

TAXONOMIC AND PHYLOGENETIC STUDIES OF HYALINE-SPORED HYPHOMYCETES

CHUANGEN LIN

DOCTOR OF PHILOSOPHY

IN

BIOSCIENCES

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ABSTRACT

Hyphomycetes is an artificial classification for a group of asexual fungi that produce conidia on mononematous or synnematous or sporodochial conidiophores. Hyaline-spored hyphomycetes are those hyphomycetes that produce hyaline conidia. In this study, a comprehensive study on hyaline-spored hyphomycetes is carried out.

In this study, a comprehensive outline for hyaline-spored hyphomycetes is provided and includes 1080 genera with 130 synonyms, which are distributed among five phyla, 26 classes, 87 orders, 204 families. At the phylum level, the dominant group of hyaline-spored hyphomycetes are *Ascomycota*, with *Sordariomycetes* being the dominant class and *Hypocreales* being the dominant order in *Ascomycota*, *Agaricomycetes* being the dominant class and *Agaricales* being the dominant order in *Basidiomycota*. For each accepted genus, notes including sexual morphs, synanamorphs, DNA sequence data and morphology are provided. The taxonomic position for 38 genera are re-organized in this study, and 22 of which were previously located in *Ascomycota* genera *incertae sedis*. DNA sequence data is one of the key points for each genus in our notes. This study represents the largest analysis of hyaline-spored hyphomycetes subjected to multi-gene phylogenetic analysis with combined LSU, SSU and *rpb2* DNA sequence data to date, which includes 754 hyaline-spored hyphomycetous genera, and recognized three phyla clades, 25 classes and class-level clades,

107 orders and order-level clades, 264 families and family-level clades. During the research, 41 taxa from 30 genera and three classes, *viz.*, *Dothideomycetes* (*Tubeufiales* 4 taxa), *Leotiomycetes* (*Helotiales* 4 taxa), and *Sordariomycetes* (*Amphisphaeriales* 6 taxa, *Chaetosphaeriales* 6 taxa, *Glomerellales* 2 taxa, *Hypocreales* 5 taxa, *Parasympodiellales* 1 taxa, *Pleurotheciales* 4 taxa, *Pseudodactylariales* 2 taxa, *Rhamphoriales* 6 taxa, *Xylariales* 1 taxa), have been illustrated based on fresh collections.

Chaetosphaeriaceae is a genus-rich, but taxonomically confused family and there is a need of more detailed studies on their asexual and sexual morphs and investigation of phylogenetic relationships to similar genera in other families. In this study, a survey of hyaline-spored chaetosphaeriaceous hyphomycetes yielded ten new taxa, including one new genus (*Multiguttulispora*) and nine new species (*Dictyochaeta brevis, D. terminaliae*, *Kionochaeta castaneae*, *K. microspora*, *Menisporopsis breviseta*, *M. dushanensis*, *Multiguttulispora sympodialis*, *Tainosphaeria aseptata* and *T. monophialidica*). In addition, *Cryptophiale udagawae* and *Dictyochaeta simplex* are described and illustrated. Support for the new taxa are provided by morphological comparison and DNA sequence data analyses. Phylogenetic analysis of SSU, ITS and LSU sequence data showed that *Kionochaeta* is polyphyletic and species are phylogenetically located in two groups (Kionochaeta 1 and Kionochaeta 2). In addition, a synopsis for *Kionochaeta* and *Menisporopsis* species, an updated phylogenetic tree and outline for *Chaetosphaeriaceae* are provided.

The conidia of *Beltrania* and beltrania-like genera are very distinctive, often being biconic, with or without a hyaline equatorial, subequatorial or supraequatorial band, and with or without swollen separating cells. The unbranched or branched conidiophores and/or setae arise from radially lobed basal cells. Four beltrania-like taxa, *viz.*, *Beltrania rhombica*, *Beltraniella fertilis*, *Beltraniopsis longiconidiophora* sp. nov., *Hemibeltrania cinnamomi* and a new monotypic *Beltrania*-like genus, *Subsessila*, with its type species *S. turbinata*, were identified during a survey of hyphomycetes in Thailand. Each species is provided with a description and a molecular analysis. The new species is introduced based on

morphological and molecular differences and compared with similar taxa. The new genus is introduced in the family *Beltraniaceae* based on phylogenetic analysis and morphological characters. *Subsessila* can be easily distinguished from other *Beltrania*-like genera by dark setae arising from radially lobed basal cells, mostly lacking macronematous conidiophores. Conidiogenous cells are ampulliform or doliiform and produce turbinate to clavate conidia with rostrate proximal end and rounded distal end. *Beltraniella fertilis* and *H. cinnamomi* are new records for Thailand.

Additionally, the genera *Castanediella*, *Fusariella* and *Pseudodactylaria* are reviewed and documented. Four new taxa, *Castanediella brevis*, *C. monoseptata*, *Fusariella curvata* and *Pseudodactylaria brevis*, are described, illustrated and compared with similar taxa. Support for the new taxa are provided by morphological comparison and multi-gene phylogenetic analyses.

Keywords: Asexual fungi, Checklist, Hyphomycetes, Phylogeny, Taxonomy

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ABBREVIATIONS AND SYMBOLS

av.	average
com.	combination
diam.	diameter
e.g.	for example
et al.	and others
hr.	hour
gen.	genus/genera
i.e.	that is
mg	milligram
min	minute
mm	millimetre
nm	nanometre
nov.	novum (Latin for new thing)
s	second
sp.	species
spp.	Species (plural)
$\bar{x}$	average
℃	degree centigrade
µm	micrometer
µl	microliter
%	percent

CHAPTER 1

INTRODUCTION

1.1 Hyphomycetes Definition

Hyphomycetes is an artificial group of asexual fungi (also called anamorphs, fungi imperfecti, imperfect fungi, conidial fungi, anamorphic fungi, mitosporic fungi) of an estimated 1500 recognizable genera (Kirk et al., 2008; Seifert et al., 2011; Ulloa & Hanlin, 2000). In some previous classifications, hyphomycetes together with another two asexual morph fungi groups, blastomycetes and coelomycetes, used to comprise the subdivision *Deuteromycotina* (Kirk et al., 2008; Seifert et al., 2011; Ulloa & Hanlin, 2000). Most of hyphomycetes are related to *Ascomycota*, while some are linked *Basidiomycota* (Hyde et al., 2011; Seifert et al., 2011; Wijayawardene et al., 2012, 2017b). Kirk et al. (2008) defined hyphomycetes as "mycelial forms which bear conidia on separate hyphae or aggregations of hyphae (as synnematous or sporodochial conidiomata) but not inside discrete conidiomata". Hyphomycetes are characterized by conidiomata are simple or synnematous or sporodochial, which are different from coelomycetes by the latter having pycnidial, pycnothyrial, acervular, cupulate or stromatic conidiomata (Li et al., 2020b; Wijayawardene et al., 2016).

In general, the most important identification characteristic for hyphomycetous fungi are stromata, setae, conidiophores, conidiogenous cells and conidia (Ellis, 1971, 1976; Seifert et al., 2011). The stromata and setae are absent in most of the hyphomycetous fungi, while they can be important characteristics to separating some hyphomycetous fungi at generic rank within some group, e.g. beltrania-like genera (Lin et al., 2017b). The stromata can be superficial or immersed, pseudoparenchymatous or prosenchymatous, erumpent or subglobose or hemispherical (Ellis, 1971, 1976; Seifert et al., 2011). The conidiophores are macronematous or micronematous, mononematous or synnematous or sporodochial,

determinate or indeterminate, scattered or crowded, simple or branched, straight or flexuous, smooth or verruculose, thin-walled or thick-walled, with various shape (Ellis, 1971, 1976; Seifert et al., 2011). The conidiogenous cells are holothallic or enterothallic or monotretic or polytretic or monophialidic or polyphialidic or monoblastic or polyblastic or basauxic, integrated or discrete, determinate or percurrent or sympodial, intercalary or terminal, with various shape (Ellis, 1971, 1976; Seifert et al., 2011). Conidia are various between genera and species. Based on conidia shape and septation, Saccardo (1884b) divided the conidia into seven categories, amerospores, didymospores, phragmospores, dictyospores, helicospores, staurospores and scolecospores. The conidia of hyphomycetes are solitary or catenate or botryose, acropleurogenous or acrogenous or pleurogenous, smooth or verruculose, aseptate or septate, with various shape (Ellis, 1971, 1976; Seifert et al., 2011).

1.2 Classification of Hyphomycetes

The research of hyphomycetes began in the middle of the 17th century after the invention of the microscope. The earliest studies on hyphomycetes were carried out by Hooke (1665), Leeuwenhock (1680), Micheli (1729). In 1665, Hooke published the first illustrations of microfungi, including anamorphic *Mucor* (Cole & Kendrick, 1981).

From the beginning of the 19th century, many mycologists studied on asexual fungi and published lots of asexual fungi in their publications, e.g., Persoon (1801), Link (1809), Martius (1817), Fries (1821–1838), Corda (1837–1845), Leveille (1846), Tulasne (1861–1865). Persoon (1801) divided fungi into two main groups on the basis of whether their fructifications were open or closed and his order Nematothecii (Fungi Byssoidei) was made up of hyphomycetes. Link (1809b) included many sporodochial hyphomycetes and acervular coelomycetes within his order *Uredinales*. Martius (1817) introduced the fungi group hyphomycetes for some asexual fungi, which Link called Mucedines, and the name hyphomycetes has been in use for 200 years. In 1821–1838, Fries published two famous monographs *Systema Mycologicum* (1821–1832) and *Epicrisis Systematis Mycologia* (1836–1838), which have great influence on the

classification of asexual fungi and *Systema Mycologicum* was chosen as the starting point for nomenclature of asexual fungi. Fries recognized six classes, *Coniomycetes*, *Hyphomycetes*, *Gasteromycetes*, *Hymenomycetes*, *Discomycetes* and *Pyrenomycetes*, which *Coniomycetes* and *Hyphomycetes* were adopted from Martius's classification. Because many asexual fungi were published with drawings and paintings in Corda's famous monographs *Icones Fungorum* (1837–1842) and *Prachtflora* (1839), he was a pioneer in the microscopic study of asexual fungi (Seifert & Gams, 2001).

By the middle of the 19th century, mycologists began to understand that hyphomycetes were asexual of *Ascomycetes* and *Basidiomycetes*. The first connection between sexual fungi and asexual fungi was described by de Bary (1854), *Aspergillus glaucus* and its *Eurotium herbariorum* sexual morph. Tulasne brothers described some connections between sexual morph and asexual morph in their *Selecta Fungorum Carpologia* (1861–1865). In the opinions of De Bary, Tulasne, Brefeld, and other mycologists, more and more connections of sexual morph – asexual morph were described, this has changed many aspects of fungal taxonomy.

Fuckel (1869) divided the fungi into two groups, *Fungi Perfecti* and *Fungi Imperfecti*. This view had a great impact on Saccardo, he accepted and developed Fuckel's opinions. In the late 19th century, he established the first truly practical and widely used classification system for asexual fungi based on fruiting body types, pigmentation and spore septation and morphology. He divided the asexual fungi by fruiting body types into two group, hyphomycetes and coelomycetes. In the volume 4 of his *Sylloge Fungorum* (1886) he divided hyphomycetes into four families—Mucedineae (mononematous, hyaline, or brightly colored), Dematieae (mononematous, darkly pigmented), Stilbeae (synnematous, light or dark), and Tuberculariеae (sporodochia, light or dark). Each family subdivided into seven group, based on conidia septation and morphology, Amerosporae, Didymosporae, Phragmosporae, Scolecosporae, Dictyosporae, Helicosporae and Staurosporae. Saccardo's classification system for asexual fungi is criticized for being artificial, does not represent the evolutionary relationships of asexual fungi, and just meant for identification purposes of asexual fungi.

In the early 20th century, ontogenetic system of asexual fungi was developed. Vuillemin (1910a, 1910b, 1911) was perhaps the first to distinguish some types of

spore forms and applied it as a stable character in taxonomy. He proposed two main kinds of conidiogenesis: conidia vera and thallospores, and four different kinds of thallospores were recognized: arthrospores, blastospores, chlamydospores, aleuriospores. Vuillemin's ideas were effectively ignored until Mason (1933), he extended the definition the term "phialide" and introduced the terms "Meristem spore", "Terminus spore" and "Radula spore".

Based on the concepts of Mason and Vuillemin, Hughes (1953) advocated the conidium ontogeny as the main character for classifying asexual fungi, and he divided asexual fungi into eight sections based on different types of conidiophore and conidiogensis:

Section I: blastic-synchronous or blastic-acropetal

Section II: blastic-sympodial

Section III: blastic-annellidic

Section IV: blastic-phialidic

Section V: thallic-meristem

Section VI: blastic-tretic (porospores)

Section VII: thallic-arthric

Section VIII: basauxic

Hughes's publication *Conidiophores, Conidia, and Classification* was an important paper on hyphomycetes taxonomy, it has influenced lots of mycologists, e.g. Subramanain (1962), Tubaki (1963), Nilsson (1964), Barron (1968), Ellis (1971, 1976), Matsushima (1971), Kendrick and Carmichael (1973), Matsushima (1975, 1980, 1982, 1983, 1985, 1987, 1989, 1993, 1995, 1996, 2003), Kirk et al. (2008), Bhat (2010), Seifert et al. (2011), and play an important role on the hyphomycetes taxonomy. Although in this paper most of his examples were drawn from hyphomycetes, the same conidiogenesis could be applied throughout the coelomycetes as well.

Some important ontogenetic systems are listed in Table 1.1.

Table 1.1 Ontogenetic systems by different authors

Hughes (1953)	Subramanian (1962)	Tubaki, 1963	Nilsson (1964)	Barron (1968)	von Arx (1981b)	Kendrick (1971) Ellis (1971)
Section IA (blastospores)				Blastosporae (with narrow hyphae)		
Section IB (solitary or botryose blastospores)		Blastosporae	Blastosporae by blastospores	Botryoblastosporae (with wider hyphae)	Blastoconidia (narrow base)	Holoblastic
Section II (terminous spores)	Torulaceae (blastospores)	Radulasporae		Sympodulosporae	Blastoconidia, sympodial proliferation	Blastic, various types with sympodial proliferation; polyblastic, polytretic
Section VIII (basauxic conidiophores)			Basauxiosporae by basauxiospores	Meristem Blastosporae		
Section III p.p. (chlamydospores)		Aleuriosporae	Aleuriosporae by aleuriospores	Annellosporae (with annellophores)	Blastoconidia with broad base; conidia in basipetal succession	Holoblastic conidia percurrent proliferation; annellides
Section III p.p. (chlamydospores)	Bactridiaceae (gangliospores)			Aleuriosporae (solitary)	Aleurioconidia or chlamydospores (broad base)	Holoblastic
Section V (meristem arthrospores)	Coniosporiaceae (Meristem arthrospores)	Aleuriosporae (Meristem aleuriospore)	Siropodosporae by siropodospores,	Meristem Arthrosporae		
Section IV (phialospores)	Tuberculariaceae (phialospores)	Phialosporae	Phialosporae by phialospores	Phialosporae	Phialoconidia (blastoconidia with a narrow base, basipetal succession)	Phialidic - Monophialidic - Polyphialidic
Section VI (porospores)	Helminthosporiaceae (porospores)	Porosporae	Porosporae by porospores	Porosporae		Tretic
Section VII (arthrospores)	Geotrichaceae (arthrospores)	Arthrosporae	Arthrosporae by arthrospores	Arthrosporae	Arthroconidia	- Arthric thallic - Solitary thallic

Sutton (1980) introduced a classification for hyphomycetes and coelomycetes based on conidiogenesis and stroma morphology at higher-rank of classes, subclasses, orders and suborders (Table 1.2).

Table 1.2 Sutton's classification for hyphomycetes and coelomycetes

	Classes	Subclasses	Orders	Suborders
Deuteromycotina	Thallodeuteromycetes	Holothallomycetidae	Thallales	Thallohyphineae Thallopycnidiineae Thallopycnothyriineae Thallostromatineae
		Enterothallomycetidae	Enterothallales	Enterothalllineae
	Blastodeuteromycetes	Holoblastomycetidae	Blastales	Blastohyphineae Blastopycnidiineae Blastopycnothyriineae Blastostromatineae
		Enteroblastomycetedae	Phialidales	Phialohyphineae Phialopycnidiineae Phialopycnothyriineae Phialostromatineae
			Tretales	Tretohyphineae

1.3 Biology of Hyphomycetes

1.3.1 Hyphomycetous Fungi in the Environment

Hyphomycetous fungi are ubiquitous in the nature. They can be found in almost all kinds of materials and ecosystems, including plant tissues, wood and bark, lichens, dung, soil, freshwater, marine waters, insects, human being and other arthropods, vertebrates, as well as parasitic on other fungi (Bärlocher, 1992; Cai et al., 2006; de Hoog et al., 2000; Ellis, 1971, 1976; Lu et al., 2018b; Luo et al., 2019; Seifert et al., 2011). Based on their ecosystem functions, Kavanagh (2018) divided fungi into three groups: symbiotic fungi, saprobic fungi, parasitic fungi. Many fungi, especially saprobic fungi, play the role of decomposers in ecosystems, breaking down and recycling nutrients from dead plants, animals and other organisms.

1.3.2 Fungal Pathogens of Plants

Many hyphomycetous fungi are important plant pathogens causing significant losses and threats worldwide (Table 1.3). Fusarium wilt (Panama disease) of bananas and other *Musa* species induced by *Fusarium oxysporum* f. sp. *cubense* (E.F. Sm.) W.C. Snyder & H.N. Hansen is one of the most important and destructive globally disease of banana which causes serious losses worldwide and affect productivity and sustainable production (Bubici et al., 2019; Dean et al., 2012; Dita et al., 2018; Ghag

et al., 2015; Ma et al., 2010; Maryani et al., 2019; Maymon et al., 2020; Pegg et al., 1996; Ploetz, 2015). Great economic losses have been caused in Australia, China, Indonesia, Malaysia, Philippines and other countries (Bubici et al., 2019; Maryani et al., 2019; Ploetz, 2015). Verticillium wilt caused by *Verticillium* species, *V. dahliae* and *V. albo-atrum* are the two most infamous species, is also a devastating fungal disease of plant that causes billions of dollars in agricultural losses globally each year (Barbara & Clewes, 2003; Inderbitzin et al., 2011; Pegg & Brady, 2002).

Table 1.3 Plants diseases caused by hyphomycetous fungi

Fungi	Host	Disease	References
Pyricularia oryzae	Rice (*Oryza sativa*)	Rice blast disease	(Dean et al., 2012)
Alternaria alternata = *Alternaria tenuis*	Potato, tea (Camellia sinensis)	Brown spot, black spot, black pit, fruit rot, leaf blight	(Gat et al., 2012; Golmohammadi et al., 2006; Huang et al., 2015; Latinovic et al., 2014; van der Waals et al., 2011)
Alternaria solani	Potato, tomato, pepper	Early blight leaf spots, stem lesions, fruit rot	(Chaerani & Voorrips, 2006)
Aspergillus sydowii	Coral species (sea fan (Gorgonia ventalina))	Sea-fan aspergillosis	(Geiser et al., 1998; Toledo-Hernández et al., 2008)
Botrytis cinerea	Host diverse (e.g., wine grapes)	Grey rot, noble rot, leaf spots and blight Gray mold	(Williamson et al., 2007)
Colletotrichum coccodes = *Colletotrichum atramentarium*	Host diverse (e.g., onion, potato, tomato)	Anthracnose, black dot	(Ben-Daniel et al., 2009; Dean et al., 2012; Lees & Hilton, 2003)
Fusarium graminearum	All cereal species	Fusarium head blight	(Obanor et al., 2013)
Fusarium oxysporum	Host diverse (melon, tomato, cotton and banana)	Vascular wilt	(O'Neill et al., 2004; Smith et al., 2001)

1.3.3 Fungal Infections of Humans and Animals

It is well known that many fungi are humans and animals pathogens (Table 1.4). In the past few years, more than one billion people have been suffering from fungal diseases, which have caused more than 1.6 million deaths each year (Almeida et al., 2019). Some hyphomycetous fungi (*Acremonium*, *Aspergillus*, *Beauveria*, *Fusarium*, *Gliomastix*, *Paecilomyces*, *Penicillium*, *Pseudallescheria*, *Purpureocillium*,

Sarocladium, *Scedosporium*, *Scopulariopsis*, *Sporothrix* and *Trichoderma*) have played an unenviable role in humans and animals health (Boucher & Patterson, 2015; Hospenthal, 2015; Kauffman, 2015). As hyphomycetous fungi can be readily found in indoor and outdoor environment, fungal disease is widely believed to pop up everywhere, and this is a huge health threat to humans and animals. Hyphomycetous fungi can cause a variety of human and animal diseases, including allergies, asthma, bloodstream infections, lung infections, nails infections, skin infections, etc. Aspergillosis is a common fungal disease caused by the fungi *Aspergillus* spp., including: aspergilloma, cutaneous infection, disseminated disease, endophthalmitis, otomycosis, pulmonary, sinusitis (Boucher & Patterson, 2015).

Table 1.4 Humans and animals diseases caused by hyphomycetous fungi

Fungi	Host	Disease	References
Aspergillus spp.	Animals	Aspergillosis, onychomycosis, and keratomycosis	(Barnes & Marr, 2006; Boucher & Patterson, 2015; de Hoog et al., 2000; Latgé, 1999)
Coccidioides sp.	Human	Coccidioidomycosis (Valley Fever)	(Johnson & Heidari, 2015)
Fusarium spp.	Human	disseminated infections, superficial and local infections	(Hospenthal, 2015; Schroers et al., 2016)
Geomyces destructans	Bat spp. (little brown bats, *Myotis lucifugus*)		(Blehert et al., 2009)
Paracoccidioides sp.	Human	Paracoccidioidomycosis	(Restrepo et al., 2015)

1.3.4 Chemical and Pharmaceutical Commodities Derived From Hyphomycetous Fungi

Fungi have been bred to generate a variety of useful items (Table 1.5). The products that are useful to human beings produced by fungi include antibiotics, enzymes, fungicides, hormones, medicinal chemicals, plant growth regulators, proteins, and vitamins are among the products produced by fungi that are beneficial to humans (Kavanagh, 2018). With the advancement of biotechnology, this list will undoubtedly expand in the future.

Table 1.5 Economic importance fungal products from hyphomycetous fungi

Product	Typical examples	Fungal taxa
Enzymes	Amylase	*Aspergillus niger*
	Cellulase	*Trichoderma longibrachiatum*
Organic acid	Citric acid	*Aspergillus niger*
Antibiotics	Penicillin	*Penicillium chrysogenum*
Antifungal	Griseofulvin	*Penicillium griseofulvum*
antibacterial	Fusidin	*Fusidium coccineum*
Immunosuppressant	Cyclosporin	*Trichoderma polysporum*
	Cephalosporin	*Cephalosporium acremonium*
Pharmaceuticals	Lovastatin	*Monascus ruber*
	Cyclosporin	*Tolypocladium inflatum*
Research - anti-actin agents	Cytochalasins	*Helminthosporium dermatoideum*
Recombinant proteins	Phytase	*Aspergillus niger*

1.3.5 Ecological Importance

Hyphomycetous fungi, because of their rapid growth and manufacture of lots of spores, play important functional roles in all ecosystems. Fungi, as important decomposers, are ubiquitous in the natural environment and have the ability to digest cellulose, chitin, glycogen, hemicellulose, pectins and starch in nature (Moore et al., 2011). Luo et al. (2019) demonstrated that freshwater fungi play a significant role in the nutrient and carbon cycling of woody debris in freshwater ecosystems through their capacity and dominance to breakdown lignocellulose in woody litter, softening the wood and releasing nutrients. *Trichoderma reesei* and *T. koningii* are typical

examples of how fungi decompose cellulose of woody material in nature (Bégum & Lemaire, 1996).

1.4 The Sexual Morphs of Hyphomycetes

The typical life cycle of fungi is divided into two stages, sexual stage and asexual stage. Hyphomycetous fungi is one of the asexual fungi groups, another two are blastomycetes and coelomycetes. In traditional classifications, these asexual fungi that no sexual stage is known had been placed in a separate group, variously called Deuteromycetes, Deuteromycotina or Deuteromycota. More and more sexual-asexual connections have been studied (Table 1.6). In fact, it is difficult to link sexual fungi and asexual fungi, result in only few hyphomycetous fungi have been linked to their sexual stage, that is, more studies are needed in this area in the future to meet the "one fungus one name" concept.

Table 1.6 Sexual-asexual connections of some hyphomycetous fungi

Sexual morphs	Asexual morphs	References
Ceratobasidium	*Rhizoctonia* spp.	(González, 2013)
Classicula	*Naiadella*	(Toome et al., 2013)
Emericella	*Aspergillus*	(Seifert et al., 2011)
Eurotium	*Aspergillus*	(Seifert et al., 2011)
Glomerella	*Colletotrichum*	(Cannon et al., 2012)
Hypocrea	*Trichoderma*	(Zachow & Berg, 2014)
Gibberella	*Fusarium*	(Seifert et al., 2011)
Lanzia	*Chalara*	(Seifert et al., 2011)
Lasionectria	*Acremonium*	(Seifert et al., 2011)
Melanconiella	*melanconium*-like	(Voglmayr et al., 2012)
Mollisia	*Phialocephala*	(Day et al., 2012b)
Neonectria	*Cylindrocarpon*	(Hirooka et al., 2012a)
Peroneutypa	*Graphium*	(Seifert et al., 2011)
Talaromyces	*Geosmithia*, *Merimbla*, *Paecilomyces*, *Penicillium*	(Yilmaz et al., 2014)
Thanatephorus cucumeris	*Rhizoctonia solani*	(Gonzalez et al., 2012)
Trichomonascus	*Blastobotrys*	(Daniel et al., 2014)

1.5 One Fungus, One Name

With the influence of molecular techniques, especially the phylogenetic analyses of DNA sequences, the fungi classification was changed from dual nomenclature system to single nomenclature system. The asexual state of a fungus may now be linked to its sexual state according to DNA sequence analysis.

The principle "one fungus, one name", one of the most recent concepts for sexual and asexual fungi, was incorporated in the International Code of Nomenclature (ICN; Melbourne Code) for algae, fungi, and plants which was issued during XVIII International Botanical Congress (Melbourne, Australia in July 2011) (Hawksworth, 2011; Taylor, 2011). Under the influence of "one fungus, one name", independent naming of sexual and asexual morphes of the same fungus was not authorized after 1 January 2013; instead, one fungus can only have one name (Hawksworth, 2011; Taylor, 2011).

With the influence of "one fungus, one name", many publications contributed to meet this concept in *Ascomycota* (de Beer et al., 2013; Healy et al., 2016; Johnston et al., 2014; Kepler et al., 2017; Quandt et al., 2014; Réblová et al., 2016a; Rossman et al., 2013, 2015a, 2015b, 2016; Stadler et al., 2013; Wijayawardene et al., 2014; Zhang et al., 2016a) and *Basidiomycota* (Aime et al., 2018; Stalpers et al., 2021).

1.6 Research Gaps of Hyaline-spored Hyphomycetes

1.6.1 The lack of a monograph or database on hyaline-spored hyphomycetes hampered identification of hyaline-spored hyphomycetous fungi.

1.6.2 Numerous new taxa of hyaline-spored hyphomycetes waiting to be collected, described and illustrated.

1.6.3 Many hyaline-spored hyphomycetous genera require reassessment of their taxonomic position. There are 288 hyaline-spored hyphomycetous genera still located in Ascomycota genera incertae sedis.

1.6.4 Many hyaline-spored hyphomycetous genera are still waiting for molecular data. Fresh collections and sequence data of these genera are required to

determine their phylogenetic position and evolution relationships in natural classification system.

1.7 Research objectives

1.7.1 To document morphology and taxonomy of hyaline-spored hyphomycetes from China, Thailand and Italy.

1.7.2 To carry out phylogenetic studies on the unresolved groups (e.g., *Beltrania*-complex) and contribute to the understanding of the natural classification of the hyaline-spored hyphomycetes.

1.7.3 To revise the families *Beltraniaceae* and *Stachybotriaceae* (Sordariomycetes).

1.7.4 To study the sexual morph – asexual morph connections of hyaline-spored hyphomycetes.

1.7.5 To provide a phylogeny tree for hyaline-spore hyphomycetes.

1.8 Research Contents

This thesis contains five chapters:

Chapter 1 comprises the general introduction of hyphomycetes.

Chapter 2 provides a comprehensive outline for hyaline-spored hyphomycetes. Totally, the outline for hyaline-spored hyphomycetes provided in this study includes 1081 genera with 130 synonyms. For each accepted genus, notes including sexual morphs, synanamorphs, DNA sequence data, morphology are provided. New taxa are introduced based on morphologic and phylogenetic analyses.

Chapter 3 document morphology, taxonomy and phylogeny of hyaline-spored chaetosphaeriaceous hyphomycetes from Thailand and China, with a review of the family Chaetosphaeriaceae. New taxa are introduced based on morphologic and phylogenetic analyses.

Chapter 4 document morphology, taxonomy and phylogeny of *Beltrania*-like taxa from Thailand. New taxa are introduced based on morphologic and phylogenetic analyses.

Chapter 5 provides the conclusions for this study.

CHAPTER 2

NOTES, OUTLINE AND PHYLOGENY OF HYALINE-SPORED HYPHOMYCETES

This chapter is extracted from the following publications Lin et al. (2016a, 2018, 2019a), Lin et al. (in press).

2.1 Introduction

Hyaline-spored hyphomycetes are those asexual fungi that produce hyaline conidia on mononematous or synnematous or sporodochial conidiophores, e.g., *Acremonium* Link, *Aspergillus* P. Micheli, *Fusarium* Link, *Penicillium* Link and *Trichoderma* Pers. They are geographically widespread and found in diverse ecological niches. They are commonly found on plant tissues, wood and bark, lichens, dung, soil, freshwater, marine waters, insects and other arthropods, vertebrates, as well as parasitic on other fungi.

2.2 Material and Methods

2.2.1 Collection and Isolation of Fungi

Materials (stem, wood, and leaves) from a variety of plants were collected from Thailand, China and Italy. Samples were taken to the laboratory in Zip-lock plastic bags for examination. The specimens were incubated in sterile moist chambers and examined using a Motic SMZ 168 series microscope. Fungi were removed with a needle and placed in a drop of distilled water on a slide for morphological study. Photomicrographs of fungal structures were captured using a Nikon ECLIPSE 80i compound microscope with a Canon 450D digital camera. All measurements were

made by the Tarosoft (R) Image FrameWork program. Photo-plates were made with Adobe Photoshop CS6 Extended version 13.0.1 (Adobe Systems, USA). Isolation onto potato dextrose agar (PDA) or malt extract agar (MEA) were performed by the single spore isolation method (Chomnunti et al., 2014; Dai et al., 2017). The herbarium material were deposited in the Herbarium of Mae Fah Luang University (MFLU), Chiang Rai, Thailand and herbarium of Kunming Institute of Botany, Chinese Academy of Sciences (HKAS), Kunming, China. Cultures were deposited at Mae Fah Luang University Culture Collection (MFLUCC), Chiang Rai, Thailand and Kunming Institute of Botany, Chinese Academy of Sciences (KUMCC), Kunming, China. Faces of Fungi and Index Fungorum numbers were registered (Index Fungorum, 2017; Jayasiri et al., 2015).

2.2.2 DNA Extraction, PCR Amplification and Sequencing

Genomic DNA were extracted from fungal mycelium grown on potato dextrose agar (PDA) or malt extract agar (MEA) at room temperature with the Fungal gDNA Kit (BioMIGA, USA) according to the manufacturer's instructions. The internal transcribed spacer region of ribosomal DNA (ITS), small subunit nuclear ribosomal DNA (SSU), large subunit nuclear ribosomal DNA (LSU), RNA polymerase II second largest subunit (*rpb2*), the translation elongation factor-1 alpha (*tef1*) genes were amplified via polymerase chain reaction (PCR) using the following primers (Table 2.1): ITS5 and ITS4 (White et al., 1990) for ITS, NS1 and NS4 (White et al., 1990) for SSU, LROR and LR5 (Vilgalys & Hester, 1990) for LSU, fRPB2-5F and fRPB2-7cR (Liu et al., 1999) for *rpb2*, and EF1-983F and EF1-2218R or EF1-728F and EF1-986R (Rehner, 2001) for *tef1*. The PCR products were sequenced with the same primers.

Table 2.1 Genes and primers used in this study

Gene	Gene name	Primer name	Primer sequence	Direction	Reference
ITS	Internal transcribed spacer regions (ITS1-5.8S-lTS2)	ITS1	TCCGTAGGTGAACCTGCGG	F	(White et al., 1990)
		ITS4	TCCTCCGCTTATTGATATGC	R	(White et al., 1990)
		ITS5	GGAAGTAAAAGTCGTAACAAGG	F	(White et al., 1990)
LSU	Large subunit nuclear ribosomal DNA	LR0R	GTACCCGCTGAACTTAAGC	R	(Rehner & Samuels, 1994)
		LR5	ATCCTGAGGGAAACTTC	F	(Vilgalys & Hester, 1990)
SSU	Small subunit nuclear ribosomal DNA	NS1	GTAGTCATATGCTTGTCTC	F	(White et al., 1990)
		NS4	CTTCCGTCAATTCCTTTAAG	R	(White et al., 1990)
tef1	The translation elongation factor-1 alpha	EF1-728F	CATCGAGAAGTTCGAGAAGG	F	(Carbone & Kohn, 1999)
		EF1-986R	TACTTGAAGGAACCCTTACC	R	(Carbone & Kohn, 1999)
		TEF-983F	GCYCCYGGHCAYCGTGAYTTYAT	F	(Rehner, 2001)
		TEF-2218R	ATGACACCRACRGCRACRGTYTG	R	(Rehner, 2001)
rpb2	RNA polymerase II second largest subunit	fRPB2-5F	GAYGAYMGWGATCAYTTYGG	F	(Liu et al., 1999)
		fRPB2-7cR	CCCATRGCTTGTYYRCCCAT	R	(Liu et al., 1999)

The PCR amplification were performed in a 25 µl reaction volume containing 12.5 µL of 2 × Power Taq PCR MasterMix (a premix and ready to use solution, including 0.1 Units/µl Taq DNA Polymerase, 500 µM dNTP Mixture each (dATP, dCTP, dGTP, dTTP), 20 mM Tris–HCl pH 8.3, 100 Mm KCl, 3 mM $MgCl_2$, stabilizer and enhancer), 1 µL of each primer (10 µM), 1 µL genomic DNA extract and 9.5 µL deionised water. The PCR thermal cycle program of ITS, SSU, LSU and *tef1* were followed as initially 94 °C for 3 min., followed by 40 cycles of denaturation at 94 °C

for 45 s, annealing at 56 °C for 50 s, elongation at 72 °C for 1 min., and final extension at 72 °C for 10 min. The PCR thermal cycle program of *rpb2* were followed as initially 95 °C for 5 min., followed by 40 cycles of denaturation at 95 °C for 1 min, annealing at 55 °C for 2 min, elongation at 72 °C for 90 s, and final extension at 72 °C for 10 min.

2.2.3 Phylogenetic Analyses

Original sequences were checked using BioEdit version 7.0.5.3 (Hall, 1999), and most reference sequences were originated from previous publications. The remaining homogenous sequences were obtained by BLAST searches (Altschul et al., 1990) from GenBank. All sequences used in this study are listed in Table 2.2. Alignments for each locus were done in MAFFT v7.307 online version (Katoh & Standley, 2016) and manually verified in MEGA 6.06 (Tamura et al., 2013). After alignment, the concatenation of different genes was done in SequenceMatrix 1.8 (Vaidya et al., 2011). The interleaved NEXUS files for Bayesian inference analyses were formatted with AliView v1.19-beta1k (Larsson, 2014). Maximum likelihood (ML) and Bayesian inference (BI) were used for phylogenetic analyses.

The best models of evolution for each gene region were determined using Akaike information criterion (AIC) as implemented in MrModeltest v2 (Nylander, 2004). The analyses' results showed that the models GTR+I+G were the best ones for LSU, SSU and *rpb2* sequence data, respectively.

ML analyses were carried out in raxmlGUI v 1.5b1 (Silvestro & Michalak, 2012) with RAxML v8.2.10 (Stamatakis, 2014), using the ML + rapid bootstrap setting and the GTRGAMMAI (viz., GTR + GAMMA + I) substitution model with 1000 bootstrap replicates. ML analyses were also carried out in IQ-Tree 2.1.3 and set as "iqtree2.exe -s LSUSSURPB2ML.phy -p LSUSSURPB2_partition.txt -m MFP -B 1000 -alrt 1000 -bnni -T AUTO".

For BI analysis, Posterior probabilities (PP) (Rannala & Yang, 1996; Zhaxybayeva & Gogarten, 2002) were determined by Markov Chain Monte Carlo sampling (BMCMC) in MrBayes v 3.2.6 (Ronquist et al., 2012). For the combined dataset, the models were set to nst = 6 and rates = invgamma for LSU, SSU and *rpb2*. Two independent analyses of two parallel runs and six simultaneous Markov chains

were run for 1,000,000,000 generations, trees were sampled every 1000th generation and the temperature value of the heated chains was set at 0.15. The first 25% sampled trees of each run were discarded as "burn-in", and the remaining trees were used for calculating posterior probabilities (PP) in the majority rule consensus tree with the sumt command in MrBayes.

Phylogenetic trees were drawn with TreeView 1.6.6 (Page, 1996) or FigTree v1.4.3 (Rambaut, 2017). Support values from different analyses were merged by using TreeGraph 2.15.0-887 beta.

Table 2.2 GenBank accession numbers of isolates used in this study

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Abieticola koreana	EML-F0010-1	T	JQ014618	JN977612	-	KP792128
Abieticola koreana	EML-F0010-2		KP835546	KP835547	-	KP792129
Abortiporus biennis	CBS 148.40		MH867559	MH856071	-	-
Abortiporus biennis	CBS 676.70; ATCC 18241		MH871686	MH859896	-	-
Abortiporus biennis	FD-319		KP135195	KP135300	-	KP134893
Acanthohelicospora pinicola	MFLUCC 10-0116	T	KF301534	KF301526	-	-
Acaromyces ingoldii	CBS 110050	T	NG_058540	NR_073342	NG_061199	KP323078
Achroiostachys humicola	CBS 868.73	T	NG_069333	NR_145065	-	KU845837
Acidea extrema	CBS 136258; CCF 4345	T	JX124323	JX124323	JX124323	-
Acidiella bohemica	CBS 132720; CCF 4123		MH878115	JQ172754	JQ172754	KF902178
Acidiella bohemica	CBS 132721; CCF 4119	T	MH878116	JQ172752	JQ172752	-
Acidiella uranophila	RA2-15-H-a		MN519396	-	-	-
Acidiella uranophila	T2; CBS 136962	T	KF857170	JQ904602	KF857169	-
Acidotalaromyces lignorum	CBS 709.68	T	MT365213	JF910285	-	MN969215
Acidothrix acidophila	CBS 136259; CCF 3799	T	MH877622	NR_164513	-	-
Acidothrix acidophila	MH566		FJ430780	FJ430780	FJ430780	-
Acremoniopsis suttonii	CBS 138708; FMR 11780	T	NG_057045	NR_145059	-	-
Acremonium alternatum	CBS 407.66	T	NG_056977	NR_144913	-	-
Acrodontium crateriforme	ATCC 15679; CBS 144.33; MUCL 15748; MUCL 8978	T	NG_057108	NR_152320	-	KX288399
Acrophialophora nainiana	CBS 100.60; ATCC 22555; IMI 076567; LSHB BB399; UAMH 10774	T	KM995865	NR_157439	NG_061193	-
Acrospeira mirabilis	UAMH 12078		MN061697	MN061697	-	-
Acrospermum longisporium	MFLU 17-2849	T	NG_064506	-	NG_065734	-
Acrostalagmus annulatus	DAOM 212126		GU180646	GU180632	GU180611	GU180662
Actinostilbe sp.	CBS 134532		MN017107	MN017110	-	-
Aegerita torulosa	CBS 107.59		MH869363	-	-	-
Aegeritella tuberculata	WA51216		KT380846	KT259307	KT380845	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Akanthomyces muscarius	CBS 143.62; IMI 068689; ATCC 28300; MUCL 9713	T	NG_058106	NR_111096	NG_063028	KM283863
Alatosessilispora bibrachiata	NBRC 31820	T	LC146719	LC146719	-	-
Albifimbria verrucaria	CBS 328.52; CBS 253.47; IMI 045541; MUCL 19018; NRRL 2003; ATCC 9095; QM 460	T	NG_068982	NR_153550	NG_061023	KU845931
Alfaria cyperi-esculenti	CPC 23153	T	KJ869200	KJ869143	-	-
Alfaria ossiformis	CBS 324.54; IMI 055309; MUCL 11831; QM 7979; BCC 38221	T	KU845993	KU845984	-	KU846002
Alfariacladiella spartii	CPC 24966	T	NG_070399	NR_164243	-	-
Aliquandostipite khaoyaiensis	CBS 118232	T	GU301796	AF201728	AF201453	-
Alternaria breviramosa	CBS 121331	T	KC584318	FJ839608	KC584574	KC584442
Alternaria cetera	CBS 121340; EGS 41.072	T	KC584317	JN383482	KC584573	KC584441
Alternaria obclavata	CBS 124120; EGS 12.128	T	FJ839651	KC584225	KC584575	KC584443
Alternariaster centaureae-diffusae	MFLUCC 14-0992		KT454715	KT454723	KT454730	-
Amblyosporium botrytis	CBS 798.71		MH872109	MH860361	-	-
Amblyosporium spongiosum	CBS 108.48		MH867827	MH856291	-	-
Amblyosporium spongiosum	CBS 331.67		MH870681	-	-	-
Ambrosiella xylebori	CBS 110.61; AFTOL ID 1285	T	NG_056955	NR_144921	NG_062695	-
Amniculicola immersa	CBS 123083	T	NG_056964	-	NG_062796	GU456358
Amniculicola lignicola	CBS 123094	T	NG_067455	NR_159633	-	-
Amniculicola parva	CBS 123092	T	NG_056970	MH863272	NG_016504	-
Amorphotheca resinae	ATCC 200942	T	NG_056951	NR_119450	-	-
Amorphotheca resinae	ATCC 22711		EU030280	EU030278	"genome"	"genome"
Amphichorda cavernicola	CGMCC 3.19571	T	MK328961	MK329056	-	-
Amphichorda guana	CGMCC 3.17908	T	KU746711	KU746665	-	-
Amplistroma carolinianum	BEO9923		FJ532377	-	-	-
Anacraspedodidymum submersum	YMF1.4176	T	MK165443	MK165445	MK165441	-
Anhellia nectandrae	VIC 31767	T	NG_042604	NR_111700	-	-
Anthocanalis sparti	MFLUCC 14-0557	T	KP340537	KP297395	-	KP340523
Anthocanalis sparti	MFLUCC 14-0010	T	KP340536	KP297394	-	KP340522
Anthopsis deltoidea	CBS 263.77; CMT 1111.74	T	NG_057113	NR_153555	-	-
Antidactylaria minifimbriata	YMF1.04578	T	MK577808	MK569506	MK577793	MK577823
Anungitea eucalyptigena	CPC 28762	T	NG_057129	NR_164411	-	-
Anungitiomyces stellenboschiensis	CPC 34726	T	NG_067874	NR_165551	-	-
Aotearoamyces nothofagi	ICMP 21969		MG807387	KM677201	MG807391	-
Aotearoamyces nothofagi	ICMP 21968		MG807386	KM677202	MG807390	-
Aotearoamyces nothofagi	PDD 106298		MG807388	MG807392	MG807389	-
Aphanoascella galapagosensis	CBS 132345; FMR12019; UTHSC 11-1518	T	JQ864082	JQ864081	-	-
Aphanocladium album	CBS 127119		MH875864	MH864426	-	-
Aphanophora eugeniae	CBS 124105	T	NG_056965	NR_132829	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Apseudocercosporella trigonotidis	CBS 131890; CPC 10864	T	NG_069100	NR_153512	-	KX288414
Aquanectria penicillioides	CBS 257.54; ATCC 16261	T	KM231613	KM231743	-	KM232299
Aquaphila albicans	MFLUCC 16-0010		KX454166	KX454165	-	MF535255
Aquapteridospora bambusinum	MFLUCC 12-0850	T	NG_070397	NR_154342	-	-
Aquapteridospora lignicola	MFLUCC 15-0377; GZCC 15-0051	T	KU221018	MZ868774	-	MZ892986
Arachnomyces glareosus	CBS 116129	T	FJ358273	-	FJ358341	-
Arachnopeziza aurelia	CBS 127675		MH876056	MH864618	-	-
Arboricolonus simplex	CBS 145520; GLMC 459; DSM 109147	T	NG_073755	NR_170762	-	-
Arbusculina fragmentans	CCM F-13486	T	NG_057024	NR_153520	-	-
Areotheca ambigua	CBS 215.60		AY999114	AY999137	-	-
Areotheca areolata	UAMH 7495		AY587936	AY587911	-	AY600275
Argopericonia indirae	GUFCC 18018		KY977982	KY977981	-	-
Arthonia anglica	Ertz 7775 (BR)		EU704084	-	-	-
Arthonia dispersa	UPSC2583		AY571381	-	AY571379	-
Arthrobotrys botryosporus	CBS 321.83	T	NG_064130	NR_159626	-	-
Arthroderma ciferrii	CBS 272.66	T	NG_057027	NR_144888	NG_062604	HF937394
Arthroderma curreyi	CBS 138.26		AY176726	KT155805	AJ315165	-
Arthrographis arxii	CBS 203.78	T	AB213426	GQ272638	-	-
Arthrographis grakistii	CBS 145530	T	NG_068348	NR_165934	-	-
Arthrographis kalrae	CBS 693.77	T	NG_056932	NR_126108	-	-
Arthrophiala arthrospora	COAD 658	T	NG_057112	KY173473	-	-
Articulospora tetracladia	CBS 106.46		MH878240	KP234371	-	-
Arxiella dolichandrae	CBS 138853; CPC 22951	T	NG_057053	NR_137930	-	MK492710
Arxiella terrestris	CBS 268.65; ATCC 18128; MUCL 8203; PRE 43090	T	MH870201	MH858565	-	-
Arxotrichum wyomingense	CCF 5691	T	LT968143	LT968153	-	-
Ascocoryne sarcoides	OSC 100772; AFTOL ID 1834		FJ176886	-	FJ176830	FJ238369
Ascospirella lutea	CBS 348.51	T	MH868414	MN431414	-	JF417429
Aspergillus glaucus	ATCC 16469; WB 116; CBS 516.65; IMI 211383; NRRL 116	T	NG_068980	NR_135337	NG_063391	EF651934
Athelia arachnoidea	CBS 418.72		GU187557	GU187504	GU187616	GU187769
Atractium crassum	CBS 180.31; NRRL 20894	T	U88110	KM231790	-	HQ897722
Aurantioporthe corni	CBS 245.90; AR2814; ATCC 66834		MN172371	MN172403	AF277119	MN271784
Aureobasidium pullulans	CBS 584.75	T	NG_055734	NR_144909	NG_062753	KT693976
Aureovirgo volantis	CMW 41238; CBS 139648	T	KR051131	NR_153530	-	-
Bagadiella lunata	CBS 124762; CPC 13655	T	NG_058637	NR_132832	-	-
Bahusutrabeeja dwaya	CBS 261.77	T	OL654135	NR_164285	-	-
Barrenia panicia	WSF1R37	T	KT598380	NR_164236	NG_065709	-
Barrenia taeda	WSF14P22	T	KT598383	NR_164237	NG_065710	-
Bartheletia paradoxa	NN46: 196-1		MW404634	-	MW404638	-
Basidiopycnis hyalina	FO44664	T	DQ363322	DQ198779	NG_061044	-
Basifimbria spinosa	CBS 499.85; MUCL 20173	T	MH873589	MH861900	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Beauveria caledonica	ARSEF 2567	T	NG_058620	HQ880817	NG_064865	HQ880961
Beauveriphora sporotricis	CBS 116.84; MFC 1814	T	MH873415	MH861704	-	-
Beltrania pseudorhombica	CBS 138003	T	NG_058667	NR_148074	-	MH555032
Beltraniella endiandrae	CBS 137976; CPC 22193	T	KJ869185	KJ869128	-	-
Beltraniopsis longiconidiophora	MFLUCC 17-2139	T	MF580256	MF580249	-	-
Berkeleyomyces basicola	CMW 49352; CBS 142796	T	MF948659	MF952429	-	MF967183
Bifusisporella sorghi	URM 7442	T	MK060153	MK060155	-	-
Bisifusarium dimerum	CBS 108944; NRRL 36140	T	JQ434514	JQ434586	-	KM232363
Bjerkandera adusta	CBS 687.93; CCRC 32451	T	MH874100	MH862453	-	-
Bjerkandera adusta	HHB-12826-Sp		KP135198	KP134983	-	KP134913
Blackwellomyces cardinalis	CBS 113411	T	MH874496	NR_159788	NG_013131	-
Blastobotrys chiropterorum	CBS 6064; ATCC 22291; CCRC 22391; DBVPG 6014; IFO 10271; JCM 9597; NRRL Y-17071	T	NG_055412	NR_153637	NG_063421	-
Blastobotrys indianensis	CBS 9600; NRRL YEAST YB-1950	T	NG_055333	NR_153638	-	-
Blastobotrys niveus	NRRL Y-17581; ATCC 18420; CBS 163.67; HFM 26; UAMH 4663; MUCL 6078; WM 07.17	T	NG_066351	OL772662	-	EU343891
Blastomyces dermatitidis	CBS 674.68; ATCC 18188; UAMH 3539; IHEM 3783,RV 24701	T	KT155307	KT155962	-	KY711017
Blastomyces gilchristii	CBS 134223; PHO TB00018/2005	T	NG_070024	NR_157449	-	-
Blastophorella smithii	CBS 139.49		MH868005	MH856466	-	-
Blastophorum aquaticum	MFLUCC 15-0264	T	NG_066172	NR_153629	-	-
Blastosporium persicolor	YMF1.05546	T	MH992517	NR_163764	NG_065765	-
Blistum tomentosum	AFSEF 5353		AY259545	-	-	-
Bloxamia cyatheicola	VIC 42563	T	NG_058691	NR_153617	NG_065079	-
Botryobasidium conspersum	AFTOL-ID 1766; PBM 2747 (CUW)		DQ521414	DQ911612	DQ521415	-
Botryobasidium robustius	CBS 945.69		MH871272	MH859491	-	-
Botryobasidium curtisii	KHL 12950		EU118629	EU118629	-	-
Botryoderma lateritium	CBS 586.66		MK919287	MH858889	-	MK919343
Botryoderma rostratum	CBS 184.68		MH870817	MH859104	-	MK919344
Botryosporium diffusum	CBS 142.49; JCM 11450		MH868006	-	-	-
Botryotrichum domesticum	UAMH 11929	T	NG_068583	NR_169944	NG_070117	MH899171
Botrytis byssoidea	CBS 104.23; MUCL 94; VKM F-83	T	NG_069610	NR_159599	-	AJ745670
Brachiosphaera tropicalis	SS2523		JN819284	FJ887923	JN819287	-
Brachiosphaera tropicalis	E192-1		EF175653	-	GU266223	-
Brachyalara straminea	CBS 622.82	T	HQ609475	-	HQ609482	-
Brefeldochium pruinosum maybe new is	CBS 111544		MH874458	AY775053	-	-
Bretziella fagacearum	CBS 138363; CMW 2656	T	KM495341	KU042044	-	-
Brevicellicium exile	MA-Fungi 26554		HE963778	HE963777	-	-
Brevistachys variabilis	CBS 141057; CPC 17349	T	KU846066	KU846047	-	KU846076

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Brocchiosphaera brocchiata	NBRC 30048	T	LC331736	LC332953	-	LC333313
Brocchiosphaera bulbiformis	NBRC 109748	T	NG_073609	NR_171935	-	LC333362
Brunneiperidium gracilentum	MFLUCC 14-0011	T	KP340542	KP297400	-	KP340528
Brunneochlamydosporium nepalense	CBS 971.72	T	NG_067402	NR_157414	-	LR026112
Brycekendrickomyces acaciae	CBS 124104	T	NG_058633	NR_132828	-	-
Budhanggurabania cynodonticola	BRIP 59305	T	NG_058678	NR_137952	KP162130	-
Bulbillomyces farinosus	NH 9933 (GB)		DQ681201	DQ681201	-	-
Bulbomicroidium bauhiniicola	MUMH 6844	T	LC222311	LC222311	-	-
Bullanockia australis	CPC 28976; CBS 142093	T	KY173506	KY173415	-	-
Cadophora bubakii	CBS 198.30	T	MH866559	NR_170736	-	-
Cadophora gregata	CBS 132.51; ATCC 11073; DSM 3716; MUCL 9703; UAMH 11045	T	NG_067355	NR_159767	NG_065712	-
Cairneyella variabilis	CSIRO, FRR 6070	T	"genome"	KF836358	"genome"	"genome"
Calcarisporiella sp.	NBRC 105922; NUH 037		AB617740	AB617740	AB597203	-
Calcarisporiella thermophila	CBS 279.70; ATCC 22718; IMI 144750; MUCL 19326	T	AB617741	NR_153863	NG_060996	-
Calcarisporiella thermophila	NBRC 33279; IFO 33279		AB617739	AB617739	AB597204	-
Calcarisporium arbuscula	CBS 900.68; ATCC 42458; DSM 3115	T	MH870978	MH859249	-	KX442597
Calcarisporium cordycipiticola	MFLUCC 15-0685	T	NG_067538	NR_144864	NG_063594	-
Calcarisporium cordycipiticola	MFLUCC 15-0686; CGMCC 3.17905	T	NG_067538	KT944999	KT944998	KX442608
Calloria urticae	GJ346A;MFLU 18-0696		MK591968	MK584941	MK585029	MK373057
Calonectria naviculata	CBS 101121; CMW 30974	T	GQ280722	GQ280600	-	KM232309
Caloscypha fulgens	OSC 100062; AFTOL ID 152; DJ 053103-2		DQ247799	DQ491483	DQ247807	DQ247787
Caloscypha fulgens	KH.06.02		JX560165	-	-	JX943747
Calosphaeria africana	STE-U 6182	T	NG_058759	NR_135945	NG_064916	-
Calosphaeria pulchella	CBS 115999; AFTOL ID 5086	T	NG_058734	NR_145357	NG_062676	GU180661
Calostilbe striispora	CBS 133491		KM231653	KM231789	-	KM232361
Calycellinopsis xishuangbanna	HMAS 187063		KR094163	-	GU936124	MH729345
Camillea globosoturbinata	CBS 137.50		MH868083	MH856570	-	-
Camillea obularia	ATCC 28093		KY610429	AF201714	-	KY624238
Camptobasidium gelus	CBS 8941	T	NG_073579	NR_170718	-	-
Camptobasidium hydrophilum	AL 17; CCM 8060; ATCC 66190	T	AY212991	MN626358	U75449	-
Campylocarpon fasciculare	CBS 112613; CPC 3970	T	HM364313	AY677301	-	KM232322
Capnodium coffeicola	MFLUCC 15-0206	T	NG_068231	KU358921	-	-
Castanediella acaciae	CBS 139896; CPC 24869	T	NG_067293	NR_137985	-	-
Catenularia cubensis	MFLUCC 18-1331		MK835840	MK828638	-	-
Catenulifera brachyconia	CBS 304.74		GU727558	GU727558	-	-
Catenulocercospora fusimaculans	CPC 17277		KF251817	KF251313	-	MF951450

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Caudospora iranica	D189 = IRAN 2552 C = CBS 143507	T	MG495960	MG495960	-	MG495988
Caudospora taleola	D185 = CBS 143508	T	MG495961	MG495961	-	MG495989
Celosporium laricicola	UAMH 11008; L3-1	T	FJ997288	FJ997287	-	-
Cenangium ferruginosum	TAAM 198451		KX090840	LT158471	KX090892	KX090739
Cephalotheca sulfurea	CCF 5203		LN908994	LN908993	LT633938	LT634038
Ceramothyrium carniolicum	CBS 175.95	T	AY004339	NR_132877	NG_070862	-
Ceratocladium polysetosum	FMR 10750	T	NG_059024	NR_154849	NG_065578	-
Ceratocystis tiliae	CBS 137354	T	NG_060422	-	-	-
Cercospora apii	CBS 116455; CPC 11556	T	NG_069525	NR_119525	-	-
Cercosporella catenulata	CBS 355.73	T	NG_058949	NR_153920	-	KX288424
Cerinosterus luteoalbus	CBS 208.48		MH867864	MH856312	-	-
Chaenothecopsis haematopus	CBS 173.95; UPSC 2082	T	MH874148	MH862507	-	-
Chaenothecopsis neocaledonica	Rikkinen 010179	T	NG_060407	KF815196	-	-
Chaetochalara africana	HKUCC OC0018		FJ176249	-	FJ176278	-
Chaetochalara aspera	HKUCC OC0004		FJ176244	-	FJ176271	-
Chaetochalara sp.	HKUCC OC0027		FJ176259	-	FJ176291	-
Chaetomella oblonga	CBS 110.78		AY487083	AY487082	AY487084	-
Chaetomium globosum	CBS 160.62	T	NG_069699	NR_144851	-	KT214666
Chaetopsina fulva	CBS 142.56; IMI 062199	T	NG_070573	NR_145061	-	-
Chaetopsis canovae	CBS 150.58		MH869271	MH857732	-	-
Chaetopsis grisea	CBS 100.57		MH869199	MH857659	-	-
Chaetopsis grisea	CBS 260.70		MH871360	MH859597	-	-
Chaetopsis grisea	CBS 628.73		MH872514	-	-	-
Chaetosphaerella fusca	GKML124N		FJ968967	-	-	-
Chaetosphaerella phaeostroma	S.M.H. 4257		AY695264	-	-	FJ968940
Chaetosphaerella phaeostroma	S.M.H. 4585		AY346274	-	-	AY780172
Chaetosphaeria metallicans	PDD 92539	T	NG_058757	NR_119668	-	-
Chaetothyrium brischoficola	MFLUCC 10-0012	T	HQ895836	HQ895839	-	-
Chalara angustata	CBS 231.96	T	NG_067438	NR_159786	-	-
Chalara breviclavata	S.M.H. 2018		AY017372	-	-	-
Chalara hyalina	CBS 558.92	T	MH874039	-	-	-
Chalara longipes	BDJ		"genome"	"genome"	-	"genome"
Chalara sp.	MFLU 15-3167		MK591953	MK584995	MK585010	MK310262
Chalarodes obpyramidata	PDD 119364		MW987823	MW987828	-	-
Chlamydocillium cyanophilum	CBS 246.74a	T	KU382212	KU382145	-	-
Chlamydosporiella restricta	CBS 178.40	T	NG_068570	MH856081	-	LR026122
Chloridium gonytrichii	MFLUCC 16-1095		MK835822	MK828622	MK834737	MN156516
Chlorocillium griseum	CBS 387.73; IMI 185384	T	NG_058935	NR_153915	-	-
Chordomyces antarcticum	CBS 120045	T	NG_068747	NR_153879	NG_065037	KJ443157
Chromelosporium macrospermum	CBS 191.63; ATCC 26681; IMI 182265; MUCL 1116	T	MH869864	MH858259	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Chromelosporium macrospermum	CBS 329.72		MH872207	MH860491	-	-
Chrysocrypta corymbiae	CBS 132528	T	NG_042680	NR_120158	-	MH545415
Chrysonectria finisterrensis	JPP17021; BRFM 2477	T	MF611689	MF611678	-	-
Chrysosporium carmichaelii	CBS 643.79	T	NG_058857	NR_077133	-	-
Chuppomyces handelii	CBS 113302		GU214437	EU167581	-	MF951475
Cinnamomeonectria cinnamomea	IMI 325248	T	KJ022072	KJ022010	KJ022206	-
Circinotrichum cycadis	CBS 137969	T	NG_058880	NR_156278	-	-
Cladobotryum asterophorum	CBS 676.77	T	NG_068978	NR_111426	-	FN868649
Cladophialophora ajelloi	CBS 260.83	T	MH873312	MH861582	AY554285	-
Cladorrhinum foecundissimum	CBS 180.66	T	NG_073585	NR_164429	-	-
Classicula fluitans	ATCC 64713		AY512838	-	AY124478	-
Classicula sinensis	CGMCC 3.18938	T	NG_064421	NR_159755	NG_065666	-
Clathrosphaerina zalewskii	CBS 160.51		MH868311	-	-	-
Claussenomyces prasinulus	TNS-F-18149		LC429384	LC425048	-	LC431719
Claussenomyces prasinulus	TU 104191		KX090815	-	KX090866	-
Clavariopsis aquatica	AJ117363		LC472492	LC472491	LC471408	-
Claviceps purpurea	GAM 12885; AFTOL ID 189		AF543789	-	AF543765	DQ522417
Clonostachys krabiensis	MFLUCC 16-0254	T	NG_068835	NR_168189	NG_068387	-
Clonostachys rosea	AFTOL-ID 187		DQ862027	-	DQ862044	DQ862013
Clonostachys rosea	CBS 710.86	T	MH873700	MH862010	-	-
Clypeophysalospora latitans	CBS 141463	T	NG_058958	NR_153929	-	-
Coccidioides immitis	CBS 120936	T	NG_070451	NR_157446	-	-
Coccinonectria rusci	CBS 126108	T	NG_058890	NR_164228	-	KM232349
Cochlearomyces eucalypti	CBS 142622; CPC 33051	T	MG386081	MG386025	-	-
Codinaea yunnanensis	MFLUCC 17-0468	T	MK835823	MK828623	MK834738	MN156517
Colispora cavincola	CBS 624.95	T	MH874177	MH862544	-	-
Collembolispora aristata	CPC 21145	T	NG_042760	NR_111830	-	-
Collembolispora barbata	CBS 115944	T	KC005812	NR_111443	-	-
Colletotrichum acutatum	ICMP1783		JN939926	JN943474	JN939857	JN985501
Colletotrichum asianum	LC0038		JN940409	JN943089	JN940363	-
Colletotrichum brevispora	LC0525		JN940395	JN943068	JN940361	-
Colletotrichum gloeosporioides	LC0555; CGMCC LC0555		JN940412	JN943090	JN940356	-
Colletotrichum lineola	CBS 125337	T	NG_069929	NR_111454	-	-
Colletotrichum musae	CBS 116870; ICMP 19119	T	NG_069093	NR_120132	NG_062840	-
Collodiscula fangjingshanensis	GZUH 0109	T	NG_058915	NR_164234	-	-
Collodiscula japonica	CBS 124266		JF440974	JF440974	-	KY624273
Collophorina rubra	CBS 120873	T	GQ154606	GQ154547	GQ154627	-
Comminutispora agavaciensis	CBS 619.95; ATCC 96605; UC 1475184	T	EU981286	MH862543	Y18699	MN829337
Condylospora vietnamensis	NBRC 107639; VTCC F-1208	T	LC146725	LC146723	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Conicomyces pseudotransvaalensis	HHUF 29956	T	LC001708	LC001710	-	-
Coniella paracastaneicola	CBS 141292	T	KX833410	KX833591	-	KX833498
Coniella pseudogranati	CBS 137980; CPC 22545	T	NG_069203	NR_154793	-	-
Coniella vitis	MFLUCC 16-1399	T	KX890083	KX890008	-	-
Coniochaeta africana	CBS 120868	T	NG_066150	NR_137725	NG_062776	-
Coniochaeta lignicola	CBS 267.33	T	NG_067344	NR_111520	-	-
Coprinellus domesticus	FMR 3936	T	AY663837	-	-	-
Corallomycetella repens	CBS 358.49		KM231708	KC479756	-	KM232391
Corallonectria jatrophae	CBS 913.96; GJS 96-18	T	NG_058888	NR_153873	-	KM232298
Cordyceps militaris	YFCC 6587		MN576818	-	MN576762	MN576932
Corinectria fuckeliana	CBS 239.29		HQ840377	HQ840384	HQ840412	JF268707
Corollospora filiformis	CBS 125146	T	NG_064219	NR_159790	-	-
Corollospora maritima	728a; AFTOL-ID 5011		FJ176901	-	FJ176846	FJ238381
Corollospora parvula	CBS 116644; TUB 6582	T	NG_064187	NR_160220	-	-
Corollospora ramulosa	CBS 398.65; ATCC 16352	T	NG_064049	NR_160104	-	-
Corollospora ramulosa	RVG-113; AFTOL-ID 794		U44092	-	U43846	DQ836888
Corticium roseum	MG46		AY463401	GU590877	-	-
Crassicarpon thermophilum	CBS 406.69	T	KX976776	NR_154779	-	KX976889
Crinula caliciiformis	AFTOL-ID 272; DAOM 231117		AY544680	KT225524	AY544729	KT225542
Cristulariella depraedans	KUS-F25920		KX098505	KT462571	-	-
Cryonesomyces dreyfussii	ATCC 201333	T	MH753594	MH753594	MH762904	MH805866
Cryphonectria neoparasitica	CFCC 52146	T	MH514019	NR_172407	-	-
Cryptophiale udagawae	GZCC 18-0047		MN104619	MN104608	-	-
Cryptophialoidea fasciculata	MFLUCC 17-2119		MH758208	MH758195	-	-
Culicinomyces bisporalis	CBS 316.87	T	MH873767	MH862078	-	-
Curvicladiella cignea	CBS 109167; CPC 1595; MUCL 40269	T	AY793431	AF220973	-	KM232311
Custingophora blanchettei	CBS 134693	T	NG_064258	NR_159876	-	-
Custingophora olivacea	CBS 335.68	T	NG_064068	NR_159847	NG_061137	GU180665
Cylindrium algarvense	CBS 124770; CPC 14936	T	NG_070517	NR_132837	-	-
Cylindrium elongatum	CBS 115974		KM231733	KM231853	-	KM232429
Cylindrium syzygii	CBS 131307; CPC 17233		JQ044441	JQ044421	-	-
Cylindrocarpostylus gregarius	CBS 101072	T	JQ666084	KM231747	-	KM232317
Cylindrocladiella lageniformis	CBS 340.92; PPRI 4449; UFV 115	T	JN099165	AF220959	-	KM232303
Cylindrocladium clavatum	CBS 143.72; ATCC 22833; IMI 164057	T	NG_067397	NR_153868	-	-
Cylindrodendrum album	CBS 301.83; ATCC 46842; IMI 255534	T	KM231626	KM231764	-	KM232339
Cylindromonium eugeniicola	CPC 37170; CBS 146075	T	NG_068337	NR_166338	-	-
Cylindrosympodium lauri	CBS 240.95; INIFAT C95/3-2	T	EU035414	EU035414	-	-
Cylindrosympodium variabile	CBS 563.82	T	NG_070448	NR_168776	-	-
Cylindrotrichum submersum	MFLU 18-2320	T	NG_068641	NR_168818	MK834780	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Cyphellophora fusarioides	CBS 130291; MUCL 44033; IHEM 6073; IMI 339361; NCPF 2733		MH877022	MH865596	-	-
Cyphellophora laciniata	CBS 190.61	T	FJ358239	EU035416	FJ358307	-
Cystodendron dryophilum	CBS 295.81		MT026557	MT026425	-	-
Dacrymyces stillatus anamorph	UPS F-939814		MN595676	MN595676	MN593455	MN580278
Dacrymyces stillatus teleomorph	UPS F-939814		MN595677	MN595677	MN593456	MN580279
Dacrymyces subarcticus	TNS-F-21067		AB472727	AB712467	AB712509	-
Dacryobolus angiospermarum	BJFC 023896	T	NG_068821	NR_160615	-	-
Dacryopinax spathularia	AFTOL-ID 454		AY701525	AY854070	AY771603	-
Dacryoscyphus chrysochilus	KUN F45014	T	AY604567	-	-	-
Dactylaria dimorphospora	CBS 256.70	T	NG_068277	NR_164282	-	-
Dactylaria lunata	CBS 689.93		MH874102	MH862455	-	-
Dactylaria sahelensis	CBS 247.93		MH874055	MH862395	-	-
Dactylaria sporexamorpha	CBS 690.93		MH874103	MH862456	-	-
Dactylella clavata	CBS 167.95	T	NG_059079	MH862506	NG_062731	-
Dactylellina appendiculata	CBS 206.64	T	NG_059071	NR_153966	-	DQ358229
Dactylidispora ellipsospora	NBRC 31376	T	NG_067533	NR_161015	NG_065635	-
Dactylospora fusiformis	MFLU 16-0593	T	NG_066423	NR_163756	-	-
Davidhawksworthia ilicicola	CBS 734.94	T	NG_067307	NR_154008	-	-
Davidsoniella neocaledoniae	CBS 149.83	T	NG_059083	NR_159853	NG_062760	-
Dematiocladium celtidis	CBS 115994	T	AY793438	AY793430	-	-
Dematiohelicomyces helicosporus	MFLUCC 16-0213	T	KX454170	KX454169	-	MF535258
Dematioscypha delicata	CBS 196.73		MH872362	MH860659	-	-
Dematioscypha delicata	CBS 739.68		MH870940	MH859215	-	-
Dematioscypha delicata	CBS 143493; CPC 31844		MH107940	MH107893	-	-
Dematioscypha delicata	TK7123 (S, TUR)		MT231683	MT231683	-	MT228668
Dematioscypha richonis	TK7082 (S, TUR)		MT231684	MT231684	-	MT228669
Dematophora necatrix	CBS 349.36		KF719204	AY909001	-	KY624275
Dendrocollybia racemosa	DUKE-DEB5575		AF042598	DQ825425	DQ825432	DQ825409
Dendrosporium lobatum	CBS 190.36; ATCC 22370; MUCL 28086	T	MH855767	MH855767	-	-
Dermea chinensis	CFCC 53008	T	MK626645	MK330013	-	-
Desmazierella acicola	NBRC 102300		LN589938	LN589938	-	LN606780
Devonomyces endophyticus	CBS 114662; CPC 1193	T	NG_070367	NR_164212	NG_061085	MF951590
Dicellomyces scirpi	R.B. 1032		AF487385	-	DQ363304	-
Dicranidion inaequale	CBS 564.71	T	LC146731	LC146731	-	-
Dictyocatenulata alba	JCM 12918		AB570320	AB570315	AB570325	-
Dictyocatenulata alba	JCM 5358		AB570316	AB570311	AB570321	-
Dictyocatenulata alba	JCM 5359		AB570317	AB570312	AB570322	-
Dictyocatenulata alba	JCM 5360		AB570318	AB570313	AB570323	-
Dictyocatenulata alba	JCM 8401		AB570319	AB570314	AB570324	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Dictyochaeta aquatica	MFLUCC 15-0983	T	MH476569	MH476572	MH476575	-
Didymostilbe aurantispora	CBS 616.85	T	NG_059135	NR_159854	-	-
Digitiseta multidigitata	MUCL 41187	T	NG_070407	NR_154031	-	KY389363
Digitiseta setiramosa	MUCL 54891 = CBS 534.88 = INIFAT C87/234	A	KU846494	KU846472	-	KU846511
Digitodochium rhodoleucum	NBRC 32296	T	LC146732	LC146732	-	-
Dimorphiseta terrestris	CBS 127345; RMF 8243	T	NG_059136	NR_154009	-	KU846375
Dimorphospora foliicola	CBS 221.59	T	NG_070437	NR_153969	-	-
Diplocarpon earlianum	CBS 162.32		MH866712	MH855259	-	-
Diplocarpon rosae	CBS 163.31		MH866612	MH855164	-	-
Diploospora rosea	DAOM 250100		KM598635	KM598634	KM598636	-
Discinella schimperi	M191		EU940126	EU940202	EU940053	-
Disporotrichum dimorphosporum	CBS 419.70	T	MH871538	MH859776	-	-
Disporotrichum dimorphosporum	CBS 433.85; QM 2378		MH873584	MH861895	-	-
Dissoconium aciculare	CBS 204.89		GU214419	AY725520	GU214523	KX288435
Dissoconium aciculare	CBS 342.82; CPC 1534	T	NG_059076	NR_119427	NG_061083	-
Ditiola radicata	HHB12010		AB712435	AB712475	AB712517	-
Dlhawksworthia alliariae	MFLUCC 13-0070	T	NG_069375	NR_164244	KX494878	-
Dlhawksworthia clematidicola	MFLUCC 14-0910	T	NG_069556	NR_164267	NG_063681	-
Dothidea sambuci	DAOM 231303; AFTOL-ID 274	T	NG_027611	NR_111220	NG_012432	DQ522854
Dothidotthia negundinicola	MFLUCC 17-2511		MN168760	MN168763	MN168758	-
Drechmeria balanoides	CBS 250.82	T	NG_059128	NR_155044	NG_062629	DQ522442
Drechslerella dactyloides	CBS 109.37; MUCL 1020	T	AY902799	NR_159842	-	-
Durotheca crateriformis	GMBC0205	T	MH645425	MH645426	-	MH645427
Durotheca guizhouensis	GMBC0065	T	MH645421	MH645423	-	MH645422
Durotheca rogersii	GMBC0204		MH645434	MH645433	-	MH645435
Dwayaangam colodena	CBS 118912	T	NG_064195	MH863042	-	-
Dwayaangam colodena	CBS 118913	T	MH874596	NR_164289	-	-
Emmonsia crescens	CBS 177.60; UAMH 3008; ATCC 13704	T	NG_070840	NR_132795	-	KY711047
Emmonsiellopsis terrestris	CBS 273.77; UAMH 2304	T	KT155190	KT155850	-	KY711091
Emydomyces testavorans	ATCC TSD-145; ILLS 81479	T	NG_066406	NR_160604	NG_065731	-
Endosporium aviarium	UAMH 10530	T	NG_059195	NR_111286	NG_016524	-
Endosporium populi-tremuloides	UAMH 10529	T	NG_064317	NR_158373	NG_016525	-
Engyodontium parvisporum	IHEM 22910		LC092915	LC092896	-	-
Engyodontium rectidentatum	CBS 206.74		LC092912	LC092893	-	-
Engyodontium rectidentatum	CBS 641.74		LC092914	LC092895	-	-
Entimomentora hyalina	CBS 130.74	T	MK185692	MK185677	MK185670	MK190959
Entimomentora hyalina	CBS 177.74		MK185693	MK185678	MK185671	MK190960
Entyloma calendulae	CBS 746.85		DQ663687	DQ663689	KP322948	DQ663690
Entyloma cosmi	BRIP HUV20935	T	NG_059239	NR_137874	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Ephelis tripsaci	CBS 857.72	T	NG_059240	NR_153997	-	-
Epichloe coenophiala	CBS 494.82	T	NG_066255	NR_153968	-	-
Epichloe typhina	ATCC 56429; AFTOL-ID 163		U17396	JN049832	U32405	DQ522440
Epicoleosporium ramularioides	CBS 141103; CPC 10672	T	NG_059251	NR_153974	GU214688	KX288433
Epidermophyton floccosum	ATCC 26072	T	NG_070354	NR_131275	-	-
Epidermophyton floccosum	CBS 230.76	T	KT155176	KT155837	NG_063110	-
Eremomyces bilateralis	CBS 781.70	T	NG_059206	NR_145364	-	-
Erysiphe fraxinicola	MUMH 211	T	NG_075216	NR_172259	-	-
Erythrogloeum hymenaeae	CPC 18819		JQ685525	JQ685519	-	-
Escovopsioides nivea	VIC 31754; AUJ6; DOA 627; IMI 501181	T	JQ855716	JQ815078	-	-
Escovopsis weberi	ATCC 64542	T	NG_069166	NR_155085	NG_061165	MT305537
Esteya vermicola	CFCC52625 (CXY1893)		MH325143	-	-	-
Esteya vermicola	CNU120806		EU627684	-	-	-
Esteya vermicola	CBS 115803		MH877851	-	-	-
Eustilbum aureum	JM-CG-01a		MW115643	MW203184	-	-
Eutypa lata	AFTOL-ID 929; CBS 208.87		DQ836903	MH862066	DQ836896	DQ836889
Everhartia hymenuloides	CBS 113640		EU552128	EU552128	-	-
Everhartia lignatilis	CBS 396.65; IFO 7071; MUCL 15741		MH870272	MH858632	-	-
Exochalara longissima	CBS 980.73	T	HQ609476	-	HQ609484	-
Exophiala salmonis	CBS 157.67; AFTOL ID 671	T	EF413609	NR_121270	NG_061119	EF413611
Extremus adstrictus	TRN96	T	KF310022	AY559346	-	KF310103
Falciphora oryzae	CBS 125863	T	NG_064356	NR_153972	-	-
Falciphoriella solaniterrestris	CBS 117.83	T	NG_058108	NR_153995	-	-
Falcocladium multivesiculatum	CBS 120386; PREM 51541; CPC 13207	T	JF831932	JF831936	JF831928	-
Falcocladium sphaeropedunculatum	CBS 111292; CPC 1448	T	JF831933	JF831938	JF831929	-
Falcocladium thailandicum	CBS 121717; CPC 13489	T	JF831934	JF831939	JF831930	-
Fantasmomyces hyalinus	CBS 139038; CMW 42166	T	KX061180	KX061179	-	-
Fantasmomyces hyalinus	CBS 139039; CMW 42167	T	KX061182	KX061181	-	-
Filiella pastinacae	CBS 114116; UPSC 2633	T	NG_058008	KF251328	-	KX348056
Filosporella fistucella	CCM F-13091	T	KC834021	NR_153982	NG_065768	-
Filosporella versimorpha	CCM F-11194	T	KC834022	KC834054	-	-
Fistulina hepatica	CBS 339.69		MH877724	-	-	-
Flabellascus tenuirostris	CBS 138680	T	KT716457	KT716466	-	KT716475
Flagelloscypha minutissima	CBS 823.88		AY571006	AY571040	-	-
Flagellospora curvula	CB-M13		KC834024	KC834045	-	-
Flagellospora leucorhynchos	CCM F-14183		KC834025	KC834049	-	-
Flagellospora sp.	CCM F-20899		KC834023	KC834050	-	-
Flavignomonia rhoigena	CFCC 53118	T	MK429917	MK432674	-	MK578102
Flavignomonia rhoigena	CFCC 53119	T	MK429918	MK432675	-	MK578103

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Flavocillium bifurcatum	YFCC 6101	T	MN576781	MN576833	MN576725	MN576897
Fonsecaea pedrosoi	CBS 271.37	T	KJ930166	NR_130652	NG_062640	-
Fontanospora fusiramosa	CCM F-12900		GQ477307	KC834052	-	-
Fulvoflamma eucalypti	CBS 118549; CPC 11243	T	DQ195791	DQ195779	DQ195802	-
Fumagopsis stellae	CBS 145078; CPC 33216	T	NG_066293	NR_161138	-	-
Furcasterigmium furcatum	CBS 122.42	T	NG_067329	NR_145349	-	LR026133
Fusariella atrovirens	CBS 311.73		MH872395	MH860688	-	-
Fusarium circinatum	CBS 405.97; BBA 69720; DAOM 225113; MRC 7541; NRRL 25331	T	NG_069843	NR_120263	-	JX171623
Fuscohypha expansa	CBS 418.89	T	LR025845	LR026715	-	LR026136
Fusichalara minuta	CBS 709.88		KX537758	KX537754	KX537773	KX537770
Gabarnaudia betae	CBS 733.69		MH871172	-	-	-
Gabarnaudia tholispora	CBS 221.73		MH872377	MH860674	-	-
Gaeumannomycella caricis	CBS 388.81	T	NG_058109	NR_146245	-	-
Gaeumannomyces radicicola	CBS 296.53	T	MH868750	MH857211	KM009218	-
Gamsylella arcuata	CBS 174.89; IMI 333702	T	NG_059070	NR_154004	-	DQ999799
Gamsylella lobata	CBS 329.94	T	MH874120	MH862471	-	-
Gamszarea humicola	CGMCC 3.19303	T	MK328997	MK329092	MK311230	MK335979
Gelatinipulvinella astraeicola	TNS-F-17846; NBRC 112540		LC429381	LC425040	LC434573	LC431715
Gelatinodiscus flavidus	OSC 65796		EU652381	EU652349	-	-
Gelatinomyces siamensis	KKUK 1	T	JX219381	NR_154059	JX219377	-
Gelatinopsis fungicola	TNS-F-44003		LC429387	LC425051	LC434551	LC431725
Geltingia associata	TU45655		KJ559564	KJ559542	KJ559585	-
Geminoarcus maximus	VTCC 31255	T	LC496779	-	-	-
Geniculospora grandis	CBS 261.84		MH873440	MH861735	-	-
Geomyces auratus	CBS 108.14	T	NG_042776	NR_111872	AB015785	-
Geomyces sp.	23WI05		KF017857	JX270595	-	-
Geonectria subalpina	CBS 143540	T	NG_067817	-	-	-
Geosmithia lavendula	CBS 344.48		MH867927	MH856380	-	-
Geotrichum candidum	CBS 557.83	T	JN974269	JN974288	-	-
Geotrichum europaeum	CBS 866.68	T	NG_055387	AY788351	-	HE984468
Gibellula leiopus	BCC 16025		MF416548	-	MF416602	-
Gibellula pulchra	NHJ 10808		EU369035	-	EU369099	EU369076
Gibellulopsis nigrescens	DAOM 226890		GU180648	GU180631	GU180613	GU180664
Gibellulopsis serrae	CBS 892.70	T	LR025885	LR026755	-	LR026159
Glaciozyma martinii	CBS 10620		KY107753	KY103469	-	-
Gliocephalotrichum bulbilium	CBS 242.62; ATCC 22228; IFO 9325; IMI 096357; MUCL 18575; NRRL 2899; QM 9007	T	AY489732	MH858145	AY489700	EF469114
Gliocladiopsis sagariensis	CBS 199.55	T	JQ666078	JQ666063	-	KM232300
Globobotrys sansevieriicola	CBS 138872; CPC 24316	T	KR476752	KR476717	-	-
Gloeotinia granigena	CBS 283.47; MUCL 11620		MH867790	-	-	-
Gloeotinia granigena	CBS 417.50; MUCL 14514		MH868212	-	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Glutinoagger fibulatus	CBS 616.80; IMI 227584b	T	MH873063	MH861298	-	-
Goidanichiella barronii	CBS 101.89; CMPG 426	T	NG_064154	NR_160178	-	-
Goniopila monticola	CCM F-11686		DQ267626	-	-	-
Goniopila monticola	DSM 104356		MK353140	MK353140	-	-
Goniopila monticola	DSM 104367		MK353141	MK353141	-	-
Gonytrichum macrocladum	CBS 195.60		MH869503	MH857954	-	-
Gorgomyces honrubiae	CCM F-12003	T	KC834028	KC834057	-	-
Graphium fabiforme	CBS 124921; CMW 30626	T	NG_067528	NR_172291	-	-
Graphium fimbriasporum	CMW 5605	T	KM495388	NR_155108	AY148171	-
Graphium penicillioides	CBS 506.86; AFTOL-ID 1415; NCPF 7140		AF027384	-	DQ471038	DQ470938
Graphostroma platystomum	CPC 37153; CBS 146066		MT223894	MT223799	-	MT223680
Gregatothecium humicola	CBS 205.96	T	NG_070395	NR_154085	-	KU846376
Grovesinia moricola	KUS-F26901		KX098504	KC460209	-	-
Grovesinia pyramidalis	CBS 737.68		MH878399	-	-	-
Guarroa acutispora	CBS 101302; FMR 6483; IMI 380445	T	MH874337	MH862730	-	-
Guarromyces ceretanicus	CBS 269.89	T	NG_058484	NR_154051	-	-
Guayaquilia cubensis	CCMCIBE-H312		MH777024	MH777025	-	-
Gymnoascus thermotolerans	CGMCC 3.17580	T	NG_067787	NR_160560	NG_065628	-
Gyoerffyella entomobryoides	CBS 268.63	T	MH869886	MH858280	-	-
Gyrothrix encephalarti	CPC 35966	T	MT373358	NR_170834	-	-
Gyrothrix eucalypti	CPC 36066	T	NG_068319	NR_166315	-	-
Gyrothrix oleae	CPC 37069	T	NG_068333	NR_166335	-	-
Gyrothrix verticiclada	CBS 127654		MH876040	MH864602	-	-
Haglerozyma chiarellii	CBS 11177	T	NG_058301	KY103494	-	-
Hainesia lythri	CBS 129121; WSF 5169		MH876652	MH865213	-	-
Halosphaeria appendiculata	NTOU4004		KX686782	-	KX686781	-
Hamatispora phuquocensis	VTCCF-1219; NBRC 111195	T	LC064073	LC064074	-	-
Hamigera ingelheimensis	CBS 163.42		MH867606	MH856108	D14408	-
Hamigera ingelheimensis	GB6187		AF368297	-	-	-
Hamigera ingelheimensis	NRRL 2110		GU092962	-	-	GU092912
Hansfordia pruni	CBS 194.56; IMI 146912	T	MH869122	NR_163361	-	KU684307
Hansfordia pruni	CBS 276.51		MH868374	MH856854	-	-
Hantamomyces aloidendri	CBS 146814; CPC 38655; HPC 3020	T	MW175388	NR_171993	-	-
Haptocillium sinense	CBS 567.95		AF339545	AJ292417	AF339594	DQ522443
Harmoniella sp.	F02000		AB911104	AB911103	-	-
Harmoniella sp.	F07343		AB910763	AB910762	-	-
Harmoniella sp.	F07344		AB911694	AB911693	-	-
Harposporium harposporiferum	CBS 213.86; ARSEF 5472	T	NG_060621	NR_160171	AF339569	-
Harzia tenella	CBS 108.78	T	NG_066189	NR_161010	NG_065673	-
Hawksworthiomyces lignivorus	CMW 18600; CBS 119148	T	EF139119	EF127890	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Heimiodora verticillata	CBS 201.60; IMI 090702; LCP 57.1589	T	MH869505	MH857955	-	-
Helgardiomyces anguioides	CBS 496.80	T	MH873055	NR_158522	-	-
Helicangiospora lignicola	MFLUCC 11-0378; BCC 52029; ICMP 20069	T	KF301531	KF301523	KF301539	-
Helicoarctatus aquaticus	MFLUCC 17-1996	T	NG_066232	NR_160361	-	MH551024
Helicoarthrosporum mellicola	FMR 15679; CBS 143838	T	LT906535	LR761645	-	-
Helicoascotaiwania lacustris	CBS 145963	T	MN699430	-	-	MN704304
Helicobasidium mompa	CBS 278.51		AY254179	-	U77064	-
Helicocentralis hyalina	SS04733.01; BCC36782	T	KR078438	KR078433	KR078442	-
Helicocentralis hyalina	SS04733.02; BCC36783		KR078439	KR078434	KR078443	-
Helicocollum chanthaburiensis	BCC 80047	T	KT222330	-	-	-
Helicocollum krabiensis	BCC71372	T	KT222325	-	-	-
Helicocollum krabiensis	BCC71374		KT222327	-	-	-
Helicocollum surathaniensis	BCC34463	T	KT222328	-	-	-
Helicocollum surathaniensis	BCC34464	T	KT222329	-	-	-
Helicodendron microsporum	CBS 100149	T	NG_058155	NR_137974	NG_063050	-
Helicodendron paradoxum	CBS 300.50		MH868142	MH856633	-	-
Helicodochium aquaticum	MFLUCC 17-2016	T	MH558837	MH558709	-	MH551026
Helicogloea aseptata	Spirin 12172	T	MK880143	NR_171842	-	-
Helicogloea lagerheimii	DB 1025; FO 36341; TUB FO36341		AY512849	-	AY124476	-
Helicogloea sp.	TLe1462; JAC13103		KP191766	KP191965	-	-
Helicohyalinum aquaticum	MFLUCC 16-1131		KY873620	KY873625	-	MF535257
Helicohyalinum aquaticum	MFLUCC 16-1133	T	MH558840	MH558712	-	MH551029
Helicomyces hyalosporus	MFLUCC 17-0051	T	MH558857	MH558731	-	MH551047
Helicoon myosuroides	CBS 743.96	T	NG_068577	NR_168778	-	-
Helicoon pluriseptatum	CBS 207.53		MH868698	MH857162	-	-
Helicoon pluriseptatum	CBS 208.53		MH868699	MH857163	-	-
Helicoon sessile	A327		KY659207	KY659207	-	-
Helicosporium aquaticum	MFLUCC 17-2008	T	MH558859	MH558733	-	MH551049
Helicotubeufia guangxiensis	MFLUCC 17-0041		MH290024	MH290019	-	MH290034
Helicotubeufia guangxiensis	MFLUCC 17-0040	T	MH290023	MH290018	-	MH290033
Heliscella stellata	DSM 104357		MK353113	-	-	-
Heliscella stellata	DSM 104386		MH930820	-	-	-
Helotium subcorticale	CBS 248.62		MH869740	-	-	-
Hemibeltrania cinnamomi	MFLUCC 17-2141		MF580258	MF580251	-	-
Herpomyces chaetophilus	DH483e		MG438351	-	MG438320	-
Herpomyces periplanetae	DH1187d		MG438359	MF458360	MG438331	-
Herpomyces shelfordellae	DE_HerpBL1		KT800011	KT800042	KT800026	-
Heterocephalum aurantiacum	CBS 314.66; ATCC 16328; IFO 8240; IMI 236332		MH870443	MH858803	-	-
Hevansia novoguineensis	CBS 610.80	T	NG_070837	NR_169678	-	MH521844

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Hirsutella citriformis	ARSEF 1446		KM652106	KM652154	KM652065	-
Hispidoconidioma alpina	UAMH 11010		FJ997286	FJ997285	-	-
Histoplasma capsulatum	G217B; ATCC 26032		"ABBT01000218.1|:121281–122712"	"ABBT01000184.1|:6176–7363"	"ABBT01000184.1:7354–9173"	"ABBT01000205.1|:625028–626732"
Histoplasma capsulatus	CBS 536.84; ATCC 58332,CDC B-3786	T	KT155281	KT155936	-	KY711085
Holwaya mucida	TNS-F-29145		LC429385	LC425042	LC434585	LC431716
Holwaya mucida	TU 112863		KX090844	MH752062	KX090898	KX090744
Hormiactis candida	CBS 539.69		MH871138	MH859370	-	-
Hormonema macrosporum	CBS 536.94	T	MH874128	MH862482	-	-
Humicola fuscoatra var. fuscoatra	CBS 118.14	T	MH866152	MH854631	NG_062672	KX976882
Hyalinostachys cylindrospora	MFLUCC 17-2583	T	MG717503	MG717501	-	MK133023
Hyalocercosporidium desmodii	CBS 142179; CPC 19483	T	MF951168	MF951322	-	MF951503
Hyalocylindrophora bispora	CGMCC 3.18408; HMAS 248881	T	KY203340	MG431982	-	-
Hyalopeziza nectrioides	KACC 45613; CBS 597.77		JN086684	JN033381	-	JN086836
Hyalorbilia brevistipitata	CBS 113946	T	KT215221	KT215221	-	-
Hyalorbilia oviparasitica	CBS 379.84	T	NG_064136	NR_153598	-	-
Hyalorhinocladiella sp.	C2303		GU393354	GU393355	-	-
Hyaloria pilacre	TI 2768		AF291338	-	-	-
Hyaloscypha variabilis	UAMH 8861	T	NG_073616	NR_121313	AY762619	-
Hyaloscypha vitreola	M236		EU940156	JN943615	EU940080	-
Hyaloseta nolinae	CBS 109837	T	KM231726	KM231846	-	KM232422
Hyalozasmidium aerohyalinosporum	CPC 14636; CBS 125011	T	KF901930	NR_156220	-	MF951504
Hymenostilbe odonatae	TNS F18563		KJ878877	-	-	-
Hyphodiscosia radicicola	NBRC 32540; ATCC 200611; MAFF 425311	T	LC146739	LC146739	-	-
Hyphodiscus brachyconius	CBS 630.75		MH872727	MH860958	-	-
Hyphodiscus hymeniophilus	CBS 335.53; MUCL 9042	T	DQ227259	DQ227259	-	-
Hyphozyma variabilis	CBS 523.79; UAMH 6101	T	AF353596	-	NG_070855	-
Hypomyces australasiaticus	CBS 127152; TFC<EST>03-8	T	MH875883	MH864443	-	FN868681
Hypomyces stephanomatis	CBS 446.64		MH870114	MH858481	-	-
Hypomyces stephanomatis	G.J.S. 88-50		AF160243	-	-	-
Hypoxylon fragiforme	MUCL 51264	T	KM186295	KC477229	-	KM186296
Hypoxylon lignicola	MFLUCC 16-0926	T	MK835808	MK828609	MK834767	MN156534
Hyweljonesia queenslandica	BRIP 61322b	T	NG_059766	NR_154095	-	-
Idriella lunata	CBS 204.56	T	KP858981	KP859044	-	-
Idriellomyces eucalypti	CPC 32632	T	NG_066413	NR_160356	-	-
Ilyonectria destructans	CBS 264.65		KM515927	AY677273	-	KM232334
Inaequalispora prestonii	CBS 175.73; IMI 160372; ATCC 24427	T	KU846348	KU846316	-	KU846377
Infundichalara microchona	CBS 175.74; UAMH 4933	T	NG_067269	NR_154074	NG_061112	KR859318
Inodoromyces interjectus	CBS 142647; C3547	T	MF399171	MF399192	MF398173	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Isaria cicadae	YFCC 7019		MN576816	-	MN576760	MN576930
Isaria farinosa	MY01338		JN940901	JN942620	JN940994	-
Isaria javanica	MY02949		JN940903	JN942618	JN940992	-
Isthmolongispora ampulliformis	CBS 223.59; ATCC 16166; IFO 6787; NI 4349	T	MH869386	MH857845	-	-
Isthmolongispora lanceata	CBS 622.66; MUCL 28087; NBRC 100994	T	MH870563	MH858897	-	-
Isthmolonqispora quadricellularis	YMF1.04719		MT507107	OL412746	MT507103	-
Isthmomyces oxysporus	YMF1.04513	T	MK577810	MF740793	MK577795	MK577825
Itersonilia perplexans	CBS 286.50; AFTOL-ID 1896; ATCC 15496; JCM 10244	T	MH868134	MH856625	DQ667162	-
Itersonilia perplexans	CBS 363.85	T	AJ235274	AB072233	AB072228	KF036900
Jaculispora submersa	DB 1250; F 1806; CCM 8127		AY512853	-	AY124477	-
Jahnula bipileata	F49-1; ATCC MYA-4173	T	EF175657	JN942353	EF175635	-
Kaarikia abrahamsonii	A1264; CBS 144155	T	MF399172	-	MF398174	-
Kaarikia abrahamsonii	A1268; CBS 142646	T	MF399172	-	MF398174	-
Kabatiella microsticta	CBS 114.64; MUCL 18713		MH870008	KT693744	-	KT693986
Kabatiella microsticta	CBS 342.66		EU167608	EU167608	EU167608	KT693985
Kabatina thujae	CBS 238.66	T	NG_064053	NR_156189	-	-
Kastanostachys aterrima	CBS 101310	T	AF178565	-	-	KU846191
Keithomyces carneus	CBS 239.32	T	NG_057769	NR_131993	NG_062730	EF468938
Kendrickiella phycomyces	K4910-1; JCM 18027		AB671441	AB671474	AB671437	-
Kendrickiella phycomyces	K5906-1-1; JCM 18028		AB671443	AB671476	AB671438	-
Kendrickiella phycomyces	MUCL 4271		AB671459	AB671492	AB671439	-
Kendrickiella phycomyces	MUCL 38565		AB671460	AB671493	AB671440	-
Keqinzhangia aquatica	YMF1.04262	T	MK577809	MK569507	MK577794	MK577824
Kiflimonium curvulum	CBS 430.66	T	NG_056980	HE608638	NG_062811	-
Kionochaeta castaneae	GZCC 18-0025	T	MN104621	MN104610	-	-
Knoxdaviesia proteae	CBS 486.88; CMW 738; PREM 48924	T	KM495393	NR_155213	NG_061020	-
Knufia cryptophialidica	DAOM 216555	T	NG_067522	NR_121501	NG_061057	-
Koorchaloma bambusae	MFLU 19-2899		MT183479	MT185516	MT214958	MT432230
Koorchalomella salmonispora	MFLUCC 15-0752	T	KX611345	-	-	-
Korunomyces prostratus	COAD 2597		MZ727000	MZ727004	-	-
Korunomyces prostratus	COAD 3306		MZ726999	MZ727003	-	-
Korunomyces terminaliae	CBS 224.80; ATCC 42410	T	MH873026	MH861257	-	-
Kylindria aquatica	MFLUCC 17-1681	T	MH120185	MH120191	-	MH120180
Kylindria peruamazonensis	CBS 838.91		GU180638	GU180628	GU180609	GU180656
Lareunionomyces syzygii	CBS 141326; CPC 26531	T	KX228338	KX228287	-	-
Lasionectriopsis germanica	CBS 143538	T	MK276528	-	-	-
Lasiosphaeris hispida	SMH 3939		JN940014	JN942176	JN938613	-
Lauriomyces basitruncatus	CC00049		KX649970	KX649981	KX649959	-
Lauriomyces bellulus	CBS 517.93; CPC 649	T	NG_057820	NR_137151	-	-
Lauriomyces cylindricus	SFC01649		KX649966	KX649977	KX649955	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Laurobasidium lauri	MAFF238665	T	AB177562	AB180359	-	-
Lecanicillium fusisporum	CBS 164.70	T	MH871316	MH859538	NG_063026	KM283858
Lecanicillium tenuipes	CBS 309.85		AF339526	JN036556	AF339576	DQ522439
Lecophagus longisporus	CBS 845.91	T	KT215220	NR_160187	NG_062600	-
Lemonniera aquatica	CBS 167.46		MH867676	MH856153	-	-
Lemonniera centrosphaera	CCM F-149	T	KC834032	KC834063	-	-
Lepisticola capitata	CBS 182.64	T	MH870038	MH858410	-	-
Leptobacillium leptobactrum	CBS 774.69	T	MH871192	MH859421	-	-
Leptodiscella africana	CBS 400.65	T	NG_064050	NR_145359	-	MK492711
Leptodontidium aureum	FMR 11834		KY853507	KY853447	HF937355	-
Leptodontidium boreale	CBS 682.76	T	MH872796	MH861025	AY129283	-
Leptodontidium irregulare	CBS 851.73		KY853508	KY853448	AY129281	-
Leptodontidium trabinellum	CBS 329.53	T	MH868765	MH857228	AY129280	-
Leptographium yamaokae	CMW 4726; CBS 129732	T	MH876968	-	-	-
Leptoxyphium fumago	CBS 123.26; ATCC 11925; IMI 089363; LSHB X13		MH866361	MH854862	GU214535	GU371741
Liangia sinensis	YFCC 3103	T	MN576782	NR_173887	MN576726	MN576898
Licrostroma sp.	He2841		MH142910	MH142906	-	-
Lyophyllum ambustum	CBS452.87		AF223216	AF357057	-	EF420997
Macgarvieomyces borealis	CBS 461.65	T	DQ341511	KM484854	DQ341489	-
Macgarvieomyces luzulae	CBS 145042; CPC 34292		MK442531	MK442591	-	-
Macroconia papilionacearum	CBS 125495; DAOM 238119; TG 2007-03		KM231704	HQ897826	-	HQ897776
Macronectria jungneri	CBS 124602	T	KJ022036	KJ021985	KJ022106	-
Magnaporthiopsis poae	M47; Lisa9	T	JF414885	JF414836	-	-
Malaysiasca phaii	CBS 141321; CPC 27548	T	NG_067310	NR_154193	-	-
Malbranchea pulchella	CBS 202.38; MUCL 8435; IFM 41308	T	AB359426	AB361638	-	-
Mammaria echinobotryoides	CBS 128852		MH876576	MH865136	-	-
Mammaria echinobotryoides	CBS 458.65		MH870308	MH858668	-	-
Marasmius oreades	ZRL2015086		KY418864	LT716048	KY418930	KY419010
Margaritispora aquatica	CBS 603.66; DSM 2220; MUCL 28095		MH870561	-	-	-
Mariannaea elegans	CBS 217.73A	T	KX986139	KX986132	-	-
Mariannaea humicola	CBS 740.95; CCT 4534	T	KM231619	KM231755	-	KM232328
Marinophialophora garethjonesii	MFLUCC 16-1449	T	NG_070406	NR_164246	NG_065664	-
Marquandomyces marquandii	CBS 182.27	T	NG_057770	NR_131994	NG_062659	EF468942
Marquandomyces sp.	CBS 127132		MT078857	MT078882	MT078872	MT078922
Mastigosporium album	CBS 138013; CPC 22945	T	KJ710451	NR_126150	-	-
Matsushimomyces verrucophorus	CBS 833.91; INIFAT C91/114-2	T	MH874010	MH862341	-	-
Mauginiella scaettae	CBS 158.26		MH866370	MH854874	-	-
Mauginiella scaettae	CBS 239.58		MH869303	MH857770	-	-
Meira argovae	CBS 110053	T	AY158669	AY158675	KP322953	KP323081
Meira geulakonigii	CBS 110052	T	AY158668	AY158674	KP322954	KP323083

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Meira nashicola	CBS 117161	T	AB185157	AB185159	KP322955	KP323084
Melanomma populicola	CBS 543.70	T	NG_075164	NR_170056	NG_070237	-
Melanopsamma pomiformis	CBS 101322	T	KU846068	KU846049	-	KU846078
Melanospora simplex	CN008I8		MT110305	MT110304	-	-
Menispora ciliata	CBS 122131; ICMP 18253	T	GU180637	EU488736	GU180614	GU180659
Menisporopsis dushanensis	GZCC 18-0084	T	MN104626	MN104615	-	-
Metacapnodium neesii	TNS F-89140; JCM 39119		LC576694	LC576698	LC576695	-
Metapochonia bulbillosa	CBS 891.72	T	AF339550	AJ292409	AF339599	DQ522458
Metarhiziopsis microspora	INEHS133a		EF464572	EF464583	-	-
Metarhizium biotecense	BCC51812	T	MN781838	MN781878	MN781937	MN781792
Metulocladosporiella musae	CBS 161.74	T	DQ008161	AY186199	-	-
Michenera artocreas	KKN2014-anamorph		MH204692	MH204688	-	-
Michenera artocreas	KKN2014-teleomorph		MH204691	-	-	-
Michenera incrustata	He5368		MH204690	MH204689	-	-
Microascus longirostris	CBS 196.61; MUCL 9058	T	NG_058479	NR_132945	-	-
Microcera coccophila	CBS 310.34; NRRL 13962		KM231703	HQ897794	-	HQ897705
Microcyclospora malicola	CBS 126138; CPC 16172; HJS 71fb	T	MH875503	MH864046	GU570557	-
Microcyclospora pomicola	CBS 126141; CPC 16175; HJS 43.1a	T	MH875506	MH864049	-	-
Microcyclosporella mali	CBS 126136; CPC 16184	T	GU570547	GU570535	-	KX288436
Microdochiella fusarioides	CBS 741.83	T	NG_058148	NR_154177	-	-
Microdochium phragmitis	CBS 285.71	T	NG_058147	MH860125	-	KP859122
Microhilum oncoperae	ARSEF 4358		AF339532	-	AF339581	EF468936
Microidium phyllanthi	MUMH 1778		AB120754	AB719951	AB120753	-
Microidium phyllanthi-reticulati	MUMH 3364	T	LC259489	NR_171203	-	-
Microsporum canis	CBS 113480		MH874500	MH862931	"ABVF01000123.1:2728–4602"	"ABVF01000081.1|:46100–47799"
Microsporum canis	CBS 217.69		MH871027	MH859294	-	-
Microthyrium propagulensis	IFRD 9037	T	KU948989	-	-	-
Microxiphium theae	CBS 202.30		MH866561	MH855113	GU296178	MN829273
Miladina lecithina	KH.03.156 (FH)		DQ220371	-	DQ646538	JX943792
Mirandina breviphora	CBS 248.68		MH870839	MH859127	-	-
Mirandina corticola	CBS 132719; FMR 11938		MH878333	-	-	-
Miuraea degenerans	MAFF 239265; MUCC 1514	T	MF951181	MF951325	-	MF951523
Moesziomyces bullatus	CBS 425.34	T	DQ831011	DQ831013	DQ831012	DQ831014
Mollisia cinerea	CBS 122029		MT026558	MT026426	-	-
Mollisia panicicola	61R8; CBS 137156	T	KF874622	KF874619	MF677922	-
Monascus ruber	CBS 135.60	T	MH869468	KY635850	MT365134	KY611974
Moniliella acetoabutens	CBS 169.66	T	AF335523	EU252153	KF706443	KF706523
Moniliella madida	CBS 240.79	T	AF335522	-	NG_062172	KF706525
Moniliella megachiliensis	CBS 190.92	T	NG_070600	NR_126139	NG_062173	KF706524
Moniliella nigrescens	CBS 269.81		AF335527	KF706436	-	KF706527

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Moniliella pollinis	CBS 461.67	T	MH870735	KF706434	KF706450	KF706529
Moniliella spathulata	CBS 241.79		MH872972	KF706432	KF706444	KF706526
Monilinia fructicola	AFTOL-ID 279		AY544683	DQ491506	AY544724	KP143827
Monilinia laxa	OSC 100063; AFTOL ID 169		AY544670	-	AY544714	DQ470889
Moniliophthora perniciosa	DIS71		AY916738	AY317136	AY916739	-
Monilochaetes camelliae	BRIP24607		HM237324	-	-	-
Monilochaetes guadalcanalensis	CBS 346.76	T	GU180640	GU180625	-	-
Monilochaetes infuscans	CBS 869.96		GU180639	GU180626	GU180620	GU180657
Monocillium indicum	CBS 313.61	T	MH869632	MH858063	-	-
Morchella esculenta cf.	MV3; AFTOL ID 60		AY544664	-	AY544708	DQ470880
Morchella semilibera	LIP 0900126; PhC 99 (LIP)	T	NG_068517	KJ174320	-	-
Mrakia blollopis	CBS 8921	T	AY038814	AY038826	KF036683	KF036923
Multiguttulispora dimorpha	MFLUCC 18-0153	T	MN104617	MN104606	-	-
Murinectria murispora	NFCCI-4515	T	MK860767	MK860769	-	-
Musicillium theobromae	CBS 968.72	T	LR025907	LR026773	-	LR026178
Musidium stromaticum	CBS 863.73	T	HQ232143	DQ825969	-	-
Muyocopron heveae	MFLUCC 17-0066	T	NG_068599	NR_168784	NG_070118	-
Myceliophthora lutea	CBS 145.77	T	KM655351	NR_145149	-	KM655395
Mycocalicium hyaloparvicellulum	MFLUCC 14-0169	T	KR920005	KR920004	-	-
Mycocentrospora acerina	CBS 105.43		MH867618	MH856114	-	-
Mycocentrospora acerina	CBS 113.24		MH866268	MH854764	-	-
Mycoceros antennatissimus	BP 105172	T	NG_060330	NR_148083	-	-
Mycochaetophora gentianae	MAFF 239231	T	AB496937	NR_121201	NG_064831	-
Mycofalcella calcarata	CCM F-10289	T	NG_060298	NR_154165	NG_065767	MK241439
Mycogone rosea	CBS 488.67		MH870753	-	-	-
Mycophilomyces periconiae	CPC 27558; CBS 142092	T	KY173509	KY173418	-	-
Mycosphaerella punctiformis	CBS 113265; AFTOL-ID 942	T	KF251723	KF251220	AY490775	DQ470920
Mycosylva clarkii	CBS 127965; RMF TC 185; WSF 3195		MH876215	MH864777	-	-
Mycosylva reticulata	CBS 448.71; ATCC 32971; JCM 32140	T	MH871980	MH860213	-	-
Mycosylva setosa	CBS 545.85; JCM 32141; NHL 2716	T	MH873592	MH861902	-	-
Mycovellosiella cajani	CBS 142174; CPC 30580; RWB 2071	T	MF951182	MF951326	-	MF951526
Myochromella inolens	CBS 330.85	T	AF223201	AF357045	-	EF421004
Myotisia cremea	CCF 5407; CBS 141864	T	LT627240	LT627243	LT671443	-
Myriangium hispanicum	CBS 247.33		KX887067	MH855426	GU296180	GU371744
Myriodontium keratinophilum	CBS 947.73	T	NG_063938	NR_157454	-	-
Myrmecridium flexuosum	CBS 398.76	T	EU041825	EU041768	-	-
Myrmecridium montsegurinum	JF 13180	T	KT991664	KT991674	KT991645	KT991654
Myrmecridium schulzeri	CBS 100.54; JCM 6974		EU041826	EU041769	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Myrotheciomyces corymbiae	CPC 33206; CBS 144420	T	NG_064542	NR_160351	-	-
Myrothecium inundatum	CBS 275.48; IMI 008983; QM 7988	T	KU846474	KU846452	-	-
Myrtacremonium eucalypti	CBS 142161; CPC 29272	T	KY979796	KY979741	-	-
Myxarium everhartioides	TNM	T	AY640107	-	-	-
Myxarium nucleatum	ZP TRE2M		AF291351	-	-	-
Myxarium nucleatum	VS 10013		KY801906	KY801879	-	-
Myxocephala albida	CBS 962.87	T	MH873810	MH862120	-	-
Myxospora masonii	CBS 174.73; IMI 158346; ATCC 24426	T	KU846484	KU846462	-	KU846500
Myxotrichum cancellatum	CBS 426.62	T	MH869798	MH858197	-	-
Nalanthamala psidii	CBS 116952; AR 4095	T	AY864837	AY864836	-	KM232401
Natonodosa speciosa	CLM-RV86	T	MF380435	MF380435	MF380435	MH745150
Naviculispora terrestris	CBS 137295	T	NG_073599	NR_171111	-	KP981622
Nectria cinnabarina	CBS 125165; AR 4477; CLL 7152	T	HM484562	HM484548	-	KM232402
Nemania macrocarpa	CBS 109567	T	MH874423	MH862830	-	-
Neoacanthostigma fusiforme	MFLUCC 11-0510; BCC 52383; ICMP 20073	T	KF301537	KF301529	-	-
Neobaryopsis andensis	A.F. 25967/2	T	NG_068701	NR_169713	-	-
Neobyssosphaeria clematidis	MFLUCC 17-0794	T	MT214566	-	MT408594	-
Neocalonectria tristaniopsidis	CBS 146800; CPC 38081; HPC 2948	T	NG_074478	NR_171984	-	MW173109
Neocelosporium eucalypti	CBS 145086	T	NG_066297	NR_164293	-	-
Neocercospora ammicola	CBS 136450; CCTU 1186	T	KR232405	KR232407	-	KX288446
Neocladophialophora quercina	CBS 138874; CPC 24426	T	NG_058128	NR_137948	-	-
Neocochlearomyces chromolaenae	BCC 68250	T	NG_066431	NR_161151	NG_065766	-
Neocrinula lambertiae	CBS 143423; CPC 32211	T	NG_058515	NR_156388	-	-
Neocrinula xanthorrhoeae	CPC 29474; CBS 142136	T	NG_059743	NR_154252	-	-
Neoeriomycopsis aristata	CBS 139913; CPC 25050	T	NG_058170	NR_154231	-	-
Neoeucasphaeria eucalypti	CBS 145075; CPC 33366	T	MK047495	MK047445	-	-
Neoeutypella baoshanensis	GMBC0052		MW797050	MW797106	-	MW814896
Neoeutypella baoshanensis	MFLUCC 16-1002		MT214618	MT310662	MT226729	-
Neohelicosporium parvisporum	MFLUCC 17-1523; GZCC 16-0088	T	MF467939	MF467926	-	MF535282
Neoidriella desertorum	CBS 985.72	T	KP858985	KP859048	-	-
Neolauriomyces eucalypti	CPC 32623; CBS 144425	T	NG_067336	NR_160353	-	MH327868
Neomycoleptodiscus venezuelense	CBS 100519	T	NG_066340	NR_164057	-	MK492736
Neomyrothecium humicola	CBS 310.96	T	KU846488	KU846467	-	KU846505
Neonawawia malaysiana	CBS 125544; CPC 16757	T	NG_068512	NR_168754	-	-
Neonectria candida	CBS 151.29; IMI 113894; MUCL 28083		HM042436	AY677291	-	DQ789792
Neonectria faginata	CBS 217.67	T	HQ840382	NR_145026	HQ840413	DQ789797
Neophaeococcomyces catenatus	CBS 650.76; ATCC 42183; UAMH 4357	T	MH872793	MH861022	NG_062767	-
Neopseudocercosporella capsellae	CBS 112032; HJS 601		KF251824	KF251320	-	KX348060

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Neoscolecobasidium agapanthi	CPC 28778	T	NG_059748	NR_152546	-	-
Neospermospora avenae	CBS 227.38	T	MW298374	MW298276	-	-
Neurospora africana	CBS 571.69; ATCC 18747; DSM 3553; FGSC 1740	T	NG_067384	NR_077130	-	-
Neurospora crassa	CBS 709.71; AFTOL-ID 1078; MUCL 19026		AF286411	MH860307	X04971	XM_952013
Niesslia exilis	CBS 560.74		MG826806	MG827005	-	-
Niesslia exilis	CBS 357.70		MG826775	MG826972	-	-
Niesslia stellenboschiana	CBS 145531	T	NG_067889	NR_165230	-	-
Nigelia martiale	HMAS 197472		JF415973	JN049881	JF415955	JF415994
Nomuraea rileyi	CBS 806.71		MH872111	AY624205	AY526491	EF468937
Nothodactylaria nephrolepidis	CBS 146078; CPC 37028	T	NG_068668	NR_166331	-	MN556809
Obeliospora microappendiculata	LAMIC 30.16		KY789451	KY789469	-	-
Ochraceocephala foeniculi	CBS 145654	T	MN516774	MN516753	MN516743	MN520145
Oculimacula acuformis	CBS 495.80		MH873054	MH861289	-	-
Oedocephalum adhaerens	CBS 125450; BRIP 52200	T	MH875145	FJ695215	-	-
Oedocephalum elegans	CBS 266.64; IMI 104308		MH870067	MH858436	-	-
Oidiodendron chlamydosporicum	CBS 403.69	T	MH871082	MH859334	-	LN833564
Oidiodendron fuscum	CBS 238.31	T	AB040706	MH855197	AB015787	-
Oidium heveae	HO_473		KY302627	KY302626	-	-
Oidium heveae	MUMH2602		AB197136	AB193589	-	-
Olla millepunctata	KACC 45226		JN086683	JN033380	-	JN086835
Onychophora coprophila	CBS 247.82	T	MH873238	MH861494	-	-
Onygena corvina	CBS 281.48		FJ358287	-	FJ358352	-
Ophidiomyces ophiodiicola	MYCO-ARIZ AN0400001		"MWKM0100 0033.1:922–2350"	"MWKM0100 0033.1|:2281–3300"	"MWKM0100 0033.1:2917–4737"	"MWKM0100 0014.1|:261984–263685"
Ophiocordyceps entomorrhiza maybe new is	TNS 16252		KJ878906	-	KJ878941	-
Ophiocordyceps sinensis	EFCC7287		EF468827	JN049854	EF468971	EF468924
Ophionectria trichospora	CBS 109876; GJS 01-155		AF543790	-	AF543766	DQ522457
Ophiostoma flexuosum	CBS 208.83	T	MH873302	MH861572	-	-
Orbilia liliputiana	CBS 116213, BBA 69350	T	KT215284	KT215284	-	-
Ovicillium attenuatum	CBS 158.96		KU382232	KU382186	-	-
Ovicillium subglobosum	CBS 101963	T	NG_069329	NR_154335	-	-
Ovipoculum album	HKAS 55229	T	GU292814	-	-	-
Ovipoculum album	HKAS 57058	T	GU292813	-	-	-
Ovulinia azaleae	CBS 280.53		MH868737	MH857199	-	-
Paecilomyces divaricatus	DTO 093-D8; CBS 284.48; ATCC 10121; ATCC 18502; DSM 1961; IAM 5001; IMI 040025; NBRC 100534; NRRL 1115; QM 6764; VTT D-83214; Thom 34	T	MH867896	MH856344	-	-
Paecilomyces niveus	CBS 100.11	T	FJ358279	NR_144910	NG_061072	JF417414
Paliphora intermedia	CBS 896.97	T	NG_057766	NR_160203	NG_065539	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Paraceratocladium silvestre	NN078262		OL655260	OL628580	-	-
Paracoccidioides brasiliensis	CBS 109819		KT155000	KT155685	-	KY711090
Paracostantinella sp.	BTCC F-35		EU541486	EU541484	EU541481	-
Paracremonium inflatum	CBS 485.77; CDC 77-043179	T	HQ232113	KM231829	-	KM232394
Paracryptophiale pirozynskii	NN044888		OL655047	OL627641	-	-
Paracylindrocarpon aloicola	CBS 141300; CPC 27362	T	NG_058238	NR_154346	-	-
Paragibellulopsis chrysanthemi	MAFF 242621; Y.H. 11-88	T	KC287230	KC287235	-	-
Paragibellulopsis chrysanthemi	MAFF 243430; Y.H. 12-168		KC287228	KC287233	-	-
Parahelicomyces aquaticus	MFLUCC 16-0234		MH558891	MH558766	-	MH551092
Parahelicomyces talbotii	MUCL 33010		AY856874	AY916465	-	-
Parahelicomyces talbotii	MFLUCC 17-2021		MH558890	MH558765	-	MH551091
Paraidriella jambosae	CBS 374.90	T	MH873905	MH862220	-	-
Paraidriella jambosae	CBS 374.9	T	KP858986	KP859049	-	-
Paraisaria rosea	HKAS 102546; KUMCC 20-0001	T	MN943842	NR_172739	NG_074911	MN929084
Paramicrodochium gracile	CBS 493.70	T	MH871585	-	-	-
Paramusicillium asperulatum	CBS 120158	T	LR025930	LR026792	-	LR026194
Paramycosphaerella brachystegiae	CBS 136436; CPC 21136	T	KF777230	KF777178	-	MF951567
Paramyrothecium roridum	CBS 357.89	T	KU846330	KU846300	-	KU846361
Paranannizziopsis tardicrescens	CBS 142038;UTHSC DI16-471; FMR 15449	T	NG_073614	NR_169928	-	-
Paraphaeoisaria alabamensis	CBS 101.77A	T	MH872801	MH861028	-	-
Paraphysalospora eucalypti	CBS 143177; CPC 32053	T	NG_058508	NR_156658	-	-
Paraphyton cookiellum	CBS 101.83	T	MH873285	MH861545	-	-
Parapleurotheciopsis caespitosa	CBS 519.93	T	MH874086	MH862437	-	-
Pararamichloridium livistonae	CBS 143166; CPC 32156	T	MG386084	MG386029	-	-
Pararamichloridium verrucosum	CBS 128.86	T	EF204508	MG386030	EF204522	-
Parasarcopodium ceratocaryi	CBS 110664; STE-U 5494	T	AY425026	-	AY344478	-
Parasarocladium radiatum	CBS 142.62	T	MH869704	MH858125	NG_065583	-
Parascedosporium putredinis	CBS 133438	T	MH877539	MH866067	-	-
Parasympodiella elongata	CBS 522.93; CPC 533	T	GQ303314	GQ303283	-	-
Parasympodiella eucalypti	CBS 124767; CPC 13397	T	GQ303315	GQ303284	-	-
Parasympodiella lauri	FMR 13132; CBS 138108	T	KY853518	KY853457	-	-
Parasympodiella laxa	CBS 102698		GQ303316	GQ303285	-	-
Parawiesneriomyces syzygii	CBS 141333	T	NG_066170	NR_145405	-	-
Parengyodontium album	CBS 368.72		MH872217	MH860502	-	-
Passalora bacilligera	CBS 131547; CPC 19944	T	MF951210	MF951356	-	MF951585
Patellaria chromolaenae	MFLUCC 17-1479	T	MT214474	MT214380	MT214425	MT394685

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Patellina sp.	P10-1		KF590159	-	-	-
Penicillifer pulcher	CBS 560.67; ATCC 18931; MUCL 11607	T	KM231610	KM231742	-	KM232297
Penicilliopsis clavariiformis	CBS 761.68		MH870948	-	MT365174	JN121549
Penicilliopsis zonata	NRRL MOLD 5079	T	NG_057318	NR_154290	-	-
Penicillium chrysogenum	CBS 306.48	T	MH867907	MH856357	NG_062803	JN121487
Penicillium hennebertii	CBS 334.68	T	AB069708	KJ834507	AB069702	JN121493
Peroneutypa diminutiasca	MFLUCC 17-2144	T	MG873473	MG873479	MG873476	-
Pesotum erubescens	CBS 278.54		MH868871	MH857328	-	-
Petchia siamensis	BCC68420		MK632087	-	MK632113	MK632140
Peyronelina glomerulata	NBRC 104522		AB455961	-	-	-
Peziza ligni	CBS 146637; CPC 39110	T	NG_076717	NR_173019	-	MW890073
Peziza vesiculosa	JV 95-652 (C)		AY500552	AF491626	-	AY500489
Pezizella epithallina	TU39378		KJ559570	KJ559546	KJ559590	-
Pezizella vulgaris	TAAM 137756a		KX090794	-	-	KX090698
Phaeoacremonium angustius	CBS 249.95	T	MH874155	MH862513	AB278178	-
Phaeoacremonium fraxinopennsylvanicum	CBS 128920; MR 3064		HQ878595	-	HQ878600	HQ878609
Phaeoacremonium minimum	CBS 246.91	T	AB278174	-	AB278174	-
Phaeoacremonium novae-zealandiae	WIN 113BI	T	AY761081	-	AY761069	-
Phaeodactylium stadleri	IMI 501220; CBS 132715; FMR 12185	T	HF678536	HF678526	-	-
Phaeoisaria clematidis	MFLUCC 17-1341		MF399247	MF399230	MF399216	MF401400
Phaeoisaria fasciculata	CBS 127885	T	KT278705	MH864619	KT278693	KT278741
Phaeomoniella chlamydospora	CBS 229.95	T	MH874153	MH862510	-	-
Phaeomoniella chlamydospora	CBS 239.74		MH872585	MH860847	AB278179	-
Phaeomoniella pinifoliorum	CBS 114903	T	MH874534	MH862974	-	-
Phaeosphaeria oryzae	CBS 110110	T	NG_069025	NR_156557	NG_061080	KF252193
Phaeostalagmus cyclosporus	CBS 663.70		MH871680	MH859892	-	-
Phaeothyriolum corymbiae	CBS 143434; CPC 33000	T	MG386098	MG386045	-	-
Phanerochaete chrysosporium	FPL5175		AF287883	AY854086	AF026593	-
Phialemonium atrogriseum	CBS 604.67	T	NG_057883	NR_111521	NG_065691	LT633959
Phialemonium inflatum	CBS 259.39	T	HE610464	NR_165996	NG_065530	LT633974
Phialemonium limoniforme	CBS 139049	T	MH877677	NR_171813	LT633924	-
Phialocephala dimorphospora	CBS 300.62	T	MH869755	MH858160	-	-
Phialocephala dimorphospora	CBS 976.72		MH878299	-	-	-
Phialolunulospora vermispora	YMF1.4260	T	MK165442	MK165444	MK165440	-
Phialoparvum bifurcatum	CBS 299.70B	T	LR025931	LR026793	-	LR026195
Phialophora verrucosa	WUC355; AFTOL ID 670; MUCL 9760		EF413615	AF050281	EF413614	-
Phialoseptomonium eucalypti	CBS 145542	T	NG_067890	NR_165572	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Phialosporostilbe scutiformis	MFLUCC 17-0227	T	NG_068569	NR_168773	NG_070116	-
Phleogena faginea	AFTOL-ID 1889		DQ831021	-	DQ831022	-
Phlogicylindrium eucalypti	CBS 120080	T	DQ923534	DQ923534	-	MH554893
Phlogicylindrium uniforme	CBS 131312; CPC 19419	T	JQ044445	JQ044426	-	-
Pholiota veris	AFTOL-ID 1676		DQ457684	DQ490638	DQ457624	DQ472730
Phycomyces blakesleeanus	AFTOL-ID 184; NRRL 1555		DQ273800	AY997071	AY635837	DQ302789
Phymatotrichopsis omnivora	ATCC 32445		EF494060	EF494043	EF494052	EF494070
Pilidium acerinum	CBS 736.68	T	AY487092	NR_119500	AY487093	-
Pinatubo oryzae	CBS 158.94; ATCC 90547	T	LC500491	LC500481	-	LC500511
Planamyces parisiensis	CBS 143165; CPC 31694	T	MG386093	MG386040	-	MG386141
Plectosphaerella cucumerina	DAOM 226828		GU180647	GU180630	GU180612	GU180663
Pleiocarpon strelitziae	CBS 142251; ST1; CPC 27628	T	KY304672	KY304644	-	KY304697
Plenodomus chrysanthemi	CBS 539.63	T	GU238151	JF740253	GU238230	KY064038
Pleuroascus nicholsonii	CBS 345.73	T	NG_057652	NR_156627	AF096182	MK190962
Pleurodesmospora coccorum	CBS 459.73		MH872454	MH860742	-	-
Pleurophragmium acutum	CBS 129113		MH876650	MH865210	-	-
Pleurophragmium subfusiforme	P011		EU107293	-	EU107330	-
Pleurostoma ootheca	CBS 115329; AFTOL ID 5085; CMU 23858	T	AY761079	MH862984	AY761074	HQ878606
Pleurostoma repens	CBS H-7594		AY761078	-	AY761067	-
Pleurotheciella rivularia	CBS 125238	T	JQ429232	-	JQ429244	JQ429263
Pleurotheciopsis bramleyi	CBS 127863; FMR 10947		MH877952	-	-	-
Pleurotheciopsis tropicalis	CBS 100511; INIFAT C97/93; MUCL 40702	T	MH874311	MH862705	-	-
Pleurothecium floriforme	MFLUCC 15-0628	T	NG_059791	NR_156614	-	-
Pleurothecium obovoideum new genus	CBS 209.95; MFC 12477	T	EU041841	EU041784	-	-
Pleurothecium pulneyense	MFLUCC 16-1293		MF399262	-	MF399228	MF401414
Pochonia chlamydosporia	CBS 504.66		AF339544	AJ292398	AF339593	EF469120
Pochonia globispora	CBS 203.86	T	MH873631	MH861942	-	-
Podonectria coccicola	DAR 81026		KU519419	KU587798	-	-
Podonectria kuwanaspidis	SICAUCC 21-0002	T	MW462900	MW484989	MW462892	MW462119
Podonectria novae-zelandiae	PUcS14		KU559551	KU720535	-	-
Podonectria sichuanensis	SICAU 16-0003	T	MK296471	MK305903	MK296467	MK313855
Podoscypha petalodes subsp. rosulata	CBS 332.66		MH870450	MH858811	-	-
Podospora fimicola	CBS 482.64	T	KP981440	MK926862	-	KP981623
Polyancora globosa	Pahang 3	T	DQ396466	DQ396469	-	-
Polyancora globosa	Pahang 3-1	T	DQ396467	-	-	-
Polyancora globosa	Selangor 2	T	DQ396468	DQ396470	-	-
Polycephalomyces aurantiacus	MFLUCC 17-2114		MG136911	MG136917	MG136905	MG136871
Polycephalomyces formosus-like	NBRC 109993		MN586842	MN586833	MN586824	MN598064

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Polycephalomyces formosus-like	NBRC 109994		MN586843	MN586834	MN586825	MN598065
Polycephalomyces tomentosus	BL4		KF049641	KF049666	KF049623	KF049678
Polyscytalum fecundissimum	CBS 100506		EU035441	EU035441	-	-
Polyscytalum pinicola	CPC 36759; CBS 146015	T	MT223925	MT223833	-	-
Populomyces zwinianus	CBS 147307; NL1976004	T	MW883835	MW883444	-	-
Porobeltraniella porosa	NFCCI 3994		KX519524	KX519518	-	-
Postia caesia	CBS 295.56		MH869189	MH857645	-	-
Postia stiptica	CBS 212.55		MH868994	MH857451	-	-
Proceropycnis hameedii	PMI 927	T	MG765270	KF428609	MG765269	-
Psammina bommeriae	CBS 134.69		MH878435	-	-	-
Pseudeurotium hygrophilum	CBS 102670	T	NG_069863	NR_111128	NG_065504	-
Pseudeurotium zonatum	CBS 329.36; AFTOL ID 1912	T	MH867318	MH855814	DQ471040	DQ470940
Pseudoachroiostachys krabiense	MFLUCC 16-0325	T	NG_068839	NR_168200	NG_068395	-
Pseudoacremonium sacchari	CPC 23155; CBS 137990	T	NG_058083	NR_156588	-	-
Pseudoarthrographis phlogis	CPC 32759; CBS 144414	T	NG_064540	NR_160349	-	-
Pseudobeltrania ocoteae	CBS 140664; CPC 26219	T	KT950870	KT950856	-	-
Pseudocatenomycopsis rothmanniae	CBS 136445;CPC 22733	T	KF777237	KF777185	-	-
Pseudocercosporella bakeri	CBS 125685; CPC 17570	T	GU570553	MH863615	-	KX288463
Pseudoclathrosphaerina evamariae	CBS 616.97	T	MH874271	MH862664	-	-
Pseudocoronospora hainanensis	YMF1.04517	T	MK577807	MK569505	MK577792	MK577822
Pseudocosmospora eutypellae	A.R. 4562; CBS 133966	T	KC291757	KC291721	-	-
Pseudodactylaria brevis	MFLUCC 16-0032	T	MH262310	MH262308	-	-
Pseudodactylaria hyalotunicata	HKUCC 2593		EU107298	-	EU107325	-
Pseudodactylaria xanthorrhoeae	CBS 143414; CPC 32430	T	MG386117	MG386064	-	-
Pseudodidymella fagi	AH 561;HHUF 30553		LC203357	LC203332	LC203311	LC203413
Pseudodidymella fagi	HHUF 22903; H 2579	T	LC203356	LC150787	LC203310	LC203412
Pseudofusicolla belgica	IHEM 2413	T	KJ126476	KJ125588	-	KP835474
Pseudogibellula formicarum	ARSEF2913; CBS 433.73		MH872442	AY945231	-	-
Pseudogliophragma indicum	MTCC 11985	T	NG_060127	NR_132085	NG_065055	-
Pseudohamigera striata	CBS 377.48; NRRL MOLD 717; IFO 6106	T	NG_063997	NR_145139	NG_062360	JN121508
Pseudoornatispora krabiense	MFLUCC 16-0317	T	MH376721	MH388348	-	MH412729
Pseudophialophora eragrostis	CM12m9	T	KF689638	KF689648	KF689598	-
Pseudopithyella minuscula	AFTOL-ID 69; KH04042003-1		AY544658	-	AY544702	-
Pseudoramichloridium brasilianum	CBS 283.92	T	MH874024	EU041797	-	-
Pseudoramichloridium henryi	CPC 13121; CBS 124775	T	GQ303320	GQ303289	-	-
Pseudoschizothecium atropurpureum	SMH 2961		AY780056	-	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Pseudoschizothecium atropurpureum	SMH 3073		AY780057	-	-	AY780160
Pseudosigmoidea excentrica	CBS 469.95	T	NG_058019	NR_156545	NG_065605	-
Pseudosigmoidea ibarakiensis	NBRC 107891	T	LC146759	LC146758	-	-
Pseudosubramaniomyces fusisaprophyticus	CBS 418.95; INIFAT C94/134	T	EU040241	EU040241	-	-
Pseudovirgaria grisea	CBS 129276		MH876634	MH865198	-	-
Pseudovirgaria hyperparasitica	CBS 121739; CPC 10753	T	EU041824	EU041767	-	-
Pseudozyma abaconensis	CBS 8380	T	FJ008047	FJ008053	KP322956	KP323092
Pseudozyma prolifica	CBS 319.87	T	AJ235298	AF294700	-	KP323089
Psychrophila antarctica	ANT92; CGMCC315133	T	KF768452	JX001640	-	-
Psychrophila lutea	HAILUO409; CGMCC315134	T	KF768454	JX001637	-	-
Psychrophila olivacea	HAILUO368; CGMCC315135	T	KF768457	JX001618	-	-
Ptychogaster rubescens	CBS 418.86; DAOM 195426		MH873668	MH861975	-	-
Pulchromyces fimicola	ATCC 36770; IFAS-F 316		EF442002	EF442002	EF442002	-
Pulchromyces fimicola	CBS 127.69; CUP 49531;ATCC 18595		EF442001	EF442001	EF442001	-
Pulchromyces fimicola			AB544014	-	-	-
Purpureocillium lilacinum	CBS 129474		MH876802	MH865347	-	-
Purpureocillium lilacinum	CBS 284.36; ATCC 10114; ATCC 1123; CBS 346.48; CCRC 31616; DSM 846; IMI 027830; JCM 9332; NCTC 584; NRRL 895; QM 7592; VKM F-3193	T	FR775484	NR_111432	NG_061025	EF468941
Purpureomyces pyriformis	BCC85074	T	MN781873	MN781929	-	MN781821
Pyricularia grisea	BR0029		KM484995	KM484880	-	-
Pyronema omphalodes	TL-11685		DQ220397	-	DQ646549	EU360915
Quambalaria cyanescens	CBS 357.73; CMW 5583; MUCL 19329	T	NG_042416	NR_111202	-	-
Quambalaria cyanescens	CBS 876.73		DQ317616	DQ317623	KF706440	KF706531
Radulidium subulatum	CBS 405.76	T	NG_057780	NR_145355	-	-
Raffaelea ambrosiae	CBS 185.64	T	EU984297	MH858412	AY497518	-
Ramularia pusilla	CBS 124973; RoKi 3143	T	KP894141	KP894248	-	KP894687
Ramulariopsis pseudoglycines	CBS 141100; CPC 18242	T	KX287246	KX287543	-	KX288705
Ramulispora sorghiphila	CBS 255.82; IMI 153077	T	NG_058497	NR_156642	-	MF951656
Rasamsonia byssochlamydoides	CBS 413.71	T	MH871961	JF417476	AY526476	JF417437
Rattania setulifera	GUFCC 15-501	T	HM171322	GU191794	-	-
Rectifusarium ventricosum	CBS 748.79; BBA 62452; NRRL 20846; NRRL 22113	T	KM231658	HQ897816	-	HQ897761
Remersonia thermophila	ATCC 22073	T	NG_059467	NR_155710	NG_061123	-
Retiarius revayae	BP 108633	T	KY352465	KY352465	-	-
Retiarius superficiaris	IMI 223459	T	KY352467	KY352467	-	-
Reticulascus clavatus	CBS 125296	T	GU180643	GU180627	GU180622	-
Rhabdocline laricis	CBS 283.59		MH869403	MH857866	-	-
Rhabdocline laricis	CBS 298.52; AFTOL ID 907		DQ470954	MH857046	DQ471002	DQ470904

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Rhachisphaerella mozambica	CBS 122464; X34	T	MF951237	EU514257	-	MF951640
Rhamphoria delicatula	CBS 132724		FJ617561	MG600391	JX066711	JX066702
Rhamphoria delicatula	PRA-13612		AF261068	MG600390	AF242267	KT991655
Rhamphoria pyriformis	CBS 139024		MG600397	MG600392	MG600405	MG600401
Rhamphoria pyriformis	CBS 139033		KT991665	KT991677	MG600406	KT991656
Rhamphoriopsis muriformis	CBS 127683		MG600395	MG600389	MG600403	MG600399
Rhamphoriopsis muriformis	CBS 131269	T	MG600396	-	MG600404	MG600400
Rhexocercosporidium carotae	CBS 418.65	T	MH870289	NR_111086	NG_061015	-
Rhexothecium globosum	CBS 955.73	T	NG_057864	NR_160147	-	-
Rhinocladiella aquaspersa	CBS 313.73; ATCC 24410; FMC 241	T	MH872396	MH860689	-	-
Rhinotrichella globulifera	CBS 563.71; NHL 2449	T	MH872026	-	-	-
Rhizopus arrhizus	CBS 112.07; AS 3.4826; AS 3.4988; ATCC 22957; ATCC 56536; BCRC 31145; CCRC 31145; IFO 5414; MUCL 9668; NBRC 5414; NRRL 3133; VKM F-1414	T	NG_056282	NR_103595	NG_062621	-
Rhodoveronaea aquatica	MFLUCC 18-1339		MK849785	MK828641	MK828310	-
Rhodoveronaea varioseptata	CBS 123472	T	FJ617559	MG600393	MG600408	JX066701
Rhodoveronaea varioseptata	CBS 123473		FJ617560	KT991676	JX066710	JX066700
Rhodoveronaea varioseptata	CBS 431.88	T	NG_057786	NR_136990	-	-
Rhopalophora clavispora	CBS 637.73	T	NG_058262	NR_152542	NG_061246	KX537769
Rhynchobrunnera lolii	CBS 135745; IMI 502640; 15lp11	T	KU844336	KU844336	KU844336	KU844339
Rhynchosporium graminicola	CBS 146761; CPC 39385; 99CH6-C1a; ETH ZT Myc2338	T	MW298457	MW298353	-	-
Rhynchosporium secalis	CBS 483.50		MH868233	MH856714	-	-
Riopa metamorphosa	Rm1		MK064104	MK064117	-	-
Riopa metamorphosa	CBS 441.70		MH871551	MH859787	-	-
Rommelaarsia flavovirens	FH 00304335	T	NG_068530	NR_169662	NG_068396	-
Rommelaarsia flavovirens	H.B. 9951c	T	KT958771	KT958774	-	-
Rosellinia necatrix	CBS 325.35		MH867206	MH855691	-	-
Rotiferophthora angustispora	CBS 101437		AF339535	AJ292412	AF339584	DQ522460
Rugonectria rugulosa	CBS 126565; GJS 09-1245		KM231615	KM231749	-	KM232320
Rupestriomyces ampulliformis	CGMCC 3.17063		KF680798	KF513537	KF513508	KJ733739
Rupestriomyces ampulliformis	CGMCC 3.17061	T	KF680799	KF513536	KF513507	-
Rupestriomyces sinensis	CGMCC 3.17066	T	KF680789	KF513521	KF513500	KJ733744
Rupestriomyces torulosus	CGMCC 3.17051	T	KF680791	KF513527	KF513505	KJ733738
Ruwenzoria pseudoannulata	MUCL 51394	T	KY610494	KY610406	-	KY624286
Sagenomella diversispora	CBS 354.36	T	MH867323	MN431407	AB024589	MN969207
Samsoniella aurantia	TBRC 7271	T	MF140728	NR_164421	-	MF140818
Samsoniella inthanonensis	TBRC 7915	T	MF140725	NR_164420	-	MF140815

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Samsoniella yunnanensis	YFCC 7282		MN576814	-	MN576758	MN576928
Sarcopodium circinatum	CBS 587.92; CCT 5383		KM231651	KM231787	-	KM232360
Sarcoscypha coccinea	OSC 100003; AFTOL ID 50		AY544647	DQ491486	AY544691	DQ497612
Sarocladium kiliense	CBS 122.29; ATCC 34716; MUCL 9724	T	MH866490	AJ621775	HQ232198	-
Sarocladium kiliense	CBS 400.52		KM231729	KM231849	-	KM232425
Sayamraella subulata	BCC 78964	T	LR025971	LR026833	-	LR026226
Scedosporium desertorum	CBS 489.72	T	MH872246	MH860541	-	-
Schizothecium carpinicola	CBS 228.87	T	NG_057741	NR_103589	-	-
Schizothyrium cryptogamum	CBS 118949	T	MH874599	MH863045	-	-
Schizothyrium pomi	CBS 228.57		EF134947	EF134947	EF134947	MF951734
Scleroramularia asiminae	CBS 128077	T	MH876249	MH864807	-	-
Scleroramularia henaniensis	CBS 128074		MH876247	MH864805	-	-
Scleroramularia pomigena	CBS 128072	T	FR716673	FR716682	-	-
Scleroramularia shaanxiensis	CBS 128080	T	FR716674	FR716683	-	-
Scopulariopsis alboflavescens	CBS 399.34	T	MH867091	KX923956	-	-
Scopulariopsis brevicaulis	MUCL 40726	T	LN851042	LM652465	-	-
Scortechinia acanthostroma	SMH 1143		FJ968988	-	-	FJ968948
Scortechinia diminuspora	SMH 4763	T	NG_059922	-	-	-
Scytalidium indonesiacum	CBS 259.81; UAMH 5733	T	MH873098	MH861338	-	-
Scytalidium lignicola	DSM 105466		MG815782	MG815782	MG815782	-
Selenodriella cubensis	CBS 683.96	T	KP858990	KP859053	-	-
Selenophoma australiensis	CBS 124776	T	NG_057833	NR_156527	-	-
Selenosporella curvispora	CBS 102623		MW144405	-	MW151686	MW147338
Selenosporella falcata	CBS 659.75		MH872731	MH860962	-	-
Sepedonium ampullosporum	CBS 392.52; IMI 204037; MUCL 9869; QM 1058	T	MH868629	MH857094	-	-
Septofusidium berolinense	CBS 731.70		KM231722	KM231841	-	KM232417
Septofusidium herbarum	CBS 265.58; IMI 053581	T	NG_057904	NR_138398	NG_062661	KM232418
Septomyrothecium maraitiense	MUCL 47202	T	KU846493	-	-	KU846510
Septomyrothecium uniseptatum	MUCL 52944		KU846495	-	-	KU846512
Septotinia podophyllina	CBS 318.37		MH867422	MH855916	-	-
Septotinia populiperda	CBS 339.53		MH101506	MH101503	-	-
Serendipita herbamans	DSM 27534; S1	T	KF061285	KF061285	-	-
Serendipita indica	CBS 125645; DSM 11827; AFTOL-ID 612	R	NG_059912	MH863568	NG_064889	-
Setosynnema yunnanense	YMF1.03964	T	MH031754	-	MH031747	MK267283
Setosynnema yunnanense	YMF1.02680		MH985635	-	MH985632	MK267284
Seychellomyces sinensis	YMF1.04178	T	MG830704	KU549178	KU549179	-
Sigleria carmichaelii	DAOMC 250076; CBS 138264	T	KP119638	KP119626	KP119651	-
Simplicillium lanosoniveum	CBS 123.42	T	MH867593	MH856100	-	-
Sirastachys phaeospora	CBS 100155	T	KU846779	KU846666	-	KU846891

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Slopeiomyces cylindrosporus	CBS 610.75	T	NG_057751	NR_120170	NG_061048	-
Smaragdiniseta bisetosa	CBS 459.82	T	KU847255	KU847229	-	KU847281
Sodiomyces alkalinus	CBS 110278	T	JX158427	NR_145378	-	JX158449
Solomyces guizhouensis	CGMCC 3.20477; GZUIFR 21.804	T	MZ444096	MZ444069	-	-
Soosiella minima	CBS 136257; MH 1230	T	JX124327	JX124327	JX124327	-
Sordaria clematidis	MFLU 16-2138	T	NG_073855	NR_170818	NG_070673	MT394717
Sordaria fimicola	CBS 723.96		MH874231	MH862606	-	DQ368647
Speiropsis pedatospora	CBS 397.59	T	NG_058179	NR_145393	-	-
Spermospora subulata	CBS 286.69		MH878455	-	-	-
Spermospora zeae	CBS 306.79	T	MW298474	MW298368	-	-
Sphaeridium vitellinum	CBS 624.76		MH872784	MH861011	-	-
Sphaerostilbella berkeleyana	CBS 102308; AFTOL-ID 158; G.J.S. 82-274	T	U00756	NR_154425	AF543770	DQ522465
Spiroplana centripeta	KACC 42611	T	HQ696652	HQ696660	-	-
Spiroplana centripeta	KACC43022		HQ696653	HQ696661	-	-
Spiroplana centripeta	KACC43136		HQ696654	HQ696662	-	-
Spirosphaera floriformis	CBS 402.52	T	MH868632	MH857097	-	-
Spissiomyces ramosus	CGMCC 3.17075		KF680785	-	-	-
Sporendocladia bactrospora	CMW 1593		AF326076	-	-	-
Sporendonema casei	CBS 543.75		MH872720	MH860952	-	-
Sporothrix bragantina	CBS 474.91	T	MH873947	MH862265	-	-
Stachybotryna columaris	CBS 565.71; ATCC 22670; IFO 9180	T	MH872027	MH860263	-	-
Stachybotrys chartarum	CBS 182.80	T	KU846792	KU846679	-	KU846904
Stachylidium bicolor	DAOM 226658		GU180651	-	GU180616	-
Stachylidium bicolor	CBS 121802	T	LR025972	LR026834	-	-
Staheliella nodosa	CBS 589.73; ATCC 26835; IPO 1218; MUCL 20198	T	MH872508	MH860777	-	-
Stanjemonium grisellum	CBS 655.79	T	NG_069774	NR_156501	-	-
Stenella araguata	CBS 105.75; ATCC 24788; FMC 245	T	NG_064105	NR_156511	NG_061090	MF951742
Stephanophorella stellata	CBS 101301; FMR 6481	T	MH874336	MH862729	MW151687	MW147339
Sterigmatobotrys rudis	DAOM 229838		JQ429241	JQ429152	JQ429256	JQ429272
Stilbella aciculosa	CBS 147.71		MH871820	MH860040	-	-
Stilbella fimetaria	CBS 117.84		MH873416	MH861705	-	-
Strelitziomyces knysnanus	CBS 146056	T	NG_068670	NR_166334	-	MN556810
Streptotinia aquilegiae	CBS 352.47		MH867820	MH856284	-	-
Strongyloarthrosporum catenulatum	FMR 16121; CBS 143841	T	LT906534	LR760230	-	-
Subbaromyces splendens	CBS 357.53 AA1	?T	MN526934	-	MN526931	-
Subbaromyces splendens	CBS 357.53 B	?T	MN526935	-	MN526932	-
Subramaniomyces podocarpi	CBS 143176; CPC 32031	T	NG_066201	NR_156659	-	-
Subsessila turbinata	MFLUCC 15-0831	T	NG_059724	NR_148122	-	-
Subulicystidium sp.	KHL10780		AY586714	AY463468	-	-
Subulispora biappendiculata	CBS 121489	T	MH874667	MH863112	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Summerbellia oligotrophica	CBS 657.94	T	LR025849	LR026719	-	-
Sungia yongmunensis	EFCC 2131	T	EF468833	NR_169650	NG_070236	KJ398690
Sydowiella fenestrans	CBS 125530		EU683078	JF681956	-	-
Symbiotaphrina lignicola	CBS 325.93; MA3373	T	NG_057675	NR_160193	NG_070853	-
Symbiotaphrina microtheca	H.B. 10054		KY657581	KY657581	-	-
Symbiotaphrina sanguinea	CBS 406.52	T	NG_064009	NR_160078	AJ496238	-
Sympodiella acicola	CBS 425.76		KY853529	KY853467	-	MK442680
Sympodiella acicola	CBS 487.82	T	KY853530	KY853468	-	MK442681
Sympodiella goidanichii	CBS 987.70		MH871803	MH860019	-	-
Sympodiella goidanichii	CBS 136.58	T	MH869262	MH857722	-	-
Sympodiella multiseptata	CBS 566.71; ATCC 22673; IFO 9369; IMI 158984	T	MH872028	MH860264	-	-
Sympoventuria capensis	CBS 120136	T	MH874632	MK810921	-	MK887810
Synchaetomella acerina	DAOM 242271	T	NG_042747	NR_111811	NG_065600	-
Synnemadiella eucalypti	CPC 27637	T	NG_067321	NR_154449	-	-
Synnematomyces capitatus	NBRC 31218	T	LC146764	LC146764	-	-
Synnematotriadelphia stilboidea	CBS 101294		MF434793	MF434783	MF434811	MF434802
Synnematotriadelphia stilboidea	CBS 221.85	T	MF434792	MF434781	MF434810	MF434801
Synnemellisia aurantia	COAD 2070	T	NG_059728	NR_154444	-	-
Taeniospora gracilis	CBS 713.83; CCM F-08683		MH873389	MH861677	-	-
Taeniospora gracilis	CBS 714.83; CCM F-564	T	MH873390	MH861678	-	-
Taeniospora incredibilis	CBS 716.83; CCM F-06083		MH873391	MH861679	-	-
Tangerinosporium thalitricola	CBS 317.61; IMI 034815	T	KU847269	KU847243	-	-
Teratoramularia kirschneriana	CBS 113093; RoKI 1144	T	GU214669	GU214669	GU214669	KX288718
Teratoramularia persicariae	CBS 141104; CPC 19488	T	KX287249	KX287545	-	KX288710
Teratosphaeria fibrillosa	CBS 121707; CPC 13960	T	NG_057862	NR_145094	NG_016538	LT799765
Termitomyces sheikhupurensis	LAH 35710	T	MT192228	NR_172179	-	-
Tetracladium ellipsoideum	MIDUI30		KF768467	-	-	-
Tetracladium ellipsoideum	MIDUI20	T	KF768465	-	-	-
Tetracladium furcatum	CBS 266.84	T	MH873441	MH861736	-	-
Tetracladium marchalianum	CCM F-26199		AY204612	AY204621	AY204614	MK241443
Thailandiomyces bisetulosus	BCC00018		EF622230	-	EF622229	-
Thailandiomyces bisetulosus	BCC00200		EF622231	-	EF622228	-
Thedgonia ligustrina	CBS 148.59		MH869373	MH857833	-	-
Thedgonia ligustrina	CBS 547.71		MH872021	MH860259	-	-
Thelonectria discophora	CBS 125153; AR 4324		HM364307	HM364294	-	KM232344
Thelonectria olida	CBS 216.67;ATCC 16545; IMI 116875	T	NG_064062	NR_156198	-	-
Theobromium fuscum	CBS 112271	T	LR025976	LR026839	-	LR026229
Thermothielavioides terrestris	CBS 117535; CBS 355.66	T	MK926837	NR_165593	-	MK876799
Thermothielavioides terrestris	CBS 455.75		MH872695	MH860938	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Thozetella fabacearum	MFLU 16-1021	T	KY212762	KY212754	-	-
Thysanophora penicillioides	CBS 292.60		MH869541	MH857987	AB075428	-
Thysanorea papuana	CBS 212.96	T	NG_057787	NR_111276	-	-
Tilachlidium brachiatum	CBS 363.97		KM231719	KM231838	-	KM232414
Tilachlidium brachiatum	CBS 505.67		KM231720	KM231839	-	KM232415
Tilachlidium brachiatum	CBS 506.67		HQ232177	MH859045	-	-
Tilachlidium brachiatum	CBS 507.67		MH870765	MH859046	-	-
Tilletiopsis cremea	CBS 605.83	T	AJ235279	AB025690	KP322969	KP323108
Tilletiopsis lilacina	CBS 435.92	T	KP322984	KP322984	KP322966	KP323110
Tilletiopsis washingtonensis	CBS 544.50	T	AJ235278	DQ835994	KP322976	DQ835995
Titaea sp.	PDD 112249		MK426984	MK426991	-	-
Togniniella acerosa	CBS 113648		AY761076	-	AY761073	GU180660
Togniniella acerosa	CBS 113726	T	NG_057734	NR_135947	NG_061029	-
Tolypocladium album	CBS 393.89		MH873866	MH862176	-	-
Tolypocladium inflatum	CBS 824.70	T	MH871762	MH859963	-	-
Tolypocladium inflatum	OSC 71235		EF469077	JN049844	EF469124	EF469108
Torulomyces lagena	CBS 185.65; MUCL 8221	T	MH870173	MH858536	-	JN121450
Toshionella nipponensis	CBS 141492; C3904	T	NG_069532	NR_165508	NG_067647	-
Trechispora alnicola	AFTOL-ID 665		AY635768	DQ411529	AY657012	DQ408135
Triadelphia heterospora	CBS 222.83	T	MH873306	MH861574	MF434807	MF434798
Tricellula aquatica	CBS 271.84	Au	MH873442	MH861737	-	-
Tricellula aurantiaca	CBS 399.58; ATCC 13128; IMI 073024; MUCL 28102; PRL 1554	T	MH869354	MH857822	-	-
Tricellula curvata	CBS 429.54; ATCC 11837; IMI 073023; MUCL 28100; PRL 1561	T	MH868922	MH857382	-	-
Tricellula inaequalis	CBS 359.53; IFO 6805; IMI 051976; MUCL 28103; PRL 1563	T	MH868778	MH857245	-	-
Trichocoma paradoxa	CBS 103.73		MH872339	JN899399	-	JN121417
Trichoconis echinophila	CBS 214.72		EU107315	-	-	-
Trichoderma polysporum	CBS 820.68	T	AF399244	NR_134448	-	DQ087238
Trichoderma virens	DAOM JBT1003		JN938865	JN942883	JN939042	-
Trichoderma virens	CBS 109339	T	MH874417	MH862822	-	-
Trichoderma viride	G.J.S. 89-127		AY489726	-	AY489694	AF545521
Tricholomella constricta	IE-BSG-HC84/75		AF223188	AF357036	-	DQ825412
Trichomerium lapideum	CGMCC 3.17311	T	KP174946	KP174850	KP174895	-
Trichomonascus ciferrii	CBS 4856; ATCC 22873; DBVPG 6217; IFO 10192; JCM 9551	T	KY109914	KY105703	AY497753	AY497613
Trichophaea minuta	CBS 236.57	T	MH869247	MH857707	-	JX943781
Trichophyton tonsurans	CBS 496.48	T	NG_069524	NR_144891	-	-
Trichosphaerella ceratophora	CBS 130.82		KM231727	KM231847	-	KM232423
Trichosporiella cerebriformis	CBS 135.68	T	MH870802	MH859089	-	-
Trichosporiella cerebriformis	CBS 244.68		MH870838	MH859126	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Trichosporon inkin	CBS 5585	T	AF105396	AF444420	AB001757	KF036971
Trichothecium crotocinigenum	CBS 129.64	T	MH870018	MH858389	-	-
Trichothecium roseum	CBS 567.50		MH868279	MH856758	-	-
Tricladium splendens	CBS 234.46; MUCL 28105	T	MH867695	MH856171	-	-
Tridentaria implicans	H.L. Barnett No. 781;CBS 320.56		KT215279	KT215279	-	-
Tridentaria subuliphora	CBS 700.93		KT215280	KT215280	-	-
Triscelophorus anakonajensis	YMF1.04398	T	MK577819	MK569512	MK577804	MK577834
Triscelophorus guizhouensis	YMF1.04156	T	MK577821	MK569514	MK577806	MK577836
Triscelophorus monosporus	CBS 440.54		MH868925	-	-	-
Tristratiperidium microsporum	MFLUCC 15-0413	T	NG_070393	NR_164238	-	-
Tritirachium cinnamomeum	CBS 182.42	T	MH867611	MH856112	NG_064977	-
Tritirachium oryzae	CBS 388.39		MH867544	MH856048	-	-
Tritirachium roseum	CBS 183.42		KF258731	JF779669	JF779655	-
Tropohalonectria suthepensis	PDD 76762	T	DQ341513	-	NG_077399	-
Tuberculina maxima	CBS 137.66		AY292408	AY292437	-	-
Tuberculina photiniae	SWFC 004453	T	NG_060014	NR_154527	-	-
Tubeufia javanica	MFLUCC 12-0545		KJ880036	KJ880034	KJ880035	-
Tumenectria laetidisca	CBS 101909	T	KJ022067	KJ022018	KJ022102	-
Tumularia aquatica	CBS 212.46; MUCL 28096	T	MH867689	MH856165	-	-
Tylophoron galapagoense	CDS 37153; Ertz 11794 (BR)	T	JF295080	-	-	-
Tylophoron hibernicum	UPS Frisch 11/Ug220		KJ851065	-	-	-
Tylophoron stalactiticum	Ertz 10880 (BR)		JF295086	-	-	-
Tympanis confusa	Quijada LQH-8		MH810148	MH810146	-	MH818601
Udeniozyma ferulica	JCM 8231	T	AF363653	AF444528	KJ708379	KJ708229
Ugola praticola	CBS 705.82	T	MH873284	MH861543	-	-
Ustilaginoidea virens	MAFF 240994	T	LC474612	NR_169664	NG_064837	LC474627
Ustilago hordei	CBS131470	T	KF706429	KF706437	KF706442	KF706521
Vandijckella johannae	JW1034; CBS 143182	T	LT904726	NR_172156	-	LT904707
Variabilispora flava	GLMC 1858; CBS 144845; DSM 107777; JKI-Nov103	T	MK314616	MK314562	-	-
Varicosporella aquatica	CBS 126103	T	KP192671	KP192669	-	-
Varicosporium elodeae	AU_CRYP05		JN941371	JN995640	JN938734	-
Varicosporium elodeae	CBS 541.92		KC834037	DQ202517	-	-
Variocladium giganteum	CBS 508.71	T	MH872007	MH860240	-	-
Venturia albae	CBS 471.61	T	MK810840	MK810955	-	MK887842
Venustampulla echinocandica	NBRC BP-5553	T	MH762907	MH762907	MH762901	MH805864
Venustampulla parva	CBS 245.31; IMI 058410	T	MK185690	MK185675	MK185668	MK190958
Venustampulla parva	UAMH 918; ATCC 58635		MK185691	MK185676	MK185669	-
Verhulstia trisororum	CBS 143234	T	MG022160	MG022181	-	-
Vermiculariopsiella dichapetali	CBS 137977; CPC 22463	T	KJ869186	KJ869129	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Vermiculariopsiella eucalypti	CBS 141281; CPC 25525	T	KX228303	KX228251	-	-
Vermiculariopsiella pediculata	FMR 12187		HF678537	HF678527	-	-
Vermispora fusarina	CBS 382.84	T	NG_057882	NR_156506	-	-
Veronaeopsis simplex	CBS 588.66; IMI 203547	T	NG_070358	NR_164225	NG_061164	MN091925
Verticillium dahliae	ATCC 16535; AFTOL-ID 237		DQ470945	KT225533	AY489705	DQ522468
Verticimonosporium diffractum	CBS 310.72; MFC 2807; NRRL 26537	T	NG_064096	NR_160138	AF049159	-
Vexillomyces palatinus	GLMC 1852; CBS 144842	T	NG_068609	NR_165532	-	-
Vexillomyces verruculosus	CBS 144838; GLMC 1840		MK314630	MK314577	-	-
Vexillomyces verruculosus	GLMC 1854; CBS 144843	T	NG_068610	NR_165533	-	-
Volutella ciliata	CBS 483.61; CCT 5396; MUCL 9859		KM231635	KM231770	-	-
Waitea circinata	AFTOL-ID 1129		AY885164	-	-	DQ846899
Wallemia ichthyophaga	CBS 113033; EXF-994; AFTOL-ID 2119	T	NG_064233	NR_145348	NG_061028	DQ847519
Wallemia mellicola	CBS 633.66; ATCC MYA-4683	T	MH870570	NR_155952	KY751335	-
Wallemia sebi	DAOM 216381		JN938862	JN942880	JN939045	-
Wiesneriomyces conjunctosporus	BCC 40615		KJ425454	-	KJ425441	-
Wolfgangiella franznegeri	CBS 144149; C4328	T	MG269974	-	-	-
Woswasia atropurpurea	CBS 133167; WU 32007	T	JX233658	NR_154480	JX233658	JX233659
Xenoacremonium recifei	CBS 137.35; IHEM 4405; MUCL 9696	T	HQ232106	KM231833	-	KM232397
Xenocylindrocladium serpens	CBS 128439; MUCL 39315	T	KM231688	AF220982	-	-
Xenodactylaria thailandica	CBS 145074; CPC 34588	T	NG_066290	NR_161134	-	-
Xenogliocladiopsis eucalyptorum	CBS 138758; CPC 16271	T	KM231622	KM231759	-	KM232331
Xenoleptographium phialoconidium	CBS 134694	T	NG_058196	-	-	KT164796
Xenopolyscytalum pinea	CBS 126493	T	NG_070454	NR_156543	-	-
Xenoramularia polygonicola	CBS 141102; CPC 10852	T	GU214695	NR_154474	GU214695	KX288723
Xenosonderhenioides indonesiana	CBS 142239; CPC 15066	T	NG_058498	NR_156643	-	MF951689
Xerochrysium dermatitidis	CBS 132.31	T	MH866606	MH855157	-	JN121443
Xerombrophila crystallifera	CBS 128289	T	MH876294	MH864847	-	-
Xeromyces bisporus	CBS 236.71	T	NG_057813	NR_154540	NG_062771	JN121466
Xeropilidium dennisii	TU 104501	T	KX090824	LT158441	KX090876	KX090723
Xyladictyochaeta lusitanica	CBS 142290; FMR 12177	T	KY853543	KY853479	HF937349	-
Xyladictyochaeta tristaniopsis	CBS 146793; CPC 38240	T	NG_074486	NR_171761	-	-
Xylaria acuta	ATCC 56487; AFTOL-ID 63		AY544676	AF163026	AY544719	DQ247797
Xylaria hypoxylon	CBS 122620; OSC 100004; AFTOL ID 51	T	AY544648	KY610407	AY544692	DQ470878
Xylaria termiticola	CBS 122919; NBRC 102095	T	NG_064210	NR_159869	AB274812	-
Xylochrysis lucida	CBS 135996	T	KF539911	NR_132063	KF539912	KF539913
Xylolentia brunneola	PRA-13611	T	MG600398	MG600394	MG600407	MG600402
Ypsilina graminea	CBS 114630	T	MH874529	MH862967	-	-

Table 2.2 (continued)

Taxa	Voucher	Type	LSU	ITS	SSU	*rpb2*
Yuccamyces citri	CBS 143161; CPC 30046	T	NG_058511	NR_164262	-	-
Yuccamyces pilosus	CBS 579.92; INIFAT C92/42		MG386097	MG386044	-	-
Zalaria alba	DAOMC 250847	T	KX579099	KX579093	KX579111	KX579105
Zalaria obscura	DAOMC 250849	T	NG_060010	KX579094	NG_061249	KX579106
Zanclospora novae-zelandiae	ICMP 15781	T	MW144411	MW144429	MW151690	MW147342
Zasmidium cellare	CBS 146.36; ATCC 36951; IFO 4862; IMI 044943; LCP 52.402; LSHB BB274; MUCL 10089	T	EU041878	EU041821	EF137362	MF951693
Zasmidium velutinum	CBS 101948; CPC 2262	T	EU041838	EU041781	-	MF951731
Zongqia sinensis	CGMCC 3.20471; GZUIFR 21.823	T	MZ444115	MZ444088	-	-
Zygophiala cryptogama	KY1_1.2A1c		EF164902	EF164900	-	-
Zygosporium oscheoides	MFLUCC 14-0402		MF621589	MF621585	MF621593	-
Zygosporium pseudomasonii	CBS 146059	T	MN567654	MN562147	-	MN556815
Zymochalara cyatheae	CPC 24665; COAD 1092	T	NG_059652	NR_154509	NG_061228	-
Zymochalara lygodii	CPC 24699	T	NG_059653	NR_154510	NG_062415	-
Zymochalara lygodii	CPC 24710; COAD 2001	T	KU597772	KU597805	KU597787	-

2.3 Results

2.3.1 Phylogenetic Analysis

The combined LSU, SSU and RPB2 sequence dataset included 1263 taxa (ingroup) and two outgroup taxa with a total of 5510 characters (2077 characters for LSU, 1925 characters for SSU, and 1508 characters for RPB2) after alignment including the gaps, of which 3462 were parsimony informative, 837 were parsimony-uninformative, and 1211 characters were constant. The tree was rooted with *Phycomyces blakesleeanus* (NRRL 1555) and *Rhizopus arrhizus* (CBS 112.07). The ML and IQ-Tree analyses based on combined LSU, SSU and RPB2 sequence data provided similar tree topologies, and the result of ML analysis with a final likelihood value of -408876.873075 is shown in Figure 2.1. The matrix had 5064 distinct alignment patterns, with 69.24% undetermined characters or gaps. Estimated base frequencies were: A = 0.257260, C = 0.224106, G = 0.283811, T = 0.234823; substitution rates AC = 1.000000, AG = 3.989692, AT = 1.000000, CG = 1.000000, CT = 3.989692, GT = 1.000000; gamma distribution shape parameter $\alpha = 0.417885$.

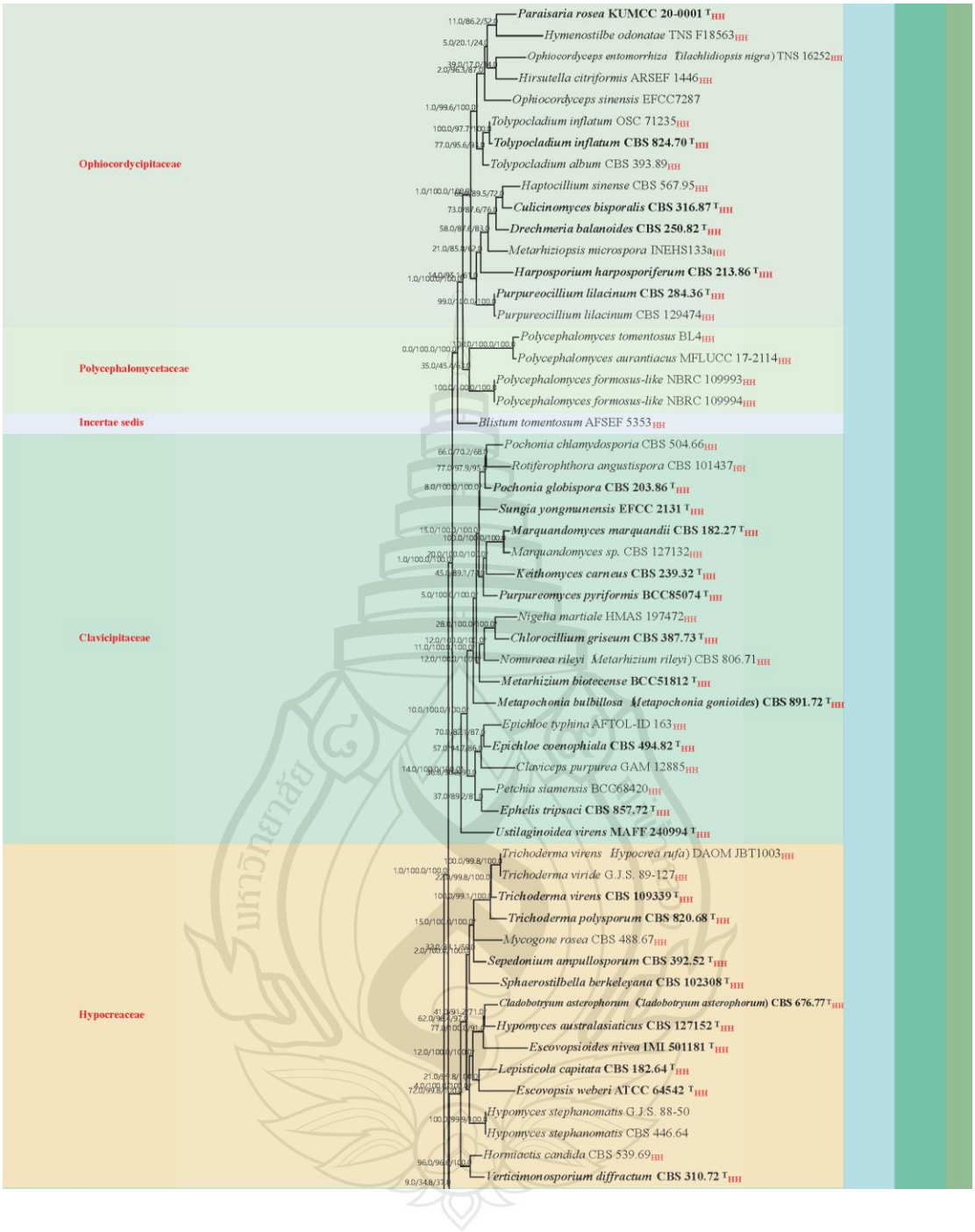


Figure 2.1 Phylogenetic tree for hyaline-spored hyphomycetes



Figure 2.1 (continued)

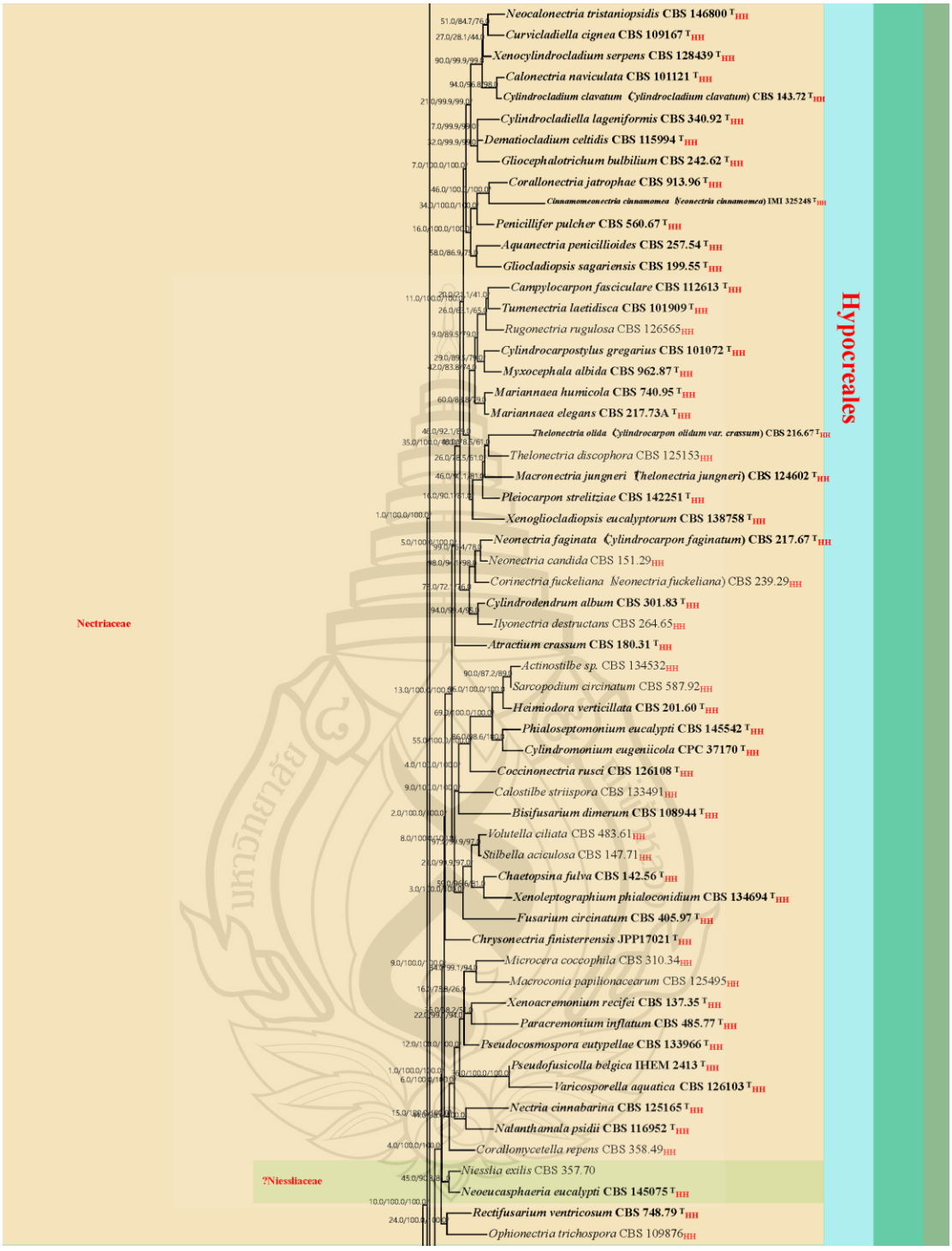


Figure 2.1 (continued)

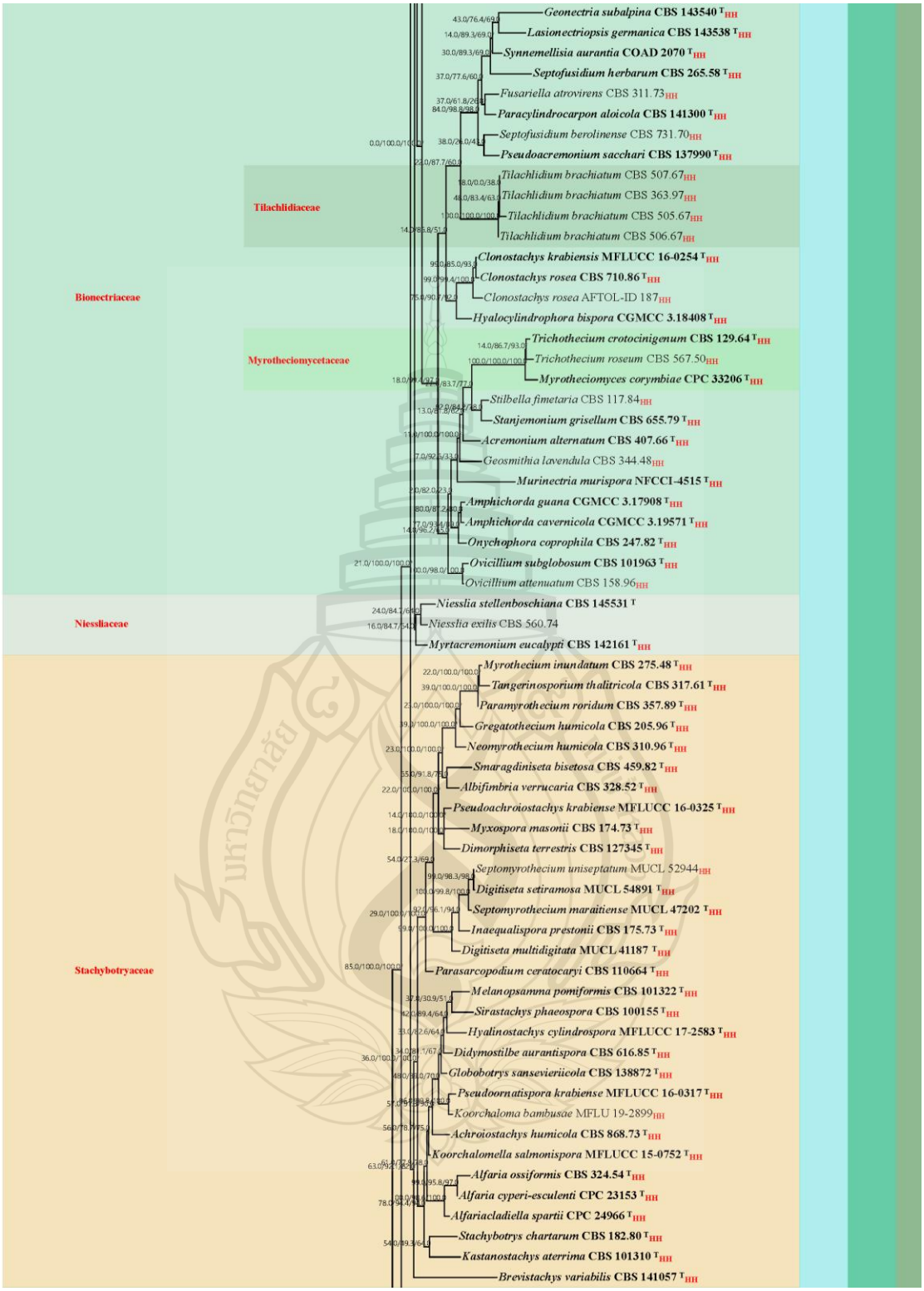


Figure 2.1 (continued)

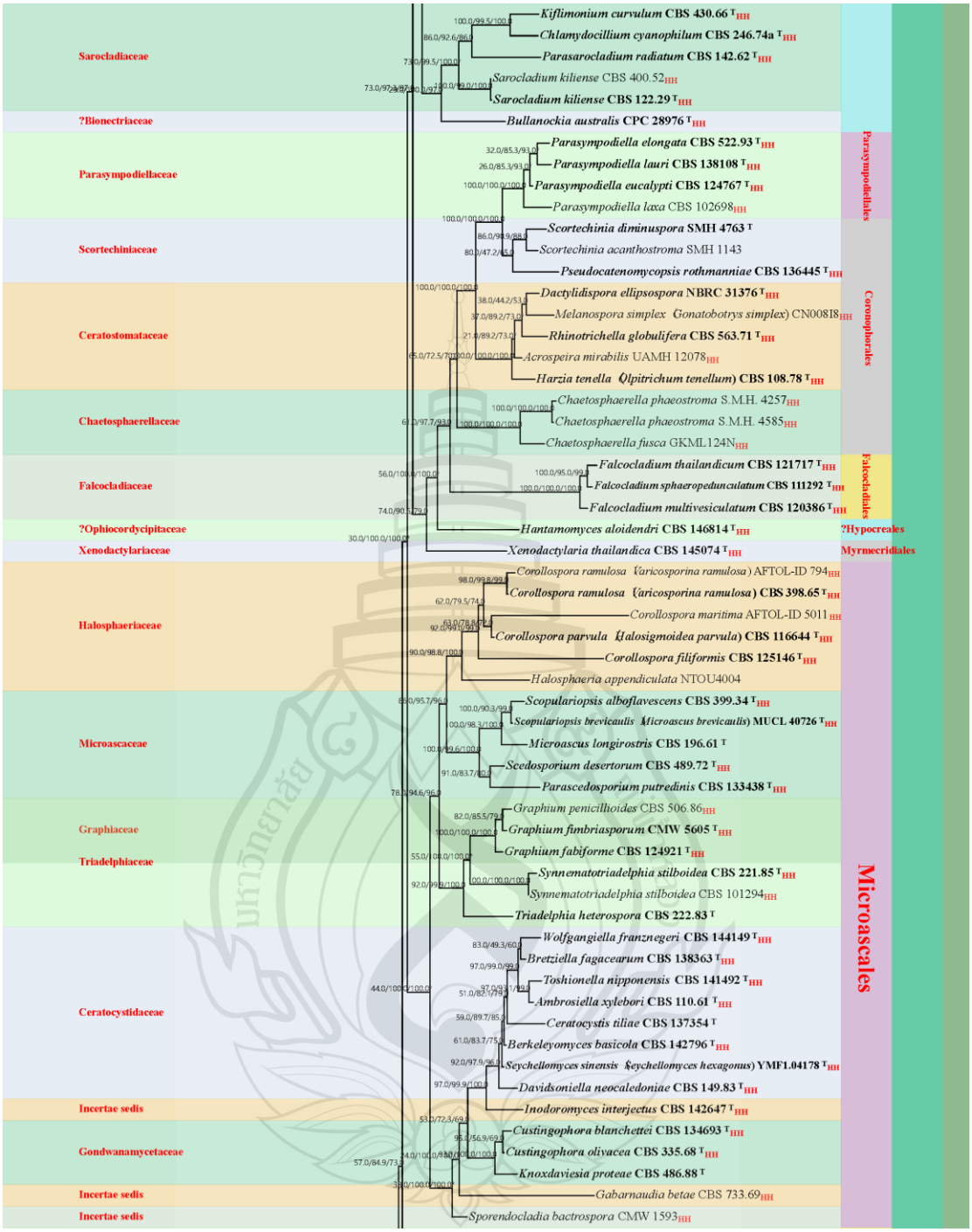


Figure 2.1 (continued)

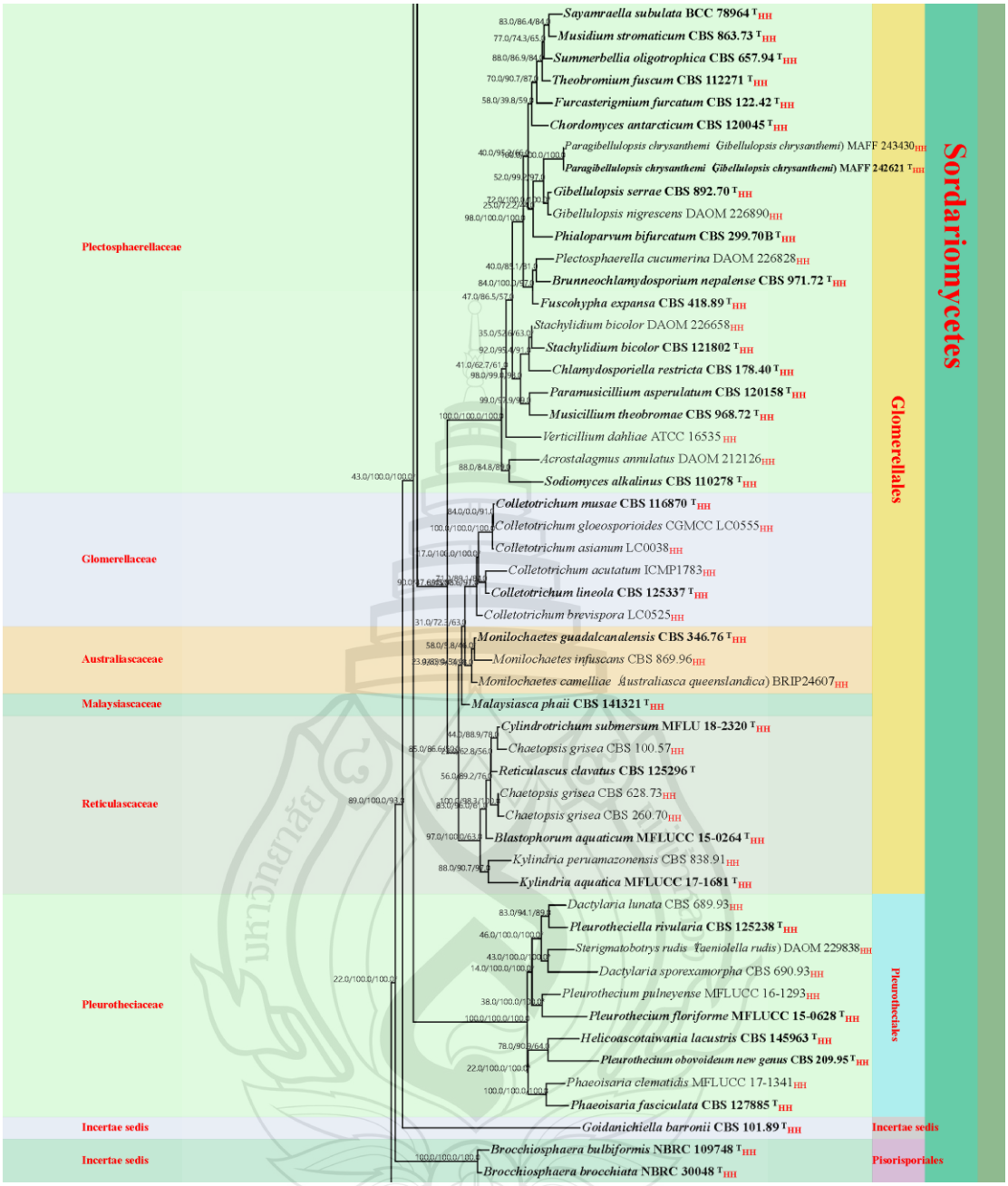


Figure 2.1 (continued)

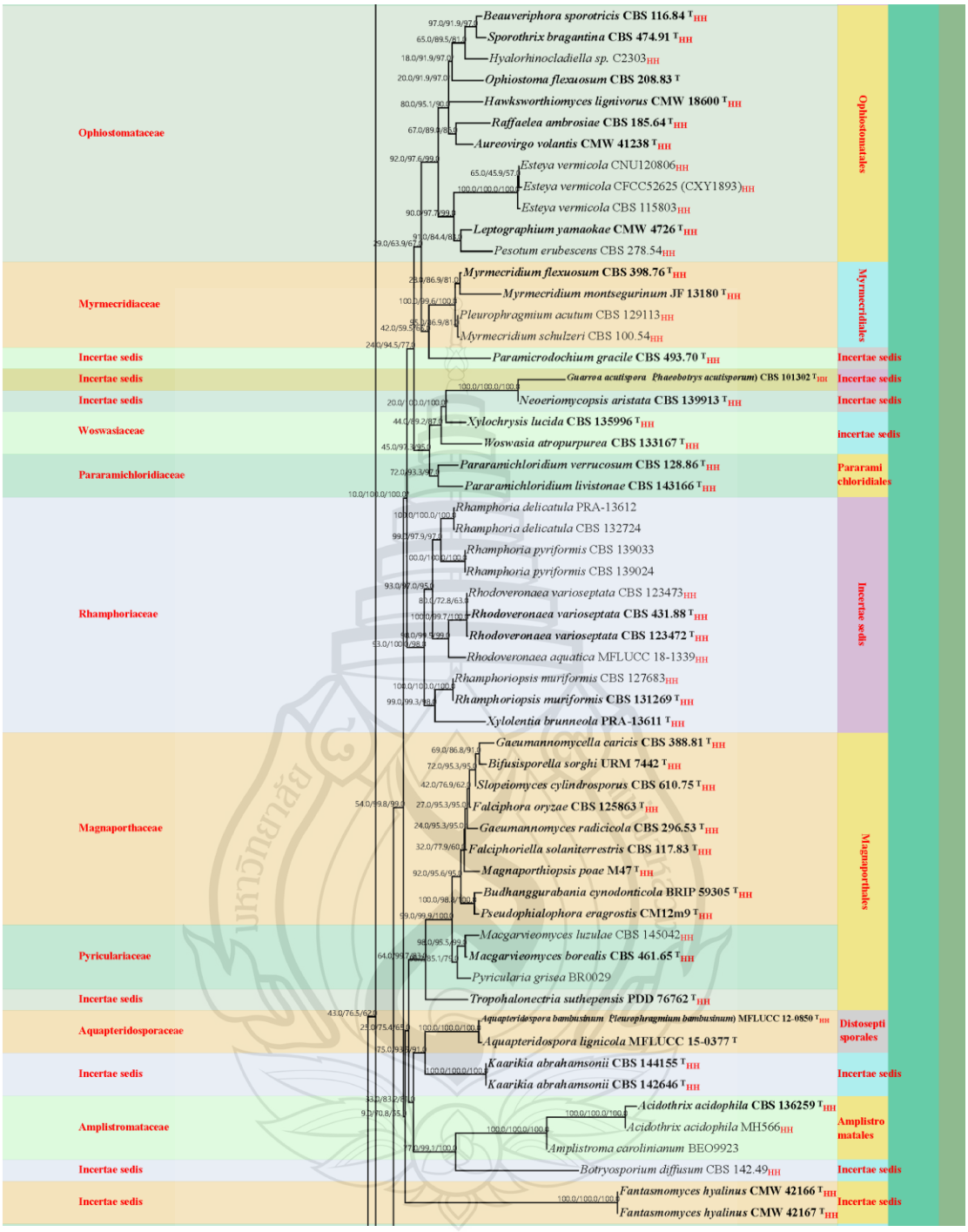


Figure 2.1 (continued)

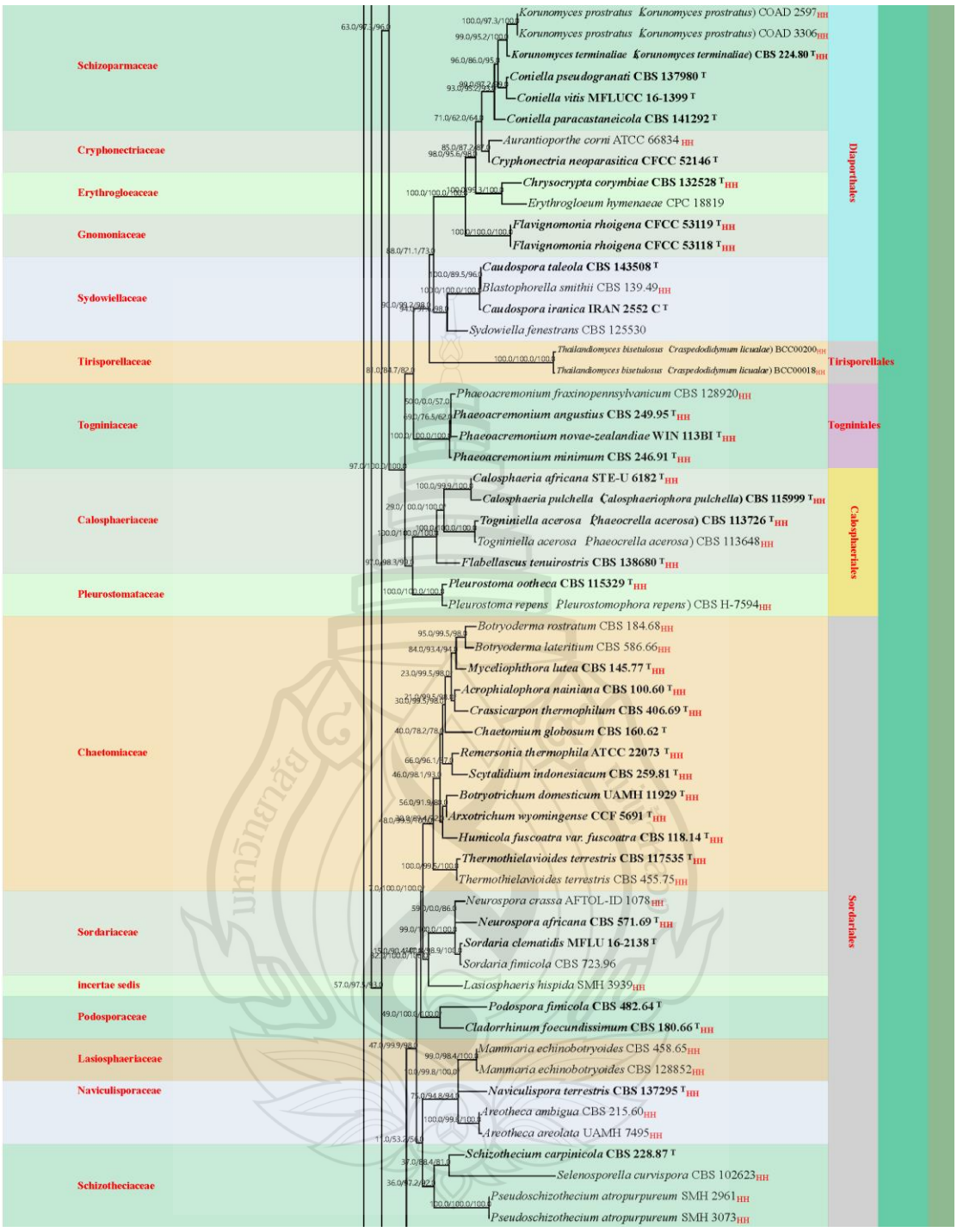


Figure 2.1 (continued)

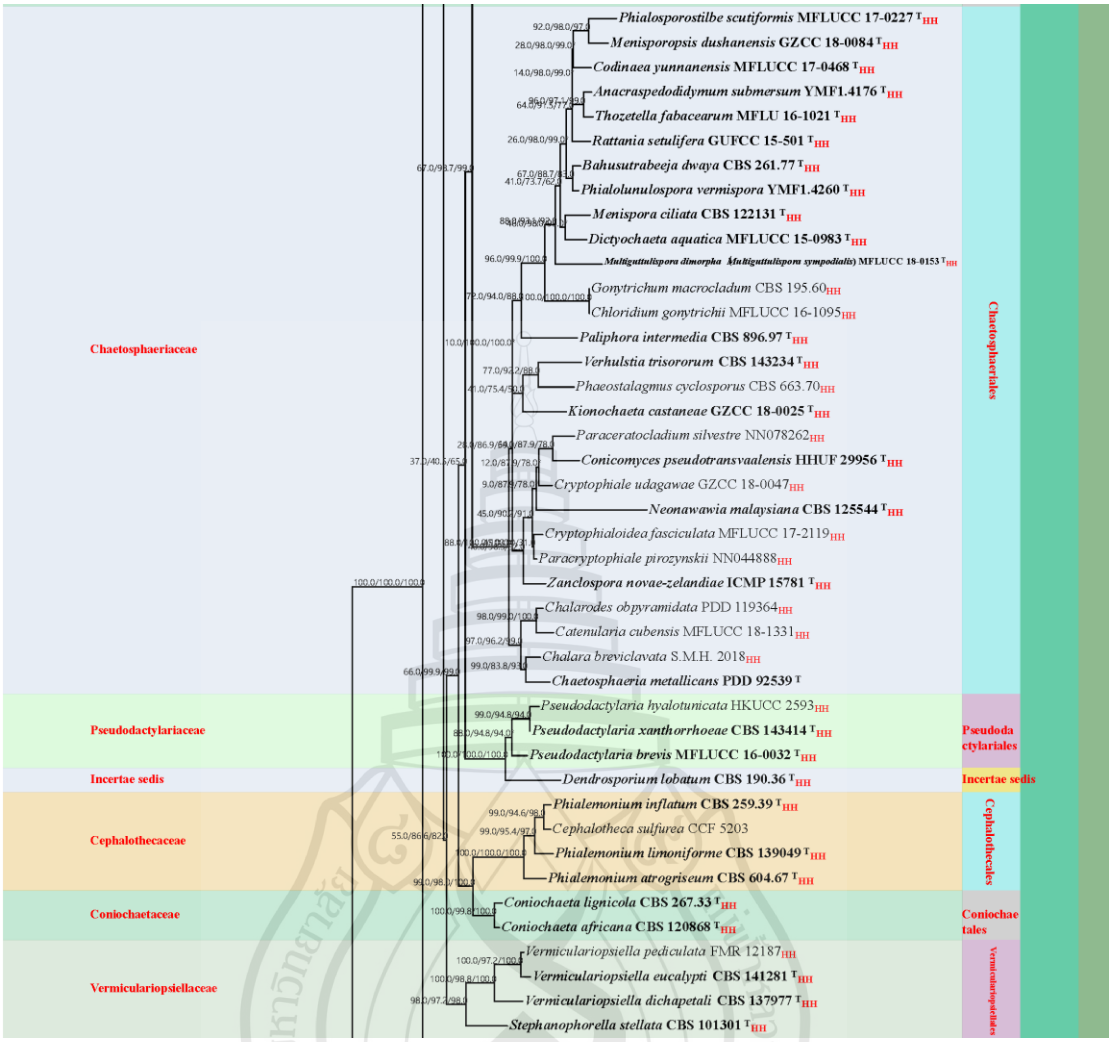


Figure 2.1 (continued)

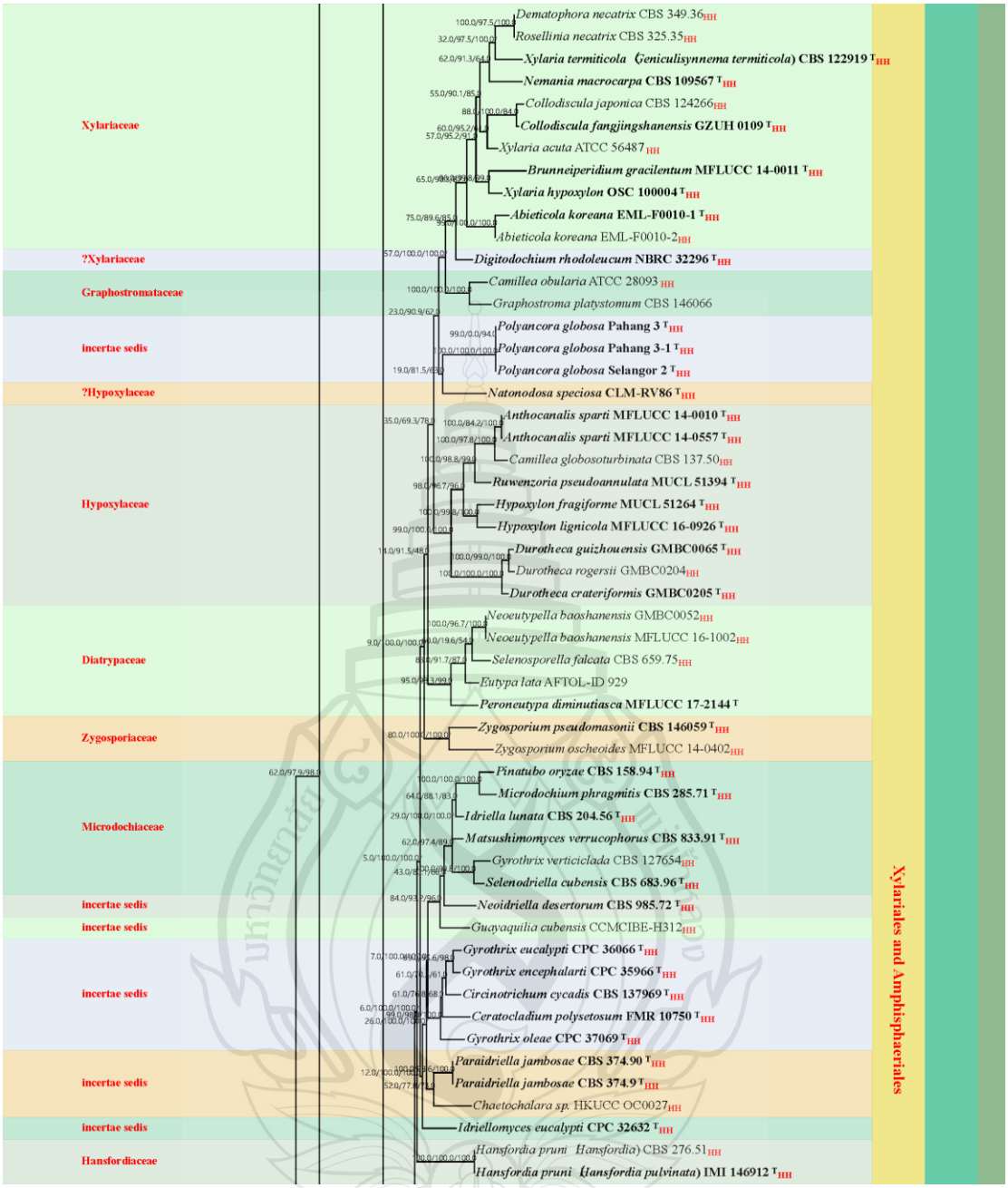


Figure 2.1 (continued)

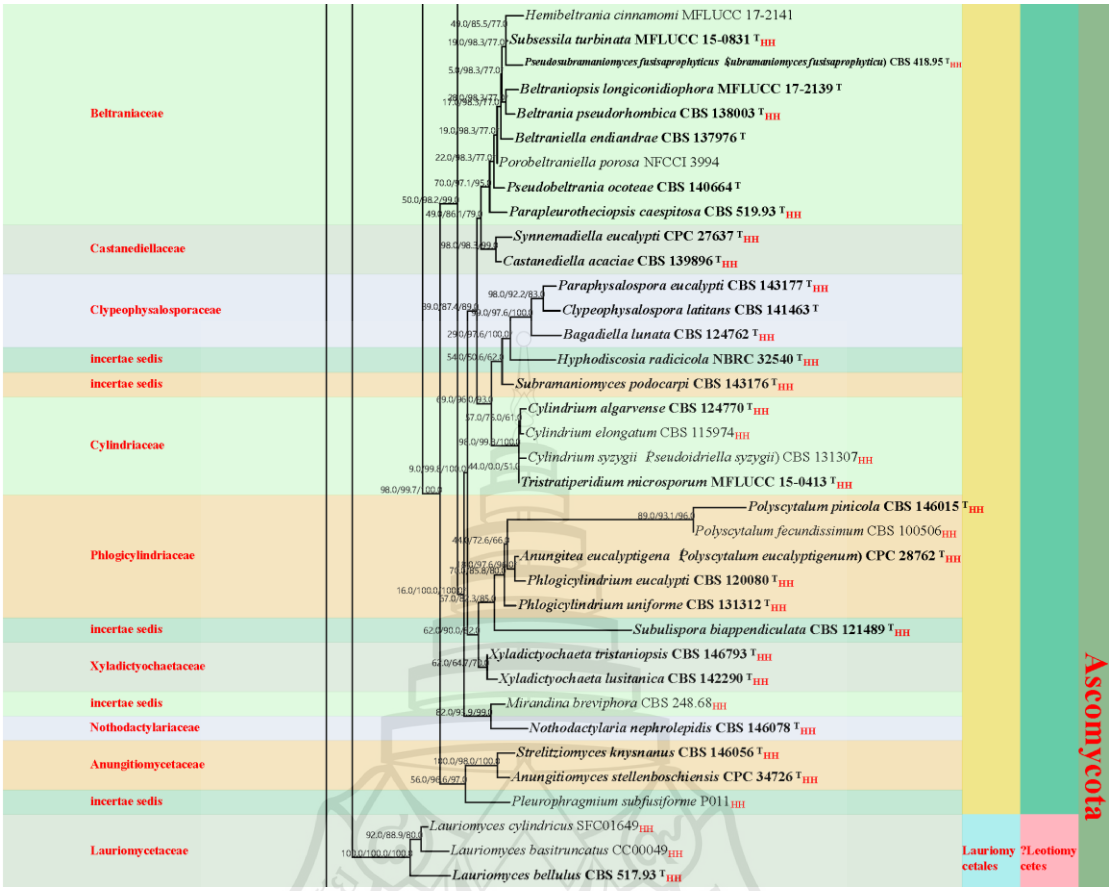


Figure 2.1 (continued)

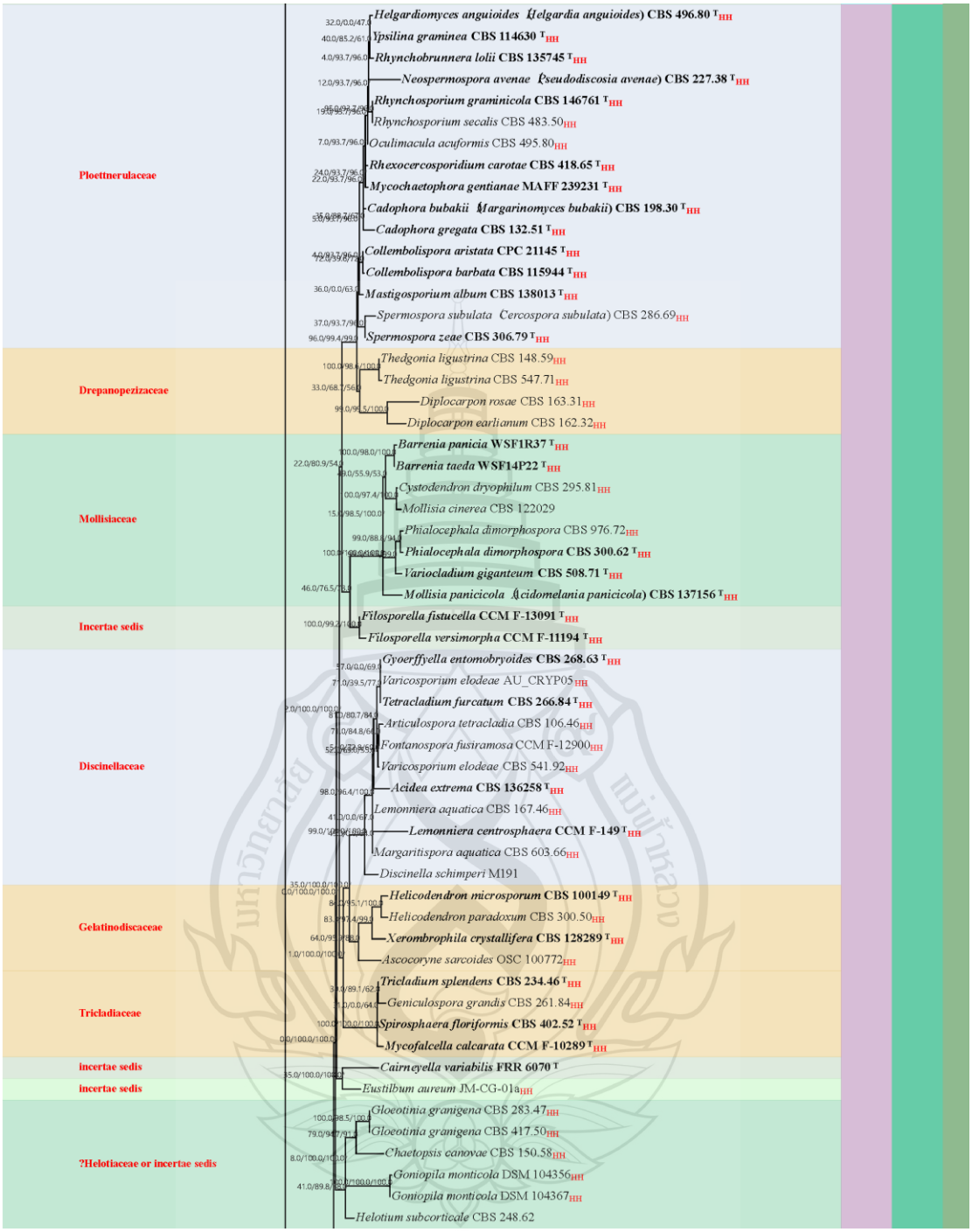


Figure 2.1 (continued)

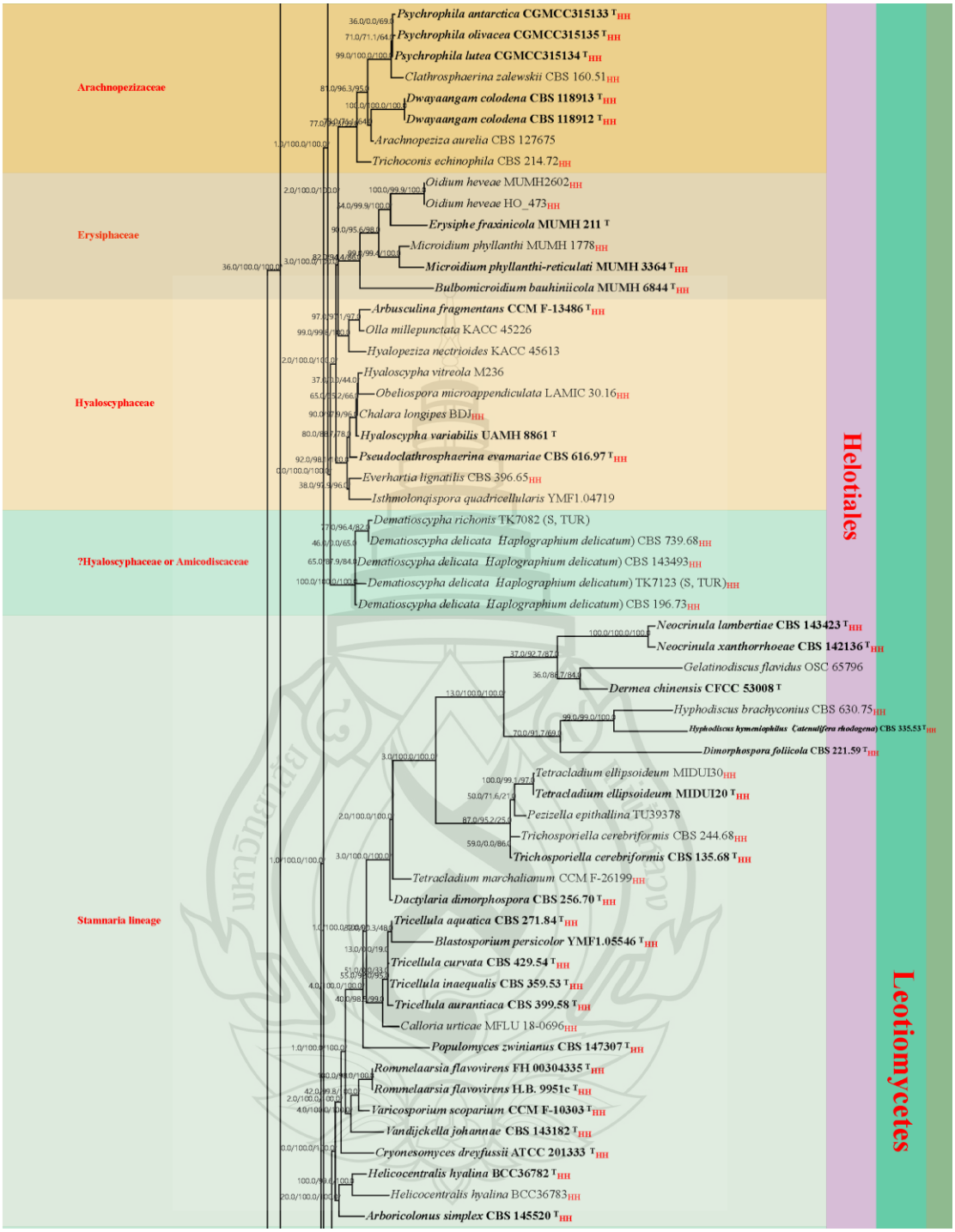


Figure 2.1 (continued)

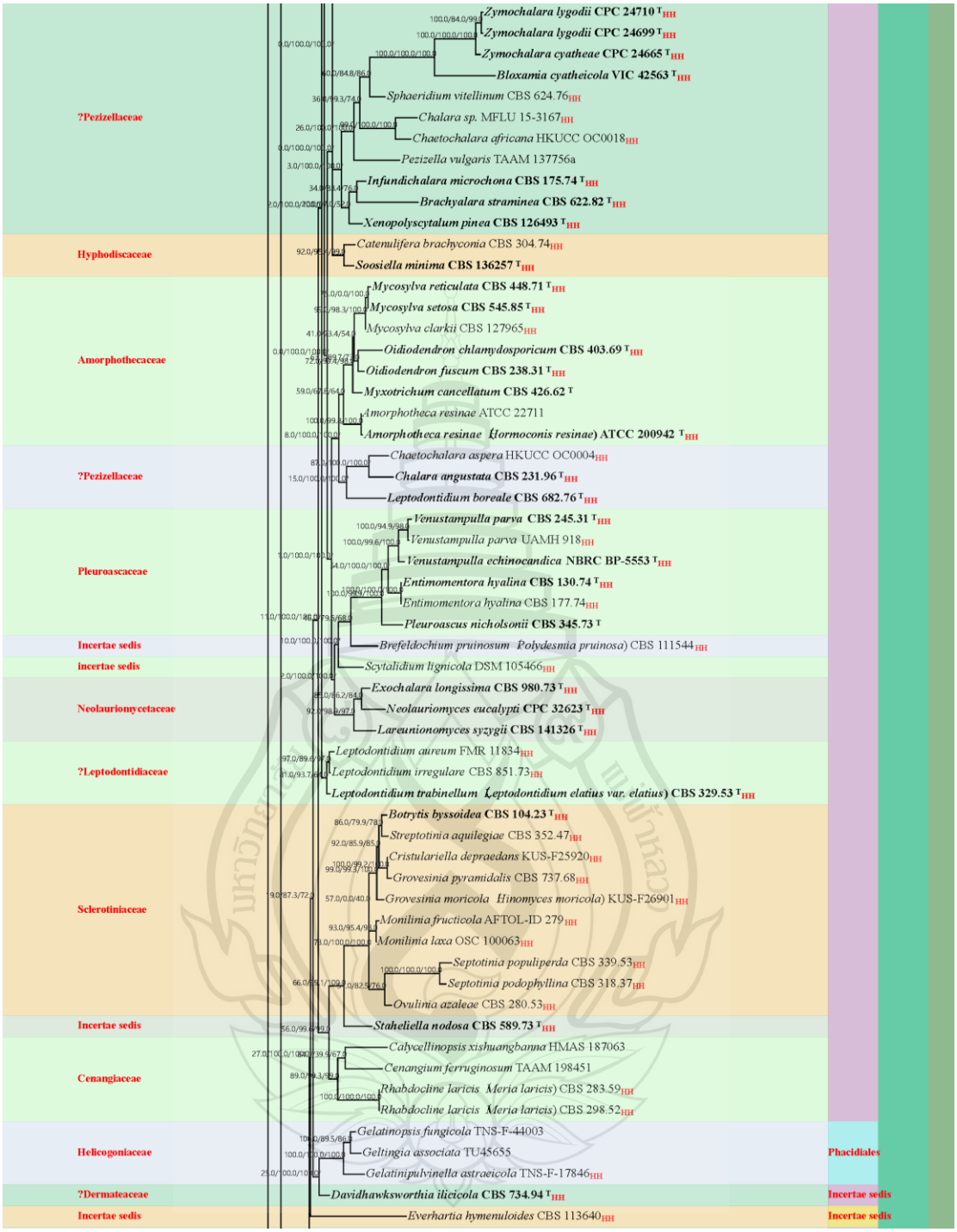


Figure 2.1 (continued)

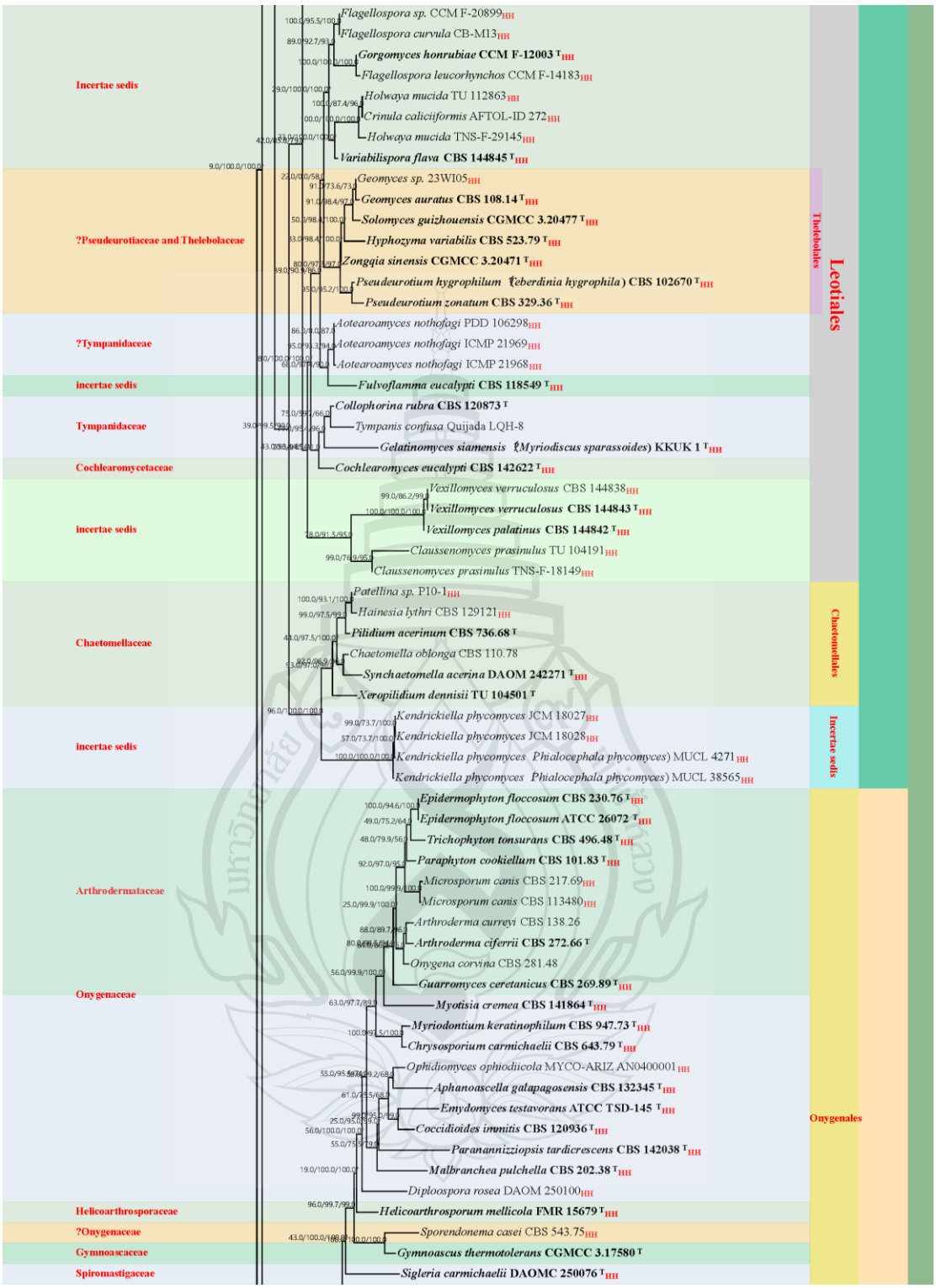


Figure 2.1 (continued)

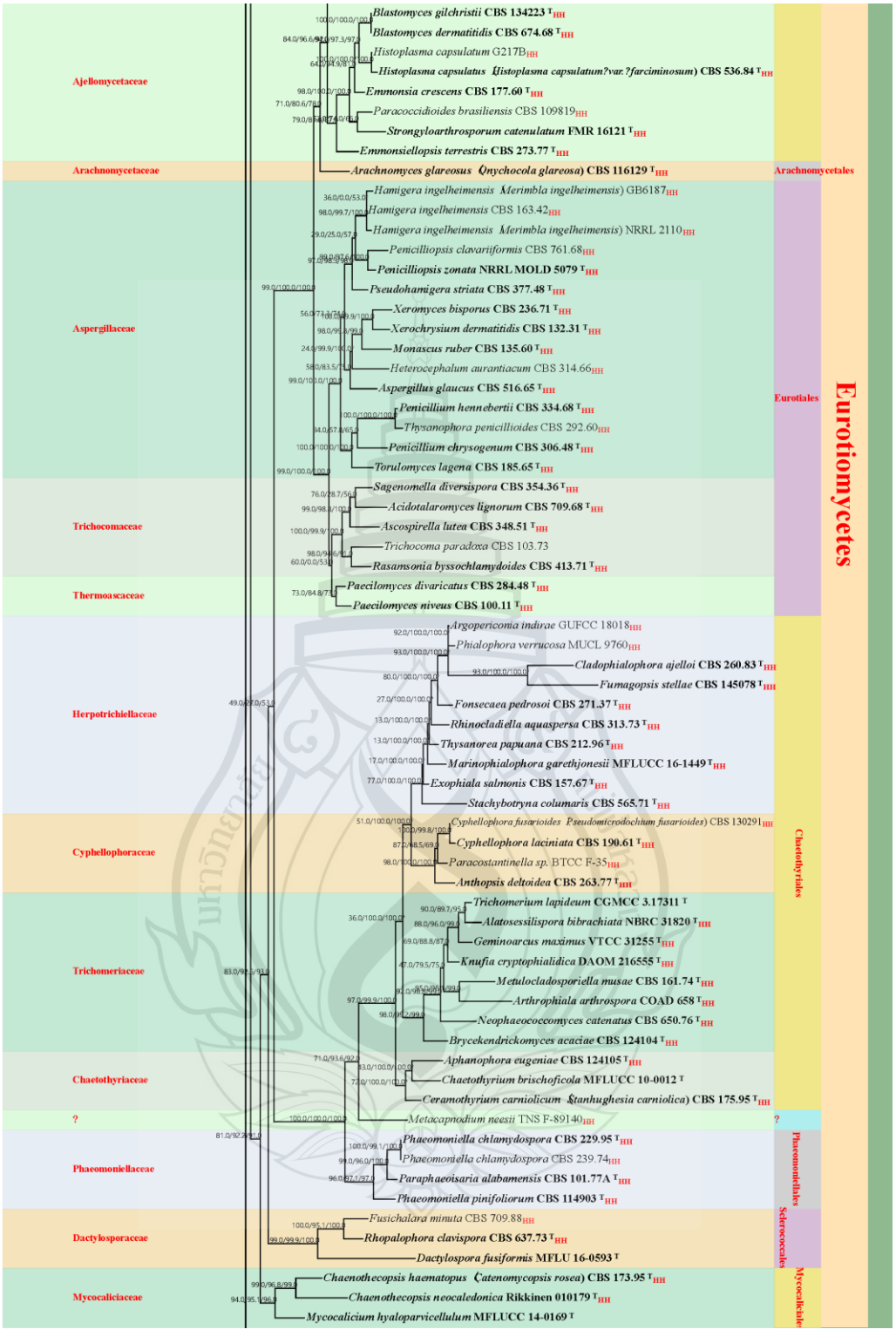


Figure 2.1 (continued)

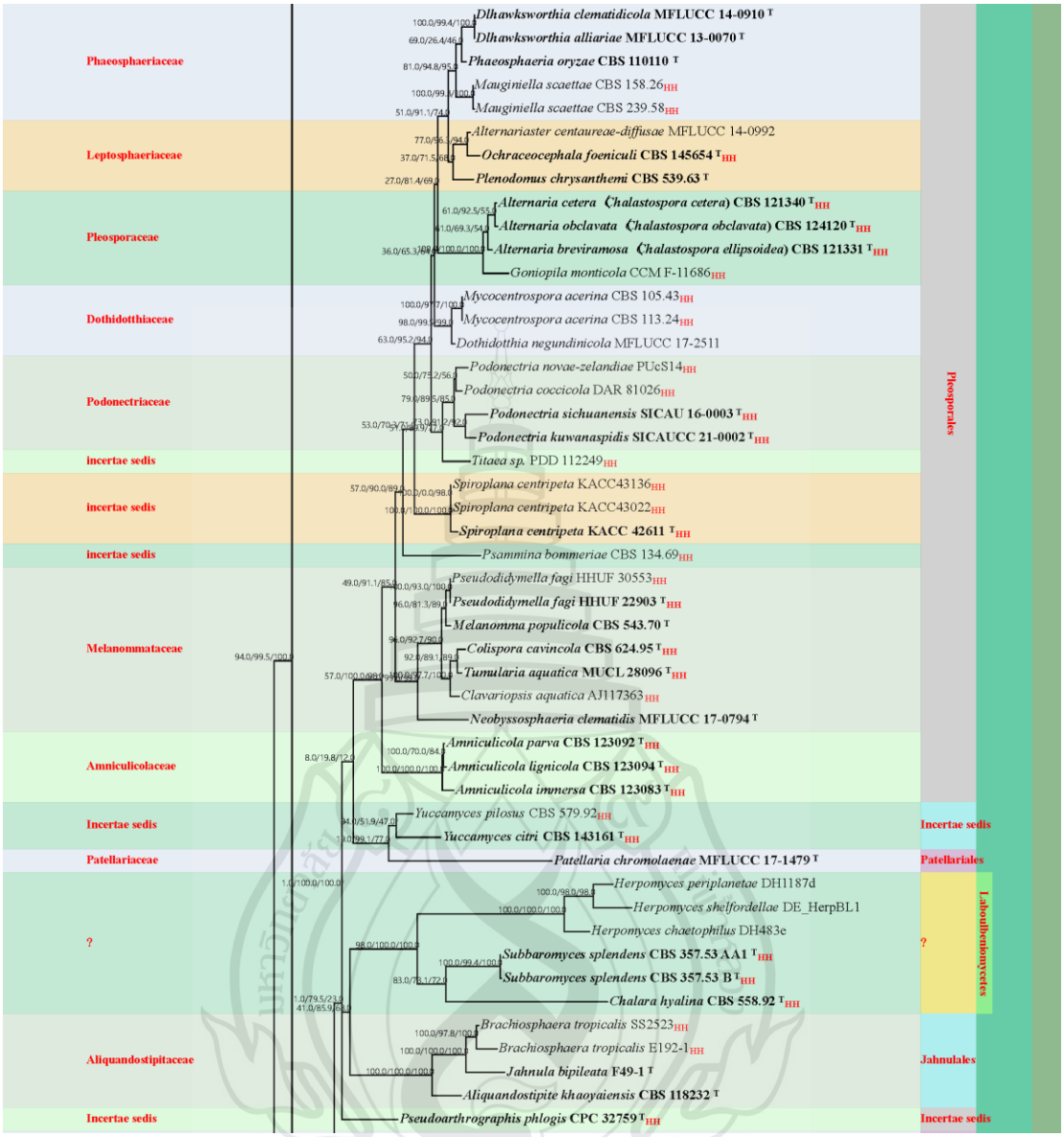


Figure 2.1 (continued)

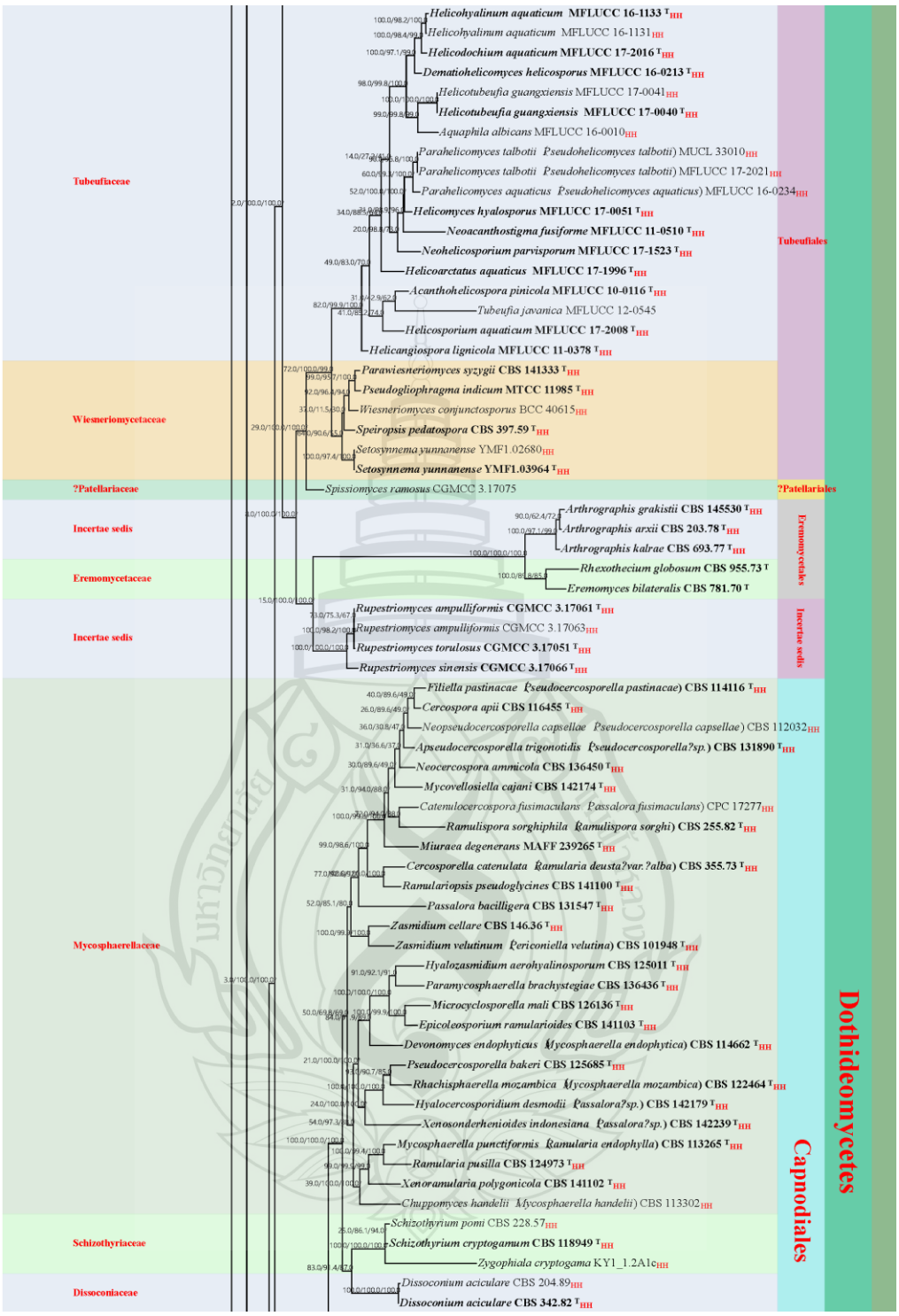


Figure 2.1 (continued)

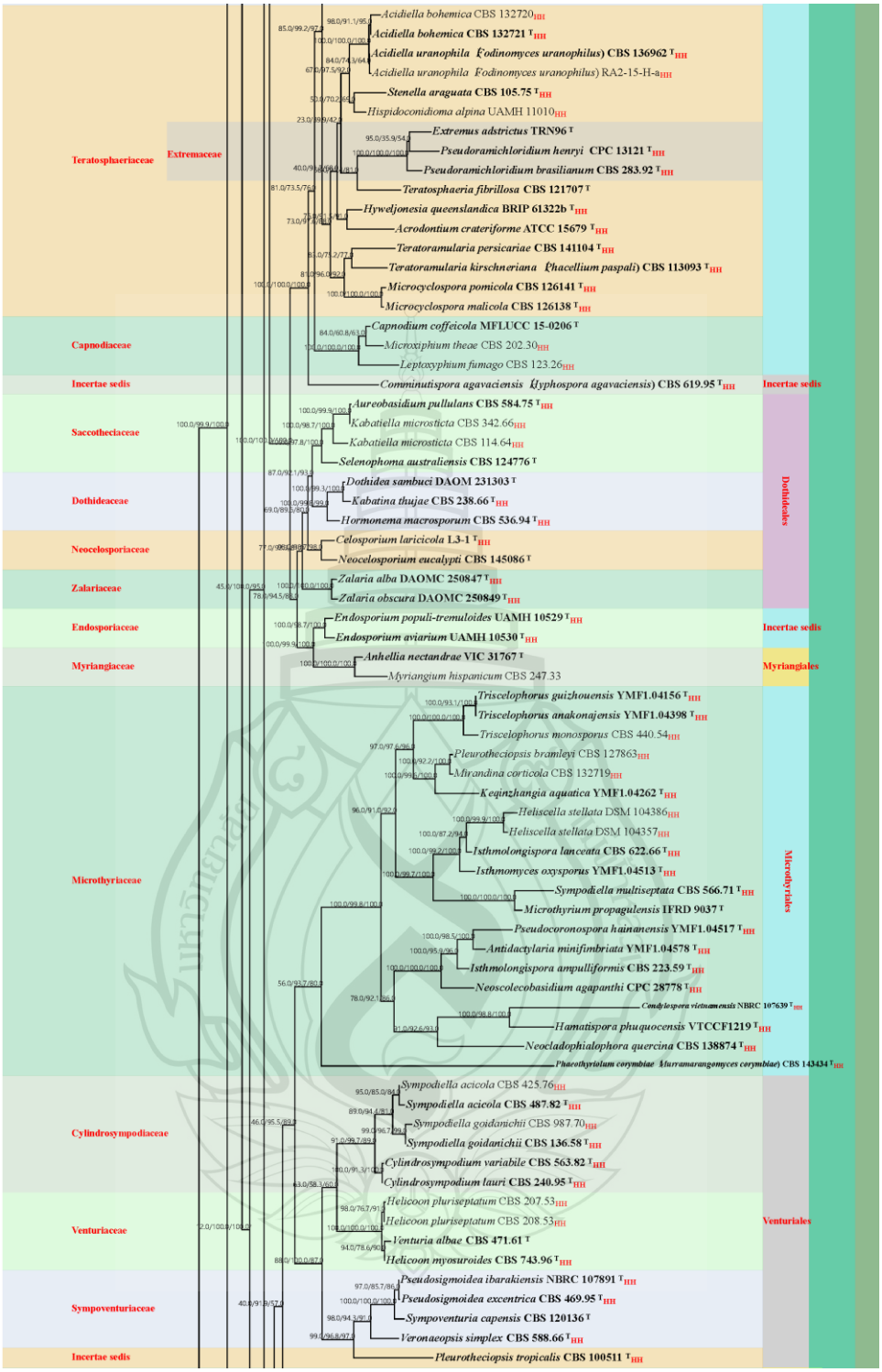


Figure 2.1 (continued)

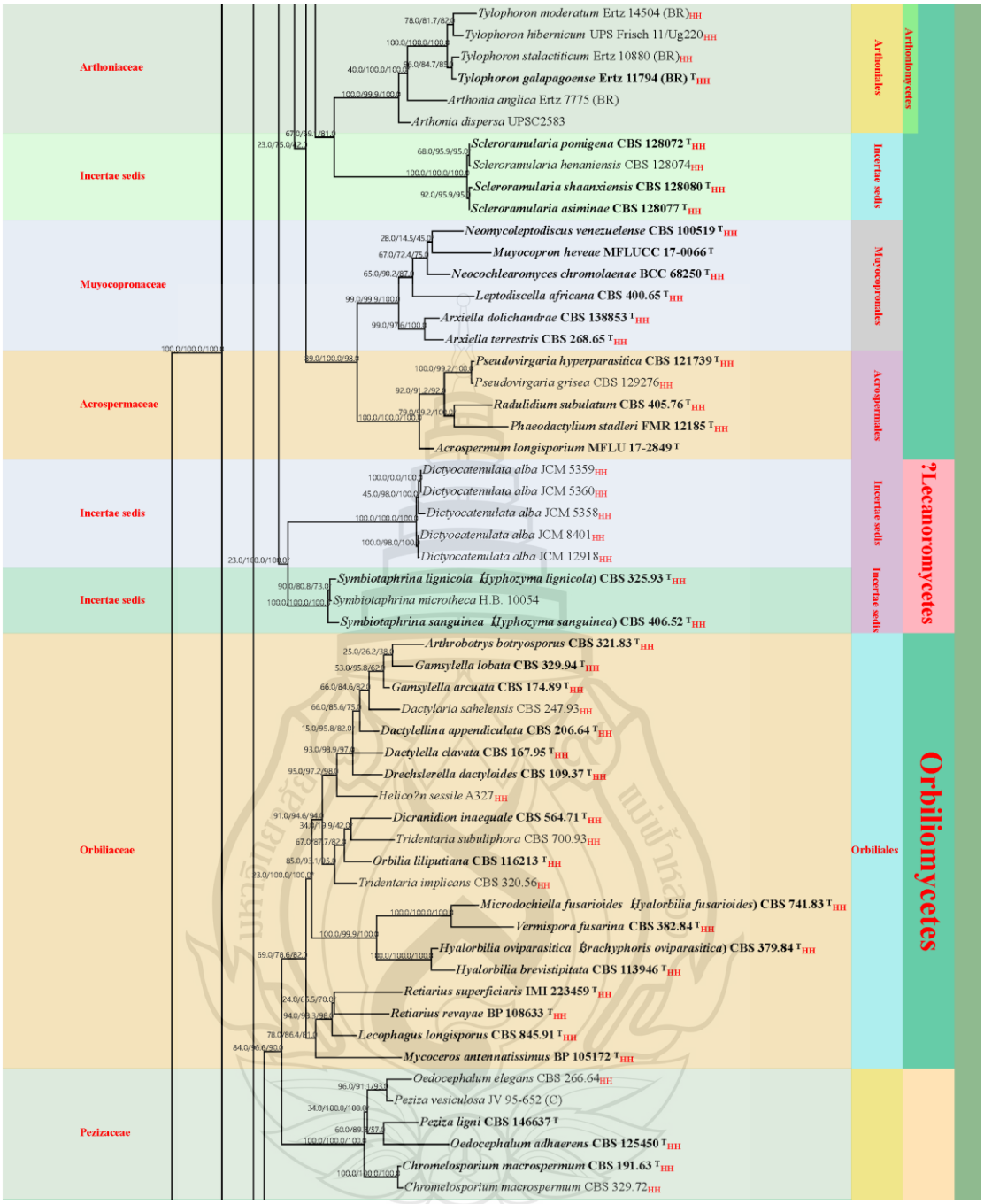


Figure 2.1 (continued)

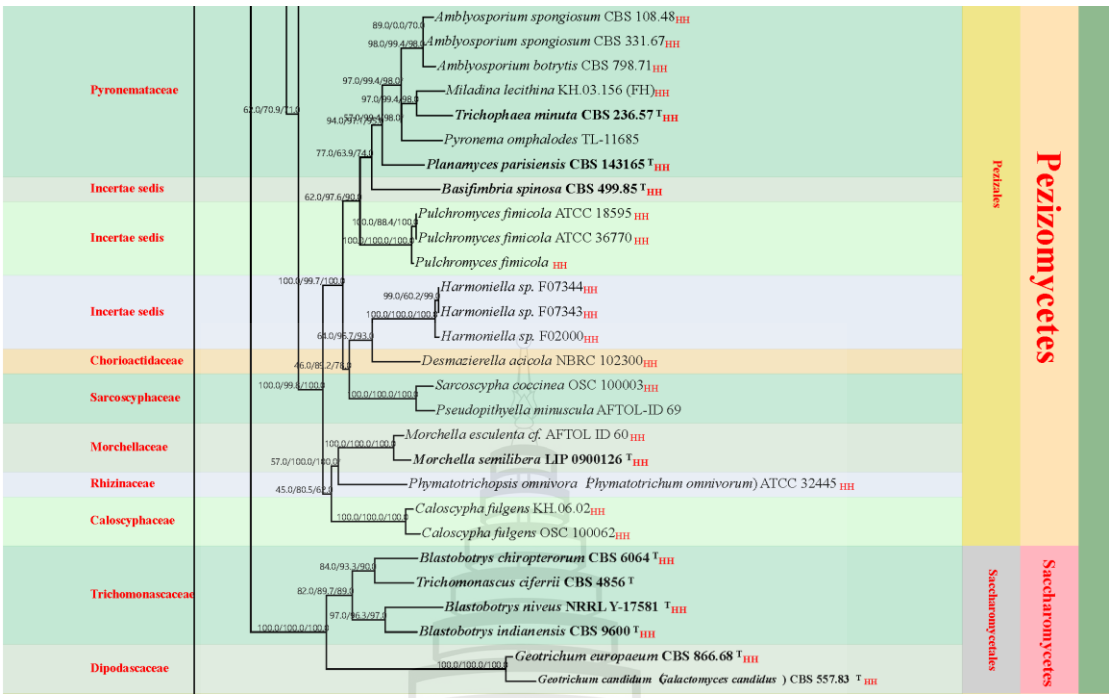


Figure 2.1 (continued)

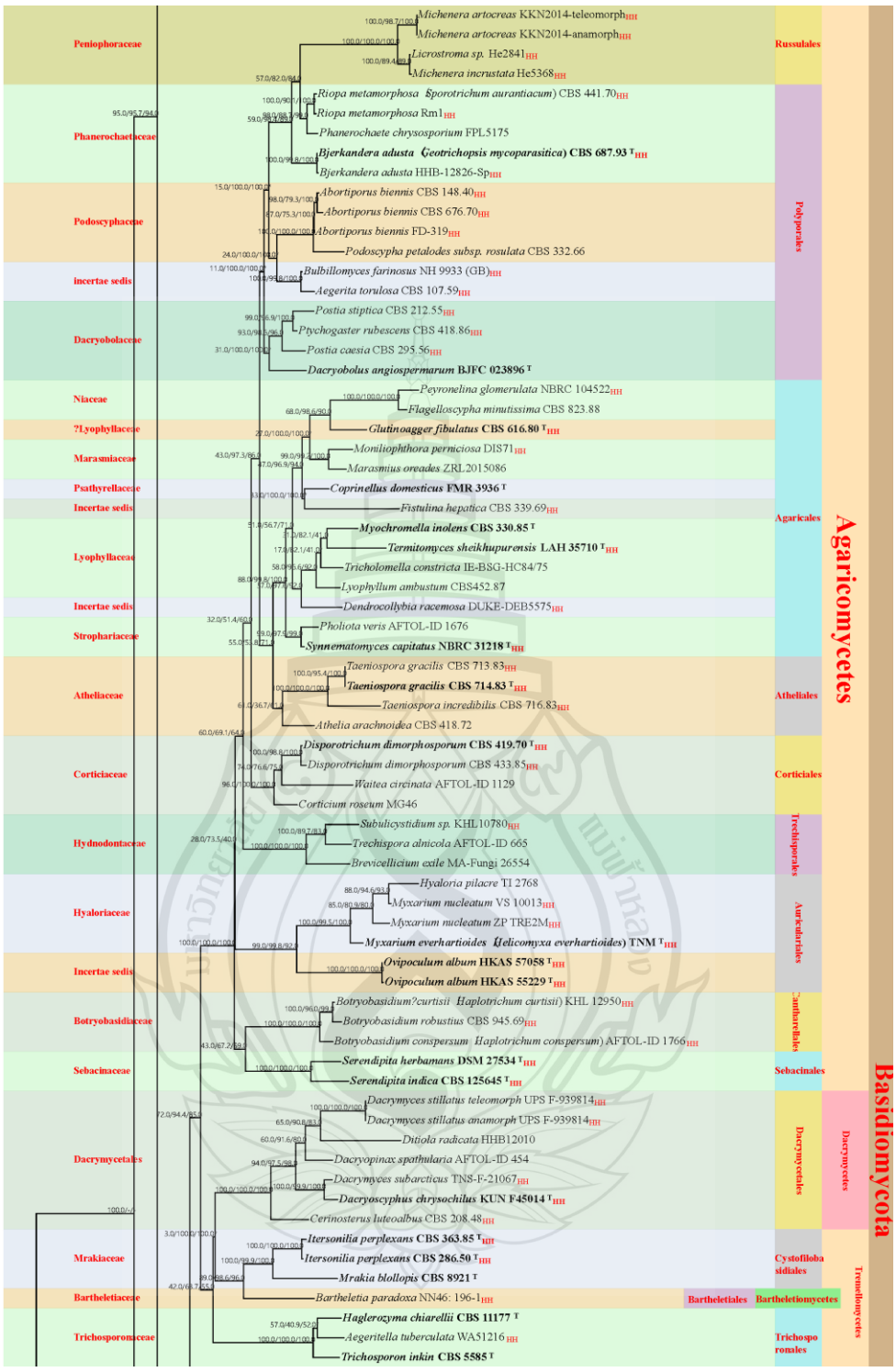
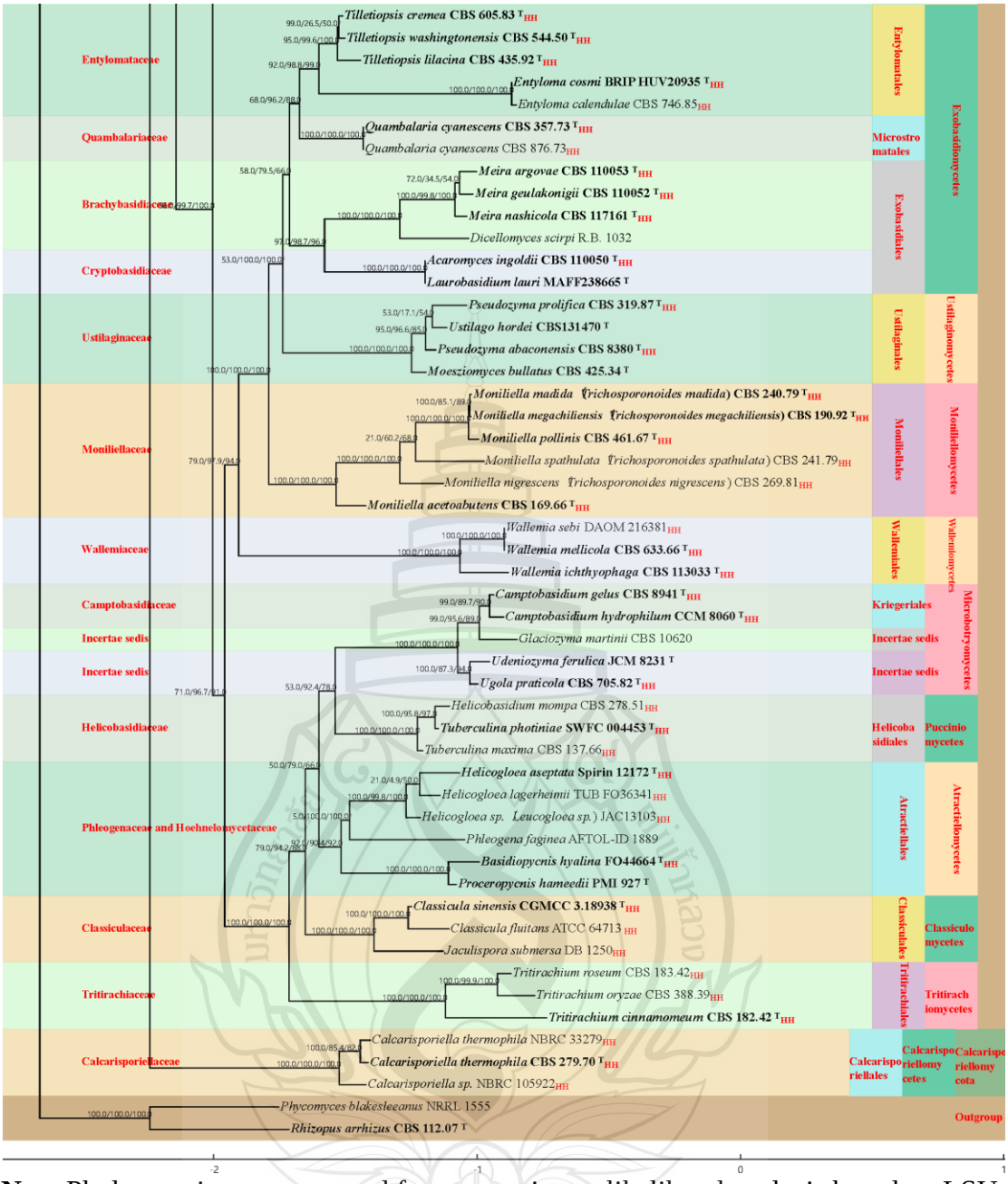


Figure 2.1 (continued)



Note Phylogenetic tree generated from a maximum likelihood analysis based on LSU, SSU and RPB2 sequences data for hyaline-spored hyphomycetes.

Figure 2.1 (continued)

2.3.2 Outline for Hyaline-spored Hyphomycetes

The outline for hyaline-spored hyphomycetous genera are provided here followed the database of Index Fungorum, MycoBank, and recent publications (He et al., 2019; Hongsanan et al., 2020a, 2020b; Hyde et al., 2020; Kirk et al., 2008; Wijayawardene et al., 2017a, 2020).

Phylum *Ascomycota*

Subphylum *Pezizomycotina*

Class *Arthoniomycetes*

Order *Arthoniales*

Family *Arthoniaceae*

Tylophoron Nyl. ex Stizenb. (1862)

= *Blarneya* D. Hawksw., Coppins & P. James (1980)

Class *Dothideomycetes*

Subclass *Dothideomycetidae*

Order *Capnodiales*

Family *Capnodiaceae*

Leptoxyphium Speg. (1918)

Family *Euantennariaceae*

Hormisciomyces Bat. & Nascim. (1957)

Family *Metacapnodiaceae*

Metacapnodium Speg. (1918)

= *Capnophialophora* S. Hughes (1966)

Order *Mycosphaerellales*

Family *Dissoconiaceae*

Dissoconium de Hoog, Oorschot & Hijwegen (1983)

Family *Extremaceae*

Pseudoramichloridium Cheewangkoon & Crous (2009)

Family *Mycosphaerellaceae*

Anguillosporella U. Braun (1995)

Apseudocercosporella Videira & Crous (2016)

Catenulocercospora C. Nakash., Videira & Crous (2017)

Cercospora Fresen. ex Fuckel (1863)

Cercosporella Sacc. (1880)

Chuppomyces Videira & Crous (2017)

Devonomyces Videira & Crous (2017)

Epicoleosporium Videira & Crous (2016)

Filiella Videira & Crous (2016)

Helicomina L.S. Olive (1948)

Hyalocercosporidium Videira & Crous (2017)

Hyalozasmidium U. Braun, C. Nakash., Videira & Crous (2017)

Microcyclosporella J. Frank, Schroers & Crous (2010)

Miuraea Hara (1948)

Mycovellosiella Rangel (1917)

Neocercospora M. Bakhshi, Arzanlou, Babai-ahari & Crous (2015)

Neopseudocercosporella Videira & Crous (2016)

Paramycosphaerella Crous & Jol. Roux (2013)

Passalora Fr. (1849)

Pseudocercosporella Deighton (1973)

Ramularia Unger (1833)

= *Phacellium* Bonord. (1860)

Ramulariopsis Speg. (1911)

Ramulispora Miura (1920)

Rhachisphaerella U. Braun, C. Nakash., Videira & Crous (2017)

Xenoramularia Videira, H.D. Shin & Crous (2016)

Xenosonderhenioides Videira & Crous (2017)

Zasmidium Fr. (1849)

= *Periconiella* Sacc. (1885)

Family *Schizothyriaceae*

Schizothyrium Desm. (1849)

= *Zygophiala* E.W. Mason (1945)

Family *Teratosphaeriaceae*

Acidiella Hujslová & M. Kolarík (2012)

= *Fodinomyces* Vázq.-Camp. (2014)

Acrodontium de Hoog (1972)

Hispidoconidioma Tsuneda & Davey (2010)

Hyweljonesia R.G. Shivas, Y.P. Tan, Marney & Abell (2016)

Microcyclospora J. Frank, Schroers & Crous (2010)

Stenella Syd. (1930)

Teratoramularia Videira, H.D. Shin & Crous (2016)

Order *Comminutisporales*

Family *Comminutisporaceae*

Comminutispora A.W. Ramaley (1996)

= *Hyphospora* A.W. Ramaley (1996)

Order *Dothideales*

Family *Dothideaceae*

Kabatina R. Schneid. & Arx (1966)

Sydowia Bres. (1895)

= *Hormonema* Lagerb. & Melin (1927)

Family *Neocelosporiaceae*

Celosporium Tsuneda & Davey (2010)

Family *Saccotheciaceae*

Aureobasidium Viala & G. Boyer (1891)

Kabatiella Bubák (1907)

Family *Zalariaceae*

Zalaria Visagie, Z. Humphries & Seifert (2017)

Dothideomycetidae* family *incertae sedis

Family *Endosporiaceae*

Endosporium Tsuneda (2008)

Subclass *Pleosporomycetidae*

Order *Pleosporales*

Family *Amniculicolaceae*

Amniculicola Y. Zhang ter & K.D. Hyde (2008)

= *Anguillospora* Ingold (1942)

Family *Dothidotthiaceae*

Mycocentrospora Deighton (1972)

Family *Leptosphaeriaceae*

Ochraceocephala Voglmayr & Aiello (2020)

Family *Melanommataceae*

Pseudodidymella C.Z. Wei, Y. Harada & Katum. (1997)

= *Pycnopleiospora* C.Z. Wei, Y. Harada & Katum. (1997)

Tumularia Descals & Marvanová (1987)

Family *Phaeosphaeriaceae*

Mauginiella Cavara (1925)

Family *Pleosporaceae*

Prathoda Subram. (1956)

Family *Podonectriaceae*

Podonectria Petch (1921)

= *Tetracrium* Henn. (1902)

Pleosporales* genera *incertae sedis

Dokmaia Promputtha (2003)

Spiroplana Voglmayr, M.J. Park & H.D. Shin (2011)

Pleosporomycetidae* family *incertae sedis

Family *Paranectriellaceae*

Araneomyces Höhn. (1909)

Dothideomycetes* orders *incertae sedis

Order *Acrospermales*

Family *Acrospermaceae*

Pseudovirgaria H.D. Shin, U. Braun, Arzanlou & Crous (2007)

Eremomycetales* genus *incertae sedis

Arthrographis G. Cochet ex Sigler & J.W. Carmich. (1976)

Order *Jahnulales*

Family *Aliquandostipitaceae*

Brachiosphaera Nawawi (1976)

Order *Microthyriales*

Family *Microthyriaceae*

Antidactylaria Z.F. Yu, M. Qiao & R.F. Castañeda (2021)

Hamatispora L.T.H. Yen, K. Yamag. & K. Ando (2018)

Isthmomyces Z.F. Yu, M. Qiao & R.F. Castañeda (2021)

Keqinzhangia Z.F. Yu, M. Qiao & R.F. Castañeda (2022)

Neocladophialophora Crous & R.K. Schumach. (2014)

Neoscolecobasidium Crous (2016)

Phaeothyriolum Syd. (1938)

= *Murramarangomyces* Crous (2017)

Pseudocoronospora Z.F. Yu, M. Qiao & R.F. Castañeda (2022)

Order *Muyocopronales*

Family *Muyocopronaceae*

Arxiella Papendorf (1967)

Leptodiscella Papendorf (1969)

Neocochlearomyces Pinruan, Sommai, Suetrong, J.Z. Groenew. & Crous (2018)

Neomycoleptodiscus Hern.-Restr., J.D.P. Bezerra & Crous (2019)

Order *Tubeufiales*

Family *Tubeufiaceae*

Acanthohelicospora Boonmee & K.D. Hyde (2014)

Aquaphila Goh, K.D. Hyde & W.H. Ho (1998)

Dematiohelicomyces Y.Z. Lu, Boonmee & K.D. Hyde (2018)

Helicangiospora Boonmee, Bhat & K.D. Hyde (2014)

Helicoarctatus Y.Z. Lu, J.C. Kang & K.D. Hyde (2018)

Helicodochium J.S. Monteiro, R.F. Castañeda, A.C. Cruz & Gusmão (2014)

Helicohyalinum Y.Z. Lu, J.K. Liu & K.D. Hyde (2018)

Helicomyces Link (1809)

Helicosporium Nees (1817)

Helicotubeufia Y.Z. Lu & J.K. Liu (2018)

Neoacanthostigma Boonmee, Bhat & K.D. Hyde (2014)

Neohelicosporium Y.Z. Lu, J.C. Kang & K.D. Hyde (2017)

Parahelicomyces Goh (2021)

Family *Wiesneriomycetaceae*

Parawiesneriomyces Crous & M.J. Wingf. (2016)

Pseudogliophragma Phadke & V.G. Rao (1980)

Setosynnema D.E. Shaw & B. Sutton (1985)

Speiropsis Tubaki (1958)

Wiesneriomyces Koord. (1907)

Order *Venturiales*

Family *Cylindrosympodiaceae*

Cylindrosympodium W.B. Kendr. & R.F. Castañeda (1990)

Sympodiella W.B. Kendr. (1958)

Family *Sympoventuriaceae*

Pseudosigmoidea K. Ando & N. Nakam. (2000)

Veronaeopsis Arzanlou & Crous (2007)

Dothideomycetes* family *incertae sedis

Family *Meliolinaceae*

Briania D.R. Reynolds (1989)

Dothideomycetes* genera *incertae sedis

Chionomyces Deighton & Piroz. (1972)

Clavariopsis De Wild. (1895)

Eriomycopsis Speg. (1911)

Fusicladiella Höhn. (1919)

Pseudoarthrographis Crous & Thangavel (2018)

Radulidium Arzanlou, W. Gams & Crous (2007)

Rupestriomyces L. Su, L.Y. Guo & X.Z. Liu (2015)

Scleroconidioma Tsuneda, Currah & Thormann (2000)

Scleroramularia Batzer & Crous (2011)

Sigmoidea J.L. Crane (1968)

Class *Eurotiomycetes*

Subclass *Chaetothyriomycetidae*

Order *Chaetothyriales*

Family *Chaetothyriaceae*

Aphanophora Réblová & Unter. (2013)

Ceramothyrium Bat. & H. Maia (1957)

= *Stanhughesia* Constant. (1989)

Fumagopsis Speg. (1911)

Family *Cyphellophoraceae*

Anthopsis Fil. March., A. Fontana & Luppi Mosca (1977)

Cyphellophora G.A. de Vries (1962)

= *Pseudomicrodochium* B. Sutton (1975)

Family *Herpotrichiellaceae*

Cladophialophora Borelli (1980)

Exophiala J.W. Carmich. (1966)

Fonsecaea Negroni (1936)

Marinophialophora J.F. Li, Phookamsak & K.D. Hyde (2018)

Phialophora Medlar (1915)

Rhinocladiella Nannf. (1934)

Stachybotryna Tubaki & T. Yokoy. (1971)

Thysanorea Arzanlou, W. Gams & Crous (2007)

Family *Trichomeriaceae*

Alatosessilispora K. Ando & Tubaki (1984)

Arthrophiala W.S. Lisboa, Meir. Silva & R.W. Barreto (2016)

Brycekendrickomyces Crous & M.J. Wingf. (2009)

Geminoarcus K. Ando (1993)

Knufia L.J. Hutchison & Unter. (1996)

Metulocladosporiella Crous, Schroers, J.Z. Groenew., U. Braun & K. Schub. (2006)

Neophaeococcomyces Crous & M.J. Wingf. (2015)

Order *Phaeomoniellales*

Family *Phaeomoniellaceae*

Paraphaeoisaria de Hoog & Morgan-Jones (1978)

Phaeomoniella Crous & W. Gams (2000)

Subclass *Eurotiomycetidae*

Order *Arachnomycetales*

Family *Arachnomycetaceae*

Onychocola Sigler (1990)

Order *Eurotiales*

Family *Aspergillaceae*

Aspergillus P. Micheli ex Haller (1768)

= *Phialosimplex* Sigler, Deanna A. Sutton, Gibas, Summerb. & Iwen (2010)

= *Polypaecilum* G. Sm. (1961)

Hamigera Stolk & Samson (1971)

= *Merimbla* Pitt (1979)

Heterocephalum Thaxt. (1903)

Monascus Tiegh. (1884)

= *Basipetospora* G.T. Cole & W.B. Kendr. (1968)

Penicilliopsis Solms (1887)

= *Pseudocordyceps* Hauman (1936)

= *Sarophorum* Syd. & P. Syd. (1916)

= *Stilbodendron* Syd. & P. Syd. (1916)

Penicillium Link (1809)

= *Thysanophora* W.B. Kendr. (1961)

= *Torulomyces* Delitsch (1943)

Pseudohamigera Houbraken, Frisvad & Samson (2020)

Xerochrysium Pitt (2013)

Xeromyces L.R. Fraser (1954)

= *Fraseriella* Cif. & A.M. Corte (1957)

Family *Thermoascaceae*

Paecilomyces Bainier (1907)

Family *Trichocomaceae*

Acidotalaromyces Houbraken, Frisvad & Samson (2020)

Ascospirella Houbraken, Frisvad & Samson (2020)

Rasamsonia Houbraken & Frisvad (2011)

Sagenomella W. Gams (1978)

Order *Onygenales*

Family *Ajellomycetaceae*

Blastomyces Gilchrist & W.R. Stokes (1898)

Emmonsia Cif. & Montemart. (1959)

Emmonsiellopsis Y. Marín, Stchigel, Guarro & Cano (2015)

Histoplasma Darling (1906)

Paracoccidioides F.P. Almeida (1930)

Family *Arthrodermataceae*

Epidermophyton Sabour. (1907)

Guarromyces Y. Gräser & de Hoog (2018)

Microsporum Gruby (1843)

Paraphyton Y. Gräser, Dukik & de Hoog (2018)

Trichophyton Malmsten (1848)

Family *Gymnoascaceae*

Oncocladium Wallr. (1833)

Family *Helicoarthrosporaceae*

Helicoarthrosporum Stchigel, Cano & Rodr.-Andr. (2019)

Family *Onygenaceae*

Aphanoascella Deanna A. Sutton, Y. Marín, E.H. Thompson & Guarro (2013)

Chrysosporium Corda (1833)

Coccidioides C.W. Stiles (1896)

Diploospora Grove (1916)

Emydomyces A.N. Mill. & D.B. Woodburn (2019)

Malbranchea Sacc. (1882)

Myotisia Kubátová, M. Kolařík & Hubka (2017)

Myriodontium Samson & Polon. (1978)

Ophidiomyces Sigler, Hambl. & Paré (2013)

Paranannizziopsis Sigler, Hambl. & Paré (2013)

Sporendonema Desm. (1827)

Family *Spiromastigaceae*

Sigleria Hirooka, Tanney & Seifert (2015)

***Onygenales* genera incertae sedis**

Ovadendron Sigler & J.W. Carmich. (1976)

Strongyloarthrosporum Rodr.-Andr., Cano & Stchigel (2019)

Subclass *Mycocaliciomycetidae*

Order *Mycocaliciales*

Family *Mycocaliciaceae*

Chaenothecopsis Vain. (1927)

= *Catenomycopsis* Tibell & Constant. (1991)

Subclass *Sclerococcomycetidae*

Order *Sclerococcales*

Family *Dactylosporaceae*

Fusichalara S. Hughes & Nag Raj (1973)

Rhopalophora Réblová, Unter. & W. Gams (2016)

Class *Laboulbeniomycetes*

Laboulbeniales* genera *incertae sedis

Coreomycetopsis Thaxt. (1920)

Gliocephalis Matr. (1899)

Order *Pyxidiophorales*

Family *Pyxidiophoraceae*

Pleurocatena G. Arnaud ex Arambarri, Gamundí, W. Gams & G.R.W. Arnold (2007)

Class *Lecanoromycetes*

Subclass *Acarosporomycetidae*

Order *Acarosporales*

Family *Acarosporaceae*

Neoacrodontiella Crous & M.J. Wingf. (2019)

Vanderaaea Crous (2020)

Subclass *Lecanoromycetidae*

Order *Lecanorales*

Family *Malmideaceae*

Cheiromycina B. Sutton (1986)

Ostropomycetidae* genus *incertae sedis

Dictyocatenulata Finley & E.F. Morris (1967)

Class *Leotiomycetes*

Order *Chaetomellales*

Family *Chaetomellaceae*

Hainesia Ellis & Sacc. (1884)

Synchaetomella Decock & Seifert (2005)

Order *Helotiales*

Family *Amorphothecaceae*

Hormoconis Arx & G.A. de Vries (1973)

Family *Arachnopezizaceae*

Clathrosphaerina Beverw. (1951)

Family *Calloriaceae*

Tricellula Beverw. (1954)

Calloria Fr. (1836)

= *Cylindrocolla* Bonord. (1851)

Populomyces Hern.-Restr. (2021)

Rommelaarsia Baral & Haelew. (2015)

Family *Cenangiaceae*

Rhabdocline Syd. (1922)

= *Meria* Vuill. (1896)

Family *Dermateaceae*

Cladochasiella Marvanová (1997)

Tetrachaetum Ingold (1942)

Xenochalara M.J. Wingf. & Crous (2000)

Family *Discinellaceae*

Acidea Hujslová & M. Kolařík (2014)

Articulospora Ingold (1942)

Fontanospora Dyko (1978)

Gyoerffyella Kol (1928)

Lemonniera De Wild. (1894)

Margaritispora Ingold (1942)

Varicosporium W. Kegel (1906)

Family *Drepanopezizaceae*

Diplocarpon F.A. Wolf (1912)

= *Bostrichonema* Ces. (1867)

Thedgonia B. Sutton (1973)

Family *Erysiphaceae*

Bulbomicroidium Marm., Siahaan, S. Takam. & U. Braun (2017)

Microidium (To-anun & S. Takam.) To-anun & S. Takam. (2012)

Oidiopsis Scalia (1902)

Oidium Link (1824)

Ovulariopsis Pat. & Har. (1900)

Streptopodium R.Y. Zheng & G.Q. Chen (1978)

Family *Gelatinodiscaceae*

Ascocoryne J.W. Groves & D.E. Wilson (1967)

= *Coryne* Nees (1817)

Dimorphospora Tubaki (1958)

Helicodendron Peyronel (1918)

Xerombrophila Baral (2013)

Family *Helotiaceae*

Ascoconidium Seaver (1942)

Eustilbum Rabenh. (1864)

Gloeotinia M. Wilson, Noble & E.G. Gray (1954)

= *Endoconidium* Prill. & Delacr. (1891)

Neocrinula Crous (2016)

Scytalidium Pesante (1957)

Symphyosirinia E.A. Ellis (1956)

= *Symphyosirella* Seifert (2009)

Family *Hyaloscyphaceae*

Arbusculina Marvanová & Descals (1987)

Dematioscypha Svrcek (1977)

= *Haplographium* Berk. & Broome (1859)

Hyphodiscus Kirschst. (1907)

= *Catenulifera* Hosoya (2002)

Mycoarthris Marvanová & P.J. Fisher (2002)

Pseudoclathrosphaerina Voglmayr (1997)

Soosiella Hujslová & M. Kolařík (2014)

Family *Leptodontidiaceae*

Leptodontidium de Hoog (1979)

Family *Mollisiaceae*

Barrenia E. Walsh & N. Zhang (2015)

Cystodendron Bubák (1914)

Mollisia (Fr.) P. Karst. (1871)

= *Acidomelania* E. Walsh & N. Zhang (2014)

Phialocephala W.B. Kendr. (1961)

Variocladium Descals & Marvanová (1999)

Family *Myxotrichaceae*

Mycosylva M.C. Tulloch (1973)

Oidiodendron Robak (1932)

Family *Neolauriomycetaceae*

Exochalara W. Gams & Hol.-Jech. (1976)

Lareunionomyces Crous & M.J. Wingf. (2016)

Neolauriomyces Crous (2018)

Family *Pezizellaceae*

Bloxamia Berk. & Broome (1854)

Brachyalara Réblová & W. Gams (2011)

Chalara (Corda) Rabenh. (1844)

Infundichalara Réblová & W. Gams (2011)

Xenopolyscytalum Crous (2010)

Xiambola Minter & Hol.-Jech. (1981)

Zymochalara Guatimosim, R.W. Barreto & Crous (2016)

Family *Pleuroascaceae*

Entimomentora Unter. & Réblová (2019)

Venustampulla Unter. & Réblová (2019)

Family *Ploettnerulaceae*

Cadophora Lagerb. & Melin (1928)

Collembolispora Marvanová & Pascoal (2003)

Helgardiomyces Crous (2020)

Mastigosporium Riess (1852)

Mycochaetophora Hara & Ogawa (1931)

Neospermospora Crous & U. Braun (2020)

Oculimacula Crous & W. Gams (2003)

= *Helgardia* Crous & W. Gams (2003)

Rhexocercosporidium U. Braun (1994)

Rhynchobrunnera B.A. McDonald, U. Braun & Crous (2020)

Rhynchosporium Heinsen ex A.B. Frank (1897)

Ypsilina J. Webster, Descals & Marvanová (1999)

Family *Sclerotiniaceae*

Botrytis P. Micheli ex Haller (1768)

Cristulariella Höhn. (1916)

Grovesinia M.N. Cline, J.L. Crane & S.D. Cline (1983)

= *Hinomyces* Narumi & Y. Harada (2006)

Monilinia Honey (1928)

= *Monilia* Bonord. (1851)

Myrioconium Syd. & P. Syd. (1912)

Ovulinia F.A. Weiss (1940)

= *Ovulitis* N.F. Buchw. (1970)

Rhacodiella Peyronel (1919)

Septotinia Whetzel ex J.W. Groves & M.E. Elliott (1961)

= *Septotis* N.F. Buchw. ex Arx (1957)

Streptotinia Whetzel (1945)

= *Streptobotrys* Hennebert (1973)

Valdensia Peyronel (1923)

Family *Tricladiaceae*

Geniculospora Sv. Nilsson ex Marvanová & Sv. Nilsson (1971)

Mycofalcella Marvanová, Om-Kalth. & J. Webster (1993)

Spirosphaera Beverw. (1953)

Tricladium Ingold (1942)

Family *Vandijckellaceae*

Cryonesomyces Unter. & Réblová (2019)

Vandijckella Sand.-Den. (2017)

Helotiales* genera *incertae sedis

Arboricolonus S. Bien & Damm (2020)

Blastosporium Z.F. Yu & H. Zheng (2019)

Brefeldochium Verkley (2005)

Dactylaria Sacc. (1880)

Filosporella Nawawi (1976)

Psychrophila M.M. Wang & Xing Z. Liu (2014)

Staheliella Emden (1974)

Tetracladium De Wild. (1893)

Trichosporiella Kamyschko (1960)

Order *Lauriomycetales*

Family *Lauriomycetaceae*

Lauriomyces R.F. Castañeda (1990)

Order *Leotiales*

Family *Cochlearomycetaceae*

Cochlearomyces Crous (2017)

Family *Leotiaceae*

Miniancora Marvanová & Bärl. (1989)

Family *Tympanidaceae*

Aotearoamyces P.R. Johnst., J.A. Cooper & Quijada (2018)

Claussenomyces Kirschst. (1923)

= *Dendrostilbella* Höhn. (1905)

Gelatinomyces Sanoamuang, Jitjak, Rodtong & Whalley (2013)

Variabilispora S. Bien, C. Kraus & Damm (2019)

Vexillomyces S. Bien, C. Kraus & Damm (2019)

Leotiales* genera *incertae sedis

Flagellospora Ingold (1942)

Fulvoflamma Crous (2006)

Order *Phacidiales*

Family *Helicogoniaceae*

Gelatinipulvinella Hosoya & Y. Otani (1995)

= *Aureohyphozyma* Hosoya & Y. Otani (1995)

Order *Thelebolales*

Family *Pseudeurotiaceae*

Geomyces Traaen (1914)

Pseudeurotium J.F.H. Beyma (1937)

= *Teberdinia* Sogonov, W. Gams, Summerb. & Schroers (2005)

Solomyces Zhi.Y. Zhang, Y.F. Han & Z.Q. Liang (2020)

Zongqia Zhi.Y. Zhang & Y.F. Han (2021)

Family *Thelebolaceae*

Cleistothelebolus Malloch & Cain (1971)

= *Hyphozyma* de Hoog & M.T. Sm. (1981)

Leotiomycetes* genera *incertae sedis

Gorgomyces Gönczöl & Révay (1985)

Helicocentralis Sri-indr., Chuaseehar., Boonyuen, K. Yamag., Suetrong & C.K.M. Tsui (2015)

Holwaya Sacc. (1889)

= *Crinula* Fr. (1821)

Class *Orbiliomycetes*

Order *Orbiliales*

Family *Orbiliaceae*

Arthrobotrys Corda (1839)

Dactylella Grove (1884)

Dactylellina M. Morelet (1968)

Drechslerella Subram. (1963)

Dwayaangam Subram. (1978)

Gamsylella M. Scholler, Hagedorn & A. Rubner (1999)

Helicoon Morgan (1892)

Hyalorbilia Baral & G. Marson (2000)

= *Brachyphoris* Juan Chen, L.L. Xu, B. Liu & Xing Z. Liu (2007)

Lecophagus M.W. Dick (1990)

Microdochiella Hern.-Restr. & Crous (2015)

Mycoceros D. Magyar & Z. Merényi (2017)

Orbilia Fr. (1836)

= *Dicranidion* Harkn. (1885)

= *Trinacrium* Riess (1852)

Pseudotripoconidium Z.F. Yu & K.Q. Zhang (2011)

Retiarius D.L. Olivier (1978)

Vermispora Deighton & Piroz. (1972)

Class *Pezizomycetes*

Order *Pezizales*

Family *Caloscyphaceae*

Caloscypha Boud. (1885)

= *Geniculodendron* G.A. Salt (1974)

Family *Chorioactidaceae*

Desmazierella Lib. (1829)

= *Verticicladium* Preuss (1851)

Family *Morchellaceae*

Morchella Dill. ex Pers. (1794)

= Costantinella Matr. (1892)

Family *Pezizaceae*

Chromelosporiopsis Hennebert (2020)

Chromelosporium Corda (1833)

Oedocephalum Preuss (1851)

Family *Pyronemataceae*

Miladina Svrcek (1972)

= *Actinosporella* Descals, Marvanová & J. Webster (1999)

Planamyces Crous & Decock (2017)

Trichophaea Boud. (1885)

= *Dichobotrys* Hennebert (1973)

Family *Rhizinaceae*

Phymatotrichopsis Hennebert (1973)

Family *Sarcoscyphaceae*

Sarcoscypha (Fr.) Boud. (1885)

= *Molliardiomyces* Paden (1984)

Class *Sordariomycetes*

Subclass *Diaporthomycetidae*

Order *Calosphaeriales*

Family *Calosphaeriaceae*

Calosphaeria Tul. & C. Tul. (1863)

= *Calosphaeriophora* Réblová, L. Mostert, W. Gams & Crous (2004)

Flabellascus Réblová (2015)

Togniniella Réblová, L. Mostert, W. Gams & Crous (2004)

= *Phaeocrella* Réblová, L. Mostert, W. Gams & Crous (2004)

Family *Pleurostomataceae*

Pleurostoma Tul. & C. Tul. (1863)

= *Pleurostomophora* D. Vijaykrishna, L. Mostert, R. Jeewon, W. Gams, K.D. Hyde & Crous (2004)

Order *Diaporthales*

Family *Gnomoniaceae*

Flavignomonia C.M. Tian, Qin Yang & N. Jiang (2019)

Family *Schizoparmaceae*

Korunomyces Hodges & F.A. Ferreira (1981)

Order *Magnaporthales*

Family *Magnaporthaceae*

Bifusisporella R.M.F. Silva, R.J.V. Oliveira, J.D.P. Bezerra, J.L. Bezerra, Souza-Motta & G.A. Silva (2019)

Budhanggurabania P. Wong, Khemmuk & R.G. Shivas (2015)

Falciphora J. Luo & N. Zhang (2015)

Falciphoriella Hern.-Restr. & Crous (2016)

Gaeumannomycella Hern.-Restr. & Crous (2016)

Gaeumannomyces Arx & D.L. Olivier (1952)

= *Harpophora* W. Gams (2000)

Magnaporthiopsis J. Luo & N. Zhang (2013)

Pseudophialophora J. Luo & N. Zhang (2014)

Slopeiomyces Klaubauf, M.-H. Lebrun & Crous (2014)

Family *Pyriculariaceae*

Macgarvieomyces Klaubauf, M.-H. Lebrun & Crous (2014)

Order *Myrmecridiales*

Family *Myrmecridiaceae*

Myrmecridium Arzanlou, W. Gams & Crous (2007)

Family *Xenodactylariaceae*

Xenodactylaria Crous (2018)

Order *Ophiostomatales*

Family *Kathistaceae*

Termitariopsis M. Blackw., Samson & Kimbr. (1980)

Family *Ophiostomataceae*

Aureovirgo J.A. van der Linde, Z.W. de Beer & Jol. Roux (2016)

Beauveriphora Matsush. (1975)

Ceratocystiopsis H.P. Upadhyay & W.B. Kendr. (1975)

= *Hyalorhinocladiella* H.P. Upadhyay & W.B. Kendr. (1975)

Esteya J.Y. Liou, J.Y. Shih & Tzean (1999)

Hawksworthiomyces Z.W. de Beer, Marinc. & M.J. Wingf. (2016)

Leptographium Lagerb. & Melin (1927)

Pesotum J.L. Crane & Schokn. (1973)

Raffaelea Arx & Hennebert (1965)

Sporothrix Hektoen & C.F. Perkins (1900)

Subbaromyces Hesselt. (1953)

Order *Togniniales*

Family *Togniniaceae*

Phaeoacremonium W. Gams, Crous & M.J. Wingf. (1996)

Diaporthomycetidae* familys *incertae sedis

Family *Rhamphoriaceae*

Rhamphoriopsis Réblová & Gardiennet (2018)

Rhodoveronaea Arzanlou, W. Gams & Crous (2007)

Xylolentia Réblová (2018)

Family *Woswasiaceae*

Woswasia Jaklitsch, Réblová & Voglmayr (2012)

Xylochrysis Réblová (2014)

Diaporthomycetidae* genus *incertae sedis

Kaarikia C. Mayers & T.C. Harr. (2020)

Subclass *Hypocreomycetidae*

Order *Coronophorales*

Family *Ceratostomataceae*

Acrospeira Berk. & Broome (1861)

Dactylidispora Y. Marín, Stchigel, Guarro & Cano (2018)

Harzia Costantin (1888)

= *Olpitrichum* G.F. Atk. (1894)

Melanospora Corda (1837)

= *Gonatobotrys* Corda (1839)

Proteophiala Cif. (1958)

Rhinotrichella G. Arnaud ex de Hoog (1977)

Family *Chaetosphaerellaceae*

Chaetosphaerella E. Müll. & C. Booth (1972)

= *Veramycina* Subram. (1995)

Family *Scortechiniaceae*

Pseudocatenomycopsis Crous & L.A. Shuttlew. (2013)

Order *Falcocladiales*

Family *Falcocladiaceae*

Falcocladium S.F. Silveira, Alfenas, Crous & M.J. Wingf. (1994)

Order *Glomerellales*

Family *Australiascaceae*

Monilochaetes Halst. ex Harter (1916)

Family *Malaysiascaceae*

Malaysiasca Crous & M.J. Wingf. (2016)

Family *Plectosphaerellaceae*

Acrostalagmus Corda (1838)

Brunneochlamydosporium Giraldo López & Crous (2018)

Chlamydosporiella Giraldo López & Crous (2018)

Chordomyces Bilanenko, Georgieva & Grum-Grzhim. (2015)

Furcasterigmium Giraldo López (2018)

Fuscohypha Giraldo López & Crous (2018)

Gibellulopsis Bat. & H. Maia (1959)

Musicillium Zare & W. Gams (2007)

Musidium Giraldo López & Crous (2018)

Paragibellulopsis Giraldo López & Crous (2018)

Paramusicillium Giraldo López & Crous (2018)

Phialoparvum Giraldo López & Crous (2018)

Plectosphaerella Kleb. (1929)

= *Plectosporium* M.E. Palm, W. Gams & Nirenberg (1995)

Sayamraella Giraldo López & Crous (2018)

Sodiomyces A.A. Grum-Grzhim., Debets & Bilanenko (2019)

Stachylidium Link (1809)

Summerbellia Giraldo López & Crous (2018)

Theobromium Giraldo López & Crous (2018)

Verticillium Nees (1817)

Family *Reticulascaceae*

Blastophorum Matsush. (1971)

Cylindrotrichum Bonord. (1851)

Kylindria DiCosmo, S.M. Berch & W.B. Kendr. (1983)

Order *Hypocreales*

Family *Bionectriaceae*

Acremonium Link (1809)

Bullanockia Crous (2016)

Clonostachys Corda (1839)

Fusariella Sacc. (1884)

Geonectria Lechat & J. Fourn. (2018)

Geosmithia Pitt (1979)

Gracilistilbella Seifert (2000)

Hyalocylindrophora J.L. Crane & Dumont (1978)

Lasionectriopsis Lechat & P.-A. Moreau (2019)

Onychophora W. Gams, P.J. Fisher & J. Webster (1984)

Ovicillium Zare & W. Gams (2016)

Paracylindrocarpon Crous, Roets & L. Lombard (2016)

Periantria Döbbeler & P.G. Davison (2017)

Spicellum Nicot & Roquebert (1976)

Stanjemonium W. Gams, O'Donnell, Schroers & M. Chr. (1999)

Synnemellisia N.K. Rao, Manohar. & Goos (1989)

Xanthonectria Lechat, J. Fourn. & P.-A. Moreau (2016)

Family *Calcarisporiaceae*

Calcarisporium Preuss (1851)

Family *Clavicipitaceae*

Claviceps Tul. (1853)

= *Sphacelia* Lév. (1827)

Ephelis Fr. (1849)

Epichloe (Fr.) Tul. & C. Tul. (1865)

Helicocollum Luangsa-ard, Mongkols., Noisripoom & Thanakitp. (2017)

Keithomyces Samson, Luangsa-ard & Houbraken (2020)

Marquandomyces Samson, Houbraken & Luangsa-ard (2020)

Metapochonia Kepler, S.A. Rehner & Humber (2014)

Metarhiziopsis D.W. Li, R.S. Cowles & Vossbrinck (2008)

Metarhizium Sorokīn (1883)

Mycophilomyces Crous & M.J. Wingf. (2016)

Neotyphodium Glenn, C.W. Bacon & Hanlin (1996)

Nigelia Luangsa-ard, Tasan. & Thanakitp. (2017)

Nomuraea Maubl. (1903)

Petchia Thanakitp., Mongkols. & Luangsa-ard (2020)

Pochonia Bat. & O.M. Fonseca (1965)

Pseudomeria G.L. Barron (1980)

Purpureomyces Luangsa-ard, Samson & Thanakitp. (2020)

Rotiferophthora G.L. Barron (1991)

Sungia Luangsa-ard, Samson & Thanakitp. (2020)

Ustilaginoidea Bref. (1895)

Family *Cordycipitaceae*

Akanthomyces Lebert (1858)

Amphichorda Fr. (1825)

Beauveria Vuill. (1912)

Blackwellomyces Spatafora & Luangsa-ard (2017)

Cordyceps Fr. (1833)

= *Isaria* Pers. (1794)

= *Microhilum* H.Y. Yip & A.C. Rath (1989)

Engyodontium de Hoog (1978)

Flavocillium H. Yu, Y.B. Wang, Y. Wang, Q. Fan & Zhu L. Yang (2020)

Gamszarea Z.F. Zhang & L. Cai (2020)

Gibellula Cavara (1894)

Hevansia Luangsa-ard, Hywel-Jones & Spatafora (2017)

Lecanicillium W. Gams & Zare (2001)

Leptobacillium Zare & W. Gams (2016)

Liangia H. Yu, Y.B. Wang, Y. Wang, Z.H. Chen & Zhu L. Yang (2020)

Neobaryopsis Flakus, Etayo, Kukwa & Rodr. Flakus (2019)

Parengyodontium C.C. Tsang, J.F.W. Chan, W.M. Pong, J.H.K. Chen, A.H.Y. Ngan, M. Cheung, C.K.C. Lai, D.N.C. Tsang, S.K.P. Lau & P.C.Y. Woo (2016)

Pseudogibellula Samson & H.C. Evans (1973)

Samsoniella Mongkols., Noisrip., Thanakitp., Spatafora & Luangsa-ard (2018)

Simplicillium Zare & W. Gams (2001)

Family *Hypocreaceae*

Escovopsioides H.C. Evans & J.O. Augustin (2013)

Escovopsis J.J. Muchovej & Della Lucia (1990)

Hypomyces (Fr.) Tul. & C. Tul. (1860)

= *Cladobotryum* Nees (1817)

Lepisticola W. Gams (2009)

Mycogone Link (1809)

Sepedonium Link (1809)

Sphaerostilbella Henn. (1901)

= *Gliocladium* Corda (1840)

Stephanoma Wallr. (1833)

Trichoderma Pers. (1794)

Verticimonosporium Matsush. (1971)

Family *Myrotheciomycetaceae*

Myrotheciomyces Crous (2018)

Trichothecium Link (1809)

Family *Nectriaceae*

Aphanocladium W. Gams (1971)

Aquanectria L. Lombard & Crous (2015)

Atractium Link (1809)

Bisifusarium L. Lombard, Crous & W. Gams (2015)

Calonectria De Not. (1867)

= *Cylindrocladium* Morgan (1892)

Calostilbe Sacc. & P. Syd. (1902)

= *Calostilbella* Höhn. (1919)

Campylocarpon Halleen, Schroers & Crous (2004)

Chaetodochium Höhn. (1932)

Chaetopsina Rambelli (1956)

Chrysonectria Lechat & J. Fourn. (2018)

Cinnamomeonectria C. Salgado & P. Chaverri (2016)

Coccinonectria L. Lombard & Crous (2015)

Corallomycetella Henn. (1904)

= *Rhizostilbella* Wolk (1914)

Corallonectria C. Herrera & P. Chaverri (2013)

Corinectria C. González & P. Chaverri (2017)

Curvicladiella Decock & Crous (2006)

Cylindrocarpostylus R. Kirschner & Oberw. (1999)

Cylindrocladiella Boesew. (1982)

Cylindrodendrum Bonord. (1851)

Cylindromonium Crous (2019)

Dacryoma Samuels (1988)

Dactylobotrys S.Q. He & S.R. Wang (2015)

Dematiocladium Allegrucci, Aramb., Cazau & Crous (2005)

Fusarium Link (1809)

Gliocephalotrichum J.J. Ellis & Hesselt. (1962)

Gliocladiopsis S.B. Saksena (1954)

Heimiodora Nicot (1960)

Ilyonectria P. Chaverri & C. Salgado (2011)

Macroconia (Wollenw.) Gräfenhan, Seifert & Schroers (2011)

Macronectria C. Salgado & P. Chaverri (2016)

Mariannaea G. Arnaud ex Samson (1974)

Microcera Desm. (1848)

Murinectria M. Niranjan & V.V. Sarma (2020)

Myxocephala G. Weber, Spaaij & Oberw. (1989)

Nalanthamala Subram. (1956)

Nectria (Fr.) Fr. (1849)

= *Tubercularia* Tode (1790)

Neocalonectria Crous (2020)

Neonectria Wollenw. (1917)

= *Cylindrocarpon* Wollenw. (1913)

= *Heliscus* Sacc. (1880)

Ophionectria Sacc. (1878)

= *Antipodium* Piroz. (1974)

Paracremonium L. Lombard & Crous (2015)

Penicillifer Emden (1968)

Phialoseptomonium Crous & Carnegie (2019)

Pleiocarpon L. Lombard & D. Aiello (2017)

Pseudocosmospora C. Herrera & P. Chaverri (2013)

Pseudofusicolla D. Triest (2016)

Rectifusarium L. Lombard, Crous & W. Gams (2015)

Rugonectria P. Chaverri & Samuels (2011)

Sarcopodium Ehrenb. (1818)

= *Actinostilbe* Petch (1925)

Thelonectria P. Chaverri & C. Salgado (2011)

Tumenectria C. Salgado & Rossman (2016)

Varicosporella Lechat & J. Fourn. (2015)

Volutella Fr. (1832)

Xenoacremonium L. Lombard & Crous (2015)

Xenocylindrocladium Decock, Hennebert & Crous (1997)

Xenogliocladiopsis Crous & W.B. Kendr. (1994)

Xenoleptographium Marinc., T.A. Duong, Z.W. de Beer & M.J. Wingf. (2015)

Family *Niessliaceae*

Monocillium S.B. Saksena (1955)

Myrtacremonium Crous (2017)

Neoeucasphaeria Crous (2018)

Family *Ophiocordycipitaceae*

Drechmeria W. Gams & H.-B. Jansson (1985)

= *Haptocillium* W. Gams & Zare (2001)

Harposporium Lohde (1874)

Ophiocordyceps Petch (1931)

= *Hirsutella* Pat. (1892)

= *Hymenostilbe* Petch (1931)

= *Paraisaria* Samson & B.L. Brady (1983)

= *Synglíocladium* Petch (1932)

= *Synnematium* Speare (1920)

Purpureocillium Luangsa-ard, Hywel-Jones, Houbraken & Samson (2011)

Tolypocladium W. Gams (1971)

= *Chaunopycnis* W. Gams (1979)

Family *Polycephalomycetaceae*

Polycephalomyces Kobayasi (1941)

Family *Sarocladiaceae*

Chlamydocillium Zare & W. Gams (2016)

Kiflimonium Summerb., J.A. Scott, Guarro & Crous (2018)

Parasarocladium Summerb., J.A. Scott, Guarro & Crous (2018)

Sarocladium W. Gams & D. Hawksw. (1976)

Family *Stachybotryaceae*

Achroiostachys L. Lombard & Crous (2016)

Albifimbria L. Lombard & Crous (2016)

Alfaria Crous, N.J. Montaño-Mata & García-Jim. (2014)

Alfariacladiella Crous & R.K. Schumach. (2016)

Brevistachys L. Lombard & Crous (2016)

Didymostilbe Henn. (1902)

Digitiseta Gordillo & Decock (2017)

Dimorphiseta L. Lombard & Crous (2016)

Globobotrys L. Lombard & Crous (2016)

Gregatothecium L. Lombard & Crous (2016)

Hyalinostachys C.G. Lin & K.D. Hyde (2020)

Inaequalispora L. Lombard & Crous (2016)

Kastanostachys L. Lombard & Crous (2016)

Koorchaloma Subram. (1953)

= Pseudoornatispora Tibpromma & K.D. Hyde (2018)

Koorchalomella Chona, Munjal & J.N. Kapoor (1958)

Melanopsamma Niessl (1876)

Myrothecium Tode (1790)

Myxospora L. Lombard & Crous (2016)

Neomyrothecium L. Lombard & Crous (2016)

Paramyrothecium L. Lombard & Crous (2016)

Parasarcopodium Melnik, S.J. Lee & Crous (2004)

Pseudoachroiostachys Tibpromma & K.D. Hyde (2018)

Septomyrothecium Matsush. (1971)

Sirastachys L. Lombard & Crous (2016)

Smaragdiniseta L. Lombard & Crous (2016)

Stachybotrys Corda (1837)

Tangerinosporium L. Lombard & Crous (2016)

Family *Tilachlidiaceae*

Septofusidium W. Gams (1971)

Tilachlidium Preuss (1851)

Hypocreales* genera *incertae sedis

Acremoniopsis Giraldo, Gené, Guarro (2014)

Berkelella (Sacc.) Sacc. (1891)

= *Blistum* B. Sutton (1973)

Chlorocillium W. Gams & Zare (2016)

Haptospora G.L. Barron (1991)

Illosporiopsis D. Hawksw. (2001)

Illosporium Mart. (1817)

Lichenopenicillus Etayo (2017)

Pseudoacremonium Crous (2014)

Stilbella Lindau (1900)

Order *Microascales*

Family *Ceratocystidaceae*

Ambrosiella Brader ex Arx & Hennebert (1965)

Berkeleyomyces W.J. Nel, Z.W. de Beer, T.A. Duong & M.J. Wingf. (2017)

Bretziella Z.W. de Beer, Marinc., T.A. Duong & M.J. Wingf. (2017)

Davidsoniella Z.W. de Beer, T.A. Duong & M.J. Wingf. (2014)

Seychellomyces Matsush. (1981)

Toshionella C. Mayers & T.C. Harr. (2019)

Wolfgangiella C. Mayers & T.C. Harr. (2019)

Family *Gondwanamycetaceae*

Custingophora Stolk, Hennebert & Klopotek (1968)

Family *Graphiaceae*

Graphium Corda (1837)

Family *Halosphaeriaceae*

Corollospora Werderm. (1922)

= *Halosigmoidea* Nakagiri, K.L. Pang & E.B.G. Jones (2009)

= *Varicosporina* Meyers & Kohlm. (1965)

Family *Microascaceae*

Brachyconidiellopsis Decock, R.F. Castañeda & Adhikari (2004)

Parascedosporium Gilgado, Gené, Cano & Guarro (2007)

Scedosporium Sacc. ex Castell. & Chalm. (1919)

Scopulariopsis Bainier (1907)

Family *Triadelphiaceae*

Synnematotriadelphia Chuaseehar., Somrith., Nuankaew & Boonyuen (2020)

Microascales* genera *incertae sedis

Gabarnaudia Samson & W. Gams (1974)

Inodoromyces C. Mayers & T.C. Harr. (2019)

Sporendocladia G. Arnaud ex Nag Raj & W.B. Kendr. (1975)

Order *Pararamichloridiales*

Family *Pararamichloridiaceae*

Pararamichloridium Crous (2017)

Order *Pleurotheciales*

Family *Pleurotheciaceae*

Helicoascotaiwania Dayar., Maharachch. & K.D. Hyde (2019)

Pleurothecium Höhn. (1919)

Hypocreomycetidae* genera *incertae sedis

Campylospora Ranzoni (1953)

Hantamomyces Crous (2020)

Subclass *Pisorisporiomycetidae*

Pisorisporiales* genus *incertae sedis

Brocchiosphaera K. Yamag., Chuaseehar. & Nakagiri (2020)

Subclass *Savoryellomycetidae*

Order *Pleurotheciales*

Family *Pleurotheciaceae*

Phaeoisaria Höhn. (1909)

Pleurotheciella Réblová, Seifert & J. Fourn. (2012)

Sterigmatobotrys Oudem. (1886)

Subclass *Sordariomycetidae*

Order *Cephalothecales*

Family *Cephalothecaceae*

Phialemonium W. Gams & McGinnis (1983)

Order *Chaetosphaeriales*

Family *Chaetosphaeriaceae*

Anacraspedodidymum C.R. Silva, R.F. Castañeda & Gusmão (2014)

Bahusutrabeeja Subram. & Bhat (1977)

Catenularia Grove (1886)

Chloridium Link (1809)

= *Gonytrichum* Nees & T. Nees (1818)

Codinaea Maire (1937)

Conicomyces R.C. Sinclair, Eicker & Morgan-Jones (1983)

Craspedodidymum Hol.-Jech. (1972)

Cryptophiale Piroz. (1968)

Cryptophialoidea Kuthub. & Nawawi (1987)

Dictyochaeta Speg. (1923)

Kionochaeta P.M. Kirk & B. Sutton (1986)

Menispora Pers. (1822)

Menisporopsis S. Hughes (1952)

Multiguttulispora C.G. Lin & J.K. Liu (2019)

Paliphora Sivan. & B. Sutton (1985)

Phaeostalagmus W. Gams (1976)

Phialolunulospora Z.F. Yu & R.F. Castañeda (2020)

Phialosporostilbe Mercado & J. Mena (1985)

Rattania Prabhugaonkar & Bhat (2009)

Thozetella Kuntze (1891)

Verhulstia Hern.-Restr. (2017)

Zanclospora S. Hughes & W.B. Kendr. (1965)

Chaetosphaeriales* genus *incertae sedis

Neonawawia J. Yang, K.D. Hyde & J.K. Liu (2018)

Order *Coniochaetales*

Family *Coniochaetaceae*

Coniochaeta (Sacc.) Cooke (1887)

= *Lecythophora* Nannf. (1934)

Coniochaetales* genus *incertae sedis

Pseudogliomastix W. Gams (1985)

Order *Pseudodactylariales*

Family *Pseudodactylariaceae*

Pseudodactylaria Crous (2017)

Order *Sordariales*

Family *Chaetomiaceae*

Acrophialophora Edward (1961)

= *Taifanglania* Z.Q. Liang, Y.F. Han, H.L. Chu & R.T.V. Fox (2009)

Arxotrichum A. Nováková & M. Kolařík (2018)

Botryotrichum Sacc. & Marchal (1885)

Crassicarpon Y. Marín, Stchigel, Guarro & Cano (2015)

Humicola Traaen (1914)

Myceliophthora Costantin (1892)

Remersonia Samson & Seifert (1997)

Thermothielavioides X. Wei Wang & Houbraken (2019)

Family *Lasiosphaeriaceae*

Mammaria Ces. (1854)

Family *Naviculisporaceae*

Areotheca Y. Marín & Stchigel (2020)

Naviculispora Stchigel, Y. Marín, Cano & Guarro (2020)

Family *Podosporaceae*

Cladorrhinum Sacc. & Marchal (1885)

Family *Schizotheciaceae*

Pseudoschizothecium Y. Marín, A.N. Mill. & Stchigel (2020)

Family *Sordariaceae*

Neurospora Shear & B.O. Dodge (1927)

= *Chrysonilia* Arx (1981)

Sordariales* genera *incertae sedis

Lasiosphaeris Clem. (1909)

= *Lasiadelphia* Réblová & W. Gams (2011)

Lunulospora Ingold (1942)

Stromatographium Höhn. (1907)

Subclass *Xylariomycetidae*

Order *Amphisphaeriales*

Family *Beltraniaceae*

Beltrania Penz. (1882)

Beltraniella Subram. (1952)

Parapleurotheciopsis P.M. Kirk (1982)

Pseudosubramaniomyces Crous (2017)

Subsessila C.G. Lin & K.D. Hyde (2017)

Family *Castanediellaceae*

Castanediella Hern.-Restr., Crous & M.J. Wingf. (2015)

Synnemadiella Crous & M.J. Wingf. (2016)

Family *Clypeophysalosporaceae*

Bagadiella Cheew. & Crous (2009)

Paraphysalospora Crous (2017)

Family *Cylindriaceae*

Cylindrium Bonord. (1851)

= *Pseudoidriella* Crous & R.G. Shivas (2011)

Tristratiperidium Daranag., Camporesi & K.D. Hyde (2015)

Family *Nothodactylariaceae*

Nothodactylaria Crous (2019)

Family *Phlogicylindriaceae*

Anungitea B. Sutton (1973)

Phlogicylindrium Crous, Summerb. & Summerell (2006)

Polyscytalum Riess (1853)

Family *Xyladictyochaetaceae*

Xyladictyochaeta Hern.-Restr., R.F. Castañeda & Gené (2017)

Amphisphaeriales* genera *incertae sedis

Hyphodiscosia Lodha & K.R.C. Reddy (1974)

Subramaniomyces Varghese & V.G. Rao (1979)

Subulispora Tubaki (1971)

Order *Xylariales*

Family *Anungitiomycetaceae*

Anungitiomyces Crous (2019)

Strelitziomyces Crous (2019)

Family *Diatrypaceae*

Neoeutypella M. Raza, Q.J. Shang, Phookamsak & L. Cai (2019)

Family *Graphostromataceae*

Camillea Fr. (1849)

= *Xylocladium* P. Syd. ex Lindau (1900)

Family *Hansfordiaceae*

Hansfordia S. Hughes (1951)

Family *Hypoxylaceae*

Anthocanalis Daranag., Camporesi & K.D. Hyde (2015)

Durotheca Læssøe, Srikitik., Luangsa-ard & M. Stadler (2013)

Hypoxylon Bull. (1791)

= *Nodulisporium* Preuss (1849)

Natonodosa Heredia, R.F. Castañeda & D.W. Li (2020)

Ruwenzoria J. Fourn., M. Stadler, Laessøe & Decock (2009)

Family *Lopadostomataceae*

Jumillera J.D. Rogers, Y.M. Ju & F. San Martín (1997)

Family *Microdochiaceae*

Idriella P.E. Nelson & S. Wilh. (1956)

Matsushimomyces V.G. Rao & Varghese (1979)

Microdochium Syd. & P. Syd. (1924)

Pinatubo J.B. Manandhar & Mew (1996)

Selenodriella R.F. Castañeda & W.B. Kendr. (1990)

Family *Xylariaceae*

Abieticola Hyang B. Lee (2017)

Brunneiperidium Daranag., Camporesi & K.D. Hyde (2015)

Collodiscula I. Hino & Katum. (1955)

= *Acanthodochium* Samuels, J.D. Rogers & Nagas. (1987)

Dematophora R. Hartig (1883)

Entalbostroma J.D. Rogers & P.R. Johnst. (2017)

Hypocreodendron Henn. (1897)

Lindquistia Subram. & Chandrash. (1977)

Nemania Gray (1821)

= *Geniculosporium* Chesters & Greenh. (1964)

Padixonia Subram. (1972)

Xylaria Hill ex Schrank (1789)

= *Geniculisynnema* Okane & Nakagiri (2007)

= *Moelleroclavus* Henn. (1902)

= *Xylocoremium* J.D. Rogers (1984)

Family *Zygosporiaceae*

Zygosporium Mont. (1842)

Xylariales* genera *incertae sedis

Basifimbria Subram. & Lodha (1968)

Ceratocladium Corda (1839)

Circinotrichum Nees (1817)

Digitodochium Tubaki & Kubono (1989)

Guayaquilia R.F. Castañeda, Magdana, D. Sosa & Hern.-Restr (2020)

Gyrothrix (Corda) Corda (1842)

Idriellomyces Crous (2018)

Neoidriella Hern.-Restr. & Crous (2016)

Paraidriella Hern.-Restr. & Crous (2016)

Polyancora Voglmayr & C. Yule (2006)

Roselymyces Fiúza, C.R. Silva, R.F. Castañeda & Gusmão (2018)

Sordariomycetes* orders *incertae sedis

Order *Amplistromatales*

Family *Amplistromataceae*

Acidothrix Hujslová & M. Kolařík (2014)

Order *Parasympodiellales*

Family *Parasympodiellaceae*

Parasympodiella Ponnappa (1975)

Order *Vermiculariopsiellales*

Family *Vermiculariopsiellaceae*

Stephanophorella Réblová & Hern.-Restr. (2021)

Vermiculariopsiella Bender (1932)

Sordariomycetes* genera *incertae sedis

Botryosporium Corda (1831)

Dendrosporium Plakidas & Edgerton ex J.L. Crane (1972)

Fantasmomyces Dong Hyeon Lee, Marinc., Z.W. de Beer, M.J. Wingf. (2016)

Goidanichiella G.L. Barron ex W. Gams (2009)

Guarroa M. Calduch, Gené, Heredia & R.F. Castañeda (2020)

Neoeriomycopsis Crous & M.J. Wingf. (2015)

Paramicrodochium Hern.-Restr. & Crous (2016)

Tulipispora Révay & Gönczöl (2009)

Subphylum *Saccharomycotina*

Class *Saccharomycetes*

Order *Saccharomycetales*

Family *Dipodascaceae*

Geotrichum Link (1809)

Saprochaete Coker & Shanor ex D.T.S. Wagner & Dawes (1970)

Family *Trichomonascaceae*

Blastobotrys Klopotek (1967)

Ascomycota* genera *incertae sedis

Acrodictyella W.A. Baker & Partr. (2001)

Acrodontiella U. Braun & Scheuer (1995)

Acrophragmis Kiffer & Reisinger (1970)

Acumispora Matsush. (1980)

Agyriella Sacc. (1884)

Algonquinia R.F. Castañeda & W.B. Kendr. (1991)

Amallospora Penz. (1897)

Amblyosporium Fresen. (1863)

Amerosympodula Matsush. (1996)

Amoenodochium Peláez & R.F. Castañeda (1996)

Amphichaetella Höhn. (1916)

Amphophialis R.F. Castañeda, W.B. Kendr. & Guarro (1998)

Ampullicephala R.F. Castañeda, Minter & M. Stadler (2009)

Anaselenosporella Heredia, R.F. Castañeda & R.M. Arias (2010)

Angulimaya Subram. & Lodha (1964)

Angulospora Sv. Nilsson (1962)

Annellospermosporella P.R. Johnst. (1999)

Antromyces Fresen. (1850)

Arborispora K. Ando (1986)

Arcuadendron Sigler & J.W. Carmich. (1976)

Ardhachandra Subram. & Sudha (1978)

Argopericonia B. Sutton & Pascoe (1987)

Arthromoniliphora S.S. Silva, Gusmão & R.F. Castañeda (2017)

Arthrosporium Sacc. (1880)

Atrosetaphiale Matsush. (1995)

Avesicladiella W.P. Wu, B. Sutton & Gange (1997)

Bactridium Kunze (1817)

Bahukalasa Subram. & Chandrash. (1979)

Belemnospora P.M. Kirk (1981)

Beltramono Dubey, A.K. Pandey bis & Manohar. (2011)

Beniowskia Racib. (1900)

Bhadradriella Nagaraju, Kunwar & Manohar. (2011)

Bibanasiella R.F. Castañeda & W.B. Kendr. (1991)

Biflagellosporella Matsush. (1993)

Blastofusarioides Matsush. (1996)

Blastophorella Boedijn (1937)

Botryoderma Papendorf & H.P. Upadhyay (1969)

Botryomonilia Goos & Piroz. (1975)

Cacumisporium Preuss (1851)

Calcarispora Marvanová & Marvan (1963)

Calceispora Matsush. (1975)

Candelosynnema K.D. Hyde & Seifert (1992)

Capsicumyces Gamundí, Aramb. & Giaiotti (1979)

Casaresia Gonz. Frag. (1920)

Catenocuneiphora Matsush. (2003)

Catenosubulispora Matsush. (1971)

Ceeveesubramaniomyces Pratibha, K.D. Hyde & Bhat (2005)

Chaetoblastophorum Morgan-Jones (1977)

Chaetochalara B. Sutton & Piroz. (1965)

Chaetopsis Grev. (1825)

Chalarodendron C.J.K. Wang & B. Sutton (1984)

Chalarodes McKenzie (1991)

Chantransiopsis Thaxt. (1914)

Chikaneea B. Sutton (1973)

Chlamydopsis Hol.-Jech. & R.F. Castañeda (1986)

Choreospora Constant. & R. Sant. (1987)

Chryseidea Onofri (1981)

Civisubramaniania Vittal & Dorai (1986)

Clavariana Nawawi (1976)

Colispora Marvanová (1988)

Condylospora Nawawi (1976)

Conjunctospora Udagawa & Uchiy. (1999)

Cornutostilbe Seifert (1990)

Corynecercospora V.K. Pal, Akhtar, N. Ahmad, Kamal & D.K. Agarwal (2006)

Cryptumbellata Udagawa & Uchiy. (1999)

Ctenosporium R. Kirschner (2006)

Culicinomyces Couch, Romney & B. Rao (1974)

Curucispora Matsush. (1981)

Delortia Pat. & Gaillard (1888)

Dendrospora Ingold (1943)

Dennisographium Rifai (1977)

Dentocircinomyces R.F. Castañeda & W.B. Kendr. (1990)

Descalsia A. Roldán & Honrubia (1989)

Dexhowardia J.J. Taylor (1970)

Dichotophora Whitton, McKenzie & K.D. Hyde (2012)

Didymopsis Sacc. & Marchal (1885)

Ditangifibula G.C. Adams (1995)

Drepanospora Berk. & M.A. Curtis (1875)

Drumopama Subram. (1957)

Dualomyces Matsush. (1987)

Dwayaloma Subram. (1957)

Echinoconidiophorum Pereira-Carvalho & Dianese (2009)

Elegantimyces Goh, K.M. Tsui & K.D. Hyde (1998)

Enantioptera Descals (1983)

Endoconospora Gjaerum (1971)

Engelhardtiella A. Funk (1973)

Episporogoniella U. Braun (1994)

Everhartia Sacc. & Ellis (1882)

= *Hyalotrochophora* Finley & E.F. Morris (1967)

Exosporella Höhn. (1912)

Flabellocladia Nawawi (1985)

Flabellospora Alas. (1968)

Flahaultiella Seifert (2009)

Fuscophialis B. Sutton (1977)

Gelatinocrinis Matsush. (1995)

Gemmulina Descals & Marvanová (1999)

Geohypha (Fr.) Hennebert (2020)

Glioblastocladium Matsush. (1989)

Gloeosporiella Cavara (1891)

Gloiosphaera Höhn. (1902)

Goniopila Marvanová & Descals (1985)

Goosiella Morgan-Jones, Kamal & R.K. Verma (1986)

Graphiothecium Fuckel (1870)

Guelichia Speg. (1886)

Haplariopsis Oudem. (1903)

Haptocara Drechsler (1975)

Harmoniella V.N. Boriss. (1981)

Harpographium Sacc. (1880)

Hawksworthiana U. Braun (1988)

Helicominopsis Deighton (1960)

Heliscella Marvanová (1980)

Heliscina Marvanová (1980)

Herreromyces R.F. Castañeda & W.B. Kendr. (1991)

Hexacladium D.L. Olivier (1983)

Hormiactis Preuss (1851)

Hormiscioideus M. Blackw. & Kimbr. (1979)

Hormographis Guarro, Punsola & Arx (1986)

Hyalobelemnospora Matsush. (1993)

Hyalocamposporium Révay & Gönczöl (2007)

Hyalocephalotrichum Nagaraju, Kunwar, Sureshk. & Manohar. (2011)

Hyalocladium Mustafa (1977)

Hyalohelicomina T. Yokoy. (1974)

Hyalopleiochaeta R.F. Castañeda, Guarro & Cano (1996)

Hyalosynnema Matsush. (1975)

Hydrometrospora Gönczöl & Révay (1985)

Hyphopolynema Nag Raj (1977)

Irpicomyces Deighton (1969)

Isariella Henn. (1908)

Isthmolongispora Matsush. (1971)

Isthmotricladia Matsush. (1971)

Iyengarina Subram. (1958)

Jayarambhatia Pratibha (2013)

Junctospora Minter & Hol.-Jech. (1981)

Kalchbrenneriella Diederich & M.S. Christ. (2002)

Kendrickiella K. Jacobs & M.J. Wingf. (2001)

Kiliophora Kuthub. & Nawawi (1993)

Kmetiopsis Bat. & Peres (1960)

Kolletes Kohlm. & Volkm.-Kohlm. (2005)

Kontospora A. Roldán, Honrubia & Marvanová (1990)

Kutilakesa Subram. (1956)

Lachnodochium Marchal (1895)

Lactydina Subram. (1978)

Lambdasporium Matsush. (1971)

Lambinonia Sérusiaux & Diederich (2005)

Lappodochium Matsush. (1975)

Lateriramulosa Matsush. (1971)

Leightoniomyces D. Hawksw. & B. Sutton (1977)

Lichenobactridium Diederich & Etayo (1995)

Lichenopuccinia D. Hawksw. & Hafellner (1984)

Lichenostella Calat. & Etayo (2000)

Linodochium Höhn. (1909)

Lomachashaka Subram. (1956)

Mackenziella Yanna & K.D. Hyde (2009)

Mahabalella B. Sutton & S.D. Patil (1966)

Medusamyces G.L. Barron & Szijarto (1990)

Minimidochium B. Sutton (1970)

Minteriella Heredia, R.F. Castañeda & R.M. Arias (2012)

Mirandina G. Arnaud ex Matsush. (1975)

Miricatena Punith. & Spooner (2012)

Monodidymaria U. Braun (1994)

Morrisographium M. Morelet (1968)

Muirella R. Sprague (1959)

Mycocentrodochium K. Matsush. & Matsush. (1996)

Mystrosporiella Munjal & Kulshr. (1969)

Nematogonum Desm. (1834)

Nematographium Goid. (1935)

Neoovularia U. Braun (1992)

Neoramularia U. Braun (1991)

Neta Shearer & J.L. Crane (1971)

Obeliospora Nawawi & Kuthub. (1990)

Odontodictyospora Mercado (1984)

Ostracodermidium Mukerji (1973)

Pachycladina Marvanová (1987)

Pappimyces B. Sutton & Hodges (1975)

Paraarthrocladium Matsush. (1993)

Paraceratocladium R.F. Castañeda (1987)

Parachionomyces Thaung (1979)

Paracostantinella Subram. & Sudha (1989)

Paracryptophiale Kuthub. & Nawawi (1994)

Paratrichoconis Deighton & Piroz. (1972)

Parvosympodium A.W. Ramaley (2002)

Patriciomyces D. Hawksw. (2001)

Petrakiopsis Subram. & K.R.C. Reddy (1968)

Phaeodactylium Agnihothr. (1968)

Phaeomonilia R.F. Castañeda, Heredia & R.M. Arias (2007)

Phialophaeoisaria Matsush. (1995)

Phialostele Deighton (1969)

Phialotubus R.Y. Roy & Leelav. (1966)

Physalidiopsis R.F. Castañeda & W.B. Kendr. (1990)

Piperivora Siboe, P.M. Kirk & P.F. Cannon (1999)

Plesiospora Drechsler (1971)

Pleurodesmospora Samson, W. Gams & H.C. Evans (1979)

Pleuropedium Marvanová & S.H. Iqbal (1973)

Pleurophragmium Costantin (1888)

Pleurotheciopsis B. Sutton (1973)

Pleurovularia R. Kirschner & U. Braun (2002)

Polybulbophiale Goh & K.D. Hyde (1998)

Polycladium Ingold (1959)

Porocladium Descals (1976)

Pseudoanguillospora S.H. Iqbal (1974)

Pseudodidymaria U. Braun (1993)

Pseudogaster Höhn. (1907)

Pseudographiella E.F. Morris (1966)

Pseudoramularia Matsush. (1983)

Pseudorhizopogon Kobayasi (1983)

Pterulopsis Wakef. & Hansf. (1943)

Pterygosporopsis P.M. Kirk (1983)

Pulchromyces Hennebert (1973)

Pyramidospora Sv. Nilsson (1962)

Quadracaea Lunghini, Pinzari & Zucconi (1996)

Quadricladium Nawawi & Kuthub. (1989)

Quasiphloeospora B. Sutton, Crous & Shamoun (1996)

Radiatispora Matsush. (1995)

Ramicapitulum Whitton, McKenzie & K.D. Hyde (2012)

Ramiphialis F.R. Barbosa, Fiúza & R.F. Castañeda (2020)

Redbia Deighton & Piroz. (1972)

Refractohilum D. Hawksw. (1977)

Rhombostilbella Zimm. (1902)

Rhopalocladium Schroers, Samuels & W. Gams (1999)

Rhynchosporina Arx (1957)

Rogergoosiella A. Hern. Gut. & J. Mena (1996)

Rosulomyces S. Marchand & Cabral (1976)

Schizotrichum McAlpine (1903)

Scolecodochium K. Matsush. & Matsush. (1996)

Scopulariella Gjaerum (1971)

Selenosporopsis R.F. Castañeda & W.B. Kendr. (1991)

Semipseudocercospora J.M. Yen (1983)

Septosporium Corda (1831)

Setophiale Matsush. (1995)

Sheathnema Dubey & Moonnambeth (2014)

Siamia V. Robert, Decock & R.F. Castañeda (2000)

Similitrichoconis R.F. Castañeda, M. Vera & D. Sosa (2020)

Soloacrospora W.B. Kendr. & R.F. Castañeda (1991)

Solosympodiella Matsush. (1971)

Spermatoloncha Speg. (1908)

Spermospora R. Sprague (1948)

Spermosporella Deighton (1969)

Sphaeridium Fresen. (1852)

Sphaerulomyces Marvanová (1977)

Spiralum J.L. Mulder (1975)

Spondylocladiopsis M.B. Ellis (1963)

Sporotretophora Whitton, McKenzie & K.D. Hyde (2012)

Stachycoremium Seifert (1986)

Stauriella Sivichai & E.B.G. Jones (2004)

Stellomyces Morgan-Jones, R.C. Sinclair & Eicker (1987)

Stellospora Alcorn & B. Sutton (1984)

Stenocladiella Marvanová & Descals (1987)

Stenospora Deighton (1969)

Stilbellula Boedijn (1951)

Stromatostysanus Höhn. (1919)

Stylaspergillus B. Sutton, Alcorn & P.J. Fisher (1982)

Sympodioplanus R.C. Sinclair & Boshoff (1997)

Termitaria Thaxt. (1920)

Tetrameronycha Speg. ex W. Rossi & M. Blackw. (1990)

Ticogloea G. Weber, Spaaij & W. Gams (1994)

Titaea Sacc. (1876)

Titaeopsis B. Sutton & Deighton (1984)

Tompetchia Subram. (1985)

Tretendophragmia Subram. (1995)

Tretovularia Deighton (1984)

Triacutus G.L. Barron & Tzean (1981)

Trichoconis Clem. (1909)

Trichomatosphaera Pereira-Carvalho, G.F. Sepúlveda & Dianese (2009)

Trichotheca P. Karst. (1887)

Tricladiella K. Ando & Tubaki (1984)

Tricladiopsis Descals (1982)

Tricornispora Bonar (1967)

Trifurcospora K. Ando & Tubaki (1988)

Tripoconidium Subram. (1978)

Triposporina Höhn. (1912)

Triscelophorus Ingold (1943)

Trisulcosporium H.J. Huds. & B. Sutton (1964)

Troposporium Harkn. (1884)

Tuberculispora Deighton & Piroz. (1972)

Tympanosporium W. Gams (1974)

Umbellidion B. Sutton & Hodges (1975)

Uvarispora Goos & Piroz. (1975)

Vanbeverwijkia Agnihothr. (1961)

Vanterpoolia A. Funk (1982)

Velutipila D. Hawksw. (1987)

Ventrographium H.P. Upadhyay, Cavalc. & A.A. Silva (1986)

Venustocephala Matsush. (1995)

Venustosynnema R.F. Castañeda & W.B. Kendr. (1990)

Veramyces Matsush. (1993)

Vesicladiella Crous & M.J. Wingf. (1994)

Xenoplaca Petr. (1949)

Yuccamyces Gour, Dyko & B. Sutton (1979)

Zakatoshia B. Sutton (1973)

Zelodactylaria A.C. Cruz, Gusmão & R.F. Castañeda (2012)

Phylum *Basidiomycota*

Subphylum *Agaricomycotina*

Class *Agaricomycetes*

Order *Agaricales*

Family *Strophariaceae*

Deconica (W.G. Sm.) P. Karst. (1879)

= *Pseudohelicomyces* Garnica & E. Valenz. (2000)

Family *Lyophyllaceae*

Asterophora Ditmar (1809)

= *Ugola* Adans. (1763)

Termitomyces R. Heim (1942)

= *Termitosphaera* Cif. (1935)

Family *Marasmiaceae*

Moniliophthora H.C. Evans, Stalpers, Samson & Benny (1978)

Family *Niaceae*

Peyronelina P.J. Fisher, J. Webster & D.F. Kane (1976)

Family *Psathyrellaceae*

Hormographiella Guarro & Gené (1992)

Family *Strophariaceae*

Synnematomyces Kobayasi (1981)

Agaricales* genera *incertae sedis

Arthrosporella Singer (1970)

= *Nothoclavulina* Singer (1970)

Dendrocollybia R.H. Petersen & Redhead (2001)

= *Tilachlidiopsis* Keissl. (1924)

Fistulina Bull. (1791)

= *Confistulina* Stalpers (1983)

Glutinoagger Sivan. & Watling (1980)

Order *Atheliales*

Family *Atheliaceae*

Taeniospora Marvanová (1977)

Order *Auriculariales*

Family *Hyaloriaceae*

Myxarium Wallr. (1833)

= *Helicomyxa* R. Kirschner & Chee J. Chen (2004)

Auriculariales* genus *incertae sedis

Ovipoculum Zhu L. Yang & R. Kirschner (2010)

Order *Cantharellales*

Family *Botryobasidiaceae*

Botryobasidium Donk (1931)

= *Haplotrichum* Link (1824)

Family *Hydnaceae*

Ingoldiella D.E. Shaw (1972)

Osteomorpha Arnaud ex Watling & Kendrick (1979)

Order *Corticiales*

Family *Corticiaceae*

Disporotrichum Stalpers (1984)

Necator Massee (1898)

Order *Hymenochaetales*

Family *Schizoporaceae*

Echinoporia Ryvarden (1980)

= *Echinodia* Pat. (1918)

Hymenochaetales* genus *incertae sedis

Caeruleomyces Stalpers (2000)

Order *Polyporales*

Family *Dacryobolaceae*

Postia Fr. (1874)

= *Ptychogaster* Corda (1838)

Family *Phanerochaetaceae*

Bjerkandera P. Karst. (1879)

= *Geotrichopsis* Tzean & Estey (1991)

Riopa D.A. Reid (1969)

= *Sporotrichum* Link (1809)

Family *Podoscyphaceae*

Abortiporus Murrill (1904)

= *Sporotrichopsis* Stalpers (2000)

Polyporales* genera *incertae sedis

Aegerita Pers. (1794)

= *Bulbillomyces* Jülich (1974)

Order *Russulales*

Family *Bondarzewiaceae*

Spiniger Stalpers (1974)

Family *Peniophoraceae*

Scytinostroma Donk (1956)

= *Licrostroma* P.A. Lemke (1964)

= *Michenera* Berk. & M.A. Curtis (1869)

Family *Stereaceae*

Matula Massee (1888)

Order *Sebacinales*

Family *Sebacinaceae*

Ditangium P. Karst. (1870)

Family *Serendipitaceae*

Serendipita P. Roberts (1993)

= *Piriformospora* Sav. Verma, Aj. Varma, Rexer, G. Kost & P. Franken (1998)

Order *Trechisporales*

Family *Hydnodontaceae*

Subulicystidium Parmasto (1968)

= *Aegeritina* Jülich (1984)

Agaricomycetes* genera *incertae sedis

Arthrodochium R.F. Castañeda & W.B. Kendr. (1990)

Arualis Katz (1980)

Cenangiomyces Dyko & B. Sutton (1979)

Cruciger R. Kirschner & Oberw. (1999)

Dendrosporomyces Nawawi, J. Webster & R.A. Davey (1977)

Fibulotaeniella Marvanová & Bärl. (1988)

Gloeosynnema Seifert & G. Okada (1988)

Glomerulomyces A.I. Romero & S.E. López (1989)

Pagidospora Drechsler (1960)

Riessia Fresen. (1852)

Titaeella G. Arnaud ex K. Ando & Tubaki (1985)

Tricladiomyces Nawawi (1985)

Class *Bartheletiomycetes*

Order *Bartheletiales*

Family *Bartheletiaceae*

Bartheletia G. Arnaud ex Scheuer, R. Bauer, M. Lutz, Stabentheiner, Melnik & Grube (2008)

Class *Dacrymycetes*

Order *Dacrymycetales*

Family *Dacrymycetaceae*

Dacrymyces Nees (1817)

= *Dacryoscyphus* R. Kirschner & Zhu L. Yang (2005)

Femsjonia Fr. (1849)

= *Cerinosterus* R.T. Moore (1987)

Class *Tremellomycetes*

Order *Cystofilobasidiales*

Family *Mrakiaceae*

Itersonilia Derx (1948)

Order *Tremellales*

Family *Tremellaceae*

Hormomyces Bonord. (1851)

Tremellales* genus *incertae sedis

Tremellina Bandoni (1986)

Order *Trichosporonales*

Family *Trichosporonaceae*

Aegeritella Balazy & J. Wisn. (1974)

Tremellomycetes* genus *incertae sedis

Heteromycophaga P. Roberts (1997)

Agaricomycotina* genus *incertae sedis

Nodulospora Marvanová & Bärl. (2000)

Subphylum *Pucciniomycotina*

Class *Atractiellomycetes*

Order *Atractiellales*

Family *Hoehnelomycetaceae*

Basidiopycnis Oberw., R. Kirschner, R. Bauer, Begerow & Arenal (2006)

= *Basidiopycnides* J. Reid, Eyjólfsd. & Georg Hausner (2008)

Family *Phleogenaceae*

Helicogloea Pat. (1892)

= *Leucogloea* R. Kirschner (2004)

Hobsonia Berk. ex Massee (1891)

Class *Classiculomycetes*

Order *Classiculales*

Family *Classiculaceae*

Classicula R. Bauer, Begerow, Oberw. & Marvanová (2003)

= *Naiadella* Marvanová & Bandoni (1987)

Jaculispora H.J. Huds. & Ingold (1960)

Class *Cryptomycocolacomycetes*

Order *Cryptomycocolacales*

Family *Cryptomycocolacaceae*

Colacosiphon R. Kirschner, R. Bauer & Oberw. (2001)

Class *Microbotryomycetes*

Order *Kriegeriales*

Family *Camptobasidiaceae*

Camptobasidium Marvanová & Suberkr. (1990)

= *Crucella* Marvanová & Suberkr. (1990)

Class *Pucciniomycetes*

Order *Helicobasidiales*

Family *Helicobasidiaceae*

Helicobasidium Pat. (1885)

= *Thanatophytum* Nees (1817)

= *Tuberculina* Tode ex Sacc. (1880)

Order *Platygloeales*

Family *Platygloeaceae*

Glomerogloea Doweld (2013)

= *Glomospora* D.M. Hend. (1961)

Glomopsis D.M. Hend. (1961)

Class *Tritirachiomycetes*

Order *Tritirachiales*

Family *Tritirachiaceae*

Tritirachium Limber (1940)

Subphylum *Ustilaginomycotina*

Class *Exobasidiomycetes*

Order *Entylomatales*

Family *Entylomataceae*

Entyloma de Bary (1874)

= *Entylomella* Höhn. (1924)

Tilletiopsis Derx (1948)

Order *Exobasidiales*

Family *Brachybasidiaceae*

Meira Boekhout, Scorzetti, Gerson & Sztejnb. ex Denchev & T. Denchev (2021)

Family *Cryptobasidiaceae*

Acaromyces Boekhout, Scorzetti, Gerson & Sztejnb. ex Denchev & T. Denchev (2021)

Exobasidiales* genus *incertae sedis

Cladosterigma Pat. (1892)

Order *Microstromatales*

Family *Quambalariaceae*

Quambalaria J.A. Simpson (2000)

Class *Moniliellomycetes*

Order *Moniliellales*

Family *Moniliellaceae*

Moniliella Stolk & Dakin (1966)

= *Trichosporonoides* Haskins & J.F.T. Spencer (1967)

Class *Ustilaginomycetes*

Order *Ustilaginales*

Family *Ustilaginaceae*

Pseudozyma Bandoni emend. Boekhout (1985)

Subphylum *Wallemiomycotina*

Class *Wallemiomycetes*

Order *Wallemiales*

Family *Wallemiaceae*

Wallemia Johan-Olsen (1887)

Basidiomycota* genera *incertae sedis

Anastomyces W.P. Wu, B. Sutton & Gange (1997)

Anguillomyces Marvanová & Bärl. (2000)

Arcispora Marvanová & Bärl. (1998)

Microstella K. Ando & Tubaki (1984)

Phylum *Calcarisporiellomycota*

Subphylum *Calcarisporiellomycotina*

Class *Calcarisporiellomycetes*

Order *Calcarisporiellales*

Family *Calcarisporiellaceae*

Calcarisporiella de Hoog (1974)

Phylum *Kickxellomycota*

Kickxellomycotina* genus *incertae sedis

Aenigmatospora R.F. Castañeda, Saikawa, Guarro & Calduch (1999)

Phylum *Zoopagomycota*

Class *Zoopagomycetes*

Order *Zoopagales*

Family *Sigmoideomycetaceae*

Sphondylocephalum Stalpers (1974)

2.3.3 Notes of Hyaline-spored Hyphomycetous Genera

Abieticola Hyang B. Lee, Mycotaxon 131 (4): 755 (2017)

Index Fungorum number: IF811702

Classification: Xylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Abieticola koreana* Hyang B. Lee, Mycotaxon 131 (4): 755 (2017)

Sexual morph: Unknown.

Sequence data: *Abieticola koreana* (EML-F0010-1, LSU: JQ014618, ITS: JN977612)

Notes: *Abieticola* was introduced by Lee et al. (2016) for a fungus isolated from the inner bark of a Manchurian fir. It is characterized by having synnematous, brown conidiophores, and producing conidia that are *Poronia*-like, ellipsoid or fusoid to ovoid, often slightly curved, hyaline to brown (Lee et al., 2016). Phylogenetically, *Abieticola* located in the family Xylariaceae (Xylariales, Xylariomycetidae, Sordariomycetes) (Figure 2.1). References: (Lee et al., 2016) (morphology), (Wijayawardene et al., 2020) (outline).

Abortiporus Murrill, Bulletin of the Torrey Botanical Club 31 (8): 421 (1904)

= *Sporotrichopsis* Stalpers, Karstenia 40: 174 (2000)

Index Fungorum number: IF17001

Classification: Podoscyphaceae, Polyporales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Abortiporus distortus* (Schwein.) Murrill, Bull. Torrey bot. Club 31(8): 422 (1904)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Sporotrichopsis* (Stalpers, 2000).

Sequence data: *Abortiporus biennis* (FD-319, LSU: KP135195, ITS: KP135300)

Notes: *Sporotrichopsis* was erected by Stalpers (2000) and has sexual morph in the genus *Abortiporus*. *Sporotrichopsis* is characterized by having branched, with clamp connections, hyaline conidiophores, monoblastic, hyaline conidiogenous cells, producing solitary, aseptate, globose or subglobose, hyaline conidia (Seifert et al., 2011; Stalpers, 2000). Phylogenetically, *Abortiporus* was shown to be nested within the family Podoscyphaceae (Polyporales, Agaricomycetes) (Figure 2.1). References: (Seifert et al., 2011; Stalpers, 2000) (morphology and phylogeny), (He et al., 2019) (outline).

Acanthohelicospora Boonmee & K.D. Hyde, Fungal Diversity 68 (1): 251 (2014)

Index Fungorum number: IF550572

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Acanthohelicospora pinicola* Boonmee & K.D. Hyde, Fungal Diversity 68 (1): 251 (2014)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Boonmee et al., 2014; Lu et al., 2018b).

Sequence data: *Acanthohelicospora pinicola* (MFLUCC 10-0116, LSU: KF301534, ITS: KF301526)

Notes: *Acanthohelicospora* was established by Boonmee et al. (2014) and its asexual morph has semi-macronematous to macronematous, mononematous, setiform, brown conidiophores, monoblastic, discrete, intercalary, denticulate, hyaline to pale brown conidiogenous cells, and produces solitary, septate, helicoid, hyaline conidia. Phylogenetically, *Acanthohelicospora* located in the family Tubeufiaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Boonmee et al., 2014; Lu et al., 2018b) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Acaromyces Boekhout, Scorzetti, Gerson & Sztejnb. ex Denchev & T. Denchev, Mycobiota 11: 4 (2021)

Index Fungorum number: IF558278

Classification: Cryptobasidiaceae, Exobasidiales, Exobasidiomycetes, Ustilaginomycotina, Basidiomycota

Type species: *Acaromyces ingoldii* Boekhout, Scorzetti, Gerson & Sztejnb. ex Denchev & T. Denchev, Mycobiota 11: 5 (2021)

Sexual morph: Unknown.

Sequence data: *Acaromyces ingoldii* (CBS 110050, LSU: NG_058540, ITS: NR_073342, SSU: NG_061199)

Notes: This genus was described by Boekhout et al. (2003) and is characterized by having reduced, sometimes branched, hyaline conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing catenate, aseptate, hyaline conidia. Phylogenetically, representative of *Acaromyces* clustered in the family Cryptobasidiaceae (Exobasidiales, Exobasidiomycetes) (Figure 2.1). References: (Boekhout et al., 2003; Wang et al., 2015b) (morphology and phylogeny), (He et al., 2019) (outline).

Achroiostachys L. Lombard & Crous, Persoonia 36: 172 (2016)

Index Fungorum number: IF815916

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Achroiostachys humicola* L. Lombard & Crous, Persoonia 36: 173 (2016)

Sexual morph: Unknown.

Sequence data: *Achroiostachys humicola* (CBS 868.73, LSU: NG_069333, ITS: NR_145065)

Notes: This genus is stachybotrys-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Acidea Hujslová & M. Kolařík, Mycological Progress 13 (3): 826 (2014)

Index Fungorum number: IF805195

Classification: Discinellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Acidea extrema* Hujslová & M. Kolařík, Mycological Progress 13 (3): 827 (2014)

Sexual morph: Unknown.

Sequence data: *Acidea extrema* (CBS 136258 = CCF 4345, LSU, ITS and SSU: JX124323)

Notes: *Acidea* was introduced by Hujslova et al. (2014) to accommodate *A. extrema*, which was isolated from extremely acidic soils. *Acidea* has mycelium that are sterile, sparsely branched, fully filled with single of granules (Hujslova et al., 2014). Phylogenetically, *Acidea* was shown to be nested within the family Discinellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Hujslova et al., 2014) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Acidiella Hujslová & M. Kolarík, Fungal Diversity 58: 39 (2012)

= *Fodinomyces* Vázq.-Camp., Mycologia 106 (6): 1077 (2014)

Index Fungorum number: IF564518

Classification: Teratosphaeriaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Acidiella bohemica* Hujslová & M. Kolarík, Fungal Diversity 58: 39 (2012)

Sexual morph: Unknown.

Sequence data: *Acidiella bohemica* (CBS 132721 = CCF 4119, LSU: MH878116, ITS: JQ172752, SSU: JQ172752); *Acidiella uranophila* (before known as *Fodinomyces uranophilus*) (T2 = CBS 136962, LSU: KF857170, ITS: JQ904602, SSU: KF857169)

Notes: *Acidiella* was established by Hujslova et al. (2013) and is characterized by having mononematous, branched, septate, hyaline to pale brown conidiophores, with thallic-arthric conidiogenous cells, producing oblong, hyaline conidia. Vázquez-Campos et al. (2014) introduced the genus *Fodinomyces*, however, it was synonymized under *Acidiella* by Kolarik et al. (2015). Phylogenetically, *Acidiella* was shown to be nested within the family Teratosphaeriaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Hujslova et al.,

2013; Vázquez-Campos et al., 2014) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Acidomelania E. Walsh & N. Zhang, Mycologia 106 (4): 857 (2014)

Index Fungorum number: IF807849

Classification: Mollisiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Acidomelania panicicola* E. Walsh & N. Zhang, Mycologia 106 (4): 857 (2014)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Walsh et al., 2014).

Sequence data: *Mollisia panicicola* (before known as *Acidomelania panicicola*) (61R8 = CBS 137156, LSU: KF874622, ITS: KF874619, SSU: MF677922)

Notes: *Acidomelania* was introduced by Walsh et al. (2014), however it was synonymized under *Mollisia* by Tanney and Seifert (2020). Phylogenetically, *Acidomelania* located in the family Mollisiaceae (Helotiales, Leotiomycetes). References: (Walsh et al., 2014) (morphology), (Wijayawardene et al., 2020) (outline).

Acidotalaromyces Houbraken, Frisvad & Samson, Studies in Mycology 95: 10 (2020)

Index Fungorum number: IF832551

Classification: Trichocomaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Acidotalaromyces lignorum* (Stolk) Houbraken, Frisvad & Samson, in Houbraken, Kocsubé, Visagie, Yilmaz, Wang, Meijer, Kraak, Hubka, Bensch, Samson & Frisvad, Stud. Mycol. 95: 86 (2020) (= *Penicillium lignorum* Stolk, Antonie van Leeuwenhoek 35 (3): 264 (1969))

Sexual morph: Unknown.

Sequence data: *Acidotalaromyces lignorum* (CBS 709.68, LSU: MT365213, ITS: JF910285)

Notes: *Acidotalaromyces* was introduced by Houbraken et al. (2020) with talaromyces-like asexual morph. References: (Houbraken et al., 2020) (morphology and phylogeny).

Acidothrix Hujslová & M. Kolařík, Mycological Progress 13 (3): 824 (2014)

Index Fungorum number: IF805194

Classification: Amplistromataceae, Amplistromatales, Sordariomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Acidothrix acidophila* Hujslová & M. Kolařík, Mycological Progress 13 (3): 824 (2014)

Sexual morph: Unknown.

Sequence data: *Acidothrix acidophila* (CBS 136259 = CCF 3799, LSU: MH877622, ITS: NR_164513)

Notes: *Acidothrix* was introduced by Hujslova et al. (2014) to accommodate *A. acidophila*, which isolated from extremely acidic soils. It is characterized by acrodontium–like, semimacronematous or macronematous, hyaline conidiophores, producing solitary, globose, or ellipsoidal to lacrimose, hyaline conidia (Hujslova et al., 2014). References: (Hujslova et al., 2014) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Acremoniopsis Giraldo, Gené, Guarro, Persoonia 33: 265 (2014)

Index Fungorum number: IF809883

Classification: Hypocreales genus *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Acremoniopsis suttonii* Giraldo, Gené & Guarro, Persoonia 33: 265 (2014)

Sexual morph: Unknown.

Sequence data: *Acremoniopsis suttonii* (CBS 138708 = FMR 11780, LSU: NG_057045, ITS: NR_145059)

Notes: This genus has the typical *Acremonium* morphology, but phylogenetically, it distinct from the type species of *Acremonium*, *A. alternatum*.

References: (Crous et al., 2014c) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Acremonium Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 15 (1809)

Index Fungorum number: IF7028

Classification: Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota, Acremonium

Type species: *Acremonium alternatum* Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 15 (1809)

Sexual morph: *Bulbithecium*, *Cosmospora*, *Emericellopsis*, *Hydropisphaera*, *Ijuhya*, *Lasionectria*, *Mycoarachis*, *Nectriella*, *Nectriopsis* (Seifert et al., 2011). Some genera were reported have acremonium-like asexual morph: *Chaetomium*, *Dimerosporiella*, *Hapsidospora*, *Heleococcum*, *Hypocrea*, *Hypomyces*, *Mycocitrus*, *Nectria*, *Neobarya*, *Neocosmospora*, *Nigrosabulum*, *Ochronectria*, *Peloronectriella*, *Phytocordyceps*, *Pseudohypocrea*, *Pronectria*, *Protocrea*, *Protocreopsis*, *Rodentomyces*, *Scopinella*, *Sporophagomyces*, *Stilbocrea*, *Thielavia*, *Trichonectria*, *Trichosphaerella*, *Valetoniellopsis*, *Valsonectria*, *Verrucostoma* (Seifert et al., 2011).

Synanamorphs: Some genera were reported have acremonium-like synanamorphs: *Botryotrichum*, *Diademospora*, *Geminoarcus*, *Humicola*, *Isthmolongispora*, *Koorchaloma*, *Mahabalella*, *Phialophaeoisaria*, *Stilbella*, *Trichocladium*, *Ventrographium*, *Volutella* (Seifert et al., 2011).

Sequence data: *Acremonium alternatum* (CBS 407.66, LSU: NG_056977, ITS: NR_144913)

Notes: *Acremonium* is characterized by having unbranched or sparingly branched or reduced, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and catenate or in slimy mass, aseptate or septate, hyaline conidia. References: (Giraldo et al., 2012; Gräfenhan et al., 2011; Ito et al., 2000; Summerbell et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Acrodictyella W.A. Baker & Partr., Mycotaxon 78: 30 (2001)

Index Fungorum number: IF28503

Classification: Ascomycota genera *incertae sedis*

Type species: *Acrodictyella obovata* W.A. Baker & Partr., Mycotaxon 78: 31 (2001)

Sexual morph: Unknown.

Sequence data: Sequence data are unavailable for this genus.

Notes: Currently, there is one species in this genus and characterized by having macronematous, mononematous, simple, cylindrical, septate, olivaceous brown to dark brown conidiophores, integrated, terminal, monoblastic, percurrent conidiogenous cells, solitary, acrogenous, obovoid, muriform, sub-hyaline to pale olivaceous brown, smooth conidia (Baker et al., 2001). References: (Baker et al., 2001) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Acrodontiella U. Braun & Scheuer, Sydowia 47: 146 (1995)

Index Fungorum number: IF27554

Classification: Ascomycota genera *incertae sedis*

Type species: *Acrodontiella fallopiae* U. Braun & Scheuer, Sydowia 47: 148 (1995)

Sexual morph: Unknown.

Sequence data: Sequence data for this genus are unavailable.

Notes: There is one species accepted in this genus and the genus is characterized by having macronematous, mononematous, unbranched or sparingly branched, hyaline conidiophores, polyblastic, integrated, sympodial, denticulate conidiogenous cells and solitary, aseptate or 1-septate, ellipsoid-ovoid, fusiform, hyaline conidia (Braun & Scheuer, 1995). In addition, sometimes conidiophores reduced to conidiogenous cells (Braun & Scheuer, 1995). References: (Braun & Scheuer, 1995) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Acrodontium de Hoog, Studies in Mycology 1: 23 (1972)

Index Fungorum number: IF7035

Classification: Teratosphaeriaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Acrodontium crateriforme* (J.F.H. Beyma) de Hoog, Studies in Mycology 1: 26 (1972) (≡ *Chloridium crateriforme* J.F.H. Beyma, Zentralblatt für Bakteriologie und Parasitenkunde, Abteilung 2 89: 241 (1933))

Sexual morph: *Amplistroma*, *Ascocorticium*, *Wallrothiella* (Seifert et al., 2011).

Sequence data: *Acrodontium crateriforme* (ATCC 15679 = CBS 144.33 = MUCL 15748 = MUCL 8978, LSU: NG_057108, ITS: NR_152320)

Notes: There are 17 species accepted in this genus and the genus is characterized by having unbranched or branched or verticillate or reduced conidiophores, sympodial, denticulate conidiogenous cells, and solitary, aseptate, hyaline conidia (de Hoog, 1972; Seifert et al., 2011). References: (de Hoog, 1972; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Acrophialophora Edward, Mycologia 51 (6): 784 (1961)

= *Taifanglania* Z.Q. Liang, Y.F. Han, H.L. Chu & R.T.V. Fox, Fungal Diversity 34: 72 (2009)

Index Fungorum number: IF7037

Classification: Chaetomiaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Acrophialophora nainiana* Edward, Mycologia 51 (6): 784 (1961)

Sexual morph: chaetomium-like (Wang et al., 2019b); Wang et al. (2019b) provided holomorphic description for this genus.

Sequence data: *Acrophialophora nainiana* (CBS 100.60 = ATCC 22555 = IMI 076567 = LSHB BB399 = UAMH 10774, LSU: KM995865, ITS: NR_157439, SSU: NG_061193)

Notes: The asexual morph of *Acrophialophora* is characterized by macronematous, mononematous, verticillate or branched, sometimes reduced, brown conidiophores, phialidic, flask-shaped, hyaline conidiogenous cells, and producing catenate, aseptate, ovoid, ellipsoidal to fusiform, hyaline to subhyaline conidia (Wang

et al., 2019b). The genus was redefined to include two sexual species (*A. jodhpurensis* and *A. teleoafricana*) by Wang et al. (2019b). *Taifanglania* was synonymized under *Acrophialophora* by Zhang et al. (2015). References: (de Hoog, 1972; Wang et al., 2019b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Acrospeira Berk. & Broome, Annals and Magazine of Natural History 7: 449 (1861)

Index Fungorum number: IF7039

Classification: Ceratostomataceae, Coronophorales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Acrospeira mirabilis* Berk. & Broome, Introduction to Cryptogamic Botany: 305, fig. 69a (1857)

Sexual morph: Unknown.

Synanamorphs: proteophiala-like (Seifert et al., 2011).

Sequence data: *Acrospeira mirabilis* (UAMH 12078, LSU and ITS: MN061697)

Notes: *Acrospeira* was introduced by Berkeley and Broome (1861) and is dimorphic: (1) reduced, branched, hyaline conidiophores, monoblastic, hyaline conidiogenous cells, solitary, muriform or helicoid, brown conidia; (2) reduced, branched, hyaline conidiophores, phialidic, hyaline conidiogenous cells, catenate, aseptate, hyaline conidia. Li et al. (2020a) provided the first phylogenetic analysis for this genus and placed this genus in the family Ceratostomataceae (Coronophorales, Hypocreomycetidae, Sordariomycetes). References: (Berkeley & Broome, 1861; Li et al., 2020a) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Acrostalagmus Corda, Icones fungorum hucusque cognitorum 2: 15 (1838)

Index Fungorum number: IF7044

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Acrostalagmus cinnabarinus* Corda, Icones fungorum hucusque cognitorum 2: 15, t. 10:66 (1838)

Sexual morph: Unknown.

Sequence data: *Acrostalagmus annulatus* (DAOM 212126, LSU: GU180646, ITS: GU180632, SSU: GU180611)

Notes: *Acrostalagmus* is characterized by macronematous, mononematous or synnematous, verticillate or penicillate, distinctly bright orange to reddish pigmented conidiophores, monophialidic, flask-shaped, subulate or cylindrical, hyaline to pale orange conidiogenous cells, and producing aseptate, in slimy mass, oval, ellipsoidal to oblong-ellipsoidal, hyaline to bright orange to reddish conidia (Giraldo & Crous, 2019; Seifert et al., 2011). References: (Giraldo & Crous, 2019; Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Acumispora Matsush., Matsushima Mycological Memoirs 1: 2 (1980)

Index Fungorum number: IF7064

Classification: Ascomycota genera *incertae sedis*

Type species: *Acumispora uniseptata* Matsush., Matsushima Mycological Memoirs 1: 2 (1980)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Acumispora* was introduced by Matsushima (1980) to accommodate *A. biseptata*, *A. phragmospora* and *A. uniseptata*. It has mononematous, short, scattered, unbranched or irregularly branched, pale brown conidiophores, monoblastic or polyblastic conidiogenous cells, and solitary, 1- to multi-septate, acuminate at apex, hyaline to pale brown conidia (Matsushima, 1980). Phylogenetic position for *Acumispora* is unresolved due to lack of sequence data. References: (Matsushima, 1980) (morphology), (Wijayawardene et al., 2020) (outline).

Aegerita Pers., Neues Magazin für die Botanik 1: 120 (1794)

= *Bulbillomyces* Jülich, Persoonia 8 (1): 69 (1974)

Index Fungorum number: IF7070

Classification: Polyporales genera *incertae sedis*, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Aegerita candida* Pers., Neues Magazin für die Botanik 1: 120 (1794)

Sexual morph: *Bulbillomyces* (Seifert et al., 2011; Stalpers et al., 2021).

Sequence data: *Aegerita torulosa* (CBS 107.59, LSU: MH869363)

Notes: *Aegerita* is characterized by having unbranched, with clamp connections, hyaline conidiophores, monoblastic, hyaline conidiogenous cells, producing solitary, hyaline conidia (Seifert et al., 2011). The sexual morph of *Aegerita* was reported in the genus *Bulbillomyces*, Stalpers et al. (2021) proposed to protect *Aegerita* over *Bulbillomyces*. Phylogenetically, *Aegerita* was shown to be nested within the order Polyporales (Agaricomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (He et al., 2019) (outline).

Aegeritella Balazy & J. Wisn., Prace Komisji Nauk Rolniczych i Komisji Nauk LeSnych: 13 (1974)

Index Fungorum number: IF7071

Classification: Trichosporonaceae, Trichosporonales, Tremellomycetes, Agaricomycotina, Basidiomycota

Type species: *Aegeritella superficialis* Balazy & J. Wisn., Prace Komisji Nauk Rolniczych i Komisji Nauk LeSnych: 13 (1974)

Sexual morph: Unknown.

Sequence data: *Aegeritella tuberculata* (WA51216, LSU: KT380846, ITS: KT259307, SSU: KT380845)

Notes: *Aegeritella* is characterized by having sporodochial comidiomata, stromatic, branched or unbranched, subhyaline to brown conidiophores, monoblastic, hyaline to subhyaline conidiogenous cells, producing solitary or catenate, aseptate, hyaline conidia (Seifert et al., 2011). Wrzosek et al. (2016) placed this genus in the family Trichosporonaceae. Phylogenetically, representative of *Aegeritella* clustered in the family Trichosporonaceae (Trichosporonales, Tremellomycetes) (Figure 2.1). References: (Seifert et al., 2011; Wrzosek et al., 2016) (morphology and phylogeny).

Aenigmatospora R.F. Castañeda, Saikawa, Guarro & Calduch, Cryptogamie Mycologie 20 (2): 115 (1999)

Index Fungorum number: IF28344

Classification: Kickxellomycotina genera *incertae sedis,* Kickxellomycota

Type species: *Aenigmatospora pulchra* R.F. Castañeda, Saikawa, Decock, Guarro & M. Calduch, Cryptogamie Mycologie 20 (2): 115 (1999)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Aenigmatospora* was introduced by Castañeda Ruíz et al. (1999) and is a unique fungus. It differs from other similar genera by its differentiated, mononematous, erect or prostrate, cylindrical, septate, branched, hyaline sporophores, with monoblastic, discrete, determinate, hyaline sporogenous cells, and producing solitary, aseptate, mushroom-shaped, hyaline spores. Seifert et al. (2011) pointed out that this genus possibly is not a hyphomycete. Phylogenetic position for *Aenigmatospora* is unresolved due to lack of sequence data. References: (Castañeda Ruíz et al., 1999) (morphology), (Wijayawardene et al., 2020) (outline).

Agyriella Sacc., Atti dell´Istituto Veneto Scienze 2: 454 (1884)

Index Fungorum number: IF7078

Classification: Ascomycota genera *incertae sedis*

Type species: *Agyriella nitida* (Lib.) Sacc., Bulletin de la Société Royale de Botanique de Belgique 23 (1): 305 (1884)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Agyriella* was erected by Saccardo (1884a) to accommodate *A. nitida*. Phylogenetic position for *Agyriella* is unresolved due to lack of sequence data. References: (Saccardo, 1884a) (morphology), (Wijayawardene et al., 2020) (outline).

Alatosessilispora K. Ando & Tubaki, Transactions of the Mycological Society of Japan 25: 24 (1984)

Index Fungorum number: IF11011

Classification: Trichomeriaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Alatosessilispora bibrachiata* K. Ando & Tubaki, Transactions of the Mycological Society of Japan 25: 24 (1984)

Sexual morph: Unknown.

Sequence data: *Alatosessilispora bibrachiata* (NBRC 31820, ITS, LSU: LC146719)

Notes: *Alatosessilispora* is characterized by reduced conidiophores, monoblastic, hyaline or pale brown conidiogenous cells, and producing conidia that are solitary, star-like, tetraradiate, main axis with two downward arms, hyaline to pale brown (Seifert et al., 2011). Previous studies placed this genus under Ascomycota genera *incertae sedis*. The ex-type strain (NBRC 31820) of the type species (*A. bibrachiata*) of this genus was included in our phylogenetic analysis, and it grouped within the family Trichomeriaceae (Chaetothyriales, Eurotiomycetes) (Figure 2.1). Hence, we suggest putting this genus under the family Trichomeriaceae. References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Albifimbria L. Lombard & Crous, Persoonia 36: 177 (2016)

Index Fungorum number: IF815924

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Albifimbria verrucaria* (Alb. & Schwein.) L. Lombard & Crous, Persoonia 36: 177 (2016)

Sexual morph: Unknown.

Sequence data: *Albifimbria verrucaria* (CBS 328.52 = CBS 253.47 = IMI 045541 = MUCL 19018 = NRRL 2003 = ATCC 9095 = QM 460, LSU: NG_068982, ITS: NR_153550, SSU: NG_061023)

Notes: This genus is myrothecium-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Alfaria Crous, N.J. Montaño-Mata & García-Jim., Persoonia 32: 239 (2014)

Index Fungorum number: IF808923

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Alfaria cyperi-esculenti* Crous, N.J. Montaño-Mata & García-Jim., Persoonia 32: 239 (2014)

Sexual morph: Lombard et al. (2016) provided a full description (sexual and asexual morphs) for this genus.

Sequence data: *Alfaria cyperi-esculenti* (CPC 23153, LSU: KJ869200, ITS: KJ869143)

Notes: This genus is myrothecium-like. References: (Lin et al., 2017a; Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Alfariacladiella Crous & R.K. Schumach., Sydowia 68: 202 (2016)

Index Fungorum number: IF817207

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Alfariacladiella spartii* Crous & R.K. Schumach., Sydowia 68: 202 (2016)

Sexual morph: Unknown.

Sequence data: *Alfariacladiella spartii* (CPC 24966, LSU: NG_070399, ITS: NR_164243)

Notes: This genus is *Alfaria*-like and differs from *Alfaria* by lacking of brown setae surrounding its sporodochial conidiomata and its hyaline, fusiform conidia have apical mucoid caps (Hernández-Restrepo et al., 2016c). References: (Hernández-Restrepo et al., 2016c) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Algonquinia R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 35: 4 (1991)

Index Fungorum number: IF26874

Classification: Ascomycota genera *incertae sedis*

Type species: *Algonquinia inflata* R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 35: 4 (1991)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Algonquinia* was introduced by Castañeda Ruíz and Kendrick (1991) and only one species is accepted. Phylogenetic position for *Algonquinia* is unresolved due to lack of sequence data. References: (Castañeda Ruíz & Kendrick, 1991) (morphology), (Wijayawardene et al., 2020) (outline).

Amallospora Penz., Malpighia: 461 (1897)

Index Fungorum number: IF7112

Classification: Ascomycota genera *incertae sedis*

Type species: *Amallospora dacrydion* Penz., Malpighia: 461 (1897)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Phylogenetic position for *Amallospora* is unresolved due to lack of sequence data. References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Amblyosporium Fresen., Beiträge zur Mykologie 3: 99 (1863)

Index Fungorum number: IF7118

Classification: Ascomycota genera *incertae sedis*

Type species: *Amblyosporium botrytis* Fresen., Beiträge zur Mykologie 3: 99 (1863)

Sexual morph: Unknown.

Synanamorphs: Producing sclerotia (Seifert et al., 2011).

Sequence data: *Amblyosporium botrytis* (CBS 798.71, LSU: MH872109, ITS: MH860361)

Notes: *Amblyosporium* is characterized by having mononematous, branched, hyaline conidiophores, with thallic-arthric, hyaline conidiogenous cells,

producing catenate, aseptate, ellipsoid to globose, hyaline to subhyaline conidia (Pirozynski, 1969; Seifert et al., 2011). Phylogenetically, three strains identified as *Amblyosporium* species were included and shown to be nested within the family Pyronemataceae (Pezizales, Pezizomycetes) (Figure 2.1). This genus maybe can be placed in Pyronemataceae, Pezizales, Pezizomycetes. References: (Pirozynski, 1969) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Ambrosiella Brader ex Arx & Hennebert, Mycopathologia et Mycologia Applicata 25 (3-4): 314 (1965)

Index Fungorum number: IF7119

Classification: Ceratocystidaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Ambrosiella xylebori* Brader ex Arx & Hennebert, Mycopathologia et Mycologia Applicata 25 (3-4): 314 (1965)

Sexual morph: Unknown.

Sequence data: *Ambrosiella xylebori* (CBS 110.61 = AFTOL ID 1285, LSU: NG_056955, ITS: NR_144921, SSU: NG_062695)

Notes: *Ambrosiella* was introduced by von Arx and Hennebert (1965) and is characterized by sporodochial conidiomata, unbranched or branched, monilioid and fragmenting into arthroconidia, hyaline to brown conidiophores, monoblastic or phialidic, hyaline conidiogenous cells, and producing solitary or catenate, aseptate, hyaline to pale brown conidia (Seifert et al., 2011). References: (Harrington et al., 2010, 2014; Seifert et al., 2011; von Arx & Hennebert, 1965) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Amerosympodula Matsush., Matsushima Mycological Memoirs 9: 1 (1996)

Index Fungorum number: IF27651

Classification: Ascomycota genera *incertae sedis*

Type species: *Amerosympodula malaysiana* Matsush., Matsushima Mycological Memoirs 9: 1 (1996)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Amerosympodula* was introduced by Matsushima (1996) and only one species is accepted. It has micronematous or semi-macronematous, mononematous, unbranched or branched, reduced, hyaline conidiophores, with polyblastic, sympodial, geniculate or sinuolate, denticulate, hyaline conidiogenous cells, and solitary, aseptate or septate, oblong, hyaline conidia (Matsushima, 1996). Phylogenetic position for *Amerosympodula* is unresolved due to lack of sequence data. References: (Matsushima, 1996) (morphology), (Wijayawardene et al., 2020) (outline).

Amniculicola Y. Zhang ter & K.D. Hyde, Mycological Research 112 (10): 1189 (2008)

= *Anguillospora* Ingold, Transactions of the British Mycological Society 25 (4): 401 (1942)

Index Fungorum number: IF511328

Classification: Amniculicolaceae, Pleosporales, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Amniculicola lignicola* Y. Zhang ter & K.D. Hyde, Mycological Research 112 (10): 1189 (2008)

Sexual morph: Sexual morphic genus and maybe have asexual morph in the genus *Anguillospora*.

Sequence data: *Amniculicola lignicola* (CBS 123094, LSU: NG_067455, ITS: NR_159633)

Notes: *Anguillospora*, typified by *A. longissimi*, was established by Ingold (1942) and is characterized by having mononematous, unbranched, hyaline conidiophores, with monoblastic, terminal, hyaline conidiogenous cells, producing solitary, curved or sigmoid, multi-septate, scolecosporous, hyaline conidia. However, the generic type *A. longissimi* was synonymized under *Amniculicola* by Rossman et al. (2016) and proposed to protect *Amniculicola* over *Anguillospora*. Phylogenetically, *Amniculicola* was shown to be nested within the family Amniculicolaceae (Pleosporales, Pleosporomycetidae, Dothideomycetes) (Figure 2.1). References: (Ingold, 1942) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Amoenodochium Peláez & R.F. Castañeda, Mycotaxon 60: 258 (1996)

Index Fungorum number: IF27803

Classification: Ascomycota genera *incertae sedis*

Type species: *Amoenodochium humicola* Peláez & R.F. Castañeda, Mycotaxon 60: 258 (1996)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Amoenodochium* was established by Pelaez and Castaneda Ruiz (1996) and it has sporodochial, pulvinate, brown conidiomata, macronematous, mononematous, fasciculate, geniculate, subhyaline to pale brown conidiophores, with polyblastic, sympodial, denticulate conidiogenous cells, and solitary, aseptate, turbinate, cuneiform, broadly pyriform to obovoid, hyaline or brown conidia. Phylogenetic position for *Amoenodochium* is unresolved due to lack of sequence data. References: (Pelaez & Castaneda Ruiz, 1996) (morphology), (Wijayawardene et al., 2020) (outline).

Amphichaetella Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 125: 92 (1916)

Index Fungorum number: IF7133

Classification: Ascomycota genera *incertae sedis*

Type species: *Amphichaetella echinata* (Kleb.) Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 125: 92 (1916)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Amphichaetella* was introduced by von Höhnel (1916) and only one species is accepted. Phylogenetic position for *Amphichaetella* is unresolved due to lack of sequence data. References: (von Höhnel, 1916) (morphology), (Wijayawardene et al., 2020) (outline).

Amphichorda Fr., Systema Orbis Vegetabilis 1: 170 (1825)

Index Fungorum number: IF7134

Classification: Cordycipitaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Amphichorda felina* (DC.) Fr., Systema Orbis Vegetabilis 1: 170 (1825)

Sexual morph: Unknown.

Sequence data: *Amphichorda cavernicola* (CGMCC3.19571, LSU: MK328961, ITS: MK329056)

Notes: *Amphichorda* is characterized by having synnematous or sporodochial conidiomata, macronematous, branched, hyaline conidiophores, sympodial, denticulate, hyaline conidiogenous cells, and solitary, aseptate, hyaline conidia (Seifert et al., 2011). References: (Seifert et al., 2011; Zhang et al., 2017b, 2021) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Amphophialis R.F. Castañeda, W.B. Kendr. & Guarro, Mycotaxon 68: 12 (1998)

Index Fungorum number: IF27875

Classification: Ascomycota genera *incertae sedis*

Type species: *Amphophialis concinna* R.F. Castañeda, W.B. Kendr. & Guarro, Mycotaxon 68: 12 (1998)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Amphophialis* was established by Castañeda Ruíz et al. (1998) and is characterized by macronematous, mononematous, unbranched or branched, cylindrical, capitate, brown conidiophores, with monophialidic and polyphialidic, integrated, determinate or sympodial, flask-shaped conidiogenous cells, and aseptate, filiform, acircular to fusiform, hyaline conidia. Phylogenetic position for *Amphophialis* is unresolved due to lack of sequence data. References: (Castañeda Ruíz et al., 1998) (morphology), (Wijayawardene et al., 2020) (outline).

Ampullicephala R.F. Castañeda, Minter & M. Stadler, Mycotaxon 109: 278 (2009)

Index Fungorum number: IF512123

Classification: Ascomycota genera *incertae sedis*

Type species: *Ampullicephala setiformis* (R.F. Castañeda) R.F. Castañeda, Minter & M. Stadler, Mycotaxon 109: 278 (2009)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ampullicephala* was introduced by Castañeda Ruíz et al. (2009) and it has unbranched or branched, brown to black setae, macronematous, mononematous, septate, brown conidiophores, with polyblastic, synchronous, determinate, denticulate conidiogenous cells, and catenate, aseptate to multi-septate, cylindrical or oblong, hyaline conidia. Phylogenetic position for *Ampullicephala* is unresolved due to lack of sequence data. References: (Castañeda Ruíz et al., 2009) (morphology), (Wijayawardene et al., 2020) (outline).

Anacraspedodidymum C.R. Silva, R.F. Castañeda & Gusmão, Mycotaxon 128: 12 (2014)

Index Fungorum number: IF805402

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Anacraspedodidymum aquaticum* C.R. Silva, R.F. Castañeda & Gusmão, Mycotaxon 128: 12 (2014)

Sexual morph: Unknown.

Sequence data: *Anacraspedodidymum submersum* (YMF1.4176, LSU: MK165443, ITS: MK165445, SSU: MK165441)

Notes: *Anacraspedodidymum* was introduced by Silva et al. (2014) and is characterized by macronematous, mononematous, unbranched, septate, brown to pale brown conidiophores, monophialidic, integrated, terminal, sometimes percurrent conidiogenous cells with a funnel shaped collarette; and conidia are solitary, aseptate, ellipsoid, spherical, globose, obpyriform to obovoid, hyaline, sometimes with mucous adherences or tunicate ornamentation. (Zheng et al., 2021) placed this genus within the family Chaetosphaeriaceae (Chaetosphaeriales) based on phylogenetic analysis.

References: (Silva et al., 2014; Zheng et al., 2021) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Anaselenosporella Heredia, R.F. Castañeda & R.M. Arias, Mycotaxon 112: 66 (2010)

Index Fungorum number: IF515452

Classification: Ascomycota genera *incertae sedis*

Type species: *Anaselenosporella sylvatica* Heredia, R.F. Castañeda & R.M. Arias, Mycotaxon 112: 67 (2009)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Anaselenosporella* was established by Castañeda Ruíz et al. (2010) and is characterized by having macronematous, mononematous, septate, branched, brown connidiophores, and polyblastic, discrete, sympodial conidiogenous cells with flattened, lenticular or convex loci, and producing solitary, aseptate, acicular, filiform, fusiform to semi-circular, hyaline conidia. Phylogenetic position for *Anaselenosporella* is unresolved due to lack of sequence data. References: (Castañeda Ruíz et al., 2010) (morphology), (Wijayawardene et al., 2020) (outline).

Anastomyces W.P. Wu, B. Sutton & Gange, Mycological Research 101 (11): 1318 (1997)

Index Fungorum number: IF27783

Classification: Basidiomycota genera *incertae sedis*

Type species: *Anastomyces microsporus* W.P. Wu, B. Sutton & Gange, Mycological Research 101 (11): 1318 (1997)

Sexual morph: *Trimorphomyces* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Anastomyces* was established by Wu et al. (1997b) for a fungicolous hyphomycetes collected on ascomata of *Apiospora* sp. It has sporodochial conidiomata, irregularly branched, septate, hyaline conidiophores, with polyblastic, integrated, determinate, hyaline conidiogenous cells, and solitary, aseptate, guttulate, ellipsoid to subcylindrical becoming H-shaped, hyaline conidia. Phylogenetic position

for *Anastomyces* is unresolved due to lack of sequence data. References: (Wu et al., 1997b) (morphology), (Wijayawardene et al., 2020) (outline).

Anguillomyces Marvanová & Bärl., Mycotaxon 75: 411 (2000)

Index Fungorum number: IF28434

Classification: Basidiomycota genera *incertae sedis*

Type species: *Anguillomyces acadiensis* Marvanová & Bärl., Mycotaxon 75: 411 (2000)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Anguillomyces* was established by Marvanová and Bärlocher (2000) and is characterized by having semimacronematous, solitary, with clamps, unbranched or branched conidiophores, and discrete or integrated conidiogenous cells with clamps, and producing solitary, aseptate, delimited by a clamp, scolecoform, curved conidia. Phylogenetic position for *Anguillomyces* is unresolved due to lack of sequence data. References: (Marvanová & Bärlocher, 2000) (morphology), (Wijayawardene et al., 2020) (outline).

Anguillosporella U. Braun, A monograph of Cercosporella, Ramularia and allied genera (phytopathogenic Hyphomycetes) 1: 233 (1995)

Index Fungorum number: IF27557

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Anguillosporella vermiformis* (Davis) U. Braun, A monograph of Cercosporella, Ramularia and allied genera (phytopathogenic Hyphomycetes) 1: 234 (1995)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Anguillosporella* is characterized by having subcuticular to intraepidermal stromata, sporodochial conidiomata, macronematous, solitary or in fascicles, unbranched, hyaline conidiophores, monoblastic, integrated, terminal, determinate, hyaline conidiogenous cells, producing solitary, multi-euseptate,

scolecosporous with short basal appendage, hyaline conidia (Videira et al., 2017). Phylogenetic position for *Anguillosporella* is unresolved due to lack of sequence data. References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Angulimaya Subram. & Lodha, Antonie van Leeuwenhoek 30: 329 (1964)

Index Fungorum number: IF7157

Classification: Ascomycota genera *incertae sedis*

Type species: *Angulimaya sundara* Subram. & Lodha, Antonie van Leeuwenhoek 30: 329 (1964)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Angulimaya* was established by Subramanian and Lodha (1964) for a fungus collected on cow dung from India. It has macronematous, mononematous, branched, setiform, septate, brown conidiophores, with phialidic (?annellidic), flask-shaped, brown conidiogenous cells, and catenate, aseptate, globose or subglobose, subhyaline to hyaline conidia (Subramanian & Lodha, 1964). Phylogenetic position for *Angulimaya* is unresolved due to lack of sequence data. References: (Subramanian & Lodha, 1964) (morphology), (Wijayawardene et al., 2020) (outline).

Angulospora Sv. Nilsson, Svensk Botanisk Tidskrift 56: 354 (1962) [MB#7158]

Index Fungorum number: IF7158

Classification: Ascomycota genera *incertae sedis*

Type species: *Angulospora aquatica* Sv. Nilsson, Svensk Botanisk Tidskrift 56: 354 (1962)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Angulospora* is characterized by having unbranched or branched, hyaline conidiophores, with monoblastic or polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing solitary, aseptate, scolecosporous, S-shaped, hyaline conidia (Seifert et al., 2011). Phylogenetic position for *Angulospora* is

unresolved due to lack of sequence data. References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Annellospermosporella P.R. Johnst., New Zealand Journal of Botany 37 (2): 290 (1999)

Index Fungorum number: IF28292

Classification: Ascomycota genera *incertae sedis*

Type species: *Annellospermosporella meliolinae* P.R. Johnst., New Zealand Journal of Botany 37 (2): 290 (1999)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Annellospermosporella* was introduced by Johnston (1999) and is similar to Spermosporella but differs by its annellidic conidiogenous cells. Phylogenetic position for *Annellospermosporella* is unresolved due to lack of sequence data. References: (Johnston, 1999) (morphology), (Wijayawardene et al., 2020) (outline).

Anthocanalis Daranag., Camporesi & K.D. Hyde, Fungal Diversity 73: 211 (2015)

Index Fungorum number: IF809515

Classification: Hypoxylaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Anthocanalis spartii* Daranag., Camporesi & K.D. Hyde., Fungal Diversity 73: 211 (2015)

Sexual morph: Sexual morphic genus with nodulisporium-like asexual morph (Daranagama et al., 2015).

Sequence data: *Anthocanalis sparti* (MFLUCC 14-0010, LSU: KP340536, ITS: KP297394)

Notes: *Anthocanalis* was introduced by Daranagama et al. (2015) and its asexual morph is nodulisporium-like, which has branched, hyaline conidiophores, cylindrical, hyaline conidiogenous cells, produces aseptate, hyaline conidia.

References: (Daranagama et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Anthopsis Fil. March., A. Fontana & Luppi Mosca, Canadian Journal of Botany 55 (2): 117 (1977)

Index Fungorum number: IF7173

Classification: Cyphellophoraceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Anthopsis deltoidea* Marchisio, Fontana & Luppi Mosca, Canadian Journal of Botany 55 (2): 117 (1977)

Sexual morph: Unknown.

Disease symptoms: Human phaeohyphomycosis (Moussa et al., 2017b).

Sequence data: *Anthopsis deltoidea* (CBS 263.77 = CMT 1111.74, LSU: NG_057113, ITS: NR_153555)

Notes: *Anthopsis* was introduced by Marchisio et al. (1977) for a fungus isolated from soil and is characterized by reduced conidiophores, phialidic, ampulliform, clustered, pale brown conidiogenous cells with basal collarette, and producing aseptate, in slimy mass, triangular, subhyaline to hyaline conidia. *Anthopsis* is similar to *Phialophora*, but differs by its conidiogenous cells bear their collarette near the base. References: (Marchisio et al., 1977; Moussa et al., 2017b) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Antromyces Fresen., Beiträge zur Mykologie 1: 37 (1850)

Index Fungorum number: IF7177

Classification: Ascomycota genera *incertae sedis*

Type species: *Antromyces copridis* Fresen., Beiträge zur Mykologie 1: 1-38 (1850)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Phylogenetic position for *Antromyces* is unresolved due to lack of sequence data. References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Anungitea B. Sutton, Mycological Papers 132: 10 (1973)

Index Fungorum number: IF7181, *Facesoffungi number*: FoFxxxx

Classification: Phlogicylindriaceae, Amphisphaeriales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: ***Anungitea fragilis*** B. Sutton, Mycological Papers 132: 10 (1973)

Sexual morph: Unknown.

Sequence data: Sequence data for ex-type culture of type species is unavailable. Other species data, ex-type of *Anungitea eucalyptigena*, CPC 28762, LSU: NG_057129, ITS: NR_164411

Notes: It has setae that are unbranched, brown, extensions of conidiophores or next to conidiophores, conidiophores are macronematous, mononematous, unbranched, brown, conidiogenous cells are polyblastic, terminal or intercalary, sympodial, denticulate, brown, and produces catenate, aseptate or 1-septate, hyaline to subhyaline, cylindrical, conidia (Seifert et al., 2011; Sutton, 1973a). Phylogenetically, this genus located within the family *Phlogicylindriaceae*. References: (Crous et al., 2014b, 2016a, 2017a; Seifert et al., 2011; Xia et al., 2015b) (morphology), (Crous et al., 2016a, 2017a)(phylogeny)

Anungitiomyces Crous, Persoonia 42: 371 (2019)

Index Fungorum number: IF830860

Classification: Anungitiomycetaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Anungitiomyces stellenboschiensis* Crous, Persoonia 42: 371 (2019)

Sexual morph: Unknown.

Sequence data: *Anungitiomyces stellenboschiensis* (CPC 34726, LSU: NG_067874, ITS: NR_165551)

Notes: It is characterized by macronematous, mononematous, unbranced or branched below, septate, brown conidiophores, polyblastic, integrated, terminal, sympodial conidiogenous cells, and solitary, aseptate or 1-septate, guttulate, obclavate,

hyaline conidia (Crous et al., 2019a). References: (Crous et al., 2019a) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Aotearoamyces P.R. Johnst., J.A. Cooper & Quijada, IMA Fungus 9 (2): 376 (2018)

Index Fungorum number: IF825175

Classification: Leotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Aotearoamyces nothofagi* P.R. Johnst., J.A. Cooper & Quijada, IMA Fungus 9 (2): 376 (2018)

Sexual morph: Introduced as holomorphic genus with hyphomycetous asexual morph (Quijada et al., 2018).

Sequence data: *Aotearoamyces nothofagi* (ICMP 21968, LSU: MG807386, ITS: KM677202, SSU: MG807390)

Notes: *Aotearoamyces* was introduced by Quijada et al. (2018) and its asexual morph has synnematous, branched, brown conidiophores, with phialidic, flask-shaped, hyaline to pale brown conidiogenous cells, and produces aseptate, curved, short-cylindric, hyaline conidia. References: (Quijada et al., 2018) (morphology), (Wijayawardene et al., 2020) (outline).

Aphanoascella Deanna A. Sutton, Y. Marín, E.H. Thompson & Guarro, Medical Mycology 51 (2): 117 (2013)

Index Fungorum number: IF564389

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Aphanoascella galapagosensis* Deanna A. Sutton, Y. Marín, E.H. Thompson & Guarro, Medical Mycology 51 (2): 117 (2013)

Sexual morph: Introduced as holomorphic genus with *Chrysosporium* or *Malbranchea* asexual morph (Sutton et al., 2013).

Sequence data: *Aphanoascella galapagosensis* (CBS 132345 = FMR12019 = UTHSC 11-1518, LSU: JQ864082, ITS: JQ864081)

Notes: *Aphanoascella* was introduced by Sutton et al. (2013) for a fungus isolated from carapace keratitis of a Galapagos Tortoise (*Chelonoidis nigra microphyes*), and its asexual morph produces hyaline, thin- and smooth-walled arthroconidia. References: (Sutton et al., 2013) (morphology and phylogeny).

Aphanophora Réblová & Unter., PLoS One 8 (5): 14 (2013)

Index Fungorum number: IF803677

Classification: Chaetothyriaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Aphanophora eugeniae* (Crous & Alfenas) Réblová & Unter., PLoS One 8 (5): 14 (2013)

Sexual morph: Unknown.

Sequence data: *Aphanophora eugeniae* (CBS 124105, LSU: NG_056965, ITS: NR_132829)

Notes: *Aphanophora* was introduced by Réblová et al. (2013) and is characterized by brown, unbranched setae, reduced conidiophores, phialidic, hyaline conidiogenous cells, and producing conidia that are solitary, hyaline to subhyaline, composed of subcylindrical to cylindrical segments, marked by constrictions in the wall at the septa. References: (Réblová et al., 2013) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Apseudocercosporella Videira & Crous, Studies in Mycology 83: 89 (2016)

Index Fungorum number: IF816816

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Apseudocercosporella trigonotidis* Videira, H.D. Shin & Crous, Studies in Mycology 83: 89 (2016)

Sexual morph: Unknown.

Sequence data: *Apseudocercosporella trigonotidis* (CBS 131890 = CPC 10864, LSU: NG_069100, ITS: NR_153512)

Notes: *Apseudocercosporella* was established by Videira et al. (2016) and is characterized by micronematous, mononematous, unbranched, occasionally branched, often reduced, hyaline conidiophores, with monoblastic, integrated, terminal conidiogenous cells, producing solitary, septate or aseptate, filiform or subcylindrical, hyaline conidia. Phylogenetically, *Apseudocercosporella* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2016) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Aquanectria L. Lombard & Crous, Studies in Mycology 80: 207 (2015)

Index Fungorum number: IF810949

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Aquanectria penicillioides* (Ingold) L. Lombard & Crous, Studies in Mycology 80: 207 (2015)

Sexual morph: Introduced as holomorph (Lombard et al., 2015).

Sequence data: *Aquanectria penicillioides* (CBS 257.54 = ATCC 16261, LSU: KM231613, ITS: KM231743)

Notes: *Aquanectria* was introduced by Lombard et al. (2015) and its asexual morph is characterized by conidiophores are macronematous, mononematous, septate, branched, hyaline with verticillate penicillus with 1–4 phialides, conidiogenous cells are phialidic, hyaline, conidia are aseptate to 1-septate, filiform, curved to slightly sigmoid, hyaline, and chlamydospores are pale to dark brown (Lombard et al., 2015). References: (Lombard et al., 2015)(morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Aquaphila Goh, K.D. Hyde & W.H. Ho, Mycological Research 102 (5): 588 (1998)

Index Fungorum number: IF27791

Classification: Tubeufiaceae, Tubeufiales, incertae sedis, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Aquaphila albicans* Goh, K.D. Hyde & W.H. Ho, Mycological Research 102 (5): 588 (1998)

Sexual morph: *Tubeufia* (Tsui et al., 2007).

Sequence data: *Aquaphila albicans* (MFLUCC 16-0010, LSU: KX454166, ITS: KX454165)

Notes: *Aquaphila* was introduced by Goh et al. (1998a) and is characterized by semi-macronematous, mononematous, unbranched or branched, geniculate, hyaline conidiophores, monoblastic or polyblastic, terminal or intercalary, sympodial, denticulate conidiogenous cells, producing solitary, septate, fusoid to falcate or sigmoid, hyaline conidia. Tsui et al. (2007) reported the sexual morph of *Aquaphila* in the genus Tubeufia. References: (Goh et al., 1998a; Tsui et al., 2007) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Araneomyces Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 118: 894 (1909)

Index Fungorum number: IF7205

Classification: Paranectriellaceae, Pleosporomycetidae family *incertae sedis*, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Araneomyces acarifer* Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 118: 894 (1909)

Sexual morph: *Paranectriella* (Rossman et al., 2015b; Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Araneomyces* was introduced by von Höhnel (1909a) to accommodate *A. acarifer* and it was reported has sexual morph in the genus *Paranectriella* (Henn. ex Sacc.) Höhn. (Rossman et al., 2015b). Rossman et al. (2015b) proposed to protect *Paranectriella* over *Araneomyces*. Phylogenetic position for *Araneomyces* is unresolved due to lack of sequence data. References: (von Höhnel, 1909a) (morphology), (Wijayawardene et al., 2020) (outline).

Arboricolonus S. Bien & Damm, MycoKeys 63: 130 (2020)

Index Fungorum number: IF832106

Classification: Helotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Arboricolonus simplex* S. Bien & Damm, MycoKeys 63: 130 (2020)

Sexual morph: Unknown.

Sequence data: *Arboricolonus simplex* (CBS 145520 = GLMC 459 = DSM 109147, LSU: NG_073755, ITS: NR_170762)

Notes: *Arboricolonus* was established by Bien and Damm (2020) and is characterized by having reduced conidiophores, with enteroblastic, intercalary, conidiogenous cells, producing aseptate, cylindrical, ovoidal to allantoid, hyaline conidia, aggregated in slimy mass. Phylogenetically, *Arboricolonus* was located in Helotiales (Leotiomycetes) (Figure 2.1). References: (Bien & Damm, 2020) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Arborispora K. Ando, Transactions of the Mycological Society of Japan 27: 120 (1986)

Index Fungorum number: IF11023

Classification: Ascomycota genera *incertae sedis*

Type species: *Arborispora palma* K. Ando, Transactions of the Mycological Society of Japan 27: 120 (1986)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Arborispora* was introduced by Ando and Kawamoto (1986) and four species are accepted. Phylogenetic position for *Arborispora* is unresolved due to lack of sequence data. References: (Ando & Kawamoto, 1986) (morphology), (Wijayawardene et al., 2020) (outline).

Arbusculina Marvanová & Descals, Transactions of the British Mycological Society 89 (4): 499 (1987)

Index Fungorum number: IF11024

Classification: Hyaloscyphaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Arbusculina irregularis* (R.H. Petersen) Marvanová & Descals, Transactions of the British Mycological Society 89 (4): 499 (1987)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011).

Sequence data: *Arbusculina fragmentans* (CCM F-13486, LSU: NG_057024, ITS: NR_153520)

Notes: *Arbusculina* was introduced by Marvanová and Descals (1987) to accommodate *A. irregularis* and *A. moniliformis*, and this genus is characterized by having semi-macronematous, mononematous, unbranched or sparsely branched, subhyaline conidiophores, with monoblastic, integrated, determinate or percurrent, subhyaline conidiogenous cells, producing conidia that are solitary, branched, septate, hyaline to subhyaline, staurosporous, with several upward and monilioid arms (Marvanová & Descals, 1987; Seifert et al., 2011). Phylogenetically, *Arbusculina* was shown to be nested within the family Hyaloscyphaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Marvanová & Descals, 1987; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Arcispora Marvanová & Bärl., Mycologia 90: 531 (1998)

Index Fungorum number: IF27795

Classification: Basidiomycota genera *incertae sedis*

Type species: *Arcispora bisagittaria* Marvanová & Bärl., Mycologia 90: 531 (1998)

Sexual morph: Unnamed basidiomycete (Seifert et al., 2011)

Sequence data: Sequence data is unavailable for this genus.

Notes: *Arcispora* was established by Marvanová and Bärlocher (1998a) and it has filoform, sympodial conidiophores, and conidia that are staurosporous, consisting of one 1-septate, clamped axis and two lateral, parallel, clamped branches. Phylogenetic position for *Arcispora* is unresolved due to lack of sequence data. References: (Marvanová & Bärlocher, 1998a) (morphology), (Wijayawardene et al., 2020) (outline).

Arcuadendron Sigler & J.W. Carmich., Mycotaxon 4 (2): 355 (1976)

Index Fungorum number: IF7208

Classification: Ascomycota genera *incertae sedis*

Type species: *Arcuadendron ovatum* Sigler & J.W. Carmich., Mycotaxon 4 (2): 358 (1976)

Sexual morph: Unknown.

Sequence data: *Arcuadendron ovatum* (CBS 122.77 = UAMH 2737, ITS: MH861036)

Notes: *Arcuadendron* was introduced by Sigler and Carmichael (1976) and is characterized by micronematous, mononematous, branched, hyaline conidiophores, with thallic-arthric, hyaline conidiogenous cells, producing catenate with separating cells, aseptate, broadly ellipsoidal or triangular, hyaline or yellowish conidia. Phylogenetic position for *Arcuadendron* is unresolved due to lack of LSU sequence data. References: (Sigler & Carmichael, 1976) (morphology), (Wijayawardene et al., 2020) (outline).

Ardhachandra Subram. & Sudha, Canadian Journal of Botany 56 (7): 730 (1978)

Index Fungorum number: IF7209

Classification: Ascomycota genera *incertae sedis*

Type species: *Ardhachandra selenoides* (de Hoog) Subram. & Sudha, Canadian Journal of Botany 56 (7): 731 (1978)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ardhachandra* was erected by Subramanian and Sudha (1978) and it has mononematous, septate, brown conidiophores, with polyblastic, sympodial, denticulate conidiogenous cells, and aseptate, selenoid and lenticular, hyaline or brown conidia. Phylogenetic position for *Ardhachandra* is unresolved due to lack of sequence data. References: (Subramanian & Sudha, 1978) (morphology), (Wijayawardene et al., 2020) (outline).

Areotheca Y. Marín & Stchigel, Microorganisms 8 (9, no. 1430): 13 (2020)

Index Fungorum number: IF835497

Classification: Naviculisporaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Areotheca ambigua* (Sacc.) Y. Marín & Stchigel, Microorganisms 8 (9, no. 1430): 14 (2020)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Marin-Felix et al., 2020).

Sequence data: *Areotheca ambigua* (CBS 215.60, LSU: AY999114, ITS: AY999137)

Notes: *Areotheca* was introduced by Marin-Felix et al. (2020) and its asexual morph has reduced conidiophores, phialidic, hyaline conidiogenous cells, and produces globose, hyaline conidia. References: (Marin-Felix et al., 2020) (morphology and phylogeny).

Argopericonia B. Sutton & Pascoe, Transactions of the British Mycological Society 88: 41 (1987)

Index Fungorum number: IF11025

Classification: Ascomycota genus *incertae sedis*

Type species: *Argopericonia elegans* B. Sutton & Pascoe, Transactions of the British Mycological Society 88: 43 (1987)

Sexual morph: Unknown.

Sequence data: *Argopericonia indirae* (GUFCC 18018, LSU: KY977982, ITS: KY977981)

Notes: *Argopericonia* was introduced by Sutton and Pascoe (1987) and is characterized by macronematous, mononematous, unbranched, brown conidiophores, polyblastic, discrete, hyaline conidiogenous cells and solitary or short catenate, aseptate, spherical, ellipsodial, guttulate, hyaline conidia (Pratibha & Prabhugaonkar, 2017; Sutton & Pascoe, 1987). Pratibha and Prabhugaonkar (2017) provided the first report of phylogenetic analysis for this genus and showed that it grouped together with *Phialophora* in the family Herpotrichiellaceae, which is consistent with our phylogenetic result (Figure 2.1). References: (Pratibha & Prabhugaonkar, 2017;

Sutton & Pascoe, 1987) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Arthrobotrys Corda, Pracht - Flora. Europaeischer Schimmel-Bildungen: 43 (1839)

Index Fungorum number: IF7217

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Arthrobotrys superba* Corda (1839)

Sexual morph: *Orbilia* (Seifert et al., 2011).

Synanamorphs: *Basifimbria* (Seifert et al., 2011).

Sequence data: *Arthrobotrys botryosporus* (CBS 321.83, LSU: NG_064130, ITS: NR_159626)

Notes: For details of this genus see the monograph in Baral et al. (2020). Phylogenetically, *Arthrobotrys* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Arthrodochium R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 32: 6 (1990)

Index Fungorum number: IF11256

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Arthrodochium candidum* R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 32: 8 (1990)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Arthrodochium* was described by Castañeda Ruíz and Kendrick (1990) and only one species is accepted. Phylogenetic position for *Arthrodochium* is unresolved due to lack of sequence data. References: (Castañeda Ruíz & Kendrick, 1990) (morphology), (Wijayawardene et al., 2020) (outline).

Arthrographis G. Cochet ex Sigler & J.W. Carmich., Mycotaxon 4 (2): 359 (1976)

Index Fungorum number: IF7222

Classification: Eremomycetales genus *incertae sedis*, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Arthrographis kalrae* (R.P. Tewari & Macph.) Sigler & J.W. Carmich., Mycotaxon 4 (2): 360 (1976)

Sexual morph: *Canariomyces*, *Eremomyces*, *Pithoascina*, ?*Arachnotheca*, (Seifert et al., 2011)

Synanamorphs: *Trichosporiella* (Hernández-Restrepo et al., 2020; Seifert et al., 2011).

Sequence data: *Arthrographis kalrae* (CBS 693.77, LSU: NG_056932, ITS: NR_126108)

Notes: *Arthrographis* was introduced by Sigler and Carmichael (1976) and is characterized by having macronematous or micronematous, unbranched or poorly branched, hyaline conidiophores, thallic-arthric, hyaline conidiogenous cells, producing catenate, aseptate, cylindrical or cuboid, hyaline conidia (Giraldo et al., 2014; Hernández-Restrepo et al., 2020; Sigler & Carmichael, 1976). References: (Giraldo et al., 2014; Hernández-Restrepo et al., 2020) (morphology and phylogeny), (Hongsanan et al., 2020b) (outline).

Arthromoniliphora S.S. Silva, Gusmão & R.F. Castañeda, Mycotaxon 131 (4): 822 (2017)

Index Fungorum number: IF813427

Classification: Ascomycota genera *incertae sedis*

Type species: *Arthromoniliphora araucariae* S.S. Silva, Gusmão & R.F. Castañeda, Mycotaxon 131 (4): 822 (2017)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Arthromoniliphora* was erected by Silva et al. (2016) for a hyphomycete associated with plant litter from Brazil and is characterized by having macronematous, single, densely fasciculate, branched, moniliform, septate, hyaline conidiophores with holothallic, discrete, moniliform, hyaline conidiogenous cells, and

producing thallic-arthric, catenate, aseptate or multi-septate, cylindrical, doliiform or cuneate, hyaline conidia. Phylogenetic position for *Arthromoniliphora* is unresolved due to lack of sequence data. References: (Silva et al., 2016) (morphology), (Wijayawardene et al., 2020) (outline).

Arthrophiala W.S. Lisboa, Meir. Silva & R.W. Barreto, Persoonia 37: 241 (2016)

Index Fungorum number: IF817842

Classification: Trichomeriaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Arthrophiala arthrospora* (D.J. Soares, R.W. Barreto & U. Braun) W.S. Lisboa, Meir. Silva & R.W. Barreto, Persoonia 37: 241 (2016)

Sexual morph: Unknown.

Sequence data: *Arthrophiala arthrospora* (COAD 658, LSU: NG_057112, ITS: KY173473)

Notes: This genus was introduced by Crous et al. (2016a) to accommodate *Pseudocercospora arthrospora* and placed in Chaetothyriaceae (Chaetothyriales, Eurotiomycetes). It produces two kinds of conidiophores, conidiogenous cells and conidia: (1) primary – conidiophores are cercosporoid-like, macronematous, mononematous, epiphyllous, subcylindrical, geniculate, septate, unbranched, conidiogenous cells are holoblastic, and produces arthroconidia that are obclavate to obclavate-cylindrical, septate, hyaline or subhyaline, guttulate or eguttulate; (2) secondary – conidiophores are restricted to phialidic conidiogenous cells formed on mycelium (only seen in culture), macronematous, mononematous, oblong to subclavate, conidiogenous cells are phialidic, and produces phialoconidia that are solitary or aggregated in slimy heads, subcylindrical, oval to subclavate, hyaline (Crous et al., 2016a). Phylogenetically, the ex-type strain of *A. arthrospora* grouped in the family Trichomeriaceae (Chaetothyriales, Eurotiomycetes) (Figure 2.1). Therefore, we suggest transforming this genus to Trichomeriaceae. References: (Crous et al., 2016a) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Arthrosporella Singer, Flora Neotropica 3: 17 (1970)

= *Nothoclavulina* Singer, Flora Neotropica 3: 18 (1970)

Index Fungorum number: IF17102

Classification: Agaricales genera *incertae sedis*, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Arthrosporella ditopa* (Singer) Singer, Flora Neotropica 3: 17 (1970)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Nothoclavulina* (Singer, 1970).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Nothoclavulina* was introduced by Singer (1970) and described as the asexual morph of *Arthrosporella*. Phylogenetic position for *Arthrosporella* is unresolved due to lack of sequence data. References: (Singer, 1970) (morphology), (Wijayawardene et al., 2020) (outline).

Arthrosporium Sacc., Michelia 2 (6): 32 (1880)

Index Fungorum number: IF7226

Classification: Ascomycota genera *incertae sedis*

Type species: *Arthrosporium albicans* (Sacc.) Sacc., Sylloge Fungorum 4: 598 (1886)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Arthrosporium* was established by Saccardo (1880) and five species are accepted. Phylogenetic position for *Arthrosporium* is unresolved due to lack of sequence data. References: (Saccardo, 1880) (morphology), (Wijayawardene et al., 2020) (outline).

Articulospora Ingold, Transactions of the British Mycological Society 25 (4): 376 (1942)

Index Fungorum number: IF7231

Classification: Discinellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Articulospora tetracladia* Ingold, Transactions of the British Mycological Society 25 (4): 376 (1942)

Sexual morph: *Hymenoscyphus* (Seifert et al., 2011)

Sequence data: *Articulospora tetracladia* (CBS 106.46, LSU: MH878240, ITS: KP234371)

Notes: *Articulospora* was erected by Ingold (1942) and is characterized by mononematous, unbranched, hyaline conidiophores, with monoblastic to polyblastic, sympodial, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, staurosporous, tetraradiate, consisting of three upward arms and one downward arm (Ingold, 1942; Seifert et al., 2011). Phylogenetically, *Articulospora* was shown to be nested within the family Discinellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Ingold, 1942; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Arualis Katz, Mycotaxon 11 (1): 230 (1980)

Index Fungorum number: IF7232

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Arualis carolinensis* Katz, Mycotaxon 11 (1): 231 (1980)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Arualis* was described by Katz (1980) for a fungi collected from loblolly pine (*Pinus taeda* L.) and it has branched, smooth-walled, clamped, hyaline conidiophores and aseptate or 1-septate, smooth, truncated, cylindrical, hyaline aleuroconidia borne on the distal end of clamp connections. Phylogenetic position for *Arualis* is unresolved due to lack of sequence data. References: (Katz, 1980) (morphology), (Wijayawardene et al., 2020) (outline).

Arxiella Papendorf, Transactions of the British Mycological Society 50 (1): 73 (1967)

Index Fungorum number: IF7233

Classification: Muyocopronaceae, Muyocopronales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Arxiella terrestris* Papendorf, Transactions of the British Mycological Society 50 (1): 73 (1967)

Sexual morph: Unknown.

Sequence data: *Arxiella terrestris* (CBS 268.65 = ATCC 18128 = MUCL 8203 = PRE 43090, LSU: MH870201, ITS: MH858565)

Notes: *Arxiella* was established by Papendorf (1967) and is characterized by having unbranched or branched, hyaline conidiophores, with sympodial, denticulate, hyaline conidiogenous cells, producing solitary or in short irregular chains, 1-septate, reniform with ends obliquely cornute, hyaline to faintly coloured conidia (Papendorf, 1967; Seifert et al., 2011). Phylogenetically, *Arxiella* was shown to be nested within the family Muyocopronaceae (Muyocopronales, Dothideomycetes) (Figure 2.1). References: (Papendorf, 1967; Seifert et al., 2011) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Arxotrichum A. Nováková & M. Kolařík, Persoonia 40: 259 (2018)

Index Fungorum number: IF824080

Classification: Chaetomiaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Arxotrichum wyomingense* A. Nováková & M. Kolařík, Persoonia 40: 259 (2018)

Sexual morph: Introduced as holomorph.

Sequence data: *Arxotrichum wyomingense* (CCF 5691, LSU: LT968143, ITS: LT968153)

Notes: This genus was introduced by Crous et al. (2018c) to accommodate *A. succineum* and *A. wyomingense*. The asexual morph of this genus is characterized by mononematous, septate, ramified, branched conidiophores, hyaline conidiophores, and solitary, aseptate, rough-walled to rugose, subglobose, hyaline to coloured conidia (Crous et al., 2018c). References: (Crous et al., 2018c) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Ascoconidium Seaver, Mycologia 34: 414 (1942)

Index Fungorum number: IF7244

Classification: Helotiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Ascoconidium castaneae* Seaver, Mycologia 34: 414 (1942)

Sexual morph: *Sageria* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ascoconidium* was introduced by Seaver (1942) for a fungi collected on branches of Castanea dentata (Marsh.) Borkh. associated with Pezicula purpurascens (Ellis & Ev.) Seaver. Three species have been recognized and they are characterized by having reduced conidiophores, phialidic conidiogenous cells with deep collarettes, and producing catenate, 3-septate, ellipsoidal, hyaline to subhyaline conidia. Phylogenetic position for *Ascoconidium* is unresolved due to lack of sequence data. References: (Seaver, 1942) (morphology), (Wijayawardene et al., 2020) (outline).

Ascocoryne J.W. Groves & D.E. Wilson, Taxon 16: 40 (1967)

= *Coryne* Nees, System der Pilze und Schwämme: 157 (1817)

Index Fungorum number: IF353

Classification: Gelatinodiscaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Ascocoryne sarcoides* (Jacq.) J.W. Groves & D.E. Wilson, Taxon 16: 40 (1967)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Coryne* (Seifert et al., 2011).

Sequence data: *Ascocoryne sarcoides* (OSC 100772 = AFTOL ID 1834, LSU: FJ176886, SSU: FJ176830)

Notes: *Coryne* is characterized by having sporodochial or synnematous conidiomata, penicillate or vesiculate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, in slimy mass, hyaline conidia (Seifert et al., 2011). The asexual morph of *Ascocoryne* was linked in the genus *Coryne* and *Coryne* was synonymized under *Ascocoryne* (Seifert et al., 2011; Wijayawardene et al., 2017a).

Phylogenetically, *Ascocoryne* was shown to be nested within the family Gelatinodiscaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Ascospirella Houbraken, Frisvad & Samson, Studies in Mycology 95: 11 (2020)

Index Fungorum number: IF832552

Classification: Trichocomaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Ascospirella lutea* (Zukal) Houbraken, Frisvad & Samson, in Houbraken, Kocsubé, Visagie, Yilmaz, Wang, Meijer, Kraak, Hubka, Bensch, Samson & Frisvad, Stud. Mycol. 95: 86 (2020) (= *Penicillium luteum* Zukal, Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 98: 561 (1890))

Sexual morph: Introduced as holomorphic genus (Houbraken et al., 2020).

Sequence data: *Ascospirella lutea* (CBS 348.51, LSU: MH868414, ITS: MN431414)

Notes: *Ascospirella* was introduced by Houbraken et al. (2020) with penicillium-like asexual morph. References: (Houbraken et al., 2020) (morphology and phylogeny).

Aspergillus P. Micheli ex Haller, Historia stirpium indigenarum Helvetiae inchoata 3: 113 (1768)

= *Phialosimplex* Sigler, Deanna A. Sutton, Gibas, Summerb. & Iwen, Medical Mycology 48 (2): 338 (2010)

= *Polypaecilum* G. Sm., Transactions of the British Mycological Society 44 (3): 437 (1961)

Index Fungorum number: IF7248

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Aspergillus glaucus* (L.) Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 16, t. 1:23 (1809)

Sexual morph: *Chaetosartorya*, *Dichlaena*, *Edyuillia*, *Emericella*, *Eurotium*, *Fennellia*, *Hemicarpenteles*, *Neocarpenteles*, *Neopetromyces*, *Neosartorya*, *Petromyces*, *Sclerocleista*, *Stilbothamnium*, *Warcupiella* (Samson et al., 2014; Seifert et al., 2011).

Disease symptoms: Aspergilloma, aspergillosis (Arastehfar et al., 2021; Latgé, 1999)

Sequence data: *Aspergillus glaucus* (ATCC 16469 = WB 116 = CBS 516.65 = IMI 211383 = NRRL 116, LSU: NG_068980, ITS: NR_135337, SSU: NG_063391)

Notes: *Aspergillus* is characterized by conidiophores are aspergillum which consisting of foot cell and vesicle, conidiogenous cells are phialidic, and producing catenate and variable conidia on the vesicle or on metulae. It was subdivided in six subgenera, 27 sections (five new) and 75 series by Houbraken et al. (2020). References: (Balajee et al., 2007; Chen et al., 2016, 2017a; Frisvad et al., 2019; Geiser et al., 2007; Houbraken et al., 2007, 2020; Jurjevic et al., 2012a, 2012b; Krijgsheld et al., 2013; Novakova et al., 2014; Perrone et al., 2007; Samson et al., 2007, 2011a, 2011b, 2014; Tanney et al., 2017; Varga et al., 2007a, 2007b, 2010a, 2010b, 2011a, 2011b; Visagie & Houbraken, 2020; Visagie et al., 2014a) (morphology and phylogeny), (Pitt & Taylor, 2016) (nomenclature), (Wijayawardene et al., 2017a, 2020) (outline).

Asterophora Ditmar, Neues Journal für die Botanik 3 (3-4): 56 (1809)

= *Ugola* Adans., Familles des plantes 2: 5 (1763)

Index Fungorum number: IF7267

Classification: Lyophyllaceae, Agaricales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Asterophora lycoperdoides* (Bull.) Ditmar, Neues J. Bot. 3(3, 4): 56 (1809)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Ugola* (Stalpers et al., 2021).

Sequence data: *Asterophora lycoperdoides* (CBS 170.86, ITS: AF357037, SSU: DQ367417)

Notes: The sexual morph of *Ugola* have been described in *Asterophora*, Stalpers et al. (2021) proposed to protect *Asterophora* over *Ugola*. Phylogenetically, representatives of *Asterophora* clustered in the family Lyophyllaceae (Agaricales, Agaricomycetes) (Figure 2.1). However, the ex-type strain CBS 705.82 of *Ugola praticola* clustered in the class Microbotryomycetes but unknown order and family (Figure 2.1). References: (He et al., 2019) (outline).

Atractium Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 10 (1809)

Index Fungorum number: IF7291

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Atractium stilbaster* Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 10, tab. 1, fig. 11 (1809)

Sexual morph: Unknown.

Sequence data: *Atractium crassum* (CBS 180.31 = NRRL 20894, LSU: U88110, ITS: KM231790); *Atractium stilbaster* (CBS 410.67, LSU: KM231654, ITS: KM231791)

Notes: *Atractium* is characterized by synnematous or sporodochial, branched or penicillate or verticillate, hyaline conidiophores, monophialidic, hyaline conidiogenous cells, and septate, in slimy masses, clavate, obovoid or gently curved, rarely ellipsoidal, hyaline conidia (Gräfenhan et al., 2011; Lombard et al., 2015). References: (Gräfenhan et al., 2011; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Atrosetaphiale Matsush., Matsushima Mycological Memoirs 8: 14 (1995)

Index Fungorum number: IF27562

Classification: Ascomycota genera *incertae sedis*

Type species: *Atrosetaphiale flagelliformis* Matsush., Matsushima Mycological Memoirs 8: 14 (1995)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Atrosetaphiale* was introduced by Matsushima (1995) and is characterized by having macronematous, mononematous, septate, brown conidiophores, bearing ampulliform and brown phialides under the septa, and producing aseptate, filiform, hyaline conidia aggregated in slimy mass. Phylogenetic position for *Atrosetaphiale* is unresolved due to lack of sequence data. References: (Matsushima, 1995) (morphology), (Wijayawardene et al., 2020) (outline).

Aureobasidium Viala & G. Boyer, Revue Génerale de Botanique 3: 371 (1891)

Index Fungorum number: IF7297

Classification: Saccotheciaceae, Dothideales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Aureobasidium vitis* Viala & G. Boyer, Revue Génerale de Botanique 3: 371 (1891)

Sexual morph: *Columnosphaeria*, *Muellerites*, *Potebniamyces* (Seifert et al., 2011)

Synanamorphs: *Kabatiella*, *Selenophoma* (Seifert et al., 2011)

Sequence data: *Aureobasidium pullulans* (CBS 584.75, LSU: NG_055734, ITS: NR_144909, SSU: NG_062753)

Notes: *Aureobasidium* is characterized by conidiophores are none or reduced, monilioid, brown, conidiogenous cells are polyblastic, synchronous or endogenous, brown, producing conidia that are aseptate, yeast-like, or in slimy mass (Seifert et al., 2011). Phylogenetically, *Aureobasidium* was shown to be nested within the family Saccotheciaceae (Dothideales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Aureovirgo J.A. van der Linde, Z.W. de Beer & Jol. Roux, Antonie van Leeuwenhoek 109: 593 (2016)

Index Fungorum number: IF813870

Classification: Ophiostomataceae, Ophiostomatales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Aureovirgo volantis* J.A. van der Linde, Z.W. de Beer & Jol. Roux, Antonie van Leeuwenhoek 109: 593 (2016)

Sexual morph: Holomorphic genus with *Leptographium*-like asexual morph (van der Linde et al., 2016).

Sequence data: *Aureovirgo volantis* (CMW 41238, LSU: KR051131, ITS: NR_153530)

Notes: *Aureovirgo* was introduced by van der Linde et al. (2016) to accommodate a ophiostomatalean fungus collected in the tunnels of *C. africus* on *E. ingens* in South Africa. This genus can be distinguished from other genera by its allantoid ascospores with ellipsoidal sheaths and having leptographium-like asexual state (van der Linde et al., 2016). References: (van der Linde et al., 2016) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Avesicladiella W.P. Wu, B. Sutton & Gange, Mycoscience 38 (1): 11 (1997)

Index Fungorum number: IF27790

Classification: Ascomycota genera *incertae sedis*

Type species: *Avesicladiella britannica* W.P. Wu, B. Sutton & Gange, Mycoscience 38 (1): 12 (1997)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Avesicladiella* was introduced by Wu et al. (1997a) to accommodate two leaf litter hyphomycetes, and it has septate, smooth, hyaline setae, reduced conidiophores, phialidic, determinate, lageniform, ampulliform conidiogenous cells, and solitary, aseptate, cylindrical, hyaline conidia. Phylogenetic position for *Avesicladiella* is unresolved due to lack of sequence data. References: (Wu et al., 1997a) (morphology), (Wijayawardene et al., 2020) (outline).

Bactridium Kunze, Mykologische Hefte 1: 5 (1817)

Index Fungorum number: IF7309

Classification: Ascomycota genera *incertae sedis*

Type species: *Bactridium flavum* Kunze, Mykologische Hefte 1: 5, t. 1:2 (1817)

Sexual morph: Unknown.

Sequence data: *Bactridium clavatum* (PDD 116697, ITS: MW191785)

Notes: *Bactridium* is characterized by having sporodochial or synnematous, branched, hyaline conidiophores, with monoblastic, hyaline conidiogenous cells, producing solitary, septate, hyaline conidia (Seifert et al., 2011). Phylogenetic position for *Bactridium* is unresolved due to lack of LSU sequence data. References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Bagadiella Cheew. & Crous, Persoonia 23: 59 (2009)

Index Fungorum number: IF513840, *Facesoffungi number*: FoFxxxx

Classification: Clypeophysalosporaceae, Amphisphaeriales, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Bagadiella lunata* Cheew. & Crous, Persoonia 23: 60 (2009)

Sexual morph: Descried as holomorph.

Disease symptoms: endophytic fungi, pale yellow leaf blotches (Crous et al., 2021c)

Sequence data: Sequence data for ex-type culture of type species is available. LSU: NG_058637, ITS: NR_132832 (CBS 124762; CPC 13655)

Notes: *Bagadiella* species are commonly found on leaves of Eucalyptus (Crous et al., 2021c). Five species are accepted in this genus, they have sporodochial conidiomata, micronematous to macronematous, dichotomously branched, medium to pale grey-brown, conidiophores, monophialidic, terminal conidiogenous cells, lunate, curved, in slimy heads, hyaline conidia. References: (Cheewangkoon et al., 2009; Crous et al., 2011a, 2017a, 2021c)(morphology and phylogeny)

Bahukalasa Subram. & Chandrash., Kavaka: 42 (1979)

Index Fungorum number: IF7315

Classification: Ascomycota genera *incertae sedis*

Type species: *Bahukalasa samala* Subram. & Chandrash., Kavaka: 44 (1979)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Bahukalasa* was erected by Subramanian and Chandrashekara (1978) for a fungi isolated from dung of antelope and only one species is accepted. It has macronematous, sparsely branched, septate, hyaline to brown conidiophores, with polyblastic, sympodial, denticulate, ampulliform or pitcher-shaped, hyaline conidiogenous cells, and solitary, aseptate, smooth, allantoid, hyaline conidia (Subramanian & Chandrashekara, 1978). Phylogenetic position for *Bahukalasa* is unresolved due to lack of sequence data. References: (Subramanian & Chandrashekara, 1978) (morphology), (Wijayawardene et al., 2020) (outline).

Bahusutrabeeja Subram. & Bhat, Canadian Journal of Botany 55 (16): 204 (1977)

Index Fungorum number: IF7320

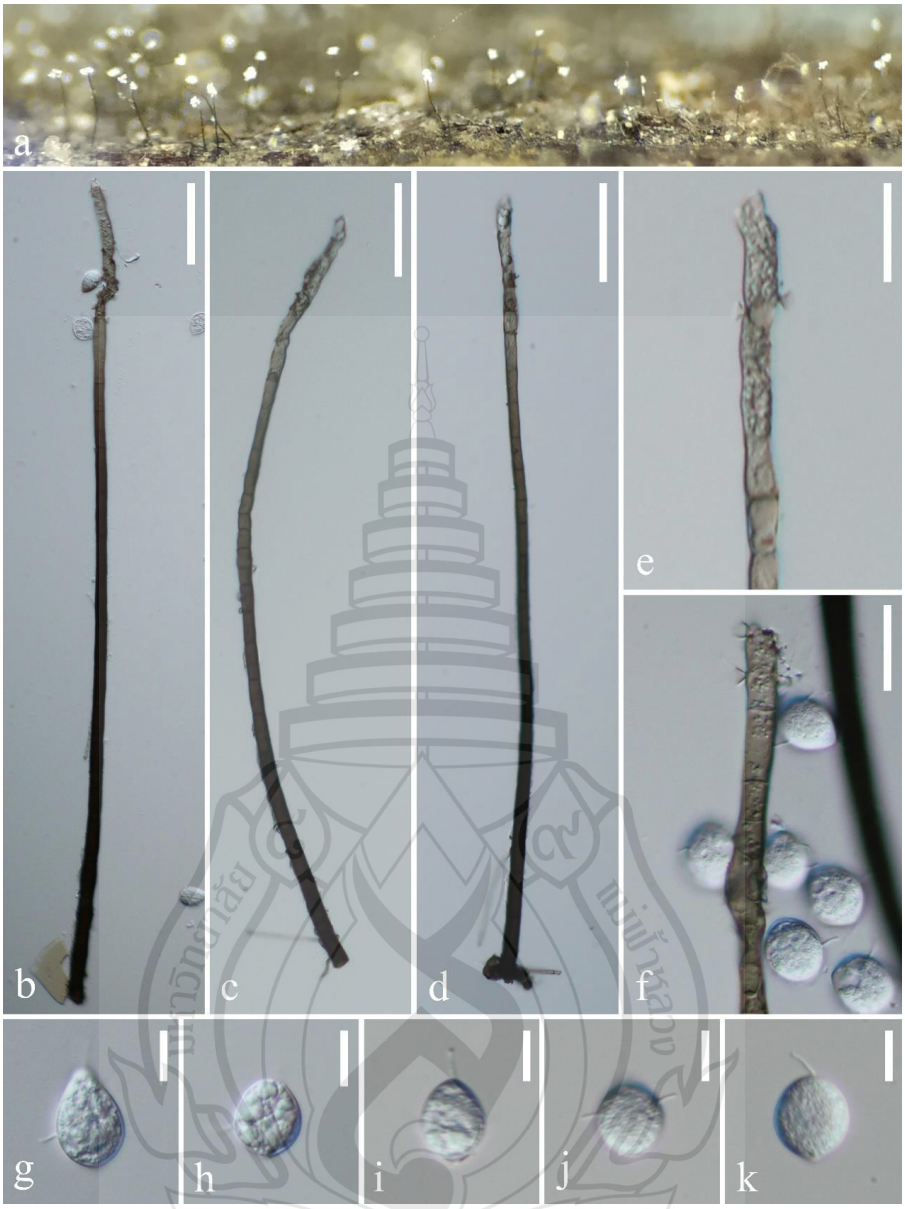
Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Bahusutrabeeja dwaya* Subram. & Bhat, Canadian Journal of Botany 55 (16): 2204 (1977)

Sexual morph: Unknown.

Sequence data: *Bahusutrabeeja dwaya* (CBS 261.77, LSU: MH872829, ITS: NR_164285)

Notes: *Bahusutrabeeja* was introduced by Subramanian and Bhat (1977) and is characterized by macronematous, mononematous, unbranched or branched, percurrent conidiophores, phialidic conidiogenous cells, aseptate, in slimy mass, hyaline conidia with several to many slender appendages distributed over the surface. Lin et al. (2019b) assigned this genus within the family Chaetosphaeriaceae (Chaetosphaeriales). References: (Gao et al., 2015a; Li et al., 2014c; Subramanian & Bhat, 1977) (morphology), (Lin et al., 2019b) (phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).



Note ***Bahusutrabeeja*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 2-31). **a** Conidiophores on the host surface. **b–d** Conidiophores. **e, f** Conidiogenous cells. **g–k** Conidia. Scale bars: **b–d** = 50 μm, **e, f** = 20 μm, **g–k** = 10 μm.

Figure 2.2 *Bahusutrabeeja* sp.

Barrenia E. Walsh & N. Zhang, Fungal Biology 119 (12): 1222 (2015)

Index Fungorum number: IF811715

Classification: Mollisiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Barrenia panicia* E. Walsh & N. Zhang, Fungal Biology 119 (12): 1222 (2015)

Sexual morph: Unknown.

Sequence data: *Barrenia panicia* (WSF1R37, LSU: KT598380, ITS: NR_164236, SSU: NG_065709)

Notes: *Barrenia* was erected by Walsh et al. (2015) to accommodate two species that associated with living plant roots. Phylogenetically, *Barrenia* was shown to be nested within the family Mollisiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Walsh et al., 2015) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Bartheletia G. Arnaud ex Scheuer, R. Bauer, M. Lutz, Stabentheiner, Melnik & Grube, Mycological Research 112 (11): 1269 (2008)

Index Fungorum number: IF511576

Classification: Bartheletiaceae, Bartheletiales, Bartheletiomycetes, Agaricomycotina, Basidiomycota

Type species: *Bartheletia paradoxa* G. Arnaud ex Scheuer, R. Bauer, M. Lutz, Stabentheiner, Melnik & Grube, Mycological Research 112 (11): 1269 (2008)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Scheuer et al., 2008).

Sequence data: *Bartheletia paradoxa* (NN46: 196-1, LSU: MW404634, SSU: MW404638)

Notes: Phylogenetically, representative of *Bartheletia* clustered in the family Bartheletiaceae, Bartheletiales, Bartheletiomycetes (Figure 2.1). References: (Scheuer et al., 2008) (morphology), (Wijayawardene et al., 2020) (outline).

Basidiopycnis Oberw., R. Kirschner, R. Bauer, Begerow & Arenal, Mycologia 98 (4): 639 (2006)

= *Basidiopycnides* J. Reid, Eyjólfsd. & Georg Hausner, Mycotaxon 103: 285 (2008)

Index Fungorum number: IF501071

Classification: Hoehnelomycetaceae, Atractiellales, Atractiellomycetes, Pucciniomycotina, Basidiomycota

Type species: *Basidiopycnis hyalina* Oberw., R. Kirschner, R. Bauer, Begerow & Arenal, Mycologia 98 (4): 639 (2006)

Sexual morph: Sexual morphic genus.

Sequence data: *Basidiopycnis hyalina* (FO44664, LSU: DQ363322, ITS: DQ198779, SSU: NG_061044)

Notes: *Basidiopycnides* was described by Hausner et al. (2008) and is characterized by having semi-macronematous or macronematous, mononematous or synnematous, branched, hyaline conidiophores, with monoblastic, percurrent, terminal, integrated, hyaline conidiogenous cells, producing solitary, aseptate, oblong or clavate, hyaline conidia aggregated in slimy mass. He et al. (2019) treated *Basidiopycnides* as a synonym of *Basidiopycnis*. Phylogenetically, representative of *Basidiopycnis* clustered in the family Hoehnelomycetaceae (Atractiellales, Atractiellomycetes) (Figure 2.1). References: (Hausner et al., 2008) (morphology and phylogeny), (He et al., 2019) (outline).

Basifimbria Subram. & Lodha, Current Science 37: 247 (1968)

Index Fungorum number: IF7338

Classification: Xylariales genera *incertae sedis*, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Basifimbria aurea* Subram. & Lodha, Current Science 37: 247 (1968)

Sexual morph: ?*Geopyxis* (Seifert et al., 2011).

Synanamorphs: arthrobotrys-like (Seifert et al., 2011).

Sequence data: *Basifimbria spinosa* (CBS 499.85 = MUCL 20173, LSU: MH873589, ITS: MH861900)

Notes: *Basifimbria* was introduced by Subramanian and Lodha (1968) and is characterized by having mononematous, unbranched or branched, sometimes

reduced, hyaline or brown conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing solitary, aseptate, globose, ovoid, hyaline or pale brown conidia. Previous studies placed this genus in Xylariales genera *incertae sedis* (Sordariomycetes) (Wijayawardene et al., 2020). However, phylogenetically, the ex-type strain of *Basifimbria spinosa* was shown to be nested within the order Pezizales (Pezizomycetes) (Figure 2.1). The taxonomic position of this genus should be resolved with more new collections and molecular data in the future, especially for the generic type. References: (Subramanian & Lodha, 1968) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Beauveriphora Matsush., Icones Microfungorum a Matsushima lectorum: 14 (1975)

Index Fungorum number: IF7347

Classification: Ophiostomataceae, Ophiostomatales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Beauveriphora sporothricis* Matsush. (1975)

Synanamorphs: sporothrix-like (Matsushima, 1975)

Sequence data: *Beauveriphora sporotricis* (CBS 116.84; MFC 1814, LSU: MH873415, ITS: MH861704)

Notes: *Beauveriphora sporotricis* was introduced by Matsushima (1975) and is characterized by synnematous conidiomata, branched or penicillate, hyaline conidiophores, sympodial, denticulate, hyaline conidiogenous cells, producing aseptate, in slimy mass, hyaline conidia. Previous studies placed this genus in Ascomycota genera *incertae sedis* (Wijayawardene et al., 2017a, 2020). However, phylogenetically, the ex-type strain of the generic type species located in the family Ophiostomataceae (Ophiostomatales, Diaporthomycetidae, Sordariomycetes). Morphologically, it similar to *Pesotum*, which is in the family Ophiostomataceae. Herein, we suggest putting this genus in the family Ophiostomataceae. References: (Matsushima, 1975) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Belemnospora P.M. Kirk, Transactions of the British Mycological Society 77: 279 (1981)

Index Fungorum number: IF7353

Classification: Ascomycota genera *incertae sedis*

Type species: *Belemnospora epiphylla* P.M. Kirk, Transactions of the British Mycological Society 77: 281 (1981)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Belemnospora* was established by Kirk (1981) and it has semi-macronematous to macronematous, mononematous, solitary, unbranched, septate, brown conidiophores, with monoblastic, integrated, terminal, percurrent conidiogenous cells, and produces solitary, aseptate or septate, cylindrical, subhyaline to pale brown conidia. Phylogenetic position for *Belemnospora* is unresolved due to lack of sequence data. References: (Kirk, 1981) (morphology), (Wijayawardene et al., 2020) (outline).

Beltramono Dubey, A.K. Pandey bis & Manohar.: 321 (2011)

Index Fungorum number: IF587729

Classification: Ascomycota genera *incertae sedis*

Type species: *Beltramono costi* Dubey, A.K. Pandey bis & Manohar. (2011)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Beltramono* was established by Rashmi et al. (2011) for a fungus isolated from leaf spot of Costus speciosus. It has macronematous, mononematous, septate conidiophores, monoblastic conidiogenous cells, swollen, ellipsoidal to spherical separating cells, and produces solitary, biconic, subhyaline to hyaline conidia with two hyaline transverse bands (Rashmi et al., 2011). Phylogenetic position for *Beltramono* is unresolved due to lack of sequence data. References: (Rashmi et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Beltrania Penz., Nuovo Giornale Botanico Italiano 16: 72 (1882)

Index Fungorum number: IF7355

Classification: Beltraniaceae, Amphisphaeriales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Beltrania rhombica* Penz., Michelia 2 (8): 474 (1882)

Sexual morph: Unknown.

Sequence data: *Beltrania pseudorhombica* (CBS 138003 = CPC 23656, LSU: KJ869215, ITS: KJ869158)

Notes: The genus *Beltrania* is characterized by having dark and mostly unbranched setae with radially lobed basal cells, unbranched conidiophores arising from basal cells of setae or from separate radially lobed basal cells, sympodial and denticulate conidiogenous cells, swollen separating cells and biconic, spicate or apiculate conidia with a hyaline transverse band (Lin et al., 2017c; Seifert et al., 2011). Phylogenetic analyses in this study showed that this genus formed a monophyletic clade within the family Beltraniaceae (Figure 2.1). References: (Bandgar & Patil, 2019; Crous et al., 2014b, 2015c; Morelet, 2001; Penzig, 1882; Pirozynski, 1963; Zhang & Zhang, 2003; Zheng et al., 2019a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Beltraniella Subram., Proceedings of the Indian Academy of Sciences Section B 36 (6): 227 (1952)

Index Fungorum number: IF7356

Classification: Beltraniaceae, Amphisphaeriales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

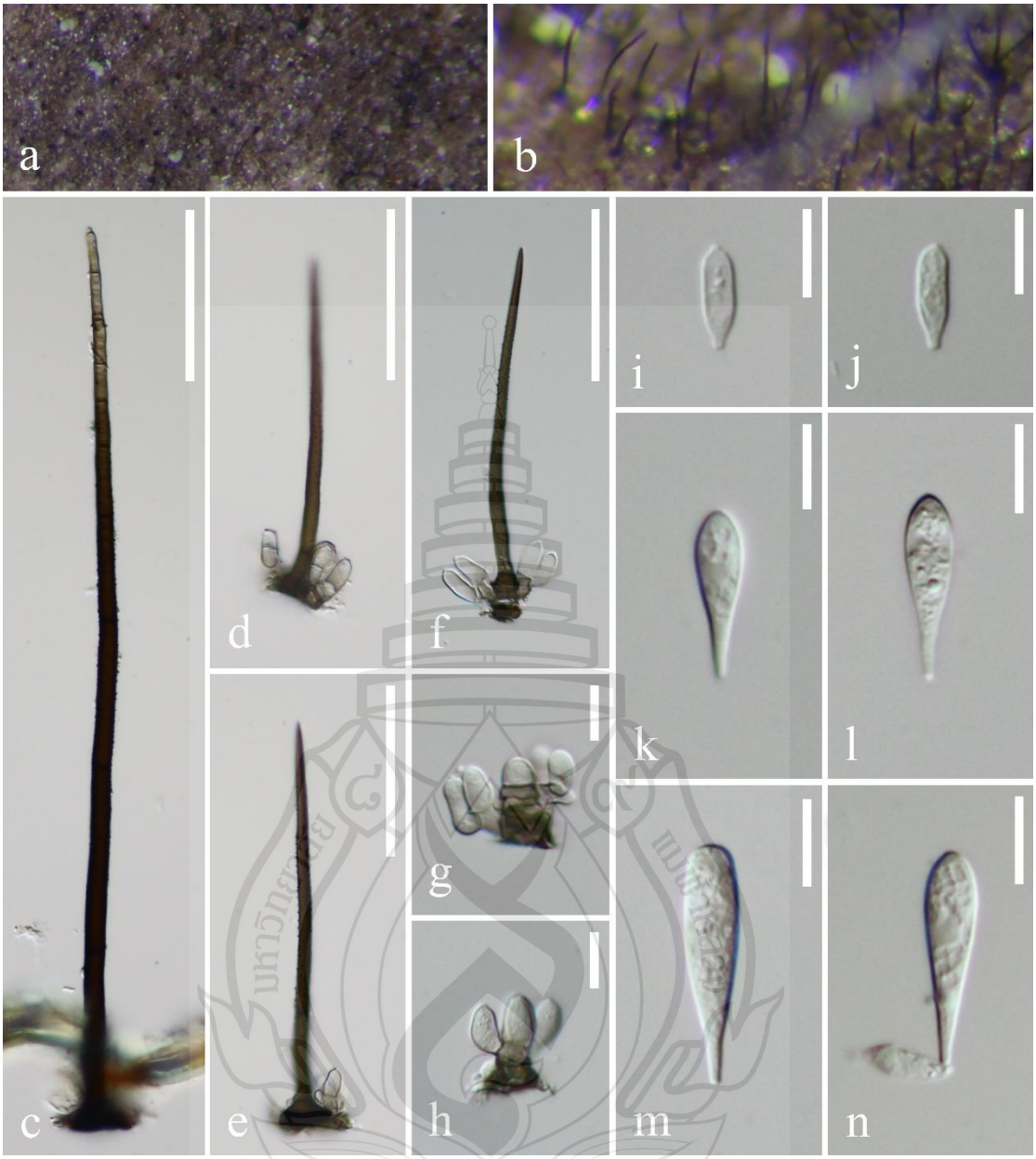
Type species: *Beltraniella odinae* Subram., Proceedings of the Indian Academy of Sciences Section B 36 (6): 224 (1952)

Sexual morph: *Pseudomassaria* Jacz. (Hodges & Barr, 1971).

Sequence data: *Beltraniella endiandrae* (CBS 137976 = CPC 22193, LSU: KJ869185, ITS: KJ869128)

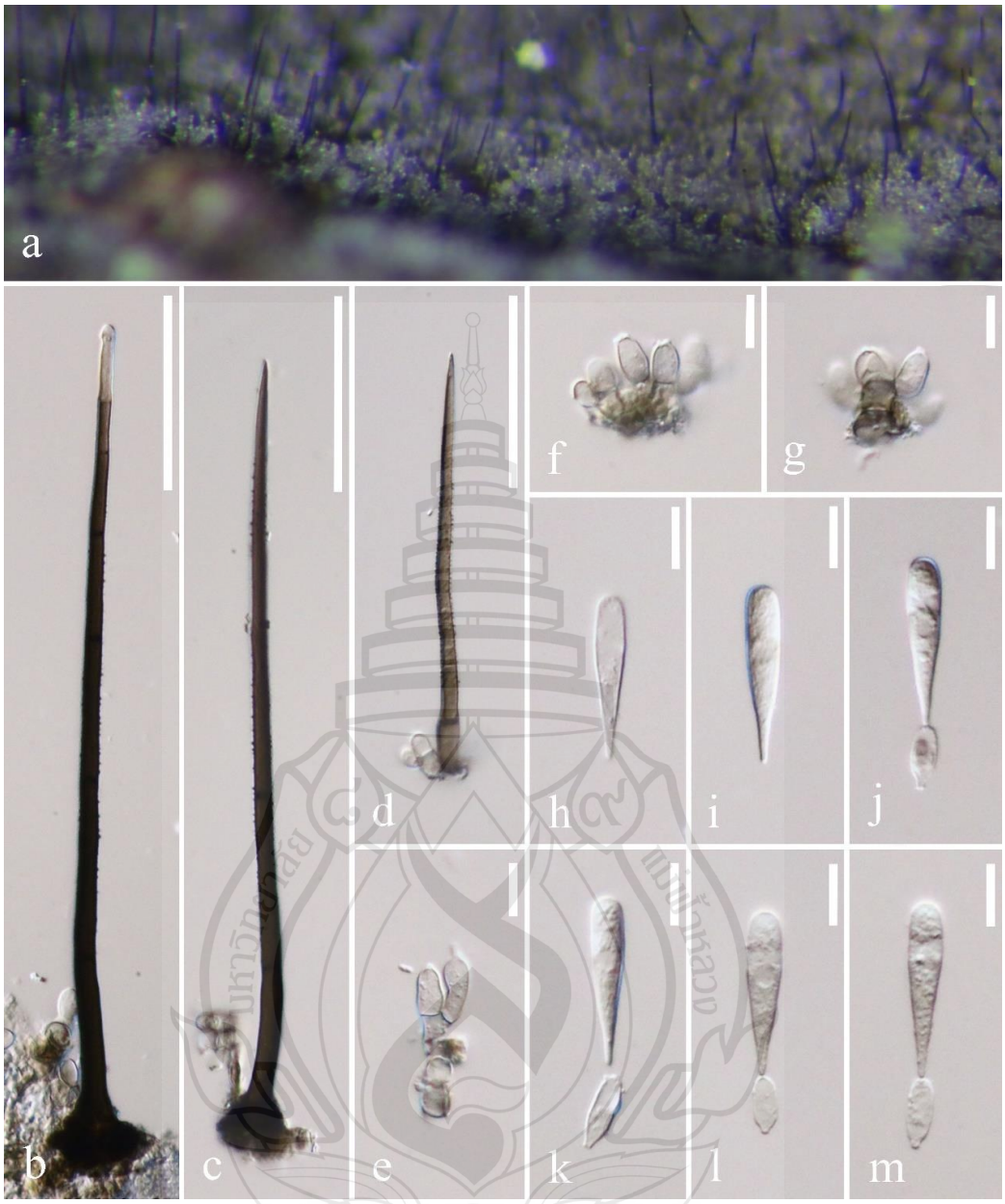
Notes: *Beltraniella* species are characterised by setae that are sterile extensions of conidiophores or among conidiophores or absent, unbranched and arising from radially lobed basal cells. Conidiophores are branched, often with setiform apex, arising from radially lobed basal cells. Conidiogenous cells are

polyblastic and sympodial and produce acropleurogenous, turbinate or biconic conidia with a distinct hyaline transverse band. Phylogenetic analyses in this study showed that this genus located within the family Beltraniaceae (Figure 2.1). References: (Castañeda Ruíz et al., 1996a; Crous et al., 2014b, 2016a; Fernando & Gusmão, 2004; Heredia et al., 2002; Hodges & Barr, 1971; Jaklitsch et al., 2016; Onofri, 1983; Pirozynski & Patil, 1970; Priya et al., 2011; Shirouzu et al., 2010; Subramanian, 1952) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



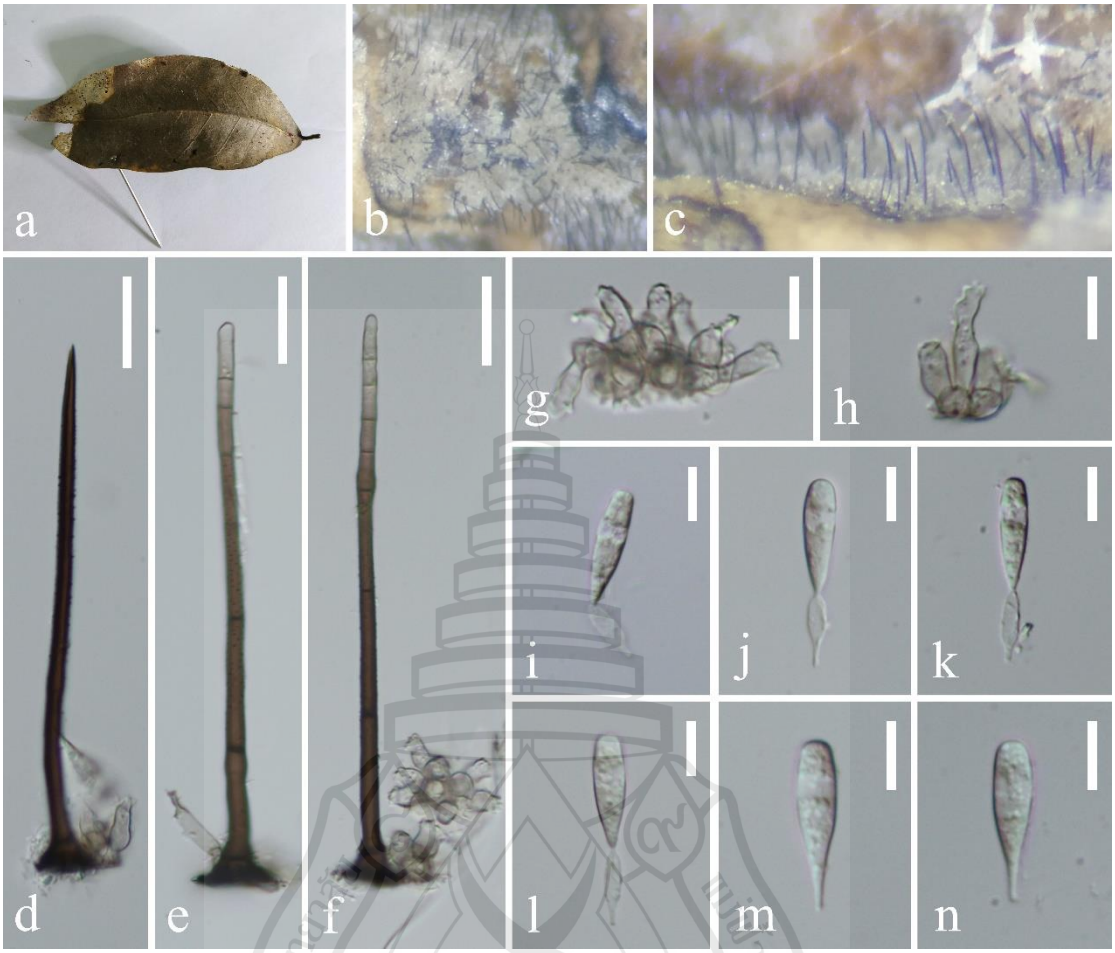
Note ***Beltraniella*** **sp.** (Material examined: China, Guizhou Province, Guiyang City, Guanshanhu District, Baihuahu Scenic Area, 18 April 2018, Yao Feng, BHH 1-3). **a, b** Conidiophores on the host surface. **c–f** Setae and conidiophores. **g, h** Conidiophores and conidiogenous cells. **i, j** Separating cells. **k–n** Conidia. Scale bars: **c**, **f** = 20 μm, **g–n** = 10 μm.

Figure 2.3 *Beltraniella* sp1



Note *Beltraniella* sp. (Material examined: China, Guizhou Province, Guiyang City, Guanshanhu District, Baihuahu Scenic Area, 18 April 2018, Yao Feng, BHH 1-9). **a** Conidiophores on the host surface. **b–d** Setae and conidiophores. **e–g** Conidiophores and conidiogenous cells. **h–m** Conidia and separating cells. Scale bars: **b–d** = 50 μm, **e–m** = 10 μm.

Figure 2.4 *Beltraniella* sp2



Note ***Beltraniella*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 2-19). **a** Host material. **b, c** Conidiophores on leaf surface. **d** Setae with short conidiophores. **e, f** Imperfect setae. **g, h** Conidiogenous cells. **i**–**n** Conidia with separating cells. Scale bars: d–f = 20 μm, g–n = 10 μm.

Figure 2.5 *Beltraniella* sp3

Beniowskia Racib., Parasitische Algen und Pilze Java's 2: 37 (1900)

Index Fungorum number: IF7359

Classification: Ascomycota genera *incertae sedis*

Type species: *Beniowskia graminis* Racib., Parasitische Algen und Pilze Java's 2: 37 (1900)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Hanlin (1987) showed *Beniowskia* and *Clathrotrichum* Patouillard are congeneric, and synonymized *Clathrotrichum* under *Beniowskia*. Phylogenetic position for *Beniowskia* is unresolved due to lack of sequence data. References: (Hanlin, 1987) (morphology), (Wijayawardene et al., 2020) (outline).

Berkelella (Sacc.) Sacc., Sylloge Fungorum 9: 989 (1891)

= *Blistum* B. Sutton, Mycological Papers 132: 16 (1973)

Index Fungorum number: IF549

Classification: Hypocreales genus *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Berkelella caledonica* (Pat.) Sacc., Sylloge Fungorum 9: 989 (1891)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Berkelella stilbigera* (= *Blistum tomentosum*) (JCM 12445, SSU: AB208109, ITS: AB208109; AFSEF 5353, LSU: AY259545)

Notes: The asexual morph of was *Berkelella* reported in *Blistum*, which has synnematous conidiomata, macronematous, branched or penicillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, in slimy mass, hyaline conidia (Seifert et al., 2011). References: (Seifert et al., 2011) (morphology), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Berkeleyomyces W.J. Nel, Z.W. de Beer, T.A. Duong & M.J. Wingf., Plant Pathology 67 (4): 876 (2017)

Index Fungorum number: IF822838

Classification: Ceratocystidaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Berkeleyomyces basicola* (Berk. & Broome) W.J. Nel, Z.W. de Beer, T.A. Duong & M.J. Wingf., Plant Pathology 67 (4): 877 (2017)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Nel et al., 2018).

Sequence data: *Berkeleyomyces basicola* (CMW 49352 = CBS 142796, LSU: MF948659, ITS: MF952429)

Notes: *Berkeleyomyces* was introduced by Nel et al. (2018) to accommodate *B. basicola* and *B. rouxiae*, which can cause black root rot on many important agricultural and ornamental plant species. It is characterized by conidiophores, phialidic, cylindrical, hyaline to subhyaline conidiogenous cells, producing solitary or catenate, aseptate, cylindrical, hyaline conidia and dark brown chlamydospores (Nel et al., 2018). References: (Nel et al., 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Bhadradriella Nagaraju, Kunwar & Manohar.: 238 (2011)

Index Fungorum number: IF581594

Classification: Ascomycota genera *incertae sedis*

Type species: *Bhadradriella hyalina* Nagaraju, Kunwar & Manohar.: 238 (2011)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Bhadradriella* was erected by Nagaraju et al. (2011) and is characterized by having synnematous, capitate, hyaline conidiomata, macronematous, unbranched, septate, hyaline conidiophores, with polyblastic, ?discrete, protuberant, denticulate conidiogenous cells, producing solitary, aseptate, botryose, globose, subglobose to broadly ellipsoidal, hyaline conidia. Phylogenetic position for *Bhadradriella* is unresolved due to lack of sequence data. References: (Nagaraju et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Bibanasiella R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 35: 14 (1991)

Index Fungorum number: IF27055

Classification: Ascomycota genera *incertae sedis*

Type species: *Bibanasiella ramispora* R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 35: 14 (1991)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Bibanasiella* was introduced by Castañeda Ruíz and Kendrick (1991) and only one species is accepted. Phylogenetic position for *Bibanasiella* is unresolved due to lack of sequence data. References: (Castañeda Ruíz & Kendrick, 1991) (morphology), (Wijayawardene et al., 2020) (outline).

Biflagellosporella Matsush., Matsushima Mycological Memoirs 7: 44 (1993)

Index Fungorum number: IF26482

Classification: Ascomycota genera *incertae sedis*

Type species: *Biflagellosporella amazonensis* Matsush., Matsushima Mycological Memoirs 7: 44 (1993)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Biflagellosporella* was established by Matsushima (1993) and is characterized by having reduced conidiophores, with monoblastic, hyaline conidiogenous cells, and producing conidia that are solitary, hyaline, appendaged, staurosporous, consisting of one obclavate, 1-septate main axis and 1-septate secondary axis connate in the middle to the main axis. Phylogenetic position for *Biflagellosporella* is unresolved due to lack of sequence data. References: (Matsushima, 1993) (morphology), (Wijayawardene et al., 2020) (outline).

Bifusisporella R.M.F. Silva, R.J.V. Oliveira, J.D.P. Bezerra, J.L. Bezerra, Souza-Motta & G.A. Silva, Mycological Progress 18 (6): 852 (2019)

Index Fungorum number: IF828222

Classification: Magnaporthaceae, Magnaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Bifusisporella sorghi* R.M.F. Silva, R.J.V. Oliveira, J.D.P. Bezerra, J.L. Bezerra, Souza-Motta & G.A. Silva, Mycological Progress 18: 852 (2019)

Sexual morph: Unknown.

Sequence data: *Bifusisporella sorghi* (URM 7442, LSU: MK060153, ITS: MK060155)

Notes: *Bifusisporella* was introduced by Silva et al. (2019) and is characterized by reduced conidiophores, phialidic, pale brown conidiogenous cells, brown, smooth, elongate, multi-lobulate hyphopodia, and producing aseptate, guttulate, curved, falcate, hyaline macroconidia, and aseptate, smooth, straight to slightly curved, falcate, hyaline microconidia. References: (Silva et al., 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Bisifusarium L. Lombard, Crous & W. Gams, Studies in Mycology 80: 223 (2015)

Index Fungorum number: IF810226

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Bisifusarium dimerum* (Penz.) L. Lombard & Crous, Studies in Mycology 80: 225 (2015)

Sexual morph: Unknown.

Sequence data: *Bisifusarium dimerum* (CBS 108944 = NRRL 36140, LSU: JQ434514, ITS: JQ434586)

Notes: *Bisifusarium* is *Fusarium*-like but differ by its short, aseptate to 3-septate macroconidia and the formation of lateral phialidic pegs arising from the hyphae (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Bjerkandera P. Karst., Meddelanden af Societas pro Fauna et Flora Fennica 5: 38 (1879)

= *Geotrichopsis* Tzean & Estey, Mycological Research 95: 1351 (1991)

Index Fungorum number: IF17160

Classification: Phanerochaetaceae, Polyporales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Bjerkandera adusta* (Willd.) P. Karst., Meddn Soc. Fauna Flora fenn. 5: 38 (1879)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Geotrichopsis* (Stalpers et al., 2021).

Synanamorphs: Producing chlamydospores (Tzean & Estey, 1991)

Sequence data: *Bjerkandera adusta* (before known as *Geotrichopsis mycoparasitica*) (CBS 687.93 = CCRC 32451, LSU: MH874100, ITS: MH862453)

Notes: *Geotrichopsis* was introduced by Tzean and Estey (1991) and is characterized by having micronematous, mononematous, branched, without clamp connections, reduced, hyaline conidiophores, with thallic, hyaline conidiogenous cells, producing catenate, aseptate, hyaline conidia and intercalary or terminal, irregularly shaped chlamydospores. *Geotrichopsis* was linked to the sexual morphic genus *Bjerkandera*, and Stalpers et al. (2021) proposed to protect *Bjerkandera* over *Geotrichopsis*. Phylogenetically, *Bjerkandera* was shown to be nested within the family Phanerochaetaceae (Polyporales, Agaricomycetes) (Figure 2.1). References: (Tzean & Estey, 1991) (morphology), (He et al., 2019) (outline).

Blastobotrys Klopotek, Archiv für Mikrobiologie 58: 92 (1967)

Index Fungorum number: IF7384

Classification: Trichomonascaceae, Saccharomycetales, Saccharomycetes, Saccharomycotina, Ascomycota

Type species: *Blastobotrys nivea* Klopotek, Archiv für Mikrobiologie 58: 92 (1967)

Sexual morph: *Trichomonascus* (Kurtzman et al., 2011).

Synanamorphs: *Trichosporiella* (Seifert et al., 2011).

Sequence data: *Blastobotrys niveus* (NRRL Y-17581 = ATCC 18420 = CBS 163.67 = HFM 26 = UAMH 4663 = MUCL 6078 = WM 07.17, LSU: NG_066351, ITS: OL772662, SSU: DQ442769)

Notes: This genus was described by von Klopotek (1967) to accommodate *B. nivea*. *Blastobotrys* is characterized by mononematous, unbranched or branched, sympodial, hyaline conidiophores, with polyblastic, vesicular, seceding, hyaline conidiogenous cells, producing solitary or catenate, aseptate, hyaline conidia (Kurtzman et al., 2011; Seifert et al., 2011). Phylogenetically, representatives of *Blastobotrys* clustered in the family Trichomonascaceae (Saccharomycetales, Saccharomycetes) (Figure 2.1). References: (Kurtzman et al., 2011; Kurtzman & Robnett, 2007; Suh et al., 2006; von Klopotek, 1967) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Blastofusarioides Matsush., Matsushima Mycological Memoirs 9: 2 (1996)

Index Fungorum number: IF27654

Classification: Ascomycota genera *incertae sedis*

Type species: *Blastofusarioides fusca* Matsush., Matsushima Mycological Memoirs 9: 2 (1996)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Blastofusarioides* was introduced by Matsushima (1996) and is characterized by having micronematous, mononematous, reduced, hyaline conidiophores, mono- or polyblastic, sympodial, denticulate, hyaline conidiogenous cells, and producing solitary, septate, hyaline to subhyaline conidia aggregated in slimy mass. Phylogenetic position for *Blastofusarioides* is unresolved due to lack of sequence data. References: (Matsushima, 1996) (morphology), (Wijayawardene et al., 2020) (outline).

Blastomyces Gilchrist & W.R. Stokes, Journal of Experimental Medicine 3: 76 (1898)

Index Fungorum number: IF7389

Classification: Ajellomycetaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Blastomyces dermatitidis* Gilchrist & W.R. Stokes, Journal of Experimental Medicine 3: 76 (1898)

Sexual morph: *Ajellomyces* (Seifert et al., 2011).

Disease symptoms: blastomycosis.

Sequence data: *Blastomyces dermatitidis* (CBS 674.68 = ATCC 18188 = UAMH 3539 = IHEM 3783 = RV 24701, LSU: KT155307, ITS: KT155962)

Notes: *Blastomyces* was introduced by Gilchrist and Stokes (1898) and is dimorphic: (1) at 24 °C, reduced, hyaline conidiophores, solitary thallic, hyaline conidiogenous cells, aseptate, hyaline conidia; (2) at 37 °C, reduced, hyaline conidiophores, blastic, hyaline conidiogenous cells, yeast-cells, hyaline conidia (Seifert et al., 2011). References: (de Hoog et al., 2016) (nomenclature), (Gilchrist & Stokes 1898; Jiang et al., 2018; Seifert et al., 2011) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Blastophorella Boedijn, Blumea Suppl. 1: 140 (1937)

Index Fungorum number: IF7393

Classification: Ascomycota genera *incertae sedis*

Type species: *Blastophorella smithii* Boedijn, Blumea Suppl. 1: 141 (1937)

Sexual morph: Unknown.

Sequence data: ?*Blastophorella smithii* (CBS 139.49, LSU: MH868005, ITS: MH856466)

Notes: *Blastophorella* was introduced by Boedijn (1937) and is characterized by macronematous, mononematous, unbranched, brown conidiophores with subfusoid head and polytretic, brown conidiogenous cells, producing solitary, 1-septate, cylindrical, hyaline conidia. The strain CBS 139.49, named *Blastophorella smithii*, was included in our phylogenetic analysis, and it located in Sydowiellaceae (Diaporthales, Sordariomycetes) (Figure 2.1). References: (Boedijn, 1937) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Blastophorum Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 8 (1971)

Index Fungorum number: IF7394

Classification: Reticulascaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Blastophorum truncatum* Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 8 (1971)

Sexual morph: Unknown.

Sequence data: *Blastophorum aquaticum* (MFLUCC 15-0264, LSU: NG_066172, ITS: NR_153629)

Notes: *Blastophorum* was introduced by Matsushima (1971) and is characterized by macronematous, mononematous, unbranched or sparingly branched, brown conidiophores, sympodial, denticulate, hyaline conidiogenous cells, and aseptate or septate, ellipsoidal to cylindrical, hyaline conidia. References: (Matsushima, 1971) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Blastosporium Z.F. Yu & H. Zheng, MycoKeys 51: 60 (2019)

Index Fungorum number: IF828280

Classification: Helotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Blastosporium persicolor* Z.F. Yu & H. Zheng, MycoKeys 51: 60 (2019)

Sexual morph: Unknown.

Sequence data: *Blastosporium persicolor* (YMF1.05546, LSU: MH992517, ITS: NR_163764, SSU: NG_065765)

Notes: *Blastosporium* was introduced by Zheng et al. (2019b) and is characterized by having macronematous or semi-macronematous, mononematous, sometimes reduced, hyaline conidiophores, with monoblastic to polyblastic, terminal, integrated or discrete, sometimes sympodial, hyaline conidiogenous cells, producing solitary or catenate, aseptate, obovoid, oblong, ellipsoidal, allantoid, broad fusiform to irregular, hyaline conidia. Phylogenetically, *Blastosporium* was shown to be located

in the order Helotiales (Leotiomycetes) (Figure 2.1). References: (Zheng et al., 2019b) (morphology and phylogeny).

Blistum B. Sutton, Mycological Papers 132: 16 (1973)

Index Fungorum number: IF7403

Classification: Hypocreales genus *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Blistum tomentosum* (Schrad.) B. Sutton, Mycological Papers 132: 19 (1973)

Sexual morph: *Berkelella* (Seifert et al., 2011).

Sequence data: *Berkelella stilbigera* (= *Blistum tomentosum*) (JCM 12445, SSU: AB208109, ITS: AB208109; AFSEF 5353, LSU: AY259545)

Notes: See notes under *Berkelella*.

Bloxamia Berk. & Broome, Annals and Magazine of Natural History 13: 468 (1854)

Index Fungorum number: IF7406

Classification: Pezizellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Bloxamia truncata* Berk. & Broome, Annals and Magazine of Natural History 13: 468, t. 16:17 (1854)

Sexual morph: *Bisporella* (Seifert et al., 2011)

Sequence data: *Bloxamia cyatheicola* (VIC 42563, LSU: NG_058691, ITS: NR_153617, SSU: NG_065079)

Notes: The genus *Bloxamia* is characterized by having sporodochial or synnematous conidiomata, macronematous, stromatic, branched, hyaline to brown conidiophores, with phialidic with deep collarette, brown conidiogenous cells, producing catenate, endogenous, aseptate, short cylindrical to cuboid, oblong, hyaline to subhyaline conidia (Seifert et al., 2011; Spooren, 2014). Phylogenetically, *Bloxamia* was shown to be nested within the family Pezizellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Guatimosim et al., 2016; Seifert et al., 2011;

Spooren, 2014) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Botryobasidium Donk, Mededelingen van de Nederlandse Mycologische Vereeniging 18-20: 116 (1931)

= *Haplotrichum* Link, Caroli a Linné Species Plantarum exhibentes Plantas Rite Cognitas ad Genera Relatas 6 (1): 52 (1824)

Index Fungorum number: IF17183

Classification: Botryobasidiaceae, Cantharellales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Botryobasidium subcoronatum* (Höhn. & Litsch.) Donk, Medded. Nedl. Mycol. Ver. 18-20: 117 (1931)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Haplotrichum* (Stalpers et al., 2021).

Sequence data: *Botryobasidium conspersum* (before known as *Haplotrichum conspersum*) (AFTOL-ID 1766 = PBM 2747 (CUW), LSU: DQ521414, ITS: DQ911612, SSU: DQ521415)

Notes: The sexual morph of *Haplotrichum* was reported in the genus *Botryobasidium*, Stalpers et al. (2021) proposed to protect *Botryobasidium* over *Haplotrichum*. Phylogenetically, representative of *Botryobasidium* clustered in the family Botryobasidiaceae (Cantharellales, Agaricomycetes) (Figure 2.1). References: (He et al., 2019) (outline).

Botryoderma Papendorf & H.P. Upadhyay, Transactions of the British Mycological Society 52 (2): 257 (1969)

Index Fungorum number: IF7419

Classification: Ascomycota genera *incertae sedis*

Type species: *Botryoderma lateritium* Papendorf & H.P. Upadhyay, Transactions of the British Mycological Society 52 (2): 258 (1969)

Sexual morph: Unknown.

Sequence data: ?*Botryoderma lateritium* (CBS 586.66, LSU: MK919287, ITS: MH858889); ?*Botryoderma rostratum* (CBS 184.68, LSU: MH870817, ITS: MH859104)

Notes: *Botryoderma* was introduced by Papendorf and Upadhyay (1969) and is characterized by setae are none or extension of conidiophores, conidiophores are macronematous, mononematous, branched, hyaline, conidiogenous cells are sympodial, hyaline, conidia are solitary, aseptate, broadly to oblong-elliptical, ovoid or subglobose, hyaline to subhyaline. Two strains CBS 184.68 and CBS 586.66 identified as *Botryoderma* species were included in our phylogenetic analysis, and formed a separate clade within the family Chaetomiaceae (Sordariales, Sordariomycetes). References: (Papendorf & Upadhyay, 1969) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Botryomonilia Goos & Piroz., Canadian Journal of Botany 53 (24): 2927 (1975)

Index Fungorum number: IF7422

Classification: Ascomycota genera *incertae sedis*

Type species: *Botryomonilia scheeleae* Goos & Piroz., Canadian Journal of Botany 53 (24): 2928 (1975)

Sexual morph: Unknown.

Synanamorphs: Producing sclerotia (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Botryomonilia* was established by Goos and Pirozynski (1975) and has unbranched or branched, penicillate conidiophores, with arthric-thallic, hyaline conidiogenous cells, and produces conidia that are catenate, aseptate, doliiform, connected by protoplasmic filaments. Phylogenetic position for *Botryomonilia* is unresolved due to lack of sequence data. References: (Goos & Pirozynski, 1975) (morphology), (Wijayawardene et al., 2020) (outline).

Botryosporium Corda, Deutschlands Flora, Abt. III. Die Pilze Deutschlands 3 (11): 9 (1831)

Index Fungorum number: IF7429

Classification: Sordariomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Botryosporium diffusum* (Alb. & Schwein.) Corda, Deutschlands Flora, Abt. III. Die Pilze Deutschlands 3 (11): 9, t. 5 (1831) (= *Botrytis diffusa* Alb. & Schwein., Conspectus Fungorum in Lusatiae superioris: 362 (1805))

Sexual morph: Unknown.

Synanamorphs: sclerotia (Seifert et al., 2011)

Sequence data: *Botryosporium diffusum* (CBS 142.49 = JCM 11450, LSU: MH868006)

Notes: *Botryosporium* is characterized by macronematous, mononematous, branched, verticillate or trichodermoid, hyaline conidiophores, polyblastic, vesiculate, hyaline conidiogenous cells, and producing solitary, aseptate, hyaline conidia (Seifert et al., 2011). References: (Seifert et al., 2011) (morphology and phylogeny), (Vincent & Blackwell, 1987) (nomenclature), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Botryotrichum Sacc. & Marchal, Bulletin de la Société Royale de Botanique de Belgique 24: 66 (1885)

Index Fungorum number: IF7431

Classification: Chaetomiaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Botryotrichum piluliferum* Sacc. & Marchal, Bulletin de la Société Royale de Botanique de Belgique 24: 66 (1885)

Sexual morph: *Chaetomium*, *Farrowia* (Seifert et al., 2011)

Synanamorphs: acremonium-like (Seifert et al., 2011)

Sequence data: *Botryotrichum domesticum* (UAMH 11929, LSU: NG_068583, ITS: NR_169944, SSU: NG_070117)

Notes: *Botryotrichum* is characterized by setae are none, or on or among conidiophores, conidiophores are micronematous or semi-macronematous, mononematous, branched, hyaline, conidiogenous cells are monoblastic or polyblastic, sympodial, denticulate, hyaline, conidia are solitary, aseptate, spherical, hyaline (Ellis,

1971; Seifert et al., 2011). References: (Ellis, 1971; Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Botrytis P. Micheli ex Haller, Historia stirpium indigenarum Helvetiae inchoata 3: 111 (1768)

Index Fungorum number: IF7435

Classification: Sclerotiniaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

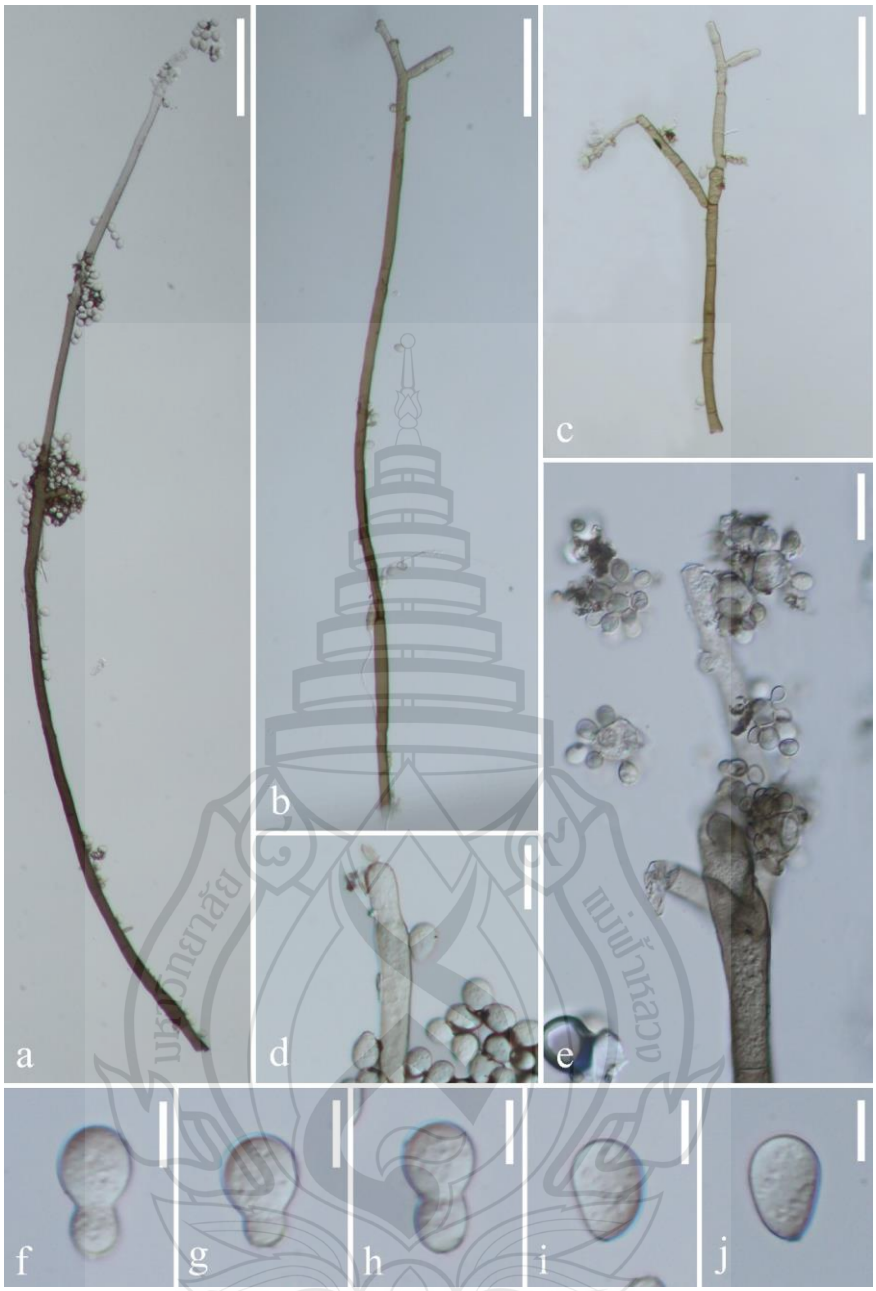
Type species: *Botrytis cinerea* Pers., Neues Magazin für die Botanik 1: 126, t. 3:9 (1794)

Sexual morph: *Botryotinia* (Seifert et al., 2011).

Synanamorphs: *Myrioconium* and producing sclerotia (Seifert et al., 2011).

Sequence data: *Botrytis byssoidea* (CBS 104.23 = MUCL 94 = VKM F-83, LSU: NG_069610, ITS: NR_159599)

Notes: *Botrytis* is characterized by having macronematous, mononematous, branched, often dichotomously or trichotomously branched, brown conidiophores, with polyblastic, integrated, terminal, synchronous, vesiculate, denticulate, hyaline to subhyaline conidiogenous cells, producing solitary, aseptate, ellipsoidal, obovoid, spherical or subspherical, hyaline to pale brown conidia (Ellis, 1971; Seifert et al., 2011). The sexual morph of *Botrytis* was reported in the genus *Botryotinia* (Seifert et al., 2011), and Johnston et al. (2014) proposed to protect *Botrytis* over *Botryotinia*. Phylogenetically, *Botrytis* was shown to be nested within the family Sclerotiniaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Ellis, 1971; Hennebert, 1973; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).



Note ***Botrytis*** **sp.** (Material examined: China, Guizhou Province, Zunyi City, 8 Auguest 2018, on flower of *Gardenia jasminoides*, Yao Feng, ZY 1-1). **a–c** Conidiophores. **d, e** Conidiogenous cells. **f–j** Conidia. Scale bars: **a–c** = 100 μm, **d, e** = 20 μm, **f–j** = 10 μm.

Figure 2.6 *Botrytis* sp.

Brachiosphaera Nawawi, Transactions of the British Mycological Society 67 (2): 213 (1976)

Index Fungorum number: IF7438

Classification: Aliquandostipitaceae, Jahnulales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Brachiosphaera tropicalis* Nawawi, Transactions of the British Mycological Society 67 (2): 213 (1976)

Sexual morph: Unknown.

Sequence data: *Brachiosphaera tropicalis* (SS2523, LSU: JN819284, ITS: FJ887923, SSU: JN819287)

Notes: *Brachiosphaera* was established by Descals et al. (1976) and is characterized by having macronematous or semi-macronematous, unbranched or branched, septate, hyaline conidiophores, with monoblastic, terminal and intercalary, sympodial or percurrent conidiogenous cells, producing conidia that are solitary, hyaline, staurosporous, with globose central cell and 4–several radiating septate arms (Descals et al., 1976; Seifert et al., 2011). Phylogenetically, *Brachiosphaera* was shown to be nested within the family Aliquandostipitaceae (Jahnulales, Dothideomycetes) (Figure 2.1). References: (Descals et al., 1976; Seifert et al., 2011) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Brachyalara Réblová & W. Gams, Fungal Diversity 46: 72 (2011)

Index Fungorum number: IF518970

Classification: ?Pezizellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Brachyalara straminea* Réblová & W. Gams, Fungal Diversity 46: 73 (2011)

Sexual morph: Unknown.

Sequence data: *Brachyalara straminea* (CBS 622.82, LSU: HQ609475, SSU: HQ609482)

Notes: *Brachyalara* was introduced by Réblová et al. (2011b) to accommodate *B. straminea* and is characterized by having macronematous,

mononematous, solitary or in groups, septate, unbranched or rarely branched, pale brown conidiophores, with phialidic, sympodial, ampulliform, subhyaline to pale brown conidiogenous cells, producing catenate, smooth-walled or finely verruculose, ellipsoidal to obovoidal, hyaline conidia. Phylogenetically, *Brachyalara* was shown to be nested within the family ?Pezizellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Réblová et al., 2011b) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Brachyconidiellopsis Decock, R.F. Castañeda & Adhikari, Cryptogamie Mycologie 25: 140 (2004)

Index Fungorum number: IF28798

Classification: Microascaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Brachyconidiellopsis fimicola* Decock, R.F. Castañeda & Adhikari, Cryptogamie Mycologie 25: 142 (2004)

Sexual morph: Unknown.

Sequence data: *Brachyconidiellopsis fimicola* (MUCL 44677, SSU: AY342016)

Notes: *Brachyconidiellopsis* was erected by Adhikari (2004) for a fungus collected on dung and it has sporodochial to synnematal conidiomata, mono- to polyblastic, determinate or sympodial conidiogenous cells, and produces conidia that are solitary, grayish brown to grayish black, cheiroid, repeatedly branched, each branch composed of ellipsoid to oblong cells in non-seceding chains. Phylogenetic position for *Brachyconidiellopsis* is unresolved due to lack of LSU sequence data. References: (Adhikari, 2004) (morphology), (Wijayawardene et al., 2020) (outline).

Brefeldochium Verkley, Nova Hedwigia 80 (3-4): 504 (2005)

Index Fungorum number: IF28954

Classification: Helotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Brefeldochium pruinosum* Verkley, Nova Hedwigia 80 (3-4): 505 (2005)

Sexual morph: *Polydesmia* (Verkley, 2005).

Sequence data: *Brefeldochium pruinosum* (CBS 111544, LSU: MH874458, ITS: AY775053)

Notes: *Brefeldochium* was erected by Verkley (2005) and is characterized by sporodochial conidiomata, unbranched, septate, hyaline conidiophores, with phialidic, terminal, hyaline conidiogenous cells, producing septate, curved, falcate or falcate-cylindrical, hyaline conidia. Phylogenetically, representative of *Brefeldochium* clustered in the order Helotiales (Figure 2.1). References: (Verkley, 2005) (morphology), (Wijayawardene et al., 2020) (outline).

Bretziella Z.W. de Beer, Marinc., T.A. Duong & M.J. Wingf., MycoKeys 27: 10 (2017)

Index Fungorum number: IF822520

Classification: Ceratocystidaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Bretziella fagacearum* (Bretz) Z.W. de Beer, Marinc., T.A. Duong & M.J. Wingf., MycoKeys 27: 10 (2017)

Sexual morph: Introduced as holomorphic genus with hyphomycetous asexual morph (de Beer et al., 2017).

Sequence data: *Bretziella fagacearum* (CBS 138363 = CMW 2656, LSU: KM495341, ITS: KU042044)

Notes: *Bretziella* was introduced by de Beer et al. (2017) to accommodate an oak wilt fungus, *B. fagacearum*. Its asexual morph has unbranched conidiophores, phialidic, cylindrical, pale to dark brown, and producing catenate, aseptate, cylindrical, hyaline conidia (de Beer et al., 2017). References: (de Beer et al., 2017) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Brevistachys L. Lombard & Crous, Persoonia 36: 182 (2016)

Index Fungorum number: IF815934

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Brevistachys variabilis* L. Lombard & Crous, Persoonia 36: 185 (2016)

Sexual morph: Unknown.

Sequence data: *Brevistachys variabilis* (CBS 141057 = CPC 17349, LSU: KU846066, ITS: KU846047)

Notes: This genus is stachybotrys-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Briania D.R. Reynolds, Pacific Science 43 (2): 161 (1989)

Index Fungorum number: IF11017

Classification: Meliolinaceae, Dothideomycetes families *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Briania fruticetum* D.R. Reynolds, Pacific Science 43 (2): 161 (1989)

Sexual morph: *Meliolina* (Reynolds, 1989).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Briania* was established by Reynolds (1989) and reported has sexual morph in the genus *Meliolina*. It has macronematous, branched, septate, brown conidiophores, and monophialidic, with well-defined collarette, terminal, determinate conidiogenous cells, produces endogenous, aseptate, cuneiform, hyaline conidia aggregated in mucusoid heads (Reynolds, 1989). Phylogenetic position for *Briania* is unresolved due to lack of sequence data. References: (Reynolds, 1989) (morphology), (Wijayawardene et al., 2020) (outline).

Brocchiosphaera K. Yamag., Chuaseehar. & Nakagiri, Mycoscience 61 (6): 279 (2020)

Index Fungorum number: IF824167

Classification: Pisorisporiales genera *incertae sedis*, Pisorisporiomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Brocchiosphaera brocchiata* (Tubaki) K. Yamag., Chuaseehar. & Nakagiri, Mycoscience 61 (6): 279 (2020)

Sexual morph: Unknown.

Sequence data: *Brocchiosphaera brocchiata* (NBRC 30048, LSU: LC331736, ITS: LC332953)

Notes: *Brocchiosphaera* was introduced by Yamaguchi et al. (2020) and is characterized by macro- to seminacronematous, mononematous, unbranched, hyaline conidiophores, monoblastic conidiogenous cells, and producing conidia that are solitary, acrogenous, hyaline to orange, composed of dichotomous or trichotomous branches. References: (Yamaguchi et al., 2020) (morphology and phylogeny).

Brunneiperidium Daranag., Camporesi & K.D. Hyde, Fungal Diversity 73: 221 (2015)

Index Fungorum number: IF809521

Classification: Xylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Brunneiperidium gracilentum* Daranag., Camporesi & K.D. Hyde, Fungal Diversity 73: 223 (2015)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Daranagama et al., 2015).

Sequence data: *Brunneiperidium gracilentum* (MFLUCC 14-0011, LSU: KP340542, ITS: KP297400)

Notes: *Brunneiperidium* was introduced by Daranagama et al. (2015) and its asexual morph has unbranched, sometimes dichotomously branched, hyaline conidiophores, with cylindrical conidiogenous cells, produces globose, hyaline conidia with thin mucilaginous sheath. Phylogenetically, *Brunneiperidium* located in the family Xylariaceae (Xylariales, Xylariomycetidae, Sordariomycetes) (Figure 2.1) References: (Daranagama et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Brunneochlamydosporium Giraldo López & Crous, Studies in Mycology 92: 260 (2018)

Index Fungorum number: IF828053

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Brunneochlamydosporium nepalense* (W. Gams) Giraldo López & Crous, Studies in Mycology 92: 262 (2018)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Giraldo & Crous, 2019).

Sequence data: *Brunneochlamydosporium nepalense* (CBS 971.72, LSU: NG_067402, ITS: NR_157414)

Notes: *Brunneochlamydosporium* was introduced by Giraldo and Crous (2019) and is characterized by mononematous, unbranched or poorly branched, hyaline conidiophores, monophialidic with conspicuous collarette, hyaline conidiogenous cells, and producing aseptate, in slimy mass, cylindrical, ellipsoidal, hyaline conidia, solitary, terminal, intercalary, catenate chlamydospores. References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Brycekendrickomyces Crous & M.J. Wingf., Persoonia 22: 141 (2009)

Index Fungorum number: IF509515

Classification: Trichomeriaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Brycekendrickomyces acaciae* Crous & M.J. Wingf., Persoonia 22: 141 (2009)

Sexual morph: Unknown.

Sequence data: *Brycekendrickomyces acaciae* (CBS 124104, LSU: NG_058633, ITS: NR_132828)

Notes: *Brycekendrickomyces* was introduced by Crous et al. (2009) and is characterized by macronematous, mononematous, brown conidiophores without rhizoids and giving rise to polyblastic, sympodial conidiogenous cells at the up parts, and producing aseptate, in slimy mass, ellipsoid, hyaline conidia. Quan et al. (2020) placed this genus in the family Trichomeriaceae (Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes). *Brycekendrickomyces* is similar to *Haplographium*, *Lauriomyces* and *Neolauriomyces* by having branched and brown

conidiophores, polyblastic, sympodial conidiogenous cells and hyaline conidia(Crous et al., 2009, 2018c; Seifert et al., 2011). However, *Brycekendrickomyces* differs from *Haplographium* and *Lauriomyces* by its unconspicuous monoverticillate conidiophores, and conidia produced in slimy heads rather than in chains (Crous et al., 2009, 2018c; Seifert et al., 2011). Furthermore, these three genera are not phylogenetically related (Figure 2.1). References: (Crous et al., 2009) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Budhanggurabania P. Wong, Khemmuk & R.G. Shivas, Persoonia 34: 241 (2015)

Index Fungorum number: IF811696

Classification: Magnaporthaceae, Magnaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Budhanggurabania cynodonticola* P. Wong, Khemmuk & R.G. Shivas, Persoonia 34: 241 (2015)

Sexual morph: Introduced as holomorph.

Disease symptoms: Root rot.

Sequence data: *Budhanggurabania cynodonticola* (BRIP 59305, LSU: NG_058678, ITS: NR_137952, SSU: KP162130)

Notes: The asexual morph of this genus is characterized by hyaline, branched conidiophores, phialidic, hyaline conidiogenous cells, aseptate, hyaline, cylindrical, slightly curved conidia aggregated in slimy heads (Crous et al., 2015b). References: (Crous et al., 2015b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Bulbomicroidium Marm., Siahaan, S. Takam. & U. Braun, Mycoscience 59 (1): 3 (2017)

Index Fungorum number: IF820341

Classification: Erysiphaceae, Helotiales, Leotiomycetidae, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Bulbomicroidium bauhiniicola* (U. Braun & Dianese) Marm., Siahaan, S. Takam. & U. Braun, Mycoscience 59 (1): 3 (2017)

Sexual morph: Unknown.

Sequence data: *Bulbomicroidium bauhiniicola* (MUMH 6844, LSU and ITS: LC222311)

Notes: *Bulbomicroidium* was established by Marmolejo et al. (2018) and is *Microidium*-like but differs from *Microidium* by phylogenetic difference and having conidiophores with a distinct basal swelling. Phylogenetically, *Bulbomicroidium* was shown to be nested within the family Erysiphaceae (Helotiales, Leotiomycetidae, Leotiomycetes) (Figure 2.1). References: (Marmolejo et al., 2018) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Bullanockia Crous, Persoonia 37: 327 (2016)

Index Fungorum number: IF819077

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Bullanockia australis* Crous, Persoonia 37: 327 (2016)

Sexual morph: Unknown.

Sequence data: *Bullanockia australis* (CPC 28976 = CBS 142093, LSU: NG_058712, ITS: NR_153645)

Notes: It is acremonium-like and characterized by mononematous, septate, subcylindrical conidiophores, phialidic, terminal, hyaline conidiogenous cells, and solitary, granular to guttulate, subcylindrical, hyaline conidia (Crous et al., 2016a). Conidia aggregating in slimy mass or in chain (Crous et al., 2016a). References: (Crous et al., 2016a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Cacumisporium Preuss, Linnaea 24: 130 (1851)

Index Fungorum number: IF7461

Classification: Ascomycota genera *incertae sedis*

Type species: *Cacumisporium tenebrosum* Preuss, Linnaea 24: 130 (1851)

Sexual morph: *Chaetosphaeria* (Réblová & Gams, 1999; Seifert et al., 2011).

Sequence data: *Cacumisporium capitatum* (FMR 11339, ITS: HF677176)

Notes: *Cacumisporium* is characterized by having macronematous, mononematous, unbranched, percurrent, brown conidiophores, with phialidic and holoblastic, terminal, integrated, annellidic or sympodial inside collarettes, cylindrical, brown conidiogenous cells, producing septate, straight or curved, obovoidal or ellipsoidal or cylindrical, hyaline or brown conidia aggregated in slimy mass (Réblová & Gams, 1999; Tsui et al., 2001b). Phylogenetic position for *Cacumisporium* is unresolved due to lack of LSU sequence data. References: (Réblová & Gams, 1999; Tsui et al., 2001b; Xu et al., 2019) (morphology), (Wijayawardene et al., 2020) (outline).

Cadophora Lagerb. & Melin, Svenska Skogsvårdsföreningens Tidskrift 2 (2-4): 263 (1928)

Index Fungorum number: IF7462

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Cadophora fastigiata* Lagerb. & Melin, Svenska Skogsvårdsföreningens Tidskrift 2 (2-4): 263 (1928)

Sexual morph: *Mollisia*, *Pseudopezicula*, *Pyrenopeziza* (Seifert et al., 2011).

Sequence data: *Cadophora gregata* (CBS 132.51 = ATCC 11073 = DSM 3716 = MUCL 9703 = UAMH 11045, LSU: NG_067355, ITS: NR_159767, SSU: NG_065712)

Notes: *Cadophora* is characterized by having mononematous, branched, sometimes reduced, hyaline to brown conidiophores, with phialidic with conspicuous collarette, hyaline to brown conidiogenous cells, producing aseptate, hyaline to subhyaline conidia in slimy mass (Seifert et al., 2011). Phylogenetically, *Cadophora* was shown to be nested within the family Ploettnerulaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Bien & Damm, 2020; Chen et al., 2010; Day et al., 2012; Travadon et al., 2015) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Caeruleomyces Stalpers, Karstenia 40: 177 (2000)

Index Fungorum number: IF28445

Classification: Hymenochaetales genera *incertae sedis*, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Caeruleomyces verae* Stalpers, Karstenia 40: 177 (2000)

Sexual morph: Unknown.

Synanamorphs: Producing arthroconidia and chlamydospores (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Caeruleomyces* was established by Stalpers (2000) to accommodate *Sporotrichum azureum* Wright & Arx. It has mononematous, branched, thin-walled, clamped, hyaline conidiophores, with ?monoblastic, hyaline conidiogenous cells and produces solitary, aseptate, terminal, thin-walled, ellipsoid to pyriform, hyaline conidia (Stalpers, 2000). Phylogenetic position for *Caeruleomyces* is unresolved due to lack of sequence data. References: (Stalpers, 2000) (morphology), (Wijayawardene et al., 2020) (outline).

Calcarispora Marvanová & Marvan, Cas. Slez. Mus., Ser. A, Hist. Nat.: 109 (1963)

Index Fungorum number: IF7463

Classification: Ascomycota genera *incertae sedis*

Type species: *Calcarispora hiemalis* Marvanová & Marvan, Cas. slezsk. Mus. Opave: 109 (1963)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted. Phylogenetic position for *Calcarispora* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Calcarisporiella de Hoog, Studies in Mycology 7: 68 (1974)

Index Fungorum number: IF7464

Classification: Calcarisporiellaceae, Calcarisporiellales, Calcarisporiellomycetes, Calcarisporiellomycotina, Calcarisporiellomycota

Type species: *Calcarisporiella thermophila* (H.C. Evans) de Hoog, Studies in Mycology 7: 68 (1974)

Sexual morph: Unknown.

Sequence data: *Calcarisporiella thermophila* (CBS 279.70 = ATCC 22718 = IMI 144750 = MUCL 19326, LSU: AB617741, ITS: NR_153863, SSU: NG_060996)

Notes: This genus was described by de Hoog (1974) and is characterized by conidiophores are micronematous, mononematous, reduced, hyaline conidiophores, conidiogenous cells are sympodial, hyaline, consisting of an inflated base, a narrow, filiform neck and a group of long, cylindrical conidium-bearing denticles, producing solitary, aseptate, smooth- and thin-walled, ovoidal to ellipsoidal, hyaline conidia. *Calcarisporiella* differs from other similar genera by its peculiar shape of the conidiogenous cells. Phylogenetically, representatives of *Calcarisporiella* clustered in the family Calcarisporiellaceae (Calcarisporiellales, Calcarisporiellomycetes) (Figure 2.1). References: (de Hoog, 1974; Hirose et al., 2012) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Calcarisporium Preuss, Linnaea 24: 124 (1851)

Index Fungorum number: IF7465

Classification: Calcarisporiaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Calcarisporium arbusculum* Preuss, Linnaea 24: 124 (1851)

Sexual morph: *Neobarya* (Seifert et al., 2011).

Synanamorphs: sclerotia (Seifert et al., 2011).

Sequence data: *Calcarisporium cordycipiticola* (MFLUCC 15-0686 = CGMCC 3.17905, LSU: NG_067538, ITS: KT944999, SSU: KT944998)

Notes: *Calcarisporium* was introduced by Preuss (1851) and is characterized by mononematous, verticillate, hyaline conidiophores, sympodial, denticulate conidiogenous cells, and solitary, aseptate, hyaline conidia (de Hoog, 1974; Preuss, 1851; Seifert et al., 2011; Sun et al., 2016b, 2017). Sun et al. (2017) introduced the family Calcarisporiaceae and placed this genus in the family.

References: (de Hoog, 1974; Preuss, 1851; Sun et al., 2016b, 2017) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Calceispora Matsush., Icones Microfungorum a Matsushima lectorum: 20 (1975)

Index Fungorum number: IF7466

Classification: Ascomycota genera *incertae sedis*

Type species: *Calceispora hachijoensis* Matsush., Icones Microfungorum a Matsushima lectorum: 20 (1975)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Calceispora* was established by Matsushima (1975) and it has macronematous, mononematous, solitary, unbranched, septate, brown conidiophores, with phialidic, brown conidiogenous cells and produces aseptate, with short polar appendages, subglobose to oval, hyaline conidia aggregated in slimy and white mass. Phylogenetic position for *Calceispora* is unresolved due to lack of sequence data. References: (Matsushima, 1975) (morphology), (Wijayawardene et al., 2020) (outline).

Calloria Fr., Fl. Scan.: 343 (1836)

= *Cylindrocolla* Bonord., Handbuch der allgemeinen Mykologie: 149 (1851)

Index Fungorum number: IF739

Classification: ?Calloriaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Calloria fusarioides* (Berk.) Fr., Summa vegetabilium Scandinaviae 2: 359 (1849)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Cylindrocolla* (Johnston et al., 2014).

Sequence data: *Calloria urticae* (GJ346A = MFLU 18-0696, LSU: MK591968, ITS: MK584941, SSU: MK585029)

Notes: The sexual morph of *Cylindrocolla* was reported in the genus *Calloria*, and Johnston et al. (2014) proposed to use *Calloria* over *Cylindrocolla*. Phylogenetically, *Calloria* was shown to be nested within the order Helotiales (Leotiomycetes) (Figure 2.1). References: (Hyde et al., 2020; Seifert et al., 2011) (outline).

Calonectria De Not., Commentario della Società Crittogamologica Italiana 2 (3): 477 (1867)

= *Cylindrocladium* Morgan, Botanical Gazette Crawfordsville 17: 191 (1892)

Index Fungorum number: IF746

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Calonectria daldiniana* De Not., Commentario della Società Crittogamologica Italiana 2 (3): 477 (1867)

Sexual morph: holomorphic description see Lombard et al. (2015).

Disease symptoms: black rot, blight disease, stem cankers, crown rot, leaf blight, leaf spots, stem lesions, root rot, (Cech et al., 2010; Lombard et al., 2010; Ma et al., 2004; Pan et al., 2009; Pei et al., 2015; Perez-Sierra et al., 2006; Polizzi et al., 2009a; Polizzi et al., 2009b; Polizzi et al., 2006; Saurat et al., 2012; Vitale et al., 2008; Vitale & Polizzi, 2008)

Sequence data: *Calonectria naviculata* (CBS 101121 = CMW 30974, LSU: GQ280722, ITS: GQ280600)

Notes: The asexual morph of *Calonectria* is *Cylindrocladium* (Seifert et al., 2011). References: (Crous et al., 2006a; Lombard et al., 2009, 2010, 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Caloscypha Boud., Bulletin de la Société Mycologique de France 1: 103 (1885)

= *Geniculodendron* G.A. Salt, Transactions of the British Mycological Society 63 (2): 339 (1974)

Index Fungorum number: IF752

Classification: Caloscyphaceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Caloscypha fulgens* (Pers.) Boud., Bulletin de la Société Mycologique de France 1: 103 (1885)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Geniculodendron* (Healy et al., 2016).

Sequence data: *Caloscypha fulgens* (OSC 100062 = AFTOL-ID 152 = DJ 053103-2, LSU: DQ247799, ITS: DQ491483, SSU: DQ247807)

Notes: *Geniculodendron* was introduced by Salt (1974) and is characterized by having mononematous, septate, branched or verticillate conidiophores, with polyblastic, sympodial, hyaline conidiogenous cells, producing solitary, aseptate, pyriform, hyaline conidia. The sexual morph of *Geniculodendron* was reported in the genus *Caloscypha* (Healy et al., 2016). Healy et al. (2016) proposed to protect *Caloscypha* over *Geniculodendron*. Phylogenetically, *Caloscypha* was shown to be nested within the family Caloscyphaceae (Pezizales, Pezizomycetes) (Figure 2.1). References: (Salt, 1974) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Calosphaeria Tul. & C. Tul., Selecta Fungorum Carpologia, Tomus Secundus. Xylariei - Valsei - Sphaeriei 2: 108 (1863)

= *Calosphaeriophora* Réblová, L. Mostert, W. Gams & Crous, Studies in Mycology 50 (2): 542 (2004)

Index Fungorum number: IF753

Classification: Calosphaeriaceae, Calosphaeriales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Calosphaeria princeps* Tul. & C. Tul., Selecta Fungorum Carpologia, Tomus Secundus. Xylariei - Valsei - Sphaeriei 2: 109 (1863)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Calosphaeriophora* (Réblová et al., 2004).

Sequence data: *Calosphaeria pulchella* (previous known as *Calosphaeriophora pulchella*) (CBS 115999 = AFTOL ID 5086, LSU: NG_058734, ITS: NR_145357, SSU: NG_062676)

Notes: Réblová et al. (2004) introduced the *Acremonium*-like genus *Calosphaeriophora* and linked it to the sexual morph genus *Calosphaeria*. Réblová et al. (2016a) proposed using *Calosphaeria* rather than *Calosphaeriophora*. References: (Réblová et al., 2004) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Calostilbe Sacc. & P. Syd., Sylloge Fungorum 16: 591 (1902)

= ***Calostilbella*** Höhn., Berichte der Deutschen Botanischen Gesellschaft 37: 160 (1919)

Index Fungorum number: IF758

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Calostilbe striispora* (Ellis & Everh.) Seaver, Mycologia 20 (4): 248 (1928)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph, holomorphic description see Lombard et al. (2015).

Sequence data: *Calostilbe striispora* (CBS 133491, LSU: KM231653, ITS: KM231789)

Notes: The asexual morph of *Calostilbe* was reported in *Calostilbella* (Seifert et al., 2011). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Camillea Fr., Summa vegetabilium Scandinaviae 2: 382 (1849)

= *Xylocladium* P. Syd. ex Lindau, Die natürlichen Pflanzenfamilien nebst ihren Gattungen und wichtigeren Arten insbesondere den Nutzpflanzen : I. Tl., 1. Abt.: Fungi (Eumycetes): 494 (1900)

Index Fungorum number: IF777

Classification: Graphostromataceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Camillea leprieurii* (Mont.) Mont., Annales des Sciences Naturelles Botanique sér. 4, 3: 112 (1855)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genera *Geniculosporium*, *Nodulisporium*, *Xylocladium* (Seifert et al., 2011).

Sequence data: *Camillea obularia* (ATCC 28093, LSU: KY610429, ITS: AF201714)

Notes: *Xylocladium* was reported as the asexual morph of *Camillea* and has mononematous, branched, brown conidiophores with aspergilloid, and sympodial, pale brown, vesiculate conidiogenous cells, produces solitary, aseptate, hyaline conidia (Seifert et al., 2011). *Xylocladium* was treated as a synonym of *Camillea* (Wijayawardene et al., 2017a). References: (Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Camptobasidium Marvanová & Suberkr., Mycologia 82: 209 (1990)

= *Crucella* Marvanová & Suberkr., Mycologia 82: 212 (1990)

Index Fungorum number: IF25503

Classification: Camptobasidiaceae, Kriegeriales, Microbotryomycetes, Pucciniomycotina, Basidiomycota

Type species: *Camptobasidium hydrophilum* Marvanová & Suberkr., Mycologia 82: 209 (1990)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Crucella* (Marvanová & Suberkropp, 1990).

Sequence data: *Camptobasidium hydrophilum* (AL 17 = CCM 8060 = ATCC 66190, LSU: AY212991, ITS: MN626358, SSU: U75449)

Notes: *Camptobasidium* with its asexual morph *Crucella* were described by Marvanová and Suberkropp (1990) and its asexual morph has mononematous, unbranched or sparsely branched, reduced, hyaline conidiophores, with conidiogenous cells are monoblastic, hyaline, clamped near base, empty and collapsed after having produced one conidium, and producing conidia that are solitary, tetraradiate, consisting of an axis and two lateral branches. Phylogenetically, representatives of *Camptobasidium* clustered in the family Camptobasidiaceae (Kriegeriales,

Microbotryomycetes) (Figure 2.1). References: (Marvanová & Suberkropp, 1990) (morphology and phylogeny), (He et al., 2019) (outline).

Campylocarpon Halleen, Schroers & Crous, Studies in Mycology 50 (2): 448 (2004)

Index Fungorum number: IF28858

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Campylocarpon fasciculare* Schroers, Halleen & Crous, Studies in Mycology 50 (2): 448 (2004)

Sexual morph: Unknown.

Sequence data: *Campylocarpon fasciculare* (CBS 112613; CPC 3970, LSU: HM364313, ITS: AY677301)

Notes: This genus is cylindrocarpon-like. References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Campylospora Ranzoni, Farlowia 4: 373 (1953)

Index Fungorum number: IF7482

Classification: Hypocreomycetidae genera *incertae sedis*, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Campylospora chaetocladia* Ranzoni, Farlowia 4: 373 (1953)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011).

Sequence data: *Campylospora leptosoma* (CCM F-15308, ITS: NR_137070)

Notes: *Campylospora* was erected by Ranzoni (1953) for a submerged aquatic fungus and it has mononematous, unbranched, hyaline conidiophores, with ?thallic, hyaline conidiogenous cells and conidia that are solitary, hyaline, consisting of a basal cell with two divergent appendages and a lateral branch with two divergent appendages. Phylogenetic position for *Campylospora* is unresolved due to

lack of LSU sequence data. References: (Ranzoni, 1953) (morphology), (Wijayawardene et al., 2020) (outline).

Candelosynnema K.D. Hyde & Seifert, Australian Systematic Botany 5: 401 (1992)

Index Fungorum number: IF25619

Classification: Ascomycota genera *incertae sedis*

Type species: *Candelosynnema ranunculosporum* K.D. Hyde & Seifert, Australian Systematic Botany 5: 402 (1992)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Candelosynnema* was established by Hyde and Seifert (1992) and is characterized by having synnematous, lightly pigmented, determinate conidiomata, macronematous, hyaline conidiophores, with mono- or polyblastic, sympodial, hyaline conidiogenous cells, and producing conidia that are hyaline, cylindrical or oblong-ellipsoidal, with an apical, tubular appendage, aggregated in slimy mass. Phylogenetic position for *Candelosynnema* is unresolved due to lack of sequence data. References: (Hyde & Seifert, 1992) (morphology), (Wijayawardene et al., 2020) (outline).

Capsicumyces Gamundí, Aramb. & Giaiotti, Darwiniana 22 (1-3): 190 (1979)

Index Fungorum number: IF7497

Classification: Ascomycota genera *incertae sedis*

Type species: *Capsicumyces delicatus* Gamundí, Aramb. & Giaiotti, Darwiniana 22 (1-3): 190 (1979)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Capsicumyces* was introduced by Gamundi et al. (1979) and is characterized by having micronematous or semi-macronematous, mononematous, reduced, hyaline conidiophores, with monoblastic or polyblastic, integrated, intercalary, sympodial, denticulate, hyaline conidiogenous cells, and producing

solitary, aseptate, subulate, hyaline conidia. Phylogenetic position for *Capsicumyces* is unresolved due to lack of sequence data. References: (Gamundi et al., 1979) (morphology), (Wijayawardene et al., 2020) (outline).

Casaresia Gonz. Frag., Boletín de la Real Sociedad Española de Historia Natural, Biologica: 112 (1920)

Index Fungorum number: IF7501

Classification: Ascomycota genera *incertae sedis*

Type species: *Casaresia sphagnorum* Gonz. Frag., Boln de la Real Soc. Españ. Hist. Nat., Madrid: 113 (1920)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted. Phylogenetic position for *Casaresia* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Castanediella Hern.-Restr., Crous & M.J. Wingf., Persoonia 34: 187 (2015)

Index Fungorum number: IF811878

Classification: Castanediellaceae, Amphisphaeriales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Castanediella acaciae* Crous, Hern.-Restr. & M.J. Wingf., Persoonia 34: 187 (2015)

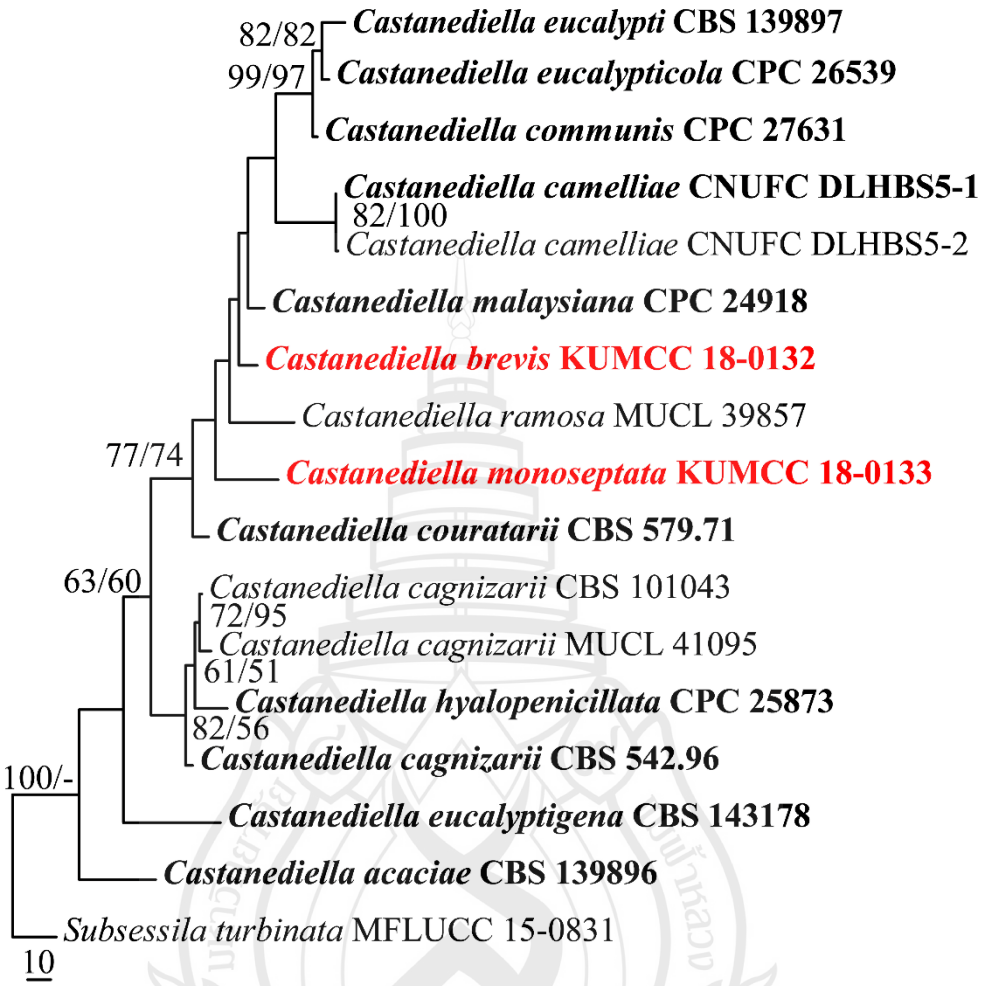
Sexual morph: Unknown.

Disease symptoms: Leas spots

Sequence data: Sequence data for ex-type culture of type species is available. Ex-type: CBS 139896; CPC 24869: LSU: NG_067293, ITS: NR_137985

Notes: Hernández-Restrepo et al. (2017) introduced the family *Castanediellaceae* for the genus *Castanediella* within Xylariales and consolidated in recent study by Wijayawardene et al. (2018). The asexual morphs in *Castanediellaceae* are hyphomycetous and characterized by macronematous, mononematous or sporodochial, branched, brown to pale brown conidiophores, with monoblastic or polyblastic, sympodial, discrete, cylindrical to lageniform, hyaline to subhyaline conidiogenous cells, that produce unicellular or transversely septate,

cylindrical, fusiform or lunate, hyaline conidia (Hernández-Restrepo et al., 2017). The genus *Castanediella* was established by Crous et al. (2015b) to accommodate *C. acaciae*, *C. cagnizarii* and *C. ramosa* within *Xylariales* genera *incertae sedis*. The genus contains twelve species (Costa et al., 2018; Wanasinghe et al., 2018). The asexual morphs of the genus are hyphomycetous and characterized by macronematous, mononematous or sporodochial, branched, pale brown to brown conidiophores, with monoblastic or polyblastic, sympodial, discrete, cylindrical to lageniform, hyaline to subhyaline conidiogenous cells, that produce 0-3-septate, falcate, cylindrical, or fusiform, hyaline conidia (Lin et al., 2019a). A comparison of the similar genera is provided by Lin et al. (2019a). References: (Costa et al., 2018; Crous et al., 2015b, 2016a, 2016b, 2017a; Hernández-Restrepo et al., 2016a, 2016c, 2017; Lin et al., 2019a; Wanasinghe et al., 2018) (morphology and phylogeny)



Note Phylogenetic tree generated from MP analysis based on combined LSU and ITS sequence data for the genus *Castanediella*. Bootstrap support values for maximum parsimony (MP, first set) and maximum likelihood (ML, second set) greater than 50% are indicated above or below the nodes. Ex-type strains are in bold, the new isolates are in red. The tree is rooted with *Subsessila turbinata* (MFLUCC 15-0831).

Figure 2.7 Phylogenetic tree for the genus *Castanediella*

Castanediella brevis C.G. Lin & K.D. Hyde, *sp. nov.* (Figure 2.2 and Figure 2.3)

MycoBank number: MB 828879; *Facesoffungi number*: FoF 04929

Holotype. THAILAND. Lampang: Amphoe Mueang Pan, Tambon Chae Son, on decaying leaves, 24 September 2016, Chuangen Lin, LCG 10-1 (MFLU 18-1695, holotype; HKAS 102198, isotype), ex-type living cultures KUMCC 18-0132.

GenBank number. ITS: MH806361, LSU:MH806358

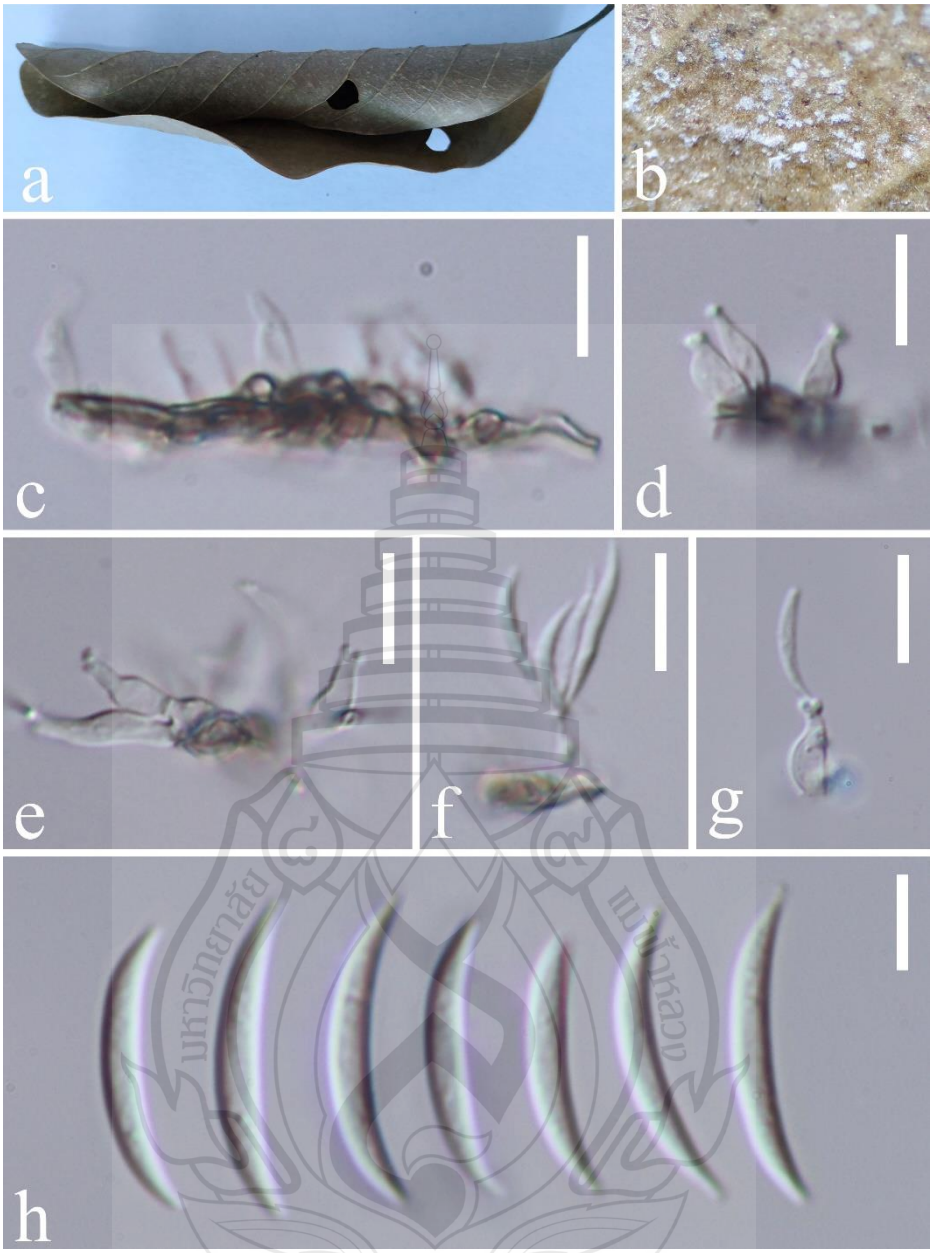
Etymology. In reference to the short conidiophores.

Saprobic on plant host. **Asexual morph:** *Colonies* on substrate effuse, white. *Mycelium* partly superficial, composed of septate, branched, smooth, hyaline to subhyaline hyphae. *Conidiophores* macronematous, mononematous, solitary, erect, unbranched, straight or flexuous, short, 0–1-septate, hyaline, subcylindrical, ampulliform, smooth, often reduced to conidiogenous cells. *Conidiogenous cells* holoblastic, polyblastic, sympodial, integrated, terminal, subcylindrical, ampulliform, hyaline, with 2–4 tiny protuberant scars, 3–14 × 1.5–5.5 μm. *Conidia* solitary, dry, acropleurogenous, simple, smooth, fusiform, curved, aseptate, hyaline, 12.5–21.7 × 1.2–3 μm (av. 16.95 × 2.2 μm, n = 60). **Sexual morph**: Undetermined.

Culture characteristics: Conidia germinating on PDA within 24 h. Colonies on PDA effuse, greyish white to dark from above and below, reaching a diam. of 5–7 cm in 30 days at 25 °C.

Notes. Based on a megablast search of the NCBI nucleotide database using the ITS sequence of the ex-type culture, the highest similarities found were with *Castanediella malysiana* (GenBank NR_154810; identities = 526/537(98%), gaps = 1/537(0%)) and *C. couratarii* (GenBank KX960789; identities = 521/538(97%), gaps = 3/538(0%)). *Castanediella brevis* differs from these two species by its conidiophore morphology. *Castanediella couratarii* has pale brown conidiophores and longer conidiogenous cells (10.5–37 × 2–3.5 μm) whereas *C. malysiana* has pale brown and longer conidiophores (76–157 × 2.5–3 μm).

Among the species that produce more or less falcate and aseptate conidia, *Castanediella communis*, *C. eucalypti*, *C. eucalypticola* and *C. eucalyptigena* are most similar to *C. brevis*. However, *Castanediella brevis* differs from these species by its short, unbranched and 0–1-septate conidiophores.



Note *Castanediella brevis* (MFLU 18-1695, holotype) **a** Host material. **b** Conidiophores on the host surface. **c–g** Conidiophores, conidiogenous cells with conidia. **h** Conidia. Scale bars: c–g = 10 μm, h = 5 μm.

Figure 2.8 *Castanediella brevis* (MFLU 18-1695, holotype)

Castanediella monoseptata C.G. Lin & K.D. Hyde, *sp. nov.* (Figure 2.4)

MycoBank number: MB 828881; *Facesoffungi number*: FoF 04930

Holotype: THAILAND. Chiang Mai: on decaying leaves, 24 August 2016, Chuangen Lin, MRC 3-1 (MFLU 18-1696, holotype; HKAS 102199, isotype), ex-type living cultures KUMCC 18-0133.

GenBank number. ITS: MH806360, LSU: MH806357

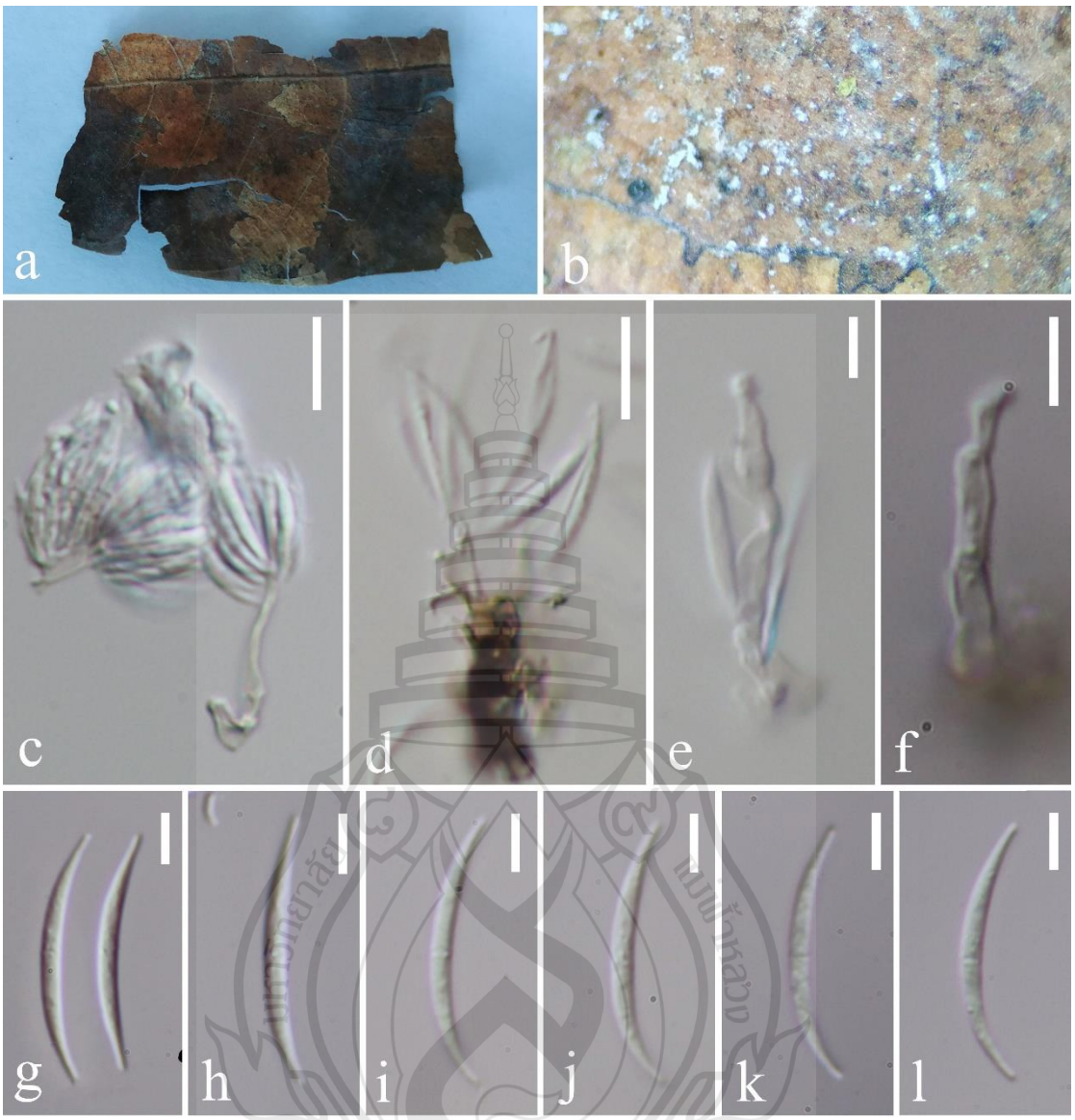
Etymology: In reference to the 0–1-septate conidia

Saprobic on plant host. **Asexual morph:** *Colonies* on substrate effuse, white. *Mycelium* partly superficial, composed of septate, branched, hyaline to subhyaline, smooth hyphae. *Conidiophores* macronematous, mononematous, solitary, erect, unbranched, straight or flexuous, septate, hyaline, subcylindrical, smooth, 8–29 × 2–4 μm. *Conidiogenous cells* polyblastic, integrated, sympodial, subcylindrical, hyaline, with several scars. *Conidia* solitary, dry, acropleurogenous, simple, smooth, fusiform, curved, 0–1-sepatate, hyaline, 15.4–25.8 × 1.5–2.3 μm (av. 23.03 × 1.98 μm, n = 45). **Sexual morph**: Undetermined.

Culture characteristics: Conidia germinating on PDA within 24 h. Colonies on PDA effuse, greyish white to dark from above and below, reaching a diam. of 5–7 cm in 30 days at 25 °C.

Notes. A megablast search of the NCBI nucleotide database using the ITS sequence of the ex-type culture showed the highest similarities with uncultured Sordariales fungi (GenBank GQ268569; identities = 518/539(96%), gaps = 3/539(0%)) and *Castanediella couratarii* (GenBank KX960789; identities = 516/540(96%), gaps = 4/540(0%)).

Five *Castanediella* species, *C. cagnizarii*, *C. diversispora*, *C. hyalopenicillata*, *C. malaysiana* and *C. ramosa*, were reported to produce 1-septate conidia. *Castanediella monoseptata* can be distinguished from these species by its unbranched conidiophores and falcate and 15.4–25.8 × 1.5–2.3 μm conidia. *Castanediella monoseptata* is phylogenetically closely related to *C. couratarii* and *C. ramosa*, but differs from both species by its conidial morphology. *Castanediella couratarii* has shorter conidia (9.5–19 × 2–3 μm) without septa and *C. ramosa* has larger conidia (26–44 × 2–3 μm) that are 0–3-septate.



Note *Castanediella monoseptata* (MFLU 18-1696, holotype) **a** Host material. **b** Conidiophores on the host surface. **c–f** Conidiophores, conidiogenous cells with conidia. **g–l** Conidia. Scale bars: c, d = 10 μm, e–l = 5 μm.

Figure 2.9 *Castanediella monoseptata* (MFLU 18-1696, holotype)

Catenocuneiphora Matsush., Matsushima Mycological Memoirs 10: 40 (2003)

Index Fungorum number: IF28556

Classification: Ascomycota genera *incertae sedis*

Type species: *Catenocuneiphora mucosa* Matsush., Matsushima Mycological Memoirs 10: 40 (2003)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Catenocuneiphora* was introduced by Matsushima (2003) and it has sporodochial, hyaline to pale brown conidiomata, macronematous, branched, penicillate, hyaline conidiophores, with ?polyblastic, sympodial, denticulate, hyaline conidiogenous cells, and produces aseptate, oblong or allantoid, hyaline conidia aggregated in slimy masses. Phylogenetic position for *Catenocuneiphora* is unresolved due to lack of sequence data. References: (Matsushima, 2003) (morphology), (Wijayawardene et al., 2020) (outline).

Catenosubulispora Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 10 (1971)

Index Fungorum number: IF7505

Classification: Ascomycota genera *incertae sedis*

Type species: *Catenosubulispora honiaraensis* Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 10 (1971)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Catenosubulispora* was established by Matsushima (1971) and is characterized by having macronematous, mononematous, unbranched, brown conidiophores, with sympodial, denticulate conidiogenous cells, and producing catenate, septate, long subulate or filiform, hyaline to subhyaline conidia. Phylogenetic position for *Catenosubulispora* is unresolved due to lack of sequence data. References: (Matsushima, 1971) (morphology), (Wijayawardene et al., 2020) (outline).

Catenularia Grove, Sylloge Fungorum 4: 303 (1886)

Index Fungorum number: IF7506

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Catenularia simplex* Grove, Sylloge Fungorum 4: 303 (1886)

Sexual morph: *Chaetosphaeria* (Seifert et al., 2011).

Sequence data: *Catenularia cubensis* (MFLUCC 18-1331, LSU: MK835840, ITS: MK828638)

Notes: *Catenularia* is characterized by setae are none or unbranched, brown, conidiophores are macronematous, mononematous, unbranched, brown, percurrent, conidiogenous cells are phialidic, brown, with collarettes, conidia are catenate, aseptate, hyaline to brown (Seifert et al., 2011). References: (Seifert et al., 2011) (morphology), (Lin et al., 2019b) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Catenulocercospora C. Nakash., Videira & Crous, Studies in Mycology 87: 303 (2017)

Index Fungorum number: IF822580

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Catenulocercospora fusimaculans* (G.F. Atk.) C. Nakash., Videira & Crous, Studies in Mycology 87: 303 (2017)

Sexual morph: Unknown.

Sequence data: *Catenulocercospora fusimaculans* (CPC 17277, LSU: KF251817, ITS: KF251313)

Notes: *Catenulocercospora* was established by Videira et al. (2017) and is characterized by macronematous or micronematous, mononematous, straight to geniculate-sinuous, brown conidiophores, with mono- or polyblastic, integrated conidiogenous cells, producing solitary or catenate, septate, obclavate or cylindrical to filiform, hyaline conidia. Phylogenetically, *Catenulocercospora* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae,

Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Ceeveesubramaniomyces Pratibha, K.D. Hyde & Bhat, Kavaka 32: 21 (2005)

Index Fungorum number: IF522503

Classification: Ascomycota genera *incertae sedis*

Type species: *Ceeveesubramaniomyces litseae* Pratibha, K.D. Hyde & Bhat, Kavaka 32: 22 (2005)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ceeveesubramaniomyces* was established by Pratibha et al. (2004) and is characterized by having macronematous, mononematous, septate, setiform, branched, hook-like, hyaline to brown conidiophores, with monophialidic, discrete, ampulliform to lageniform conidiogenous cells, producing aseptate, endogenous, allantoid, hyaline conidia aggregated in slimy mass. Phylogenetic position for *Ceeveesubramaniomyces* is unresolved due to lack of sequence data. References: (Pratibha et al., 2004) (morphology), (Wijayawardene et al., 2020) (outline).

Celosporium Tsuneda & Davey, Botany 88: 472 (2010)

Index Fungorum number: IF518301

Classification: Neocelosporiaceae, Dothideales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Celosporium laricicola* Tsuneda & M.L. Davey, Botany 88: 473 (2010)

Sexual morph: Unknown.

Sequence data: *Celosporium laricicola* (UAMH 11008 = L3-1, LSU: FJ997288, ITS: FJ997287)

Notes: *Celosporium* was established by Tsuneda et al. (2010) to accommodate an endoconidial and black meristematic fungus *C. laricicola*. *Celosporium* is characterized by having conidiomata consist of black cellular clumps, conidia are aseptate or 1-2-septate, endogenous, hyaline becoming pigmented as age

(Tsuneda et al., 2010). Phylogenetically, *Celosporium* was shown to be nested within the family Neocelosporiaceae (Dothideales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Tsuneda et al., 2010) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Cenangiomyces Dyko & B. Sutton, Transactions of the British Mycological Society 72 (3): 411 (1979)

Index Fungorum number: IF7515

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Cenangiomyces luteus* Dyko & B. Sutton, Transactions of the British Mycological Society 72 (3): 411 (1979)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Cenangiomyces* was established by Dyko and Sutton (1979) and it has sporodochial, cupulate, erumpent, separate, pale conidiomata, branched, septate, clamped, hyaline conidiophores, and integrated, percurrent or sympodial, with clamp-connexions, hyaline conidiogenous cells, and produces septate, filiform to subulate, hyaline conidia with appendages. Phylogenetic position for *Cenangiomyces* is unresolved due to lack of sequence data. References: (Dyko & Sutton, 1979) (morphology), (Wijayawardene et al., 2020) (outline).

Ceratocladium Corda, Pracht - Flora. Europaeischer Schimmel-Bildungen: 41 (1839)

Index Fungorum number: IF7530

Classification: Xylariales genera incertae sedis, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: ***Ceratocladium microspermum*** Corda, Pracht - Flora. Europaeischer Schimmel-Bildungen: 40 (1839)

Sexual morph: Unknown.

Sequence data: *Ceratocladium polysetosum* (FMR 10750, LSU: NG_059024, ITS: NR_154849, SSU: NG_065578)

Notes: It is characterized by branched, circinate setae, macronematous conidiophores encasing the lower part of the setae, polyblastic, discrete, sympodial or percurrent conidiogenous cells, and solitary, aseptate or multiseptate, straight or curved, cylindrical, hyaline conidia (Sushma et al., 2021). References: (Sushma et al., 2021) (morphology), (Hernández-Restrepo et al., 2017)(phylogeny)

Cercospora Fresen. ex Fuckel, Fungi Rhenani Exsiccati Fasc. 2: no. 117 (1863)

Index Fungorum number: IF7545

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Cercospora apii* Fresen., Beiträge zur Mykologie 3: 91 (1863)

Sexual morph: *Mycosphaerella*, *Sphaerulina*, ?*Didymella* (Seifert et al., 2011).

Sequence data: *Cercospora apii* (CBS 116455 = CPC 11556, LSU: NG_069525, ITS: NR_119525)

Notes: *Cercospora* is characterized by macronematous, mononematous, solitary or fasciculate, unbranched or rarely branched, hyaline to pigmented conidiophores, and polyblastic with conspicuous scars, integrated, sympodial, subhyaline or brown conidiogenous cells, producing solitary or catenate, multi-euseptate, obclavate-cylindrical, acicular, filiform, hyaline or pale brown conidia (Ellis, 1971; Videira et al., 2017). Phylogenetically, *Cercospora* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Ellis, 1971; Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Cercosporella Sacc., Michelia 2 (6): 20 (1880)

Index Fungorum number: IF7546

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Cercosporella virgaureae* (Thüm.) Allesch., Hedwigia 34: 286 (1895)

Sexual morph: *Mycosphaerella*, *Heterosphaeria* (Seifert et al., 2011).

Disease symptoms: Leas spots (Videira et al., 2017)

Sequence data: *Cercosporella catenulata* (CBS 355.73, LSU: NG_058949, ITS: NR_153920)

Notes: *Cercosporella* was introduced by Saccardo (1880) and is characterized by mononematous, unbranched, fasciculate, hyaline to subhyaline conidiophores, with polyblastic, integrated, terminal, sympodial, hyaline conidiogenous cells, producing solitary, 1- to multi-septate, subcylindrical to obclavate, sometimes fusiform, hyaline conidia (Videira et al., 2017). Phylogenetically, *Cercosporella* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Cerinosterus R.T. Moore, Studies in Mycology 30: 216 (1987) [MB#11043]

Index Fungorum number: IF11043

Classification: Dacrymycetaceae, Dacrymycetales, Dacrymycetes, Agaricomycotina, Basidiomycota

Type species: *Cerinosterus luteoalbus* (de Hoog) R.T. Moore, Studies in Mycology 30: 216 (1987)

Sexual morph: *Calocera*, *Cerinomyces*, *Dacrymyces*, *Femsjonia*, *Guepiniopsis* (Seifert et al., 2011).

Sequence data: *Cerinosterus luteoalbus* (CBS 208.48, LSU: MH867864, ITS: MH856312)

Notes: This genus was described by Moore (1987) and is characterized by having mononematous, unbranched or branched, hyaline conidiophores, with polyblastic, terminal and intercalary, sympodial, denticulate, hyaline conidiogenous cells, producing solitary, aseptate, hyaline conidia (Moore, 1987; Seifert et al., 2011). Stalpers et al. (2021) synonymized *Cerinosterus* under *Femsjonia*. Phylogenetically,

representative of *Cerinosterus* clustered in the family Dacrymycetaceae (Dacrymycetales, Dacrymycetes) (Figure 2.1). References: (Moore, 1987; Seifert et al., 2011) (morphology), (He et al., 2019) (outline).

Chaenothecopsis Vain., Acta Societatis pro Fauna et Flora Fennica 57 (1): 70 (1927)

= *Catenomycopsis* Tibell & Constant., Mycological Research 95 (5): 556 (1991)

Index Fungorum number: IF934

Classification: Mycocaliciaceae, Mycocaliciales, Mycocaliciomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Chaenothecopsis rubescens* Vain., Acta Societatis pro Fauna et Flora Fennica 57 (1): 71 (1927)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Catenomycopsis* (Tibell & Constantinescu, 1991).

Sequence data: *Chaenothecopsis haematopus* (= *Catenomycopsis rosea*)(CBS 173.95 = UPSC 2082, LSU: MH874148, ITS: MH862507)

Notes: The asexual morph of *Chaenothecopsis* was linked to *Catenomycopsis* (Tibell & Constantinescu, 1991). References: (Tibell & Constantinescu, 1991) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Chaetoblastophorum Morgan-Jones, Mycotaxon 5 (2): 484 (1977)

Index Fungorum number: IF7563

Classification: Ascomycota genera *incertae sedis*

Type species: *Chaetoblastophorum ingramii* Morgan-Jones, Mycotaxon 5 (2): 485 (1977)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Chaetoblastophorum* was established by Morgan-Jones (1977) and it has septate, brown setae, macronematous, aggregated in fascicles, unbranched, brown conidiophores, with polyblastic, terminal, sympodial conidiogenous cells and produces solitary, continuous, cylindrical, hyaline conidia. Phylogenetic position for

Chaetoblastophorum is unresolved due to lack of sequence data. References: (Morgan-Jones, 1977) (morphology), (Wijayawardene et al., 2020) (outline).

Chaetochalara B. Sutton & Piroz., Transactions of the British Mycological Society 48 (3): 350 (1965)

Index Fungorum number: IF7564

Classification: Ascomycota genera *incertae sedis*

Type species: *Chaetochalara bulbosa* B. Sutton & Piroz., Transactions of the British Mycological Society 48 (3): 351 (1965)

Sexual morph: Unknown.

Sequence data: *Chaetochalara africana* (HKUCC OC0018, LSU: FJ176249, SSU: FJ176278); *Chaetochalara aspera* (HKUCC OC0004, LSU: FJ176244, SSU: FJ176271)

Notes: *Chaetochalara* was established by Sutton and Pirozynski (1965) and is characterized by having unbranched, brown setae, mononematous, reduced conidiophores, phialidic with deep cylindrical collarettes, hyaline to brown conidiogenous cells, producing catenate, aseptate or septate, cylindrical, hyaline conidia. *Chaetochalara* is *Chalara*-like, but differs by having unbranched and brown setae next to conidiophores. Phylogenetically, *Chaetochalara* was shown to be nested within the order Helotiales (Leotiomycetes) (Figure 2.1). References: (Cai et al., 2009; Sutton & Pirozynski, 1965) (morphology and phylogeny).

Chaetodochium Höhn., Mitt. bot. Inst. tech. Hochsch. Wien: 44 (1932)

Index Fungorum number: IF7573

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Chaetodochium buxi* (DC.) Höhn., Mitteil. Bot. Inst. Techn. Hochsch. Wien: 45 (1932)

Sexual morph: *Pseudonectria* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Chaetodochium* was synonymized under *Pseudonectria* Seaver (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology), (Wijayawardene et al., 2020) (outline).

Chaetopsina Rambelli, Atti della Accademia delle Scienze dell'Istituto di Bologna 11: 5 (1956)

= *Chaetopsinectria* J. Luo & W.Y. Zhuang, Mycologia 102 (4): 979 (2010)

Index Fungorum number: IF7584

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Chaetopsina fulva* Rambelli, Atti della Accademia delle Scienze dell'Istituto di Bologna 11: 5 (1956)

Sexual morph: *Chaetopsinectria* (Lombard et al., 2015).

Sequence data: *Chaetopsina fulva* (CBS 142.56 = IMI 062199, LSU: NG_070573, ITS: NR_145061)

Notes: The asexual morph of *Chaetopsina* is characterized by setae are absent or unbranched, brown extension of conidiophores, with fertile region at the mid part, conidiophores are branched, arising from setae, conidiogenous cells are monophialidic or polyphialidic, hyaline, and conidia are aseptate, guttulate, subcylindrical, hyaline. References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Chaetopsis Grev., Edinburgh Philos. J.: 63 (1825)

Index Fungorum number: IF7585

Classification: Ascomycota genera *incertae sedis*

Type species: *Chaetopsis wauchii* Grev., Edinb. Phil. J.: 63 (1825)

Sexual morph: ?*Chaetosphaeria*.

Notes: *Chaetopsis* is characterized by having macronematous, mononematous, branched, verticillate or trichodermoid, setiform, brown conidiophores, with polyphialidic, sympodial conidiogenous cells, and producing aseptate or septate, in slimy mass, cylindrical, hyaline conidia (DiCosmo et al., 1983; Hughes, 1951; Seifert et al., 2011). Phylogenetic inference in this study showed that

representatives of this genus clustered in Reticulascaceae (Glomerellales, Sordariomycetes) and Helotiales (Leotiomycetes) (Figure 2.1). References: (DiCosmo et al., 1983; Hughes, 1951; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Chaetosphaerella E. Müll. & C. Booth, Transactions of the British Mycological Society 58 (1): 76 (1972)

= *Veramycina* Subram., Kavaka 20/21: 58 (1995)

Index Fungorum number: IF969

Classification: Chaetosphaerellaceae, Coronophorales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Chaetosphaerella phaeostroma* (Durieu & Mont.) E. Müll. & C. Booth, Transactions of the British Mycological Society 58 (1): 77 (1972)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Veramycina* (Seifert et al., 2011).

Sequence data: *Chaetosphaerella phaeostroma* (S.M.H. 4257, LSU: AY695264)

Notes: Phylogenetically, representatives of *Chaetosphaerella* clustered in the family Chaetosphaerellaceae, Coronophorales, Sordariomycetes (Figure 2.1). References: (Wijayawardene et al., 2020) (outline).

Chalara (Corda) Rabenh., Deutschlands Kryptogamenflora 1: 38 (1844)

Index Fungorum number: IF7601

Classification: Pezizellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

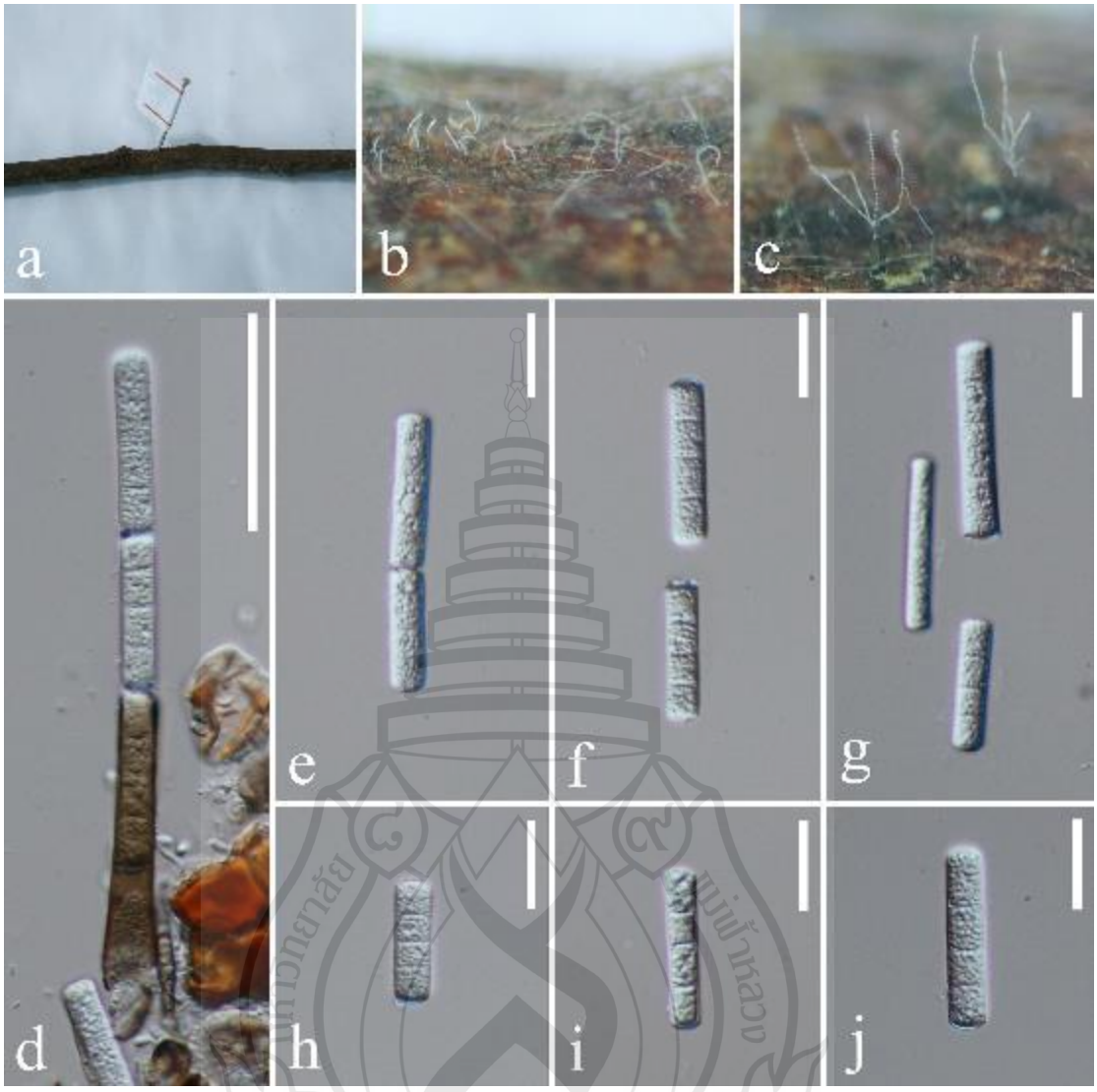
Type species: *Chalara fusidioides* (Corda) Rabenh., Deutschlands Kryptogamenflora 1: 38 (1844)

Sexual morph: ?*Allophylaria*, *Ascochalara*, *Bioscypha*, *Calycellina*, *Chaetosphaeria*, *Chlorociboria*, *Cryptendoxyla*, *Hymenoscyphus*, *Lanzia*, *Melanochaeta*, *Mollisina*, *Phaeoscypha*, *Phialea*, *Pyxidiophora*, *Quasiconcha*, *Velutaria* (Seifert et al., 2011).

Synanamorphs: *Seychellomyces*, *Sporoschisma* (Seifert et al., 2011)

Sequence data: *Chalara hyalina* (CBS 558.92, LSU: MH874039, SSU: AF222509)

Notes: *Chalara* is characterized by having unbranched or branched, sometimes reduced, brown conidiophores, with phialidic with deep cylindrical collarettes, hyaline or brown conidiogenous cells, producing catenate, aseptate to multi-septate, cylindrical, hyaline to subhyaline conidia (Seifert et al., 2011). Phylogenetically, *Chalara* were shown to be located in the order Helotiales and are paraphyletic (Figure 2.1). References: (Cai et al., 2009; Koukol, 2011; Kowalski & Holdenrieder, 2009; Kraj et al., 2012; McKenzie et al., 2002; Paulin-Mahady et al., 2002; Pratibha et al., 2005) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).



Note *Chalara* sp. (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-19). **a** Host material. **b, c** Conidiophores on the host surface. **d** Conidiophores. **e–j** Conidia. Scale bars: **d** = 50 μm, **e–J** = 20 μm.

Figure 2.10 *Chalara* sp.

Chalarodendron C.J.K. Wang & B. Sutton, Mycologia 76 (3): 569 (1984)

Index Fungorum number: IF25792

Classification: Ascomycota genera *incertae sedis*

Type species: *Chalarodendron fuscum* C.J.K. Wang & B. Sutton, Mycologia 76 (3): 569 (1984)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Chalarodendron* was introduced by Wang and Sutton (1984) and it has synnematous, unbranched, brown to black conidiomata, macronematous, unbranched, pale brown conidiophores, and phialidic, with long, tubular collarettes, terminal, pale brown conidiogenous cells, produces catenate, aseptate, endogenous, rectangular, hyaline conidia. Phylogenetic position for *Chalarodendron* is unresolved due to lack of sequence data. References: (Wang & Sutton, 1984) (morphology), (Wijayawardene et al., 2020) (outline).

Chalarodes McKenzie, Mycotaxon 42: 89 (1991)

Index Fungorum number: IF11294

Classification: Ascomycota genera *incertae sedis*

Type species: *Chalarodes bisetis* McKenzie, Mycotaxon 42: 91 (1991)

Sexual morph: Unknown.

Sequence data: *Chalarodes obpyramidata* (PDD 119364, LSU: MW987823, ITS: MW987828)

Notes: *Chalarodes* was introduced by McKenzie (1991) and is characterized by having mononematous, solitary, unbranched, septate, brown conidiophores, with monophialidic, integrated, terminal conidiogenous cells, and producing catenate, endogenous, aseptate, obconical, hyaline conidia with two setulae at the distal end. Phylogenetically, representatives of *Chalarodes* clustered in the family Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetes (Figure 2.1). References: (McKenzie, 1991) (morphology), (Wijayawardene et al., 2020) (outline).

Chantransiopsis Thaxt., Botanical Gazette Crawfordsville 58: 246 (1914)

Index Fungorum number: IF7603

Classification: Ascomycota genera *incertae sedis*

Type species: *Chantransiopsis decumbens* Thaxt., Botanical Gazette Crawfordsville 58: 246 (1914)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Chantransiopsis* was introduced by Thaxter (1914) for three entomophilous fungi. Phylogenetic position for *Chantransiopsis* is unresolved due to lack of sequence data. References: (Thaxter, 1914) (morphology), (Wijayawardene et al., 2020) (outline).

Cheiromycina B. Sutton, Nordic Journal of Botany 6 (6): 831 (1986)

Index Fungorum number: IF25026

Classification: Malmideaceae, Lecanorales, Lecanoromycetidae, Lecanoromycetes, Pezizomycotina, Ascomycota

Type species: *Cheiromycina flabelliformis* B. Sutton, Nordic Journal of Botany 6 (6): 834 (1986)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Cheiromycina* was introduced by Sutton and Muhr (1986) and it has sporodochial, eustromatic conidiomata, macronematous, irregularly branched, septate, hyaline conidiophores, with monoblastic to polyblastic, integrated, terminal, lateral or intercalary, hyaline conidiogenous cells, and produces septate, flabelliform to palmate, hyaline to pale brown conidia. References: (Aptroot & Schiefelbein, 2003; Kukwa et al., 2017; Muggia et al., 2017; Printzen, 2007; Sutton & Muhr, 1986) (morphology), (Wijayawardene et al., 2020) (outline).

Chikaneea B. Sutton, Mycological Papers 132: 29 (1973)

Index Fungorum number: IF7617

Classification: Ascomycota genera *incertae sedis*

Type species: *Chikaneea holleroniae* B. Sutton, Mycological Papers 132: 30 (1973)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Chikaneea* was established by Sutton (1973a) and it has macronematous, mononematous, unbranched, septate, hyaline or pale brown conidiophores, with polyblastic, integrated, terminal conidiogenous cells, and produces solitary or catenate, multi-septate, guttulate, cymbiform, hyaline conidia. Phylogenetic position for *Chikaneea* is unresolved due to lack of sequence data. References: (Sutton, 1973a) (morphology), (Wijayawardene et al., 2020) (outline).

Chionomyces Deighton & Piroz., Mycological Papers 128: 74 (1972)

Index Fungorum number: IF7619

Classification: Dothideomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Chionomyces meliolicola* (Cif.) Deighton & Piroz., Mycological Papers 128: 75 (1972)

Sexual morph: *Melioliphila* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Chionomyces* was established by Deighton and Pirozynski (1972) and is characterized by having mononematous, unbranched, hyaline conidiophores, with percurrent and sympodial, hyaline conidiogenous cells, and producing solitary, multi-septate, rostrate, fusiform, navicular or obclavate, hyaline conidia. Phylogenetic position for *Chionomyces* is unresolved due to lack of sequence data. References: (Deighton & Pirozynski, 1972) (morphology), (Wijayawardene et al., 2020) (outline).

Chlamydocillium Zare & W. Gams, Mycological Progress 15: 1018 (2016)

Index Fungorum number: IF815500

Classification: Sarocladiaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Chlamydocillium cyanophilum* Zare & W. Gams, Mycological Progress 15: 1020 (2016)

Sexual morph: Unknown.

Sequence data: *Chlamydocillium cyanophilum* (CBS 246.74a, LSU: KU382212, ITS: KU382145)

Notes: *Leptobacillium* was introduced by Zare and Gams (2016) and is verticillium-like. Phylogenetically, the ex-type of generic type species located in the family Sarocladiaceae (Hypocreales, Sordariomycetes). Therefore, we suggest assigned this genus in Sarocladiaceae (Hypocreales, Sordariomycetes). References: (Zare & Gams, 2016) (morphology and phylogeny).

Chlamydopsis Hol.-Jech. & R.F. Castañeda, Ceská Mykologie 40 (2): 74 (1986)

Index Fungorum number: IF25753

Classification: Ascomycota genera *incertae sedis*

Type species: *Chlamydopsis proliferans* Hol.-Jech. & R.F. Castañeda, Ceská Mykologie 40 (2): 74 (1986)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Chlamydopsis* was introduced by Holubová-Jechová and Castañeda Ruiz (1986) and only one species is accepted. Phylogenetic position for *Chlamydopsis* is unresolved due to lack of sequence data. References: (Holubová-Jechová & Castañeda Ruiz, 1986) (morphology), (Wijayawardene et al., 2020) (outline).

Chlamydosporiella Giraldo López & Crous, Studies in Mycology 92: 270 (2018)

Index Fungorum number: IF828069

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Chlamydosporiella restricta* (J.F.H. Beyma) Giraldo López & Crous, Studies in Mycology 92: 270 (2018)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Giraldo & Crous, 2019).

Sequence data: *Chlamydosporiella restricta* (CBS 178.40, LSU: NG_068570, ITS: MH856081)

Notes: *Chlamydosporiella* was introduced by Giraldo and Crous (2019) and is characterized by mononematous, bent, unbranched or basitonously branched,

hyaline conidiophores, monophialidic with short collarette, cylindrical, hyaline conidiogenous cells, and producing aseptate, in slimy mass, obovoid, widely ellipsoidal, hyaline conidia, terminal or intercalary, catenate, dark olive green chlamydospores. References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Chloridium Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 13 (1809)

= *Gonytrichum* Nees & T. Nees, Nova Acta Physico-Medica Academiae Caesareae Leopoldino-Carolinae Naturae Curiosorum 9 (1): 244 (1818)

= *Melanopsammella* Höhn., Annales Mycologici 17 (2-6): 121 (1920)

Index Fungorum number: IF7624

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

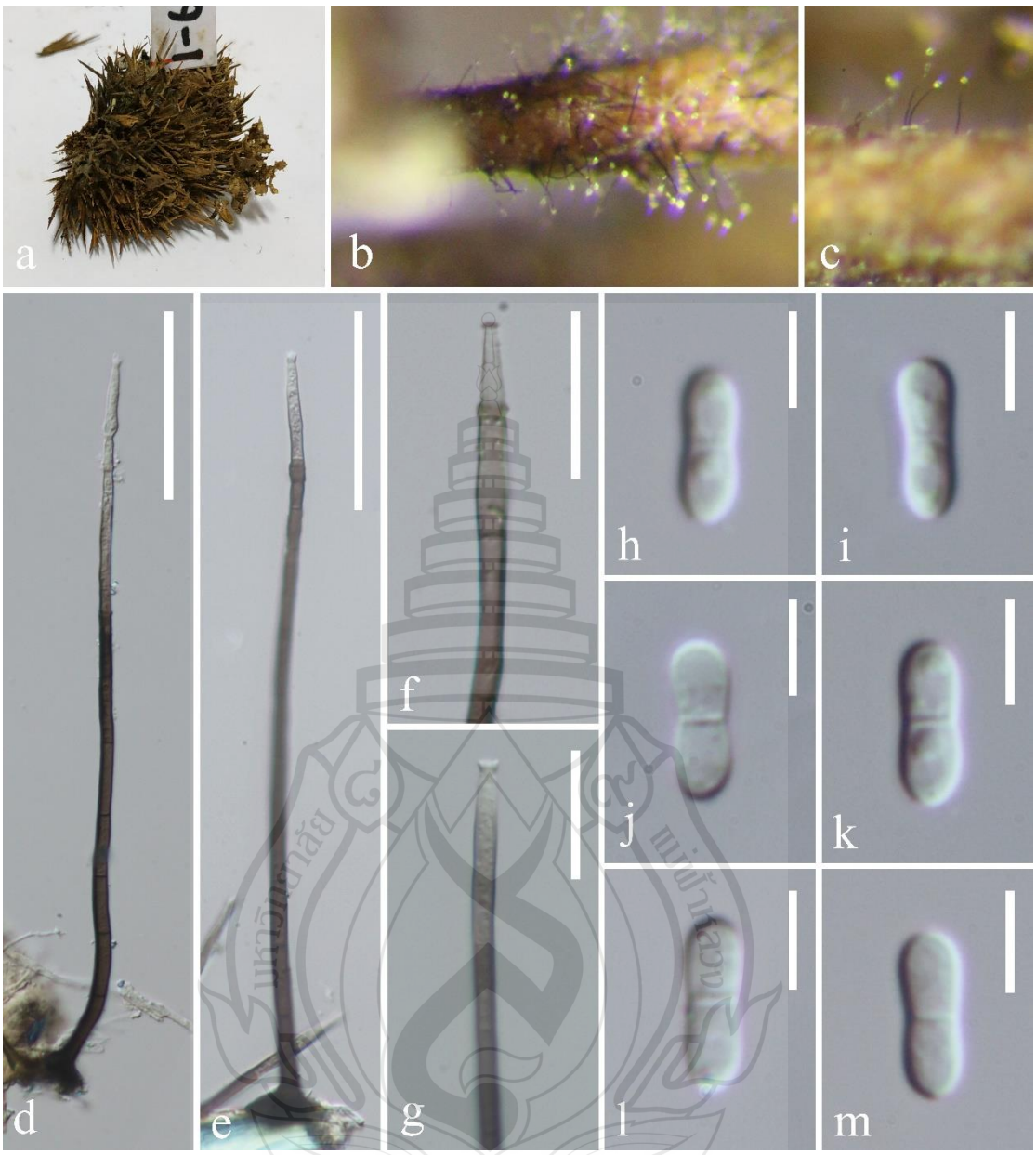
Type species: *Chloridium viride* Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 13, t. 1:16 (1809)

Sexual morph: *Chaetosphaeria*, *Melanopsammella*, *Umbrinosphaeria* (Seifert et al., 2011).

Synanamorphs: *Craspedodidymum*, *Dictyochaeta*, *Gonytrichum*, *Helicodendron*, *Phialogeniculata*, *Sporidesmium* (Seifert et al., 2011).

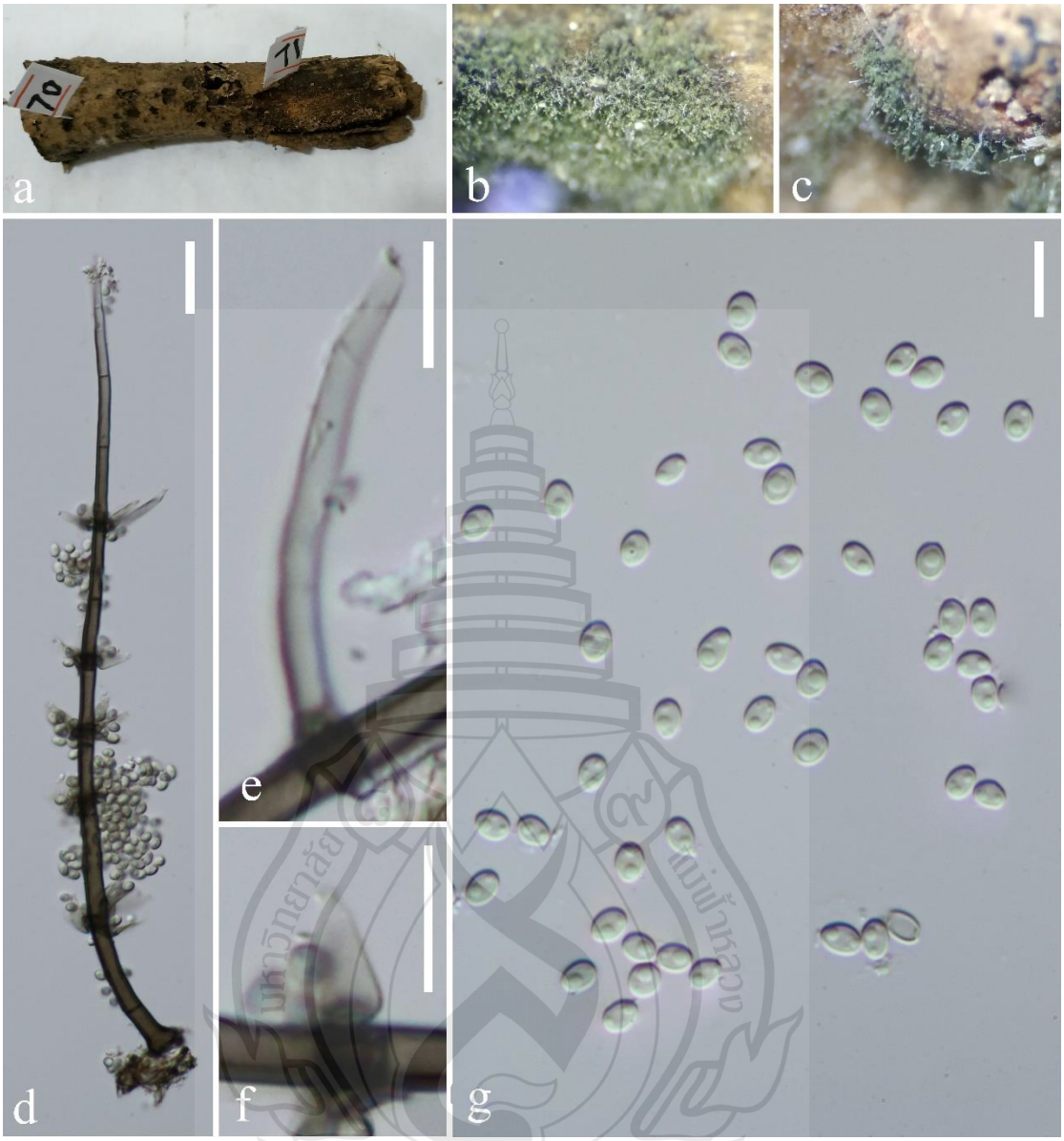
Sequence data: *Chloridium gonytrichii* (MFLUCC 16-1095, LSU: MK835822, ITS: MK828622, SSU: MK834737)

Notes: *Chloridium* was introduced by Link (1809b) and is characterized by mononematous, macronematous, unbranched, brown, sometimes percurrent conidiophores, mono- or polyphialidic, brown or subhyaline conidiogenous cells, with a funnel-shaped collarette and aseptate, hyaline to brown conidia with or without appendage (Seifert et al., 2011). References: (Gams & Holubová-Jechová, 1976; Link, 1809b; Réblová et al., 2011b; Wang et al., 2017; Wu & Zhang, 2013) (morphology), (Lin et al., 2019b) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note *Chloridium* sp. (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-6). **a** Host material. **b, c** Conidiophores on the host surface. **d, e** conidiophores. **f, g** Conidiogenous cells. **h–m** Conidia. Scale bars: **d**, **e** = 50 μm, **f**, **g** = 20 μm, **h–m** = 5 μm.

Figure 2.11 *Chloridium* sp1



Note *Chloridium* sp. (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-70). **a** Host material. **b, c** Conidiophores on the host surface. **d** conidiophores. **e, f** Conidiogenous cells. **g** Conidia. Scale bars: **d**, **g** = 20 μm, **e, f** = 10 μm.

Figure 2.12 *Chloridium* sp2



Note *Chloridium* sp. (Material examined: China, Guizhou Province, Guiyang City, Nanming District, Xiaochehe Rd, Xiaochehe City Wetland Park, July 2018, N. G. Liu, XCH 2-7). **a** Host material. **b** Conidiophores on the host surface. **c, d** conidiophores. **e, f** Conidiogenous cells. **g–l** Conidia.

Figure 2.13 *Chloridium* sp3

Chlorocillium W. Gams & Zare, Mycological Progress 15: 1005 (2016)

Index Fungorum number: IF815506

Classification: Hypocreales genera *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Chlorocillium griseum* (Petch) Zare & W. Gams, Mycological Progress 15: 1007 (2016)

Sexual morph: Unknown.

Sequence data: *Chlorocillium griseum* (CBS 387.73 = IMI 185384, LSU: NG_058935, ITS: NR_153915)

Notes: *Chlorocillium* was introduced by Zare and Gams (2016) and is verticillium-like. Phylogenetically, *Chlorocillium* located in the order Hypocreales (Sordariomycetes) (Figure 2.1). References: (Zare & Gams, 2016) (morphology and phylogeny).

Chordomyces Bilanenko, Georgieva & Grum-Grzhim., Fungal Diversity 76: 55 (2015)

Index Fungorum number: IF811265

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Chordomyces antarcticus* Bilanenko, Georgieva & Grum-Grzhim., Fungal Diversity 76: 57 (2015)

Sexual morph: Unknown.

Sequence data: *Chordomyces antarcticum* (CBS 120045, LSU: NG_068747, ITS: NR_153879, SSU: NG_065037)

Notes: *Chordomyces* was introduced by Grum-Grzhimaylo et al. (2016) and is characterized by mononematous or synnematous, unbranched or branched, hyaline conidiophores, mono- or polyphialidic, sympodial, hyaline conidiogenous cells, producing catenate or in slimy mass, aseptate to 1-septate, subglobosa, limoniform, ellipsoidal to cylindrical, hyaline conidia. References: (Giraldo & Crous, 2019; Grum-Grzhimaylo et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Seifert et al., 2011; Wijayawardene et al., 2017a) (outline).

Choreospora Constant. & R. Sant., The Lichenologist 19 (2): 177 (1987)

Index Fungorum number: IF25027

Classification: Ascomycota genera *incertae sedis*

Type species: *Choreospora tibellii* Constant. & R. Sant., The Lichenologist 19 (2): 177 (1987)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Choreospora* was introduced by Constantinescu and Santesson (2007) and is characterized by having sporodochial conidiomata, with phialidic, annellidic, cylindrical, brown conidiogenous cells, and producing conidia that are aseptate, pale olivaceous, tetraradiate, arms provided with whip-like extensions. Phylogenetic position for *Choreospora* is unresolved due to lack of sequence data. References: (Constantinescu & Santesson, 2007) (morphology), (Wijayawardene et al., 2020) (outline).

Chromelosporiopsis Hennebert, Mycotaxon 135 (3): 688 (2020)

Index Fungorum number: IF835622

Classification: Pezizaceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Chromelosporiopsis carnea* (Schumach.) Hennebert, Mycotaxon 135 (3): 689 (2020)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Chromelosporiopsis* was introduced by Hennebert (2020) and it has synnematous, septate, branching in a coralloid pattern of asymmetric dichotomies, smooth conidiophores, with polyblastic, denticulate conidiogenous cells, produces aseptate, verrucose, globose or subglobose, colored in mass. Phylogenetic position for *Chromelosporiopsis* is unresolved due to lack of sequence data. References: (Hennebert, 2020) (morphology), (Wijayawardene et al., 2020) (outline).

Chromelosporium Corda, Deutschlands Flora, Abt. III. Die Pilze Deutschlands 3-13: 81 (1833)

Index Fungorum number: IF7633

Classification: Pezizaceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Chromelosporium ochraceum* Corda, Deutschlands Flora, Abt. III. Die Pilze Deutschlands 3-13: 81 (1833)

Sexual morph: Unknown.

Sequence data: *Chromelosporium macrospermum* (CBS 191.63 = ATCC 26681 = IMI 182265 = MUCL 1116, LSU: MH869864, ITS: MH858259)

Notes: *Chromelosporium* is characterized by having mononematous, septate, apically branched conidiophores, with polyblastic, synchronous, denticulate, conidiogenous cells, producing solitary, aseptate, verrucose, globose or subglobose, hyaline conidia (Hennebert, 2020). Hennebert and Decock (2020) proposed to maintain *Chromelosporium* as a distinct genus from *Pachyphlodes*. Phylogenetically, *Chromelosporium* was shown to be nested within the family Pezizaceae (Pezizales, Pezizomycetes) (Figure 2.1). References: (Hennebert, 2020; Hennebert & Decock, 2020) (morphology).

Chryseidea Onofri, Mycotaxon 13 (2): 331 (1981)

Index Fungorum number: IF7642

Classification: Ascomycota genera *incertae sedis*

Type species: *Chryseidea africana* Onofri, Mycotaxon 13 (2): 331 (1981)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Chryseidea* was introduced by Onofri et al. (1981) to accommodate *C. africana*. It has synnematous conidiomata, macronematous, synnematous, unbranched, brown conidiophores, polyblastic, sympodial, discrete, denticulate, ampulliform conidiogenous cells, and produces solitary, falcate, hyaline conidia (Onofri et al., 1981). Phylogenetic position for *Chryseidea* is unresolved due to lack of sequence data. References: (Onofri et al., 1981) (morphology), (Wijayawardene et al., 2020) (outline).

Chrysonectria Lechat & J. Fourn., Ascomycete.org 10 (4): 121 (2018)

Index Fungorum number: IF826765

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Chrysonectria finisterrensis* Lechat, J. Fourn. & Priou, Ascomycete.org 10 (4): 121 (2018)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Lechat et al., 2018a).

Sequence data: *Chrysonectria finisterrensis* (JPP17021 = BRFM 2477, LSU: MF611689, ITS: MF611678)

Notes: *Chrysonectria* was introduced by Lechat et al. (2018a) with acremonium-like asexual morph. References: (Lechat et al., 2018a) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Chrysosporium Corda, Deutschlands Flora, Abt. III. Die Pilze Deutschlands 3-13: 85 (1833)

Index Fungorum number: IF7645

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Chrysosporium merdarium* (Link) J.W. Carmich., Canadian Journal of Botany 40 (8): 1160 (1962) (= *Chrysosporium corii* Corda, Deutschlands Flora, Abt. III. Die Pilze Deutschlands 3-13: 85 (1833))

Sexual morph: *Amauroascus*, *Ajellomyces*, *Aphanoascus*, *Apinisia*, *Arachniotus*, *Arachnotheca*, *Arthroderma*, *Bettsia*, *Cercophora*, *Ctenomyces*, *Echinopodospora*, *Keratinophyton*, *Nannizziopsis*, *Neoxenophila*, *Pectinotrichum*, *Renispora*, *Rhexothecium*, *Shanorella*, *Uncinocarpus*, *Zopfiella* (Seifert et al., 2011).

Synanamorphs: *Cladobotryum*, *Cladorrhinum*, *Cryptumbellata*, *Discomycetoidea*, *Microsporum*, *Paracoccidioides*, *Trichophyton* (Seifert et al., 2011).

Disease symptoms: Some species are dermatophytic or keratinolytic or both (Pitt et al., 2013).

Sequence data: *Chrysosporium carmichaelii* (CBS 643.79, LSU: NG_058857, ITS: NR_077133)

Notes: *Chrysosporium* is characterized by its conidiophores are sparingly branched or branched, hyaline, sometimes reduced to conidiogenous cells, conidiogenous cells are thallic-arthric, hyaline, conidia are solitary, aseptate, hyaline (Seifert et al., 2011). References: (Li et al., 2017d; Liang et al., 2009a; Novakova & Kolarik, 2010; Pitt et al., 2013; Sigler et al., 2013; Zhang et al., 2016b) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Chuppomyces Videira & Crous, Studies in Mycology 87: 370 (2017)

Index Fungorum number: IF822582

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Chuppomyces handelii* (Bubák) U. Braun, C. Nakash., Videira & Crous, Studies in Mycology 87: 370 (2017)

Sexual morph: Unknown.

Sequence data: *Chuppomyces handelii* (CBS 113302, LSU: GU214437, ITS: EU167581)

Notes: *Chuppomyces* was introduced by Videira et al. (2017) and is characterized by macronematous, rough, straight or strongly geniculate, unbranched, brown conidiophores, with polyblastic, integrated, terminal or intercalary, sympodial conidiogenous cells, producing solitary, septate, cylindrical to obclavate, hyaline conidia. Phylogenetically, *Chuppomyces* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Cinnamomeonectria C. Salgado & P. Chaverri, Fungal Diversity 80: 451 (2016)

Index Fungorum number: IF816465

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Cinnamomeonectria cinnamomea* (Brayford & Samuels) C. Salgado & P. Chaverri, Fungal Diversity 80: 452 (2016)

Sexual morph: Introduced as holomorph (Salgado-Salazar et al., 2016).

Sequence data: *Cinnamomeonectria cinnamomea* (IMI 325248, LSU: KJ022072, ITS: KJ022010, SSU: KJ022206)

Notes: The asexual morph of *Cinnamomeonectria* is cylindrocarpon-like. References: (Salgado-Salazar et al., 2016) (morphology and phylogeny).

Circinotrichum Nees, System der Pilze und Schwämme: 18 (1817)

Index Fungorum number: IF7667

Classification: Xylariales genera incertae sedis, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Circinotrichum maculiforme* Nees, System der Pilze und Schwämme: 19, t. 5:66 (1817)

Sexual morph: Unknown.

Sequence data: *Circinotrichum cycadis* (CBS 137969, LSU: NG_058880, ITS: NR_156278)

Notes: It is characterized by unbranched, circinate or flexuous setae, conidiophores reduced to conidiogenous cells and aggregate around the bases of setae, sympodial or percurrent, hyaline conidiogenous cells, and aseptate or multiseptate, falcate, hyaline conidia (Pirozynski, 1962). Phylogenetically, this genus is polyphyletic (Li et al., 2017a). References: (Pirozynski, 1962)(morphology) (Li et al., 2017a) (phylogeny).

Civisubramaniania Vittal & Dorai, Transactions of the British Mycological Society 87: 482 (1986)

Index Fungorum number: IF11047

Classification: Ascomycota genera *incertae sedis*

Type species: *Civisubramaniania eucalypti* Vittal & Dorai, Transactions of the British Mycological Society 87: 485 (1986)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Civisubramaniania* was established by Vittal and Dorai (1986) and is characterized by having sinuous setae, macronematous, branched, verrucose

conidiophores, with discrete, polyblastic, flask-shaped conidiogenous cells, and producing solitary, ellipsoidal to subspherical, echinulate, hyaline conidia. Phylogenetic position for *Civisubramaniania* is unresolved due to lack of sequence data. References: (Vittal & Dorai, 1986) (morphology), (Wijayawardene et al., 2020) (outline).

Cladochasiella Marvanová, Cryptogamie Mycologie 18 (4): 285 (1997)

Index Fungorum number: IF27789

Classification: Discinellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Cladochasiella divergens* Marvanová, Cryptogamie Mycologie 18 (4): 286 (1997)

Sexual morph: Unknown.

Sequence data: *Cladochasiella divergens* (CCM F-13489, ITS: NR_153874)

Notes: *Cladochasiella* was introduced by Marvanová (1997) and described as a contaminant from culture of a freshwater hyphomycete *Fontanospora fusiramosa*. It has semimacronematous, branched, septate, hyaline conidiophores, polyblastic, integrated conidiogenous cells and catenate, septate, elongate conidia. Phylogenetic position for *Cladochasiella* is unresolved due to lack of LSU sequence data. References: (Marvanová, 1997) (morphology), (Wijayawardene et al., 2020) (outline).

Cladophialophora Borelli, Proceedings of the 5th International Conference on Mycoses: 355 (1980)

Index Fungorum number: IF7677

Classification: Herpotrichiellaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Cladophialophora ajelloi* Borelli, Pan Amer. Health Organ. Sci. Publ.: 335 (1980) = *Cladophialophora carrionii* (Trejos) de Hoog, Kwon-Chung & McGinnis, Journal of Medical and Veterinary Mycology 33: 345 (1995)

Sexual morph: ?*Capronia* Sacc. (Badali et al., 2008)

Disease symptoms: Causing chromoblastomycosis, brain infections, disseminated disease, cutaneous infections on human (Badali et al., 2008; Badali et al., 2011; de Hoog et al., 2007; Feng et al., 2014a)

Sequence data: *Cladophialophora ajelloi* (= *Cladophialophora carrionii*)(CBS 260.83, LSU: MH873312, ITS: MH861582)

Notes: *Cladophialophora* is a yeast-like genus and characterized by reduced or branched conidiophores, blastic, sympodial, conidiogenous cells and aseptate, branched or unbranched acropetal chains, ellipsoidal to fusiform, dry conidia (Badali et al., 2008; Seifert et al., 2011). The genus includes several clinically significant species, e.g., *C. arxii*, *C. bantiana*, *C. carrionii*, *C. devriesii*, and *C. modesta* (Badali et al., 2008). The sexual state was predicted to belong to the genus *Capronia* based on the SSU rDNA phylogenetic analysis (Haase et al., 1999). Diederich et al. (2013) provided a key to the lichenicolous species of *Cladophialophora*. References: (Badali et al., 2008, 2011; Diederich et al., 2013; Feng et al., 2014a; Haase et al., 1999; Seifert et al., 2011; de Hoog et al., 2007) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Cladorrhinum Sacc. & Marchal, Bulletin de la Société Royale de Botanique de Belgique 24: 64 (1885)

Index Fungorum number: IF7678

Classification: Podosporaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Cladorrhinum foecundissimum* Sacc. & Marchal, Bulletin de la Société Royale de Botanique de Belgique 24: 64 (1885)

Sexual morph: *Apiosordaria*, *Apodospora*, *Arnium*, *Cercophora*, *Podospora* (Mouchacca & Gams, 1993; Seifert et al., 2011); Marin-Felix et al. (2020) provided holomorphic description for this genus.

Synanamorphs: chrysosporium-like, *Papulaspora* (Seifert et al., 2011).

Sequence data: *Cladorrhinum foecundissimum* (CBS 180.66, LSU: NG_073585, ITS: NR_164429)

Notes: Marin-Felix et al. (2020) emended this genus and provided the holomorphic description for it. Its asexual morph has phialidic, intercalary, hyaline to

pale brown conidiogenous cells and produces aseptate, in slimy mass, smooth-walled, broad obovoid, ellipsoidal or subglobose, hyaline conidia (Marin-Felix et al., 2020). References: (Madrid et al., 2011; Marin-Felix et al., 2020; Mouchacca & Gams, 1993; Seifert et al., 2011; Wang et al., 2019b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Cladosterigma Pat., Bulletin de la Société Mycologique de France 8 (2): 138 (1892)

Index Fungorum number: IF7682

Classification: Gomphillaceae, Graphidales, Lecanoromycetes, Ascomycota (before is in Exobasidiales genera *incertae sedis*, Exobasidiomycetes, Ustilaginomycotina, Basidiomycota)

Type species: *Cladosterigma clavariellum* (Speg.) Höhnel, Sber Akad Wiss Wien Abt I 128:536. 1919 (= *Cladosterigma fusisporum* Pat., Bulletin de la Société Mycologique de France 8 (2): 138 (1892))

Sexual morph: Unknown.

Sequence data: *Cladosterigma clavariellum* (UB23227, LSU: MK933757, ITS: MK933759, SSU: MK933761)

Notes: Guterres et al. (2020) emended this genus and placed it in Gomphillaceae (Lecanoromycetes, Graphidales). References: (Guterres et al., 2020) (morphology and phylogeny).

Classicula R. Bauer, Begerow, Oberw. & Marvanová, Mycologia 95 (4): 757 (2003)

= *Naiadella* Marvanová & Bandoni, Mycologia 79: 579 (1987)

Index Fungorum number: IF28760

Classification: Classiculaceae, Classiculales, Classiculomycetes, Pucciniomycotina, Basidiomycota

Type species: *Classicula fluitans* R. Bauer, Begerow, Oberw. & Marvanová, Mycologia 95 (4): 757 (2003)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Naiadella* (Aime et al., 2018).

Sequence data: *Classicula sinensis* (CGMCC 3.18938, LSU: NG_064421, ITS: NR_159755, SSU: NG_065666)

Notes: Sexual morphs of *Naiadella* species were described in *Classicula*, Aime et al. (2018) proposed to protect *Classicula* over *Naiadella*. Phylogenetically, representative of *Classicula* clustered in the family Classiculaceae (Classiculales, Classiculomycetes) (Figure 2.1). References: (He et al., 2019) (outline).

Clathrosphaerina Beverw., Transactions of the British Mycological Society 34 (3): 289 (1951)

Index Fungorum number: IF7689

Classification: Arachnopezizaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Clathrosphaerina zalewskii* Beverw., Transactions of the British Mycological Society 34 (3): 289 (1951)

Sexual morph: *Hyaloscypha* (Seifert et al., 2011)

Sequence data: *Clathrosphaerina zalewskii* (CBS 162.49, ITS: NR_159766)

Notes: *Clathrosphaerina* was established by Van Beverwijk (1951) and is characterized by having reduced conidiophores, monoblastic, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, bulbil, clathrate (Seifert et al., 2011; Van Beverwijk, 1951). Phylogenetically, *Clathrosphaerina* was shown to be nested within the family Arachnopezizaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011; Van Beverwijk, 1951) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Claussenomyces Kirschst., Verhandlungen des Botanischen Vereins der Provinz Brandenburg 65: 122 (1923)

= *Dendrostilbella* Höhn., Österreichische Botanische Zeitschrift 55 (1): 22 (1905)

Index Fungorum number: IF1091

Classification: Tympanidaceae, Leotiales, Leotiomycetidae, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Claussenomyces jahnianus* Kirschst., Verhandlungen des Botanischen Vereins der Provinz Brandenburg 65: 122 (1923)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Claussenomyces prasinulus* (TNS-F-18149, LSU: LC429384, ITS: LC425048)

Notes: The asexual morph of *Claussenomyces* was report in *Dendrostilbella*, which has determinate synnemata, penicillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, hyaline conidia (Seifert et al., 2011). References: (Wijayawardene et al., 2017a, 2020) (outline).

Clavariana Nawawi, Transactions of the British Mycological Society 67 (2): 217 (1976)

Index Fungorum number: IF7691

Classification: Ascomycota genera *incertae sedis*

Type species: *Clavariana aquatica* Nawawi, Transactions of the British Mycological Society 67 (2): 218 (1976)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Clavariana* was established by Descals et al. (1976) and is characterized by having semi-macronematous, unbranched or branched, septate, hyaline conidiophores, with monoblastic to polyblastic, sympodial, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, staurosporous, tetraradiate, consisting of obovoid body and four arms. Phylogenetic position for *Clavariana* is unresolved due to lack of sequence data. References: (Descals et al., 1976) (morphology), (Wijayawardene et al., 2020) (outline).

Clavariopsis De Wild., Annales de la Societé Belge de Microscopie 19: 200 (1895)

Index Fungorum number: IF7692

Classification: Dothideomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Clavariopsis aquatica* De Wild., Annales de la Societé Belge de Microscopie 19: 201 (1895)

Sexual morph: *Massarina* (Seifert et al., 2011)

Sequence data: *Clavariopsis aquatica* (AJ117363, LSU: LC472492, ITS: LC472491, SSU: LC471408)

Notes: *Clavariopsis* is characterized by having mononematous, unbranched, hyaline conidiophores, with monoblastic, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, staurosporous, tetraradiate, 3 arms up, 1-septate body down (Seifert et al., 2011). Phylogenetically, a strain AJ117363, named *C. aquatica* but not ex-type strain, was shown to be nested within the family Melanommataceae (Pleosporales, Pleosporomycetidae, Dothideomycetes) (Figure 2.1). References: (Kaida et al., 2001; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Cleistothelebolus Malloch & Cain, Canadian Journal of Botany 49 (6): 851 (1971)

= *Hyphozyma* de Hoog & M.T. Sm., Antonie van Leeuwenhoek 47 (4): 340 (1981)

Index Fungorum number: IF1103

Classification: Thelebolaceae, Thelebolales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Cleistothelebolus nipigonensis* Malloch & Cain, Canadian Journal of Botany 49 (6): 851 (1971)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Hyphozyma* (Baral et al., 2018b; Seifert et al., 2011).

Sequence data: *Hyphozyma variabilis* (CBS 523.79 = UAMH 6101, LSU: AF353596, SSU: NG_070855)

Notes: *Hyphozyma* was described by de Hoog and Smith (1981) and is yeast-like. Baral et al. (2018b) synonymized *Hyphozyma* under *Cleistothelebolus*. Phylogenetically, representative of *Hyphozyma* clustered in the order Thelebolales (Leotiomycetes) (Figure 2.1). References: (Baral et al., 2018b; de Hoog & Smith, 1981) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Clonostachys Corda, Pracht - Flora. Europaeischer Schimmel-Bildungen: 31 (1839)

= *Sesquicillium* W. Gams 1968

= *Bionectria* Spegazzini 1918

= *Spicaria* Harting 1846

= *Bionectria* subgen. *Bionectria* ?

= *Clonostachyopsis* Höhnel 1907

= *Verticilliodochium* Bubák 1914

= *Verticillis* Clements & Shear 1931

= *Bionectria* subgen. *Bionectria* Speg. 1919

Index Fungorum number: IF7701

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Clonostachys araucaria* Corda, Pracht - Flora. Europaeischer Schimmel-Bildungen: 31, tab. 15 (1839)

Sexual morph: *Bionectria* Spegazzini 1918 (Schroers, 2001; Seifert et al., 2011).

Synanamorphs: *Ve1iicillium*-like (Seifert et al., 2011).

Sequence data: *Clonostachys rosea* (CBS 710.86, LSU: MH873700, ITS: MH862010)

Notes: *Clonostachys* is characterized by having mononematous, penicillate or verticillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, in slimy mass, hyaline conidia (Seifert et al., 2011). References: (Moreira et al., 2016; Rossman et al., 2013; Schroers, 2001; Zhuang et al., 2007) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Coccidioides C.W. Stiles, Johns Hopkins Hospital Reports 1: 243 (1896)

Index Fungorum number: IF7712

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Coccidioides immitis* C.W. Stiles, Johns Hopkins Hospital Reports 1: 243 (1896)

Sexual morph: Unknown.

Synanamorphs: *Malbranchea* (Sigler & Carmichael, 1976).

Disease symptoms: Coccidioidomycosis (Valley Fever) (Chaturvedi & de Hoog, 2020; Emmet Rixford & Gilchrist, 1896; Fisher et al., 2002).

Sequence data: *Coccidioides immitis* (CBS 120936, LSU: NG_070451, ITS: NR_157446)

Notes: *Coccidioides* was introduced by Emmet Rixford and Gilchrist (1896) and is dimorphic: (1) *in vitro*: unbranched or sparingly branched, hyaline conidiophores, arthric, hyaline conidiogenous cells, catenate, aseptate, hyaline conidia; (2) *in vivo*: spherules, hyaline conidiophores, sporangium-like with endoconidia, hyaline conidiogenous cells, aseptate, hyaline conidia (Seifert et al., 2011). References: (Emmet Rixford & Gilchrist, 1896) (morphology), (Sugiyama et al., 2002; Untereiner et al., 2002) (phylogeny), (Fisher et al., 2002) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Coccinonectria L. Lombard & Crous, Studies in Mycology 80: 218 (2015)

Index Fungorum number: IF810176

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Coccinonectria pachysandricola* (B.O. Dodge) L. Lombard & Crous, Studies in Mycology 80: 218 (2015)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Lombard et al., 2015).

Sequence data: *Coccinonectria pachysandricola* (CBS 501.63 = BBA 808 = CCT 4699, LSU: KM231640, ITS: KM231774); *Coccinonectria rusci* (CBS 126108, LSU: NG_058890, ITS: NR_164228)

Notes: *Coccinonectria* was introduced by Lombard et al. (2015) with volutella-like asexual morph. References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Cochlearomyces Crous, Persoonia 39: 351 (2017)

Index Fungorum number: IF823365

Classification: Cochlearomycetaceae, Leotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Cochlearomyces eucalypti* Crous, Persoonia 39: 351 (2017)

Sexual morph: Unknown.

Sequence data: *Cochlearomyces eucalypti* (CBS 142622 = CPC 33051, LSU: MG386081, ITS: MG386025)

Notes: *Cochlearomyces* is unique by its solitary, erect, brown synnemata that form a shield, bearing terminal and intercalary, doliiform to subcylindrical phialides and produces solitary, aseptate, cylindrical, hyaline conidia (Crous et al., 2017a). References: (Crous et al., 2017a) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Codinaea Maire, Publicacions del Instituto Botánico Barcelona 3 (4): 15 (1937)

Index Fungorum number: IF7720

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Codinaea aristata* Maire, Publicacions del Instituto Botánico Barcelona 3 (4): 15 (1937)

Sexual morph: *Tainosphaeria* (Seifert et al., 2011).

Sequence data: *Codinaea yunnanensis* (MFLUCC 17-0468, LSU: MK835823, ITS: MK828623, SSU: MK834738)

Notes: *Codinaea* was introduced by Maire (1937) and is characterized by macronematous, mononematous or synnematous, unbranched, brown conidiophores, phialidic, brown conidiogenous cells, aseptate or septate, hyaline conidia with polar setulae at both ends. References: (Crous et al., 2014c, 2015b; Hughes & Kendrick, 1968; Kuthubutheen & Nawawi, 1991d; Li et al., 2012a; Maggi & Persiani, 1984; Reddy & Reddy, 1977; Xia et al., 2015a)(morphology), (Lin et al., 2019b) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Colacosiphon R. Kirschner, R. Bauer & Oberw., Mycologia 93: 643 (2001)

Index Fungorum number: IF28508

Classification: Cryptomycocolacaceae, Cryptomycocolacales, Cryptomycocolacomycetes, Pucciniomycotina, Basidiomycota

Type species: *Colacosiphon filiformis* R. Kirschner, R. Bauer & Oberw., Mycologia 93: 643 (2001)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Colacosiphon* was established by Kirschner et al. (2001) and is characterized by macronematous, mononematous, mostly unbranched, aseptate, reduced, filiform conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing solitary, aseptate, cylindrical, hyaline conidia, and ellipsoidal chlamydospores. Phylogenetic position for *Colacosiphon* is unresolved due to lack of sequence data. References: (Kirschner et al., 2001) (morphology), (Wijayawardene et al., 2020) (outline).

Colispora Marvanová, Transactions of the British Mycological Society 90: 614 (1988)

Index Fungorum number: IF11016

Classification: Ascomycota genera *incertae sedis*

Type species: *Colispora elongata* Marvanová, Transactions of the British Mycological Society 90: 615 (1988)

Sexual morph: Unknown.

Sequence data: *Colispora cavincola* (CBS 624.95, LSU: MH874177, ITS: MH862544)

Notes: *Colispora* was introduced by Marvanová (1988) and is characterized by having unbranched or sparsely branched, hyaline conidiophores, with percurrent or sympodial, denticulate conidiogenous cells, producing solitary, septate, fusiform or clavate, hyaline conidia. Phylogenetically, the ex-type of *C. cavincola*, not generic type, was shown to be nested within the family Melanommataceae (Pleosporales, Pleosporomycetidae, Dothideomycetes) (Figure 2.1). References: (Marvanová, 1988) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Collembolispora Marvanová & Pascoal, Cryptogamie Mycologie 24 (4): 341 (2003)

Index Fungorum number: IF28741

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Collembolispora barbata* Marvanová, Pascoal & Cássio, Cryptogamie Mycologie 24 (4): 341 (2003)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011)

Sequence data: *Collembolispora barbata* (CBS 115944, LSU: KC005812.1, ITS: NR_111443)

Notes: *Collembolispora* was erected by Marvanová et al. (2003) and is dimorphic: (1) mononematous, branched, hyaline conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing septate, branched, staurosporous conidia; (2) semi-macronematous or micronematous, mononematous, unbranched or branched or penicillate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, producing aseptate, hyaline conidia in slimy mass (Marvanová et al., 2003; Seifert et al., 2011). Phylogenetically, *Collembolispora* was shown to be nested within the family Ploettnerulaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Marvanová et al., 2003; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Collodiscula I. Hino & Katum., Bulletin of the Faculty of Agriculture Yamaguchi University 6: 55 (1955)

= *Acanthodochium* Samuels, J.D. Rogers & Nagas., Mycotaxon 28 (2): 457 (1987)

Index Fungorum number: IF1187

Classification: Xylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Collodiscula japonica* I. Hino & Katum., Bulletin of the Faculty of Agriculture Yamaguchi University 6: 55 (1955)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Acanthodochium* (Samuels et al., 1987).

Sequence data: *Collodiscula fangjingshanensis* (GZUH 0109, LSU: NG_058915, ITS: NR_164234); *Collodiscula japonica* (CBS 124266, LSU: JF440974, ITS: JF440974)

Notes: *Acanthodochium* was introduced by Samuels et al. (1987) to accommodate *A. collodisculae*, which is the asexual morph of *Collodiscula japonica*. Réblová et al. (2016a) proposed protecting *Collodiscula* over *Acanthodochium*. *Acanthodochium* has sporodochial or synnematous, stromatic conidiomata, macronematous, branched conidiophores, with polyblastic, sympodial, denticulate conidiogenous cells, produces solitary, aseptate, hyaline or brown conidia (Seifert et al., 2011). References: (Samuels et al., 1987; Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Comminutispora A.W. Ramaley, Mycologia 88 (1): 132 (1996)

= *Hyphospora* A.W. Ramaley, Mycologia 88 (1): 133 (1996)

Index Fungorum number: IF27576

Classification: Comminutisporaceae, Comminutisporales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Comminutispora agavacearum* A.W. Ramaley, Mycologia 88 (1): 133 (1996)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Hyphospora* (Ramaley, 1996)

Sequence data: *Comminutispora agavaciensis* (CBS 619.95 = ATCC 96605 = UC 1475184, LSU: EU981286, ITS: MH862543, SSU: Y18699)

Notes: *Comminutispora* and its asexual morph *Hyphospora* were introduced by Ramaley (1996), and its asexual morph has reduced conidiophores, and sporangium-like with endoconidia, hyaline conidiogenous cells, produces aseptate, endogenous, hyaline conidia (Ramaley, 1996; Seifert et al., 2011). Rossman et al. (2015b) proposed to protect the name *Comminutispora* over its asexual morph *Hyphospora*. Abdollahzadeh et al. (2020) introduced the new order Comminutisporales along with the new family Comminutisporaceae to accommodate

Comminutispora. Phylogenetically, *Comminutispora* was shown to be nested within the family Comminutisporaceae (Comminutisporales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Condylospora Nawawi, Transactions of the British Mycological Society 66 (2): 363 (1976)

Index Fungorum number: IF7749

Classification: Ascomycota genera *incertae sedis*

Type species: *Condylospora spumigena* Nawawi, Transactions of the British Mycological Society 66 (2): 363 (1976)

Sexual morph: Unknown.

Sequence data: *Condylospora vietnamensis* (NBRC 107639 = VTCC F-1208, LSU: LC146725, ITS: LC146723)

Notes: This genus was described by Nawawi (1976a) for an aquatic fungus from foam samples. *Condylospora* is characterized by having micronematous, mononematous, unbranched, geniculate, hyaline conidiophores, with monoblastic or polyblastic, terminal and intercalary, sympodial, denticulate, hyaline conidiogenous cells, producing solitary, multi-septate, filiform, L-shaped, hyaline conidia (Nawawi, 1976a). Phylogenetically, the ex-type strain NBRC 107639 of *Condylospora vietnamensis*, not generic type, clustered in the family Microthyriaceae (Microthyriales, Dothideomycetes) (Figure 2.1). References: (Le et al., 2012; Nawawi, 1976a) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Conicomyces R.C. Sinclair, Eicker & Morgan-Jones, Mycologia 75 (6): 1100 (1983)

Index Fungorum number: IF11019

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Conicomyces transvaalensis* R.C. Sinclair, Eicker & Morgan-Jones, Mycologia 75 (6): 1100 (1983)

Sexual morph: Unknown.

Sequence data: *Conicomyces pseudotransvaalensis* (HHUF 29956, LSU: LC001708, ITS: LC001710)

Notes: *Conicomyces* was introduced by Sinclair et al. (1983) and is characterized by synnematous conidiomata, dark brown, unbranched setae, micronematous, branched, septate, hyaline conidiophores, phialidic conidiogenous cells, septate, fusiform, hyaline conidia with apical appendage. References: (Lin et al., 2019b; Liu et al., 2015; Sinclair et al., 1983) (morphology and/or phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Coniochaeta (Sacc.) Cooke, Grevillea 16 (77): 16 (1887)

= *Lecythophora* Nannf., Svenska Skogsvårdsföreningens Tidskrift 32: 435 (1934)

Index Fungorum number: IF1209

Classification: Coniochaetaceae, Coniochaetales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Coniochaeta ligniaria* (Grev.) Cooke, Grevillea 16 (77): 16 (1887)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Lecythophora* and cladobotryum-like, paecilomyces-like, verticillium-like (Damm et al., 2010; Seifert et al., 2011).

Sequence data: *Coniochaeta africana* (CBS 120868, LSU: NG_066150, ITS: NR_137725, SSU: NG_062776); *Coniochaeta lignicola* (= *Lecythophora lignicola*) (CBS 267.33, LSU: NG_067344, ITS: NR_111520)

Notes: The asexual morph of *Coniochaeta* was reported in the hyphomycetous genus *Lecythophora*. Réblová et al. (2016a) proposed using *Coniochaeta* rather than *Lecythophora*. References: (Damm et al., 2010; Garcia et al., 2006) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Conjunctospora Udagawa & Uchiy., Canadian Journal of Botany 76 (9): 1638 (1999)

Index Fungorum number: IF27916

Classification: Ascomycota genera *incertae sedis*

Type species: *Conjunctospora vesiculifera* Udagawa, Uchiy. & Kamiya, Canadian Journal of Botany 76 (9): 1638 (1999)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Conjunctospora* was introduced by Udagawa and Uchiyama (1998) and is characterized by having macronematous, mononematous, unbranched, septate, vesiculate, hyaline conidiophores, with discrete, determinate, hyaline conidiogenous cells, and producing catenate, aseptate, globose to subglobose, hyaline to light brown conidia. Phylogenetic position for *Conjunctospora* is unresolved due to lack of sequence data. References: (Udagawa & Uchiyama, 1998) (morphology), (Wijayawardene et al., 2020) (outline).

Corallomycetella Henn., Hedwigia 43: 245 (1904)

= *Rhizostilbella* Wolk, Mykologisches Zentralblatt 4: 237 (1914)

= *Corallomyces* Fr., Summa vegetabilium Scandinaviae 2: 468 (1849)

Index Fungorum number: IF1237

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Corallomycetella repens* (Berk. & Broome) Rossman & Samuels, Studies in Mycology 42: 113 (1999)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Seifert et al., 2011).

Synanamorphs: rhizomorphs (Seifert et al., 2011).

Disease symptoms: rot

Sequence data: *Corallomycetella repens* (CBS 358.49, LSU: KM231708, ITS: KC479756)

Notes: It was reported that the asexual morph of *Corallomycetella* is in *Rhizostilbella*, which has synnematous conidiomata, unbranched or branched or monoverticillate conidiophores, phialidic conidiogenous cells, and aseptate, in slimy masses, ellipsoidal, ovoidal, hyaline conidia (Lombard et al., 2015). References:

(Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Corallonectria C. Herrera & P. Chaverri, Mycosystema 32: 539 (2013)

Index Fungorum number: IF803108

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Corallonectria jatrophae* (Möller) C. Herrera & P. Chaverri, Mycosystema 32: 539 (2013)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Herrera et al., 2013b).

Sequence data: *Corallonectria jatrophae* (CBS 913.96 = GJS 96-18, LSU: NG_058888, ITS: NR_153873)

Notes: *Corallonectria* was introduced by Herrera et al. (2013b) with synnematous, fusarium-like asexual morph. Phylogenetically, representative of *Corallonectria* clustered in the family Nectriaceae, Hypocreales, Sordariomycetes (Figure 2.1). References: (Herrera et al., 2013b) (morphology), (Wijayawardene et al., 2020) (outline).

Coreomycetopsis Thaxt., Botanical Gazette Crawfordsville 69: 13 (1920)

Index Fungorum number: IF1244

Classification: Laboulbeniales genera *incertae sedis*, Laboulbeniomycetes, Pezizomycotina, Ascomycota

Type species: *Coreomycetopsis oedipus* Thaxt., Botanical Gazette Crawfordsville 69: 13 (1920)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Coreomycetopsis* was established by Thaxter (1920) and only one species is accepted. Phylogenetic position for *Coreomycetopsis* is unresolved due to lack of sequence data. References: (Thaxter, 1920) (morphology), (Wijayawardene et al., 2020) (outline).

Corinectria C. González & P. Chaverri, Mycological Progress 16 (11-12): 1021 (2017)

Index Fungorum number: IF822856

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Corinectria fuckeliana* (C. Booth) C. González & P. Chaverri, Mycological Progress 16 (11-12): 1023 (2017)

Sexual morph: Introduced as holomorph (González & Chaverri, 2017).

Disease symptoms: Canker (González & Chaverri, 2017).

Sequence data: *Corinectria fuckeliana* (CBS 239.29, LSU: HQ840377, ITS: HQ840384, SSU: HQ840412)

Notes: *Corinectria* was introduced by González and Chaverri (2017) to accommodate *C. constricta, C. fuckeliana* (before known as *Nectria fuckeliana, Neonectria fuckeliana*) and *C. tsugae* (before known as *Acremonium tsugae, Neonectria tsugae*). *Corinectria* differs from *Neonectria* by the asexual morph does not produce macroconidia or chlaydospores in culture. References: (González & Chaverri, 2017) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Cornutostilbe Seifert, Memoirs of the New York Botanical Garden 59: 120 (1990)

Index Fungorum number: IF11269

Classification: Ascomycota genera *incertae sedis*

Type species: *Cornutostilbe medusa* Seifert, Memoirs of the New York Botanical Garden 59: 120 (1990)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted. Phylogenetic position for *Cornutostilbe* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Corollospora Werderm., Notizbl. Bot. Gart. Berlin-Dahlem: 248 (1922)

= *Halosigmoidea* Nakagiri, K.L. Pang & E.B.G. Jones, Botanica Marina 52 (4): 355 (2009)

= *Varicosporina* Meyers & Kohlm., Canadian Journal of Botany 43 (8): 916 (1965)

Index Fungorum number: IF1251

Classification: Halosphaeriaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Corollospora maritima* Werderm., Notizblatt des Königl. bot. Gartens u. Museum zu Berlin: 248 (1922)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genera *Clavatospora*, *Halosigmoidea*, *Sigmoidea*, *Varicosporina* (Abdel-Wahab et al., 2009; Réblová et al., 2016a; Seifert et al., 2011).

Sequence data: *Corollospora maritima* (728a = AFTOL ID 5011, LSU: FJ176901, SSU: FJ176846); *C. parvula* (= *Halosigmoidea parvula*) (CBS 116644 = TUB 6582, LSU: NG_064187, ITS: NR_160220); *C. ramulosa* (= *Varicosporina ramulosa*) (CBS 398.65, LSU: NG_064049, ITS: NR_160104)

Notes: The asexual morph of *Corollospora* was linked in the genera *Clavatospora*, *Halosigmoidea*, *Sigmoidea*, *Varicosporina* (Abdel-Wahab et al., 2009; Réblová et al., 2016a; Seifert et al., 2011). Réblová et al. (2016a) proposed using *Corollospora* rather than *Halosigmoidea* and *Varicosporina*. References: (Abdel-Wahab et al., 2009; Jones et al., 2009; MacKenzie et al., 2004; Sundari et al., 1996) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Corynecercospora V.K. Pal, Akhtar, N. Ahmad, Kamal & D.K. Agarwal, Indian Phytopathology 59 (4): 492 (2006)

Index Fungorum number: IF531952

Classification: Ascomycota genera *incertae sedis*

Type species: *Corynecercospora teraiensis* V.K. Pal, Akhtar, N. Ahmad, Kamal & D.K. Agarwal, Indian Phytopathology 59 (4): 493 (2006)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Corynecercospora* was introduced by Pal et al. (2006) and only one species is accepted. Phylogenetic position for *Corynecercospora* is unresolved due to lack of sequence data. References: (Pal et al., 2006) (morphology), (Wijayawardene et al., 2020) (outline).

Craspedodidymum Hol.-Jech., Ceská Mykologie 26 (2): 70 (1972)

Index Fungorum number: IF7804

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Craspedodidymum elatum* Hol.-Jech., Ceská Mykologie 26 (2): 70 (1972)

Sexual morph: *Chaetosphaeria, Thailandiomyces* (Seifert et al., 2011).

Synanamorphs: *Chloridium* (Seifert et al., 2011).

Notes: *Craspedodidymum* is characterized by macronematous, mononematous, unbranched or rarely branched, brown conidiophores, phialidic, integrated, brown conidiogenous cells with funnel-shaped collarette, and conidia are aseptate or septate, ellipsoidal, oblong, obovoid, subglobose, brown or hyaline (Ma et al., 2011). References: (Ma et al., 2011; Pinruan et al., 2008; Yang et al., 2016; Yanna et al., 2000b) (morphology), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Crassicarpon Y. Marín, Stchigel, Guarro & Cano, Mycologia 107 (3): 629 (2015)

Index Fungorum number: IF809487

Classification: Chaetomiaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Crassicarpon thermophilum* (Fergus & Sinden) Y. Marín, Stchigel, Guarro & Cano, Mycologia 107 (3): 629 (2015)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Marin-Felix et al., 2015b).

Sequence data: *Crassicarpon thermophilum* (CBS 406.69, LSU: KX976776, ITS: NR_154779)

Notes: *Crassicarpon* was introduced by Marin-Felix et al. (2015b) to accommodate *C. thermophilum*, a thermophilic fungus. The asexual morph of this genus has micronematous or semimacronematous conidiophores, polyblastic conidiogenous cells and producing solitary, aseptate, smooth-walled, spherical to cuneiform, hyaline conidia (Marin-Felix et al., 2015b). References: (Marin-Felix et al., 2015b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Cristulariella Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 125: 124 (1916)

Index Fungorum number: IF7817

Classification: Sclerotiniaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Cristulariella depraedans* (Cooke) Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 125: 124 (1916)

Sexual morph: *Nervostroma* (Narumi-Saito et al., 2006).

Synanamorphs: *Myrioconium* (Seifert et al., 2011)

Sequence data: *Cristulariella depraedans* (KUS-F25920, LSU: KX098505, ITS: KT462571)

Notes: The sexual morph of *Cristulariella* was reported in the genus *Nervostroma* (Narumi-Saito et al., 2006), Johnston et al. (2014) proposed to protect *Cristulariella* over *Nervostroma*. Phylogenetically, *Cristulariella* was shown to be nested within the family Sclerotiniaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Cruciger R. Kirschner & Oberw., Mycoscience 40 (4): 345 (1999)

Index Fungorum number: IF28360

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Cruciger lignatilis* R. Kirschner & Oberw., Mycoscience 40 (4): 345 (1999)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Cruciger* was established by Kirschner and Oberwinkler (1999a) for a basidiomycetous anamorph fungus, and it has sporodochial, white or pale conidiomata, branched, septate, clamped at the septa, hyaline conidiophores, with percurrent, champed, cylindrical, hyaline conidiogenous cells, and produces conidia that are aseptate, hyaline, cruciform, consisting of cylindrical, straight main axis and lateral branches. Phylogenetic position for *Cruciger* is unresolved due to lack of sequence data. References: (Kirschner & Oberwinkler, 1999a) (morphology), (Wijayawardene et al., 2020) (outline).

Cryonesomyces Unter. & Réblová, Mycologia 111 (6): 1017 (2019)

Index Fungorum number: IF829380

Classification: Vandijckellaceae, Helotiales, Leotiomycetidae, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Cryonesomyces dreyfussii* Unter., Réblová & Bills, Mycologia 111 (6): 1017 (2019)

Sexual morph: Unknown.

Sequence data: *Cryonesomyces dreyfussii* (ATCC 201333, LSU: MH753594, ITS: MH753594, SSU: MH762904)

Notes: *Cryonesomyces* was established by Untereiner et al. (2019) and is characterized by having mononematous, sparingly and basitonously branched, hyaline conidiophores, with phialidic, bearing cylindrical or cup-shaped collarettes, cylindrical, hyaline conidiogenous cells, producing aseptate, accumulating in chains or small groups, clavate to ellipsoidal, hyaline conidia. Phylogenetically, *Cryonesomyces* was shown to be nested within the family Vandijckellaceae (Helotiales, Leotiomycetidae, Leotiomycetes) (Figure 2.1). References: (Untereiner et al., 2019) (morphology and phylogeny).

Cryptophiale Piroz., Canadian Journal of Botany 46 (9): 1123 (1968)

Index Fungorum number: IF7833

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Cryptophiale kakombensis* Piroz., Canadian Journal of Botany 46 (9): 1124 (1968)

Sexual morph: Unknown.

Sequence data: *Cryptophiale udagawae* (GZCC 18-0047, LSU: MN104619, ITS: MN104608)

Notes: *Cryptophiale* was introduced by Pirozynski (1968) and is characterized by macronematous, mononematous, subulate, setiform, unbranched or apically dichotomous or verticillate, brown conidiophores with conidiogenous zone closely arranged on only one side at the median or apical or subapical parts; conidiogenous cells are phialidic, discrete and encircle the conidiophores and are protected by shield cells; conidia are aseptate or septate, simple, in slimy mass, falcate to cylindrical, hyaline. References: (Lin et al., 2019b; Pirozynski, 1968; Whitton et al., 2012; Yang et al., 2018) (morphology and/or phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Cryptophialoidea Kuthub. & Nawawi, Transactions of the British Mycological Society 89 (4): 581 (1987)

Index Fungorum number: IF11061

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Cryptophialoidea secunda* (Kuthub. & B. Sutton) Kuthub. & Nawawi, Transactions of the British Mycological Society 89 (4): 583 (1987)

Sexual morph: Unknown.

Sequence data: *Cryptophialoidea fasciculata* (MFLUCC 17-2119, LSU: MH758208, ITS: MH758195)

Notes: *Cryptophialoidea* was introduced by Kuthubutheen and Nawawi (1987b) and is characterized by macronematous, mononematous, subulate, setiform, unbranched or dichotomously branched, brown conidiophores with conidiogenous zone closely arranged on only one side at the median parts; conidiogenous cells are

monophialidic, discrete, lageniform with collarettes; conidia are septate, simple, in mucous mass, falcate or uncinate, hyaline. References: (Delgado et al., 2005; Kuthubutheen & Nawawi, 1987b, 1994a; Whitton et al., 2012; Yang et al., 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Cryptumbellata Udagawa & Uchiy., Mycotaxon 70: 186 (1999)

Index Fungorum number: IF28268

Classification: Ascomycota genera *incertae sedis*

Type species: *Cryptumbellata terricola* Udagawa & Uchiy., Mycotaxon 70: 188 (1999)

Sexual morph: Unknown.

Synanamorphs: *Chrysosporium* (Udagawa & Uchiyama, 1999).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Cryptumbellata* was introduced by Udagawa and Uchiyama (1999) and has sporodochial, scattered, pale brown conidiomata, irregularly branched, septate, hyaline conidiophores, with monoblastic and polyblastic, discrete, sympodial, short-cylindrical, hyaline conidiogenous cells, and produces solitary, aseptate, verruculose, subglobose to obovoid, subhyaline conidia (Udagawa & Uchiyama, 1999). It has branched, hooked, brown setae surrounding conidiophores (Seifert et al., 2011; Udagawa & Uchiyama, 1999). Phylogenetic position for *Cryptumbellata* is unresolved due to lack of sequence data. References: (Udagawa & Uchiyama, 1999) (morphology), (Wijayawardene et al., 2020) (outline).

Ctenosporium R. Kirschner, Mycological Progress 5 (3): 136 (2006)

Index Fungorum number: IF500777

Classification: Ascomycota genera *incertae sedis*

Type species: *Ctenosporium pectinatum* R. Kirschner, Mycological Progress 5 (3): 137 (2006)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ctenosporium* was established by Kirschner and Piepenbring (2006) and is characterized by having micronematous, hyaline conidiophores, with

monoblastic conidiogenous cells, and producing conidia that are solitary, hyaline, asymmetric, pectinate, consisting of curved main axis and unilateral, parallel, septate branches. Phylogenetic position for *Ctenosporium* is unresolved due to lack of sequence data. References: (Kirschner & Piepenbring, 2006) (morphology), (Wijayawardene et al., 2020) (outline).

Curucispora Matsush., Matsushima Mycological Memoirs 2: 4 (1981)

Index Fungorum number: IF7845

Classification: Ascomycota genera *incertae sedis*

Type species: *Curucispora ponapensis* Matsush., Matsushima Mycological Memoirs 2: 4 (1981)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Curucispora* was established by Matsushima (1982) and it has reduced conidiophores, and solitary, staurosporous, x-form, hyaline conidia. Phylogenetic position for *Curucispora* is unresolved due to lack of sequence data. References: (Matsushima, 1982) (morphology), (Wijayawardene et al., 2020) (outline).

Curvicladiella Decock & Crous, Studies in Mycology 55: 225 (2006)

Index Fungorum number: IF500866

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Curvicladiella cignea* (Decock & Crous) Decock & Crous, Studies in Mycology 55: 225 (2006)

Sexual morph: unknown.

Sequence data: *Curvicladiella cignea* (CBS 109167 = CPC 1595 = MUCL 40269, LSU: AY793431, ITS: AF220973)

Notes: *Curvicladiella* is characterized by sporodochial or synnematous conidiomata, macronematous, penicillate, hyaline or pale brown conidiophores, phialidic, hyaline conidiogenous cells, and septate, hyaline conidia (Lombard et al.,

2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Custingophora Stolk, Hennebert & Klopotek, Persoonia 5 (2): 195 (1968)

Index Fungorum number: IF7851

Classification: Gondwanamycetaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Custingophora olivacea* Stolk, Hennebert & Klopotek, Persoonia 5 (2): 197 (1968)

Sexual morph: *Chaetosphaeria*, *Gondwanamyces* (Seifert et al., 2011)

Sequence data: *Custingophora olivacea* (CBS 335.68, LSU: NG_064068, ITS: NR_159847, SSU: NG_061137)

Notes: *Custingophora* was introduced by Stolk and Hennebert (1968) and is characterized by mononematous, aspergillate or penicillate, sympodial, brown conidiophores, phialidic, brown conidiogenous cells, and aseptate, in slimy mass, hyaline conidia (Seifert et al., 2011). References: (Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Cylindrium Bonord., Handbuch der allgemeinen Mykologie: 34 (1851)

= *Pseudoidriella* Crous & R.G. Shivas, Persoonia 27: 135 (2011)

Index Fungorum number: IF7865

Classification: Cylindriaceae, Amphisphaeriales, Sordariomycetes, Ascomycota

Type species: *Cylindrium elongatum* Bonord., Handbuch der allgemeinen Mykologie: 34 (1851)

Sexual morph: Unknown.

Sequence data: Sequence data for ex-type culture of type species is unavailable.

Notes: This genus has sporodochia conidiomata or solitary conidiophores, branched, hyaline or brown conidiophores, sympodial, hyaline conidiogenous cells, and aseptate to multi-septate, chains, hyaline conidia. Lombard et al. (2015) excluded *Cylindrium* from Nectriaceae and treated as *incertae sedis*, then Crous et al. (2018b)

introduced the family Cylindriaceae to accommodate it. *Pseudoidriella* was synonymized under *Cylindrium* (Crous et al., 2018b). References: (Crous et al., 2011b, 2018b, 2020b, 2020c; Lombard et al., 2015) (morphology and phylogeny)

Cylindrocarpostylus R. Kirschner & Oberw., Mycological Research 103 (9): 1155 (1999)

Index Fungorum number: IF28330

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Cylindrocarpostylus gregarius* (Bres.) R. Kirschner & Oberw., Mycological Research 103 (9): 1155 (1999)

Sexual morph: Unknown.

Sequence data: *Cylindrocarpostylus gregarius* (CBS 101072, LSU: JQ666084, ITS: KM231747)

Notes: This genus is characterized by macronematous, mononematous, penicillate, hyaline conidiophores, phialidic, cylindrical conidiogenous cells, and septate, aggregating in a slimy mass, curved, cylindrical, hyaline conidia (Kirschner & Oberwinkler, 1999b). Phylogenetically, this genus located in the family Nectriaceae. References: (Kirschner & Oberwinkler, 1999b) (morphology), (Lombard et al., 2015) (phylogeny), (Wijayawardene et al., 2017a) (outline).

Cylindrocladiella Boesew., Canadian Journal of Botany 60 (11): 2289 (1982)

Index Fungorum number: IF7869

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Cylindrocladiella parva* (P.J. Anderson) Boesew., Canadian Journal of Botany 60 (11): 2289 (1982)

Sexual morph: *Nectricladiella* (Seifert et al., 2011).

Disease symptoms: Black-foot disease, dieback, Grapevine pathogens (Agusti-Brisach et al., 2012; Brielmaier-Liebetanz et al., 2013; Jones et al., 2012; Koike et al., 2016; Scattolin & Montecchio, 2007).

Sequence data: *Cylindrocladiella lageniformis* (CBS 340.92 = PPRI 4449 = UFV 115, LSU: JN099165, ITS: AF220959)

Notes: *Cylindrocladiella* was introduced by Boesewinkel (1982) and its asexual morph is characterized by its setae are hyaline, aseptate vesiculate extensions of conidiophores, conidiophores are macronematous, mononematous, penicillate, hyaline, conidiogenous cells are phialidica, hyaline, conidia are aseptate or multiseptate, in slimy head, cylindrical, hyaline and chlamydospores are brown, thick-walled (Boesewinkel, 1982; Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Cylindrodendrum Bonord., Handbuch der allgemeinen Mykologie: 98 (1851)

Index Fungorum number: IF7873

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Cylindrodendrum album* Bonord., Handbuch der allgemeinen Mykologie: 48 (1851)

Sexual morph: Unknown.

Synanamorphs: *Cylindrocarpon* (Seifert et al., 2011).

Sequence data: *Cylindrodendrum album* (CBS 301.83 = ATCC 46842 = IMI 255534, LSU: KM231626, ITS: KM231764)

Notes: *Cylindrodendrum* is characterized by mononematous, branched or verricillate, hyaline conidiophores, monophialidic conidiogenous cells, aseptate or 1-septate, cylindrical, hyaline conidia. References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Cylindromonium Crous, Persoonia 43: 313 (2019)

Index Fungorum number: IF832900

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Cylindromonium eugeniicola* Crous, Persoonia 43: 313 (2019)

Sexual morph: Unknown.

Sequence data: *Cylindromonium eugeniicola* (CPC 37170, LSU: NG_068337, ITS: NR_166338)

Notes: *Cylindromonium* was introduced by Crous et al. (2019d) for three acremonium-like species. References: (Crous et al., 2019d) (morphology and phylogeny).

Cylindrosympodium W.B. Kendr. & R.F. Castañeda, University of Waterloo Biology Series 32: 9 (1990)

Index Fungorum number: IF11257

Classification: Cylindrosympodiaceae, Venturiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Cylindrosympodium variabile* (de Hoog) W.B. Kendr. & R.F. Castañeda, University of Waterloo Biology Series 32: 10 (1990)

Sexual morph: Unknown.

Sequence data: *Cylindrosympodium variabile* (CBS 563.82, LSU: NG_070448, ITS: NR_168776)

Notes: This genus was described by Castañeda Ruíz and Kendrick (1990) and is characterized by having macronematous, mononematous, solitary, unbranched or branched, sometimes reduced, straight to geniculate-sinuous, hyaline to brown conidiophores, with polyblastic, sympodial, terminal, integrated, denticulate, hyaline to medium brown conidiogenous cells, producing solitary, septate, subacicular to narrowly subcylindrical, hyaline to pale brown conidia (Castañeda Ruíz & Kendrick, 1990; Crous et al., 2007b; Seifert et al., 2011). Shen et al. (2020) introduced the family Cylindrosympodiaceae and accepted this genus within it. Phylogenetically, representatives of *Cylindrosympodium* clustered in the family Cylindrosympodiaceae (Venturiales, Dothideomycetes) (Figure 2.1). References: (Castañeda Ruíz & Kendrick, 1990; Crous et al., 2007b; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Cylindrotrichum Bonord., Handbuch der allgemeinen Mykologie: 88 (1851)

Index Fungorum number: IF7881

Classification: Reticulascaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

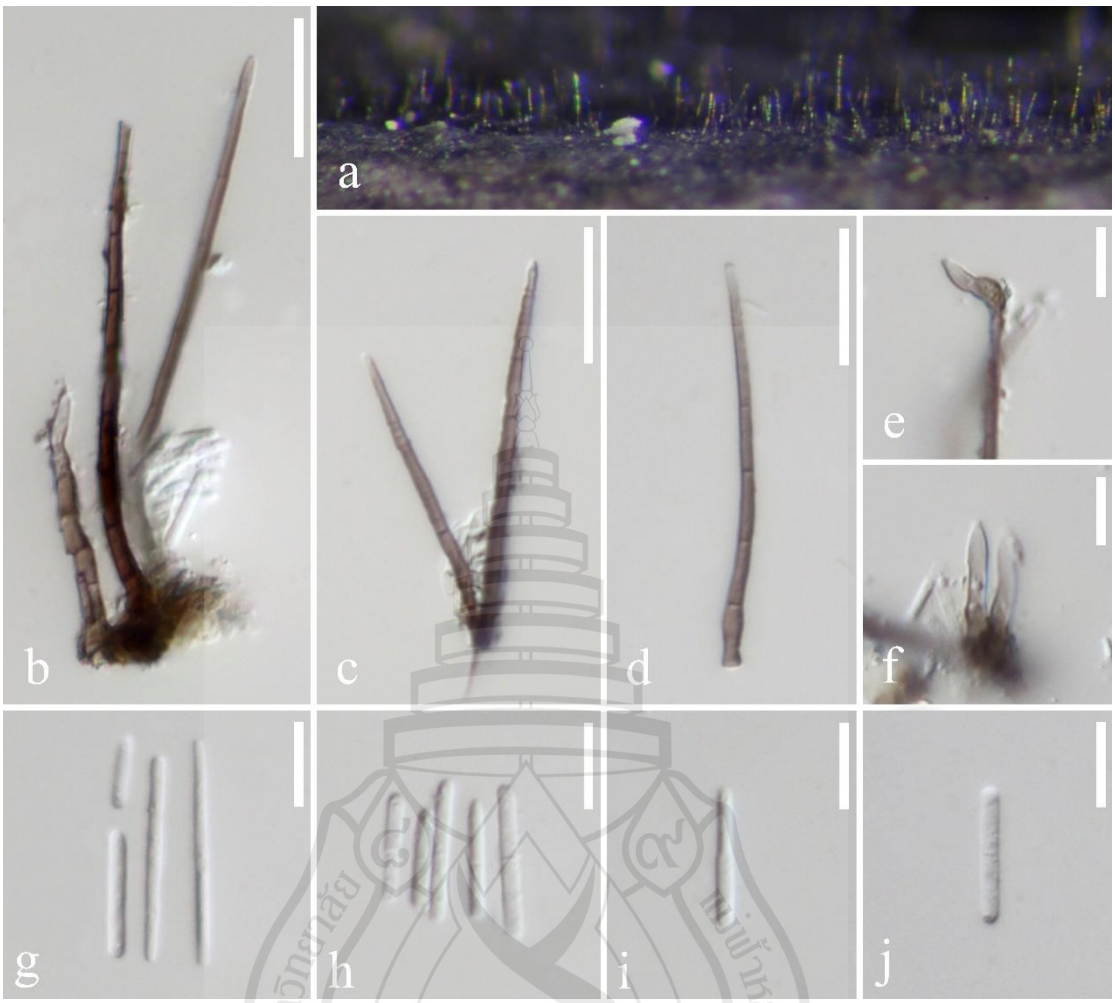
Type species: *Cylindrotrichum oligospermum* (Corda) Bonord., Handbuch der allgemeinen Mykologie: 88 (1851)

Sexual morph: *Reticulascus* (Réblová et al., 2011a).

Synanamorphs: cladosporium-like (Seifert et al., 2011).

Sequence data: *Cylindrotrichum submersum* (MFLU 18-2320, LSU: NG_068641, ITS: NR_168818, SSU: MK834780)

Notes: *Cylindrotrichum* is characterized by setae are none or next to conidiophores, brown, conidiophores are macronematous, mononematous, unbranched or sparingly branched, brown, conidiogenous cells are polyphialidic, sympodial, brown, conidia are aseptate or septate, hyaline (Seifert et al., 2011). References: (DiCosmo et al., 1983; Morgan-Jones, 1977; Réblová & Gams, 1999; Réblová et al., 2011a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Cylindrotrichum*** **sp.** (Material examined: China, Guizhou Province, Guiyang City, Guanshanhu District, Baihuahu Scenic Area, 18 April 2018, Yao Feng, BHH 1-4). **a** Conidiophores on the host surface. **b–f** Setae and conidiophores. **g–j** Conidia. Scale bars: **b–d** = 20 μm, **e–j** = 10 μm.

Figure 2.14 *Cylindrotrichum* sp.

Cyphellophora G.A. de Vries, Mycopathologia et Mycologia Applicata 16: 47 (1962)

= *Pseudomicrodochium* B. Sutton, Transactions of the British Mycological Society 64 (3): 417 (1975)

Index Fungorum number: IF7885

Classification: Cyphellophoraceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Cyphellophora laciniata* G.A. de Vries, Mycopathologia et Mycologia Applicata 16: 47 (1962)

Sexual morph: ?*Lahmia* (Seifert et al., 2011).

Disease symptoms: skin and nail infection in humans

Sequence data: *Cyphellophora laciniata* (CBS 190.61, LSU: FJ358239, ITS: EU035416, SSU: FJ358307)

Notes: *Cyphellophora* was introduced by de Vries (1962) and is characterized by reduced or unbranched or sparingly branched conidiophores, phialidic, flask-shaped, brown conidiogenous cells with distinctive collarettes, and produce multiseptate, mostly curved, hyaline to brown conidia (Seifert et al., 2011). *Pseudomicrodochium* was synonymized under *Cyphellophora* (Feng et al., 2014b). References: (de Vries, 1962; Feng et al., 2014b) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Cystodendron Bubák, Annales Mycologici 12 (2): 212 (1914)

Index Fungorum number: IF7893

Classification: Mollisiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Cystodendron dryophilum* (Pass.) Bubák, Annales Mycologici 12 (2): 212 (1914)

Sexual morph: *Belonopsis*, *Bisporella*, *Mollisia*, *Niptera* (Seifert et al., 2011).

Sequence data: *Cystodendron dryophilum* (CBS 295.81, LSU: MT026557, ITS: MT026425)

Notes: *Cystodendron* is characterized by having sporodochial or synnematous conidiomata, macronematous or semi-macronematous, branched or penicillate, brown conidiophores, with phialidic with deep collarettes, discrete or integrated, terminal, brown conidiogenous cells, producing endogenous, aseptate, ellipsoidal, spherical or subspherical, hyaline conidia aggregated in slimy mass (Ellis, 1971; Seifert et al., 2011). Phylogenetically, *Cystodendron* was shown to be nested within the family Mollisiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Ellis, 1971; Seifert et al., 2011; Tanney & Seifert, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Dacrymyces Nees, System der Pilze und Schwämme: 89 (1817)

Index Fungorum number: IF17455

Classification: Dacrymycetaceae, Dacrymycetales, Dacrymycetes, Agaricomycotina, Basidiomycota

Type species: *Dacrymyces stillatus* Nees, System der Pilze und Schwämme: 89, t. 7:90 (1817)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Dacrymyces stillatus* (UPS F-939814, LSU and ITS: MN595676, SSU: MN593455)

Notes: The asexual morph of *Dacrymyces* has sporodochial, gelatinous conidiomata, branched, hyaline conidiophores, with thallic-arthric, hyaline conidiogenous cells, producing catenate, aseptate or septate, hyaline conidia, and blastic, aseptate microconidia (Seifert et al., 2011). Stalpers et al. (2021) synonymized *Dacryoscyphus* under *Dacrymyces*. Phylogenetically, representatives of *Dacrymyces* clustered in the family Dacrymycetaceae (Dacrymycetales, Dacrymycetes) (Figure 2.1). References: (Seifert et al., 2011; Shirouzu et al., 2013, 2017; Zamora & Ekman, 2020) (morphology and phylogeny), (He et al., 2019) (outline).

Dacryoma Samuels, Brittonia 40 (3): 328 (1988)

Index Fungorum number: IF25250

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Dacryoma album* Samuels, Brittonia 40 (3): 328 (1988)

Sexual morph: ?*Nectria* (Samuels, 1988; Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Dacryoma* was established by Samuels (1988) and it has sporodochial or synnematous, scattered conidiomata, macronematous, branched, septate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, and produces aseptate, ellipsoidal, hyaline conidia. Phylogenetic position for *Dacryoma* is unresolved due to lack of sequence data. References: (Samuels, 1988) (morphology), (Wijayawardene et al., 2020) (outline).

Dacryoscyphus R. Kirschner & Zhu L. Yang, Antonie van Leeuwenhoek 87 (4): 331 (2005)

Index Fungorum number: IF28955

Classification: Dacrymycetaceae, Dacrymycetales, Dacrymycetes, Agaricomycotina, Basidiomycota

Type species: *Dacryoscyphus chrysochilus* R. Kirschner & Zhu L. Yang, Antonie van Leeuwenhoek 87 (4): 331 (2005)

Sexual morph: Unknown.

Sequence data: *Dacryoscyphus chrysochilus* (KUN F45014, LSU: AY604567)

Notes: This genus was described by Kirschner and Yang (2005) and is characterized by having sporodochial, laterally attached, cupulate, gelatinous conidiomata, with monoblastic, terminal or intercalary conidiogenous cells, producing solitary, septate, staurosporous, hyaline or pale conidia. Stalpers et al. (2021) synonymized *Dacryoscyphus* under *Dacrymyces*. Phylogenetically, representative of *Dacryoscyphus* clustered in the family Dacrymycetaceae (Dacrymycetales, Dacrymycetes) (Figure 2.1). References: (Kirschner & Yang, 2005; Zamora & Ekman, 2020) (morphology and phylogeny), (He et al., 2019) (outline).

Dactylaria Sacc., Michelia 2 (6): 20 (1880)

Index Fungorum number: IF7916

Classification: Helotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Dactylaria purpurella* (Sacc.) Sacc., Michelia 2 (6): 20 (1880)

Sexual morph: *Acrospermum*, *Coniolariella*, *Orbilia*, ?*Synaptospora* (Seifert et al., 2011).

Synanamorphs: *Acrodictys*, *Beejadwaya*, *Idriella*, *Microdochium*, *Monodictys*, *Ramichloridium* (Seifert et al., 2011)

Sequence data: *Dactylaria dimorphospora* (CBS 256.70, LSU: NG_068277, ITS: NR_164282)

Notes: *Dactylaria* is characterized by having macronematous, mononematous, solitary or fasciculate, unbranched or branched, hyaline or brown conidiophores, with polyblastic, integrated, terminal and intercalary, sympodial, denticulate, hyaline or brown conidiogenous cells, producing solitary, 1- to multi-septate, variously shaped, hyaline or brown conidia (Ellis, 1976; Seifert et al., 2011). Phylogenetically, *Dactylaria* was shown to be nested within the family xxx (Helotiales, Leotiomycetes) (Figure 2.1). References: (Ellis, 1976; Seifert et al., 2011) (morphology), (Hyde et al., 2020; Seifert et al., 2011) (outline).

Dactylella Grove, Journal of Botany, British and Foreign 22: 199 (1884)

Index Fungorum number: IF7918

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Dactylella minuta* Grove, Journal of Botany, British and Foreign 22: 199 (1884)

Sexual morph: *Orbilia* (Baral et al., 2020).

Sequence data: *Dactylella clavata* (CBS 167.95, LSU: NG_059079, ITS: MH862506, SSU: NG_062731)

Notes: For details of this genus see the monograph in Baral et al. (2020). Phylogenetically, *Dactylella* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Dactylellina M. Morelet, Bulletin de la Société des Sciences Naturelles et d'Archéologie de Toulon et du Var 178: 6 (1968)

Index Fungorum number: IF7919

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Dactylellina leptospora* (Drechsler) M. Morelet, Bulletin de la Société des Sciences Naturelles et d'Archéologie de Toulon et du Var 178: 6 (1968)

Sexual morph: *Orbilia* (Baral et al., 2020).

Sequence data: *Dactylellina appendiculata* (CBS 206.64, LSU: NG_059071.1, ITS: NR_153966.1, SSU: AF106531)

Notes: For details of this genus see the monograph in Baral et al. (2020). Phylogenetically, *Dactylellina* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Dactylidispora Y. Marín, Stchigel, Guarro & Cano, MycoKeys 44: 89 (2018)

Index Fungorum number: IF812079

Classification: Ceratostomataceae, Coronophorales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Dactylidispora ellipsospora* (Takada) Y. Marín, Stchigel, Guarro & Cano, MycoKeys 44: 90 (2018)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph.

Sequences data: *Dactylidispora ellipsospora* (NBRC 31376, LSU: NG_067533, ITS: NR_161015, SSU: NG_065635)

Notes: *Dactylidispora* was introduced by Marin-Felix et al. (2018) to accommodate three fungi that isolated from soil and its asexual morph has reduced conidiophores, phialidic, flask-shaped, hyaline conidiogenous cells and subglobosa to ovoid, smooth-walled, hyaline conidia. References: (Marin-Felix et al., 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Dactylobotrys S.Q. He & S.R. Wang, Mycosystema 34 (3): 333 (2015)

Index Fungorum number: IF570100

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Dactylobotrys graminicola* S.Q. He & S.R. Wang, Mycosystema 34 (3): 333 (2015)

Sexual morph: Unknown.

Sequence data: *Dactylobotrys graminicola* (Gan-1131, ITS: JF320820)

Notes: *Dactylobotrys* was introduced by He et al. (2015) collected from sheath rot of hulless barley and oats and is *Botrytis*-like. Phylogenetic position for *Dactylobotrys* is unresolved due to lack of LSU sequence data. References: (He et al., 2015) (morphology), (Wijayawardene et al., 2020) (outline).

Davidsoniella Z.W. de Beer, T.A. Duong & M.J. Wingf., Studies in Mycology 79: 210 (2014)

Index Fungorum number: IF810235

Classification: Ceratocystidaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Davidsoniella virescens* (R.W. Davidson) Z.W. de Beer, T.A. Duong & M.J. Wingf., Studies in Mycology 79: 210 (2014)

Sexual morph: Introduced as holomorphic genus with hyphomycetous asexual morph (de Beer et al., 2014).

Sequence data: *Davidsoniella neocaledoniae* (CBS 149.83, LSU: NG_059083, ITS: NR_159853, SSU: NG_062760)

Notes: *Davidsoniella* was introduced by de Beer et al. (2014) to accommodate *D. australis*, *D. eucalypti*, *D. neocaledoniae* and *D. virescens*. Its asexual morph has mononematous conidiophores, phialidic, cylindrical, hyaline conidiogenous cells, and catenate, aseptate, cylindrical, barrel-shaped, hyaline conidia. References: (de Beer et al., 2014) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Delortia Pat. & Gaillard, Bulletin de la Société Mycologique de France 4 (2): 43 (1888)

Index Fungorum number: IF7935

Classification: Ascomycota genera *incertae sedis*

Type species: *Delortia palmicola* Pat., Bulletin de la Société Mycologique de France 4 (2): 43 (1888)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Some species were transformed to *Everhartia*, and only two species are accepted. Phylogenetic position for *Delortia* is unresolved due to lack of sequence data. References: (Goh & Hyde, 1997b; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Dematiocladium Allegrucci, Aramb., Cazau & Crous, Mycological Research 109 (7): 836 (2005)

Index Fungorum number: IF28939

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Dematiocladium celtidis* Allegrucci, Aramb., Cazau & Crous, Mycological Research 109 (7): 836 (2005)

Sexual morph: Unknown.

Sequence data: *Dematiocladium celtidis* (CBS 115994, LSU: AY793438, ITS: AY793430)

Notes: *Dematiocladium* was introduced by Crous et al. (2005) with *Cylindrocladium*-like morphological characters but differ from other genera by brown to dark brown, thick-walled setae, hyaline, penicillate conidiophores, phialidic conidiogenous cells, cylindrical conidia, globose, medium brown chlamydospores and lacking stipe extensions and vesicles. References: (Crous et al., 2005; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Dematiohelicomyces Y.Z. Lu, Boonmee & K.D. Hyde, Fungal Diversity 92: 159 (2018)

Index Fungorum number: IF554824

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Dematiohelicomyces helicosporus* (Boonmee, Y.Z. Lu & K.D. Hyde) Y.Z. Lu, Fungal Diversity 92: 159 (2018)

Sexual morph: Unknown.

Sequence data: *Dematiohelicomyces helicosporus* (MFLUCC 16-0213, LSU: KX454170, ITS: KX454169)

Notes: *Dematiohelicomyces* was established by Lu et al. (2018b) and is characterized by having macronematous, mononematous, mostly unbranched, pale brown conidiophores, mono- to polyblastic, integrated, sympodial, terminal, pale brown conidiogenous cells, and producing solitary, helicoid, coiled $1^1/_2$-$3^3/_4$ times, becoming loosely coiled or uncoiled in water, guttulate, hyaline conidia. References: (Lu et al., 2018b) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2020) (outline).

Dematioscypha Svrcek, Ceská Mykologie 31 (4): 193 (1977)

= *Haplographium* Berk. & Broome, Annals and Magazine of Natural History 3: 361 (1859)

Index Fungorum number: IF1449

Classification: Hyaloscyphaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

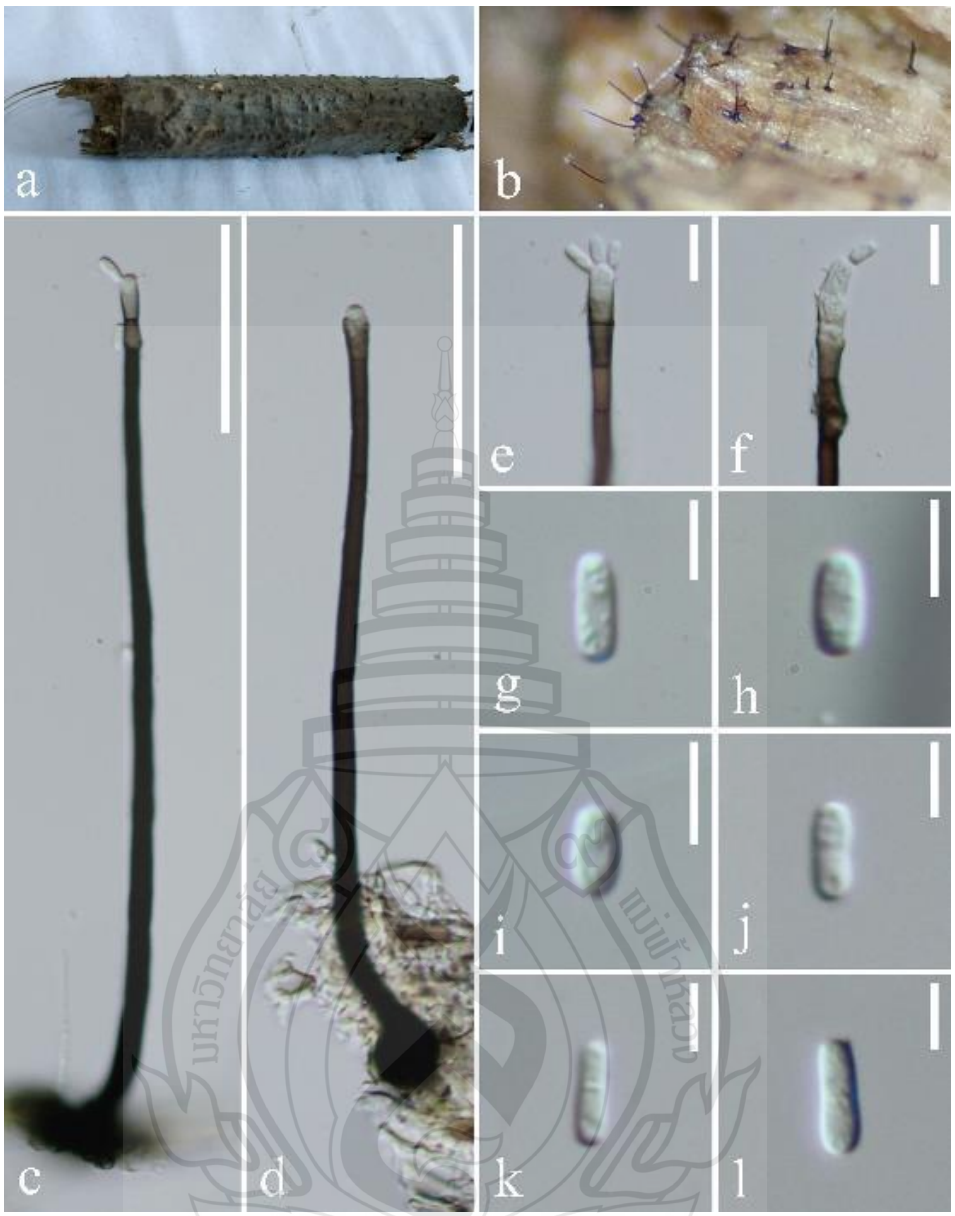
Type species: *Dematioscypha dematiicola* (Berk. & Broome) Svrcek, Ceská Mykologie 31 (4): 193 (1977)

Sexual morph: *Dematioscypha* (Seifert et al., 2011)

Sequence data: *Dematioscypha delicata* (before known as *Haplographium delicatum*) (CBS 739.68, LSU: MH870940, ITS: MH859215)

Notes: *Haplographium* is characterized by having penicillate, brown conidiophores, with sympodial, hyaline to subhyaline conidiogenous cells, producing aseptate, hyaline conidia aggregated in slimy mass (Seifert et al., 2011). The sexual

morph of *Haplographium* was reported in the genus *Dematioscypha*, Johnston et al. (2014) proposed to protect *Dematioscypha* over *Haplographium*. Phylogenetically, *Haplographium* was shown to be nested within the family ?Hyaloscyphaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).



Note ***Haplographium*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-17). **a** Host material. **b** Conidiophores on the host surface. **c, d** conidiophores. **e, f** Conidiogenous cells. **g–l** Conidia. Scale bars: **c**, **d** = 50 μm, **e**, **f** = 10 μm, **g–l** = 5 μm.

Figure 2.15 *Haplographium* sp.

Dematophora R. Hartig, Untersuchungen aus dem Forstbotanischen Institut zu München 3: 95, 125 (1883)

Index Fungorum number: IF7938

Classification: Xylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Dematophora necatrix* R. Hartig, Untersuchungen aus dem Forstbotanischen Institut zu München 3: 125 (1883)

Sexual morph: *Rosellinia* (Réblová et al., 2016a).

Sequence data: *Dematophora necatrix* (CBS 349.36, LSU: KF719204, ITS: AY909001)

Notes: *Dematophora* is characterized by synnematous conidiomata, macronematous, branched, brown conidiophores, with polyblastic, sympodial, scars and denticulate, brown conidiogenous cells, producing solitary, aseptate, ellipsoidal or obovoid, hyaline or pale brown conidia (Ellis, 1971). The sexual morph of *Dematophora* was reported in *Rosellinia* and *Dematophora* was synonymized under *Rosellinia* (Réblová et al., 2016a). However, *Dematophora* was resurrected and divided from *Rosellinia* by Wittstein et al. (2020). References: (Ellis, 1971; Wittstein et al., 2020) (morphology and phylogeny).

Dendrocollybia R.H. Petersen & Redhead, Mycological Research 105 (2): 169 (2001)

= *Tilachlidiopsis* Keissl., Annalen des Naturhistorischen Museums Wien 37: 215 (1924)

Index Fungorum number: IF28459

Classification: Agaricales genera *incertae sedis*, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Dendrocollybia racemosa* (Pers.) R.H. Petersen & Redhead, Mycological Research 105 (2): 169 (2001)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Tilachlidiopsis* (Stalpers et al., 2021).

Sequence data: *Dendrocollybia racemosa* (DUKE-DEB5575, LSU: AF042598, ITS: DQ825425, SSU: DQ825432)

Notes: The sexual morph of *Tilachlidiopsis* was reported in the genus *Dendrocollybia*, Stalpers et al. (2021) proposed to use *Dendrocollybia* rather than *Tilachlidiopsis*. Phylogenetically, representative of *Dendrocollybia* clustered in the order Agaricales (Agaricomycetes) (Figure 2.1). References: (He et al., 2019) (outline).

Dendrospora Ingold, Transactions of the British Mycological Society 26 (3-4): 106 (1943)

Index Fungorum number: IF7946

Classification: Ascomycota genera *incertae sedis*

Type species: *Dendrospora erecta* Ingold, Transactions of the British Mycological Society 26 (3-4): 107 (1943)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011).

Sequence data: *Dendrospora tenella* (UMB-913.11, ITS: KF730811)

Notes: *Dendrospora* was introduced by Ingold (1943a) for an aquatic fungus and is characterized by having mononematous, reduced, hyaline conidiophores, producing conidia that are solitary, staurosporous, septate, branched, hyaline, consisting of one main axis with several secondary and tertiary ramuli. Phylogenetic position for *Dendrospora* is unresolved due to lack of LSU sequence data. References: (Ingold, 1943a) (morphology), (Wijayawardene et al., 2020) (outline).

Dendrosporium Plakidas & Edgerton ex J.L. Crane, Transactions of the British Mycological Society 58 (3): 423 (1972)

Index Fungorum number: IF7947

Classification: Sordariomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Dendrosporium lobatum* Plakidas & Edgerton ex J.L. Crane, Transactions of the British Mycological Society 58 (3): 423 (1972)

Sexual morph: Unknown.

Sequence data: *Dendrosporium lobatum* (CBS 190.36; ATCC 22370; MUCL 28086, LSU: MH855767, ITS: MH855767)

Notes: *Dendrosporium* was reintroduced by Crane (1972) and is characterized by simple or branched, hyaline conidiophores, sympodial, denticulate, hyaline conidiogenous cells, and producing solitary, septate, flattened, somewhat triangular, deeply constricted, with lobes on each side, hyaline conidia. Previous studies placed this genus in Ascomycota genera *incertae sedis* (Wijayawardene et al., 2017a, 2020). In this study, we provided the first phylogenetic analysis for this genus, and it showed that the ex-type strain of the generic type located in Sordariomycetes. Herein, we suggest putting this genus within Sordariomycetes genera *incertae sedis*. References: (Crane, 1972) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Dendrosporomyces Nawawi, J. Webster & R.A. Davey, Transactions of the British Mycological Society 68 (1): 59 (1977)

Index Fungorum number: IF7948

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Dendrosporomyces prolifer* Nawawi, J. Webster & R.A. Davey, Transactions of the British Mycological Society 68 (1): 59 (1977)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Dendrosporomyces* was introduced by Nawawi et al. (1977) and it has semi-macronematous, mononematous, unbranched, hyaline conidiophores, and produces conidia that are hyaline, branched, consisting of a main axis and laterals secondary branches. Phylogenetic position for *Dendrosporomyces* is unresolved due to lack of sequence data. References: (Nawawi et al., 1977) (morphology), (Wijayawardene et al., 2020) (outline).

Dennisographium Rifai, Kew Bulletin 31 (3): 726 (1977)

Index Fungorum number: IF7955

Classification: Ascomycota genera *incertae sedis*

Type species: *Dennisographium episphaeriae* Rifai, Kew Bulletin 31 (3): 726 (1977)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Two species are accepted in this genus. Phylogenetic position for *Dennisographium* is unresolved due to lack of sequence data. References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Dentocircinomyces R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 32: 17 (1990)

Index Fungorum number: IF11258

Classification: Ascomycota genera *incertae sedis*

Type species: *Dentocircinomyces occidentalis* R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 32: 17 (1990)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Dentocircinomyces* was introduced by Castañeda Ruíz and Kendrick (1990) and only one species is accepted. Phylogenetic position for *Dentocircinomyces* is unresolved due to lack of sequence data. References: (Castañeda Ruíz & Kendrick, 1990) (morphology), (Wijayawardene et al., 2020) (outline).

Descalsia A. Roldán & Honrubia, Mycological Research 92 (4): 494 (1989)

Index Fungorum number: IF11066

Classification: Ascomycota genera *incertae sedis*

Type species: *Descalsia cruciata* A. Roldán & Honrubia, Mycological Research 92 (4): 495 (1989)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Descalsia* was introduced by Roldán and Honrubia (1989) for a aquatic hyphomycete, and it has micronematous, reduced, hyaline conidiophores, with integrated or terminal or lateral, discrete, sympodial conidiogenous cells, and produces solitary, branched, staurosporous, hyaline conidia. Phylogenetic position for

Descalsia is unresolved due to lack of sequence data. References: (Roldán & Honrubia, 1989) (morphology), (Wijayawardene et al., 2020) (outline).

Desmazierella Lib., Annales des Sciences Naturelles Botanique 17: 83 (1829)

= *Verticicladium* Preuss, Linnaea 24: 127 (1851)

Index Fungorum number: IF1481

Classification: Chorioactidaceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Desmazierella acicola* Lib., Annales des Sciences Naturelles Botanique 17: 82 (1829)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Verticicladium* (Seifert et al., 2011).

Sequence data: *Desmazierella acicola* (NBRC 102300, LSU: LN589938, ITS: LN589938)

Notes: Phylogenetically, representative of *Desmazierella* clustered in the family Chorioactidaceae, Pezizales, Pezizomycetes (Figure 2.1). References: (Wijayawardene et al., 2020) (outline).

Devonomyces Videira & Crous, Studies in Mycology 87: 353 (2017)

Index Fungorum number: IF822695

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Devonomyces endophyticus* (Crous & H. Sm. ter) Videira & Crous, Studies in Mycology 87: 353 (2017)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Videira et al., 2017).

Sequence data: *Devonomyces endophyticus* (CBS 114662 = CPC 1193, LSU: NG_070367, ITS: NR_164212, SSU: NG_061085)

Notes: *Devonomyces* was established by Videira et al. (2017) and its asexual morph has sporodochial caespituli, and verruculose, cylindrical, straight to irregularly curved, mostly hyaline conidiophores, with terminal, sympodial, hyaline

conidiogenous cells, produces solitary, aggregated in slimy mass, septate, irregularly curved, narrowly obclavate, hyaline conidia. Phylogenetically, *Devonomyces* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Dexhowardia J.J. Taylor, Mycopathologia et Mycologia Applicata 40 (3-4): 305-308 (1970)

Index Fungorum number: IF7971

Classification: Ascomycota genera *incertae sedis*

Type species: *Dexhowardia tetraspora* J.J. Taylor, Mycopathologia et Mycologia Applicata 40 (3-4): 306 (1970)

Sexual morph: Unknown.

Synanamorphs: *Riessia* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Dexhowardia* was erected by Taylor (1970) for a fungus isolated from the contaminant of the culture of *Sporotrichum aureum*. It has mononematous, unbranched or branched, septate, sometimes reduced, hyaline conidiophores, with sympodial, synchronous, denticulate, long, cylindrical, hyaline conidiogenous cells, and produces solitary, aseptate, ovate, hyaline conidia (Taylor, 1970). Phylogenetic position for *Dexhowardia* is unresolved due to lack of sequence data. References: (Taylor, 1970) (morphology), (Wijayawardene et al., 2020) (outline).

Dichotophora Whitton, McKenzie & K.D. Hyde, Fungal Diversity Research Series 21: 182 (2012)

Index Fungorum number: IF563882

Classification: Ascomycota genera *incertae sedis*

Type species: *Dichotophora setiramosa* Whitton, McKenzie & K.D. Hyde, Fungal Diversity Research Series 21: 184 (2012)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Dichotophora* was erected by Whitton et al. (2012) and it has macronematous, mononematous, unbranched or dichotomously branched, sometimes setiform, septate, brown conidiophores, with polyblastic, discrete, denticulate, sympodial, pale brown to hyaline conidiogenous cells, produces solitary, fusoid, angular, hyaline conidia. Phylogenetic position for *Dichotophora* is unresolved due to lack of sequence data. References: (Whitton et al., 2012) (morphology), (Wijayawardene et al., 2020) (outline).

Dictyocatenulata Finley & E.F. Morris, The American Midland Naturalist 77: 200 (1967)

Index Fungorum number: IF7994

Classification: Ostropomycetidae genera *incertae sedis*, Lecanoromycetes, Pezizomycotina, Ascomycota

Type species: *Dictyocatenulata alba* Finley & E.F. Morris, The American Midland Naturalist 77: 201 (1967)

Sexual morph: Unknown.

Sequence data: *Dictyocatenulata alba* (JCM 12918, LSU: AB570320, ITS: AB570315, SSU: AB570325)

Notes: This genus was described by Morris and Finley (1967) to accommodate *D. alba*. *Dictyocatenulata* is characterized by having synnematous, rigid, unbranched, capitate, light conidiomata, macronematous, septate, unbranched or branched, hyaline conidiophores, with meristem arthric, hyaline conidiogenous cells, producing catenate, septate, muriform, hyaline conidia (Morris & Finley, 1967; Seifert et al., 2011). Phylogenetically, representatives of *Dictyocatenulata* clustered in Lecanoromycetes (Figure 2.1). References: (An et al., 2012; Morris & Finley, 1967; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Dictyochaeta Speg., Physis Revista de la Sociedad Argentina de Ciencias Naturales 7: 18 (1923)

Index Fungorum number: IF7996

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

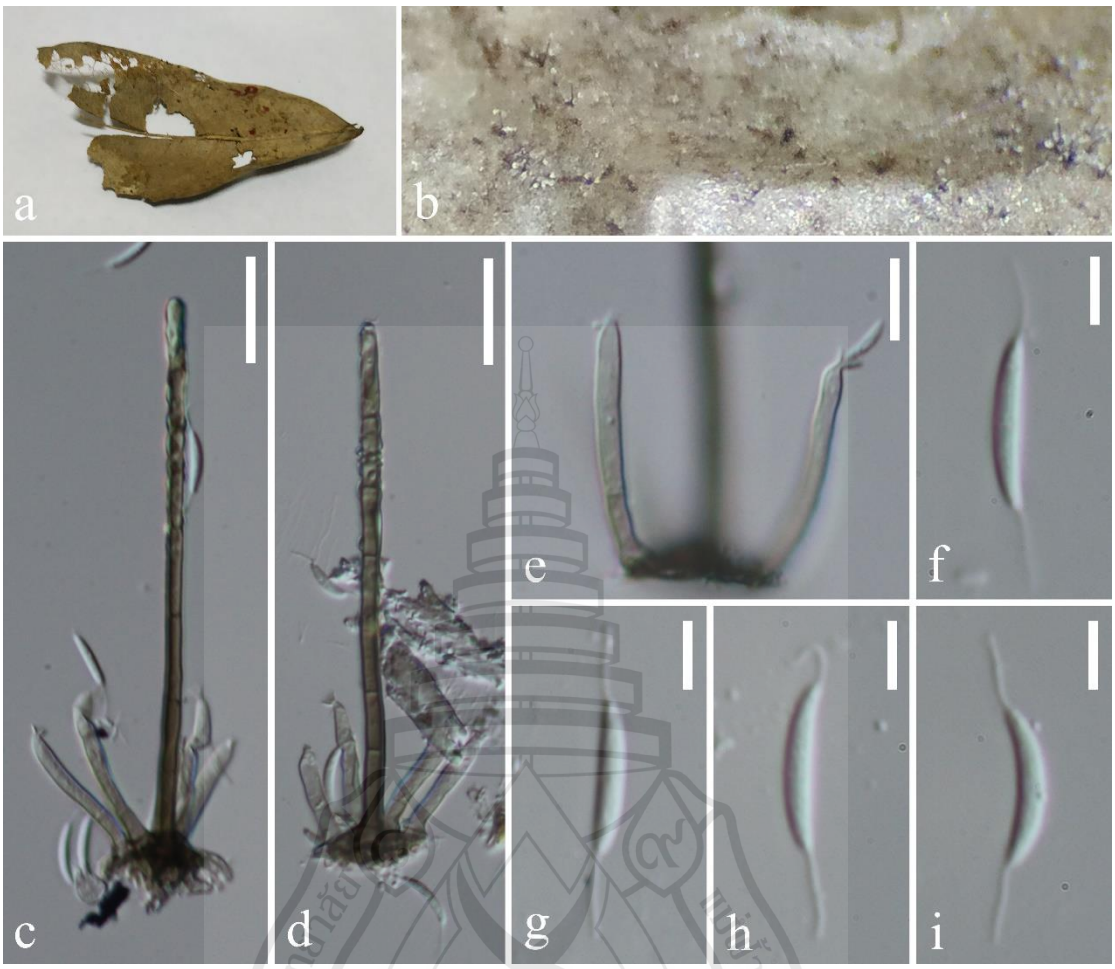
Type species: *Dictyochaeta fuegiana* Speg., Physis Revista de la Sociedad Argentina de Ciencias Naturales 7: 18 (1923)

Sexual morph: *Ascocodinaea*, *Chaetosphaeria*, *Striatosphaeria* (Seifert et al., 2011).

Synanamorphs: chloridium-like (Seifert et al., 2011).

Sequence data: *Dictyochaeta aquatica* (MFLUCC 15-0983, LSU: MH476569, ITS: MH476572, SSU: MH476575).

Notes: *Dictyochaeta* is characterized by setae are none or unbranched, brown, conidiophores are macronematous, mononematous, unbranched or branched, brown, conidiogenous cells are phialidic, brown, and conidia are aseptate, in slimy mass, hyaline (Seifert et al., 2011). References: (da Cruz et al., 2009; Goh & Hyde, 1999; Kuthubutheen & Nawawi, 1990, 1991a, 1991b, 1991c, 1991d, 1991e; Silva & Gusmão, 2013; Tsui et al., 2001a; Whitton et al., 2000) (morphology), (Lin et al., 2019b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Dictyochaeta*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 2-20). **a** Host material. **b** Conidiophores on the host surface. **c, d** Conidiophores, conidiogenous cells, and setae. **e** Conidiogenous cells. **f–i** Conidia. Scale bars: **c**, **d** = 20 μm, **e** = 10 μm, **f–i** = 5 μm.

Figure 2.16 *Dictyochaeta* sp.

Didymopsis Sacc. & Marchal, Bulletin de la Société Royale de Botanique de Belgique 24: 61 (1885)

Index Fungorum number: IF8014

Classification: Ascomycota genera *incertae sedis*

Type species: *Didymopsis perexigua* Sacc. & Marchal, Bull. Soc. r. Bot. Belg.: 29 (1885)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Didymopsis* was introduced by Marchal (1885) and four species are accepted. Phylogenetic position for *Didymopsis* is unresolved due to lack of sequence data. References: (Marchal, 1885) (morphology), (Wijayawardene et al., 2020) (outline).

Didymostilbe Henn., Hedwigia 41: 148 (1902)

Index Fungorum number: IF8021

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Didymostilbe coffeae* Henn., Hedwigia 41: 148 (1902)

Sexual morph: *Peethambara*, ?*Ornatispora* (Lombard et al., 2016; Seifert et al., 2011)

Sequence data: *Didymostilbe aurantispora* (CBS 616.85, LSU: NG_059135, ITS: NR_159854)

Notes: It is characterized by pale or dark synnemata, branched or penicillate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells that produces aseptate or multiseptate, hyaline to pigmented, slimy conidia (Seifert et al., 2011). References: (Seifert et al., 2011) (morphology), (Lombard et al., 2016)(phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Digitiseta Gordillo & Decock, Mycological Progress 17 (1-2): 184 (2017)

Index Fungorum number: IF820512

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Digitiseta setiramosa* (R.F. Castañeda) Gordillo & Decock, Mycological Progress 17 (1-2): 185 (2017)

Sexual morph: Unknown.

Sequence data: *Digitiseta setiramosa* (MUCL 54891 = CBS 534.88 = INIFAT C87/234, LSU: KU846494, ITS: KU846472)

Notes: This genus is myrothecium-like. References: (Gordillo & Decock, 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Digitodochium Tubaki & Kubono, Sydowia 41: 344 (1989)

Index Fungorum number: IF11230

Classification: Xylariales genera *incertae sedis*, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Digitodochium rhodoleucum* Tubaki & Kubono, Sydowia 41: 346 (1989)

Sexual morph: Unknown.

Sequence data: *Digitodochium rhodoleucum* (NBRC 32296, LSU and ITS: LC146732)

Notes: *Digitodochium* was introduced by Tubaki (1989) and has sporodochial conidiomata, reduced conidiophores, monoblastic, hyaline conidiogenous cells, produces solitary, hyaline stauroconidia, consisting of a cylindrical main axis and whorls of lateral branches. Previous studies placed this genus in Ascomycota genera *incertae sedis* (Wijayawardene et al., 2017a, 2020). In this study, the ex-type strain of the generic type was included in our phylogenetic analysis, and it showed *Digitodochium* locates in the order Xylariales (Figure 2.1). We suggest putting this genus in Xylariales genera *incertae sedis* (Xylariomycetidae, Sordariomycetes). References: (Tubaki, 1989) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Dimorphiseta L. Lombard & Crous, Persoonia 36: 188 (2016)

Index Fungorum number: IF815956

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Dimorphiseta terrestris* L. Lombard & Crous, Persoonia 36: 189 (2016)

Sexual morph: Unknown.

Sequence data: *Dimorphiseta terrestris* (CBS 127345 = RMF 8243, LSU: NG_059136, ITS: NR_154009)

Notes: This genus is myrothecium-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Dimorphospora Tubaki, Journal of the Hattori Botanical Laboratory 20: 156 (1958)

Index Fungorum number: IF8035

Classification: Gelatinodiscaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Dimorphospora foliicola* Tubaki, Journal of the Hattori Botanical Laboratory 20: 156 (1958)

Sexual morph: *Hymenoscyphus* (Seifert et al., 2011)

Synanamorphs: phialophora-like (Seifert et al., 2011)

Sequence data: *Dimorphospora foliicola* (CBS 221.59, LSU: NG_070437, ITS: NR_153969)

Notes: *Dimorphospora* was introduced by Tubaki (1958) and is dimorphic: (1) mononematous, branched, hyaline conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, produces solitary, aseptate, hyaline conidia; (2) mononematous, penicillate, hyaline conidiophores, with phialidic, flask-shaped, hyaline conidiogenous cells, produces aseptate, in slimy mass, hyaline conidia (Seifert et al., 2011; Tubaki, 1958). Phylogenetically, *Dimorphospora* was shown to be nested within the family Gelatinodiscaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011; Tubaki, 1958) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Diplocarpon F.A. Wolf, Botanical Gazette Crawfordsville 54 (3): 231 (1912)

= *Bostrichonema* Ces., Erbario Crittogamico Italiano: no. 149 (1867)

Index Fungorum number: IF1601

Classification: Drepanopezizaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Diplocarpon rosae* F.A. Wolf, Botanical Gazette Crawfordsville 54 (3): 231 (1912)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the *Bostrichonema* (Johnston et al., 2014).

Sequence data: *Diplocarpon rosae* (CBS 163.31, LSU: MH866612, ITS: MH855164)

Notes: The asexual morphs of *Diplocarpon* were reported in the genera *Bostrichonema*, *Entomosporium* and *Marssonina* (Johnston et al., 2014). Johnston et al. (2014) proposed to use *Diplocarpon* over *Bostrichonema*, *Entomosporium* and *Marssonina*. Phylogenetically, *Diplocarpon* was shown to be nested within the family Drepanopezizaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Wijayawardene et al., 2017a, 2020) (outline).

Diploospora Grove [as '*Diploöspora*'], Journal of Botany, British and Foreign 54: 220 (1916)

Index Fungorum number: IF622352

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Diploospora rosea* Grove [as '*Diploöspora rosea*'], Journal of Botany, British and Foreign 54: 220 (1916)

Sexual morph: Unknown.

Sequence data: *Diploospora rosea* (DAOM 250100, LSU: KM598635, ITS: KM598634, SSU: KM598636)

Notes: *Diploospora* was introduced by Grove (1916) and is characterized by conidiophores are micronematous to semi-macronematous, mononematous, hyaline, sometimes reduced to conidiogenous cells, conidiogenous cells are

sympodial, hyaline, conidia are septate, in unbranched or sparingly branched chains with ramoconidia, hyaline (Tanney et al., 2015). Phylogenetically, Tanney et al. (2015) placed this genus in Onygenales based on the type species, *D. rosea*. References: (Tanney et al., 2015) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Disporotrichum Stalpers, Studies in Mycology 24: 29 (1984)

Index Fungorum number: IF11072

Classification: Corticiaceae, Corticiales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Disporotrichum dimorphosporum* (Arx) Stalpers, Stud. Mycol. 24: 30 (1984)

Sexual morph: Unknown.

Sequence data: *Disporotrichum dimorphosporum* (CBS 419.70, LSU: MH871538, ITS: MH859776)

Notes: This genus was described by Stalper (1984) and is dimorphic: (1) conidiophores are branched or unbranched, hyaline, with clamp connections, conidiogenous cells are terminal and intercalary, sympodial, hyaline, with broad scars, conidia are solitary, aseptate, ellipsoidal, hyaline; (2) conidiophores are branched or unbranched, hyaline, with clamp connections, conidiogenous cells are sympodial, denticulate, conidia are solitary, aseptate, cylindrical, hyaline (Seifert et al., 2011; Stalper, 1984). Phylogenetically, representatives of *Disporotrichum*, including the ex-type of generic type species, clustered in the family Corticiaceae (Corticiales, Agaricomycetes) (Figure 2.1). We propose to assign this genus in Corticiaceae (Corticiales, Agaricomycetes). References: (Seifert et al., 2011; Stalper, 1984) (morphology and phylogeny), (He et al., 2019) (outline).

Dissoconium de Hoog, Oorschot & Hijwegen, Proceedings van de Koninklijke Nederlandse Akademie van Wetenschappen Section C 86 (2): 198 (1983)

Index Fungorum number: IF11074

Classification: Dissoconiaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Dissoconium aciculare* de Hoog, Oorschot & Hijwegen, Proceedings van de Koninklijke Nederlandse Akademie van Wetenschappen Section C 86 (2): 198 (1983)

Sexual morph: *Mycosphaerella* (Seifert et al., 2011).

Synanamorphs: Producing sclerotia in culture (Li et al., 2012b).

Sequence data: *Dissoconium aciculare* (CBS 342.82 = CPC 1534, LSU: NG_059076, ITS: NR_119427, SSU: NG_061083)

Notes: *Dissoconium* is characterized by having mononematous, straight to once geniculate, often reduced, brown conidiophores, with terminal and intercalary, percurrent and sympodial, brown conidiogenous cells, producing solitary, 1-septate, ellipsoidal to obclavate, pale olivaceous-brown primary conidia, and aseptate, adjacent to primary conidia, obclavate to ellipsoid, pale olivaceous to subhyaline secondary conidia (Li et al., 2012b). Phylogenetically, *Dissoconium* was shown to be nested within the family Dissoconiaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (de Hoog et al., 1983; Li et al., 2012b) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Ditangifibula G.C. Adams, Mycologia 87: 911 (1995)

Index Fungorum number: IF27583

Classification: Ascomycota genera *incertae sedis*

Type species: *Ditangifibula dikaryotae* G.C. Adams, Mycologia 87: 911 (1995)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores or yeast-like (Adams et al., 1995).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ditangifibula* was erected by Adams et al. (1995) and it has branched, septate, with clamp connections, hyaline conidiophores, with polyblastic, sympodial, hyaline conidiogenous cells, and produces solitary, aseptate or septate, thin-walled, hyaline conidia. Phylogenetic position for *Ditangifibula* is unresolved

due to lack of sequence data. References: (Adams et al., 1995) (morphology), (Wijayawardene et al., 2020) (outline).

Ditangium P. Karst., Notiser ur Sällskapets pro Fauna et Flora Fennica Förhandlingar 11: 213 (1870)

Index Fungorum number: IF17519

Classification: Sebacinaceae, Sebacinales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Ditangium insigne* P. Karst., Notiser ur Sällskapets pro Fauna et Flora Fennica Förhandlingar 11: 213 (1870)

Sexual morph: *Craterocolla* (Seifert et al., 2011).

Sequence data: *Ditangium altaicum* (LE<RUS> 231836, ITS: NR_163760)

Notes: Phylogenetic position for *Ditangium* is unresolved due to lack of LSU sequence data. References: (Wijayawardene et al., 2020) (outline).

Dokmaia Promputtha, Sydowia 55: 100 (2003)

Index Fungorum number: IF28694

Classification: Pleosporales genera *incertae sedis*, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Dokmaia monthadangi* Promputtha, Sydowia 55: 101 (2003)

Sexual morph: Unknown.

Sequence data: *Dokmaia monthadangii* (Saprobe 103, ITS: DQ780454)

Notes: *Dokmaia* was erected by Promputtha et al. (2003) for a fungus from dead leaves of *Manglietia garrettii* from Thailand and it has synnematous, cylindrical, brown conidiomata, macronematous, septate, brown conidiophores, polyblastic, discrete, denticulate, hyaline conidiogenous cells, and aseptate, smooth, cylindrical, obovoid or fusiform, hyaline conidia. Phylogenetic position for *Dokmaia* is unresolved due to lack of LSU sequence data. References: (Promputtha et al., 2003) (morphology), (Wijayawardene et al., 2020) (outline).

Drechslerella Subram., Journal of the Indian Botanical Society 42: 299 (1963)

Index Fungorum number: IF8104

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Drechslerella acrochaeta* (Drechsler) Subram., J. Indian bot. Soc. 42: 299 (1964) [1963]

Sexual morph: *Orbilia*, *Patinella* (Baral et al., 2020)

Sequence data: *Drechslerella dactyloides* (CBS 109.37; MUCL 1020, LSU: AY902799, ITS: NR_159842)

Notes: For details of this genus see the monograph in Baral et al. (2020). Phylogenetically, *Drechslerella* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Drepanospora Berk. & M.A. Curtis, Grevillea 3 (27): 105 (1875)

Index Fungorum number: IF8106

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Drepanospora pannosa* Berk. & M.A. Curtis, Grevillea 3 (27): 105 (1875)

Sexual morph: *Tubeufia* (Seifert et al., 2011)

Synanamorphs: Producing sclerotia or microconidia (Seifert et al., 2011)

Sequence data: Sequence data is unavailable for this genus.

Notes: Lu et al. (2018b) transferred all *Drepanospora* species to the genus *Helicoma*. References: (Wijayawardene et al., 2020) (outline).

Drumopama Subram., Proceedings of the Indian Academy of Sciences Section B 46: 333 (1957)

Index Fungorum number: IF8109

Classification: Ascomycota genera *incertae sedis*

Type species: *Drumopama girisa* Subram., Proceedings of the Indian Academy of Sciences Section B 46: 333 (1957)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Drumopama* was introduced by Subramanian (1957b) and it has synnematous, scattered, dark conidiomata, macronematous, unbranched, septate, geniculate, brown conidiophores with polyblastic, sympodial, denticulate, subhyaline conidiogenous cells, and produces solitary, aseptate, ovoid to subglobose, hyaline conidia. Phylogenetic position for *Drumopama* is unresolved due to lack of sequence data. References: (Subramanian, 1957b) (morphology), (Wijayawardene et al., 2020) (outline).

Dualomyces Matsush., Matsushima Mycological Memoirs 5: 13 (1987)

Index Fungorum number: IF25100

Classification: Ascomycota genera *incertae sedis*

Type species: *Dualomyces taiwanensis* Matsush., Matsushima Mycological Memoirs 5: 14 (1987)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Dualomyces* was introduced by Matsushima (1987) and is dimorphic: (1) micronematous or macronematous, reduced conidiophores, polyblastic, sympodial, pale brown conidiogenous cells, solitary, multi-septate, scolecosporous, elongate to filiform, hyaline to pale brown; (2) micronematous or macronematous, reduced, subulate conidiophores, phialidic, brown conidiogenous cells, aseptate, obovate, hyaline conidia. Phylogenetic position for *Dualomyces* is unresolved due to lack of sequence data. References: (Matsushima, 1987) (morphology), (Wijayawardene et al., 2020) (outline).

Durotheca Læssøe, Srikitik., Luangsa-ard & M. Stadler, IMA Fungus 4 (1): 62 (2013)

Index Fungorum number: IF803610

Classification: Hypoxylaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Durotheca depressa* Læssøe & Srikitik., IMA Fungus 4 (1): 62 (2013)

Sexual morph: Introduced as sexual genus but have nodulisporium-like asexual morph.

Sequence data: *Durotheca rogersii* (GMBC0204, LSU: MH645434, ITS: MH645433)

Notes: This genus was introduced by Laessoe et al. (2013) which has nodulisporium-like asexual morph and placed in the family Xylariaceae. However, Long et al. (2019) assigned this genus to Hypoxylaceae based on phylogenetic analysis. References: (Laessoe et al., 2013; Long et al., 2019)(morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline)

Dwayaangam Subram., Kavaka 5: 96 (1978)

Index Fungorum number: IF8114

Classification: Orbiliaceae, Orbiliales, Orbiliomycetidae, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Dwayaangam quadridens* (Drechsler) Subram., Kavaka 5: 96 (1978) [MB#313430]

Sexual morph: *Orbilia* (Seifert et al., 2011).

Sequence data: *Dwayaangam colodena* (CBS 118913, LSU: MH874596, ITS: NR_164289)

Notes: *Dwayaangam* was introduced by Subramanian (1977) and is characterized by having mononematous, unbranched or sparingly branched, sometimes reduced, hyaline conidiophores, with monoblastic to polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, staurosporous, with 4 or more septate arms (Seifert et al., 2011; Subramanian, 1977). Previous studies placed this genus in Orbiliaceae (Orbiliales, Orbiliomycetidae, Orbiliomycetes) (Wijayawardene et al., 2017a, 2020). However, phylogenetically, the ex-type strain CBS 118913 of *Dwayaangam colodena*, not generic type, was shown to be nested within the family Arachnopezizaceae (Helotiales, Leotiomycetes) (Figure 2.1). More sequence data are requested for this genus to solve the taxonomic position in the future. References: (Sokolski et al., 2006;

Subramanian, 1977) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Dwayaloma Subram., Journal of the Indian Botanical Society 36 (1): 62 (1957)

Index Fungorum number: IF8116

Classification: Ascomycota genera *incertae sedis*

Type species: *Dwayaloma trina* Subram., Journal of the Indian Botanical Society 36 (1): 62 (1957)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Dwayaloma* was established by Subramanian (1957a) and it has sporodochial, dark conidiomata, aseptate, unbranched, long subulate, brown setae, reduced conidiophores, with monoblastic, hyaline to pale brown conidiogenous cells, and produces solitary, 1-septate, cylindrical to oblong, hyaline conidia with polar once-forked setulae. Phylogenetic position for *Dwayaloma* is unresolved due to lack of sequence data. References: (Subramanian, 1957a) (morphology), (Wijayawardene et al., 2020) (outline).

Echinoconidiophorum Pereira-Carvalho & Dianese, Mycological Research 113 (2): 262 (2009)

Index Fungorum number: IF512462

Classification: Ascomycota genera *incertae sedis*

Type species: *Echinoconidiophorum cerradense* Pereira-Carvalho & Dianese, Mycological Research 113 (2): 262 (2009)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Echinoconidiophorum* was introduced by Pereira-Carvalho et al. (2009) and is characterized by having macronematous, mononematous, unbranched, brown conidiophores, smooth foot cells, monoblastic or sometimes polyblastic, integrate, strongly echinulate, dark brown conidiogenous cells, and producing solitary, aseptate, ellipsoidal to fusoid, hyaline conidia. Phylogenetic position for

Echinoconidiophorum is unresolved due to lack of sequence data. References: (Pereira-Carvalho et al., 2009) (morphology), (Wijayawardene et al., 2020) (outline).

Echinoporia Ryvarden, A preliminary polypore flora of East Africa: 325 (1980)

= *Echinodia* Pat., Bull. trimest. Soc. mycol. Fr.: 199 (1918)

Index Fungorum number: IF17541

Classification: Schizoporaceae, Hymenochaetales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Echinoporia hydnophora* (Berk. & Broome) Ryvarden [as 'hydnophorus'], in Ryvarden & Johansen, Prelim. Polyp. Fl. E. Afr. (Oslo): 326 (1980) (before known as *Polyporus hydnophorus* Berk. & Broome, Journal of the Linnean Society. Botany 14: 54 (1875))

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Echinodia* (Seifert et al., 2011).

Sequence data: *Echinoporia hydnophora* (CSIRO(M) E7099, ITS: AJ537400)

Notes: The sexual morph of *Echinodia* was reported in the genus *Echinoporia* (He et al., 2019). References: (He et al., 2019) (outline).

Elegantimyces Goh, K.M. Tsui & K.D. Hyde, Mycological Research 102 (2): 239 (1998)

Index Fungorum number: IF27811

Classification: Ascomycota genera *incertae sedis*

Type species: *Elegantimyces sporidesmiopsis* Goh, K.M. Tsui & K.D. Hyde, Mycological Research 102 (2): 239 (1998)

Sexual morph: Unknown.

Synanamorphs: selenosporella-like or *Idriella*-like (Goh et al., 1998b; Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Elegantimyces* was introduced by Goh et al. (1998b) for a fungus collected from decaying wood submerged in a stream. It is characterized by having

macronematous, mononematous, euseptate, unbranched or branched, brown conidiophores, with monoblastic, integrated, terminal, determinate conidiogenous cells, and producing solitary, 3-septate, obclavate, versicoloured conidia. Phylogenetic position for *Elegantimyces* is unresolved due to lack of sequence data. References: (Goh et al., 1998b) (morphology), (Wijayawardene et al., 2020) (outline).

Emmonsia Cif. & Montemart., Mycopathologia et Mycologia Applicata 10 (4): 314 (1959)

Index Fungorum number: IF8151

Classification: Ajellomycetaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Emmonsia parva* (C.W. Emmons & Ashburn) Cif. & Montemart., Mycopathologia et Mycologia Applicata 10 (4): 314 (1959)

Sexual morph: *Ajellomyces* (Seifert et al., 2011).

Disease symptoms: adiaspiromycosis (Anstead et al., 2012; Jiang et al., 2018; Jiang et al., 2020; Schwartz et al., 2015)

Sequence data: *Emmonsia crescens* (CBS 177.60 = UAMH 3008 = ATCC 13704, LSU: NG_070840, ITS: NR_132795)

Notes: *Emmonsia* was introduced by Ciferri and Montemartini (1959) to accommodate Haplosporangium parvum. It is dimorphic: at 24 °C, conidiophores are unbranched or sparingly branched, vesiculate, hyaline, conidiogenous cells are sympodial, denticulate, hyaline, conidia are solitary or catenate, aseptate, hyaline; (2) at 37 °C, producing hyaline chlamydospores (Jiang et al., 2018; Seifert et al., 2011). References: (Ciferri & Montemartini, 1959; Jiang et al., 2018, 2020; Schwartz et al., 2015) (morphology and phylogeny).

Emmonsiellopsis Y. Marín, Stchigel, Guarro & Cano, Mycoses 58 (8): 455 (2015)

Index Fungorum number: IF811334

Classification: Ajellomycetaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Emmonsiellopsis terrestris* Y. Marín, Stchigel, Guarro & Cano, Mycoses 58 (8): 456 (2015)

Sexual morph: Unknown.

Sequence data: *Emmonsiellopsis terrestris* (CBS 273.77 = UAMH 2304, LSU: KT155190, ITS: KT155850)

Notes: *Emmonsiellopsis* was introduced by Marin-Felix et al. (2015a) and is characterized by micronematous, mononematous, branched, sometimes contorted to dendritic, hyaline conidiophores, and blastic, solitary or catenate, aseptate or rarely 1-septate, smooth or verrucose or spinulose, globose to ovoid or clavate, hyaline conidia. References: (Marin-Felix et al., 2015a) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Emydomyces A.N. Mill. & D.B. Woodburn, Journal of Clinical microbiology 57 (2): e00628-18, 6 (2019)

Index Fungorum number: IF827506

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Emydomyces testavorans* A.N. Mill. & D.B. Woodburn, Journal of Clinical microbiology 57 (2): e00628-18, 7 (2019)

Sexual morph: Unknown.

Disease symptoms: Shell lesions in freshwater aquatic turtles (Woodburn et al., 2019).

Sequence data: *Emydomyces testavorans* (ILLS 81479 = ATCC TSD-145, LSU: NG_066406, ITS: NR_160604, SSU: NG_065731)

Notes: *Emydomyces* was introduced by Woodburn et al. (2019) for a fungus associated with shell lesions in freshwater aquatic turtles and is characterized by micronematous, branched, septate, hyaline conidiophores, and produces holoblastic, aseptate, clavate to pyriform, widely variable in shape aleurioconidia and aseptate, barrel shaped to cylindrical arthroconidia. References: (Woodburn et al., 2019) (morphology and phylogeny).

Enantioptera Descals, Transactions of the British Mycological Society 80 (1): 70 (1983)

Index Fungorum number: IF8152

Classification: Ascomycota genera *incertae sedis*

Type species: *Enantioptera tetra-alata* Descals, Transactions of the British Mycological Society 80 (1): 70 (1983)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Enantioptera* was introduced by Descals and Webster (1983) and it has micronematous, mononematous conidiophores, lateral, sympodial conidiogenous cells and staurosporous, consisting of elongated main body and opposite lateral branches. Phylogenetic position for *Enantioptera* is unresolved due to lack of sequence data. References: (Descals & Webster, 1983) (morphology), (Wijayawardene et al., 2020) (outline).

Endoconospora Gjaerum, Norwegian Journal of Botany 18 (2): 109 (1971)

Index Fungorum number: IF8161

Classification: Ascomycota genera *incertae sedis*

Type species: *Endoconospora cerastii* Gjaerum, Norwegian Journal of Botany 18 (2): 109 (1971)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Endoconospora* was introduced by Gjaerum (1971) and two species are accepted. Phylogenetic position for *Endoconospora* is unresolved due to lack of sequence data. References: (Gjaerum, 1971) (morphology), (Wijayawardene et al., 2020) (outline).

Endosporium Tsuneda, Botany 86 (9): 1022 (2008)

Index Fungorum number: IF536893

Classification: Endosporiaceae, Dothideomycetes families incertae sedis, Pezizomycotina, Ascomycota

Type species: *Endosporium populi-tremuloides* Tsuneda, Botany 86 (9): 1023 (2008)

Sexual morph: Unknown.

Sequence data: *Endosporium populi-tremuloides* (UAMH 10529, LSU: NG_064317, ITS: NR_158373, SSU: NG_016525)

Notes: *Endosporium* was introduced by Tsuneda et al. (2008) and is characterized by cellular clumps are subdividing by multiple septations to form daughter cells inside, hyphae are septate, cylindrical or torulose, pale to dark brown, endoconidia are aseptate, hyaline, forming in cellular clumps by separation of adjacent daughter cells through septum schizolysis, released by dissolution of the mother cell wall, and blastic conidia are aseptate, hyaline to pale brown, arising from cells of cellular clumps or from sides of hyphae (Tsuneda et al., 2008). Phylogenetically, *Endosporium* was shown to be nested within the family Endosporiaceae (Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Tsuneda et al., 2008) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Engelhardtiella A. Funk, Canadian Journal of Botany 51 (9): 1643 (1973)

Index Fungorum number: IF8177

Classification: Ascomycota genera *incertae sedis*

Type species: *Engelhardtiella alba* A. Funk, Canadian Journal of Botany 51 (9): 1643 (1973)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Engelhardtiella* was erected by Funk (1973) and is characterized by having sporodochial conidiomata, unbranched or rarely branched, septate, hyaline conidiophores, with polyblastic, synchronous, vesiculate, hyaline conidiogenous cells, producing solitary, 3-septate, hyaline, staurosporous, consisting of basal, central, and two superior, lateral, bicorniform cells. Phylogenetic position for *Engelhardtiella* is unresolved due to lack of sequence data. References: (Funk, 1973) (morphology), (Wijayawardene et al., 2020) (outline).

Entalbostroma J.D. Rogers & P.R. Johnst., Mycotaxon 131 (4): 766 (2017)

Index Fungorum number: IF817225

Classification: Xylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Entalbostroma erumpens* J.D. Rogers & P.R. Johnst., Mycotaxon 131 (4): 768 (2017)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in culture (Johnston et al., 2016).

Sequence data: *Entalbostroma erumpens* (ICMP 21152, ITS: NR_154013)

Notes: *Entalbostroma* was introduced by Johnston et al. (2016) and its asexual morph has holoblastic conidiogenous cells, and ellipsoid, smooth, hyaline conidia. References: (Johnston et al., 2016) (morphology), (Wijayawardene et al., 2020) (outline).

Entimomentora Unter. & Réblová, Mycologia 111 (6): 1007 (2019)

Index Fungorum number: IF829378

Classification: Pleuroascaceae, Helotiales, Leotiomycetidae, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Entimomentora hyalina* (W. Gams) Unter. & Réblová, Mycologia 111 (6): 1007 (2019)

Sexual morph: Unknown.

Sequence data: *Entimomentora hyalina* (CBS 130.74, LSU: MK185692, ITS: MK185677, SSU: MK185670)

Notes: *Entimomentora* was introduced by Untereiner et al. (2019) and is characterized by having micronematous, mononematous, unbranched or sparingly and basitonously branched, reduced, hyaline or pale conidiophores, with phialidic bearing cylindrical or cup-shaped collarettes, cylindrical, hyaline conidiogenous cells, producing aseptate, in slimy mass, ellipsoidal to dacryoid, hyaline conidia. Untereiner et al. (2019) established the family Pleuroascaceae and accepted *Entimomentora* within it. Phylogenetically, *Entimomentora* was shown to be nested within the family Pleuroascaceae (Helotiales, Leotiomycetidae, Leotiomycetes) (Figure 2.1). References: (Untereiner et al., 2019) (morphology and phylogeny).

Entyloma de Bary, Botanische Zeitung 32: 101 (1874)

= *Entylomella* Höhn., Annales Mycologici 22: 191 (1924)

Index Fungorum number: IF16122

Classification: Entylomataceae, Entylomatales, Exobasidiomycetes, Ustilaginomycotina, Basidiomycota

Type species: *Entyloma microsporum* (Unger) J. Schröt., Fungi Europaei exsiccati Cent. 19: no. 1872 (1874)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Entylomella* (Seifert et al., 2011).

Sequence data: *Entyloma calendulae* (CBS 746.85, LSU: DQ663687, ITS: DQ663689, SSU: KP322948)

Notes: *Entylomella* was reported has sexual morph in the genus *Entyloma* (Seifert et al., 2011). Phylogenetically, representatives of *Entyloma* clustered in the family Entylomataceae (Entylomatales, Exobasidiomycetes) (Figure 2.1). References: (He et al., 2019) (outline).

Epicoleosporium Videira & Crous, Studies in Mycology 83: 100 (2016)

Index Fungorum number: IF816817

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Epicoleosporium ramularioides* Videira, H.D. Shin & Crous, Studies in Mycology 83: 100 (2016)

Sexual morph: Unknown.

Sequence data: *Epicoleosporium ramularioides* (CBS 141103; CPC 10672, LSU: GU214688, ITS: GU214688)

Notes: *Epicoleosporium* was established by Videira et al. (2016) and is characterized by micronematous, mononematous, loose, unbranched, hyaline conidiophores, with terminal, sympodial, hyaline conidiogenous cells, producing solitary or catenate, aseptate, cylindrical-oblong, clavate, obovate, hyaline conidia. Phylogenetically, *Epicoleosporium* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2016, 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Epidermophyton Sabour., Arch. Méd. exp. Anat. path.: 754 (1907)

Index Fungorum number: IF8190

Classification: Arthrodermataceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Epidermophyton inguinale* (Sabour.) Sabour., Malad. Cuir Chev.: 420 (1910)

Sexual morph: Unknown.

Disease symptoms: Some species are dermatophytes that infect skin of mammals (Cafarchia et al., 2013; Gräser et al., 1998; Gumowski et al., 1987).

Sequence data: *Epidermophyton floccosum* (CBS 230.76, LSU: KT155176, ITS: KT155837, SSU: NG_063110)

Notes: *Epidermophyton* is characterized by producing two kinds of conidiophores and conidia: (1) reduced, hyaline conidiophores, solitary thallic, hyaline conidiogenous cells, solitary, septate, hyaline conidia; (2) reduced, hyaline conidiophores, thallic-arthric, hyaline conidiogenous cells, catenate, aseptate, hyaline conidia (Seifert et al., 2011). References: (de Hoog et al., 2017; Seifert et al., 2011) (morphology), (de Hoog et al., 2017; Rakeman et al., 2005) (phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Episporogoniella U. Braun, Mycotaxon 51: 41 (1994)

Index Fungorum number: IF27267

Classification: Ascomycota genera *incertae sedis*

Type species: *Episporogoniella muscigena* (Speg.) U. Braun, Mycotaxon 51: 41 (1994)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Episporogoniella* was established by Braun (1994a) and is characterized by having macronematous, mononematous, solitary or loosely caespitose, erect or decumbent, septate conidiophores, with monoblastic, integrated, terminal, determinate conidiogenous cells and producing solitary, septate, smooth, subcylindrical, subclavate, subhyaline conidia. Phylogenetic position for

Episporogoniella is unresolved due to lack of sequence data. References: (Braun, 1994a) (morphology), (Wijayawardene et al., 2020) (outline).

Eriomycopsis Speg., Anales del Museo Nacional de Historia Natural Buenos Aires ser. 3, 13: 429 [ser. 3, 13] (1911)

Index Fungorum number: IF8203

Classification: Dothideomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Eriomycopsis bonplandii* Speg. (1910)

Sexual morph: *Byssocallis*, *Calloriopsis*, *Melioliphila* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Eriomycopsis* was introduced by Spegazzini (1910) and 13 species are accepted. Phylogenetic position for *Eriomycopsis* is unresolved due to lack of sequence data. References: (Spegazzini, 1910) (morphology), (Wijayawardene et al., 2020) (outline).

Escovopsioides H.C. Evans & J.O. Augustin, PLoS One 8 (12): e82265, 6 (2013)

Index Fungorum number: IF800474

Classification: Hypocreaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Escovopsioides nivea* H.C. Evans & J.O. Augustin, PLoS One 8 (12): e82265, 6 (2013)

Sexual morph: Unknown.

Synanamorphs: producing aleurioconidia (Augustin et al., 2013).

Sequence data: *Escovopsioides nivea* (VIC 31754 = AUJ6 = DOA 627 = IMI 501181, LSU: JQ855716, ITS: JQ815078)

Notes: *Escovopsioides* was introduced by Augustin et al. (2013) and is *Escovopsis*-like. *Escovopsioides* differs from *Escovopsis* by its hyaline conidiophores with globose vesicles, phialidic, lageniform conidiogenous cells, catenate, hyaline conidia, subhyaline, spherical aleurioconidia (Augustin et al., 2013). References:

(Augustin et al., 2013) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Escovopsis J.J. Muchovej & Della Lucia, Mycotaxon 37: 192 (1990)

Index Fungorum number: IF11249

Classification: Hypocreaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Escovopsis weberi* J.J. Muchovej & Della Lucia, Mycotaxon 37: 192 (1990)

Sexual morph: Unknown.

Sequence data: *Escovopsis weberi* (ATCC 64542, LSU: NG_069166, ITS: NR_155085, SSU: NG_061165)

Notes: *Escovopsis* was introduced by Muchovej and Della Lucia (1990) and is characterized by mononematous, branched, sometimes reduced, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and catenate, aseptate, hyaline conidia. References: (Muchovej & Della Lucia, 1990) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Esteya J.Y. Liou, J.Y. Shih & Tzean, Mycological Research 103 (2): 243 (1999)

Index Fungorum number: IF28256

Classification: Ophiostomataceae, Ophiostomatales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Esteya vermicola* J.Y. Liou, J.Y. Shih & Tzean, Mycological Research 103 (2): 243 (1999)

Sexual morph: Unknown.

Sequence data: *Esteya vermicola* (ATCC 74485, TEF: GQ995674)

Notes: *Esteya* was introduced by Liou et al. (1999) to accommodate a fungus isolated from infected pinewood nematodes. It is dimorphic: (1) conidiophores are macronematous, mononematous, flask-shaped and subhyaline to greyish green, conidiogenous cells are phialidic, rarely percurrent, conidia are hyaline, aseptate, lunate, concave, containing an endospore-like apparatus, adhesive; (2) conidiophores

are macronematous, mononematous, cylindrical, subulate, subhyaline to greyish green, conidiogenous cells are phialidic, conidia are hyaline, aseptate, bacilloid, often forming an aggregate droplet at the apex, non-adhesive (Liou et al., 1999). Phylogenetically, this genus located in the family Ophiostomataceae (Ophiostomatales, Diaporthomycetidae, Sordariomycetes). References: (Chu et al., 2015; Liou et al., 1999; Selbmann et al., 2015; Wang et al., 2011, 2014, 2019a) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Eustilbum Rabenh.: no. 677 (1864)

Index Fungorum number: IF562089

Classification: Helotiaceae or incertae sedis, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Eustilbum rehmianum* Rabenh. (1862)

Sexual morph: *Bisporella* (Seifert et al., 2011).

Sequence data: *Eustilbum aureum* (JM-CG-01a, LSU: MW115643, ITS: MW203184)

Notes: *Eustilbum* is characterized by synnematous conidiomata, macronematous, penicillate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, producing aseptate, hyaline conidia aggregated in slimy mass (Seifert et al., 2011). Phylogenetically, representative of *Eustilbum* clustered in the order Helotiales (Figure 2.1). References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Everhartia Sacc. & Ellis, Michelia 2 (8): 580 (1882)

= *Hyalotrochophora* Finley & E.F. Morris, The American Midland Naturalist 77: 202 (1967)

Index Fungorum number: IF8221

Classification: Ascomycota genera *incertae sedis*

Type species: *Everhartia hymenuloides* Sacc. & Ellis, Michelia 2 (8): 580 (1882)

Sexual morph: Unknown.

Sequence data: ?*Everhartia hymenuloides* (CBS 113640, LSU: EU552128, ITS: EU552128); ?*Everhartia lignatilis* (CBS 396.65 = IFO 7071 = MUCL 15741, LSU: MH870272, ITS: MH858632)

Notes: *Everhartia* was established by Saccardo (1882) and is characterized by having sporodochial conidiomata, unbranched, hyaline conidiophores, with monoblastic, hyaline conidiogenous cells, producing septate, in slimy mass, coiled, hyaline conidia (Seifert et al., 2011). Yanna et al. (2000a) synonymized *Hyalotrochophora* under *Everhartia*. Phylogenetically, *Everhartia* was shown to be nested within Helotiales, (Leotiomycetes) (Figure 2.1). References: (Saccardo, 1882; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Exochalara W. Gams & Hol.-Jech., Studies in Mycology 13: 56 (1976)

Index Fungorum number: IF8232

Classification: Neolauriomycetaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Exochalara longissima* (Grove) W. Gams & Hol.-Jech., Studies in Mycology 13: 56 (1976)

Sexual morph: Unknown.

Sequence data: *Exochalara longissima* (CBS 980.73, LSU: HQ609476, SSU: HQ609484)

Notes: *Exochalara* was introduced by Gams and Holubová-Jechová (1976) and is characterized by having macronematous, mononematous, solitary, unbranched or rarely branched, septate, brown conidiophores, with phialidic with short and funnel-shaped collarettes, terminal, integrated, often percurrent, brown conidiogenous cells, producing catenate, aseptate or 1-septate, hyaline conidia. Réblová et al. (2011b) designed an epitype (dried culture of CBS 980.73) for *E. longissima*. Phylogenetically, *Exochalara* was shown to be nested within the family Neolauriomycetaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Gams & Holubová-Jechová, 1976; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Exophiala J.W. Carmich., Sabouraudia 5 (1): 122 (1966)

Index Fungorum number: IF8233

Classification: Herpotrichiellaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Exophiala salmonis* Carmich., Sabouraudia 5 (1): 122 (1966)

Sexual morph: *Capronia* (de Hoog et al., 2011; Macia-Vicente et al., 2016; Seifert et al., 2011).

Synanamorphs: *Phaeococcomyces*, *Phialophora*, *Ramichloridium*, *Rhinocladiella* (de Hoog et al., 2011; Seifert et al., 2011)

Disease symptoms: opportunistic pathogens on humans and animals.

Sequence data: *Exophiala dermatitidis* (CBS 207.35 = AFTOL ID 668, LSU: DQ823100, ITS: MH855649, SSU: DQ823107); *Exophiala salmonis* (CBS 157.67 = AFTOL ID 671, LSU: EF413609, ITS: NR_121270.1, SSU: NG_061119.1)

Notes: *Exophiala* was introduced by Carmichael (1967) to accommodate *E. salmonis*, which was associated with cerebral mycetoma of trout. It is polymorphic and characterized by branched or reduced, brown conidiophores, annellidic or phialidic or sympodial, brown conidiogenous cells, aseptate or 1-septate, in slimy mass, hyaline to brown conidia (Carmichael, 1967). References: (Carmichael, 1967; de Hoog et al., 2011; Macia-Vicente et al., 2016; Moussa et al., 2017a; Vicente et al., 2014; Zeng et al., 2014) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Exosporella Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 121: 414 (1912)

Index Fungorum number: IF8235

Classification: Ascomycota genera *incertae sedis*

Type species: *Exosporella symploci* Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 121: 414 [76 repr.] (1912)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Exosporella* was introduced by Höhnel (1912) and only one species is accepted. Phylogenetic position for *Exosporella* is unresolved due to lack of

sequence data. References: (Höhnel, 1912) (morphology), (Wijayawardene et al., 2020) (outline).

Falciphora J. Luo & N. Zhang, Mycologia 170 (3): 643 (2015)

Index Fungorum number: IF810801

Classification: Magnaporthaceae, Magnaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Falciphora oryzae* Z.L. Yuan, C.L. Zhang & F.C. Lin ex J. Luo & N. Zhang, Mycologia 170 (3): 644 (2015)

Sexual morph: Unknown.

Sequence data: *Falciphora oryzae* (CBS 125863, LSU: NG_064356, ITS: NR_153972)

Notes: *Falciphora* was introduced by Luo et al. (2015) to accommodate *Harpophora oryzae* Z.L. Yuan, C.L. Zhang & F.C. Lin. It has branched conidiophores, phialidic with collarette, hyaline to brown conidiogenous cells and produces aseptate, in slimy mass, sickle-shaped, curved, hyaline conidia. References: (Luo et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Falciphoriella Hern.-Restr. & Crous, Studies in Mycology 83: 27 (2016)

Index Fungorum number: IF816902

Classification: Magnaporthaceae, Magnaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Falciphoriella solaniterrestris* Hern.-Restr. & Crous, Studies in Mycology 83: 27 (2016)

Sexual morph: Unknown.

Sequence data: *Falciphoriella solaniterrestris* (CBS 117.83, LSU: NG_058108, ITS: NR_153995)

Notes: *Falciphoriella* was introduced by (Hernández-Restrepo et al., 2016b) and is characterized by having macronematous, branched, hyaline to pale brown conidiophores, phialidic with cylindrical to funnel-shaped collarettes, hyaline to pale brown conidiogenous cells, and producing fusiform, obovoid, hyaline conidia.

References: (Hernández-Restrepo et al., 2016b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Falcocladium S.F. Silveira, Alfenas, Crous & M.J. Wingf., Mycotaxon 50: 447 (1994)

Index Fungorum number: IF25800

Classification: Falcocladiaceae, Falcocladiales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Falcocladium multivesiculatum* S.F. Silveira, Alfenas, Crous & M.J. Wingf., Mycotaxon 50: 448 (1994)

Sexual morph: Unknown.

Sequence data: *Falcocladium multivesiculatum* (CBS 120386 = PREM 51541 = CPC 13207, LSU: JF831932, ITS: JF831936)

Notes: *Falcocladium* is characterized by conidiomata are sporodochial or synnematous, setae are hyaline, apex vesiculate, extensions of conidiophores, conidiophores are macronematous, branched, hyaline, conidiogenous cells are phialidic, hyaline, and conidia are solitary, 0-1-septate, falcate, hyaline, with short apical and basal appendages (Jones et al., 2014). Jones et al. (2014) introduced the family Falcocladiaceae and placed *Falcocladium* in this family. References: (Somrithipol et al., 2007) (morphology) (Jones et al., 2014) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Fantasmomyces Dong Hyeon Lee, Marinc., Z.W. de Beer, M.J. Wingf., Persoonia 37: 249 (2016)

Index Fungorum number: IF816620

Classification: Sordariomycetes genus *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Fantasmomyces hyalinus* Dong Hyeon Lee, Marinc., Z.W. de Beer, M.J. Wingf., Sydowia: 249 (2016)

Sexual morph: Introduced as holomorph.

Sequence data: *Fantasmomyces hyalinus* (CBS 139038 = CMW 42166, LSU: KX061180, ITS: KX061179)

Notes: The asexual morph of *Fantasmomyces* is sporothrix-like, but phylogenetically it differs from other sporothrix-like genera. References: (Crous et al., 2016a)(morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Fibulotaeniella Marvanová & Bärl., Mycotaxon 32: 340 (1988)

Index Fungorum number: IF11038

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Fibulotaeniella canadensis* Marvanová & Bärl., Mycotaxon 32: 340 (1988)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Fibulotaeniella* was introduced by Marvanová and Bärlocher (1988) and is characterized by having sporodochial or mononematous, unbranched or branched, clamped, hyaline conidiophores, with integrated or discrete, sympodial, clamped, hyaline conidiogenous cells, and producing solitary, aseptate or septate, scolecosporous, clamped, hyaline conidia. Phylogenetic position for *Fibulotaeniella* is unresolved due to lack of sequence data. References: (Marvanová & Bärlocher, 1988) (morphology), (Wijayawardene et al., 2020) (outline).

Filiella Videira & Crous, Studies in Mycology 83: 88 (2016)

Index Fungorum number: IF816823

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Filiella pastinacae* (P. Karst.) Videira & Crous, Studies in Mycology 83: 88 (2016)

Sexual morph: Unknown.

Sequence data: *Filiella pastinacae* (CBS 114116 = UPSC 2633, LSU: NG_058008, ITS: KF251328)

Notes: *Filiella* was introduced by Videira et al. (2016) and is characterized by mononematous, straight to flexuous, geniculate-sinuous, often reduced, hyaline to

pale yellow conidiophores, and producing solitary, discretely septate, acicular, subcylindrical, filiform, narrowly obclavate, hyaline conidia. Phylogenetically, *Filiella* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2016, 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Filosporella Nawawi, Transactions of the British Mycological Society 67 (1): 175 (1976)

Index Fungorum number: IF8253

Classification: Helotiales genera *incertae sedis*, Leotiomycetidae, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Filosporella aquatica* Nawawi, Transactions of the British Mycological Society 67 (1): 175 (1976)

Sexual morph: Unknown.

Synanamorphs: phialophora-like and producing arthroconidia (Seifert et al., 2011).

Sequence data: *Filosporella fistucella* (CCM F-13091, LSU: KC834021, ITS: NR_153982, SSU: NG_065768)

Notes: *Filosporella* was introduced by Nawawi (1976b) and is characterized by having branched or penicillate, hyaline conidiophores, with monoblastic, percurrent, hyaline conidiogenous cells, producing solitary, multi-septate, filiform, hyaline conidia (Nawawi, 1976b; Seifert et al., 2011). Phylogenetically, *Filosporella* was shown to be nested within the order Helotiales (Leotiomycetes) (Figure 2.1). References: (Marvanová & Bärlocher, 1998b; Nawawi, 1976b; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Fistulina Bull., Histoire des champignons de la France. I: 313 (1791)

= *Confistulina* Stalpers, Canadian Journal of Botany 61 (6): 1660 (1983)

Index Fungorum number: IF17591

Classification: Agaricales genera *incertae sedis*, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Fistulina buglossoides* Bull., Hist. Champ. Fr. (Paris) 1(2): 314 (1791)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Confistulina* (Stalpers et al., 2021).

Sequence data: *Fistulina hepatica* (CBS 339.69, LSU: MH877724)

Notes: The sexual morph of *Confistulina* was reported in the genus *Fistulina*, Stalpers et al. (2021) proposed to use *Fistulina* rather than *Confistulina*. Phylogenetically, representative of *Fistulina* clustered in the order Agaricales (Agaricomycetes) (Figure 2.1). References: (He et al., 2019) (outline).

Flabellascus Réblová, PLoS One 10: 15 (2015)

Index Fungorum number: IF814416

Classification: Calosphaeriaceae, Calosphaeriales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Flabellascus tenuirostris* Réblová, PLoS One 10: 15 (2015)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Reblova et al., 2015).

Sequence data: *Flabellascus tenuirostris* (CBS 138680, LSU: KT716457, ITS: KT716466)

Notes: *Flabellascus* was introduced by Reblova et al. (2015) and its asexual morph has macronematous to semi-macronematous, mononematous, unbranched or verticillate, dark brown conidiophores, with phialidic with flaring collarettes, hyaline to pale brown conidiogenous cells and produces aseptate, in slimy mass, allantoid and suballantoid to reniform, hyaline conidia. Phylogenetically, *Flabellascus* located in the family Calosphaeriaceae (Figure 2.1). References: (Reblova et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Flabellocladia Nawawi, Transactions of the British Mycological Society 85 (1): 174 (1985)

Index Fungorum number: IF11032

Classification: Ascomycota genera *incertae sedis*

Type species: *Flabellocladia gigantea* Nawawi, Transactions of the British Mycological Society 85 (1): 174 (1985)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Flabellocladia* was erected by Nawawi (1985a) and it has micronematous, mononematous, unbranched, septate, hyaline conidiophores, with monoblastic, integrated, determinate, hyaline conidiogenous cells, and produces conidia that are solitary, multi-septate, hyaline, staurosporous, tetraradiate, consisting of three septate, upwards arms and one septate, downwards arm. Phylogenetic position for *Flabellocladia* is unresolved due to lack of sequence data. References: (Nawawi, 1985a) (morphology), (Wijayawardene et al., 2020) (outline).

Flabellospora Alas., Nova Hedwigia 15: 415 (1968)

Index Fungorum number: IF8257

Classification: Ascomycota genera *incertae sedis*

Type species: *Flabellospora crassa* Alas., Nova Hedwigia 15: 416 (1968)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Flabellospora irregularis* Matsush. was transferred to *Trifurcospora* as *T. irregularis* (Ando et al., 1987). Seven species are accepted within this genus. Phylogenetic position for *Flabellospora* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Flagellospora Ingold, Transactions of the British Mycological Society 25 (4): 404 (1942)

Index Fungorum number: IF8258

Classification: Leotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Flagellospora curvula* Ingold, Transactions of the British Mycological Society 25 (4): 402 (1942)

Sexual morph: ?*Nectria* (Seifert et al., 2011).

Sequence data: *Flagellospora curvula* (CB-M13, LSU: KC834024, ITS: KC834045)

Notes: *Flagellospora* was introduced by Ingold (1942) and is characterized by having penicillate, hyaline conidiophores, with phialidic, clavate, hyaline conidiogenous cells, producing aseptate to multi-septate, scolecosporous, curved or sigmoid, filiform, hyaline conidia. Phylogenetically, *Flagellospora* was shown to be nested within the order Leotiales (Leotiomycetes) (Figure 2.1). References: (Baschien et al., 2013; Ingold, 1942) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Flahaultiella Seifert, Mycotaxon 110: 95 (2009)

Index Fungorum number: IF514100

Classification: Ascomycota genera *incertae sedis*

Type species: *Flahaultiella microspora* Seifert, Mycotaxon 110: 97 (2009)

Sexual morph: *Sebacina* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Flahaultiella* was introduced by Gams et al. (2009) to replace the name Flahaultia G. Arnaud (nom. inval.). Phylogenetic position for *Flahaultiella* is unresolved due to lack of sequence data. References: (Gams et al., 2009) (morphology), (Wijayawardene et al., 2020) (outline).

Flavignomonia C.M. Tian, Qin Yang & N. Jiang, MycoKeys 60: 20 (2019)

Index Fungorum number: IF829530

Classification: Gnomoniaceae, Diaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Flavignomonia rhoigena* C.M. Tian & Qin Yang, MycoKeys 60: 23 (2019)

Sexual morph: Unknown.

Sequence data: *Flavignomonia rhoigena* (CFCC 53119, LSU: MK429918, ITS: MK432675)

Notes: *Flavignomonia* was introduced by Jiang et al. (2019) and it has synnematous conidiomata, reduced conidiophores, phialidic, cylindrical, hyaline

conidiogenous cells, and solitary, smooth, multi-guttulate, cylindrical to oblong, hyaline conidia. References: (Jiang et al., 2019) (morphology), (Wijayawardene et al., 2020) (outline).

Fonsecaea Negroni, Revista Inst. Bacteriol. 'Dr. Carlos G. Malbrán': 424 (1936)

Index Fungorum number: IF8264

Classification: Herpotrichiellaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Fonsecaea pedrosoi* (Brumpt) Negroni, Rev. Inst. Bact.: 419 (1936)

Sexual morph: Unknown.

Synanamorphs: *Phialophora* (Seifert et al., 2011).

Disease symptoms: chromoblastomycosis on humans and animals (Li et al., 2016c; Vicente et al., 2014).

Sequence data: *Fonsecaea pedrosoi* (CBS 271.37, LSU: KJ930166, ITS: NR_130652, SSU: NG_062640)

Notes: *Fonsecaea* is dimorphic: (1) macronematous, mononematous, branched, pale brown to brown conidiophores, polyblastic, sympodial conidiogenous cells, solitary or catenate, aseptate, brown conidia; (2) macronematous, mononematous, reduced conidiophores, phialidic, brown conidiogenous cells, solitary, aseptate, hyaline conidia (Najafzadeh et al., 2011; Seifert et al., 2011). References: (Najafzadeh et al., 2011; Vicente et al., 2014) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Fontanospora Dyko, Transactions of the British Mycological Society 70 (3): 411 (1978)

Index Fungorum number: IF8265

Classification: Discinellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Fontanospora eccentrica* (R.H. Petersen) Dyko, Transactions of the British Mycological Society 70 (3): 412 (1978)

Sexual morph: Unknown.

Sequence data: *Fontanospora fusiramosa* (CCM F-12900, LSU: GQ477307, ITS: KC834052)

Notes: *Fontanospora* was erected by Dyko (1978) and is characterized by having unbranched or branched, septate, hyaline conidiophores, with holoblastic, integrated, terminal, sympodial and percurrent, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, staurosporous, tetraradiate, consisting of three upward, septate arms and one downward, septate arm. Phylogenetically, *Fontanospora* was shown to be nested within the family Discinellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Dyko, 1978) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Fulvoflamma Crous, Studies in Mycology 55: 56 (2006)

Index Fungorum number: IF500801

Classification: Leotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Fulvoflamma eucalypti* Crous, Studies in Mycology 55: 56 (2006)

Sexual morph: Unknown.

Sequence data: *Fulvoflamma eucalypti* (CBS 118549 = CPC 11243, LSU: DQ195791, ITS: DQ195779, SSU: DQ195802)

Notes: *Fulvoflamma* was erected by Crous et al. (2006c) to accommodate *F. eucalypti* and this genus is characterized by having sporodochial conidiomata, smooth, thin-walled, hyaline setae, hyaline conidiophores, with monoblastic or polyblastic, sympodial, subcylindrical, hyaline conidiogenous cells, producing solitary, guttulate, multi-septate, scolecosporous, subcylindrical, hyaline conidia (Crous et al., 2006c; Seifert et al., 2011). Phylogenetically, *Fulvoflamma* was shown to be nested within the order Leotiales (Leotiomycetes) (Figure 2.1). References: (Crous et al., 2006c; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Fumagopsis Speg., Anales del Museo Nacional de Historia Natural Buenos Aires ser. 3, 13: 464 (1911)

Index Fungorum number: IF8277

Classification: Chaetothyriaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Fumagopsis triglifioides* Speg., Anales del Museo Nacional de Historia Natural Buenos Aires ser. 3, 13: 464 (1911)

Sexual morph: Unknown.

Sequence data: *Fumagopsis stellae* (CBS 145078 = CPC 33216, LSU: NG_066293, ITS: NR_161138)

Notes: *Fumagopsis* was introduced by Spegazzini (1910) and is characterized by sporodochial, dark, stromatic conidiomata, unbranched, brown, aseptate setae, stromatic, hyaline to subhyaline conidiophores, monoblastic, hyaline to subhyaline conidiogenous cells, staurosporic, tetraradiate, hyaline conidia (Seifert et al., 2011). Quan et al. (2020) placed this genus in the family Chaetothyriaceae (Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes). References: (Quan et al., 2020; Seifert et al., 2011; Spegazzini, 1910; Wu & Sutton, 1995) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Furcasterigmium Giraldo López, Studies in Mycology 92: 251 (2018)

Index Fungorum number: IF828041

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Furcasterigmium furcatum* (Gams) Giraldo López & Crous, Studies in Mycology 92: 252 (2018)

Sexual morph: Unknown.

Sequence data: *Furcasterigmium furcatum* (CBS 122.42, LSU: NG_067329, ITS: NR_145349)

Notes: *Furcasterigmium* was introduced by Giraldo and Crous (2019) and is characterized by mononematous, unbranched or poorly branched, sympodial, hyaline conidiophores, mono- and polyphialidic with conspicuous collarette, subulate, hyaline conidiogenous cells, and producing aseptate, in slimy mass, smooth-walled,

ellipsoidal, hyaline conidia. References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Fusariella Sacc., Atti del Reale Istituto Veneto di Scienzi, Lettere ed Arti ser. 6, 2: 463 (1884)

Index Fungorum number: IF8282

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Fusariella atrovirens* (Berk.) Sacc., Atti dell´Istituto Veneto Scienze 2: 463 (1884)

Sexual morph: Unknown.

Sequence data: *Fusariella atrovirens* (CBS 311.73, LSU: MH872395, ITS: MH860688)

Notes: Presently, there are 18 species accepted in this genus (Jiang et al., 2017; Lin et al., 2016a) and they are characterized by semi-macronematous, mononematous, unbranched or variously branched conidiophores, with curved, cylindrical, subulate or lageniform, hyaline to pale brown phialides that produce catenate, acrogenous, straight or slightly curved, fusiform, cylindrical, clavate or obclavate, subhyaline to brown conidia (Hyde et al., 2020). References: (Jiang et al., 2017; Lin et al., 2016a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Fusariella curvata C.G. Lin, Yong Wang bis & K.D. Hyde, sp. nov. (Figure 2.5 and Figure 2.6)

Index Fungorum number: IF552354; *Facesoffungi number*: FoF 02514;

Etymology: In reference to the tip of each conidium being curved laterally.

Holotype: MFLU 15-3268

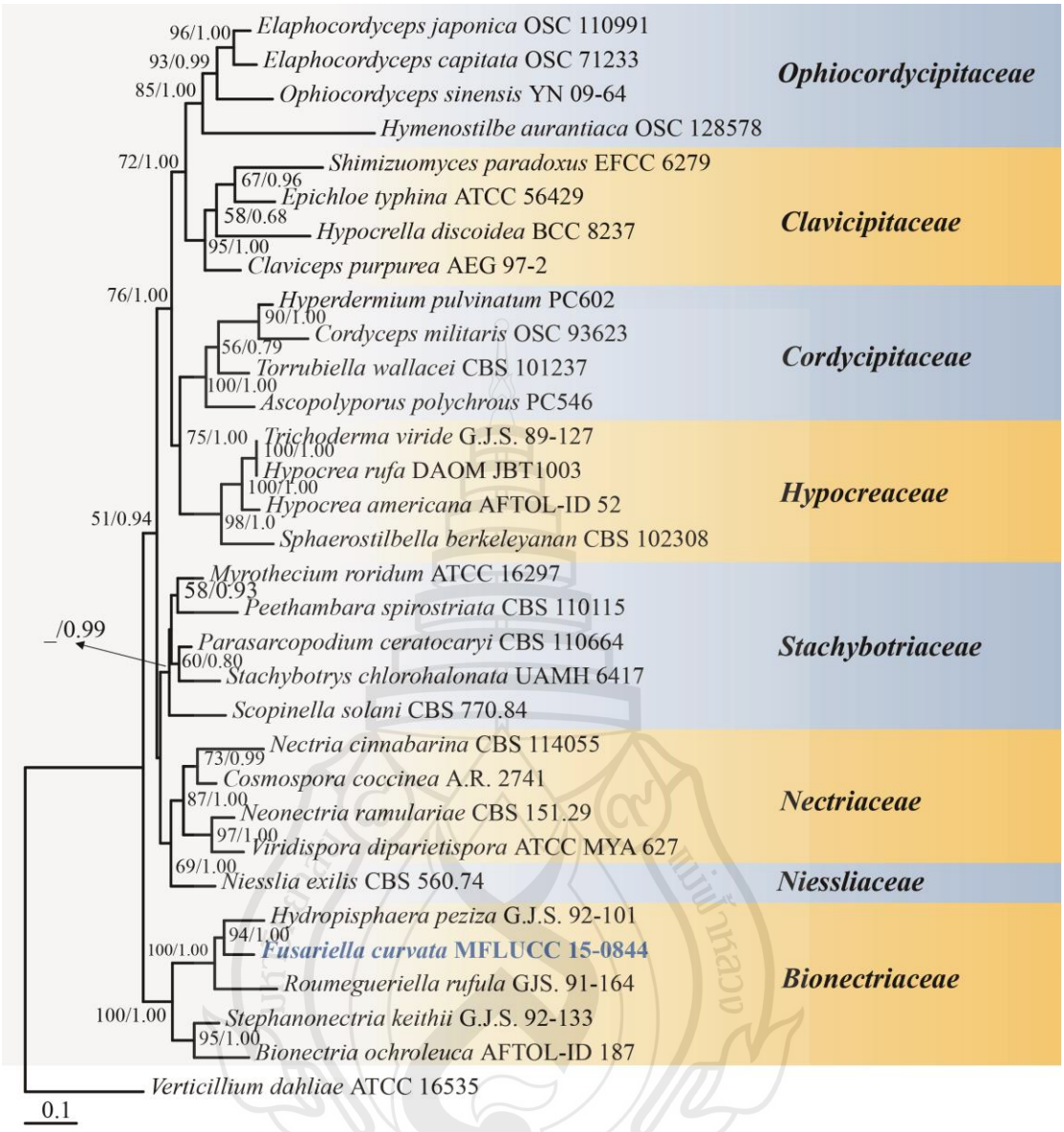
Asexual morph *Colonies* on natural substrate effuse, greyish green. *Mycelium* partly superficial and partly immersed. *Conidiophores* macronematous, mononematous, erect, branched, straight or flexuous, smooth, 1–3-septate, hyaline, up to 70 µm long, up to 4.5 µm wide. *Conidiogenous cells* monophialidic, integrated, terminal or laterally intercalary, straight or flexuous, subulate, smooth, hyaline, 19.5–

31.5 μm (av. = 23.9 μm, n = 20) long, 2.0–3.0 μm (av. = 2.4 μm, n = 20) wide at the base, tapering slightly to the apex to 1.0–2.0 μm (av. = 1.6 μm, n = 20) wide. *Conidia* catenate, acrogenous, usually straight but sometimes curved, fusiform, obclavate, rounded at the base and pointed at the apex, mostly the apical cell of each conidium curved laterally, 1–3-septate (mostly 3-septate), slightly constricted at the septa, smooth, hyaline when young, pale olivaceous when mature, 18–24 μm (av. = 20.5 μm, n = 50) long, 3.0–4.5 μm (av. = 3.8 μm, n = 50) wide at the widest point. **Sexual morph** Undetermined.

Culture characteristics: Conidia germinating on PDA within 24 h. Colonies on MEA effuse, in concentric rings with radial wrinkles in the center, white from above, light yellow from below, reaching a diam. of 2–3 cm in 20 days at 25 °C.

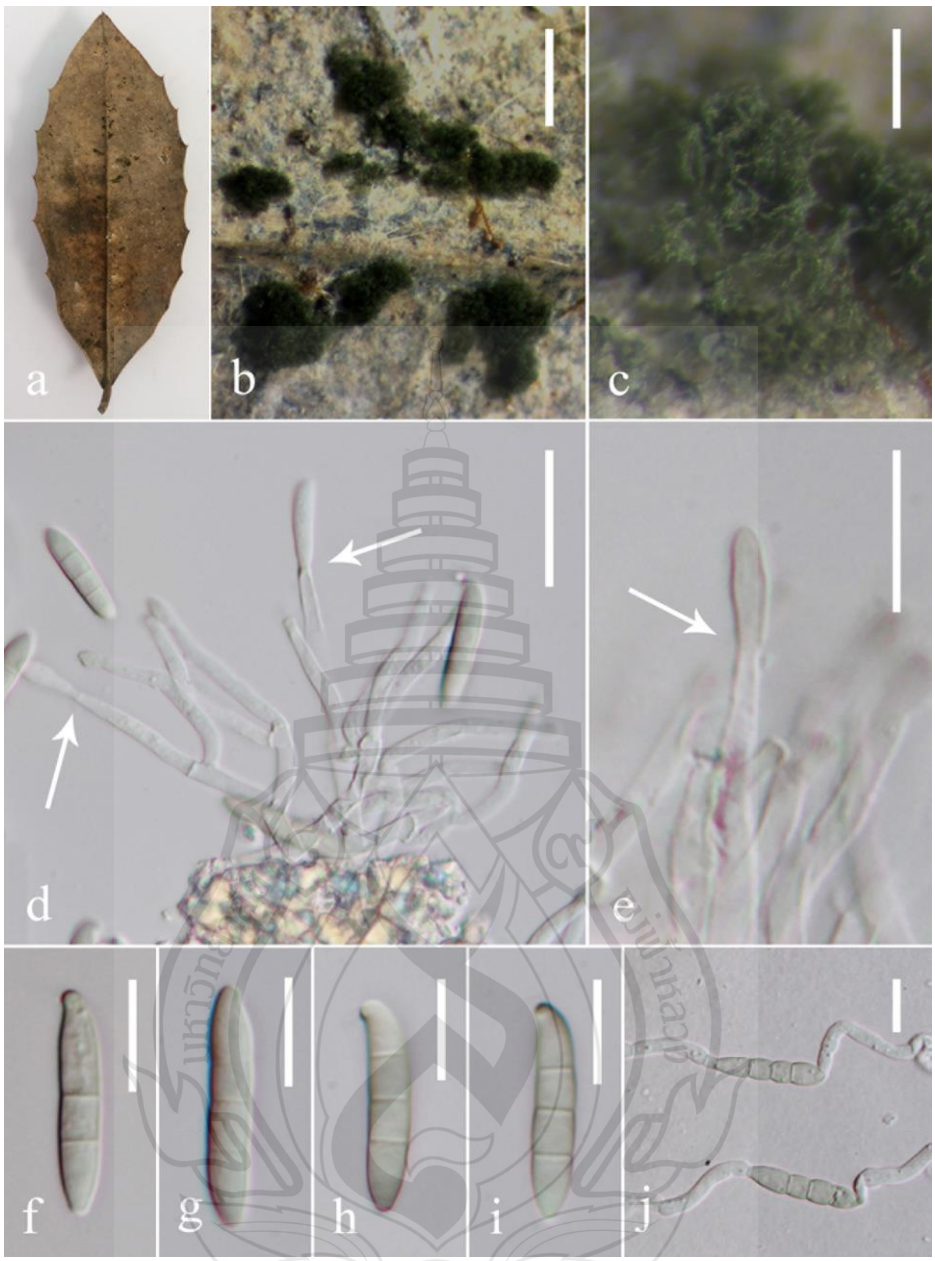
Material examined: THAILAND, Chiang Rai, Mae Sai District, Ang Kep Nam Wat Tham Khao Hin Phayanak (Wat Tham Sao Hin Payanak), 20°19'16.58 – 30.12" N, 99°51'40.72 – 54.50" E, on decaying *Quercus* sp. leaf, 19 June 2015, C.-G. Lin, WTSP 10-1 (MFLU 15-3268, holotype; HGUP 8001, isotype), living culture MFLUCC 15-0844 = GUCC 8001.

Notes: The shape of conidium (tip mostly curved laterally) clearly distinguishes this species from all other *Fusariella* species. Conidia of our new species are similar to those of *F. sinensis* H.M. Liu & T.Y. Zhang, but the conidiogenous cells of our new species are smooth and hyaline while those of *F. sinensis* are distinctly verrucose and coloured. Additionally, conidia of our new species are longer but narrower than those of *F. sinensis* (10–15 × 4.4–5.5 μm, av. = 13.5 × 5 μm) (Liu and Zhang 2006). *Fusariella concinna* (Syd.) S. Hughes is similar to our new species in conidial shape, sometimes the conidia of *F. concinna* are slightly curved or bent above. However, conidia of *F. concinna* mostly are curved, fusoid but tapering towards the apex, whereas those of our new species are straight, fusiform, obclavate. Additionally, conidia of *F. concinna* are hyaline to slightly coloured with a well-defined basal scar, while those of our new species are hyaline when young, pale olivaceous when mature.



Note Phylogenetic tree generated from maximum likelihood (ML) analysis based on combined SSU, LSU, TEF and RPB2 sequence data for order Hypocreales. Bootstrap support values for maximum likelihood (ML) greater than 50% and Bayesian posterior probabilities greater than 0.5 are indicated above or below the nodes as MLBS/PP. The new isolates are in bold and blue. The tree is rooted with *Verticillium dahliae* ATCC 16535.

Figure 2.17 Phylogenetic tree for *Fusariella*



Note *Fusariella curvata* (holotype MFLU 15-3268). **a** Host leaf. **b, c** Conidiophores on the host surface. **d, e** Conidiophores. conidiogenous cells and conidia. **f–i** Conidia. **j** Germinating conidia. Scale bars: **b** = 1000 μm, **c** = 200 μm, **d** = 20 μm, **e–j**= 10 μm.

Figure 2.18 *Fusariella curvata* (holotype MFLU 15-3268)

Other species accepted in the genus *Fusariella*

Sixteen known species of *Fusariella* are re-evaluated and recognized.

1. ***Fusariella atrovirens*** (Berk.) Sacc., Fung. 2: 463 (1884) (Figure 2.7)

≡ *Fusisporium atrovirens* Berk., in Smith, Engl. Fl., Fungi (Edn 2) (London) 5(2): 351 (1836)

≡ *Fusarium atrovirens* (Berk.) Mussat, in Saccardo, Syll. fung. (Abellini) 15: 144 (1900)

Description and illustrations — See Hughes (1949)

Notes: *Fusariella atrovirens* is the type species of the genus *Fusariella*. The conidia of this species are similar to those of *F. bizzozeriana*, but its conidiophores are minutely verruculose while those of *F. bizzozeriana* are smooth (Hughes 1949). Type material of this species is *Mycotheca veneta*, 1038.

2. ***Fusariella bizzozeriana*** (Sacc.) S. Hughes, Mycol. Pap. 28 (6): 6, 1949. (Figure 2.8)

≡ *Sporidesmium bizzozerianum* Sacc., Mycotheca veneta: no. 365 (1876)

≡ *Clasterosporium bizzozerianum* (Sacc.) Sacc. [as '*Closterosporium*'], Michelia 2(no. 7): 289 (1881)

Description and illustrations — See Hughes (1949)

Notes: See notes of *F. atrovirens*. Type material of this species is Mycotheca veneta, 365.

3. ***Fusariella candida*** Matsush., Matsush. Mycol. Mem. 7: 51 (1993) (Figure 2.9)

Description and illustrations — See Matsushima (1993)

Notes: It is a distinct species. The conidia of all *Fusariella* species are colored when mature, except in *F. candida* and *F. formosana*. *Fusariella candida* has very short conidiophores (6.5–14 μm) (Matsushima 1993). Type material of this species is MFC-0P411 (Matsushima Fungus Collection, Kobe).

4. ***Fusariella concinna*** (Syd.) S. Hughes, Mycol. Pap. 28: 8 (1949) (Figure 2.10)

≡ *Clasterosporium concinnum* Syd., Annales Mycologici 31 (1-2): 94 (1933)

Description and illustrations — See Hughes (1949)

Notes: *Fusariella bizzozeriana* and *F. viridiatra* are similar to *F. concinna* in conidial shape. However, the latter species develops hyaline to slightly coloured conidia, whereas those of *F. bizzozeriana* are olivaceous at the base, the upper parts nearly hyaline and those of *F. viridiatra* are green brown. Type material of this species is Herb. I.M.I. 8669.

5. ***Fusariella echinulata*** H.M. Liu & T.Y. Zhang, Mycosystema 25(4): [513] (2006) (Figure 2.11)

Description and illustrations — See Liu and Zhang (2006)

Notes: Liu and Zhang (2006) described this species with obovoid conidia, which are actually obclavate based on their original description "the conidia are rounded at the base, tapered at apex" and the illustration.

Fusariella obstipa is similar to *F. echinulata* in conidial shape. However, the latter species develops pale olivaceous conidia, whereas those of *F. obstipa* are subhyaline. Type material of this species is $HSAUP_{03}1168$.

6. ***Fusariella egyptiaca*** Mouch. [as '*aegyptiacum*'], in Mouchacca & Nicot, Revue Mycol., Paris 37(3): 181 (1973) [1972] (Figure 2.12)

Description and illustrations — See Ellis (1976)

Notes: Morphologically, *Fusariella formosana* and *F. hughesii* are similar to *F. egyptiaca* in having subcylindrical to obclavate conidia. However, the conidia of *F. egyptiaca* are dark blackish brown, whereas those of *F. formosana* are hyaline and *F. hughesii* are initially hyaline, at maturity greenish blue to grey when in mass.

7. ***Fusariella formosana*** Matsush., Matsush. Mycol. Mem. 4: 9 (1985) (Figure 2.13)

Description and illustrations — See Matsushima (1985)

Notes: *Fusariella formosana* is similar to *F. egyptiaca* and *F. hughesii* in conidial shape, see notes of *F. egyptiaca*. Type material of this species is MFC-10015.

8. ***Fusariella helanshanensis*** Y.M. Wu & T.Y. Zhang, Mycosystema 28(5): 653 (2009) (Figure 2.14)

Description and illustrations — See Wu et al. (2009)

Notes: This species is very similar to *F. obstipa* in conidial shape and size, but differs from it by the middle cell of conidia being inflated (Wu et al. 2009). Type material of this species is $HSAUPII_{05}4119$ and ex-type is HMAS 196216.

9. ***Fusariella hughesii*** Chab.-Frydm., Can. J. Bot. 42(11): 1485 (1964) (Figure 2.15)

Description and illustrations — See Chabelska-Frydman (1964) and Matsushima (1982)

Notes: It differs from the other *Fusariella* species in its light green conidia (Chabelska-Frydman 1964). Type material is Herb. I.M.I. 82236.

10. ***Fusariella indica*** R.Y. Roy & B. Rai, Trans. Br. mycol. Soc. 51(2): 333 (1968) (Figure 2.16)

Description and illustrations — See Roy and Rai (1968)

Notes: This species differs in producing chains of three kinds of conidia, *viz.*, (i) long obclavate, 1–3-septate, 12–15 × 4.5–5 μm; (ii) short obclavate, 1-septate 8–12 × 4.5–6 μm; (iii) fusiform, 1–3-septate, 12–16 × 4.5–5 μm (Roy and Rai 1968). These three kinds of conidia are hyaline when young, becoming greenish black at maturity. Type material of this species is Herb. I.M.I. 127253.

11. ***Fusariella intermedia*** Mouch. & Nicot, Revue Mycol., Paris 37(3): 181 (1973) [1972] (Figure 2.17)

Description and illustrations — See Ellis (1976)

Notes: It is similar to *F. kansensis* in conidial shape as both species produce curved and fusiform conidia. However, the conidia of *F. intermedia* are smaller than those of *F. kansensis* (22–27 × 7–9 μm).

12. ***Fusariella kansensis*** (Ellis & Barthol.) M.B. Ellis, More Dematiaceous Hyphomycetes (Kew): 459 (1976) (Figure 2.18)

≡ *Clasterosporium kansense* Ellis & Barthol., Erythea 4: 28 (1896)

Description and illustrations — See Ellis (1976)

Notes: Hughes (1958) firstly proposed *Clasterosporium kansense* as a synonym of *F. bizzozeriana* but the rough-walled phialides and much broader conidia distinguish it from *F. bizzozeriana* (Ellis 1976). Ellis (1976) redescribed this species with the following morphological characters: conidia curved, 3-septate, constricted at the septa, smooth-walled, grey, 22–27 × 7–9 μm, conidiophores hyaline to pale olivaceous brown, 15–30 × 3–4 μm, phialides often verruculose, confirming its

position in *Fusariella*. *Fusariella kansensis* differs from *F. intermedia* by producing larger conidia, see the notes of *F. intermedia*.

13. ***Fusariella obstipa*** (Pollack) S. Hughes, Mycol. Pap. 28: 9 (1949) (Figure 2.19)

≡ *Dendryphion obstipum* Pollack, Mycologia 39(5): 617 (1947)

Description and illustrations — See Pollack (1947) and Hughes (1949)

Notes: Amongst the species that produce more or less obclavate conidia, *Fusariella echinulata* is most similar to *F. obstipa*. However, conidia of *F. echinulata* are pale olivaceous. Type material of this species is BPI 442857 deposited as *Dendryphion obstipum*.

14. ***Fusariella sarniensis*** M.B. Ellis, More Dematiaceous Hyphomycetes (Kew): 460 (1976) (Figure 2.20)

Description and illustrations — See Ellis (1976)

Notes: The conidia are straight, cylindrical, rounded at the apex, truncate at the base, 3-septate, pale to mid grey, smooth-walled, 15–18 × 5–7 μm (Ellis 1976). The type material of this species is I.M.I. 35730.

15. ***Fusariella sinensis*** H.M. Liu & T.Y. Zhang, Mycosystema 25(4): 514 (2006) (Figure 2.21)

Description and illustrations — See Liu and Zhang (2006)

Notes: *Fusariella sinensis* is similar to *F. obstipa* in conidial shape as all produce obclavate conidia. However, *Fusariella sinensis* differs by having distinctly verrucose and colored phialides (Liu and Zhang 2006). Type material of this species is $HSAUP_{03}1039$.

16. ***Fusariella viridiatra*** Sacc., Syll. fung. (Abellini) 4: 395 (1886) (Figure 2.22)

≡ *Fusisporium atrovirens* Sacc. Fung. ital., fig. 45 (1881)

Description and illustrations — See Lindau (1910)

Notes: *Fusariella viridiatra* is similar to *F. intermedia* and *F. kansensis* in conidial shape as all produce fusiform and curved conidia. However, *Fusariella viridiatra* differs by producing green brown conidia.

Species excluded from *Fusariella*

1. ***Fusariella cladosporioides*** P. Karst., Hedwigia 30: 248 (1891)

Notes: Karst (1891) briefly described it as “Caespituli effuai, minuti, hypophylli, griseo-olivacei. Hyphae brevissimae, ramosae, articulatae. Conidia bacillaria, apicem versus attenuata, curvata, raro recta, vulgo pauciseptata, fumoso-hyalina vel hyalina (sub lente), 50–100 × 4–6 mmn.”, without any illustration (Hughes 1949).

Crous at al. (2013) proposed *F. cladosporioides* as a synonym of *Pseudocercospora myrticola* (Speg.) Deighton (1976). In this study, we agree with this arrangement.

2. ***Fusariella polysciadis*** (Henn.) Wollenw. [as '*polysciatis*'], Fusaria autographica delineate 1: no. 433 (1916)

≡ *Pionnotes polysciadis* Henn. [as 'polysciatis'], Bot. Jb. 34: 57 (1904)

≡ *Cercosporella polysciadis* (Henn.) Hansf. [as '*polysciatis*'], Proc. Linn. Soc. London 155: 43 (1943) [1942-43]

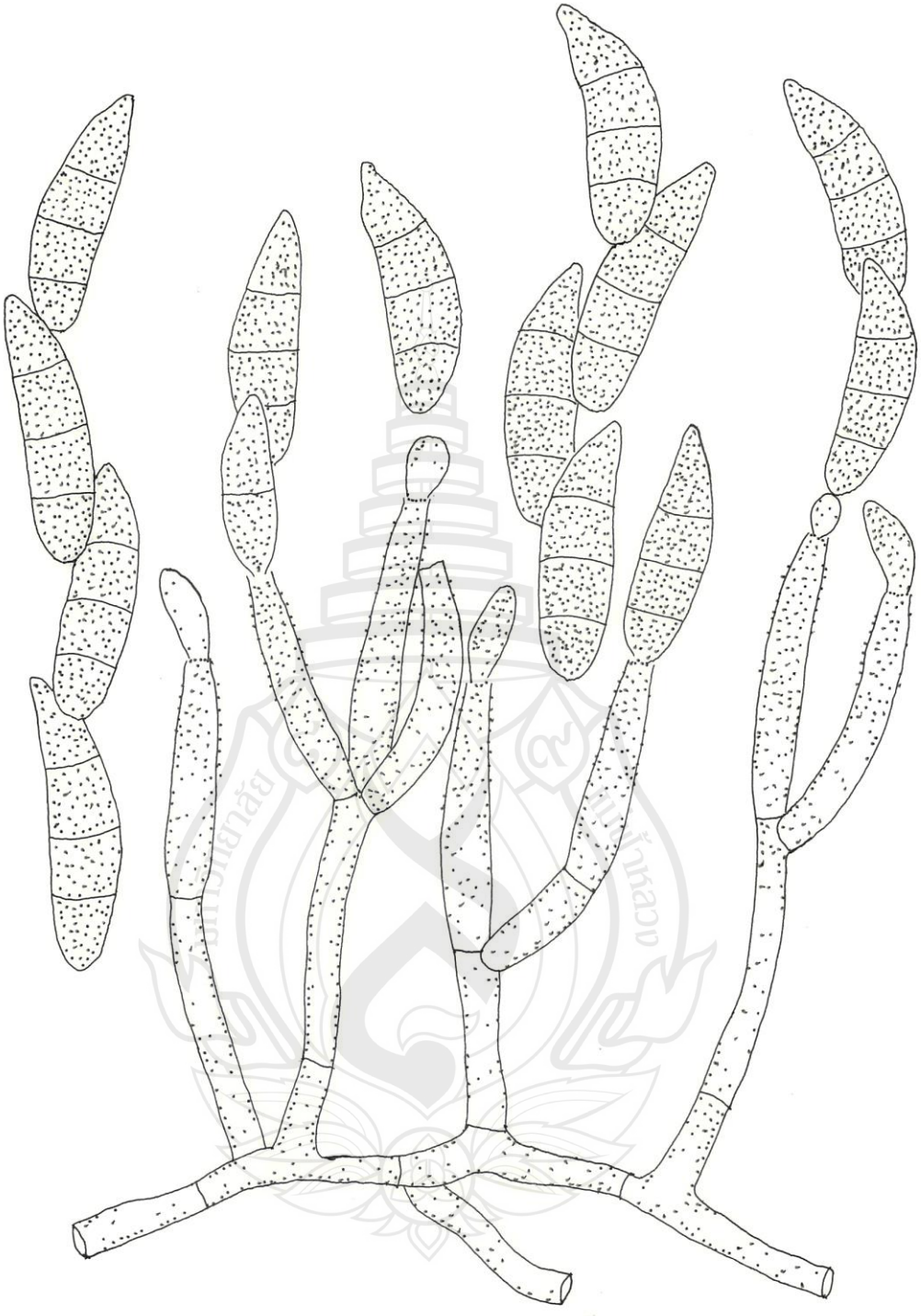
Notes: This species is not a *Fusariella* because “the conidia are formed in typical *Cercospora* manner on simple or branched geniculate conidiophores” (Hansford 1943).

3. ***Fusariella populi*** Garb., Bull. Soc. mycol. Fr. 33: 89 (1917)

= ? *Stigmina radiosa* (Lib.) Goid., Annali Bot.: 11 (1938)

Notes: Garbowski (1917) described a new *Fusariella* species as follows: “Caespitulis griseo-olivaceis in macula arida brunneola; conidiophoris subnullis; hyphis sporophoris hyalinis, fliformibus, 2 μ circ. latis; conidiis numerosis, fusoideis, curvulis vel rectis 2-septatis, ad septa leviter constrictis, utrinque rotundatis, guttulatis, olivaceis glabris, 30–35 × 5–7 μm.” (Saccardo 1931; Hughes 1949).

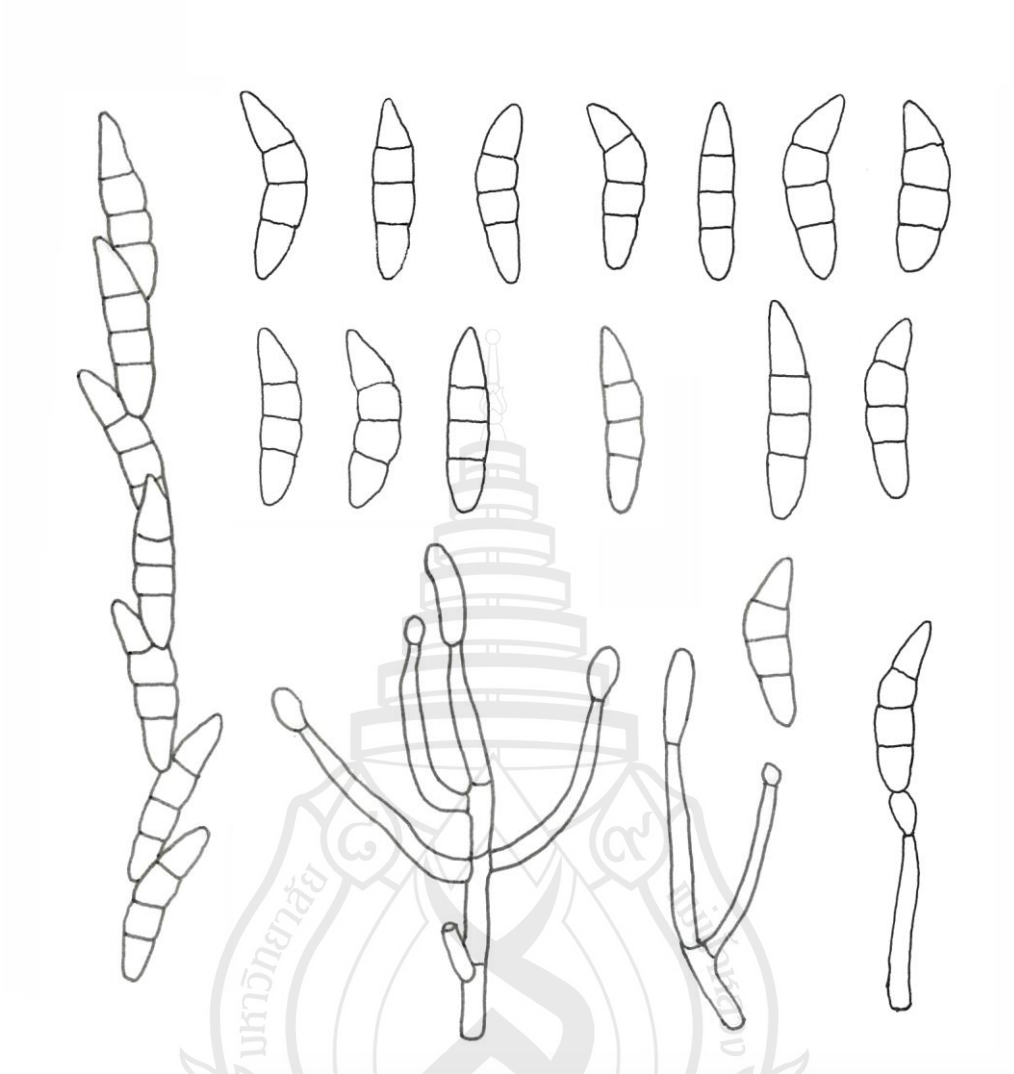
Goidànich (1936) regarded *Fusariella populi* as a synonym of *Stigmina radiosa*, while Hughes (1949) only stated that this species did not belong in *Fusariella*. We concur with their conclusions.



Note *Fusariella atrovirens*

Source Seifert et al. (2011)

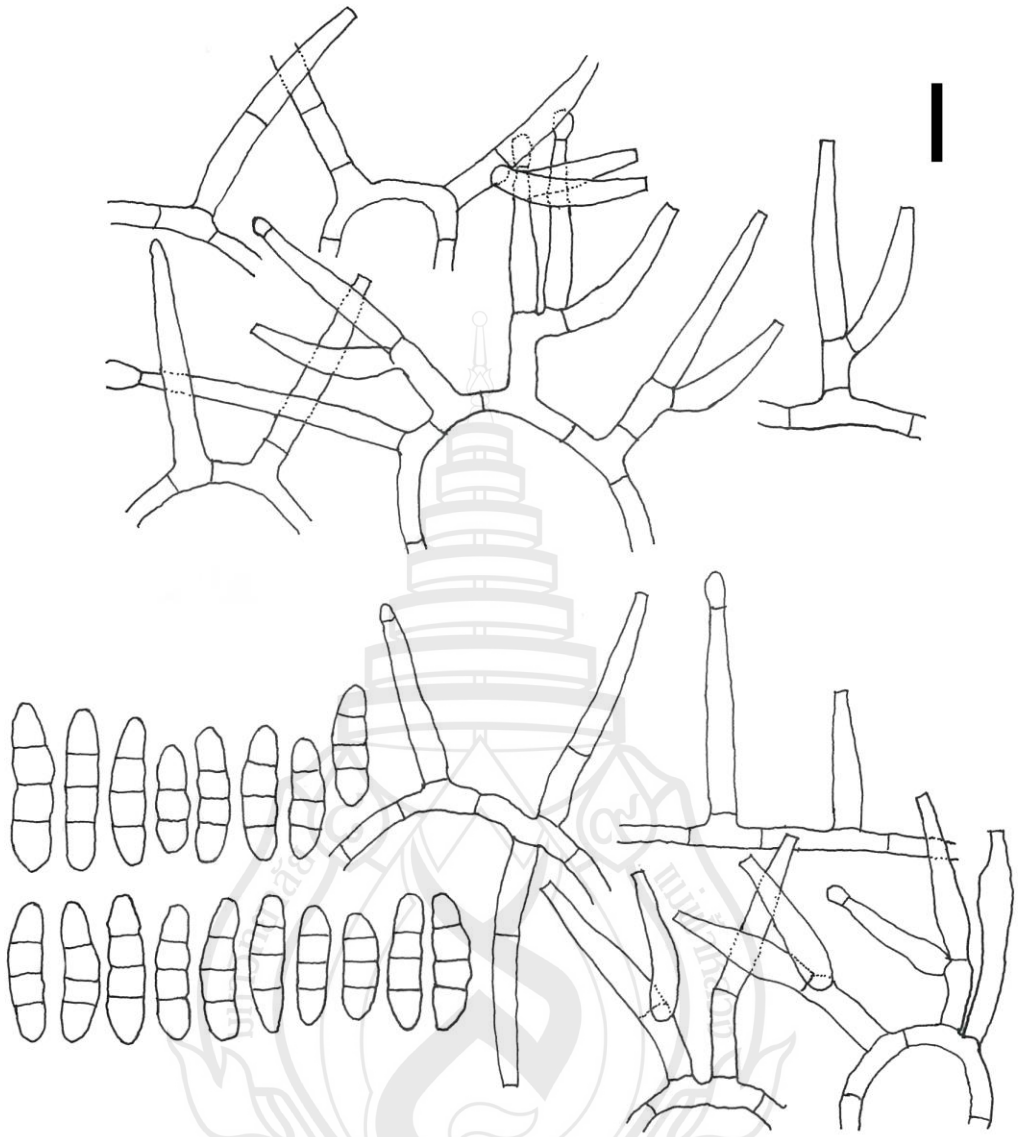
Figure 2.19 *Fusariella atrovirens*



Note *Fusariella bizzozeriana*

Source Hughes (1949)

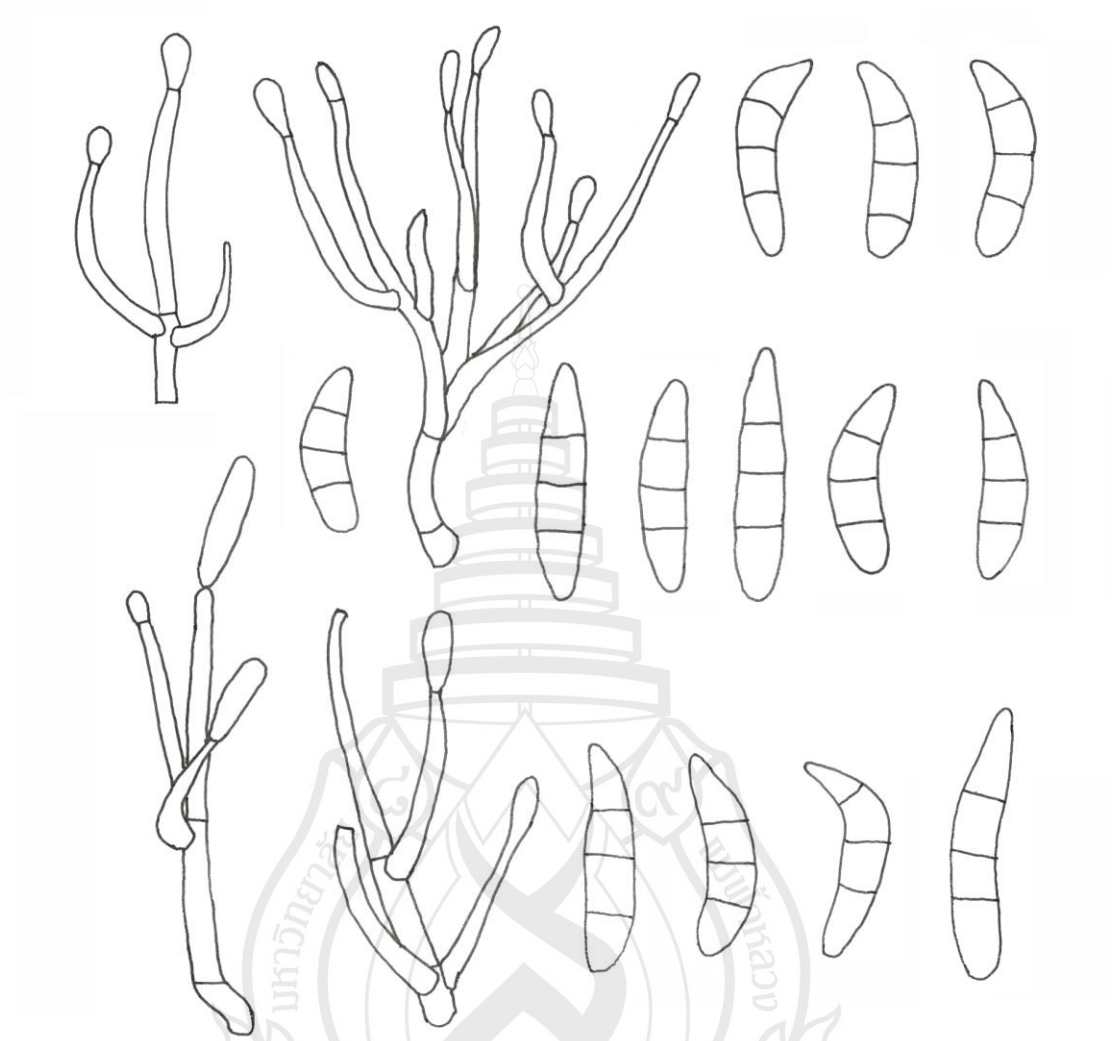
Figure 2.20 *Fusariella bizzozeriana*



Note *Fusariella candida* (Scale bar = 10 μm)

Source Matsushima (1993)

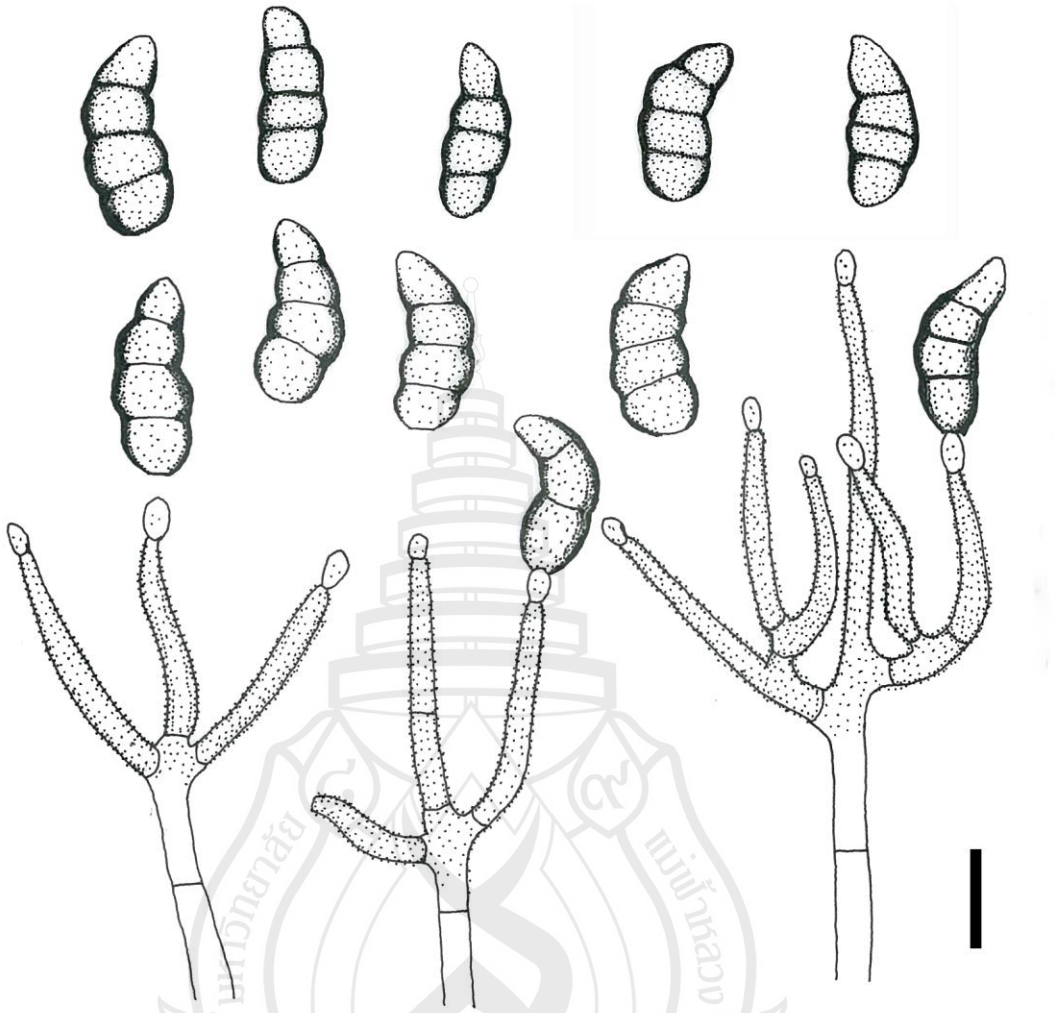
Figure 2.21 *Fusariella candida*



Note *Fusariella concinna*

Source Hughes (1949)

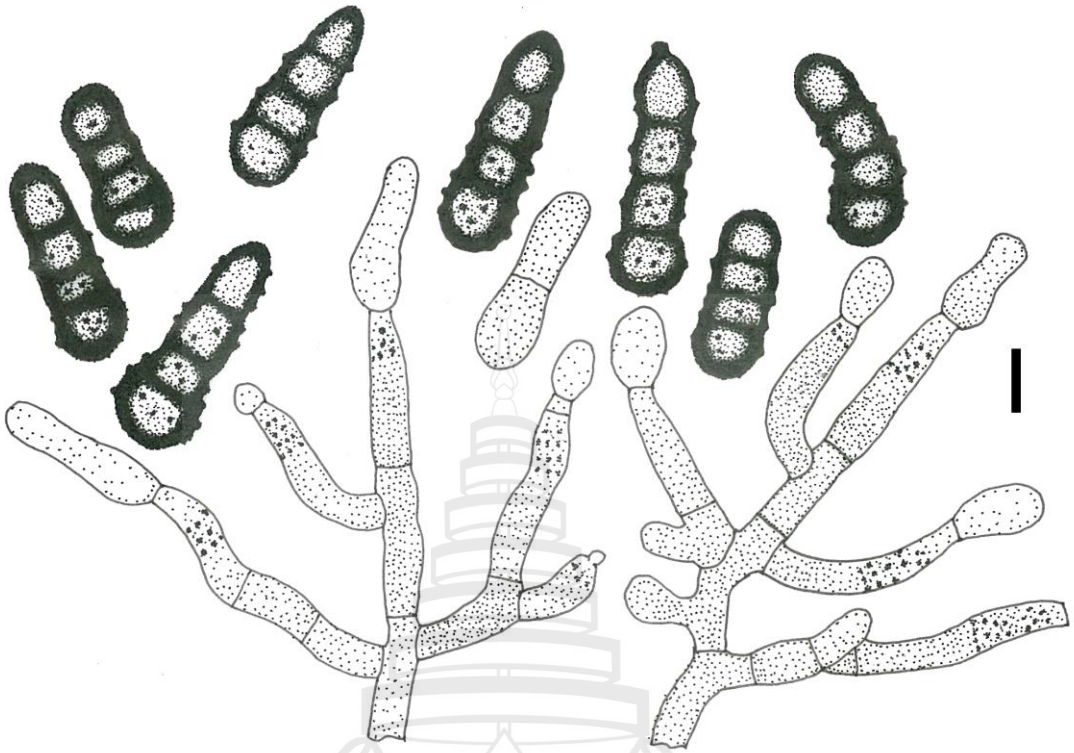
Figure 2.22 *Fusariella concinna*



Note *Fusariella echinulata* (Scale bar = 10 μm)

Source Liu and Zhang (2006)

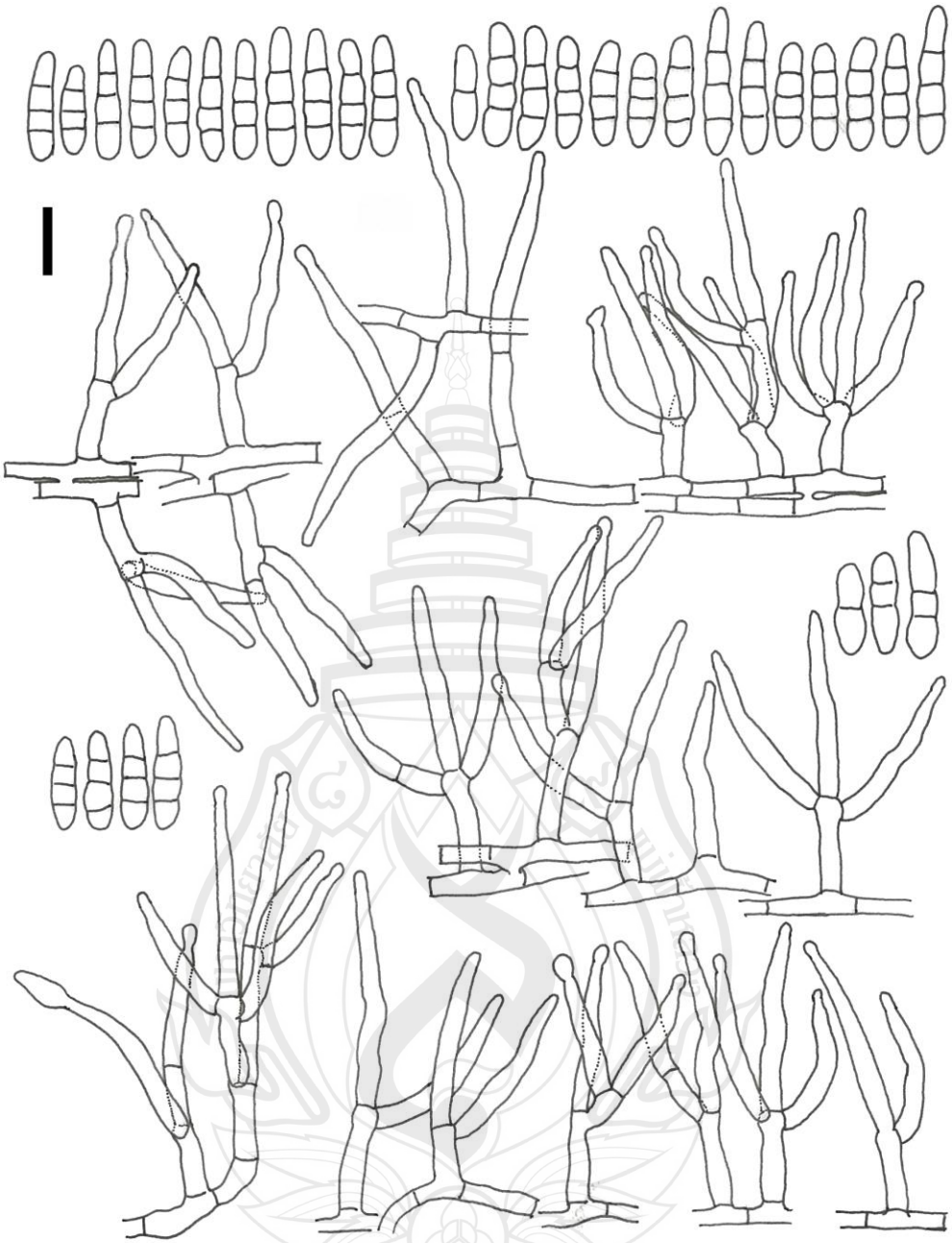
Figure 2.23 *Fusariella echinulata*



Note *Fusariella egyptiaca* (Scale bar = 5 μm)

Source Ellis (1976)

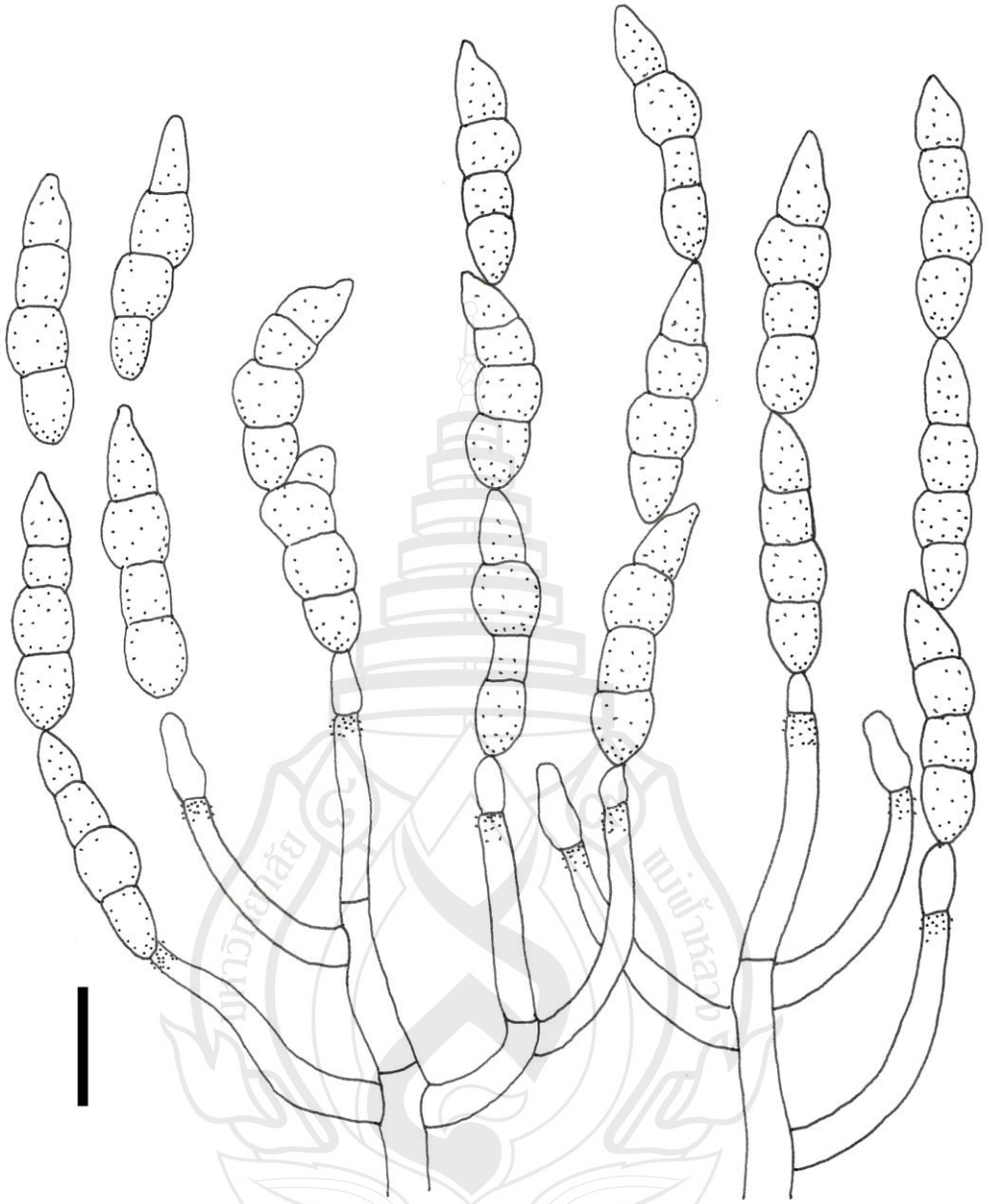
Figure 2.24 *Fusariella egyptiaca*



Note *Fusariella formosana* (Scale bar = 10 μm)

Source Matsushima (1985)

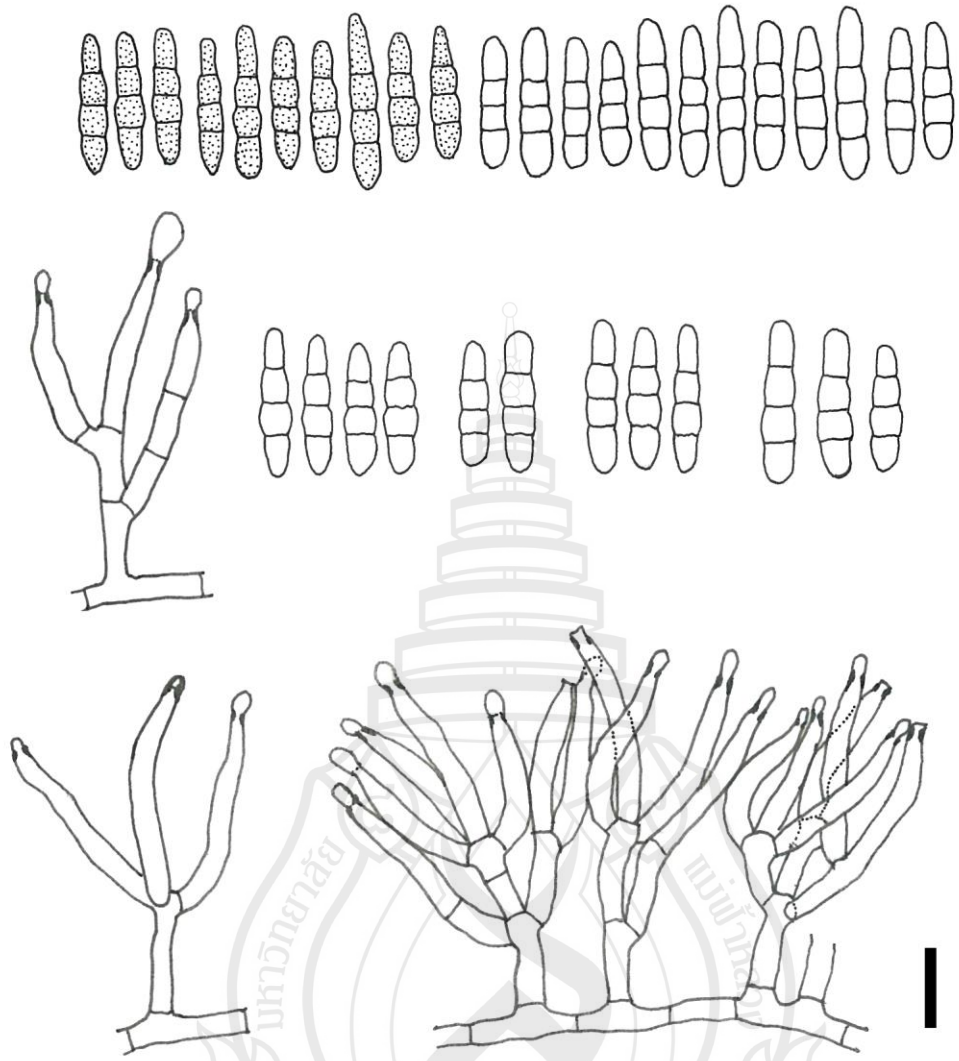
Figure 2.25 *Fusariella formosana*



Note *Fusariella helanshanensis* (Scale bar = 10 μm).

Source Wu et al. (2009)

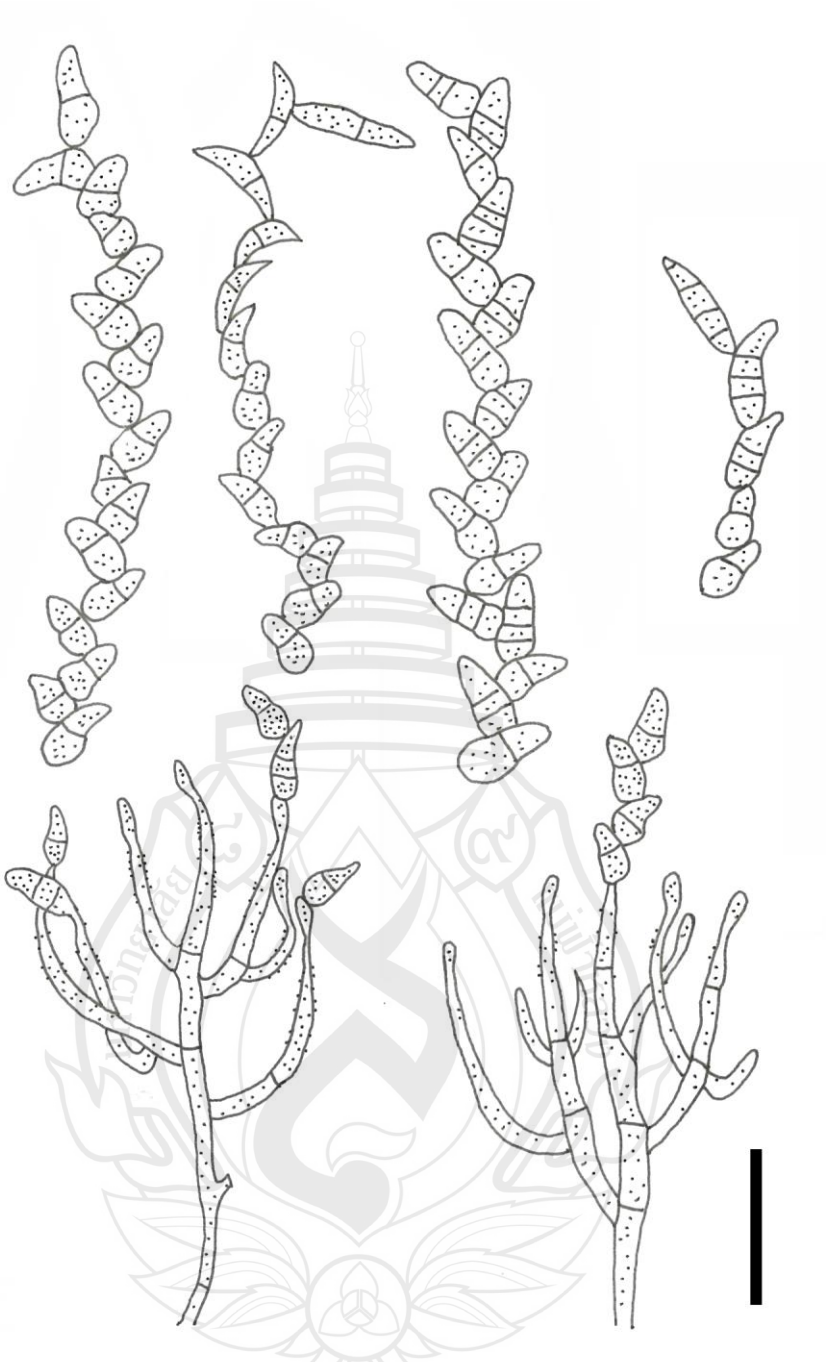
Figure 2.26 *Fusariella helanshanensis*



Note *Fusariella hughesii* (Scale bar = 10 μm)

Source Matsushima (1982)

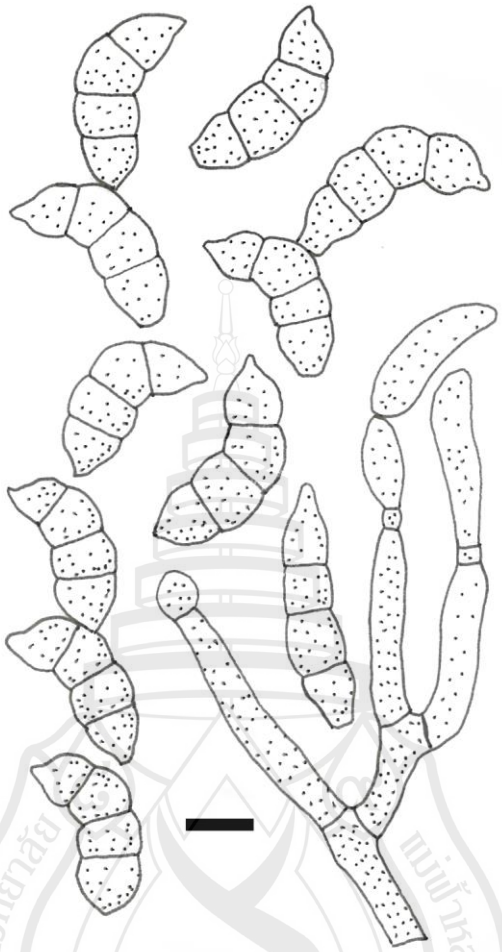
Figure 2.27 *Fusariella hughesii*



Note *Fusariella indica* (Scale bar = 20 μm).

Source Roy and Rai (1968)

Figure 2.28 *Fusariella indica*



Note *Fusariella intermedia* (Scale bar = 5 μm).

Source Ellis (1976)

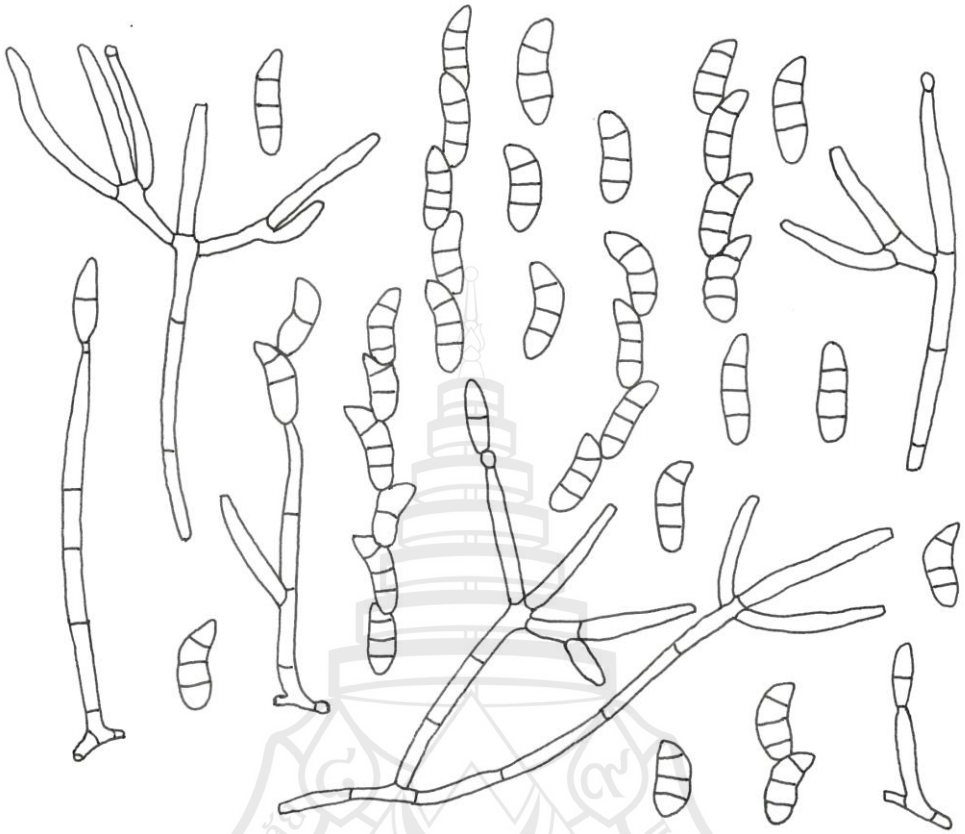
Figure 2.29 *Fusariella intermedia*



Note *Fusariella kansensis* (a. scale bar = 5 μm, b. without scale bar).

Source Ellis (1976)

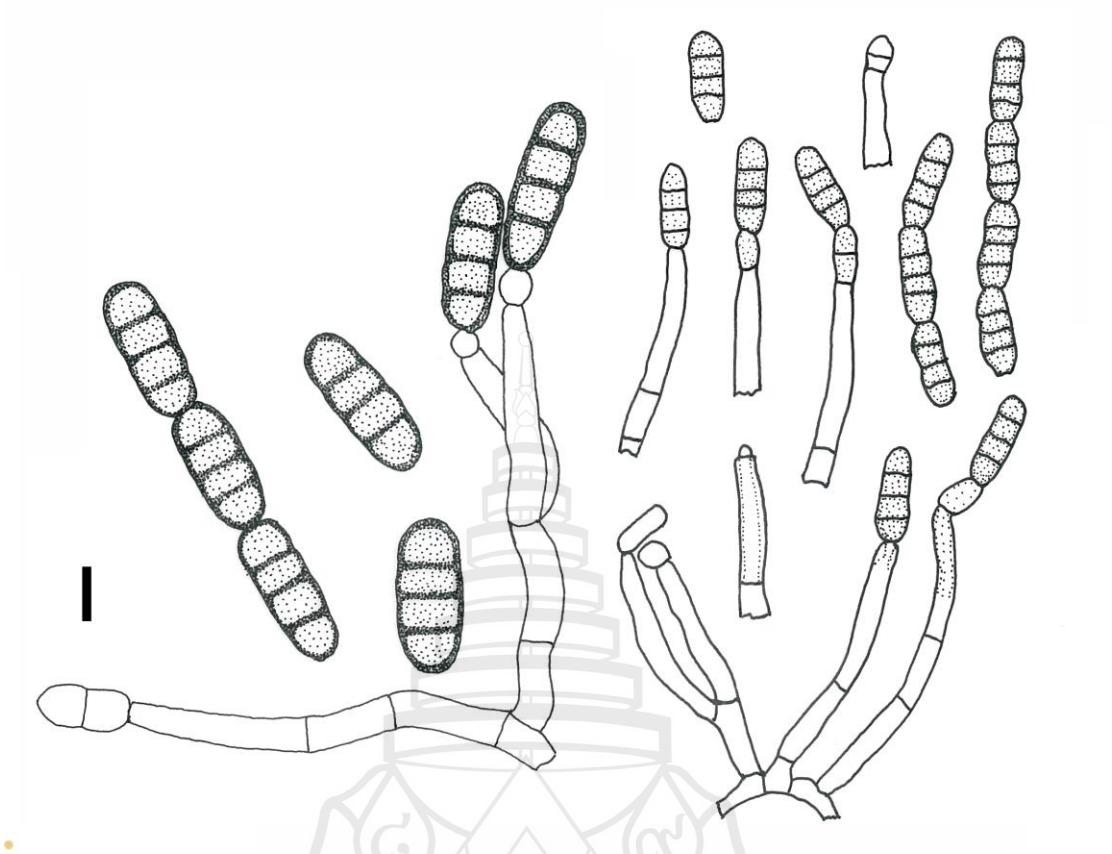
Figure 2.30 *Fusariella kansensis*



Note *Fusariella obstipa*

Source Hughes (1949)

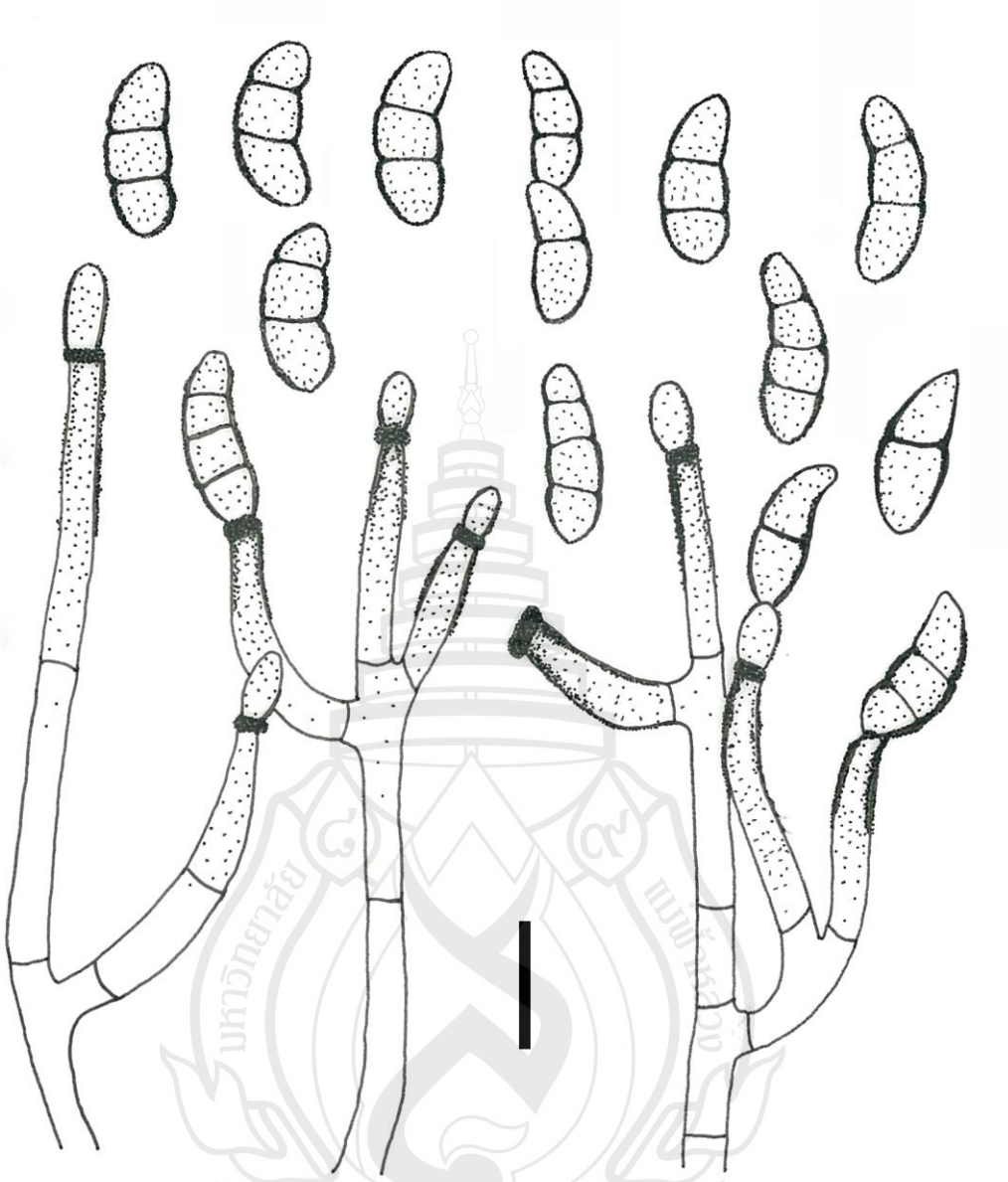
Figure 2.31 *Fusariella obstipa*



Note *Fusariella sarniensis* (Scale bar = 5 μm).

Source Ellis (1976)

Figure 2.32 *Fusariella sarniensis*



Note *Fusariella sinensis* (Scale bar = 10 μm).

Source Liu and Zhang (2006)

Figure 2.33 *Fusariella sinensis*



Note *Fusariella viridiatra*

Source Lindau (1910)

Figure 2.34 *Fusariella viridiatra*

Fusarium Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 10 (1809)

= *Selenosporium* Corda, Icones fungorum hucusque cognitorum 1: 7 (1837)

= *Pionnotes* Fr., Summa vegetabilium Scandinaviae 2: 481 (1849)

= *Gibberella* Sacc., Michelia 1 (1): 43 (1877)

= *Sporotrichella* P. Karst., Meddelanden af Societas pro Fauna et Flora Fennica 14: 96 (1887)

= *Ustilaginoidella* Essed, Annals of Botany 25 (2): 351 (1911)

= *Rachisia* Lindner, Die Deutsche Essigindustrie 17: 467 (1913)

= *Stagonostroma* Died., Kryptogamen-Flora der Mark Brandenburg 9 (3): 561 (1914)

= *Discofusarium* Petch, Transactions of the British Mycological Society 7 (3): 143, 164 (1921)

= *Pseudomicrocera* Petch, Transactions of the British Mycological Society 7 (3): 164 (1921)

= *Fusidomus* Grove, Journal of Botany, British and Foreign 67: 201 (1929)

= *Botryocrea* Petr., Sydowia 3 (1-6): 140 (1949)

= *Bidenticula* Deighton, Transactions of the British Mycological Society 59 (3): 425 (1972)

= *Pycnofusarium* Punith., Transactions of the British Mycological Society 61 (1): 63 (1973)

Index Fungorum number: IF8284

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Fusarium roseum* Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 10, tab. 1, fig. 10 (1809)

Sexual morph: *Gibberella*, *Haematonectria*, *Albonectria*, *Corallomycetella* (Seifert et al., 2011).

Disease symptoms: blight, canker, rot, wilt (Dean et al., 2012; Dita et al., 2018; Ghag et al., 2015; Giesbrecht et al., 2013; Gomes et al., 2015; Graney et al., 2017; Hyde et al., 2018; Ma et al., 2010; Pegg et al., 1996; Perez-Hernandez et al., 2014; Ploetz, 2015; Polizzi et al., 2010)

Sequence data: *Fusarium circinatum* (CBS 405.97 = BBA 69720 = DAOM 225113 = MRC 7541 = NRRL 25331, LSU: NG_069843, ITS: NR_120263)

Notes: *Fusarium* is characterized by conidiophores are mononematous or sporodochial, branched or penicillate, hyaline, conidiogenous cells are monophialidic or polyphialidic, macrocodidia are 1-septate to multiseptate, straight or curved with or without a hooked apical cell, microconidia are absent or present, 0–2-septate, and chlamydospores are absent or present, globose, subglobose to ellipsoidal (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Fuscohypha Giraldo López & Crous, Studies in Mycology 92: 264 (2018)

Index Fungorum number: IF828058

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Fuscohypha expansa* Giraldo López & Crous, Studies in Mycology 92: 264 (2018)

Sexual morph: Unknown.

Sequence data: *Fuscohypha expansa* (CBS 418.89, LSU: LR025845, ITS: LR026715)

Notes: *Fuscohypha* was introduced by Giraldo and Crous (2019) and is characterized by mononematous, simple or verticillate conidiophores, monophialidic, cylindrical to subulate, hyaline conidiogenous cells, and producing aseptate, in slimy mass, subglobosa or ellipsoidal, hyaline conidia. References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Fuscophialis B. Sutton, Boletín de la Sociedad Argentina de Botánica 18 (1-2): 158 (1977)

Index Fungorum number: IF8285

Classification: Ascomycota genera *incertae sedis*

Type species: *Fuscophialis brasiliensis* B. Sutton, Boletín de la Sociedad Argentina de Botánica 18 (1-2): 158 (1977)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Four species are accepted in this genus. Phylogenetic position for *Fuscophialis* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Fusichalara S. Hughes & Nag Raj, New Zealand Journal of Botany 11: 662 (1973)

Index Fungorum number: IF8287

Classification: Dactylosporaceae, Sclerococcales, Sclerococcomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Fusichalara dimorphospora* S. Hughes & Nag Raj, New Zealand Journal of Botany 11: 663 (1973)

Sexual morph: *Chaetosphaeria* (Seifert et al., 2011).

Sequence data: *Fusichalara minuta* (CBS 709.88, LSU: KX537758, ITS: KX537754, SSU: KX537773)

Notes: *Fusichalara* was introduced by Hughes and Nag Raj (1973) and is characterized by unbranched, brown conidiophores, phialidic with deep cylindrical collarettes, brown conidiogenous cells, and producing conidia that are dimorphic: (1) 7- or pluri-septate, obconic or cylindrical, hyaline to pale brown, with or without a marginal frill; (2) 3- to 7-septate, fusiform, hyaline or pale to brown. References: (Hughes & Nag Raj, 1973; Réblová et al., 2017) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Fusicladiella Höhn., Berichte der Deutschen Botanischen Gesellschaft 37: 155 (1919)

Index Fungorum number: IF8288

Classification: Dothideomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Fusicladiella aronici* (Sacc.) Höhn., Berichte der Deutschen Botanischen Gesellschaft 37: 155 (1919)

Sexual morph: *Didymosphaeria*, *Mycosphaerella* (Seifert et al., 2011).

Synanamorphs: *Phyllosticta* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Fusicladiella* was introduced by Höhnel (1919a) and six species are accepted in this genus. Phylogenetic position for *Fusicladiella* is unresolved due to lack of sequence data. References: (Höhnel, 1919a) (morphology), (Wijayawardene et al., 2020) (outline).

Gabarnaudia Samson & W. Gams, Studies in Mycology 6: 88 (1974)

Index Fungorum number: IF8302

Classification: Microascales genus *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Gabarnaudia betae* (Delacr.) Samson & W. Gams, Studies in Mycology 6: 90 (1974)

Sexual morph: *Sphaeronaemella*, *Pyxidiophora* (Samson, 1974; Seifert et al., 2011).

Sequence data: *Gabarnaudia betae* (CBS 167.90, ITS: AY271805, SSU: AY271798)

Notes: *Gabarnaudia* was introduced by Samson (1974) with *Acremonium*-like morphology. References: (Samson, 1974) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Gaeumannomycella Hern.-Restr. & Crous, Studies in Mycology 83: 27 (2016)

Index Fungorum number: IF816904

Classification: Magnaporthaceae, Magnaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Gaeumannomycella caricis* Hern.-Restr. & Crous, Studies in Mycology 83: 27 (2016)

Sexual morph: Unknown.

Sequence data: *Gaeumannomycella caricis* (CBS 388.81, LSU: NG_058109, ITS: NR_146245)

Notes: *Gaeumannomycella* was introduced by Hernández-Restrepo et al. (2016b) to accommodate a harpophora-like species. It has semi-macronematous, mononematous, hyaline conidiophores, phialidic with inconspicuous collarette, ampulliform, lageniform or conical, hyaline to pale brown conidiogenous cells, producing lunate or cylindrical, hyaline conidia and lobed, hyaline to brown hyphopodia (Hernández-Restrepo et al., 2016b). References: (Hernández-Restrepo et al., 2016b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Gaeumannomyces Arx & D.L. Olivier, Transactions of the British Mycological Society 35 (1): 32 (1952)

= *Harpophora* W. Gams, Studies in Mycology 45: 192 (2000)

Index Fungorum number: IF2026

Classification: Magnaporthaceae, Magnaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Gaeumannomyces graminis* (Sacc.) Arx & D.L. Olivier, Transactions of the British Mycological Society 35 (1): 32 (1952)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Harpophora* (Seifert et al., 2011; Zhang et al., 2016a).

Sequence data: *Gaeumannomyces radicicola* (CBS 296.53, LSU: MH868750, ITS: MH857211, SSU: KM009218)

Notes: The hyphomycetous genus *Harpophora* was introduced by Gams (2000) and has phialidic conidiogenous cells with conspicuous collarettes and cylindrical, in slimy mass, hyaline conidia. The sexual morph of *Harpophora* was reported in *Gaeumannomyces* and *Magnaporthe* (Zhang et al., 2016a). Zhang et al. (2016a) proposed using *Gaeumannomyces* rather than *Harpophora*. References: (Gams, 2000; von Arx & Olivier, 1952; Zhang et al., 2016a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Gamsylella M. Scholler, Hagedorn & A. Rubner, Sydowia 51 (1): 108 (1999)

Index Fungorum number: IF28370

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Gamsylella arcuata* (Scheuer & J. Webster) M. Scholler, Hagedorn & A. Rubner, Sydowia 51(1): 108 (1999)

Sexual morph: Unknown.

Sequence data: *Gamsylella arcuata* (CBS 174.89 = IMI 333702, LSU: NG_059070, ITS: NR_154004, SSU: KT215197)

Notes: For details of this genus see the monograph in Baral et al. (2020). Phylogenetically, *Gamsylella* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a) (outline).

Gelatinipulvinella Hosoya & Y. Otani, Mycologia 87: 690 (1995)

= *Aureohyphozyma* Hosoya & Y. Otani, Mycologia 87: 690 (1995)

Index Fungorum number: IF27591

Classification: Helicogoniaceae, Phacidiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Gelatinipulvinella astraeicola* Hosoya & Y. Otani, Mycologia 87: 690 (1995)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Aureohyphozyma* (Hosoya & Otani, 1995; Johnston et al., 2014).

Sequence data: *Gelatinipulvinella astraeicola* (TNS-F17846, LSU: LC429381, ITS: LC425040, SSU: LC434573)

Notes: *Aureohyphozyma* was introduced by Hosoya and Otani (1995) and reported the asexual morph of the genus *Gelatinipulvinella*. Johnston et al. (2014) proposed to use *Gelatinipulvinella* rather than *Aureohyphozyma*. Phylogenetically, *Gelatinipulvinella* was shown to be nested within the family Helicogoniaceae (Phacidiales, Leotiomycetes) (Figure 2.1). References: (Hosoya & Otani, 1995) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Gelatinocrinis Matsush., Matsushima Mycological Memoirs 8: 20 (1995)

Index Fungorum number: IF27179

Classification: Ascomycota genera *incertae sedis*

Type species: *Gelatinocrinis roseus* Matsush., Matsushima Mycological Memoirs 8: 21 (1995)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Gelatinocrinis* was introduced by Matsushima (1995) and is characterized by having sporodochial conidiomata, branched, hyaline conidiophores, monophialidic, determinate, hyaline conidiogenous cells, and producing aseptate, in slimy mass, ellipsoidal-fusiform, hyaline conidia with many apical gelatinous appendages. Phylogenetic position for *Gelatinocrinis* is unresolved due to lack of sequence data. References: (Matsushima, 1995) (morphology), (Wijayawardene et al., 2020) (outline).

Gelatinomyces Sanoamuang, Jitjak, Rodtong & Whalley, IMA Fungus 4 (1): 77 (2013)

Index Fungorum number: IF804026

Classification: Tympanidaceae, Leotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Gelatinomyces siamensis* Sanoamuang, Jitjak, Rodtong & Whalley, IMA Fungus 4 (1): 80 (2013)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph which is *Phialophora*-like (Sanoamuang et al., 2013).

Sequence data: *Gelatinomyces siamensis* (KKUK 1, LSU: JX219381, ITS: NR_154059, SSU: JX219377)

Notes: *Gelatinomyces* was introduced by Sanoamuang et al. (2013) and its asexual morph is *Phialophora*-like. Phylogenetically, *Gelatinomyces* was shown to be nested within the family ?Tympanidaceae (Leotiales, Leotiomycetes) (Figure 2.1). References: (Sanoamuang et al., 2013) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Geminoarcus K. Ando, Transactions of the Mycological Society of Japan 34: 110 (1993)

Index Fungorum number: IF22425

Classification: Trichomeriaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Geminoarcus pachysporus* K. Ando, Transactions of the Mycological Society of Japan 34: 113 (1993)

Sexual morph: Unknown.

Synanamorphs: acremonium-like (Seifert et al., 2011).

Sequence data: *Geminoarcus maximus* (VTCC 31255, LSU: LC496779)

Notes: *Geminoarcus* is characterized by reduced or absent conidiophores, monoblastic, sometimes percurrent, hyaline conidiogenous cells, and producing conidia that are solitary, multiseptate, staurosporic, consisting of a one-celled, short, subspherical, ellipsoidal or short club-shaped central cell, an inverted open V-shaped arm and two lateral arms, hyaline to pale brown (Le et al., 2020; Seifert et al., 2011). Le et al. (2020) placed this genus in the family Trichomeriaceae (Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes). It is similar to Alatosessilispora by having reduced conidiophores, monoblastic conidiogenous cells and staurosporic conidia, but differs by its conidia have an inverted open V-shaped arm and two lateral arms. References: (Le et al., 2020; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Gemmulina Descals & Marvanová, Canadian Journal of Botany 76 (9): 1657 (1999)

Index Fungorum number: IF27917

Classification: Ascomycota genera *incertae sedis*

Type species: *Gemmulina botryosa* (Descals) Descals & Marvanová, Canadian Journal of Botany 76 (9): 1658 (1999)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Gemmulina* was introduced by Descals et al. (1998) to accommodate *Tricellula botryosa*, and is characterized by having semi-macronematous, mononematous, branched, hyaline conidiophores, with polyblastic, hyaline conidiogenous cells, producing conidia that are solitary, hyaline,

staurosporous, consisting of many inflated, ellipsoid, aseptate radiating arms. Phylogenetic position for *Gemmulina* is unresolved due to lack of sequence data. References: (Descals et al., 1998) (morphology), (Wijayawardene et al., 2020) (outline).

Geniculospora Sv. Nilsson ex Marvanová & Sv. Nilsson, Transactions of the British Mycological Society 57 (3): 532 (1971)

Index Fungorum number: IF8321

Classification: Tricladiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Geniculospora inflata* (Ingold) Sv. Nilsson ex Marvanová & Sv. Nilsson, Transactions of the British Mycological Society 57 (3): 532 (1971)

Sexual morph: *Hymenoscyphus* (Seifert et al., 2011)

Sequence data: *Geniculospora grandis* (CBS 261.84, LSU: MH873440, ITS: MH861735)

Notes: *Geniculospora* was reintroduced by Marvanová and Nilsson (1971) and is characterized by having mononematous, unbranched or sparingly branched, hyaline conidiophores, with thallic, percurrent, hyaline conidiogenous cells, producing conidia that are solitary, septate, hyaline, staurosporous, tetraradiate, consisting of three upward arms and one downward arm (Seifert et al., 2011). Johnston and Baschien (2020) introduced the family Tricladiaceae and accepted *Geniculospora* within it. Phylogenetically, *Geniculospora* was shown to be nested within the family Tricladiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Geohypha (Fr.) Hennebert, Mycotaxon 135 (3): 708 (2020)

Index Fungorum number: IF835628

Classification: Ascomycota genera *incertae sedis*

Type species: *Geohypha terrestris* (Fr.) Hennebert, Mycotaxon 135 (3): 709 (2020)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Geohypha* is characterized by having micronematous, mononematous, branched, hyaline conidiophores, with thallic conidiogenous cells, and producing solitary, aseptate, smooth to verrucose, globose or subglobose, sometimes napiform, hyaline conidia (Hennebert, 2020). Phylogenetic position for *Geohypha* is unresolved due to lack of sequence data. References: (Hennebert, 2020) (morphology), (Wijayawardene et al., 2020) (outline).

Geomyces Traaen, Nytt Magazin for Naturvidenskapene 52: 28 (1914)

Index Fungorum number: IF8323

Classification: Pseudeurotiaceae, Thelebolales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Geomyces auratus* Traaen, Nytt Magazin for Naturvidenskapene 52: 30 (1914)

Sexual morph: *Pseudogymnoascus* (Seifert et al., 2011).

Sequence data: *Geomyces auratus* (CBS 108.14, LSU: NG_042776, ITS: NR_111872, SSU: AB015785)

Notes: *Geomyces* was erected by Traaen (1914) and is characterized by having mononematous, branched, hyaline conidiophores, with thallic, hyaline conidiogenous cells and short, hyaline separating cells, producing catenate, aseptate, ellipsoidal or ovoidal, hyaline conidia (Seifert et al., 2011; Traaen, 1914). Phylogenetically, *Geomyces* was shown to be nested within the family Pseudeurotiaceae (Thelebolales, Leotiomycetes) (Figure 2.1). References: (Chen et al., 2017b; Minnis & Lindner, 2013; Seifert et al., 2011; Traaen, 1914) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Geonectria Lechat & J. Fourn., Ascomycete.org 10 (2): 81 (2018)

Index Fungorum number: IF824881

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Geonectria subalpina* Lechat, J. Fourn., M. Vega & Priou, Ascomycete.org 10 (2): 81 (2018)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Geonectria subalpina* (CBS 143540, LSU: NG_067817)

Notes: The genus was introduced by Lechat et al. (2018b) for a species collected from bare soil in France and produces acremonium-like asexual morph in culture. The asexual state of this genus has unbranched or branched, flexuous, smooth, septate conidiophores, subulate conidiogenous cells, and ellipsoidal to subcylindrical, hyaline, smooth, aseptate conidia (Lechat et al., 2018b). References: (Lechat et al., 2018b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Geosmithia Pitt, Canadian Journal of Botany 57 (19): 2021 (1979)

Index Fungorum number: IF8324

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Geosmithia lavendula* (Raper & Fennell) Pitt, Canadian Journal of Botany 57 (19): 2022 (1979)

Sexual morph: *Chromocleista*, *Talaromyces* (Seifert et al., 2011; Yaguchi et al., 2005).

Sequence data: *Geosmithia lavendula* (CBS 344.48, LSU: MH867927, ITS: MH856380)

Notes: *Geosmithia* was introduced by Pitt (1979) and is *Penicillium*-like. References: (Kolarik et al., 2004, 2007, 2011; Pitt, 1979; Wu et al., 2013a; Yaguchi et al., 2005) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Geotrichum Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 17 (1809)

Index Fungorum number: IF8327

Classification: Dipodascaceae, Saccharomycetales, Saccharomycetes, Saccharomycotina, Ascomycota

Type species: *Geotrichum candidum* Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 17, t. 1:26 (1809)

Sexual morph: *Dipodascus*, *Galactomyces* (Seifert et al., 2011).

Sequence data: *Geotrichum europaeum* (CBS 866.68, LSU: NG_055387, ITS: AY788351)

Notes: *Geotrichum* is characterized by conidiophores are none or reduced, hyaline with thallic-arthric, hyaline conidiogenous cells, and producing catenate, aseptate, yeast-like conidia (Seifert et al., 2011). Phylogenetically, representatives of *Geotrichum* clustered in the family Dipodascaceae, Saccharomycetales, Saccharomycetes (Figure 2.1). References: (de Hoog & Smith, 2004; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Gibellulopsis Bat. & H. Maia, Anais da Sociedade de Biologia de Pernambuco 16 (1): 153 (1959)

Index Fungorum number: IF8331

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Gibellulopsis serrae* (Maffei) Giraldo López & Crous, Studies in Mycology 92: 250 (2018) (= *Gibellulopsis piscis* Bat. & H. Maia, Anais da Sociedade de Biologia de Pernambuco 16 (1): 153 (1959))

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Giraldo & Crous, 2019).

Sequence data: *Gibellulopsis serrae* (CBS 892.70, LSU: LR025885, ITS: LR026755)

Notes: *Gibellulopsis* is characterized by having mononematous, verticillate, hyaline conidiophores, monophialidic with inconspicuous collarette, subulate or cylindrical, hyaline conidiogenous cells and producing aseptate or 1-septate, in slimy mass, elongate ellipsoidal to cylindrical, hyaline conidia (Giraldo & Crous, 2019). Giraldo and Crous (2019) transformed *Gibellulopsis chrysanthemi* Hirooka et al. to *Paragibellulopsis*. References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Glioblastocladium Matsush., Matsushima Mycological Memoirs 6: 20 (1989)

Index Fungorum number: IF25575

Classification: Ascomycota genera *incertae sedis*

Type species: *Glioblastocladium australiense* Matsush., Matsushima Mycological Memoirs 6: 20 (1989)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Glioblastocladium* was erected by Matsushima (1989) and similar to *Gliocladium* Corda, but differs by its polyblastic conidiogenous cells. Phylogenetic position for *Glioblastocladium* is unresolved due to lack of sequence data. References: (Matsushima, 1989) (morphology), (Wijayawardene et al., 2020) (outline).

Gliocephalis Matr., Bulletin de la Société Mycologique de France 15: 254 (1899)

Index Fungorum number: IF8339

Classification: Laboulbeniales genera *incertae sedis*, Laboulbeniomycetes, Pezizomycotina, Ascomycota

Type species: *Gliocephalis hyalina* Matr., Bulletin de la Société Mycologique de France 15: 254 (1899)

Sexual morph: Unknown.

Sequence data: *Gliocephalis hyalina* (SSU: AH012810)

Notes: *Gliocephalis* is a rarely see genus which was introduced by Matruchot (1899) and is *Aspergillus*-like, but differs from *Aspergillus* by producing slimy conidia and aggregated in slimy mass (Jacobs et al., 2005; Matruchot, 1899). Phylogenetic position for *Gliocephalis* is unresolved due to lack of LSU sequence data. References: (Jacobs et al., 2005; Matruchot, 1899) (morphology), (Wijayawardene et al., 2020) (outline).

Gliocephalotrichum J.J. Ellis & Hesselt., Bulletin of the Torrey Botanical Club 89: 21 (1962)

Index Fungorum number: IF8340

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Gliocephalotrichum bulbilium* J.J. Ellis & Hesselt., Bulletin of the Torrey Botanical Club 89: 22 (1962)

Sexual morph: *Leuconectria* (Seifert et al., 2011).

Disease symptoms: fruit rot (Constantelos et al., 2011; Li, 2014; Sakinah & Latiffah, 2013; Serrato-Diaz et al., 2012).

Sequence data: *Gliocephalotrichum bulbilium* (CBS 242.62 = ATCC 22228 = IFO 9325 = IMI 096357 = MUCL 18575 = NRRL 2899 = QM 9007, LSU: AY489732, ITS: MH858145, SSU: AY489700)

Notes: The asexual morph of *Gliocephalotrichum* is characterized by setae are hyaline, unbranched, on conidiophores, conidiophores are penicillate or aspergilloid, hyaline, conidiogenous cells are phialidic, hyaline that produces aseptate, cylindrical to ellipsoidal, hyaline conidia, and dark chlamydospores (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Gliocladiopsis S.B. Saksena, Mycologia 46: 662 (1954)

Index Fungorum number: IF8341

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Gliocladiopsis sagariensis* S.B. Saksena, Mycologia 46: 660 (1954)

Sexual morph: Lombard and Crous (2012) and Lombard et al. (2015) provided holomorphic description.

Sequence data: *Gliocladiopsis sagariensis* (CBS 199.55, LSU: JQ666078, ITS: JQ666063)

Notes: *Gliocladiopsis* was introduced by Saksena (1954). Phylogenetically, it is located in the family Nectriaceae. References: (Saksena, 1954) (morphology), (Lombard & Crous, 2012; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Globobotrys L. Lombard & Crous, Persoonia 36: 189 (2016)

Index Fungorum number: IF815990

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Globobotrys sansevieriicola* (Crous & M.J. Wingf.) L. Lombard & Crous, Persoonia 36: 189 (2016)

Sexual morph: Unknown.

Sequence data: *Globobotrys sansevieriicola* (CBS 138872 = CPC 24316, LSU: KR476752, ITS: KR476717)

Notes: This genus is stachybotrys-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Gloeosporiella Cavara, Fungi Longobardiae exsiccati sive Mycetum specimina in Longobardia collecta, exsiccata et speciebus novis vel criticis, iconibus illustrata Pug. I: no. 41 (1891)

Index Fungorum number: IF8355

Classification: Ascomycota genera *incertae sedis*

Type species: *Gloeosporiella rosicola* Cavara, Fungi Longobardiae exsiccati sive Mycetum specimina in Longobardia collecta, exsiccata et speciebus novis vel criticis, iconibus illustrata Pug. I: no. 41 (1891)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Two species are accepted in this genus. Phylogenetic position for *Gloeosporiella* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Gloeosynnema Seifert & G. Okada, Mycotaxon 32: 471 (1988)

Index Fungorum number: IF11084

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Gloeosynnema ochroleucum* (Penz. & Sacc.) Seifert & G. Okada, Mycotaxon 32(1): 472 (1988)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Gloeosynnema* was introduced by Seifert and Okada (1988) and is characterized by having synnematous, subgelatinous, determinate conidiomata, macronematous, sparsely branched, clamped, hyaline conidiophores, with percurrent or rarely sympodial, hyaline conidiogenous cells, and producing aseptate, in slimy mass, oblong-ellipsoidal, hyaline conidia. Phylogenetic position for *Gloeosynnema* is unresolved due to lack of sequence data. References: (Seifert & Okada, 1988) (morphology), (Wijayawardene et al., 2020) (outline).

Gloeotinia M. Wilson, Noble & E.G. Gray, Transactions of the British Mycological Society 37 (1): 31 (1954)

= *Endoconidium* Prill. & Delacr., Bulletin de la Société Mycologique de France 7: 116 (1891)

Index Fungorum number: IF2086

Classification: ?Helotiaceae, Helotiales, , Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Gloeotinia temulenta* (Prill. & Delacr.) M. Wilson, Noble & E.G. Gray, Transactions of the British Mycological Society 37 (1): 29 (1954)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Endoconidium* (Seifert et al., 2011).

Sequence data: *Gloeotinia granigena* (CBS 417.50 = MUCL 14514, LSU: MH868212)

Notes: *Gloeotinia* was introduced by Wilson et al. (1954) and its asexual morph was reported in the genus *Endoconidium*, which was established by Prillieux (1891). Phylogenetically, *Gloeotinia* was shown to be nested within the family ?Helotiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Wilson et al., 1954) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Gloiosphaera Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 111: 1038 (1902)

Index Fungorum number: IF8360

Classification: Ascomycota genera *incertae sedis*

Type species: *Gloiosphaera globuligera* Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 111: 1039 [53 of repr.] (1902)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Gloiosphaera* was introduced by von Höhnel (1902) and only one species is accepted. Phylogenetic position for *Gloiosphaera* is unresolved due to lack of sequence data. References: (von Höhnel, 1902) (morphology), (Wijayawardene et al., 2020) (outline).

Glomerogloea Doweld, Index Fungorum 30: 1 (2013)

= *Glomospora* D.M. Hend., Notes from the Royal Botanical Garden Edinburgh 23 (4): 497 (1961)

Index Fungorum number: IF550272

Classification: Platygloeaceae, Platygloeales, Pucciniomycetes, Pucciniomycotina, Basidiomycota

Type species: *Glomerogloea empetri* (D.M. Hend.) Doweld, Index Fungorum 30: 1 (2013)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Phylogenetic position for *Glomerogloea* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Glomerulomyces A.I. Romero & S.E. López, Mycotaxon 34 (2): 432 (1989)

Index Fungorum number: IF11085

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Glomerulomyces fibulosus* A.I. Romero & S.E. López, Mycotaxon 34 (2): 432 (1989)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Glomerulomyces* was erected by Romero et al. (1989) and it has semi-macronematous, unbranched or branched, clamped conidiophores, with mono- and polyblastic, terminal, hyaline conidiogenous cells, and produces aseptate, in slimy mass, smooth, spherical, hyaline conidia. Phylogenetic position for *Glomerulomyces* is unresolved due to lack of sequence data. References: (Romero et al., 1989) (morphology), (Wijayawardene et al., 2020) (outline).

Glomopsis D.M. Hend., Notes from the Royal Botanical Garden Edinburgh 23 (4): 500 (1961)

Index Fungorum number: IF8364

Classification: Platygloeaceae, Platygloeales, Pucciniomycetes, Pucciniomycotina, Basidiomycota

Type species: *Glomopsis corni* (Peck) D.M. Hend., Notes from the Royal Botanical Garden Edinburgh 23 (4): 500 (1961)

Sexual morph: *Insolibasidium* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Glomopsis* was established by Henderson (1961) and two species are accepted. Phylogenetic position for *Glomopsis* is unresolved due to lack of sequence data. References: (Henderson, 1961) (morphology), (Wijayawardene et al., 2020) (outline).

Glutinoagger Sivan. & Watling, Transactions of the British Mycological Society 74 (2): 424 (1980)

Index Fungorum number: IF8367

Classification: Agaricales genera *incertae sedis*, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Glutinoagger fibulatus* Sivan. & Watling, Transactions of the British Mycological Society 74 (2): 424 (1980)

Sexual morph: Unknown.

Sequence data: *Glutinoagger fibulatus* (CBS 616.80 = IMI 227584b, LSU: MH873063, ITS: MH861298)

Notes: *Glutinoagger* was introduced by Sivanesan and Watling (1980) and is characterized by having conidiomata are none or sporodochial, conidiophores are branched, septate, hyaline, with clamp connections, conidiogenous cells are sympodial and percurrent, conidia are aseptate, hyaline, pyriform, ellipsoid or lacryform, with a persistent hyphal appendage. Previous studies placed this genus in Agaricomycetes genera *incertae sedis* (He et al., 2019), however, phylogenetically, the ex-type of *G. fibulatus*, the generic type, was shown to be nested within the order Agaricales (Agaricomycetes) (Figure 2.1). Therefore, we suggest placing this genus in Agaricales genera *incertae sedis*. References: (Sivanesan & Watling, 1980) (morphology), (He et al., 2019) (outline).

Goidanichiella G.L. Barron ex W. Gams, Mycotaxon 110: 98 (2009)

Index Fungorum number: IF513879

Classification: Sordariomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Goidanichiella barronii* W. Gams, Steiman & Seigle-Mur., Mycotaxon 110: 98 (2009)

Sexual morph: Unknown.

Sequence data: *Goidanichiella barronii* (CBS 101.89 = CMPG 426, LSU: NG_064154, ITS: NR_160178)

Notes: Gams et al. (2009) validated this genus and its associate species. It is characterized by aspergillate, brown conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, in slimy mass, hyaline conidia (Seifert et al., 2011). Previous studies placed this genus in Ascomycota genera *incertae sedis* (Wijayawardene et al., 2020). In our phylogenetic study, the type strain of genic type species clustered in a monophyletic clade in Sordariomycetes. Herein, we suggest placing this genus in Sordariomycetes genera *incertae sedis*. References: (Seifert et al., 2011) (morphology and phylogeny), (Gams et al., 2009) (nomenclature), (Wijayawardene et al., 2020) (outline).

Goniopila Marvanová & Descals, Botanical Journal of the Linnean Society 91: 14 (1985)

Index Fungorum number: IF25718

Classification: Ascomycota genera *incertae sedis*

Type species: *Goniopila monticola* (Dyko) Marvanová & Descals, Botanical Journal of the Linnean Society 91: 16 (1985)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011)

Sequence data: *Goniopila monticola* (DSM 104356, LSU: MK353140, ITS: MK353140, SSU: -)

Notes: *Goniopila* was established by Marvanová and Descals (1985) and is dimorphic: (1) micronematous to semi-macronematous, monoverticillate, penicillate, hyaline conidiophores, with mono- to polyblastic, integrated or discrete, terminal or intercalary, sympodial or percurrent, hyaline conidiogenous cells, produces rarely solitary, aseptate, globose with small protuberances, hyaline conidia; (2) micronematous, sparingly branched, sometimes reduced, hyaline conidiophores, with phialidic bearing deep collarettes, hyaline conidiogenous cells, produces aseptate, subclavate, hyaline conidia (Marvanová & Descals, 1985; Seifert et al., 2011). Campbell et al. (2006) performed a phylogenetic study on *Goniopila* based on the strain CCM F-11686 and it was phylogenetically located in Pleosporales, Dothideomycetes. However, this is incongruous with Belliveau and Barlocher (2005), which was located in Helotiales, Leotiomycetes. Phylogenetically, except the strain CCM F-11686, *Goniopila* was shown to be nested within the family xxx (Helotiales, Leotiomycetidae, Leotiomycetes) (Figure 2.1). References: (Belliveau & Barlocher, 2005; Campbell et al., 2006; Marvanová & Descals, 1985) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Goosiella Morgan-Jones, Kamal & R.K. Verma, Mycologia 78 (3): 496 (1986)

Index Fungorum number: IF11088

Classification: Ascomycota genera *incertae sedis*

Type species: *Goosiella helicospora* Morgan-Jones, Kamal & R.K. Verma, Mycologia 78 (3): 499 (1986)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Goosiella* was established by Morgan-Jones et al. (1986) for a fungus collected on living fronds of an unidentified fern in India. It has macronematous, mononematous, branched, septate, brown conidiophores, monoblastic or polyblastic, terminal or lateral, discrete or integrated, sympodial, denticulate, pale brown conidiogenous cells, and produces solitary, acrogenous, septate, curved or helicoid, hyaline conidia (Morgan-Jones et al., 1986). Phylogenetic position for *Goosiella* is unresolved due to lack of sequence data. References: (Morgan-Jones et al., 1986) (morphology), (Wijayawardene et al., 2020) (outline).

Gorgomyces Gönczöl & Révay, Nova Hedwigia 41 (1-4): 453 (1985)

Index Fungorum number: IF11089

Classification: Leotiomycetes genera *incertae sedis,* Pezizomycotina, Ascomycota

Type species: *Gorgomyces hungaricus* Gönczöl & Révay, Nova Hedwigia 41 (1-4): 454 (1985)

Sexual morph: Unknown.

Sequence data: *Gorgomyces honrubiae* (CCM F-12003, LSU: KC834028, ITS: KC834057); *Gorgomyces hungaricus* (CCM F-12696, ITS: KC834058)

Notes: *Gorgomyces* was introduced by Gönczöl and Révay (1985) to accommodate *G. hungaricus* and this genus is characterized by having mononematous, monoverticillate, subhyaline conidiophores, with monoblastic or polyblastic, subhyaline conidiogenous cells, producing solitary, multi-septate, subhyaline conidia with gelatinous apical appendages (Seifert et al., 2011). Phylogenetically, *Gorgomyces* was shown to be nested within Leotiomycetes (Figure 2.1). References: (Baschien et al., 2013; Gönczöl & Révay, 1985; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Gracilistilbella Seifert, Studies in Mycology 45: 18 (2000)

Index Fungorum number: IF28455

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Gracilistilbella clavulata* (Mont.) Seifert, Studies in Mycology 45: 18 (2000)

Sexual morph: *Stilbocrea* (Seifert et al., 2011).

Synanamorphs: *Stilbella* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Gracilistilbella* was established by Seifert and Samuels (2000) and it differs from other hyphomycetes by having globose to ellipsoidal ornamenting cells on the marginal hyphae of the stipe of the synnematous conidiomata. Phylogenetic position for *Gracilistilbella* is unresolved due to lack of sequence data. References: (Seifert & Samuels, 2000) (morphology), (Wijayawardene et al., 2020) (outline).

Graphiothecium Fuckel, Jahrbücher des Nassauischen Vereins für Naturkunde 23-24: 366 (1870)

Index Fungorum number: IF8397

Classification: Ascomycota genera *incertae sedis*

Type species: *Graphiothecium fresenii* Fuckel, Jahrbücher des Nassauischen Vereins für Naturkunde 23-24: 366 (1870)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Graphiothecium* was introduced by Fuckel (1870) and three species are accepted. Phylogenetic position for *Graphiothecium* is unresolved due to lack of sequence data. References: (Fuckel, 1870) (morphology), (Wijayawardene et al., 2020) (outline).

Graphium Corda, Icones fungorum hucusque cognitorum 1: 18 (1837)

Index Fungorum number: IF8398

Classification: Graphiaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Graphium penicillioides* Corda, Icones fungorum hucusque cognitorum 1: 18, t. 5:251 (1837)

Sexual morph: *Kernia*, *Petriella*, *Pseudallescheria*, ?*Coniochaeta* (Seifert et al., 2011).

Synanamorphs: *Scedosporium* (Seifert et al., 2011).

Sequence data: *Graphium penicillioides* (CBS 506.86 = AFTOL-ID 1415, LSU: AF027384, SSU: DQ471038)

Notes: *Graphium* is characterized by synnematous conidiomata, macronematous, synnematous, branched or penicillate, brown conidiophores, monoblastic, percurrent, subhyaline conidiogenous cells, and producing aseptate, in slimy mass, cylindrical, hyaline to brown conidia (Ellis, 1971). References: (Cruywagen et al., 2010; Ellis, 1971; Geldenhuis et al., 2004; Jacobs et al., 2003b; Motiejunaite, 2006; Paciura et al., 2010b; Wu et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Gregatothecium L. Lombard & Crous, Persoonia 36: 191 (2016)

Index Fungorum number: IF815995

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Gregatothecium humicola* L. Lombard & Crous, Persoonia 36: 191 (2016)

Sexual morph: Unknown.

Sequence data: *Gregatothecium humicola* (CBS 205.96, LSU: NG_070395, ITS: NR_154085)

Notes: This genus is myrothecium-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Grovesinia M.N. Cline, J.L. Crane & S.D. Cline, Mycologia 75: 989 (1983)

= *Hinomyces* Narumi & Y. Harada, Mycoscience 47 (6): 357 (2006)

Index Fungorum number: IF25807

Classification: Sclerotiniaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Grovesinia pyramidalis* M.N. Cline, J.L. Crane & S.D. Cline, Mycologia 75: 991 (1983)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Hinomyces* (Narumi-Saito et al., 2006).

Sequence data: *Grovesinia pyramidalis* (CBS 737.68, LSU: MH878399)

Notes: *Hinomyces* was introduced by Narumi-Saito et al. (2006) and reported as the asexual morph of *Grovesinia*. Johnston et al. (2014) proposed to protect *Grovesinia* over *Hinomyces*. Phylogenetically, *Grovesinia* was shown to be nested within the family Sclerotiniaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Narumi-Saito et al., 2006) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Guarroa M. Calduch, Gené, Heredia & R.F. Castañeda, Mycological Progress 19 (1): 22 (2020)

= *Phaeobotrys* Calduch, Gené & Guarro, Mycologia 94 (1): 127 (2002)

Index Fungorum number: IF819416

Classification: Sordariomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Guarroa acutispora* (Matsush.) Heredia & R. F. Castañeda, Mycological Progress 19 (1): 23 (2020)

Sexual morph: Unknown.

Sequence data: *Guarroa acutispora* (previous known as *Phaeobotrys acutisporum*, *Phaeodactylium acutisporum*) (CBS 101302 = FMR 6483 = IMI 380445, LSU: MH874337, ITS: MH862730)

Notes: *Guarroa* was introduced by Heredia et al. (2020) to replace *Phaeobotrys*, which was introduced by Calduch et al. (2002b). It has macronematous, mononematous, branched, hyaline to brown conidiophores, with polyblastic, integrated, denticulate, hyaline conidiogenous cells, produces aseptate to 1-septate, fusiform with appendage at the apex, hyaline conidia (Calduch et al., 2002b). Previous study placed this genus in Ascomycota genera *incertae sedis*. Phylogenetically, this genus formed a seperata clade in Sordariomycetes. Therefore, we suggest placing this genus in Sordariomycetes genera *incertae sedis*. References: (Calduch et al., 2002b) (morphology and phylogeny), (Heredia et al., 2020) (nomenclature), (Wijayawardene et al., 2020) (outline).

Guarromyces Y. Gräser & de Hoog, Index Fungorum 356: 1 (2018)

Index Fungorum number: IF554315

Classification: Arthrodermataceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Guarromyces ceretanicus* (Punsola & Guarro) Y. Gräser & de Hoog, Index Fungorum 356: 1 (2018)

Sexual morph: Unknown.

Sequence data: *Guarromyces ceretanicus* (CBS 269.89, LSU: NG_058484, ITS: NR_154051)

Notes: *Guarromyces* was introduced by de Hoog et al. (2017), however the name was invalid due to Art. F.5.1 of the Shenzhen Code (Turland et al., 2018). *Guarromyces* was validated by de Hoog et al. (2018). The genus is characterized by producing holothallic, multiseptate, smooth- and thick-walled, lanceolate to cylindrical, hyaline conidia. References: (de Hoog et al., 2017) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Guayaquilia R.F. Castañeda, Magdana, D. Sosa & Hern.-Restr, Mycotaxon 135 (3): 506 (2020)

Index Fungorum number: IF831849

Classification: Xylariales genera incertae sedis, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: ***Guayaquilia cubensis*** (R.F. Castañeda & G.R.W. Arnold) R.F. Castañeda, Magdana, D. Sosa & Hern.-Restr., Mycotaxon 135 (3): 507 (2020)

Sexual morph: Unknown.

Sequence data: *Guayaquilia cubensis* (MUCL 39017, LSU: KC775708, ITS: KC775733)

Notes: Magdama et al. (2020) introduced this genus for *Idriella cubensis* R.F. Castañeda & G.R.W. Arnold. This genus is *Idriella*-like and differs from other genera by its macronematous, mononematous, tree-like, irregularly multibranched conidiophores. References: (Magdama et al., 2020) (morphology and phylogeny)

Guelichia Speg., Anales de la Sociedad Científica Argentina 22 (4): 220 (1886)

Index Fungorum number: IF8405

Classification: Ascomycota genera *incertae sedis*

Type species: *Guelichia paradoxa* Speg., Anales de la Sociedad Científica Argentina 22 (4): 221 (1886)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Guelichia* was introduced by Spegazzini (1886) and only one species is accepted. Phylogenetic position for *Guelichia* is unresolved due to lack of sequence data. References: (Spegazzini, 1886) (morphology), (Wijayawardene et al., 2020) (outline).

Gyoerffyella Kol, Folia Cryptog.: 618 (1928)

Index Fungorum number: IF8410

Classification: Discinellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Gyoerffyella tatrica* Kol, Folia Cryptog.: 618 (1928)

Sexual morph: Unknown.

Sequence data: *Gyoerffyella entomobryoides* (CBS 268.63, LSU: MH869886, ITS: MH858280)

Notes: *Gyoerffyella* is characterized by having mononematous, unbranched or branched, hyaline conidiophores, with monoblastic to polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, staurosporous or helicosporous, with curved tapering arms emerging from a central axis or primary arms (Seifert et al., 2011). Phylogenetically, *Gyoerffyella* was shown to be nested within the family Discinellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Gyrothrix (Corda) Corda, Anleitung zum Studium der Mykologie: lxiii, 49 (1842)

Index Fungorum number: IF8414

Classification: Xylariales genera incertae sedis, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: ***Gyrothrix podosperma*** (Corda) Rabenh., Deutschlands Kryptogamenflora 1: 72 (1844)

Sexual morph: Unknown.

Sequence data: *Gyrothrix verticiclada* (CBS 127654, LSU: MH876040, ITS: MH864602); *Gyrothrix encephalarti* (CPC 35966, LSU: MT373358, ITS: NR_170834); *Gyrothrix eucalypti* (CPC 36066, LSU: NG_068319, ITS: NR_166315); *Gyrothrix oleae* (CPC 37069, LSU: NG_068333, ITS: NR_166335)

Notes: It is characterized by branched, circinate or flexuous setae, conidiophores reduced to conidiogenous cells and aggregate around the bases of setae, sympodial or percurrent, hyaline conidiogenous cells, and aseptate or multiseptate, falcate, hyaline conidia (Pirozynski, 1962). Phylogenetically, this genus is polyphyletic (Li et al., 2017a). References: (Pirozynski, 1962)(morphology) (Li et al., 2017a) (phylogeny).

Hainesia Ellis & Sacc., Sylloge Fungorum 3: 698 (1884)

Index Fungorum number: IF8420

Classification: Chaetomellaceae, Chaetomellales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Hainesia rhoina* (Sacc.) Ellis & Sacc. (1884)

Sexual morph: *Discohainesia* (Seifert et al., 2011)

Synanamorphs: *Pilidium* (Seifert et al., 2011; Suija et al., 2017)

Sequence data: *Hainesia lythri* (CBS 129121 = WSF 5169, LSU: MH876652, ITS: MH865213)

Notes: *Hainesia* was erected by Saccardo (1884c) and is characterized by having acervular or sporodochial, cupulate conidiomata, hyaline setae, branched, hyaline conidiophores, phialidic, terminal and intercalary, hyaline conidiogenous cells, producing aseptate, in slimy mass, bacilliform to filiform, hyaline conidia (Seifert et al., 2011; Suija et al., 2017). *Hainesia* was considered as a synonym of *Pilidium* (Suija et al., 2017). Phylogenetically, a strain CBS 129121 named *Hainesia lythri* was

shown to be nested within the family Chaetomellaceae (Chaetomellales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011; Suija et al., 2017) (morphology and phylogeny).

Hamatispora L.T.H. Yen, K. Yamag. & K. Ando, Mycoscience 59 (6): 468 (2018)

Index Fungorum number: IF822829

Classification: Microthyriaceae, Microthyriales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Hamatispora phuquocensis* L.T.H. Yen, K. Yamag. & K. Ando, Mycoscience 59 (6): 468 (2018)

Sexual morph: Unknown.

Sequence data: *Hamatispora phuquocensis* (VTCCF-1219 = NBRC 111195, LSU: LC064073, ITS: LC064074)

Notes: This genus was described by Yen et al. (2018) for an aquatic fungus. *Hamatispora* is characterized by producing solitary, hyaline, unique-shaped, staurosporous conidia consisting of a hook-shaped main axis with three lateral arms at the helicoid part (Yen et al., 2018). Phylogenetically, representative of *Hamatispora* clustered in the family Microthyriaceae, Microthyriales, Dothideomycetes (Figure 2.1). References: (Yen et al., 2018) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Hamigera Stolk & Samson, Persoonia 6 (3): 342 (1971)

= *Merimbla* Pitt, Canadian Journal of Botany 57 (21): 2394 (1979)

Index Fungorum number: IF2215

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Hamigera avellanea* (Thom & Turesson) Stolk & Samson, Persoonia 6 (3): 345 (1971)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Merimbla* (Houbraken et al., 2020).

Sequence data: *Hamigera ingelheimensis* (CBS 163.42, LSU: MH867606, ITS: MH856108, SSU: D14408)

Notes: The asexual morph of *Hamigera* was reported in the genus *Merimbla* and is characterized by penicillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and producing catenate, aseptate, hyaline conidia (Seifert et al., 2011; Stolk & Samson, 1971). References: (Houbraken et al., 2020; Peterson et al., 2010; Stolk & Samson, 1971) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Hansfordia S. Hughes, Mycological Papers 43: 15 (1951)

Index Fungorum number: IF8423

Classification: Hansfordiaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: ***Hansfordia ovalispora*** S. Hughes, Mycological Papers 43: 16 (1951)

Sexual morph: Unknown.

Sequence data: *Hansfordia pruni* (CBS 194.56 = IMI 146912, LSU: MH869122, ITS: NR_163361)

Notes: It is characterized by macronematous, mononematous, branched, brown conidiophores, polyblastic, sympodial, denticles, hyaline conidiogenous cells, solitary, aseptate, hyaline conidia. Crous et al. (2019b) introduced the family Hansfordiaceae and placed this genus within it. References: (Crous et al., 2019b)(morphology and phylogeny)

Hantamomyces Crous, Persoonia 45: 297 (2020)

Index Fungorum number: IF837840

Classification: Hypocreomycetidae genera *incertae sedis*, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Hantamomyces aloidendri* Crous, Persoonia 45: 297 (2020)

Sexual morph: Unknown.

Sequence data: *Hantamomyces aloidendri* (CPC 38655 = CBS 146814, LSU: MW175388, ITS: MW175348)

Notes: *Hantamomyces* is characterized by macronematous, mononematous, pale brown, branched, septate conidiophores, integrated, denticulate, sympodial conidiogenous cells, hyaline separating cells, and catenate, hyaline, fusoid conidia with truncate hilum at both ends (Crous et al., 2020a). Crous et al. (2020a) introduced this genus and placed it in Ophiocordycipitaceae (Hypocreales, Sordariomycetes). Phylogenetically, the ex-type strain of generic type formed a separate clade outside the Hypocreales super-clade, and sister to the clades representing the orders Coronophorales, Falcocladiales, Myrmecridiales, and Parasympodiellales. Therefor, we exclude this genus from Ophiocordycipitaceae, Hypocreales, and place it in Hypocreomycetidae genera *incertae sedis*, Sordariomycetes. References: (Crous et al., 2020a) (morphology and phylogeny).

Haplariopsis Oudem., Nederlandsch Kruidkundig Archief Ser. 3, 2 (4): 902 (1903)

Index Fungorum number: IF8433

Classification: Ascomycota genera *incertae sedis*

Type species: *Haplariopsis fagicola* Oudem., Nederlandsch Kruidkundig Archief 2 (3): 902 (1903)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Haplariopsis* was introduced by Oudemans (1903) and two species are accepted. Phylogenetic position for *Haplariopsis* is unresolved due to lack of sequence data. References: (Oudemans, 1903) (morphology), (Wijayawardene et al., 2020) (outline).

Haptocara Drechsler, American Journal of Botany 62 (10): 1073 (1975)

Index Fungorum number: IF8446

Classification: Ascomycota genera *incertae sedis*

Type species: *Haptocara latirostrum* Drechsler, American Journal of Botany 62 (10): 1073 (1975)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Haptocara* was introduced by Drechsler (1975) for a nematode-destroying fungus. Phylogenetic position for *Haptocara* is unresolved due to lack of sequence data. References: (Drechsler, 1975) (morphology), (Wijayawardene et al., 2020) (outline).

Haptospora G.L. Barron, Canadian Journal of Botany 69 (3): 503 (1991)

Index Fungorum number: IF25554

Classification: Hypocreales genera *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Haptospora appendiculata* G.L. Barron, Canadian Journal of Botany 69 (3): 503 (1991)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Haptospora* was introduced by Barron (1991) and it has unbranched or branched, hyaline conidiophores, and phialidic, with membranous collarette, hyaline conidiogenous cells, produces aseptate, T- or Y-shaped, hyaline conidia. Phylogenetic position for *Haptospora* is unresolved due to lack of sequence data. References: (Barron, 1991) (morphology), (Wijayawardene et al., 2020) (outline).

Harmoniella V.N. Boriss., Mikologiya i Fitopatologiya 15: 89 (1981) [MB#8450]

Index Fungorum number: IF8450

Classification: Ascomycota genera *incertae sedis*

Type species: *Harmoniella chrysocephalus* V.N. Boriss., Mikologiya i Fitopatologiya 15: 90 (1981)

Sexual morph: Unknown.

Sequence data: ?*Harmoniella* sp. (F02000, LSU: AB911104, ITS: AB911103)

Notes: *Harmoniella* was introduced by Borisova (1981) and is aspergillus-like.

Harmoniella is characterized by having macronematous, mononematous, solitary to caespitose, vesiculate, hyaline or brown conidiophores, with sympodial,

denticulate, hyaline conidiogenous cells, producing solitary, aseptate, verruculose to echinulate, subglobose, ellipsoid to dacryoid, hyaline or pale brown conidia (Madrid et al., 2016; Seifert et al., 2011). Presently, there are two species accepted in this genus. Phylogenetically, three strains named *Harmoniella* sp. were shown to be nested within the order Pezizales (Pezizomycetes) (Figure 2.1). References: (Borisova, 1981; Madrid et al., 2016; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Harpographium Sacc., Michelia 2 (6): 33 (1880)

Index Fungorum number: IF8453

Classification: Ascomycota genera *incertae sedis*

Type species: *Harpographium fasciculatum* (Sacc.) Sacc., Michelia 2 (6): 33 (1880)

Sexual morph: *Pareutypella*, *Peroneutypella*, *Septobasidium* (Seifert et al., 2011).

Sequence data: *Harpographium fasciculatum* (Mushroom Observer # 305126, ITS: MK607591)

Notes: *Harpographium* is characterized by having macronematous, synnematous, branched, brown conidiophores, with polyblastic, sympodial, denticulate conidiogenous cells, producing solitary, aseptate, falcate, hyaline to subhyaline conidia (Seifert et al., 2011). Phylogenetic position for *Harpographium* is unresolved due to lack of LSU sequence data. References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Harzia Costantin, Les Mucédinées Simples: 42 (1888)

= *Olpitrichum* G.F. Atk., Botanical Gazette Crawfordsville 19: 244 (1894)

Index Fungorum number: IF8458

Classification: Ceratostomataceae, Coronophorales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Harzia acremonioides* (Harz) Costantin, Les Mucédinées Simples: 42 (1888)

Sexual morph: *Melanospora* (Schultes et al., 2017; Seifert et al., 2011).

Synanamorphs: *Proteophiala* (Schultes et al., 2017; Seifert et al., 2011).

Sequence data: *Harzia tenella* (CBS 108.78, LSU: NG_066189, ITS: NR_161010, SSU: NG_065673)

Notes: *Olpitrichum* was introduced by Atkinson (1894) to accommodate a fungus collected on decaying carpels of *Gossypium herbaceum*. Li et al. (2016a) provided sequence data for this genus and placed *Olpitrichum* in the family Ceratostomataceae based on phylogenetic analysis. However, Schultes et al. (2017) synonymized *Olpitrichum* under *Harzia*. References: (Atkinson, 1894; Li et al., 2016a; Schultes et al., 2017) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Hawksworthiana U. Braun, International Journal of Mycology and Lichenology 3 (2-3): 276 (1988)

Index Fungorum number: IF11094

Classification: Ascomycota genera *incertae sedis*

Type species: *Hawksworthiana peltigericola* (D. Hawksw.) U. Braun, International Journal of Mycology and Lichenology 3 (2-3): 276 (1988)

Sexual morph: Unknown.

Sequence data: Sequence data for this genus is unavailable.

Notes: *Hawksworthiana* is characterized by having reduced conidiophores, with monoblastic or polyblastic, sympodial, hyaline conidiogenous cells, producing solitary, aseptate or 1-septate, hyaline conidia (Seifert et al., 2011). Phylogenetic position for *Hawksworthiana* remains unresolved. References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Hawksworthiomyces Z.W. de Beer, Marinc. & M.J. Wingf., Fungal Biology 120 (11): 1329 (2016)

Index Fungorum number: IF815685

Classification: Ophiostomataceae, Ophiostomatales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Hawksworthiomyces lignivorus* (De Mey., Z.W. de Beer & M.J. Wingf.) Z.W. de Beer, Marinc. & M.J. Wingf., Fungal Biology 120 (11): 1329 (2016)

Sexual morph: Unknown.

Sequence data: *Hawksworthiomyces lignivorus* (CMW18600 = CBS 119148, LSU: EF139119, ITS: EF127890)

Notes: *Hawksworthiomyces* was introduced by de Beer et al. (2016) to accommodate four specimen-based species (*H. crousii* Z.W. de Beer, Marinc. & M.J. Wingf., *H. hibbettii* Z.W. de Beer, Marinc. & M.J. Wingf., *H. lignivorus* and *H. taylorii* Z.W. de Beer, Marinc. & M.J. Wingf.) and one species (*H. sequentia* Z.W. de Beer, Marinc. & M.J. Wingf.) that introduced by using environmental nucleic acid sequences (ENAS). However, *H. sequentia* is invalid published since the type of the name wasn't indicated (Art. 40.1 (Melbourne)) (Index Fungorum 2020). Phylogenetically, the genus revealed a distinct, well-supported lineage in the Ophiostomatales. References: (de Beer et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Heimiodora Nicot, Annales des Sciences Naturelles Botanique 1: 384 (1960)

Index Fungorum number: IF8465

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Heimiodora verticillata* Nicot, Annales des Sciences Naturelles. Botanique et Biologie Végétale sér. 12, 1: 384 (1960)

Sexual morph: Unknown.

Sequence data: *Heimiodora verticillata* (CBS 201.60 = IMI 090702 = LCP 57.1589, LSU: MH869505, ITS: MH857955)

Notes: *Heimiodora* is characterized by setae are verticillate, pale brown extensions of conidiophores, conidiophores are verticillate, pale brown, sympodial, conidiogenous cells are denticles, hyaline, conidia are aseptate, hyaline, in slimy masses, and chlamydospores are monilioid (Seifert et al., 2011). Previous studies assigned this genus in Ascomycota genus incertae sedis. Phylogenetically, the ex-type

culture of the type species is located in the family Nectriaceae (Figure 2.1). Herein, we assign this genus in Nectriaceae. References: (Benjamin, 1963) (morphology), (Crous et al., 2021c) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Helgardiomyces Crous, Fungal Systematics and Evolution 7: 83 (2020)

Index Fungorum number: IF838072

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Helgardiomyces anguioides* (Nirenberg) Crous, Fungal Systematics and Evolution 7: 83 (2020)

Sexual morph: Unknown.

Sequence data: *Helgardiomyces anguioides* (CBS 496.80, LSU: MH873055, ITS: NR_158522)

Notes: *Helgardiomyces* was introduced by Crous et al. (2021a) and is characterized by having solitary or in groups, rarely branched, hyaline conidiophores, with terminal, sympodial conidiogenous cells, producing multiseptate, long, flexuous, subcylindrical, hyaline conidia. Phylogenetically, *Helgardiomyces* was shown to be nested within the family Ploettnerulaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Crous et al., 2021a) (morphology and phylogeny).

Helicangiospora Boonmee, Bhat & K.D. Hyde, Fungal Diversity 68 (1): 259 (2014)

Index Fungorum number: IF550574

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Helicangiospora lignicola* Boonmee, Bhat & K.D. Hyde, Fungal Diversity 68 (1): 262 (2014)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Boonmee et al., 2014).

Sequence data: *Helicangiospora lignicola* (MFLUCC 11-0378 = BCC 52029 = ICMP 20069, LSU: KF301531, ITS: KF301523, SSU: KF301539)

Notes: *Helicangiospora* was introduced by Boonmee et al. (2014) to accommodate *H. lignicola* and its asexual morph has holoblastic, integrated, terminal, brown conidiogenous cells, produces conidia that are solitary, septate, hyaline to pale brown, helicoid, developing endogenously within conidiogenous cells, released by breaking wall of conidiogenous cells. Phylogenetically, *Helicangiospora* located in the family Tubeufiaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Boonmee et al., 2014; Lu et al., 2018b) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Helicoarctatus Y.Z. Lu, J.C. Kang & K.D. Hyde, Fungal Diversity 92: 165 (2018)

Index Fungorum number: IF554830

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Helicoarctatus aquaticus* Y.Z. Lu, J.C. Kang & K.D. Hyde, Fungal Diversity 92: 166 (2018)

Sexual morph: Unknown.

Sequence data: *Helicoarctatus aquaticus* (MFLUCC 17-1996, LSU: NG_066232, ITS: NR_160361)

Notes: *Helicoarctatus* was introduced by Lu et al. (2018b) and is characterized by macronematous, mononematous, unbranched, setiform, brown conidiophores, mono- to polyblastic, discrete, intercalary, denticulate, hyaline conidiogenous cells, producing solitary, septate, helicoid, tightly coiled 3–4 times, will not becoming loosely in water, hyaline conidia. Phylogenetically, *Helicoarctatus* located in the family Tubeufiaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Lu et al., 2018b) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2020) (outline).

Helicoarthrosporum Stchigel, Cano & Rodr.-Andr., IMA Fungus 10 (no. 20): 14 (2019)

Index Fungorum number: IF823584

Classification: Helicoarthrosporaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Helicoarthrosporum mellicola* Stchigel, Cano & Rodr.-Andr., IMA Fungus 10 (no. 20): 15 (2019)

Sexual morph: Unknown.

Sequence data: *Helicoarthrosporum mellicola* (FMR 15679 = CBS 143838, LSU: LT906535, ITS: LR761645)

Notes: *Helicoarthrosporum* was introduced by Rodríguez-Andrade et al. (2019) and is characterized by micronematous, mononemtaous, sinuous, helical or zigzag conidiophores, and holo- and enteroarthric, prismatic to cuboid, hyaline conidia. References: (Rodríguez-Andrade et al., 2019) (morphology and phylogeny).

Helicoascotaiwania Dayar., Maharachch. & K.D. Hyde, Frontiers in Microbiology 10 (no. 840): 22 (2019)

Index Fungorum number: IF555625

Classification: Pleurotheciaceae, Pleurotheciales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Helicoascotaiwania hughesii* (Fallah, J.L. Crane & Shearer) Dayar. & K.D. Hyde, Frontiers in Microbiology 10 (no. 840): 22 (2019)

Sexual morph: Introduced as holomorphic genus with hyphomycetous asexual morph (Dayarathne et al., 2019).

Sequence data: *Helicoascotaiwania lacustris* (CBS 145963, LSU: MN699430)

Notes: Dayarathne et al. (2019) introduced this genus to accommodate *Ascotaiwania hughesii* Fallah, J.L. Crane & Shearer (asexual morph is *Helicoon farinosum* Linder) and placed this genus in the family Pleurotheciaceae. This is the first genus that conidia are helicosporous within the family Pleurotheciaceae. References: (Dayarathne et al., 2019) (morphology and phylogeny), (Hyde et al., 2020) (outline).

Helicobasidium Pat., Bulletin de la Société Botanique de France 32: 172 (1885)

= *Tuberculina* Tode ex Sacc., Michelia 2 (6): 34 (1880)

= *Thanatophytum* Nees, System der Pilze und Schwämme: 148 (1817)

Index Fungorum number: IF17727

Classification: Helicobasidiaceae, Helicobasidiales, Pucciniomycetes, Pucciniomycotina, Basidiomycota

Type species: *Helicobasidium purpureum* (Tul.) Pat., Bull. Soc. bot. Fr. 32: 172 (1885)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Tuberculina photiniae* (SWFC 004453, LSU: NG_060014, ITS: NR_154527)

Notes: The sexual morph of *Thanatophytum* and *Tuberculina* were reported in *Helicobasidium*, Aime et al. (2018) proposed to protect *Helicobasidium* over *Thanatophytum* and *Tuberculina*. Phylogenetically, representatives of *Helicobasidium* clustered in the family Helicobasidiaceae (Helicobasidiales, Pucciniomycetes) (Figure 2.1). References: (He et al., 2019) (outline).

Helicocentralis Sri-indr., Chuaseehar., Boonyuen, K. Yamag., Suetrong & C.K.M. Tsui, Mycological Progress 14 (10/81): 3 (2015)

Index Fungorum number: IF811729

Classification: Leotiomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Helicocentralis hyalina* Sri-indr., Chuaseehar., Boonyuen, K. Yamag., Suetrong & C.K.M. Tsui, Mycological Progress 14 (10/81): 6 (2015)

Sexual morph: Unknown.

Sequence data: *Helicocentralis hyalina* (SS04733.01 = BCC36782, LSU: KR078438, ITS: KR078433, SSU: KR078442)

Notes: *Helicocentralis* was established by Sri-Indrasutdhi et al. (2015) and is characterized by having micronematous or semi-macronematous, mononematous, unbranched or rarely branched, hyaline conidiophores, with monoblastic, integrated, terminal, determinate conidiogenous cells, producing solitary, septate, circinate, tightly and centrifugally coiled, two- or three-dimensionally coiled, hyaline conidia. Phylogenetically, *Helicocentralis* was shown to be nested within the class

Leotiomycetes (Figure 2.1). References: (Sri-Indrasutdhi et al., 2015) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Helicodendron Peyronel, Nuovo Giornale Botanico Italiano 25: 461 (1918)

Index Fungorum number: IF8471

Classification: Gelatinodiscaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Helicodendron paradoxum* Peyronel, G. bot. ital., N.S.: 461 (1918)

Sexual morph: Hymenoscyphus, Lambertella, Mollisia, Tyrannosorus (Peyronel, 1918)

Synanamorphs: chloridium-like

Sequence data: *Helicodendron microsporum* (CBS 100149, LSU: NG_058155.1, ITS: NR_137974.1, SSU: NG_063050.1); *Helicodendron paradoxum* (CBS 300.50, LSU: MH868142, ITS: MH856633)

Notes: *Helicodendron* was introduced by Peyronel (1918) and is characterized by having micronematous, or semi-macronematous, mononematous, branched, hyaline to brown conidiophores, with mono- or polyblastic, integrated, terminal and intercalary, determinate, cylindrical, hyaline to brown conidiogenous cells, producing catenate, septate, three-dimensionally coiled, hyaline to brown conidia (Peyronel, 1918; Sri-Indrasutdhi et al., 2015). Phylogenetically, *Helicodendron* was shown to be nested within the family Gelatinodiscaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Peyronel, 1918; Sri-Indrasutdhi et al., 2015) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Helicodochium J.S. Monteiro, R.F. Castañeda, A.C. Cruz & Gusmão, Mycotaxon 127: 6 (2014)

Index Fungorum number: IF804995

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Helicodochium amazonicum* J.S. Monteiro, R.F. Castañeda, A.C. Cruz & Gusmão, Mycotaxon 127: 6 (2014)

Sexual morph: Unknown.

Sequence data: *Helicodochium aquaticum* (MFLUCC 17-2016, LSU: MH558837, ITS: MH558709)

Notes: *Helicodochium* was introduced by Monteiro et al. (2014) and is characterized by having sporodochial conidiomata, macronematous, unbranched or branched, pale brown conidiophores, monoblastic, integrated, terminal, pale brown to hyaline conidiogenous cells, producing solitary, septate, helicoid, hyaline to pink conidia. Phylogenetically, *Helicodochium* located in the family Tubeufiaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Lu et al., 2018b; Monteiro et al., 2014) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Helicogloea Pat., Bulletin de la Société Mycologique de France 8 (2): 121 (1892)

= *Leucogloea* R. Kirschner, Sporodochial anamorphs of species of Helicogloea: 177 (2004)

Index Fungorum number: IF17729

Classification: Phleogenaceae, Atractiellales, Atractiellomycetes, Pucciniomycotina, Basidiomycota

Type species: *Helicogloea lagerheimii* Pat., Bulletin de la Société Mycologique de France 8 (2): 121 (1892)

Sexual morph: Sexual morphic genus

Sequence data: *Helicogloea lagerheimii* (DB 1025 = FO 36341 = TUB FO36341, LSU: AY512849, SSU: AY124476); *Leucogloea* sp. (TLe1462 = JAC13103, LSU: KP191766, ITS: KP191965)

Notes: *Leucogloea* is characterized by having sporodochial, gelatinous conidiomata, verticillate, hyaline conidiophores, with percurrent, hyaline conidiogenous cells, producing aseptate, hyaline conidia aggregated in slimy mass (Seifert et al., 2011). He et al. (2019) treated *Leucogloea* as a synonym of *Helicogloea*. Phylogenetically, representatives of *Helicogloea* clustered in the family

Phleogenaceae (Atractiellales, Atractiellomycetes) (Figure 2.1). References: (He et al., 2019) (outline).

Helicohyalinum Y.Z. Lu, J.K. Liu & K.D. Hyde, Fungal Diversity 92: 168 (2018)

Index Fungorum number: IF554833

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Helicohyalinum infundibulum* Y.Z. Lu, J.K. Liu & K.D. Hyde, Fungal Diversity 92: 170 (2018)

Sexual morph: Unknown.

Sequence data: *Helicohyalinum aquaticum* (MFLUCC 16-1133, LSU: MH558840, ITS: MH558712)

Notes: *Helicohyalinum* was established by Lu et al. (2018b) and is characterized by macronematous, mononematous, unbranched or branched, hyaline conidiophores, monoblastic, integrated, terminal, hyaline conidiogenous cells, producing solitary, septate, helicoid, tightly coiled $2^1/_2$-$3^1/_2$ times, not becoming loose in water, hyaline conidia. Phylogenetically, *Helicohyalinum* located in the family Tubeufiaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Lu et al., 2018b) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2020) (outline).

Helicomina L.S. Olive, Mycologia 40 (1): 16 (1948)

Index Fungorum number: IF8474

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Helicomina caperoniae* L.S. Olive, Mycologia 40 (1): 17 (1948)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Helicomina* was introduced by Olive (1948) and it has unbranched or branched, septate, elongate, dark conidiophores, with polyblastic, sympodial,

brown conidiogenous cells, and produces solitary, septate, straight or curved or coiled, hyaline to brown conidia. Phylogenetic position for *Helicomina* is unresolved due to lack of sequence data. References: (Olive, 1948) (morphology), (Wijayawardene et al., 2020) (outline).

Helicominopsis Deighton, Mycological Papers 78: 20 (1960)

Index Fungorum number: IF8475

Classification: Ascomycota genera *incertae sedis*

Type species: *Helicominopsis fici* Deighton, Mycological Papers 78: 21 (1960)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Helicominopsis* was introduced by Deighton (1960) and it has mononematous, septate, unbranched, subhyaline conidiophores, with polyblastic, sympodial, subhyaline conidiogenous cells, and produces solitary, multi-septate, coiled in 3-D, vermiform, subcylindrical, subhyaline conidia. Phylogenetic position for *Helicominopsis* is unresolved due to lack of sequence data. References: (Deighton, 1960) (morphology), (Wijayawardene et al., 2020) (outline).

Helicomyces Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 21 (1809)

Index Fungorum number: IF8476

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

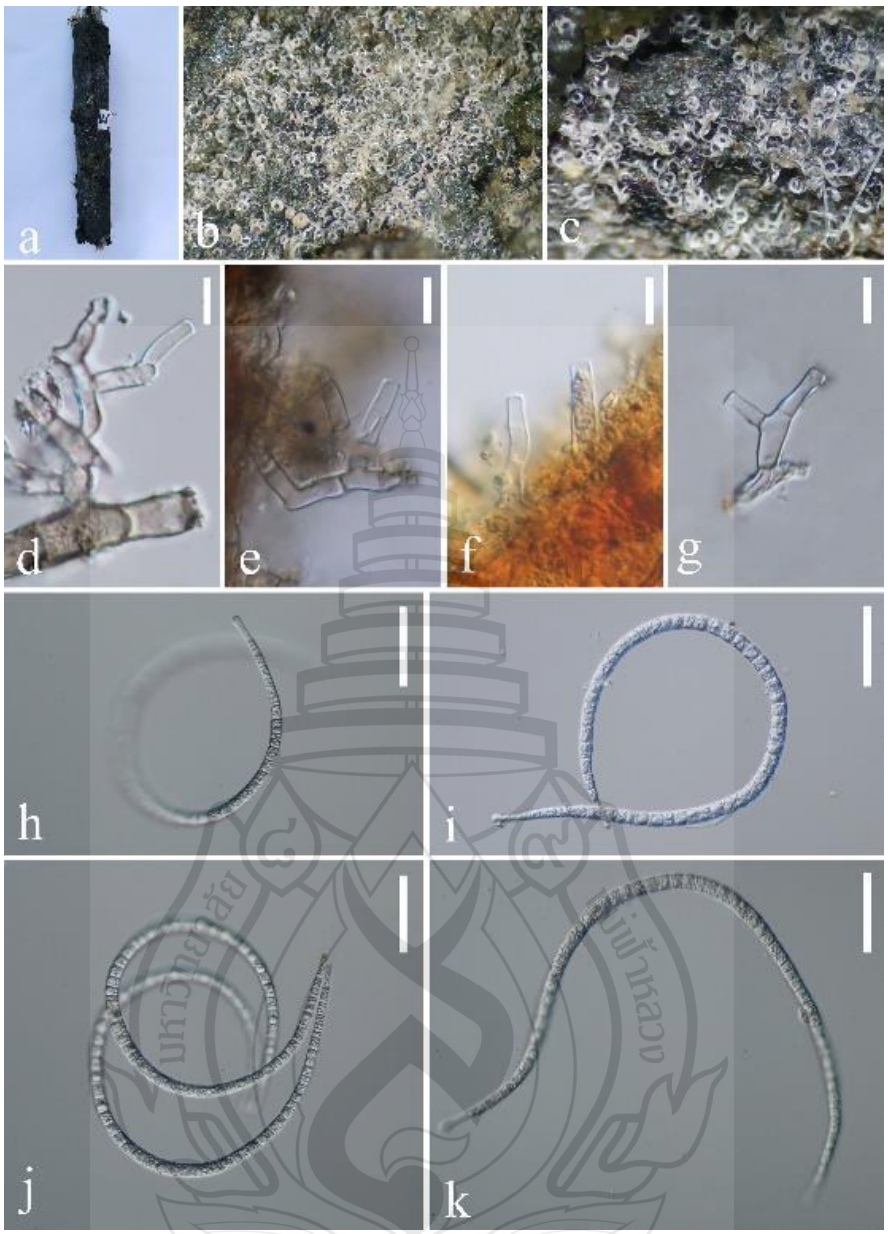
Type species: *Helicomyces roseus* Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 21, t. 1:35 (1809) [MB#237696]

Sexual morph: *Acanthostigma, Tubeufia* (Seifert et al., 2011).

Sequence data: *Helicomyces hyalosporus* (MFLUCC 17-0051, LSU: MH558857, ITS: MH558731)

Notes: *Helicomyces* is characterized by having macronematous, mononematous, unbranched or branched, sometimes reduced, subhyaline to brown conidiophores, with mono- to polyblastic, integrated, sympodial, terminal or

intercalary, denticulate, hyaline to brown conidiogenous cells, producing solitary, aseptate or septate, helicoid, hyaline to pale brown conidia. Phylogenetically, *Helicomyces* located in the family Tubeufiaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Lu et al., 2018b) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Helicomyces*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-21). **a** Host material. **b, c** Conidiophores on the host surface. **d–g** Conidiophores and conidiogenous cells. **h–k** Conidia. Scale bars: **d–g** = 10 μm, **h–k** = 50 μm.

Figure 2.35 *Helicomyces* sp.

Helicoon Morgan [as '*Helicoön*'], Journal of the Cincinnati Society of Natural History 15: 49 (1892)

Index Fungorum number: IF91188

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Helicoön sessile* Morgan, Journal of the Cincinnati Society of Natural History 15: 49 (1892)

Sexual morph: *Orbilia* (Seifert et al., 2011).

Sequence data: *Helicoön sessile* (A327, LSU, ITS and SSU: KY659207)

Notes: *Helicoon* is characterized by mononematous, unbranched or branched, hyaline to brown conidiophores, with monoblastic or polyblastic, sympodial, denticulate, hyaline to brown conidiogenous cells, producing solitary, helicosporous, hyaline to brown conidia (Seifert et al., 2011). Some species of *Helicoon* were transformed to other genera, e.g. *Helicoascotaiwania*, *Magnohelicospora*, *Pseudohelicoon* (Dayarathne et al., 2019; Goh & Kuo, 2018). References: (Dayarathne et al., 2019; Goh & Hyde, 1996b; Goh & Kuo, 2018; Van Beverwijk, 1954; Vanderaa & Samson, 1994; Voglmayr, 1997) (morphology), (Wijayawardene et al., 2020) (outline).

Helicosporium Nees, System der Pilze und Schwämme: 68 (1817)

Index Fungorum number: IF8484

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Helicosporium vegetum* Nees, System der Pilze und Schwämme: 68, t. 5:66(2) (1817)

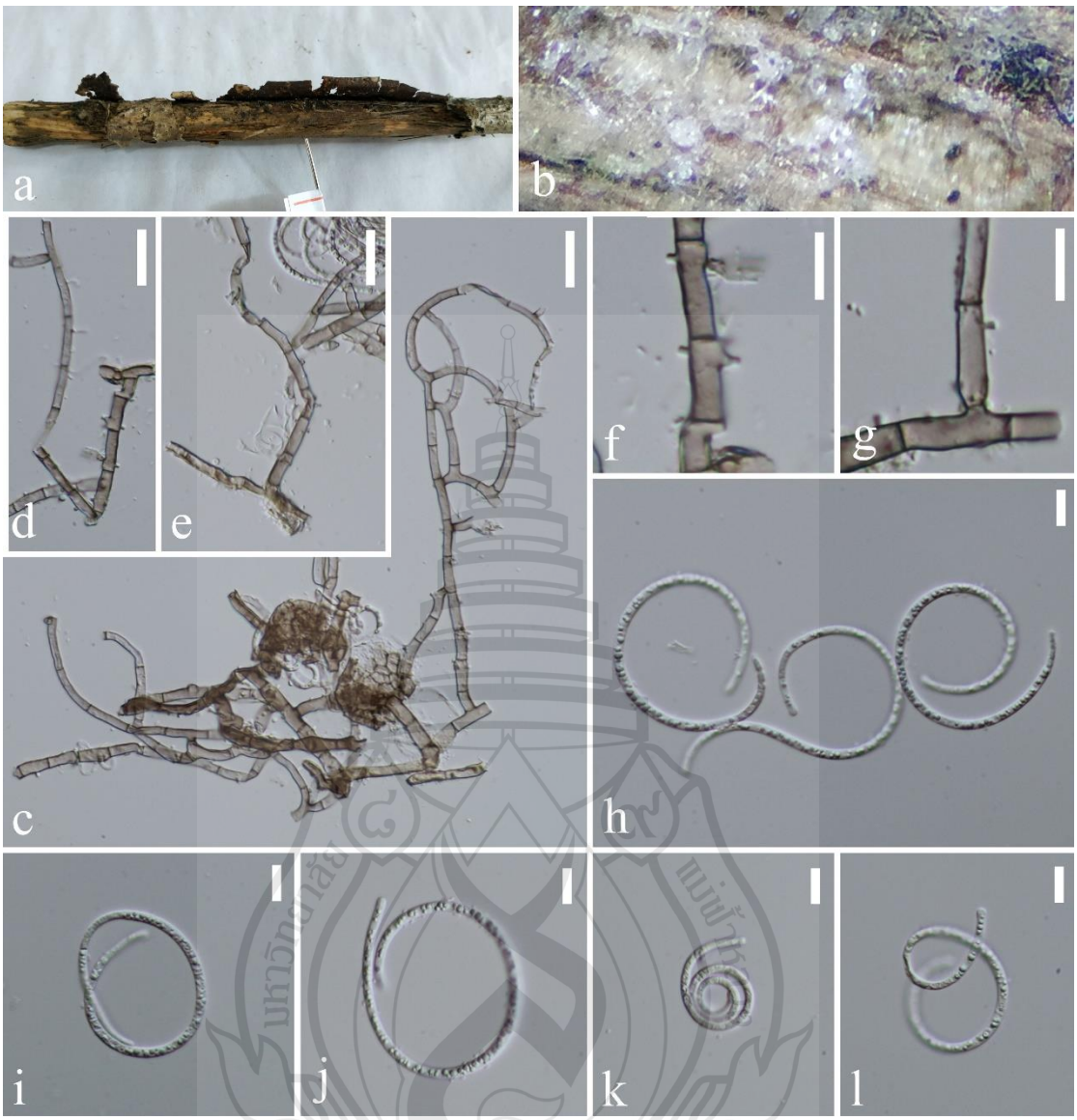
Sexual morph: *Acanthostigma, Tubeufia* (Seifert et al., 2011).

Synanamorphs: stemphylium-like (Seifert et al., 2011).

Sequence data: *Helicosporium aquaticum* (MFLUCC 17-2008, LSU: MH558859, ITS: MH558733)

Notes: *Helicosporium* is characterized by macronematous, mononematous, unbranched or branched, setiform, brown conidiophores, mono- to polyblastic, discrete, intercalary, sympodial, denticulate, hyaline to pale brown conidiogenous

cells, producing solitary, septate, helicoid, hyaline to yellow green conidia. Phylogenetically, *Helicosporium* located in the family Tubeufiaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Lu et al., 2018b) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Helicosporium*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-14). **a** Host material. **b** Conidiophores on the host surface. **c–e** conidiophores. **f, g** Conidiogenous cells. **h–l** Conidia. Scale bars: **c–e** = 20 μm, **f–l** = 10 μm.

Figure 2.36 *Helicosporium* sp.

Helicotubeufia Y.Z. Lu & J.K. Liu, Mycosphere 9 (3): 500 (2018)

Index Fungorum number: IF554759

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Helicotubeufia guangxiensis* Y.Z. Lu & J.K. Liu, Mycosphere 9 (3): 500 (2018)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Liu et al., 2018).

Sequence data: *Helicotubeufia guangxiensis* (MFLUCC 17-0040, LSU: MH290023, ITS: MH290018)

Notes: *Helicotubeufia* was established by Liu et al. (2018) and its asexual morph has macronematous, mononematous, hyaline conidiophores, polyblastic, integrated, terminal or intercalary, sympodial, hyaline conidiogenous cells, producing solitary, septate, helicoid, coiled 2½–3½ times when tightly coiled, becoming loosely coiled in the water, hyaline conidia. References: (Liu et al., 2018) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2020) (outline).

Heliscella Marvanová, Transactions of the British Mycological Society 75 (2): 224 (1980)

Index Fungorum number: IF8490

Classification: Ascomycota genera *incertae sedis*

Type species: *Heliscella stellata* (Ingold & V.J. Cox) Marvanová, Transactions of the British Mycological Society 75 (2): 224 (1980)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Marvanová, 1980).

Sequence data: ?*Heliscella stellata* (DSM 104357, LSU and ITS2: MK353113)

Notes: This genus was described by Marvanová (1980) to accommodate *Clavatospora stellata* and *C. stellatacula*. *Heliscella* is characterized by having mononematous, often reduced, unbranched or branched, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, producing aseptate, hyaline, staurosporous, tetraradiate conidia consisting of three upwards conical arms and one downwards arm

(Marvanová, 1980; Seifert et al., 2011). Phylogenetically, two strain DSM 104357 and DSM 104386, identified as *Heliscella stellata*, were included and clustered in the family Microthyriaceae (Microthyriales, Dothideomycetes) (Figure 2.1). References: (Marvanová, 1980; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Heliscina Marvanová, Transactions of the British Mycological Society 75 (2): 227 (1980)

Index Fungorum number: IF8491

Classification: Ascomycota genera *incertae sedis*

Type species: *Heliscina campanulata* Marvanová, Transactions of the British Mycological Society 75 (2): 227 (1980)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Heliscina* was introduced by Marvanová (1980) to accommodate *Heliscina campanulata*. It has mononematous, unbranched or poorly branched, hyaline conidiophores, with monoblastic, in chains, hyaline conidiogenous cells, and produces solitary, multi-septate, staurosporous, hyaline conidia. Phylogenetic position for *Heliscina* is unresolved due to lack of sequence data. References: (Marvanová, 1980) (morphology), (Wijayawardene et al., 2020) (outline).

Herreromyces R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 35: 60 (1991)

Index Fungorum number: IF27078

Classification: Ascomycota genera *incertae sedis*

Type species: *Herreromyces catenosporus* R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 35: 62 (1991)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Herreromyces* was established by Castañeda Ruíz and Kendrick (1991) and only one species is accepted. Phylogenetic position for *Herreromyces* is

unresolved due to lack of sequence data. References: (Castañeda Ruíz & Kendrick, 1991) (morphology), (Wijayawardene et al., 2020) (outline).

Heterocephalum Thaxt., Botanical Gazette Crawfordsville 35: 157 (1903)

Index Fungorum number: IF8521

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Heterocephalum aurantiacum* Thaxt., Botanical Gazette Crawfordsville 35: 157 (1903)

Sexual morph: Unknown.

Sequence data: *Heterocephalum aurantiacum* (CBS 314.66 = ATCC 16328 = IFO 8240 = IMI 236332, LSU: MH870443, ITS: MH858803)

Notes: *Heterocephalum* was introduced by Thaxter (1903) and is characterized by conidiomata are synnematous, with narrow hyphae around central conidiophores, setae are radiating at top of conidiomata, conidiophores are macronematous, aspergilloid with several series of metulae, hyaline, conidiogenous cells are phialidic, hyaline and conidia are aseptate, in slimy mass, hyaline (Thaxter, 1903). Phylogenetically, *Heterocephalum* located in the family Aspergillaceae (Figure 2.1). Previous studies placed this genus in Ascomycota genus *incertae sedis* (Wijayawardene et al., 2017a, 2020). In this study, we put this genus in the family Aspergillaceae based on our phylogenetic analysis and its aspergilloid conidiophores morphlogy. References: (Thaxter, 1903) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Heteromycophaga P. Roberts, Mycotaxon 63: 210 (1997)

Index Fungorum number: IF27781

Classification: Tremellomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Heteromycophaga glandulosae* P. Roberts, Mycotaxon 63: 211 (1997)

Sexual morph: Unknown.

Synanamorphs: yeast-like (Roberts, 1997; Seifert et al., 2011)

Sequence data: Sequence data is unavailable for this genus.

Notes: *Heteromycophaga* was established by Roberts (1997) and it has sporodochial, gelatinous conidiomata, micronematous, branched, clamped, hyaline conidiophores, with monoblastic, in chains, clamped, hyaline conidiogenous cells, produces solitary, aseptate, yeast-like, clavate to oblong, hyaline conidia. Phylogenetic position for *Heteromycophaga* is unresolved due to lack of sequence data. References: (Roberts, 1997) (morphology), (Wijayawardene et al., 2020) (outline).

Hexacladium D.L. Olivier, Transactions of the British Mycological Society 80 (2): 237 (1983)

Index Fungorum number: IF8530

Classification: Ascomycota genera *incertae sedis*

Type species: *Hexacladium corynephorum* D.L. Olivier, Transactions of the British Mycological Society 80 (2): 237 (1983)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hexacladium* was established by Olivier (1983) and is characterized by having reduced conidiophores, with monoblastic, integrated, intercalary, occasionally sympodial, hyaline conidiogenous cells, producing solitary, staurosporous, consisting of six branches with terminal clavate swellings. Phylogenetic position for *Hexacladium* is unresolved due to lack of sequence data. References: (Olivier, 1983) (morphology), (Wijayawardene et al., 2020) (outline).

Hispidoconidioma Tsuneda & Davey, Botany 88: 473 (2010)

Index Fungorum number: IF518303

Classification: Teratosphaeriaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Hispidoconidioma alpina* Tsuneda & Davey, Botany 88: 473 (2010)

Sexual morph: Unknown.

Sequence data: *Hispidoconidioma alpina* (UAMH 11010, LSU: FJ997286, ITS: FJ997285)

Notes: *Hispidoconidioma* was introduced by Tsuneda et al. (2010) and is characterized by having sporodochial conidiomata, reduced conidiophores, sporangium-like with endoconidia, dark brown conidiogenous cells, producing aseptate, endogenous, subglobose to ellipsoid, hyaline conidia (Seifert et al., 2011; Tsuneda et al., 2010). Phylogenetically, *Hispidoconidioma* was shown to be nested within the family Teratosphaeriaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Seifert et al., 2011; Tsuneda et al., 2010) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Histoplasma Darling, Journal of the American Medical Association 46: 1285 (1906)

Index Fungorum number: IF8540

Classification: Ajellomycetaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Histoplasma capsulatum* Darling, Journal of the American Medical Association 46: 1285 (1906)

Sexual morph: *Ajellomyces* (Seifert et al., 2011).

Synanamorphs: yeast at 37 °C (Seifert et al., 2011).

Disease symptoms: histoplasmosis (Rodrigues et al., 2020; Sepúlveda et al., 2017).

Sequence data: *Histoplasma capsulatus* (CBS 536.84 = ATCC 58332 = CDC B-3786, LSU: KT155281, ITS: KT155936)

Notes: *Histoplasma* is dimorphic: (1) at 24 °C, conidiophores are reduced or unbranched or sparingly branched, hyaline, conidiogenous cells are thallic, hyaline, microconidia are aseptate, hyaline, and macroconidia are aseptate, tuberculate, hyaline to pale brown; (2) at 37 °C, budding yeast, hyaline (Seifert et al., 2011). References: (Sepúlveda et al., 2017) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Hobsonia Berk. ex Massee, Annals of Botany 5 (4): 509 (1891)

Index Fungorum number: IF8462

Classification: Phleogenaceae, Atractiellales, Atractiellomycetes, Pucciniomycotina, Basidiomycota

Type species: *Hobsonia gigaspora* Berk., Annals of Botany 5 (4): 509 (1891)

Sexual morph: Unknown.

Sequence data: *Hobsonia christiansenii* (ATCC 201109, SSU: AF289656)

Notes: *Hobsonia* was introduced by Massee (1891) to accommodate *H. gigaspora* for which has sporodochial, gelatinous conidiomata, and helicosporous, hyaline conidia. Phylogenetic position for *Hobsonia* is unresolved due to lack of LSU sequence data. References: (Massee, 1891) (morphology), (Wijayawardene et al., 2020) (outline).

Holwaya Sacc., Sylloge Fungorum 8: 646 (1889)

= *Crinula* Fr., Systema Mycologicum 1: 493 (1821)

Index Fungorum number: IF2353

Classification: Leotiomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Holwaya ophiobolus* (Ellis) Sacc., Sylloge Fungorum 8: 646 (1889)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Crinula* (Seifert et al., 2011).

Sequence data: *Holwaya mucida* (before known as *Crinula caliciiformis*) (AFTOL-ID 272 = DAOM 231117, LSU: AY544680, ITS: KT225524, SSU: AY544729)

Notes: The sexual morph of *Crinula* was reported in the genus *Holwaya*, and Johnston et al. (2014) proposed to protect *Holwaya* over *Crinula*. Phylogenetically, *Holwaya* was shown to be nested within Leotiomycetes (Figure 2.1). References: (Wijayawardene et al., 2017a, 2020) (outline).

Hormiactis Preuss, Linnaea 24: 127 (1851)

Index Fungorum number: IF8546

Classification: Ascomycota genera *incertae sedis*

Type species: *Hormiactis alba* Preuss, Linnaea 24: 128 (1851)

Sexual morph: Unknown.

Sequence data: ?*Hormiactis candida* (CBS 539.69, LSU: MH871138, ITS: MH859370)

Notes: *Hormiactis* was introduced by Preuss (1851) and is characterized by having setae are none or unbranched, brown, conidiophores are macronematous, mononematous, unbranched or apically branched, brown, conidiogenous cells are monoblastic or ?monophialidic, sympodial, pale brown, and conidia are catenate, aseptate or septate, pale brown or subhyaline or hyaline (Seifert et al., 2011). Phylogenetically, the strain CBS 539.69 named *H. candida* located in the family Hypocreaceae (Hypocreales, Sordariomycetes). References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Hormiscioideus M. Blackw. & Kimbr., Mycologia 70: 1275 (1979)

Index Fungorum number: IF11437

Classification: Ascomycota genera *incertae sedis*

Type species: *Hormiscioideus filamentosus* M. Blackw. & Kimbr., Mycologia 70: 1275 (1979)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hormiscioideus* was established by Blackwell and Kimbrough (1978) and only one species is accepted. Phylogenetic position for *Hormiscioideus* is unresolved due to lack of sequence data. References: (Blackwell & Kimbrough, 1978) (morphology), (Wijayawardene et al., 2020) (outline).

Hormisciomyces Bat. & Nascim., Anais da Sociedade de Biologia de Pernambuco 15 (2): 349 (1957)

Index Fungorum number: IF8550

Classification: Euantennariaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Hormisciomyces prepusus* Bat. & Nascim., Anais da Sociedade de Biologia de Pernambuco 15 (2): 350 (1957)

Sexual morph: *Euantennaria*, *Trichopeltheca* (Seifert et al., 2011).

Synanamorphs: *Antennatula*, *Capnokyma* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hormisciomyces* was introduced by Batista and Nascimento (1957) and three species are accepted. Phylogenetic position for *Hormisciomyces* is unresolved due to lack of sequence data. References: (Batista & Nascimento, 1957) (morphology), (Wijayawardene et al., 2020) (outline).

Hormoconis Arx & G.A. de Vries, Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde 61 (4): 62 (1973)

Index Fungorum number: IF8556

Classification: Amorphothecaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Hormoconis resinae* (Lindau) Arx & G.A. de Vries, Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde 61 (4): 62 (1973)

Sexual morph: *Amorphotheca* (Seifert et al., 2007; Seifert et al., 2011).

Sequence data: *Hormoconis resinae* (ATCC 200942, LSU: NG_056951, ITS: NR_119450)

Notes: *Hormoconis* was introduced by von Arx (1973) and is characterized by branched, brown conidiophores, polyblastic, sympodial, brown conidiogenous cells with inconspicuous scars, producing catenate, aseptate, hyaline to subhyaline conidia (Seifert et al., 2011). Phylogenetically, representative of *Hormoconis* clustered in the family Amorphothecaceae, Helotiales, Leotiomycetes (Figure 2.1). References: (Seifert et al., 2007, 2011; von Arx, 1973) (morphology), (Wijayawardene et al., 2020) (outline).

Hormographiella Guarro & Gené, Mycotaxon 45: 179 (1992)

Index Fungorum number: IF25339

Classification: Psathyrellaceae, Agaricales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Hormographiella aspergillata* Guarro, Gené & De Vroey, Mycotaxon 45: 182 (1992)

Sexual morph: *Coprinopsis*, *Psathyrella* (Seifert et al., 2011).

Synanamorphs: Producing sclerotia (Seifert et al., 2011).

Sequence data: *Hormographiella candelabrata* (CBS 517.91 = FMR 3782, ITS: MH862273)

Notes: *Hormographiella* was introduced by Guarro et al. (1992) to accommodate *H. aspergillata*, *H. candelabrata* and *H. verticillata* and is characterized by having macro- to semi-macronematous, mononematous, erect, unbranched or branched, septate, sympodial conidiophores, with thallic-arthric, lateral or terminal, frequently in whorls, hyaline conidiogenous cells, and catenate, aseptate, cylindrical, hyaline conidia. Phylogenetic position for *Hormographiella* is unresolved due to lack of LSU sequence data. References: (Guarro et al., 1992) (morphology), (Wijayawardene et al., 2020) (outline).

Hormographis Guarro, Punsola & Arx, Mycologia 78: 969 (1986)

Index Fungorum number: IF11100

Classification: Ascomycota genera *incertae sedis*

Type species: *Hormographis ramirezii* Guarro, Punsola & Arx, Mycologia 78: 969 (1986)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hormographis* was established by Guarro et al. (1986) and it has synnematous conidiomata, macronematous or micronematous, unbranched or branched, hyaline conidiophores, with thallic-arthric, integrated or discrete, lateral and terminal, hyaline conidiogenous cells, and produces catenate, 1-septate, cylindrical, hyaline conidia. Phylogenetic position for *Hormographis* is unresolved due to lack of sequence data. References: (Guarro et al., 1986) (morphology), (Wijayawardene et al., 2020) (outline).

Hormomyces Bonord., Handbuch der allgemeinen Mykologie: 150 (1851) [MB#8561]

Index Fungorum number: IF8561

Classification: ?Tremellaceae, Tremellales, Tremellomycetes, Agaricomycotina, Basidiomycota

Type species: *Hormomyces aurantiacus* Bonord., Handbuch der allgemeinen Mykologie: 150 (1851)

Sexual morph: ?*Tremella* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hormomyces* was established by Bonorden (1851) to accommodate *H. aurantiacus*. *Hormomyces* was synonymized under *Tulasnella* J. Schröt. (Mack et al., 2021). Phylogenetic position for *Hormomyces* is unresolved due to lack of sequence data. References: (Bonorden, 1851; Mack et al., 2021) (morphology), (Wijayawardene et al., 2020) (outline).

Hormonema Lagerb. & Melin, Svenska Skogsvårdsföreningens Tidskrift 2 (2-4): 219 (1927)

Index Fungorum number: IF8562

Classification: Dothideaceae, Dothideales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Hormonema dematioides* Lagerb. & Melin, Svenska Skogsvårdsföreningens Tidskrift 2 (2-4): 219 (1927)

Sexual morph: *Dothiora*, *Guignardia*, *Potebniamyces*, *Pringsheimia*, *Sydowia*, *Valsaria*, *Xenomeris* (Seifert et al., 2011).

Synanamorphs: *Dothichiza*, *Kabatina*, *Sarcophoma*, *Sclerophoma*, *Selenophoma*, cytosporella-like (Seifert et al., 2011).

Sequence data: *Hormonema macrosporum* (CBS 536.94, LSU: MH874128, ITS: MH862482)

Notes: *Hormonema* is characterized by having reduced conidiophores, monoblastic, percurrent, intercalary in monilioid hyphae, brown conidiogenous cells, producing aseptate or septate, yeast-like, hyaline or brown conidia (Seifert et al., 2011). Rossman et al. (2015b) proposed to protect *Sydowia* over *Hormonema*.

References: (Hirooka et al., 2013; Seifert et al., 2011) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Humicola Traaen, Nytt Magazin for Naturvidenskapene 52: 31 (1914)

Index Fungorum number: IF8566

Classification: Chaetomiaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Humicola fuscoatra* Traaen, Nytt Magazin for Naturvidenskapene 52: 33 (1914)

Sexual morph: *Chaetomium*, *Lignincola*, *Lophotrichus*, *Pseudolignincola*, *Zopfiella* (Seifert et al., 2011).

Synanamorphs: acremonium-like, *Arthropsis*, *Chaetasbolisia*, *Idriella*, *Isthmolongispora*, *Microdochium*, *Phaeoisaria*, *Scolecobasidium*, *Trichoconis*, verticillium-like, *Zalerion* (Seifert et al., 2011).

Sequence data: *Humicola fuscoatra* (CBS 118.14, LSU: MH866152, ITS: MH854631, SSU: NG_062672)

Notes: *Humicola* is dimorphic: (1) micronematous or semi-macronematous, unbranched or irregularly branched, or reduced, hyaline to brown conidiophores, monoblastic conidiogenous cells, solitary, aseptate, spherical, obovoid or pyriform, brown conidia; (2) micronematous or semi-macronematous, or reduced, hyaline conidiophores, phialidic, hyaline conidiogenous cells, catenate or in slimy heads, aseptate, hyaline conidia (Ellis, 1971; Seifert et al., 2011; Wang et al., 2019c). *Humicola sensu stricto* was redefined by Wang et al. (2019c). References: (Ellis, 1971; Seifert et al., 2011; Wang et al., 2019c) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Hyalinostachys C.G. Lin & K.D. Hyde, Mycosphere 11 (1): 877 (2020)

Index Fungorum number: IF555606

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Hyalinostachys cylindrospora* C.G. Lin & K.D. Hyde, Mycosphere 11 (1): 878 (2020)

Sexual morph: Unknown.

Sequence data: *Hyalinostachys cylindrospora* (MFLUCC 17-2583, LSU: MG717503, ITS: MG717501)

Notes: This genus is stachybotrys-like. References: (Hyde et al., 2020) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Hyalobelemnospora Matsush., Matsushima Mycological Memoirs 7: 54 (1993)

Index Fungorum number: IF26483

Classification: Ascomycota genera *incertae sedis*

Type species: *Hyalobelemnospora amazonica* Matsush., Matsushima Mycological Memoirs 7: 54 (1993)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hyalobelemnospora* was introduced by Matsushima (1993) and is characterized by having macronematous or semi-macronematous, mononematous, unbranched, septate, sometimes reduced, hyaline conidiophores with monoblastic, percurrent, hyaline conidiogenous cells, producing solitary, aseptate, hyaline conidia. Phylogenetic position for *Hyalobelemnospora* is unresolved due to lack of sequence data. References: (Matsushima, 1993) (morphology), (Wijayawardene et al., 2020) (outline).

Hyalocamposporium Révay & Gönczöl, Fungal Diversity 25: 177 (2007)

Index Fungorum number: IF510551

Classification: Ascomycota genera *incertae sedis*

Type species: *Hyalocamposporium longiflagellatum* Révay & Gönczöl, Fungal Diversity 25: 178 (2007)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hyalocamposporium* was introduced by Revay and Gonczol (2007) and it has macronematous, mononematous, unbranched, cylindrical, septate, hyaline

conidiophores, with polyblastic, integrated, terminal, sympodial, denticulate, hyaline conidiogenous cells, and produces solitary, cylindrical to fusoid, elongate, hyaline conidia with or without a filiform appendage. Phylogenetic position for *Hyalocamposporium* is unresolved due to lack of sequence data. References: (Revay & Gonczol, 2007) (morphology), (Wijayawardene et al., 2020) (outline).

Hyalocephalotrichum Nagaraju, Kunwar, Sureshk. & Manohar.: 589 (2011)

Index Fungorum number: IF582710

Classification: Ascomycota genera *incertae sedis*

Type species: *Hyalocephalotrichum indicum* Nagaraju, Kunwar, Sureshk. & Manohar.: 589 (2011)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hyalocephalotrichum* was introduced by Nagaraju et al. (2012) and it has macronematous, mononematous, septate, penicillate, hyaline conidiophores, with phialidic, determinate, hyaline conidiogenous cells, and produces solitary, aseptate, cylindrical, hyaline conidia. Phylogenetic position for *Hyalocephalotrichum* is unresolved due to lack of sequence data. References: (Nagaraju et al., 2012) (morphology), (Wijayawardene et al., 2020) (outline).

Hyalocercosporidium Videira & Crous, Studies in Mycology 87: 339 (2017)

Index Fungorum number: IF822592

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Hyalocercosporidium desmodii* Videira & Crous, Studies in Mycology 87: 340 (2017)

Sexual morph: Unknown.

Sequence data: *Hyalocercosporidium desmodii* (CBS 142179 = CPC 19483, LSU: MF951168, ITS: MF951322)

Notes: *Hyalocercosporidium* was introduced by Videira et al. (2017) and is characterized by having semi-macronematous or micronematous, mononematous, solitary, simple, brown conidiophores with monoblastic, terminal and intercalary, determinate or sympodial conidiogenous cells, producing solitary, aseptate or septate, obovoid, long-obclavate, hyaline conidia. Phylogenetically, *Hyalocercosporidium* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Hyalocladium Mustafa, Transactions of the British Mycological Society 67 (3): 537 (1977)

Index Fungorum number: IF8571

Classification: Ascomycota genera *incertae sedis*

Type species: *Hyalocladium moubasheri* Moustafa, Transactions of the British Mycological Society 67 (3): 537 (1977)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hyalocladium* was erected by Moustafa (1976) and it has micronematous or semi-macronematous, solitary, flexuous, unbranched or branched, hyaline conidiophore, monoblastic or polyblastic, sympodial, hyaline conidiogenous cells, and produces solitary, muriform, spherical to oval, or sometimes ellipsoidal, rarely elongated, hyaline conidia. Phylogenetic position for *Hyalocladium* is unresolved due to lack of sequence data. References: (Moustafa, 1976) (morphology), (Wijayawardene et al., 2020) (outline).

Hyalocylindrophora J.L. Crane & Dumont, Canadian Journal of Botany 56 (20): 2616 (1978)

Index Fungorum number: IF8573

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Hyalocylindrophora venezuelensis* J.L. Crane & Dumont, Canadian Journal of Botany 56 (20): 2616 (1978)

Sexual morph: The sexual morph of *Hyalocylindrophora bispora* is similar to *Hydropisphaera* and *Trichonectria* (Zeng & Zhuang, 2018).

Sequence data: *Hyalocylindrophora bispora* (CGMCC 3.18408 = HMAS 248881, LSU: KY203340, ITS: MG431982)

Notes: *Hyalocylindrophora* was introduced by Crane and Dumont (1978) and is characterized by having unbranched, septate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, in slimy mass, cylindrical and ellipsoidal, hyaline conidia. Zeng and Zhuang (2018) provided the first phylogenetic analysis for this genus. References: (Crane & Dumont, 1978; Zeng & Zhuang, 2018) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Hyalohelicomina T. Yokoy., Transactions of the Mycological Society of Japan 15: 159 (1974)

Index Fungorum number: IF8578

Classification: Ascomycota genera *incertae sedis*

Type species: *Hyalohelicomina deutziae* (T. Yokoy.) T. Yokoy., Transactions of the Mycological Society of Japan 15: 159 (1974)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hyalohelicomina* was introduced by Yokoyama (1974) and only one species is accepted. Phylogenetic position for *Hyalohelicomina* is unresolved due to lack of sequence data. References: (Yokoyama, 1974) (morphology), (Wijayawardene et al., 2020) (outline).

Hyalopleiochaeta R.F. Castañeda, Guarro & Cano, Mycotaxon 57: 458 (1996)

Index Fungorum number: IF27598

Classification: Ascomycota genera *incertae sedis*

Type species: *Hyalopleiochaeta delicata* R.F. Castañeda, Guarro & Cano, Mycotaxon 57: 458 (1996)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hyalopleiochaeta* was erected by Castañeda Ruíz et al. (1996b) and it has macronematous, mononematous, septate, hyaline conidiophores, with polyblastic, sympodial, integrated, scarred, hyaline conidiogenous cells, produces solitary, multi-septate, cylindrical, ellipsoid, to obclavate, hyaline conidia with several filiform appendages. Phylogenetic position for *Hyalopleiochaeta* is unresolved due to lack of sequence data. References: (Castañeda Ruíz et al., 1996b) (morphology), (Wijayawardene et al., 2020) (outline).

Hyalorbilia Baral & G. Marson, Monographic revision of Gelatinopsis and Calloriopsis (Calloriopsideae, Leotiales): 44 (2000)

= *Brachyphoris* Juan Chen, L.L. Xu, B. Liu & Xing Z. Liu, Fungal Diversity 26: 79 (2007)

Index Fungorum number: IF28404

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Hyalorbilia berberidis* (Velen.) Baral, Monographic revision of Gelatinopsis and Calloriopsis (Calloriopsideae, Leotiales): 44 (2000) [MB#482907]

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Hyalorbilia brevistipitata* (CBS 113946, LSU, ITS and SSU: KT215221); *Hyalorbilia oviparasitica* (CBS 379.84, LSU: NG_064136, ITS: NR_153598)

Notes: For details of *Brachyphoris* and *Hyalorbilia* the monograph in Baral et al. (2020). Phylogenetically, *Hyalorbilia* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Hyalorhinocladiella H.P. Upadhyay & W.B. Kendr., Mycologia 67: 800 (1975)

Index Fungorum number: IF8582

Classification: Ophiostomataceae, Ophiostomatales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Hyalorhinocladiella minuta-bicolor* (R.W. Davidson) H.P. Upadhyay & W.B. Kendr., Mycologia 67: 800 (1975)

Sexual morph: *Ceratocystiopsis*, *Klasterskya*, *Ophiostoma* (Seifert et al., 2011).

Sequence data: *Hyalorhinocladiella* sp. (C2303, LSU: GU393354, ITS: GU393355)

Notes: de Beer et al. (2013) synonymized *Hyalorhinocladiella* under *Ceratocystiopsis*. Phylogenetically, representative of *Hyalorhinocladiella* clustered in the family Ophiostomataceae, Ophiostomatales, Sordariomycetes (Figure 2.1). References: (Wijayawardene et al., 2020) (outline).

Hyalosynnema Matsush., Icones Microfungorum a Matsushima lectorum: 85 (1975)

Index Fungorum number: IF8584

Classification: Ascomycota genera *incertae sedis*

Type species: *Hyalosynnema multiseptatum* Matsush., Icones Microfungorum a Matsushima lectorum: 85 (1975)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hyalosynnema* was introduced by Matsushima (1975) and it has synnematous, white conidiomata, macronematous, unbranched, septate, hyaline conidiophores, with polyblastic, sympodial, scarred, hyaline conidiogenous cells, produces solitary, septate, oblong, hyaline conidia. Phylogenetic position for *Hyalosynnema* is unresolved due to lack of sequence data. References: (Matsushima, 1975) (morphology), (Wijayawardene et al., 2020) (outline).

Hyalozasmidium U. Braun, C. Nakash., Videira & Crous, Studies in Mycology 87: 375 (2017)

Index Fungorum number: IF822593

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Hyalozasmidium aerohyalinosporum* (Crous & Summerell) Videira & Crous, Studies in Mycology 87: 375 (2017)

Sexual morph: Unknown.

Sequence data: *Hyalozasmidium aerohyalinosporum* (CPC 14636 = CBS 125011, LSU: KF901930, ITS: NR_156220)

Notes: *Hyalozasmidium* was introduced by Videira et al. (2017) and is characterized by micro- or macronematous, mononematous, unbranched, smooth to verruculose, brown conidiophores, with mono- or polyblastic, integrated, terminal and intercalary, sympodial conidiogenous cells, producing solitary, septate, subcylindrical, hyaline conidia. Phylogenetically, *Hyalozasmidium* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Hydrometrospora Gönczöl & Révay, Nova Hedwigia 40 (1-4): 199 (1985)

Index Fungorum number: IF11102

Classification: Ascomycota genera *incertae sedis*

Type species: *Hydrometrospora symmetrica* Gönczöl & Révay, Nova Hedwigia 40 (1-4): 199 (1985)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hydrometrospora* was erected by Gönczöl and Révay (1984) and only one species is accepted. Phylogenetic position for *Hydrometrospora* is unresolved due to lack of sequence data. References: (Gönczöl & Révay, 1984) (morphology), (Wijayawardene et al., 2020) (outline).

Hyphodiscosia Lodha & K.R.C. Reddy, Transactions of the British Mycological Society 62 (2): 419 (1974)

Index Fungorum number: IF8605

Classification: maybe in Xylariales genera *incertae sedis*, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Hyphodiscosia jaipurensis* Lodha & K.R.C. Reddy, Transactions of the British Mycological Society 62 (2): 421 (1974)

Sexual morph: Unknown.

Sequence data: Sequence data for ex-type culture of type species is unavailable. Other sequence data: Ex-type of *Hyphodiscosia radicicola*, NBRC 32540 = ATCC 200611 = MAFF 425311, LSU: LC146739, ITS: LC146739.

Notes: In previous studies, the genus was placed in Ascomycota genus *incertae sedis*. In our phylogenetic study, the ex-type of *Hyphodiscosia radicicola* groups with other Xylariales spp., but the taxonomic rank in family level is unknown, hence this genus maybe in Xylariales genus *incertae sedis*. References: (Ellis, 1976; Seifert et al., 2011)(morphology and phylogeny)

Hyphodiscus Kirschst., Verhandlungen des Botanischen Vereins der Provinz Brandenburg 48: 44 (1907)

= *Catenulifera* Hosoya, Mycoscience 43 (1): 48 (2002)

Index Fungorum number: IF2421

Classification: Hyaloscyphaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Hyphodiscus gregarius* Kirschst., Verhandlungen des Botanischen Vereins der Provinz Brandenburg 48: 44 (1907)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Catenulifera* (Hosoya, 2002)

Sequence data: *Hyphodiscus hymeniophilus* (before known as *Catenulifera rhodogena*) (CBS 335.53 = MUCL 9042, LSU and ITS: DQ227259)

Notes: *Catenulifera* was introduced by Hosoya (2002) and is characterized by having micronematous or macronematous, mononematous, unbranched, sometimes reduced, hyaline conidiophores, with phialidic with cylindrical to cup-shaped, funnel-shaped or flaring collarettes, discrete or integrated, hyaline conidiogenous cells, producing aseptate, more or less cuneate or dacryoid, hyaline conidia arranged in chains or slimy droplets. The sexual morph of *Catenulifera* was reported in the genus

Hyphodiscus, Johnston et al. (2014) proposed to use *Hyphodiscus* over *Catenulifera*. Phylogenetically, *Hyphodiscus* was shown to be nested within the family Hyaloscyphaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Bogale et al., 2010; Hosoya, 2002) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Hyphopolynema Nag Raj, Canadian Journal of Botany 55 (7): 760 (1977)

Index Fungorum number: IF8607

Classification: Ascomycota genera *incertae sedis*

Type species: *Hyphopolynema tropicale* Nag Raj, Canadian Journal of Botany 55 (7): 762 (1977)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hyphopolynema* was erected by Nag Raj (1977) and is characterized by having sporodochial or synnematous, macronematous, branched, septate, subhyaline to pale brown conidiophores, with phialidic, percurrent, clavate, subhyaline conidiogenous cells, and producing solitary, aseptate, occasionally 1- or 2-septate, hyaline conidia with apical and basal appendages. Phylogenetic position for *Hyphopolynema* is unresolved due to lack of sequence data. References: (Nag Raj, 1977) (morphology), (Wijayawardene et al., 2020) (outline).

Hypocreodendron Henn., Hedwigia 36: 223 (1897)

Index Fungorum number: IF8615

Classification: Xylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Hypocreodendron sanguineum* Henn., Hedwigia 36: 223 (1897)

Sexual morph: *Discoxylaria* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Hypocreodendron* was introduced by Hennings (1896) and only one species is accepted. Phylogenetic position for *Hypocreodendron* is unresolved due to

lack of sequence data. References: (Hennings, 1896) (morphology), (Wijayawardene et al., 2020) (outline).

Hypomyces (Fr.) Tul. & C. Tul., Annales des Sciences Naturelles Botanique 13: 11 (1860)

= *Cladobotryum* Nees, System der Pilze und Schwämme: 55 (1817)

Index Fungorum number: IF2446

Classification: Hypocreaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Hypomyces lactifluorum* (Schwein.) Tul. & C. Tul., Annales des Sciences Naturelles Botanique 13: 11 (1860)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Hypomyces australasiaticus* (CBS 127152, LSU: MH875883, ITS: MH864443)

Notes: The asexual morphs of *Hypomyces* were reported in *Acremonium*-like, *Cladobotryum*, *Gliocladium*-like, *Mycogone*, *Sepedonium*, *Stephanoma*, *Stilbella*, *Trichoderma*, *Verticillium*-like (Rossman et al., 1999, 2013). References: (Rossman et al., 1999) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Hypoxylon Bull., Histoire des champignons de la France. I: 168 (1791)

= *Nodulisporium* Preuss, Klotzschii herbarium vivum mycologicum sistens fungorum per totam Germaniam crescentium collectionem perfectam. Editio prima. Centuria XIII: no. 1272 (1849)

Index Fungorum number: IF2456

Classification: Hypoxylaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Hypoxylon fragiforme* (Pers.) J. Kickx f., Flore cryptogamique des environs de Louvain, ou déscription des plantes cryptogames et agames qui croissent dans le Brabant et dans une partie de la province d'Anvers: 116 (1835)

Sexual morph: Sexual morphic genus with asexual morph in the genera *Nodulisporium*.

Sequence data: *Hypoxylon fragiforme* (MUCL 51264, LSU: KM186295, ITS: KC477229)

Notes: *Nodulisporium* was reported as the asexual morph of *Hypoxylon*, and Réblová et al. (2016a) proposed protecting *Hypoxylon* over *Nodulisporium*. References: (Daranagama et al., 2018; Granmo, 2002; Hladki & Romero, 2009; Hsieh et al., 2005; Kuhnert et al., 2014; Mazzaglia et al., 2001) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Hyweljonesia R.G. Shivas, Y.P. Tan, Marney & Abell, Persoonia 37: 269 (2016)

Index Fungorum number: IF817134

Classification: Teratosphaeriaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Hyweljonesia queenslandica* R.G. Shivas, Y.P. Tan, Marney & Abell, Persoonia 37: 269 (2016)

Sexual morph: Unknown.

Sequence data: *Hyweljonesia queenslandica* (BRIP 61322b, LSU: NG_059766, ITS: NR_154095)

Notes: *Hyweljonesia* was introduced by Crous et al. (2016a) and placed this genus under Teratosphaeriaceae (Capnodiales, Dothideomycetes). It is characterized by macronematous, mononematous, often on hyphal tufts, unbranched, light brown conidiophores with an apical whorl of conidiogenous cells, pale brown, clavate conidiogenous cells, subhyaline, cuneiform, smooth conidia (Crous et al., 2016a). References: (Crous et al., 2016a)(morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Idriella P.E. Nelson & S. Wilh., Mycologia 48 (4): 550 (1956) [MB#8625]

Index Fungorum number: IF8625

Classification: Microdochiaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: ***Idriella lunata*** P.E. Nelson & S. Wilh., Mycologia 48 (4): 547 (1956)

Sexual morph: Unknown.

Sequence data: Sequence data for ex-type culture of type species is available. *Idriella lunata* (CBS 204.56, LSU: KP858981, ITS: KP859044).

Notes: The genus is characterized by brown conidiophores, polyblastic, terminal, denticulate conidiogenous cells, and aseptate, hyaline, lunate, curved conidia. It was placed in the family Microdochiaceae by Hernández-Restrepo et al. (2016a). References: (Hernández-Restrepo et al., 2016a) (morphology and phylogeny).

Idriellomyces Crous, Persoonia 40: 369 (2018)

Index Fungorum number: IF825426

Classification: Xylariales genera incertae sedis, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Idriellomyces eucalypti* Crous, Persoonia 40: 369 (2018)

Sexual morph: Unknown.

Sequence data: *Idriellomyces eucalypti* (CPC 32632, LSU: NG_066413, ITS: NR_160356)

Notes: This genus is *Idriella*-like and characterized by synnematous, branched, brown conidiophores, polyblastic, medium brown conidiogenous cells, solitary, aseptate, hyaline, guttulate, fusoid conidia. *Idriellomyces* was introduced by Crous et al. (2018c) and placed in Phlogicylindriaceae, Xylariales. However, phylogenetically, the ex-type of generic type species of this genus formed a separate clade outside the Phlogicylindriaceae clade. Therefore, we suggest putting this genus in Xylariales genera *incertae sedis*. References: (Crous et al., 2018c) (morphology and phylogeny)

Illosporiopsis D. Hawksw., Mycological Research 105 (4): 457 (2001)

Index Fungorum number: IF28491

Classification: Hypocreales genera *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Illosporiopsis christiansenii* (B.L. Brady & D. Hawksw.) D. Hawksw., Mycological Research 105 (4): 457 (2001)

Sexual morph: Unknown.

Sequence data: *Illosporiopsis christiansenii* (ATCC 201109, SSU: AF289656).

Notes: *Illosporiopsis* was introduced by Sikaroodi et al. (2001) to accommodate *Hobsonia christiansenii* B. L. Brady & D. Hawksw. It has micronematous, sporodochial, reduced conidiophores, with monoblastic, integrated conidiogenous cells, and solitary, septate, helicoid, hyaline conidia (Sikaroodi et al., 2001). Phylogenetic position for *Illosporiopsis* is unresolved due to lack of LSU sequence data. References: (Sikaroodi et al., 2001) (morphology), (Wijayawardene et al., 2020) (outline).

Illosporium Mart., Flora Cryptogamica Erlangensis sistens vegetabilia e classe ultima Linn. In agro Erlangensi hucusque detecta: 325 (1817)

Index Fungorum number: IF8626

Classification: Hypocreales genera *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Illosporium roseum* Mart., Flora Cryptogamica Erlangensis sistens vegetabilia e classe ultima Linn. In agro Erlangensi hucusque detecta: 325 (1817)

Sexual morph: *Pronectria* (Seifert et al., 2011).

Sequence data: *Illosporium carneum* (ATCC 200590, SSU: AF289655)

Notes: Phylogenetic position for *Illosporium* is unresolved in this study due to lack of LSU sequence data. References: (Sikaroodi et al., 2001) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Ilyonectria P. Chaverri & C. Salgado, Studies in Mycology 68: 69 (2011)

Index Fungorum number: IF518558

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Ilyonectria destructans* (Zinssm.) Rossman, L. Lombard & Crous, Studies in Mycology 80: 217 (2015)

Sexual morph: Introduced as holomorph (Chaverri et al., 2011).

Sequence data: *Ilyonectria destructans* (CBS 264.65, LSU: KM515927, ITS: AY677273)

Notes: *Ilyonectria* was introduced by Chaverri et al. (2011) with *Cylindrocarpon*-like asexual morph. References: (Chaverri et al., 2011; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Inaequalispora L. Lombard & Crous, Persoonia 36: 191 (2016)

Index Fungorum number: IF815997

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Inaequalispora prestonii* (M.C. Tulloch) L. Lombard & Crous, Persoonia 36: 192 (2016)

Sexual morph: Unknown.

Sequence data: *Inaequalispora prestonii* (CBS 175.73 = IMI 160372 = ATCC 24427, LSU: KU846348, ITS: KU846316)

Notes: This genus is myrothecium-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Infundichalara Réblová & W. Gams, Fungal Diversity 46: 78 (2011)

Index Fungorum number: IF518972

Classification: Pezizellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Infundichalara microchona* (W. Gams) Réblová & W. Gams, Fungal Diversity 46: 80 (2011)

Sexual morph: Unknown.

Sequence data: *Infundichalara microchona* (CBS 175.74 = UAMH 4933, LSU: NG_067269, ITS: NR_154074, SSU: NG_061112)

Notes: *Infundichalara* was erected by Réblová et al. (2011b) to accommodate *Chalara microchona* and is characterized by having macronematous, mononematous, unbranched, septate, or sometimes reduced, brown conidiophores, phialidic with funnel-shaped collarettes, sympodial, subhyaline to brown conidiogenous cells, producing catenate, smooth-walled, clavate, hyaline conidia. Phylogenetically, *Infundichalara* was shown to be nested within the family Pezizellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Koukol, 2012; Réblová et al., 2011b) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Ingoldiella D.E. Shaw, Transactions of the British Mycological Society 59 (2): 258 (1972)

Index Fungorum number: IF8631

Classification: Hydnaceae, Cantharellales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Ingoldiella hamata* D.E. Shaw, Transactions of the British Mycological Society 59 (2): 258 (1972)

Sexual morph: *Sistotrema* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ingoldiella* was introduced by Shaw (1972) and it has mononematous, unbranched or branched, clamped, hyaline conidiophores, with monoblastic or polyblastic, sympodial, hyaline conidiogenous cells, and produces conidia that are solitary, hyaline, septate, clamped, staurosporous, consisting of a main axis and 2-3 lateral arms. Phylogenetic position for *Ingoldiella* is unresolved due to lack of sequence data. References: (Shaw, 1972) (morphology), (Wijayawardene et al., 2020) (outline).

Inodoromyces C. Mayers & T.C. Harr., Persoonia 44: 56 (2019)

Index Fungorum number: IF828237

Classification: Microascales genera *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Inodoromyces interjectus* C. Mayers & T.C. Harr., Persoonia 44: 57 (2019)

Sexual morph: Unknown.

Sequence data: *Inodoromyces interjectus* (CBS 142647 = C3547, LSU: MF399171, ITS: MF399192, SSU: MF398173)

Notes: *Inodoromyces* was introduced by Mayers et al. (2020a) to accommodate *I. interjectus*, which collected from gallery of *Elateroides lugubris* larvae in *Populus* sp. It is characterized by micronematous, mononematous, simple to branched, hyaline conidiophores, phialidic, hyaline conidiogenous cells, producing aseptate or rarely septate, globose becoming oblong, hyaline conidia (Mayers et al., 2020a). References: (Mayers et al., 2020a) (morphology and phylogeny).

Irpicomyces Deighton, Mycological Papers 118: 24 (1969)

Index Fungorum number: IF8635

Classification: Ascomycota genera *incertae sedis*

Type species: *Irpicomyces schiffnerulae* Deighton, Mycological Papers 118: 24 (1969)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Irpicomyces* was erected by Deighton (1969a) and is characterized by having reduced, hyaline to subhyaline conidiophores, with polyblastic, sympodial, denticulate, hyaline to subhyaline conidiogenous cells, and producing solitary or catenate, multi-septate, obclavate-filiform, hyaline to subhyaline conidia. Phylogenetic position for *Irpicomyces* is unresolved due to lack of sequence data. References: (Deighton, 1969a) (morphology), (Wijayawardene et al., 2020) (outline).

Isariella Henn., Hedwigia 48: 19 (1908)

Index Fungorum number: IF8637

Classification: Ascomycota genera *incertae sedis*

Type species: *Isariella auerswaldiae* Henn., Hedwigia 48: 19 (1908)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Isariella* was introduced by Hennings (1909) and it has sporordochial conidiomata, macronematous, unbranched or branched, hyaline conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, and produces solitary, septate, ellipsoidal, hyaline conidia. Phylogenetic position for *Isariella* is unresolved due to lack of sequence data. References: (Hennings, 1909) (morphology), (Wijayawardene et al., 2020) (outline).

Isthmolongispora Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 32 (1971)

Index Fungorum number: IF8641

Classification: Ascomycota genera *incertae sedis*

Type species: *Isthmolongispora intermedia* Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 32 (1971)

Sexual morph: Unknown.

Synanamorphs: acremonium-like, humicola-like, zalerion-like (Seifert et al., 2011).

Sequence data: *Isthmolongispora ampulliformis* (CBS 223.59 = ATCC 16166 = IFO 6787 = NI 4349, LSU: MH869386, ITS: MH857845); *Isthmolongispora lanceata* (CBS 622.66 = MUCL 28087 = NBRC 100994, LSU: MH870563, ITS: MH858897)

Notes: *Isthmolongispora* was described by Matsushima (1971) and is characterized by having mononematous, unbranched, sometimes reduced, hyaline to subhyaline conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing conidia that are aseptate, with 1 to several constrictions, scolecosporous, fusiform or filiform, hyaline (Matsushima, 1971; Seifert et al., 2011). Phylogenetically, the ex-type of *I. ampulliformis* and ex-isotype of *I. lanceata* clustered in the family Microthyriaceae (Microthyriales, Dothideomycetes) (Figure 2.1). References: (Matsushima, 1971; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Isthmotricladia Matsush., Bulletin of the National Science Museum Tokyo 14 (3): 478 (1971)

Index Fungorum number: IF8643

Classification: Ascomycota genera *incertae sedis*

Type species: *Isthmotricladia laeensis* Matsush., Bulletin of the National Science Museum Tokyo 14 (3): 480 (1971)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Isthmotricladia* was erected by Kobayasi (1971) and it has reduced conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, and produces solitary, hyaline, staurosporous, consisting of one axis and three branches. Phylogenetic position for *Isthmotricladia* is unresolved due to lack of sequence data. References: (Kobayasi, 1971) (morphology), (Wijayawardene et al., 2020) (outline).

Itersonilia Derx, Bulletin du Jardin Botanique de Buitenzorg 17: 471 (1948)

Index Fungorum number: IF8644

Classification: Mrakiaceae, Cystofilobasidiales, Tremellomycetes, Agaricomycotina, Basidiomycota

Type species: *Itersonilia perplexans* Derx, Bulletin du Jardin Botanique de Buitenzorg 17: 471 (1948)

Sexual morph: Unknown.

Sequence data: *Itersonilia perplexans* (CBS 363.85, LSU: AJ235274, ITS: AB072233, SSU: AB072228)

Notes: *Itersonilia* is characterized by having conidiophores are reduced to conidiogenous cells, conidiogenous cells are monoblastic, with clamp connections, hyaline, and producing conidia that are solitary, yeast-like, aseptate, hyaline (Seifert et al., 2011). Phylogenetically, representatives of *Itersonilia* clustered in the family Mrakiaceae (Cystofilobasidiales, Tremellomycetes) (Figure 2.1). References: (Boekhout, 1991; Derx, 1948; Ingold, 1987; Seifert et al., 2011) (morphology), (He et al., 2019) (outline).

Iyengarina Subram., Journal of the Indian Botanical Society 37 (3): 406 (1958)

Index Fungorum number: IF8645

Classification: Ascomycota genera *incertae sedis*

Type species: *Iyengarina elegans* Subram., Journal of the Indian Botanical Society 37 (3): 407 (1958)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Iyengarina* was erected by Subramanian (1958) and it has macronematous, mononematous, unbranched or branched, septate, brown conidiophores, produces solitary, septate, staurosporous, Y-shaped, hyaline or brown conidia. Phylogenetic position for *Iyengarina* is unresolved due to lack of sequence data. References: (Subramanian, 1958) (morphology), (Wijayawardene et al., 2020) (outline).

Jaculispora H.J. Huds. & Ingold, Transactions of the British Mycological Society 43 (3): 475 (1960)

Index Fungorum number: IF2522

Classification: Classiculaceae, Classiculales, Classiculomycetes, Pucciniomycotina, Basidiomycota

Type species: *Jaculispora submersa* H.J. Huds. & Ingold, Transactions of the British Mycological Society 43 (3): 475 (1960)

Sexual morph: Unknown.

Sequence data: *Jaculispora submersa* (DB 1250 = F 1806 = CCM 8127, LSU: AY512853, SSU: AY124477)

Notes: This genus was described by Hudson and Ingold (1960) and is characterized by having mononematous, unbranched, hyaline conidiophores, with monoblastic (?thallic), hyaline conidiogenous cells, producing conidia that are solitary, aseptate, hyaline, staurosporous, consisting of a main axis with three lateral appendages. Phylogenetically, representative of *Jaculispora* clustered in the family Classiculaceae (Classiculales, Classiculomycetes) (Figure 2.1). References: (Hudson & Ingold, 1960) (morphology), (He et al., 2019) (outline).

Jayarambhatia Pratibha, Mycotaxon 125: 140 (2013)

Index Fungorum number: IF803753

Classification: Ascomycota genera *incertae sedis*

Type species: *Jayarambhatia rhizophorae* Pratibha, Mycotaxon 125: 140 (2013)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Jayarambhatia* was erected by Pratibha (2013) and is characterized by having macronematous, mononematous, solitary, sometimes branched, brown conidiophores, monophialidic with a narrow, elongated, slender neck,, integrated, terminal conidiogenous cells, producing conidia that are aseptate, filiform, narrowly obclavate, hyaline, aggregated in slimy mass. Phylogenetic position for *Jayarambhatia* is unresolved due to lack of sequence data. References: (Pratibha, 2013) (morphology), (Wijayawardene et al., 2020) (outline).

Jumillera J.D. Rogers, Y.M. Ju & F. San Martín, Mycotaxon 64: 41 (1997)

Index Fungorum number: IF27739

Classification: Lopadostomataceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Jumillera mexicana* J.D. Rogers, Y.M. Ju & F. San Martín, Mycotaxon 64: 46 (1997)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Jumillera* was introduced by Rogers et al. (1997) and its asexual morph is *Libertella*-like. Phylogenetic position for *Jumillera* is unresolved due to lack of sequence data. References: (Rogers et al., 1997) (morphology), (Wijayawardene et al., 2020) (outline).

Junctospora Minter & Hol.-Jech., Folia Geobotanica et Phytotaxonomica 16 (2): 202 (1981)

Index Fungorum number: IF2540

Classification: Ascomycota genera *incertae sedis*

Type species: *Junctospora pulchra* Minter & Hol.-Jech., Folia Geobotanica et Phytotaxonomica 16 (2): 202 (1981)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Junctospora* was erected by Minter and Holubová-Jechová (1981) and it has macronematous, mononematous, unbranched or sparingly branched, septate, hyaline to subhyaline conidiophores, with monoblastic, integrated, terminal, percurrent conidiogenous cells, and produces catenate, aseptate, fusiform, hyaline to subhyaline conidia with small separating cells. Phylogenetic position for *Junctospora* is unresolved due to lack of sequence data. References: (Minter & Holubová-Jechová, 1981) (morphology), (Wijayawardene et al., 2020) (outline).

Kaarikia C. Mayers & T.C. Harr., Mycologia 112 (6): 1126 (2020)

Index Fungorum number: IF824946

Classification: Diaporthomycetidae genera *incertae sedis*, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Kaarikia abrahamsonii* C. Mayers, T.C. Harr. & Roeper, Mycologia 112 (6): 1126 (2020)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Mayers et al., 2020b).

Sequence data: *Kaarikia abrahamsonii* (A1268 = CBS 142646, LSU: MF399172, SSU: MF398174)

Notes: *Kaarikia* was introduced by Mayers et al. (2020b) and it has unbranched, septate, sometimes reduced conidiophores bearing solitary, aseptate or rarely 1-2-septate, obovoid, truncate, hyaline conidia. References: (Mayers et al., 2020b) (morphology), (Wijayawardene et al., 2020) (outline).

Kabatiella Bubák, Hedwigia 46: 297 (1907) [MB#8656]

Index Fungorum number: IF8656

Classification: Saccotheciaceae, Dothideales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Kabatiella microsticta* Bubák, Hedwigia 46: 297 (1907) [MB#176942]

Sexual morph: *Discosphaerina* (Seifert et al., 2011).

Synanamorphs: *Aureobasidium* (Seifert et al., 2011).

Sequence data: *Kabatiella microsticta* (CBS 342.66, LSU: EU167608, ITS: EU167608, SSU: EU167608)

Notes: *Kabatiella* was introduced by Bubák and Kabát (1907) and is characterized by stromatic, brown sporodochia or acervuli, stromatic, unbranched or branched, hyaline conidiophores, with polyblastic, vesiculate, hyaline conidiogenous cells, and producing solitary, aseptate, hyaline conidia (Seifert et al., 2011). Phylogenetically, representative of *Kabatiella* clustered in the family Saccotheciaceae, Dothideales, Dothideomycetes (Figure 2.1). References: (Bills et al., 2012; Bubák & Kabát, 1907; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Kabatina R. Schneid. & Arx, Phytopathologische Zeitschrift 57: 179 (1966)

Index Fungorum number: IF8657

Classification: Dothideaceae, Dothideales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Kabatina thujae* R. Schneid. & Arx, Phytopathologische Zeitschrift 57: 180 (1966)

Sexual morph: Unknown.

Synanamorphs: hormonema-like (Seifert et al., 2011)

Sequence data: *Kabatina thujae* (CBS 238.66, LSU: NG_064053, ITS: NR_156189)

Notes: *Kabatina* was introduced by Schneider and Arx (1966) and is characterized by having sporodochial or acervuluslar, stromatic, dark conidiomata, stromatic or branched, pale brown conidiophores, phialidic, percurrent, terminal and intercalary, brown conidiogenous cells, producing catenate, aseptate, hyaline conidia (Seifert et al., 2011). Phylogenetically, *Kabatina* was shown to be nested within the family Dothideaceae (Dothideales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Kalchbrenneriella Diederich & M.S. Christ., The Bryologist 105 (3): 411 (2002)

Index Fungorum number: IF28656

Classification: Ascomycota genera *incertae sedis*

Type species: *Kalchbrenneriella cyanescens* (Kalchbr.) Diederich & M.S. Christ., The Bryologist 105 (3): 411 (2002)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Kalchbrenneriella* was introduced by Diederich (2002) for a lichenicolous hyphomycete *Torula cyanescens* Kalchbr. It has semi-macronematous, unbranched or rarely branched, reduced, hyaline conidiophores, with monoblastic, terminal, hyaline conidiogenous cells, and produces catenate, aseptate, subcylindrical to ellipsoidal, hyaline conidia. Phylogenetic position for *Kalchbrenneriella* is unresolved due to lack of sequence data. References: (Diederich, 2002) (morphology), (Wijayawardene et al., 2020) (outline).

Kastanostachys L. Lombard & Crous, Persoonia 36: 192 (2016)

Index Fungorum number: IF815999

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Kastanostachys aterrima* (Fuckel) L. Lombard & Crous, Persoonia 36: 193 (2016)

Sexual morph: Introduced as holomorph.

Sequence data: *Kastanostachys aterrima* (CBS 101310, LSU: AF178565)

Notes: This genus is stachybotrys-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Kendrickiella K. Jacobs & M.J. Wingf., Canadian Journal of Botany 79 (1): 113 (2001)

Index Fungorum number: IF28454

Classification: Ascomycota genera incertae sedis

Type species: *Kendrickiella phycomyces* (Auersw.) K. Jacobs & M.J. Wingf., Canadian Journal of Botany 79 (1): 113 (2001)

Sexual morph: Unknown.

Sequence data: *Kendrickiella phycomyces* (MUCL 38565, LSU: AB671460, ITS: AB671493, SSU: AB671440)

Notes: *Kendrickiella* was introduced by Jacobs et al. (2001b) and is characterized by macronematous, mononematous, penicillate, brown conidiophores, phialidic, hyaline conidiogenous cells and aseptate, in mucilaginous mass, hyaline conidia. References: (Jacobs et al., 2001b; Kiyuna et al., 2012) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Kiflimonium Summerb., J.A. Scott, Guarro & Crous, Microorganisms 6 (3): 88, 17 (2018)

Index Fungorum number: IF826819

Classification: Sarocladiaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Kiflimonium curvulum* (W. Gams) Summerb., J.A. Scott, Guarro & Crous, Microorganisms 6 (3): 88, 18 (2018)

Sexual morph: Unknown.

Sequence data: *Kiflimonium curvulum* (CBS 430.66, LSU: NG_056980, ITS: HE608638, SSU: NG_062811)

Notes: *Kiflimonium* was introduced by Summerbell et al. (2018) to accommodate *K. curvulum*. It is characterized by mononematous, unbranched or branched or subverticillata, hyaline conidiophores, monophialidic with inconspicuous collarettes, hyaline conidiogenous cells, and aseptate to 1-septate, in slimy mass, lunate to falcate or ellipsoidal, hyaline conidia. Previous studies placed this genus in the family Hypocreaceae (Hypocreales, Sordariomycetes) (Hyde et al., 2020; Wijayawardene et al., 2020, 2021). Phylogenetically, the ex-type strain of the generic type located in the family Sarocladiaceae. We suggest placing this genus in the family Sarocladiaceae based on its phylogenetic position and it shares some morphological characters with other members in this family. References: (Summerbell et al., 2018)

(morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Kiliophora Kuthub. & Nawawi, Mycotaxon 48: 239 (1993)

Index Fungorum number: IF11442

Classification: Ascomycota genera *incertae sedis*

Type species: *Kiliophora fusispora* Kuthub. & Nawawi, Mycotaxon 48: 241 (1993)

Sexual morph: Unknown.

Sequence data: *Kiliophora ubiensis* (IPBCC 131080, ITS: KF056850)

Notes: *Kiliophora* was introduced by Kuthubutheen and Nawawi (1993) and is characterized by macronematous, mononematous, unbranched or sometimes sparingly branched, setiform, brown conidiophores, with polyblastic (?polytretic), discrete, solitary or in chains, sympodial, globose to broadly lageniform, brown conidiogenous cells, producing solitary, aseptate, biconic, fusiform, subhyaline to brown conidia. Phylogenetic position for *Kiliophora* is unresolved due to lack of LSU sequence data. References: (Hidayat et al., 2014; Kuthubutheen & Nawawi, 1993) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Kionochaeta P.M. Kirk & B. Sutton, Transactions of the British Mycological Society 85 (4): 712 (1986)

Index Fungorum number: IF11111

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Kionochaeta ramifera* (Matsush.) P.M. Kirk & B. Sutton, Transactions of the British Mycological Society 85 (4): 712 (1985)

Sexual morph: Unknown.

Synanamorphs: *Heteroconium*, *Selenosporella*, *Sporidesmiella* (Seifert et al., 2011).

Sequence data: *Kionochaeta castaneae* (GZCC 18-0025, LSU: MN104621, ITS: MN104610)

Notes: *Kionochaeta* was introduced by Kirk and Sutton (1985) and is characterized by macronematous, mononematous, setiform, branched conidiophores with fertile branches at the sub-median or apical parts, conidiogenous cells are phialidic, ampulliform, lageniform or cylindrical, conidia are solitary, in slimy mass, aseptate, ellipsoid, fusiform, falcate or clavate, hyaline. References: (Crous et al., 1994b; Goh & Hyde, 1997c; Kirk & Sutton, 1985; Kuthubutheen & Nawawi, 1988; Okada et al., 1997; Yanna & Hyde, 2002) (morphology), (Lin et al., 2019b; Okada et al., 1997) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Kionochaeta*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-11). **a** Host material. **b, c** Conidiophores on the host surface. **d, e** Conidiophores, conidiogenous cells. **f** Conidiogenous. **g** Conidia. Scale bars: **d, e** = 50 μm, **f, g** = 10 μm.

Figure 2.37 *Kionochaeta* sp.

Kmetiopsis Bat. & Peres, Publ. Inst. Micol. Recife: 4 (1960)

Index Fungorum number: IF8677

Classification: Ascomycota genera *incertae sedis*

Type species: *Kmetiopsis hymenaeae* Bat. & Peres, Publicaçoes do Instituto de Micologia da Universidade do Recife: 6 (1960)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted in this genus. Phylogenetic position for *Kmetiopsis* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Knufia L.J. Hutchison & Unter., Mycologia 87: 903 (1996)

Index Fungorum number: IF27605

Classification: Trichomeriaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Knufia cryptophialidica* L.J. Hutchison & Unter., Mycologia 87: 903 (1996)

Sexual morph: Unknown.

Disease symptoms: opportunistic human pathogens.

Sequence data: *Knufia cryptophialidica* (DAOM 216555, LSU: NG_067522, ITS: NR_121501, SSU: NG_061057)

Notes: *Knufia* was introduced by Hutchison et al. (1995) and is dimorphic: (1) micronematous, reduced or absent conidiophores, holoblastic, brown conidiogenous cells, catenate, aseptate or septate, obovate to cylindrical, subhyaline to brown conidia; (2) micronematous, reduced or absent conidiophores, phialidic, brown conidiogenous cells with conspicuous collarettes, solitary, aseptate, cylindrical to pyriform, hyaline conidia. Some species lack phialoconidia, e.g., *K. endospora*, *K. hypolithi* and *K. walvisbayicola* (Crous et al., 2021b; He et al., 2013). References: (Crous et al., 2021b; He et al., 2013; Hutchison et al., 1995) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Kolletes Kohlm. & Volkm.-Kohlm., Botanica Marina 48 (4): 316 (2005)

Index Fungorum number: IF29058

Classification: Ascomycota genera *incertae sedis*

Type species: *Kolletes undulatus* Kohlm. & Volkm.-Kohlm., Botanica Marina 48 (4): 316 (2005)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Kolletes* was established by Kohlmeyer et al. (2005) and it has mononematous, twisted, branched, or reduced, hyaline conidiophores, with polyblastic, sympodial, denticulate, ellipsoidal to clavate, hyaline to pale brown conidiogenous cells, and produces solitary, aseptate, smooth, subglobose, hyaline to pale brown conidia. Phylogenetic position for *Kolletes* is unresolved due to lack of sequence data. References: (Kohlmeyer et al., 2005) (morphology), (Wijayawardene et al., 2020) (outline).

Kontospora A. Roldán, Honrubia & Marvanová, Mycological Research 94 (2): 243 (1990)

Index Fungorum number: IF11235

Classification: Ascomycota genera *incertae sedis*

Type species: *Kontospora halophila* A. Roldán, Honrubia & Marvanová, Mycological Research 94 (2): 243 (1990)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Kontospora* was established by Roldán et al. (1990) and it has micronematous to semi-macronematous, reduced, hyaline conidiophores, with monoblastic, percurrent, hyaline conidiogenous cells, and produces solitary, irregularly cylindrical, filiform, sometimes with branches, hyaline conidia. Phylogenetic position for *Kontospora* is unresolved due to lack of sequence data. References: (Roldán et al., 1990) (morphology), (Wijayawardene et al., 2020) (outline).

Koorchaloma Subram., Journal of the Indian Botanical Society 32: 124 (1953)

= *Pseudoornatispora* Tibpromma & K.D. Hyde, Fungal Diversity 93: 115 (2018)

Index Fungorum number: IF8680

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Koorchaloma madreeya* Subram., Journal of the Indian Botanical Society 32: 124 (1953)

Sexual morph: *Kananascus* (Hyde et al., 2020; Seifert et al., 2011).

Synanamorphs: acremonium-like (Seifert et al., 2011).

Sequence data: *Koorchaloma bambusae* (MFLU 19-2899, LSU: MT183479, ITS: MT185516, SSU: MT214958)

Notes: Phylogenetically, this genus belongs to Stachybotryaceae (Hypocreales, Sordariomycetes), which consistent with the treatment in Li et al. (2020b). *Kananascus* and *Pseudoornatispora* were synonymised under *Koorchaloma* (Li et al., 2020b). References: (Li et al., 2020b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Koorchalomella Chona, Munjal & J.N. Kapoor, Indian Phytopath.: 130 (1958)

Index Fungorum number: IF8681

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Koorchalomella oryzae* Chona, Munjal & J.N. Kapoor, Indian Phytopath.: 130 (1958)

Sexual morph: Unknown.

Sequence data: *Koorchalomella salmonispora* (MFLUCC 15-0752, LSU: KX611345)

Notes: *Koorchalomella* is characterized by sporodochial conidiomata, unbranched, hyaline setae arising from conidiomata, branched, hyaline conidiophores, with phialidic, hyaline conidiogenous cells that produces aseptate, hyaline, slimy conidia with funnel-shaped mucilaginous polar appendages (Hyde et al., 2020; Seifert et al., 2011). Hyde et al. (2017b) provided molecular data for *Koorchalomella* and

showed it belongs to Stachybotryaceae (Hypocreales). References: (Hyde et al., 2017b, 2020) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Korunomyces Hodges & F.A. Ferreira, Mycologia 73 (2): 335 (1981)

Index Fungorum number: IF8682

Classification: Schizoparmaceae, Diaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Korunomyces terminaliae* Hodges & F.A. Ferreira, Mycologia 73 (2): 335 (1981)

Sexual morph: Unknown.

Sequence data: *Korunomyces terminaliae* (CBS 224.80 = ATCC 42410, LSU: MH873026, ITS: MH861257)

Notes: *Korunomyces* was introduced by Hodges and Ferreira (1981) and is characterized by mononematous, unbranched, hyaline conidiophores, with monoblastic, hyaline conidiogenous cells, producing solitary, hyaline stauroconidia, compact branched hyphal system terminating in tapered cells. Previous studies placed this genus in Ascomycota genera *incertae sedis* (Wijayawardene et al., 2017a, 2020). In this study, the ex-type strain of the generic type was included our phylogenetic analysis, and it located in Schizoparmaceae, Diaporthales, Sordariomycetes (Figure 2.1). References: (Hodges & Ferreira, 1981) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Kutilakesa Subram., Journal of the Indian Botanical Society 35 (4): 480 (1956)

Index Fungorum number: IF8689

Classification: Ascomycota genera *incertae sedis*

Type species: *Kutilakesa madreeya* Subram., Journal of the Indian Botanical Society 35 (4): 480 (1956)

Sexual morph: *Nectriella* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Kutilakesa* was established by Subramanian (1956b) and it has sporodochial conidiomata, unbranched, brown, septate, circinate or coiled setae, macronematous, unbranched, septate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, and produces solitary, aseptate, hyaline conidia. Phylogenetic position for *Kutilakesa* is unresolved due to lack of sequence data. References: (Subramanian, 1956b) (morphology), (Wijayawardene et al., 2020) (outline).

Kylindria DiCosmo, S.M. Berch & W.B. Kendr., Mycologia 75 (6): 970 (1983)

Index Fungorum number: IF11115

Classification: Reticulascaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Kylindria triseptata* (Matsush.) DiCosmo, S.M. Berch & W.B. Kendr., Mycologia 75 (6): 971 (1983)

Sexual morph: *Chaetosphaeria* (Seifert et al., 2011).

Sequence data: *Kylindria aquatica* (MFLUCC 17-1681, LSU: MH120185, ITS: MH120191)

Notes: *Kylindria* was introduced by DiCosmo et al. (1983) and is characterized by conidiomata are none or synnematous, setae are none or unbranched, brown, next to conidiophores, conidiophores are macronematous, mononematous, unbranched, brown, conidiogenous cells are phialidic, sometimes sympodial inside collarette, brown, conidia are aseptate or septate, smooth-walled, oblong-ellipsoid, hyaline (Seifert et al., 2011). References: (DiCosmo et al., 1983) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Lachnodochium Marchal, Bulletin de la Société Royale de Botanique de Belgique 34: 144 (1895)

Index Fungorum number: IF8696

Classification: Ascomycota genera *incertae sedis*

Type species: *Lachnodochium candidum* Marchal, Bulletin de la Société Royale de Botanique de Belgique 34: 144 (1895)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Lachnodochium* was established by Marchal (1895) and two species are accepted. Phylogenetic position for *Lachnodochium* is unresolved due to lack of sequence data. References: (Marchal, 1895) (morphology), (Wijayawardene et al., 2020) (outline).

Lactydina Subram., Kavaka 5: 95 (1978)

Index Fungorum number: IF8698

Classification: Ascomycota genera *incertae sedis*

Type species: *Lactydina tylopaga* (Drechsler) Subram., Kavaka 5: 95 (1978)

Sexual morph: Unknown.

Synanamorphs: Producing microconidia (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Lactydina* was introduced by Subramanian (1977) and only one species is accepted. Phylogenetic position for *Lactydina* is unresolved due to lack of sequence data. References: (Subramanian, 1977) (morphology), (Wijayawardene et al., 2020) (outline).

Lambdasporium Matsush., Bulletin of the National Science Museum Tokyo 14 (3): 467 (1971)

Index Fungorum number: IF8702

Classification: Ascomycota genera *incertae sedis*

Type species: *Lambdasporium wauense* Matsush., Bulletin of the National Science Museum Tokyo 14 (3): 468 (1971)

Sexual morph: Unknown.

Synanamorphs: *Spirosphaera* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Lambdasporium* has reduced conidiophores, monoblastic or polyblastic, sympodial, denticulate, hyaline conidiogenous cells, and solitary, staurosporous, Y-shaped, hyaline to subhyaline conidia. Phylogenetic position for

Lambdasporium is unresolved due to lack of sequence data. References: (Kobayasi, 1971) (morphology), (Wijayawardene et al., 2020) (outline).

Lambinonia Sérusiaux & Diederich, The Lichenologist 37 (6): 500 (2005)

Index Fungorum number: IF510802

Classification: Ascomycota genera *incertae sedis*

Type species: *Lambinonia strigulae* (Elenkin & Woron.) Sérus. & Diederich, Lichenologist 37(6): 500 (2005)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Lambinonia* was introduced by Sérusiaux and Diederich (2005) for a lichenicolous hyphomycete. It has sporodochial conidiomata, macronematous, branched, brown conidiophores, with monophialidic, integrated, terminal, cylindrical, hyaline to brown conidiogenous cells, and produces solitary, aseptate, endogenous, elongate ellipsoid, hyaline conidia. Phylogenetic position for *Lambinonia* is unresolved due to lack of sequence data. References: (Sérusiaux & Diederich, 2005) (morphology), (Wijayawardene et al., 2020) (outline).

Lappodochium Matsush., Icones Microfungorum a Matsushima lectorum: 91 (1975)

Index Fungorum number: IF8706

Classification: Ascomycota genera *incertae sedis*

Type species: *Lappodochium langeniforme* Matsush., Icones Microfungorum a Matsushima lectorum: 92 (1975)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Lappodochium* was established by Matsushima (1975) and only one species is accepted. Phylogenetic position for *Lappodochium* is unresolved due to lack of sequence data. References: (Matsushima, 1975) (morphology), (Wijayawardene et al., 2020) (outline).

Lareunionomyces Crous & M.J. Wingf., Persoonia 36: 387 (2016) [MB#817053]

Index Fungorum number: IF817053

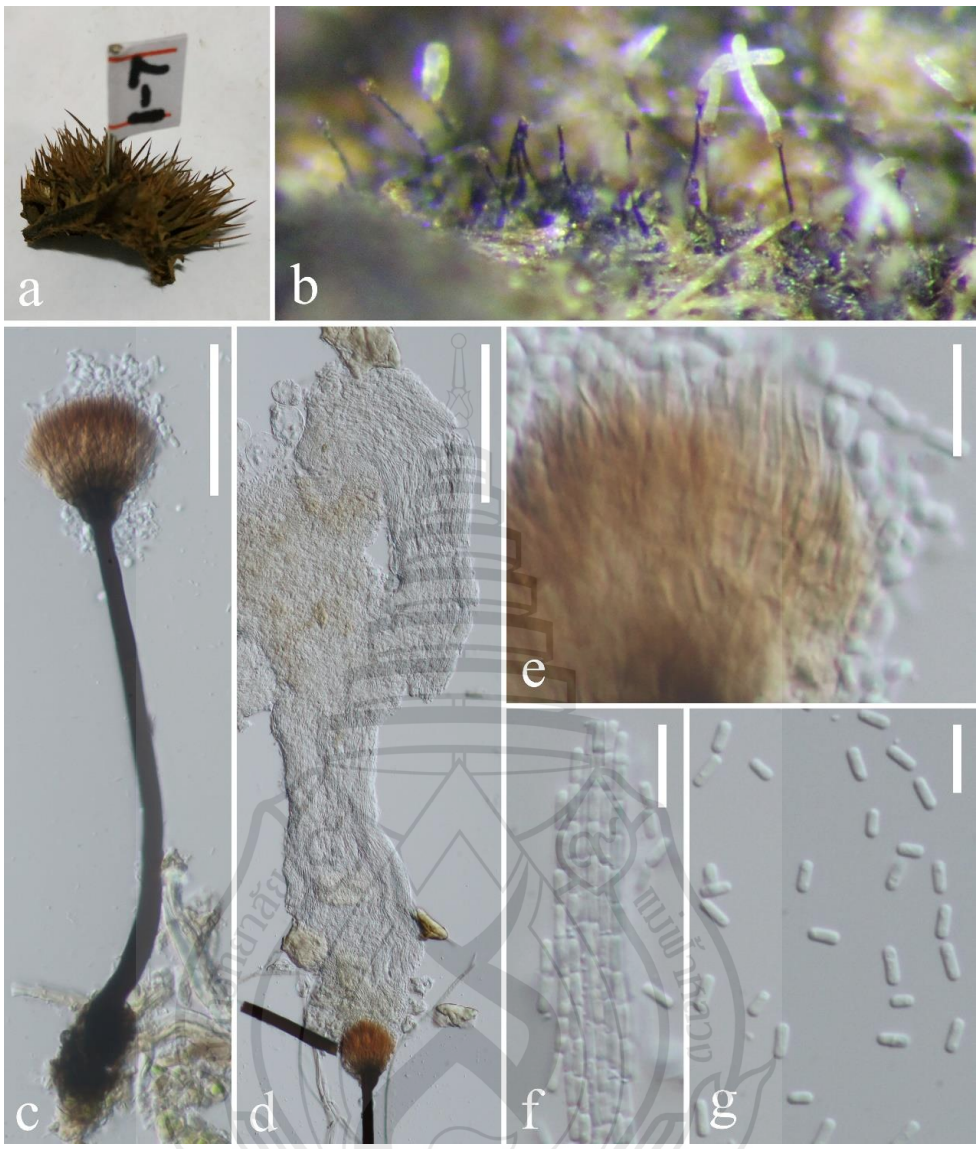
Classification: Neolauriomycetaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Lareunionomyces syzygii* Crous & M.J. Wingf., Persoonia 36: 387 (2016)

Sexual morph: Unknown.

Sequence data: *Lareunionomyces syzygii* (CBS 141326 = CPC 26531, LSU: KX228338, ITS: KX228287)

Notes: *Lareunionomyces* was introduced by Crous et al. (2016b) and characterized by macronematous, mononematous, unbranched, dark brown conidiophores, pale brown penicillate conidiogenous apparatus, phialidic, pale brown conidiogenous cells and conidia are aseptate, hyaline, subcylindrical, in short chains that form slimy spore masses (Crous et al., 2016b). Morphologically, it is similar to *Sporendocladia*, but differs by its more intricate conidiogenous apparatus. References: (Crous et al., 2016b) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).



Note ***Lareunionomyces*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-7). **a** Host material. **b** Conidiophores on the host surface. **c** conidiophores. **d** Spore head. **e** Conidiogenous cells. **f, g** Conidia. Scale bars: **c** = 50 μm, **d** = 100 μm, **e–g** = 10 μm.

Figure 2.38 *Lareunionomyces* sp.

Lasionectriopsis Lechat & P.-A. Moreau, Ascomycete.org 11 (1): 1 (2019)

Index Fungorum number: IF828975

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Lasionectriopsis germanica* Lechat, P.-A. Moreau & H. Bender, Ascomycete.org 11 (1): 1 (2019)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph.

Sequence data: *Lasionectriopsis germanica* (CBS 143538, LSU: MK276528)

Notes: *Lasionectriopsis* was introduced by Lechat et al. (2019) and its asexual morph is acremonium-like. References: (Lechat et al., 2019) (morphology and phylogeny).

Lasiosphaeris Clem., The genera of Fungi: 35, 173 (1909)

= *Lasiadelphia* Réblová & W. Gams, Fungal Diversity 46: 82 (2011)

Index Fungorum number: IF2659

Classification: Sordariales genera incertae sedis, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Lasiosphaeris hispida* (Tode) Clem., The genera of Fungi: 173 (1909)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Lasiadelphia* (Réblová et al., 2011b; Réblová et al., 2016a).

Sequence data: *Lasiosphaeris hispida* (SMH 3939, LSU: JN940014, ITS: JN942176, SSU: JN938613)

Notes: Réblová et al. (2011b) introduced the hyphomycetous genus as *Lasiadelphia* the asexual morph of *Lasiosphaeris*. Réblová et al. (2016a) proposed using *Lasiosphaeris* rather than *Lasiadelphia*. References: (Réblová et al., 2011b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Lateriramulosa Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 34 (1971)

Index Fungorum number: IF8716

Classification: Ascomycota genera *incertae sedis*

Type species: *Lateriramulosa uni-inflata* Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 34 (1971)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Lateriramulosa* was erected by Matsushima (1971) and it has reduced conidiophores, with monoblastic, denticulate, hyaline conidiogenous cells, and produces solitary, hyaline, staurosporous conidia. Phylogenetic position for *Lateriramulosa* is unresolved due to lack of sequence data. References: (Matsushima, 1971) (morphology), (Wijayawardene et al., 2020) (outline).

Lauriomyces R.F. Castañeda, University of Waterloo Biology Series 32: 21 (1990)

Index Fungorum number: IF11259

Classification: Lauriomycetaceae, Lauriomycetales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Lauriomyces pulcher* R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 32: 22 (1990)

Sexual morph: Unknown.

Sequence data: *Lauriomyces bellulus* (CBS 517.93 = CPC 649, LSU: NG_057820, ITS: NR_137151)

Notes: *Lauriomyces* is characterized by having macronematous, mononematous, penicillate, brown conidiophores, with polyblastic, sympodial, denticulate, sometimes percurrent, hyaline or brown conidiogenous cells, producing catenate, aseptate, hyaline conidia (Seifert et al., 2011). Phylogenetically, *Lauriomyces* was shown to be nested within the family Lauriomycetaceae (Lauriomycetales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011; Somrithipol, 2006; Somrithipol & Jones, 2007) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Lecophagus M.W. Dick, Mycological Research 94 (3): 351 (1990)

Index Fungorum number: IF25454

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Lecophagus fasciculatus* M.W. Dick, Mycological Research 94 (3): 351 (1990)

Sexual morph: Unknown.

Sequence data: *Lecophagus longisporus* (CBS 845.91, LSU: KT215220, ITS: NR_160187, SSU: NG_062600)

Notes: For details of this genus see the monograph in Baral et al. (2020). Phylogenetically, *Lecophagus* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a) (outline).

Leightoniomyces D. Hawksw. & B. Sutton, Botanical Journal of the Linnean Society 75 (2): 199 (1977)

Index Fungorum number: IF8723

Classification: Ascomycota genera *incertae sedis*

Type species: *Leightoniomyces phillipsii* (Berk. & Leight.) D. Hawksw. & B. Sutton, Botanical Journal of the Linnean Society 75 (2): 204 (1977)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Leightoniomyces* was established by Hawksworth (1977) for a lichenicolous fungus *Periconia phillipsii* Berk. & Leight and it has macronematous, synnematous, unbranched or branched, brown conidiophores, with holoblastic, terminal, integrated or discrete, annellidic, brown conidiogenous cells, and produces solitary, aseptate, coarsely verrucose, globose, dark brown conidia. Phylogenetic position for *Leightoniomyces* is unresolved due to lack of sequence data. References: (Hawksworth, 1977) (morphology), (Wijayawardene et al., 2020) (outline).

Lemonniera De Wild., Annales de la Societé Belge de Microscopie 18: 143 (1894)

Index Fungorum number: IF8727

Classification: Discinellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Lemonniera aquatica* De Wild., Annales de la Societé Belge de Microscopie 18: 143 (1894)

Sexual morph: Unknown.

Synanamorphs: Producing sclerotia (Seifert et al., 2011).

Sequence data: *Lemonniera centrosphaera* (CCM F-149, LSU: KC834032, ITS: KC834063)

Notes: *Lemonniera* was established by Wildeman (1894) and is characterized by having macronematous, mononematous, branched or verticillate or penicillate, sometimes unbranched, septate, hyaline conidiophores, with phialidic, terminal, integrated or discrete, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, staurosporous, tetraradiate, consisting of 1–2 septate, upward arms and 2–3 septate, downward arms (Sati et al., 2014; Seifert et al., 2011; Yu et al., 2019). Phylogenetically, *Lemonniera* was shown to be nested within the family Discinellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Sati et al., 2014; Seifert et al., 2011; Yu et al., 2019) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Lepisticola W. Gams, Mycotaxon 110: 101 (2009)

Index Fungorum number: IF514102

Classification: Hypocreaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Lepisticola capitata* (Costantin & Matr.) W. Gams, Mycotaxon 110: 101 (2009)

Sexual morph: *Harziella* (Seifert et al., 2011).

Sequence data: *Lepisticola capitata* (CBS 182.64, LSU: MH870038, ITS: MH858410)

Notes: *Lepisticola* was re-introduced by Gams et al. (2009) and is characterized by mononematous, verticillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, in slimy mass, hyaline conidia (Seifert et al., 2011). Previous studies placed this genus in Ascomycota genera *incertae sedis*. However, the

ex-neotype strain of the type species phylogenetically located in Hypocreaceae (Hypocreales, Hypocreomycetidae, Sordariomycetes) (Figure 2.1). We suggest transforming this genus into Hypocreaceae. References: (Gams et al., 2009; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Leptobacillium Zare & W. Gams, Mycological Progress 15: 1001 (2016)

Index Fungorum number: IF815489

Classification: Cordycipitaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Leptobacillium leptobactrum* (W. Gams) Zare & W. Gams, Mycological Progress 15: 1003 (2016)

Sexual morph: Unknown.

Sequence data: *Leptobacillium leptobactrum* (CBS 774.69, LSU: MH871192, ITS: MH859421)

Notes: *Leptobacillium* was introduced by Zare and Gams (2016) and is verticillium-like. References: (Zare & Gams, 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Leptodiscella Papendorf, Transactions of the British Mycological Society 53: 146 (1969)

Index Fungorum number: IF8743

Classification: Muyocopronaceae, Muyocopronales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Leptodiscella africana* (Papendorf) Papendorf, Transactions of the British Mycological Society 53: 146 (1969)

Sexual morph: Unknown.

Synanamorphs: Producing sclerotia and chlamydospores (Seifert et al., 2011).

Sequence data: *Leptodiscella africana* (CBS 400.65, LSU: NG_064050, ITS: NR_145359)

Notes: *Leptodiscella* was established by Papendorf (1969) and is characterized by having sporodochial, stromatic conidiomata, unbranched or branched,

or reduced, hyaline conidiophores, terminal and intercalary, sympodial, denticulate conidiogenous cells, producing conidia that are solitary or in slimy mas, septate, with subpolar setulae, cylindrical, hyaline to pale brown (Papendorf, 1969; Seifert et al., 2011). Phylogenetically, *Leptodiscella* was shown to be nested within the family Muyocopronaceae (Muyocopronales, Dothideomycetes) (Figure 2.1). References: (Madrid et al., 2012; Papendorf, 1969) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Leptodontidium de Hoog, Taxon 28: 347 (1979)

Index Fungorum number: IF8745

Classification: Leptodontidiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Leptodontidium elatius* (F. Mangenot) de Hoog, Taxon 28: 348 (1979)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Seifert et al., 2011)

Sequence data: *Leptodontidium trabinellum* (CBS 329.53, LSU: MH868765, ITS: MH857228, SSU: AY129280)

Notes: *Leptodontidium* was validated by de Hoog (1979) and is characterized by having macronematous, mononematous, unbranched or branched, brown conidiophores, with polyblastic, sympodial, denticulate, brown conidiogenous cells, producing solitary, aseptate, hyaline conidia (Seifert et al., 2011). Phylogenetically, *Leptodontidium* was shown to be nested within the family Leptodontidiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Leptographium Lagerb. & Melin, Svenska Skogsvårdsföreningens Tidskrift 2 (2-4): 257 (1927)

Index Fungorum number: IF8749

Classification: Ophiostomataceae, Ophiostomatales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Leptographium lundbergii* Lagerb. & Melin, Svenska Skogsvårdsföreningens Tidskrift 2 (2-4): 248 (1927)

Sexual morph: Grosmannia

Sequence data: *Leptographium yamaokae* (CMW 4726 = CBS 129732, LSU: MH876968)

Notes: *Leptographium* was introduced by Lagerberg et al. (1927) and is characterized by macronematous, mononematous, penicillate, brown conidiophores, with monoblastic, sympodial or percurrent, hyaline to subhyaline conidiogenous cells, producing aseptate, in limy mass, cuneiform or oblong, hyaline conidia (Ellis, 1971). References: (Alamouti et al., 2006; Ellis, 1971; Greif et al., 2006; Jacobs et al., 2001a; Kim et al., 2011; Lu et al., 2008; Masuya et al., 2004; Paciura et al., 2010a; Seifert et al., 2011; Six et al., 2003; Van Zuydam et al., 2010; Zhou et al., 2008) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Leptoxyphium Speg., Physis Revista de la Sociedad Argentina de Ciencias Naturales 4 (17): 294 (1918)

Index Fungorum number: IF8762

Classification: Capnodiaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Leptoxyphium graminum* (Pat.) Speg., Physis Revista de la Sociedad Argentina de Ciencias Naturales 4 (17): 294 (1918)

Sexual morph: Unknown.

Sequence data: *Leptoxyphium fumago* (CBS 123.26 = ATCC 11925 = IMI 089363 = LSHB X13, LSU: MH866361, ITS: MH854862, SSU: GU214535)

Notes: *Leptoxyphium* is characterized by having synnematous, dark conidiomata, unbranched, dark setae, unbranched, hyaline conidiophores, phialidic, terminal and intercalary, hyaline conidiogenous cells, producing aseptate or septate, in slimy mass, hyaline or brown conidia (Seifert et al., 2011). Phylogenetically, *Leptoxyphium* was shown to be nested within the family Capnodiaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Kajale et al., 2015; Olejnik et al., 1999; Seifert et al., 2011; Yang et al., 2014) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Lichenobactridium Diederich & Etayo, Lichenicolous fungi. from the western Pyrenees, France and Spain. I: 212 (1995)

Index Fungorum number: IF27675

Classification: Ascomycota genera *incertae sedis*

Type species: *Lichenobactridium pertusariae* Diederich & Etayo, Lichenicolous fungi. from the western Pyrenees, France and Spain. I: 212 (1995)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted in this genus. Phylogenetic position for *Lichenobactridium* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Lichenopenicillus Etayo, Opera Lilloana 50: 248 (2017)

Index Fungorum number: IF818339

Classification: Hypocreales genera *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Lichenopenicillus versicolor* Etayo, Opera Lilloana 50: 249 (2017)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted in this genus. Phylogenetic position for *Lichenopenicillus* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Lichenopuccinia D. Hawksw. & Hafellner, Beihefte zur Nova Hedwigia 79: 373 (1984)

Index Fungorum number: IF11120

Classification: Ascomycota genera *incertae sedis*

Type species: *Lichenopuccinia poeltii* D. Hawksw. & Hafellner, Beihefte zur Nova Hedwigia 79: 374 (1984)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Lichenopuccinia* was introduced by Hawksworth (1984) and only one species is accepted. Phylogenetic position for *Lichenopuccinia* is unresolved due to lack of sequence data. References: (Hawksworth, 1984) (morphology), (Wijayawardene et al., 2020) (outline).

Lichenostella Calat. & Etayo, The Lichenologist 31 (6): 597 (2000)

Index Fungorum number: IF28398

Classification: Ascomycota genera *incertae sedis*

Type species: *Lichenostella hypotrachynae* Etayo & Calat., The Lichenologist 31 (6): 597 (1999)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Lichenostella* was established by Calatayud and Etayo (1999) and it has sporodochial conidiomata, unbranched or branched, septate, brown setae, macronematous, aggregated, hyaline to brown conidiophores, with monoblastic or rarely polyblastic, integrated, terminal or intercalary, percurrent, hyaline to brown conidiogenous cells, and produces solitary, hyaline, smooth, staurosporous, with four septate, hyaline arms. Phylogenetic position for *Lichenostella* is unresolved due to lack of sequence data. References: (Calatayud & Etayo, 1999) (morphology), (Wijayawardene et al., 2020) (outline).

Lindquistia Subram. & Chandrash., Boletín de la Sociedad Argentina de Botánica 18 (1-2): 150 (1977)

Index Fungorum number: IF8780

Classification: Xylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Lindquistia indica* Subram. & Chandrash., Boletín de la Sociedad Argentina de Botánica 18 (1-2): 150 (1977)

Sexual morph: *Poronia* (Seifert et al., 2011; Subramanian & Chandrashekara, 1977).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Lindquistia* was established by Subramanian and Chandrashekara (1977) and it has synnematous conidiomata, and conidiophores are anastomosing to form a network, septate, branched, hyaline, with polyblastic, lateral, sympodial, denticulate, ampuliform, globose to subglobose, hyaline conidiogenous cells, and produces solitary, aseptate, cylindrical to obovoid, hyaline conidia. Phylogenetic position for *Lindquistia* is unresolved due to lack of sequence data. References: (Subramanian & Chandrashekara, 1977) (morphology), (Wijayawardene et al., 2020) (outline).

Linodochium Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Wien. Mathematisch-naturwissenschaftliche Classe. Abteilung 1 118: 1239 (1909)

Index Fungorum number: IF8783

Classification: Ascomycota genera *incertae sedis*

Type species: *Linodochium hyalinum* (Lib.) Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Wien. Mathematisch-naturwissenschaftliche Classe. Abteilung 1 118: 1239 [83 repr.] (1909)

Sexual morph: *Pseudohelotium* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Linodochium* was established by von Höhnel (1909b) and five species are accepted. Phylogenetic position for *Linodochium* is unresolved due to lack of sequence data. References: (Li et al., 2014a; von Höhnel, 1909b) (morphology), (Wijayawardene et al., 2020) (outline).

Lomachashaka Subram., Journal of the Indian Botanical Society 35 (1): 67 (1956)

Index Fungorum number: IF8789

Classification: Ascomycota genera *incertae sedis*

Type species: *Lomachashaka kera* Subram., Journal of the Indian Botanical Society 35 (1): 67 (1956)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Lomachashaka* was introduced by Subramanian (1956a) and its conidiomata are sporodochial, cup-like, with unbranched, hyaline, sterile hairs, conidiophores are unbranched, septate, hyaline, conidiogenous cells are phialidic, and conidia are solitary, aseptate, fusiform, hyaline with apical, obconical, evanescent, mucoid appendage. Phylogenetic position for *Lomachashaka* is unresolved due to lack of sequence data. References: (Subramanian, 1956a) (morphology), (Wijayawardene et al., 2020) (outline).

Lunulospora Ingold, Transactions of the British Mycological Society 25 (4): 408 (1942)

Index Fungorum number: IF8795

Classification: Sordariales genera *incertae sedis*, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Lunulospora curvula* Ingold, Transactions of the British Mycological Society 25 (4): 404 (1942)

Sexual morph: Unknown.

Sequence data: *Lunulospora curvula* (UMB-666.10, ITS: JX089522)

Notes: *Lunulospora* was described by Ingold (1942) for a submerged aquatic fungus, and it has unbranched or branched conidiophores, and solitary, aseptate, sigmoid or crescent-shaped, hyaline conidia. Phylogenetic position for *Lunulospora* is unresolved due to lack of LSU sequence data. References: (Ingold, 1942) (morphology), (Wijayawardene et al., 2020) (outline).

Macgarvieomyces Klaubauf, M.-H. Lebrun & Crous, Studies in Mycology 79: 106 (2014)

Index Fungorum number: IF810207

Classification: Pyriculariaceae, Magnaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Macgarvieomyces borealis* (de Hoog & Oorschot) Klaubauf, M.-H. Lebrun & Crous, Studies in Mycology 79: 107 (2014)

Sexual morph: Unknown.

Sequence data: *Macgarvieomyces borealis* (CBS 461.65, LSU: DQ341511, ITS: MH858669, SSU: DQ341489)

Notes: *Macgarvieomyces* was introduced by Klaubauf et al. (2014) to accommodate *M. borealis* and *M. juncicola*. It has mononematous, unbranched, brown conidiophores, integrated, terminal, denticulate, brown conidiogenous cells and producing solitary, 1-septate, narrowly obclavate, hyaline conidia. References: (Klaubauf et al., 2014) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Mackenziella Yanna & K.D. Hyde, Mycotaxon 110: 101 (2009)

Index Fungorum number: IF514104

Classification: Ascomycota genera *incertae sedis*

Type species: *Mackenziella livistonae* (Yanna & K.D. Hyde) Yanna & K.D. Hyde, Mycotaxon 110: 101 (2009)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Mackenziella* was established by Gams et al. (2009) to replace *Mackenziea* Yanna & K.D. Hyde (nom. illegit.). Phylogenetic position for *Mackenziella* is unresolved due to lack of sequence data. References: (Gams et al., 2009) (morphology), (Wijayawardene et al., 2020) (outline).

Macroconia (Wollenw.) Gräfenhan, Seifert & Schroers, Studies in Mycology 68: 101 (2011)

= *Nectria* sect. *Macroconia* Wollenw., Angewandte Botanik 8: 179 (1926)

Index Fungorum number: IF519441

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Nectria leptosphaeriae* Niessl, Fungi Saxonici Exsiccati. Die Pilze Sachsen's: no. 165 (1886) = *Macroconia leptosphaeriae* (Niessl) Gräfenhan & Schroers, Studies in Mycology 68: 102 (2011)

Sexual morph: Introduced as holomorphic genus (Gräfenhan et al., 2011).

Sequence data: *Macroconia papilionacearum* (CBS 125495 = DAOM 238119 = TG 2007-03, LSU: KM231704, ITS: HQ897826)

Notes: *Macroconia* was introduced by Gräfenhan et al. (2011) and synonymized *Nectria* sect. *Macroconia*. Its asexual morph has verticillate conidiophores, phialidic, hyaline conidiogenous, and septate, subcylindrical, hyaline macroconidia (Gräfenhan et al., 2011; Lombard et al., 2015). References: (Gräfenhan et al., 2011; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Macronectria C. Salgado & P. Chaverri, Fungal Diversity 80: 448 (2016)

Index Fungorum number: IF816457

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Macronectria jungneri* (Henn.) C. Salgado & P. Chaverri, Fungal Diversity 80: 448 (2016)

Sexual morph: Introduced as holomorph (Salgado-Salazar et al., 2016).

Sequence data: *Macronectria jungneri* (CBS 124602, LSU: KJ022036, ITS: KJ021985, SSU: KJ022106)

Notes: The asexual morph of *Macronectria* is cylindrocarpon-like. References: (Salgado-Salazar et al., 2016) (morphology and phylogeny).

Magnaporthiopsis J. Luo & N. Zhang, Mycologia 105 (4): 1021 (2013)

Index Fungorum number: IF802972

Classification: Magnaporthaceae, Magnaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Magnaporthiopsis poae* (Landsch. & N. Jacks.) J. Luo & N. Zhang, Mycologia 105 (4): 1024 (2013)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Luo & Zhang, 2013).

Sequence data: *Magnaporthiopsis poae* (M47 = Lisa9, LSU: JF414885, ITS: JF414836, SSU: JF414860)

Notes: *Magnaporthiopsis* was introduced by Luo and Zhang (2013) and its asexual morph has unbranched or branched conidiophores, phialidic, hyaline conidiogenous cells, and produces aseptate, subglobose to ovoid, hyaline conidia. References: (Luo & Zhang, 2013) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Mahabalella B. Sutton & S.D. Patil, Nova Hedwigia 11 (1-4): 203 (1966)

Index Fungorum number: IF8826

Classification: Ascomycota genera *incertae sedis*

Type species: *Mahabalella acutisetosa* B. Sutton & S.D. Patil, Nova Hedwigia 11 (1-4): 203 (1966)

Sexual morph: Unknown.

Synanamorphs: acremonium-like (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Mahabalella* was established by Sutton and Patil (1966) and three species are accepted. Phylogenetic position for *Mahabalella* is unresolved due to lack of sequence data. References: (Sutton & Patil, 1966) (morphology), (Wijayawardene et al., 2020) (outline).

Malaysiasca Crous & M.J. Wingf., Persoonia 36: 373 (2016)

Index Fungorum number: IF817044

Classification: Malaysiascaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Malaysiasca phaii* Crous & M.J. Wingf., Persoonia 36: 373 (2016)

Sexual morph: Introduced as holomorph.

Sequence data: *Malaysiasca phaii* (CBS 141321 = CPC 27548, LSU: NG_067310, ITS: NR_154193)

Notes: The asexual morph of *Malaysiasca* is characterized by brown, globose stroma, macronematous, mononematous, unbranched, grey-brown conidiophores, monophialidic, integrated, pale brown conidiogenous cells, and solitary, aggregating in a slimy mass, ellipsoidal to cylindrical-ellipsoid to somewhat

clavate, guttulate, aseptate, hyaline conidia (Crous et al., 2016b). References: (Crous et al., 2016b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Malbranchea Sacc., Michelia 2 (8): 638 (1882)

Index Fungorum number: IF8833

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Malbranchea pulchella* Sacc. & Penz., Michelia 2 (8): 639 (1882)

Sexual morph: *Aphanoascus*, *Auxarthron*, *Byssoonygena*, *Chlamydosauromyces*, *Gymnoascus*, *Gymnostellatospora*, *Plunkettomyces*, *Pseudoamauroascus*, *Uncinocarpus* (Seifert et al., 2011; Sigler & Carmichael, 1976; Sigler et al., 2002)

Synanamorphs: *Coccidioides*, *Oncocladium* (Seifert et al., 2011).

Sequence data: *Malbranchea pulchella* (CBS 202.38 = MUCL 8435 = IFM 41308, LSU: AB359426, ITS: AB361638)

Notes: *Malbranchea* is characterized by reduced, branched, hyaline conidiophores, thallic-arthric, hyaline conidiogenous cells, and catenate, aseptate, mostly cylindrical, barrel-shaped, or irregularly shaped, hyaline conidia (Rodríguez-Andrade et al., 2021; Sigler & Carmichael, 1976; Sigler et al., 2002). References: (Rodríguez-Andrade et al., 2021; Sigler & Carmichael, 1976; Sigler et al., 2002) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Mammaria Ces., Klotzschii herbarium vivum mycologicum sistens fungorum per totam Germaniam crescentium collectionem perfectam. Cent. 19: no. 1895 (1854)

Index Fungorum number: IF8836

Classification: Lasiosphaeriaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Mammaria echinobotryoides* Ces., Klotzschii herbarium vivum mycologicum sistens fungorum per totam Germaniam crescentium collectionem perfectam. Cent. 19: no. 1859 (1854)

Sexual morph: *Cercophora*, *Pseudocercophora* (Seifert et al., 2011).

Synanamorphs: *Pleurostomophora* (Seifert et al., 2011).

Sequence data: *Mammaria echinobotryoides* (CBS 128852, LSU: MH876576, ITS: MH865136)

Notes: *Mammaria* is dimorphic: (1) micronematous or semi-macronematous, irregularly branched, reduced, hyaline to pale brown conidiophores, monoblastic or polyblastic, conidiogenous cells, solitary, aseptate, ellipsoidal or navicular, brown conidia; (2) micronematous, reduced, hyaline conidiophores, monophialidic, discrete conidiogenous cells, catenate become aggregated in slimy heads, aseptate, spherical or subspherical, hyaline conidia (Ellis, 1971). References: (Ellis, 1971) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Margaritispora Ingold, Transactions of the British Mycological Society 25 (4): 352 (1942)

Index Fungorum number: IF8845

Classification: Discinellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Margaritispora aquatica* Ingold, Transactions of the British Mycological Society 25 (4): 353 (1941)

Sexual morph: Unknown.

Sequence data: *Margaritispora aquatica* (CBS 603.66 = DSM 2220 = MUCL 28095, LSU: MH870561)

Notes: *Margaritispora* was introduced by Ingold (1942) and is characterized by having mononematous, penicillate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, producing conidia that are dimorphic: (1) under water, aseptate, angular, tetrahedral to subspherical, hyaline (2) in the air, multi-septate, elongate or fusiform, hyaline (Ingold, 1942; Seifert et al., 2011). Phylogenetically, *Margaritispora* was shown to be nested within the family

Discinellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Ingold, 1942; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Mariannaea G. Arnaud ex Samson, Studies in Mycology 6: 74 (1974)

Index Fungorum number: IF8846

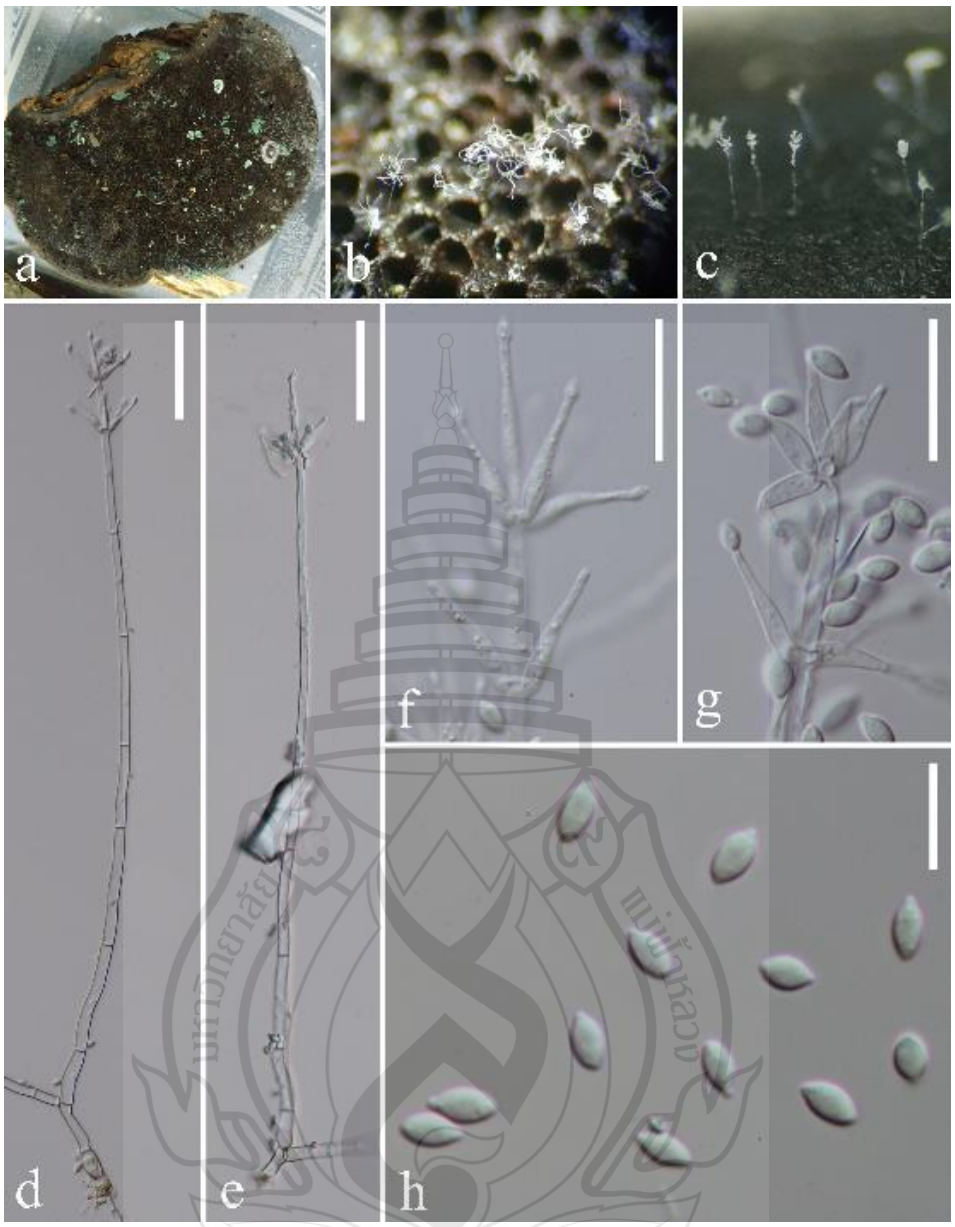
Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Mariannaea elegans* (Corda) Samson, Studies in Mycology 6: 75 (1974)

Sexual morph: Introduced as holomorph (Lombard et al., 2015).

Sequence data: *Mariannaea elegans* (CBS 217.73A, LSU: KX986139, ITS: KX986132)

Notes: It is characterized by macronematous, mononematous, verticillate to penicillate, hyaline conidiophores, monophialidic, flask-shaped, hyaline conidiogenous cells, aseptate, hyaline conidia, and globose to ellipsoidal, hyaline chlamydospores (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Mariannaea*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-27). **a** Host material. **b, c** Conidiophores on the host surface. **d, e** Conidiophores. **f, g** Conidiogenous cells. **h** Conidia. Scale bars: **d, e** = 50 μm, **f**, **g** = 20 μm, **h** = 10 μm.

Figure 2.39 *Mariannaea* sp.

Marinophialophora J.F. Li, Phookamsak & K.D. Hyde, Phytotaxa 345 (1): 4 (2018)

Index Fungorum number: IF552733

Classification: Herpotrichiellaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Marinophialophora garethjonesii* J.F. Li, Phookamsak, Dayar. & K.D. Hyde, Phytotaxa 345 (1): 4 (2018)

Sexual morph: Unknown.

Sequence data: *Marinophialophora garethjonesii* (MFLUCC 16-1449, LSU: NG_070406.1, ITS: NR_164246.1, SSU: NG_065664.1)

Notes: *Marinophialophora* was introduced by Li et al. (2018) and is characterized by macronematous, mononematous, unbranched, hyaline to subhyaline conidiophores, phialidic, hyaline to subhyaline conidiogenous cells, catenate, aseptate, globose to subglobose, hyaline to subhyaline conidia. References: (Li et al., 2018) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Mastigosporium Riess, Beiträge zur Mykologie 2: 56 (1852)

Index Fungorum number: IF8861

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Mastigosporium album* Riess, Beiträge zur Mykologie 2: 56 (1852)

Sexual morph: Unknown.

Synanamorphs: pycnidium-like (Seifert et al., 2011)

Sequence data: *Mastigosporium album* (CBS 138013 = CPC 22945, LSU: KJ710451, ITS: NR_126150.2)

Notes: *Mastigosporium* is characterized by having mononematous, reduced conidiophores, with monoblastic to polyblastic, percurrent, hyaline conidiogenous cells, producing solitary, multi-septate, subcylindrical, broadly ellipsoid-fusiform, rostrate, hyaline conidia with or without 1–3 apical or subapical setulae (Crous et al., 2014a; Seifert et al., 2011). Phylogenetically, *Mastigosporium* was shown to be nested within the family Ploettnerulaceae (Helotiales, Leotiomycetes) (Figure 2.1).

References: (Crous et al., 2014a; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Matsushimomyces V.G. Rao & Varghese, Botaniska Notiser 132 (3): 313 (1979)

Index Fungorum number: IF8866

Classification: Microdochiaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Matsushimomyces indicus* V.G. Rao & Varghese, Botaniska Notiser 132 (3): 313 (1979)

Sequence data: *Matsushimomyces verrucophorus* (CBS 833.91 = INIFAT C91/114-2, LSU: MH874010, ITS: MH862341)

Notes: This genus is *Idriella*-like or *Microdochium*-like. In this study, we place this genus within the family Microdochiaceae based on our phylogenetic analysis (Figure 2.1) and its *Idriella*-like morphological characters. References: (Seifert et al., 2011) (morphology).

Matula Massee, Journal of the Royal Microscopical Society 1888: 176 (1888)

Index Fungorum number: IF8868

Classification: Stereaceae, Russulales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Matula poroniiforme* (Berk. & Broome) Massee, Journal of the Royal Microscopical Society 1888: 176 (1888)

Sexual morph: *Cytidia* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Matula* was established by Massee (1888) and there are two records listed in Index Fungorum. Phylogenetic position for *Matula* is unresolved due to lack of sequence data. References: (Massee, 1888) (morphology), (Wijayawardene et al., 2020) (outline).

Mauginiella Cavara, Atti Reale Accad. Naz. Lincei, Mem. Cl. Sci. Fis., ser. 6: 65 (1925)

Index Fungorum number: IF8869

Classification: Phaeosphaeriaceae, Pleosporales, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Mauginiella scaettae* Cavara, Atti Reale Accad. Naz. Lincei, Mem. Cl. Sci. Fis., ser. 6: 65 (1925)

Sexual morph: Unknown.

Sequence data: *Mauginiella scaettae* (CBS 239.58, LSU: MH869303, ITS: MH857770)

Notes: *Mauginiella* is characterized by having mononematous or sporodochial, reduced conidiophores, thallic-arthric, hyaline conidiogenous cells, producing catenate, aseptate or septate, hyaline conidia (Seifert et al., 2011). Phylogenetically, *Mauginiella* was shown to be nested within the family Phaeosphaeriaceae (Pleosporales, Pleosporomycetidae, Dothideomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Medusamyces G.L. Barron & Szijarto, Mycologia 82 (1): 136 (1990)

Index Fungorum number: IF11240

Classification: Ascomycota genera *incertae sedis*

Type species: *Medusamyces lunulosporus* G.L. Barron & Szijarto, Mycologia 82 (1): 136 (1990)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Medusamyces* was erected by Barron and Szuarto (1990), and it has mononematous, penicillate, hyaline to pale brown conidiophores, with monoblastic, globose or subglobose or ellipsoidal, hyaline conidiogenous cells, and produces solitary, aseptate, long falcate, with a basal appendage, hyaline conidia. Phylogenetic position for *Medusamyces* is unresolved due to lack of sequence data. References: (Barron & Szuarto, 1990) (morphology), (Wijayawardene et al., 2020) (outline).

Meira Boekhout, Scorzetti, Gerson & Sztejnb. ex Denchev & T. Denchev, Mycobiota 11: 2 (2021)

Index Fungorum number: IF558271

Classification: Brachybasidiaceae, Exobasidiales, Exobasidiomycetes, Ustilaginomycotina, Basidiomycota

Type species: *Meira geulakonigae* Boekhout, Scorzetti, Gerson & Sztejnb. ex Denchev & T. Denchev, Mycobiota 11: 2 (2021) [MB#558272]

Sexual morph: Unknown.

Sequence data: *Meira geulakonigii* (CBS 110052, LSU: AY158668, ITS: AY158674, SSU: KP322954)

Notes: This genus was described by Boekhout et al. (2003) and is a yeast-like. Phylogenetically, representatives of *Meira* clustered in the family Brachybasidiaceae (Exobasidiales, Exobasidiomycetes) (Figure 2.1). References: (Boekhout et al., 2003; Tanaka et al., 2008; Wang et al., 2015b) (morphology and phylogeny), (He et al., 2019) (outline).

Melanopsamma Niessl, Verhandlungen des Naturforschenden Vereins in Brünn 14: 200 (1876)

Index Fungorum number: IF3079

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Melanopsamma pomiformis* (Pers.) Sacc., Michelia 1 (3): 347 (1878)

Sexual morph: Lombard et al. (2016) provided a full description (sexual and asexual morphs) for this genus.

Sequence data: *Melanopsamma pomiformis* (CBS 101322, LSU: KU846068, ITS: KU846049)

Notes: The asexual morph of this genus is stachybotrys-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Melanospora Corda, Icones fungorum hucusque cognitorum 1: 24 (1837)

= *Gonatobotrys* Corda, Pracht - Flora. Europaeischer Schimmel-Bildungen: 9 (1839)

Index Fungorum number: IF3085

Classification: Ceratostomataceae, Coronophorales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Melanospora zamiae* Corda, Icones fungorum hucusque cognitorum 1: 24, t. 7:297A (1837)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genera *Acremonium*, *Chlamydomyces*, *Gonatobotrys*, *Gonytrichum*, *Harzia*, *Papulaspora*, *Paecilomyces*, *Phialophora* and *Proteophiala* (Schultes et al., 2017).

Sequence data: *Melanospora simplex* (= *Gonatobotrys simplex*) (CN008I8, LSU: MT110305, ITS: MT110304).

Notes: The sexual morph of *Gonatobotrys* was linked to *Melanospora* (Schultes et al., 2017; Vakili, 1989). Réblová et al. (2016a) proposed using *Melanospora* rather than *Gonatobotrys*. References: (Schultes et al., 2017; Vakili, 1989) (morphology and phylogeny), (Réblová et al., 2016a)(taxonomy), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Menispora Pers., Mycologia Europaea 1: 32 (1822)

Index Fungorum number: IF8902

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Menispora glauca* Link ex Pers., Mycologia Europaea 1: 32 (1822)

Sexual morph: *Chaetosphaeria* (Seifert et al., 2011).

Synanamorphs: phialophora-like (Seifert et al., 2011).

Sequence data: *Menispora ciliata* (CBS 122131 = ICMP 18253, LSU: GU180637, ITS: EU488736, SSU: GU180614)

Notes: *Menispora* is characterized by setae are setae none or extensions of conidiophores, conidiophores are branched, brown, conidiogenous cells are phialidic, hyaline, and conidia are aseptate to multiseptate, hyaline, falcate with or without polar

setulae at both ends. References: (Réblová et al., 2006) (morphology), (Lin et al., 2019b) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Menisporopsis S. Hughes, Mycological Papers 48: 59 (1952)

Index Fungorum number: IF8904

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Menisporopsis theobromae* S. Hughes, Mycological Papers 48: 59 (1952)

Sexual morph: *Menisporopascus* (Seifert et al., 2011).

Sequence data: *Menisporopsis dushanensis* (GZCC 18-0084, LSU: MN104626, ITS: MN104615)

Notes: *Menisporopsis* was introduced by Hughes (1952) and is characterized by synnematous conidiomata, dark, septate, unbranched setae, macronematous, unbranched conidiophores, phialidic conidiogenous cells, and aseptate or septate, falcate, with polar setulae, hyaline conidia. References: (Castañeda Ruíz et al., 1997, 2001; Hughes & Kendrick, 1968; Hughes, 1952; Lin et al., 2019b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Metacapnodium Speg., Physis Revista de la Sociedad Argentina de Ciencias Naturales 4 (17): 288 (1918)

= *Capnophialophora* S. Hughes, New Zealand Journal of Botany 4: 352 (1966)

Index Fungorum number: IF3137

Classification: Metacapnodiaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Metacapnodium juniperi* (W. Phillips & Plowr.) Speg., Physis Revista de la Sociedad Argentina de Ciencias Naturales 4 (17): 288 (1918)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Metacapnodium neesii* (TNS F-89140 = JCM 39119, LSU: LC576694, ITS: LC576698, SSU: LC576695)

Notes: The asexual morph of *Metacapnodium* was reported in the hyphomycetous genus *Capnophialophora*, and *Capnophialophora* was synonymized under *Metacapnodium*. Phylogenetically, representative of *Metacapnodium* formed a separate clade at the base of the Chaetothyriales within Eurotiomycetes (Figure 2.1), which is the same with Hawksworth and Boluda (2020) and Sugiyama et al. (2020). The higher classification of this genus and Metacapnodiaceae should be reorganized in the future. References: (Hawksworth & Boluda, 2020; Sugiyama et al., 2020) (morphology), (Wijayawardene et al., 2020) (outline).

Metulocladosporiella Crous, Schroers, J.Z. Groenew., U. Braun & K. Schub., Mycological Research 110 (3): 269 (2006)

Index Fungorum number: IF500224

Classification: Trichomeriaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Metulocladosporiella musae* (E.W. Mason) Crous, Schroers, J.Z. Groenew., U. Braun & K. Schub., Mycological Research 110 (3): 269 (2006)

Sexual morph: Unknown.

Sequence data: *Metulocladosporiella musae* (CBS 161.74, LSU: DQ008161, ITS: AY186199)

Notes: *Metulocladosporiella* was introduced by Crous et al. (2006b) and is characterized by macronematous, mononematous, branched, brown conidiophores, polyblastic, sympodial, pale brown conidiogenous cells, and catenate, aseptate to 1-septate, ellipsoid, ovoid, subcylindrical, fusiform pale brown to subhyaline conidia. Quan et al. (2020) placed this genus in the family Trichomeriaceae (Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes). References: (Crous et al., 2006b; Quan et al., 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Microcera Desm., Annales des Sciences Naturelles Botanique sér. 3, 10: 358 (1848)

= *Pseudomicrocera* Petch, Transactions of the British Mycological Society 7 (3): 164 (1921)

Index Fungorum number: IF8920

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Microcera coccophila* Desm., Annales des Sciences Naturelles Botanique sér. 3, 10: 359 (1848)

Sexual morph: holomorphic description see Gräfenhan et al. (2011) and Lombard et al. (2015).

Sequence data: *Microcera coccophila* (CBS 310.34 = NRRL 13962, LSU: KM231703, ITS: HQ897794)

Notes: The asexual morph of *Microcera* is characterized by sporodochial or synnematous conidiomata, monochasial, verticillate or penicillate, hyaline conidiophores, monophialidic, hyaline conidiogenous cells, septate, in masses, subcylindrical, curved, hyaline macroconidia (Gräfenhan et al., 2011; Lombard et al., 2015). References: (Gräfenhan et al., 2011; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Microcyclospora J. Frank, Schroers & Crous, Persoonia 24: 99 (2010)

Index Fungorum number: IF516842

Classification: Teratosphaeriaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Microcyclospora pomicola* J. Frank, B. Oertel, Schroers & Crous, Persoonia 24: 100 (2010)

Sexual morph: Unknown.

Sequence data: *Microcyclospora pomicola* (CBS 126141, LSU: MH875506, ITS: MH864049)

Notes: *Microcyclospora* was established by Frank et al. (2010) and is characterized by reduced conidiophores, mono- to polyblastic, integrated, intercalary, pale brown conidiogenous cells, producing 1- to multi-septate, scolecosporous, cylindrical, aggregated in mucoid masses, subhyaline to pale brown conidia. Phylogenetically, *Microcyclospora* was shown to be nested within the family Teratosphaeriaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Frank et al., 2010) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Microcyclosporella J. Frank, Schroers & Crous, Persoonia 24: 101 (2010)

Index Fungorum number: IF516840

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Microcyclosporella mali* J. Frank, Schroers & Crous, Persoonia 24: 101 (2010)

Sexual morph: Unknown.

Sequence data: *Microcyclosporella mali* (CBS 126136 = CPC 16184, LSU: GU570547, ITS: GU570535)

Notes: *Microcyclosporella* was introduced by Frank et al. (2010) and is characterized by reduced conidiophores, mono- or polyblastic, integrated, intercalary, sympodial, pale brown conidiogenous cells, producing solitary, 0–6-septate, subcylindrical to narrowly obclavate or narrowly fusoid, hyaline conidia. Phylogenetically, *Microcyclosporella* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Frank et al., 2010; Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Microdochiella Hern.-Restr. & Crous, Persoonia 36: 62 (2015)

Index Fungorum number: IF811866

Classification: Orbiliaceae, Orbiliales, Orbiliomycetidae, Orbiliomycetes, Ascomycota

Type species: *Microdochiella fusarioides* (D.C. Harris) Hern.-Restr. & Crous, Persoonia 36: 62 (2015)

Sexual morph: Unknown.

Sequence data: *Microdochiella fusarioides* (CBS 741.83, LSU: NG_058148, ITS: NR_154177)

Notes: This genus is *Microdochium*-like. Phylogenetically, this genus located in Orbiliaceae (Orbiliales, Orbiliomycetes). We suggest moving this genus to Orbiliaceae (Orbiliales, Orbiliomycetes). References: (Hernández-Restrepo et al., 2016a)(morphology and phylogeny).

Microdochium Syd. & P. Syd., Annales Mycologici 22 (306): 267 (1924)

= *Monographella* Petr., Annales Mycologici 22 (1-2): 144 (1924)

= *Griphosphaerella* Petr., Annales Mycologici 25: 209 (1927)

= *Gloeocercospora* D.C. Bain & Edgerton ex Deighton, Transactions of the British Mycological Society 57: 358 (1971)

= *Gerlachia* W. Gams & E. Müll., Netherlands Journal of Plant Pathology 86: 49 (1980)

Index Fungorum number: IF8926

Classification: Microdochiaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Microdochium phragmitis* Syd. & P. Syd., Annales Mycologici 22 (306): 267 (1924)

Sexual morph: *Monographella* (Seifert et al., 2011).

Synanamorphs: *Dactylaria*, humicola-like (Seifert et al., 2011).

Disease symptoms: Leaf spots, necrosis, chlorosis, defomations, damping-off, die back, foot diseases, root rot and decay.

Sequence data: Sequence data for ex-epitype culture of type species is available. CBS 285.71, LSU: NG_058147, ITS: MH860125

Notes: It is characterized by sporodochial conidiomata, macronematous, branched, hyaline conidiophores, polyblastic, discrete, hyaline, sympodial and percurrent, conidiogenous cells, and aseptate to multiseptate, hyaline, lunate, falcate, fusiform, filiform, obovoid or subpyriform, straight or curved conidia (Hernández-Restrepo et al., 2016a; Kwasna & Bateman, 2007; Seifert et al., 2011). The conidiophores often reduced to conidiogenous cells. An epitype was designated for the type species of *Microdochium*, *M. phragmitis*, by Hernández-Restrepo et al. (2016a). Hernández-Restrepo et al. (2016a) introduced the family *Microdochiaceae*, and three genera, *Idriella*, *Microdochium* and *Selenodriella*, were placed in this family. References: (Hernández-Restrepo et al., 2016a; Kwasna & Bateman, 2007; Seifert et al., 2011) (morphology and phylogeny)

Microidium (To-anun & S. Takam.) To-anun & S. Takam., CBS Biodiversity Series 11: 624 (2012)

Index Fungorum number: IF561519

Classification: Erysiphaceae, Helotiales, Leotiomycetidae, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Microidium phyllanthi* (J.M. Yen) To-anun & S. Takam., CBS Biodiversity Series 11: 626 (2012)

Sexual morph: Unknown.

Sequence data: *Microidium phyllanthi* (MUMH 1778, LSU: AB120754, ITS: AB719951, SSU: AB120753)

Notes: *Oidium* subg. *Microidium* was established by To-anun et al. (2005) and it was raised to generic rank as *Microidium* by Braun and Cook (2012). *Microidium* has multi-lobed appressoria, mononematous, unbranched conidiophores with long, straight or twisted foot-cell, produces catenate, aseptate, cylindrical to barrel-cylindrical, hyaline conidia bearing broad club-shaped germ tubes on the shoulder (To-anun et al., 2005). Phylogenetically, *Microidium* was shown to be nested within the family Erysiphaceae (Helotiales, Leotiomycetidae, Leotiomycetes) (Figure 2.1). References: (Braun & Cook, 2012; Meeboon & Takamatsu, 2017; To-anun et al., 2005) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Microsporum Gruby, Compte rendu hebdomadaire des Sciences de l'Academie des sciences, Paris: 301 (1843)

Index Fungorum number: IF8939

Classification: Arthrodermataceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Microsporum audouinii* Gruby, Compt. Rend. Hebd. Séances Acad. Sci., Sér. D: 301 (1843)

Sexual morph: *Nannizzia* (Seifert et al., 2011).

Synanamorphs: *Chrysosporium* (Seifert et al., 2011).

Disease symptoms: Some species can infect human and cause dermatomycoses, glabrous skin, onychomycosis (Dolenc-Voljč & Gasparič, 2017; Skerlev & Miklić, 2010).

Sequence data: *Microsporum canis* (CBS 113480, LSU: MH874500, ITS: MH862931)

Notes: *Microsporum* is characterized by conidiophores reduced to conidiogenous cells, conidiogenous cells are thallic, hyaline and produce microconidia and macroconidia that are hyaline. References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Microstella K. Ando & Tubaki, Transactions of the Mycological Society of Japan 25: 34 (1984)

Index Fungorum number: IF11130

Classification: Basidiomycota genera *incertae sedis*

Type species: *Microstella pluvioriens* K. Ando & Tubaki, Transactions of the Mycological Society of Japan 25: 34 (1984)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Microstella* was erected by Ando and Tubaki (1984) and one species is accepted. Phylogenetic position for *Microstella* is unresolved due to lack of sequence data. References: (Ando & Tubaki, 1984) (morphology), (Wijayawardene et al., 2020) (outline).

Miladina Svrcek, Ceská Mykologie 26 (4): 213 (1972)

= *Actinosporella* Descals, Marvanová & J. Webster, Canadian Journal of Botany 76 (9): 1647 (1999)

Index Fungorum number: IF3210

Classification: Pyronemataceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Miladina lecithina* (Cooke) Svrcek, Ceská Mykologie 26 (4): 214 (1972)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Actinosporella* (Healy et al., 2016)

Sequence data: *Miladina lecithina* (KH.03.156 (FH), LSU: DQ220371, SSU: DQ646538)

Notes: *Actinosporella* was introduced by Descals et al. (1998) and its sexual morph was reported in the genus *Miladina* (Healy et al., 2016). Healy et al.

(2016) proposed to use *Miladina* rather than *Actinosporella*. Phylogenetically, *Miladina* was shown to be nested within the family Pyronemataceae (Pezizales, Pezizomycetes) (Figure 2.1). References: (Descals et al., 1998) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Miniancora Marvanová & Bärl., Mycotaxon 35 (1): 86 (1989)

Index Fungorum number: IF11127

Classification: Leotiaceae, Leotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Miniancora allisoniensis* Marvanová & Bärl., Mycotaxon 35 (1): 86 (1989)

Sexual morph: Unknown.

Sequence data: *Miniancora allisoniensis* (CCM F-30487, ITS: KC834064)

Notes: *Miniancora* was introduced by Marvanová and Bärlocher (1989) to accommodate a fungus from soft water streams in Canada. It has mononematous, solitary, unbranched or branched, flexuous, hyaline conidiophores, with mono- to polyblastic, integrated, sympodial, frilled, hyaline conidiogenous cells, and solitary, septate, T-shaped, hyaline conidia (Marvanová & Bärlocher, 1989). Phylogenetic position for *Miniancora* is unresolved due to lack of LSU sequence data. References: (Marvanová & Bärlocher, 1989) (morphology), (Wijayawardene et al., 2020) (outline).

Minimidochium B. Sutton, Canadian Journal of Botany 47 (12): 2095 (1970)

Index Fungorum number: IF8952

Classification: Ascomycota genera *incertae sedis*

Type species: *Minimidochium setosum* B. Sutton, Canadian Journal of Botany 47 (12): 2095 (1970)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Minimidochium* was erected by Sutton (1969) and is characterized by having pulvinate, hemispherical, setose, brown sporodochia, and stromatic conidiophores, with monophialidic conidiogenous cells, producing aseptate, curved,

setulate, hyaline conidia aggregated in slimy mass. Phylogenetic position for *Minimidochium* is unresolved due to lack of sequence data. References: (Cabello et al., 1998; Sutton, 1969) (morphology), (Wijayawardene et al., 2020) (outline).

Minteriella Heredia, R.F. Castañeda & R.M. Arias, Mycological Progress (2012)

Index Fungorum number: IF561723

Classification: Ascomycota genera *incertae sedis*

Type species: *Minteriella cenotigena* Heredia, R.F. Castañeda & R.M. Arias, Mycological Progress (2012)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Minteriella* was erected by Heredia et al. (2013) and it has synnematous conidiomata, macronematous, septate, unbranched or branched, brown conidiophores, with polyblastic, discrete, sympodial conidiogenous cells, and produces solitary, multi-septate, cylindrical to broad-filiform, hyaline to subhyaline conidia. Phylogenetic position for *Minteriella* is unresolved due to lack of sequence data. References: (Heredia et al., 2013) (morphology), (Wijayawardene et al., 2020) (outline).

Mirandina G. Arnaud ex Matsush., Icones Microfungorum a Matsushima lectorum: 96 (1975)

Index Fungorum number: IF30616

Classification: Ascomycota genera *incertae sedis*

Type species: *Mirandina corticola* G. Arnaud ex Matsush., Icones Microfungorum a Matsushima lectorum: 96 (1975)

Sexual morph: *Apogaeumannomyces*, *Chaetonectrioides*, *Kretzschmariella*, *Taphrophila* (Seifert et al., 2011).

Sequence data: ?*Mirandina breviphora* (CBS 248.68, LSU: MH870839, ITS: MH859127); ?*Mirandina corticola* (CBS 132719 = FMR 11938, LSU: MH878333)

Notes: This genus was described by Matsushima (1975) and is characterized by having macronematous, mononematous, unbranched or branched, hyaline or brown conidiophores, with polyblastic, sympodial, denticulate, hyaline to subhyaline conidiogenous cells, producing solitary, multi-septate, scolecosporous, hyaline to subhyaline conidia (Matsushima, 1975; Seifert et al., 2011). Two strains CBS 248.68 and CBS 132719, which were respectively identified as *M. breviphora* and *M. corticola*, were included in our phylogenetic analysis, however, the former one located in Xylariales (Sordariomycetes) and the latter one located in Microthyriaceae (Microthyriales, Dothideomycetes) (Figure 2.1). References: (Matsushima, 1975; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Miricatena Punith. & Spooner: 637 (2012)

Index Fungorum number: IF580230

Classification: Ascomycota genera *incertae sedis*

Type species: *Miricatena prunicola* Punith. & Spooner: 638 (2012)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Miricatena* was introduced by Punithalingam and Spooner (2011) for a fungus collected from leaf spots of *Prunus serotina*. It has macronematous to semi-macronematous, mononematous, solitary, septate, hyaline conidiophores, with polyblastic, hyaline conidiogenous cells, and produces ?solitary, complex, consisting of almost symmetrical primary, secondary and rarely tertiary chains. Phylogenetic position for *Miricatena* is unresolved due to lack of sequence data. References: (Punithalingam & Spooner, 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Miuraea Hara, Byogaichu-Hoten (Manual of Pests and Diseases): 779 (1948)

Index Fungorum number: IF8957

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Miuraea degenerans* (Syd. & P. Syd.) Hara, Byogaichu-Hoten (Manual of Pests and Diseases): 260 (1948)

Sexual morph: *Mycosphaerella* (Seifert et al., 2011).

Sequence data: *Miuraea degenerans* (MAFF 239265 = MUCC 1514, LSU: MF951181, ITS: MF951325)

Notes: *Miuraea* is characterized by having semi-macronematous, mononematous, unbranched, sometimes reduced, hyaline to subhyaline conidiophores, with monoblastic, or occasionally polyblastic, sympodial or percurrent conidiogenous cells, producing solitary or catenate, multi-septate, ellipsoid-ovoid, subcylindrical-vermiform, obclavate, subclavate, hyaline to subhyaline conidia (Videira et al., 2017). Phylogenetically, *Miuraea* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Monascus Tiegh., Bulletin de la Société Botanique de France 31: 226 (1884)

= *Basipetospora* G.T. Cole & W.B. Kendr., Canadian Journal of Botany 46 (8): 991 (1968)

Index Fungorum number: IF3247

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Monascus ruber* Tiegh., Bulletin de la Société Botanique de France 31: 227 (1884)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Basipetospora* (Rossman et al., 2016; Seifert et al., 2011).

Sequence data: *Monascus ruber* (CBS 135.60, LSU: MH869468, ITS: KY635850, SSU: MT365134)

Notes: The asexual morph of *Monascus* was reported in the hyphomycetous genus *Basipetospora* and is characterized by unbranched or sparingly branched, hyaline conidiophores, blastic, retrogressive, hyaline conidiogenous cells, and catenate, aseptate, hyaline conidia (Seifert et al., 2011). References: (Houbraken

et al., 2020; Seifert et al., 2011) (morphology and/or phylogeny), (Rossman et al., 2016) (nomenclature), (Wijayawardene et al., 2017a, 2020) (outline).

Moniliella Stolk & Dakin, Antonie van Leeuwenhoek 32 (4): 399 (1966)

= *Trichosporonoides* Haskins & J.F.T. Spencer, Canadian Journal of Botany 45 (4): 519 (1967)

Index Fungorum number: IF8966

Classification: Moniliellaceae, Moniliellales, Moniliellomycetes, Ustilaginomycotina, Basidiomycota

Type species: *Moniliella acetoabutans* Stolk & Dakin, Antonie van Leeuwenhoek 32 (4): 400 (1966)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Stolk & Dakin, 1966).

Sequence data: *Moniliella acetoabutens* (CBS 169.66, LSU: AF335523, ITS: EU252153, SSU: KF706443)

Notes: This genus was described by Stolk and Dakin (1966) and is yeast-like. *Trichosporonoides* was synonymized under *Moniliella* by Rosa et al. (2009). Phylogenetically, representatives of *Moniliella* clustered in the family Moniliellaceae (Moniliellales, Moniliellomycetes) (Figure 2.1). References: (Stolk & Dakin, 1966; Wang et al., 2015b) (morphology and phylogeny), (He et al., 2019) (outline).

Monilinia Honey, Mycologia 20: 153 (1928)

= *Monilia* Bonord., Handbuch der allgemeinen Mykologie: 76 (1851)

Index Fungorum number: IF3249

Classification: Sclerotiniaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Monilinia fructicola* (G. Winter) Honey, Mycologia 20: 153 (1928)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Monilia* (Seifert et al., 2011).

Sequence data: *Monilinia fructicola* (AFTOL-ID 279, LSU: AY544683, ITS: DQ491506, SSU: AY544724)

Notes: The asexual morph of *Monilinia* was reported in the genus *Monilia* (Seifert et al., 2011), Johnston et al. (2014) proposed to use *Monilinia* over *Monilia*. Phylogenetically, *Monilinia* was shown to be nested within the family Sclerotiniaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Moniliophthora H.C. Evans, Stalpers, Samson & Benny, Canadian Journal of Botany 56 (20): 2530 (1978)

Index Fungorum number: IF18070

Classification: Marasmiaceae, Agaricales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Moniliophthora roreri* (Cif.) H.C. Evans, Stalpers, Samson & Benny, Canadian Journal of Botany 56 (20): 2530 (1978)

Sexual morph: Unknown.

Sequence data: *Moniliophthora perniciosa* (DIS71, LSU: AY916738, ITS: AY317136, SSU: AY916739)

Notes: *Moniliophthora* was erected by Evans et al. (1978) and is characterized by conidiophores are branched, hyaline, without clamp connections but with dolipores, conidiogenous cells are thallic-arthric, hyaline, conidia are catenate, aseptate, globose to ellipsoidal, hyaline or pale brown. Phylogenetically, *Moniliophthora* was shown to be nested within the family Marasmiaceae (Agaricales, Agaricomycetes) (Figure 2.1). References: (Evans et al., 1978) (morphology and phylogeny), (He et al., 2019) (outline).

Monilochaetes Halst. ex Harter, Journal of Agricultural Research 5: 791 (1916)

Index Fungorum number: IF8969

Classification: Australiascaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Monilochaetes infuscans* Halst. ex Harter, Journal of Agricultural Research 5: 791 (1916)

Sexual morph: *Australiasca* (Seifert et al., 2011).

Sequence data: *Monilochaetes infuscans* (CBS 869.96, LSU: GU180639, ITS: GU180626, SSU: GU180620)

Notes: *Monilochaetes* was introduced by Harter (1916) and is characterized by macronematous, mononematous, unbranched, brown conidiophores, phialidic, subhyaline or brown conidiogenous cells, and producing aseptate, in slimy mass or in chains, hyaline conidia. References: (Harter, 1916) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Monilochaetes*** **sp.** (Material examined: China, Guizhou Province, Zunyi City, Chishui, April 2018, Yao Feng, CS 1-2). **a** Conidiophores on the host surface. **b, c** Conidiophores. **d, e** Conidiogenous cells. **f–j** Conidia.

Figure 2.40 *Monilochaetes* sp.

Monocillium S.B. Saksena, Indian Phytopathology 8: 9 (1955)

Index Fungorum number: IF8976

Classification: Niessliaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Monocillium indicum* S.B. Saksena, Indian Phytopathology 8: 9 (1955)

Sexual morph: *Hyaloseta*, *Niesslia* (Seifert et al., 2011).

Synanamorphs: sclerotium-like structures (Seifert et al., 2011).

Sequence data: *Monocillium indicum* (CBS 313.61, LSU: MH869632, ITS: MH858063)

Notes: It is characterized by conidiophores are mononematous, unbranched, hyaline, often reduced to conidiogenous cells, conidiogenous cells are phialidic, hyaline, and conidia are catenate or in slimy heads, aseptate, hyaline. *Monocillium* species were reported can parasitise nematode eggs (Ashrafi et al., 2017). References: (Ashrafi et al., 2017) (morphology and phylogeny), (Wijayawardene et al., 2017a) (outline).

Monodidymaria U. Braun, Nova Hedwigia 58 (1-2): 195 (1994)

Index Fungorum number: IF27290

Classification: Ascomycota genera *incertae sedis*

Type species: *Monodidymaria canadensis* (Ellis & Everh.) U. Braun, Nova Hedwigia 58 (1-2): 195 (1994)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Monodidymaria* was established by Braun (1994b) and it has solitary or in loose fascicles, aseptate or 1-2-septate, hyaline conidiophores, with monoblastic, integrated, terminal, hyaline conidiogenous cells, and produces solitary, (0-)1(-3)-septate, ellipsoid, ovoid, subcylindric, subclavate, fusiform, hyaline conidia. Phylogenetic position for *Monodidymaria* is unresolved due to lack of sequence data. References: (Braun, 1994b) (morphology), (Wijayawardene et al., 2020) (outline).

Morchella Dill. ex Pers., Neues Magazin für die Botanik 1: 116 (1794)

= *Costantinella* Matr., Recherches sur le Développement de quelques Mucédinées: 97 (1892)

Index Fungorum number: IF3268

Classification: Morchellaceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Morchella esculenta* (L.) Pers., Synopsis methodica fungorum: 618 (1801)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Costantinella* (Healy et al., 2016).

Sequence data: *Morchella semilibera* (LIP 0900126, LSU: NG_068517, ITS: KJ174320)

Notes: The sexual morph of *Costantinella* was reported in the genus *Morchella* (Healy et al., 2016). Healy et al. (2016) proposed to protect *Morchella* over *Costantinella*. Phylogenetically, *Morchella* was shown to be nested within the family Morchellaceae (Pezizales, Pezizomycetes) (Figure 2.1). References: (Wijayawardene et al., 2017a, 2020) (outline).

Morrisographium M. Morelet, Taxon 17 (5): 528 (1968)

Index Fungorum number: IF8999

Classification: Ascomycota genera *incertae sedis*

Type species: *Morrisographium ulmi* (E.F. Morris) Illman & G.P. White, Can. J. Bot. 63(3): 424 (1985)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Morrisographium* was introduced by Morelet (1968) to replace the genus *Phragmographium* E.F. Morris (nom. illegit.). Phylogenetic position for *Morrisographium* is unresolved due to lack of sequence data. References: (Morelet, 1968) (morphology), (Wijayawardene et al., 2020) (outline).

Muirella R. Sprague, Mycologia 50: 827 (1959)

Index Fungorum number: IF9007

Classification: Ascomycota genera *incertae sedis*

Type species: *Muirella alascensis* (R. Sprague) R. Sprague, Mycologia 50: 827 (1959)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Muirella* was erected by Sprague (1958) and it has sporodochial, erumpent, white conidiomata, reduced conidiophores, with monoblastic, hyaline conidiogenous cells, and produces solitary, 1- to 3-septate, cylindrical-fusiform, hyaline conidia. Phylogenetic position for *Muirella* is unresolved due to lack of sequence data. References: (Sprague, 1958) (morphology), (Wijayawardene et al., 2020) (outline).

Multiguttulispora C.G. Lin & J.K. Liu, Mycosphere 10 (1): 681 (2019)

Index Fungorum number: IF556712

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Multiguttulispora dimorpha* (Toyaz. & Udagawa) Réblová & Hern.-Restr., Journal of Fungi 7 (6, no. 438): 20 (2021) (= *Multiguttulispora sympodialis* C.G. Lin & J.K. Liu, Mycosphere 10 (1): 681 (2019))

Sexual morph: Unknown.

Sequence data: *Multiguttulispora sympodialis* (now known as *Multiguttulispora dimorpha*)(MFLUCC 18-0153, LSU: MN104617, ITS: MN104606)

Notes: *Multiguttulispora* was introduced by Lin et al. (2019b) and is characterized by macronematous, mononematous, unbranched, septate, dark brown conidiophores, mono- and polyphialidic, integrated, terminal, sympodial, hyaline to subhyaline conidiogenous cells, and septate, ellipsoidal to oblong to ellipsoidal-fusiform, hyaline conidia with a gently curved setula at each end (Lin et al., 2019b; Réblová et al., 2021b). Réblová et al. (2021b) emended this genus and transferred two *Codinaea* species to it. *Multiguttulispora sympodialis* was reduced to the synonymy of *M. dimorpha* (Réblová et al., 2021b). References: (Lin et al., 2019b; Réblová et al., 2021b) (morphology and phylogeny).

Murinectria M. Niranjan & V.V. Sarma, Mycosphere 11 (1): 738 (2020)

Index Fungorum number: IF556843

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Murinectria murispora* M. Niranjan & V.V. Sarma, Mycosphere 11 (1): 738 (2020)

Sexual morph: Introduced as holomorphic genus with hyphomycetous asexual morph (Hyde et al., 2020).

Sequence data: *Murinectria murispora* (NFCCI-4515, LSU: MK860767, ITS: MK860769)

Notes: *Murinectria* was introduced by Hyde et al. (2020) and its asexual morph has synnematous conidiomata, phialidic conidiogenous cells, and obovoid, hyaline conidia. References: (Hyde et al., 2020) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Murramarangomyces Crous, Persoonia 39: 385 (2017)

Index Fungorum number: IF823391

Classification: Murramarangomycetaceae, Murramarangomycetales, Dothideomycetes order *incertae sedis*, Pezizomycotina, Ascomycota (Now in Microthyriaceae, Microthyriales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota)

Type species: *Murramarangomyces corymbiae* Crous, Persoonia 39: 385 (2017) (Now known as *Phaeothyriolum corymbiae* (Crous) Crous, Studies in Mycology 94: 226 (2019))

Sexual morph: *Phaeothyriolum* Syd., Annales Mycologici 36 (4): 305 (1938) (Crous et al., 2019c)

Disease symptoms: Leas spots

Sequence data: *Murramarangomyces corymbiae* (CBS 143434 = CPC 33000, LSU: MG386098, ITS: MG386045)

Notes: This genus was introduced by Crous et al. (2017a) and placed in Murramarangomycetaceae (Murramarangomycetales, Dothideomycetes). Crous et al. (2019c) linked this genus to *Phaeothyriolum* and be reduced to synonymy with the latter one and now is in Microthyriaceae (Microthyriales, Dothideomycetes).

References: (Crous et al., 2017a)(morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Musicillium Zare & W. Gams, Nova Hedwigia 85 (3-4): 482 (2007)

Index Fungorum number: IF510696

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Musicillium theobromae* (Turconi) Zare & W. Gams, Nova Hedwigia 85 (3-4): 482 (2007) (= *Verticillium theobromae* (Turconi) E.W. Mason & S. Hughes, Mycological Papers 45: 10 (1951)

Sexual morph: Unknown.

Sequence data: *Musicillium theobromae* (CBS 968.72, LSU: LR025907, ITS: LR026773)

Notes: *Musicillium* was introduced by Zare et al. (2007) and is verticillium-like. It is characterized by mononematous, verticillate, brown conidiophores, monophialidic, subulate, hyaline conidiogenous cells, aseptate, in slimy mass, cylindrical, hyaline conidia. References: (Giraldo & Crous, 2019; Zare et al., 2007) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Musidium Giraldo López & Crous, Studies in Mycology 92: 253 (2018)

Index Fungorum number: IF828045

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Musidium stromaticum* (W. Gams & R.H. Stover) Giraldo López & Crous, Studies in Mycology 92: 254 (2018)

Sexual morph: Unknown.

Sequence data: *Musidium stromaticum* (CBS 863.73, LSU: HQ232143, ITS: DQ825969)

Notes: *Musidium* was introduced by Giraldo and Crous (2019) and is characterized by mononematous, unbranched or poorly branched, hyaline conidiophores, monophialidic with short cylindrical collarette, subulate, hyaline

conidiogenous cells, and producing aseptate, smooth-walled, in slimy mass, cylindrical or ellipsoidal, hyaline conidia. This genus has branched or unbranched, dark olivaceous, incrusted or smooth, thick-walled stromatic hyphae, which distant if from other similar genera. References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Myceliophthora Costantin, Comptes Rendus Hebdomadaires des Séances de l'Academie des Sciences 114: 849 (1892)

Index Fungorum number: IF9013

Classification: Chaetomiaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Myceliophthora lutea* Costantin, Comptes Rendus Hebdomadaires des Séances de l'Academie des Sciences 114: 850 (1892)

Sexual morph: *Corynascus*, *Thielavia* (van den Brink et al., 2012).

Sequence data: *Myceliophthora lutea* (CBS 145.77, LSU: KM655351, ITS: NR_145149)

Notes: *Myceliophthora* is characterized by micronematous, mononematous, unbranched or branched, reduced, hyaline conidiophores, monoblastic or polyblastic, hyaline conidiogenous cells, and producing solitary or catenate, aseptate, smooth-walled, hyaline conidia (Seifert et al., 2011). References: (Marin-Felix et al., 2015b; Seifert et al., 2011; van den Brink et al., 2012; Zhang et al., 2014) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Mycoarthris Marvanová & P.J. Fisher, Nova Hedwigia 75 (1-2): 258 (2002)

Index Fungorum number: IF28697

Classification: Hyaloscyphaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Mycoarthris corallina* Marvanová & P.J. Fisher, Nova Hedwigia 75 (1-2): 258 (2002)

Sexual morph: Unknown.

Sequence data: *Mycoarthris corallina* (91A, ITS: AH009124, SSU: AH009124)

Notes: *Mycoarthris* was established by Marvanova et al. (2002) to accommodate a fungus from stream foam in U.K. Phylogenetic position for *Mycoarthris* is unresolved due to lack of LSU sequence data. References: (Marvanova et al., 2002) (morphology), (Wijayawardene et al., 2020) (outline).

Mycocentrodochium K. Matsush. & Matsush., Matsushima Mycological Memoirs 9: 34 (1996)

Index Fungorum number: IF27677

Classification: Ascomycota genera *incertae sedis*

Type species: *Mycocentrodochium curvisporum* K. Matsush. & Matsush., Matsushima Mycological Memoirs 9: 34 (1996)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Mycocentrodochium* was introduced by Matsushima and Matsushima (1996) and one species is accepted. Phylogenetic position for *Mycocentrodochium* is unresolved due to lack of sequence data. References: (Matsushima & Matsushima, 1996) (morphology), (Wijayawardene et al., 2020) (outline).

Mycocentrospora Deighton, Taxon 21 (5-6): 716 (1972)

Index Fungorum number: IF9021

Classification: Dothidotthiaceae, Pleosporales, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Mycocentrospora acerina* (R. Hartig) Deighton, Taxon 21(5-6): 716 (1972) (≡ *Cercospora acerina* R. Hartig, Untersuch. Forstbot. Inst. München: 58 (1880))

Sexual morph: Unknown.

Synanamorphs: producing chlamydospores (Seifert et al., 2011)

Sequence data: *Mycocentrospora acerina* (CBS 105.43, LSU: MH867618, ITS: MH856114)

Notes: *Mycocentrospora* is characterized by having mononematous or sporodochial, sometimes reduced, unbranched, geniculate, pale brown conidiophore, with monoblastic to polyblastic, intercalary, sympodial, pale brown conidiogenous cells, producing solitary, multi-septate, scolecosporous, falcate, hyaline or brown conidia with extended apical cell and hyaline basal appendage (Seifert et al., 2011). Phylogenetically, *Mycocentrospora* was shown to be nested within the family Dothidotthiaceae (Pleosporales, Pleosporomycetidae, Dothideomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Mycoceros D. Magyar & Z. Merényi, Mycological Progress 17 (1-2): 36 (2017)

Index Fungorum number: IF819442

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Mycoceros antennatissimus* D. Magyar, Mycological Progress 17 (1-2): 37 (2017)

Sexual morph: Unknown.

Sequence data: *Mycoceros antennatissimus* (BP 105172, LSU: NG_060330, ITS: NR_148083)

Notes: For details of this genus see the monograph in Baral et al. (2020). In our phylogenetic analysis, *Mycoceros* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). We suggest assigning this genus in Orbiliaceae (Orbiliales, Orbiliomycetes). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Mycochaetophora Hara & Ogawa, Nippon Fung. Soc.: 112 (1931)

Index Fungorum number: IF9022

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Mycochaetophora japonica* Hara & Ogawa, Nippon Fung. Soc.: 112 (1931)

Sexual morph: Unknown.

Sequence data: *Mycochaetophora gentianae* (MAFF 239231, LSU: AB496937, ITS: NR_121201, SSU: NG_064831)

Notes: *Mycochaetophora* is characterized by having branched or penicillate, hyaline conidiophores, with monoblastic to polyblastic, sympodial, hyaline conidiogenous cells, producing catenate, septate, hyaline conidia (Seifert et al., 2011). Phylogenetically, *Mycochaetophora* was shown to be nested within the family Ploettnerulaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Nekoduka et al., 2010; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Mycofalcella Marvanová, Om-Kalth. & J. Webster, Nova Hedwigia 56 (3-4): 402 (1993)

Index Fungorum number: IF26474

Classification: Tricladiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Mycofalcella calcarata* Marvanová, Om-Kalth. & J. Webster, Nova Hedwigia 56 (3-4): 402 (1993)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011)

Sequence data: *Mycofalcella calcarata* (CCM F-10289, LSU: NG_060298, ITS: NR_154165, SSU: NG_065767)

Notes: *Mycofalcella* is dimorphic: (1) mononematous, unbranched or branched, sometimes reduced, hyaline conidiophores, with percurrent, hyaline conidiogenous cells, produces multi-septate, falcate, with basal appendage, hyaline conidia; (2) branched, penicillate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, produces aseptate, in slimy mass, hyaline conidia (Seifert et al., 2011). Johnston and Baschien (2020) introduced the family Tricladiaceae and accepted *Mycofalcella* within it. Phylogenetically, *Mycofalcella* was shown to be nested within the family Tricladiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Marvanová et al., 1993; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Mycogone Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 18 (1809)

Index Fungorum number: IF9026

Classification: Hypocreaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Mycogone rosea* Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 18 (1809)

Sexual morph: *Hypomyces* (Seifert et al., 2011).

Synanamorphs: *Cladobotryum*, verticillium-like (Seifert et al., 2011)

Sequence data: *Mycogone rosea* (CBS 488.67, LSU: MH870753)

Notes: *Mycogone* is dimorphic: (1) reduced conidiophores, monoblastic, hyaline conidiogenous cells, solitary, septate, with larger apical cell, brown conidia; (2) branched or verticillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate or septate, hyaline conidia (Seifert et al., 2011). References: (Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Mycophilomyces Crous & M.J. Wingf., Persoonia 37: 325 (2016)

Index Fungorum number: IF819075

Classification: Clavicipitaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Mycophilomyces periconiae* Crous & M.J. Wingf., Persoonia 37: 325 (2016)

Sexual morph: Unknown.

Sequence data: *Mycophilomyces periconiae* (CPC 27558 = CBS 142092, LSU: KY173509, ITS: KY173418)

Notes: It was introduced by Crous et al. (2016a) for a fungus collected on *Periconia* growing on leaves of *Albizia falcataria* (Fabaceae) and characterized by mononematous, flexuous, hypha-like, septate conidiophores, holoblastic, terminal, integrated conidiogenous, and solitary, granular, obclavate, hyaline conidia (Crous et al., 2016a). *Mycophilomyces* is similar to *Dactylella* (Orbiliaceae, Orbiliales, Orbiliomycetes), but they are phylogenetically distinct. References: (Crous et al.,

2016a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Mycosylva M.C. Tulloch, Transactions of the British Mycological Society 60 (1): 155 (1973)

Index Fungorum number: IF9034

Classification: ?Myxotrichaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Mycosylva clarkii* M.C. Tulloch, Transactions of the British Mycological Society 60 (1): 155 (1973)

Sexual morph: Unknown.

Sequence data: *Mycosylva clarkii* (CBS 608.73 = ATCC 32970 = IMI 163345 = JCM 32139, ITS: MH860779)

Notes: *Mycosylva* was introduced by Tulloch (1973) to accommodate *M. clarkii* and this genus is characterized by having synnematous conidiomata, branched, hyaline conidiophores, with monoblastic or polyblastic, intercalary, sympodial, denticulate, hyaline conidiogenous cells, producing solitary or catenate, aseptate, hyaline conidia (Seifert et al., 2011; Tulloch, 1973). Previous studies placed this genus in Ascomycota genera *incertae sedis* (Wijayawardene et al., 2017a, 2020). However, phylogenetically, *Mycosylva* was shown to be nested within the clade Myxotrichaceae (Helotiales, Leotiomycetes) (Figure 2.1). This genus maybe can place in the family Myxotrichaceae. References: (Seifert et al., 2011; Tulloch, 1973) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Mycovellosiella Rangel, Arquivos do Jardim Botânico do Rio de Janeiro 2: 71 (1917)

Index Fungorum number: IF9038

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Mycovellosiella cajani* (Henn.) Rangel ex Trotter, Sylloge Fungorum 25: 942 (1931)

Sexual morph: *Mycosphaerella* (Seifert et al., 2011).

Sequence data: *Mycovellosiella cajani* (CBS 142174 = CPC 30580 = RWB 2071, LSU: MF951182, ITS: MF951326)

Notes: *Mycovellosiella* was introduced by Rangel (1917) to replace the genus *Vellosiella* Rangel. *Mycovellosiella* is characterized by having macronematous, mononematous, branched or unbranched, subhyaline or brown conidiophores, with polyblastic, sympodial, terminal and intercalary, brown conidiogenous cells, producing solitary or catenate, aseptate or septate, ellipsoid-ovoid, subcylindrical-fusiform, obclavate, straight or curved, subhyaline to brown conidia (Videira et al., 2017). Phylogenetically, *Mycovellosiella* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Myotisia Kubátová, M. Kolařík & Hubka, Persoonia 38: 343 (2017)

Index Fungorum number: IF819229

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Myotisia cremea* Kubátová, M. Kolařík & Hubka, Persoonia 38: 343 (2017)

Sexual morph: Introduced as holomorph with malbranchea-like asexual morph.

Sequence data: *Myotisia cremea* (CCF 5407 = CBS 141864, LSU: LT627240, ITS: LT627243, SSU: LT671443)

Notes: It was introduced by Crous et al. (2017b) for a fungus collected on bat droppings of *Myotis myotis* and has malbranchea-like asexual morph. References: (Crous et al., 2017b) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Myrioconium Syd. & P. Syd., Annales Mycologici 10 (5): 448 (1912)

Index Fungorum number: IF9044

Classification: Sclerotiniaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Myrioconium scirpi* Syd. & P. Syd., Annales Mycologici 10 (5): 448 (1912)

Sexual morph: *Ciboria*, *Ciborinia*, *Dibeloniella*, *Lambertella*, *Poculum*, *Monilinia*, *Myriosclerotinia*, *Rutstroemia*, *Sclerotinia*, *Stromatinia* (Seifert et al., 2011).

Synanamorphs: *Amphobotrys*, *Botrytis*, *Cristulariella*, ?*Helicodendron*, *Monilia*, *Ovulitis*, *Rhacodiella*, *Septotis*, *Streptobotrys*, or producing sclerotia (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Myrioconium* was erected by Sydow and Sydow (1912) and it has sporodochial or mononematous, branched, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, and produces catenate, aseptate, globose, hyaline conidia aggregated in slimy mass. Phylogenetic position for *Myrioconium* is unresolved due to lack of sequence data. References: (Sydow & Sydow, 1912) (morphology), (Wijayawardene et al., 2020) (outline).

Myriodontium Samson & Polon., Persoonia 9 (4): 505 (1978)

Index Fungorum number: IF9045

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Myriodontium keratinophilum* Samson & Polon., Persoonia 9 (4): 505 (1978)

Sexual morph: *Neoarachnotheca* (Seifert et al., 2011).

Sequence data: *Myriodontium keratinophilum* (CBS 947.73, LSU: NG_063938, ITS: NR_157454)

Notes: *Myriodontium* was introduced by Samson and Polonelli (1978) and is characterized by procumbent, hyaline, branched conidiophores, polyblastic, integrated, denticualate conidiogenous cells, and produce solitary, aseptate, hyaline conidia. References: (Samson & Polonelli, 1978) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Myrmecridium Arzanlou, W. Gams & Crous, Studies in Mycology 58: 84 (2007)

Index Fungorum number: IF504559

Classification: Myrmecridiaceae, Myrmecridiales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Myrmecridium schulzeri* (Sacc.) Arzanlou, W. Gams & Crous, Studies in Mycology 58: 84 (2007)

Sexual morph: Unknown.

Sequence data: *Myrmecridium schulzeri* (CBS 100.54 = JCM 6974, LSU: EU041826, ITS: EU041769)

Notes: *Myrmecridium* was introduced by Arzanlou et al. (2007) to accommodate ramichloridium-like taxa, *Ramichloridium schulzeri* and its varieties. It is characterized by having macronematous, mononematous, unbranched, brown conidiophores, with polyblastic, cylindrical, pale brown conidiogenous cells, producing solitary, obovoidal or fusiform with a wing-like gelatinous sheath, subhyaline conidia. References: (Arzanlou et al., 2007) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Myrotheciomyces Crous, Persoonia 40: 351 (2018)

Index Fungorum number: IF825409

Classification: Myrotheciomycetaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Myrotheciomyces corymbiae* Crous, Persoonia 40: 351 (2018)

Sexual morph: Unknown.

Sequence data: *Myrotheciomyces corymbiae* (CPC 33206 = CBS 144420, LSU: NG_064542, ITS: NR_160351)

Notes: This genus is myrothecium-like, but phylogenetically differs from *Myrothecium* and other myrothecium-like genera. References: (Crous et al., 2018c) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Myrothecium Tode, Fungi Mecklenburgenses Selecti 1: 25 (1790)

Index Fungorum number: IF9049

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Myrothecium inundatum* Tode, Fungi Mecklenburgenses Selecti 1: 25, tab. 5, fig. 39 (1790)

Disease symptoms: Dieback, leaf spots

Sequence data: *Myrothecium inundatum* (CBS 275.48 = IMI 008983 = QM 7988, LSU: KU846474, ITS: KU846452)

Notes: The generic concept for *Myrothecium* was narrowed and only accepted the species that have sporodochia or mononematous conidiophores, and produces conidia smaller than 5 μm in green slimy masses without mucoid appendages. Only two species were accepted, *M. inundatum* and *M. simplex*. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Myrtacremonium Crous, Persoonia 38: 259 (2017)

Index Fungorum number: IF820937

Classification: Niessliaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Myrtacremonium eucalypti* Crous, Persoonia 38: 259 (2017)

Sexual morph: Unknown.

Sequence data: *Myrtacremonium eucalypti* (CBS 142161 = CPC 29272, LSU: KY979796, ITS: KY979741)

Notes: *Myrtacremonium* is acremonium-like but phylogenetically differs from other acremonium-like genera. References: (Crous et al., 2017b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Mystrosporiella Munjal & Kulshr., Mycopathologia et Mycologia Applicata 39 (3-4): 356 (1969)

Index Fungorum number: IF9050

Classification: Ascomycota genera *incertae sedis*

Type species: *Mystrosporiella litseae* Munjal & Kulshr., Mycopathologia et Mycologia Applicata 39 (3-4): 357 (1969)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Mystrosporiella* was erected by Munjal and Kulshrestha (1969) and it has macronematous, mononematous, solitary or in fascicles, septate, branched, brown conidiophores, with polyblastic, sympodial, scared, brown conidiogenous cells, and produces solitary, septate, clavate or obovate, hyaline to brown conidia. Phylogenetic position for *Mystrosporiella* is unresolved due to lack of sequence data. References: (Munjal & Kulshrestha, 1969) (morphology), (Wijayawardene et al., 2020) (outline).

Myxarium Wallr., Flora Cryptogamica Germaniae 2: 260 (1833)

= *Helicomyxa* R. Kirschner & Chee J. Chen, Studies in Mycology 50 (2): 338 (2004)

Index Fungorum number: IF18106

Classification: Hyaloriaceae, Auriculariales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Myxarium nucleatum* Wallr., Flora Cryptogamica Germaniae 2: 260 (1833)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Myxarium everhartioides* (before known as *Helicomyxa everhartioides*) (TNM, LSU: AY640107)

Notes: *Helicomyxa* was described by Kirschner and Chen (2004) and is characterized by having sporodochial, gelatinous conidiomata, irregularly branched, with clamp connections, hyaline conidiophores, monoblastic or polyblastic, terminal and intercalary, sympodial, hyaline conidiogenous cells, producing aseptate, dikaryotic, curved, hyaline conidia aggregated in slimy mass. Stalpers et al. (2021) synonymized *Helicomyxa* under *Myxarium*. Phylogenetically, representatives of *Myxarium* clustered in the family Hyaloriaceae (Auriculariales, Agaricomycetes) (Figure 2.1). References: (Kirschner & Chen, 2004) (morphology and phylogeny), (He et al., 2019) (outline).

Myxocephala G. Weber, Spaaij & Oberw., Sydowia 41: 360 (1989)

Index Fungorum number: IF11231

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Myxocephala albida* G. Weber, Spaaij & Oberw., Sydowia 41: 361 (1989)

Sexual morph: Unknown.

Sequence data: *Myxocephala albida* (CBS 962.87, LSU: MH873810, ITS: MH862120)

Notes: This genus is characterized by macronematous, mononematous, septate, polyverticillate, penicillate conidiophores, phialidic, subcylindrical, hyaline conidiogenous cells, and produces that are aseptate, aggregated in slimy heads. Previous studies placed this genus under Sordariomycetidae genera *incertae sedis*, however, phylogenetically this genus located in the family Nectriaceae (Figure 2.1). Herein, we put this genus in the family Nectriaceae. References: (Weber et al., 1989) (morphology), (Jacobs et al., 2001b; Kiyuna et al., 2012) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Myxospora L. Lombard & Crous, Persoonia 36: 202 (2016)

Index Fungorum number: IF816011

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Myxospora masonii* (M.C. Tulloch) L. Lombard & Crous, Persoonia 36: 205 (2016)

Sexual morph: Unknown.

Sequence data: *Myxospora masonii* (CBS 174.73 = IMI 158346 = ATCC 24426, LSU: KU846484, ITS: KU846462)

Notes: This genus is myrothecium-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Nalanthamala Subram., Journal of the Indian Botanical Society 35 (4): 478 (1956)

= *Rubrinectria* Rossman & Samuels, Studies in Mycology 42: 164 (1999)

Index Fungorum number: IF9076

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Nalanthamala madreeya* Subram., Journal of the Indian Botanical Society 35 (4): 478 (1956)

Sexual morph: *Rubrinectria* (Seifert et al., 2011); holomorphic description see Lombard et al. (2015).

Sequence data: *Nalanthamala psidii* (CBS 116952 = AR 4095, LSU: AY864837, ITS: AY864836)

Notes: The asexual morph of *Nalanthamala* is characterized by sporodochial conidiomata, branched or penicillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and catenate, aseptate, ovoid, hyaline conidia (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Natonodosa Heredia, R.F. Castañeda & D.W. Li, Mycological Progress 19 (1): 17 (2020)

Index Fungorum number: IF819411

Classification: Hypoxylaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Natonodosa speciosa* Heredia, R.F. Castañeda & D.W. Li, Mycological Progress 19 (1): 17 (2020) [MB#819412]

Sexual morph: Unknown.

Sequence data: *Natonodosa speciosa* (CLM-RV86, LSU: MF380435, ITS: MF380435, SSU: MF380435)

Notes: *Natonodosa* was introduced by Heredia et al. (2020) to accommodate *N. speciosa*. is characterized by having macronematous, mononematous unbranched, brown conidiophores with polyblastic, nodose, denticulate conidiogenous cells and producing aseptate, fusiform to navicular, hyaline conidia. Phylogenetically, *Natonodosa* located in the family Hypoxylaceae (Xylariales, Xylariomycetidae,

Sordariomycetes) (Figure 2.1). References: (Heredia et al., 2020) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Naviculispora Stchigel, Y. Marín, Cano & Guarro, Microorganisms 8 (9, no. 1430): 14 (2020)

Index Fungorum number: IF812135

Classification: Naviculisporaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Naviculispora terrestris* Stchigel, Y. Marín, Cano, & Guarro, Microorganisms 8 (9, no. 1430): 15 (2020)

Sexual morph: Introduced as holomorphic genus with hyphomycetous asexual morph (Marin-Felix et al., 2020).

Sequence data: *Naviculispora terrestris* (CBS 137295, LSU: NG_073599, ITS: NR_171111)

Notes: *Naviculispora* was introduced by Marin-Felix et al. (2020) with hyphomycetous asexual morph. Its asexual morph has reduced or sympodial conidiophores, phialidic conidiogenous cells, and produces ellipsoidal to subspherical, obovoid or clavate, hyaline to subhyaline conidia (Marin-Felix et al., 2020). References: (Marin-Felix et al., 2020) (morphology and phylogeny).

Necator Massee, Bulletin of Miscellaneous Informations of the Royal Botanical Gardens Kew 1898: 119 (1898)

Index Fungorum number: IF9082

Classification: Corticiaceae, Corticiales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Necator decretus* Massee, Bulletin of Miscellaneous Informations of the Royal Botanical Gardens Kew 1898: 119 (1898)

Sexual morph: *Corticium*, *Phanerochaete* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Necator* was erected by Massee (1898) and it has sporodochial, gelatinous conidiomata, reduced conidiophores, with thallic-arthric, hyaline conidiogenous cells and produces catenate, aseptate, oblong or ellipsoidal, hyaline

conidia. Phylogenetic position for *Necator* is unresolved due to lack of sequence data. References: (Massee, 1898) (morphology), (Wijayawardene et al., 2020) (outline).

Nectria (Fr.) Fr., Summa vegetabilium Scandinaviae 2: 387 (1849)

= *Tubercularia* Tode, Fungi Mecklenburgenses Selecti 1: 18 (1790)

Index Fungorum number: IF3431

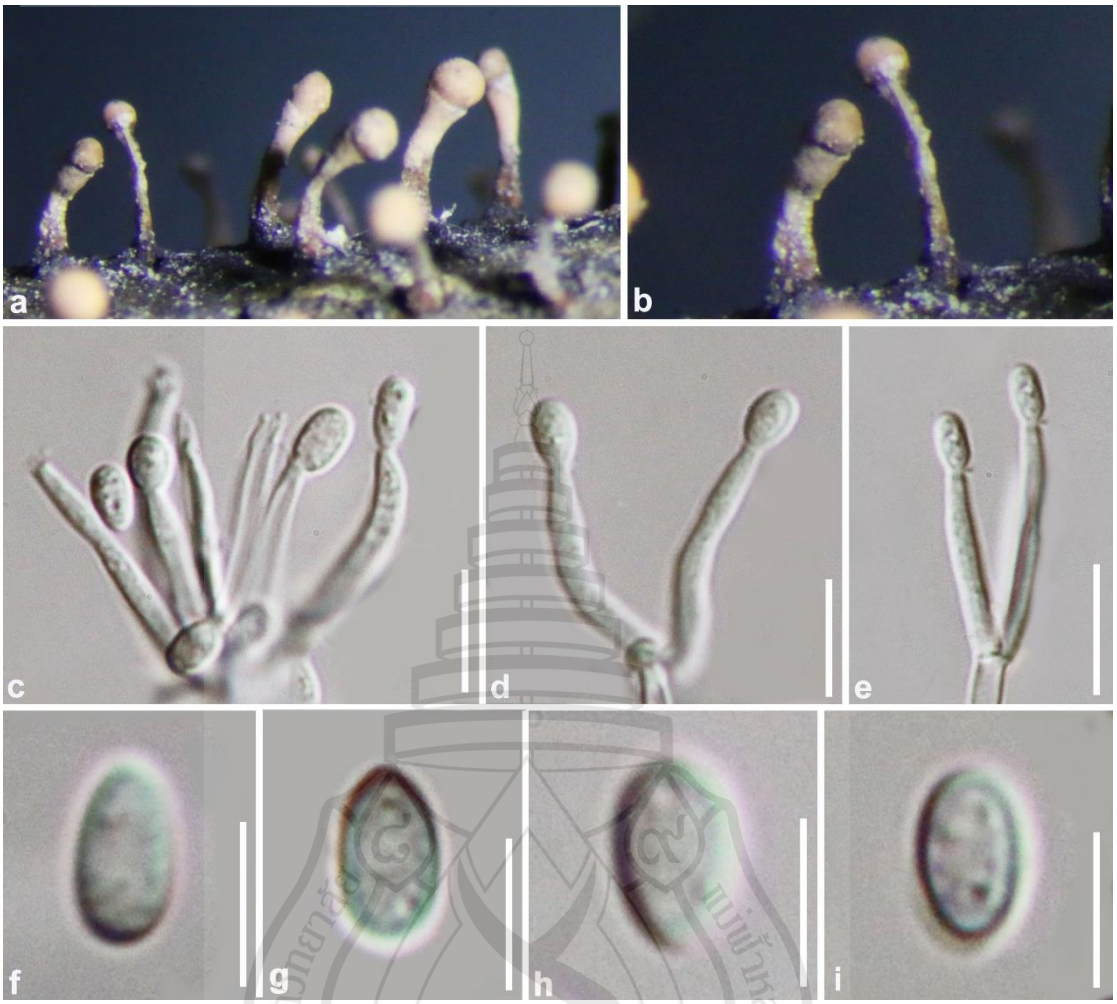
Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Nectria cinnabarina* (Tode) Fr., Summa vegetabilium Scandinaviae 2: 388 (1849)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Hirooka et al., 2012).

Sequence data: *Nectria cinnabarina* (CBS 125165 = AR 4477 = CLL 7152, LSU: HM484562, ITS: HM484548)

Notes: The asexual morph of *Nectria* is characterized by pycnidial, sporodochial or synnematous conidiomata, branched, hyaline conidiophores, phialidic, hyaline conidiogenous cells, aseptate, ellipsoid to fusoid, hyaline microconidia, and aseptate or 1-septate, ellipsoidal, oblong, cylindrical to allantoid or subglobose to ellipsoidal, hyaline macroconidia (Hirooka et al., 2012; Lombard et al., 2015). References: (Hirooka et al., 2012; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Nectria pseudotrichia*** (Material examined – China, Guizhou Province, Huaxi District, Guizhou Academy of Agricultural Sciences (106°66′ N 26°.49′ E), on the stem of *Sophora japonica*, 4 January 2018, Yao Feng, 17 (GZAAS 21-0307, living culture GZCC 21-0821)). **a, b** Appearance of conidiophores on culm. **c–e** Conidiogenous cells and conidia. **f–i** conidia. Scale bars: **c–e** = 10 µm. **f–i** = 5 µm.

Figure 2.41 *Nectria pseudotrichia*

Nemania Gray, A natural arrangement of British plants 1: 516 (1821)

= *Geniculosporium* Chesters & Greenh., Transactions of the British Mycological Society 47 (3): 400 (1964)

Index Fungorum number: IF3437

Classification: Xylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Nemania serpens* (Pers.) Gray, A natural arrangement of British plants 1: 516 (1821)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Geniculosporium*.

Sequence data: *Nemania macrocarpa* (CBS 109567, LSU: MH874423, ITS: MH862830)

Notes: *Geniculosporium* was introduced by Chesters and Greenhalgh (1964) and was reported as the asexual morph of *Nemania*. Réblová et al. (2016a) proposed using *Nemania* rather than *Geniculosporium*. References: (Chesters & Greenhalgh, 1964) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Nematogonum Desm., Annales des Sciences Naturelles Botanique 2: 69 (1834)

Index Fungorum number: IF9089

Classification: Ascomycota genera *incertae sedis*

Type species: *Nematogonum aurantiacum* Desm., Annales des Sciences Naturelles Botanique 2: 70 (1834)

Sexual morph: Unknown.

Synanamorphs: ?*Proteophiala* (Seifert et al., 2011).

Sequence data: *Nematogonum ferrugineum* (CBS 144203 = CPC 31872, ITS: MH107902)

Notes: *Nematogonum* was introduced by Desmazières (1834) and is characterized by having unbranched or branched, nodose, vesiculate, hyaline to pale brown conidiophores, with polyblastic, denticulate, hyaline to pale brown conidiogenous cells, and producing catenate, aseptate or septate, hyaline to pale

brown conidia (Desmazières, 1834; Seifert et al., 2011). Phylogenetic position for *Nematogonum* is unresolved due to lack of LSU sequence data. References: (Desmazières, 1834; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Nematographium Goid., Annali di Botanica 21 (1): 46 (1935)

Index Fungorum number: IF9090

Classification: Ascomycota genera *incertae sedis*

Type species: *Nematographium hippotrichoides* (Lindau) Goid., Ann. Bot., Roma 21(1): 46 (1935)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Five species are accepted in this genus. Phylogenetic position for *Nematographium* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Neoacanthostigma Boonmee, Bhat & K.D. Hyde, Fungal Diversity 68 (1): 278 (2014)

Index Fungorum number: IF550576

Classification: Tubeufiaceae, Tubeufiales, incertae sedis, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Neoacanthostigma fusiforme* Boonmee, Bhat & K.D. Hyde, Fungal Diversity 68 (1): 279 (2014)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Boonmee et al., 2014).

Sequence data: *Neoacanthostigma fusiforme* (MFLUCC 11-0510 = BCC 52383 = ICMP 20073, LSU: KF301537, ITS: KF301529)

Notes: *Neoacanthostigma* was introduced by Boonmee et al. (2014) to accommodate *N. filiforme*, *N. fusiforme* and *N. septoconstrictum*. Some of *Neoacanthostigma* species were transformed to *Acanthotubeufia* and *Berkleasmium* (Lu et al., 2018b). The asexual morph of *Neoacanthostigma* has monoblastic, integrated, sympodial, hyaline conidiogenous cells and produces solitary, septate,

helicoid, hyaline conidia (Lu et al., 2018b). Phylogenetically, *Neoacanthostigma* located in the family Tubeufiaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Boonmee et al., 2014; Lu et al., 2018b) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Neoacrodontiella Crous & M.J. Wingf., Persoonia 42: 347 (2019)

Index Fungorum number: IF830844

Classification: Acarosporaceae, Acarosporales, Acarosporomycetidae, Lecanoromycetes, Pezizomycotina, Ascomycota

Type species: *Neoacrodontiella eucalypti* Crous & Wingf., Persoonia 42: 347 (2019)

Sexual morph: Unknown.

Sequence data: *Neoacrodontiella eucalypti* (CBS 145561 = CPC 35693, LSU: NG_067885, ITS: NR_165567)

Notes: *Neoacrodontiella* was introduced by Crous et al. (2019a) and is characterized by macronematous, sporodochial, branched, multiseptate conidiophores, polyblastic, terminal and intercalary, sympodial, denticulate conidiogenous cells, solitary, guttulate, aseptate, fusoid, hyaline conidia (Crous et al., 2019a). It is similar to *Acrodontiella*, but differs by the formation of sporodochial conidiomata. References: (Crous et al., 2019a) (morphology and phylogeny).

Neobaryopsis Flakus, Etayo, Kukwa & Rodr. Flakus, Plant and Fungal Systematics 64 (2): 307 (2019)

Index Fungorum number: IF833335

Classification: Cordycipitaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Neobaryopsis andensis* Flakus, Etayo, Kukwa & Rodr. Flakus, Plant and Fungal Systematics 64 (2): 307 (2019)

Sexual morph: Introduced as holomorphic genus (Flakus et al., 2019).

Sequence data: *Neobaryopsis andensis* (A.F. 25967/2, LSU: NG_068701, ITS: NR_169713)

Notes: *Neobaryopsis* was introduced for a *Neobarya*-like lichenicolous fungi with hyphomycetous asexual morph (Flakus et al., 2019). Its asexual morph has synnematous conidiomata, branched, bi- or ter-verticillate, hyaline conidiophores, phialidic conidiogenous cells, aseptate, ellipsoidal, bacilliform-ellipsoidal to obovoid, hyaline conidia (Flakus et al., 2019). References: (Flakus et al., 2019) (morphology and phylogeny).

Neocalonectria Crous, Persoonia 45: 271 (2020)

Index Fungorum number: IF837819

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Neocalonectria tristaniopsidis* Crous, Persoonia 45: 271 (2020)

Sexual morph: Unknown.

Sequence data: *Neocalonectria tristaniopsidis* (CBS 146800 = CPC 38081, LSU: NG_074478, ITS: NR_171984)

Notes: The genus is characterized and differs from other genera by macronematous, mononematous, hyaline, penicillate conidiophores lacking a terminal vesicle, hyaline conidiogenous apparatus, hyaline phialides, and cylindrical, 1-septate, hyaline conidia (Crous et al., 2020a). References: (Crous et al., 2020a)(morphology and phylogeny)

Neocercospora M. Bakhshi, Arzanlou, Babai-ahari & Crous, Phytotaxa 213: 28 (2015)

Index Fungorum number: IF812284

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Neocercospora ammicola* M. Bakhshi, Arzanlou, Babai-ahari & Crous, Phytotaxa 213: 28 (2015)

Sexual morph: Unknown.

Sequence data: *Neocercospora ammicola* (CBS 136450 = CCTU 1186, LSU: KR232405, ITS: KR232407)

Notes: *Neocercospora* was established by Bakhshi et al. (2015) and is *Cercospora*-like. Phylogenetically, *Neocercospora* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes), but clustered apart from *Cercospora s. str.* (Figure 2.1). References: (Bakhshi et al., 2015; Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Neocladophialophora Crous & R.K. Schumach., Persoonia 33: 261 (2014)

Index Fungorum number: IF810618

Classification: Microthyriaceae, Microthyriales, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Neocladophialophora quercina* Crous & R.K. Schumach., Persoonia 33: 261 (2014)

Sexual morph: Unknown.

Sequence data: *Neocladophialophora quercina* (CBS 138874 = CPC 24426, LSU: NG_058128, ITS: NR_137948)

Notes: The genus is characterized by conidiophores reduced to conidiogenous cells, mono- to polyphialidic, hyaline to subhyaline conidiogenous cells, subcylindrical, clavate or subglobose, 0-1-septate, guttulate to granular, subhyaline conidia in long, rarely branched basipetal chains (Crous et al., 2014c). References: (Crous et al., 2014c) (morphology and phylogeny), (Crous et al., 2016a)(phylogeny) (Wijayawardene et al., 2017a, 2020) (outline).

Neocochlearomyces Pinruan, Sommai, Suetrong, J.Z. Groenew. & Crous, Persoonia 41: 381 (2018)

Index Fungorum number: IF828085

Classification: Muyocopronaceae, Muyocopronales, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Neocochlearomyces chromolaenae* Pinruan, Sommai, Suetrong, J.Z. Groenew. & Crous, Persoonia 41: 381 (2018)

Sexual morph: Unknown.

Sequence data: *Neocochlearomyces chromolaenae* (BCC 68250, LSU: NG_066431, ITS: NR_161151, SSU: NG_065766)

Notes: *Neocochlearomyces* is characterized by conidiophores are macronematous, mononematous, septate with apical fan-like conidiogenous region, conidiogenous cells are phialidic, terminal and intercalary on the one side of the fan-like structure, and conidia are in slimy spore mass, aseptate, guttulate, falcate, hyaline with setula at each end (Crous et al., 2018a). It is similar to *Cochlearomyces*, but differs by lacking of synnematous conidiomata, conidiogenous region are fan-like, and conidia are falcate, with setulae, which the latter has synnematous conidiomata, spoon-shaped conidiogenous region, and cylindrical conidia without setulae. References: (Crous et al., 2018a) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2020) (outline).

Neocrinula Crous, Persoonia 37: 287 (2016)

Index Fungorum number: IF819051

Classification: Helotiaceae or Neocrinulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Neocrinula xanthorrhoeae* Crous, Persoonia 37: 287 (2016)

Sexual morph: Unknown.

Sequence data: *Neocrinula xanthorrhoeae* (CPC 29474 = CBS 142136, LSU: NG_059743, ITS: NR_154252); *Neocrinula lambertiae* (CBS 143423 = CPC 32211, LSU: NG_058515, ITS: NR_156388)

Notes: This genus was introduced by Crous et al. (2016a) and characterized by solitary or in a cluster, brown synnemata, macronematous, synnematous, brown, septate conidiophores, monophialidic, terminal and intercalary conidiogenous cells and procudes solitary, aseptate, hyaline, fusoid-ellipsoid conidia (Crous et al., 2016a). *Neocrinula xanthorrhoeae* forms synnemata on the host *in vivo*, however, *N. lambertiae* forms solitary conidiophores on the host *in vivo* and sporodochia in culture (Crous et al., 2016a, 2017a). Crous et al. (2017a) introduced the family Neocrinulaceae and placed this genus under it. *Neocrinula* is similar to *Crinula* but they are phylogenetically distinct. References: (Crous et al., 2016a, 2017a) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020)(outline).

Neoeriomycopsis Crous & M.J. Wingf., Persoonia 34: 207 (2015)

Index Fungorum number: IF812452

Classification: Sordariomycetes genus incertae sedis, Pezizomycotina, Ascomycota

Type species: *Neoeriomycopsis aristata* (B. Sutton & Hodges) Crous & M.J. Wingf., Persoonia 34: 207 (2015)

Sexual morph: Unknown.

Sequence data: *Neoeriomycopsis aristata* (CBS 139913 = CPC 25050, LSU: NG_058170, ITS: NR_154231)

Notes: The genus is characterized by sporodochial or mononematous, branched conidiophores, polyblastic, hyaline conidiogenous cells, solitary, 1–3-septate, hyaline, fusiform conidia with truncate hila (Crous et al., 2015b). References: (Crous et al., 2015b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Neoeucasphaeria Crous, Persoonia 41: 293 (2018)

Index Fungorum number: IF828249

Classification: Niessliaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Neoeucasphaeria eucalypti* Crous, Persoonia 41: 293 (2018)

Sexual morph: Unknown.

Sequence data: *Neoeucasphaeria eucalypti* (CBS 145075 = CPC 33366, LSU: MK047495, ITS: MK047445)

Notes: *Neoeucasphaeria* is characterized by conidiomata are sporodochial, conidiophores are reduced to conidiogenous cells, conidiogenous cells are phialidic, subcylindrical, hyaline, and conidia are in slimy mass, aseptate, guttulate, ellipsoid, hyaline (Crous et al., 2018a). It is similar to *Eucasphaeria*, but differs by its aseptate, ellipsoid conidia. References: (Crous et al., 2018a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Neoeutypella M. Raza, Q.J. Shang, Phookamsak & L. Cai, Fungal Diversity 95: 167 (2019)

Index Fungorum number: IF555373

Classification: Diatrypaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Neoeutypella baoshanensis* M. Raza, Q.J. Shang, Phookamsak & L. Cai, Fungal Diversity 95: 168 (2019)

Sexual morph: Holomorphic genus (Phookamsak et al., 2019).

Sequence data: *Neoeutypella baoshanensis* (MFLUCC 16-1002, LSU: MT214618, ITS: MT310662, SSU: MT226729)

Notes: *Neoeutypella* was introduced by Phookamsak et al. (2019) and its asexual morph has macronematous, mononematous, branched, hyaline conidiophores, with phialidic, integrated, hyaline conidiogenous cells, produces solitary, aseptate, filiform, hyaline to pale yellow conidia. Phylogenetically, representatives of *Neoeutypella* clustered in the family Diatrypaceae, Xylariales, Sordariomycetes (Figure 2.1). References: (Phookamsak et al., 2019) (morphology), (Wijayawardene et al., 2020) (outline).

Neohelicosporium Y.Z. Lu, J.C. Kang & K.D. Hyde, Mycological Progress 17 (5): 637 (2017)

Index Fungorum number: IF822045

Classification: Tubeufiaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

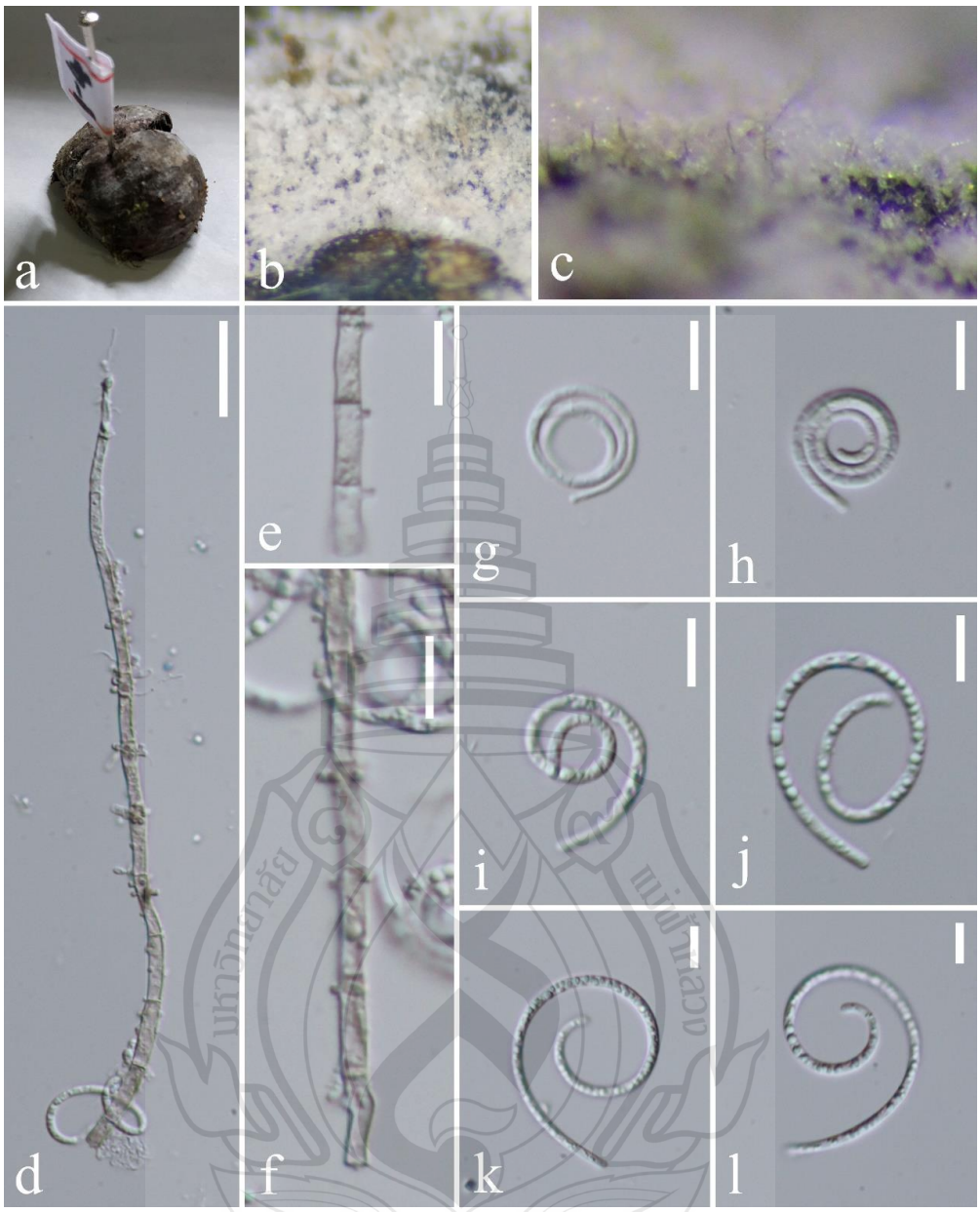
Type species: *Neohelicosporium parvisporum* Y.Z. Lu, J.C. Kang & K.D. Hyde, Mycological Progress 17 (5): 637 (2017)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Lu et al., 2018b)

Sequence data: *Neohelicosporium parvisporum* (MFLUCC 17-1523 = GZCC 16-0088, LSU: MF467939, ITS: MF467926)

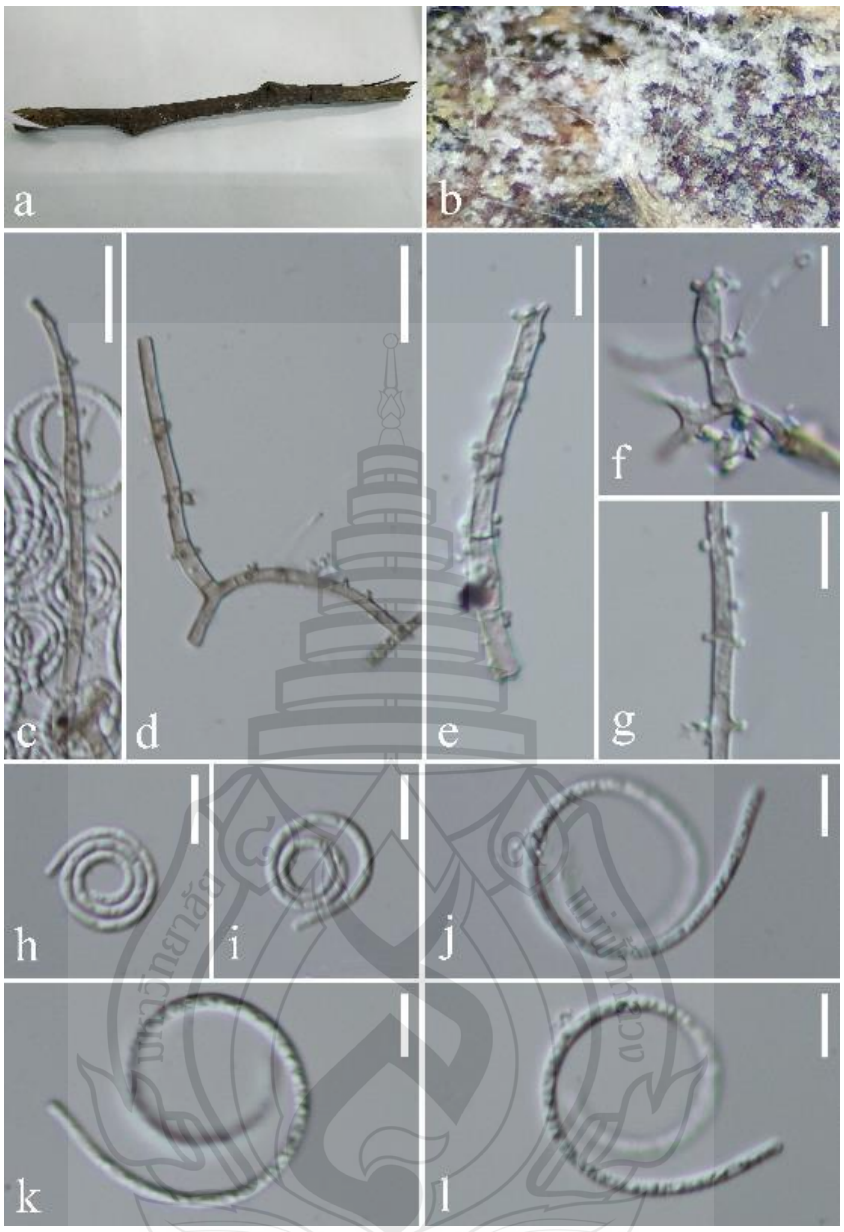
Notes: *Neohelicosporium* was established by Lu et al. (2018a) and its asexual morph has macronematous, mononematous, unbranched or branched, brown conidiophores, mono- to polyblastic, integrated, sympodial, intercalary or terminal, denticulate, hyaline to brown conidiogenous cells, produces solitary, septate, helicoid, hyaline to pale brown conidia. Phylogenetically, *Neohelicosporium* located in the family Tubeufiaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Lu et

al., 2018a, 2018b) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2020) (outline).



Note ***Neohelicosporium*** **sp**. (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-4). **a** Host material. **b, c** Conidiophores on the host surface. **d–f** Conidiophores and conidiogenous cells. **g–l** Conidia. Scale bars: **d** = 20 μm, **e–l** = 10 μm.

Figure 2.42 *Neohelicosporium* sp1



Note ***Neohelicosporium*** **sp**. (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-23). **a** Host material. **b** Conidiophores on the host surface. **c–g** Conidiophores and conidiogenous cells. **h–l** Conidia. Scale bars: **c, d** = 20 μm, **e–l** = 10 μm.

Figure 2.43 *Neohelicosporium* sp2

Neoidriella Hern.-Restr. & Crous, Persoonia 36: 78 (2016)

Index Fungorum number: IF 811884

Classification: Xylariales genera incertae sedis, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Neoidriella desertorum* (Nicot & Mouchacca) Hern.-Restr. & Crous, Persoonia 36: 78 (2016)

Sexual morph: Unknown.

Sequence data: *Neoidriella desertorum* (CBS 985.72, LSU: KP858985, ITS: KP859048)

Notes: This genus is *Idriella*-like. Phylogenetically, *Neoidriella* located in the order Xylariales within unkonwn family (Figure 2.1). References: (Hernández-Restrepo et al., 2016a) (morphology and phylogeny).

Neolauriomyces Crous, Persoonia 40: 359 (2018)

Index Fungorum number: IF825415

Classification: Neolauriomycetaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: Neolauriomyces eucalypti Crous, Persoonia 40: 359 (2018)

Sexual morph: Unknown.

Sequence data: *Neolauriomyces eucalypti* (CPC 32623 = CBS 144425, LSU: NG_067336, ITS: NR_160353)

Notes: Crous et al. (2018c) introduced this genus for a fungus collected on leaves of *Eucalyptus* sp. (Myrtaceae). It is similar to *Lauriomyces*, but phylogenetically they are distinct. References: (Crous et al., 2018c) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Neomycoleptodiscus Hern.-Restr., J.D.P. Bezerra & Crous, Persoonia 42: 221 (2019)

Index Fungorum number: IF829829

Classification: Muyocopronaceae, Muyocopronales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Neomycoleptodiscus venezuelensis* Hern.-Restr., J.D.P. Bezerra & Crous, Persoonia 42: 221 (2019)

Sexual morph: Unknown.

Sequence data: *Neomycoleptodiscus venezuelense* (CBS 100519, LSU: NG_066340, ITS: NR_164057)

Notes: *Neomycoleptodiscus* was established by Hernández-Restrepo et al. (2019) and is characterized by conidiomata are sporodochium-like, superficial, brown, conidiogenous cells are dark brown, ampulliform to doliiform, angular in face view, with a circular aperture situated in the upper side, producing conidia that are in mucous mass, 1-septate, hyaline, guttulate, cylindrical with a filamentous appendage at each end. Phylogenetically, *Neomycoleptodiscus* was shown to be nested within the family Muyocopronaceae (Muyocopronales, Dothideomycetes) (Figure 2.1). References: (Hernández-Restrepo et al., 2019) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2020) (outline).

Neomyrothecium L. Lombard & Crous, Persoonia 36: 205 (2016)

Index Fungorum number: IF816017

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Neomyrothecium humicola* L. Lombard & Crous, Persoonia 36: 205 (2016)

Sexual morph: Unknown.

Sequence data: *Neomyrothecium humicola* (CBS 310.96, LSU: KU846488, ITS: KU846467)

Notes: This genus is myrothecium-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Neonawawia J. Yang, K.D. Hyde & J.K. Liu, Mycosphere 9 (6): 1143 (2018)

Index Fungorum number: IF555449

Classification: Chaetosphaeriales genus incertae sedis, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Neonawawia malaysiana* (Crous & S.S. Lee) J. Yang, K.D. Hyde & J.K. Liu, Mycosphere 9 (6): 1143 (2018)

Sexual morph: Unknown.

Sequence data: *Neonawawia malaysiana* (CBS 125544 = CPC 16757, LSU: NG_068512, ITS: NR_168754)

Notes: *Neonawawia* was introduced by Yang et al. (2018) to accommodate a species previously known as *Nawawia malaysiana* Crous & S.S. Lee, and is characterized by sporodochial conidiomata, macronematous, branched, hyaline to pale brown conidiophores, monophialidic, hyaline to pale brown conidiogenous cells, and solitary, in slimy masses, hyaline, lobed, with 4–6 projections, aseptate, with a hair-like appendage at each corner. References: (Yang et al., 2018) (morphology and phylogeny), (Lin et al., 2019b) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Neonectria Wollenw., Annales Mycologici 15 (1-2): 52 (1917)

= *Cylindrocarpon* Wollenw., Phytopathology 1: 225 (1913)

= *Heliscus* Sacc., Michelia 2 (6): 35 (1880)

Index Fungorum number: IF3469

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Neonectria candida* (Ehrenb.) Rossman, L. Lombard & Crous, Studies in Mycology 80: 217 (2015)

Sexual morph: holomorphic descriptions see Chaverri et al. (2011) and Lombard et al. (2015).

Sequence data: *Neonectria candida* (CBS 151.29; IMI 113894; MUCL 28083, LSU: HM042436, ITS: AY677291)

Notes: The asexual morph of *Neonectria* is characterized by macronematous, mononematous or sporodochial, unbranched or irregularly branched conidiophores, phialidic, cylindrical conidiogenous cells, aseptate or 1-septate, ellipsoidal to oblong, hyaline microconidia, septate, straight or curved, hyaline

macroconidia, and globose to subglobose, hyaline chlamydospores (Chaverri et al., 2011; Lombard et al., 2015). References: (Chaverri et al., 2011; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Neoovularia U. Braun, Nova Hedwigia 54: 473 (1992)

Index Fungorum number: IF26306

Classification: Ascomycota genera *incertae sedis*

Type species: *Neoovularia nomuriana* (Sacc.) U. Braun, Nova Hedwigia 54(3-4): 474 (1992)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Phylogenetic position for *Neoovularia* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Neophaeococcomyces Crous & M.J. Wingf., Persoonia 35: 287 (2015)

Index Fungorum number: IF814935

Classification: Trichomeriaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Neophaeococcomyces aloes* (Crous & M.J. Wingf.) Crous & M.J. Wingf., Persoonia 35: 287 (2015)

Sequence data: *Neophaeococcomyces catenatus* (CBS 650.76 = ATCC 42183 = UAMH 4357, LSU: MH872793, ITS: MH861022)

Notes: This genus was introduced by Crous et al. (2015c) for *Phaeococcomyces aloes* and *Phaeococcus catenatus* which are *Phaeococcomyces*-like. Quan et al. (2020) placed this genus in the family Trichomeriaceae (Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes). References: (Crous et al., 2015c) (classification), (Wijayawardene et al., 2017a, 2020) (outline).

Neopseudocercosporella Videira & Crous, Studies in Mycology 83: 80 (2016)

Index Fungorum number: IF816820

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Neopseudocercosporella capsellae* (Ellis & Everh.) Videira & Crous, Studies in Mycology 83: 86 (2016)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Videira et al., 2016).

Sequence data: *Neopseudocercosporella capsellae* (CBS 112032; HJS 601, LSU: KF251824, ITS: KF251320)

Notes: *Neopseudocercosporella* was introduced by Videira et al. (2016) and is characterized by mononematous, solitary or grouped, unbranched, usually reduced, hyaline conidiophores, hyaline conidiogenous cells, solitary, 1- to multi-septate, subcylindrical to obclavate, hyaline conidia. Phylogenetically, *Neopseudocercosporella* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2016) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Neoramularia U. Braun, Nova Hedwigia 53: 291 (1991)

Index Fungorum number: IF11285

Classification: Ascomycota genera *incertae sedis*

Type species: *Neoramularia eurotiae* (Gamalizk.) U. Braun, Nova Hedwigia 53(3-4): 292 (1991)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Neoramularia* was erected by Braun (1991) and it has macronematous, densely fasciculate, septate, hyaline conidiophores, with polyblastic, sympodial, integrated conidiogenous cells, and produces solitary, 0-1-septate, smooth, subcylindric, obclavate-cylindric, ellipsoid, ovoid, hyaline conidia. Phylogenetic position for *Neoramularia* is unresolved due to lack of sequence data. References: (Braun, 1991) (morphology), (Wijayawardene et al., 2020) (outline).

Neoscolecobasidium Crous, Persoonia 37: 309 (2016)

Index Fungorum number: IF819064

Classification: Microthyriaceae, Microthyriales, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Neoscolecobasidium agapanthi* Crous, Persoonia 37: 309 (2016)

Sexual morph: Unknown.

Sequence data: *Neoscolecobasidium agapanthi* (CPC 28778, LSU: NG_059748, ITS: NR_152546)

Notes: It is characterized by macronematous, mononematous, unbranched, hyaline conidiophores, hyaline conidiogenous cells with denticle-like loci, and produces conidia that are solitary, guttulate, septate, constricted at central septum, hyaline becoming somewhat pale brown, fusoid-ellipsoid with marginal frill at the conidium hilum (Crous et al., 2016a). Phylogenetically, *Neoscolecobasidium* species located in Microthyriaceae (Microthyriales, Dothideomycetes) (Figure 2.1). References: (Crous et al., 2016a) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Neospermospora Crous & U. Braun, Fungal Systematics and Evolution 7: 84 (2020)

Index Fungorum number: IF838074

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Neospermospora avenae* (R. Sprague & Aar.G. Johnson) Crous & U. Braun, Fungal Systematics and Evolution 7: 84 (2020)

Sexual morph: Unknown.

Synanamorphs: Forming in culture that producing hyaline, aseptate microconidia (Crous et al., 2021a).

Disease symptoms: Leas spots

Sequence data: *Neospermospora avenae* (CBS 227.38, LSU: MW298374, ITS: MW298276)

Notes: *Neospermospora* was introduced by Crous et al. (2021a) and is characterized by having micronematous, mononematous, branched, hyaline to brown

conidiophores, and producing conidia that are solitary, septate, straight to curved, narrowly fusoid with long narrow rostrum and single filiform sub-basal appendage. References: (Crous et al., 2021a) (morphology), (Wijayawardene et al., 2020) (outline).

Neta Shearer & J.L. Crane, Mycologia 63 (2): 239 (1971)

Index Fungorum number: IF9120

Classification: Ascomycota genera *incertae sedis*

Type species: *Neta patuxentica* Shearer & J.L. Crane, Mycologia 63 (2): 241 (1971)

Sexual morph: Unknown.

Synanamorphs: cladosporium-like (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Neta* was introduced by Shearer and Crane (1971) and is characterized by having mononematous, branched, septate, setiform, hyaline conidiophores, polyblastic, sympodial, denticulate conidiogenous cells and producing 1-septate, slightly allantoid, hyaline conidia. Phylogenetic position for *Neta* is unresolved due to lack of sequence data. References: (Shearer & Crane, 1971) (morphology), (Wijayawardene et al., 2020) (outline).

Neurospora Shear & B.O. Dodge, Journal of Agricultural Research 34 (11): 1025 (1927)

= *Chrysonilia* Arx, Sydowia 34: 16 (1981)

Index Fungorum number: IF3502

Classification: Sordariaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Neurospora sitophila* Shear & B.O. Dodge, Journal of Agricultural Research 34 (11): 1019 (1927)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Chrysonilia* (Réblová et al., 2016a; von Arx, 1981a).

Sequence data: *Neurospora africana* (CBS 571.69 = ATCC 18747 = DSM 3553 = FGSC 1740, LSU: NG_067384, ITS: NR_077130)

Notes: von Arx (1981a) introduced the genus to accommodate the red bread mould, *Monilia sitophila*, and linked to the sexual genus *Neurospora*. Réblová et al. (2016a) proposed using *Neurospora* rather than *Chrysonilia*. References: (von Arx, 1981a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Nodulospora Marvanová & Bärl., Mycotaxon 75: 416 (2000)

Index Fungorum number: IF28435

Classification: Agaricomycotina genera *incertae sedis*, Basidiomycota

Type species: *Nodulospora inconstans* Marvanová & Bärl., Mycotaxon 75: 416 (2000)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Nodulospora* was introduced by Marvanová and Bärlocher (2000) and it has mononematous or synnematous, unbranched or branched, clamped, hyaline conidiophores, with thallic solitary, integrated, hyaline conidiogenous cells, and produces solitary, hyaline, clamped, staurosporous conidia. Phylogenetic position for *Nodulospora* is unresolved due to lack of sequence data. References: (Marvanová & Bärlocher, 2000) (morphology), (Wijayawardene et al., 2020) (outline).

Nothodactylaria Crous, Persoonia 43: 297 (2019) [MB#833023]

Index Fungorum number: IF833023, *Facesoffungi number*: FoFxxxx

Classification: Nothodactylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: ***Nothodactylaria nephrolepidis*** Crous, Persoonia 43: 297 (2019)

Sexual morph: Unknown.

Sequence data: Sequence data for ex-type culture of type species is available. Ex-type CBS 146078 = CPC 37028, LSU: NG_068668, ITS: NR_166331.

Notes: The genus is characterized by macronematous, mononematous, unbranched, subcylindrical, hyaline to pale brown, septate conidiophores, with sympodial, terminal, integrated, hyaline to pale brown, subcylindrical conidiogenous

cells, that produce solitary, aggregating in a mucoid mass, septate, hyaline, smooth, subcylindrical to fusoid-ellipsoid, straight conidia (Crous et al., 2019d). One species is accepted in this genus. References: (Crous et al., 2019d) (morphology and phylogeny), (Miller & Réblová, 2021) (phylogeny).

Obeliospora Nawawi & Kuthub., Mycotaxon 37: 395 (1990)

Index Fungorum number: IF11252

Classification: Ascomycota genera *incertae sedis*

Type species: *Obeliospora basispira* Nawawi & Kuthub., Mycotaxon 37: 397 (1990)

Sexual morph: Unknown.

Synnamorph: *Phialophora*-like (Cantillo-Pérez et al., 2018).

Sequence data: *Obeliospora microappendiculata* (LAMIC 30.16, LSU: KY789451, ITS: KY789469)

Notes: *Obeliospora* was established by Nawawi and Kuthubutheen (1990) and is characterized by having unbranched, sterile, septate setae, macronematous, mononematous, solitary or in small groups, unbranched, septate, brown conidiophores, monophialidic with conspicuously flared and cup-shaped collarettes, integrated, terminal conidiogenous cells, producing solitary, aseptate, globose to subglobose, hyaline to brown conidia with several appendages. Cantillo-Pérez et al. (2018) provided a key to *Obeliospora* species. Phylogenetically, a strain LAMIC 30.16, named *Obeliospora microappendiculata*, was shown to be nested within the family Hyaloscyphaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Cantillo-Pérez et al., 2018; Kuthubutheen & Nawawi, 1994b; Nawawi & Kuthubutheen, 1990; Wu & McKenzie, 2003) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Ochraceocephala Voglmayr & Aiello, MycoKeys 66: 12 (2020)

Index Fungorum number: IF833933

Classification: Leptosphaeriaceae, Pleosporales, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Ochraceocephala foeniculi* Voglmayr & Aiello, MycoKeys 66: 14 (2020)

Sexual morph: Unknown.

Sequence data: *Ochraceocephala foeniculi* (CBS 145654, LSU: MN516774, ITS: MN516753, SSU: MN516743)

Notes: *Ochraceocephala* was established by Aiello et al. (2020) to accommodate a pathogen, *Ochraceocephala foeniculi*, causing crown rot of fennel. *Ochraceocephala* is characterized by having micronematous, mononematous, unbranched or verticillate, hyaline conidiophores, with monophialidic, rarely polyphialidic, hyaline conidiogenous cells, producing catenate, aseptate, thick-walled, hyaline conidia (Aiello et al., 2020). Phylogenetically, *Ochraceocephala* was shown to be nested within the family Leptosphaeriaceae (Pleosporales, Pleosporomycetidae, Dothideomycetes) (Figure 2.1). References: (Aiello et al., 2020) (morphology and phylogeny), (Hongsanan et al., 2020a) (outline).

Oculimacula Crous & W. Gams, European Journal of Plant Pathology 109 (8): 845 (2003)

= *Helgardia* Crous & W. Gams, European Journal of Plant Pathology 109 (8): 845 (2003)

Index Fungorum number: IF28777

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Oculimacula yallundae* (Wallwork & Spooner) Crous & W. Gams, European Journal of Plant Pathology 109 (8): 846 (2003)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Helgardia* (Crous et al., 2003).

Sequence data: *Helgardia anguioides* (CBS 496.80, LSU: MH873055, ITS: NR_158522)

Notes: *Helgardia* was erected by Crous et al. (2003) and linked to the sexual morphic genus *Oculimacula*. *Helgardia* is characterized by having mononematous, solitary or fasciculate, unbranched or branched, often reduced, hyaline to pale olivaceous conidiophores, with polyblastic, integrated, sympodial conidiogenous cells, producing solitary, arranged in slimy packets, one- to multi-septate, acicular-filiform, straight to curved, hyaline conidia (Crous et al., 2003).

Phylogenetically, *Helgardia* was shown to be nested within the family Ploettnerulaceae (Helotiales, Leotiomycetes) (Figure 2.1). Johnston et al. (2014) proposed to protect *Oculimacula* over *Helgardia*. References: (Crous et al., 2003) (morphology and phylogeny).

Odontodictyospora Mercado, Acta Botanica Cubana 22: 1 (1984)

Index Fungorum number: IF11142

Classification: Ascomycota genera *incertae sedis*

Type species: *Odontodictyospora comasii* Mercado, Acta Botanica Cubana 22: 1 (1984)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted in this genus. Phylogenetic position for *Odontodictyospora* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Oedocephalum Preuss, Linnaea 24: 131 (1851)

Index Fungorum number: IF9138

Classification: Pezizaceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Oedocephalum elegans* Preuss, Linnaea 24: 131, tab. 1, fig. 31 (1851)

Sexual morph: *Cleistoiodophanus*, *Iodophanus*, *Peziza* (Seifert et al., 2011; Stalpers, 1974)

Sequence data: *Oedocephalum adhaerens* (CBS 125450 = BRIP 52200, LSU: MH875145, ITS: FJ695215)

Notes: *Oedocephalum* is characterized by having mononematous, unbranched or rarely branched, septate, vesiculate, hyaline or rarely slightly pigmented conidiophores, with polyblastic, synchronous, denticulate, hyaline conidiogenous cells, producing aseptate, smooth to distinctly warty, hyaline conidia (Seifert et al., 2011; Stalpers, 1974). Phylogenetically, *Oedocephalum* was shown to be nested within the family Pezizaceae (Pezizales, Pezizomycetes) (Figure 2.1).

References: (Davison et al., 2009; Seifert et al., 2011; Stalpers, 1974) (morphology and phylogeny), (Wijayawardene et al., 2017a) (outline).

Oidiodendron Robak, Nytt Magazin for Naturvidenskapene 71: 245 (1932)

Index Fungorum number: IF9141

Classification: ?Myxotrichaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Oidiodendron fuscum* Robak, Nytt Magazin for Naturvidenskapene 71: 249 (1932)

Sexual morph: *Byssoascus*, *Myxotrichum* (Seifert et al., 2011).

Sequence data: *Oidiodendron fuscum* (CBS 238.31, LSU: AB040706, ITS: MH855197, SSU: AB015787)

Notes: *Oidiodendron* is characterized by setae are none or branched, brown, conidiophores are branched, hyaline or brown, conidiogenous cells are thallic-arthic, hyaline or brown, conidia are aseptate, hyaline or brown, in branched chains with connectives (Seifert et al., 2011). Phylogenetically, *Oidiodendron* was shown to be nested within the clade Myxotrichaceae (Helotiales, Leotiomycetes) (Figure 2.1). This genus maybe can place in the family Myxotrichaceae. References: (Rice & Currah, 2005a, 2005b; Seifert et al., 2011; Sigler & Gibas, 2005) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Oidiopsis Scalia, Agric. Calabro-Siculo: 396 (1902)

Index Fungorum number: IF9142

Classification: Erysiphaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Oidiopsis sicula* Scalia, Agric. Calabro-Siculo: 396 (1902)

Sexual morph: *Leveillula* (Seifert et al., 2011).

Sequence data: *Oidiopsis balsaminae* (HAI04326, ITS: LC565542)

Notes: *Oidiopsis* species were reported as causing agent of powdery mildew of different hosts (Abdel-Azeem & Abdel-Moneim, 2009; Fayette et al., 2016; Halfeld-Vieira et al., 2007; Park et al., 2008; Ribeiro et al., 2007). Phylogenetic

position for *Oidiopsis* is unresolved due to lack of LSU sequence data. References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Oidium Link, Caroli a Linné Species Plantarum exhibentes Plantas Rite Cognitas ad Genera Relatas 6 (1): 121 (1824)

Index Fungorum number: IF9143

Classification: Erysiphaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Oidium monilioides* (Nees) Link, Caroli a Linné Species Plantarum exhibentes Plantas Rite Cognitas ad Genera Relatas 6 (1): 122 (1824)

Sexual morph: *Arthrocladiella*, *Blumeria*, *Cystotheca*, *Erysiphe*, *Golovinomyces*, *Medusosphaera*, *Microsphaera*, *Neoerysiphe*, *Podosphaera*, *Sawadaea*, *Sphaerotheca*, *Uncinula*, *Uncinuliella* (Seifert et al., 2011).

Sequence data: *Oidium heveae* (MUMH2602, LSU: AB197136, ITS: AB193589)

Notes: *Oidium* is characterized by mononematous, reduced conidiophores, with meristem arthric, hyaline conidiogenous cells, producing solitary or catenate, aseptate, hyaline conidia (Seifert et al., 2011). Phylogenetically, representatives of *Oidium* clustered in the family Erysiphaceae, Helotiales, Leotiomycetes (Figure 2.1). References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Oncocladium Wallr., Flora Cryptogamica Germaniae 2: 289 (1833)

Index Fungorum number: IF9151

Classification: Gymnoascaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Oncocladium flavum* Wallr., Flora Cryptogamica Germaniae 2: 289 (1833)

Sexual morph: Unknown.

Synanamorphs: *Malbranchea* (Sigler et al., 1987).

Sequence data: Sequence is unavailable for this genus.

Notes: *Oncocladium* differs from other hyphomycetous genera by verticillate, brown, thick-walled setae, reduced conidiophores, arthric, hyaline conidiogenous cells, and solitary, aseptate, hyaline conidia (Hughes, 1968; Seifert et al., 2011; Sigler et al., 1987). References: (Hughes, 1968; Sigler et al., 1987) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Onychocola Sigler, Journal of Medical and Veterinary Mycology 28 (5): 409 (1990)

Index Fungorum number: IF11264

Classification: Arachnomycetaceae, Arachnomycetales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Onychocola canadensis* Sigler, Journal of Medical and Veterinary Mycology 28 (5): 409 (1990)

Sexual morph: *Arachnomyces* (Seifert et al., 2011).

Synanamorphs: Producing chlamydospores and sclerotia (Seifert et al., 2011).

Sequence data: *Arachnomyces glareosus* (CBS 116129, LSU: FJ358273, SSU: FJ358341)

Notes: *Onychocola* was introduced by Sigler and Congly (1990) for a fungus isolated from three cases of great toenail infection. *Onychocola* is characterized by mononematous, reduced conidiophores, thallic-arthric, hyaline conidiogenous cells, and catenate, aseptate or septate, ellipsoidal or cylindrical, hyaline to subhyaline conidia (Seifert et al., 2011; Sigler & Congly, 1990). Phylogenetically, representative of *Arachnomyces* clustered in the family Arachnomycetaceae, Arachnomycetales, Eurotiomycetes (Figure 2.1). References: (Seifert et al., 2011; Sigler & Congly, 1990) (morphology), (Wijayawardene et al., 2020) (outline).

Onychophora W. Gams, P.J. Fisher & J. Webster, Transactions of the British Mycological Society 82 (1): 174 (1984)

Index Fungorum number: IF11144

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Onychophora coprophila* W. Gams, P.J. Fisher & J. Webster, Transactions of the British Mycological Society 82 (1): 174 (1984)

Sexual morph: Unknown.

Sequence data: *Onychophora coprophila* (CBS 247.82, LSU: MH873238, ITS: MH861494)

Notes: *Onychophora* was introduced by Gams et al. (1984) and is characterized by having synnematous conidiomata, macronematous, branched, hyaline conidiophores, phialidic, flask-shaped, hyaline conidiogenous cells, aseptate, in slimy mass, obovoidal to ellipsoidal, hyaline conidia. Previous studies placed this genus in Ascomycota genera *incertae sedis* (Wijayawardene et al., 2017a, 2020). However, the ex-type strain (CBS 247.82) of the type species phylogenetically located in the family Bionectriaceae (Hypocreales, Hypocreomycetidae, Sordariomycetes) (Figure 2.1). Hence, we suggest placing this genus in the family Bionectriaceae, since its phylogenetic position and it shares similar morphological characters with other genera in this family. References: (Gams et al., 1984) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Ophidiomyces Sigler, Hambl. & Paré, Index Fungorum 19: 1 (2013)

Index Fungorum number: IF550166

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Ophidiomyces ophiodiicola* (Guarro, Deanna A. Sutton, Wickes & Rajeev) Sigler, Hambl. & Paré (2013)

Sexual morph: Unknown.

Disease symptoms: Causing mycotic granuloma on snake (Rajeev et al., 2009).

Sequence data: *Ophidiomyces ophiodiicola* (MYCO-ARIZ AN0400001, LSU: MWKM01000033: 922–2350, ITS: MWKM01000033: 2281–3300, SSU: MWKM01000033: 2917–4737)

Notes: *Ophidiomyces* was introduced by Sigler (2013) to accommodate a species previously known as Chrysosporium ophiodiicola, which was collected from a mycotic granuloma of a black rat snake (*Elaphe obsoleta obsoleta*). It is characterized by producing solitary, smooth, cylindrical to clavate, hyaline, thallic conidia and arthric conidia in chains. References: (Rajeev et al., 2009; Sigler, 2013) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Ophionectria Sacc., Michelia 1 (3): 323 (1878)

= *Antipodium* Piroz., Canadian Journal of Botany 52 (5): 1143 (1974)

Index Fungorum number: IF3608

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Ophionectria trichospora* (Berk. & Broome) Sacc., Michelia 1 (3): 323 (1878)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Ophionectria trichospora* (CBS 109876 = GJS 01-155, LSU: AF543790, SSU: AF543766)

Notes: The asexual morph of *Ophionectria* was reported in *Antipodium*, which has macronematous, mononematous, unbranched, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and septate, fusiform, or broadly ellipsoidal to ovoid, hyaline becoming olive-yellow conidia with short apical appendage (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Orbilia Fr., Corpus Florarum provincialium suecicae I. Floram Scanicam: 343 (1836)

= *Dicranidion* Harkn., Bulletin of the California Academy of Sciences 1 (3): 163 (1885)

= *Trinacrium* Riess, Beiträge zur Mykologie 2: 42 (1852)

Index Fungorum number: IF3626

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Orbilia xanthostigma* (Fr.) Fr., Summa vegetabilium Scandinaviae 2: 357 (1849)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Orbilia liliputiana* (CBS 116213 = BBA 69350, LSU, ITS and SSU: KT215284)

Notes: For details of *Dicranidion*, *Orbilia* and *Trinacrium* see the monograph in Baral et al. (2020). Phylogenetically, *Orbilia* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Osteomorpha Arnaud ex Watling & Kendrick, Yorkshire Naturalist 104: 1 (1979)

Index Fungorum number: IF517859

Classification: Hydnaceae, Cantharellales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Osteomorpha fragilis* G. Arnaud ex Watling & W.B. Kendr., Yorkshire Naturalist 104: 1 (1979)

Sexual morph: *Trechispora* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted in this genus. Phylogenetic position for *Osteomorpha* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Ostracodermidium Mukerji, Transactions of the Mycological Society of Japan 14: 175 (1973)

Index Fungorum number: IF9174

Classification: Ascomycota genera *incertae sedis*

Type species: *Ostracodermidium serpentinum* (J.N. Rai & J.P. Tewari) Mukerji, Transactions of the Mycological Society of Japan 14: 176 (1973)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ostracodermidium* was introduced by Mukerji (1973) and one species is accepted. Phylogenetic position for *Ostracodermidium* is unresolved due to lack of sequence data. References: (Mukerji, 1973) (morphology), (Wijayawardene et al., 2020) (outline).

Ovadendron Sigler & J.W. Carmich., Mycotaxon 4 (2): 391 (1976)

Index Fungorum number: IF9179

Classification: Onygenales genera *incertae sedis*, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Ovadendron sulphureo-ochraceum* (J.F.H. Beyma) Sigler & J.W. Carmich., Mycotaxon 4 (2): 392 (1976)

Sexual morph: Unknown.

Sequence data: *Ovadendron sulphureo-ochraceum* (CBS 233.32, ITS: MH855301)

Notes: *Ovadendron* was described by Sigler and Carmichael (1976) for *Oospora sulphureo-ochracea* van Beyma, and it has micronematous, mononematous, branched, reduced, hyaline conidiophores, with thallic-arthric, hyaline conidiogenous cells, and conidia that are catenate with connectives, aseptate, smooth, barrel-shaped, hyaline. Phylogenetic position for *Ovadendron* is unresolved due to lack of LSU sequence data. References: (Sigler & Carmichael, 1976) (morphology), (Wijayawardene et al., 2020) (outline).

Ovicillium Zare & W. Gams, Mycological Progress 15: 1020 (2016)

Index Fungorum number: IF815495

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Ovicillium attenuatum* Zare & W. Gams, Mycological Progress 15: 1021 (2016)

Sexual morph: Unknown.

Sequence data: *Ovicillium attenuatum* (CBS 158.96, LSU: KU382232, ITS: KU382186); *Ovicillium attenuatum* (CBS 399.86 = INIFAT C86/59-3, ITS: NR_154333)

Notes: *Ovicillium* was introduced by Zare and Gams (2016) and is verticillium-like. References: (Zare & Gams, 2016) (morphology and phylogeny).

Ovipoculum Zhu L. Yang & R. Kirschner, Fungal Diversity 43: 58 (2010)

Index Fungorum number: IF516041

Classification: Auriculariales genera incertae sedis, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Ovipoculum album* Zhu L. Yang & R. Kirschner, Fungal Diversity 43: 58 (2010)

Sexual morph: Unknown.

Sequence data: *Ovipoculum album* (HKAS 55229, LSU: GU292814)

Notes: This genus was described by Kirschner et al. (2010) and is characterized by having gelatinous, cupulate conidiomata, and producing hyaline bulbils from clamped hyphae. Phylogenetically, representatives of *Ovipoculum* clustered in the family xxxx (Figure 2.1). References: (Kirschner et al., 2010) (morphology and phylogeny).

Ovulariopsis Pat. & Har., Journal de Botanique (Morot) 14: 245 (1900)

Index Fungorum number: IF9183

Classification: Erysiphaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Ovulariopsis erysiphoides* Pat. & Har., Journal de Botanique (Morot) 14: 245 (1900)

Sexual morph: *Phyllactinia*, *Pleiochaeta* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ovulariopsis* was introduced by Patouillard and Hariot (1900) to accommodate *O. erysiphoides*. Phylogenetic position for *Ovulariopsis* is unresolved due to lack of sequence data. References: (Braun & de Jesús Yáñez-Morales, 2009; Kirschner & Chen, 2008; Liberato & Barreto, 2005; Patouillard & Hariot, 1900) (morphology), (Wijayawardene et al., 2020) (outline).

Ovulinia F.A. Weiss, Phytopathology 30: 242 (1940)

= *Ovulitis* N.F. Buchw., Friesia 9 (3): 328 (1970)

Index Fungorum number: IF3660

Classification: Sclerotiniaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Ovulinia azaleae* F.A. Weiss, Phytopathology 30: 243 (1940)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Ovulitis* (Johnston et al., 2014; Seifert et al., 2011).

Sequence data: Ovulinia azaleae (CBS 680.88, LSU: MH873840, ITS: MH862149)

Notes: The sexual morph of *Ovulitis* was reported in the genus *Ovulinia* (Johnston et al., 2014; Seifert et al., 2011), and Johnston et al. (2014) proposed to use *Ovulinia* rather than *Ovulitis*. Phylogenetically, *Ovulinia* was shown to be nested within the family Sclerotiniaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Wijayawardene et al., 2017a, 2020) (outline).

Pachycladina Marvanová, Transactions of the British Mycological Society 87: 617 (1987)

Index Fungorum number: IF11146

Classification: Ascomycota genera *incertae sedis*

Type species: *Pachycladina mutabilis* Marvanová, Transactions of the British Mycological Society 87: 617 (1987)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pachycladina* was erected by Marvanová (1986) and it has micronematous or semi-macronematous, solitary, unbranched, septate, sometimes reduced, hyaline conidiophores, with monoblastic, sometimes percurrent or sympodial, scared, hyaline conidiogenous cells, and produces solitary, multi-septate, long fusoid or branched, hyaline conidia. Phylogenetic position for *Pachycladina* is unresolved due to lack of sequence data. References: (Marvanová, 1986) (morphology), (Wijayawardene et al., 2020) (outline).

Padixonia Subram., Current Science 41 (8): 282 (1972)

Index Fungorum number: IF9195

Classification: Xylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Padixonia bispora* Subram., Current Science 41 (8): 282 (1972)

Sexual morph: *Xylaria* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Padixonia* was erected by Subramanian (1972) and it has synnematous conidiomata, macronematous, dichotomously branched, septate, sometimes reduced conidiophores, with monoblastic, hyaline conidiogenous cells, and produces catenate, aseptate, hyaline conidia. Phylogenetic position for *Padixonia* is unresolved due to lack of sequence data. References: (Subramanian, 1972) (morphology), (Wijayawardene et al., 2020) (outline).

Paecilomyces Bainier, Bulletin de la Société Mycologique de France 23: 27 (1907)

Index Fungorum number: IF9196

Classification: Thermoascaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Paecilomyces variotii* Bainier, Bulletin de la Société Mycologique de France 23: 27 (1907)

Sexual morph: *Byssochlamys*, *Chromocleista*, *Dactylomyces*, *Talaromyces*, *Thermoascus* (Rossman et al., 2016; Seifert et al., 2011).

Synanamorphs: chlamydospores (Seifert et al., 2011).

Sequence data: *Paecilomyces niveus* (CBS 100.11, LSU: FJ358279, ITS: NR_144910, SSU: NG_061072)

Notes: *Paecilomyces* is characterized by penicillate, verticillate or branched, hyaline conidiophores, phialidic conidiogenous cells, catenate, aseptate, hyaline conidia (Seifert et al., 2011). References: (Houbraken et al., 2020; Liang et al., 2005, 2009b; Luangsa-Ard et al., 2005; Samson et al., 2009; Samson, 1974) (morphology and phylogeny), (Rossman et al., 2016) (nomenclature), (outline).

Pagidospora Drechsler, Sydowia 14 (1-6): 246 (1960)

Index Fungorum number: IF9197

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Pagidospora amoebophila* Drechsler, Sydowia 14 (1-6): 247 (1960)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pagidospora* was introduced by Drechsler (1960) and one species is accepted. Phylogenetic position for *Pagidospora* is unresolved due to lack of sequence data. References: (Drechsler, 1960) (morphology), (Wijayawardene et al., 2020) (outline).

Paliphora Sivan. & B. Sutton, Transactions of the British Mycological Society 85 (2): 249 (1985)

Index Fungorum number: IF11148

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Paliphora aurea* Sivan. & B. Sutton, Transactions of the British Mycological Society 85 (2): 251 (1985)

Sexual morph: Unknown.

Sequence data: *Paliphora intermedia* (CBS 896.97, LSU: NG_057766, ITS: NR_160203, SSU: NG_065539)

Notes: *Paliphora* was introduced by Sivanesan and Sutton (1985) and is characterized by macronematous, mononematous, septate, conidiophores, polytretic integrated, intercalary conidiogenous cells, and aseptate or 1-septate, falcate, hyaline conidia. References: (Goh et al., 2014; Gusmão et al., 2008; Malosso et al., 2018; Sivanesan & Sutton, 1985) (morphology), (Lin et al., 2019b; Shenoy et al., 2010) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Pappimyces B. Sutton & Hodges, Nova Hedwigia 26: 527 (1975)

Index Fungorum number: IF9203

Classification: Ascomycota genera *incertae sedis*

Type species: *Pappimyces hastatus* B. Sutton & Hodges, Nova Hedwigia 26: 528 (1975)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pappimyces* was established by Sutton and Hodges (1975) and one species is accepted. Phylogenetic position for *Pappimyces* is unresolved due to lack of sequence data. References: (Sutton & Hodges, 1975) (morphology), (Wijayawardene et al., 2020) (outline).

Paraarthrocladium Matsush., Matsushima Mycological Memoirs 7: 58 (1993)

Index Fungorum number: IF26485

Classification: Ascomycota genera *incertae sedis*

Type species: *Paraarthrocladium amazonense* Matsush., Matsushima Mycological Memoirs 7: 59 (1993)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Paraarthrocladium* was introduced by Matsushima (1993) and it has macronematous or semi-macronematous, unbranched or branched, hyaline conidiophores, with monoblastic or polyblastic, sympodial, hyaline conidiogenous cells, and produces solitary, multi-septate, cylindrical, hyaline conidia. Phylogenetic position for *Paraarthrocladium* is unresolved due to lack of sequence data. References: (Matsushima, 1993) (morphology), (Wijayawardene et al., 2020) (outline).

Paraceratocladium R.F. Castañeda, Fungi Cubenses II: 8 (1987)

Index Fungorum number: IF11151

Classification: Ascomycota genera *incertae sedis*

Type species: *Paraceratocladium silvestre* R.F. Castañeda, Fungi Cubenses II: 9 (1987)

Sexual morph: Unknown.

Sequence data: *Paraceratocladium silvestre* (NN078262, LSU: OL655260, ITS: OL628580)

Notes: *Paraceratocladium* is characterized by setae are unbranched, brown setae, conidiophore are brown, wrapped around setae, conidiogenous cells are phialidic, intercalary, brown, and conidia are septate, falcate, hyaline (Seifert et al., 2011). Phylogenetically, representative of *Paraceratocladium* clustered in the family Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetes (Figure 2.1). References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Parachionomyces Thaung, Transactions of the British Mycological Society 72 (2): 333 (1979)

Index Fungorum number: IF29076

Classification: Ascomycota genera *incertae sedis*

Type species: *Parachionomyces acroconidiellinae* Thaung, Transactions of the British Mycological Society 72 (2): 333 (1979)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Parachionomyces* was established by Thaung (1979) and it has macronematous, mononematous, unbranched or branched, septate, geniculate, hyaline conidiophores, with polyblastic, sympodial, integrated, terminal, cicatricized, hyaline conidiogenous cells, and produces solitary, three or more septate, fusiform, navicular or obclavate, rostrate, hyaline conidia. One species is accepted in this genus. Phylogenetic position for *Parachionomyces* is unresolved due to lack of sequence data. References: (Thaung, 1979) (morphology), (Wijayawardene et al., 2020) (outline).

Paracoccidioides F.P. Almeida, Crypt. Fr. Exs.: 316 (1930)

Index Fungorum number: IF9208

Classification: Ajellomycetaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Paracoccidioides brasiliensis* (Splend.) F.P. Almeida, C.R. Soc. Biol.: 316 (1930)

Sexual morph: Unknown.

Synanamorphs: *Chrysosporium* (Seifert et al., 2011).

Disease symptoms: paracoccidioidomycosis (Bagagli et al., 2008; Borges-Walmsley et al., 2002; Franco et al., 2000; Pinheiro et al., 2020; San-Blas et al., 2002; Teixeira et al., 2009), fungemia (Hahn et al., 2014).

Sequence data: *Paracoccidioides brasiliensis* (CBS 109819, LSU: KT155000, ITS: KT155685)

Notes: *Paracoccidioides* is dimorphic: (1) conidiophores are absent, conidiogenous cells are blastic, hyaline, conidia are catenate, aseptate, hyaline, yeast-like; (2) conidiophores are absent, conidiogenous cells are polyblastic synchronous, hyaline, conidia are solitary, aseptate, hyaline (Seifert et al., 2011). References: (Borges-Walmsley et al., 2002; Hahn et al., 2014; San-Blas et al., 2002; Teixeira et al., 2009, 2013)(morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Paracostantinella Subram. & Sudha, Kavaka 15 (1-2): 12 (1989)

Index Fungorum number: IF25328

Classification: Ascomycota genera *incertae sedis*

Type species: *Paracostantinella pulchra* Subram. & Sudha, Kavaka 15 (1-2): 13 (1989)

Sexual morph: Unknown.

Sequence data: Unavailable.

Notes: *Paracostantinella* was introduced by Subramanian and Sudha (1987) and is characterized by macronematous, mononematous, penicillate, brown conidiophores, polyblastic, sympodial, denticulate conidiogenous cells, and solitary, aseptate, elliptic, hyaline conidia. References: (Subramanian & Sudha, 1987) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Paracremonium L. Lombard & Crous, Studies in Mycology 80: 233 (2015)

Index Fungorum number: IF810267

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Paracremonium inflatum* L. Lombard & Crous, Studies in Mycology 80: 233 (2015)

Sexual morph: Unknown.

Sequence data: *Paracremonium inflatum* (CBS 485.77 = CDC 77-043179, LSU: HQ232113, ITS: KM231829)

Notes: *Paracremonium* was introduced by Lombard et al. (2015) with acremonium-like morphology. References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Paracryptophiale Kuthub. & Nawawi, Mycological Research 98 (1): 125 (1994)

Index Fungorum number: IF26491

Classification: Ascomycota genera *incertae sedis*

Type species: *Paracryptophiale kamaruddinii* Kuthub. & Nawawi, Mycological Research 98 (1): 125 (1994)

Sexual morph: Unknown.

Sequence data: *Paracryptophiale pirozynskii* (NN044888, LSU: OL655047, ITS: OL627641)

Notes: *Paracryptophiale* was introduced by Kuthubutheen and Nawawi (1994c) for a fungus from submerged litter in Malaysia and is characterized by having macronematous, mononematous, setiform, unbranched or branched, brown conidiophores, with apical or sub-apical, fertile conidiogenous zone and phialidic, discrete, obscured by a shield of sterile cells, determinate conidiogenous cells, and producing dictyosporous, appendiculate, hyaline to subhyaline conidia aggerated in slimy masses. Phylogenetically, representative of *Paracryptophiale* clustered in the family Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetes (Figure 2.1). References: (Kuthubutheen & Nawawi, 1994c) (morphology), (Wijayawardene et al., 2020) (outline).

Paracylindrocarpon Crous, Roets & L. Lombard, Persoonia 36: 367 (2016)

Index Fungorum number: IF817039

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Paracylindrocarpon aloicola* Crous, Roets & L. Lombard, Persoonia 36: 367 (2016)

Sexual morph: Unknown.

Sequence data: *Paracylindrocarpon aloicola* (CBS 141300 = CPC 27362, LSU: NG_058238, ITS: NR_154346)

Notes: This genus is *Cylindrocarpon*-like but phylogenetically distinct from *Cylindrocarpon* (Nectriaceae). References: (Crous et al., 2016b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020)(outline).

Paragibellulopsis Giraldo López & Crous, Studies in Mycology 92: 265 (2018)

Index Fungorum number: IF828060

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Paragibellulopsis chrysanthemi* (Hirooka, Kawaradani & Toy. Sato) Giraldo López & Crous, Studies in Mycology 92: 265 (2018)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Giraldo & Crous, 2019).

Sequence data: *Paragibellulopsis chrysanthemi* (= *Gibellulopsis chrysanthemi*) (MAFF 242621 = Y.H. 11-88, LSU: KC287230, ITS: KC287235)

Notes: *Paragibellulopsis* was introduced by Giraldo and Crous (2019) to accommodate a species previous known as *Gibellulopsis chrysanthemi* Hirooka et al. This genus is characterized by micronematous, mononematous, erect or slanted, simple or poorly branched, hyaline conidiophores, monophialidic with funnel-shaped collarette, cylindrical to aculeate, hyaline conidiogenous cells, and producing 1-septate, in slimy, cylindrical, hyaline conidia and intercalary, single or in short in chains, grey-brown, smooth-walled chlamydospores. Phylogenetically, *Paragibellulopsis* distinct from *Gibellulopsis* (Giraldo & Crous, 2019). References:

(Giraldo & Crous, 2019; Hirooka et al., 2014) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Parahelicomyces Goh, Mycological Progress 20 (2): 182 (2021)

≡ *Pseudohelicomyces* Y.Z. Lu, J.K. Liu & K.D. Hyde, nom. illegit., Art. 53.1, Fungal Diversity 92: 248 (2018); non *Pseudohelicomyces* Garnica & E. Valenz., Mycol. Res. 104: 739 (2000).

Index Fungorum number: IF837332

Classification: Tubeufiaceae, Tubeufiales, Incertae sedis, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Parahelicomyces talbotii* (Goos) S.Y. Hsieh, Goh & C.H. Kuo, Mycological Progress 20 (2): 182 (2021)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Lu et al., 2018b).

Sequence data: *Parahelicomyces talbotii* (MFLUCC 17-2021, LSU: MH558890, ITS: MH558765)

Notes: *Parahelicomyces* was introduced by Hsieh et al. (2021), which is the new name for *Pseudohelicomyces* Y.Z. Lu, J.K. Liu & K.D. Hyde (nom. illegit., Art. 53.1). The asexual morph of *Parahelicomyces* is *Helicomyces*-like, but *Parahelicomyces* phylogenetically distinct from *Helicomyces* (Hsieh et al., 2021; Lu et al., 2018b). References: (Hsieh et al., 2021; Lu et al., 2018b) (morphology and phylogeny).

Paraidriella Hern.-Restr. & Crous, Persoonia 36: 79 (2016)

Index Fungorum number: IF811886

Classification: Xylariales genera *incertae sedis*, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Paraidriella jambosae* (R.F. Castañeda & W.B. Kendrick) Hern.-Restr. & Crous, Persoonia 36: 79 (2016)

Sexual morph: Unknown.

Sequence data: *Paraidriella jambosae* (CBS 374.90, LSU: KP858986, ITS: KP859049)

Notes: This genus is *Idriella*-like. References: (Hernández-Restrepo et al., 2016a) (morphology and phylogeny).

Paramicrodochium Hern.-Restr. & Crous, Persoonia 36: 62 (2016)

Index Fungorum number: IF811869

Classification: Sordariomycetes genus *incertae sedis*, Pezizomycotina, Ascomycota

Type species: Paramicrodochium gracile (Mouch. & Samson) Hern.-Restr. & Crous, Persoonia 36: 63 (2016)

Sexual morph: Unknown.

Sequence data: *Paramicrodochium gracile* (CBS 493.70, LSU: MH871585)

Notes: This genus is *Microdochium*-like. References: (Hernández-Restrepo et al., 2016a)(morphology and phylogeny).

Paramusicillium Giraldo López & Crous, Studies in Mycology 92: 269 (2018)

Index Fungorum number: IF828067

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Paramusicillium asperulatum* Giraldo López & Crous, Studies in Mycology 92: 269 (2018)

Sexual morph: Unknown.

Sequence data: *Paramusicillium asperulatum* (CBS 120158, LSU: LR025930, ITS: LR026792)

Notes: *Paramusicillium* was introduced by Giraldo and Crous (2019) and is characterized by mononematous, septate, repeatedly verticillate, brown conidiophores, monophialidic, cylindrical or subulate, hyaline conidiogenous cells, and producing aseptate, in slimy mass, pale brown in mass, ellipsoidal or cylindrical, hyaline conidia. References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Paramycosphaerella Crous & Jol. Roux, Persoonia 31: 245 (2013)

Index Fungorum number: IF805850

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Paramycosphaerella brachystegia* Crous & Jol. Roux, Persoonia 31: 245 (2013)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Videira et al., 2017).

Sequence data: *Paramycosphaerella brachystegiae* (CBS 136436 = CPC 21136, LSU: KF777230, ITS: KF777178)

Notes: *Paramycosphaerella* was established by Crous et al. (2013) and was reported has zasmidium-like asexual morph (Videira et al., 2017). Phylogenetically, *Paramycosphaerella* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Crous et al., 2013; Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Paramyrothecium L. Lombard & Crous, Persoonia 36: 206 (2016)

Index Fungorum number: IF815988

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Paramyrothecium roridum* (Tode) L. Lombard & Crous, Persoonia 36: 211 (2016)

Sexual morph: Unknown.

Sequence data: *Paramyrothecium roridum* (CBS 357.89, LSU: KU846330, ITS: KU846300,)

Notes: This genus is myrothecium-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Paranannizziopsis Sigler, Hambl. & Paré, Journal of Clinical Microbiology 51 (10): 3353 (2013)

Index Fungorum number: IF804611

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Paranannizziopsis australasiensis* Sigler, Hambl. & Paré, Journal of Clinical Microbiology 51 (10): 3353 (2013)

Sexual morph: Unknown.

Disease symptoms: Skin lesion of animals (Sigler et al., 2013).

Sequence data: *Paranannizziopsis australasiensis* (UAMH 11645, ITS: NR_111879)

Notes: *Paranannizziopsis* was introduced by Sigler et al. (2013) to accommodate *P. australasiensis*, *P. californiensis*, *P. crustacea*, and *P. longispora*, which are associated with skin lesions of animals. References: (Sigler et al., 2013) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Paraphaeoisaria de Hoog & Morgan-Jones, Mycotaxon 7 (1): 133 (1978)

Index Fungorum number: IF9217

Classification: Phaeomoniellaceae, Phaeomoniellales, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Paraphaeoisaria alabamensis* de Hoog & Morgan-Jones, Mycotaxon 7 (1): 134 (1978)

Sexual morph: Unknown.

Sequence data: *Paraphaeoisaria alabamensis* (CBS 101.77A, LSU: MH872801, ITS: MH861028)

Notes: *Paraphaeoisaria* was introduced by de Hoog and Morgan-Jones (1978) and is characterized by reduced conidiophores, sympodial, denticulate, subhyaline to pale brown conidiogenous cells, solitary, aseptate, cylindrical to fusiform, hyaline conidia. Phylogenetically, the ex-type strain of *P. alabamensis* grouped in Phaeomoniellaceae (Phaeomoniellales, Eurotiomycetes). Therefore, we suggest moving this genus to the family Phaeomoniellaceae (Phaeomoniellales, Eurotiomycetes). References: (de Hoog & Morgan-Jones, 1978) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Paraphysalospora Crous, Persoonia 39: 373 (2017)

Index Fungorum number: IF823380, *Facesoffungi number*: FoFxxxx

Classification: Clypeophysalosporaceae/Amphisphaeriales/Sordariomycetes/Pezizomycotina/Ascomycota

Type species: ***Paraphysalospora eucalypti*** Crous, Persoonia 39: 373 (2017)

Sexual morph: Described as holomorph.

Sequence data: Sequence data for ex-type culture of type species is unavailable. ITS: XXX, LSU: XXX(GZCC 18-0056); ITS: XXX, LSU: XXX(GZCC 18-0066).

Notes: This genus was described by Crous et al. (2017a) for a single species collected on leaves of *Eucalyptus sieberi* (Myrtaceae) from Australia. Currently, one species is accepted in this genus, it has sporodochial conidiomata, pale brown, branched, septate conidiophores, phialidic, terminal and intercalary, subcylindrical, pale brown, smooth conidiogenous cells, and solitary, hyaline, smooth, aseptate, sickle-shaped conidia (Crous et al., 2017a). References: (Crous et al., 2017a) (morphology and phylogeny).

Paraphyton Y. Gräser, Dukik & de Hoog, Index Fungorum 356: 2 (2018)

Index Fungorum number: IF554305

Classification: Arthrodermataceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Paraphyton cookei* (Ajello) Y. Gräser, Dukik & de Hoog, Index Fungorum 356: 2 (2018)

Sexual morph: arthroderma-like (de Hoog et al., 2017).

Disease symptoms: Some species are dermatophytes that infect skin of mammals (de Hoog et al., 2017).

Sequence data: *Paraphyton cookiellum* (CBS 101.83, LSU: MH873285, ITS: MH861545)

Notes: *Paraphyton* was introduced by de Hoog et al. (2017), however the name was invalid due to Art. F.5.1 of the Shenzhen Code (Turland et al., 2018). *Paraphyton* was validated by de Hoog et al. (2018). The genus is characterized by

hyaline hyphae, thallic, septate, thick- and rough-walled, clavate or cigar-shaped, hyaline or subhyaline macroconidia, thallic, aseptate, thin- and smooth-walled, clavate, hyaline microconidia. References: (de Hoog et al., 2017) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Parapleurotheciopsis P.M. Kirk, Transactions of the British Mycological Society 78 (1): 63 (1982)

Index Fungorum number: IF9219

Classification: Beltraniaceae, Amphisphaeriales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Parapleurotheciopsis inaequiseptata* (Matsush.) P.M. Kirk, Transactions of the British Mycological Society 78 (1): 65 (1982)

Sexual morph: Unknown.

Sequence data: *Parapleurotheciopsis caespitosa* (CBS 519.93, LSU: MH874086, ITS: MH862437)

Notes: *Parapleurotheciopsis* is characterized by unbranched, percurrent conidiophores arising from radially lobed basal cells, sympodial and denticulate conidiogenous cells and catenate, hyaline to pale brown conidia without a transverse band, lacking setae and swollen separating cells (Seifert et al., 2011). Phylogenetic analyses in this study showed that this genus formed a monophyletic clade within the family Beltraniaceae (Figure 2.1). References: (Crous et al., 2018b; Kirk, 1982) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Pararamichloridium Crous, Persoonia 39: 357 (2017)

Index Fungorum number: IF823369

Classification: Pararamichloridiaceae, Pararamichloridiales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pararamichloridium livistonae* Crous, Persoonia 39: 357 (2017)

Sexual morph: Unknown.

Sequence data: *Pararamichloridium livistonae* (CBS 143166 = CPC 32156, LSU: MG386084, ITS: MG386029); *Pararamichloridium verrucosum* (CBS 128.86, LSU: EF204508, ITS: MG386030, SSU: EF204522)

Notes: Crous et al. (2017a) introduced the genus *Pararamichloridium* to accommodate *P. livistonae* and *P. verrucosum*, later, Crous et al. (2018a) introduced the third species *P. caricicola*. The genus is characterised by branched or unbranched, medium brown, septate conidiophores, medium brown, denticulate conidiogenous cells, solitary, hyaline, smooth, granular, aseptate, clavate conidia (Crous et al., 2017a). *Pararamichloridium* is ramichloridium-like but phylogenetically differs from other ramichloridium-like genera. References: (Crous et al., 2017a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Parasarcopodium Melnik, S.J. Lee & Crous, Mycological Progress 3 (1): 22 (2004)

Index Fungorum number: IF28802

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Parasarcopodium ceratocaryi* Melnik, S.J. Lee & Crous, Mycological Progress 3 (1): 24 (2004)

Sexual morph: Unknown.

Sequence data: *Parasarcopodium ceratocaryi* (CBS 110664 = STE-U 5494, LSU: AY425026, SSU: AY344478)

Notes: *Parasarcopodium* is characterized by macronematous, mononematous, verruculose conidiophores with monophialidic, discrete conidiogenous cells that produces aseptate, cylindrical, hyaline conidia with amorphous mucoid appendages at both ends (Mel'nik et al., 2004). References: (Mel'nik et al., 2004) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Parasarocladium Summerb., J.A. Scott, Guarro & Crous, Microorganisms 6 (3): 88, 17 (2018)

Index Fungorum number: IF826815

Classification: Sarocladiaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Parasarocladium radiatum* (Sukapure & Thirum.) Summerb., J.A. Scott, Guarro & Crous, Microorganisms 6 (3): 88, 17 (2018)

Sexual morph: Unknown.

Sequence data: *Parasarocladium radiatum* (CBS 142.62, LSU: MH869704, ITS: MH858125, SSU: NG_065583)

Notes: *Parasarocladium* was introduced by Summerbell et al. (2018) to accommodate *P. breve*, *P. gamsii* and *P. radiatum*. It is characterized by mononematous, unbranched or verticillate, hyaline conidiophores, monophialidic without collarettes, hyaline conidiogenous cells, aseptate, in slimy mass, ellipsoidal, ovate, bacilliform or fusiform, hyaline conidia. References: (Summerbell et al., 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Parascedosporium Gilgado, Gené, Cano & Guarro, International Journal of Systematic and Evolutionary Microbiology 57: 2176 (2007)

Index Fungorum number: IF506554

Classification: Microascaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Parascedosporium tectonae* (C. Booth) Gilgado, Gené, Cano & Guarro, International Journal of Systematic and Evolutionary Microbiology 57: 2176 (2007) (= *Graphium tectonae* C. Booth, Mycological Papers 94: 5 (1964))

Sexual morph: Unknown.

Sequence data: *Parascedosporium tectonae* (CBS 127.84, LSU: NG_057765, ITS: NR_145211, SSU: U43907)

Notes: *Parascedosporium* was introduced by Gilgado et al. (2007) and is characterized by macronematous, mononematous, unbranched or irregularly branched conidiophores, polyblastic, sympodial, denticulate conidiogenous cells and producing solitary, aseptate, subhyaline to brown conidia. References: (Gilgado et al., 2007) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Parasympodiella Ponnappa, Transactions of the British Mycological Society 64 (2): 344 (1975)

Index Fungorum number: IF9226

Classification: Parasympodiellaceae, Parasympodiellales, Sordariomycetes orders incertae sedis, Pezizomycotina, Ascomycota

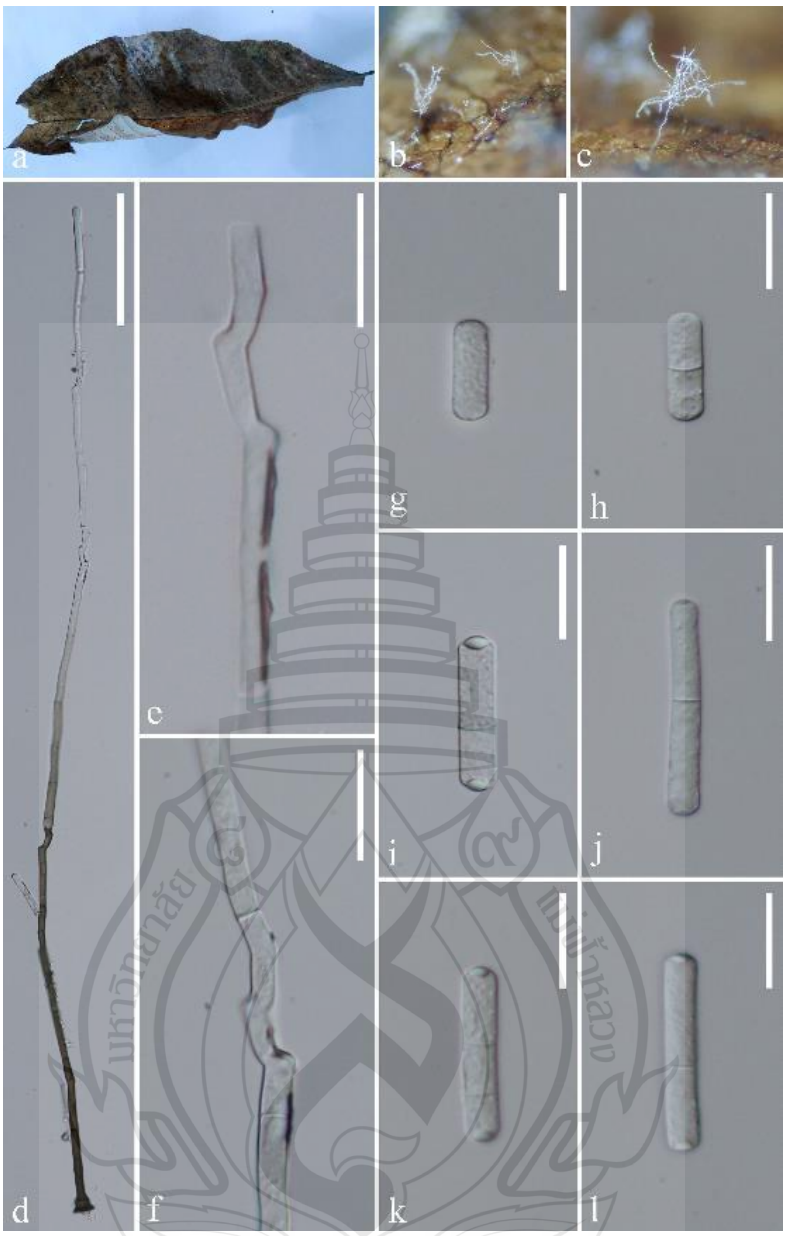
Type species: *Parasympodiella laxa* (Subram. & Vittal) Ponnappa, Transactions of the British Mycological Society 64 (2): 344 (1975)

Sexual morph: Unknown.

Synanamorphs: *Stylaspergillus* (Seifert et al., 2011; Sutton et al., 1982).

Sequence data: *Parasympodiella lauri* (FMR 13132 = CBS 138108, LSU: KY853518, ITS: KY853457); *Parasympodiella laxa* (CBS 102698, LSU: GQ303316, ITS: GQ303285).

Notes: *Parasympodiella* was introduced by Ponnappa (1975) and is characterized by macronematous, mononematous, unbranched or sparingly branched, sympodial or percurrent, brown conidiophores, thallic-arthric, hyaline conidiogenous cells, catenate, aseptate or septate, hyaline conidia. Hernández-Restrepo et al. (2017) introduced the order Parasympodiellales and the family Parasympodiellaceae to accommodate the genus *Parasympodiella*. References: (Hernández-Restrepo et al., 2017; Li et al., 2014b; Ponnappa, 1975; Sutton et al., 1982) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Parasympodiella*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-47). **a** Host material. **b, c** Conidiophores on the host surface. **d** Conidiophores. **e, f** Conidiogenous cells. **g–l** Conidia. Scale bars: **d** = 100 μm, **e–l** = 20 μm.

Figure 2.44 *Parasympodiella* sp.

Paratrichoconis Deighton & Piroz., Mycological Papers 128: 32 (1972)

Index Fungorum number: IF9230

Classification: Ascomycota genera *incertae sedis*

Type species: *Paratrichoconis chinensis* (Hansf.) Deighton & Piroz., Mycological Papers 128: 32 (1972)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Paratrichoconis* was established by Deighton and Pirozynski (1972) and it has macronematous, mononematous, unbranched, septate, brown, with polyblastic, sympodial, denticulate, hyaline to brown conidiogenous cells, and produces solitary, multi-septate, cylindrical to fusiform, hyaline conidia. Phylogenetic position for *Paratrichoconis* is unresolved due to lack of sequence data. References: (Deighton & Pirozynski, 1972) (morphology), (Wijayawardene et al., 2020) (outline).

Parawiesneriomyces Crous & M.J. Wingf., Persoonia 36: 389 (2016)

Index Fungorum number: IF817060

Classification: Wiesneriomycetaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Parawiesneriomyces syzygii* Crous & M.J. Wingf., Persoonia 36: 389 (2016)

Sexual morph: Unknown.

Sequence data: *Parawiesneriomyces syzygii* (CBS 141333, LSU: NG_066170, ITS: NR_145405)

Notes: This genus is *Wiesneriomyces*-like. References: (Crous et al., 2016b)(morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020)(outline).

Parvosympodium A.W. Ramaley, Mycotaxon 83: 329 (2002)

Index Fungorum number: IF28679

Classification: Ascomycota genera *incertae sedis*

Type species: *Parvosympodium nolinae* A.W. Ramaley, Mycotaxon 83: 329 (2002)

Sexual morph: *Stomiopeltopsis* (Seifert et al., 2011).

Synanamorphs: pycnothyria (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Parvosympodium* was established by Ramaley (2002) and it has reduced conidiophores, with polyblastic, sympodial, discrete, lageniform, hyaline conidiogenous cells, and produces solitary, multi-septate, falcate, hyaline conidia. Phylogenetic position for *Parvosympodium* is unresolved due to lack of sequence data. References: (Ramaley, 2002) (morphology), (Wijayawardene et al., 2020) (outline).

Passalora Fr., Summa vegetabilium Scandinaviae 2: 500 (1849)

Index Fungorum number: IF9233

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Passalora bacilligera* (Mont. & Fr.) Mont. & Fr., Sylloge generum specierumque plantarum cryptogamarum: 305 (1856)

Sexual morph: *Mycosphaerella* (Seifert et al., 2011).

Sequence data: *Passalora bacilligera* (CBS 131547 = CPC 19944, LSU: MF951210, ITS: MF951356)

Notes: *Passalora* is characterized by macronematous, mononematous or synnematous or sporodochial, caespitose, unbranched or branched, brown conidiophores, with integrated, terminal and intercalary, sympodial, cicatrized conidiogenous cells, producing solitary or catenate, aseptate or septate, subhyaline or olivaceous to brown conidia (Seifert et al., 2011; Videira et al., 2017). Phylogenetically, *Passalora* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Seifert et al., 2011; Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Patriciomyces D. Hawksw., Mycotaxon 77: 327 (2001)

Index Fungorum number: IF28498

Classification: Ascomycota genera *incertae sedis*

Type species: *Patriciomyces valentinianus* D. Hawksw., Mycotaxon 77: 327 (2001)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Patriciomyces* was established by Cole and Hawksworth (2001) for a lichenicolous fungus, and it has sporodochial conidiomata, macronematous, branched, hyaline conidiophores, with phialidic, terminal or lateral, subulate, hyaline conidiogenous cells, and produces catenate, 1-septate, biconic, hyaline conidia. Phylogenetic position for *Patriciomyces* is unresolved due to lack of sequence data. References: (Cole & Hawksworth, 2001) (morphology), (Wijayawardene et al., 2020) (outline).

Penicillifer Emden, Acta Botanica Neerlandica 17: 54 (1968)

= *Viridispora* Samuels & Rossman, Studies in Mycology 42: 166 (1999)

Index Fungorum number: IF9256

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Penicillifer pulcher* Emden, Acta Botanica Neerlandica 17: 54 (1968)

Sexual morph: *Neocosmospora*, *Viridispora* (Lombard et al., 2015), holomorphic description see Lombard et al. (2015).

Sequence data: *Penicillifer pulcher* (CBS 560.67 = ATCC 18931 = MUCL 11607, LSU: KM231610, ITS: KM231742)

Notes: The asexual morph of *Penicillifer* is characterized by macronematous, mononematous, septate, hyaline, unbranched or biverticillate or penicillate conidiophores, phialidic, cylindrical conidiogenous cells, and catenate, 1-septate, smooth, cylindrical to slightly naviculate, hyaline conidia (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Penicilliopsis Solms, Annales du Jardin Botanique de Buitenzorg 6: 53 (1887)

= *Pseudocordyceps* Hauman, Bulletin de la Société Botanique Belgique 69: 116 (1936)

= *Sarophorum* Syd. & P. Syd., Botanische Jahrbücher für Systematik Pflanzengeschichte und Pflanzengeographie 54: 260 (1916)

= *Stilbodendron* Syd. & P. Syd., Annales Mycologici 14 (3-4): 260 (1916)

Index Fungorum number: IF3806

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Penicilliopsis clavariiformis* Solms, Annales du Jardin Botanique de Buitenzorg 6: 53 (1886)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genere *Sarophorum*, *Stilbothamnium*, *Stilbodendron* and *Pseudocordyceps* (Houbraken et al., 2020; Hsieh & Ju, 2002; Seifert et al., 2011).

Sequence data: *Penicilliopsis clavariiformis* (CBS 761.68, LSU: MH870948, SSU: MT365174)

Notes: *Penicilliopsis* was introduced by zu Solms-Laubach (1887), its asexual morphs were reported in the genera *Sarophorum*, *Stilbothamnium*, *Stilbodendron* and *Pseudocordyceps* and is characterized by synnematous conidiomata, macronematous, unbranched or aspergilloid, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and catenate, aseptate, hyaline conidia (Hsieh & Ju, 2002). References: (Houbraken et al., 2020; Hsieh & Ju, 2002; zu Solms-Laubach, 1887) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Penicillium Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 16 (1809)

= *Thysanophora* W.B. Kendr., Canadian Journal of Botany 39 (4): 820 (1961)

= *Torulomyces* Delitsch, Ergebnisse der theoretischen und angewandten Mikrobiologie: Band I: Systematik der Schimmelpilze: 91 (1943)

Index Fungorum number: IF9257

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Penicillium crustaceum* (L.) Fr., Systema Mycologicum 3: 407 (1832)

Sexual morph: *Dichlaena*, *Eupenicillium*, *Hamigera*, *Paratalaromyces*, *Talaromyces*, *Trichocoma*, *Trichoskytale* (Seifert et al., 2011).

Disease symptoms: penicilliosis (Kawila et al., 2013).

Sequence data: *Penicillium hennebertii* (CBS 334.68, LSU: AB069708, ITS: KJ834507, SSU: AB069702)

Notes: *Penicillium* is characterized by macronematous, mononematous or synnematous, penicillate or verticillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and catenate, aseptate, hyaline conidia. It was subdivided in two subgenera, 32 sections, and 89 series (Houbraken et al., 2020). Houbraken and Samson (2011) placed the genus *Thysanophora* in synonymy with *Penicillium*. References: (Houbraken & Samson, 2011; Houbraken et al., 2011, 2014, 2020; Jorgensen & Gunnerbeck, 1977; Rivera & Seifert, 2011; Samson et al., 2011c; Visagie et al., 2014a, 2014b) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Periantria Döbbeler & P.G. Davison, Nova Hedwigia 106 (1-2): 242 (2017)

Index Fungorum number: IF821330

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Periantria frullaniae* (Racov.) Döbbeler & P.G. Davison, Nova Hedwigia 106 (1-2): 247 (2017)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Döbbeler & Davison, 2018).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Periantria* was established by Döbbeler and Davison (2018) and its asexual morph has sporodochial, dichotomously or verticillately branched, hyaline conidiophores with phialidic conidiogenous cells bearing solitary, globose to

ellipsoidal, hyaline conidia. Phylogenetic position for *Periantria* is unresolved due to lack of sequence data. References: (Döbbeler & Davison, 2018) (morphology), (Wijayawardene et al., 2020) (outline).

Pesotum J.L. Crane & Schokn., American Journal of Botany 60: 347 (1973)

Index Fungorum number: IF9270

Classification: Ophiostomataceae, Ophiostomatales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pesotum ulmi* (M.B. Schwarz) J.L. Crane & Schokn., American Journal of Botany 60: 348 (1973)

Sexual morph: *Ophiostoma* (Seifert et al., 2011)

Synanamorphs: *Sporothrix* (Seifert et al., 2011)

Notes: *Pesotum* was introduced by Crane and Schoknecht (1973) and has none or synnematous conidiomata, macronematous, mononematous and synnematous, branched or penicillate, brown conidiophores, with polyblastic, percurrent or sympodial, denticulate, hyaline to subhyaline conidiogenous cells, produces aseptate or septate, in slimy mass, hyaline conidia. *Pesotum* seems to be synonyms of *Ophiostoma*. References: (Crane & Schoknecht, 1973) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Petrakiopsis Subram. & K.R.C. Reddy, Sydowia 20 (1-6): 340 (1968)

Index Fungorum number: IF9278

Classification: Ascomycota genera *incertae sedis*

Type species: *Petrakiopsis elegans* Subram. & K.R.C. Reddy, Sydowia 20 (1-6): 340 (1968)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Petrakiopsis* was established by Subramanian and Reddy (1966) and it has sporodochial conidiomata, reduced conidiophores, polyblastic, sympodial, subhyaline conidiogenous cells, and produces solitary, curved, multi-septate, scolecosporous, subhyaline conidia. Phylogenetic position for *Petrakiopsis* is

unresolved due to lack of sequence data. References: (Subramanian & Reddy, 1966) (morphology), (Wijayawardene et al., 2020) (outline).

Peyronelina P.J. Fisher, J. Webster & D.F. Kane, Transactions of the British Mycological Society 67 (2): 351 (1976)

Index Fungorum number: IF9282

Classification: Niaceae, Agaricales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Peyronelina glomerulata* P.J. Fisher, J. Webster & D.F. Kane, Transactions of the British Mycological Society 67 (2): 351 (1976)

Sexual morph: *Flagelloscypha*-like (Yamaguchi et al., 2009).

Sequence data: *Peyronelina glomerulata* (NBRC 104522, LSU: AB455961)

Notes: This genus was described by Fisher et al. (1976) as a monotypic genus with *Peyronelina glomerulata* as the type species. *Peyronelina* is characterized by producing conidia that are solitary, staurosporous, hyaline, crown-shaped, composed of central 20–30 subglobose cells and surrounding 7–17 arms (Fisher et al., 1976; Yamaguchi et al., 2009). Phylogenetically, representative of *Peyronelina* clustered in the family Niaceae (Agaricales, Agaricomycetes) (Figure 2.1). References: (Fisher et al., 1976; Yamaguchi et al., 2009) (morphology and phylogeny), (He et al., 2019) (outline).

Phaeoacremonium W. Gams, Crous & M.J. Wingf., Mycologia 88: 789 (1996)

Index Fungorum number: IF27679

Classification: Togniniaceae, Togniniales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Phaeoacremonium parasiticum* (Ajello, Georg & C.J.K. Wang) W. Gams, Crous & M.J. Wingf., Mycologia 88: 794 (1996)

Sexual morph: *Togninia* (Mostert et al., 2006).

Sequence data: *Phaeoacremonium angustius* (CBS 249.95, LSU: MH874155, ITS: MH862513, SSU: AB278178); *Phaeoacremonium minimum* (CBS 246.91, LSU: AB278174, SSU: AB278174)

Notes: *Phaeoacremonium* was introduced by Crous et al. (1996) and is characterized by macronematous and micronematous, mononematous, unbranched or branched, septate, brown conidiophores, mono- and polyphialidic with narrowly funnel-shaped collarettes, sometimes percurrent conidiogenous cells, producing aseptate, in slimy mass, oblong-ellipsoidal to obovate or cylindrical, hyaline to subhyaline conidia. Phylogenetically, *Phaeoacremonium* located in the family Togniniaceae (Togniniales, Sordariomycetes) (Figure 2.1).References: (Crous et al., 1996; Mostert et al., 2006) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Phaeodactylium Agnihothr., Proceedings of the Indian Academy of Sciences Section B 68 (4): 206 (1968)

Index Fungorum number: IF9299

Classification: Ascomycota genera *incertae sedis*

Type species: *Phaeodactylium alpiniae* (Sawada) M.B. Ellis, Dematiaceous Hyphomycetes: 215 (1971) (= *Phaeodactylium venkatesanum* Agnihothr., Proceedings of the Indian Academy of Sciences Section B 68 (4): 208 (1968))

Sexual morph: Unknown.

Sequence data: *Phaeodactylium stadleri* (IMI 501220 = CBS 132715 = FMR 12185, LSU: HF678536, ITS: HF678526)

Notes: *Phaeodactylium* was established by Agnihothrudu (1968) and is characterized by having macronematous, mononematous, solitary or in small groups, branched, brown conidiophores, with polyblastic, sympodial, denticulate conidiogenous cells, producing solitary, septate, narrowly ellipsoidal or clavate, hyaline to subhyaline conidia (Agnihothrudu, 1968; Ellis, 1971). Phylogenetically, the ex-type of *Phaeodactylium stadleri*, not generic type species, was shown to be nested within the family Acrospermaceae (Acrospermales, Dothideomycetes) (Figure 2.1). References: (Agnihothrudu, 1968; Castañeda Ruíz et al., 2013; Costa et al., 2016a;

Ellis, 1971; Zhang et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Phaeoisaria Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 118: 330 (1909)

Index Fungorum number: IF9305

Classification: Pleurotheciaceae, Pleurotheciales, Savoryellomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

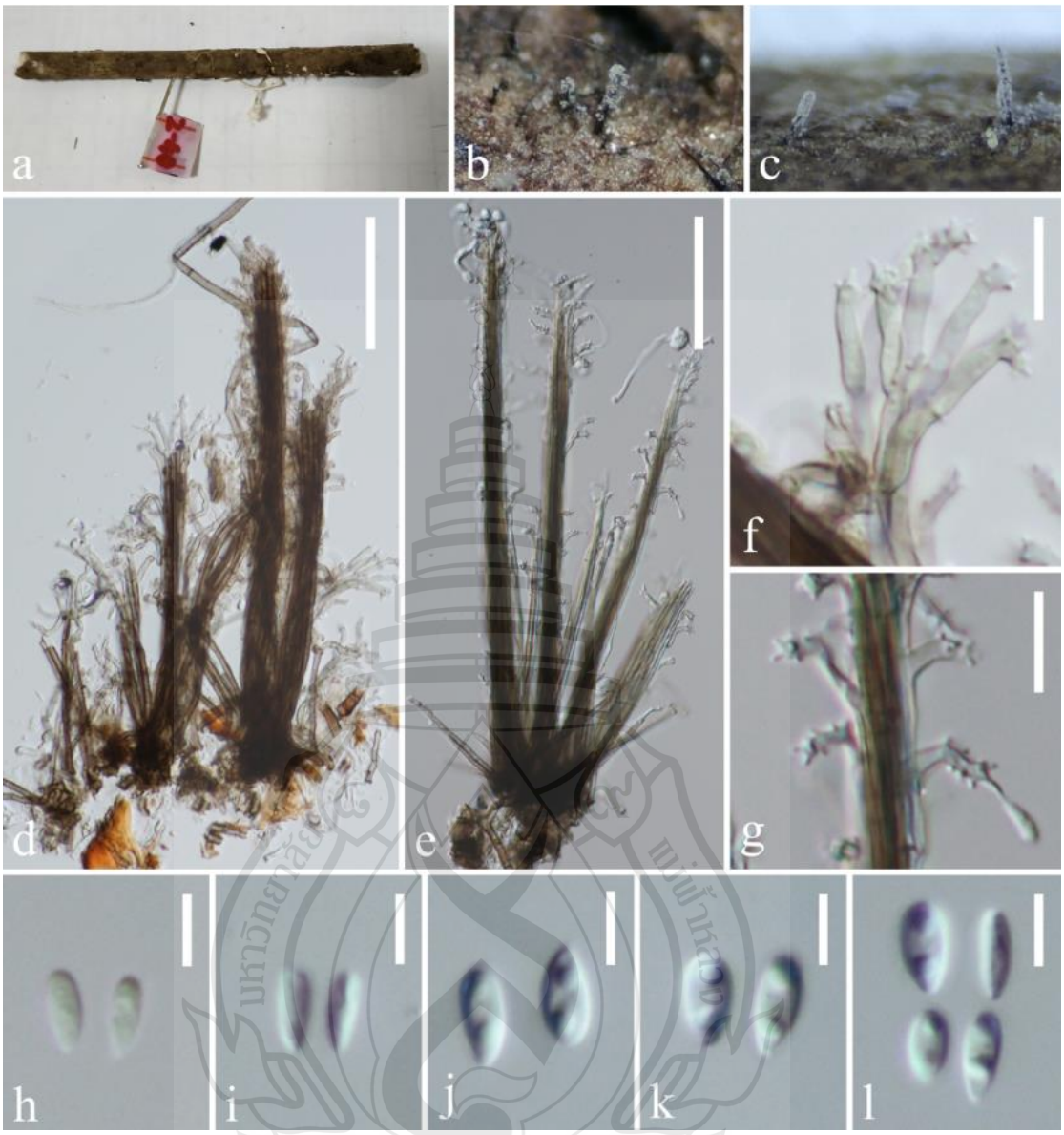
Type species: *Phaeoisaria bambusae* Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 118: 329 (1909)

Sexual morph: *Eutypella, Lentomitella, Paraëutypella, Rhamphoria* (Seifert et al., 2011).

Synanamorphs: humicola-like, *Rhinocladiella*, ?*Sporothrix* (Seifert et al., 2011)

Sequence data: *Phaeoisaria fasciculata* (CBS 127885, LSU: KT278705, ITS: MH864619, SSU: KT278693)

Notes: The genus *Phaeoisaria* is characterized by having synnemata, however, four of *Phaeoisaria* species were not observed to have synnemata, *P. curvata* de Hoog & Papendorf, *P. fasciculata* Réblová & Seifert, *P. glauca* (Ellis & Everh.) de Hoog & Papendorf and *P. loranthacearum* Crous & R.K. Schumach. Phylogenetic analyses in this study showed that this genus formed a monophyletic clade within the family Pleurotheciaceae (Figure 2.1). References: (Cheng et al., 2014; Crous et al., 2015a; de Hoog & Papendorf, 1976; Liu et al., 2015; Luo et al., 2019; Réblová et al., 2016b; Ruiz et al., 2002; Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Phaeoisaria clematidis*** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 2-40). **a** Host material. **b, c** Conidiophores on the host surface. **d, e** Conidiophores, conidiogenous cells. **f, g** Conidiogenous cells. **h**–**l** Conidia. Scale bars: **d, e** = 50 μm, **f, g** = 10 μm, **h**–**l** = 5 μm.

Figure 2.45 *Phaeoisaria clematidis*

Phaeomoniella Crous & W. Gams, Phytopathologia Mediterranea 39: 113 (2000)

Index Fungorum number: IF28425

Classification: Phaeomoniellaceae, Phaeomoniellales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Phaeomoniella chlamydospora* (W. Gams, Crous, M.J. Wingf. & Mugnai) Crous & W. Gams, Phytopathologia Mediterranea 39: 114 (2000)

Sexual morph: Unknown.

Synanamorphs: *Phoma*-like (Crous & Gams, 2000)

Disease symptoms: Important fungal organism associated to Petri grapevine decline (Crous & Gams, 2000).

Sequence data: *Phaeomoniella chlamydospora* (CBS 229.95, LSU: MH874153, ITS: MH862510)

Notes: *Phaeomoniella* was introduced by Crous and Gams (2000) and is characterized by micronematous, mononematous, unbranched or sparingly branched, percurrent, brown conidiophores, monophialidic with narrowly funnel-shaped collarette, subhyaline to hyaline conidiogenous cells, aseptate, in slimy mass, subhyaline to hyaline conidia. References: (Crous & Gams, 2000; Kraus et al., 2020) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Phaeomonilia R.F. Castañeda, Heredia & R.M. Arias, Mycotaxon 100: 328 (2007)

Index Fungorum number: IF510699

Classification: Ascomycota genera *incertae sedis*

Type species: *Phaeomonilia pleiomorpha* R.F. Castañeda, Heredia & R.M. Arias, Mycotaxon 100: 329 (2007)

Sexual morph: Unknown.

Synanamorphs: *Stylaspergillus* (Castañeda Ruíz et al., 2007; Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Phaeomonilia* was established by Castañeda Ruíz et al. (2007) and it has macronematous, mononematous, mostly dichotomously branched, septate,

brown conidiophores, with thallic-arthric conidiogenous cells, and produces catenate, aseptate, globose, ellipsoid, doliiform to irregular, hyaline conidia. Phylogenetic position for *Phaeomonilia* is unresolved due to lack of sequence data. References: (Castañeda Ruíz et al., 2007) (morphology), (Wijayawardene et al., 2020) (outline).

Phaeostalagmus W. Gams, Studies in Mycology 13: 90 (1976)

Index Fungorum number: IF9321

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Phaeostalagmus cyclosporus* (Grove) W. Gams, Studies in Mycology 13: 91 (1976)

Sexual morph: Chaetosphaeria (Seifert et al., 2011).

Sequence data: *Phaeostalagmus cyclosporus* (CBS 663.70, LSU: MH871680, ITS: MH859892)

Notes: *Phaeostalagmus* was introduced by Gams and Holubová-Jechová (1976) and is characterized by branched or verticillate, brown conidiophores, phialidic, pale brown conidiogenous cells, and aseptate, in slimy mass, ellipsoidal, hyaline conidia. References: (Gams & Holubová-Jechová, 1976; Sutton & Melnik, 1992) (morphology), (Lin et al., 2019b) (phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Phialemonium W. Gams & McGinnis, Mycologia 75: 978 (1983)

Index Fungorum number: IF11160

Classification: Cephalothecaceae, Cephalothecales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Phialemonium obovatum* W. Gams & McGinnis, Mycologia 75: 978 (1983)

Sexual morph: *Cephalotheca* (Seifert et al., 2011).

Sequence data: *Phialemonium atrogriseum* (CBS 604.67, LSU: NG_057883, ITS: NR_111521, SSU: NG_065691)

Notes: *Phialemonium* was introduced by Gams and McGinnis (1983) for three species, *P. curvatum*, *P. dimorphosporum* and *P. obovatum*. It is characterized

by reduced conidiophores, phialidic, short cylindrical, hyaline conidiogenous cells and producing aseptate, in slimy mass, smooth-walled, hyaline conidia (Gams & McGinnis, 1983). References: (Gams & McGinnis, 1983) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Phialocephala W.B. Kendr., Canadian Journal of Botany 39 (5): 1079 (1961)

Index Fungorum number: IF9336

Classification: Mollisiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Phialocephala dimorphospora* W.B. Kendr., Canadian Journal of Botany 39 (5): 1080 (1961)

Sexual morph: *Phaeomollisia* (Seifert et al., 2011)

Synanamorphs: *Anavirga*, *Anguillospora* (Seifert et al., 2011)

Sequence data: *Phialocephala dimorphospora* (CBS 300.62, LSU: MH869755, ITS: MH858160)

Notes: *Phialocephala* was introduced by Kendrick (1961) and is characterized by having macronematous, mononematous, solitary or in groups, penicillate, brown conidiophores, with phialidic with well-marked collarettes, hyaline to subhyaline conidiogenous cells, producing aseptate, hyaline to subhyaline conidia aggregated in slimy mass or in chains (Kendrick, 1961; Seifert et al., 2011). The sexual morph of *Phialocephala* was reported in the genus *Phaeomollisia* (Seifert et al., 2011), and Johnston et al. (2014) proposed to protect *Phialocephala* over *Phaeomollisia*. Phylogenetically, *Phialocephala* was shown to be nested within the family Mollisiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Kendrick, 1961) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Phialolunulospora Z.F. Yu & R.F. Castañeda, MycoKeys 76: 23 (2020)

Index Fungorum number: IF828716

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Phialolunulospora vermispora* Z.F. Yu & R.F. Castañeda, MycoKeys 76: 23 (2020)

Sexual morph: Unknown.

Sequence data: *Phialolunulospora vermispora* (YMF1.4260, LSU: MK165442, ITS: MK165444, SSU: MK165440)

Notes: *Phialolunulospora* was introduced by Zheng et al. (2020) and is characterized by macronematous, semimacronematous, mononematous, septate, pigmented conidiophores, monophialidic or polyphialidic, integrated conidiogenous cells, and solitary, acrogenous, aseptate, long lunate, vermiform to sigmoid, hyaline conidia with an eccentric basal appendage. References: (Zheng et al., 2020) (morphology and phylogeny).

Phialoparvum Giraldo López & Crous, Studies in Mycology 92: 265 (2018)

Index Fungorum number: IF828063

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Phialoparvum bifurcatum* Giraldo López & Crous, Studies in Mycology 92: 266 (2018)

Sexual morph: Unknown.

Sequence data: *Phialoparvum bifurcatum* (CBS 299.70B, LSU: LR025931, ITS: LR026793)

Notes: *Phialoparvum* was introduced by Giraldo and Crous (2019) and is characterized by mononematous, unbranched or poorly branched, hyaline conidiophores, mono- and polyphialidic, subulate to ampulliform, hyaline conidiogenous cells, and producing aseptate, in slimy mass, smooth-walled, cylindrical, hyaline conidia. It is *Acremonium*-like, but phylogenetically distant from other *Acremonium*-like genera (Giraldo & Crous, 2019). References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Phialophaeoisaria Matsush., Matsushima Mycological Memoirs 8: 29 (1995)

Index Fungorum number: IF27260

Classification: Ascomycota genera *incertae sedis*

Type species: *Phialophaeoisaria spongiosa* Matsush., Matsushima Mycological Memoirs 8: 29 (1995)

Sexual morph: Unknown.

Synanamorphs: acremonium-like (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Phialophaeoisaria* was established by Matsushima (1995) and is similar to Phaeoisaria, but differs by its polyphialidic conidiogenous cells. Phylogenetic position for *Phialophaeoisaria* is unresolved due to lack of sequence data. References: (Matsushima, 1995) (morphology), (Wijayawardene et al., 2020) (outline).

Phialophora Medlar, Mycologia 7 (4): 202 (1915)

Index Fungorum number: IF9342

Classification: Herpotrichiellaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Phialophora verrucosa* Medlar, Mycologia 7 (4): 203 (1915)

Sexual morph: *Capronia*, *Cercophora*, *Chaetosphaeria*, *Chlorociboria*, *Eosphaeria*, *Hypobryon*, *Lambertella*, *Lasiosphaeria*, *Leptosphaeria*, *Mycocalicium*, *Neobulgaria*, *Phruensis*, *Retrostium*, *Spathulospora*, *Teracosphaeria*, *Tirisporella*, (Seifert et al., 2011).

Synanamorphs: *Acrostroma*, *Anguillospora*, *Anthopsis*, *Arbusculina*, *Bispora*, *Campylospora*, *Casaresia*, *Cladophialophora*, *Culicidospora*, *Dendrospora*, *Dimorphospora*, *Dualomyces*, *Esteya*, *Exophiala*, *Filosporella*, *Fonsecaea*, *Goniopila*, *Irpicomyces*, *Madurella*, *Melanocephala*, *Mycofalcella*, *Phaeosclera*, *Phialosporostilbe*, *Physalidiella*, *Pseudoanguillospora*, *Rhinocladiella*, *Spadicoides*, *Taeniolella*, *Tretendophragmia*, *Tricladium*, *Ypsilina* (Seifert et al., 2011).

Disease symptoms: Phaeohyphomycosis (Ajello et al., 1974).

Sequence data: *Phialophora verrucosa* (WUC355 = AFTOL ID 670 = MUCL 9760, LSU: EF413615, ITS: AF050281, SSU: EF413614)

Notes: *Phialophora* was introduced by Medlar (1915) to accommodate *P. verrucosa*, which was isolated from a chronic skin lesion on the buttock of a man. It is characterized by branched or sparingly branched, brown conidiophores, phialidic, brown or hyaline conidiogenous cells with collarettes, aseptate, in slimy mass, hyaline conidia (Medlar, 1915; Seifert et al., 2011). References: (Li et al., 2017c; Liu et al., 2013; Medlar, 1915; Untereiner et al., 2019; Wu & Zhang, 2011b; Zhuang et al., 2010) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Phialoseptomonium Crous & Carnegie, Persoonia 42: 319 (2019)

Index Fungorum number: IF830829

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Phialoseptomonium eucalypti* Crous & Carnegie, Persoonia 42: 319 (2019)

Sexual morph: Unknown.

Sequence data: *Phialoseptomonium eucalypti* (CBS 145542, LSU: NG_067890, ITS: NR_165572)

Notes: This genus was introduced by Crous et al. (2019a) with acremonium-like morphological characters. References: (Crous et al., 2019a) (morphology and phylogeny).

Phialosporostilbe Mercado & J. Mena, Revista del Jardín Botánico Nacional Universidad de la Habana 6 (3): 57 (1985)

Index Fungorum number: IF11162

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Phialosporostilbe turbinata* Mercado & J. Mena, Revista del Jardín Botánico Nacional Universidad de la Habana 6 (3): 58 (1985)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011).

Sequence data: *Phialosporostilbe scutiformis* (MFLUCC 17-0227, LSU: NG_068569, ITS: NR_168773, SSU: NG_070116)

Notes: *Phialosporostilbe* is characterized by synnematous conidiomata, macronematous, unbranched, brown conidiophores, phialidic, annellidic, brown conidiogenous cells, catenate, aseptate, cuneiform, or turbinate, hyaline conidia with several radiating apical setulae (Seifert et al., 2011; Wu & Zhang, 2009). References: (Lin et al., 2019b; Wu & Zhang, 2009; Yang et al., 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Phialostele Deighton, Mycological Papers 117: 11 (1969)

Index Fungorum number: IF9345

Classification: Ascomycota genera *incertae sedis*

Type species: *Phialostele scytopetali* Deighton, Mycological Papers 117: 11 (1969)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Phialostele* was established by Deighton (1969b) and it has synnematous conidiomata, macronematous, branched, hyaline conidiophores, with phialidic, ampulliform, hyaline conidiogenous cells, and produces catenate, aseptate, ellipsoid or subglobose, hyaline or pale conidia. Phylogenetic position for *Phialostele* is unresolved due to lack of sequence data. References: (Deighton, 1969b) (morphology), (Wijayawardene et al., 2020) (outline).

Phialotubus R.Y. Roy & Leelav., Transactions of the British Mycological Society 49 (3): 495 (1966)

Index Fungorum number: IF9346

Classification: Ascomycota genera *incertae sedis*

Type species: *Phialotubus microsporus* R.Y. Roy & Leelav., Transactions of the British Mycological Society 49 (3): 495 (1966)

Sexual morph: Unknown.

Sequence data: *Phialotubus microsporus* (CBS 861.70, ITS: JN831360)

Notes: *Phialotubus* was introduced by Roy and Leelavathy (1966) is characterized by having unbranched or penicillate, hyaline conidiophores, monophialidic, hyaline conidiogenous cells with long or short, narrow, hyaline, tube-like structures, and producing conidia that are catenate with hyaline interconnexions, aseptate, smooth, hyaline becoming yellowish brown. Phylogenetic position for *Phialotubus* is unresolved due to lack of LSU sequence data. References: (Roy & Leelavathy, 1966) (morphology), (Wijayawardene et al., 2020) (outline).

Phlogicylindrium Crous, Summerb. & Summerell, Fungal Diversity 23: 340 (2006)

Index Fungorum number: IF510013, *Facesoffungi number*: FoFxxxx

Classification: Phlogicylindriaceae, Amphisphaeriales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Phlogicylindrium eucalypti* Crous, Summerb. & Summerell, Fungal Diversity 23: 340 (2006)

Sexual morph: Unknown.

Disease symptoms: Leas spots

Sequence data: Sequence data for ex-type culture of type species is available. Ex-type, CBS 120080, LSU: DQ923534, ITS: DQ923534, RPB2: MH554893

Notes: *Phlogicylindrium* was described by Summerell et al. (2006) for a species associated with *Eucalyptus* (*Myrtaceae*) leaves. It is characterized by macronematous, sporodochial or synnematous, hyaline to brown, percurrent conidiogenous cells, and hyaline, 0-1-septate, cylindrical conidia. References: (Crous et al., 2007a, 2011b, 2016a, 2017a, 2019a, 2019b; Summerell et al., 2006) (morphology and phylogeny)

Phymatotrichopsis Hennebert, Persoonia 7 (2): 199 (1973)

Index Fungorum number: IF9388

Classification: Rhizinaceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Phymatotrichopsis omnivora* (Shear) Hennebert, Persoonia 7 (2): 199 (1973)

Sexual morph: Unknown.

Sequence data: *Phymatotrichopsis omnivora* (ATCC 32445, LSU: EF494060, ITS: EF494043, SSU: EF494052)

Notes: *Phymatotrichopsis* was introduced by Hennebert (1973) and is characterized by having cross-shaped, hyaline setae, unbranched or branched, moniliform, hyaline conidiophores, with polyblastic, synchronous, vesiculate, denticulate, hyaline conidiogenous cells, producing solitary, aseptate, globose or ovate, hyaline conidia (Hennebert, 1973; Seifert et al., 2011). Phylogenetically, representative of *Phymatotrichopsis* clustered in the family Rhizinaceae, Pezizales, Pezizomycetes (Figure 2.1). References: (Hennebert, 1973; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Physalidiopsis R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 32: 36 (1990)

Index Fungorum number: IF11262

Classification: Ascomycota genera *incertae sedis*

Type species: *Physalidiopsis carbonis* (R.F. Castañeda) R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 32: 39 (1990)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Physalidiopsis* was introduced by Castañeda Ruíz and Kendrick (1990) and one species is accepted. Phylogenetic position for *Physalidiopsis* is unresolved due to lack of sequence data. References: (Castañeda Ruíz & Kendrick, 1990) (morphology), (Wijayawardene et al., 2020) (outline).

Pinatubo J.B. Manandhar & Mew, Mycotaxon 60: 203 (1996)

Index Fungorum number: IF27804

Classification: Microdochiaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pinatubo oryzae* J.B. Manandhar & Mew, Mycotaxon 60: 203 (1996)

Sequence data: Sequence data for ex-type culture of type species is available. CBS 158.94 = ATCC 90547, LSU: LC500491; ITS: LC500481; RPB2: LC500511; TUB2: LC500501.

Notes: In previous studies, the genus was placed in Ascomycota genus *incertae sedis*. In our phylogenetic study, the ex-type of the type species (*P. oryzae*) groups within Microdochiaceae (Xylariales, Sordariomycetes), hence we assign this genus under Microdochiaceae (Xylariales, Sordariomycetes). References: (Manandhar & Mew, 1996) (morphology)

Piperivora Siboe, P.M. Kirk & P.F. Cannon, Mycotaxon 73: 298 (1999)

Index Fungorum number: IF28367

Classification: Ascomycota genera *incertae sedis*

Type species: *Piperivora nodosa* Siboe, P.M. Kirk & P.F. Cannon, Mycotaxon 73: 298 (1999)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Piperivora* was introduced by Siboe et al. (1999) and it has macronematous, mononematous, formed in loose tufts, branched, brown conidiophores, with polyblastic, sympodial, intercalary or terminal, nodose, brown conidiogenous cells, and produces solitary, 0-1-septate, cylindrical, hyaline conidia. Phylogenetic position for *Piperivora* is unresolved due to lack of sequence data. References: (Siboe et al., 1999) (morphology), (Wijayawardene et al., 2020) (outline).

Planamyces Crous & Decock, Persoonia 39: 377 (2017)

Index Fungorum number: IF823383

Classification: Pyronemataceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Planamyces parisiensis* Crous & C. Decock, Persoonia 39: 377 (2017)

Sexual morph: Unknown.

Sequence data: *Planamyces parisiensis* (CBS 143165 = CPC 31694, LSU: MG386093, ITS: MG386040)

Notes: *Planamyces* is unique by its conidiophores are mononematous, branched, subcylindrical, hyaline, conidiogenous cells are holoblastic, hyaline, denticulate, and conidia are solitary, aseptate, globose but flattened in side view, hyaline and smooth becoming saffron and have warts (Crous et al., 2017a). References: (Crous et al., 2017a)(morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Plectosphaerella Kleb., Phytopathologische Zeitschrift 1: 43 (1929)

= *Plectosporium* M.E. Palm, W. Gams & Nirenberg, Mycologia 87 (3): 398 (1995)

Index Fungorum number: IF4197

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Plectosphaerella cucumerina* (Lindf.) W. Gams, Fungi in agricultural soils: 160 (1972)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Plectosporium* (Giraldo & Crous, 2019).

Sequence data: *Plectosphaerella cucumerina* (= *Plectosporium tabacinum*) (DAOM 226828, LSU: GU180647, ITS: GU180630, SSU: GU180612)

Notes: The asexual morph of *Plectosphaerella* was reported in *Plectosporium* (Giraldo & Crous, 2019). References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Pleiocarpon L. Lombard & D. Aiello, IMA Fungus 8 (1): 73 (2017)

Index Fungorum number: IF820028

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pleiocarpon strelitziae* L. Lombard & D. Aiello, IMA Fungus 8 (1): 73 (2017)

Sexual morph: Unknown.

Sequence data: *Pleiocarpon strelitziae* (CBS 142251 = ST1 = CPC 27628, LSU: KY304672, ITS: KY304644)

Notes: *Pleiocarpon* was erected by Aiello et al. (2017) and is cylindrocarpon-like. *Pleiocarpon* is characterized by mononematous or sporodochial, solitary or loosely aggregated, unbranched or sparsely branched conidiophores, with monophialidic, cylindrical conidiogenous cells, producing aseptate, ellipsoid to ovoid or subcylindrical, straight to slightly curved microconidia and cylindrical to subcylindrical, straight to curved, 1−5-septate macroconidia (Aiello et al., 2017). Phylogenetically, representative of *Pleiocarpon* clustered in the family Nectriaceae, Hypocreales, Sordariomycetes (Figure 2.1). References: (Aiello et al., 2017) (morphology), (Wijayawardene et al., 2020) (outline).

Plesiospora Drechsler, Sydowia 24 (1-6): 174 (1971)

Index Fungorum number: IF9455

Classification: Ascomycota genera *incertae sedis*

Type species: *Plesiospora globosa* Drechsler, Sydowia 24 (1-6): 174 (1971)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Plesiospora* was established by Drechsler (1970) for a nematode-destroying fungus, and it has micronematous, mononematous, hyaline, reduced conidiophores, with phialidic, flask-shaped, hyaline conidiogenous cells, and produces aseptate, globose, hyaline conidia aggregated in slimy mass. Phylogenetic position for *Plesiospora* is unresolved due to lack of sequence data. References: (Drechsler, 1970) (morphology), (Wijayawardene et al., 2020) (outline).

Plesiospora Drechsler, Sydowia 24 (1-6): 174 (1971)

Index Fungorum number: IF9455

Classification: Ascomycota genera *incertae sedis*

Type species: *Plesiospora globosa* Drechsler, Sydowia 24 (1-6): 174 (1971)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Phylogenetic position for *Plesiospora* is unresolved due to lack of sequence data. References: (morphology), (Wijayawardene et al., 2020) (outline).

Pleuropedium Marvanová & S.H. Iqbal, Antonie van Leeuwenhoek 39: 401 (1973)

Index Fungorum number: IF9466

Classification: Ascomycota genera *incertae sedis*

Type species: *Pleuropedium tricladioides* Marvanová & S.H. Iqbal, Antonie van Leeuwenhoek 39: 401 (1973)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pleuropedium* was introduced by Marvanová and Iqbal (1973) and it has mononematous, septate, unbranched or branched, hyaline conidiophores, with monoblastic or polyblastic, percurrent or sympodial, denticulate, hyaline conidiogenous cells, and produces conidia that are solitary, septate, hyaline, staurosporous, consisting of a main axis with primary and secondary branches. Phylogenetic position for *Pleuropedium* is unresolved due to lack of sequence data. References: (Marvanová & Iqbal, 1973) (morphology), (Wijayawardene et al., 2020) (outline).

Pleurophragmium Costantin, Les Mucédinées Simples: 100 (1888)

Index Fungorum number: IF9470

Classification: Ascomycota genera *incertae sedis*

Type species: *Pleurophragmium bicolor* Costantin, Les Mucédinées Simples: 100 (1888)

Sexual morph: Unknown.

Sequence data: *Pleurophragmium subfusiforme* (P011, LSU: EU107293, SSU: EU107330)

Notes: *Pleurophragmium* is characterized by macronematous, mononematous, unbranched, brown conidiophores, polyblastic, sympodial, denticulate, brown conidiogenous cells, and producing solitary, aseptate or septate, narrowly ellipsoidal to subclavate, hyaline or brown conidia (Ellis, 1971). Dai et al.

(2017) described a new species, *P. bambusinum*, and phylogenetically located in Sordariomycetes genera *incertae sedis*. However, this species was synonymized under *Aquapteridospora*, which belongs to the family Aquapteridosporaceae (Distoseptisporales, Sordariomycetes), by Bao et al. (2021). D'Souza and Bhat (2012) provided a key for accepted taxa of this genus. References: (Abarca et al., 2007; D'Souza & Bhat, 2012; Ellis, 1971; Ma et al., 2014) (morphology and phylogeny)

Pleurostoma Tul. & C. Tul., Selecta Fungorum Carpologia, Tomus Secundus. Xylariei - Valsei - Sphaeriei 2: 247 (1863)

= *Pleurostomophora* D. Vijaykrishna, L. Mostert, R. Jeewon, W. Gams, K.D. Hyde & Crous, Studies in Mycology 50 (2): 390 (2004)

Index Fungorum number: IF4247

Classification: Pleurostomataceae, Calosphaeriales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pleurostoma candollei* Tul. & C. Tul., Selecta Fungorum Carpologia, Tomus Secundus. Xylariei - Valsei - Sphaeriei 2: 247 (1863)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Pleurostomophora* (Vijaykrishna et al., 2004).

Sequence data: *Pleurostoma ootheca* (CBS 115329 = AFTOL ID 5085 = CMU 23858, LSU: AY761079, ITS: MH862984, SSU: AY761074)

Notes: *Pleurostomophora* was introduced by Vijaykrishna et al. (2004) and its sexual morph was linked to the genus *Pleurostoma*. Réblová et al. (2016a) proposed using *Pleurostoma* rather than *Pleurostomophora*. The asexual morph of *Pleurostoma* has mononematous, hyaline to brown conidiophores, phialidic conidiogenous cells with inconspicuous or flaring collarettes, produces conidia that are hyaline, in slimy mass, dimorphic, being either straight to allantoid, or shorter and more ellipsoid. References: (Réblová et al., 2016a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Pleurotheciella Réblová, Seifert & J. Fourn., Mycologia 104 (6): 1304 (2012)

Index Fungorum number: IF564282

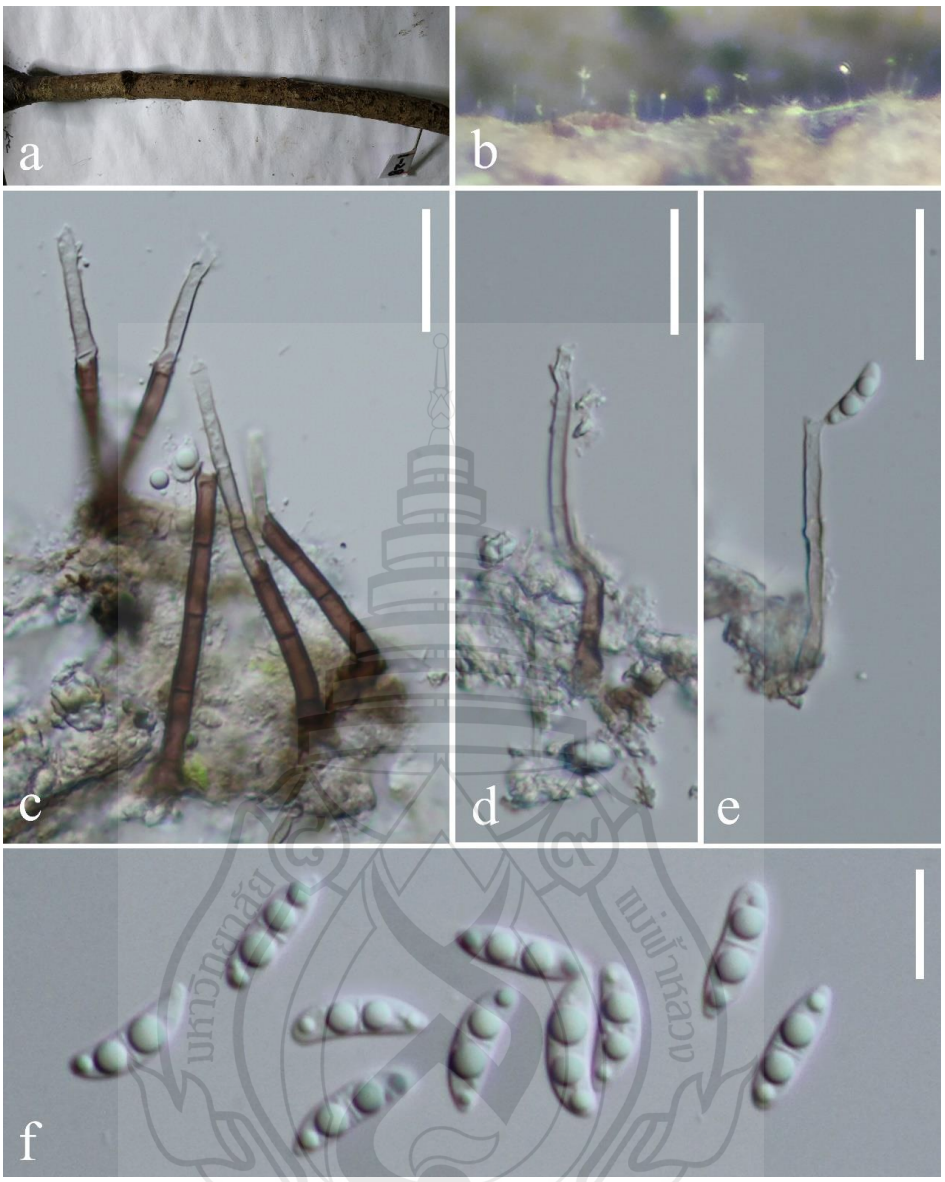
Classification: Pleurotheciaceae, Pleurotheciales, Savoryellomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pleurotheciella rivularia* Réblová, Seifert & J. Fourn., Mycologia 104 (6): 1304 (2012)

Sexual morph: Introduced as holomorphic genus with hyphomycetous asexual morph (Réblová et al., 2012).

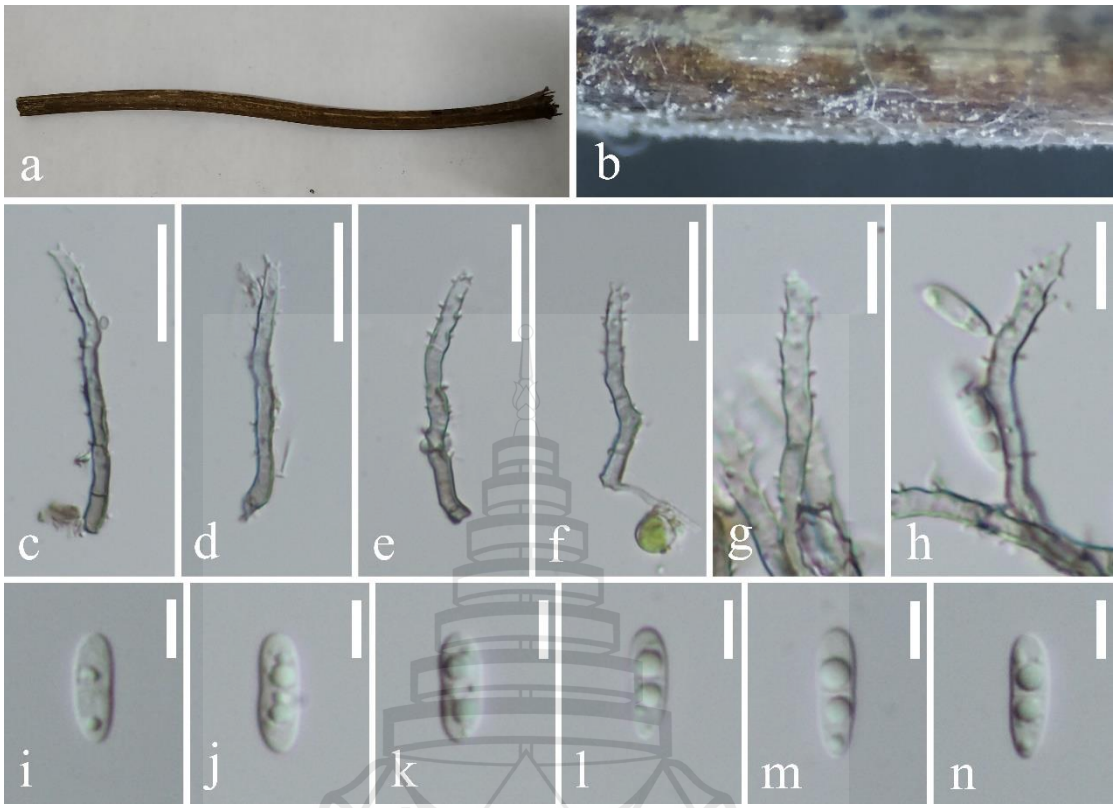
Sequence data: *Pleurotheciella rivularia* (CBS 125238, LSU: JQ429232, SSU: JQ429244)

Notes: The asexual morph of this genus is characterised by unbranched to sparingly branched, septate conidiophores, integrated, denticles conidiogenous cells and ellipsoidal to clavate, hyaline, 0–several-septate conidia (Réblová et al., 2012). Phylogenetic analyses in this study showed that this genus formed a monophyletic clade within the family Pleurotheciaceae (Figure 2.1). In this study, the ex-type strain of *Dactylaria lunata* (CBS 689.93) grouped together with *Pleurotheciella fusiformis* in a single clade (Figure 2.1), and *D. lunata* is morphologically similar to *P. fusiformis* (Luo et al., 2018; Tzean & Chen, 1991), therefore we propose *D. lunata* as a synonym of *P. fusiformis*. *Bactrodesmium obovatum* is a dematiaceous hyphomycetes species, but a non-ex-type strain (CBS 128676) placed within the *Pleurotheciella* clade in our phylogenetic analyses (Figure 2.1), therefore *Bactrodesmium* may be highly polyphyletic. References: (Réblová et al., 2012) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Pleurotheciella*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-28). **a** Host material. **b** Conidiophores on the host surface. **c**–**e** Conidiophores, conidiogenous cells with conidia. **f** Conidia. Scale bars: **c**–**e** = 20 μm, **f** = 10 μm.

Figure 2.46 *Pleurotheciella* sp1



Note *Pleurotheciella* sp. (China, Guizhou Province, Guiyang City, Nanming District, Xiaochehe Rd, Xiaochehe City Wetland Park, July 2018, N. G. Liu, XCH 2-5). **a** Host material. **b** Conidiophores on the host surface. **c**–**h** Conidiophores, conidiogenous cells. **i**–**n** Conidia. Scale bars: **c**–**e** = 20 μm, **g, h** = 10 μm, **i**–**n** = 5 μm.

Figure 2.47 *Pleurotheciella* sp2

Pleurotheciopsis B. Sutton, Transactions of the British Mycological Society 61 (3): 417 (1973)

Index Fungorum number: IF9474

Classification: Ascomycota genera *incertae sedis*

Type species: *Pleurotheciopsis pussilla* B. Sutton, Transactions of the British Mycological Society 61 (3): 418 (1973)

Sexual morph: Unknown.

Sequence data: *Pleurotheciopsis tropicalis* (CBS 100511 = INIFAT C97/93 = MUCL 40702, LSU: MH874311, ITS: MH862705)

Notes: This genus was described by Sutton (1973b) and is characterized by having macronematous, mononematous, unbranched, percurrent, brown conidiophores, polyblastic, integrated, terminal, sympodial, denticulate, hyaline to brown conidiogenous cells, producing catenate, septate, fusiform or doliiform, hyaline to brown conidia (Ellis, 1976; Sutton, 1973b). Phylogenetically, ex-type strain CBS 100511 of *Pleurotheciopsis tropicalis*, which is not generic type, clustered in the order Venturiales (Dothideomycetes) (Figure 2.1). References: (Ai et al., 2019; Ellis, 1976; Sutton, 1973b) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Pleurothecium Höhn., Berichte der Deutschen Botanischen Gesellschaft 37: 154 (1919)

Index Fungorum number: IF9475

Classification: Pleurotheciaceae, Pleurotheciales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

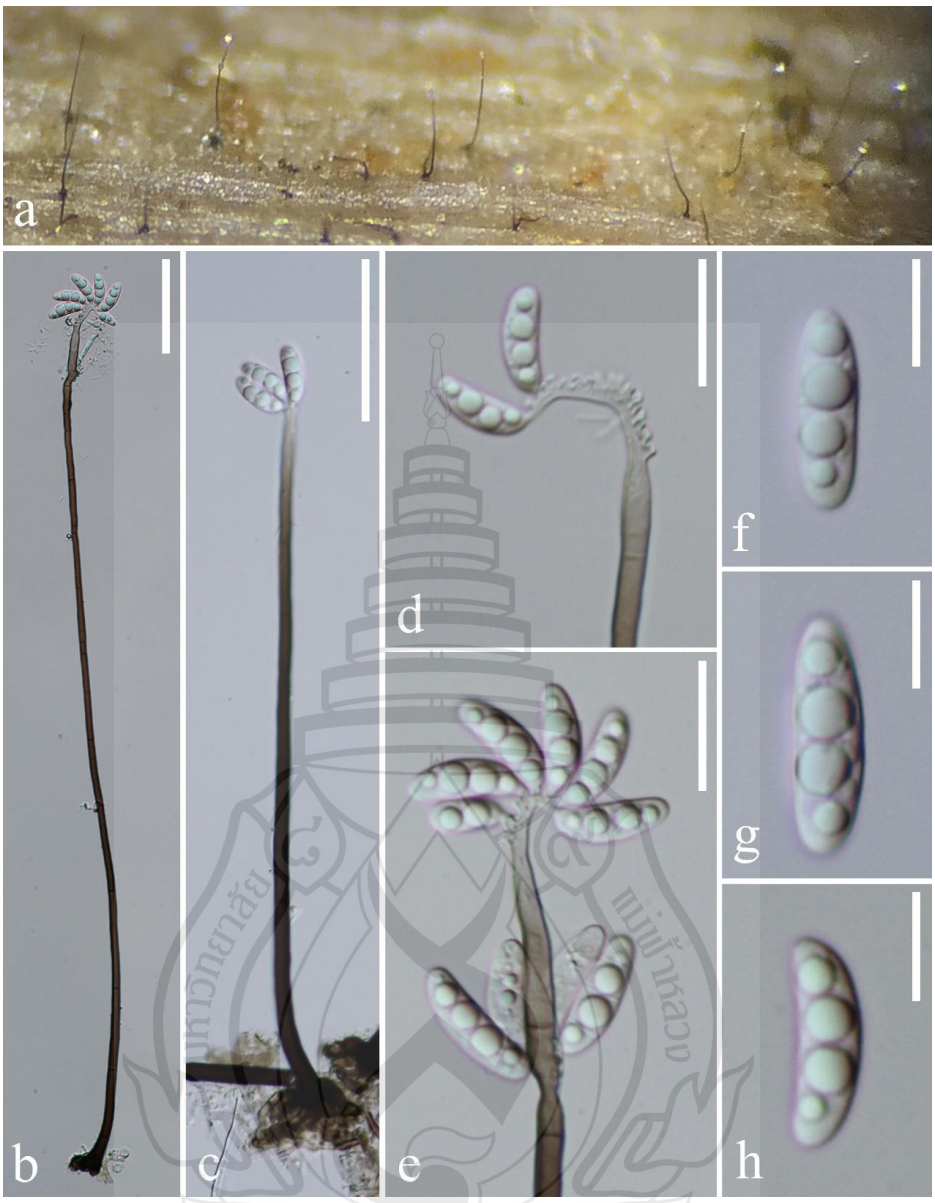
Type species: *Pleurothecium recurvatum* (Morgan) Höhn., Berichte der Deutschen Botanischen Gesellschaft 37: 154 (1919)

Sexual morph: *Carpoligna* F.A. Fernández & Huhndorf (Fernández et al., 1999)

Sequence data: *Pleurothecium floriforme* (MFLUCC 15-0628, LSU: NG_059791, ITS: NR_156614)

Notes: Fernández et al. (1999) introduced the sexual genus *Carpoligna* and linked the asexual morph to *Pleurothecium*. However, Réblová et al. (2016a)

proposed using *Pleurothecium* rather than *Carpoligna*. The sexual morph of *Pleurothecium* is similar to *Chaetosphaeria* Tul. & C. Tul., but they are different in the asexual morph morphology. *Chaetosphaeria* have phialidic conidiogenous cells, which are holoblastic in *Pleurothecium*. Phylogenetic analyses in this study showed that this genus, except *P. obovoideum* (Matsush.) Arzanlou & Crous, formed a monophyletic clade within the family Pleurotheciaceae (Figure 2.1). Morphologically, *P. obovoideum* is not a typically *Pleurothecium* species, since it does not fit well with the genus concept (Réblová et al., 2012). In addition, the ex-type strain of *P. obovoideum* formed a separated clade within the family (Figure 2.1). Therefore, we suggest to introduce a new genus to accommodate the species *P. obovoideum*. References: (Ellis, 1971, 1976; Goos, 1969; Hyde et al., 2017b; Luo et al., 2018, 2019; Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Pleurothecium*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-29). **a** Conidiophores on the host surface. **b, c** Conidiophores, conidiogenous cells with conidia. **d, e** Conidiogenous cells. **f**–**h** Conidia. Scale bars: **b, c** = 50 μm, **d, e** = 20 μm, **f**–**h** = 10 μm.

Figure 2.48 *Pleurothecium* sp.

Pleurovularia R. Kirschner & U. Braun, Mycoscience 43 (1): 16 (2002)

Index Fungorum number: IF28597

Classification: Ascomycota genera *incertae sedis*

Type species: *Pleurovularia polliniae* (Henn.) R. Kirschner & U. Braun, Mycoscience 43 (1): 18 (2002)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pleurovularia* was introduced by Kirschner et al. (2002) and it has macronematous, mononematous, unbranched or sparsely branched, hyaline conidiophores, with monoblastic or polyblastic, intercalary and terminal, hyaline conidiogenous cells, and produces solitary, smooth, obovoid, hyaline conidia. Phylogenetic position for *Pleurovularia* is unresolved due to lack of sequence data. References: (Kirschner et al., 2002) (morphology), (Wijayawardene et al., 2020) (outline).

Podonectria Petch, Transactions of the British Mycological Society 7 (3): 146, 161 (1921)

= *Tetracrium* Henn., Hedwigia 41: 116 (1902)

Index Fungorum number: IF4280

Classification: Podonectriaceae, Pleosporales, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Podonectria coccicola* (Ellis & Everh.) Petch, Transactions of the British Mycological Society 7 (3): 161 (1921)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Tetracrium* (Rossman et al., 2015b; Xu et al., 2021).

Sequence data: *Podonectria coccicola* (DAR 81026, LSU: KU519419, ITS: KU587798); *Podonectria kuwanaspidis* (SICAUCC 21-0002, LSU: MW462900, ITS: MW484989, SSU: MW462892)

Notes: The asexual morph of *Podonectria* was reported in *Tetracrium* and Rossman et al. (2015b) proposed to protect *Podonectria* over *Tetracrium*. Some studies placed this genus in the family Tubeufiaceae (Tubeufiales, Dothideomycetes) (Lu et al., 2018b; Wijayawardene et al., 2017a, 2020). Phylogenetically, *Podonectria*

was shown to be nested within the family Podonectriaceae (Pleosporales, Pleosporomycetidae, Dothideomycetes) (Figure 2.1). References: (Lu et al., 2018b; Xu et al., 2021) (morphology and phylogeny).

Polyancora Voglmayr & C. Yule, Mycological Research 110 (10): 1247 (2006)

Index Fungorum number: IF500689

Classification: Xylariales genera *incertae sedis*, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Polyancora globosa* Voglmayr & Yule, Mycological Research 110 (10): 1247 (2006)

Sexual morph: Unknown.

Sequence data: *Polyancora globosa* (Pahang 3, LSU: DQ396466, ITS: DQ396469)

Notes: *Polyancora* was introduced by Voglmayr and Yule (2006) and is a unique hyphomycetous genus by having mononematous conidiophores, monoblastic conidiogenous cells, producing solitary, bulbil, subhyaline to brown conidia with radiating, anchor-like appendages (Seifert et al., 2011). Phylogenetically, *Polyancora* located in Xylariales genera *incertae sedis* (Xylariomycetidae, Sordariomycetes) (Figure 2.1). References: (Seifert et al., 2011; Voglmayr & Yule, 2006) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Polybulbophiale Goh & K.D. Hyde, Mycotaxon 69: 145 (1998)

Index Fungorum number: IF27929

Classification: Ascomycota genera *incertae sedis*

Type species: *Polybulbophiale palmicola* Goh & K.D. Hyde, Mycotaxon 69: 148 (1998)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Polybulbophiale* was established by Goh and Hyde (1998) and it is dimorphic, and conidiophores are (1) macronematous, mononematous, solitary or in loose fascicles, unbranched, multi-septate, brown; (2) reduced, brown. Conidiogenous

cells are phialidic, integrated or discrete, terminal, brown conidiogenous cells, and produces solitary, septate, asetulate, fusoid, hyaline conidia aggregated in slimy mass. Phylogenetic position for *Polybulbophiale* is unresolved due to lack of sequence data. References: (Goh & Hyde, 1998) (morphology), (Wijayawardene et al., 2020) (outline).

Polycladium Ingold, Transactions of the British Mycological Society 42 (1): 114 (1959)

Index Fungorum number: IF9496

Classification: Ascomycota genera *incertae sedis*

Type species: *Polycladium equiseti* Ingold, Transactions of the British Mycological Society 42 (1): 114 (1959)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Polycladium* was introduced by Ingold (1959) and it has mononematous, unbranched, hyaline conidiophores, with thallic, hyaline conidiogenous cells, and produces conidia that are solitary, septate, complex, hyaline, staurosporous, consisting of a main axis with primary and secondary branches. Phylogenetic position for *Polycladium* is unresolved due to lack of sequence data. References: (Ingold, 1959) (morphology), (Wijayawardene et al., 2020) (outline).

Polyscytalum Riess, Botanische Zeitung 11: 138 (1853)

Index Fungorum number: IF9508

Classification: Phlogicylindriaceae, Amphisphaeriales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Polyscytalum fecundissimum* Riess, Botanische Zeitung 11: 138 (1853)

Sexual morph: Unknown.

Sequence data: *Polyscytalum fecundissimum* (CBS 100506, LSU and ITS: EU035441); *Polyscytalum pinicola* (CPC 36759 = CBS 146015, LSU: MT223925, ITS: MT223833)

Notes: *Polyscytalum* is characterized by having macronematous, mononematous or sporodochial, solitary or in groups, unbranched or branched, brown conidiophores, with polyblastic, terminal and intercalary, sympodial, denticulate, hyaline to brown conidiogenous cells, producing catenate, aseptate or septate, hyaline or brown conidia (Crous et al., 2020c; Seifert et al., 2011). Phylogenetically, *Polyscytalum* was shown to be nested within the family Phlogicylindriaceae (Amphisphaeriales, Xylariomycetidae, Sordariomycetes) (Figure 2.1). References: (Crous et al., 2020c; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Populomyces Hern.-Restr., Fungal Systematics and Evolution 7: 319 (2021)

Index Fungorum number: IF838712

Classification: ?Calloriaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Populomyces zwinianus* Hern.-Restr., Fungal Systematics and Evolution 7: 321 (2021)

Sexual morph: Unknown.

Sequence data: *Populomyces zwinianus* (CBS 147307 = NL1976004, LSU: MW883835, ITS: MW883444)

Notes: *Populomyces* was introduced by Crous et al. (2021c) and is characterized by having micronematous, mostly reduced, hyaline conidiophores, with monophialidic, cylindrical to lageniform, hyaline conidiogenous cells, producing solitary, aseptate, cylindrical, hyaline conidia. Phylogenetically, *Populomyces* was shown to be nested within the family ?Calloriaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Crous et al., 2021c) (morphology and phylogeny).

Porocladium Descals, Transactions of the British Mycological Society 67 (2): 211 (1976)

Index Fungorum number: IF9516

Classification: Ascomycota genera *incertae sedis*

Type species: *Porocladium aquaticum* Descals, Transactions of the British Mycological Society 67 (2): 211 (1976)

Sexual morph: Unknown.

Synanamorphs: Producing sclerotia (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Porocladium* was introduced by Descals et al. (1976) and it has macronematous, mononematous, solitary or caespitose, unbranched, acroauxic, hyaline conidiophores, with tretic, integrated, terminal or becoming intercalary, sympodial or sometimes determinate, hyaline conidiogenous cells, and produces solitary, septate, hyaline, staurosporous, consisting of a swollen main body with radiate arms. Phylogenetic position for *Porocladium* is unresolved due to lack of sequence data. References: (Descals et al., 1976) (morphology), (Wijayawardene et al., 2020) (outline).

Postia Fr., Hymenomycetes europaei: 586 (1874)

= *Ptychogaster* Corda, Icones fungorum hucusque cognitorum 2: 23 (1838)

Index Fungorum number: IF18356

Classification: Dacryobolaceae, Polyporales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Postia lactea* (Fr.) P. Karst. 1881 (Designated by Cooke, Lloydia 3: 94. 1940)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Ptychogaster* (Stalpers et al., 2021).

Sequence data: *Ptychogaster rubescens* (CBS 418.86 = DAOM 195426, LSU: MH873668, ITS: MH861975)

Notes: *Ptychogaster* is characterized by having mononematous, unbranched or branched, with clamp connections, hyaline conidiophores, thallic-arthric, hyaline conidiogenous cells, producing solitary or catenate, aseptate, hyaline conidia (Seifert et al., 2011). It was reported that *Ptychogaster* has sexual morphs in the genera Postia and Punctularia (Seifert et al., 2011; Stalpers et al., 2021). Stalpers et al. (2021) proposed to protect *Postia* over *Ptychogaster*. Phylogenetically, *Postia* was shown to be nested within the family Dacryobolaceae (Polyporales,

Agaricomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology), (He et al., 2019) (outline).

Prathoda Subram., Journal of the Indian Botanical Society 35 (1): 73 (1956)

Index Fungorum number: IF9526

Classification: Pleosporaceae, Pleosporales, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Prathoda saparva* Subram., Journal of the Indian Botanical Society 35 (1): 73 (1956)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Prathoda* was established by Subramanian (1956a) and it has synnematous, unbranched or branched, dark brown conidiomata, macronematous, unbranched or branched, septate, geniculate, brown conidiophores, with tretic, sympodial, scared, brown conidiogenous cells, and produces solitary, multi-septate, long, scolecosporous, hyaline to subhyaline conidia. Phylogenetic position for *Prathoda* is unresolved due to lack of sequence data. References: (Subramanian, 1956a) (morphology), (Wijayawardene et al., 2020) (outline).

Proteophiala Cif., Sydowia 11: 289 (1958)

Index Fungorum number: IF9537

Classification: Ceratostomataceae, Coronophorales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Proteophiala mattiroloana* Cif., Sydowia 11: 289 (1958)

Sexual morph: *Melanospora*, *Persiciospora*, *Pteridiosperma*, *Sphaerodes* (Seifert et al., 2011).

Synanamorphs: *Acrospeira*, *Chlamydomyces*, *Harzia*, *Nematogonum*, *Olpitrichum*, *Papulaspora*, *Rhinotrichella* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Proteophiala* was introduced by Ciferri (1958) and four records are listed in Index Fungorum. Phylogenetic position for *Proteophiala* is unresolved due to

lack of sequence data. References: (Ciferri, 1958) (morphology), (Wijayawardene et al., 2020) (outline).

Pseudeurotium J.F.H. Beyma, Zentralblatt für Bakteriologie und Parasitenkunde, Abteilung 2 96: 415 (1937)

= *Teberdinia* Sogonov, W. Gams, Summerb. & Schroers, Mycologia 97 (3): 698 (2005)

Index Fungorum number: IF4408

Classification: Pseudeurotiaceae, Thelebolales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudeurotium zonatum* J.F.H. Beyma, Zentralblatt für Bakteriologie und Parasitenkunde, Abteilung 2 96: 411 (1937)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Teberdinia* (Sogonov et al., 2005).

Sequence data: *Pseudeurotium zonatum* (CBS 329.36 = AFTOL-ID 1912, LSU: MH867318, ITS: MH855814, SSU: DQ471040)

Notes: *Teberdinia* was introduced by Sogonov et al. (2005) and its sexual morph was reported in the genus *Pseudeurotium*. Minnis and Lindner (2013) synonymized *Teberdinia* under *Pseudeurotium*. Phylogenetically, *Pseudeurotium* was shown to be nested within the family Pseudeurotiaceae (Thelebolales, Leotiomycetes) (Figure 2.1). References: (Minnis & Lindner, 2013; Sogonov et al., 2005) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Pseudoachroiostachys Tibpromma & K.D. Hyde, Fungal Diversity 93: 107 (2018)

Index Fungorum number: IF554547

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudoachroiostachys krabiense* Tibpromma & K.D. Hyde (2018)

Sexual morph: Unknown.

Sequence data: *Pseudoachroiostachys krabiense* (MFLUCC 16-0325, LSU: NG_068839, ITS: NR_168200, SSU: NG_068395)

Notes: *Pseudoachroiostachys* was introduced by Tibpromma et al. (2018) and was placed in Nectriaceae (Hypocreales, Sordariomycetes). Based on the phylogenetic tree provided by Tibpromma et al. (2018), this genus located in Nectriaceae. However, they showed "Combined rDNA gene sequence data revealed that *Pseudoachroiostachys* belongs to the family Stachybotryaceae and is closely related to *Pandanaceomyces*" under the notes of this genus. These are contradictory to each other. It seems that *Pseudoachroiostachys* located in wrong position in the phylogenetic tree of Tibpromma et al. (2018), because of the wrong *tef1* sequence data which belongs to Dothideomycetes after doing the BLAST research in GenBank. In our phylogenetic analysis (Figure 2.1), this genus located in the family Stachybotryaceae. *Pseudoachroiostachys* is similar to *Stachybotrys* and other stachybotrys-like genera by macronematous, mononematous, unbranched or branched conidiophores with phialidic and discrete conidiogenous cells radiating from the apex. Hence, we put this genus in the family Stachybotryaceae based on morphological and phylogenetic analysis. References: (Tibpromma et al., 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline, in Nectriaceae).

Pseudoacremonium Crous, Persoonia 32: 241 (2014)

Index Fungorum number: IF808925

Classification: Hypocreales genus incertae sedis, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudoacremonium sacchari* Crous, Persoonia 32: 241 (2014)

Sexual morph: Unknown.

Sequence data: *Pseudoacremonium sacchari* (CPC 23155 = CBS 137990, LSU: NG_058083, ITS: NR_156588)

Notes: This genus is acremonium-like and differs from other similar genera by the solitary brown, globose chlamydospore, mononematous, rarely branched, hyaline becoming brown conidiophores, monophialidic, hyaline becoming brown conidiogenous cells, and produces aseptate, hyaline becoming brown, ellipsoid

conidia in unbranched chains (Crous et al., 2014b). References: (Crous et al., 2014b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Pseudoanguillospora S.H. Iqbal, Biologia Lahore 20: 11 (1974)

Index Fungorum number: IF9551

Classification: Ascomycota genera *incertae sedis*

Type species: *Pseudoanguillospora stricta* S.H. Iqbal, Biologia Lahore 20: 11 (1974)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Marvanová, 1996).

Sequence data: *Pseudoanguillospora stricta* (DSM 104335, ITS: MK353118)

Notes: *Pseudoanguillospora* was introduced by Iqbal (1974) and is characterized by having mononematous, unbranched or sparsely branched, sometimes reduced, hyaline conidiophores, with monoblastic or polyblastic, terminal or lateral or intercalary, sympodial, hyaline conidiogenous cells, and producing solitary or in groups, multi-septate, straight or slightly curved, long-fusoid to narrow-obclavate, hyaline conidia (Marvanová, 1996). Phylogenetic position for *Pseudoanguillospora* is unresolved due to lack of LSU sequence data. References: (Iqbal, 1974; Marvanová, 1996) (morphology), (Wijayawardene et al., 2020) (outline).

Pseudoarthrographis Crous & Thangavel, Persoonia 40: 341 (2018)

Index Fungorum number: IF825401

Classification: Dothideomycetes genera incertae sedis, Pezizomycotina, Ascomycota

Type species: *Pseudoarthrographis phlogis* Crous & Thangavel, Persoonia 40: 341 (2018)

Sexual morph: Unknown.

Sequence data: *Pseudoarthrographis phlogis* (CPC 32759 = CBS 144414, LSU: NG_064540, ITS: NR_160349)

Notes: *Pseudoarthrographis* was introduced by Crous et al. (2018c) and is *Arthrographis*-like. References: (Crous et al., 2018c) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Pseudocatenomycopsis Crous & L.A. Shuttlew., Persoonia 31: 221 (2013)

Index Fungorum number: IF805836

Classification: Scortechiniaceae, Coronophorales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudocatenomycopsis rothmanniae* Crous & L.A. Shuttlew., Persoonia 31: 221 (2013)

Sexual morph: Unknown.

Sequence data: *Pseudocatenomycopsis rothmanniae* (CBS 136445 = CPC 22733, LSU: KF777237, ITS: KF777185)

Notes: The genus is characterized by macronematous, mononematous, hyaline becoming brown conidiophores, apical conidiogenous apparatus, polyblastic, hyaline conidiogenous cells, 0-1-septate, hyaline, fusoid-ellipsoid to doliiform or subcylindrical ramoconidia, and aseptate, hyaline, ellipsoid to ovoid, granular conidia in branched chain (Crous et al., 2013). References: (Crous et al., 2013) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Pseudocercosporella Deighton, Mycological Papers 133: 38 (1973)

Index Fungorum number: IF9560

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudocercosporella bakeri* (Syd. & P. Syd.) Deighton, Mycological Papers 133: 41 (1973)

Sexual morph: *Mycosphaerella* (Seifert et al., 2011).

Synanamorphs: *Mycopappus* (Seifert et al., 2011).

Sequence data: *Pseudocercosporella bakeri* (CBS 125685 = CPC 17570, LSU: KX287005, ITS: KX287306)

Notes: *Pseudocercosporella* was introduced by Deighton (1973) and is characterized by having mononematous or sporodochial, solitary to fasciculate,

unbranched or branched, sometimes reduced, hyaline conidiophores, with mono- to polyblastic, integrated, terminal, sympodial, hyaline conidiogenous cells, producing solitary, rarely catenate, 1-septate to multi-septate, subcylindrical, filiform, somewhat obclavate, hyaline conidia (Deighton, 1973; Videira et al., 2017). Phylogenetically, *Pseudocercosporella* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Deighton, 1973; Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Pseudoclathrosphaerina Voglmayr, Mycologia 89: 943 (1997)

Index Fungorum number: IF27800

Classification: Hyaloscyphaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudoclathrosphaerina evamariae* Voglmayr, Mycologia 89: 943 (1997)

Sexual morph: Unknown.

Sequence data: *Pseudoclathrosphaerina evamariae* (CBS 616.97, LSU: MH874271, ITS: MH862664)

Notes: *Pseudoclathrosphaerina* was erected by Voglmayr and Krisai-Greilhuber (1997) and is characterized by having micro- to semi-macronematous, mononematous, erect conidiophores, with monoblastic, integrated, terminal, hyaline conidiogenous cells, producing conidia that are solitary, globose, consisting of repeatedly dichotomously branched conidial filament. Phylogenetically, the ex-type strain CBS 616.97 of generic type was shown to be nested within the family Hyaloscyphaceae (Helotiales, Leotiomycetes) (Figure 2.1). Therefore, we suggest putting *Pseudoclathrosphaerina* in the family Hyaloscyphaceae. References: (Voglmayr & Krisai-Greilhuber, 1997) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Pseudocosmospora C. Herrera & P. Chaverri, Mycologia 105 (5): 1291 (2013)

Index Fungorum number: IF802432

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudocosmospora eutypellae* C. Herrera & P. Chaverri, Mycologia 105 (5): 1293 (2013)

Sexual morph: Introduced as holomorphic genus (Herrera et al., 2013a).

Sequence data: *Pseudocosmospora eutypellae* (A.R. 4562 = CBS 133966, LSU: KC291757, ITS: KC291721)

Notes: *Pseudocosmospora* was introduced by Herrera et al. (2013a) with acremonium-like to verticillium-like asexual morph. References: (Herrera et al., 2013a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Pseudodactylaria Crous, Persoonia 39: 421 (2017)

Index Fungorum number: IF823411

Classification: Pseudodactylariaceae, Pseudodactylariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

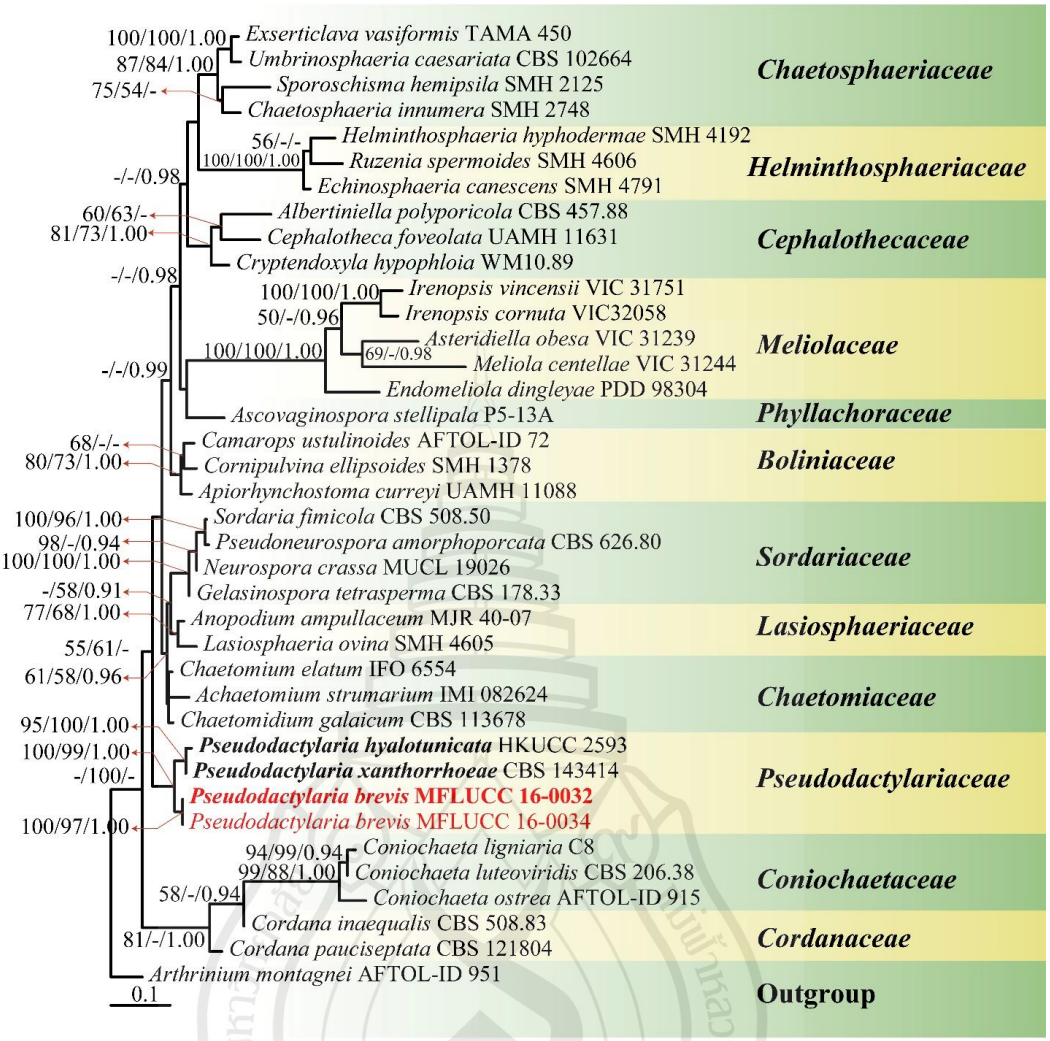
Type species: *Pseudodactylaria xanthorrhoeae* Crous, Persoonia 39: 421 (2017)

Sexual morph: Unknown.

Sequence data: *Pseudodactylaria xanthorrhoeae* (CBS 143414 = CPC 32430, LSU: MG386117, ITS: MG386064)

Notes: *Pseudodactylaria* is *Dactylaria*-like but phylogenetically differs from other *Dactylaria*-like genera. Many hitherto reported genera share some similarities with *Dactylaria sensu lato* (de Hoog & van Oorschot, 1985; Goh & Hyde, 1997a; Réblová et al., 2012). de Hoog and van Oorschot (1985) listed 38 *Dactylaria*-like genera, e.g. *Arthrobotrys*, *Dactylella*, *Lactydina* and *Neta*, and provided a key to these taxa. Réblová et al. (2012) introduced the genus *Pleurotheciella* with *Dactylaria*-like asexual morph (Wijayawardene et al., 2017b). The taxonomy of the *Dactylaria sensu lato* and *Dactylaria*-like genera is still confused, and further work, especially phylogenetic analysis based on DNA sequence data, is required to confirm their taxonomic placement. The genus *Pseudodactylaria* Crous was introduced by Crous et al. (2017a) for two *Dactylaria*-like species, *P. hyalotunicata* (K.M. Tsuí et

al.) Crous and *P. xanthorrhoeae* Crous, within the family *Pseudodactylariaceae* Crous and order Pseudodactylariales Crous. *Pseudodactylaria* is similar to *Dactylaria sensu lato*, but can be distinguished by the morphology of its conidiophores and conidia. *Pseudodactylariaceae* is included within subclass Sordariomycetidae (Eriksson & Winka, 1997) and class Sordariomycetes, which is the second largest class of Ascomycota (Hyde et al., 2017a; Maharachchikumbura et al., 2015, 2016; Wijayawardene et al., 2018). References: (Crous et al., 2017a; Lin et al., 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).



Note Phylogenetic tree generated from ML analysis based on LSU sequence data for subclass Sordariomycetidae. Bootstrap support values for maximum parsimony (MP) and maximum likelihood (ML) greater than 50% and Bayesian posterior probabilities greater than 0.9 are indicated above or below the nodes as MLBS/MPBS/PP. Ex-type strains are in bold, the new isolates are in red. The tree is rooted with *Arthrinium montagnei* (AFTOL-ID 951).

Figure 2.49 Phylogenetic tree for *Pseudodactylaria*

Pseudodactylaria brevis C.G. Lin, McKenzie & K.D. Hyde, *sp. nov.* (Figure 2.23 and Figure 2.24)

Index Fungorum number: IF554780; *Facesoffungi number*: FoF 04684

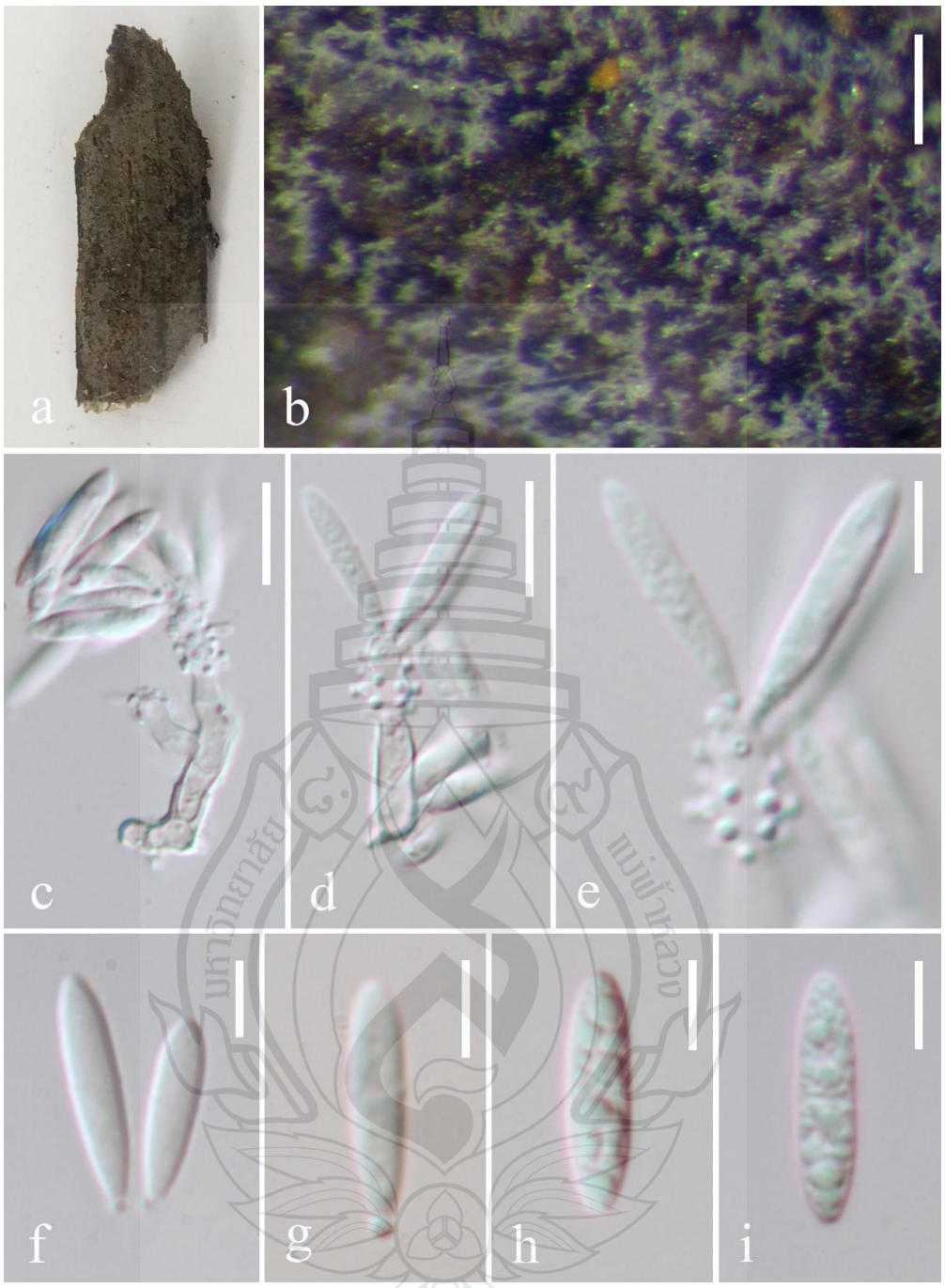
Etymology: In reference to the short conidiophores.

Holotype: MFLU 18-1037

Saprobic on plant host. **Asexual morph:** *Colonies* on plant substrate effuse, grey-white. *Mycelium* partly superficial. *Conidiophores* macronematous, mononematous, solitary, erect, sometimes branched, straight or flexuous, septate, hyaline, cylindrical with apex sometimes inflated, smooth, often reduced to conidiogenous cells. *Conidiogenous cells* polyblastic, integrated, sympodial, terminal, sometimes becoming intercalary, denticulate, cylindrical, hyaline, 11–25 × 2–5 μm; denticles numerous, cylindrical, flat-topped, up to 1 μm wide. *Conidia* solitary, dry, acropleurogenous, simple, smooth, prominently guttulate, with 1 median transverse septum, fusiform, sometimes clavate, subtruncate at base, subobtuse at apex, hyaline, 11.5–17.5 × 2.5–4.0 μm (av. 14.7 × 3.2 μm, n = 40).

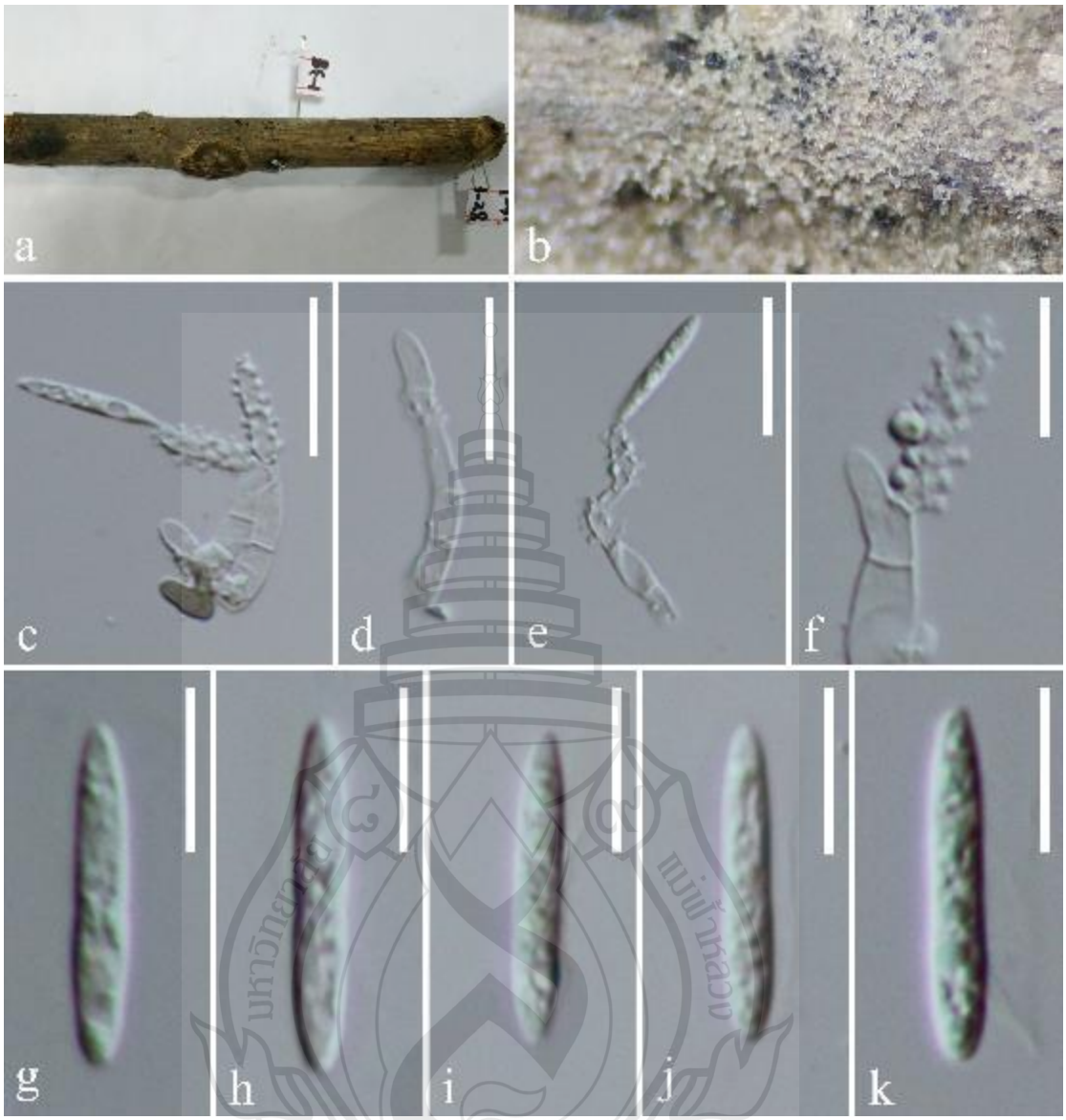
Culture characteristics: Conidia germinating on PDA within 12 h. Colonies on PDA effuse, greyish white from above, greyish yellow from below, reaching a diam. of 2–3 cm in 14 days at 25 °C.

Material examined: THAILAND. Krabi: Wat Thum Sua, on decaying wood, 15 December 2015, S. Tibpromma, M 1-1 (MFLU 18-1037, holotype; HKAS, isotype), ex-type living cultures MFLUCC 16-0032. *ibid.*, M 1-5 (MFLU 18-1038; HKAS), living cultures MFLUCC 16-0034.



Note *Pseudodactylaria brevis* (MFLU 18-1037, holotype) **a** Host material. **b** Conidiophores on the host surface. **c–e** Conidiophores, conidiogenous cells with denticles and conidia. **f–i** Conidia. Scale bars: b = 100 μm, c, d = 10 μm, e–i = 5 μm.

Figure 2.50 *Pseudodactylaria brevis* (MFLU 18-1037, holotype)



Note ***Pseudodactylaria hyalotunicata*** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-38). **a** Host material. **b** Conidiophores on the host surface. **c–e** Conidiophores. **f** Conidiogenous cells. **g–k** Conidia. Scale bars: **c–e** = 20 μm, **f–k** = 10 μm.

Figure 2.51 *Pseudodactylaria hyalotunicata*

Pseudodidymaria U. Braun, Cryptogamic Botany 4: 110 (1993)

Index Fungorum number: IF11485

Classification: Ascomycota genera *incertae sedis*

Type species: *Pseudodidymaria wyethiae* (Ellis & Everh.) U. Braun, Cryptogamic Botany 4: 110 (1993)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Three species are accepted in this genus. Phylogenetic position for *Pseudodidymaria* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Pseudodidymella C.Z. Wei, Y. Harada & Katum., Mycologia 89 (3): 494 (1997)

= *Pycnopleiospora* C.Z. Wei, Y. Harada & Katum., Mycologia 89 (3): 496 (1997)

Index Fungorum number: IF27703

Classification: Melanommataceae, Pleosporales, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudodidymella fagi* C.Z. Wei, Y. Harada & Katum., Mycologia 89 (3): 496 (1997)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Pycnopleiospora* (Wei et al., 1997).

Synanamorphs: Producing chlamydospores (Wei et al., 1997).

Sequence data: *Pseudodidymella fagi* (HHUF 22903; H 2579, LSU: LC203356, ITS: LC150787, SSU: LC203310)

Notes: *Pseudodidymella* and its asexual morph *Pycnopleiospora* were introduced by Wei et al. (1997). Rossman et al. (2015b) proposed to protect *Pseudodidymella* over *Pycnopleiospora*. Phylogenetically, *Pseudodidymella* was shown to be nested within the family Melanommataceae (Pleosporales, Pleosporomycetidae, Dothideomycetes) (Figure 2.1). References: (Wei et al., 1997) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Pseudofusicolla D. Triest, Mycobiology 44 (3): 127 (2016) [MB#811910]

Index Fungorum number: IF811910

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudofusicolla belgica* D. Triest, Mycobiology 44 (3): 127 (2016) [MB#812587]

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Triest et al., 2016).

Sequence data: *Pseudofusicolla belgica* (IHEM 2413, LSU: KJ126476, ITS: KJ125588)

Notes: *Pseudofusicolla* was introduced by Triest et al. (2016) and is *Fusarium*-like. References: (Triest et al., 2016) (morphology), (Wijayawardene et al., 2020) (outline).

Pseudogaster Höhn., Denkschriften der Akademie der Wissenschaften (Wien) Mathematisch-naturwissenschaftliche Klasse 83: 38 (1907)

Index Fungorum number: IF9577

Classification: Ascomycota genera *incertae sedis*

Type species: *Pseudogaster singularis* Höhn., Denkschriften der Akademie der Wissenschaften (Wien) Mathematisch-naturwissenschaftliche Klasse 83: 38 [extr.] (1907)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted in this genus. Phylogenetic position for *Pseudogaster* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Pseudogliomastix W. Gams, Proceedings of the Indian Academy of Sciences Section B 94: 279 (1985)

Index Fungorum number: IF11172

Classification: Coniochaetales genera *incertae sedis*, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudogliomastix protea* (Sacc.) W. Gams & Boekhout, Proceedings of the Indian Academy of Sciences Section B 94: 279 (1985)

Sexual morph: *Wallrothiella* (Gams & Boekhout, 1985; Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pseudogliomastix* was established by Gams and Boekhout (1985) and is acremonium-like. Phylogenetic position for *Pseudogliomastix* is unresolved due to lack of sequence data. References: (Gams & Boekhout, 1985) (morphology), (Wijayawardene et al., 2020) (outline).

Pseudogliophragma Phadke & V.G. Rao, Norwegian Journal of Botany 27: 127 (1980)

Index Fungorum number: IF9579

Classification: Wiesneriomycetaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Pseudogliophragma indicum* Phadke & V.G. Rao, Norwegian Journal of Botany 27: 127 (1980)

Sexual morph: Unknown.

Sequence data: *Pseudogliophragma indicum* (MTCC 11985, LSU: NG_060127, ITS: NR_132085, SSU: NG_065055.1)

Notes: *Pseudogliophragma* was established by Phadke and Rao (1980) and is characterized by synnematous conidiomata, branched, brown conidiophores, monoblastic, subhyaline conidiogenous cells, producing 4–8-celled, in slimy mass, fusiform to falcate, subhyaline to hyaline conidia. Phylogenetically, *Pseudogliophragma* located in the family Wiesneriomycetaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Phadke & Rao, 1980; Pratibha et al., 2015) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Pseudographiella E.F. Morris, Mycopathologia et Mycologia Applicata 28 (1-2): 97 (1966)

Index Fungorum number: IF9581

Classification: Ascomycota genera *incertae sedis*

Type species: *Pseudographiella variiseptata* E.F. Morris, Mycopathologia et Mycologia Applicata 28 (1-2): 97 (1966)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pseudographiella* was introduced by Morris (1966) and it has synnematous, dark conidiomata, macronematous, branched, septate, hyaline conidiophores, and produces solitary or catenate, septate, mucoid, fusiform to falcate, hyaline conidia. Phylogenetic position for *Pseudographiella* is unresolved due to lack of sequence data. References: (Morris, 1966) (morphology), (Wijayawardene et al., 2020) (outline).

Pseudohamigera Houbraken, Frisvad & Samson, Studies in Mycology 95: 19 (2020)

Index Fungorum number: IF832554

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudohamigera striata* (Raper & Fennell) Houbraken, Frisvad & Samson, in Houbraken, Kocsubé, Visagie, Yilmaz, Wang, Meijer, Kraak, Hubka, Bensch, Samson & Frisvad, Stud. Mycol. 95: 90 (2020) (= *Penicillium striatum* Raper & Fennell, Mycologia 40 (5): 521 (1948))

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Houbraken et al., 2020).

Sequence data: *Pseudohamigera striata* (CBS 377.48 = NRRL MOLD 717 = IFO 6106, LSU: NG_063997, ITS: NR_145139, SSU: NG_062360)

Notes: *Pseudohamigera* was introduced by Houbraken et al. (2020) with penicillium-like asexual morph. References: (Houbraken et al., 2020) (morphology and phylogeny).

Pseudohelicomyces Garnica & E. Valenz., Mycological Research 104 (6): 739 (2000)

Index Fungorum number: IF28428

Classification: Strophariaceae, Agaricales, Agaricomycetidae, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Pseudohelicomyces albus* Garnica & E. Valenz., Mycological Research 104 (6): 739 (2000)

Sexual morph: *Deconica* (Stalpers et al., 2021; Valenzuela & Garnica, 2000).

Sequence data: Sequence data is unavailable for the genus *Pseudohelicomyces* Garnica & E. Valenz.

Notes: *Pseudohelicomyces* was introduced by Valenzuela and Garnica (2000) to accommodate *P. albus*, which is the anamorph of *Psilocybe merdaria* (now known as *Deconica merdaria*). Stalpers et al. (2021) proposed protecting *Deconica* (W.G. Sm.) P. Karst. over *Pseudohelicomyces*. References: (Valenzuela & Garnica, 2000) (morphology and phylogeny), (Wijayawardene et al., 2017a) (outline).

Pseudoidriella Crous & R.G. Shivas, Persoonia 27: 135 (2011)

Index Fungorum number: IF560696

Classification: Cylindriaceae, Amphisphaeriales, Sordariomycetes, Ascomycota

Type species: *Pseudoidriella syzygii* Crous & R.G. Shivas, Persoonia 27: 135 (2011)

Sexual morph: Unknown.

Notes: See notes under *Cylindrium*.

Pseudoornatispora Tibpromma & K.D. Hyde, Fungal Diversity 93: 115 (2018)

Index Fungorum number: IF555336

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudoornatispora krabiense* Tibpromma & K.D. Hyde (2018)

Sexual morph: Introduced as holomorph.

Sequence data: *Pseudoornatispora krabiense* (MFLUCC 16-0317, LSU: MH376721, ITS: MH388348)

Notes: The asexual morph of *Pseudoornatispora* is characterized by sporodochial conidiomata, macronematous, hyaline conidiophores, phialidic, discrete, hyaline conidiogenous cells, and solitary, aseptate, guttulate, ellipsoid, hyaline conidia (Tibpromma et al., 2018). This genus was synonymised under *Koorchaloma* Subram. (Li et al., 2020b). References: (Li et al., 2020b; Tibpromma et al., 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Pseudophialophora J. Luo & N. Zhang, Mycologia 106 (3): 581 (2014)

Index Fungorum number: IF807080

Classification: Magnaporthaceae, Magnaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudophialophora eragrostis* J. Luo & N. Zhang, Mycologia 106 (3): 581 (2014)

Sexual morph: Unknown.

Sequence data: *Pseudophialophora eragrostis* (CM12m9, LSU: KF689638, ITS: KF689648, SSU: KF689598)

Notes: *Pseudophialophora* was introduced by Luo et al. (2014) to accommodate *P. eragrostis*, *P. panicorum* and *P. schizachyrii*. It has unbranched or branched, hyaline conidiophores, phialidic without a conspicuous collarette, curved, yellowish to hyaline conidiogenous cells, and produces aseptate, in slimy mass, oblong ellipsoidal, hyaline conidia (Luo et al., 2014). References: (Luo et al., 2014) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Pseudoramichloridium Cheewangkoon & Crous, Persoonia 23: 75 (2009)

Index Fungorum number: IF513854

Classification: Extremaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudoramichloridium henryi* Cheewangkoon & Crous, Persoonia 23: 75 (2009)

Sexual morph: Unknown.

Sequence data: *Pseudoramichloridium henryi* (CPC 13121 = CBS 124775, LSU: GQ303320, ITS: GQ303289)

Notes: *Pseudoramichloridium* was introduced by Cheewangkoon et al. (2009) and is characterized by macronematous, mononematous, unbranched, brown conidiophores, with polyblastic, integrated, terminal and intercalary, sympodial, brown conidiogenous cells, producing solitary, aseptate, obovoid to fusiform, subhyaline to pale brown conidia. Phylogenetically, *Pseudoramichloridium* was shown to be nested within the family Extremaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Cheewangkoon et al., 2009) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Pseudoramularia Matsush., Matsushima Mycological Memoirs 3: 13 (1983)

Index Fungorum number: IF11174

Classification: Ascomycota genera *incertae sedis*

Type species: *Pseudoramularia ponapensis* Matsush., Matsushima Mycological Memoirs 3: 13 (1983)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pseudoramularia* was established by Matsushima (1983) and it has mononematous, unbranched, reduced conidiophores, with polyblastic, sympodial, denticulate, hyaline to pale brown conidiogenous cells, and produces solitary, catenate, septate, elongate fusiform or elongate cylindrical, hyaline to pale brown conidia. Phylogenetic position for *Pseudoramularia* is unresolved due to lack of sequence data. References: (Matsushima, 1983) (morphology), (Wijayawardene et al., 2020) (outline).

Pseudorhizopogon Kobayasi, J. Jap. Bot.: 175 (1983)

Index Fungorum number: IF11175

Classification: Ascomycota genera *incertae sedis*

Type species: *Pseudorhizopogon sudae* Kobayasi, J. Jap. Bot.: 175 (1983)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted in this genus. Phylogenetic position for *Pseudorhizopogon* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Pseudoschizothecium Y. Marín, A.N. Mill. & Stchigel, Microorganisms 8 (9, no. 1430): 32 (2020)

Index Fungorum number: IF835515

Classification: Schizotheciaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudoschizothecium atropurpureum* (A.N. Mill. & Huhndorf) Y. Marín, A.N. Mill. & Stchigel, Microorganisms 8 (9, no. 1430): 32 (2020)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Marin-Felix et al., 2020).

Sequence data: *Pseudoschizothecium atropurpureum* (SMH 3073, LSU: AY780057)

Notes: *Pseudoschizothecium* was introduced by Marin-Felix et al. (2020) to accommodate *C. atropurpurea* and its asexual morph has reduced conidiophores, phialidic, flask-shaped or elongate-clavate conidiogenous cells, and produces globose or ovoid, hyaline conidia. References: (Marin-Felix et al., 2020) (morphology and phylogeny).

Pseudosigmoidea K. Ando & N. Nakam., Journal of General and Applied Microbiology Tokyo 46 (1): 55 (2000)

Index Fungorum number: IF28418

Classification: Sympoventuriaceae, Venturiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Pseudosigmoidea cranei* K. Ando & N. Nakam., Journal of General and Applied Microbiology Tokyo 46 (1): 55 (2000)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Ando & Nakamura, 2000)

Sequence data: *Pseudosigmoidea excentrica* (CBS 469.95, LSU: NG_058019, ITS: NR_156545, SSU: NG_065605)

Notes: This genus was described by Ando and Nakamura (2000) to accommodate *P. cranei*. *Pseudosigmoidea* is characterized by having micronematous, mononematous, branched, septate, reduced, hyaline to brown conidiophores, with polyphialidic, intercalary, hyaline to brown conidiogenous cells, producing solitary, septate, scolecoid, hyaline to pale brown conidia (Ando & Nakamura, 2000). Phylogenetically, representatives of *Pseudosigmoidea* clustered in the family Sympoventuriaceae (Venturiales, Dothideomycetes) (Figure 2.1). References: (Ando & Nakamura, 2000; Shen et al., 2020) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Pseudosubramaniomyces Crous, Persoonia 39: 375 (2017)

Index Fungorum number: IF823465

Classification: Beltraniaceae, Amphisphaeriales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudosubramaniomyces fusisaprophyticus* (Matsush.) Crous, Persoonia 39: 375 (2017)

Sexual morph: Unknown.

Sequence data: *Pseudosubramaniomyces fusisaprophyticus* (CBS 418.95 = INIFAT C94/134, LSU:EU040241; ITS: EU040241)

Notes: Matsushima (1971) introduced the species *Ramularia fusisaprophytica* Matsush., however, Kirk (1982) combined this species under *Subramaniomyces* Varghese & V.G. Rao, and named *S. fusisaprophyticus* (Matsush.) P.M. Kir. *Subramaniomyces* was accepted within the family Beltraniaceae by Maharachchikumbura et al. (2016) based on *S. fusisaprophyticus*. Crous et al. (2017a) introduced a new genus *Pseudosubramaniomyces* Crous to accommodate *S. fusisaprophyticus* because of its distinct morphology and placed it under Xylariales *incertae sedis*. References: (Crous et al., 2017a, 2020a; Kirk, 1982; Matsushima, 1971) (morphology and phylogeny), (Hyde et al., 2020) (outline).

Pseudotripoconidium Z.F. Yu & K.Q. Zhang, Mycologia 103 (1): 168 (2011)

Index Fungorum number: IF510511

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Pseudotripoconidium sinense* Z.F. Yu & K.Q. Zhang, Mycologia 103 (1): 168 (2011)

Sexual morph: Unknown.

Sequence data: *Pseudotripoconidium sinense* (before known as *Orbilia sinensis*) (CBS 121220, LSU: DQ480728, ITS: DQ480727)

Notes: For details of this genus see the monograph in Baral et al. (2020). Phylogenetically, *Pseudotripoconidium* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Pseudovirgaria H.D. Shin, U. Braun, Arzanlou & Crous, Studies in Mycology 58: 87 (2007)

Index Fungorum number: IF504564

Classification: Acrospermaceae, Acrospermales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Pseudovirgaria hyperparasitica* H.D. Shin, U. Braun, Arzanlou & Crous, Studies in Mycology 58: 87 (2007)

Sexual morph: Unknown.

Sequence data: *Pseudovirgaria hyperparasitica* (CBS 121739 = CPC 10753, LSU: EU041824, ITS: EU041767)

Notes: *Pseudovirgaria* was established by Arzanlou et al. (2007) and is characterized by having mononematous, branched, reduced conidiophores, with polyblastic, sympodial, terminal and intercalary, subdenticulate, hyaline to pale brown conidiogenous cells, producing solitary, aseptate, more or less obovoid, hyaline to pale brown conidia. Hongsanan et al. (2020b) placed this genus in the family Acrospermaceae (Acrospermales). Phylogenetically, *Pseudovirgaria* was shown to be nested within the family Acrospermaceae (Acrospermales, Dothideomycetes) (Figure

2.1). References: (Arzanlou et al., 2007; Hongsanan et al., 2020b) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Pseudozyma Bandoni emend. Boekhout, Journal of General and Applied Microbiology Tokyo 41 (4): 359-366 (1985)

Index Fungorum number: IF25732

Classification: Ustilaginaceae, Ustilaginales, Ustilaginomycetes, Ustilaginomycotina, Basidiomycota

Type species: *Pseudozyma prolifica* Bandoni, Botanical Journal of the Linnean Society 91: 38 (1985)

Sexual morph: Unknown.

Sequence data: *Pseudozyma prolifica* (CBS 319.87, LSU: AJ235298, ITS: AF294700, SSU: AF294724)

Notes: This genus was emended by Boekhout (1995) and is yeast-like. Some *Pseudozyma* species were transformed to other genera, e.g. *Anthracocystis*, *Dirkmeia*, *Kalmanozyma*, *Langdonia*, *Moesziomyces*, *Sporisorium*, *Triodiomyces* and *Ustilago*, by Wang et al. (2015b). Phylogenetically, representatives of *Pseudozyma* clustered in the family Ustilaginaceae, Ustilaginales, Ustilaginomycetes (Figure 2.1). References: (Boekhout, 1995; Piatek et al., 2015; Wang et al., 2015b) (morphology and phylogeny), (He et al., 2019) (outline).

Psychrophila M.M. Wang & Xing Z. Liu, Persoonia 34: 105 (2014)

Index Fungorum number: IF801296

Classification: Helotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Psychrophila antarctica* M.M. Wang & Xing Z. Liu, Persoonia 34: 106 (2014)

Sexual morph: Unknown.

Sequence data: *Psychrophila antarctica* (ANT92 = CGMCC315133, LSU: KF768452, ITS: JX001640)

Notes: *Psychrophila* was erected by Wang et al. (2015a) and is characterized by reduced conidiophores, and phialidic, flask-shaped, with collarettes,

hyaline conidiogenous cells, producing aseptate, smooth, pyriform to globose, hyaline conidia. Phylogenetically, representatives of *Psychrophila* clustered in the family Arachnopezizaceae, Helotiales, Leotiomycetes (Figure 2.1). References: (Wang et al., 2015a) (morphology), (Wijayawardene et al., 2020) (outline).

Pterulopsis Wakef. & Hansf., Proceedings of the Linnean Society London 155: 64 (1943)

Index Fungorum number: IF9632

Classification: Ascomycota genera *incertae sedis*

Type species: *Pterulopsis dummeri* Wakef. & Hansf., Proceedings of the Linnean Society London 155: 64 (1943)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pterulopsis* was established by Hansford (1943) and one species is accepted. Phylogenetic position for *Pterulopsis* is unresolved due to lack of sequence data. References: (Hansford, 1943) (morphology), (Wijayawardene et al., 2020) (outline).

Pterygosporopsis P.M. Kirk, Mycotaxon 18 (2): 285 (1983)

Index Fungorum number: IF25843

Classification: Ascomycota genera *incertae sedis*

Type species: *Pterygosporopsis fragilis* P.M. Kirk, Mycotaxon 18 (2): 286 (1983)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pterygosporopsis* was introduced by Kirk (1983) and it has macronematous, mononematous, solitary or fasciculate, unbranched, septate, brown conidiophores, with polyblastic, integrated, terminal, sympodial, denticulate conidiogenous cells, and produces catenate, aseptate, broadly fusiform to ellipsoid or clavate to narrowly obovoid, hyaline to subhyaline conidia. Phylogenetic position for *Pterygosporopsis* is unresolved due to lack of sequence data. References: (Kirk, 1983) (morphology), (Wijayawardene et al., 2020) (outline).

Pulchromyces Hennebert, Persoonia 7 (2): 198 (1973)

Index Fungorum number: IF9636

Classification: Ascomycota genera *incertae sedis*

Type species: *Pulchromyces fimicola* (V. Dring) Hennebert, Persoonia 7 (2): 198 (1973)

Sexual morph: Unknown.

Sequence data: *Pulchromyces fimicola* (CBS 127.69 = CUP 49531 = ATCC 18595, LSU, ITS and SSU: EF442001)

Notes: *Pulchromyces* was introduced by Hennebert (1973) and is characterized by having mononematous, solitary or caespitose, branched with radiating apical branches, hyaline or brown conidiophores, with polyblastic, synchronous, denticulate, hyaline conidiogenous cells, producing solitary, aseptate, smooth becoming ferrugineous and reticulate, spherical, hyaline conidia. Phylogenetically, representatives of *Pulchromyces* were shown to be nested within the order Pezizales (Pezizomycetes) (Figure 2.1). References: (Hennebert, 1973; Marek et al., 2009) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Pyramidospora Sv. Nilsson, Svensk Botanisk Tidskrift 56: 358 (1962)

Index Fungorum number: IF9664

Classification: Ascomycota genera *incertae sedis*

Type species: *Pyramidospora casuarinae* Sv. Nilsson, Svensk Botanisk Tidskrift 56: 359 (1962)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Pyramidospora* was introduced by Nilsson (1962) and eight species are accepted. Phylogenetic position for *Pyramidospora* is unresolved due to lack of sequence data. References: (Nilsson, 1962) (morphology), (Wijayawardene et al., 2020) (outline).

Quadracaea Lunghini, Pinzari & Zucconi, Mycotaxon 60: 103 (1996)

Index Fungorum number: IF27814

Classification: Ascomycota genera *incertae sedis*

Type species: *Quadracaea mediterranea* Lunghini, Pinzari & Zucconi, Mycotaxon 60: 104 (1996)

Sexual morph: Unknown.

Synanamorphs: selenosporella-like (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: Phylogenetic position for *Quadracaea* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Quadricladium Nawawi & Kuthub., Mycotaxon 34 (2): 489 (1989)

Index Fungorum number: IF11179

Classification: Ascomycota genera *incertae sedis*

Type species: *Quadricladium aquaticum* Nawawi & Kuthub., Mycotaxon 34 (2): 490 (1989)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Quadricladium* was introduced by Nawawi and Kuthubutheen (1989) for an aquatic hyphomycete and it has macronematous, mononematous, solitary, unbranched, septate, hyaline conidiophores, with polyblastic, sympodial, terminal, hyaline conidiogenous cells, and produces solitary, septate, tetraradiate, hyaline conidia. Phylogenetic position for *Quadricladium* is unresolved due to lack of sequence data. References: (Nawawi & Kuthubutheen, 1989) (morphology), (Wijayawardene et al., 2020) (outline).

Quambalaria J.A. Simpson, Australasian Mycologist 19 (2): 60 (2000)

Index Fungorum number: IF28451

Classification: Quambalariaceae, Microstromatales, Exobasidiomycetes, Ustilaginomycotina, Basidiomycota

Type species: *Quambalaria pitereka* (J. Walker & Bertus) J.A. Simpson, Australasian Mycologist 19 (2): 60 (2000)

Sexual morph: Unknown.

Sequence data: *Quambalaria cyanescens* (CBS 357.73 = CMW 5583 = MUCL 19329, LSU: NG_042416, ITS: NR_111202)

Notes: This genus was described by Simpson (2000) and is characterized by having mononematous, solitary to caespitose, unbranched or rarely branched, sparsely septate, hyaline conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing solitary, aseptate, variably shaped, hyaline conidia and catenate secondary conidia from primary conidia. Phylogenetically, representatives of *Quambalaria* clustered in the family Quambalariaceae (Microstromatales, Exobasidiomycetes) (Figure 2.1). References: (Braganca et al., 2016; de Beer et al., 2006; Paap et al., 2008; Pegg et al., 2008; Simpson, 2000) (morphology and phylogeny), (He et al., 2019) (outline).

Quasiphloeospora B. Sutton, Crous & Shamoun, Mycological Research 100: 979 (1996)

Index Fungorum number: IF27631

Classification: Ascomycota genera *incertae sedis*

Type species: *Quasiphloeospora saximontanensis* (Deighton) B. Sutton, Crous & Shamoun, in Sutton, Shamoun & Crous, Mycol. Res. 100(8): 981 (1996)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Quasiphloeospora* was established by Sutton et al. (1996) and it has acervular to sporodochial conidiomata, verruculose, septate, irregularly branched, brown conidiophores, with percurrent or sympodial, brown conidiogenous cells, produces septate, cylindrical, hyaline to pale brown conidia. Phylogenetic position for *Quasiphloeospora* is unresolved due to lack of sequence data. References: (Sutton et al., 1996) (morphology), (Wijayawardene et al., 2020) (outline).

Radiatispora Matsush., Matsushima Mycological Memoirs 8: 32 (1995)

Index Fungorum number: IF11488

Classification: Ascomycota genera *incertae sedis*

Type species: *Radiatispora yunnanensis* Matsush., Matsushima Mycological Memoirs 8: 32 (1995)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Radiatispora* was introduced by Matsushima (1995) and it has micronematous, reduced conidiophores, with monoblastic, determinate, hyaline conidiogenous cells, and produces solitary, hyaline, staurosporous conidia. Phylogenetic position for *Radiatispora* is unresolved due to lack of sequence data. References: (Matsushima, 1995) (morphology), (Wijayawardene et al., 2020) (outline).

Radulidium Arzanlou, W. Gams & Crous, Studies in Mycology 58: 89 (2007)

Index Fungorum number: IF504566

Classification: Dothideomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Radulidium subulatum* (de Hoog) Arzanlou, W. Gams & Crous, Studies in Mycology 58: 89 (2007)

Sexual morph: Unknown.

Sequence data: *Radulidium subulatum* (CBS 405.76, LSU: NG_057780, ITS: NR_145355)

Notes: *Radulidium* was erected by Arzanlou et al. (2007) and is characterized by having micronematous or semi-macronematous, mononematous, rarely branched, often reduced conidiophores, polyblastic, terminal or intercalary, integrated, smooth, denticulate, pale brown conidiogenous cells, producing solitary, aseptate, smooth or verrucose, obovoidal, fusiform to subcylindrical, subhyaline conidia. Phylogenetically, representative of *Radulidium* clustered in the family Acrospermaceae, Acrospermales, Dothideomycetes (Figure 2.1). References: (Arzanlou et al., 2007) (morphology), (Wijayawardene et al., 2020) (outline).

Raffaelea Arx & Hennebert, Mycopathologia et Mycologia Applicata 25 (3-4): 310 (1965)

Index Fungorum number: IF9685

Classification: Ophiostomataceae, Ophiostomatales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Raffaelea ambrosiae* Arx & Hennebert, Mycopathologia et Mycologia Applicata 25 (3-4): 310 (1965)

Sexual morph: *Ambrosiozyma*, *Botryoascus*, *Ophiostoma* (Seifert et al., 2011).

Sequence data: *Raffaelea ambrosiae* (CBS 185.64, LSU: EU984297, ITS: MH858412, SSU: AY497518)

Notes: *Raffaelea* was introduced by von Arx and Hennebert (1965) and has none or synnematous conidiomata, unbranched or sparingly branched, hyaline or pale brown conidiophores, with monoblastic or polyblastic, sympodial or percurrent, scars or denticulate, hyaline conidiogenous cells and produces aseptate, solitary, hyaline conidia and aseptate, hyaline aleuriocodia (Seifert et al., 2011). References: (Seifert et al., 2011; von Arx & Hennebert, 1965) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Ramicapitulum Whitton, McKenzie & K.D. Hyde, Fungal Diversity Research Series 21: 276 (2012)

Index Fungorum number: IF563872

Classification: Ascomycota genera *incertae sedis*

Type species: *Ramicapitulum chinensis* Whitton, McKenzie & K.D. Hyde, Fungal Diversity Research Series 21: 277 (2012)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ramicapitulum* was introduced by Whitton et al. (2012) and it has macronematous, mononematous, septate, branched, brown conidiophores, with polyblastic, discrete, denticulate conidiogenous cells, and produces aseptate, smooth, ellipsoidal, hyaline conidia. Phylogenetic position for *Ramicapitulum* is unresolved due to lack of sequence data. References: (Whitton et al., 2012) (morphology), (Wijayawardene et al., 2020) (outline).

Ramiphialis F.R. Barbosa, Fiúza & R.F. Castañeda, Mycotaxon 135 (2): 294 (2020)

Index Fungorum number: IF831423

Classification: Ascomycota genera *incertae sedis*

Type species: *Ramiphialis ronuroensis* F.R. Barbosa, Fiúza & R.F. Castañeda, Mycotaxon 135 (2): 294 (2020)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ramiphialis* was introduced by Barbosa et al. (2020) and is characterized by macronematous, mononematous, branched conidiophores with monophialidic, discrete, terminal and intercalary conidiogenous cells that produce aseptate, filiform to falcate, hyaline conidia accumulating in a white mucilaginous mass. Phylogenetic position for *Ramiphialis* is unresolved due to lack of sequence data. References: (Barbosa et al., 2020) (morphology), (Wijayawardene et al., 2020) (outline).

Ramularia Unger, Die Exantheme der Pflanzen: 119 (1833)

= *Phacellium* Bonord., Fungi europaei exsiccati. Edito nova. Series secunda. Cent. 3: no. 288 (1860)

Index Fungorum number: IF9691

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Ramularia pusilla* Unger, Die Exantheme der Pflanzen: 169 (1833)

Sexual morph: Mycosphaerella, Melanodothis

Disease symptoms: Leaf spots, chlorosis or necrosis (Videira et al., 2017)

Sequence data: *Ramularia pusilla* (CBS 124973 = RoKi 3143, LSU: KP894141, ITS: KP894248)

Notes: *Ramularia* is characterized by mononematous or synnematous or sporodochial, unbranched or branched, sometimes reduced, hyaline conidiophores, with polyblastic, integrated, terminal, sympodial, hyaline conidiogenous cells, producing solitary or catenate, aseptate or septate, usually ellipsoid-ovoid, cylindrical-fusiform, rarely filiform, hyaline conidia (Videira et al., 2017). *Phacellium* was tentatively synonymised under *Ramularia* (Videira et al., 2016). Phylogenetically, *Ramularia* was shown to be nested within the family Mycosphaerellaceae

(Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Kirschner, 2009; Videira et al., 2016, 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Ramulariopsis Speg., Anales del Museo Nacional de Historia Natural Buenos Aires ser. 3, 13: 421 [ser. 3, 13] (1911)

Index Fungorum number: IF9692

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Ramulariopsis cnidoscoli* Speg., Anales del Museo Nacional de Historia Natural Buenos Aires ser. 3, 13: 422 (1911)

Sexual morph: *Mycosphaerella* (Seifert et al., 2011).

Disease symptoms: Leas spots (Videira et al., 2017).

Sequence data: *Ramulariopsis pseudoglycines* (CBS 141100 = CPC 18242, LSU: KX287246, ITS: KX287543)

Notes: *Ramulariopsis* was established by Spegazzini (1910) and is characterized by macronematous, mononematous, fasciculate, unbranched or branched, hyaline conidiophores, with polyblastic, integrated, terminal or intercalary, sympodial conidiogenous cells, producing catenate, aseptate or 1- to multi-septate, ellipsoid-ovoid, subcylindrical-fusiform, hyaline conidia (Videira et al., 2017). Phylogenetically, *Ramulariopsis* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Ramulispora Miura, Koshurei Agric. Exp. Sta. S. Manchur. Railway Co. Report: 43 (1920)

Index Fungorum number: IF9695

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Ramulispora sorghi* (Ellis & Everh.) L.S. Olive & Lefebvre, Phytopathology 36: 198 (1946)

Sexual morph: *Mycosphaerella* (Seifert et al., 2011).

Disease symptoms: Leaf spots, necrosis, foot-rot, and seedling blight (Videira et al., 2017)

Sequence data: *Ramulispora sorghiphila* (CBS 255.82 = IMI 153077, LSU: NG_058497, ITS: NR_156642)

Notes: *Ramulispora* is characterized by semi-macronematous or macronematous, mononematous, solitary or fasciculate, unbranched, rarely branched, often reduced, hyaline or brown conidiophores, with mono- to polyblastic, integrated, terminal, sympodial, rarely percurrent, hyaline to subhyaline conidiogenous cells, producing solitary, multi-septate, scolecosporous, acicular, subcylindrical, filiform, narrowly obclavate, hyaline conidia (Videira et al., 2017). Phylogenetically, *Ramulispora* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Rasamsonia Houbraken & Frisvad, Antonie van Leeuwenhoek 101: 411 (2011)

Index Fungorum number: IF519868

Classification: Trichocomaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Rasamsonia emersonii* (Stolk) Houbraken & Frisvad, Antonie van Leeuwenhoek 101: 417 (2011)

Sexual morph: Unknown.

Sequence data: *Rasamsonia brevistipitata* (CBS 128785, LSU: MT365183, ITS: JF417488, SSU: MT365127); *Rasamsonia byssochlamydoides* (CBS 413.71, LSU: MH871961, ITS: JF417476, SSU: AY526476)

Notes: *Rasamsonia* was introduced by Houbraken et al. (2012) and is penicillium-like. References: (Houbraken et al., 2012; Su & Cai, 2013; Tanney & Seifert, 2013) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Rattania Prabhugaonkar & Bhat, Mycotaxon 108: 218 (2009)

Index Fungorum number: IF512876

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Rattania setulifera* Prabhugaonkar & Bhat, Mycotaxon 108: 220 (2009)

Sexual morph: Unknown.

Sequence data: *Rattania setulifera* (GUFCC 15-501, LSU: HM171322, ITS: GU191794)

Notes: *Rattania* was introduced by Prabhugaonkar and Bhat (2009) and is characterized by sporodochial conidiomata, unbranched, dark brown setae, macronematous, branched, hyaline conidiophores, monoblastic, sympodial, conidiogenous cells, and solitary, aseptate or multiseptate, fusiform, curved, hyaline conidia with setulate at both ends. References: (Prabhugaonkar & Bhat, 2009) (morphology), (Lin et al., 2019b; Shenoy et al., 2010) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Rectifusarium L. Lombard, Crous & W. Gams, Studies in Mycology 80: 229 (2015)

Index Fungorum number: IF810252

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Rectifusarium ventricosum* (Appel & Wollenw.) L. Lombard & Crous, Studies in Mycology 80: 229 (2015)

Sexual morph: Introduced as holomorphic genus (Lombard et al., 2015).

Sequence data: *Rectifusarium ventricosum* (CBS 748.79 = BBA 62452 = NRRL 20846 = NRRL 22113, LSU: KM231658, ITS: HQ897816)

Notes: *Rectifusarium* was introduced by Lombard et al. (2015) and its asexual morph has mononematous, unbranched conidiophores, phialidic conidiogenous cells, 3-septate, ellipsoidal to fusiform, hyaline macrocodidia, and globose to subglobose, hyaline chlamydospores (Lombard et al., 2015). References:

(Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Redbia Deighton & Piroz., Mycological Papers 128: 83 (1972)

Index Fungorum number: IF9700

Classification: Ascomycota genera *incertae sedis*

Type species: *Redbia pucciniicola* Deighton & Piroz., Mycological Papers 128: 83 (1972)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Redbia* was introduced by Deighton and Pirozynski (1972) and it has mononematous, septate, branched, brown conidiophores, with polyblastic, sympodial, denticulate, pale brown conidiogenous cells, and produces solitary, septate, fusiform, hyaline or pale brown conidia. Phylogenetic position for *Redbia* is unresolved due to lack of sequence data. References: (Deighton & Pirozynski, 1972) (morphology), (Wijayawardene et al., 2020) (outline).

Refractohilum D. Hawksw., Botanical Journal of the Linnean Society 75 (2): 204 (1977)

Index Fungorum number: IF9701

Classification: Ascomycota genera *incertae sedis*

Type species: *Refractohilum galligenum* D. Hawksw., Botanical Journal of the Linnean Society 75 (2): 207 (1977)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Refractohilum* was introduced by Hawksworth (1977) for a lichenicolous fungus, and it has macronematous, mononematous, unbranched, septate, hyaline conidiophores, with monoblastic, terminal, percurrent, hyaline conidiogenous cells, and produces solitary, 0-3-septate, guttulate, cymbiform, hyaline conidia. Phylogenetic position for *Refractohilum* is unresolved due to lack of sequence data. References: (Hawksworth, 1977) (morphology), (Wijayawardene et al., 2020) (outline).

Remersonia Samson & Seifert, Canadian Journal of Botany 75 (7): 1160 (1997)

Index Fungorum number: IF27809

Classification: Chaetomiaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Remersonia thermophila* (Fergus) Seifert & Samson, Canadian Journal of Botany 75 (7): 1160 (1997)

Sexual morph: Unknown.

Sequence data: *Remersonia thermophila* (ATCC 22073, LSU: NG_059467, ITS: NR_155710, SSU: NG_061123)

Notes: *Remersonia* was introduced by Seifert et al. (1997) and is characterized by determinate, pale synnemata, macronematous, unbranched or sparingly branched, hyaline, percurrent conidiophores, hyaline conidiogenous cells, aseptate, oblong to ellipsoidal, or clavate, hyaline conidia. References: (Seifert et al., 1997) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Retiarius D.L. Olivier, Transactions of the British Mycological Society 71 (2): 193 (1978)

Index Fungorum number: IF9702

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Retiarius superficiaris* D.L. Olivier, Transactions of the British Mycological Society 71 (2): 194 (1978)

Sexual morph: Unknown.

Sequence data: *Retiarius superficiaris* (IMI 223459, LSU and ITS: KY352467)

Notes: For details of this genus see the monograph in Baral et al. (2020). Phylogenetically, *Retiarius* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny).

Rhabdocline Syd., Annales Mycologici 20: 194 (1922)

= *Meria* Vuill., Bull. Soc. Sci. Nancy: 20 (1896)

Index Fungorum number: IF4681

Classification: Cenangiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Rhabdocline pseudotsugae* Syd., Annales Mycologici 20: 194 (1922)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Meria* (Johnston et al., 2014; Seifert et al., 2011).

Sequence data: *Rhabdocline laricis* (previous known as *Meria laricis*) (CBS 298.52; AFTOL ID 907, LSU: DQ470954, ITS: MH857046, SSU: DQ471002)

Notes: *Rhabdocline* was introduced by Sydow and Petrak (1922) and was reported have asexual morph in the genus *Meria* (Johnston et al., 2014; Seifert et al., 2011). Johnston et al. (2014) proposed to use *Rhabdocline* over *Meria*. Phylogenetically, *Rhabdocline* was shown to be nested within the family Cenangiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Wijayawardene et al., 2017a, 2020) (outline).

Rhachisphaerella U. Braun, C. Nakash., Videira & Crous, Studies in Mycology 87: 337 (2017)

Index Fungorum number: IF822702

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Rhachisphaerella mozambica* (Arzanlou & Crous) Videira & Crous, Studies in Mycology 87: 338 (2017) [MB#822798]

Sexual morph: Holomorphic genus with mycosphaerella-like sexual morph and hyphomycetous asexual morph (Videira et al., 2017).

Sequence data: *Rhachisphaerella mozambica* (CBS 122464 = X34, LSU: MF951237, ITS: EU514257)

Notes: *Rhachisphaerella* was established by Videira et al. (2017) and its asexual morph has subcylindrical, hyaline, occasionally reduced conidiophores, with polyblastic, integrated, terminal, sympodial conidiogenous cells, produces solitary,

aseptate or multi-septate, obovoid, ellipsoidal, obclavate, hyaline conidia. Phylogenetically, *Rhachisphaerella* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Rhacodiella Peyronel, Staz. Sperim. Arg. Ital.: 39 (1919)

Index Fungorum number: IF9714

Classification: Sclerotiniaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Rhacodiella castaneae* (Bainier) Peyronel, Rendic. R. Accad. Naz. Lincei: 10 (1920)

Sexual morph: *Ciboria* (Seifert et al., 2011).

Synanamorphs: *Myrioconium* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: Phylogenetic position for *Rhacodiella* is unresolved due to lack of sequence data.

Rhamphoriopsis Réblová & Gardiennet, Mycologia 11 (4): 755 (2018)

Index Fungorum number: IF823919

Classification: Rhamphoriaceae, Diaporthomycetidae families incertae sedis, Sordariomycetes, Pezizomycotina, Ascomycota

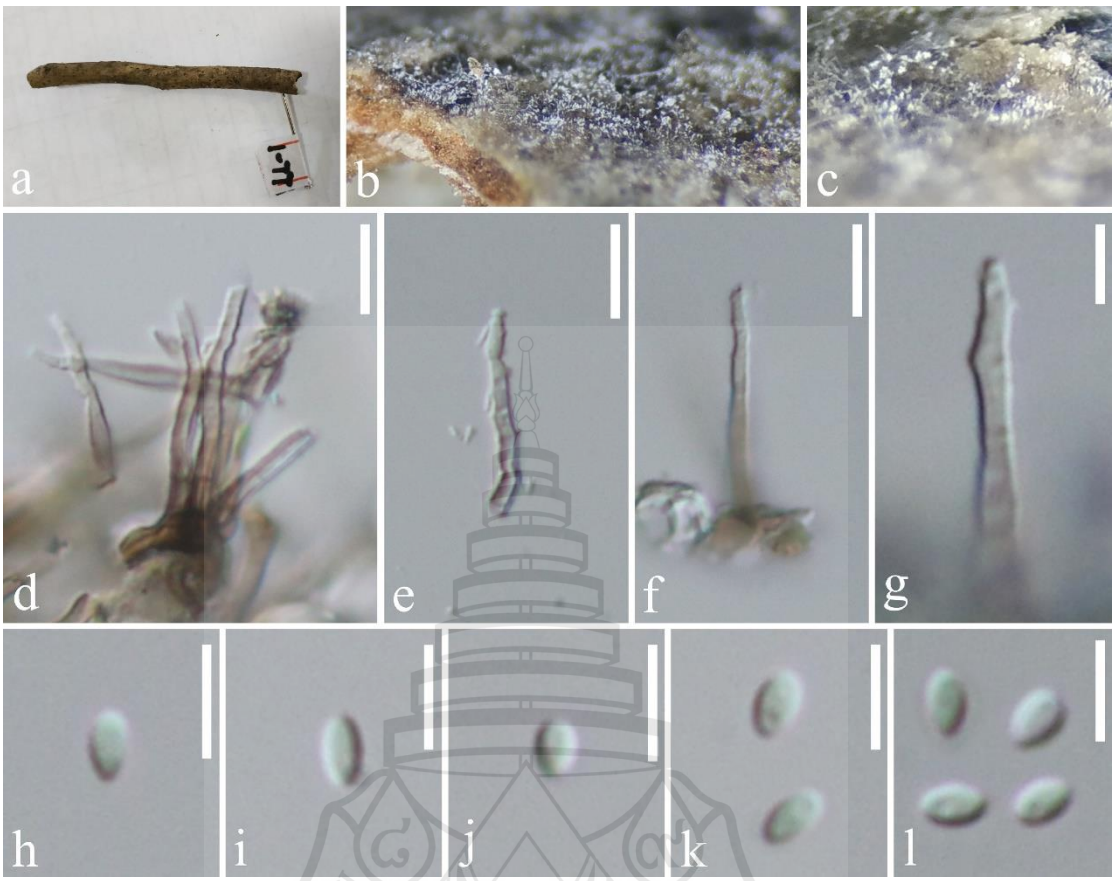
Type species: *Rhamphoriopsis muriformis* Réblová & Gardiennet, Mycologia 11 (4): 756 (2018)

Sexual morph: Holomorphic genus with *Phaeoisaria*-like asexual morph (Réblová & Štěpánek, 2018).

Sequence data: *Rhamphoriopsis muriformis* (CBS 131269, LSU: MG600396, SSU: MG600404)

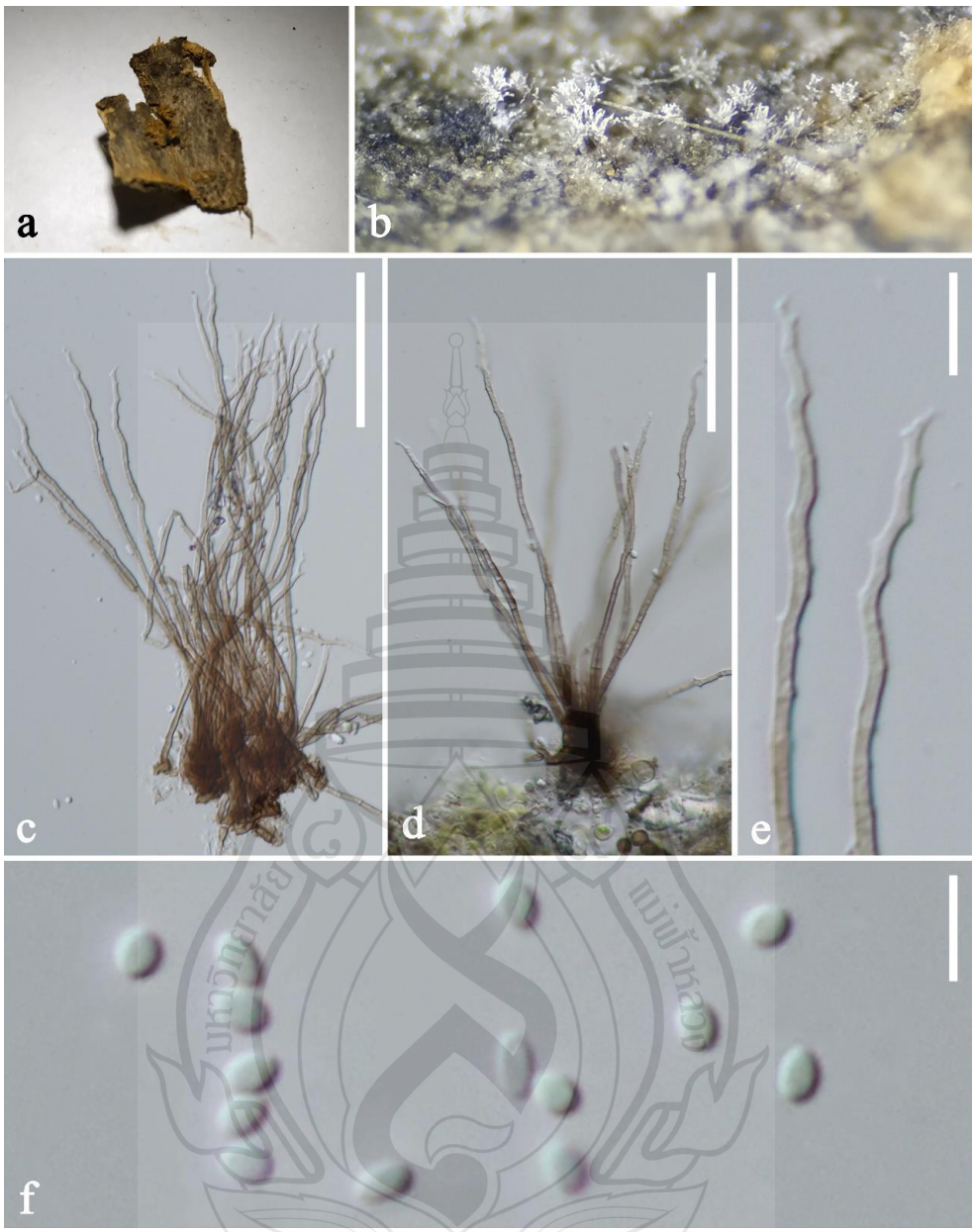
Notes: Species of *Rhamphoriopsis* are distinguished from other similar genera by the globose ascomata with a cylindrical, usually flattened neck, hyaline, dictyoseptate ascospores and *Phaeoisaria*-like anamorphs (Réblová & Štěpánek, 2018). Phylogenetic analyses in this study showed that this genus formed a monophyletic clade within the family Rhamphoriaceae (Figure 2.1). An isolate CBS

480.75, named *Phaeoisaria glauca*, grouped together with *Rhamphoriopsis* species and *P. glauca* is morphologically similar to *Rhamphoriopsis* species (de Hoog & Papendorf, 1976). The status of *P. glauca* should be reconsidered in the future study. References: (Réblová & Štěpánek, 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).



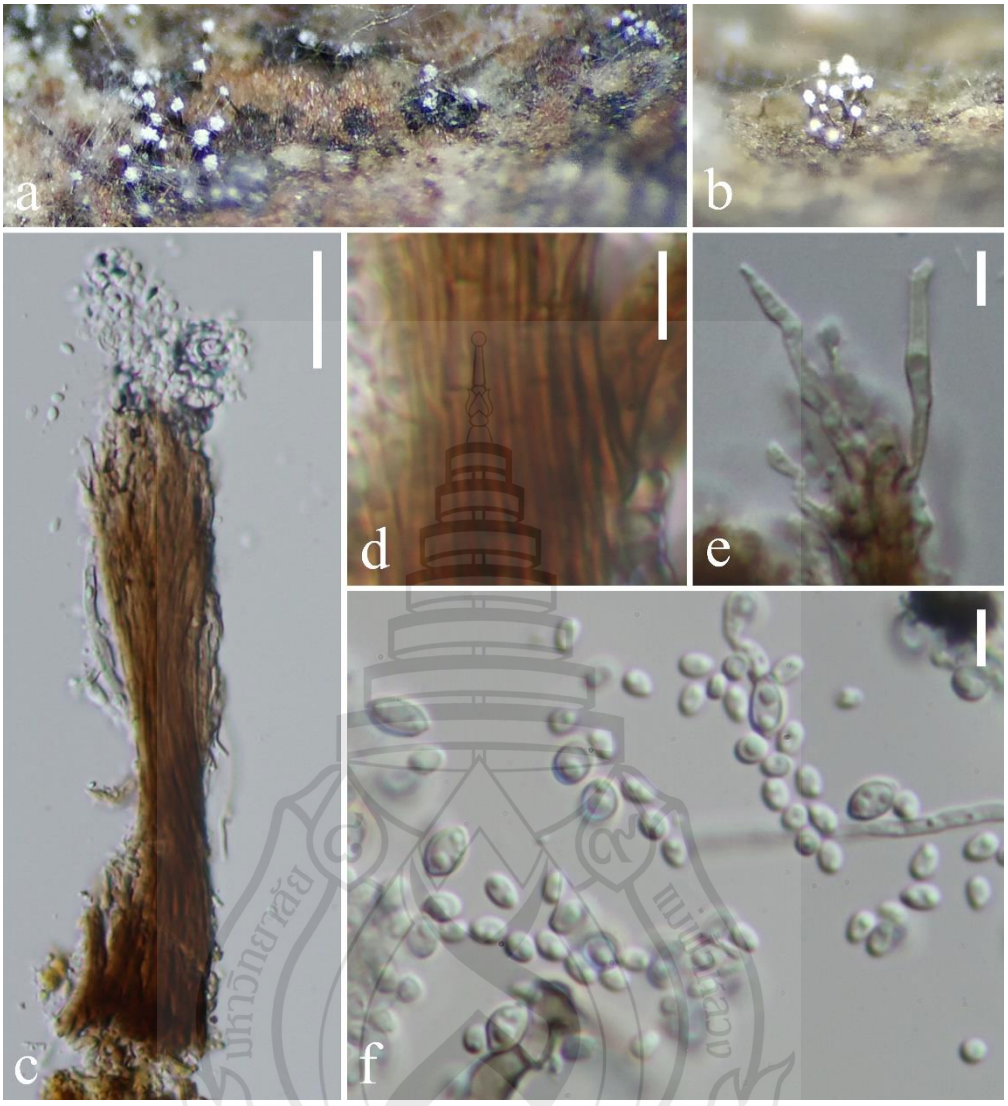
Note ***Rhamphoriopsis brevis*** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-77). **a** Host material. **b, c** Conidiophores on the host surface. **d-f** conidiophores. **g** Conidiogenous cells. **h-l** Conidia. Scale bars: **d–f** = 10 μm, **g–l** = 5 μm.

Figure 2.52 *Rhamphoriopsis brevis*



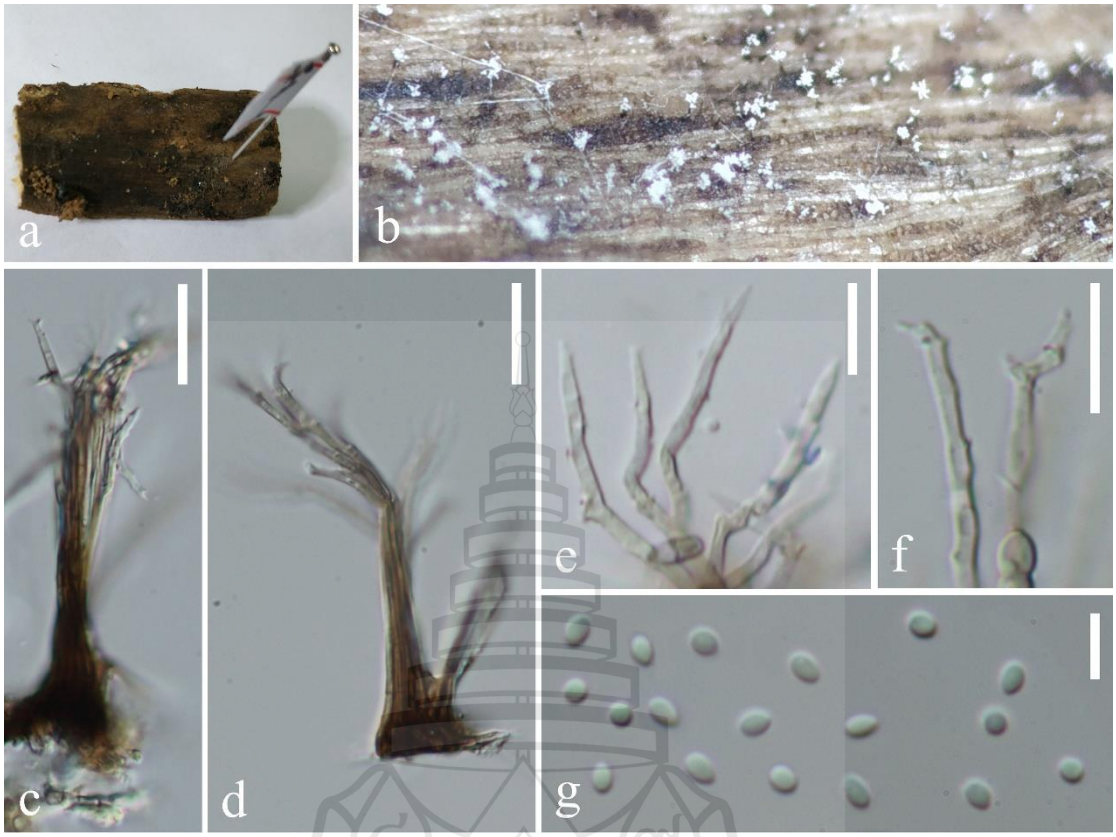
Note ***Rhamphoriopsis hyalospora*** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-66). **a** Host material. **b** Conidiophores on the host surface. **c**, **d** conidiophores. **e** Conidiogenous cells. **f** Conidia. Scale bars: **c**, **d** = 50 μm, **e** = 10 μm, **f** = 5 μm.

Figure 2.53 *Rhamphoriopsis hyalospora*



Note ***Rhamphoriopsis synnematifera*** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-32). **a, b** Conidiophores on the host surface. **c**, **d** Synnemata, conidiophores. **e** Conidiogenous cells. **f** Conidia. Scale bars: **c** = 20 μm, **d**–**f** = 5 μm.

Figure 2.54 *Rhamphoriopsis synnematifera* (DS 1-32)



Note ***Rhamphoriopsis synnematifera*** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-45). **a** Host material. **b** Conidiophores on the host surface. **c**, **d** Synnemata, conidiophores. **e, f** Conidiogenous cells. **g** Conidia. Scale bars: **c**, **d** = 20 μm, **e**, **f** = 10 μm, **g** = 5 μm.

Figure 2.55 *Rhamphoriopsis synnematifera* (DS 1-45)

Rhexocercosporidium U. Braun, Mycotaxon 51: 63 (1994)

Index Fungorum number: IF27279

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Rhexocercosporidium carotae* (Årsvoll) U. Braun, Mycotaxon 51: 65 (1994)

Sexual morph: Unknown.

Sequence data: *Rhexocercosporidium carotae* (CBS 418.65, LSU: MH870289, ITS: NR_111086, SSU: NG_061015)

Notes: *Rhexocercosporidium* was introduced by Braun (1994a) and is characterized by having mononematous, scattered, unbranched or branched, subhyaline conidiophores, with monoblastic to polyblastic, integrated, terminal and intercalary, sympodial, subhyaline conidiogenous cells, producing solitary, aseptate to multi-septate, subcylindrical, hyaline to subhyaline conidia. Phylogenetically, *Rhexocercosporidium* was shown to be nested within the family Ploettnerulaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Braun, 1994a) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Rhinocladiella Nannf., Svenska Skogsvårdsföreningens Tidskrift 32: 461 (1934)

Index Fungorum number: IF9720

Classification: Herpotrichiellaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Rhinocladiella atrovirens* Nannf., Svenska Skogsvårdsföreningens Tidskrift 32: 462 (1934)

Sexual morph: *Capronia*, *Biostictis*, ?*Obolarina* (Seifert et al., 2011).

Synanamorphs: *Exophiala*, *Sporothrix*, *Phaeoisaria* (Seifert et al., 2011).

Disease symptoms: Chromoblastomycosis (González et al., 2013; Marques et al., 2004).

Sequence data: *Rhinocladiella aquaspersa* (CBS 313.73, LSU: MH872396, ITS: MH860689)

Notes: *Rhinocladiella* was introduced by Melin and Nannfeldt (1934) and is characterized by macronematous, mononematous, unbranched or sparingly branched, brown conidiophores, polyblastic, sympodial, denticulate, hyaline or brown conidiogenous cells, solitary, aseptate or 1-septate, hyaline conidia (Seifert et al., 2011). The genus includes several clinically significant species, e.g., *R. compacta*, *R. aquaspersa*, *R. mansonii*, *R. pedrosoi*. (Badali et al., 2010; Beatrice Schol-Schwarz, 1968). References: (Badali et al., 2010; Beatrice Schol-Schwarz, 1968; de Hoog, 1977; Hernández-Restrepo et al., 2017; Melin & Nannfeldt, 1934; Wu et al., 2013b) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Rhinotrichella G. Arnaud ex de Hoog, Studies in Mycology 15: 86 (1977)

Index Fungorum number: IF9723

Classification: Ceratostomataceae, Coronophorales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Rhinotrichella globulifera* G. Arnaud, Bulletin de la Société Mycologique de France 69: 272 (1953)

Sexual morph: Unknown.

Synanamorphs: *Proteophiala* (Seifert et al., 2011).

Sequence data: *Rhinotrichella globulifera* (CBS 563.71 = NHL 2449, LSU: MH872026)

Notes: *Rhinotrichella* was re-introduced by de Hoog and Hermanides-Nijhof (1977) and is characterized by mononematous, branched, hyaline conidiophores, polyblastic, sympodial, denticulate, hyaline conidiogenous cells, and solitary, aseptate, smooth or verrucose, globose, hyaline conidia. Phylogenetic inference in this study showed that representatives of *Rhinotrichella*, the ex-type strain CBS 563.71 of generic type species, clustered in the family Ceratostomataceae (Coronophorales, Hypocreomycetidae, Sordariomycetes) (Figure 2.1). Hence, we suggest placing this genus in the family Ceratostomataceae. References: (de Hoog & Hermanides-Nijhof, 1977) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Rhodoveronaea Arzanlou, W. Gams & Crous, Studies in Mycology 58: 89 (2007)

Index Fungorum number: IF504569

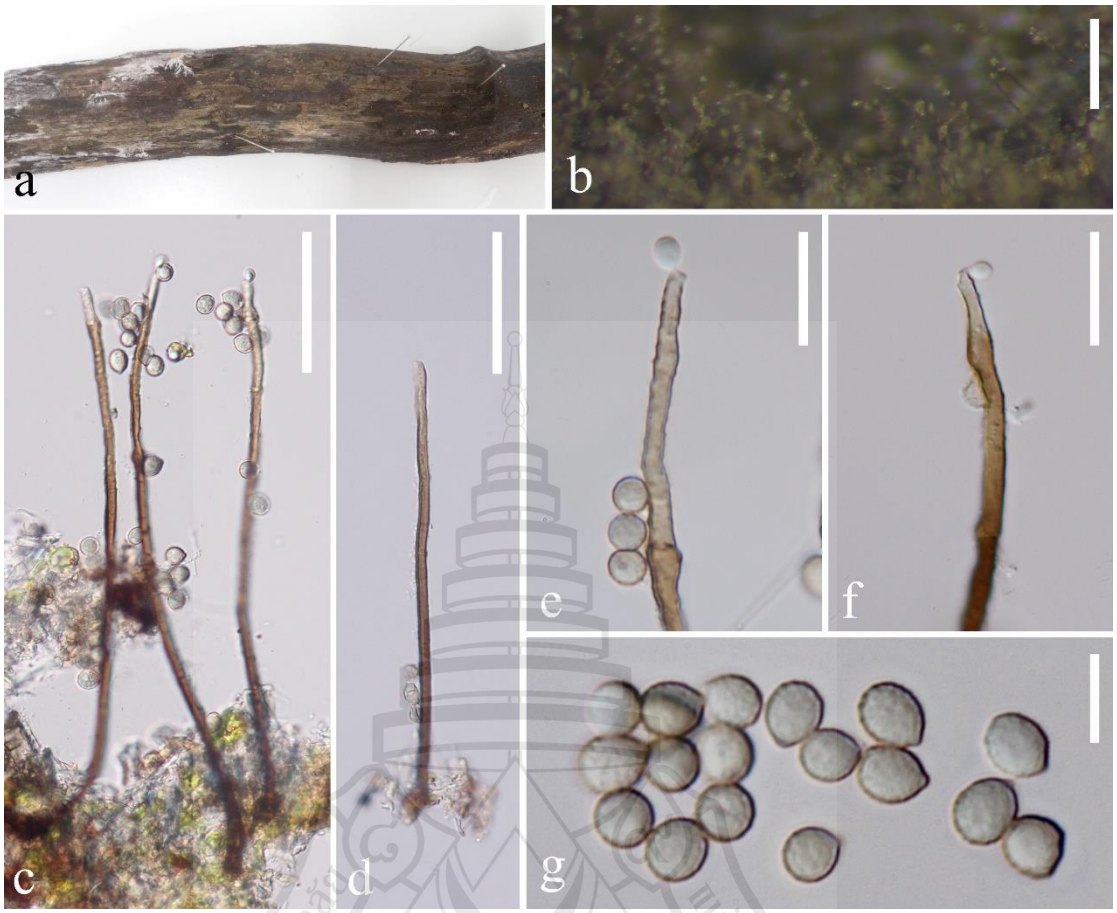
Classification: Rhamphoriaceae, Diaporthomycetidae families incertae sedis, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Rhodoveronaea varioseptata* Arzanlou, W. Gams & Crous, Studies in Mycology 58: 91 (2007)

Sexual morph: Holomorphic genus with *Veronaea*-like asexual morph (Arzanlou et al., 2007; Réblová, 2009).

Sequence data: *Rhodoveronaea varioseptata* (CBS 431.88, LSU: NG_057786, ITS: NR_136990); *Rhodoveronaea varioseptata* (CBS 123472, LSU: FJ617559, ITS: MG600393, SSU: MG600408)

Notes: *Rhodoveronaea* differs from other similar genera by the presence of a basal, marginal conidial frill, and variably septate, brown conidia (Arzanlou et al., 2007; Réblová, 2009; Seifert et al., 2011). Phylogenetic analyses in this study showed that this genus formed a monophyletic clade within the family Rhamphoriaceae (Figure 2.1). References: (Arzanlou et al., 2007; Réblová, 2009; Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Rhodoveronaea aseptata*** **a** Host material. **b** Conidiophores on the host surface. **c**, **d** Conidiophores, conidiogenous cells with conidia. **e**, **f** Conidiogenous cells. **g** Conidia. Scale bars: **b** = 200 μm, **c**, **d** = 50 μm, **e**, **f** = 20 μm, **g** = 10 μm.

Figure 2.56 *Rhodoveronaea aseptata*

Rhombostilbella Zimm., Centralblatt für Bakteriologie und Parasitenkunde 8: 221 (1902)

Index Fungorum number: IF9742

Classification: Ascomycota genera *incertae sedis*

Type species: *Rhombostilbella rosae* Zimm., Centralblatt für Bakteriologie und Parasitenkunde 8: 221 (1902)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Rhombostilbella* was introduced by Zimmermann (1902) and two species are accepted. Phylogenetic position for *Rhombostilbella* is unresolved due to lack of sequence data. References: (Zimmermann, 1902) (morphology), (Wijayawardene et al., 2020) (outline).

Rhopalocladium Schroers, Samuels & W. Gams, Mycologia 91: 375 (1999)

Index Fungorum number: IF28338

Classification: Ascomycota genera *incertae sedis*

Type species: *Rhopalocladium myxophilum* Schroers, Samuels & W. Gams, Mycologia 91: 375 (1999)

Sexual morph: *Nectriopsis* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Rhopalocladium* was introduced by Schroers et al. (1999) and it has mononematous, penicillate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, and produces aseptate, polysymmetrical, ellipsoidal, hyaline conidia aggregated in slimy mass. Phylogenetic position for *Rhopalocladium* is unresolved due to lack of sequence data. References: (Schroers et al., 1999) (morphology), (Wijayawardene et al., 2020) (outline).

Rhopalophora Réblová, Unter. & W. Gams, Mycological Progress 16 (1): 35 (2016)

Index Fungorum number: IF817768

Classification: Dactylosporaceae, Sclerococcales, Sclerococcomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Rhopalophora clavispora* (W. Gams) Réblová, Unter. & W. Gams, Mycological Progress 16 (1): 35 (2016)

Sexual morph: Unknown.

Sequence data: *Rhopalophora clavispora* (CBS 637.73, LSU: NG_058262, ITS: NR_152542, SSU: NG_061246)

Notes: *Rhopalophora* was introduced by Réblová et al. (2017) and is characterized by micronematous, mononematous, unbranched, often reduced, pale brown conidiophores, phialidic, sometimes sympodial or percurrent, light brown conidiogenous cells, and catenate or in slimy mass, aseptate, clavate, hyaline conidia. Réblová et al. (2017) introduced the family Sclerococcaceae and placed this genus in this family. However, Sclerococcaceae was synonymized under Dactylosporaceae by Diederich et al. (2018). References: (Réblová et al., 2017) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Rhynchobrunnera B.A. McDonald, U. Braun & Crous, Fungal Systematics and Evolution 7: 85 (2020)

Index Fungorum number: IF838076

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Rhynchobrunnera lolii* (K.M. King, J.S. West, P.C. Brunner, P.S. Dyer & Fitt) B.A. McDonald, U. Braun & Crous, Fungal Systematics and Evolution 7: 85 (2020)

Sexual morph: Unknown.

Sequence data: *Rhynchobrunnera lolii* (CBS 135745 = IMI 502640 = 15lp11, LSU: KU844336, ITS: KU844336, SSU: KU844336)

Notes: *Rhynchobrunnera* was introduced by Crous et al. (2021a) and is *Rhynchosporium*-like, but differs from *Rhynchosporium* by having solitary, aseptate or septate, straight, subcylindrical, hyaline conidia. Phylogenetically, *Rhynchobrunnera* was shown to be nested within the family Ploettnerulaceae

(Helotiales, Leotiomycetes) (Figure 2.1). References: (Crous et al., 2021a) (morphology and phylogeny).

Rhynchosporina Arx, Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde 51 (3): 19 (1957)

Index Fungorum number: IF9750

Classification: Ascomycota genera *incertae sedis*

Type species: *Rhynchosporina meinersii* (R. Sprague) Arx, Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde 51 (3): 103 (1957)

Sexual morph: ?*Buergenerula* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Rhynchosporina* was introduced by von Arx (1957) and two species are accepted. Phylogenetic position for *Rhynchosporina* is unresolved due to lack of sequence data. References: (von Arx, 1957) (morphology), (Wijayawardene et al., 2020) (outline).

Rhynchosporium Heinsen ex A.B. Frank, Wochenschrift für Brauerei 14 (42): 518 (1897)

Index Fungorum number: IF9751

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Rhynchosporium graminicola* Heinsen ex A.B. Frank, Wochenschrift für Brauerei 14 (42): 518 (1897)

Sexual morph: Unknown.

Synanamorphs: Producing sclerotia (Seifert et al., 2011)

Sequence data: *Rhynchosporium graminicola* (CBS 146761 = CPC 39385 = 99CH6-C1a = ETH ZT Myc2338, LSU: MW298457, ITS: MW298353)

Notes: *Rhynchosporium* is characterized by having stromatic conidiomata, micronematous, reduced, hyaline conidiophores, with monoblastic to polyblastic, percurrent, hyaline conidiogenous cells, producing solitary, mostly 1-septate, subcylindrical, ellipsoid-ovoid, fusiform, curved, hyaline conidia (Crous et al., 2021a;

Seifert et al., 2011). Phylogenetically, *Rhynchosporium* was shown to be nested within the family Ploettnerulaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Crous et al., 2021a; Lanoiselet et al., 2001; Lee et al., 2001; Linde et al., 2003; Seifert et al., 2011; Zaffarano et al., 2011) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Riessia Fresen., Beiträge zur Mykologie 2: 127 (1852)

Index Fungorum number: IF9755

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Riessia semiophora* Fresen., Beiträge zur Mykologie 2: 74 (1852)

Sexual morph: Unknown.

Synanamorphs: *Dexhowardia* (Seifert et al., 2011)

Sequence data: Sequence data is unavailable for this genus.

Notes: Five species are accepted in this genus. Phylogenetic position for *Riessia* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (morphology), (Wijayawardene et al., 2020) (outline).

Riopa D.A. Reid, Revue de Mycologie (Paris) 33: 244 (1969)

= *Sporotrichum* Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 12 (1809)

Index Fungorum number: IF18480

Classification: Phanerochaetaceae, Polyporales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Riopa davidii* D.A. Reid, Revue de Mycologie (Paris) 33: 247 (1969)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Sporotrichum* (Stalpers et al., 2021).

Sequence data: *Riopa metamorphosa* (before known as *Sporotrichum aurantiacum*) (CBS 441.70, LSU: MH871551, ITS: MH859787)

Notes: *Sporotrichum* was introduced by Link (1809b) and has mononematous, unbranched or branched, with clamps, hyaline conidiophores, monoblastic or thallic, hyaline conidiogenous cells, producing solitary, aseptate, hyaline conidia (Seifert et al., 2011). *Sporotrichum* was reported has sexual morph linked in the genus *Riopa*, and Stalpers et al. (2021) proposed to protect *Riopa* over *Sporotrichum*. Phylogenetically, *Riopa* was shown to be nested within the family Phanerochaetaceae (Polyporales, Agaricomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (He et al., 2019) (outline).

Rogergoosiella A. Hern. Gut. & J. Mena, Mycological Research 100: 1483 (1996)

Index Fungorum number: IF27786

Classification: Ascomycota genera *incertae sedis*

Type species: *Rogergoosiella roystoneicola* A. Hern. Gut. & J. Mena, Mycological Research 100: 1483 (1996)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Rogergoosiella* was introduced by Gutiérrez and Portales (1996) and it has macronematous, mononematous, unbranched or dichotomously branched, septate, hyaline to brown conidiophores, with monoblastic, integrated, terminal, percurrent conidiogenous cells, and produces solitary, septate, smooth, coiled in 3-D, hyaline to subhyaline conidia. Phylogenetic position for *Rogergoosiella* is unresolved due to lack of sequence data. References: (Gutiérrez & Portales, 1996) (morphology), (Wijayawardene et al., 2020) (outline).

Rommelaarsia Baral & Haelew., Ascomycete.org 7 (6): 323 (2015)

Index Fungorum number: IF814656

Classification: ?Calloriaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Rommelaarsia flavovirens* Baral, Tanchaud & Romm., Ascomycete.org 7 (6): 323 (2015)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Baral & Haelewaters, 2015).

Sequence data: *Rommelaarsia flavovirens* (H.B. 9951c, LSU: KT958771, ITS: KT958774)

Notes: *Rommelaarsia* was erected by Baral and Haelewaters (2015), and its asexual morph has sporodochial conidiomata, branched, hyaline conidiophores, with monoblastic, hyaline conidiogenous cells, produces solitary, multi-guttulate, multi-septate, cigar-shaped to fusiform, hyaline conidia. Phylogenetically, *Rommelaarsia* was shown to be nested within the family ?Calloriaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Baral & Haelewaters, 2015) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Roselymyces Fiúza, C.R. Silva, R.F. Castañeda & Gusmão, Sydowia 70: 60 (2018)

Index Fungorum number: IF822003

Classification: Xylariales genera *incertae sedis*, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Roselymyces brasiliensis* Fiúza, C.R. Silva, R.F. Castañeda & Gusmão, Sydowia 70: 60 (2018)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Roselymyces* was introduced by Fiuza et al. (2018). References: (Fiuza et al., 2018) (morphology), (Wijayawardene et al., 2020) (outline).

Rosulomyces S. Marchand & Cabral, Boletín de la Sociedad Argentina de Botánica 17 (1-2): 64 (1976)

Index Fungorum number: IF9762

Classification: Ascomycota genera *incertae sedis*

Type species: *Rosulomyces arthrosporioides* Marchand & Cabral, Boletín de la Sociedad Argentina de Botánica 17 (1-2): 64-66 (1976)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Rosulomyces* was established by Marchand et al. (1976) and one species is accepted. Phylogenetic position for *Rosulomyces* is unresolved due to lack of sequence data. References: (Marchand et al., 1976) (morphology), (Wijayawardene et al., 2020) (outline).

Rugonectria P. Chaverri & Samuels, Studies in Mycology 68: 73 (2011)

Index Fungorum number: IF518563

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Rugonectria rugulosa* (Pat. & Gaillard) Samuels, P. Chaverri & C. Salgado, Studies in Mycology 68: 73 (2010)

Sexual morph: Introduced as holomorph.

Sequence data: *Rugonectria rugulosa* (CBS 126565; GJS 09-1245, LSU: KM231615, ITS: KM231749)

Notes: Its asexual morph is cylindrocarpon-like. References: (Chaverri et al., 2011; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Rupestriomyces L. Su, L.Y. Guo & X.Z. Liu, Mycologia 107 (4): 839 (2015)

Index Fungorum number: IF807036

Classification: Dothideomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Rupestriomyces ampulliformis* L. Su, L.Y. Guo & X.Z. Liu, sp. nov., Mycologia 107 (4): 841 (2015)

Sexual morph: Unknown.

Sequence data: *Rupestriomyces ampulliformis* (CGMCC 3.17061, LSU: KF680799, ITS: KF513536, SSU: KF513507)

Notes: *Rupestriomyces* was established by Su et al. (2015) to accommodate three rock-inhabiting fungi. *Rupestriomyces* is characterized by having micronematous conidiophores, with integrated, terminal and intercalary, indeterminate, brown conidiogenous cells, producing solitary or in short chains,

aseptate to multi-septate, globose, barrel-shaped, ampulliform or ovoidal, hyaline to dark brown conidia (Su et al., 2015). Phylogenetically, *Rupestriomyces* was shown to be formed a separate clade within Dothideomycetes (Figure 2.1). References: (Su et al., 2015) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Ruwenzoria J. Fourn., M. Stadler, Laessøe & Decock, Mycological Progress 9 (2): 171 (2009)

Index Fungorum number: IF515155

Classification: Hypoxylaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Ruwenzoria pseudoannulata* J. Fourn., M. Stadler, Laessøe & Decock, Mycological Progress 9 (2): 172 (2010)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Stadler et al., 2010).

Sequence data: *Ruwenzoria pseudoannulata* (MUCL 51394, LSU: KY610494, ITS: KY610406)

Notes: *Ruwenzoria* was introduced by Stadler et al. (2010) and its asexual morph has unbranched or dichotomously branched, hyaline to light brown conidiophores, with enteroblastic, clavate, hyaline to light brown conidiogenous cells, produces hyaline to light brown conidia. References: (Stadler et al., 2010) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Sagenomella W. Gams, Persoonia 10 (1): 100 (1978)

Index Fungorum number: IF9773

Classification: Trichocomaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Sagenomella diversispora* (J.F.H. Beyma) W. Gams, Persoonia 10 (1): 102 (1978)

Sexual morph: *Sagenoma*, *Talaromyces* (Seifert et al., 2011).

Sequence data: *Sagenomella diversispora* (CBS 354.36, LSU: MH867323, ITS: MN431407, SSU: AB024589)

Notes: *Sagenomella* was introduced by Gams (1978) and is characterized by mononematous, semi-macronematous, unbranched or sparingly branched, sometimes reduced, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and catenate, aseptate, hyaline conidia. References: (Gams, 1978) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Saprochaete Coker & Shanor ex D.T.S. Wagner & Dawes, Mycologia 62 (4): 794 (1970)

Index Fungorum number: IF30613

Classification: Dipodascaceae, Saccharomycetales, Saccharomycetes, Saccharomycotina, Ascomycota

Type species: *Saprochaete saccharophila* Coker & Shanor ex D.T.S. Wagner & Dawes, Mycologia 62 (4): 794 (1970)

Sexual morph: *Magnusiomyces* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Saprochaete* was introduced by Diane Te Strake and Dawes (1970) and is yeast-like. Phylogenetic position for *Saprochaete* is unresolved due to lack of sequence data. References: (Diane Te Strake & Dawes, 1970) (morphology), (Wijayawardene et al., 2020) (outline).

Sarcopodium Ehrenb., Sylvae mycologicae Berolinenses: 23 (1818)

= *Actinostilbe* Petch, Annals of the Royal Botanic Gardens Peradeniya 9 (3): 327 (1925)

= *Lanatonectria* Samuels & Rossman, Studies in Mycology 42: 137 (1999)

Index Fungorum number: IF9788

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Sarcopodium circinatum* Ehrenb., Sylvae mycologicae Berolinenses: 23 (1818)

Sexual morph: *Lanatonectria* (Lombard et al., 2015); holomorphic description see Lombard et al. (2015).

Synanamorphs: gliocladium-like, acremonium-like (Seifert et al., 2011).

Sequence data: *Sarcopodium circinatum* (CBS 587.92 = CCT 5383, LSU: KM231651, ITS: KM231787)

Notes: The asexual morph of *Sarcopodium* is characterized by sporodochial conidiomata, unbranched or rarely branched, brown or pale brown setae, macronematous, reduced or sparingly branched, verticillate or penicillate conidiophores, phialidic, hyaline conidiogenous cells, and aseptate or 1-septate, cylindrical to ellipsoid, hyaline conidia aggregated in slimy masses (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Sarcoscypha (Fr.) Boud., Bulletin de la Société Mycologique de France 1: 103 (1885)

= *Molliardiomyces* Paden, Canadian Journal of Botany 62 (2): 211 (1984)

Index Fungorum number: IF4858

Classification: Sarcoscyphaceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Sarcoscypha coccinea* (Scop.) Sacc., Sylloge Fungorum 8: 154 (1889)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Molliardiomyces* (Healy et al., 2016; Paden, 1984).

Sequence data: *Sarcoscypha coccinea* (OSC 100003 = AFTOL-ID 50, LSU: AY544647, ITS: DQ491486, SSU: AY544691)

Notes: *Molliardiomyces* was introduced by Paden (1984) and its sexual morph was reported in the genus *Sarcoscypha* (Healy et al., 2016; Paden, 1984). Healy et al. (2016) proposed to protect *Sarcoscypha* over *Molliardiomyces*. Phylogenetically, *Sarcoscypha* was shown to be nested within the family Sarcoscyphaceae (Pezizales, Pezizomycetes) (Figure 2.1). References: (Paden, 1984) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Sarocladium W. Gams & D. Hawksw., Kavaka 3: 57 (1976)

Index Fungorum number: IF9790

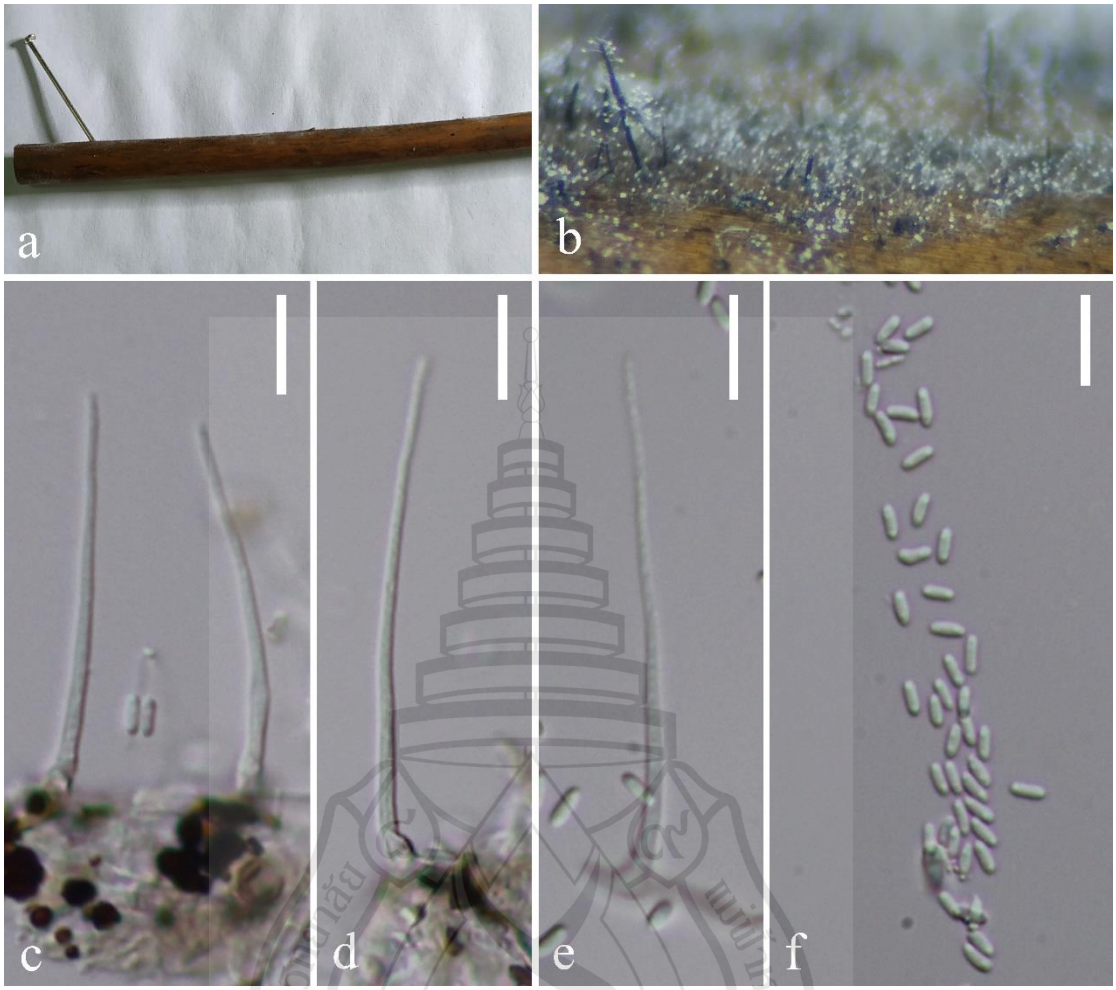
Classification: Sarocladiaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Sarocladium oryzae* (Sawada) W. Gams & D. Hawksw., Kavaka 3: 58 (1975)

Sexual morph: Unknown.

Sequence data: *Sarocladium kiliense* (CBS 122.29 = ATCC 34716 = MUCL 9724, LSU: MH866490, ITS: AJ621775, SSU: HQ232198)

Notes: *Sarocladium* was introduced by Gams and Hawksworth (1975) and is characterized by having mononematous, branched or penicillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, in slimy mass, cylindrical, hyaline conidia. References: (Gams & Hawksworth, 1975; Giraldo et al., 2015; Liu et al., 2017; Summerbell et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Sarocladium strictum*** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 2-3). **a** Host material. **b** Conidiophores on the host surface. **c–e** Conidiophores and conidiogenous cells. **f** Conidia. Scale bars: **c–f** = 10 μm.

Figure 2.57 *Sarocladium strictum*

Sarophorum Syd. & P. Syd., Botanische Jahrbücher für Systematik Pflanzengeschichte und Pflanzengeographie 54: 260 (1916)

Index Fungorum number: IF4865

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Sarophorum ledermannii* Syd. & P. Syd., Botanische Jahrbücher für Systematik Pflanzengeschichte und Pflanzengeographie 54: 260 (1916) [MB#235760]

Sexual morph: *Penicilliopsis* (Seifert et al., 2011).

Sequence data: Sequence is unavailable for this genus.

Notes: *Sarophorum* was synonymised under *Penicilliopsis* (Houbraken et al., 2020).

Sayamraella Giraldo López & Crous, Studies in Mycology 92: 255 (2018)

Index Fungorum number: IF828047

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Sayamraella subulata* Giraldo López & Crous, Studies in Mycology 92: 255 (2018)

Sexual morph: Unknown.

Sequence data: *Sayamraella subulata* (BCC 78964, LSU: LR025971, ITS: LR026833)

Notes: *Sayamraella* was introduced by Giraldo and Crous (2019) and is characterized by mononematous, unbranched or poorly branched, sympodial conidiophores, mono- and polyphialidic, subulate, hyaline conidiogenous cells, and producing aseptate, in slimy mass, smooth-walled, ellipsoidal, hyaline conidia. References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Scedosporium Sacc. ex Castell. & Chalm., Manual of Tropical Medicine: 1122 (1919)

Index Fungorum number: IF9794

Classification: Microascaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Scedosporium apiospermum* (Sacc.) Sacc. ex Castell. & Chalm., Manual of Tropical Medicine: 1122 (1919)

Sexual morph: *Pseudallescheria, Petriella* (Seifert et al., 2011)

Synanamorphs: *Graphium* (Seifert et al., 2011)

Sequence data: *Parascedosporium putredinis* (CBS 133438, LSU: MH877539, ITS: MH866067)

Notes: *Scedosporium* is characterized by mononematous, branched or penicillate, or reduced conidiophores, percurrent or sympodial, hyaline conidiogenous cells, and producing aseptate, hyaline to brown conidia (Seifert et al., 2011). References: (Lackner et al., 2014; Rainer & De Hoog, 2006; Rainer & Kaltseis, 2010; Seifert et al., 2011; Sharma et al., 2013) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Schizothyrium Desm., Annales des Sciences Naturelles Botanique sér. 3, 11: 360 (1849)

= *Zygophiala* E.W. Mason, Mycological Papers 13: 3 (1945)

Index Fungorum number: IF4911

Classification: Schizothyriaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Schizothyrium acerinum* Desm., Annales des Sciences Naturelles Botanique sér. 3, 11: 360 (1849)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Schizothyrium* (Phookamsak et al., 2016).

Sequence data: *Schizothyrium cryptogamum* (CBS 118949, LSU: MH874599, ITS: MH863045)

Notes: The asexual morph of *Schizothyrium* was reported in the hyaline-spored hyphomycetous genus *Zygophiala* and *Zygophiala* was synonymized under *Schizothyrium* (Phookamsak et al., 2016). Phylogenetically, *Schizothyrium* was shown to be nested within the family Schizothyriaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Phookamsak et al., 2016) (morphology

and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Schizotrichum McAlpine, Proceedings of the Linnean Society of New South Wales 28 (3): 562 (1903)

Index Fungorum number: IF9810

Classification: Ascomycota genera *incertae sedis*

Type species: *Schizotrichum lobeliae* McAlpine, Proceedings of the Linnean Society of New South Wales 28 (3): 562 (1903)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Schizotrichum* was introduced by McAlpine (1903) and three species are accepted. Phylogenetic position for *Schizotrichum* is unresolved due to lack of sequence data. References: (McAlpine, 1903) (morphology), (Wijayawardene et al., 2020) (outline).

Scleroconidioma Tsuneda, Currah & Thormann, Canadian Journal of Botany 78 (10): 1295 (2000)

Index Fungorum number: IF28452

Classification: Dothideomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Scleroconidioma sphagnicola* Tsuneda, Currah & Thormann, Canadian Journal of Botany 78 (10): 1295 (2000)

Sexual morph: Unknown.

Synanamorphs: aureobasidium-like (Seifert et al., 2011; Tsuneda et al., 2000).

Sequence data: *Scleroconidioma sphagnicola* (UAMH 9731, ITS: NR_121294)

Notes: *Scleroconidioma* was introduced by Tsuneda et al. (2000) for a fungi collected from necrotic patches of *Sphagnum fuscum* (Schimp.) Klinggr and has stromatic conidiophores, phialidic, papillate conidiogenous cells, and aseptate, bacilliform, hyaline conidia. Phylogenetic position for *Scleroconidioma* is unresolved

due to lack of LSU sequence data. References: (Tsuneda et al., 2000, 2001) (morphology), (Wijayawardene et al., 2020) (outline).

Scleroramularia Batzer & Crous, Fungal Diversity 46: 58 (2011)

Index Fungorum number: IF517454

Classification: Dothideomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Scleroramularia pomigena* Batzer & Crous, Fungal Diversity 46: 62 (2011)

Sexual morph: Unknown.

Synanamorphs: Producing sclerotia in culture (Li et al., 2011).

Sequence data: *Scleroramularia pomigena* (CBS 128072, LSU: FR716673, ITS: FR716682)

Notes: *Scleroramularia* was introduced by Li et al. (2011) and is characterized by conidiophores are mostly reduced or with one supporting cells, conidiogenous cells are monoblastic to polyblastic, intercalary on hyphae, conidia are in branched chains, 0–4-septate, guttulate, straight or gently curved, narrowly cylindrical, or narrowly ellipsoid to fusoid-ellipsoid, hyaline. Phylogenetically, *Scleroramularia* was shown to be formed a separate clade within Dothideomycetes (Figure 2.1). We suggest assigning this genus to Dothideomycetes genera *incertae sedis*. References: (Gao et al., 2015b; Li et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Scolecodochium K. Matsush. & Matsush., Matsushima Mycological Memoirs 9: 36 (1996)

Index Fungorum number: IF27684

Classification: Ascomycota genera *incertae sedis*

Type species: *Scolecodochium malayense* K. Matsush. & Matsush., Matsushima Mycological Memoirs 9: 36 (1996)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Scolecodochium* was introduced by Matsushima and Matsushima (1996) and one species is accepted. Phylogenetic position for *Scolecodochium* is unresolved due to lack of sequence data. References: (Matsushima & Matsushima, 1996) (morphology), (Wijayawardene et al., 2020) (outline).

Scopulariella Gjaerum, Friesia 9 (4-5): 416 (1971)

Index Fungorum number: IF9853

Classification: Ascomycota genera *incertae sedis*

Type species: *Scopulariella vaccinii* Gjaerum, Friesia 9 (4-5): 416 (1971)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Only one species is accepted in this genus. Phylogenetic position for *Scopulariella* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Scopulariopsis Bainier, Bulletin de la Société Mycologique de France 23: 98 (1907)

Index Fungorum number: IF9854

Classification: Microascaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Scopulariopsis brevicaulis* (Sacc.) Bainier, Bulletin de la Société Mycologique de France 23: 99 (1907)

Sexual morph: *Kernia*, *Microascus*, *Petriella* (Seifert et al., 2011).

Synanamorphs: *Cephalotrichum*, *Echinobotryum*, *Wardomyces* (Seifert et al., 2011).

Sequence data: *Scopulariopsis brevicaulis* (MUCL 40726, LSU: LN851042, ITS: LM652465)

Notes: The asexual morph of *Scopulariopsis* is characterized by macronematous, mononematous, branched or penicillate, brown or hyaline conidiophores, annellidic, hyaline conidiogenous cells, and producing catenate, aseptate, globose to ovate, hyaline, avellaneous or brown conidia (Sandoval-Denis et al., 2016). Sandoval-Denis et al. (2016) provided a key to *Scopulariopsis* species.

References: (Sandoval-Denis et al., 2016; Seifert et al., 2011; Woudenberg et al., 2017) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Scytalidium Pesante, Annali della Sperimentazione Agaria 11 (suppl.): 264 (1957)

Index Fungorum number: IF9862

Classification: Helotiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Scytalidium lignicola* Pesante, Annali della Sperimentazione Agaria 11 (suppl.): 265 (1957)

Sexual morph: *Hymenoscyphus*, ?*Anthracobia* (Seifert et al., 2011).

Synanamorphs: *Monochaetia*, producing chlamydospores (Seifert et al., 2011)

Sequence data: *Scytalidium lignicola* (UAMH 1502, ITS: NR_121314, SSU: NG_061078)

Notes: *Scytalidium* was introduced by Pesante (1957) and is characterized by micronematous, mononematous, branched or unbranched, reduced, hyaline to brown conidiophores, thallic-arthric conidiogenous cells, and producing catenate, aseptate or septate, cylindrical or oblong, hyaline conidia and solitary or catenate, oblong, doliiform or broadly ellipsoidal, dark brown chlamydospores (Ellis, 1971). References: (Ellis, 1971; Hedger et al., 1982; Pesante, 1957; Straatsma & Samson, 1993; Wu & Zhang, 2011a) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Scytinostroma Donk, Fungus 26: 19 (1956)

= *Michenera* Berk. & M.A. Curtis, Journal of the Linnean Society. Botany 10: 333 (1869)

= *Licrostroma* P.A. Lemke, Canadian Journal of Botany 42 (6): 762 (1964)

Index Fungorum number: IF18530

Classification: Peniophoraceae, Russulales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Scytinostroma portentosum* (Berk. & M.A. Curtis) Donk, Fungus, Wageningen 26(1-4): 20 (1956)

Sexual morph: Sexual morphic genus.

Sequence data: *Michenera artocreas* (KKN2014-anamorph, LSU: MH204692, ITS: MH204688)

Notes: The sexual morph of *Michenera* was reported in the genus *Licrostroma* P.A. Lemke, however, *Licrostroma* was synonymized under *Scytinostroma* (Stalpers et al., 2021). Stalpers et al. (2021) proposed to use *Scytinostroma* over *Michenera*. Phylogenetically, *Scytinostroma* was shown to be nested within the family Peniophoraceae (Russulales, Agaricomycetes) (Figure 2.1). References: (He et al., 2019) (outline).

Selenodriella R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 33: 34 (1990)

Index Fungorum number: IF11398

Classification: Microdochiaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: ***Selenodriella fertilis*** (Piroz. & Hodges) R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 33: 34 (1990)

Sequence data: *Selenodriella fertilis* (CBS 772.83 LSU: KP858992, ITS: KP859055); *Selenodriella cubensis* (CBS 683.96, LSU: KP858990, ITS: KP859053)

Notes: This genus is *Idriella*-like and was placed in the family Microdochiaceae by Hernández-Restrepo et al. (2016a). References: (Hernández-Restrepo et al., 2016a) (morphology and phylogeny).

Selenosporopsis R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 35: 100 (1991)

Index Fungorum number: IF27196

Classification: Ascomycota genera *incertae sedis*

Type species: *Selenosporopsis elegans* R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 35: 101 (1991)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Selenosporopsis* was introduced by Castañeda Ruíz and Kendrick (1991) and one species is accepted. Phylogenetic position for *Selenosporopsis* is unresolved due to lack of sequence data. References: (Castañeda Ruíz & Kendrick, 1991) (morphology), (Wijayawardene et al., 2020) (outline).

Semipseudocercospora J.M. Yen, Mycotaxon 17: 361 (1983)

Index Fungorum number: IF25847

Classification: Ascomycota genera *incertae sedis*

Type species: *Semipseudocercospora peristrophes-acuminatae* (J.M. Yen) J.M. Yen, Mycotaxon 17: 363 (1983)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Semipseudocercospora* was introduced by Yen (1983) to accommodate *Cercospora peristrophes-acuminatae* Yen and it has macronematous, mononematous, unbranched, septate, brown conidiophores, with polyblastic, integrated, sympodial conidiogenous cells, and produces solitary, septate, smooth, clavate or oblong, subhyaline conidia. Phylogenetic position for *Semipseudocercospora* is unresolved due to lack of sequence data. References: (Yen, 1983) (morphology), (Wijayawardene et al., 2020) (outline).

Sepedonium Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 18 (1809)

Index Fungorum number: IF9876

Classification: Hypocreaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Sepedonium mycophilum* (Pers.) Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 18 (1809)

Sexual morph: *Hypomyces* (Seifert et al., 2011).

Synanamorphs: verticillium-like (Seifert et al., 2011).

Sequence data: *Sepedonium ampullosporum* (CBS 392.52, LSU: MH868629, ITS: MH857094)

Notes: *Sepedonium* is dimorphic: (1) unbranched or sparingly branched, hyaline conidiophores, monoblastic, hyaline conidiogenous cells, and solitary, aseptate, hyaline or brown conidia; (2) sparingly branched or verticillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, hyaline conidia (Seifert et al., 2011). References: (Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Septofusidium W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 147 (1971)

Index Fungorum number: IF9882

Classification: Tilachlidiaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Septofusidium elegantulum* (Pidopl.) W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 147 (1971)

Sexual morph: *Cordyceps* (Seifert et al., 2011).

Sequence data: *Septofusidium herbarum* (CBS 265.58 = IMI 053581, LSU: NG_057904, ITS: NR_138398, SSU: NG_062661)

Notes: *Septofusidium* is *Acremonium*-like. References: (Samson, 1974; Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Septomyrothecium Matsush., Bulletin of the National Science Museum Tokyo 14 (3): 469 (1971)

Index Fungorum number: IF9885

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Septomyrothecium uniseptatum* Matsush., Bulletin of the National Science Museum Tokyo 14: 470 (1971)

Sexual morph: Unknown.

Sequence data: *Septomyrothecium uniseptatum* (CBS 100966 = INIFAT C98/23-1, LSU: KU846494, ITS: KU846472)

Notes: This genus is myrothecium-like. References: (Lombard et al., 2016)(phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Septosporium Corda, Deutschlands Flora, Abt. III. Die Pilze Deutschlands 2-6: 33 (1831)

Index Fungorum number: IF9901

Classification: Ascomycota genera *incertae sedis*

Type species: *Septosporium atrum* Corda, Deutschlands Flora, Abt. III. Die Pilze Deutschlands 2-6: 33, t. 17 (1831)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Phylogenetic position for *Septosporium* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Septotinia Whetzel ex J.W. Groves & M.E. Elliott, Canadian Journal of Botany 39 (1): 227 (1961)

= *Septotis* N.F. Buchw. ex Arx, Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde 51 (3) (1957)

Index Fungorum number: IF5006

Classification: Sclerotiniaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Septotinia podophyllina* (Ellis & Everh.) Whetzel, Mycologia 29: 135 (1937)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Septotis* (Johnston et al., 2014).

Sequence data: *Septotinia populiperda* (CBS 339.53, LSU: MH101506, ITS: MH101503)

Notes: The hyphomycetous genus *Septotis* was introduced as the asexual morph of *Septotinia*, Johnston et al. (2014) proposed to use *Septotinia* over *Septotis*. Phylogenetically, *Septotinia* was shown to be nested within the family Sclerotiniaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Wijayawardene et al., 2017a, 2020) (outline).

Serendipita P. Roberts, Mycological Research 97: 474 (1993)

= *Piriformospora* Sav. Verma, Aj. Varma, Rexer, G. Kost & P. Franken, Mycologia 90: 897 (1998)

Index Fungorum number: IF22442

Classification: Serendipitaceae, Sebacinales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Serendipita vermifera* (Oberw.) P. Roberts, Mycological Research 97: 474 (1993)

Sexual morph: Sexual morphic genus.

Sequence data: *Serendipita indica* (CBS 125645 = DSM 11827, LSU: NG_059912, ITS: MH863568, SSU: NG_064889)

Notes: *Piriformospora* is characterized by having reduced, hyaline conidiophores, monoblastic or polyblastic, sympodial, hyaline conidiogenous cells, producing solitary, aseptate, hyaline conidia (Seifert et al., 2011). *Piriformospora* was treated as a synonym of *Serendipita* (He et al., 2019). Phylogenetically, representatives of *Serendipita* clustered in the family Serendipitaceae (Sebacinales, Agaricomycetes) (Figure 2.1). References: (Basiewicz et al., 2012) (morphology and phylogeny), (He et al., 2019) (outline).

Setophiale Matsush., Matsushima Mycological Memoirs 8: 35 (1995)

Index Fungorum number: IF27485

Classification: Ascomycota genera *incertae sedis*

Type species: *Setophiale unisetulata* Matsush., Matsushima Mycological Memoirs 8: 35 (1995)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Setophiale* was introduced by Matsushima (1995) and it has macronematous, mononematous, reduced conidiophores, with phialidic, subulate, brown conidiogenous cells, and produces conidia that are aseptate, in slimy mass, fusiform, hyaline, with filiform apical appendage. Phylogenetic position for *Setophiale* is unresolved due to lack of sequence data. References: (Matsushima, 1995) (morphology), (Wijayawardene et al., 2020) (outline).

Setosynnema D.E. Shaw & B. Sutton, Botanical Journal of the Linnean Society 91 (1-2): 33 (1985)

Index Fungorum number: IF11188

Classification: Wiesneriomycetaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Setosynnema isthmosporum* D.E. Shaw & B. Sutton, Botanical Journal of the Linnean Society 91 (1-2): 34 (1985)

Sexual morph: Unknown.

Sequence data: *Setosynnema yunnanense* (YMF1.03964, LSU: MH031754, SSU: MH031747)

Notes: *Setosynnema* was introduced by Shaw and Sutton (1985) and is characterized by synnematous conidiomata, unbranched, brown setae, branched, hyaline to subhyaline conidiophores, with sympodial, denticulate, hyaline conidiogenous cells, producing conidia that are hyaline, septate, in white mass, U-, S- or V-shaped, filiform, widest at the centre and with an isthmus. Phylogenetically, *Setosynnema* located in the family Wiesneriomycetaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Bai et al., 2013; Shaw & Sutton, 1985) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Seychellomyces Matsush., Matsushima Mycological Memoirs 2: 14 (1981)

Index Fungorum number: IF9910

Classification: Ceratocystidaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Seychellomyces hexagonus* Matsush., Matsushima Mycological Memoirs 2: 14 (1981)

Sexual morph: Unknown.

Synanamorphs: *Chalara*-like (Seifert et al., 2011)

Sequence data: *Seychellomyces sinensis* (YMF1.04178, LSU: MG830704, ITS: KU549178, SSU: KU549179)

Notes: *Seychellomyces* was introduced by Matsushima (1982) and is dimorphic: (1) unbranched, brown conidiophores, monoblastic, brown conidiogenous

cells, producing solitary or catenate, septate, brown conidia; (2) reduced conidiophores, phialidic, hyaline conidiogenous cells with deep cylindrical collarettes, producing catenate, aseptate, hyaline conidia (Seifert et al., 2011). Qiao et al. (2019) placed this genus in the family Ceratocystidaceae (Microascales, Hypocreomycetidae, Sordariomycetes) based on multi-gene phylogenetic analysis. References: (Matsushima, 1982; Qiao et al., 2019; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Sheathnema Dubey & Moonnambeth, Journal of Threatened Taxa 6 (12): 6550 (2014)

Index Fungorum number: IF802964

Classification: Ascomycota genera *incertae sedis*

Type species: *Sheathnema indicum* Dubey & Moonnambeth, Journal of Threatened Taxa 6 (12): 6550 (2014)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Sheathnema* was introduced by Dubey and Moonnambeth (2014) and it has synnematous, dark brown conidiomata, macronematous, unbranched or rarely branched, geniculate, hyaline to pale brown conidiophores, with polyblastic, sympodial, integrated or discrete, hyaline conidiogenous cells, and produces solitary or in short chain, 3-septate, clavate to sub-clavate, smooth, hyaline to subhyaline conidia. Phylogenetic position for *Sheathnema* is unresolved due to lack of sequence data. References: (Dubey & Moonnambeth, 2014) (morphology), (Wijayawardene et al., 2020) (outline).

Siamia V. Robert, Decock & R.F. Castañeda, Mycological Research 104 (7): 893 (2000)

Index Fungorum number: IF28429

Classification: Ascomycota genera *incertae sedis*

Type species: *Siamia luxuriosa* V. Robert, Decock & R.F. Castañeda, Mycological Research 104 (7): 893 (2000)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Siamia* was established by Robert et al. (2000) and it has synnematous, indeterminate conidiomata, macronematous, septate, brown conidiophores, with monoblastic or polyblastic, integrated, terminal and intercalary, sympodial, hyaline or subhyaline conidiogenous cells, and produces solitary, multi-septate, smooth, obclavate to cylindrical, rostrate, hyaline to subhyaline conidia. Phylogenetic position for *Siamia* is unresolved due to lack of sequence data. References: (Robert et al., 2000) (morphology), (Wijayawardene et al., 2020) (outline).

Sigleria Hirooka, Tanney & Seifert, Mycologia 108 (1): 140 (2015)

Index Fungorum number: IF811852

Classification: Spiromastigaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Sigleria carmichaelii* Hirooka, Tanney & Seifert, Mycologia 108 (1): 143 (2015)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Hirooka et al., 2016).

Sequence data: *Sigleria carmichaelii* (DAOMC 250076 = CBS 138264, LSU: KP119638, ITS: KP119626, SSU: KP119651)

Notes: *Sigleria* was erected by Hirooka et al. (2016) to accommodate *S. amenda* and *S. carmichaelii*. *Sigleria* is characterized by mononematous, branched, hyaline conidiophores, thallic-arthric, hyaline conidiogenous cells, and aseptate or septate, cylindrical, cuboid, or doliiform, hyaline conidia, solitary, aseptate, chlamydospores. Phylogenetically, representative of *Sigleria* clustered in the family Spiromastigaceae, Onygenales, Eurotiomycetes (Figure 2.1). References: (Hirooka et al., 2016) (morphology), (Wijayawardene et al., 2020) (outline).

Sigmoidea J.L. Crane, American Journal of Botany 55 (8): 998 (1968)

Index Fungorum number: IF9922

Classification: Dothideomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Sigmoidea prolifera* (R.H. Petersen) J.L. Crane, American Journal of Botany 55 (8): 998 (1968)

Sexual morph: *Corollospora* (Seifert et al., 2011).

Sequence data: *Sigmoidea prolifera* (SSU: DQ104807)

Notes: *Sigmoidea* is characterized by reduced, unbranched or sparingly branched, hyaline conidiophores, sympodial, denticulate or scars, hyaline conidiogenous cells, and producing multi-septate, hyaline scolecoconidia (Seifert et al., 2011). Jones et al. (2009) transformed *S. luteola* and *S. marina* to the genus *Halosigmoidea*. Réblová et al. (2016a) proposed using *Corollospora* rather than *Halosigmoidea* and *Varicosporina*. References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a) (outline).

Similitrichoconis R.F. Castañeda, M. Vera & D. Sosa, Mycotaxon 135 (4): 830 (2020)

Index Fungorum number: IF833730

Classification: Ascomycota genera *incertae sedis*

Type species: *Similitrichoconis wongii* R.F. Castañeda, M. Vera & D. Sosa, Mycotaxon 135 (4): 833 (2020)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Similitrichoconis* was introduced by Vera et al. (2020) and is characterized by macronematous, mononematous, unbranched, hyaline conidiophores, with monoblastic, integrated, determinate, clear to translucent conidiogenous cells that produce solitary, multi-septate, obclavate to long fusiform, hyaline conidia. Phylogenetic position for *Similitrichoconis* is unresolved due to lack of sequence data. References: (Vera et al., 2020) (morphology), (Wijayawardene et al., 2020) (outline).

Sirastachys L. Lombard & Crous, Persoonia 36: 215 (2016)

Index Fungorum number: IF816021

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Sirastachys phaeospora* L. Lombard & Crous, Persoonia 36: 218 (2016)

Sexual morph: Unknown.

Sequence data: *Sirastachys phaeospora* (CBS 100155, LSU: KU846779, ITS: KU846666)

Notes: This genus is stachybotrys-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Slopeiomyces Klaubauf, M.-H. Lebrun & Crous, Studies in Mycology 79: 102 (2014)

Index Fungorum number: IF810199

Classification: Magnaporthaceae, Magnaporthales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Slopeiomyces cylindrosporus* (D. Hornby, Slope, Gutter. & Sivan.) Klaubauf, M.-H. Lebrun & Crous, Studies in Mycology 79: 103 (2014)

Sexual morph: Introduced as holomorphic genus with phialophora-like asexual morph (Klaubauf et al., 2014).

Sequence data: *Slopeiomyces cylindrosporus* (CBS 610.75, LSU: NG_057751, ITS: NR_120170, SSU: NG_061048)

Notes: *Slopeiomyces* was introduced by (Klaubauf et al., 2014) with phialophora-like asexual morph, which has phialidic, hyaline conidiogenous cells and produces aseptate, straight to curved or sigmoid, hyaline conidia. References: (Klaubauf et al., 2014) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Smaragdiniseta L. Lombard & Crous, Persoonia 36: 219 (2016)

Index Fungorum number: IF816029

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Smaragdiniseta bisetosa* (V. Rao & de Hoog) L. Lombard & Crous, Persoonia 36: 220 (2016)

Sexual morph: Unknown.

Sequence data: *Smaragdiniseta bisetosa* (CBS 459.82, LSU: KU847255, ITS: KU847229)

Notes: This genus is myrothecium-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Sodiomyces A.A. Grum-Grzhim., Debets & Bilanenko, Fungal Systematics and Evolution 3: 131 (2019)

Index Fungorum number: IF829354

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Sodiomyces alkalinus* Grum-Grzhim., Debets & Bilanenko, Fungal Systematics and Evolution 3: 131 (2019)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: *Sodiomyces alcalophilus* (CBS 114.92, LSU: MH874011, ITS: MH862344, SSU: NG_062857); *Sodiomyces alkalinus* (CBS 110278, LSU: JX158427, ITS: NR_145378)

Notes: *Sodiomyces* was validated by Crous et al. (2019b). *Sodiomyces* was reported has *Acremonium*-like asexual morph (Grum-Grzhimaylo et al., 2013). References: (Crous et al., 2019b; Giraldo & Crous, 2019; Grum-Grzhimaylo et al., 2013) (morphology and phylogeny), (Crous et al., 2019b; Giraldo & Crous, 2019) (nomenclature), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Soloacrospora W.B. Kendr. & R.F. Castañeda, University of Waterloo Biology Series 35: 102 (1991)

Index Fungorum number: IF27197

Classification: Ascomycota genera *incertae sedis*

Type species: *Soloacrospora flagellisetosa* W.B. Kendr. & R.F. Castañeda, University of Waterloo Biology Series 35: 102 (1991)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Soloacrospora* was introduced by Castañeda Ruíz and Kendrick (1991) and two species are accepted. Phylogenetic position for *Soloacrospora* is unresolved due to lack of sequence data. References: (Castañeda Ruíz & Kendrick, 1991) (morphology), (Wijayawardene et al., 2020) (outline).

Solomyces Zhi.Y. Zhang, Y.F. Han & Z.Q. Liang, Frontiers in Microbiology 11 (no. 572596): 11 (2020)

Index Fungorum number: IF835713

Classification: Thelebolaceae, Thelebolales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Solomyces sinensis* Zhi.Y. Zhang, Y.F. Han & Z.Q. Liang, Frontiers in Microbiology 11 (no. 572596): 11 (2020)

Sexual morph: Unknown.

Sequence data: *Solomyces guizhouensis* (CGMCC 3.20477 = GZUIFR 21.804, LSU: MZ444096, ITS: MZ444069)

Notes: *Solomyces* was erected by Zhang et al. (2020) and is characterized by mononematous, branched, hyaline conidiophores, producing terminal and lateral conidia that are solitary or sometimes catenate, on hyphae, short protrusions, or side branches. Phylogenetically, representative of *Solomyces* clustered in the family Thelebolaceae, Thelebolales, Leotiomycetes (Figure 2.1). References: (Zhang et al., 2020) (morphology), (Wijayawardene et al., 2020) (outline).

Solosympodiella Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 55 (1971)

Index Fungorum number: IF9954

Classification: Ascomycota genera *incertae sedis*

Type species: *Solosympodiella clavata* Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 55 (1971)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Solosympodiella* was introduced by Matsushima (1971) and it has macronematous, mononematous, unbranched or branched, septate, brown

conidiophores, with polyblastic, sympodial, denticulate, brown conidiogenous cells, and produces solitary, septate, ellipsoidal to clavate, hyaline to pale brown conidia. Phylogenetic position for *Solosympodiella* is unresolved due to lack of sequence data. References: (Matsushima, 1971) (morphology), (Wijayawardene et al., 2020) (outline).

Soosiella Hujslová & M. Kolařík, Mycological Progress 13 (3): 827 (2014)

Index Fungorum number: IF805196

Classification: Hyphodiscaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Soosiella minima* Hujslová & M. Kolařík, Mycological Progress 13 (3): 827 (2014)

Sexual morph: Unknown.

Sequence data: *Soosiella minima* (CBS 136257 = MH 1230, LSU, ITS and SSU: JX124327)

Notes: *Soosiella* was introduced by Hujslova et al. (2014) to accommodate *S. minima*, which was isolated from extremely acidic soils. *Soosiella* has mycelium that are sterile, sparsely branched, irregularly granular (Hujslova et al., 2014). Phylogenetically, *Soosiella* was shown to be nested within the family Hyphodiscaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Hujslova et al., 2014) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Speiropsis Tubaki, Journal of the Hattori Botanical Laboratory 20: 171 (1958)

Index Fungorum number: IF9965

Classification: Wiesneriomycetaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Speiropsis pedatospora* Tubaki, Journal of the Hattori Botanical Laboratory 20: 171 (1958)

Sexual morph: Unknown.

Sequence data: *Speiropsis pedatospora* (CBS 397.59, LSU: NG_058179, ITS: NR_145393)

Notes: *Speiropsis* was established by Tubaki (1958) and is characterized by macronematous, mononematous, unbranched or branched, brown conidiophores, polyblastic, discrete, sympodial, denticulate, pale brown conidiogenous cells, producing conidia that are catenate, hyaline to pale brown, and linearly joined by narrow, small isthmi (Pratibha et al., 2016; Tubaki, 1958). Phylogenetically, *Speiropsis* located in the family Wiesneriomycetaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Kuthubutheen & Nawawi, 1987a; Pratibha et al., 2016; Tubaki, 1958) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Spermatoloncha Speg., Anales del Museo Nacional de Historia Natural Buenos Aires 17: 139 (1908)

Index Fungorum number: IF9967

Classification: Ascomycota genera *incertae sedis*

Type species: *Spermatoloncha maticola* Speg., Anales del Museo Nacional de Historia Natural Buenos Aires 17: 139 (1908)

Sexual morph: ?*Puttemansia* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Spermatoloncha* was introduced by Spegazzini (1908) and one species is accepted. Phylogenetic position for *Spermatoloncha* is unresolved due to lack of sequence data. References: (Spegazzini, 1908) (morphology), (Wijayawardene et al., 2020) (outline).

Spermospora R. Sprague, Mycologia 40 (2): 177 (1948)

Index Fungorum number: IF9970

Classification: Ascomycota genera *incertae sedis*

Type species: *Spermospora subulata* (R. Sprague) R. Sprague, Mycologia 40 (3): 308 (1948)

Sexual morph: Unknown.

Synanamorphs: *Tricellula* (Seifert et al., 2011).

Sequence data: *Spermospora zeae* (CBS 306.79, LSU: MW298474, ITS: MW298368)

Notes: *Spermospora* is characterized by having reduced conidiophores, with monoblastic, terminal and intercalary, hyaline conidiogenous cells, producing solitary, septate, scolecosporous, acicular-fusiform, obclavate, straight to curved, appendiculate, hyaline macroconidia and aseptate or 1-septate, straight, subcylindrical, hyaline microconidia (Crous et al., 2021a; Seifert et al., 2011). Crous et al. (2021a) shown that Spermospora is paraphyletic. Phylogenetically, representatives of *Spermospora* clustered in the family Ploettnerulaceae, Helotiales, Leotiomycetes (Figure 2.1). References: (Crous et al., 2021a; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2020) (outline).

Spermosporella Deighton, Mycological Papers 118: 21 (1969)

Index Fungorum number: IF9971

Classification: Ascomycota genera *incertae sedis*

Type species: *Spermosporella aggregata* Deighton, Mycological Papers 118: 21 (1969)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Spermosporella* was introduced by Deighton (1969a) and it has unbranched, reduced, hyaline conidiophores, with polyblastic, sympodial, hyaline conidiogenous cells, and produces solitary, 2-3-septate, obclavate-fusiform, hyaline conidia. Phylogenetic position for *Spermosporella* is unresolved due to lack of sequence data. References: (Deighton, 1969a) (morphology), (Wijayawardene et al., 2020) (outline).

Sphaeridium Fresen., Beiträge zur Mykologie 2: 46 (1852)

Index Fungorum number: IF9977

Classification: Ascomycota genera *incertae sedis*

Type species: *Sphaeridium vitellinum* Fresen., Beiträge zur Mykologie 2: 46 (1852)

Sexual morph: Unknown.

Sequence data: ?*Sphaeridium vitellinum* (CBS 624.76, LSU: MH872784, ITS: MH861011)

Notes: *Sphaeridium* is characterized by having synnematous conidiomata, unbranched or branched, hyaline conidiophores, with polyblastic, sympodial, hyaline conidiogenous cells, producing catenate, aseptate, hyaline conidia (Seifert et al., 2011). Phylogenetically, a strain CBS 624.76, identified as *Sphaeridium vitellinum*, was shown to be nested within the family Pezizellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Sphaerostilbella Henn., Botanische Jahrbücher für Systematik Pflanzengeschichte und Pflanzengeographie 30: 40 (1901)

= *Gliocladium* Corda, Icones fungorum hucusque cognitorum 4: 30 (1840)

Index Fungorum number: IF5122

Classification: Hypocreaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Sphaerostilbella lutea* (Henn.) Sacc., Sylloge Fungorum 17: 778 (1905)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Gliocladium* (Rehner & Samuels, 1994; Seifert et al., 2011)

Sequence data: *Sphaerostilbella berkeleyana* (CBS 102308 = AFTOL ID 158 = G.J.S. 82-274, LSU: U00756, SSU: AF543770); *Sphaerostilbella novae-zelandiae* (CBS 648.83, LSU: MH873387, ITS: MH861675)

Notes: The asexual morph of *Sphaerostilbella* was linked in *Gliocladium* (Rehner & Samuels, 1994; Seifert et al., 2011). References: (Rehner & Samuels, 1994; Schroers et al., 1999) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Sphaerulomyces Marvanová, Transactions of the British Mycological Society 68 (3): 485 (1977)

Index Fungorum number: IF9994

Classification: Ascomycota genera *incertae sedis*

Type species: *Sphaerulomyces coralloides* Marvanová, Transactions of the British Mycological Society 68 (3): 485 (1977)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Sphaerulomyces* was introduced by Marvanová (1977a) and one species is accepted. Phylogenetic position for *Sphaerulomyces* is unresolved due to lack of sequence data. References: (Marvanová, 1977a) (morphology), (Wijayawardene et al., 2020) (outline).

Sphondylocephalum Stalpers, Proceedings van de Koninklijke Nederlandse Akademie van Wetenschappen Section C 77 (4): 400 (1974)

Index Fungorum number: IF9996

Classification: Sigmoideomycetaceae, Zoopagales, Zoopagomycetes, Zoopagomycota

Type species: *Sphondylocephalum verticillatum* (Thaxt.) Stalpers, Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 77(4): 400 (1974) (≡ *Oedocephalum verticillatum* Thaxt., Botanical Gazette Crawfordsville 16: 18 (1891))

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Stalpers (1974) revised the genus *Oedocephalum* and introduced the genus *Sphondylocephalum* to accommodate *Oedocephalum verticillatum*. *Sphondylocephalum* is characterized by having mononematous, solitary or in small groups, verticillate, septate, hyaline conidiophores, with polyblastic, synchronous, vesiculate, hyaline conidiogenous cells, producing solitary, aseptate, reticulate, globose, hyaline conidia (Seifert et al., 2011; Stalpers, 1974). Phylogenetic position for *Sphondylocephalum* is unresolved due to lack of sequence data. References: (Seifert et al., 2011; Stalpers, 1974) (morphology), (Wijayawardene et al., 2020) (outline).

Spicellum Nicot & Roquebert, Revue de Mycologie (Paris) 39 (4): 272 (1976)

Index Fungorum number: IF9998

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Spicellum roseum* Nicot & Roquebert, Revue de Mycologie (Paris) 39 (4): 272 (1976)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: Phylogenetic position for *Spicellum* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Spiniger Stalpers, Proceedings van de Koninklijke Nederlandse Akademie van Wetenschappen Section C 77 (4): 402 (1974)

Index Fungorum number: IF10006

Classification: Bondarzewiaceae, Russulales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Spiniger meineckellus* (A.J. Olson) Stalpers, Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 77(4): 402 (1974)

Sexual morph: *Bondarzewia*, *Dichostereum*, *Heterobasidion*, *Laurilia*, *Mutatoderma*, *Resinicium* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: Phylogenetic position for *Spiniger* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Spiralum J.L. Mulder, Transactions of the British Mycological Society 65 (3): 518 (1975)

Index Fungorum number: IF10010

Classification: Ascomycota genera *incertae sedis*

Type species: *Spiralum helicosporum* J.L. Mulder, Transactions of the British Mycological Society 65 (3): 518 (1975)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Spiralum* was introduced by Mulder (1975) and it has macronematous, mononematous, in groups, unbranched, twisted, brown conidiophores, with polytretic, scared, brown conidiogenous cells, and produces solitary, multi-septate, smooth, cylindrical, straight or curved or coiled in 2-D or 3-D,

hyaline to pale brown conidia. Phylogenetic position for *Spiralum* is unresolved due to lack of sequence data. References: (Mulder, 1975) (morphology), (Wijayawardene et al., 2020) (outline).

Spiroplana Voglmayr, M.J. Park & H.D. Shin, Mycotaxon 116: 208 (2011)

Index Fungorum number: IF519376

Classification: Pleosporales genera *incertae sedis*, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Spiroplana centripeta* Voglmayr, M.J. Park & H.D. Shin, Mycotaxon 116: 210 (2011)

Sexual morph: Unknown.

Sequence data: *Spiroplana centripeta* (KACC 42611, LSU: HQ696652, ITS: HQ696660)

Notes: *Spiroplana* was introduced by Voglmayr et al. (2011) and is characterized by having macronematous, mononematous, septate, unbranched, hyaline to subhyaline conidiophores, with monoblastic or polyblastic, integrated, terminal conidiogenous cells, producing conidia that are solitary, hyaline, irregularly globose to elongated, laterally flattened, formed by branched, tightly spirally interwoven, septate conidial filaments consistently growing inwards. Phylogenetically, *Spiroplana* was shown to be nested within the order Pleosporales (Pleosporomycetidae, Dothideomycetes), but family rank remains unknown (Figure 2.1). References: (Voglmayr et al., 2011) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Spirosphaera Beverw., Transactions of the British Mycological Society 36 (2): 120 (1953)

Index Fungorum number: IF10013

Classification: Tricladiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Spirosphaera floriformis* Beverw., Transactions of the British Mycological Society 36 (2): 121 (1953)

Sexual morph: Unknown.

Synanamorphs: *Lambdasporium* (Seifert et al., 2011)

Sequence data: *Spirosphaera floriformis* (CBS 402.52, LSU: MH868632, ITS: MH857097)

Notes: *Spirosphaera* was introduced by Van Beverwijk (1953) and is characterized by having semi-macronematous or micronematous, mononematous, unbranched or sparingly branched, sometimes reduced, hyaline conidiophores, with monoblastic, hyaline conidiogenous cells, producing conidia that are solitary, hyaline or brown, clathrate, bulbils, consisting of branched, septate coils (Seifert et al., 2011; Van Beverwijk, 1953). Johnston and Baschien (2020) introduced the family Tricladiaceae and accepted *Spirosphaera* within this family. Phylogenetically, *Spirosphaera* was shown to be nested within the family Tricladiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011; Van Beverwijk, 1953) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Spondylocladiopsis M.B. Ellis, Mycological Papers 87: 15 (1963)

Index Fungorum number: IF10018

Classification: Ascomycota genera *incertae sedis*

Type species: *Spondylocladiopsis cupulicola* M.B. Ellis, Dematiaceous Hyphomycetes: 295 (1971)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: One species is accepted in this genus. Phylogenetic position for *Spondylocladiopsis* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Sporendocladia G. Arnaud ex Nag Raj & W.B. Kendr., A monograph of Chalara and allied genera: 162 (1975)

Index Fungorum number: IF10020

Classification: Microascales genera incertae sedis, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Sporendocladia castaneae* G. Arnaud ex Nag Raj & W.B. Kendr., A monograph of Chalara and allied genera: 162 (1975)

Sexual morph: Unknown.

Sequence data: *Sporendocladia bactrospora* (CBS 299.62 = ATCC 44606 = DAOM 28736 = IMI 047572ii = MUCL 4270, ITS: MH869754)

Notes: *Sporendocladia* is characterized by penicillate, brown conidiophores, phialidic conidiogenous cells with long collarettes, and conidia are catenate, aseptate, hyaline (Seifert et al., 2011). References: (Seifert et al., 2011) (morphology), (Jacobs et al., 2003a) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Sporendonema Desm., Annales des Sciences Naturelles Botanique 11: 247 (1827)

Index Fungorum number: IF10021

Classification: Onygenaceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Sporendonema casei* Desm., Annales des Sciences Naturelles Botanique 11: 248 (1827)

Sexual morph: *Onygena* (Seifert et al., 2011).

Sequence data: *Sporendonema casei* (CBS 543.75, LSU: MH872720, ITS: MH860952)

Notes: *Sporendonema* was introduced by Desmazières (1827) and is characterized by micronematous, mononematous, reduced conidiophores, thallic-arthric, hyaline conidiogenous cells, and aseptate, in chains with long separating cells, hyaline conidia (Seifert et al., 2011). References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Sporothrix Hektoen & C.F. Perkins, Journal of Experimental Medicine 5: 80 (1900)

Index Fungorum number: IF10046

Classification: Ophiostomataceae, Ophiostomatales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Sporothrix schenckii* Hektoen & C.F. Perkins, Journal of Experimental Medicine 5: 77 (1900)

Sexual morph: *Cephaloascus*, *Ophiostoma*, *Phomatospora*, *Tectonidula* (Seifert et al., 2011).

Synanamorphs: *Beauveriphora*, *Pesotum*, ?*Phaeoisaria*, *Rhinocladiella*, *Zygosporium* (Seifert et al., 2011).

Sequence data: *Sporothrix bragantina* (CBS 474.91, LSU: MH873947, ITS: MH862265)

Notes: *Sporothrix* was introduced by Hektoen and Perkins (1900) and it has none or synnematous conidiomata, unbranched or sparingly branched conidiophores, polyblastic, sympodial, denticulate, hyaline conidiogenous cells, and producing solitary or catenate, aseptate, hyaline conidia (Seifert et al., 2011). References: (Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Sporotretophora Whitton, McKenzie & K.D. Hyde, Fungal Diversity Research Series 21: 296 (2012)

Index Fungorum number: IF563870

Classification: Ascomycota genera *incertae sedis*

Type species: *Sporotretophora punctata* Whitton, McKenzie & K.D. Hyde, Fungal Diversity Research Series 21: 297 (2012)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Sporotretophora* was introduced by Whitton et al. (2012) and it has macronematous, mononematous, septate, unbranched, pale brown conidiophores, with monotretic, terminal and intercalary, integrated, pale brown conidiogenous cells, and produces solitary, aseptate, spherical, hyaline conidia. Phylogenetic position for *Sporotretophora* is unresolved due to lack of sequence data. References: (Whitton et al., 2012) (morphology), (Wijayawardene et al., 2020) (outline).

Stachybotryna Tubaki & T. Yokoy., Transactions of the Mycological Society of Japan 12 (1): 18 (1971)

Index Fungorum number: IF10051

Classification: Herpotrichiellaceae, Chaetothyriales, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Stachybotryna columaris* Tubaki & T. Yokoy., Transactions of the Mycological Society of Japan 12 (1): 18 (1971)

Sexual morph: ?*Nectria* (Seifert et al., 2011).

Sequence data: *Stachybotryna columaris* (CBS 565.71 = ATCC 22670 = IFO 9180, LSU: MH872027, ITS: MH860263)

Notes: *Stachybotryna* was introduced by Tubaki and Yokoyama (1971) and is *Stachybotrys*-like, but differs by having brown setae around the conidiophores (Heredia et al., 2012; Seifert et al., 2011). Phylogenetically, the ex-type of the type species, *S. columaris*, grouped in the family Herpotrichiellaceae (Figure 2.1). Therefore, we suggest putting this genus in Herpotrichiellaceae (Chaetothyriales) References: (Calduch et al., 2002a; Costa et al., 2016b; Heredia et al., 2012; Tubaki & Yokoyama, 1971) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Stachybotrys Corda, Icones fungorum hucusque cognitorum 1: 21 (1837)

Index Fungorum number: IF10052

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Stachybotrys chartarum* (Ehrenb.) S. Hughes, Canadian Journal of Botany 36 (6): 812 (1958) (= *Stachybotrys atra* Corda (1837))

Sexual morph: Lombard et al. (2016) provided a full description (sexual and asexual morphs) for this genus

Disease symptoms: Stachybotryotoxicosis (Hyde et al., 2018)

Sequence data: *Stachybotrys chartarum* (CBS 182.80, LSU: KU846792, ITS: KU846679)

Notes: *Stachybotrys* was revised by Lombard et al. (2016) and its asexual morph is characterized by its conidiophores are macronematous, mononematous, unbranched or branched, hyaline to olivaceous brown with 3-12 conidiogenous cells radiating from the apex, conidiogenous cells are phialidic with conspicuous collarettes, and conidia are solitary, aseptate, hyaline becoming olivaceous brown to dark brown, ellipsoidal to globose to fusiform to limoniform (Lombard et al., 2016). References:

(Lin et al., 2016b; Lombard et al., 2016; Wang et al., 2015c) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Stachycoremium Seifert, Mycologia 77: 987 (1986)

Index Fungorum number: IF11193

Classification: Ascomycota genera *incertae sedis*

Type species: *Stachycoremium parvulum* (Cooke & Ellis) Seifert, Mycologia 77: 987 (1986)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Stachycoremium* was introduced by Seifert (1985b) and it has synnematous conidiomata, macronematous, septate, branched, hyaline conidiophores, with sympodial, denticulate, hyaline conidiogenous cells, and produces 1-septate, ellipsoidal to fusiform-ellipsoidal, hyaline conidia aggregated in slimy mass. Phylogenetic position for *Stachycoremium* is unresolved due to lack of sequence data. References: (Seifert, 1985b) (morphology), (Wijayawardene et al., 2020) (outline).

Stachylidium Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 15 (1809)

Index Fungorum number: IF10053

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Stachylidium bicolor* Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 15 (1809)

Sexual morph: Unknown.

Sequence data: *Stachylidium bicolor* (CBS 121802, LSU: LR025972, ITS: LR026834)

Notes: *Stachylidium* is characterized by macronematous, mononematous, verticillate, hyaline to brown conidiophores, monophialidic, cylindrical, ellipsoidal, hyaline or pale brown conidiogenous cells, and producing aseptate, in slimy mass, smooth-walled, ellipsoidal or cylindrical, hyaline to brown conidia (Giraldo & Crous,

2019). References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Staheliella Emden, Acta Botanica Neerlandica 23: 251 (1974)

Index Fungorum number: IF10062

Classification: Helotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Staheliella nodosa* Emden, Acta Botanica Neerlandica 23: 251 (1974)

Sexual morph: Unknown.

Sequence data: *Staheliella nodosa* (CBS 589.73 = ATCC 26835 = IPO 1218 = MUCL 20198, LSU: MH872508, ITS: MH860777)

Notes: *Staheliella* was erected by Van Emden (1974) to accommodate *S. nodosa*, which was isolated from soil. *Staheliella* is characterized by having macronematous, mononematous, septate, apically branched, brown conidiophores, with thallic-arthric, hyaline or brown conidiogenous cells, producing catenate, aseptate, cylindrical, hyaline or brown conidia (Van Emden, 1974). Phylogenetically, the ex-type strain CBS 589.73 of generic type clustered in the order Helotiales (Leotiomycetes), but unknown familial placement (Figure 2.1). Thus, we suggest placing this genus under Helotiales genera *incertae sedis*. References: (Van Emden, 1974) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Stanhughesia Constant., Studies in Mycology 31: 71 (1989)

Index Fungorum number: IF11194

Classification: Chaetothyriaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Stanhughesia linnaeae* Constant., Studies in Mycology 31: 75 (1989)

Sexual morph: *Ceramothyrium* (Constantinescu et al., 1989).

Sequence data: *Ceramothyrium carniolicum* (= *Stanhughesia carniolica* (CBS 175.95, LSU: AY004339, ITS: NR_132877, SSU: NG_070862)

Notes: *Stanhughesia* was introduced by Constantinescu et al. (1989) and is characterized by reduced conidiophores, monoblastic, hyaline conidiogenous cells, and solitary, staurosporic, subhyaline conidia. *Stanhughesia* was synonymized under the genus *Ceramothyrium*. References: (Constantinescu et al., 1989; Quan et al., 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Stanjemonium W. Gams, O'Donnell, Schroers & M. Chr., Canadian Journal of Botany 76 (9): 1579 (1999)

Index Fungorum number: IF27934

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Stanjemonium grisellum* W. Gams, Schroers & M. Chr., Canadian Journal of Botany 76 (9): 1580 (1998)

Sexual morph: Unknown.

Sequence data: *Stanjemonium grisellum* (CBS 655.79, LSU: NG_069774, ITS: NR_156501)

Notes: *Stanjemonium* was introduced by Gams et al. (1998) and is characterized by having mononematous, unbranched or verticillate, hyaline conidiophores, monophialidic, flask-shaped, hyaline conidiogenous cells, solitary, aseptate, ellipsoid to cylindrical, hyaline conidia. References: (Gams et al., 1998) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Stauriella Sivichai & E.B.G. Jones, Sydowia 56 (1): 132 (2004)

Index Fungorum number: IF28815

Classification: Ascomycota genera *incertae sedis*

Type species: *Stauriella aquatica* Sivichai & E.B.G. Jones, Sydowia 56 (1): 133 (2004)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Stauriella* was established by Sivichai and Jones (2004) and it has micronematous, mononematous, branched, reduced conidiophores, with monoblastic,

denticulate, clamped, hyaline conidiogenous cells, and produces solitary, clamped, hyaline conidia. Phylogenetic position for *Stauriella* is unresolved due to lack of sequence data. References: (Sivichai & Jones, 2004) (morphology), (Wijayawardene et al., 2020) (outline).

Stellomyces Morgan-Jones, R.C. Sinclair & Eicker, Mycotaxon 28 (2): 447 (1987)

Index Fungorum number: IF11195

Classification: Ascomycota genera *incertae sedis*

Type species: *Stellomyces suidafrikanus* Morgan-Jones, R.C. Sinclair & Eicker, Mycotaxon 28 (2): 448 (1987)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Stellomyces* was introduced by Morgan-Jones et al. (1987) and it has macronematous, mononematous, unbranched or branched, aseptate or septate, hyaline conidiophores, with polyblastic, integrated or discrete, denticulate, hyaline conidiogenous cells, and produces solitary, aseptate, ellipsoidal or boat-shaped, hyaline conidia. Phylogenetic position for *Stellomyces* is unresolved due to lack of sequence data. References: (Morgan-Jones et al., 1987) (morphology), (Wijayawardene et al., 2020) (outline).

Stellospora Alcorn & B. Sutton, Mycotaxon 20 (1): 45 (1984)

Index Fungorum number: IF11196

Classification: Ascomycota genera *incertae sedis*

Type species: *Stellospora appendiculellae* Alcorn & B. Sutton, Mycotaxon 20 (1): 45 (1984)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Stellospora* was introduced by Alcorn and Sutton (1984) and it has macronematous, mononematous, unbranched or branched, septate, sometimes reduced, hyaline conidiophores, with monophialidic, terminal, determinate, hyaline conidiogenous cells, and produces aseptate, staurosporous, hyaline conidia.

Phylogenetic position for *Stellospora* is unresolved due to lack of sequence data. References: (Alcorn & Sutton, 1984) (morphology), (Wijayawardene et al., 2020) (outline).

Stenella Syd., Annales Mycologici 28 (1-2): 205 (1930)

Index Fungorum number: IF10082

Classification: Teratosphaeriaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Stenella araguata* Syd., Annales Mycologici 28 (1-2): 205 (1930)

Sexual morph: *Mycosphaerella* (Seifert et al., 2011).

Synanamorphs: scytalidium-like (Seifert et al., 2011).

Sequence data: *Stenella araguata* (CBS 105.75 = ATCC 24788 = FMC 245, LSU: NG_064105, ITS: NR_156511, SSU: NG_061090)

Notes: *Stenella* was introduced by Sydow (1930) and is characterized by having macronematous, mononematous, solitary or caespitose, unbranched or sparingly branched, brown conidiophores, polyblastic, integrated, terminal and intercalary, sympodial, cicatrized, brown conidiogenous cells, solitary or catenate, aseptate or septate, fusiform or obclavate, hyaline or brown conidia (Ellis, 1971; Seifert et al., 2011). Phylogenetically, *Stenella* was shown to be nested within the family Teratosphaeriaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Ellis, 1971; Quaedvlieg et al., 2014; Seifert et al., 2011; Sydow, 1930) (morphology and/or phylogeny), (Hongsanan et al., 2020a; Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Stenocladiella Marvanová & Descals, Transactions of the British Mycological Society 89 (4): 507 (1987)

Index Fungorum number: IF11197

Classification: Ascomycota genera *incertae sedis*

Type species: *Stenocladiella neglecta* (Marvanová & Descals) Marvanová & Descals, Transactions of the British Mycological Society 89 (4): 507 (1987)

Sexual morph: Unknown.

Sequence data: *Stenocladiella neglecta* (STNE 183-1689, ITS: KX858624)

Notes: *Leptocladia* Marvanová & Descals was introduced by Marvanová and Descals (1985), however, it is a homonym of a red alga genus *Leptocladia* J. Agardh. Marvanová and Descals (1987) introduced the genus *Stenocladiella* to replace *Leptocladia* Marvanová & Descals. Phylogenetic position for *Stenocladiella* is unresolved due to lack of LSU sequence data. References: (Marvanová & Descals, 1985, 1987) (morphology), (Wijayawardene et al., 2020) (outline).

Stenospora Deighton, Mycological Papers 118: 22 (1969)

Index Fungorum number: IF10086

Classification: Ascomycota genera *incertae sedis*

Type species: *Stenospora uredinicola* Deighton, Mycological Papers 118: 23 (1969)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Stenospora* was introduced by Deighton (1969a) and it has mononematous, unbranched or branched, septate, hyaline conidiophores, with polyblastic, sympodial, scared, hyaline conidiogenous cells, and produces solitary, multi-septate, acicular, hyaline conidia. Phylogenetic position for *Stenospora* is unresolved due to lack of sequence data. References: (Deighton, 1969a) (morphology), (Wijayawardene et al., 2020) (outline).

Stephanoma Wallr., Flora Cryptogamica Germaniae 2: 269 (1833)

Index Fungorum number: IF10087

Classification: Hypocreaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Stephanoma strigosum* Wallr., Flora Cryptogamica Germaniae 2: 269 (1833)

Sexual morph: *Hypomyces* (Seifert et al., 2011).

Synanamorphs: *Cladobotryum* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: Five species are accepted in this genus. Phylogenetic position for *Stephanoma* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Stephanophorella Réblová & Hern.-Restr., Microorganisms 9 (4, no. 706): 47 (2021)

Index Fungorum number: IF836363

Classification: Vermiculariopsiellaceae, Vermiculariopsiellales, Incertae sedis, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Stephanophorella stellata* (M. Calduch, Gené & Guarro) Réblová & Hern.-Restr., Microorganisms 9 (4, no. 706): 48 (2021)

Sexual morph: Unknown.

Sequence data: *Stephanophorella stellata* (CBS 101301 = FMR 6481, LSU: MH874336, ITS: MH862729, SSU: MW151687)

Notes: *Stephanophorella* was introduced by Réblová et al. (2021a) to accommodate *Zanclospora stellata* M. Calduch, Gené & Guarro. It is characterized by conidiophores are macronematous, mononematous, setiform, branched, pigmented, conidiogenous cells are phialidic with a tubular collarette, discrete, arranged in whorls forming a compact fertile zone, conidia are aseptate, in slimy mass, hyaline (Réblová et al., 2021a). *Stephanophorella* similar to *Zanclospora* but differs by its phialidic conidiogenous cells with tubular collarettes. Phylogenetically, *Stephanophorella* located in the order Vermiculariopsiellales (Figure 2.1). References: (Réblová et al., 2021a) (morphology and phylogeny).

Sterigmatobotrys Oudem., Nederlandsch Kruidkundig Archief Ser. 2, 4: 548 (1886)

Index Fungorum number: IF10090

Classification: Pleurotheciaceae, Pleurotheciales, Savoryellomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Sterigmatobotrys elata* (Sacc.) Oudem. (1886)

Sexual morph: Holomorphic genus (Réblová & Seifert, 2011).

Sequence data: *Sterigmatobotrys rudis* (DAOM 229838, LSU: JQ429241, ITS: JQ429152, SSU: JQ429256)

Notes: It accommodates fungi with macronematous, irregularly biverticillate to terverticillate conidiophores with stout, septate, darkly pigmented stipes and a penicillus consisting of appressed branches and/or whorls of metulae, terminating in polyblastic conidiogenous cells with minute, sympodially arranged denticles, and hyaline, septate conidia that turn brown at maturity and are aggregated in slime (Réblová & Seifert, 2011). Phylogenetic analyses in this study showed that this genus, except *P. obovoideum* (Matsush.) Arzanlou & Crous, formed a monophyletic clade within the family Pleurotheciaceae (Figure 2.1). References: (Ellis, 1971; Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Stilbella Lindau, Die natürlichen Pflanzenfamilien nebst ihren Gattungen und wichtigeren Arten insbesondere den Nutzpflanzen : I. Tl., 1. Abt.: Fungi (Eumycetes): 489 (1900)

Index Fungorum number: IF10110

Classification: Hypocreales genus *incertae sedis*, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Stilbella erythrocephala* (Ditmar) Lindau, Die natürlichen Pflanzenfamilien nebst ihren Gattungen und wichtigeren Arten insbesondere den Nutzpflanzen : I. Tl., 1. Abt.: Fungi (Eumycetes): 489 (1900) = *Stilbella fimetaria* (Pers.) Lindau, Verhandelingen van het Bataviaasch Genootschap der Kunsten en Wetenschappen 47: 75 (1905)

Sexual morph: *Cosmospora*, *Emericellopsis*, *Hypocrea*, *Stilbocrea*, *Valsonectria* (Seifert et al., 2011).

Synanamorphs: acremonium-like, *Gracilistibella* (Seifert et al., 2011)

Disease symptoms: Leaf spots

Sequence data: *Stilbella fimetaria* (CBS 117.84, LSU: MH873416, ITS: MH861705)

Notes: The asexual morph of *Stilbella* is characterized by determinate synnemata, monoverticillate or biverticillate conidiophores, phialidic conidiogenous

cells, and aseptate or 1-septate, globose, ellipsoidal, oblong-ellipsoidal, fusiform-ellipsidal or clavate, hyaline conidia (Seifert, 1985a). References: (Gräfenhan et al., 2011; Seifert, 1985a) (morphology), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Stilbellula Boedijn, Sydowia 5 (3-6): 227 (1951)

Index Fungorum number: IF10111

Classification: Ascomycota genera *incertae sedis*

Type species: *Stilbellula pallida* Boedijn, Sydowia 5 (3-6): 228 (1951)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Stilbellula* was established by Boedijn (1951) and it has synnematous conidiomata, macronematous, branched, septate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, and produces aseptate, echinulate, globose, hyaline conidia forming spore head. Phylogenetic position for *Stilbellula* is unresolved due to lack of sequence data. References: (Boedijn, 1951) (morphology), (Wijayawardene et al., 2020) (outline).

Stilbodendron Syd. & P. Syd., Annales Mycologici 14 (3-4): 260 (1916)

Index Fungorum number: IF10113

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Stilbodendron camerunense* Syd. & P. Syd., Annales Mycologici 14 (3-4): 260 (1916)

Sexual morph: *Penicilliopsis* (Houbraken et al., 2020).

Sequence data: Sequence is unavailable for this genus.

Notes: *Stilbodendron* was synonymized under *Penicilliopsis* (Houbraken et al., 2020).

Strelitziomyces Crous, Persoonia 43: 303 (2019)

Index Fungorum number: IF832893

Classification: Anungitiomycetaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Strelitziomyces knysnanus* Crous, Persoonia 43: 303 (2019)

Sexual morph: Unknown.

Sequence data: *Strelitziomyces knysnanus* (CBS 146056, LSU: NG_068670, ITS: NR_166334)

Notes: It is characterized by macronematous, mononematous, unbranched conidiophores, polyblastic, hyaline, subdenticulate conidiogenous cells, solitary, 1-septate, fusoid, hyaline conidia, and dark brown, muriform, globose *Sclerotium*-like bodies (Crous et al., 2019d). It is similar to *Anungitiomyces*, but differs by the formation of *Sclerotium*-like bodies. References: (Crous et al., 2019d) (morphology and phylogeny).

Streptopodium R.Y. Zheng & G.Q. Chen, Acta Microbiologica Sinica 18: 183 (1978)

Index Fungorum number: IF10123

Classification: Erysiphaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Streptopodium bonariense* (Speg.) R.Y. Zheng & G.Q. Chen, Acta Microbiologica Sinica 18: 183 (1978)

Sexual morph: *Pleiochaeta*, *Phyllactinia* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: Two species are accepted in this genus. Phylogenetic position for *Streptopodium* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Streptotinia Whetzel, Mycologia 37 (6): 684 (1945)

= *Streptobotrys* Hennebert, Persoonia 7 (2): 191 (1973)

Index Fungorum number: IF5280

Classification: Sclerotiniaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Streptotinia arisaemae* Whetzel, Mycologia 37 (6): 686 (1945)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Streptobotrys* (Seifert et al., 2011).

Sequence data: *Streptotinia aquilegiae* (CBS 352.47, LSU: MH867820, ITS: MH856284)

Notes: *Streptobotrys* was introduced by Hennebert (1973) and is characterized by having dichotomously branched, helically twisted, brown conidiophores, with polyblastic, denticulate, hyaline to pale brown conidiogenous cells, producing solitary, aseptate, regularly globose, subhyaline to brown conidia (Hennebert, 1973; Seifert et al., 2011). The sexual morph of *Streptobotrys* was reported in the genus *Streptotinia* (Seifert et al., 2011), and Johnston et al. (2014) proposed to protect *Streptotinia* over *Streptobotrys*. Phylogenetically, *Streptotinia* was shown to be nested within the family Sclerotiniaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Hennebert, 1973; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Stromatographium Höhn., Denkschriften der Akademie der Wissenschaften (Wien) Mathematisch-naturwissenschaftliche Klasse 83: 37 (1907)

Index Fungorum number: IF10129

Classification: Sordariales genera *incertae sedis*, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Stromatographium stromaticum* (Berk.) Höhn., Ergebth. Bot. Exp. Sudakras Deut. k. Ak. d. Wiss Wien: 37 (extr.) (1907)

Sexual morph: *Fluviostroma* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: Two species are accepted in this genus. Phylogenetic position for *Stromatographium* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Stromatostysanus Höhn., Berichte der Deutschen Botanischen Gesellschaft 37: 153 (1919)

Index Fungorum number: IF10132

Classification: Ascomycota genera *incertae sedis*

Type species: *Stromatostysanus caprifoliorum* (Desm.) Höhn., Mitt. Bot. Inst. Techn. Hochsch. Wien: 71 (1929)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Stromatostysanus* was introduced by Höhnel (1919a) and four species are accepted. Phylogenetic position for *Stromatostysanus* is unresolved due to lack of sequence data. References: (Höhnel, 1919a) (morphology), (Wijayawardene et al., 2020) (outline).

Strongyloarthrosporum Rodr.-Andr., Cano & Stchigel, IMA Fungus 10 (no. 20): 16 (2019)

Index Fungorum number: IF823587

Classification: Onygenales genus *incertae sedis*, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Strongyloarthrosporum catenulatum* Rodr.-Andr., Cano & Stchigel, IMA Fungus 10 (no. 20): 16 (2019)

Sexual morph: Unknown.

Sequence data: *Strongyloarthrosporum catenulatum* (FMR 16121 = CBS 143841, LSU: LT906534, ITS: LR760230)

Notes: *Strongyloarthrosporum* was introduced by Rodríguez-Andrade et al. (2019) and is characterized by micronematous, mononematous, hyaline conidiophores, and enteroarthic, globose, hyaline conidia. References: (Rodríguez-Andrade et al., 2019) (morphology and phylogeny).

Stylaspergillus B. Sutton, Alcorn & P.J. Fisher, Transactions of the British Mycological Society 79 (2): 340 (1982)

Index Fungorum number: IF10136

Classification: Ascomycota genera *incertae sedis*

Type species: *Stylaspergillus laxus* B. Sutton, Alcorn & P.J. Fisher, Transactions of the British Mycological Society 79 (2): 340 (1982)

Sexual morph: Unknown.

Synanamorphs: *Parasympodiella* (Seifert et al., 2011; Sutton et al., 1982).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Stylaspergillus* was established by Sutton et al. (1982) and it has macronematous, mononematous, branched, vesiculate, septate, brown conidiophores, with phialidic, integrated, lageniform, inwardly curved conidiogenous cells, and produces aseptate, acicular, hyaline conidia aggregated in slimy mass. Phylogenetic position for *Stylaspergillus* is unresolved due to lack of sequence data. References: (Sutton et al., 1982) (morphology), (Wijayawardene et al., 2020) (outline).

Subbaromyces Hesselt., Bulletin of the Torrey Botanical Club 80: 511 (1953)

Index Fungorum number: IF5303

Classification: Laboulbeniomycetes genera *insertae sedis*, Pezizomycotina, Ascomycota

Type species: *Subbaromyces splendens* Hesselt., Bulletin of the Torrey Botanical Club 80: 511 (1953)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Hesseltine, 1953).

Sequence data: *Subbaromyces splendens* (CBS 357.53 B, LSU: MN526935, SSU: MN526932)

Notes: The genus was established by Hesseltine (1953) for a species that collected from trickling filter rocks in New York, USA. Totally, two species were accepted within this genus (Chary & Ramarao, 1974; Hesseltine, 1953). The other accepted species, *S. aquaticus*, was introduced by Chary and Ramarao (1974) for a species isolated from water samples that collected from India. A phylogenetic analyses based on SSU sequence data that included *S. splendens* was provided by Jones et al. (1999), and it showed that *S. splendens* is closed related to *Curvularia brachyspora*. However, this SSU sequence was turned out to be wrong (Blackwell et al., 2020). In the most modem classifications, *Subbaromyces* was placed in the family Ophiostomataceae Nannf. (Ophiostomatales, Sordariomycetes) (Maharachchikumbura et al., 2015, 2016; Wijayawardene et al., 2017a, 2018). However, Blackwell et al. (2020) placed this genus in Laboulbeniomycetes genera *insertae sedis*. Phylogenetically, *Subbaromyces* species located in Laboulbeniomycetes (Figure 2.1).

References: (Chary & Ramarao, 1974; Hesseltine, 1953) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Subramaniomyces Varghese & V.G. Rao, Kavaka 7: 83 (1979)

Index Fungorum number: IF10141

Classification: Amphisphaeriales genera *incertae sedis*, Sordariomycetes

Type species: *Subramaniomyces indicus* Varghese & V.G. Rao, Kavaka 7: 83 (1979)

Sexual morph: Unknown.

Sequence data: Sequence data for ex-type culture of type species is unavailable. Other sequence data: *Subramaniomyces podocarpi*, CBS 143176 = CPC 32031, LSU: NG_066201, ITS: NR_156659.

Notes: Varghese and Rao (1979) introduced this genus for a new species and *Hemibeltrania navicularis*. Kirk (1982) emend this genus and synonymised *Ramularia fusisaprophytica* under it. This genus has macronematous, mononematous, unbranched or sparingly branched, sometimes setiform pale brown to dark brown conidiophores, polyblastic, integrated or discrete, sympodial, denticles, cylindrical, pale brown conidiogenous cells, hyaline to subhyaline, aseptate, catenate, ellipsoid to fusiform conidia (Seifert et al., 2011). References: (Braun & Hill, 2002; Crous et al., 2017a; da Cruz et al., 2007; Kirk, 1982; Seifert et al., 2011; Varghese & Rao, 1979) (morphology), (Crous et al., 2017a)(phylogeny)

Subsessila C.G. Lin & K.D. Hyde, Mycological Progress 16 (4): 396 (2017)

Index Fungorum number: IF 552504

Classification: Beltraniaceae, Amphisphaeriales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Subsessila turbinata* C.G. Lin & K.D. Hyde, Mycological Progress 16 (4): 396 (2017)

Sexual morph: Unknown.

Sequence data: *Subsessila turbinata* (MFLUCC 15-0831, LSU: NG_059724, ITS: NR_148122)

Notes: *Subsessila* differs from Beltrania and other similar genera by the absence of distinct conidiophores and separating cells, and its turbinate to clavate conidia without a hyaline transverse band (Lin et al., 2017b). Phylogenetic analyses in this study showed that this genus formed a monophyletic clade within the family Beltraniaceae (Figure 2.1). References: (Lin et al., 2017b) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Subulicystidium Parmasto, Conspectus Systematis Corticiacearum: 120 (1968)

= *Aegeritina* Jülich, International Journal of Mycology and Lichenology 1 (3): 282 (1984)

Index Fungorum number: IF18619

Classification: Hydnodontaceae, Trechisporales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Subulicystidium longisporum* (Pat.) Parmasto, Consp. System. Corticiac. (Tartu): 121 (1968)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Aegeritina* (Seifert et al., 2011).

Sequence data: *Subulicystidium* sp. (KHL10780, LSU: AY586714, 5.8S: AY463468)

Notes: The sexual morph of *Aegeritina* was reported in the genus *Subulicystidium*, Stalpers et al. (2021) proposed to protect *Subulicystidium* over *Aegeritina*. Phylogenetically, *Subulicystidium* was shown to be nested within the family Hydnodontaceae (Trechisporales, Agaricomycetes) (Figure 2.1). References: (Jülich, 1984; Seifert et al., 2011) (morphology and phylogeny), (He et al., 2019) (outline).

Subulispora Tubaki, Transactions of the Mycological Society of Japan 12 (1): 20 (1971)

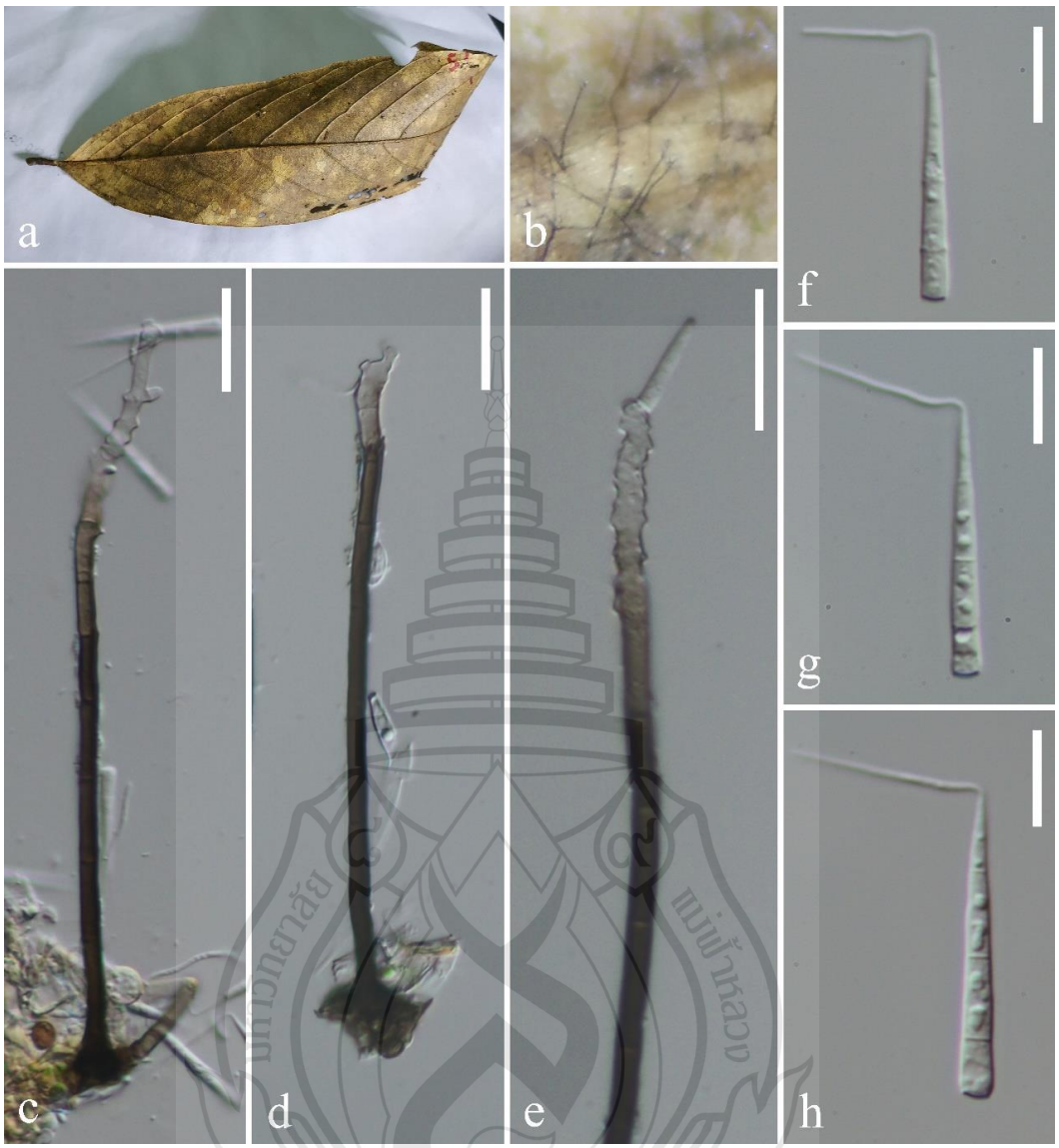
Index Fungorum number: IF10142

Classification: Incertae sedis, Xylariales, Sordariomycetes

Type species: *Subulispora procurvata* Tubaki, Transactions of the Mycological Society of Japan 12 (1): 20 (1971)

Sequence data: Sequence data for ex-isotype culture of type species is available. CBS 567.71 = ATCC 22671 = IFO 9181 = IMI 158981, ITS: MH860265.

Notes: In previous studies, the genus was placed in Ascomycota genus *incertae sedis*. In our phylogenetic study, the ex-type of *Subulispora biappendiculata* groups with other Xylariales spp., but the taxonomic rank in family level is unknown, hence we assign this genus under Xylariales genus *incertae sedis*. References: (de Hoog, 1985; Marvanová & Laichmanova, 2007; Seifert et al., 2011) (morphology).



Note ***Subulispora*** **sp.** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 2-5). **a** Host material. **b** Conidiophores on the host surface. **c, d** Conidiophores. **e** Conidiogenous cells. **f–h** Conidia. Scale bars: **c–e** = 20 μm, **f–h** = 10 μm.

Figure 2.58 *Subulispora* sp.

Summerbellia Giraldo López & Crous, Studies in Mycology 92: 252 (2018)

Index Fungorum number: IF828043

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Summerbellia oligotrophica* Giraldo López & Crous, Studies in Mycology 92: 253 (2018)

Sexual morph: Unknown.

Synanamorphs: Producing chlamydospores (Giraldo & Crous, 2019).

Sequence data: *Summerbellia oligotrophica* (CBS 657.94, LSU: LR025849, ITS: LR026719)

Notes: *Summerbellia* was introduced by Giraldo and Crous (2019) and is characterized by mononematous, unbranched or poorly branched conidiophores, monophialidic with minute cylindrical collarette, sub-cylindrical, hyaline conidiogenous cells, producing aseptate, in slimy mass, ellipsoidal or cylindrical, hyaline conidia, and terminal or intercalary, catenate, pale to dark brown chlamydospores. References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Symphyosirinia E.A. Ellis, Transactions of the Norfolk and Norwich Naturalists Society 18 (3): 5 (1956)

= *Symphyosirella* Seifert, Mycotaxon 110: 105 (2009)

Index Fungorum number: IF5318

Classification: Helotiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Symphyosirinia galii* E.A. Ellis, Transactions of the Norfolk and Norwich Naturalists Society 18 (3): 6 (1956)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Symphyosirella* (Johnston et al., 2014; Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: Johnston et al. (2014) proposed to use *Symphyosirinia* rather than *Symphyosirella*. Phylogenetic position for *Symphyosirinia* is unresolved due to lack of

sequence data. References: (Johnston et al., 2014) (nomenclature), (Wijayawardene et al., 2020) (outline).

Sympodiella W.B. Kendr., Transactions of the British Mycological Society 41 (4): 519 (1958)

Index Fungorum number: IF10151

Classification: Cylindrosympodiaceae, Venturiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Sympodiella acicola* W.B. Kendr., Transactions of the British Mycological Society 41 (4): 519 (1958)

Sexual morph: *Sympoventuria* (Seifert et al., 2011).

Sequence data: *Sympodiella acicola* (CBS 487.82, LSU: KY853530, ITS: KY853468)

Notes: This genus was described by Kendrick (1958) for a species inhabiting decaying needles of *Pinus sylvestris* (Pinaceae). *Sympodiella* is characterized by having macronematous, mononematous, solitary, unbranched, septate, geniculate, sympodial, brown conidiophores, with thallic-arthric, hyaline conidiogenous cells, producing catenate, aseptate or septate, cylindrical, hyaline (Ellis, 1971; Kendrick, 1958). Shen et al. (2020) introduced the family Cylindrosympodiaceae and accepted *Sympodiella* within it. Phylogenetically, representatives of *Sympodiella* clustered in the family Cylindrosympodiaceae (Venturiales, Dothideomycetes) (Figure 2.1). References: (Ellis, 1971; Kendrick, 1958; Shen et al., 2020) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Sympodioplanus R.C. Sinclair & Boshoff, Mycotaxon 64: 366 (1997)

Index Fungorum number: IF27707

Classification: Ascomycota genera *incertae sedis*

Type species: *Sympodioplanus capensis* R.C. Sinclair & Boshoff, Mycotaxon 64: 366 (1997)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Sympodioplanus* was introduced by Sinclair et al. (1997) and it has macronematous, mononematous, solitary or in groups, unbranched, septate, brown conidiophores, with polyblastic, integrated, terminal, sympodial, scared conidiogenous cells, and produces solitary, septate, smooth, elongated, hyaline to pale brown conidia. Phylogenetic position for *Sympodioplanus* is unresolved due to lack of sequence data. References: (Sinclair et al., 1997) (morphology), (Wijayawardene et al., 2020) (outline).

Synchaetomella Decock & Seifert, Antonie van Leeuwenhoek 88 (3-4): 234 (2005)

Index Fungorum number: IF28991

Classification: Chaetomellaceae, Chaetomellales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Synchaetomella lunatospora* Decock, G. Delgado & Seifert, Antonie van Leeuwenhoek 88 (3-4): 234 (2005)

Sexual morph: Unknown.

Sequence data: *Synchaetomella acerina* (DAOM 242271, LSU: NG_042747, ITS: NR_111811, SSU: NG_065600); *Synchaetomella lunatospora* (MUCL 43804, SSU: AY342013)

Notes: *Synchaetomella* was erected by Decock et al. (2005) and is characterized by having synnematous, brown conidiomata, macronematous, brown conidiophores, with phialidic, terminal or intercalary conidiogenous cells, producing 1-septate, falcate, hyaline conidia, accumulating in a hyaline to white mucilaginous mass. Phylogenetically, *Synchaetomella* was shown to be nested within the family Chaetomellaceae (Chaetomellales, Leotiomycetes) (Figure 2.1). References: (Decock et al., 2005; Fiuza et al., 2016) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Synnemadiella Crous & M.J. Wingf., Persoonia 37: 339 (2016)

Index Fungorum number: IF819088, *Facesoffungi number*: FoFxxxx

Classification: Incertae sedis, Xylariales, Sordariomycetes

Type species: ***Synnemadiella eucalypti*** Crous & M.J. Wingf., Persoonia 37: 339 (2016)

Sexual morph: Unknown.

Synasexual morph: subverticillium-like

Disease symptoms: Leas spots

Sequence data: Sequence data for ex-type culture of type species is available. ex-type: CPC 27637 = CBS 142100, LSU: KY173556, ITS: KY173467.

Notes: *Synnemadiella* is introduced by Crous et al. (2016a) for a fungus collected on leaf spots of *Eucalyptus pellita* (*Myrtaceae*) from Malaysia. One species is accepted in this genus and this genus has macronematous, synnematous, hyaline to pale brown conidiophores, monophialidic, percurrent, hyaline conidiogenous cells, solitary, granular, ellipsoid, hyaline conidia (Crous et al., 2016a). This genus has subverticillium-like synasexual morph (Crous et al., 2016a). Phylogenetically, this genus group together with *Castanediella* species within Castanediellaceae (Figure 2.1). References: (Crous et al., 2016a) (morphology and phylogeny).

Synnematomyces Kobayasi, J. Jap. Bot.: 287 (1981)

Index Fungorum number: IF10161

Classification: Strophariaceae, Agaricales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Synnematomyces capitatus* Kobayasi, J. Jap. Bot.: 287 (1981)

Sexual morph: Unknown.

Sequence data: *Synnematomyces capitatus* (NBRC 31218, LSU and ITS: LC146764)

Notes: This genus is unique by having multiheaded, determinate synnemata, unbranched, hyaline conidiophores, producing catenate, aseptate, hyaline conidia (Seifert et al., 2011). Phylogenetically, representative of *Synnematomyces* clustered in the family Strophariaceae (Agaricales, Agaricomycetes) (Figure 2.1). We suggest assigning this genus in Strophariaceae (Agaricales, Agaricomycetes). References: (Tian & Matheny, 2021) (phylogeny).

Synnematotriadelphia Chuaseehar., Somrith., Nuankaew & Boonyuen, Mycological Progress 19 (2): 132 (2020)

Index Fungorum number: IF833278

Classification: Triadelphiaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Synnematotriadelphia stilboidea* (Mercado & R.F. Castañeda) Chuaseehar., Somrith., Nuankaew & Boonyuen, Mycological Progress 19 (2): 133 (2020)

Sexual morph: Unknown.

Sequence data: *Synnematotriadelphia stilboidea* (CBS 221.85, LSU: MF434792, ITS: MF434781, SSU: MF434810)

Notes: *Synnematotriadelphia* was introduced by Chuaseeharonnachai et al. (2020) to accommodate two synnematous *Triadelphia* species, *T. stilboidea* and *T. synnematofera*. It is characterized by synnematous, simple or branched, solitary to gregarious conidiomata, macronematous, synnematous, septate, branched conidiophores, monoblastic conidiogenous cells, producing pleomorphic, solitary, aseptate or septate, cylindrical, clavate, allantoid, reniform, obovate, fusiform, ellipsoidal to broadly ellipsoidal, or obclavate to acicular, hyaline to pigmented conidia. References: (Chuaseeharonnachai et al., 2020) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Synnemellisia N.K. Rao, Manohar. & Goos, Mycologia 80 (6): 896 (1989)

Index Fungorum number: IF11201

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Synnemellisia hyalospora* N.K. Rao, Manohar. & Goos, Mycologia 80 (6): 896 (1989)

Sexual morph: Unknown.

Sequence data: *Synnemellisia aurantia* (COAD 2070, LSU: NG_059728, ITS: NR_154444)

Notes: *Synnemellisia* was introduced by Rao et al. (1988) and is characterized by synnematous conidiomata, macronematous, unbranched, pale brown

conidiophores, monoblastic, hyaline conidiogenous cells, and solitary, aseptate, fusiform, hyaline conidia. Rao et al. (1988) descripted this genus as having monoblastic conidiogensis, however, it seems the conidiogensis of this genus should be monophialidic based on their photo plates. References: (Crous et al., 2016a; Rao et al., 1988) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Taeniospora Marvanová, Transactions of the British Mycological Society 69 (1): 146 (1977)

Index Fungorum number: IF10173

Classification: Atheliaceae, Atheliales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Taeniospora gracilis* Marvanová, Transactions of the British Mycological Society 69 (1): 146 (1977)

Sexual morph: *Leptosporomyces* (Marvanová & Stalpers, 1987).

Sequence data: *Taeniospora gracilis* (CBS 714.83 = CCM F-564, LSU: MH873390, ITS: MH861678)

Notes: This genus was described by Marvanová (1977b) and is characterized by having conidiophores are unbranched or branched, hyaline with clamp connections, conidiogenous cells are monoblastic or polyblastic, sympodial, hyaline, with clamp connections, conidia are solitary, hyaline, staurosporous, curved axis with two unilateral branches, with clamp connections (Marvanová, 1977b; Marvanová & Stalpers, 1987; Seifert et al., 2011). Phylogenetically, representatives of *Taeniospora* clustered in the family Atheliaceae (Atheliales, Agaricomycetes) (Figure 2.1). References: (Marvanová, 1977b; Marvanová & Stalpers, 1987; Seifert et al., 2011) (morphology and phylogeny), (He et al., 2019) (outline).

Tangerinosporium L. Lombard & Crous, Persoonia 36: 231 (2016)

Index Fungorum number: IF816048

Classification: Stachybotryaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Tangerinosporium thalictricola* L. Lombard & Crous, Persoonia 36: 231 (2016)

Sexual morph: Unknown.

Sequence data: *Tangerinosporium thalitricola* (CBS 317.61 = IMI 034815, LSU: KU847269, ITS: KU847243)

Notes: This genus is myrothecium-like. References: (Lombard et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Teratoramularia Videira, H.D. Shin & Crous, Studies in Mycology 83: 104 (2016)

Index Fungorum number: IF816821

Classification: Teratosphaeriaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Teratoramularia persicariae* Videira, H.D. Shin & Crous, Studies in Mycology 83: 105 (2016)

Sexual morph: Unknown.

Sequence data: *Teratoramularia persicariae* (CBS 141104 = CPC 19488, LSU: KX287249, ITS: KX287545)

Notes: *Teratoramularia* was introduced by Videira et al. (2016) and is characterized by having mononematous or synnematous, mostly reduced conidiophores, with integrated, terminal or intercalary, sympodial, hyaline conidiogenous cells, producing two kinds of conidia: (1) catenate, aseptate to 1-septate, long, subcylindrical, hyaline conidia; (2) sometimes formed, catenate, multi-septate, brown conidia. Phylogenetically, *Teratoramularia* was shown to be nested within the family Teratosphaeriaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2016) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Termitaria Thaxt., Botanical Gazette Crawfordsville 69: 3 (1920)

Index Fungorum number: IF10183

Classification: Ascomycota genera *incertae sedis*

Type species: *Termitaria snyderi* Thaxt., Botanical Gazette Crawfordsville 69: 8 (1920)

Sexual morph: Unknown.

Sequence data: *Termitaria snyderi* (DAH14, SSU: AY212812)

Notes: *Termitaria* was introduced by Thaxter (1920) to accommodate two species, *T. coronata* and *T. snyderi*, associate with living Termites, and is characterized by having sporodochial conidiomata, macronematous, sporodochial, stromatic conidiophores, phialidic with deep collarette conidiogenous cells, and producing catenate, aseptate, endogenous, hyaline conidia. Phylogenetic position for *Termitaria* is unresolved due to lack of LSU sequence data. References: (Thaxter, 1920) (morphology), (Wijayawardene et al., 2020) (outline).

Termitariopsis M. Blackw., Samson & Kimbr., Mycotaxon 12 (1): 98 (1980)

Index Fungorum number: IF10184

Classification: Kathistaceae, Ophiostomatales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Termitariopsis cavernosa* M. Blackw., Samson & Kimbr., Mycotaxon 12 (1): 98 (1980)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: This genus was introduced by Blackwell et al. (1980) to accommodate a fungus found on ants, and presently one species is accepted. Some studies placed this genus under Ascomycata genera *incertae sedis* (Wijayawardene et al., 2017a, 2017b), however, some mycologists accepted it under the family Kathistaceae (Ophiostomatales) (Hyde et al., 2011; Maharachchikumbura et al., 2015, 2016; Wijayawardene et al., 2012, 2018). References: (Blackwell et al., 1980) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Termitomyces R. Heim, Archives du Muséum National d'Histoire Naturelle 18: 147 (1942)

= *Termitosphaera* Cif., Atti dell'Istituto Botanico "Giovanni Briosi" 6: 242 (1935)

Index Fungorum number: IF18637

Classification: Lyophyllaceae, Agaricales, Agaricomycetes, Agaricomycotina, Basidiomycota

Type species: *Termitomyces striatus* (Beeli) R. Heim, Mémoires de l'Académie des Sciences de l'Institut de France 64: 72 (1942)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Termitosphaera* (Seifert et al., 2011).

Sequence data: *Termitomyces sheikhupurensis* (LAH 35710, LSU: MT192228, ITS: NR_172179)

Notes: Phylogenetically, representative of *Termitomyces* clustered in the family Lyophyllaceae, Agaricales, Agaricomycetes (Figure 2.1). References: (Wijayawardene et al., 2020) (outline).

Tetrachaetum Ingold, Transactions of the British Mycological Society 25 (4): 380 (1942)

Index Fungorum number: IF10187

Classification: Discinellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Tetrachaetum elegans* Ingold, Transactions of the British Mycological Society 25 (4): 377 (1942)

Sexual morph: Unknown.

Sequence data: *Tetrachaetum elegans* (CBS 421.54 = MUCL 28098, ITS: MH857377)

Notes: *Tetrachaetum* was introduced by Ingold (1942) for a submerged aquatic fungi, and it has mononematous, usually unbranched, often reduced, hyaline conidiophores with solitary thallic, hyaline conidiogenous cells, and conidia that are solitary, hyaline, staurosporous, consisting of four long branches. Phylogenetic position for *Tetrachaetum* is unresolved due to lack of LSU sequence data. References: (Ingold, 1942) (morphology), (Wijayawardene et al., 2020) (outline).

Tetracladium De Wild., Annales de la Societé Belge de Microscopie 17: 39 (1893)

Index Fungorum number: IF10191

Classification: Helotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Tetracladium marchalianum* De Wild., Annales de la Societé Belge de Microscopie 17: 39 (1893)

Sexual morph: Unknown.

Sequence data: *Tetracladium marchalianum* (CCM F-26199, LSU: AY204612, ITS: AY204621, SSU: AY204614)

Notes: *Tetracladium* is characterized by having branched, hyaline conidiophores, with sympodial, denticulate, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, staurosporous, tetraradiate, consisting of axis with 2-3 tapering arms, and one or more lobes or monilioid or untapered arms (Seifert et al., 2011). Phylogenetically, representatives of *Tetracladium* were shown to be clustered in the family Discinellaceae and the clade Stamnaria lineage (Helotiales, Leotiomycetes) (Figure 2.1). References: (Roldan et al., 1989; Sati et al., 2009; Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Tetrameronycha Speg. ex W. Rossi & M. Blackw., Mycologia 82: 138 (1990)

Index Fungorum number: IF11241

Classification: Ascomycota genera *incertae sedis*

Type species: *Tetrameronycha bonaerensis* (Speg.) W. Rossi & M. Blackw., Mycologia 82: 138 (1990)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tetrameronycha* was introduced by Rossi and Blackwell (1990) to accommodate a entomogenous fungus, *Chantransiopsis bonaerensis* Spegazzini, that associate with different insect hosts. *Tetrameronycha* has 4-celled, dark basal structure, macronematous, ?sporodochial, septate, unbranched, percurrent, hyaline to brown conidiophores and solitary, simple conidia (Rossi & Blackwell, 1990).

Phylogenetic position for *Tetrameronycha* is unresolved due to lack of sequence data. References: (Rossi & Blackwell, 1990) (morphology), (Wijayawardene et al., 2020) (outline).

Thedgonia B. Sutton, Transactions of the British Mycological Society 61 (3): 426 (1973)

Index Fungorum number: IF10207

Classification: Drepanopezizaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Thedgonia ligustrina* (Boerema) B. Sutton, Transactions of the British Mycological Society 61 (3): 428 (1973)

Sexual morph: *Mycosphaerella* (Seifert et al., 2011)

Synanamorphs: Producing spermatia (Seifert et al., 2011)

Sequence data: *Thedgonia ligustrina* (CBS 547.71, LSU: MH872021, ITS: MH860259)

Notes: *Thedgonia* was established by Sutton (1973b) and is characterized by having macronematous, mononematous, caespitose, unbranched or branched, septate, sometimes reduced, hyaline conidiophores, with polyblastic, integrated, terminal, sympodial, hyaline conidiogenous cells, producing catenate, unbranched, fragmenting, 1- to multi-septate, subcylindrical to obclavate, hyaline conidia (Crous et al., 2009; Sutton, 1973b). Phylogenetically, *Thedgonia* was shown to be nested within the family Drepanopezizaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Crous et al., 2009; Sutton, 1973b) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Thelonectria P. Chaverri & C. Salgado, Studies in Mycology 68: 76 (2011)

Index Fungorum number: IF518567

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Thelonectria discophora* (Mont.) P. Chaverri & C. Salgado, Studies in Mycology 68: 76 (2011)

Sexual morph: Introduced as holomorph (Chaverri et al., 2011).

Disease symptoms: Canker, rot (Chaverri et al., 2011).

Sequence data: *Thelonectria discophora* (CBS 125153; AR 4324, LSU: HM364307, ITS: HM364294)

Notes: *Thelonectria* was introduced by Chaverri et al. (2011) with *Cylindrocarpon*-like asexual morph. References: (Chaverri et al., 2011; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Theobromium Giraldo López & Crous, Studies in Mycology 92: 256 (2018)

Index Fungorum number: IF828049

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Theobromium fuscum* Giraldo López & Crous, Studies in Mycology 92: 256 (2018)

Sexual morph: Unknown.

Sequence data: *Theobromium fuscum* (CBS 112271, LSU: LR025976, ITS: LR026839)

Notes: *Theobromium* was introduced by Giraldo and Crous (2019) and is characterized by mononematous, unbranched or poorly branched, sympodial, hyaline conidiophores, mono- and polyphialidic, subulate, hyaline conidiogenous cells, and producing aseptate, slimy mass, cylindrical or ellipsoidal, hyaline conidia. References: (Giraldo & Crous, 2019) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Thermothielavioides X. Wei Wang & Houbraken, Studies in Mycology 93: 223 (2019)

Index Fungorum number: IF829879

Classification: Chaetomiaceae, Sordariales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Thermothielavioides terrestris* (Apinis) X. Wei Wang & Houbraken, Studies in Mycology 93: 223 (2019)

Sexual morph: Introduced as holomorphic genus with hyphomycetous asexual morph (Wang et al., 2019b).

Sequence data: *Thermothielavioides terrestris* (CBS 117535 = CBS 355.66, LSU: MK926837, ITS: NR_165593)

Notes: *Thermothielavioides* was introduced by Wang et al. (2019b) to accommodate thermorphilic fungus *T. terrestris*. Its asexual morph has phialidic, hyaline conidiogenous cells and produces catenate, aseptate, smooth-walled, obovoid to clavate, hyaline conidia (Wang et al., 2019b). References: (Wang et al., 2019b) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Thozetella Kuntze, Revisio generum plantarum 2: 873 (1891)

Index Fungorum number: IF10214

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Thozetella nivea* (Berk.) Kuntze, Revisio generum plantarum 2: 873 (1891)

Sexual morph: Unknown.

Sequence data: *Thozetella fabacearum* (MFLU 16-1021, LSU: KY212762, ITS: KY212754)

Notes: *Thozetella* is characterized by conidiomata are sporodochial or synnematous, setae are none or unbranched, brown, conidiophores are macronematous, unbranched or branched, hyaline or brown, conidiogenous cells are phialidic, hyaline or brown, conidia are aseptate, in slimy mass, falcate, hyaline with setulae at each end (Seifert et al., 2011). References: (Jeewon et al., 2009; Lin et al., 2019b; Perera et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Thysanorea Arzanlou, W. Gams & Crous, Studies in Mycology 58: 80 (2007)

Index Fungorum number: IF504555

Classification: Herpotrichiellaceae, Chaetothyriales, Chaetothyriomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Thysanorea papuana* (Aptroot) Arzanlou, W. Gams & Crous, Studies in Mycology 58: 80 (2007)

Sexual morph: Unknown.

Sequence data: *Thysanorea papuana* (CBS 212.96, LSU: NG_057787, ITS: NR_111276)

Notes: *Thysanorea* is characterized by having dimorphic conidiophores and more or less prominent denticle-like conidiogenous loci (Arzanlou et al., 2007). Hernández-Restrepo et al. (2020) emended this genus and two new species and nine combinations are proposed. Presently, there are 14 species accepted within this genus. References: (Arzanlou et al., 2007; Hernández-Restrepo et al., 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Ticogloea G. Weber, Spaaij & W. Gams, Mycological Research 98 (6): 663 (1994)

Index Fungorum number: IF27280

Classification: Ascomycota genera *incertae sedis*

Type species: *Ticogloea guttulata* G. Weber, Spaaij & W. Gams, Mycological Research 98 (6): 663 (1994)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ticogloea* was introduced by Weber et al. (1994) and it has micronematous, mononematous, branched, septate, subhyaline conidiophores, with monoblastic or polyblastic, hyaline conidiogenous cells, and produces aseptate, hyaline becoming dark-brown to blackish conidia aggregated in slimy mass. Phylogenetic position for *Ticogloea* is unresolved due to lack of sequence data. References: (Weber et al., 1994) (morphology), (Wijayawardene et al., 2020) (outline).

Tilachlidium Preuss, Linnaea 24: 126 (1851)

Index Fungorum number: IF10236

Classification: Tilachlidiaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Tilachlidium pinnatum* Preuss, Linnaea 24: 127 (1851)

Sexual morph: Unknown.

Sequence data: *Tilachlidium brachiatum* (CBS 505.67, LSU: KM231720, ITS: KM231839)

Notes: *Tilachlidium* is characterized by synnematous, simple or branched conidiomata, branched or penicillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, in slimy mass, smooth, oblong to ellipsoidal, hyaline conidia (Lombard et al., 2015). Lombard et al. (2015) introduced the family Tilachlidiaceae and placed this genus in this family. References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Tilletiopsis Derx, Bulletin du Jardin Botanique de Buitenzorg 17: 471 (1948)

Index Fungorum number: IF10237

Classification: Entylomataceae, Entylomatales, Exobasidiomycetes, Ustilaginomycotina, Basidiomycota

Type species: *Tilletiopsis washingtonensis* Nyland, Mycologia 42: 488 (1950)

Sexual morph: *Entyloma*, *Exobasidium*, *Melanotaenium* (Seifert et al., 2011).

Synanamorphs: Producing chlamydospores (Seifert et al., 2011).

Sequence data: *Tilletiopsis washingtonensis* (CBS 544.50, LSU: AJ235278, ITS: DQ835994, SSU: KP322976)

Notes: *Tilletiopsis* yeast-like fungus with ballistoconidia and is characterized by having reduced, branched or unbranched, hyaline conidiophores, sympodial, denticulate, hyaline conidiogenous cells, solitary, aseptate, forcibly discharged, yeast-like, hyaline conidia (Seifert et al., 2011). Phylogenetically, representatives of *Tilletiopsis* clustered in the family Entylomataceae (Entylomatales, Exobasidiomycetes) (Figure 2.1). References: (Wang et al., 2015b) (morphology and phylogeny), (He et al., 2019) (outline).

Titaea Sacc., Nuovo Giornale Botanico Italiano 8 (2): 193 (1876)

Index Fungorum number: IF10238

Classification: Ascomycota genera *incertae sedis*

Type species: *Titaea callispora* Sacc., Nuovo Giornale Botanico Italiano 8 (2): 193 (1876)

Sexual morph: *Paranectriella*, *Puttemansia* (Seifert et al., 2011)

Sequence data: ?*Titaea* sp. (PDD 112249, LSU: MK426984, ITS: MK426991)

Notes: *Titaea* is characterized by having mononematous, branched, hyaline conidiophores, with monoblastic to polyblastic, sympodial, hyaline conidiogenous cells, producing solitary, hyaline, staurosporous conidia that consist of 1-2-celled axis with 2-5 asymmetrical tapering arms (Seifert et al., 2011). A specimen PDD 112249, identified as *Titaea* sp., phylogenetically was shown to be located within the order Pleosporales (Pleosporomycetidae, Dothideomycetes) (Figure 2.1). Reliable sequence data is needed for this genus to resolve its phylogenetic position in the future. References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Titaeella G. Arnaud ex K. Ando & Tubaki, Trans. Mycol. Soc. Japan: 155 (1985)

Index Fungorum number: IF20611

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Titaeella capnophila* G. Arnaud ex K. Ando & Tubaki, Trans. Mycol. Soc. Japan: 155 (1985)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: One species is accepted in this genus. Phylogenetic position for *Titaeella* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Titaeopsis B. Sutton & Deighton, Transactions of the British Mycological Society 83 (3): 409 (1984)

Index Fungorum number: IF11206

Classification: Ascomycota genera *incertae sedis*

Type species: *Titaeopsis ugandae* (Hansf.) B. Sutton & Deighton, Transactions of the British Mycological Society 83 (3): 411 (1984)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Titaeopsis* was introduced by Sutton (1984) and it has mononematous, solitary or fasciculate, repeatedly branched, sinuous or irregular, septate conidiophores, with monoblastic or polyblastic, sympodial, integrated, terminal or intercalary, often geniculate, denticulate, hyaline conidiogenous cells, and produces conidia that are solitary, hyaline, staurosporous, consisting of a 2-celled axis with 1-3 lateral conic or biconic cells. Phylogenetic position for *Titaeopsis* is unresolved due to lack of sequence data. References: (Sutton, 1984) (morphology), (Wijayawardene et al., 2020) (outline).

Togniniella Réblová, L. Mostert, W. Gams & Crous, Studies in Mycology 50 (2): 543 (2004)

= *Phaeocrella* Réblová, L. Mostert, W. Gams & Crous, Studies in Mycology 50 (2): 545 (2004)

Index Fungorum number: IF500157

Classification: Calosphaeriaceae, Calosphaeriales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Togniniella acerosa* Réblová, L. Mostert, W. Gams & Crous, Studies in Mycology 50 (2): 545 (2004)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Phaeocrella* (Réblová et al., 2004).

Sequence data: *Togniniella acerosa* (CBS 113726, LSU: NG_057734, ITS: NR_135947, SSU: NG_061029)

Notes: Réblová et al. (2004) introduced the sexual morph genus *Togniniella* and along with its hyphomycetous asexual morph *Phaeocrella*. Réblová

et al. (2016a) proposed using *Togniniella* rather than *Phaeocrella*. Its asexual morph has macronematous or micronematous, mononematous, simple or regularly branched, septate, constricted at the septa, pale brown conidiophores, phialidic, subhyaline conidiogenous cells with flaring collarette, produces aseptate, in slimy mass, obovoid, oblong–ellipsoid or reniform, hyaline conidia (Réblová et al., 2004). Phylogenetically, *Togniniella* located in the family Calosphaeriaceae (Figure 2.1). References: (Réblová et al., 2004) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Tompetchia Subram., Kavaka 12 (2): 66 (1985)

Index Fungorum number: IF11210

Classification: Ascomycota genera *incertae sedis*

Type species: *Tompetchia webberi* (H.S. Fawc.) Subram., Kavaka 12 (2): 66 (1985)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tompetchia* was introduced by Subramanian (1984) for a fungus collected on scale insects, and it has plectenchymatous, brown stroma, scattered, sometimes reduced conidiophores, and produces conidia that are hyaline to brown, appendaged or setose, irregular in shape, consisting of aggregations of inflated, catenate cells. Phylogenetic position for *Tompetchia* is unresolved due to lack of sequence data. References: (Subramanian, 1984) (morphology), (Wijayawardene et al., 2020) (outline).

Torulomyces Delitsch, Ergebnisse der theoretischen und angewandten Mikrobiologie: Band I: Systematik der Schimmelpilze: 91 (1943)

Index Fungorum number: IF10252

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Torulomyces lagena* Delitsch, Ergebnisse der theoretischen und angewandten Mikrobiologie: Band I: Systematik der Schimmelpilze: 91 (1943)

Sexual morph: *Eupenicillium* (Seifert et al., 2011).

Sequence data: *Torulomyces lagena* (CBS 185.65 = MUCL 8221, LSU: MH870173, ITS: MH858536)

Notes: *Torulomyces* was synonymized under *Penicillium* (Houbraken & Samson, 2011).

Toshionella C. Mayers & T.C. Harr., Persoonia 44: 53 (2019)

Index Fungorum number: IF824934

Classification: Ceratocystidaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Toshionella nipponensis* C. Mayers, T.C. Harr. & H. Masuya, Persoonia 44: 54 (2019)

Sexual morph: Unknown.

Sequence data: *Toshionella nipponensis* (CBS 141492 = C3904, LSU: NG_069532, ITS: NR_165508, SSU: NG_067647)

Notes: *Toshionella* was introduced by Mayers et al. (2020a) and is characterized by mononematous, hyaline to brown or reduced conidiophores, thallic-arthric, hyaline to brown conidiogenous cells, producing solitary or catenate, terminal, globose, hyaline to brown aleurioconidia. References: (Mayers et al., 2020a) (morphology and phylogeny).

Tremellina Bandoni, Windahlia 16: 53 (1986)

Index Fungorum number: IF25079

Classification: Tremellales genera *incertae sedis*, Tremellomycetes, Agaricomycotina, Basidiomycota

Type species: *Tremellina pyrenophila* Bandoni, Windahlia 16: 54 (1986)

Sexual morph: *Cuniculitrema* (Seifert et al., 2011).

Synanamorphs: yeast-like (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: One species is accepted in this genus. Phylogenetic position for *Tremellina* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Tretendophragmia Subram., Kavaka 20/21: 58 (1995)

Index Fungorum number: IF11540

Classification: Ascomycota genera *incertae sedis*

Type species: *Tretendophragmia palmivora* Subram., Kavaka 20/21: 61 (1995)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011)

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tretendophragmia* was validated by Subramanian (1992/1993) and one species is accepted. Phylogenetic position for *Tretendophragmia* is unresolved due to lack of sequence data. References: (Subramanian, 1992/1993) (morphology), (Wijayawardene et al., 2020) (outline).

Tretovularia Deighton, Transactions of the British Mycological Society 82 (4): 743 (1984)

Index Fungorum number: IF11211

Classification: Ascomycota genera *incertae sedis*

Type species: *Tretovularia villiana* (Magnus) Deighton, Transactions of the British Mycological Society 82 (4): 743 (1984)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tretovularia* was introduced by Deighton (1984) macronematous, synnematous or sporodochial, fasciculate conidiophores, with polytretic, integrated, sympodial, hyaline conidiogenous cells, and produces aseptate, subglobose, hyaline conidia. It is similar to *Ramularia*, but differs by having polytretic conidiogenous cells. Phylogenetic position for *Tretovularia* is unresolved due to lack of sequence data. References: (Deighton, 1984) (morphology), (Wijayawardene et al., 2020) (outline).

Triacutus G.L. Barron & Tzean, Canadian Journal of Botany 59 (7): 1207 (1981)

Index Fungorum number: IF10269

Classification: Ascomycota genera *incertae sedis*

Type species: *Triacutus subcuticularis* G.L. Barron & Tzean, Canadian Journal of Botany 59 (7): 1207 (1981)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Triacutus* was established by Barron and Tzean (1981) for a fungus collected from infected rotifer, and it has reduced conidiophores, with monoblastic or polyblastic, hyaline conidiogenous cells, produces solitary, hyaline, aseptate, staurosporous conidia. Phylogenetic position for *Triacutus* is unresolved due to lack of sequence data. References: (Barron & Tzean, 1981) (morphology), (Wijayawardene et al., 2020) (outline).

Tricellula Beverw., Antonie van Leeuwenhoek 20: 15 (1954)

Index Fungorum number: IF10272

Classification: Calloriaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Tricellula inaequalis* Beverw., Antonie van Leeuwenhoek 20: 15 (1954)

Sexual morph: *Orbilia* (Seifert et al., 2011)

Synanamorphs: *Spermospora* (Seifert et al., 2011)

Sequence data: *Tricellula inaequalis* (CBS 359.53 = IFO 6805 = IMI 051976 = MUCL 28103 = PRL 1563, LSU: MH868778, ITS: MH857245)

Notes: *Tricellula* was introduced by Van Beverwijk (1954) and is characterized by having mononematous, branched, hyaline conidiophores, with polyblastic, sympodial, hyaline conidiogenous cells, producing conidia that are hyaline, staurosporous, with 2-4 arms, arms are connected by narrow constrictions (Seifert et al., 2011; Van Beverwijk, 1954). Phylogenetically, *Tricellula* was shown to be nested within the family Calloriaceae (Helotiales Leotiomycetes) (Figure 2.1). We suggest putting this genus in Calloriaceae (Helotiales Leotiomycetes). References: (Crous et al., 2021c; Seifert et al., 2011; Van Beverwijk, 1954) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Trichoconis Clem., The genera of Fungi: 145, 176 (1909)

Index Fungorum number: IF10280

Classification: Ascomycota genera *incertae sedis*

Type species: *Trichoconis caudata* (Appel & Strunk) Clem., The genera of Fungi: 176 (1909)

Sexual morph: Unknown.

Synanamorphs: *Acremoniula*, humicola-like (Seifert et al., 2011)

Sequence data: *Trichoconis echinophila* (CBS 214.72, LSU: MH877732)

Notes: *Trichoconis* is characterized by having mononematous, unbranched or branched, hyaline conidiophores, with monoblastic or polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing solitary, septate, hyaline conidia (Seifert et al., 2011). Previous studies placed this genus in Ascomycota genera *incertae sedis* (Wijayawardene et al., 2017a, 2020). *Trichoconis echinophila* was included in our phylogenetic analysis and shown to be nested within the family Arachnopezizaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Trichoderma Pers., Neues Magazin für die Botanik 1: 92 (1794)

Index Fungorum number: IF10282

Classification: Hypocreaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Trichoderma viride* Pers., Neues Magazin für die Botanik 1: 92 (1794)

Sexual morph: *Hypocrea*, *Podostroma*, *Sarawakus* (Seifert et al., 2011).

Synanamorphs: producing chlamydospores (Seifert et al., 2011).

Sequence data: *Trichoderma virens* (CBS 109339, LSU: MH874417, ITS: MH862822)

Notes: *Trichoderma* was introduced by Persoon (1794) and is characterized by mononematous, trichodermoid branched, hyaline conidiophores, phialidic, hyaline conidiogenous cells, aseptate, in slimy mass, green or hyaline conidia (Seifert et al., 2011). References: (Bissett et al., 2015; Cai & Druzhinina, 2021; Jaklitsch & Voglmayr, 2015; Jaklitsch et al., 2006, 2013b; Overton et al., 2006;

Qiao et al., 2018; Roehrich et al., 2014; Samuels et al., 2006a, 2006b, 2012; Seifert et al., 2011; Zhu & Zhuang, 2015; Zhu et al., 2017) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Trichomatosphaera Pereira-Carvalho, G.F. Sepúlveda & Dianese, Mycological Research 113 (2): 268 (2009)

Index Fungorum number: IF512553

Classification: Ascomycota genera *incertae sedis*

Type species: *Trichomatosphaera cerradensis* Pereira-Carvalho, G.F. Sepúlveda & Dianese, Mycological Research 113 (2): 268 (2009)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Trichomatosphaera* was introduced by Pereira-Carvalho et al. (2009) and it has globoid, brown to dark brown microsclerotia, macronematous, mononematous, 1-septate, hyaline conidiophores, with polyblastic, integrated, terminal, sympodial, hyaline conidiogenous cells, and produces aseptate or 1-septate, cylindrical to fusoid, hyaline conidia. Phylogenetic position for *Trichomatosphaera* is unresolved due to lack of sequence data. References: (Pereira-Carvalho et al., 2009) (morphology), (Wijayawardene et al., 2020) (outline).

Trichophaea Boud., Bulletin de la Société Mycologique de France 1: 105 (1885)

= *Dichobotrys* Hennebert, Persoonia 7 (2): 193 (1973)

Index Fungorum number: IF5574

Classification: Pyronemataceae, Pezizales, Pezizomycetes, Pezizomycotina, Ascomycota

Type species: *Trichophaea woolhopeia* (Cooke & W. Phillips) Boud., Bulletin de la Société Mycologique de France 1: 105 (1885)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Dichobotrys* (Healy et al., 2016).

Sequence data: *Trichophaea minuta* (CBS 236.57, LSU: MH869247, ITS: MH857707)

Notes: *Dichobotrys* was introduced by Hennebert (1973) and its sexual morph was reported in the genus *Trichophaea* (Healy et al., 2016). Healy et al. (2016) proposed to protect *Trichophaea* over *Dichobotrys*. Phylogenetically, *Trichophaea* was shown to be nested within the family Pyronemataceae (Pezizales, Pezizomycetes) (Figure 2.1). References: (Hennebert, 1973) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Trichophyton Malmsten: 14 (1848)

Index Fungorum number: IF10292

Classification: Arthrodermataceae, Onygenales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Trichophyton tonsurans* Malmsten, Arch. Anat. Physiol. Wiss. Med.: 19 (1848)

Sexual morph: *Arthroderma* (de Hoog et al., 2017; Seifert et al., 2011).

Synanamorphs: chrysosporium-like, arthroconidia, chlamydospores (Seifert et al., 2011).

Disease symptoms: Some species are dermatophytes that infect skin of mammals (Cmokova et al., 2020; de Hoog et al., 2017; Gräser et al., 1998; Gumowski et al., 1987; Zhan et al., 2018).

Sequence data: *Trichophyton tonsurans* (CBS 496.48, LSU: NG_069524, ITS: NR_144891)

Notes: *Trichophyton* is characterized by reduced, hyaline conidiophores, thallic, hyaline conidiogenous cells, septate, thin- and smooth-walled, cylindrical, or clavate to cigar-shaped, hyaline macroconidia, aseptate, thin- and smooth-walled, ovoidal, pyriform to clavate, hyaline microconidia (de Hoog et al., 2017). References: (Cmokova et al., 2020; de Hoog et al., 2017) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Trichosporiella Kamyschko, Bot. Mater. Otd. Sporov. Rast.: 166 (1960)

Index Fungorum number: IF10295

Classification: Helotiales genera *incertae sedis*, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Trichosporiella cerebriformis* (G.A. de Vries & Kleine-Natrop) W. Gams, Persoonia 6 (2): 184 (1971) (= *Trichosporiella hyalina* Kamyschko ex W. Gams & Domsch, Nova Hedwigia 18: 19 (1969))

Sexual morph: *Diplogelasinospora*, *Eremomyces*, *Rhexothecium*, *Thielavia* (Seifert et al., 2011).

Synanamorphs: *Arthrographis*, *Blastobotrys* (Seifert et al., 2011).

Sequence data: *Trichosporiella cerebriformis* (this strain before known as *Trichosporiella hyalina*) (CBS 135.68, LSU: MH870802, ITS: MH859089)

Notes: *Trichosporiella* is characterized by having micronematous, reduced conidiophores, with monoblastic, intercalary, denticulate, hyaline conidiogenous cells, producing solitary, aseptate, globose, subglobose, hyaline conidia (Seifert et al., 2011). Phylogenetically, ex-type strain of *Trichosporiella hyalina* (now known as *Trichosporiella cerebriformis*) clustered in the order Helotiales (Leotiomycetes) but unknown familial placement (Figure 2.1). Thus, we suggest placing this genus under Helotiales genera *incertae sedis*. References: (Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Trichotheca P. Karst., Meddelanden af Societas pro Fauna et Flora Fennica 14: 101 (1887)

Index Fungorum number: IF10301

Classification: Ascomycota genera *incertae sedis*

Type species: *Trichotheca alba* P. Karst., Meddelanden af Societas pro Fauna et Flora Fennica 14: 101 (1887)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Trichotheca* was established by Karsten (1887) and it has sporodochial conidiomata, stromatic, branched, hyaline conidiophores, with polyblastic, sympodial, hyaline conidiogenous cells, and produces catenate, septate, ellipsoidal, hyaline conidia. Phylogenetic position for *Trichotheca* is unresolved due to lack of sequence data. References: (Karsten, 1887) (morphology), (Wijayawardene et al., 2020) (outline).

Trichothecium Link, Neues Journal für die Botanik 3 (1-2): 18 (1809)

Index Fungorum number: IF10303

Classification: Myrotheciomycetaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Trichothecium roseum* (Pers.) Link, Magazin der Gesellschaft Naturforschenden Freunde Berlin 3 (1): 18, t. 1:27 (1809)

Sexual morph: Unknown.

Sequence data: *Trichothecium crotocinigenum* (CBS 129.64, LSU: MH870018, ITS: MH858389)

Notes: *Trichothecium* was introduced by Link (1809a) and is characterized by mononematous, unbranched or sparingly branched, hyaline conidiophores, retrogressive, hyaline conidiogenous cells and aseptate or septate, obovate, oblong, cylindrical, ellipsoidal, hyaline conidia (Summerbell et al., 2011). References: (Kendrick & Cole, 1969; Link, 1809a; Summerbell et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Tricladiella K. Ando & Tubaki, Transactions of the Mycological Society of Japan 25: 41 (1984)

Index Fungorum number: IF11212

Classification: Ascomycota genera *incertae sedis*

Type species: *Tricladiella pluvialis* K. Ando & Tubaki, Transactions of the Mycological Society of Japan 25: 41 (1984)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: One species is accepted in this genus. Phylogenetic position for *Tricladiella* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Tricladiomyces Nawawi, Botanical Journal of the Linnean Society 91 (1-2): 58 (1985)

Index Fungorum number: IF25738

Classification: Agaricomycetes genera *incertae sedis*, Agaricomycotina, Basidiomycota

Type species: *Tricladiomyces malaysianus* (Nawawi) Nawawi, Botanical Journal of the Linnean Society 91 (1-2): 58 (1985)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tricladiomyces* was introduced by Nawawi (1985b) and it has micronematous, mononematous, unbranched, hyaline conidiophores, produces solitary, hyaline, branched, staurosporous, consisting of principal axis elongate with 2-4 lateral branches. Phylogenetic position for *Tricladiomyces* is unresolved due to lack of sequence data. References: (Nawawi, 1985b) (morphology), (Wijayawardene et al., 2020) (outline).

Tricladiopsis Descals, Transactions of the British Mycological Society 78 (3): 417 (1982)

Index Fungorum number: IF10305

Classification: Ascomycota genera *incertae sedis*

Type species: *Tricladiopsis foliosa* Descals, Transactions of the British Mycological Society 78 (3): 418 (1982)

Sexual morph: *Coccomyces* (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tricladiopsis* was established by Descals and Webster (1982) and it has macronematous, mononematous, unbranched or sparsely branched, brown conidiophores, with monoblastic, integrated, terminal, scared or denticulate, sympodial conidiogenous cells, produces conidia that are solitary, multi-septate, hyaline, staurosporous, consisting of a elongate main body with lateral branches. Phylogenetic position for *Tricladiopsis* is unresolved due to lack of sequence data. References: (Descals & Webster, 1982) (morphology), (Wijayawardene et al., 2020) (outline).

Tricladium Ingold, Transactions of the British Mycological Society 25 (4): 388 (1942)

Index Fungorum number: IF10306

Classification: Tricladiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Tricladium splendens* Ingold, Transactions of the British Mycological Society 25 (4): 385 (1942)

Sexual morph: *Cudoniella*, *Hydrocina*, *Hymenoscyphus* (Seifert et al., 2011).

Synanamorphs: phialophora-like or penicillium-like (Seifert et al., 2011).

Sequence data: *Tricladium splendens* (CBS 234.46 = MUCL 28105, LSU: MH867695, ITS: MH856171)

Notes: *Tricladium* was established by Ingold (1942) and is characterized by having mononematous, unbranched or branched, hyaline conidiophores, with thallic or monoblastic, percurrent or sympodial, hyaline conidiogenous cells, producing conidia that are solitary, septate, hyaline, stautosporous, consisting of an elongated main axis with 2 to several lateral arms (Ingold, 1942; Seifert et al., 2011). Johnston and Baschien (2020) introduced the family Tricladiaceae and accepted *Tricladium* within this family. Phylogenetically, *Tricladium* was shown to be nested within the family Tricladiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Gulis et al., 2012; Ingold, 1942; Marvanová & Bandoni, 1985; Sati & Tiwari, 1992; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Tricornispora Bonar, Mycologia 59: 597 (1967)

Index Fungorum number: IF10307

Classification: Ascomycota genera *incertae sedis*

Type species: *Tricornispora bambusae* Bonar, Mycologia 59: 597 (1967)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tricornispora* was established by Bonar (1967) and it has sporodochial conidiomata, stromatic, unbranched, hyaline conidiophores, with monoblastic or polyblastic, sympodial, denticulate, hyaline conidiogenous cells, and produces solitary, hyaline, septate, staurosporous conidia. Phylogenetic position for

Tricornispora is unresolved due to lack of sequence data. References: (Bonar, 1967) (morphology), (Wijayawardene et al., 2020) (outline).

Trifurcospora K. Ando & Tubaki, Transactions of the Mycological Society of Japan 28: 471 (1988)

Index Fungorum number: IF11213

Classification: Ascomycota genera *incertae sedis*

Type species: *Trifurcospora irregularis* (Matsush.) K. Ando & Tubaki, Transactions of the Mycological Society of Japan 28: 471 (1988)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Trifurcospora* was introduced by Ando et al. (1987) and two species are accepted. Phylogenetic position for *Trifurcospora* is unresolved due to lack of sequence data. References: (Ando et al., 1987) (morphology), (Wijayawardene et al., 2020) (outline).

Tripoconidium Subram., Kavaka 5: 95 (1978)

Index Fungorum number: IF10315

Classification: Ascomycota genera *incertae sedis*

Type species: *Tripoconidium aphanophagum* (Drechsler) Subram., Kavaka 5: 95 (1978)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tripoconidium* was introduced by Subramanian (1977) and it has mononematous, septate, unbranched or branched, hyaline conidiophores, with monoblastic, hyaline conidiogenous cells, produces solitary, septate, hyaline, staurosporous conidia. Phylogenetic position for *Tripoconidium* is unresolved due to lack of sequence data. References: (Subramanian, 1977) (morphology), (Wijayawardene et al., 2020) (outline).

Triposporina Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 121: 410 (1912)

Index Fungorum number: IF10317

Classification: Ascomycota genera *incertae sedis*

Type species: *Triposporina uredinicola* Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I 121: 411 (1912)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Triposporina* was introduced by Höhnel (1912) and two species are accepted. Phylogenetic position for *Triposporina* is unresolved due to lack of sequence data. References: (Höhnel, 1912) (morphology), (Wijayawardene et al., 2020) (outline).

Triscelophorus Ingold, Transactions of the British Mycological Society 26 (3-4): 151 (1943)

Index Fungorum number: IF10320

Classification: Ascomycota genera *incertae sedis*

Type species: *Triscelophorus monosporus* Ingold, Transactions of the British Mycological Society 26 (3-4): 148 (1943)

Sexual morph: Unknown.

Sequence data: ?*Triscelophorus monosporus* (CBS 440.54, LSU: MH868925)

Notes: This genus was described by Ingold (1943b) for an aquatic fungus. *Triscelophorus* is characterized by having mononematous, unbranched or branched, septate, hyaline conidiophores, with monoblastic or polyblastic, sympodial, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, tetraradiate, staurosporous, consisting of tapered septate, elongated main axis with three tapered radiating arms from the lower part of the main axis (Ingold, 1943b; Seifert et al., 2011). Phylogenetically, *T. monosporus* (CBS 440.54), ex-type of *T. anakonajensis*, and ex-type of *T. guizhouensis* clustered in the family Microthyriaceae (Microthyriales, Dothideomycetes) (Figure 2.1). This genus maybe can be assigned to Microthyriaceae (Microthyriales, Dothideomycetes). References: (Ingold, 1943b;

Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Tristratiperidium Daranag., Camporesi & K.D. Hyde, Mycological Progress 15 (1/8): 4 (2015)

Index Fungorum number: IF551386

Classification: Cylindriaceae, Amphisphaeriales, Sordariomycetes, Ascomycota

Type species: *Tristratiperidium microsporum* Daranag., Camporesi & K.D.Hyde, Mycological Progress 15 (1/8): 4 (2015)

Sexual morph: Introduced as holomorph.

Sequence data: Sequence data for ex-type culture of type species is available. ITS: KT696538, LSU: KT696539 (MFLUCC 15-0413).

Notes: *Tristratiperidium* was introduced by Daranagama et al. (2016) for a holomorph species collected on dead leaves of *Arundo plinii* L (*Poaceae*) from Italy. The asexual morph of this genus has macronematous, unbranched, brown conidiophores, terminal, phialidic, percurrent conidiogenous cells and hyaline, fusiform, gutullate conidia bearing two back-curved, short, polar setulae (Daranagama et al., 2016). In the phylogenetic tree (Figure 2.1), this genus clades within the genus *Cylindrium* in *Cylindriaceae*, however, their morphologies are conflict with each other. Crous et al. (2018b) showed the sequence data of *Tristratiperidium* should be reconsidered. References: (Daranagama et al., 2016) (morphology and phylogeny), (Crous et al., 2018b) (Discussion).

Trisulcosporium H.J. Huds. & B. Sutton, Transactions of the British Mycological Society 47 (2): 200 (1964)

Index Fungorum number: IF10321

Classification: Ascomycota genera *incertae sedis*

Type species: *Trisulcosporium acerinum* H.J. Huds. & B. Sutton, Transactions of the British Mycological Society 47 (2): 200 (1964)

Sexual morph: Unknown

Sequence data: Sequence data is unavailable for this genus.

Notes: *Trisulcosporium* was introduced by Hudson and Sutton (1964) and it has mononematous, reduced conidiophores, with monoblastic, intercalary, integrated, hyaline conidiogenous cells, and produces solitary, hyaline, septate, staurosporous, consisting of a main axis with 2-3 branches. Phylogenetic position for *Trisulcosporium* is unresolved due to lack of sequence data. References: (Hudson & Sutton, 1964) (morphology), (Wijayawardene et al., 2020) (outline).

Tritirachium Limber, Mycologia 32: 26 (1940)

Index Fungorum number: IF10322

Classification: Tritirachiaceae, Tritirachiales, Tritirachiomycetes, Pucciniomycotina, Basidiomycota

Type species: *Tritirachium dependens* Limber, Mycologia 32: 26 (1940)

Sexual morph: *Cephalotheca*, *Neorehmia* (Seifert et al., 2011)

Sequence data: *Tritirachium cinnamomeum* (CBS 182.42, LSU: MH867611, ITS: MH856112, SSU: NG_064977)

Notes: This genus was described by Limber (1940) is characterized by conidiophores are mononematous, erect or recumbent, septate, verticillate, apical branches tapering to the rachis-like or zigzag conidia-bearing portion, with polyblastic, sympodial, hyaline conidiogenous cells, producing solitary, aseptate, globose to ovate, hyaline conidia. Phylogenetically, representatives of *Tritirachium* clustered in the family Tritirachiaceae (Tritirachiales, Tritirachiomycetes) (Figure 2.1). References: (Limber, 1940) (morphology), (He et al., 2019) (outline).

Troposporium Harkn., Bulletin of the California Academy of Sciences 1: 39 (1884)

Index Fungorum number: IF10326

Classification: Ascomycota genera *incertae sedis*

Type species: *Troposporium album* Harkn., Bulletin of the California Academy of Sciences 1: 39 (1884)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: One species is accepted in this genus. Phylogenetic position for *Troposporium* is unresolved due to lack of sequence data. References: (Wijayawardene et al., 2020) (outline).

Tuberculispora Deighton & Piroz., Mycological Papers 128: 92 (1972)

Index Fungorum number: IF10337

Classification: Ascomycota genera *incertae sedis*

Type species: *Tuberculispora jamaicensis* Deighton & Piroz., Mycological Papers 128: 92 (1972)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tuberculispora* was introduced by Deighton and Pirozynski (1972) and it has mononematous, unbranched, sometimes reduced, hyaline conidiophores, with polyblastic, sympodial, hyaline conidiogenous cells, and produces conidia that are solitary, aseptate, hyaline, staurosporous, subglobose, covered with large conoid warts. Phylogenetic position for *Tuberculispora* is unresolved due to lack of sequence data. References: (Deighton & Pirozynski, 1972) (morphology), (Wijayawardene et al., 2020) (outline).

Tulipispora Révay & Gönczöl, Nova Hedwigia 88 (1-2): 42 (2009)

Index Fungorum number: IF537065

Classification: Sordariomycetes genera *incertae sedis*, Pezizomycotina, Ascomycota

Type species: *Tulipispora ingoldii* Révay & Gönczöl, Nova Hedwigia 88 (1-2): 41-48 (2009)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tulipispora* was established by Révay et al. (2009) and it has semi-macronematous, mononematous, unbranched, septate, hyaline conidiophores, with polyblastic, integrated, terminal, sympodial conidiogenous cells, and produces conidia that are solitary, staurosporous, consisting of elongate main axis and subverticillate branches. Phylogenetic position for *Tulipispora* is unresolved due to lack of sequence

data. References: (Révay et al., 2009) (morphology), (Wijayawardene et al., 2020) (outline).

Tumenectria C. Salgado & Rossman, Fungal Diversity 80: 451 (2016)

Index Fungorum number: IF816463

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Tumenectria laetidisca* (Rossman) C. Salgado & Rossman, Fungal Diversity 80: 451 (2016)

Sexual morph: Introduced as holomorph (Salgado-Salazar et al., 2016).

Sequence data: *Tumenectria laetidisca* (CBS 101909, LSU: KJ022067, ITS: KJ022018, SSU: KJ022102)

Notes: The asexual morph of *Tumenectria* is cylindrocarpon-like. References: (Salgado-Salazar et al., 2016) (morphology and phylogeny).

Tumularia Descals & Marvanová, Transactions of the British Mycological Society 89 (4): 506 (1987)

Index Fungorum number: IF11216

Classification: Melanommataceae, Pleosporales, Pleosporomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Tumularia tuberculata* (Gönczöl) Descals & Marvanová, Transactions of the British Mycological Society 89 (4): 506 (1987)

Sexual morph: Massarina

Sequence data: *Tumularia aquatica* (CBS 212.46 = MUCL 28096, LSU: MH867689, ITS: MH856165)

Notes: *Tumularia* was established by Marvanová and Descals (1987) and is characterized by having semi-macronematous, mononematous, unbranched or sparsely branched, sometimes reduced, hyaline conidiophores, with integrated, terminal, percurrent or sympodial conidiogenous cells, producing solitary, 1- to multi-septate, fusoid to clavate, hyaline to fuscous conidia. Phylogenetically, *Tumularia* was shown to be nested within the family Melanommataceae (Pleosporales, Pleosporomycetidae, Dothideomycetes) (Figure 2.1). References: (Marvanová &

Descals, 1987) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Tylophoron Nyl. ex Stizenb., Berichte Tät. St. Gall. Naturw. Ges.: 117 (1862)

= *Blarneya* D. Hawksw., Coppins & P. James, Botanical Journal of the Linnean Society 79: 358 (1980)

Index Fungorum number: IF5647

Classification: Arthoniaceae, Arthoniales, Arthoniomycetes, Pezizomycotina, Ascomycota

Type species: *Tylophoron protrudens* Nyl., Botanische Zeitung 20: 279 (1862)

Sexual morph: Sexual morphic genus and the hyphomycetous genus *Blarneya* was synonymized under this genus (Damien et al., 2011).

Sequence data: *Tylophoron galapagoense* (CDS 37153; Ertz 11794 (BR), LSU: JF295080); *Tylophoron hibernicum* (UPS Frisch 11/Ug220, LSU: KJ851065)

Notes: *Blarneya* was established by Hawksworth et al. (1979) and is characterized by having sporodochial conidiomata, semi-macronematous, unbranched or irregularly branched, hyaline conidiophores, with integrated, terminal and intercalary conidiogenous cells, producing catenate, aseptate or 1-septate, bacilliform, hyaline conidia. However, *Blarneya* was synonymized under *Tylophoron* by Damien et al. (2011) based on morphological, anatomical, chemical, ecological and molecular evidence. Phylogenetically, *Tylophoron* was shown to be nested within the family Arthoniaceae (Arthoniales, Arthoniomycetes) (Figure 2.1). References: (Diederich et al., 2012) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Tympanosporium W. Gams, Antonie van Leeuwenhoek 40 (3): 478 (1974)

Index Fungorum number: IF10343

Classification: Ascomycota genera *incertae sedis*

Type species: *Tympanosporium parasiticum* W. Gams, Antonie van Leeuwenhoek 40 (3): 478 (1974)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Tympanosporium* was established by Gams (1974) and it has sporodochial conidiomata, unbranched or branched, hyaline conidiophores, with phialidic, percurrent, hyaline conidiogenous cells, and produces catenate, aseptate, cylindrical, tympaniform, hyaline conidia. Phylogenetic position for *Tympanosporium* is unresolved due to lack of sequence data. References: (Gams, 1974) (morphology), (Wijayawardene et al., 2020) (outline).

Umbellidion B. Sutton & Hodges, Nova Hedwigia 26: 529 (1975)

Index Fungorum number: IF10348

Classification: Ascomycota genera *incertae sedis*

Type species: *Umbellidion radulans* B. Sutton & Hodges, Nova Hedwigia 26: 532 (1975)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Umbellidion* was established by Sutton and Hodges (1975) and one species is accepted. Phylogenetic position for *Umbellidion* is unresolved due to lack of sequence data. References: (Sutton & Hodges, 1975) (morphology), (Wijayawardene et al., 2020) (outline).

Uvarispora Goos & Piroz., Canadian Journal of Botany 53 (24): 2930 (1975)

Index Fungorum number: IF10367

Classification: Ascomycota genera *incertae sedis*

Type species: *Uvarispora lignicola* Goos & Piroz., Canadian Journal of Botany 53 (24): 2930 (1975)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Uvarispora* was introduced by Goos and Pirozynski (1975) and it has sporodochial, gelatinous conidiomata, unbranched, aseptate or septate, sometimes reduced, hyaline conidiophores, with solitary thallic, hyaline conidiogenous cells, and produces solitary, multicellular, bilateral, hyaline or subhyaline, hemispherical,

consisting of grape-like clusters of branched chains of rounded, thin-walled cells. Phylogenetic position for *Uvarispora* is unresolved due to lack of sequence data. References: (Goos & Pirozynski, 1975) (morphology), (Wijayawardene et al., 2020) (outline).

Valdensia Peyronel, Le Stazioni Sperimentali Agrarie Italiane 56: 521 (1923)

Index Fungorum number: IF10369

Classification: Sclerotiniaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Valdensia heterodoxa* Peyronel, Staz. Sperim. Arg. Ital.: 521 (1923)

Sexual morph: *Valdensinia* (Seifert et al., 2011).

Synanamorphs: gliocladium-like (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Valdensia* was introduced by Peyronel (1923) and it can cause leaf spot necrosis and premature defoliation of the host (Nekoduka et al., 2012; Norvell & Redhead, 1994). Phylogenetic position for *Valdensia* is unresolved due to lack of sequence data. References: (Dzieciol et al., 2014; Nekoduka et al., 2012; Norvell & Redhead, 1994; Peyronel, 1923; Vogelsang & Shamoun, 2002; Zhao & Shamoun, 2006) (morphology), (Wijayawardene et al., 2020) (outline).

Vanbeverwijkia Agnihothr., Transactions of the British Mycological Society 44 (1): 53 (1961)

Index Fungorum number: IF10370

Classification: Ascomycota genera *incertae sedis*

Type species: *Vanbeverwijkia spirospora* Agnihothr., Transactions of the British Mycological Society 44 (1): 53 (1961)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Vanbeverwijkia* was established by Agnihothrudu (1961) with *V. spirospora* as the type species. The genus was emended by Shearer and Crane (1971)

and the genus is characterized by having sporodochial, hemispherical to subglobose, superficial conidiomata, phialidic conidiogenous cells, and multi-septate, helicosporous, coilded in 2-D. Phylogenetic position for *Vanbeverwijkia* is unresolved due to lack of sequence data. References: (Agnihothrudu, 1961; Shearer & Crane, 1971) (morphology), (Wijayawardene et al., 2020) (outline).

Vanderaaea Crous, Fungal Systematics and Evolution 7: 94 (2020)

Index Fungorum number: IF838082

Classification: Acarosporaceae, Acarosporales, Acarosporomycetidae, Lecanoromycetes, Pezizomycotina, Ascomycota

Type species: *Vanderaaea ammophilae* Crous, Fungal Systematics and Evolution 7: 94 (2020)

Sexual morph: Unknown.

Sequence data: *Vanderaaea ammophilae* (CBS 886.68, LSU: MH878416, ITS: MW298369)

Notes: *Vanderaaea* was introduced by Crous et al. (2021a) and is characterized by having sporodochial, reduced conidiophores, with holoblastic, hyaline conidiogenous cells and producing conidia that are solitary, aseptate or 1-septate, fusoid, flexuously curved, hyaline with appendage and hilum. References: (Crous et al., 2021a) (morphology), (Wijayawardene et al., 2020) (outline).

Vandijckella Sand.-Den., Persoonia 39: 455 (2017)

Index Fungorum number: IF822625

Classification: Vandijckellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Vandijckella johannae* Sand.-Den., Persoonia 39: 455 (2017)

Sexual morph: Unknown.

Sequence data: *Vandijckella johannae* (JW1034 = CBS 143182, LSU: LT904726, ITS: NR_172156)

Notes: It was introduced by Crous et al. (2017a) for a fungus isolated from soil and placed in Vandijckellaceae (Helotiales, Leotiomycetes). It differs from similar genera by conidiophores are monomorphic, mononematous, often reduced to

conidiogenous cells, conidiogenous cells are monophialidic, borne laterally on aerial hyphae, ampulliform, hyaline with conspicuous and long collarettes, and conidia are catenate, clavate, short cylindrical to oblong with rounded apices, hyaline (Crous et al., 2017a). References: (Crous et al., 2017a) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Vanterpoolia A. Funk, Canadian Journal of Botany 60 (6): 973 (1982)

Index Fungorum number: IF10374

Classification: Ascomycota genera *incertae sedis*

Type species: *Vanterpoolia tsugae* A. Funk, Canadian Journal of Botany 60 (6): 973 (1982)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Vanterpoolia* was introduced by Funk (1982) with *Vanterpoolia tsugae* as type species. *Vanterpoolia* is characterized by having sporodochial, semiglobose, sessile, reddish orange, translucent conidiomata, unbranched, septate conidiophores, producing catenate, septate, triradiate or cylindric, appendaged, hyaline conidia. Phylogenetic position for *Vanterpoolia* is unresolved due to lack of sequence data. References: (Funk, 1982) (morphology), (Wijayawardene et al., 2020) (outline).

Variabilispora S. Bien, C. Kraus & Damm, Persoonia 45: 61 (2019)

Index Fungorum number: IF829155

Classification: ?Tympanidaceae, Leotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Variabilispora flava* S. Bien, C. Kraus & Damm, Persoonia 45: 61 (2019)

Sexual morph: Unknown.

Sequence data: *Variabilispora flava* (GLMC 1858 = CBS 144845 = DSM 107777 = JKI-Nov103, LSU: MK314616, ITS: MK314562)

Notes: *Variabilispora* was introduced by Bien et al. (2020) and is characterized by having mononematous, reduced, hyaline conidiophores, with

phialidic, intercalary, hyaline conidiogenous cells, producing conidia that are aggregated in slimy mass, aseptate, subglobose, ellipsoidal, oblong to allantoid, often slightly curved, hyaline. Phylogenetically, *Variabilispora* was shown to be nested within the family ?Tympanidaceae (Leotiales, Leotiomycetes) (Figure 2.1). References: (Bien et al., 2020) (morphology and phylogeny).

Varicosporella Lechat & J. Fourn., Ascomycete 7 (1): 2 (2015)

Index Fungorum number: IF810690

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Varicosporella aquatica* Lechat & J. Fourn., Ascomycete 7 (1): 2 (2015)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Lechat & Fournier, 2015).

Sequence data: *Varicosporella aquatica* (CBS 126103, LSU: KP192671, ITS: KP192669)

Notes: *Varicosporella* was introduced by Lechat and Fournier (2015) with fusarium-like asexual morph. References: (Lechat & Fournier, 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Varicosporium W. Kegel, Berichte der Deutschen Botanischen Gesellschaft 24: 213 (1906)

Index Fungorum number: IF10377

Classification: Discinellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Varicosporium elodeae* W. Kegel, Berichte der Deutschen Botanischen Gesellschaft 24: 213 (1906)

Sexual morph: *Hymenoscyphus* (Seifert et al., 2011).

Sequence data: *Varicosporium elodeae* (AU_CRYP05, LSU: JN941371, ITS: JN995640, SSU: JN938734)

Notes: *Varicosporium* was introduced by Kegel (1906) and is characterized by having unbranched or sparingly branched, hyaline conidiophores,

with monoblastic to polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, staurosporous, axis with primary and secondary branches (Seifert et al., 2011). Phylogenetically, *Varicosporium* was shown to be nested within the family Discinellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology), (Wijayawardene et al., 2017a, 2020) (outline).

Variocladium Descals & Marvanová, Canadian Journal of Botany 76 (9): 1658 (1999)

Index Fungorum number: IF27936

Classification: Mollisiaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Variocladium rangiferinum* (Descals) Descals & Marvanová, Canadian Journal of Botany 76 (9): 1658 (1999)

Sexual morph: Unknown.

Synanamorphs: phialocephala-like (Seifert et al., 2011)

Sequence data: *Variocladium giganteum* (CBS 508.71, LSU: MH872007, ITS: MH860240)

Notes: *Variocladium* was introduced by Descals et al. (1998) and is dimorphic: (1) semi-macronematous, mononematous, unbranched or branched, septate, hyaline conidiophores, with monoblastic, integrated, terminal, determinate or percurrent, hyaline conidiogenous cells, producing solitary, hyaline, staurosporous conidia; (2) mononematous, penicillate, hyaline or pale brown conidiophores, with phialidic, hyaline conidiogenous cells, producing aseptate, hyaline conidia aggregated in slimy mass (Descals et al., 1998; Seifert et al., 2011). Phylogenetically, *Variocladium* was shown to be nested within the family Mollisiaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Descals et al., 1998; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Velutipila D. Hawksw., Notes from the Royal Botanical Garden Edinburgh 44 (3): 555 (1987)

Index Fungorum number: IF11218

Classification: Ascomycota genera *incertae sedis*

Type species: *Velutipila poeltii* D. Hawksw., Notes from the Royal Botanical Garden Edinburgh 44 (3): 556 (1987)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Velutipila* was introduced by Hawksworth (1987) and one species is accepted. Phylogenetic position for *Velutipila* is unresolved due to lack of sequence data. References: (Hawksworth, 1987) (morphology), (Wijayawardene et al., 2020) (outline).

Ventrographium H.P. Upadhyay, Cavalc. & A.A. Silva, Mycologia 78 (3): 494 (1986)

Index Fungorum number: IF11219

Classification: Ascomycota genera *incertae sedis*

Type species: *Ventrographium nervicola* H.P. Upadhyay, Cavalc. & A.A. Silva, Mycologia 78 (3): 494 (1986)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Ventrographium* was introduced by Upadhyay et al. (1986) and is characterized by having synnematous, unbranched or branched, hyaline to pale conidiophores, with monoblastic or sometimes monophialidic, integrated or discrete, hyaline conidiogenous cells, and producing 0-1-septate, smooth, falcate, hyaline conidia. Phylogenetic position for *Ventrographium* is unresolved due to lack of sequence data. References: (Upadhyay et al., 1986) (morphology), (Wijayawardene et al., 2020) (outline).

Venustampulla Unter. & Réblová, Mycologia 111 (6): 1009 (2019)

Index Fungorum number: IF829374

Classification: Pleuroascaceae, Helotiales, Leotiomycetidae, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Venustampulla parva* (A.H.S. Br. & G. Sm.) Unter. & Réblová, Mycologia 111 (6): 1012 (2019)

Sexual morph: Unknown.

Sequence data: *Venustampulla parva* (CBS 245.31 = IMI 058410, LSU: MK185690, ITS: MK185675, SSU: MK185668)

Notes: *Venustampulla* was introduced by Untereiner et al. (2019) and is characterized by having mononematous, penicillately branched, hyaline conidiophores, with phialidic, lacking distinct collarettes, terminal or intercalary, cylindrical to ampulliform, hyaline conidiogenous cells, producing aseptate, in slimy mass, subglobose to ovoidal, hyaline conidia. Untereiner et al. (2019) established the family Pleuroascaceae and accepted *Venustampulla* within it. Phylogenetically, *Venustampulla* was shown to be nested within the family Pleuroascaceae (Helotiales, Leotiomycetidae, Leotiomycetes) (Figure 2.1). References: (Untereiner et al., 2019) (morphology and phylogeny).

Venustocephala Matsush., Matsushima Mycological Memoirs 8: 41 (1995)

Index Fungorum number: IF27487

Classification: Ascomycota genera *incertae sedis*

Type species: *Venustocephala aequatorialis* Matsush., Matsushima Mycological Memoirs 8: 41 (1995)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Venustocephala* was introduced by Matsushima (1995) and it has macronematous, mononematous, scattered, unbranched, aseptate, hyaline conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, and produces catenate, aseptate, ellipsoid or cordate, hyaline conidia aggregated in slimy mass. Phylogenetic position for *Venustocephala* is unresolved due to lack of sequence data. References: (Matsushima, 1995) (morphology), (Wijayawardene et al., 2020) (outline).

Venustosynnema R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 32: 45 (1990)

Index Fungorum number: IF11263

Classification: Ascomycota genera *incertae sedis*

Type species: *Venustosynnema ciliatum* (R.F. Castañeda, G.R.W. Arnold & A.G. Guerra) R.F. Castañeda & W.B. Kendr., University of Waterloo Biology Series 32: 45 (1990)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Venustosynnema* was established by Castañeda Ruíz and Kendrick (1990) and it has unbranched, dark setae, synnematous, macronematous, unbranched or branched, septate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, and produces aseptate, in slimy mass, hyaline conidia with two polar setulae (Castañeda Ruíz et al., 2009; Kirschner & Liu, 2014). Phylogenetic position for *Venustosynnema* is unresolved due to lack of sequence data. References: (Castañeda Ruíz et al., 2009; Castañeda Ruíz & Kendrick, 1990; Kirschner & Liu, 2014) (morphology), (Wijayawardene et al., 2020) (outline).

Veramyces Matsush., Matsushima Mycological Memoirs 7: 71 (1993)

Index Fungorum number: IF26489

Classification: Ascomycota genera *incertae sedis*

Type species: *Veramyces manuensis* Matsush., Matsushima Mycological Memoirs 7: 71 (1993)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Veramyces* was established by Matsushima (1993) and it has macronematous, mononematous, unbranched or branched, brown conidiophores, with polyblastic, integrated, terminal and intercalary, sympodial, denticulate, geniculate, brown conidiogenous cells, catenate, multi-pseudoseptate, cylindrical, hyaline to subhyaline conidia. Phylogenetic position for *Veramyces* is unresolved due to lack of sequence data. References: (Matsushima, 1993) (morphology), (Wijayawardene et al., 2020) (outline).

Verhulstia Hern.-Restr., Persoonia 39: 449 (2017)

Index Fungorum number: IF823032

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Verhulstia trisororum* Hern.-Restr., Persoonia 39: 449 (2017)

Sexual morph: Unknown.

Sequence data: *Verhulstia trisororum* (CBS 143234, LSU: MG022160, ITS: MG022181)

Notes: This genus was introduced by Crous et al. (2017a) for a fungus isolated from soil. It differs from similar genera by having setose, sporodochial conidiomata, macronematous, unbranched, hyaline to pale brown conidiophores, phialidic with a collarette, integrated, terminal, hyaline to pale brown, lageniform conidiogenous cells, and solitary, aseptate, cylindrical to ellipsoidal, or obovoid, hyaline conidia (Crous et al., 2017a). References: (Crous et al., 2017a; Lin et al., 2019b) (morphology and phylogeny), (Hyde et al., 2020; Lin et al., 2019b; Wijayawardene et al., 2020) (outline).

Vermiculariopsiella Bender, Mycologia 24 (4): 412 (1932)

Index Fungorum number: IF10383

Classification: Vermiculariopsiellaceae, Vermiculariopsiellales, Incertae sedis, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Vermiculariopsiella immersa* (Desm.) Bender, Mycologia 24 (4): 412 (1932)

Sexual morph: ?*Echinosphaeria* (Dhargalkar & Bhat, 2009; Puja et al., 2006; Seifert et al., 2011).

Synanamorphs: ?*Tripospori*um (Seifert et al., 2011).

Sequence data: *Vermiculariopsiella eucalypti* (CBS 141281 = CPC 25525, LSU: KX228303, ITS: KX228251)

Notes: *Vermiculariopsiella* was introduced by Bender (1932) and is characterized by sporodochial conidiomata, brown setae, macronematous, simple or branched, stromatic conidiophores, phialidic, hyaline conidiogenous cells and producing aseptate, in slimy mass, fusoid to cylindrical, hyaline conidia. References: (Bender, 1932; Dhargalkar & Bhat, 2009; Hernández-Restrepo et al., 2013; Puja et al.,

2006) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Vermispora Deighton & Piroz., Mycological Papers 128: 87 (1972)

Index Fungorum number: IF10386

Classification: Orbiliaceae, Orbiliales, Orbiliomycetes, Pezizomycotina, Ascomycota

Type species: *Vermispora grandispora* Deighton & Piroz., Mycological Papers 128: 87 (1972)

Sexual morph: Unknown.

Sequence data: *Vermispora fusarina* (CBS 382.84, LSU: NG_057882, ITS: NR_156506)

Notes: For details of this genus see the monograph in Baral et al. (2020). Phylogenetically, *Vermispora* was shown to be nested within the family Orbiliaceae (Orbiliales, Orbiliomycetes) (Figure 2.1). References: (Baral et al., 2018a, 2020) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Veronaeopsis Arzanlou & Crous, Studies in Mycology 58: 91 (2007)

Index Fungorum number: IF504571

Classification: Sympoventuriaceae, Venturiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Veronaeopsis simplex* (Papendorf) Arzanlou & Crous, Studies in Mycology 58: 91 (2007)

Sexual morph: Unknown.

Sequence data: *Veronaeopsis simplex* (CBS 588.66; IMI 203547, LSU: NG_070358, ITS: NR_164225, SSU: NG_061164)

Notes: This genus was described by (Arzanlou et al., 2007) to accommodate *Veronaea simplex* Papendorf. *Veronaeopsis* is characterized by having mononematous, unbranched or branched, occasionally reduced, pale brown conidiophores, with polyblastic, terminal, integrated, sympodial, geniculate, denticulate, pale brown conidiogenous cells, producing solitary, aseptate or 1-septate, oblong-ellipsoidal to subcylindrical, subhyaline to pale brown conidia (Arzanlou et al.,

2007). Phylogenetically, representative of *Veronaeopsis* clustered in the family Sympoventuriaceae (Venturiales, Dothideomycetes) (Figure 2.1). References: (Arzanlou et al., 2007) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

Verticillium Nees, System der Pilze und Schwämme: 56 (1817)

Index Fungorum number: IF10400

Classification: Plectosphaerellaceae, Glomerellales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Verticillium dahliae* Kleb., Mycologisches Centralblatt 3: 66 (1913)

Sexual morph: Genera with verticillium-like sexual morph: *Aphysiostroma*, *Arachnocrea*, *Coniochaeta*, *Cosmospora*, *Hypocrea*, *Hypomyces*, ?*Nectria*, *Nectriopsis*, *Sphaerostilbella* (Seifert et al., 2011).

Synanamorphs: Genera with verticillium-like synanamorphs: *Cladobotryum*, *Clonostachys*, *Gliocladium*, *Mycogone*, *Sepedonium*. *Volutella* (Seifert et al., 2011).

Disease symptoms: Verticillium hadromycosis, Verticillium wilt (Auger et al., 2009; Baeza-Montanez et al., 2010; Barbara & Clewes, 2003; Berbegal & Armengol, 2009; Bhat & Subbarao, 1999; Bruton et al., 2007; Garibaldi et al., 2007; Himelick, 1969; Klosterman et al., 2009; Lazarovits & Subbarao, 2009; Lo Giudice et al., 2010; Parker, 1959; Pegg & Brady, 2002; Rampersad, 2008; Rudolph, 1931; Sun et al., 2016a; van der Meer, 1925).

Sequence data: *Verticillium dahliae* (ATCC 16535 = AFTOL ID 237, LSU: DQ470945, SSU: AY489705); *Verticillium longisporum* (CBS 124.64, LSU: MH870014, ITS: MH858385)

Notes: The genus *Verticillium* was introduced by Nees von Esenbeck (1816) to accommodate *V. tenerum* Nees. which was the type species of this genus. *Verticillium tenerum* was synonymized under *Acrostalagmus luteoalbus* (Link) Zare, W. Gams & Schroers (Zare et al., 2004). Gams et al. (2005) proposed *V. dahliae* as the conserved type of *Verticillium*. Inderbitzin et al. (2011) rerevised this genus and accepted ten species in *Verticillium* sensu stricto, *V. albo-atrum*, *V. alfalfae*, *V.*

dahliae, *V. isaacii*, *V. klebahnii*, *V. longisporum*, *V. nonalfalfae*, *V. nubilum*, *V. tricorpus* and *V. zaregamsianum*. *Verticillium* is characterized by mononematous, verticillate, septate, hyaline to subhyaline conidiophores, monophialidic, flask-shaped or aculeate, hyaline conidiogenous cells with inconspicuous collarettes, and producing aseptate or 1-septate, in slimy mass, ellipsoidal or cylindrical, hyaline conidia (Giraldo & Crous, 2019; Inderbitzin et al., 2011). References: (Devaux & Sackston, 1966; Fahleson et al., 2004; Gams & Zare, 2001, 2002; Giraldo & Crous, 2019; Inderbitzin et al., 2011, 2013; Jayawardena et al., 2019; Sung et al., 2001; Zare & Gams, 2001a, 2001b; Zare et al., 2000, 2001, 2004, 2007) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Verticimonosporium Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 68 (1971)

Index Fungorum number: IF10401

Classification: Hypocreaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Verticimonosporium diffractum* Matsush., Microfungi of the Solomon Islands and Papua-New Guinea: 68 (1971)

Sexual morph: Unknown.

Sequence data: *Verticimonosporium diffractum* (CBS 310.72, LSU: NG_064096, ITS: NR_160138)

Notes: *Verticimonosporium* was introduced by Matsushima (1971) and is characterized by trichodermoid or verticillate, hyaline conidiophores, monoblastic or phialidic, hyaline conidiogenous cells, and solitary, aseptate, globose to elongate, hyaline conidia (Matsushima, 1971; Seifert et al., 2011). References: (Matsushima, 1971; Seifert et al., 2011) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Vesicladiella Crous & M.J. Wingf., Mycotaxon 50: 454 (1994)

Index Fungorum number: IF26064

Classification: Ascomycota genera *incertae sedis*

Type species: *Vesicladiella capitata* (B. Sutton) Crous & M.J. Wingf., Mycotaxon 50: 456 (1994)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Vesicladiella* was introduced by Crous et al. (1994a) and it has sporodochial, scattered to gregarious, white conidiomata, unbranched, reduced conidiophores, with phialidic, discrete, intercalary or lateral, determinate, ampulliform conidiogenous cells, and produces aseptate, smooth, guttulate, cylindrical, hyaline conidia. Phylogenetic position for *Vesicladiella* is unresolved due to lack of sequence data. References: (Crous et al., 1994a) (morphology), (Wijayawardene et al., 2020) (outline).

Vexillomyces S. Bien, C. Kraus & Damm, Persoonia 45: 62 (2019)

Index Fungorum number: IF829157

Classification: ?Tympanidaceae, Leotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Vexillomyces verruculosus* S. Bien, C. Kraus & Damm, Persoonia 45: 63 (2019)

Sexual morph: Unknown.

Sequence data: *Vexillomyces verruculosus* (GLMC 1854 = CBS 144843, LSU: NG_068610, ITS: NR_165533)

Notes: *Vexillomyces* was erected by Bien et al. (2020) to accommodate *V. palatinus* and *V. verruculosus*. *Vexillomyces* is characterized by having mononematous, reduced, hyaline conidiophores, with phialidic, intercalary, hyaline conidiogenous cells, producing aseptate, cylindrical to ellipsoidal, hyaline conidia aggregated in slimy masses (Bien et al., 2020). Phylogenetically, *Vexillomyces* was shown to be nested within the family ?Tympanidaceae (Leotiales, Leotiomycetes) (Figure 2.1). References: (Bien et al., 2020) (morphology and phylogeny).

Volutella Fr., Systema Mycologicum 3: 458, 466 (1832)

Index Fungorum number: IF10415

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Volutella ciliata* (Alb. & Schwein.) Fr., Systema Mycologicum 3: 467 (1832)

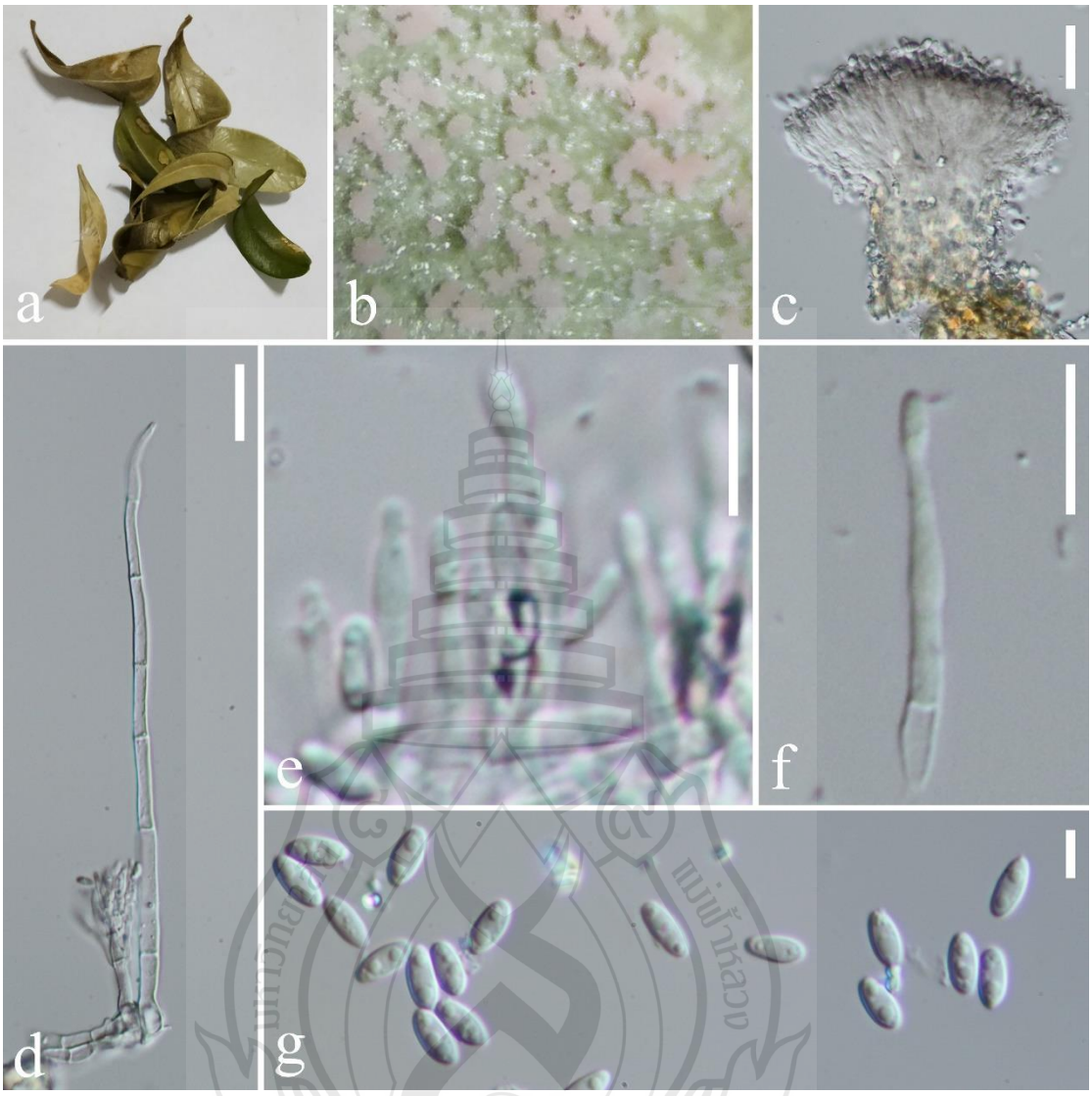
Sexual morph: *Volutellonectria* (Lombard et al., 2015), *Cosmospora*, *Pseudonectria* (Seifert et al., 2011); holomorphic description see Lombard et al. (2015).

Synanamorphs: verticillium-like, acremonium-like (Seifert et al., 2011).

Disease symptoms: Volutella blight (Bai et al., 2012; Garibaldi et al., 2016).

Sequence data: *Volutella ciliata* (CBS 483.61 = CCT 5396 = MUCL 9859, LSU: KM231635, ITS: KM231770)

Notes: The asexual morph of *Volutella* is characterized by sporocochial or synnematous conidiomata, hyaline, unbranched setae, branched or penicillate or monoverticillate or irregularly biverticillate, hyaline conidiophores, phialidic, hyaline conidiogenous cells, and aseptate, ellipsoidal, ovate or oblong hyaline conidia (Gräfenhan et al., 2011; Lombard et al., 2015). References: (Gräfenhan et al., 2011; Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).



Note ***Pseudonectria foliicola*** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 2-7). **a** Host material. **b** Conidiophores on the host surface. **c, d** Conidiophores. **e** Conidiogenous cells. **g** Conidia. Scale bars: **c**, **d** = 20 μm, **e, f** = 10 μm, **g** = 5 μm.

Figure 2.59 *Pseudonectria foliicola*

Wallemia Johan-Olsen, Skr. Vidensk.-Selsk. Christiana Math.-Nat. Kl.: 6 (1887)

Index Fungorum number: IF10428

Classification: Wallemiaceae, Wallemiales, Wallemiomycetes, Wallemiomycotina, Basidiomycota

Type species: *Wallemia ichthyophaga* Johan-Olsen, Skr. VidenskSelsk. Christiania, Kl. I, Math.-Natur.: 6 (1887)

Sexual morph: Unknown.

Sequence data: *Wallemia ichthyophaga* (CBS 113033 = EXF-994 = AFTOL-ID 2119, LSU: NG_064233, ITS: NR_145348, SSU: NG_061028)

Notes: *Wallemia* is characterized by having conidiophores are mononematous, sometimes reduced, unbranched or branched, hyaline to subhyaline, conidiogenous cells are blastic conidiogenous hypha converting into meristem arthric conidia, constricted, hyaline to subhyaline, producing conidia that are catenate, aseptate, hyaline to subhyaline (Seifert et al., 2011). Phylogenetically, representatives of *Wallemia* clustered in the family Wallemiaceae (Wallemiales, Wallemiomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (He et al., 2019) (outline).

Wiesneriomyces Koord., Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde 13 (4): 246 (1907)

Index Fungorum number: IF10438

Classification: Wiesneriomycetaceae, Tubeufiales, Dothideomycetes orders incertae sedis, Pezizomycotina, Ascomycota

Type species: *Wiesneriomyces javanicus* Koord., Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde 13 (4): 246 (1907)

Sexual morph: Unknown.

Sequence data: *Wiesneriomyces conjunctosporus* (BCC40615, LSU: KJ425454, SSU: KJ425441)

Notes: *Wiesneriomyces* is characterized by sporodochial, conidiomata, unbranched, dark setae, monoverticillate or penicillate, hyaline to pale brown

conidiophores, with polyblastic, sympodial, denticulate, hyaline conidiogenous cells, producing conidia that are in slimy mass, septate, constricted at septa, hyaline (Seifert et al., 2011). Phylogenetically, *Wiesneriomyces* located in the family Wiesneriomycetaceae (Tubeufiales, Dothideomycetes) (Figure 2.1). References: (Seifert et al., 2011) (morphology and phylogeny), (Hongsanan et al., 2020b; Wijayawardene et al., 2017a, 2020) (outline).

Wolfgangiella C. Mayers & T.C. Harr., Persoonia 44: 53 (2019)

Index Fungorum number: IF824930

Classification: Ceratocystidaceae, Microascales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Wolfgangiella franznegeri* C. Mayers, T.C. Harr. & Roets, Persoonia 44: 53 (2019)

Sexual morph: Introduced as holomorphic genus and its asexual morph is hyphomycetes (Mayers et al., 2020a).

Sequence data: *Wolfgangiella franznegeri* (CBS 144149 = C4328, LSU: MG269974)

Notes: *Wolfgangiella* was introduced by Mayers et al. (2020a) to accommodate *W. franznegeri* and *W. madagascarensis*. Its asexual morph is characterized by producing solitary or catenate, thallic-arthric, irregular to spherical, hyaline conidia on branching hyphae (Mayers et al., 2020a). References: (Mayers et al., 2020a) (morphology and phylogeny).

Woswasia Jaklitsch, Réblová & Voglmayr, Mycologia 105 (2): 479 (2012)

Index Fungorum number: IF800841

Classification: Woswasiaceae, Diaporthomycetidae families incertae sedis, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Woswasia atropurpurea* Jaklitsch, Réblová & Voglmayr, Mycologia 105 (2): 479 (2012)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Jaklitsch et al., 2013a).

Synanamorphs: Producing chlamydospores (Jaklitsch et al., 2013a).

Sequence data: *Woswasia atropurpurea* (CBS 133167 = WU 32007, LSU: JX233658, ITS: NR_154480, SSU: JX233658)

Notes: The sexual morphic genus *Woswasia* was introduced by Jaklitsch et al. (2013a) and its asexual morph has branched or penicillate, subhyaline to hyaline conidiophores with polyblastic, sympodial conidiogenous cells, producing aseptate, smooth-walled, ellipsoid to obovoid, hyaline conidia. References: (Jaklitsch et al., 2013a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Xanthonectria Lechat, J. Fourn. & P.-A. Moreau, Ascomycete.org 8 (4): 173 (2016)

Index Fungorum number: IF816960

Classification: Bionectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Xanthonectria pseudopeziza* (Desm.) Lechat, J. Fourn. & P.-A. Moreau, Ascomycete.org 8 (4): 173 (2016)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph.

Sequence data: Sequence data for this genus is unavailable.

Notes: The genus was introduced by Lechat et al. (2016) for *Sphaeria pseudopeziza* Desm. with acremonium-like asexual morph appearing in culture. The asexual state of this genus primarily produces mononematous conidiophores and late forming sporodochia. References: (Lechat et al., 2016) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Xenoacremonium L. Lombard & Crous, Studies in Mycology 80: 234 (2015)

Index Fungorum number: IF810270

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Xenoacremonium recifei* (Leão & Lôbo) L. Lombard & Crous, Studies in Mycology 80: 235 (2015)

Sexual morph: Unknown.

Sequence data: *Xenoacremonium recifei* (CBS 137.35 = IHEM 4405 = MUCL 9696, LSU: HQ232106, ITS: KM231833)

Notes: *Xenoacremonium* was introduced by Lombard et al. (2015) with acremonium-like morphology. References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Xenochalara M.J. Wingf. & Crous, South African Journal of Botany 66 (2): 101 (2000)

Index Fungorum number: IF28446

Classification: Dermateaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Xenochalara juniperi* M.J. Wingf. & Crous, South African Journal of Botany 66 (2): 102 (2000)

Sexual morph: Unknown.

Synanamorphs: *Sporothrix* and phialophora-like (Coetsee et al., 2000).

Sequence data: *Xenochalara juniperi* (CE274, ITS: JN604463, SSU: JN604474)

Notes: *Xenochalara* was established by Coetsee et al. (2000) and is chalara-like, but differs from by producing conidia through apical wall building. Phylogenetic position for *Xenochalara* is unresolved due to lack of LSU sequence data. References: (Coetsee et al., 2000) (morphology), (Wijayawardene et al., 2020) (outline).

Xenocylindrocladium Decock, Hennebert & Crous, Mycological Research 101 (7): 788 (1997)

= *Xenocalonectria* Crous & C.L. Schoch, Studies in Mycology 45: 50 (2000)

Index Fungorum number: IF27788

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Xenocylindrocladium serpens* Decock, Hennebert & Crous, Mycological Research 101 (7): 788 (1997)

Sexual morph: *Xenocalonectria* (Lombard et al., 2015); holomorphic description see Lombard et al. (2015).

Sequence data: *Xenocylindrocladium serpens* (CBS 128439 = MUCL 39315, LSU: KM231688, ITS: AF220982)

Notes: *Xenocylindrocladium* is characterized by setae are sinuous extensions of conidiophores, hyaline, conidiophores are macronematous, mononematous, penicillate, hyaline, conidiogenous cells are phialidic, hyaline, and conidia are septate, cylindrical, hyaline (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Xenodactylaria Crous, Persoonia 41: 289 (2018)

Index Fungorum number: IF828193

Classification: Xenodactylariaceae, Myrmecridiales, Diaporthomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Xenodactylaria thailandica* Crous, Persoonia 41: 289 (2018)

Sexual morph: Unknown.

Sequence data: Xenodactylaria thailandica (CBS 145074 = CPC 34588, LSU: NG_066290, ITS: NR_161134)

Notes: *Xenodactylaria* was introduced by Crous et al. (2018a) and is *Dactylaria*-like. Phylogenetically, it distinct from *Dactylaria* and *Dactylaria*-like genera. References: (Crous et al., 2018a) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Xenogliocladiopsis Crous & W.B. Kendr., Canadian Journal of Botany 72 (1): 63 (1994)

Index Fungorum number: IF27282

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Xenogliocladiopsis eucalyptorum* Crous & W.B. Kendr., Canadian Journal of Botany 72 (1): 63 (1994)

Sexual morph: *Arnaudiella* (Seifert et al., 2011).

Sequence data: *Xenogliocladiopsis eucalyptorum* (CBS 138758 = CPC 16271, LSU: KM231622, ITS: KM231759)

Notes: *Xenogliocladiopsis* is characterized by setae are hyaline extension of conidiophores, conidiophores are mononematous or sporodochial, penicillate, hyaline, conidiogenous cells are phialidic, hyaline, conidia are aseptate, in slimy masses, cylindrical to fusiform, hyaline (Lombard et al., 2015). References: (Lombard et al., 2015) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Xenoleptographium Marinc., T.A. Duong, Z.W. de Beer & M.J. Wingf., Persoonia 35: 319 (2015)

Index Fungorum number: IF812683

Classification: Nectriaceae, Hypocreales, Hypocreomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Xenoleptographium phialoconidium* Marinc., T.A. Duong, Z.W. de Beer & M.J. Wingf., Persoonia 35: 319 (2015)

Sexual morph: Unknown.

Sequence data: *Xenoleptographium phialoconidium* (CBS 134694, LSU: NG_058196)

Notes: This genus is *Leptographium*-like and differs from other genera by macronematous, mononematous conidiophores, monophidlidic, hyaline conidiogenous cells, and aseptate, in yellowish slimy droplets, smooth, ellipsoid, hyaline conidia (Crous et al., 2015c). References: (Crous et al., 2015c)(morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Xenoplaca Petr., Sydowia 3 (1-6): 261 (1949)

Index Fungorum number: IF10446

Classification: Ascomycota genera *incertae sedis*

Type species: *Xenoplaca aequatoriensis* Petr., Sydowia 3 (1-6): 261 (1949)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Xenoplaca* was introduced by Petrak (1949) and it has pseudoparenchymatous stromata, mononematous, reduced, brown conidiophores, with polyblastic, sympodial, brown conidiogenous cells, and produces solitary, aseptate, subhyaline conidia. Phylogenetic position for *Xenoplaca* is unresolved due to lack of sequence data. References: (Petrak, 1949) (morphology), (Wijayawardene et al., 2020) (outline).

Xenopolyscytalum Crous, Persoonia (Fungal Planet) 25: 131 (2010)

Index Fungorum number: IF517533

Classification: Pezizellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Xenopolyscytalum pinea* Crous, Persoonia (Fungal Planet) 25: 131 (2010)

Sexual morph: Unknown.

Synanamorphs: *Chalara*-like (Crous et al., 2010).

Sequence data: *Xenopolyscytalum pinea* (CBS 126493, LSU: NG_070454, ITS: NR_156543)

Notes: *Xenopolyscytalum* was introduced by Crous et al. (2010) and is dimorphic: (1) mononematous, penicillate, brown conidiophores, with sympodial, hyaline to brown conidiogenous cells, produces aseptate, smooth, subcylindrical, hyaline ramoconidia, and catenate, aseptate, subcylindrical to narrowly ellipsoid, hyaline conidia; (2) mononematous, unbranched, septate, brown conidiophores, with phialidic with flaring collarettes, long ampulliform conidiogenous cells, produces aseptate, cylindrical, hyaline conidia. Phylogenetically, *Xenopolyscytalum* was shown to be nested within the family Pezizellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Crous et al., 2010) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Xenoramularia Videira, H.D. Shin & Crous, Studies in Mycology 83: 96 (2016)

Index Fungorum number: IF816822

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: X*enoramularia polygonicola* Videira, H.D. Shin & Crous, Studies in Mycology 83: 97 (2016)

Sexual morph: Unknown.

Disease symptoms: Leas spots (Videira et al., 2016)

Sequence data: *Xenoramularia polygonicola* (CBS 141102 = CPC 10852, LSU: GU214695, ITS: GU214695)

Notes: X*enoramularia* was introduced by Videira et al. (2016) and is characterized by semi-macronematous or micronematous, mononematous, solitary, unbranched, often reduced, hyaline to brown conidiophores, with integrated or terminal, hyaline conidiogenous cells, producing solitary or catenate, aseptate or 1-septate, subcylindrical, hyaline conidia. Phylogenetically, X*enoramularia* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2016, 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Xenosonderhenioides Videira & Crous, Studies in Mycology 87: 368 (2017)

Index Fungorum number: IF822706

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Xenosonderhenioides indonesiana* C. Nakash., Videira & Crous, Studies in Mycology 87: 368 (2017)

Sexual morph: Unknown.

Sequence data: *Xenosonderhenioides indonesiana* (CBS 142239 = CPC 15066, LSU: NG_058498, ITS: NR_156643)

Notes: *Xenosonderhenioides* was established by Videira et al. (2017) and is characterized by micro- to macronematous, unbranched, sometimes branched, straight to sinuous, subhyaline to pale brown conidiophores, with polyblastic, integrated, terminal or intercalary, sympodial, hyaline to pale brown conidiogenous

cells, producing solitary, rarely catenate, aseptate or septate, oblong, cylindrical to obclavate, hyaline to subhyaline conidia. Phylogenetically, *Xenosonderhenioides* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Xerochrysium Pitt, IMA Fungus 4 (2): 236 (2013)

Index Fungorum number: IF807003

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Xerochrysium dermatitidis* (A. Agostini) Pitt, IMA Fungus 4 (2): 237 (2013)

Sexual morph: Unknown.

Sequence data: *Xerochrysium dermatitidis* (CBS 132.31, LSU: MH866606, ITS: MH855157)

Notes: *Xerochrysium* was introduced by Pitt et al. (2013) to accommodate *X. dermatitidis* and *X. xerophilum* and is characterized by the production of aleurioconidia, chlamydoconidia and arthroconidia. References: (Pitt et al., 2013) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Xerombrophila Baral, Mycological Progress 12 (3): 480 (2013)

Index Fungorum number: IF800287

Classification: Gelatinodiscaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Xerombrophila crystallifera* Baral, G. Marson & Unter., Mycological Progress 12 (3): 480 (2013)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Baral et al., 2013)

Sequence data: *Xerombrophila crystallifera* (CBS 128289, LSU: MH876294, ITS: MH864847)

Notes: *Xerombrophila* was established by Baral et al. (2013) and its asexual morph has unbranched, hyaline conidiophores, with holoblastic, sympodial, hyaline conidiogenous cells and aseptate, clavate-pyriform to almost globose, hyaline conidia. Phylogenetically, *Xerombrophila* was shown to be nested within the family Gelatinodiscaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Baral et al., 2013) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Xeromyces L.R. Fraser, Proceedings of the Linnean Society of New South Wales 78: 245 (1954)

= *Fraseriella* Cif. & A.M. Corte, Atti dell'Istituto Botanico della Università e Laboratorio Crittogamico di Pavia 14: 109 (1957)

Index Fungorum number: IF5830

Classification: Aspergillaceae, Eurotiales, Eurotiomycetidae, Eurotiomycetes, Pezizomycotina, Ascomycota

Type species: *Xeromyces bisporus* L.R. Fraser, Proceedings of the Linnean Society of New South Wales 78: 245 (1953)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph in the genus *Fraseriella* (Fraser, 1953; Seifert et al., 2011).

Sequence data: *Xeromyces bisporus* (CBS 236.71, LSU: NG_057813, ITS: NR_154540, SSU: NG_062771)

Notes: The asexual morph of *Xeromyces* is characterized by the formation of solitary, large, thick-walled, terminal aleurioconidia (Fraser, 1953; Pettersson et al., 2011). References: (Fraser, 1953; Houbraken et al., 2020; Pettersson et al., 2011) (morphology and/or phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Xiambola Minter & Hol.-Jech., Folia Geobotanica et Phytotaxonomica 16 (2): 213 (1981)

Index Fungorum number: IF10452

Classification: Pezizellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Xiambola mirabilis* Minter & Hol.-Jech., Folia Geobotanica et Phytotaxonomica 16 (2): 213 (1981)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Xiambola* was introduced by Minter and Holubová-Jechová (1981) and it has sporodochial, gelatinous conidiomata, hyaline setae, macronematous, unbranched, smooth, hyaline conidiophores, with thallic-arthric, integrated, terminal, hyaline conidiogenous cells, produces catenate, 1-septate, cylindric, hyaline conidia. Phylogenetic position for *Xiambola* is unresolved due to lack of sequence data. References: (Minter & Holubová-Jechová, 1981) (morphology), (Wijayawardene et al., 2020) (outline).

Xyladictyochaeta Hern.-Restr., R.F. Castañeda & Gené, Studies in Mycology 86: 93 (2017)

Index Fungorum number: IF820355

Classification: Xyladictyochaetaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Xyladictyochaeta lusitanica* Hern.-Restr., R.F. Castañeda & Gené, Studies in Mycology 86: 93 (2017)

Sequence data: Sequence data for ex-type culture of type species is available. CBS 142290 = FMR 12177, LSU: KY853543, ITS: KY853479, SSU: HF937349.

Notes: This genus characterized by macronematous, mononematous, setiform, commonly unbranched, cylindrical, brown conidiophores, and mono- or polyphialidic, integrated, terminal and intercalary, sympodial, collarette, brown, that produces solitary, mucous, 0–1-septate, falcate, hyaline conidia with an unbranched setula at each end (Hernández-Restrepo et al., 2017). Morphologically, *Xyladictyochaeta* similar to *Dictyochaeta* but phylogenetically distinct, which the former one located within Xyladictyochaetaceae (Xylariales) and the later one grouped within Chaetosphaeriaceae (Chaetosphaeriales) (Figure 2.1). References: (Crous et al., 2018b; Hernández-Restrepo et al., 2017) (morphology and phylogeny)

Xylaria Hill ex Schrank, Baierische Flora 1: 200 (1789)

= *Moelleroclavus* Henn., Hedwigia 41: 15 (1902)

= *Geniculisynnema* Okane & Nakagiri, Mycoscience 48 (4): 245 (2007)

= *Xylocoremium* J.D. Rogers, Mycologia 76: 913 (1984)

Index Fungorum number: IF5832

Classification: Xylariaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Xylaria hypoxylon* (L.) Grev., Flora Edinensis: 355 (1824)

Sexual morph: Sexual morphic genus with asexual morph in the genera *Geniculosporium*, *Moelleroclavus*, *Nodulisporium*, *Padixonia*, *Xylocladium*, *Xylocoremium*.

Sequence data: *Xylaria hypoxylon* (CBS 122620 = OSC 100004 = AFTOL ID 51, LSU: AY544648, ITS: KY610407, SSU: AY544692); *Xylaria termiticola* (before known as *Geniculisynnema termiticola*) (CBS 122919; NBRC 102095, LSU: NG_064210, ITS: NR_159869, SSU: AB274812)

Notes: *Geniculisynnema* was introduced by Okane and Nakagiri (2007) and has synnematous conidiomata, macronematous, branched conidiophores, with polyblastic, sympodial conidiogenous cells, produces solitary, aseptate, hyaline conidia. Réblová et al. (2016a) synonymized *Geniculisynnema* under *Xylaria* as the former one shows phylogenetically close related to the later one.

Moelleroclavus and *Xylocoremium* were reported as the asexual morph of *Xylaria*, Réblová et al. (2016a) proposed using *Xylaria* rather than *Moelleroclavus* and *Xylocoremium*. References: (Jaklitsch & Voglmayr, 2012; Okane & Nakagiri, 2007; Pelaez et al., 2008; Smith et al., 2003; Tang et al., 2009; Urairuj et al., 2003) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Xylochrysis Réblová, Mycologia 106 (3): 567 (2014)

Index Fungorum number: IF805253

Classification: Woswasiaceae, Diaporthomycetidae families incertae sedis, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Xylochrysis lucida* Réblová, Mycologia 106 (3): 567 (2014)

Sexual morph: Sexual morphic genus with hyphomycetous asexual morph (Réblová et al., 2014).

Sequence data: *Xylochrysis lucida* (CBS 135996, LSU: KF539911, ITS: NR_132063, SSU: KF539912)

Notes: The sexual morphic genus *Xylochrysis* was introduced by Réblová et al. (2014) to accommodate a lignicolous taxon, *X. lucida*. Its asexual morph has sporodochial conidiomata, penicillate, hyaline to subhyaline conidiophores, with monoblastic, sympodial, hyaline conidiogenous cells and produces aseptate, ellipsoid to obovoid, hyaline conidia (Réblová et al., 2014). Zhang et al. (2017a) introduced the family Woswasiaceae and put *Xylochrysis* in this family. References: (Réblová et al., 2014) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).

Xylolentia Réblová, Mycologia 11 (4): 759 (2018)

Index Fungorum number: IF823921

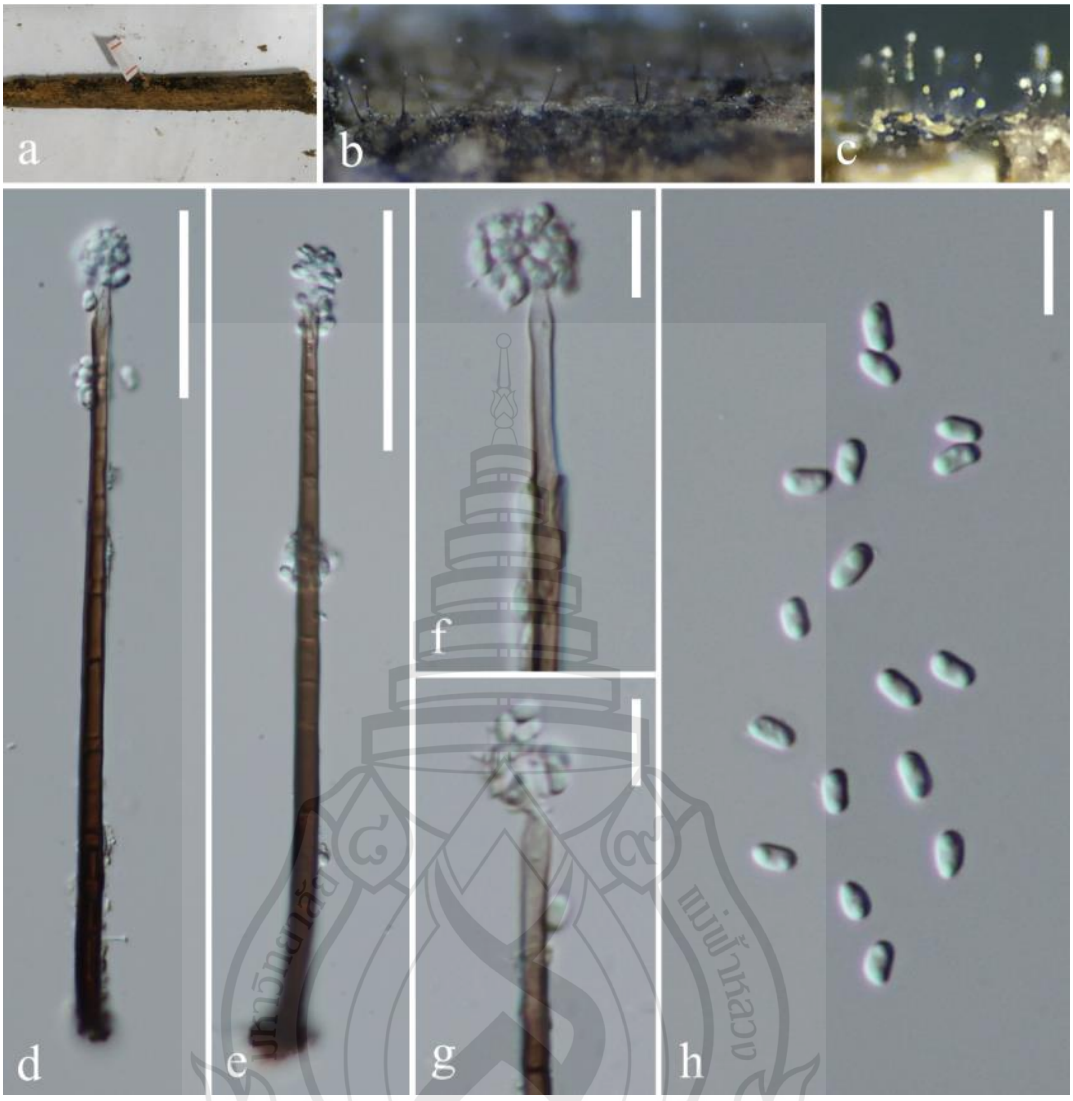
Classification: Rhamphoriaceae, Diaporthomycetidae families incertae sedis, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Xylolentia brunneola* Réblová, Mycologia 11 (4): 759 (2018)

Sexual morph: Holomorphic genus with hyphomycetous asexual morph (Réblová & Štěpánek, 2018).

Sequence data: *Xylolentia brunneola* (PRA-13611, LSU: MG600398, ITS: MG600394, SSU: MG600407)

Notes: *Xylolentia* is characterised by its brown, 1-septate ascospores, polyblastic, sympodial conidiogenous cells and hyaline becoming brown, aseptate conidia (Réblová & Štěpánek, 2018). Phylogenetic analyses in this study showed that this genus together with *Linkosia multiseptum* (HKUCC 10825) formed a monophyletic clade within the family Rhamphoriaceae (Figure 2.1). References: (Réblová & Štěpánek, 2018) (morphology and phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2020) (outline).



Note ***Xylolentia oblongispora*** (Material examined: China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, 6 July 2018, Chuan-Gen Lin, DS 1-43). **a** Host material. **b, c** Conidiophores on the host surface. **d, e** Conidiophores, conidiogenous cells with conidia. **f**, **g** Conidiogenous cells. **h** Conidia. Scale bars: **d**, **e** = 50 μm, **f**–**h** = 10 μm.

Figure 2.60 *Xylolentia oblongispora*

Ypsilina J. Webster, Descals & Marvanová, Canadian Journal of Botany 76 (9): 1658 (1999)

Index Fungorum number: IF27938

Classification: Ploettnerulaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Ypsilina graminea* (Ingold, P.J. McDougall & Dann) Descals, J. Webster & Marvanová, Canadian Journal of Botany 76 (9): 1659 (1999)

Sexual morph: Unknown.

Synanamorphs: phialophora-like (Seifert et al., 2011)

Sequence data: *Ypsilina graminea* (CBS 114630, LSU: MH874529, ITS: MH862967)

Notes: *Ypsilina* is dimorphic: (1) mononematous, unbranched or branched, septate, hyaline conidiophores, with terminal, sympodial or percurrent, hyaline conidiogenous cells, producing conidia that are solitary, hyaline, septate, staurosporous, Y-shaped, variously branched, with arms long-conoid, septate, with acute apices, bases truncate or with a subulate basal extension; (2) mononematous, branched or verticillate, hyaline conidiophores, with phialidic, hyaline conidiogenous cells, producing aseptate, hyaline conidia in slimy mass (Crous et al., 2021a; Seifert et al., 2011). Phylogenetically, *Ypsilina* was shown to be nested within the family Ploettnerulaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Crous et al., 2021a; Seifert et al., 2011) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Yuccamyces Gour, Dyko & B. Sutton, Transactions of the British Mycological Society 72 (3): 413 (1979)

Index Fungorum number: IF10465

Classification: Ascomycota genera *incertae sedis*

Type species: *Yuccamyces purpureus* Gour, Dyko & B. Sutton, Transactions of the British Mycological Society 72 (3): 413 (1979)

Sexual morph: Unknown.

Sequence data: *Yuccamyces citri* (CBS 143161 = CPC 30046, LSU: NG_058511, ITS: NR_164262); *Yuccamyces pilosus* (CBS 579.92 = INIFAT C92/42, LSU: MG386097, ITS: MG386044)

Notes: *Yuccamyces* was established by Dyko and Sutton (1979) and is characterized by having sporodochial conidiomata, with polyblastic, integrated, terminal, sympodial, denticulate, hyaline conidiogenous cells, producing septate, in branched chains, cylindrical, hyaline conidia. Crous et al. (2017a) placed this genus in Patellariales *incertae sedis* based on their phylogenetic analysis. Pem et al. (2018) proposed to accept this genus within the family Patellariaceae (Patellariales, Dothideomycetes). Phylogenetically, *Yuccamyces* was shown to be nested within Dothideomycetes (Figure 2.1). References: (Crous et al., 2017a; Dyko & Sutton, 1979; Pem et al., 2018) (morphology and phylogeny), (Wijayawardene et al., 2017a, 2020) (outline).

Zakatoshia B. Sutton, Mycological Papers 132: 129 (1973)

Index Fungorum number: IF10466

Classification: Ascomycota genera *incertae sedis*

Type species: *Zakatoshia hirschiopori* B. Sutton, Mycological Papers 132: 129 (1973)

Sexual morph: Unknown.

Synanamorphs: yeast-like (Seifert et al., 2011).

Sequence data: Sequence data is unavailable for this genus.

Notes: *Zakatoshia* was introduced by Sutton (1973a) and it has macronematous, mononematous, unbranched, septate, brown conidiophores, with monophialidic, integrated, terminal and intercalary, determinate conidiogenous cells, and produces aseptate, semi-endogenous, slimy, simple ellipsoid to ovoid, hyaline conidia. Phylogenetic position for *Zakatoshia* is unresolved due to lack of sequence data. References: (Sutton, 1973a) (morphology), (Wijayawardene et al., 2020) (outline).

Zalaria Visagie, Z. Humphries & Seifert, IMA Fungus 8 (2): 307 (2017)

Index Fungorum number: IF821628

Classification: Zalariaceae, Dothideales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Zalaria obscura* Visagie, Z. Humphries & Seifert, IMA Fungus 8 (2): 309 (2017)

Sexual morph: Unknown.

Synanamorphs: producing chlamydospores (Humphries et al., 2017)

Sequence data: *Zalaria obscura* (DAOMC 250849, LSU: NG_060010, ITS: KX579094, SSU: NG_061249)

Notes: *Zalaria* was established by Humphries et al. (2017) and placed in the family Zalariaceae. *Zalaria* is characterized by hyphae are transversely and longitudinally septate, hyaline and thin-walled when, becoming melanized and thick-walled with age, may develop into chlamydospores, conidiogenous cells are monoblastic to polyblastic, integrated, intercalary, producing yeast-like, aseptate, ellipsoidal to lemon-shaped, hyaline conidia and septate, globose to ellipsoidal, dark brown chlamydospores (Humphries et al., 2017). Phylogenetically, *Zalaria* was shown to be nested within the family Zalariaceae (Dothideales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Humphries et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2020) (outline).

Zanclospora S. Hughes & W.B. Kendr., New Zealand Journal of Botany 3: 151 (1965)

Index Fungorum number: IF10468

Classification: Chaetosphaeriaceae, Chaetosphaeriales, Sordariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

Type species: *Zanclospora novae-zelandiae* S. Hughes & W.B. Kendr., New Zealand Journal of Botany 3: 152 (1965)

Sexual morph: *Chaetosphaeria* (Seifert et al., 2011).

Sequence data: *Zanclospora novae-zelandiae* (ICMP 15781, LSU: MW144411, ITS: MW144429, SSU: MW151690)

Notes: *Zanclospora* was introduced by Hughes and Kendrick (1965) and is characterized by unbranched or branched or verticillate, setiform conidiophores, phialidic, discrete conidiogenous cells arranged in multiple verticils, and conidia are

aseptate, in slimy mass, falcate or narrowly obovoid, hyaline. Almeida et al. (2013) provided a key to *Zanclospora* species. References: (Almeida et al., 2013; Calduch et al., 2002b; Hughes & Kendrick, 1965; Villavicencio et al., 2020) (morphology), (Lin et al., 2019b) (phylogeny), (Hyde et al., 2020; Wijayawardene et al., 2017a, 2020) (outline).

Zasmidium Fr., Summa vegetabilium Scandinaviae 2: 407 (1849)

= *Periconiella* Sacc., Atti dell´Istituto Veneto Scienze 3: 727 (1885)

Index Fungorum number: IF22396

Classification: Mycosphaerellaceae, Capnodiales, Dothideomycetidae, Dothideomycetes, Pezizomycotina, Ascomycota

Type species: *Zasmidium cellare* (Pers.) Fr., Summa veg. Scand., Sectio Post. (Stockholm): 407 (1849)

Sexual morph: mycosphaerella-like (Videira et al., 2017)

Synanamorphs: *Rhinocladiella* (Seifert et al., 2011).

Sequence data: *Zasmidium cellare* (CBS 146.36 = ATCC 36951 = IFO 4862 = IMI 044943 = LCP 52.402 = LSHB BB274 = MUCL 10089, LSU: EU041878, ITS: EU041821)

Notes: *Zasmidium* is characterized by having micronematous or macronematous, mononematous, solitary or fasciculate, unbranched or branched, sometimes reduced, subhyaline to brown conidiophores, with polyblastic, integrated, terminal, occasionally intercalary, sympodial, hyaline to brown conidiogenous cells, producing solitary or catenate, aseptate or septate, hyaline to brown conidia (Seifert et al., 2011; Videira et al., 2017). *Periconiella* was reduced to synonymy under *Zasmidium* (Videira et al., 2017). Phylogenetically, *Zasmidium* was shown to be nested within the family Mycosphaerellaceae (Capnodiales, Dothideomycetidae, Dothideomycetes) (Figure 2.1). References: (Seifert et al., 2011; Videira et al., 2017) (morphology and phylogeny), (Hongsanan et al., 2020a; Wijayawardene et al., 2017a, 2020) (outline).

Zelodactylaria A.C. Cruz, Gusmão & R.F. Castañeda, Mycotaxon 119: 242 (2012)

Index Fungorum number: IF561559

Classification: Ascomycota genera *incertae sedis*

Type species: *Zelodactylaria verticillata* A.C. Cruz, Gusmão & R.F. Castañeda, Mycotaxon 119: 242 (2012)

Sexual morph: Unknown.

Sequence data: Sequence data is unavailable for this genus.

Notes: *Zelodactylaria* was introduced by Cruz et al. (2012) and is characterized by having macronematous, mononematous, septate, verticillate, brown conidiophores, with polyblastic, discrete, sympodial, denticulate conidiogenous cells, and producing solitary, 0-1-septate, obovoid to clavate, hyaline conidia. Phylogenetic position for *Zelodactylaria* is unresolved due to lack of sequence data. References: (Cruz et al., 2012) (morphology), (Wijayawardene et al., 2020) (outline).

Zygosporium Mont., Annales des Sciences Naturelles Botanique 17: 152 (1842)

Index Fungorum number: IF10473

Classification: Zygosporiaceae, Xylariales, Xylariomycetidae, Sordariomycetes, Pezizomycotina, Ascomycota

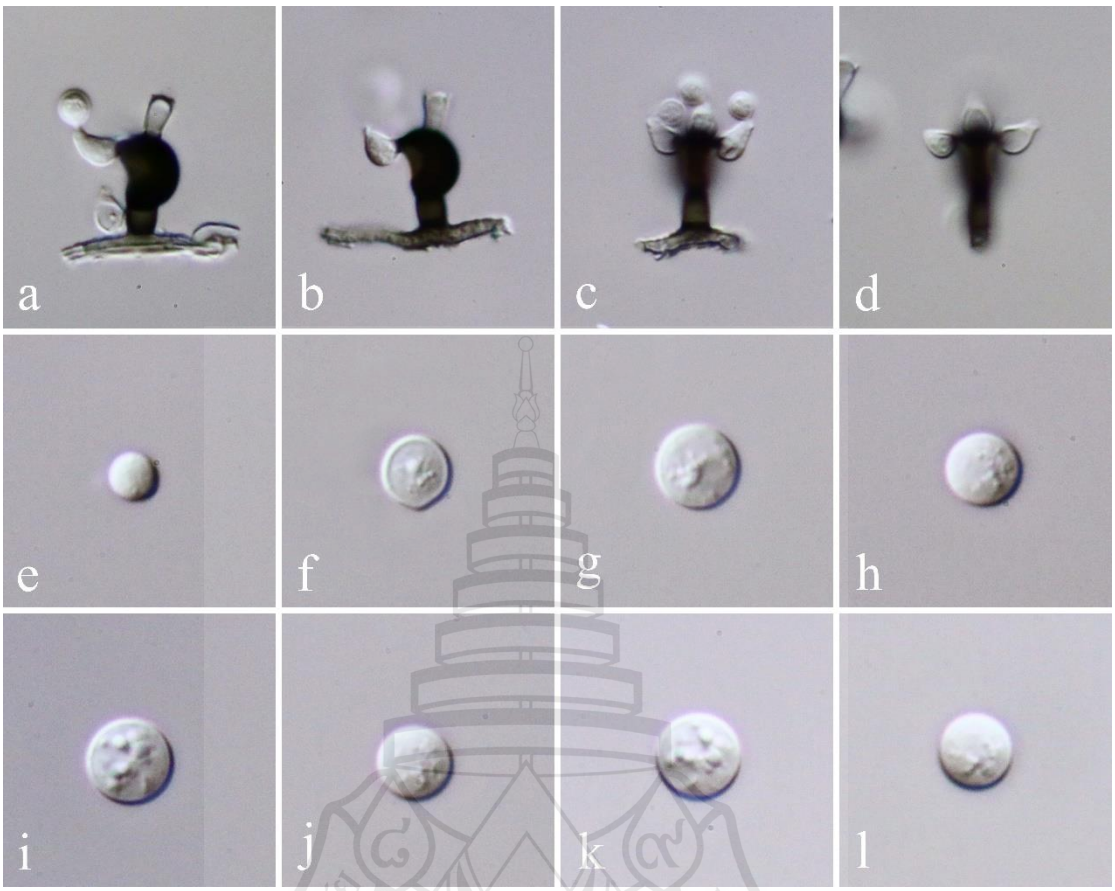
Type species: ***Zygosporium oscheoides*** Mont., Annales des Sciences Naturelles Botanique 17: 121 (1842)

Sexual morph: Unknown.

Synanamorph: sporothrix-like

Sequence data: *Zygosporium pseudomasonii* (CBS 146059, LSU: MN567654, ITS: MN562147, RPB2: MN556815)

Notes: It differs from other genera by having dark vesicular cells usually born from the side of setiform conidiophores and aseptate, hyaline, globose, ellipsoid conidia. Li et al. (2017b) introduced the family Zygosporiaceae to accommodate the genus *Zygosporium*. References: (Li et al., 2017b) (morphology and phylogeny)



Note *Zygosporium* sp. (Material examined: China, Guizhou Province, Guiyang City, Huaxi District, Huaxi Park, April 2018, Yao Feng, HX 2-3). **a–d** Conidiophores, conidiogenous cells with conidia. **e–l** Conidia.

Figure 2.61 *Zygosporium* sp.

Zymochalara Guatimosim, R.W. Barreto & Crous, Mycological Progress 15 (12): 1261 (2016)

Index Fungorum number: IF815563

Classification: Pezizellaceae, Helotiales, Leotiomycetes, Pezizomycotina, Ascomycota

Type species: *Zymochalara cyatheae* Guatimosim, R.W. Barreto & Crous, Mycological Progress 15 (12): 1262 (2016)

Sexual morph: Unknown.

Sequence data: *Zymochalara cyatheae* (CPC 24665 = COAD 1092, LSU: NG_059652, ITS: NR_154509, SSU: NG_061228)

Notes: *Zymochalara* was introduced by Guatimosim et al. (2016) and is *Chalara*-like. *Zymochalara* is similar to *Chalara* but differs by producing a yeast-like colony in pure culture (Guatimosim et al., 2016). Phylogenetically, *Zymochalara* was shown to be nested within the family Pezizellaceae (Helotiales, Leotiomycetes) (Figure 2.1). References: (Guatimosim et al., 2016) (morphology and phylogeny), (Wijayawardene et al., 2020) (outline).

2.4 Discussion

2.4.1 The Genus *Castanediella*

In this study, two new *Castanediella* species, *C. brevis* and *C. monoseptata*, were identified from decaying leaves in Thailand and a synopsis of hitherto described *Castanediella* species is provided (Table 2.3).

Presently, the genus *Castanediella* contains 14 species, and show to be diverse in its habitats. Most of *Castanediella* species have been collected from plant leaves. *Castanediella acaciae*, *C. camelliae*, *C. communis*, *C. eucalypti*, and *C. eucalypticola* were isolated from disease symptoms on different host plant leaves (Crous et al., 2015b, 2016a, 2016b; Wanasinghe et al., 2018) whereas *C. cagnizarii* is the only species found on decaying leaves submerged in a stream (Castañeda Ruíz et al., 2005). Some *Castanediella* species were reported from decaying leaves, such as *C. brevis*, *C. cagnizarii*, *C. diversispora*, *C. hyalopenicillata* and *C. monoseptata* (Castañeda Ruíz

et al., 2005; Costa et al., 2018; Hernández-Restrepo et al., 2016c). *Castanediella couratarii* was reported from dead wood (Hernández-Restrepo et al., 2016a).

The genus *Castanediella* is morphologically similar to *Idriella*, *Idriellopsis*, *Microdochium*, *Neoidriella*, *Paraidriella*, *Selenodriella* (Crous et al., 2015b; Hernández-Restrepo et al., 2016a; Seifert et al., 2011). However, these genera can be distinguished by the branching pattern of their conidiophores and conidial shape and septation (Hernández-Restrepo et al., 2016a). *Castanediella* differs from these genera by its branched conidiophores, ampulliform conidiogenous cells with scars instead of denticles, and filiform, 0–1-septate, straight to curved conidia (Crous et al., 2015b). These similar-looking genera are phylogenetically distinct (Crous et al., 2015b; Hernández-Restrepo et al., 2016a). A comparative synopsis of these genera is provided (Table 2.4).

Table 2.3 Synopsis of *Castanediella* species

Taxa	Conidiophores	Conidiogenous cells	Conidia			
			Shape	Size (µm)	Septa	Colour
C. acaciae	Subcylindrical, medium brown, 40–80 × 2–3 µm.	Polyblastic, ampulliform, pale brown, 10–15 × 2–3 µm.	Falcate with subobtuse ends	(8–)10–11(–12) × 1.5(–2)	0	Hyaline
C. brevis	Subcylindrica, ampulliform, hyaline, often reduced to conidiogenous cells	Polyblastic, cylindrical, hyaline, 3–14 × 1.5–5.5 µm	Fusiform, curved	12.5–21.7 × 1.2–3.0	0	Hyaline
C. cagnizarii	Cylindrical, brown at the base, subhyaline towards the apex, up to 45 µm long.	Polyblastic, sympodial, subhyaline, 5–22 × 3–4 µm.	Cylindrical to fusiform, curved at the ends	Two sizes, 10–15 × 2 and 20–26 × 2		Hyaline
C. camelliae	Conidiophores reduced to conidiogenous cell.	Cylindrical, ampulliform, globose subglobose, irregularly-shaped, 5.5–20.5 × 2–4.5 µm.	Straight to slightly curved, sometimes or swollen in the middle part	18.5–51.5 × 1.6–2.5	Septum indistinct	Hyaline

Table 2.3 (continued)

Taxa	Conidiophores	Conidiogenous cells	Conidia			
			Shape	Size (µm)	Septa	Colour
C. communis	Subcylindrical, medium brown, 20–60 × 3–4 µm.	Polyblastic, subcylindrical to ampulliform, pale brown, 10–35 × 2–4 µm.	Falcate with subobtuse ends	(13–)17–20(–22) × (2–)2.5(–3)	0	Hyaline
C. couratarii	Pale brown	Lageniform to cylindrical, hyaline to pale brown, 10.5–37 × 2–3.5 µm	Lunate	9.5–19 × 2–3	0	Hyaline
C. diversispora	Pale brown to brown	Polyblastic, sympodial, pale brown to brown, 4–9 × 2–3.5 µm.	Type i) cylindrical, slightly uncinate at the ends, straight Type ii) cylindrical to slightly subacerose, slightly uncinate at the apex, abruptly attenuated at the base, straight Type iii) long filiform, obtuse or rounded at the apex attenuated at the base, straight or curved	Type i) 11.5–16 × 2 Type ii) 19.5–25 × 1.5–2 Type iii) 28.5–47 × 1	Type i) 1-septate Type ii) 1-septate Type iii) 1–3-septate	Hyaline
C. eucalypti	Subcylindrical, medium brown, 10–30 × 3–4 µm.	Polyblastic, subcylindrical to ampulliform, pale brown, 8–25 × 2.5–4 µm.	Falcate, slightly to curved, widest in middle with subobtuse ends	(15–)18–21(–23) × 2–3	0	Hyaline
C. eucalypticola	Subcylindrical, medium brown, 5–30 × 3–5 µm.	Polyblastic, subcylindrical to ampulliform or lanceolate, pale brown, 5–20 × 3–3.5 µm.	Falcate, straight to curved, widest in the middle, apex subobtusely rounded, base truncate, 0.5 µm diam	(15–)20–26(–30) × (2.5–)3	0	Hyaline
C. eucalyptigena	Subcylindrical, hyaline, frequently reduced to conidiogenous loci on hyphae, up to 15 µm tall, 3–5 µm diam.	Polyblastic, hyaline, ampulliform to subcylindrical, 10 × 2–5 µm	Falcate, tapering to acute ends that are subobtusely rounded	(13–)18–24(–30) × 2(–2.5)	0	Hyaline

Table 2.3 (continued)

Taxa	Conidiophores	Conidiogenous cells	Conidia			
			Shape	Size (µm)	Septa	Colour
C. hyalopenicillata	Cylindrical, penicillate, mono-, bi-, and terverticillate, hyaline, 24–69 × 1.5–3 µm.	Mono- and polyblastic, short cylindrical, ampulliform, hyaline, 6.5–14 × 2–4 µm	Fusiform, base pointed, apex obtuse	14–24 × 2–3	0–1	Hyaline
C. malaysiana	Cylindrical, biverticillate, pale brown, 76–157 × 2.5–3 µm.	Polyblastic, cylindrical, subcylindrical, hyaline, 19–28 × 2.5–3.5 µm.	Fusiform, curved, apex acuminate, and base acuminate or slightly flattened	18–30 × 3	2–0	0–1 Hyaline
C. monoseptata	Subcylindrica, unbranched, hyaline, 8–29 × 2–4 µm	Polyblastic, cylindrical, hyaline	Fusiform, curved	15.4–25.8 × 1.5–2.3		0–1 Hyaline
C. ramosa	Cylindrical, penicillate, brown at the base, subhyaline at the apex, up to 70 µm long	Polyblastic, subhyaline, 10–20 x 2.5–3.5 µm	Falcate	26–44 × 2.2–3		(0–)1 Hyaline (–3)

Table 2.4 Synopsis of *Castanediella*-like genera

Genera	Conidiophores	Conidiogenous cells	Conidia	Chlamydospores
Castanediella	Branched, pale brown to brown at the base and subhyaline at the apex.	Sympodial, small denticles or scars, subhyaline.	0 – 1-sepate, falcate, lunate, cylindrical or fusiform, hyaline	Not observed.
Idriella	Brown, mostly reduced to conidiogenous cells	Denticulate, sympodial	Aseptate, lunate, curved, hyaline	Brown, uni- or pluricellular.
Idriellopsis	Unbranched, brown at the base, almost hyaline at the apex, mostly reduced to conidiogenous cells	Terminal, denticulate	0 – 1-septate, falcate, curved, hyaline	Not observed
Microdochium	More or less verticillate, reduced to conidiogenous cells, hyaline	Hyaline, sympodial or percurrent, sometimes denticulate	Aseptate or multiseptate, lunate, falcate, fusiform, filiform, obovoid or subpyriform, straight or curved, hyaline	Terminal or intercalary, solitary, in chains or grouped in clusters, brown.
Neoidriella	Mostly unbranched, pale brown, mostly reduced to conidiogenous cells	Sympodial, denticulate, terminal.	Aseptate, cylindrical to obovoid, hyaline	Intercalary or terminal, pale brown.
Paraidriella	Unbranched, pale brown, mostly reduced to conidiogenous cells.	Sympodial, denticulate, terminal.	Aseptate, cylindrical to oblong, hyaline	Not observed.
Selenodriella	Unbranched or verticillate, brown.	Sympodial, denticulate, (sub)hyaline.	Aseptate, falcate, hyaline	Not observed

2.4.2 The Genus *Fusariella*

In this study, all the earlier described species of *Fusariella* are reviewed and a synopsis of *Fusariella* species and a key to the genus is provided below (Table 2.5). Seventeen accepted species of the *Fusariella* are included, three species, *F. cladosporioides, F. polysciadis* and *F. populi*, are to be excluded.

Key to *Fusariella* species

1. Conidiophores coloured 2
1. Conidiophores hyaline to subhyaline 5
2. Conidia sub-cylindrical to obclavate, 16–24 × 3–9 μm *F. egyptiaca*
2. Conidia usually curved 3
3. Conidia olive brown, black in mass, 20–26 × 6–7 μm *F. atrovirens*

3. Conidia grey 4

4. Conidia 14–22 × 4.5–7 μm *F. intermedia*

4. Conidia 22–27 × 7–9 μm *F. kansensis*

5. Conidia hyaline to slightly coloured when mature 6

5. Conidia coloured when mature 8

6. Conidia with a distinct basal scar, 16–26 × 3.5–4.5 μm *F. concinna*

6. Conidia without a distinct basal scar 7

7. Conidiophores 6.5–14 μm long. Conidia cylindrical to fusiform, 14–24.5 × 3.5–5.5 μm *F. candida*

7. Conidiophores up to 60 μm long. Conidia cylindrical to obclavate, 14–20 × 3.5–5 μm *F. formosana*

8. Conidiophores branched 9

8. Conidiophores unbranched. Conidia fusoid, more tapered at apex than at the base, olivaceous at the base, upper parts nearly hyaline, 25–31.5 × 5.5–6.5 μm. *F. bizzozeriana*

9. Conidia mostly straight 10

9. Conidia mostly curved 13

10. Conidia less than 5 μm wide 11

10. Conidia more than 5 μm wide 12

11. Conidia fusiform, obclavate, rounded at the base and pointed at the apex, mostly the tip of each conidium being curved laterally, hyaline when young, pale olivaceous when mature, 18–24 × 3–4.5 μm. *F. curvata*

11. Conidia nearly cylindrical, initially hyaline, at maturity greenish-blue to grey when in mass, 15–19 × 2.5–3.5 μm *F. hughesii*

12. Conidia clavate, yellowish brown, 20–30 × 5–8 μm *F. helanshanensis*

12. Conidia cylindrical, rounded at the apex, truncate at the base, pale to mid grey, 15–18 × 5–7 μm *F. sarniensis*

13. Conidia of three different kinds of shapes: (i) long obclavate, 1–3-septate, 12–15 × 4.5–5 μm; (ii) short obclavate, 1-septate 8–12 × 4.5–6 μm; (iii) fusiform, 1–3-septate, 12–16 × 4.5–5 μm. *F. indica*

13. Conidia of one shape 14

14. Conidia less than 20 μm long 15

14. Conidia 25–30 × 6–8 μm *F. viridiatra*

15. Conidia obclavate, rounded at the base, tapered at apex, mostly incurved, pale olivaceous, green in mass, always 2–3-septate, 10.5–19 × 5–7.5 μm *F. echinulata*

15. Conidia fusoid to short obclavate, pointed at the apex, blunt at the base, the tip of each conidium being deflected laterally, pale olivaceous-brown, olivaceous-brown in mass, 1–3-septate, 10–15 × 4.4–5.5 μm *F. sinensis*

15. Conidia obclavate with rounded base and pointed apex, subhyaline when immature, becoming greenish olivaceous with age, 1–3-septate (mostly 3-septate), 14–20 × 4–6 um *F. obstipa*

Prior to this study, the natural classification of the genus *Fusariella* had not been determined. In this study, the phylogeny of the order *Hypocreales* is inferred from sequence data (SSU, LSU, EF1-α and RPB2) and a phylogenetic tree is provided to infer the phylogenetic position of the genus *Fusariella*. Based on phylogenetic analysis and morphology, the genus *Fusariella* belongs to the family *Bionectriaceae*.

Maharachchikumbura et al. (2015) accepted 38 genera within the family *Bionectriaceae* (Hypocreales, Sordariomycetes). The asexual morphs of family *Bionectriaceae* are acremonium- or gliocladium-like hyphomycetous, e.g. *Acremonium* Link, *Clonostachys* Corda, *Gliomastix* Guég., *Kutilakesa* Subram., having phialidic conidiogenous cells and hyaline to bright-coloured conidia (Seifert et al. 2011).

In the tree generated from maximum likelihood (ML) analysis based on combined ITS, SSU, LSU, TEF and RPB2 sequence data for family *Bionectriaceae* (data not shown), the strain of *F. curvata* (MFLUCC 15-0844) grouped together with *Hydropisphaera arenula* (NRRL 13963) with 59% ML bootstrap support and sister to the *Hydropisphaera erubescens* (ATCC 36093, ATCC 44545, ATCC 36092, HMAS 91779 and A.R. 2766) clade. The asexual morph of *Hydropisphaera* were reported as *Acremonium* (Rossman et al. 1999), *Cephalosporiopsis* (Rossman et al. 1999) or *Gliomastix* (Lechat et al. 2010). Morphologically, these genera are similar to *Fusariella* in producing unbranched or branched conidiophores, phialidic conidiogenous cells and unicellular to multi-septate, ellipsoidal, fusiform to

subfusiform, hyaline to greenish hyaline or bright-coloured conidia (Seifert et al. 2011; Maharachchikumbura et al. 2015).

Table 2.5 Synopsis of *Fusariella* species discussed in this study

Species Name	Conidia				
	Shape	**Colour**	**Septate**	**Ornamentation**	**Size (*μm*)**
F. atrovirens	Fusiform, pointed at the apex, blunt at the base	Olive brown, black in mass	3		20–26 × 6–7
F. bizzozeriana	Fusoid, more tapered at apex than at the base, thick-walled,	Olivaceous at the base, upper parts nearly hyaline	3	Smooth	25–31.5 × 5.5–6.5
F. candida	Cylindrical-fusiform	Colorless	(2–)3	Smooth	14–24.5 × 3.2–5.2
F. concinna	Thick-walled when mature, more or less fusoid but tapering towards the apex,	Slightly coloured, hyaline to slightly coloured, with a well-defined basal scar	3		16–22(26) × 3.5–4(4.5)
F. curvata	Fusiform, obclavate, rounded at the base and pointed at the apex, mostly the tip of each conidium being curved laterally	Hyaline when young, pale olivaceous when mature	1–3, mostly 3	Smooth	18–24 × 3–4.5
F. egyptiaca	Sub-cylindrical to obclavate	Dark blackish brown	3	Smooth at first then verruculose	16–24 × 7–9
F. formosana	Cylindrical to obclavate,	Hyaline	1–3, usually 3		14–20 × 3.5–5
F. helanshanensis	Clavate, straight, inflated in middle cell	Yellowish brown	2–3	Smooth	20–30 × 5–8
F. hughesii	Nearly cylindrical	Initially hyaline, at maturity greenish blue to grey when in mass	1–3, mostly 3	Smooth	15–19 × 2.5–3.5
F. indica	Long obclavate, short obclavate, fusiform	Hyaline when young, greenish black at maturity	1–3		8–16 × 4.5–6
F. intermedia	Curved, usually truncate and very dark at the base	Grey	3	Mostly smooth	14–22 × 4.5–7
F. kansensis	Curved	Grey	3	Smooth	22–27 × 7–9
F. obstipa	Obclavate with rounded base and pointed apex	Subhyaline when immature, becoming greenish olivaceous withe age	1–3, mostly 3		14–20 × 4–6
F. sarniensis	Cylindrical, rounded at the apex, truncate at the base	Pale to mid grey	3	Smooth	15–18 × 5–7

Table 2.5 (continued)

Species Name	Conidia				
	Shape	**Colour**	**Septate**	**Ornamentation**	**Size (*μm*)**
F. sinensis	Fusoid to short obclavate, pointed at the apex, blunt at the base, the tip of each conidium being deflected laterally	Pale olivaceous brown, olivaceous brown in mass	1–3	Smooth	10–15 × 4.4–5.5
F. viridiatra	Fusiform, curved, pointed at both ends	Green brown	3		25–30 × 6–8

2.4.3 The Genus *Pseudodactylaria*

Based on a megablast search of the NCBI nucleotide database using the ITS sequence of the ex-type culture, the highest similarities found were with *Pseudodactylaria xanthorrhoeae* (GenBank MG386064; identities = 450/498(90%), gaps = 7/498(1%)) and some unidentified *Sordariomycetes* species. A similar search using the LSU sequence of the ex-type culture (MFLUCC 16-0032), showed the highest similarities with *Pseudodactylaria xanthorrhoeae* (GenBank MG386117; identities = 804/826(97%), gaps = 0/826(0%)); *Dactylaria hyalotunicata* (≡ *Pseudodactylaria hyalotunicata*) (GenBank EU107298; identities = 800/828(97%), gaps = 2/828(0%)); and *Melanocarpus albomyces* (GenBank JQ067902; identities = 784/828(95%), gaps = 2/828(0%)).

In the tree generated from ML, MP and BI analysis based on LSU sequence data for the subclass *Sordariomycetidae*, the strain of *Pseudodactylaria brevis* grouped together with two other *Pseudodactylaria* species, *P. hyalotunicata* and *P. xanthorrhoeae*, with 100% ML bootstrap support, 97% MP bootstrap support and 100% Bayesian posterior probabilities. However, *P. brevis* formed a separate clade, sister to *P. hyalotunicata* and *P. xanthorrhoeae* clade.

The genus *Pseudodactylaria* Crous was introduced by Crous et al. (2017a) within the family *Pseudodactylariaceae* Crous (*Pseudodactylariales*, *Sordariomycetes*). The genus *Pseudodactylaria* is characterised by distinct, single, hyaline, unbranched and septate conidiophores, with terminal, integrated, denticulate conidiogenous cells that produce solitary, fusoid-ellipsoid, hyaline conidia (Crous et al., 2017a). The conidia of *Pseudodactylaria* are surrounded by a thin mucilaginous

sheath and aggregated in a slimy mass. The mucilaginous sheath is absent in *Dactylaria,* and this is the distinct difference between the two genera (Crous et al., 2017a).

Morphologically, *Pseudodactylaria brevis* can easily be distinguished from the two other accepted *Pseudodactylaria* species. *Pseudodactylaria brevis* often has its conidiophores reduced to conidiogenous cells a feature not occurring in the other species. Most noticeably, the conidia of *P. brevis* are smaller (11.5–17.5 × 2.5–4.0 μm) than those of *P. hyalotunicata*: (20–25 × 2.5–3) and *P. xanthorrhoeae* (20– 33 × 3–4 μm).

Dactylaria chrysosperma (Sacc.) Bhatt & Kendrick is morphologically the most similar species in *Dactylaria sensu lato* to *Pseudodactylaria brevis* (Crous et al., 2017a; de Hoog, 1985; de Hoog & van Oorschot, 1985; Ellis, 1976; Goh & Hyde, 1997a; Paulus et al., 2003; Seifert et al., 2011; van Oorschot, 1985). Both *P. brevis* and *D. chrysosperma* have fusiform, 1-septate, hyaline conidia. However, the conidiophores of *P. brevis* are hyaline whereas those of *D. chrysosperma* are brown, paler towards the apex, longer and wider. In addition, *Dactylaria chrysosperma* produces larger (18–26 × 3–4 μm) and hyaline or yellowish conidia.

Most *Dactylaria*-like species have been collected from terrestrial leaves (Argôlo Magalhães et al., 2014; Pinnoi et al., 2006; Pinruan et al., 2007; Promputtha et al., 2002; Wijayawardene et al., 2017a), wood (Goh & Hyde, 1997a) and soil (Rifai, 1968). Some *Dactylaria*-like species were reported from decaying submerged leaves (Barbosa et al., 2013; Pinnoi et al., 2003) or decaying submerged wood (Cai et al., 2002; Goh & Hyde, 1997a; Réblová et al., 2012; Tsui et al., 1997). *Dactylaria endophytica* was reported as an endophyte from leaves of *Prunus lusitanica* (Wu et al., 1996). Some *Dactylaria* species are pathogens on humans (Kralovic & Rhodes, 1995; Mazur & Judson, 2001) and animals (Salkin & Dixon, 1987). The genus *Dactylaria* includes several nematode-trapping species, such as *D. clavispora*, *D. haptotyla*, *D. sclerohypha* and *D. vermicola* (Cooke, 1964; Cooke & Satchuthananthavale, 1966; Saikawa & Kaneko, 1994; Schenck et al., 1977).

2.4.4 Hyaline-spored Hyphomycetes

2.4.4.1 Notes and Outline of Hyaline-spored Hyphomycetes

How many hyaline-spored hyphomycetous genera? In the book of Seifert et al. (2011), which included all the genera published before 2009 and parts of 2010 and 2011, 824 accepted genera were reported have hyaline conidia. In this study, based on the database of Index Fungorum, MycoBank and literature investigation, 294 genera, published after 2010, are proposed. Totally, the outline for hyaline-spored hyphomycetes provided in this study includes 1080 genera with 130 synonyms. For each accepted genus, notes including sexual morphs, synanamorphs, DNA sequence data, morphology are provided.

The hyaline-spored hyphomycetous genera are rich in diversity and distributed among five phyla, 26 classes, 87 orders, 204 families, see Table 2.6.

Table 2.6 Approximate numbers of hyaline-spored hyphomycetous genera from each fungal lineage Table 2.6 (continued)

Phylum	Subphylum	Class	Order	Family	Genera number
Ascomycota					1000
	Pezizomycotina				709
		Arthoniomycetes			1
			Arthoniales		1
				Arthoniaceae	1
		Dothideomycetes			107
			Acrospermales		1
				Acrospermaceae	1
			Capnodiales		40
				Capnodiaceae	1
				Dissoconiaceae	1
				Euantennariaceae	1
				Extremaceae	1
				Metacapnodiaceae	1
				Mycosphaerellaceae	27
				Schizothyriaceae	1
				Teratosphaeriaceae	7
			Comminutisporales		1
				Comminutisporaceae	1
			Dothideales		6
				Dothideaceae	2
				Neocelosporiaceae	1
				Saccotheciaceae	2
				Zalariaceae	1
			Eremomycetales		1
			Eremomycetales genera incertae sedis		1
			Jahnulales		1

Table 2.6 (continued)

Phylum	Subphylum	Class	Order	Family	Genera number
				Aliquandostipitaceae	1
			Microthyriales		8
				Microthyriaceae	8
			Muyocopronales		4
				Muyocopronaceae	4
			Pleosporales		10
				Amniculicolaceae	1
				Dothidotthiaceae	1
				Leptosphaeriaceae	1
				Melanommataceae	2
				Phaeosphaeriaceae	1
				Pleosporaceae	1
				Podonectriaceae	1
			Pleosporales genera incertae sedis		2
			Tubeufiales		18
				Tubeufiaceae	13
				Wiesneriomycetaceae	5
			Venturiales		4
				Cylindrosympodiaceae	2
				Sympoventuriaceae	2
		Dothideomycetes genera incertae sedis			10
		Dothideomycetes family incertae sedis			3
				Endosporiaceae	1
				Meliolinaceae	1
				Paranectriellaceae	1
		Eurotiomycetes			66
			Arachnomycetales		1
				Arachnomycetaceae	1
			Chaetothyriales		20
				Chaetothyriaceae	3
				Cyphellophoraceae	2
				Herpotrichiellaceae	8
				Trichomeriaceae	7
			Eurotiales		14
				Aspergillaceae	9
				Thermoascaceae	5
			Mycocaliciales		1
				Mycocaliciaceae	1
			Onygenales		26
				Ajellomycetaceae	5
				Arthrodermataceae	5
				Gymnoascaceae	1
				Helicoarthrosporaceae	1
				Onygenaceae	11
				Spiromastigaceae	1
			Onygenales genera incertae sedis		2
			Phaeomoniellales		2
				Phaeomoniellaceae	2

Table 2.6 (continued)

Phylum	Subphylum	Class	Order	Family	Genera number
			Sclerococcales		2
				Dactylosporaceae	2
		Laboulbeniomycetes			3
			Laboulbeniales		2
			Laboulbeniales genera incertae sedis		2
			Pyxidiophorales		1
				Pyxidiophoraceae	1
		Lecanoromycetes			4
			Acarosporales		2
				Acarosporaceae	2
			Lecanorales		1
				Malmideaceae	1
		Lecanoromycetes genera incertae sedis			1
		Leotiomycetes			118
			Chaetomellales		2
				Chaetomellaceae	2
			Helotiales		97
				Amorphothecaceae	1
				Arachnopezizaceae	1
				Calloriaceae	4
				Cenangiaceae	1
				Dermateaceae	3
				Discinellaceae	7
				Drepanopezizaceae	2
				Erysiphaceae	6
				Gelatinodiscaceae	4
				Helotiaceae	5
				Hyaloscyphaceae	6
				Leptodontidiaceae	1
				Mollisiaceae	5
				Myxotrichaceae	2
				Neolauriomycetaceae	3
				Pezizellaceae	7
				Pleuroascaceae	2
				Ploettnerulaceae	11
				Sclerotiniaceae	10
				Tricladiaceae	4
				Vandijckellaceae	2
			Helotiales genera incertae sedis		10
			Lauriomycetales		1
				Lauriomycetaceae	1
			Leotiales		9
				Cochlearomycetaceae	1
				Leotiaceae	1
				Tympanidaceae	5
			Leotiales genera incertae		2
			Phacidiales		1
				Helicogoniaceae	1

Table 2.6 (continued)

Phylum	Subphylum	Class	Order	Family	Genera number
			Thelebolales		5
				Pseudeurotiaceae	2
				Thelebolaceae	3
		Leotiomycetes genera incertae sedis			3
		Orbiliomycetes			15
			Orbiliales		15
				Orbiliaceae	15
		Pezizomycetes			11
			Pezizales		11
				Caloscyphaceae	1
				Chorioactidaceae	1
				Morchellaceae	1
				Pezizaceae	3
				Pyronemataceae	3
				Rhizinaceae	1
				Sarcoscyphaceae	1
		Sordariomycetes			384
			Amphisphaeriales		19
				Beltraniaceae	5
				Castanediellaceae	2
				Clypeophysalosporaceae	2
				Cylindriaceae	2
				Nothodactylariaceae	1
				Phlogicylindriaceae	3
				Xyladictyochaetaceae	1
			Amphisphaeriales genera incertae sedis		3
			Amplistromatales		1
				Amplistromataceae	1
			Calosphaeriales		4
				Calosphaeriaceae	3
				Pleurostomataceae	1
			Cephalothecales		1
				Cephalothecaceae	1
			Chaetosphaeriales		23
				Chaetosphaeriaceae	22
			Chaetosphaeriales genera incertae sedis		1
			Coniochaetales		2
				Coniochaetaceae	1
			Coniochaetales genera incertae sedis		1
			Coronophorales		7
				Ceratostomataceae	5
				Chaetosphaerellaceae	1
				Scortechiniaceae	1
			Diaporthales		2
				Gnomoniaceae	1
				Schizoparmaceae	1
			Falcocladiales		1
				Falcocladiaceae	1

Table 2.6 (continued)

Phylum	Subphylum	Class	Order	Family	Genera number
			Glomerellales		24
				Australiascaceae	1
				Malaysiascaceae	1
				Plectosphaerellaceae	19
				Reticulascaceae	3
			Hypocreales		175
				Bionectriaceae	17
				Calcarisporiaceae	1
				Clavicipitaceae	20
				Cordycipitaceae	19
				Hypocreaceae	10
				Myrotheciomycetaceae	2
				Nectriaceae	55
				Niessliaceae	3
				Ophiocordycipitaceae	5
				Polycephalomycetaceae	1
				Sarocladiaceae	4
				Stachybotryaceae	27
				Tilachlidiaceae	2
			Hypocreales genera incertae sedis		9
			Magnaporthales		10
				Magnaporthaceae	9
				Pyriculariaceae	1
			Melanosporales		1
				Ceratostomataceae	1
			Microascales		18
				Ceratocystidaceae	7
				Gondwanamycetaceae	1
				Graphiaceae	1
				Halosphaeriaceae	1
				Microascaceae	4
				Triadelphiaceae	1
			Microascales genera incertae sedis		3
			Myrmecridiales		2
				Myrmecridiaceae	1
				Xenodactylariaceae	1
			Ophiostomatales		11
				Kathistaceae	1
				Ophiostomataceae	10
			Pararamichloridiales		1
				Pararamichloridiaceae	1
			Parasympodiellales		1
				Parasympodiellaceae	1
			Pisorisporiales		1
			Pisorisporiales genera incertae sedis		1
			Pleurotheciales		5
				Pleurotheciaceae	5
			Pseudodactylariales		1
				Pseudodactylariaceae	1

Table 2.6 (continued)

Phylum	Subphylum	Class	Order	Family	Genera number
			Sordariales		17
				Chaetomiaceae	8
				Lasiosphaeriaceae	1
				Naviculisporaceae	2
				Podosporaceae	1
				Schizotheciaceae	1
				Sordariaceae	1
			Sordariales incertae sedis	genera	3
			Togniniales		1
				Togniniaceae	1
			Vermiculariopsiellales		2
				Vermiculariopsiellaceae	2
			Xylariales		38
				Anungitiomycetaceae	2
				Diatrypaceae	1
				Graphostromataceae	1
				Hansfordiaceae	1
				Hypoxylaceae	5
				Lopadostomataceae	1
				Microdochiaceae	5
				Xylariaceae	10
				Zygosporiaceae	1
			Xylariales incertae sedis	genera	11
		Sordariomycetes family incertae sedis			5
				Rhamphoriaceae	3
				Woswasiaceae	2
		Sordariomycetes genera incertae sedis			11
	Saccharomycotina				3
		Saccharomycetes			3
			Saccharomycetales		3
				Dipodascaceae	2
				Trichomonascaceae	1
Ascomycota genera incertae sedis					288
Basidiomycota					77
	Agaricomycotina				53
		Agaricomycetes			44
			Agaricales		11
				Lyophyllaceae	2
				Marasmiaceae	1
				Niaceae	1
				Psathyrellaceae	1
				Strophariaceae	2
			Agaricales incertae sedis	genera	4
			Atheliales		1
				Atheliaceae	1
			Auriculariales		2

Table 2.6 (continued)

Phylum	Subphylum	Class	Order	Family	Genera number
				Hyaloriaceae	1
			Auriculariales genera incertae sedis		1
			Cantharellales		3
				Botryobasidiaceae	1
				Hydnaceae	2
			Corticiales		2
				Corticiaceae	2
			Hymenochaetales		2
				Schizoporaceae	1
			Hymenochaetales genera incertae sedis		1
			Polyporales		5
				Dacryobolaceae	1
				Phanerochaetaceae	2
				Podoscyphaceae	1
			Polyporales genera incertae sedis		1
			Russulales		3
				Bondarzewiaceae	1
				Peniophoraceae	1
				Stereaceae	1
			Sebacinales		2
				Sebacinaceae	1
				Serendipitaceae	1
			Trechisporales		1
				Hydnodontaceae	1
		Agaricomycetes genera incertae sedis			12
		Bartheletiomycetes			1
			Bartheletiales		1
				Bartheletiaceae	1
		Dacrymycetes			2
			Dacrymycetales		2
				Dacrymycetaceae	2
		Tremellomycetes			5
			Cystofilobasidiales		1
				Mrakiaceae	1
			Tremellales		2
				Tremellaceae	1
			Tremellales genera incertae sedis		1
			Trichosporonales		1
				Trichosporonaceae	1
		Tremellomycetes genera incertae sedis			1
	Agaricomycotina genera incertae sedis				1
	Pucciniomycotina				11
		Atractiellomycetes			3
			Atractiellales		3
				Hoehnelomycetaceae	1
				Phleogenaceae	2

Table 2.6 (continued)

Phylum	Subphylum	Class	Order	Family	Genera number
		Classiculomycetes			2
			Classiculales		2
				Classiculaceae	2
		Cryptomycocolacomycetes			1
			Cryptomycocolacales		1
				Cryptomycocolacaceae	1
		Microbotryomycetes			1
			Kriegeriales		1
				Camptobasidiaceae	1
		Pucciniomycetes			3
			Helicobasidiales		1
				Helicobasidiaceae	1
			Platygloeales		2
				Platygloeaceae	2
		Tritirachiomycetes			1
			Tritirachiales		1
				Tritirachiaceae	1
	Ustilaginomycotina				8
		Exobasidiomycetes			6
			Entylomatales		2
				Entylomataceae	2
			Exobasidiales		3
				Brachybasidiaceae	1
				Cryptobasidiaceae	1
			Exobasidiales genera incertae sedis		1
			Microstromatales		1
				Quambalariaceae	1
		Moniliellomycetes			1
			Moniliellales		1
				Moniliellaceae	1
		Ustilaginomycetes			1
			Ustilaginales		1
				Ustilaginaceae	1
	Wallemiomycotina				1
		Wallemiomycetes			1
			Wallemiales		1
				Wallemiaceae	1
Basidiomycota genera incertae sedis					4
Calcarisporiellomycota					1
		Calcarisporiellomycetes			1
			Calcarisporiellales		1
				Calcarisporiellaceae	1
Kickxellomycota					1
Kickxellomycota genera incertae sedis					1
Zoopagomycota					1

Table 2.6 (continued)

Phylum	Subphylum	Class	Order	Family	Genera number
		Zoopagomycetes			1
			Zoopagales		1
				Sigmoideomycetaceae	1

In the last ten years, lots of hyaline-spored hyphomycetous genera were introduced (See Figure 2.25). The main reasons maybe are: (1) lots of newly introduced genera described based on new collections from several publication series that focused on fungal taxonomy, e.g., Fungal diversity notes series (Phookamsak et al., 2019; Tibpromma et al., 2018), Fungal Planet series (Crous et al., 2015b, 2015c, 2016a, 2016b, 2017a, 2017b, 2018a, 2018c, 2019a, 2019d, 2020a), Fungal Systematics and Evolution series (Hernández-Restrepo et al., 2016c), New and Interesting Fungi series (Crous et al., 2019b), and lots of other taxonomic publications (Hyde et al., 2020; Lin et al., 2017b; Lu et al., 2018b); (2) many previous genera were revised with the influence of DNA sequence data based analysis, and split into more small new genera (Giraldo & Crous, 2019; Hernández-Restrepo et al., 2016a; Houbraken et al., 2020; Lombard et al., 2015, 2016; Videira et al., 2016, 2017; Zare & Gams, 2016).

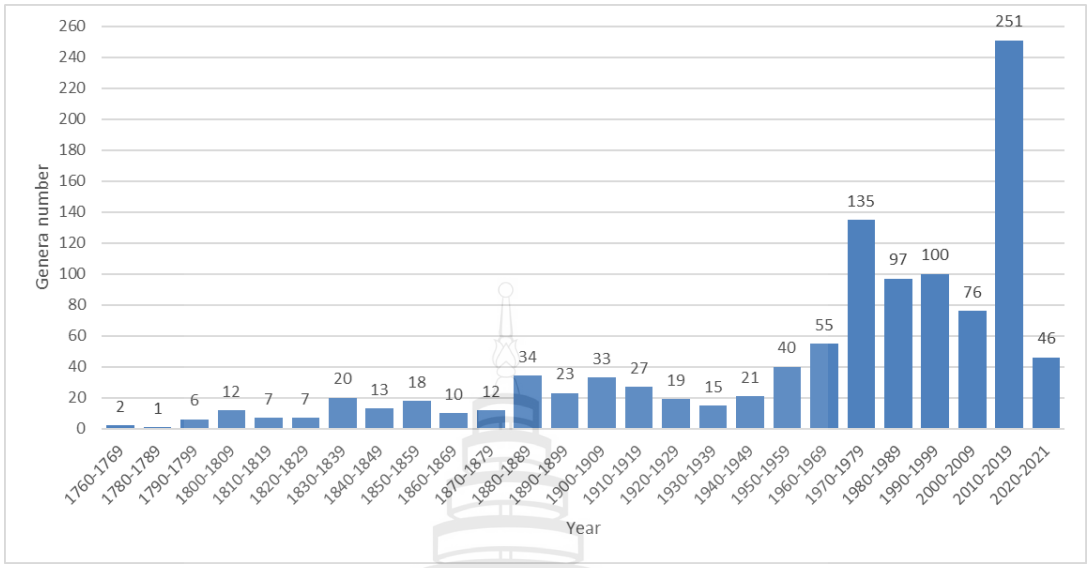


Figure 2.62 Decadal increase in the number of hyaline-spored hyphomycetous genera

DNA sequence data based analysis, especially phylogenetic analysis, are widely used in fungi taxonomy (Dissanayake et al., 2020; He et al., 2019; Hyde et al., 2020; James et al., 2006; Johnston et al., 2019; Lu et al., 2018b; Lücking et al., 2021; Luo et al., 2019; Schoch et al., 2009; Wijayawardene et al., 2020). DNA sequence data is one of the key points for each genus in our notes. Based on the database GenBank and recent publications, we found that a total of 754 hyaline-spored hyphomycetous genera were reported had DNA sequence data, and 709 of them were included in our phylogenetic analysis, 45 genera were excluded as lacking of LSU sequence data. In other words, about 30% of the hyaline-spored hyphomycetous genera are lacking DNA sequence data, and most of them were located in *Ascomycota* genera *incertae sedis*.

To our knowledge, this study represents the largest analysis of hyaline-spored hyphomycetes subjected to multi-gene phylogenetic analysis to date. We provide a broad phylogenetic backbone and framework for future studies of the hyaline-spored hyphomycetes, and will form the basis for further studies of hyaline-spored hyphomycetes.

The taxonomic positions for some genera were re-organized in this study based on phylogenetic evidence and morphology. The checklist of re-organized hyaline-spored hyphomycetous genera is shown in Table 2.7.

Table 2.7 Re-organized hyaline-spored hyphomycetous genera

Genus	Taxonomic position in this study	Taxonomic position in previous study
Pleurophragmium Costantin (1888)	*Ascomycota* genera *incertae sedis*	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes* genera *incertae sedis*
Scleroramularia Batzer & Crous (2011)	*Ascomycota*, *Pezizomycotina*, *Dothideomycetes* genera *incertae sedis*	*Ascomycota*, *Pezizomycotina*, *Dothideomycetes*, *Pleosporomycetidae*, *Pleosporales* genera *incertae sedis*
Neoscolecobasidium Crous (2016)	*Ascomycota*, *Pezizomycotina*, *Dothideomycetes*, *Microthyriales*, *Microthyriaceae*	*Ascomycota*, *Pezizomycotina*, *Dothideomycetes* orders *incertae sedis*, *Microthyriales* genera *incertae sedis*,
Stachybotryna Tubaki & T. Yokoy. (1971)	*Ascomycota*, *Pezizomycotina*, *Eurotiomycetes*, *Chaetothyriomycetidae*, *Chaetothyriales*, *Herpotrichiellaceae*	*Ascomycota* genera *incertae sedis*
Alatosessilispora K. Ando & Tubaki (1984)	*Ascomycota*, *Pezizomycotina*, *Eurotiomycetes*, *Chaetothyriomycetidae*, *Chaetothyriales*, *Trichomeriaceae*	*Ascomycota* genera *incertae sedis*
Arthrophiala W.S. Lisboa, Meir. Silva & R.W. Barreto (2016)	*Ascomycota*, *Pezizomycotina*, *Eurotiomycetes*, *Chaetothyriomycetidae*, *Chaetothyriales*, *Trichomeriaceae*	*Ascomycota*, *Pezizomycotina*, *Eurotiomycetes*, *Chaetothyriomycetidae*, *Chaetothyriales*, *Chaetothyriaceae*
Paraphaeoisaria de Hoog & Morgan-Jones (1978)	*Ascomycota*, *Pezizomycotina*, *Eurotiomycetes*, *Chaetothyriomycetidae*, *Phaeomoniellales*, *Phaeomoniellaceae*	*Ascomycota* genera *incertae sedis*
Mycosylva M.C. Tulloch (1973)	*Ascomycota*, *Pezizomycotina*, *Leotiomycetes*, *Helotiales*, ?*Myxotrichaceae*	*Ascomycota* genera *incertae sedis*
Tricellula Beverw. (1954)	*Ascomycota*, *Pezizomycotina*, *Leotiomycetes*, *Helotiales*, *Calloriaceae*	*Ascomycota* genera *incertae sedis*
Pseudoclathrosphaerina Voglmayr (1997)	*Ascomycota*, *Pezizomycotina*, *Leotiomycetes*, *Helotiales*, *Hyaloscyphaceae*	*Ascomycota* genera *incertae sedis*

Table 2.7 (continued)

Genus	Taxonomic position in this study	Taxonomic position in previous study
Staheliella Emden (1974)	*Ascomycota*, *Pezizomycotina*, *Leotiomycetes*, *Helotiales* genera *Incertae sedis*	*Ascomycota* genera *incertae sedis*
Trichosporiella Kamyschko (1960)	*Ascomycota*, *Pezizomycotina*, *Leotiomycetes*, *Helotiales*, *Incertae sedis*	*Ascomycota* genera *incertae sedis*
Microdochiella Hern.-Restr. & Crous (2015)	*Ascomycota*, *Pezizomycotina*, *Orbiliomycetes*, *Orbiliales*, *Orbiliaceae*	*Ascomycota*, *Pezizomycotina*, *Orbiliomycetes*, *Orbiliales* genus *incertae sedis*
Mycoceros D. Magyar & Z. Merényi (2017)	*Ascomycota*, *Pezizomycotina*, *Orbiliomycetes*, *Orbiliales*, *Orbiliaceae*	*Ascomycota*, *Pezizomycotina*, *Orbiliomycetes* genus *incertae sedis*
Korunomyces Hodges & F.A. Ferreira (1981)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Diaporthomycetidae*, *Diaporthales*, *Schizoparmaceae*	*Ascomycota* genera *incertae sedis*
Beauveriphora Matsush. (1975)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Diaporthomycetidae*, *Ophiostomatales*, *Ophiostomataceae*	*Ascomycota* genera *incertae sedis*
Rhinotrichella G. Arnaud ex de Hoog (1977)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae*, *Coronophorales*, *Ceratostomataceae*	*Ascomycota* genera *incertae sedis*
Onychophora W. Gams, P.J. Fisher & J. Webster (1984)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae*, *Hypocreales*, *Bionectriaceae*	*Ascomycota* genera *incertae sedis*
Lepisticola W. Gams (2009)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae*, *Hypocreales*, *Hypocreaceae*	*Ascomycota* genera *incertae sedis*
Heimiodora Nicot (1960)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae*, *Hypocreales*, *Nectriaceae*	*Ascomycota* genera *incertae sedis*
Myxocephala G. Weber, Spaaij & Oberw. (1989)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae*, *Hypocreales*, *Nectriaceae*	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Sordariomycetidae* genera *incertae sedis*
Chlamydocillium Zare & W. Gams (2016)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae*, *Hypocreales*, *Sarocladiaceae*	
Kiflimonium Summerb., J.A. Scott, Guarro & Crous (2018)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae*, *Hypocreales*, *Sarocladiaceae*	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae*, *Hypocreales*, *Hypocreaceae*

Table 2.7 (continued)

Genus	Taxonomic position in this study	Taxonomic position in previous study
Pseudoachroiostachys Tibpromma & K.D. Hyde (2018)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae*, *Hypocreales*, *Stachybotryaceae*	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae*, *Hypocreales*, *Nectriaceae*
Hantamomyces Crous (2020)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Hypocreomycetidae* genera *incertae sedis*	
Dendrosporium Plakidas & Edgerton ex J.L. Crane (1972)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes* genera *incertae sedis*	*Ascomycota* genera *incertae sedis*
Goidanichiella G.L. Barron ex W. Gams (2009)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes* genera *incertae sedis*	*Ascomycota* genera *incertae sedis*
Guarroa M. Calduch, Gené, Heredia & R.F. Castañeda (2020)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes* genera *incertae sedis*	*Ascomycota* genera *incertae sedis*
Hyphodiscosia Lodha & K.R.C. Reddy (1974)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Xylariomycetidae*, *Amphisphaeriales* genera incertae sedis	*Ascomycota* genera *incertae sedis*
Subulispora Tubaki (1971)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Xylariomycetidae*, *Amphisphaeriales* genera *incertae sedis*	*Ascomycota* genera *incertae sedis*
Polyscytalum Riess (1853)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Xylariomycetidae*, *Amphisphaeriales*, *Phlogicylindriaceae*	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Xylariomycetidae*, *Xylariales* genera *incertae sedis*
Digitodochium Tubaki & Kubono (1989)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Xylariomycetidae*, *Xylariales* genera *incertae sedis*	*Ascomycota* genera *incertae sedis*
Idriellomyces Crous (2018)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Xylariomycetidae*, *Xylariales* genera *incertae sedis*	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Xylariomycetidae*, *Amphisphaeriales*, *Phlogicylindriaceae*
Pinatubo J.B. Manandhar & Mew (1996)	*Ascomycota*, *Pezizomycotina*, *Sordariomycetes*, *Xylariomycetidae*, *Xylariales*, *Microdochiaceae*	*Ascomycota* genera *incertae sedis*
Glutinoagger Sivan. & Watling (1980)	*Basidiomycota*, *Agaricomycotina*, *Agaricomycetes*, *Agaricales* genera *incertae sedis*	*Basidiomycota*, *Agaricomycotina*, *Agaricomycetes* genera *incertae sedis*

Table 2.7 (continued)

Genus	Taxonomic position in this study	Taxonomic position in previous study
Synnematomyces Kobayasi (1981)	*Basidiomycota*, *Agaricomycotina*, *Agaricomycetes*, *Agaricales*, *Strophariaceae*	*Ascomycota* genera *incertae sedis*
Disporotrichum Stalpers (1984)	*Basidiomycota*, *Agaricomycotina*, *Agaricomycetes*, *Corticiales*, *Corticiaceae*	*Basidiomycota*, *Agaricomycotina*, *Agaricomycetes*, *Agaricales* genera *incertae sedis*

2.4.4.2 Hyaline-spored Hyphomycetes in *Ascomycota*

Ascomycota is the largest fungal phylum, and more than 90 % of the hyaline-spored hyphomycetous genera belong to this phylum. In our outline for hyaline-spored hyphomycetes, there are 1000 genera located in Ascomycota and are in high diversity in this phylum, which distributed among 2 subphyla, 10 classes, 57 orders, 162 families. Hyaline-spored hyphomycetes in Ascomycota are mainly in the *Sordariomycetes* (384 genera), *Leotiomycetes* (118 genera), *Dothideomycetes* (107 genera), *Eurotiomycetes* (66 genera) and *Ascomycota* genera *incertae sedis* (288 genera).

Hyaline-spored hyphomycetes in Sordariomycetes

Sordariomycetes is one of the largest classes of Ascomycota that comprises large number of hyphomycetes, and 384 genera are reported have hyaline conidia from this class.

Hyaline-spored hyphomycetes in the orders of *Sordariomycetes* are: *Hypocreales*, *Xylariales*, *Amphisphaeriales*, *Glomerellales*, *Chaetosphaeriales*, *Microascales*, *Sordariales*, *Ophiostomatales*, *Magnaporthales*, *Coronophorales*, *Calosphaeriales*, *Pleurotheciales*, *Diaporthales*, *Coniochaetales*, *Myrmecridiales*, *Vermiculariopsiellales*, *Melanosporales*, *Togniniales*, *Pseudodactylariales*, *Parasympodiellales*, *Cephalothecales*, *Pisorisporiales*, *Falcocladiales*, *Amplistromatales*, *Pararamichloridiales* and some uncertain orders, and mainly from the first 12 orders.

Hypocreales

Hyaline-spored hyphomycetes are extremely rich in the order *Hypocreales*, nearly half of the hyaline-spored hyphomycetous genera in *Sordariomycetes* are located in this order and are mainly in the families *Nectriaceae*, *Stachybotryaceae*, *Clavicipitaceae*, *Bionectriaceae*, *Cordycipitaceae*, *Hypocreaceae*, and *Ophiocordycipitaceae*, and rarely reported in the families *Sarocladiaceae*, *Niessliaceae*, *Tilachlidiaceae*, *Myrotheciomycetaceae*, *Calcarisporiaceae* and *Polycephalomycetaceae*.

At family level, *Nectriaceae* is the family that contains the largest number of hyaline-spored hyphomycetous genera, which 55 genera in this family were reported producing hyaline conidia. Hyaline-spored hyphomycetes in this family are characterized by conidiophores are mononematous or synnematous or sporodochial, branched or unbranched or penicillate or verticillate, with or without setae, mostly hyaline, conidiogenous cells are monophialidic to polyphialidic, integrated, ampulliform or lageniform or cylindrical or subcylindrical or subulate or subclavate, hyaline and producing conidia that are solitary or catenate, often aggregated in slimy masses, aseptate to multi-septate, sometimes guttulate, and chlamydospores are present or absent. Numerous hyaline-spored hyphomycetes are important plant and human pathogens, e.g., *Fusarium* and *Paracremonium*.

There are 27 hyaline-spored hyphomycetous genera are recorded in the family *Stachybotryaceae*, and hyaline-spored hyphomycetes in this family are characterized by conidiophores are mononematous or synnematous or sporodochial, solitary or gregarious, unbranched or branched or penicillate or verticillate, with or without setae, hyaline or brown, conidiogenous cells are monophialidic to polyphialidic, discrete, cylindrical or ellipsoidal or clavate or reniform, hyaline or brown, and producing conidia that are aggregated in slimy masses, aseptate to multi-septate, cylindrical, fusiform, ellipsoidal.

Within the family *Bionectriaceae*, 17 genera were reported producing hyaline conidia. Hyaline-spored hyphomycetes in this family are characterized by conidiophores are mononematous or synnematous or sporodochial, unbranched or branched or penicillate or verticillate, hyaline or brown, conidiogenous cells are mostly monophialidic, integrated, cylindrical to flask-shaped, hyaline, conidia are

solitary or catenate, aggregated in slimy masses, aseptate to multi-septate, chlamydospores are present or absent.

Within the family *Hypocreaceae*, 10 genera were reported producing hyaline conidia. Hyaline-spored hyphomycetes in this family are characterized by conidiophores are mononematous or synnematous or sporodochial, sparingly branched, trichodermoid, verticillate, hyaline, conidiogenous cells are mostly phialidic or sometimes monoblastic or polyblastic, integrated or discrete, sometimes sympodial, hyaline, and producing conidia that are solitary or catenate, aggregated in slimy masses, aseptate to multi-septate.

There are 20, 19 and 5 hyaline-spored hyphomycetous genera are recorded in the family *Clavicipitaceae*, *Cordycipitaceae*, and *Ophiocordycipitaceae*, respectively.

Amphisphaeriales and Xylariales

57 hyphomycetous genera are recorded have hyaline conidia within the subclass *Xylariomycetidae*, and distributed among two orders, *Amphisphaeriales* and *Xylariales*. Hyaline-spored hyphomycetes within these two orders are mainly recorded in the families *Xylariaceae*, *Hypoxylaceae*, *Microdochiaceae*, *Beltraniaceae*, *Amphisphaeriales* genera *incertae sedis* and *Xylariales* genera *incertae sedis*, and are rarely recorded in the family *Cylindriaceae*, *Phlogicylindriaceae*, *Castanediellaceae*, *Graphostromataceae*, *Anungitiomycetaceae*, *Clypeophysalosporaceae*, *Xyladictyochaetaceae*, *Hansfordiaceae*, *Diatrypaceae*, *Nothodactylariaceae*, *Zygosporiaceae*, *Lopadostomataceae*.

Within the family *Xylariaceae*, 10 genera were reported producing hyaline conidia. Hyaline-spored hyphomycetes in this family are characterized by conidiophores are mononematous or synnematous, unbranched or branched, sometimes vesiculate, hyaline to brown, conidiogenous cells are monoblastic or polyblastic, sympodial or percurrent, often denticulate, hyaline or brown, producing conidia that are solitary, aseptate.

Within the family *Hypoxylaceae*, 5 genera were reported producing hyaline conidia. Hyaline-spored hyphomycetes in this family mostly are nodulisporium-like and are characterized by having mononematous or sometimes synnematous, mostly branched, hyaline to brown conidiophores, with polyblastic,

sympodial, hyaline to pale brown conidiogenous cells, and producing conidia that are solitary, aseptate.

Within the family *Microdochiaceae*, 5 genera were reported producing hyaline conidia. Hyaline-spored hyphomycetes in this family mostly are *Idriella*-like or *Microdochium*-like and are characterized by mononematous or sporodochial, unbranched or branched, sometimes reduced, hyaline or brown conidiophores, polyblastic, integrated or discrete, terminal, mostly sympodial or rarely percurrent, denticulate conidiogenous cells, and solitary, aseptate to multi-septate, hyaline, lunate, curved conidia.

Within the family *Beltraniaceae*, 5 genera were reported producing hyaline conidia. Hyaline-spored hyphomycetes in this family are characterized by setae are present or absent, dark brown, with radially lobed basal cell, conidiophores are mononematous, unbranched or sometimes branched, septate, arising from the base of setae or separate, with or without radially lobed basal cell, conidiogenous cells are polyblastic, integrated, denticulate, pale brown, and producing conidia that are biconic, lageniform to navicular, with transverse band at widest part of the conidium.

Glomerellales

Within the order *Glomerellales*, hyaline-spored hyphomycetes are mainly recorded in the family *Plectosphaerellaceae*, and relatively uncommon in the families *Australiascaceae*, *Glomerellaceae*, *Malaysiascaceae* and *Reticulascaceae*.

Within the family *Plectosphaerellaceae*, 19 genera were reported producing hyaline conidia. Hyaline-spored hyphomycetes in this family are characterized by conidiophores are mononematous or sporodochial, unbranched or branched or verticillate, hyaline or brown, conidiogenous cells are blastic or phialidic, hyaline or brown, and producing conidia that are solitary, aggregated in slimy masses, aseptate or 1-septate.

Chaetosphaeriales

Within the order *Chaetosphaeriales*, almost all the hyaline-spored hyphomycetes are recorded in the family *Chaetosphaeriaceae*. Hyaline-spored hyphomycetes in this family are mostly characterized by conidiophores are mononematous or sometimes synnematous or sporodochial, solitary or scattered, unbranched or branched, with or without setae, hyaline or brown, conidiogenous cells

are monophialidic or polyphialidic, integrated, sympodial or percurrent, with funnel-shaped collarettes, hyaline and producing conidia that are solitary or catenate, aggregated in slimy masses, aseptate to multi-septate, straight or curved with or without setulae.

Microascales

Within the order *Microascales*, hyaline-spored hyphomycetes are mainly recorded in the families *Ceratocystidaceae*, and relatively uncommon in the families *Microascaceae*, *Gondwanamycetaceae*, *Graphiaceae*, *Halosphaeriaceae* and *Triadelphiaceae*.

Sordariales

Within the order *Sordariales*, hyaline-spored hyphomycetes are mainly recorded in the family *Chaetomiaceae*, and are rarely reported in the families *Lasiosphaeriaceae*, *Naviculisporaceae*, *Podosporaceae*, *Schizotheciaceae* and *Sordariaceae*.

Ophiostomatales

Within the order *Ophiostomatales*, hyaline-spored hyphomycetes are almost recorded in the family *Ophiostomataceae*, and one genus is reported in the family *Kathistaceae*. Hyaline-spored hyphomycetes in *Ophiostomataceae* are mostly characterized by conidiophores are mononematous or synnematous, unbranched or branched or penicillate, sometimes reduced, hyaline or brown, conidiogenous cells are monoblastic to polyblastic, sympodial or percurrent, denticulate, hyaline or subhyaline and producing conidia that are solitary, aggregated in slimy masses, aseptate, hyaline.

Magnaporthales

Within the order *Magnaporthales*, hyaline-spored hyphomycetes are almost recorded in the family *Magnaporthaceae*, and only one genus is recorded in the family *Pyriculariaceae*. Hyaline-spored hyphomycetes in *Magnaporthaceae* are mostly characterized by conidiophores are mononematous, unbranched or branched, sometimes reduced, hyaline or brown, conidiogenous cells are phialidic, integrated, with collarettes, hyaline or pale brown, and producing conidia that are solitary, often aggregated in slimy masses, aseptate or septate, straight or curved, hyaline.

Coronophorales

Within the order *Coronophorales*, hyaline-spored hyphomycetes are mainly recorded in the family *Ceratostomataceae*, and are rarely reported in the families *Chaetosphaerellaceae* and *Scortechiniaceae*

Hyaline-spored hyphomycetes in *Ceratostomataceae* are mostly characterized by conidiophores are mononematous, unbranched or branched, sometimes reduced, sometimes vesiculate, hyaline or brown, conidiogenous cells are monoblastic to polyblastic or phialidic, integrated, sympodial, denticulate, hyaline, and producing conidia that are solitary or sometimes catenate, aggregated in slimy masses, aseptate, smooth or verrucose, hyaline.

Pleurotheciales

Only one family, *Pleurotheciaceae*, was accepted within the order *Pleurotheciales*, it also means all hyaline-spored hyphomycetes in this order are recorded in the family *Pleurotheciaceae*.

Hyaline-spored hyphomycetes in *Pleurotheciaceae* are mostly characterized by conidiophores are mononematous or synnematous, solitary or in groups, unbranched or branched, hyaline or brown, conidiogenous cells are monoblastic or polyblastic, sympodial or percurrent, denticulate, and producing conidia that are solitary, aggregated in slimy masses, aseptate or septate, hyaline.

Calosphaeriales

Within the order *Calosphaeriales*, hyaline-spored hyphomycetes are mainly recorded in the family *Calosphaeriaceae* and are rarely reported in the family *Pleurostomataceae*.

Other orders

Hyaline-spored hyphomycetes are relatively uncommon in these orders, which only one to four genera are recorded in these orders, *Diaporthales*, *Coniochaetales*, *Myrmecridiales*, *Vermiculariopsiellales*, *Melanosporales*, *Togniniales*, *Pseudodactylariales*, *Parasympodiellales*, *Cephalothecales*, *Pisorisporiales*, *Falcocladiales*, *Amplistromatales* and *Pararamichloridiales*.

Hyaline-spored hyphomycetes in Leotiomycetes

Hyaline-spored hyphomycetes in the orders of *Leotiomycetes* are: *Helotiales*, *Leotiales*, *Thelebolales*, *Phacidiales*, *Chaetomellales*, *Lauriomycetales* and uncertain orders. *Helotiales* is the largest order in *Leotiomycetes*, contains half of

the described species of *Leotiomycetes* (Johnston et al., 2019), which in turn hyaline-spored hyphomycetes in *Leotiomycetes* are mainly from this order and account for more than 80% of hyaline-spored hyphomycetous *Leotiomycetes*. Hyaline-spored hyphomycetes are relatively uncommon in *Leotiales*, *Thelebolales*, *Chaetomellales*, *Phacidiales*, *Lauriomycetales*, and only 9, 5, 2, 1 and 1 genera are recorded so far, respectively.

Hyaline-spored hyphomycetes in Dothideomycetes

Hyaline-spored hyphomycetes in the orders of *Dothideomycetes* are: *Capnodiales*, *Tubeufiales*, *Pleosporales*, *Microthyriales*, *Dothideales*, *Venturiales*, *Muyocopronales*, *Acrospermales*, *Eremomycetales*, *Jahnulales* and uncertain orders, and are mainly from the first four orders.

Capnodiales

Abdollahzadeh et al. (2020) re-evaluated the *Capnodiales s. lat.*, as a result, (1) *Capnodiales s. str*. was redefined, which only accepted the family *Capnodiaceae* and along with two newly introduced families *Neoantennariellaceae* and *Readerielliopsidaceae*; (2) *Mycosphaerellales* was resurrected and accepted the families *Cystocoleaceae*, *Dissoconiaceae*, *Extremaceae*, *Mycosphaerellaceae*, *Neodevriesiaceae*, *Phaeothecoidiellaceae*, *Schizothyriaceae* and *Teratosphaeriaceae*.

In this study, we still follow the previous treatments for *Capnodiales*, except for *Comminutispora*, by other mycologists (Wijayawardene et al., 2020), which is the broad sense of Abdollahzadeh et al. (2020).

Within the order *Capnodiales*, hyaline-spored hyphomycetes are mainly recorded in the families *Mycosphaerellaceae* and *Teratosphaeriaceae*, and are rarely reported in the families *Schizothyriaceae*, *Metacapnodiaceae*, *Capnodiaceae*, *Euantennariaceae*, *Dissoconiaceae*, *Extremaceae*.

Account for hyaline-spored hyphomycetous genera in *Capnodiales*, more than half of them are associated with *Mycosphaerellaceae*. Hyaline-spored hyphomycetes in *Mycosphaerellaceae* are mostly characterized by conidiophores are mononematous or synnematous or sporodochial, solitary or fasciculate, unbranched or branched, sometimes reduced, straight to geniculate-sinuous, hyaline or brown, with conidiogenous cells are monoblastic or polyblastic, integrated, terminal, sympodial,

often cicatrized, hyaline or pale brown, and producing conidia that are solitary or catenate, aseptate to multi-septate, sometimes scolecosporous.

Hyaline-spored hyphomycetes in *Teratosphaeriaceae* are mostly characterized by conidiophores are mononematous or sporodochial, solitary or caespitose, unbranched or branched or sometimes verticillate, often reduced, hyaline or brown, conidiogenous cells are monoblastic or polyblastic or sometimes thallic-arthric, integrated, terminal or intercalary, sympodial, hyaline or brown, and producing conidia that are solitary or catenate, sometimes aggregated in slimy masses, aseptate or septate, sometimes scolecosporous.

Tubeufiales

Three families, *Bezerromycetaceae*, *Tubeufiaceae* and *Wiesneriomycetaceae*, are accepted within the order *Tubeufiales* (Hongsanan et al., 2020b; Lu et al., 2018b) and numerous hyaline-spored hyphomycetes are recorded in the family *Tubeufiaceae* and *Wiesneriomycetaceae*, especially in the family *Tubeufiaceae*.

Three kinds of hyphomycetous asexual morphs were reported in *Tubeufiaceae*, which producing conidia that are dictyosporous, helicosporous and phragmosporous (Lu et al., 2018b). There are 13 hyaline-spored hyphomycetous genera in Tubeufiaceae and mostly produce helicosporous conidia.

Pleosporales

Within the order *Pleosporales*, hyaline-spored hyphomycetes are from the families *Amniculicolaceae*, *Dothidotthiaceae*, *Leptosphaeriaceae*, *Melanommataceae*, *Phaeosphaeriaceae*, *Pleosporaceae*, *Podonectriaceae* and uncertain families, and one to three genera are recorded in each family.

Microthyriales

Microthyriales contains a single family *Microthyriaceae* (Hongsanan et al., 2020b), therefore, all hyaline-spored hyphomycetes in *Microthyriales* are from *Microthyriaceae*. Hyaline-spored hyphomycetes in *Microthyriaceae* are mostly characterized by conidiophores are mononematous, solitary, unbranched or branched, sometimes reduced, hyaline or brown, conidiogenous cells are monoblastic or polyblastic or phialidic, integrated, terminal, determinate or sympodial, hyaline or

brown, and producing conidia that are solitary or catenate, aseptate to multi-septate, sometimes staurosporous.

Hyaline-spored hyphomycetes in Eurotiomycetes

Hyaline-spored hyphomycetes in the orders of *Eurotiomycetes* are: *Onygenales*, *Eurotiales*, *Chaetothyriales*, *Phaeomoniellales*, *Sclerococcales*, *Mycocaliciales*, *Arachnomycetales*, and are mainly from the first three orders.

Onygenales

Within the order *Onygenales*, hyaline-spored hyphomycetes are mainly from the families *Onygenaceae*, *Ajellomycetaceae* and *Arthrodermataceae*, and are rarely reported in the families *Spiromastigaceae*, *Gymnoascaceae*, *Helicoarthrosporaceae*.

Many hyaline-spored hyphomycetes in *Onygenales*, e.g. species of *Blastomyces*, *Coccidioides*, *Histoplasma*, *Paracoccidioides* and *Trichophyton*, were reported as human and animal pathogens which being associated with human or animal blood, bone marrow, brain, liver, lung, oral and skin (Chaturvedi & de Hoog, 2020; Cmokova et al., 2020; Jiang et al., 2018).

Eurotiales

Houbraken et al. (2020) re-evaluated *Eurotiales* and accepted five families *Aspergillaceae*, *Elaphomycetaceae*, *Penicillaginaceae*, *Thermoascaceae* and *Trichocomaceae*, in addition, a list of accepted species in this order was provided. This order contains various economically important genera, such as *Aspergillus* and *Penicillium*, which play important roles in food, indoor environment, medical mycology and biotechnology (Houbraken et al., 2020).

Within the order *Eurotiales*, hyaline-spored hyphomycetes are from the families *Aspergillaceae* and *Thermoascaceae*.

Chaetothyriales

Within the order *Chaetothyriales*, hyaline-spored hyphomycetes are from the families *Herpotrichiellaceae*, *Trichomeriaceae*, *Chaetothyriaceae*, and *Cyphellophoraceae*, and 8, 7, 3 and 2 genera are recorded, respectively.

Hyaline-spored hyphomycetes in Ascomycota genera incertae sedis

The morphology of hyaline-spored hyphomycetous genera assigned in *Ascomycota* genera *incertae sedis* are various. Some genera have conidiomata that are

single conidiophores (e.g., *Botryomonilia*, *Chalarodes*, *Solosympodiella*), or synnematous (e.g., *Leightoniomyces*, *Stilbellula*, *Venustosynnema*), or sporodochial (e.g., *Everhartia*, *Lappodochium*, *Lichenostella*). Some genera have brown setae (e.g., *Chaetoblastophorum*, *Chaetochalara*, *Spondylocladiopsis*). Some genera have conidiogensis that are blastic (e.g., *Drumopama*, *Mackenziella*, *Solosympodiella*), or phialidic (e.g., *Chalarodes*, *Harmoniella*, *Zakatoshia*), or percurrent (e.g., *Acrophragmis*, *Chantransiopsis*, *Hyalobelemnospora*). Some genera have conidia that are solitary (e.g., *Soloacrospora*), or catenate (e.g., *Chikaneea*, *Herreromyces*, *Junctospora*), and some genera producing ameroconidia (e.g., *Chaetochalara*, *Echinoconidiophorum*, *Rhynchosporina*), or didymoconidia (e.g., *Blastophorella*, *Chaetopsis*, *Paraceratocladium*), or phragmoconidia (e.g., *Parvosympodium*, *Pleurophragmium*, *Stenospora*), or dictyoconidia (e.g., *Hyalocladium*, *Mystrosporiella*, *Odontodictyospora*), or helicoconidia (e.g., *Drepanospora*, *Helicominopsis*, *Hyalohelicomina*), or stauroconidia (e.g., *Lateriramulosa*, *Radiatispora*, *Vanterpoolia*), or scolecoconidia (e.g., *Petrakiopsis*, *Scolecodochium*, *Stenospora*).

In this study, we resolved some taxonomic problems for some genera previously placed in *Ascomycota* genera *incertae sedis*. For example, *Alatosessilispora* was transformed to the family Trichomeriaceae (Chaetothyriales, Eurotiomycetes) since the ex-type strain (NBRC 31820) of the generic type species (*A. bibrachiata*) phylogenetically grouped within the family *Trichomeriaceae*. *Onychophora* was assigned to the family *Bionectriaceae* (*Hypocreales*, *Hypocreomycetidae*, *Sordariomycetes*) based on our phylogenetic analysis and it shares similar morphological characters with other genera in this family. For other treated genera in this study, see Table 2.7.

There are 288 hyaline-spored hyphomycetous genera are retained as *Ascomycota* genera *incertae sedis*. Among these genera, only 49 of them have sequence data. Herbarium materials, fresh collections and DNA sequence data are required for these genera, especially for their generic type species, to evaluate their taxonomic position in the future studies.

2.4.4.3 Hyaline-spored Hyphomycetes in *Basidiomycota*

Basidiomycota is the second largest fungal phylum, and nearly 10 % of the hyaline-spored hyphomycetous genera are from this phylum. In our outline for hyaline-spored hyphomycetes, there are 77 genera located in *Basidiomycota* and distribute among 4 subphyla, 14 classes, 28 orders, 40 families.

Hyaline-spored hyphomycetes in *Basidiomycota* are from the subphyla *Agaricomycotina*, *Pucciniomycotina*, *Ustilaginomycotina*, *Wallemiomycotina* and uncertain subphyla, and more than 70% genera are from *Agaricomycotina*.

At the class-level, hyaline-spored hyphomycetes in *Basidiomycota* are from the classes *Agaricomycetes*, *Exobasidiomycetes*, *Pucciniomycetes*, *Tremellomycetes*, *Atractiellomycetes*, *Classiculomycetes*, *Dacrymycetes*, *Microbotryomycetes*, *Cryptomycocolacomycetes*, *Bartheletiomycetes*, *Tritirachiomycetes*, *Ustilaginomycetes*, *Wallemiomycetes*, *Moniliellomycetes*, and uncertain classes. Account for the hyaline-spored hyphomycetous genera in *Basidiomycota*, nearly 60% are from the class *Agaricomycetes* and of the remaining classes, each has only one to six genera.

At order-level, hyaline-spored hyphomycetes in *Basidiomycota* are mainly from *Agaricales* and *Polyporales*, 11 and 5 genera are recorded, respectively. Of the remaining 26 classes, each has only one to three genera.

Hyaline-spored hyphomycetes in *Basidiomycota* are various in morphology. Conidiomata are none or synnematous or sporodochial, sometimes gelatinous and cupulate. Conidiophores are mononematous or synnematous or sporodochial, unbranched or branched or verticillate or penicillate, sometimes reduced, with or without clamp connections, sometimes with dolipores, hyaline or brown. Conidiogenous cells are blastic or thallic, determinate or sympodial or rarely percurrent, sometimes denticulate, with or without clamp connections. Conidia are solitary or catenate or aggregated in slimy masses, aseptate to multi-septate, some genera yeast-like, some genera helicosporous or staurosporous or scolecosporous.

2.4.4.4 Hyaline-spored Hyphomycetes in *Calcarisporiellomycota*

Hyaline-spored hyphomycete was rarely reported in *Calcarisporiellomycota* and only one genus, *Calcarisporiella*, is recorded in our outline. *Calcarisporiella* differs from other similar genera by its mononematous, reduced, hyaline conidiophores, with sympodial, denticulate, peculiar-shaped

conidiogenous cells. In our phylogenetic analysis, *Calcarisporiellomycota* formed a separate clade apart from *Ascomycota* and *Basidiomycota*.

2.4.4.5 Hyaline-spored Hyphomycetes in *Kickxellomycota*

Hyaline-spored hyphomycete is uncommon in *Kickxellomycota* and only one genus, *Aenigmatospora*, is recorded in our outline. *Aenigmatospora* is unique by its solitary, aseptate, mushroom-shaped, hyaline spores (Castañeda Ruíz et al., 1999). However, this genus maybe is not a hyphomycetes (Seifert et al., 2011). Phylogenetic position for *Aenigmatospora* is unresolved due to lack of DNA sequence data.

2.4.4.6 Hyaline-spored Hyphomycetes in *Zoopagomycota*

Hyaline-spored hyphomycete was rarely reported in *Zoopagomycota* and only one genus, *Sphondylocephalum*, is recorded in our outline. *Sphondylocephalum* differs from similar genera by its verticillate conidiophores, polyblastic, vesiculate conidiogenous cells and reticulate, globose, hyaline conidia (Stalpers, 1974). Phylogenetic position for *Sphondylocephalum* is unresolved due to lack of DNA sequence data.

CHAPTER 3

HYALINE-SPORED CHAETOSPHAERIACEOUS HYPHOMYCETES FROM THAILAND AND CHINA, WITH A CURRENT REVIEW OF THE FAMILY CHAETOSPHAERIACEAE

This chapter is extracted from the following publications Lin et al. (2019b)

3.1 Introduction

The family *Chaetosphaeriaceae* was introduced by Locquin (1984) for *Chaetosphaeria* Tul. & C. Tul., *Loramyces* W. Weston, *Niesslia* Auersw., *Rhagadostoma* Körb. and *Zignoëlla* Sacc., but it was not validly published (Réblová et al., 1999). Réblová et al. (1999) re-described the *Chaetosphaeriaceae* and accepted the genera *Ascocodinaea* Samuels, Cand. & Magni, *Chaetosphaeria*, *Melanochaeta* E. Müll., Harr & Sulmont, *Melanopsammella* Höhn., *Porosphaerella* E. Müll. & Samuels, *Porosphaerellopsis* Samuels & E. Müll. and *Striatosphaeria* Samuels & E. Müll. Presently, 38 genera are accepted within the family *Chaetosphaeriaceae* (Maharachchikumbura et al., 2016; Wijayawardene et al., 2018).

Cryptophiale Piroz. was introduced by Pirozynski (1968) to accommodate *C. kakombensis* Piroz. and *C. udagawae* Piroz. & Ichinoe, and 20 species are accepted (Whitton et al., 2012). *Cryptophiale* is most similar to *Cryptophialoidea* Kuthub. & Nawawi, but differs by its conidiogenous cells encircling the conidiophore and they are protected by shield cells, which are on one side of the conidiophore and are not covered by sterile shield cells (Whitton et al., 2012).

Dictyochaeta was established by Spegazzini (1923) to accommodate *D. fuegiana* Speg. It is characterized by unbranched or branched, brown conidiophores

with or without unbranched setae, monophialidic or polyphialidic, brown conidiogenous cells which produce aseptate and hyaline conidia. There are 104 epithets listed in Index Fungorum 2019). Kuthubutheen and Nawawi (1991e) provided a key to *Dictyochaeta* and *Codinaea* species.

Kionochaeta P.M. Kirk & B. Sutton was introduced by Kirk and Sutton (1985) when they amended the genus *Chaetopsina* Rambelli. *Kionochaeta* is similar to *Zanclospora*, but differs by its conidiogenous cells borne on variously arranged branches of conidiophores, however, the conidiogenous cells are sessile, arranged in whorls on a conidiophore in *Zanclospora* (Kirk & Sutton, 1985).

Menisporopsis S. Hughes was established by Hughes (1952) to accommodate *M. theobromae* S. Hughes. Liu et al. (2016) provided a detailed description of *M. theobromae* and the first molecular data for this genus. There are eleven epithets listed in Index Fungorum (July, 2019). Keys to the *Menisporopsis* species were provided by Castañeda Ruíz et al. (2001) and Tsui et al. (1999).

Tainosphaeria F.A. Fernández & Huhndorf was introduced by Fernández and Huhndorf (2005) with *T. crassiparies* F.A. Fernández & Huhndorf as the type species, and placed within the family *Chaetosphaeriaceae*. Three species are accepted within this genus (Fernández & Huhndorf, 2005; Liu et al., 2016; Lu et al., 2016). Its placement in *Chaetosphaeriaceae* was confirmed by phylogenetic analyses (Fernández et al., 2006; Liu et al., 2016; Lu et al., 2016).

During a survey of hyphomycetes in China and Thailand, several hyaline-spored chaetosphaeriaceous species were collected. They were shown to belong to *Cryptophiale*, *Dictyochaeta*, *Kionochaeta*, *Menisporopsis*, *Tainosphaeria* and the new genus *Multiguttulispora* in *Chaetosphaeriaceae* based on both morphology and phylogenetic analyses of ITS and LSU sequence data. In this study, we introduce one new genus *Multiguttulispora* with its type species *M. sympodialis*, two new *Dictyochaeta* species (*D. brevis* and *D. terminaliae*), two new *Kionochaeta* species (*K. castaneae* and *K. microspora*), two new *Menisporopsis* species (*M. breviseta* and *M. dushanensis*), two new *Tainosphaeria* species (*T. aseptata* and *T. monophialidica*) along with two previously described species, *Cryptophiale udagawae* and *Dictyochaeta simplex* based on morphology and phylogenetic analysis.

3.2 Materials and Methods

3.2.1 Collection and Isolation of Fungi

Dead wood from a variety of plants in forests were collected in Krabi Province, Thailand and Guizhou Province, China. Samples were taken to the laboratory in Zip-lock plastic bags for examination. The specimens were incubated in sterile moist chambers and examined using a Motic SMZ 168 series microscope. Fungi were removed with a needle and placed in a drop of distilled water on a slide for morphological study. Photomicrographs of fungal structures were captured with a Canon 600D digital camera attached to a Nikon ECLIPSE Ni compound microscope. All measurements were made using the Tarosoft (R) Image FrameWork program (Liu et al., 2010). Photo-plates were made with Adobe Photoshop CS3 (Adobe Systems, USA). Isolation onto potato dextrose agar (PDA) was performed by the single spore isolation method (Chomnunti et al., 2014). Dried material was deposited in the Herbarium of Mae Fah Luang University (MFLU), Chiang Rai, Thailand and herbarium of Kunming Institute of Botany, Chinese Academy of Sciences (HKAS), Kunming, China. Cultures were deposited at Mae Fah Luang University Culture Collection (MFLUCC), Chiang Rai, Thailand and Guizhou Culture Collection, China (GZCC). Faces of Fungi and Index Fungorum numbers were registered (Index Fungorum, 2019; Jayasiri et al., 2015).

3.2.2 DNA Extraction, PCR Amplification and Sequencing

Genomic DNA was extracted from pure fungal mycelium grown on PDA or malt extract agar (MEA) at room temperature using the Fungal gDNA Kit (BioMIGA, USA) according to the manufacturer's instructions. The internal transcribed spacer region of ribosomal DNA (ITS), large subunit nuclear ribosomal DNA (LSU) and small subunit nuclear ribosomal DNA (SSU) genes regions were amplified via polymerase chain reaction (PCR) using the following primers: ITS5 and ITS4 (White et al., 1990) for ITS, LR0R and LR5 (Vilgalys & Hester, 1990) for LSU, and NS1 and NS4 for SSU (White et al., 1990). The PCR products were sequenced with the same primers. The PCR amplification was performed in a 25 μL reaction volume containing 12.5 μL of 2 × Power Taq PCR MasterMix (a premix and ready to use

solution, including 0.1 Units/ µ l Taq DNA Polymerase, 500 µM dNTP Mixture each [dATP, dCTP, dGTP, dTTP], 20 mM Tris-HCl pH 8.3, 100 Mm KCl, 3 mM MgCl2, stabilizer and enhancer), 1 µL of each primer (10 µM), 1 µL genomic DNA extract and 9.5 µL deionised water. The PCR thermal cycle program of ITS and LSU were: initially 94 °C for 3 min., followed by 35 cycles of denaturation at 94 °C for 30 s, annealing at 55 °C for 50 s, elongation at 72 °C for 1 min., and final extension at 72 °C for 10 min.

3.2.3 Phylogenetic Analyses

Original sequences were checked using BioEdit version 7.0.5.3 (Hall, 1999), along with reference sequences originated from previous publications. The remaining homogenous sequences were obtained by BLAST searches (Altschul et al., 1990) from GenBank. All sequences used in this study are listed in Table 3.1. Alignments for each locus were done in MAFFT v7.307 online version (Katoh & Standley, 2016) and manually verified in MEGA 6.06 (Tamura et al., 2013). Conserved blocks were selected from the initial alignments with Gblocks 0.91b (Castresana, 2000). The interleaved NEXUS files for Bayesian inference analyses were formatted with AliView v1.19-beta1k (Larsson, 2014). Bayesian inference (BI), maximum parsimony (MP) and maximum likelihood (ML) were used for phylogenetic analyses. For Bayesian inference analysis, the best model of evolution was determined using MrModeltest v2 (Nylander, 2004). Bayesian inference analysis was done with MrBayes v 3.2.6 (Ronquist et al., 2012). Maximum parsimony analysis was performed in PAUP*4.0b10 (Swofford, 2002). Maximum likelihood analysis was performed in raxmlGUI v 1.3.1 (Silvestro & Michalak, 2012). Phylogenetic trees were drawn with TreeView 1.6.6 (Page, 1996) or FigTree v1.4.3 (Rambaut, 2017).

Table 3.1 GenBank accession numbers of isolates included in this study

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU
Adautomilanezia caesalpiniae	HUEFS 216632 =T LAMIC010212 = CC-LAMIC 102/12		NG_058594	NR_153560	-[d]
Anacacumisporium appendiculatum	HMAS 245593	T	KT001553	KT001555	-
Anacacumisporium appendiculatum	HMAS 245602		KT001554	KT001556	-
Bahusutrabeeja dwaya	CBS 261.77 = JCMT 6357		MH872829	MH861059	-
Brunneodinemasporium brasiliense	CBS 112007	T	JQ889288	JQ889272	-
Brunneodinemasporium jonesii	GZCC 16-0050	T	KY026055	KY026058	-
Cacumisporium capitulatum	FMR 11339		HF677190	HF677176	-
Cacumisporium capitulatum	SMH 3766		AY017374	-	-
Chaetosphaeria acutata	CBS 101312		AF178553	AF178553	-
Chaetosphaeria albida	PDD 92537	T	NG_058756	NR_119666	-
Chaetosphaeria biapiculata	SMH 3074		AF466065	-	-
Chaetosphaeria caesariata	SMH 2794		AF466060	-	-
Chaetosphaeria callimorpha	CBS 525.88		AF178555	AF178555	-
Chaetosphaeria callimorpha	SMH 2791		AF466062	-	-
Chaetosphaeria capitata	SMH 3239		AF466061	-	-
Chaetosphaeria chalaroides	SMH 2018		AY017372	-	-
Chaetosphaeria chalaroides	SMH 2223		AF466063	-	-
Chaetosphaeria chlorotunicata	SMH 1565		AF466064	-	-
Chaetosphaeria ciliata	CBS 122131	T	MH874726	MH863180	
Chaetosphaeria ciliata	ICMP 18253		GU180637	-	GU180614
Chaetosphaeria conirostris	SMH 2183		AF466066	-	-
Chaetosphaeria cubensis	SMH 3258		AF466067	-	-
Chaetosphaeria curvispora	CBS 125555		MH875040	MH863562	-
Chaetosphaeria curvispora	CBS 125782		MH875199	MH863736	-
Chaetosphaeria curvispora	ICMP 18255		GU180636	-	-
Chaetosphaeria cylindrospora	SMH 3568	T	AY017373	-	-
Chaetosphaeria decastyla	SMH 2629		AF466068	-	-
Chaetosphaeria dilabens	CBS 712.88		AF178557	AF178557	-
Chaetosphaeria dilabens	CBS 734.83		MH873395	MH861683	-
Chaetosphaeria fennica	CBS 101641		AF178562	AF178562	-
Chaetosphaeria fuegiana	CBS 114553		MH874528	-	-
Chaetosphaeria fusiformis	CBS 101429		AF178554	AF178554	-
Chaetosphaeria garethjonesii	MFLUCC 15-1012	T	NG_059017	NR_154840	-
Chaetosphaeria hebetiseta	MR 938		AF178549	AF178549	-
Chaetosphaeria hebetiseta	SMH 2729		AF466069	AY906955	-
Chaetosphaeria inaequalis	MR 1450		AF178564	AF178564	-

Table 3.1 (continued)

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU
Chaetosphaeria innumera	MR 1175		AF178551	AF178551	-
Chaetosphaeria innumera	SMH 2748		AY017375	AY906956	-
Chaetosphaeria jonesii	MFLUCC 15-1015	T	KY212761	NR_154841	-
Chaetosphaeria lateriphiala	SMH 2629-1		AF466070	-	-
Chaetosphaeria lateriphiala	SMH 3294		AF466071	-	-
Chaetosphaeria lateriphiala	SMH 3320		AF466072	-	-
Chaetosphaeria lentomita	MR 1265		AF178548	AF178548	-
Chaetosphaeria lignomollis	SMH 3015		AF466073	EU037896	-
Chaetosphaeria longiseta	SMH 1725		AF279416	-	-
Chaetosphaeria longiseta	SMH 3854		AF279417	-	-
Chaetosphaeria luquillensis	SMH 2973		AF466074	-	-
Chaetosphaeria mangrovei	MCD 069	T	MG813820	MG813821	-
Chaetosphaeria metallicans	PDD 92539	T	NG_058757	NR_119668	-
Chaetosphaeria minuta	SMH 3396		AF466075	-	-
Chaetosphaeria myriocarpa	CBS 116.57		MH869208	MH857668	-
Chaetosphaeria myriocarpa	CBS 141.53		MH868672	MH857137	-
Chaetosphaeria myriocarpa	CBS 143389		MH107931	MH107883	-
Chaetosphaeria myriocarpa	CBS 241.75B		MH872648	MH860912	-
Chaetosphaeria myriocarpa	CBS 264.76		AF178552	AF178552	-
Chaetosphaeria myriocarpa	MUCL 34784		AF466076	-	-
Chaetosphaeria panamensis	MFLUCC 15-1011		KY212760	KY212752	-
Chaetosphaeria preussii	CBS 262.76		AF178561	AF178561	-
Chaetosphaeria pygmaea	UPSC 2523		AF466077	-	-
Chaetosphaeria pygmaea	MR 1365		AF178545	AF178545	-
Chaetosphaeria raciborskii	SMH 2017		AF466078	AY906949	-
Chaetosphaeria raciborskii	SMH 3119		AY436402	AY906953	-
Chaetosphaeria rivularia	CBS 127686	T	KR347357	KR347356	-
Chaetosphaeria spinosa	SMH 2754		AF466079	-	-
Chaetosphaeria sylvatica	SMH 2893		AF279419	-	-
Chaetosphaeria tropicalis	SMH 1267		AF279418	-	-
Chaetosphaeria tropicalis	SMH 2250		AF466080	-	-
Chloridium aquaticum	HKAS 96226	T	MH476567	MH476570	MH476573
Chloridium aseptatum	MFLUCC 11-0216	T	MH476568	NR_158365	MH476574
Chloridium botryoideum	CBS 131270		MH877338	-	-
Chloridium botryoideum var. *botryoideum*	CBS 259.76		MH878530	-	-
Chloridium botryoideum var. *botryoideum*	CBS 246.76		MH878531	-	-
Chloridium chloroconium	FMR 11940		KY853495	KY853435	-
Chloridium lignicola	CBS 143.54	IT	MH857273	MH857273	-
Chloridium sp.	HGUP1806		MK372068	MK372070	-
Chloridium sp.	HGUP1805		MK372067	MK372069	-
Chloridium virescens	MR 1148		AF178550	AF178550	-
Chloridium virescens	NRRL 37636		GU183124	GU183124	-

Table 3.1 (continued)

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU
Chloridium virescens var. *caudigerum*	CBS 152.53		MH868678	MH857142	-
Chloridium virescens var. *caudigerum*	CBS 141.54		MH868805	MH857272	-
Chloridium virescens var. *caudigerum*	CBS 126073		MH875524	MH864068	-
Chloridium virescens var. *chlamydosporum*	CBS 345.67		MH870689	MH858992	-
Chloridium virescens var. *chlamydosporum*	CBS 126074		MH875525	MH864069	-
Chloridium virescens var. *chlamydosporum*	CBS 142.61		MH869557	-	-
Chloridium virescens var. chlamydosporum	CBS 114.41	T	MH867576	-	-
Chloridium virescens var. *virescens*	CBS 239.75B		MH878291	-	-
Codinaea lambertiae	CBS 143419 = CPC 32289	T	NG_059053	NR_156389	-
Codinaea pini	CBS 138866	T	NG_058902	NR_137943	-
Codinaeopsis gonytrichoides	CBS 593.93		AF178556	AF178556	-
Conicomyces pseudotransvaalensis	HHUF 29956 = GS20	T	LC001708	NR_138015	-
Cryptophiale hamulata	MFLUCC 18-0098		MG386756	-	MG386757
Cryptophiale udagawae	MFLUCC 18-0422		MH758211	MH758198	MH758205
Cryptophiale udagawae	MFLUCC 18-0428		MH758210	MH758197	MH758204
Cryptophiale udagawae	**GZCC 18-0047**		**MN104619**	**MN104608**	**MN104628**
Cryptophialoidea fasciculata	MFLUCC 17-2119		MH758208	MH758195	MH758202
Dendrophoma cytisporoides	CBS 223.95	T	JQ889289	JQ889273	-
Dictyochaeta aquatica	MFLUCC 15–0983	T	MH476569	NR_158452	MH476575
Dictyochaeta assamica	CBS 242.66		MH870426	MH858788	-
Dictyochaeta brevis	**GZCC 18-0096**	**T**	**MN104625**	**MN104614**	**MN104634**
Dictyochaeta fuegiana	FMR 13126		KY853500	KY853440	-
Dictyochaeta fuegiana	ICMP 15153		EF063574	-	-
Dictyochaeta mimusopis	CBS 143435		MH107935	MH107888	-
Dictyochaeta pandanicola	KUMCC 16-0153 = MFLUCC 17-0563	T	MH376710	MH388338	MH388307
Dictyochaeta septata	CBS 143386		MH107936	MH107889	-
Dictyochaeta siamensis	MFLUCC 15-0614	T	KX609952	KX609955	-
Dictyochaeta siamensis	MFLUCC 16-0371		MH376711	MH388339	MH388308
Dictyochaeta simplex	CBS 966.69		AF178559	AF178559	-
Dictyochaeta simplex	**GZCC 18-0017**		**MN104620**	**MN104609**	**MN104629**
Dictyochaeta terminalis	**GZCC 18-0085**	**T**	**MN104624**	**MN104613**	**MN104633**
Dinemasporium decipiens	CBS 592.73		JQ889291	JQ889275	-
Dinemasporium morbidum	CBS 129.66	T	JQ889296	JQ889280	-
Dinemasporium morbidum	CBS 995.97		JQ889297	JQ889281	-
Dinemasporium nelloi	MFLUCC 13-0482	T	KP711363	KP711358	KP711368
Dinemasporium polygonum	CBS 516.95	T	NG_059109	NR_137786	-
Dinemasporium pseudoindicum	CBS 127402	T	JQ889293	NR_137787	-

Table 3.1 (continued)

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU
Echinosphaeria canescens	SMH 4791		AY436403	-	-
Ellisembia brachypus	HKUCC 10555		DQ408563	-	-
Eucalyptostroma eucalypti	CBS 142074 = CPC 28764	T	NG_059257	NR_154027	-
Eucalyptostroma eucalypti	CBS 142075 = CPC 28748		KY173499	KY173407	-
Eucalyptostroma eucalyptorum	CPC 31800	T	MH327838	NR_159834	-
Exserticlava vasiformis	TAMA 450		AB753846	-	-
Gelasinospora tetrasperma	CBS 178.33 = AFTOL-ID 1287		DQ470980	NR_077163	DQ471032
Gonytrichum caesium	CBS 696.74		MH872625	-	-
Gonytrichum caesium var. *chloridioides*	CBS 129.72		MH872151	MH860413	-
Gonytrichum macrocladum	CBS 201.55		MH868989	MH857448	-
Gonytrichum macrocladum	CBS 195.60		MH869503	MH857954	-
Gonytrichum macrocladum	CBS 875.68		MH870968	MH859240	-
Gonytrichum mirabile	CBS 408.76		MH872760	MH860990	-
Helminthosphaeria clavariarum	SMH 4609	T	AY346283	-	-
Infundibulomyces cupulata	BCC 11929	T	EF113979	EF113976	EF113982
Infundibulomyces oblongisporus	BCC 13400	T	EF113980	EF113977	EF113983
Kionochaeta castaneae	**GZCC 18-0025**	**T**	**MN104621**	**MN104610**	**MN104630**
Kionochaeta ivoriensis	CBS 374.76 = JCM 9876	T	MH872758	NR_160149	NG_063387
Kionochaeta microspora	**GZCC 18-0036**	**T**	**MN104618**	**MN104607**	**MN104627**
Kionochaeta ramifera	JCM9756		-	-	AB003788
Kionochaeta spissa	JCM9817		-	-	AB003789
Kionochaeta spissa	JCM9818		-	-	AB003790
Lecythothecium duriligni	CBS 101317		AF261071	-	-
Leptosporella arengae	MFLUCC 15-0330	T	MG272246	MG272255	MG366594
Leptosporella gregaria	SMH 4290	T	AY346290	-	-
Linocarpon arengae	MFLUCC 15-0331	T	MG272247	-	MG366596
Linocarpon cocois	MFLUCC 15-0812	T	MG272248	MG272257	MG272253
Melanochaeta aotearoae	SMH 1655		AF466081	-	-
Melanochaeta aotearoae	SMH 3551		AF466082	-	-
Melanopsammella gonytrichii	SMH 3785		AF466085	-	-
Melanopsammella vermicularioides	SMH 1985		AF064644	-	-
Melanopsammella vermicularioides	SMH 3883		AF466086	-	-
Melanopsammella vermicularioides	FC 404		AF466087	-	-
Menispora glauca	FMR 12089		HF678538	HF678528	-
Menispora tortuosa	CBS 214.56		AF178558	AF178558	-
Menispora tortuosa	DAOM 231154 = AFTOL-ID 278		AY544682	KT225527	AY544723
Menisporopsis anisospora	CBS 109475	T	MH874421	MH862827	-
Menisporopsis breviseta	**GZCC 18-0071**	**T**	**MN104623**	**MN104612**	**MN104632**
Menisporopsis dushanensis	**GZCC 18-0084**	**T**	**MN104626**	**MN104615**	**MN104635**

Table 3.1 (continued)

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU
Menisporopsis pandanicola	KUMCC 17-0271	T	MH376726	MH388353	MH388320
Menisporopsis theobromae	MFLUCC 15-0055		KX609954	KX609957	-
Morrisiella indica	HKUCC 10827		DQ408578	-	-
Multiguttulispora sympodialis	**MFLUCC 18-0153**	**T**	**MN104617**	**MN104606**	-
Nawawia filiformis	MFLUCC 16-0853		MH758206	-	MH758200
Nawawia filiformis	MFLUCC 17-2394		MH758209	MH758196	MH758203
Nawawia malaysiana	CPC 16757 = CBS 125544	T	GU229887	GU229886	-
Neopseudolachnella acutispora	HHUF 29727	T	NG_059404	NR_154223	-
Neopseudolachnella magnispora	MAFF 244359	T	AB934042	AB934066	-
Neopseudolachnella uniseptata	MAFF 244360	T	AB934043	AB934067	-
Paliphora intermedia	CBS 896.97	T	NG_057766	NR_160203	EF204518
Paliphora intermedia	CBS 199.95		EF204500	-	EF204517
Phaeostalagmus cyclosporus	CBS 663.70		MH871680	MH859892	-
Phaeostalagmus cyclosporus	CBS 312.75		MH872661	-	-
Phialosporostilbe scutiformis	MFLUCC 17-0227	T	MH758207	MH758194	MH758201
Phialosporostilbe scutiformis	MFLUCC 18-1288		MH758212	MH758199	-
Polynema podocarpi	CPC 32761	T	MH327833	MH327797	-
Pseudodinemasporium fabiforme	MAFF 244361	T	AB934044	AB934068	-
Pseudolachnea fraxini	CBS 113701	T	JQ889301	JQ889287	-
Pseudolachnea hispidula	MAFF 244364		AB934047	AB934071	-
Pseudolachnella asymmetrica	MAFF 244366	T	AB934049	AB934073	-
Pseudolachnella botulispora	MAFF 244367	T	AB934050	AB934074	-
Pseudolachnella guaviyunis	CBS 134695 = CMW 39055	T	NG_058879	NR_153892	-
Pyrigemmula aurantiaca	CBS 126743	**T**	HM241692	HM241692	-
Pyrigemmula aurantiaca	CBS 126744		HM241693	HM241693	-
Rattania setulifera	GUFCC 15501		HM171322	GU191794	-
Ruzenia spermoides	SMH 4606		AY436422	-	-
Sordaria fimicola	CBS 508.50		MH868251	MH856730	-
Sporoschisma hemipsilum	MFLUCC 15-0615		KX358074	KX505869	-
Sporoschisma hemipsilum	SMH 2125		AF466083	-	-
Sporoschisma hemipsilum	SMH 3251		AF466084	-	-
Sporoschisma longicatenatum	MFLUCC 16-0180		KX358077	KX505871	-
Sporoschisma mirabile	FMR 11247		HF677183	HF677174	HF937358
Sporoschisma palauense	MFLUCC 15-0616	T	KX358075	KX505870	-
Stanjehughesia vermiculata	HKUCC 10840		DQ408570	-	-
Striatosphaeria codinaeophora	MR 1230		AF178546	AF178546	-
Striatosphaeria codinaeophora	SMH 1524		AF466088	-	-
Synaptospora plumbea	SMH3962		KF765621	-	-
Tainosphaeria aseptata	**GZCC 18-0044**	**T**	**MN104622**	**MN104611**	**MN104631**
Tainosphaeria crassiparies	SMH 1934	T	AF466089	-	-
Tainosphaeria jonesii	GZCC 16-0053		KY026056	KY026059	-
Tainosphaeria jonesii	GZCC 16-0065		KY026057	KY026060	-

Table 3.1 (continued)

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU
Tainosphaeria monophialidica	**MFLUCC 18-0146**	**T**	**MN104616**	-	-
Tainosphaeria siamensis	MFLUCC15-0607	T	KX609953	KX609956	-
Thozetella fabacearum	MFLUCC 15-1020	T	NG_059767	KY212754	-
Thozetella nivea			EU825200	EU825201	-
Thozetella pandanicola	MFLUCC 16-0253	T	MH376740	MH388366	-
Thozetella pinicola	RJ-2008		EU825195	EU825197	EU825198
Thozetella tocklaiensis	CBS 378.58	T	MH869349	MH857817	-
Umbrinosphaeria caesariata	CBS 102664		AF261069	-	-
Verhulstia trisororum	CBS 143234	T	MG022160	MG022181	-
Zanclospora iberica	FMR 11584 = CBS 130426	T	KY853544	KY853480	HF937360
Zanclospora iberica	FMR 12186		KY853545	KY853481	HF937361
Zanclospora novae-zelandiae	CBS 130280 = FMR 11022		MH877214	-	-
Zignoëlla ovoidea	SMH 2605		AF064641	-	-
Zignoëlla pulviscula	MUCL 15710		AF466090	-	-
Zignoëlla pulviscula	SMH 3289		AF466091	-	-

Note [a] Newly generated sequences are indicated in bold. [b] Abbreviations of culture collections (where known): AFTOL, Assembling the Fungal Tree of Life; BCC, BIOTEC Culture Collection, National Center for Genetic Engineering and Biotechnology (BIOTEC), Bangkok, Thailand; CBS, Westerdijk Fungal Biodiversity Institute, Utrecht, The Netherlands; CPC, Culture collection of Pedro Crous, housed at CBS; CMW, Culture collection of the Forestry and Agricultural Biotechnology Institute (FABI) of the University of Pretoria, Pretoria South Africa; DAOM, Canadian Collection of Fungal Cultures, Agriculture and Agri-Food Canada, Ottawa, Canada; FMR, Facultad de Medicina, Universitat Rovira i Virgili, Reus, Tarragona, Spain; GUFCC, Fungus Culture Collection of Goa University, India; GZCC, Guizhou Culture Collection, Guiyang, China; HGUP, Herbarium of Guizhou University, Plant Pathology, China; HHUF, Herbarium of Hirosaki University, Fungi; HKAS, Herbarium of Kunming Institute of Botany, Chinese Academy of Sciences, Kunming, China; HKUCC, University of Hong Kong Culture Collection, Department of Ecology and Biodiversity, Hong Kong, China; HMAS, Herbarium of Mycology, Chinese Academy of Sciences, China; HUEFS, Herbarium of the State University of Feira de Santana, Bahia, Brazil; ICMP,

International Collection of Micro-organisms from Plants, Landcare Research, Auckland, New Zealand; JCM, Japan Collection of Microorganism, RIKEN BioResource Center, Japan; KUMCC, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming, China; MAFF, Ministry of Agriculture, Forestry and Fisheries, Tsukuba, Ibaraki, Japan; MFLUCC, Mae Fah Luang University Culture Collection, Chiang Rai, Thailand; MUCL, Mycothèque de l'Université Catholique de Louvian, Laboratoire de Mycologie Systematique et Appliquee, Universite catholique de Louvain, Louvain-la-Neuve, Belgium; NRRL, Agriculatural Research Service Culture Collection, USA; PDD, New Zealand Fungus Herbarium, New Zealand; SMH, Collection of S.M. Huhndorf; UPSC, Uppsala University Culture Collection, Uppsala University, Uppsala, Sweden. [c] Status: T: ex-type; IT: ex-isotype. [d] No data in GenBank.

3.3 Results

3.3.1 Molecular Phylogeny

The combined LSU and ITS sequence dataset included 214 taxa (ingroup) and two outgroup taxa with a total of 1670 characters (954 characters for LSU, 716 characters for ITS) after alignment including the gaps, of which 722 were parsimony informative, 228 were parsimony-uninformative, and 720 characters were constant. The tree was rooted with *Gelasinospora tetrasperma* (AFTOL-ID 1287) and *Sordaria fimicola* (CBS 508.50). The ML and BI analyses based on combined LSU and ITS sequence data provided similar tree topologies, and the result of ML analysis with a final likelihood value of -32807.818894 is shown in Figure 3.1. The matrix had 1149 distinct alignment patterns, with 29.85% undetermined characters or gaps. Estimated base frequencies were: A = 0.233314, C = 0.262649, G = 0.309421, T = 0.194616; substitution rates AC = 1.000000, AG = 3.741518, AT = 1.000000, CG = 1.000000, CT = 3.741518, GT = 1.000000; gamma distribution shape parameter $\alpha = 0.303701$. For the Bayesian analysis, two parallel runs with six chains were run for 100000000 generations and trees were sampled every 10000th generation and the run was stopped automatically when standard deviation of split frequencies fell below 0.01. The run

automatically stopped at 31790000 generations, resulting in 6360 trees from two runs of which 4770 trees were used to calculate the posterior probabilities (each run resulted in 3180 trees of which 2385 trees were sampled).

Eleven isolates of hyaline-spored chaetosphaeriaceous hyphomycetes from China and Thailand were identified in the family *Chaetosphaeriaceae* and located in the genera *Cryptophiale*, *Dictyochaeta*, *Kionochaeta*, *Menisporopsis*, *Tainosphaeria* and the new genus *Multiguttulispora* (Figure 3.1).

On the ML tree (Figure 3.1), *Chaetosphaeria* located in 14 different groups, with some of them grouped with its asexual genera, e.g. *Chloridium* (group *Chloridium 3*), *Dictyochaeta* (group *Dictyochaeta 4* and *Dictyochaeta 5*), *Exserticlava* (group *Chaetosphaeria 3*), *Menispora* (group *Menispora*), *Umbrinosphaeria* (group *Chaetosphaeria 3*).

Dictyochaeta species were phylogenetically located in five different groups (Figure 3.1), which are the same as reported by Hernández-Restrepo et al. (2017); Liu et al. (2016); Perera et al. (2016); Tibpromma et al. (2018); Yang et al. (2018).

To analyses the genus *Kionochaeta*, a combined SSU, ITS and LSU sequence dataset was also analyzed (Figure 3.2). This dataset included 33 taxa (ingroup) and one outgroup taxon with a total of 2480 characters (1036 characters for SSU, 602 characters for ITS, 842 characters for LSU) after alignment including the gaps, of which 524 were parsimony informative, 307 were parsimony-uninformative, and 1649 characters were constant. The tree was rooted with *Gelasinospora tetrasperma* (AFTOL-ID 1287). The MP, ML and BI analyses based on combined SSU, ITS and LSU sequence data provided similar tree topologies, and the result of ML analysis with a final likelihood value of -14301.378740 is shown in Figure 3.2. The matrix had 922 distinct alignment patterns, with 20.33% undetermined characters or gaps. Estimated base frequencies were: A = 0.241157, C = 0.247000, G = 0.286422, T = 0.225421; substitution rates AC = 1.270116, AG = 1.760629, AT = 1.010454, CG = 0.828899, CT = 5.543715, GT = 1.000000; gamma distribution shape parameter α = 0.428282. For the Bayesian analysis, two parallel runs with six chains were run for 1000000 generations and trees were sampled every 100th generation, resulting in 20002 trees from two runs of which 15002 trees were used to calculate the posterior probabilities (each run resulted in 10001 trees of which 7501 trees were sampled).

Our two newly collected *Kionochaeta* isolates grouped together with another three *Kionochaeta* isolates (*K. ramifera* (Matsush.) P.M. Kirk & B. Sutton (JCM9756) and *K. spissa* P.M. Kirk & B. Sutton (JCM9817 and JCM9818)) (Figure 3.2), however, this group is separate from the group comprising the ex-type strain of *K. ivoriensis* (Rambelli & Lunghini) P.M. Kirk & B. Sutton (CBS 374.76). Morphologically, *Kionochaeta* is similar to *Zanclospora*, but they are phylogenetically different (Figure 3.2).

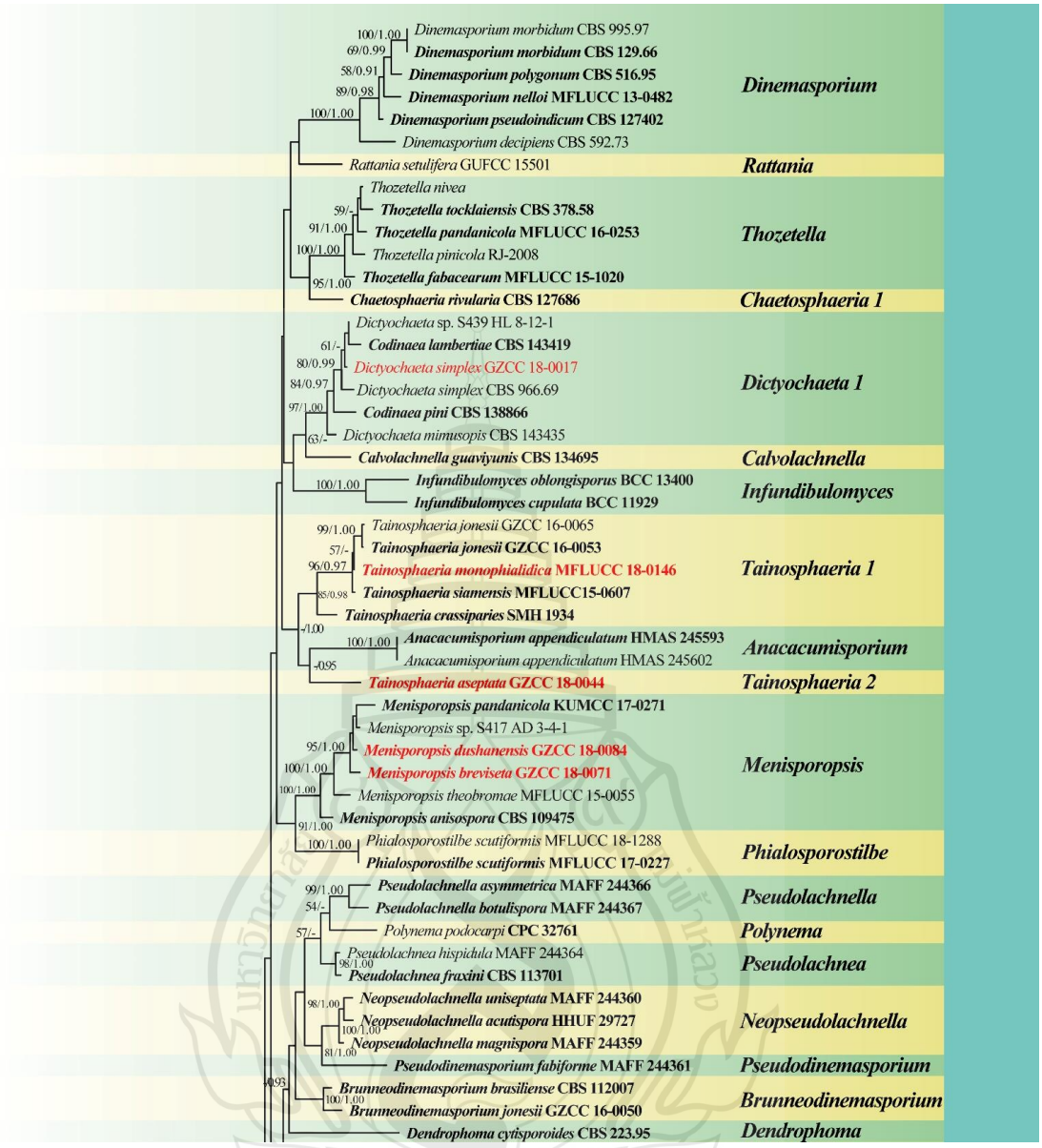


Figure 3.1 Phylogenetic tree for the family *Chaetosphaeriaceae*

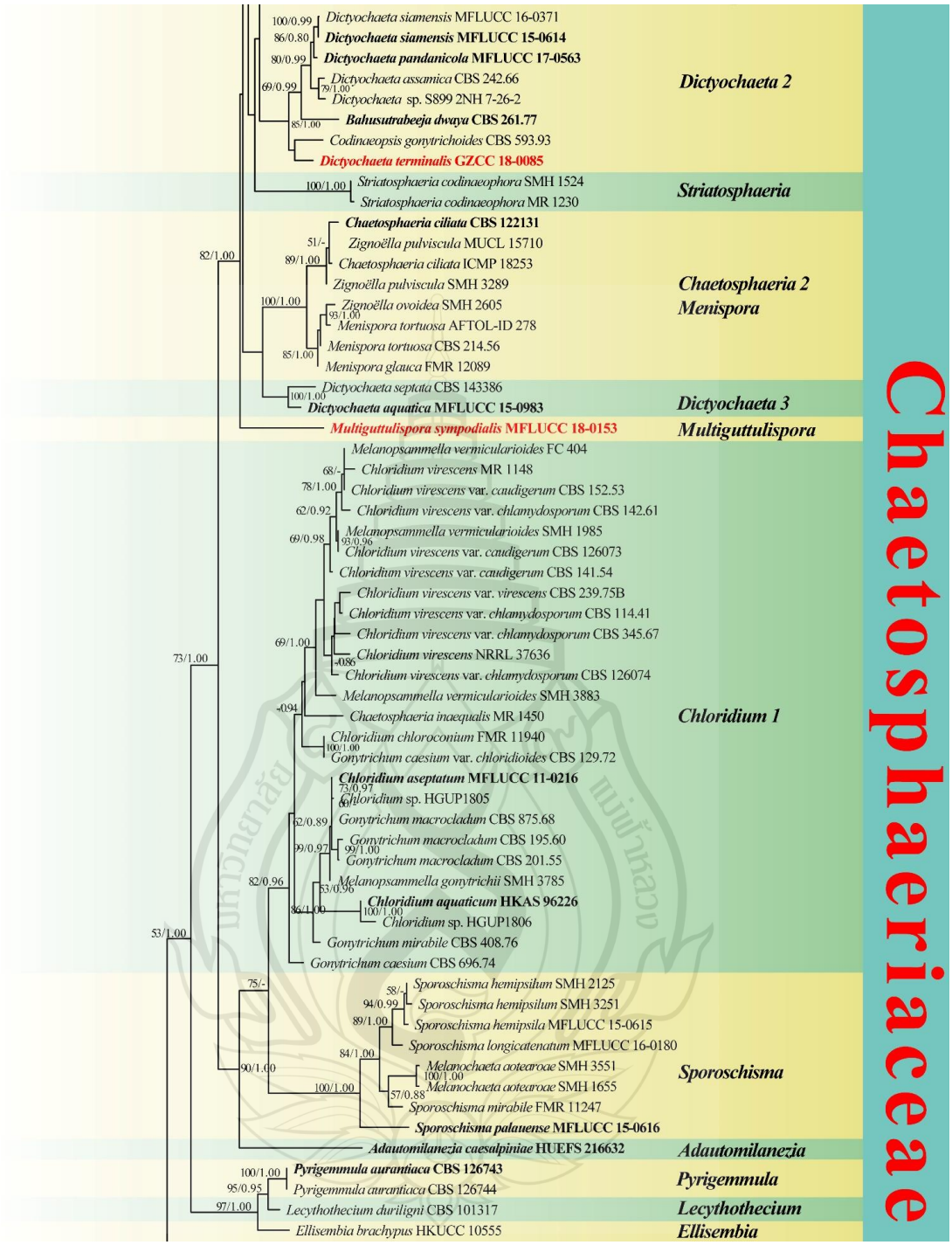


Figure 3.1 (continued)

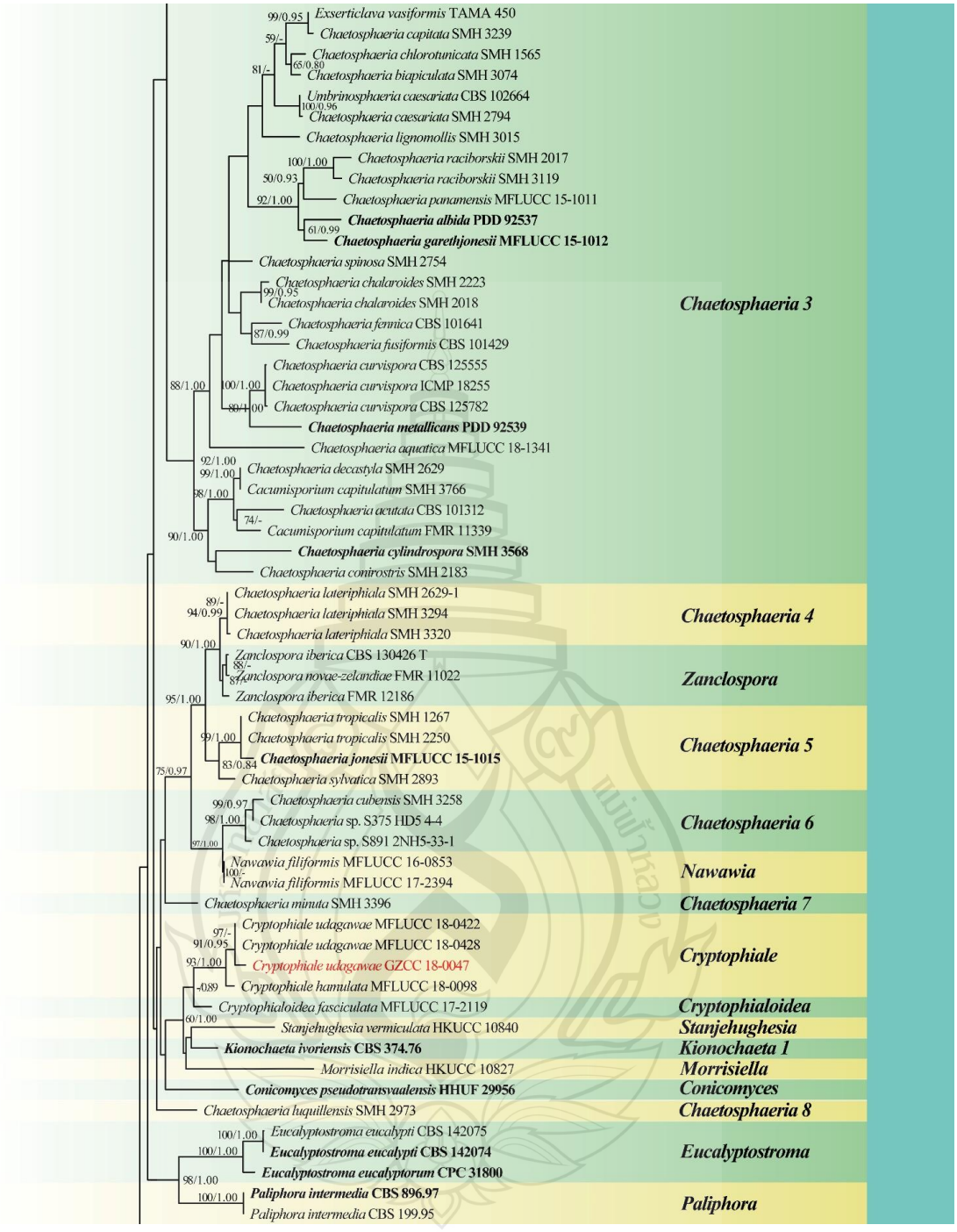
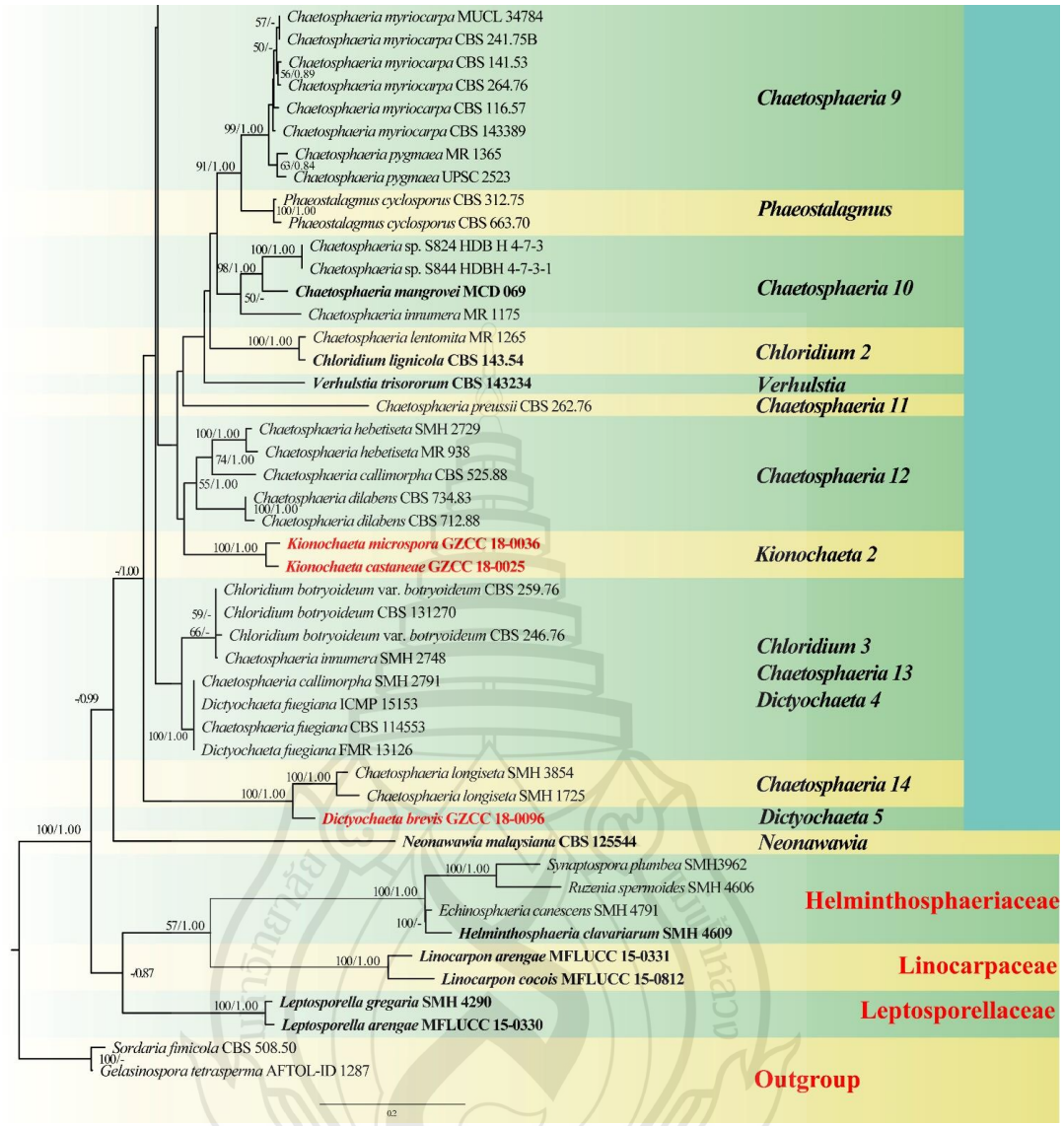
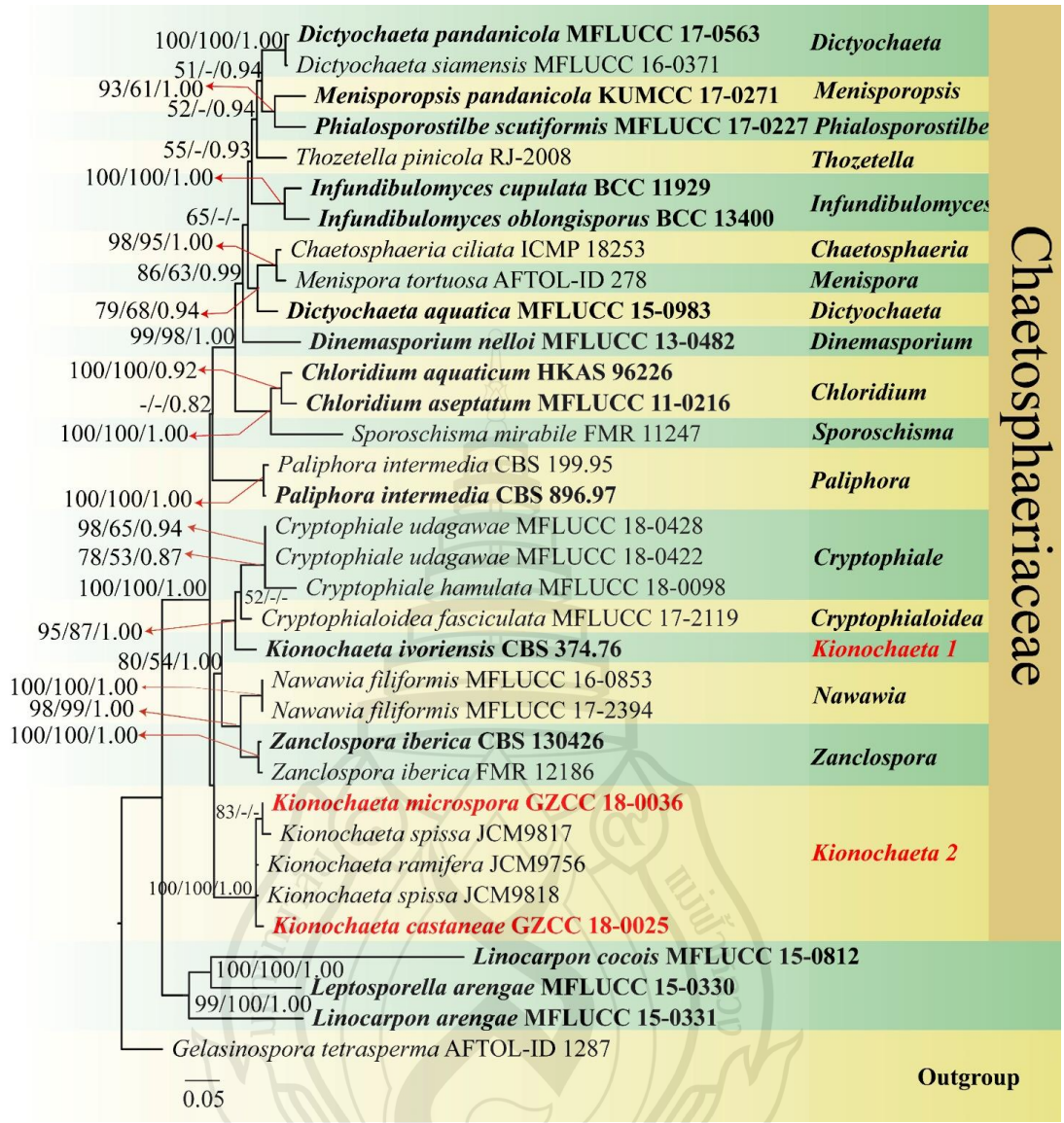


Figure 3.1 (continued)



Note Phylogenetic tree generated from maximum likelihood (ML) analysis based on combined LSU and ITS sequence data for the family *Chaetosphaeriaceae*. Bootstrap support values for maximum likelihood greater than 50% and Bayesian posterior probabilities (PP) greater than 0.8 are indicated above or below the nodes as ML/PP. Ex-type strains are in bold, the new isolates are in red. The tree is rooted with *Gelasinospora tetrasperma* (AFTOL-ID 1287) and *Sordaria fimicola* (CBS 508.50).

Figure 3.1 (continued)



Note Phylogenetic tree generated from maximum likelihood (ML) analysis based on combined SSU, ITS and LSU sequence data for selected genera within family *Chaetosphaeriaceae*. Bootstrap support values for maximum likelihood and maximum parsimony greater than 50% and Bayesian posterior probabilities (PP) greater than 0.8 are indicated above or below the nodes as ML/MP/PP. Ex-type strains are in bold, the new isolates are in red. The tree is rooted with *Gelasinospora tetrasperma* (AFTOL-ID 1287).

Figure 3.2 Phylogenetic tree for selected genera within *Chaetosphaeriaceae*

3.3.2 Taxonomy

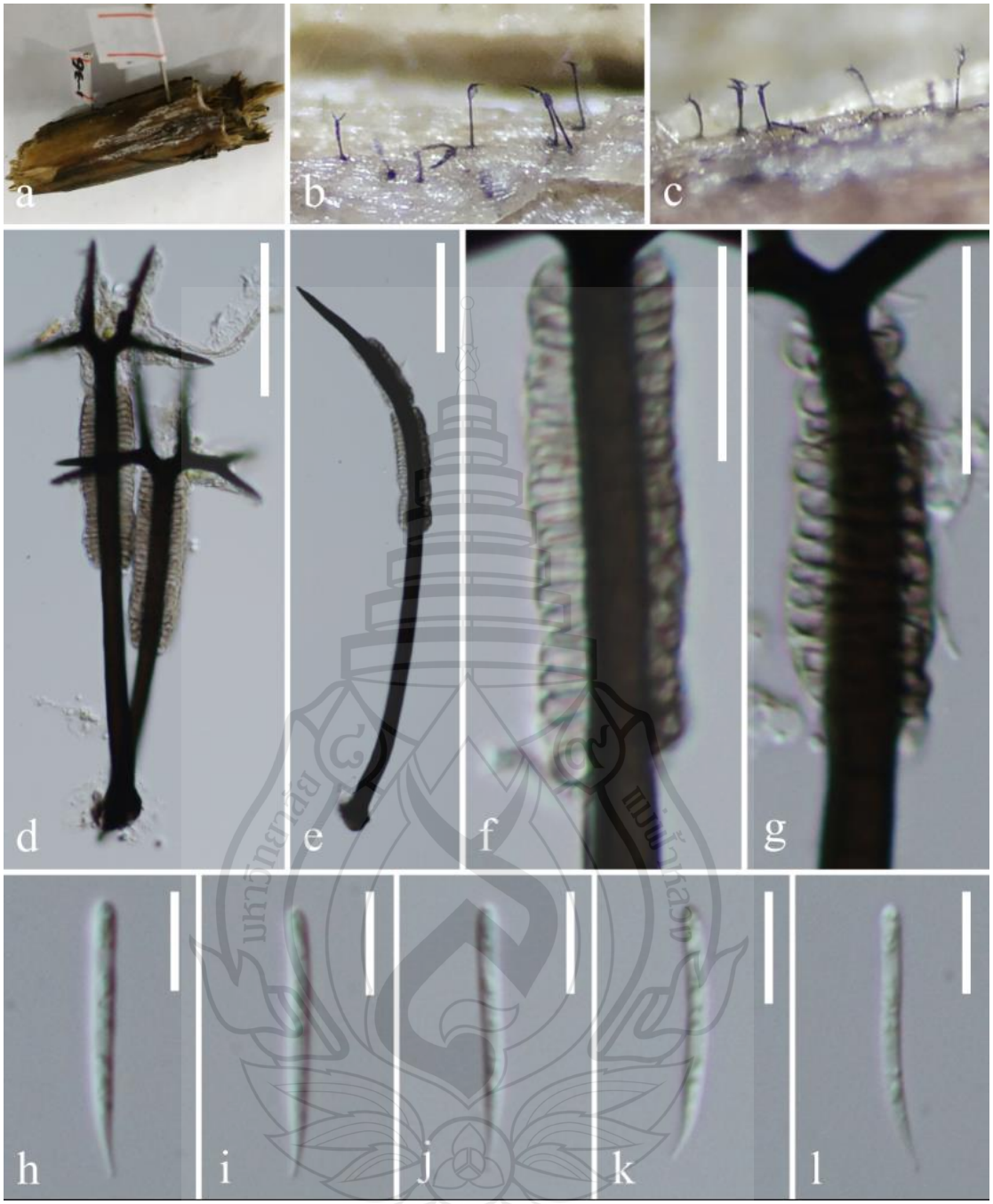
Cryptophiale udagawae Piroz. & Ichinoe, in Pirozynski, Can. J. Bot. 46: 1126 (1968), Figure 3.3

Facesoffungi number: FoF06284

Saprobic on decaying wood. **Asexual morph**: *Colonies* on plant substrate effuse, hairy, scattered, glistening. *Mycelium* mostly immersed, partially superficial. *Conidiophores* macronematous, mononematous, setiform, scattered, erect, straight or slightly curved, dark brown, smooth, thick-walled, septate below the branches, 150–290 × 10–33 μm, 1–2 times dichotomously branched towards the apex and generally above the fertile region; terminal branches dark brown, 9.5–51.5 μm long, 2.9–6.2 μm wide at the base, acutely pointed above. *Fertile region* from middle up to the first dichotomy, 36.5–92 × 10–17 μm, consisting of two rows of phialides one on each side of the conidiophore with each cell narrowly ellipsoid, covered by sterile shield cells. *Conidiogenous cells* not observed. *Conidia* produced in slime and adhering to the fertile region, hyaline, smooth, clavate, aseptate, basal end rounded, with a short appendage at the base, 19.9–28.1 × 1.6–2.8 μm (av. = 24.9 × 2.05 μm, n = 30). **Sexual morph**: Undetermined.

Material examined – China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying wood, 6 July 2018, Chuan-Gen Lin, DS 1-36 (MFLU 19-0209, HKAS 105133), living culture GZCC 18-0047.

Notes – This is the second report of *Cryptophiale udagawae* from China and we provide description, sequences data and phylogenetic analysis for this species. This collection fits well with the description of Pirozynski (1968) and with the first description of a Chinese isolate by Yang et al. (2018). The phylogenetic result (Figure 3.1) showed that our newly collected isolate clustered with *C. udagawae* (MFLUCC 18-0422 and MFLUCC 18-0428) with high support (91% MLBS, 0.95 PP). Thus, we identify our collection as *C. udagawae*.



Note ***Cryptophiale udagawae*** (MFLU 19-0209) **a** Host material. **b, c** Conidiophores on the host surface. **d, e** Conidiophores and conidiogenous cells. **f, g** Conidiogenous cells. **h–l** Conidia. – Scale bars: d, e = 50 μm, f, g = 20 μm, h–l = 10 μm.

Figure 3.3 *Cryptophiale udagawae* (MFLU 19-0209)

Dictyochaeta brevis C.G. Lin & K.D. Hyde sp. nov., Figure 3.4

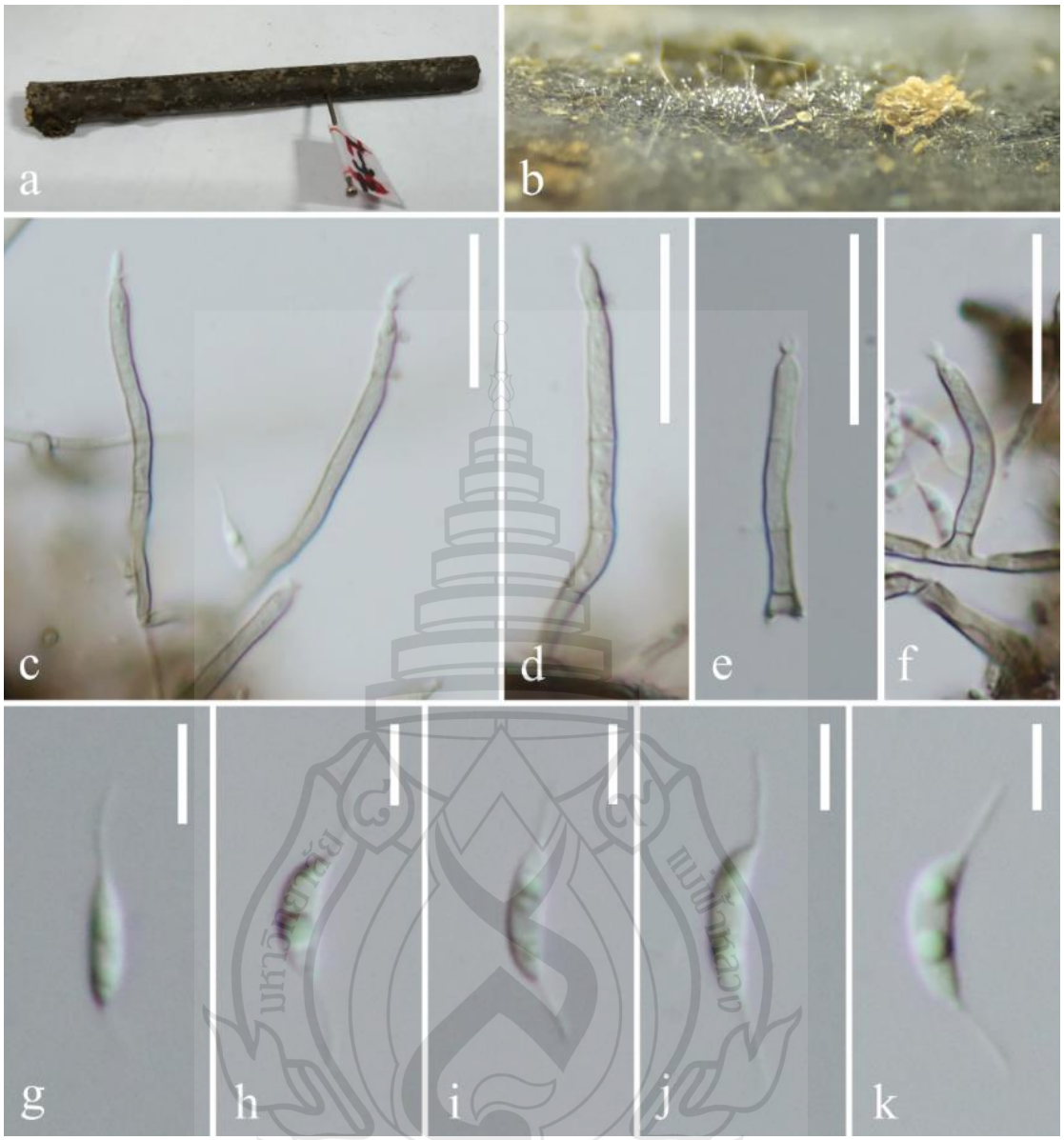
Index Fungorum number: IF556705; Facesoffungi number: FoF06285

Etymology – Referring to its short conidiophores.

Saprobic on decaying wood. **Asexual morph**: *Colonies* on plant substrate effuse, gregarious, white to brown, shining. *Mycelium* mostly immersed, composed of branched, septate, smooth, thin-walled, pale brown hyphae. *Setae* absent. *Conidiophores* mononematous, macronematous, sometimes in groups, pale brown at the base becoming subhyaline or hyaline towards the apex, straight or slightly flexuous, septate, unbranched, smooth, cylindrical, swollen at the base, 13.5–51(–102) µm long, 2–4 µm wide just above the basal cell, sometimes reduced to conidiogenous cells. *Conidiogenous cells* monophialidic, with flared collarette, terminal, integrated, cylindrical, 12.7–33.6 × 2.5–3.9 µm. *Conidia* aggregated in large, slimy, white and glistening heads at the apex of conidiophores, acrogenous, aseptate, fusiform, most curved, with hair-like and 3.5–6.5 µm long appendages at both ends, 0–2 guttules, smooth, hyaline, 7.5–11.4 µm (av. = 9.02 µm, n = 45) long, 2.0–2.9 µm (av. = 2.48 µm, n = 45) wide. **Sexual morph**: Undetermined.

Material examined – China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying wood, 6 July 2018, Chuan-Gen Lin, DS 2-39 (MFLU 19-0216, **holotype**, HKAS 105173, **isotype**); ex-type living culture GZCC 18-0096.

Notes – *Dictyochaeta brevis* is similar to *D. renispora* Whitton, McKenzie & K.D. Hyde by having mononematous conidiophores, monophialidic, terminal conidiogenous cells, hyaline, reniform, aseptate conidia with a setula at each end, and both lacking setae. However, *D. brevis* differs from *D. renispora* by its shorter and determinate conidiophores, and longer and narrower conidia. Phylogenetically, *D. brevis* grouped in one of the *Chaetosphaeria* clades but in a separate clade with *Chaetosphaeria longiseta* F.A. Fernández & Huhndorf with high support value. *Dictyochaeta brevis* differs from the asexual morph of *C. longiseta* by its smaller conidia and lacking setae.



Note ***Dictyochaeta brevis*** (MFLU 19-0216, holotype) **a** Host material. **b** Conidiophores on the host surface. **c–f** Conidiophores and conidiogenous cells. **g–k** Conidia. – Scale bars: c–f = 20 μm, g–k = 5 μm.

Figure 3.4 *Dictyochaeta brevis* (MFLU 19-0216, holotype)

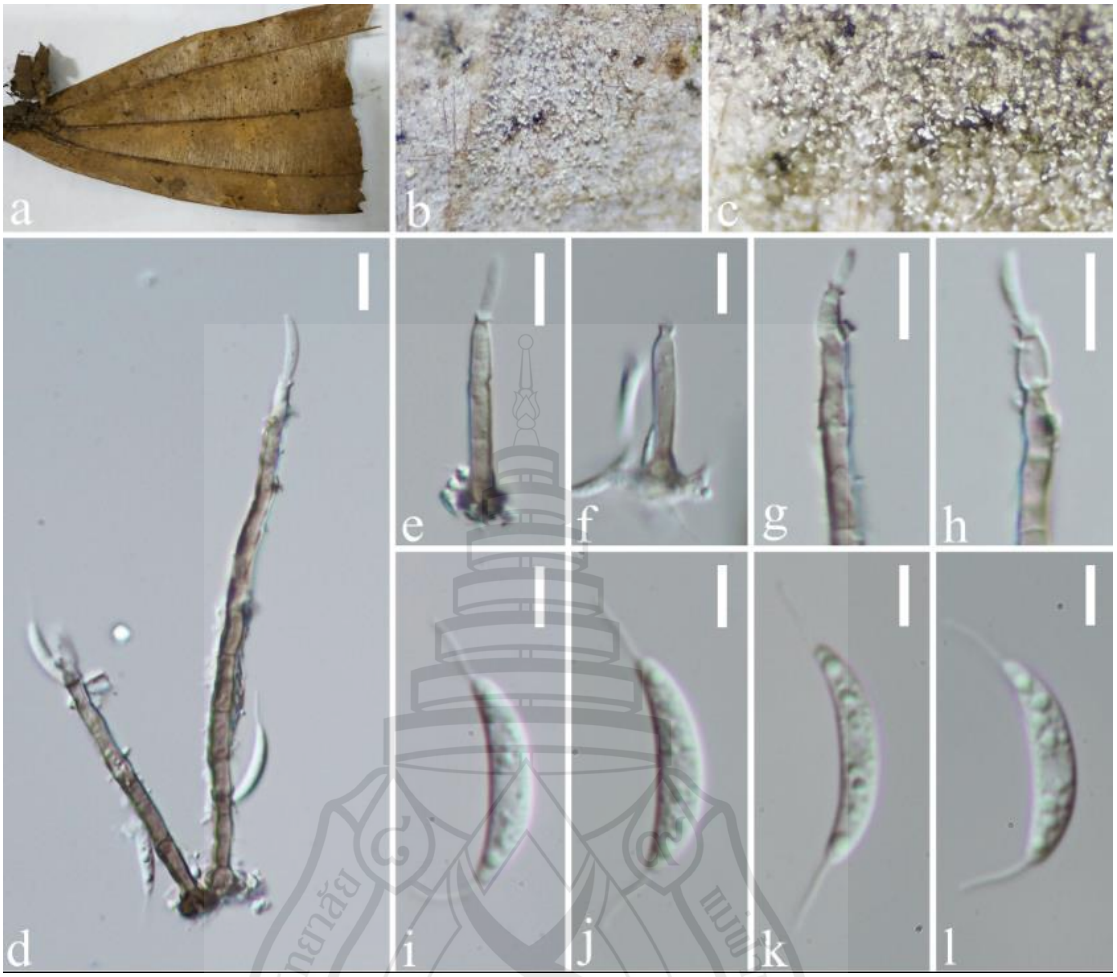
Dictyochaeta simplex (S. Hughes & W.B. Kendr.) Hol.-Jech., Folia geobot. phytotax. 19(4): 434 (1984), Figure 3.5

Facesoffungi number: FoF06286

Saprobic on decaying leaves. **Asexual morph**: *Colonies* on plant substrate effuse, gregarious, brown, shining. *Mycelium* mostly immersed, composed of branched, septate, smooth, thin-walled, brown hyphae. *Setae* absent *Conidiophores* mononematous, macronematous, in groups, short, dark brown at the base becoming pale brown towards the apex, straight or slightly flexuous, septate, unbranched, sometimes reduced to conidiogenous cells, smooth, cylindrical, 20–125 µm long, 2.7–5.2 µm wide just above the base, which is swollen up to 7.5 µm. *Conidiogenous cells* monophialidic or polyphialidic, with flared collarette, terminal, integrated, sometimes sympodial, 8–51 µm long, 3–4 µm wide, slightly narrowing to 1.5–2.3 µm just below the collarette. *Conidia* aggregating in a globose mass at apex of conidiophores, acrogenous, aseptate, long fusiform, curved, with a hair-like, 4.4–7.8 µm long appendage at both ends, hyaline, smooth, 12.7–18.7 × 2.0–2.9 µm (av. = 15.6 × 2.5 µm, n = 30) wide. **Sexual morph**: Undetermined.

Material examined – China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying leaves, 6 July 2018, Chuan-Gen Lin, DS 1-1 (MFLU 19-0202, HKAS 105104), living culture GZCC 18-0017.

Notes – Our specimen fits well with the description of *Dictyochaeta simplex* (≡ *Codinaea simplex*) in Hughes and Kendrick (1968), except they show sympodial proliferation in *D. simplex*. Our isolate grouped together with *D. simplex* (CBS 966.69) with high support value. Thus, we identify this new specimen as *D. simplex*.



Note ***Dictyochaeta simplex*** (MFLU 19-0202) **a** Host material. **b, c** Conidiophores on the host surface. **d–f** Conidiophores and conidiogenous cells. **g, h** Conidiogenous cells. **i–l** Conidia. – Scale bars: d–h = 10 μm, i–l = 5 μm.

Figure 3.5 *Dictyochaeta simplex* (MFLU 19-0202)

Dictyochaeta terminalis C.G. Lin & K.D. Hyde sp. nov., Figure 3.6

Index Fungorum number: IF556706; Facesoffungi number: FoF06287

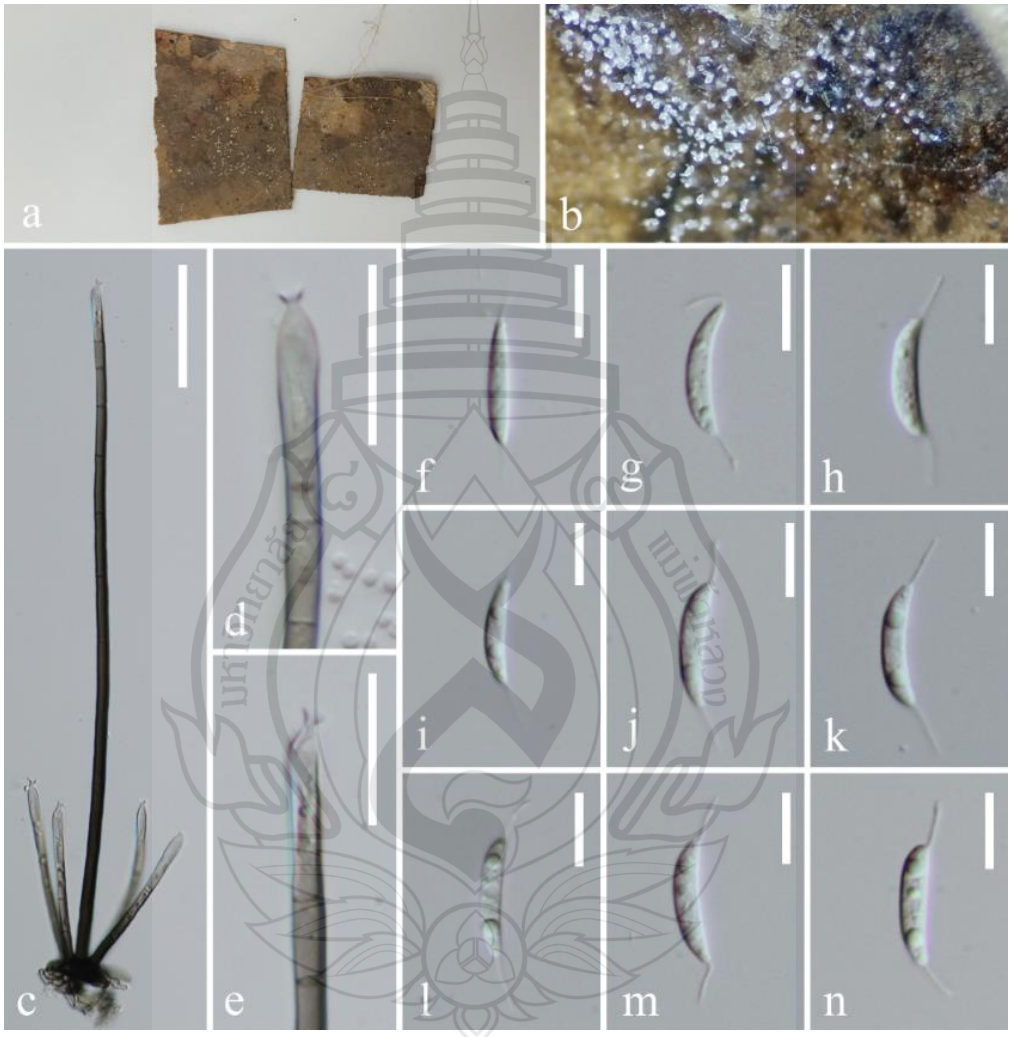
Etymology – Referring to the terminal conidiogenous cells.

Saprobic on decaying leaves. **Asexual morph**: *Colonies* on plant substrate effuse, gregarious, brown, shining. *Mycelium* mostly immersed, composed of branched, septate, smooth, thin-walled, brown hyphae. *Setae* fertile, erect, dark brown at the base, paler towards the apex, septate, thick-walled, unbranched, smooth, cylindrical, 150–320 µm long, 3.7–9.4 µm wide at the base. *Conidiophores* mononematous, macronematous, in groups arising from the mycelial knots from the base of setae, short, sometimes percurrent, dark brown at the base becoming pale brown towards the apex, straight or slightly flexuous, septate, unbranched, smooth cylindrical, 31–171 µm long, 2.7–8.7 µm wide at the base. *Conidiogenous cells* monophialidic, with flared collarette, terminal, integrated, 13–70 × 3–6 µm. *Conidia* aggregating in a globose mass at apex of conidiophores and setae, acrogenous, aseptate, long fusiform, straight to curved, with a hair-like, 4–9.5 µm long appendage at both ends, hyaline, smooth, with 0–2 guttules, 14.7–20.7 × 2.9–4.2 µm (av. = 16.94 × 3.55 µm, n = 40). **Sexual morph**: Undetermined.

Material examined – China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying leaves, 6 July 2018, Chuan-Gen Lin, DS 2-26 (MFLU 19-0214, **holotype**, HKAS 105163, **isotype**); ex-type living culture GZCC 18-0085.

Notes – Morphologically, *Dictyochaeta terminalis* is similar to *Codinaea pakhalensis* S.M. Reddy & S.S. Reddy, *D. assamica* (Agnihothr.) Aramb., Cabello & Mengasc., *D. fertilis* (S. Hughes & W.B. Kendr.) Hol.-Jech., *D. gamundiae* Aramb. & Cabello and *D. plovercovensis* Goh & K.D. Hyde in having fertile setae, mononematous conidiophores, and aseptate and hyaline conidia with setulae at each end (Agnihothrudu, 1962; Arambarri et al., 1987; Goh & Hyde, 1999; Hughes & Kendrick, 1968; Kuthubutheen & Nawawi, 1991e; Reddy & Reddy, 1977; Whitton et al., 2000). However, *Dictyochaeta terminalis* differs from these species by its conidiogenous cells on setae, the conidiophores are monophialidic and without intercalary conidiogenous loci, and its conidia are bigger. In the phylogeny (Figure

3.1), *D. terminalis* formed a separate clade, and grouped together with *Codinaeopsis gonytrichoides* (Shearer & J.L. Crane) Morgan-Jones (CBS 593.93). *Codinaeopsis gonytrichoides* differs from *D. terminalis* by conidiophores that are setiform, conidiogenous cells are polyphialidic and intercalary and conidia are allantoid, 14–17 × 2.5–3.0 μm, with a filiform, 6–10 μm long appendage at each end.



Note ***Dictyochaeta terminalis*** (MFLU 19-0214, holotype) **a** Host material. **b** Conidiophores on the host surface. **c** Conidiophores and conidiogenous cells. **d, e** Conidiogenous cells. **f–n** Conidia. – Scale bars: c = 50 μm, d, e = 20 μm, f–n = 10 μm.

Figure 3.6 *Dictyochaeta terminalis* (MFLU 19-0214, holotype)

Kionochaeta castaneae C.G. Lin & J.K. Liu sp. nov., Figure 3.7

Index Fungorum number: IF556707; Facesoffungi number: FoF06288

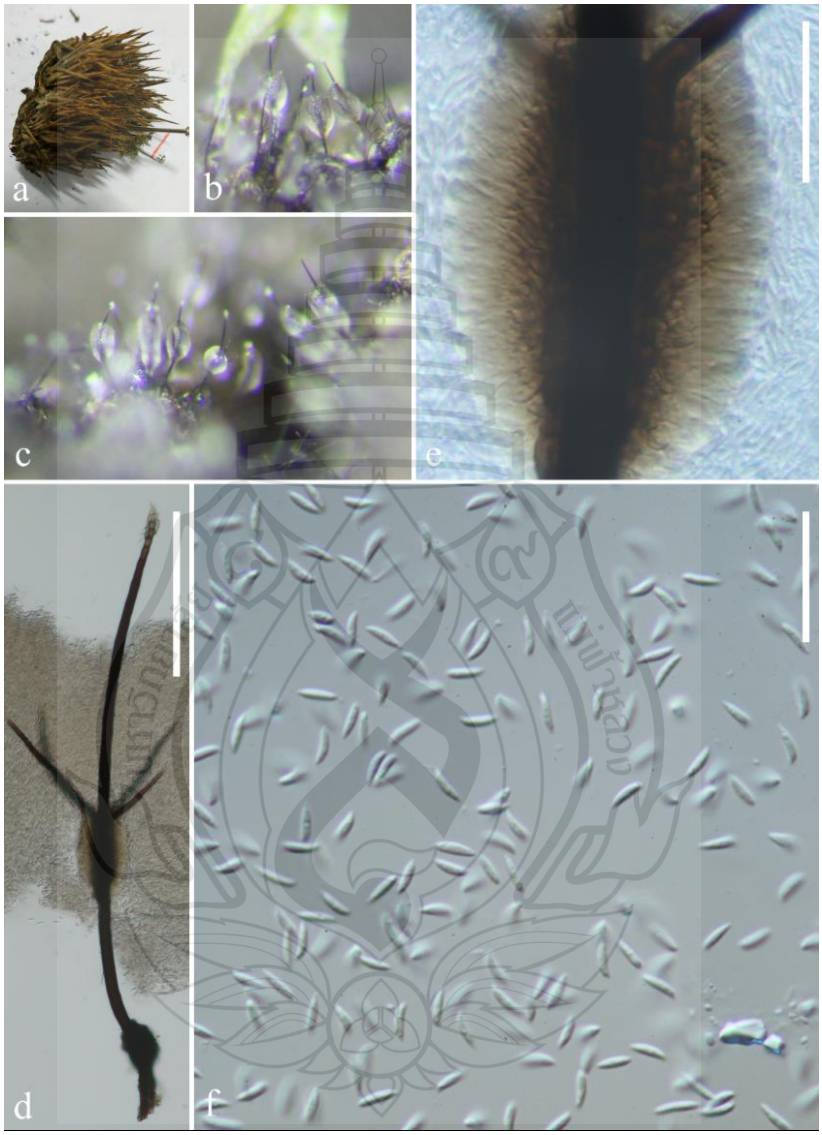
Etymology – Referring to the host genus *Castanea* on which the type specimen was collected.

Saprobic on decaying shell of *Castanea mollissima*. **Asexual morph**: *Colonies* on plant substrate effuse, caespitose, glistening, with white and slimy mass of conidia. *Mycelium* mostly immersed, partially superficial. *Conidiophores* macronematous, mononematous, setiform, caespitose, erect, straight or slightly curved, dark brown, smooth, thick-walled, sometimes branched above the fertile region, sometimes with secondly fertile region at the apex of the main axis, 265–320 μm long, 7–9.5 μm wide at the base; when branched, terminal branches dark brown, 45–105 μm long, 2.5–5.5 μm wide at the base, acutely pointed above. *Fertile region* immediately below the sterile branches at the middle part of the conidiophores, rarely with a secondly fertile region at the apex of the main axis, consisting of a mass of short branches on which conidiogenous cells are borne. *Conidiogenous cells* monophialidic, discrete, determinate, intercalary, rarely terminal, narrowly ellipsoid, pale brown, 5.2–7.9 × 2–2.8 μm. *Conidia* produced in slime and adhering to the fertile region, hyaline, smooth, lunate, cylindrical, aseptate, 5.1–6.5 μm long (av. = 5.87 μm, n = 35), 1.2–1.8 μm wide (av. = 1.52 μm, n = 35). **Sexual morph**: Undetermined.

Material examined – China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying shell of *Castanea mollissima* Blume (Chinese chestnut), 6 July 2018, Chuan-Gen Lin, DS 1-10 (MFLU 19-0204, **holotype**, HKAS 105111, **isotype**); ex-type living culture GZCC 18-0025.

Notes – This is the fifth *Kionochaeta* species that has accessory lateral setiform branches. The other four are *K. australiensis* Goh & K.D. Hyde, *K. keniensis* (P.M. Kirk) P.M. Kirk & B. Sutton, *K. pughii* Kuthub. & Nawawi and *K. ramifera* (Goh & Hyde, 1997c; Kirk & Sutton, 1985; Kuthubutheen & Nawawi, 1988). *Kionochaeta castaneae* differs from *K. keniensis* by its asetulate conidia and from *K. australiensis* and *K. pughii* by its accessory lateral branches being sterile. The conidia of *K. castaneae* are smaller than *K. ramifera* (5.1–6.5 × 1.2–1.8 μm vs. (5–) 8–12 × 1–1.5(–1.8) μm). Phylogenetically, *K. castaneae* shows close relationship with *K.*

microspora as they formed a monophyletic group (Figure 3.1). However, *Kionochaeta castaneae* can be recognized as a phylogenetically distinct species. A comparison of ITS sequences data between *K. castaneae* and *K. microspora* showed that there are 20 bp (base pair) of 505 base pairs differences (including the gaps).



Note ***Kionochaeta castaneae*** (MFLU19-0204, holotype) **a** Host material. **b, c** Conidiophores on the host surface. **d** Conidiophore, conidiogenous cells and conidia. **e** Conidiogenous cells. **f** Conidia. – Scale bars: d = 100 μm, e, f = 20 μm.

Figure 3.7 *Kionochaeta castaneae* (MFLU19-0204, holotype)

Kionochaeta microspora C.G. Lin & K.D. Hyde sp. nov., Figure 3.8

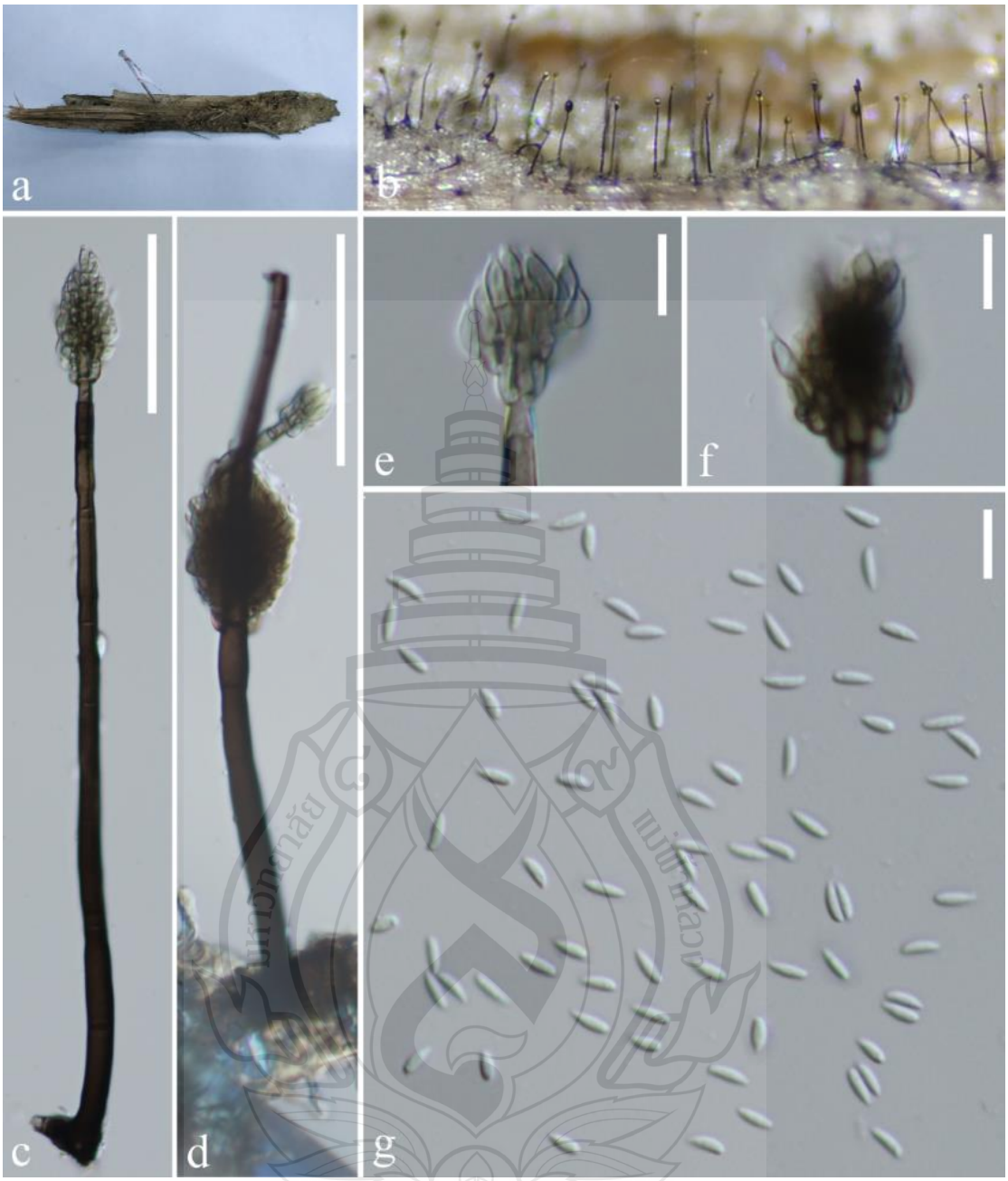
Index Fungorum number: IF556708; Facesoffungi number: FoF06289

Etymology – Referring to its small conidia.

Saprobic on decaying wood. **Asexual morph**: *Colonies* on plant substrate effuse, caespitose, glistening, with olive-green to dark green and slimy mass of conidia. *Mycelium* mostly immersed, partially superficial. *Conidiophores* macronematous, mononematous, caespitose, erect, straight or slightly curved, setiform, smooth, thick-walled, unbranched, septate, dark brown at the base, paler towards the apex, cylindrical, swollen at the base, 40–305 μm long, 3.3–10.5 μm wide at the base. *Fertile region* at the apex of the conidiophores, rarely at the middle of the conidiophores with a secondary fertile region at the conidiophore apex, consisting of a mass of short branches on which conidiogenous cells are borne, 12–38 × 8–23 μm. *Conidiogenous cells* monophialidic, discrete, determinate, terminal, rarely intercalary, narrowly ellipsoid, ampulliform, subhyaline to pale brown, 4.5–8.1 × 2.5–3.9 μm. *Conidia* produced in slime and adhering to the fertile region, hyaline, smooth, lunate, cylindrical or clavate, aseptate, 4.2–6.4 × 1.5–2.3 μm (av. = 5.45 × 1.85 μm, n = 40). **Sexual morph**: Undetermined.

Material examined – China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying wood, 6 July 2018, Chuan-Gen Lin, DS 1-22 (MFLU 19-0206, **holotype**, HKAS 105121, **isotype**); ex-type living culture GZCC 18-0036.

Notes – Morphologically, *Kionochaeta microspora* is similar to *K. filamentosa* Yanna & K.D. Hyde, *K. nanophora* Kuthub. & Nawawi and *K. pleomorpha* R.F. Castañeda, W.B. Kendr. & Guarro by having a fertile region at the apex of the setiform conidiophores without accessory lateral branches and aseptate conidia (Castañeda Ruíz et al., 1998; Kuthubutheen & Nawawi, 1988; Subramanian, 1993; Yanna & Hyde, 2002). *Kionochaeta filamentosa* is a unique species in having hyaline filaments at the conidiophore apex (Yanna & Hyde, 2002). *Kionochaeta nanophora* and *K. pleomorpha* have a setiform element devoid of a compactly branched conidiogenous apparatus throughout its height, which separates them from other *Kionochaeta* species (Kuthubutheen & Nawawi, 1988; Subramanian, 1993).



Note ***Kionochaeta microspora*** (MFLU 19-0206, holotype) **a** Host material. **b** Conidiophores on the host surface. **c, d** Conidiophores and conidiogenous cells. **e, f** Conidiogenous cells. **g** Conidia. – Scale bars: c, d = 50 μm, e–g = 10 μm.

Figure 3.8 *Kionochaeta microspora* (MFLU 19-0206, holotype)

Menisporopsis breviseta C.G. Lin & K.D. Hyde sp. nov., Figure 3.9

Index Fungorum number: IF556709; Facesoffungi number: FoF06290

Etymology – Referring to the short setae.

Saprobic on decaying leaves. **Asexual morph**: *Colonies* on plant substrate effuse, scattered, white to pale brown. *Mycelium* partly immersed, composed of brown hyphae. *Setae* central, solitary, erect, straight, unbranched, dark brown, septate, smooth, thick-walled, subulate, swollen at the apex, the lower part of each seta encased by tightly compacted conidiophores, 95–190 μm long, 2.7–5.4 μm thick at the base. *Synnemata* 52–113 μm long, 6.5–12 μm wide. *Conidiophores* macronematous, synnematous, encasing lower part of setae; separate filaments unbranched, straight or slightly flexuous, lower part narrow, upper part wider, pale brown, smooth, up to 182 μm long, upper part 2.5–4.6 μm thick. *Conidiogenous cells* monophialidic, integrated, terminal, cylindrical, with collarettes. *Conidia* aggregated in slimy heads, acrogenous, semi-endogenous, appendiculate with one or two setulae at each end, setulae 4–9 μm long, aseptate, curved, cylindrical or fusiform, hyaline, smooth, 14.2–24.3 μm (av. = 18.75 μm, n = 50) long, 2.4–3.6 μm (av. = 3.08 μm, n = 50) wide. **Sexual morph**: Undetermined.

Material examined – China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying leaves, 6 July 2018, Chuan-Gen Lin, DS 1-76 (MFLU 19-0212, **holotype**, HKAS 105151, **isotype**); ex-type living culture GZCC 18-0071.

Notes – The phylogenetic results showed that our isolate clustered with other *Menisporopsis* species and formed a sister group with *M. pandanicola* Tibpromma & K.D. Hyde (Figure 3.1). *Menisporopsis breviseta* is similar to *M. pandanicola* by having lunate, hyaline conidia with 1–2 setula at each end. However, *M. breviseta* differs from *M. pandanicola* by its short setae and smaller synnemata. *Menisporopsis breviseta* can be distinguished from other *Menisporopsis* species by its short setae and conidia with 1–2 setula at each end. A comparison of ITS sequences data between *M. breviseta* and *M. pandanicola* showed that there are 23 bp (base pair) of 477 base pairs differences (including the gaps).



Note ***Menisporopsis breviseta*** (MFLU 19-0212, holotype) **a** Host material. **b, c** Conidiophores on the host surface. **d** Conidiophores, setae, conidiogenous cells and conidia. **e** Apex of seta. **f** Conidiogenous cells. **g–k** Conidia. – Scale bars: d = 20 μm, e–k = 10 μm.

Figure 3.9 *Menisporopsis breviseta* (MFLU 19-0212, holotype)

Menisporopsis dushanensis C.G. Lin & K.D. Hyde sp. nov., Figure 3.10

Index Fungorum number: IF556710; Facesoffungi number: FoF06291

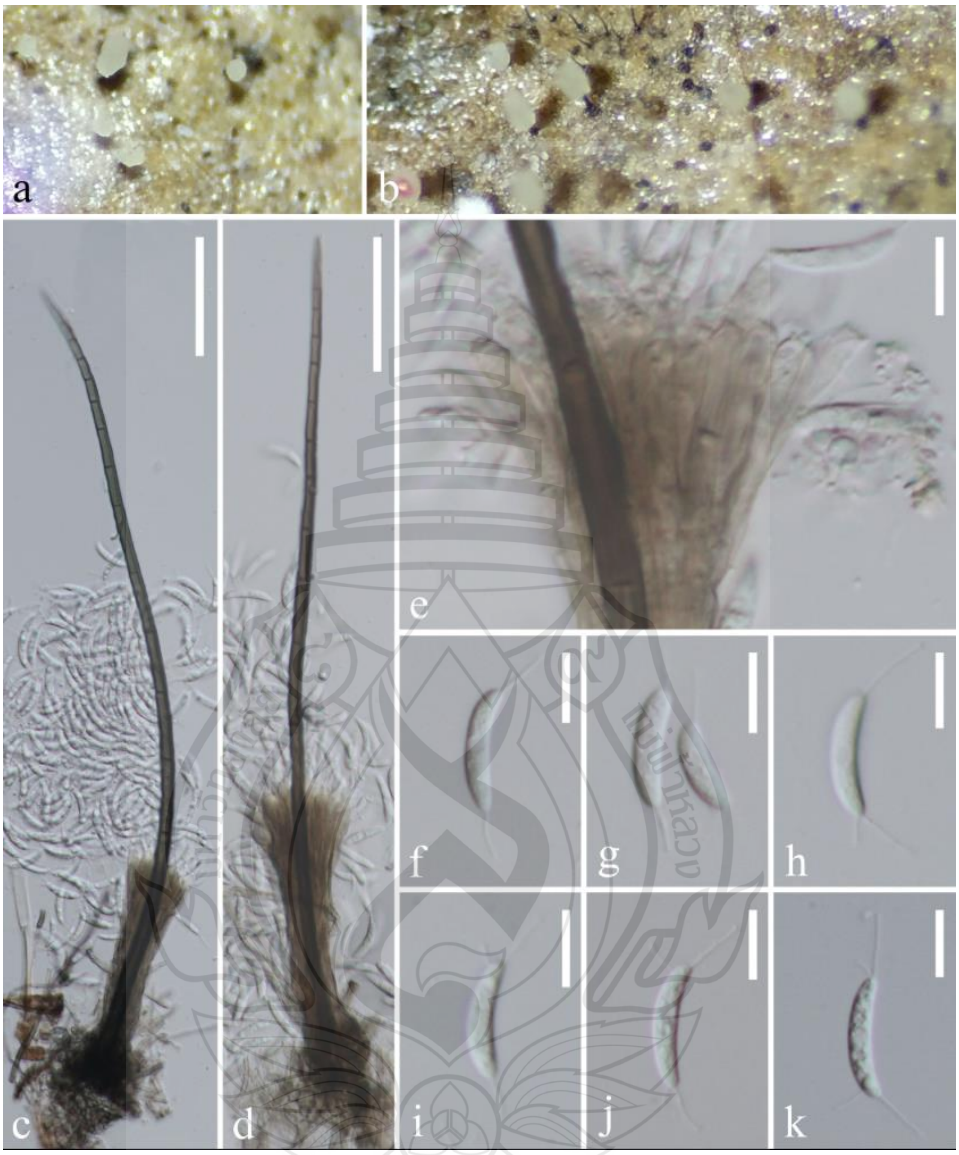
Etymology – Referring to Dushan, the type locality of this species.

Saprobic on decaying leaves. **Asexual morph**: *Colonies* on plant substrate effuse, scattered, white to pale brown. *Mycelium* partly immersed, composed of brown hyphae. *Setae* central, solitary, erect, straight, unbranched, dark brown, septate, smooth, thick-walled, subulate, the lower part of each seta encased by tightly compacted conidiophores, 207–455 μm long, 5–10.5 μm wide at the base. *Synemata* 75–150 μm long, 8.5–22.5 μm wide. *Conidiophores* macronematous, synnematous, encasing lower part of setae; separate filaments unbranched, straight or slightly flexuous, lower part narrow, upper part wider, pale brown, smooth, up to 147 μm long, upper part 2.5–6 μm thick. *Conidiogenous cells* monophialidic, integrated, terminal, cylindrical, with collarettes. *Conidia* aggregated in slimy heads, acrogenous, semi-endogenous, appendiculate with one or two setulae at each end, setulae 3–11 μm long, aseptate, curved, cylindrical or fusiform, hyaline, smooth, 14.0–20.6 μm (av. = 17.69 μm, n = 50) long, 2.7–4.2 μm (av. = 3.49 μm, n = 50) wide. **Sexual morph**: Undetermined.

Material examined – China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying leaves, 6 July 2018, Chuan-Gen Lin, DS 2-25 (MFLU 19-0213, **holotype**, HKAS 105162, **isotype**); ex-type living culture GZCC 18-0084.

Notes – Phylogenetically, *Menisporopsis dushanensis* shows close relationship with *M. breviseta* and *M. pandanicola* (Figure 3.1) since they grouped together with *Menisporopsis* sp. (S417 AD 3-4-1) and formed a monophyletic group, however, they can be recognized as distinct lineages. The most similar species to *M. dushanensis* are *M. breviseta* and *M. pandanicola* by having lunate, hyaline conidia with 1–2 setula at each end. However, *M. dushanensis* differs from *M. breviseta* by its longer setae, bigger synnemata and wider conidia. *Menisporopsis dushanensis* differs from *M. pandanicola* by longer setae and wider conidia. A comparison of ITS sequences data between *M. dushanensis* and *M. pandanicola* showed that there are 23

bp (base pair) of 478 base pairs differences (including the gaps). Therefore, we introduce it as a new species *M. dushanensis*.



Note ***Menisporopsis dushanensis*** (MFLU 19-0213, holotype) **a, b** Conidiophores on the host surface. **c, d** Conidiophores, setae, conidiogenous cells and conidia. **e** Conidiogenous cells. **f–k** Conidia. – Scale bars: c, d = 50 μm, e–k = 10 μm.

Figure 3.10 *Menisporopsis dushanensis* (MFLU 19-0213, holotype)

Multiguttulispora C.G. Lin & J.K. Liu gen. nov.

Index Fungorum number: IF556712; Facesoffungi number: FoF06293

Etymology – Referring to the conidia with 0–4 guttules.

Type species – *Multiguttulispora sympodialis*

Saprobic on decaying plant. **Asexual morph**: *Colonies* on plant substrate effuse, scattered, white to pale brown. *Mycelium* partly immersed, composed of brown hyphae. *Conidiophores* mononematous, macronematous, erect, straight or flexuous, unbranched, septate, smooth, dark brown at the base becoming light brown towards the apex, cylindrical. *Conidiogenous cells* polyblastic, integrated, terminal, sympodial, pale brown, cylindrical. *Conidia* aggregated in slimy mass at the apex of the conidiophores, acrogenous, smooth, hyaline, septate, with guttules, cylindrical, oblong with an appendage at each end. **Sexual morph**: Undetermined.

Multiguttulispora sympodialis C.G. Lin & J.K. Liu sp. nov., Figure 3.11

Index Fungorum number: IF556711; Facesoffungi number: FoF06292

Etymology – Referring to the sympodial conidiophores.

Saprobic on decaying plant material. **Asexual morph**: *Colonies* on plant substrate effuse, scattered, white to pale brown. *Mycelium* partly immersed, composed of brown hyphae. *Conidiophores* mononematous, macronematous, erect, straight or flexuous, unbranched, septate, smooth, dark brown at the base becoming light brown towards the apex, cylindrical, 155–405 μm long, 5.6–10.6 μm wide. *Conidiogenous cells* polyblastic, integrated, terminal, sympodial, pale brown, cylindrical. *Conidia* aggregated in slimy mass at apex of the conidiophores, acrogenous, smooth, hyaline, 1–3-septate, with guttules, cylindrical, oblong, sometimes slightly curved, with a short and hyaline appendage at each end, 15.8–20.9 × 6–8.3 μm (av. =19.2 × 7.2 μm, n = 30). **Sexual morph**: Undetermined.

Material examined – Thailand, Nan Province, Pua District, Phu Kha, on decaying plant, 4 Aug 2017, Chuan-Gen Lin, NAN 1-31 (MFLU 19-0218, **holotype**); ex-type living culture MFLUCC 18-0153.

Notes – *Multiguttulispora* is similar to *Anacacumisporium* Y.R. Ma & X.G. Zhang, which was introduced by Ma et al. (2016) and typified by *A. appendiculatum* Y.R. Ma & X.G. Zhang, by having mononematous, macronematous, unbranched,

septate, dark brown to light brown and cylindrical conidiophores, integrated, terminal and cylindrical conidiogenous cells that produce septate conidia with an appendage at the tip and base and conidia aggregated in slimy masses at the conidiogenous loci. However, *Multiguttulispora* differs from *Anacacumisporium* by having sympodial conidiophores and hyaline and guttulate conidia, whereas the conidiophores are determinate and conidia are brown to dark brown or bicolorous in *Anacacumisporium*. *Multiguttulispora* is also similar to *Cacumisporium* Preuss by having cylindrical conidia with guttules, but *Multiguttulispora* has conidia with an appendage at both ends. A key to *Anacacumisporium* and similar genera was provided by Ma et al. (2016), which indicates that our fungus appears to be distinct from presently known genera. Phylogenetically, *Multiguttulispora* formed a separate clade within the family Chaetosphaeriaceae on the tree generated based on the combined LSU and ITS sequence data (Figure 3.1). Therefore, we introduce a new genus, *Multiguttulispora*, to accommodate this distinct fungus *M. sympodialis*.



Note ***Multiguttulispora sympodialis*** (MFLU 19-0218, holotype) **a, b** Conidiophores and conidiogenous cells. **c, d** Conidiogenous cells. **e–k** Conidia. – Scale bars: a, b = 100 μm, c, d = 20 μm, e–k = 10 μm.

Figure 3.11 *Multiguttulispora sympodialis* (MFLU 19-0218, holotype)

Tainosphaeria aseptata C.G. Lin & J.K. Liu sp. nov., Figure 3.12

Index Fungorum number: IF556713; Facesoffungi number: FoF06294

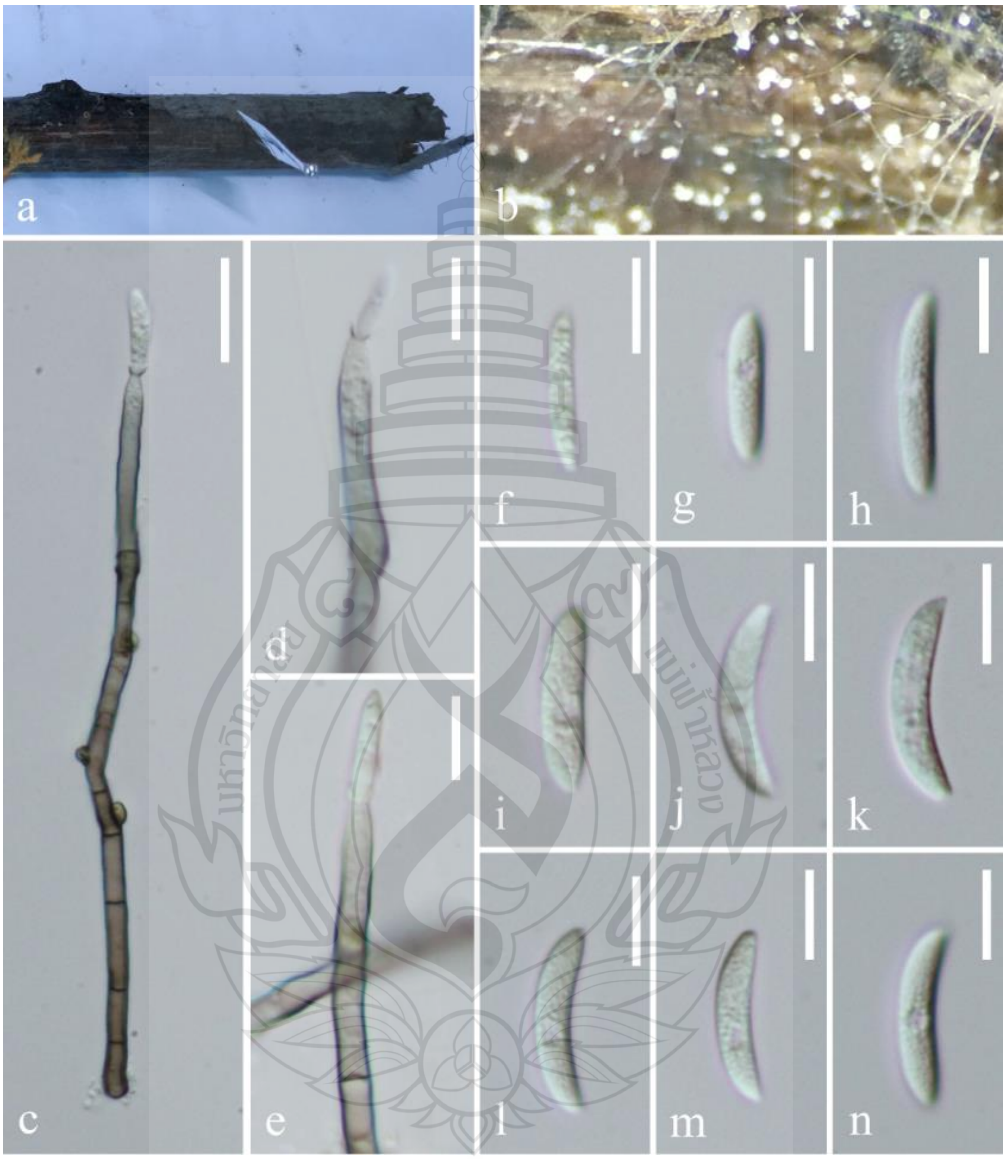
Etymology – Referring to the aseptate conidia.

Saprobic on decaying wood. **Asexual morph**: *Colonies* on plant substrate effuse, aggregate, brown, with a hyaline, glistening conidial mass, hairy, short. *Conidiophores* mononematous, macronematous, erect, straight or flexuous, unbranched, septate, smooth, dark brown at the base, paler towards the apex, often with percurrent proliferations, cylindrical, 65–135 μm long, 3.5–5.5 μm wide at the base. *Conidiogenous cells* monophialidic, integrated, terminal, with conspicuous collarettes, pale brown to subhyaline, cylindrical, 28–49 μm long, 3.3–4.8 μm wide, narrowing to 1.2–2.8 μm just below the collarette. *Conidia* aggregated in slimy mass at the apex of the conidiophore, acrogenous, smooth, hyaline, aseptate, straight to curved, long fusiform, 15.7–23.3 × 3.8–4.5 μm (av. = 20.55 × 4.09 μm, n = 20). **Sexual morph**: Undetermined.

Material examined – China, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying wood, 6 July 2018, Chuan-Gen Lin, DS 1-31 (MFLU 19-0208, **holotype**, HKAS 105130, **isotype**); ex-type living culture GZCC 18-0044.

Notes – *Tainosphaeria aseptata* is similar to *Dictyochaeta heteroderae* (Morgan-Jones) Carris & Glawe and *D. lunulospora* (Hewings & J.L. Crane) Hol.-Jech. by having mononematous conidiophores without fertile lateral branches, lacking setae, and aseptate, curved conidia without setulae. However, the conidia of *D. heteroderae* (9–13 × 3–4 μm) and *D. lunulospora* (8.8–12.0 × 0.8–1.0 μm) are smaller than those of *T. aseptata* (15.7–23.3 × 3.8–4.5 μm) and they are also guttulate. The phylogenetic results (Figure 3.1) showed that our isolate clustered together with species of *Tainosphaeria* and *Anacacumisporium*. *Tainosphaeria aseptata* (GZCC 18-0044) formed a separate clade and sister to *Anacacumisporium*. however, this clade is not stable. *Anacacumisporium* is characterized by pigmented, transversely septate, appendaged conidia and conidiophores that are brown, macronematous, mononematous and that bear one (or more) integrated phialides at the tip (Ma et al., 2016). Our fresh specimen does not fit with the generic concept of *Anacacumisporium*.

In addition, *Tainosphaeria aseptata* is morphologically distinguishable from all known asexual morph *Tainosphaeria* species. Therefore, *T. aseptata* is introduced as a new species based on both morphology and phylogeny.



Note ***Tainosphaeria aseptata*** (MFLU 19-0208, holotype) **a** Host material. **b** Conidiophores on the host surface. **c** Conidiophore and conidiogenous cell with conidium. **d, e** Conidiogenous cells. **f–n** Conidia. – Scale bars: c = 20 μm, d–n = 10 μm.

Figure 3.12 *Tainosphaeria aseptata* (MFLU 19-0208, holotype)

Tainosphaeria monophialidica C.G. Lin & J.K. Liu sp. nov., Figure 3.13

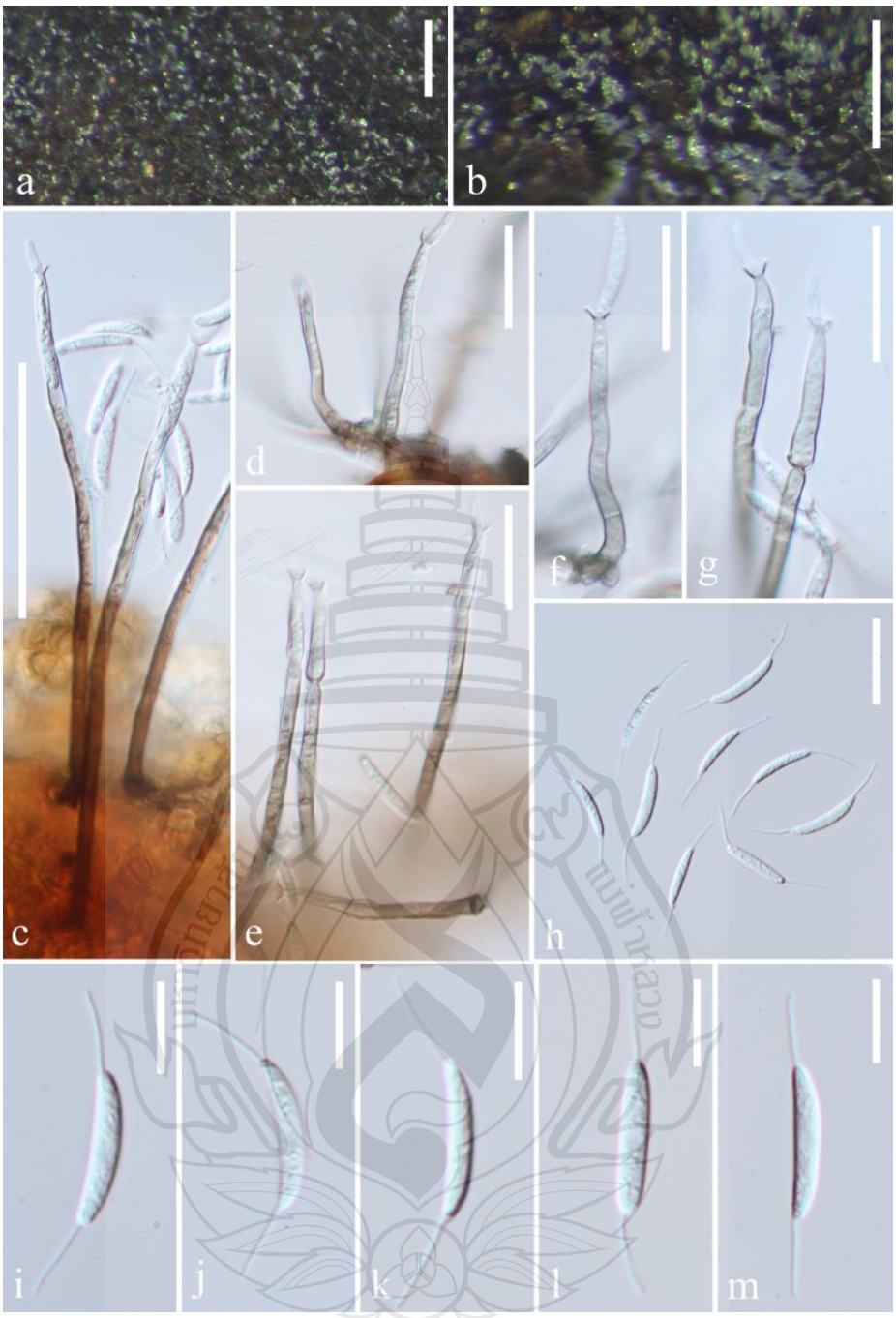
Index Fungorum number: IF556714; Facesoffungi number: FoF06295

Etymology – Referring to the monophialidic conidiogenous cells.

Saprobic on decaying wood. **Asexual morph**: *Colonies* on plant substrate effuse, aggregated, brown, as a hyaline, glistening conidial mass, hairy, short. *Conidiophores* mononematous, macronematous, erect, straight or slightly flexuous, unbranched, septate, smooth, pale brown at the base becoming subhyaline towards the apex, often with percurrent proliferations, sometimes reduced to conidiogenous cells, cylindrical, 33–120 μm long, 2.7–4.8 μm wide. *Conidiogenous cells* monophialidic, integrated, terminal, percurrent, with conspicuous collarettes, subhyaline, cylindrical, 20–46 μm long, 2.7–4.3 μm wide, narrowing to 1–2 μm just below the collarette. *Conidia* aggregated in slimy mass at the apex of the conidiophores, acrogenous, smooth, hyaline, aseptate, straight to slightly curved, ellipsoidal, long fusiform, 14.0–19 × 2.3–3.5 μm (av. = 16.6 × 3.0 μm, n = 40), with 7–10 μm long hair-like appendage at both ends. **Sexual morph**: Undetermined.

Material examined – Thailand, Nan, Pua District, Phu Kha, on decaying wood, 4 August 2017, Chuan-Gen Lin, NAN 1-3 (MFLU 19-0217, **holotype**); ex-type living culture MFLUCC 18-0146.

Notes – *Tainosphaeria monophialidica* is similar to *Dictyochaeta tumidospora* Kuthub. & Nawawi by lacking setae, having mononematous conidiophores, well-developed and funnel-shaped collarettes, and aseptate, ellipsoidal, not typically curved conidia with long setulae at both ends. However, *T. monophialidica* has smaller conidia and shorter conidiophores than *D. tumidiospora*, and its conidiogenous cells are monophialidic rather than polyphialidic as in *D. tumidiospora*. The phylogenetic results (Figure 3.1) showed that our isolate clustered together with other *Tainosphaeria* species and can be recognized as a distinct lineage. *Tainosphaeria monophialidica* is sister to *T. jonesii* (GZCC 16-0053 and GZCC 16-0065), but differs from *T. jonesii* by its conidiophores sometimes reduced to conidiogenous cells. In addition, the conidia are guttulate in *T. jonesii*. Based on the morphology and phylogeny, *T. monophialidica* is introduced as a new species.



Note ***Tainosphaeria monophialidica*** (MFLU 19-0217, holotype) **a, b** Conidiophores on the host surface. **c–e** Conidiophores and conidiogenous cells. **f–g** Conidiogenous cells. **h–m** Conidia. – Scale bars: a, b = 200 µm, c = 10 µm, d–h = 20 µm, i–m = 10 µm.

Figure 3.13 *Tainosphaeria monophialidica* (MFLU 19-0217, holotype)

3.4 Discussion

The family *Chaetosphaeriaceae* is a genus-rich but confusing family. Taxa in this family are common on wood in terrestrial habitats and some are fungicolous while others are frequently recorded on submerged wood in freshwater (Goh & Hyde, 1996a; Ho et al., 2002; Hyde & Goh, 1998; Maharachchikumbura et al., 2016; Sun et al., 2019). Réblová et al. (1999) accepted seven sexual genera and 13 asexual genera in the *Chaetosphaeriaceae*. Molecular data has allowed a better understanding of the asexual morph genera (Shenoy et al., 2007) and various genera have been placed in this family (Table 2.2). In the most recent treatment, 38 genera were accepted (Wijayawardene et al., 2017a, 2018). However, this family needs a detailed study of both asexual and sexual morphs of the various genera and a comparison with similar genera in other families. Several new *Chaetosphaeriaceae* species have been introduced in recent studies and updated phylogenetic trees have been provided (Hyde et al., 2019; Li et al., 2016b; Liu et al., 2016; Tibpromma et al., 2018; Yang et al., 2018). Here we discuss some of the genera assigned to the *Chaetosphaeriaceae*.

Chaetosphaeria was introduced by Tulasne and Tulasne (1863) for *C. innumera* Berk. & Broome ex Tul. & C. Tul. The asexual morphs of this genus are various. Seifert et al. (2011) listed 19 genera that linked to *Chaetosphaeria*, viz., *Cacumisporium*, *Catenularia* Grove, *Chalara* (Corda) Rabenh., *Chloridium*, *Codinaea* Maire, *Cryptophiale*, *Craspedodidymum* Hol.-Jech., *Custingophora* Stolk, Hennebert & Klopotek, *Dictyochaeta*, *Exserohilum* K.J. Leonard & Suggs, *Fusichalara* S. Hughes & Nag Raj, *Gonytrichum* Nees & T. Nees, *Kylindria* DiCosmo, S.M. Berch & W.B. Kendr., *Menispora* Pers., *Menisporopsis* S. Hughes, *Phaeostalagmus* W. Gams, *Phialophora* Medlar, *Sporoschisma* Berk. & Broome and *Zanclospora* S. Hughes & W.B. Kendr. In this study, the phylogenetic results (Figure 3.1) also confirmed some of these connections, e.g. *Chloridium*, *Codinaea*, *Dictyochaeta*, *Exserohilum*, *Gonytrichum*, and *Menispora*.

The genera *Codinaea*, *Codinaeopsis*, *Dictyochaeta* and *Dictyochaetopsis* are problematic. A brief historical review of these four genera was provided by Li et al. (2012a) and Réblová (2000). In this study, we treat *Codinaea*, *Dictyochaeta* and

Dictyochaetopsis as distinct genera and accept the treatment of Whitton et al. (2000) to synonymize *Codinaeopsis* under *Dictyochaetopsis* to prevent ongoing confusion until a monographic study on these genera is performed in the future.

This study carried out a phylogenetic analysis based on combined SSU, ITS and LSU sequence data to assess the genus *Kionochaeta*. Phylogenetic results (Figure 3.2) showed that *Kionochaeta* is polyphyletic and species are phylogenetically located in two groups (*Kionochaeta 1* and *Kionochaeta 2*) (Figure 3.2). A synopsis of *Kionochaeta* species is provided here (Table 2.3).

The status of *Menisporopsis* within *Chaetosphaeriaceae* was confirmed by Liu et al. (2016). Tibpromma et al. (2018) introduced the new species *M. pandanicola* and we introduce two new species. Twelve species are accepted within *Menisporopsis*. A synopsis of *Menisporopsis* species is provided here (Table 2.4).

Ellisembia Subram. was synonymized under *Sporidesmium* Link by Su et al. (2016). The main difference between these two genera is that the conidia of *Ellisembia* are distoseptate, while those of *Sporidesmium* are euseptate. However, Su et al. (2016) suggested that this difference was not significant. We included *E. brachypus* (HKUCC 10555) in our phylogenetic analysis, and it clustered within *Chaetosphaeriaceae* (Figure 3.1). Hyde et al. (2019) introduced a new species *Ellisembia aurea* Réblová & J. Fourn. and placed it within *Chaetosphaeriaceae*. Luo et al. (pers. comm.) suggested to use *Sporidesmium brachypus* rather than *Ellisembia brachypus*. Shenoy et al. (2006) confirmed that *Sporidesmium* is polyphyletic based on combined LSU and RPB2 sequence data.

Table 3.2 Genera accepted within family *Chaetosphaeriaceae* by various authors

Réblová et al. (1999)[a]	Lumbsch and Huhndorf (2010)[a]	Seifert et al. (2011)[b]	Maharachchikumbura et al. (2015)	Maharachchikumbura et al. (2016)	Wijayawardene et al. (2018)
Ascocodinaea	*Ascochalara*	*Cacumisporium*	*Ascochalara*	*Ascochalara*	*Adautomilanezia*
Chaetosphaeria	*Australiasca*	*Catenularia*	*Brunneodinemasporium*	*Brunneodinemasporium*	*Anacacumisporium*
Melanochaeta	*Chaetosphaeria*	*Chloridium*	*Catenularia*	*Catenularia*	*Ascochalara*
Melanopsammella	*=Paragaeumannomyces*	*Codinaea*	*Chaetosphaeria*	*Chaetosphaeria*	*Brunneodinemasporium*
Porosphaerella	*Lecythothecium*	*Craspedodidymum*	*Chloridium*	*Chloridium*	*Catenularia*
Porosphaerellopsis	*Melanochaet*	*Cryptophiale*	*Codinaea*	*Codinaea*	*Chaetosphaeria*
Striatosphaeria	*Melanopsammella*	*Custingophora*	*Codinaeopsis*	*Codinaeopsis*	*Chloridium*
	Porosphaerella	*Dictyochaeta*	*Craspedodidymum*	*Craspedodidymum*	*Codinaea*
	Striatosphaeria	*Exserticlava*	*Cryptophiale*	*Cryptophiale*	*Conicomyces*
	Tainosphaeri	*Fusichalara*	*Dendrophoma*	*Dendrophoma*	*Craspedodidymum*
	Zignoëlla	*Gonytrichum*	*Dictyochaeta*	*Dictyochaeta*	*Cryptophiale*
		Hyphopolynema	*Dictyochaetopsis*	*Dictyochaetopsis*	*Dendrophoma*
		Janetia	*Dinemasporium*	*Dinemasporium*	*Dictyochaeta*
		Kylindria	*Exserticlava*	*Exserticlava*	*Dinemasporium*
		Menispora	*Gonytrichum*	*Gonytrichum*	*Eucalyptostroma*
		Menisporopsis	*Hemicorynespora*	*Hemicorynespora*	*Exserticlava*
		Paliphora	*Infundibulomyces*	*Infundibulomyces*	*Gonytrichum*
		Phaeostalagmus	*Kionochaeta*	*Kionochaeta*	*Hemicorynespora*
		Pleurothecium	*Lecythothecium*	*Lecythothecium*	*Infundibulomyces*
		Rattania	*Melanopsammella*	*Melanopsammella*	*Kionochaeta*
		Sporoschisma	*Menispora*	*Menispora*	*Lecythothecium*
		Sporoschismopsis	*Miyoshiella*	*Miyoshiella*	*Melanopsammella*
		Thozetella	*Phaeostalagmus*	*Neopseudolachnella*	*Menispora*
		Zanclospora	*Phialogeniculata*	*Phaeostalagmus*	*Menisporopsis*
			Pseudobotrytis	*Phialogeniculata*	*Miyoshiella*
			Pseudolachnea	*Pseudobotrytis*	*Neopseudolachnella*
			Pyrigemmula	*Pseudodinemasporium*	*Pseudobotrytis*
			Rattania	*Pseudolachnea*	*Pseudodinemasporium*
			Sporoschisma	*Pyrigemmula*	*Pseudolachnea*
			= Melanochaeta	*Rattania*	*Pseudolachnella*
			Striatosphaeria	*Sporoschisma*	*Pyrigemmula*
			Tainosphaeria	*= Melanochaeta*	*Rattania*
			Thozetella	*Striatosphaeria*	*Sporoschisma*
			Umbrinosphaeria	*Tainosphaeria*	*= Melanochaeta*
			Zanclospora	*Thozetella*	*Striatosphaeria*
			Zignoëlla	*Umbrinosphaeria*	*Tainosphaeria*
				Zanclospora	*Thozetella*
				Zignoëlla	*Umbrinosphaeria*
					Zanclospora

Note [a] Only included the sexual genera; [b] Only included the hyphomycetous genera

Table 3.3 Synopsis of *Kionochaeta* species

Species	Conidiophores	Fertile branches	Conidiogenous cells	Conidia
K. aristata	Simple, subulate, smooth, 240–320µm high	Borne sub-medianly on the conidiophore	Lageniform, with a conspicuous, cup-shaped collarette at the apex.	Cylindrical to broadly fusiform, slightly curved, with a setula 6.0–8.5µm long at each end, hyaline, smooth, non-septate, 2–4 guttulate, 10–12(–14) µm long, 1.5–2.0µm wide.
K. australiensis	Setiform, smooth, up to 9-septate, subulate, 200–300 µm long, unbranched or occasionally with a single lateral setiform branch arising from the middle of the central element; apex of central setiform element and lateral setiform branches fertile;	Median to submedian on the conidiophore	Ampulliform or lageniform, subhyaline to hyaline, monoblastic	Ellipsoidal to fusiform, hyaline, smooth, 4–5 × 1–1.5µm
K. castaneae	Setiform, dark brown, smooth, sometimes branched above the fertile region, sometimes with secondly fertile region at the apex of the main axis, 265–320 µm long, 7–9.5 µm wide at the base; when branched, terminal branches dark brown, 45–105 µm long, 2.5–5.5 µm wide at the base, acutely pointed above	Middle part of the conidiophores, rarely with the secondarily fertile region at the apex of the main axis	Narrowly ellipsoid, pale brown	Hyaline, smooth, lunate, cylindrical, aseptate, 5.1–6.5 × 1.2–1.8 µm

Table 3.3 (continued)

Species	Conidiophores	Fertile branches	Conidiogenous cells	Conidia
K. filamentosa	Unbranched, smooth, multiseptate, cylindrical, 800–1200 µm long	Terminal	Monoblastic, ampulliform or lageniform, hyaline to pale brown	Hyaline, narrowly ellipsoidal to fusiform, 0- or 1-septate, smooth, 10–16 × 1.5–3 µm (av. = 14 × 2 µm, n = 25)
K. ivoriensis	Setiform, subulate, smooth, 70–150µm high, 4.5–5.5µm wide, 12.5–14.0µm wide at the base, up to 11-septate, unbranched	Terminal and/or situated just below the middle of the main axis	Ampulliform to short lageniform, with an indistinct collarette.	Aseptate, cylindrical, 3.4–5.0 × 1.5–2.5 µm
K. keniensis	Setiform, subulate, smooth, 200–260µm high, up to 8-septate, branched	Just below the middle of the conidiophores	Cylindrical, with an indistinct collarette	Aseptate, setulate, cylindrical to broadly fusiform, slightly curved, (11–)12–16 µm long (excluding the setulae), 1.5–2.5 µm wide
K. malaysiana	Simple, subulate, smooth, 3–4-septate, 200–250 µm high	Borne sub-medianly on the conidiophore at two loci	Obpyriform, with an indistinct collarette at the apex	Narrowly clavate to fusiform, slightly curved, hyaline, smooth, non-septate, (11–)14–16(–17) µm long, 1.0(–1.5) µm wide

Table 3.3 (continued)

Species	Conidiophores	Fertile branches	Conidiogenous cells	Conidia
K. microspora	Setiform, smooth, unbranched, septate, dark brown at the base, paler towards the apex, cylindrical, swollen at the base, 40–305 μm long, 3.3–10.5 μm wide at the base	At the apex of the conidiophores, rarely at the middle of the conidiophores with a secondary fertile region at the conidiophore apex	Narrowly ellipsoid, ampulliform, subhyaline to pale brown	Hyaline, smooth, lunate, cylindrical or clavate, aseptate, 4.2–6.4 × 1.5–2.3 μm
K. nanophora	Setiform element up to 10-septate, subulate, up to 320 μm tall, occasionally fertile at the apex; conidiophores smooth, up to 2–4 septate, up to 160 μm tall	At the apex of the shorter conidiophore	Ampulliform to lageniform with an indistinct collarette at the apex.	Fusiform, hyaline, smooth, non-septate, 5–7 × 0.8–1.2 μm
K. pini	Simple, verrucose, up to 10-septate, subulate, 120–180μm tall	Situated in middle of conidiophore	Ampulliform to lageniform or cylindrical; apical collarettes inconspicuous.	Fusiform to cylindrical, hyaline, smooth, aseptate, 10–12 × 1.5–2 μm.
K. pleomorpha	Simple, up to 7-septate, 50–100 μm long, cylindrical to subcylindrical	At the apex of conidiophores	Lageniform or globose with short narrow neck, hyaline to subhyaline	Small, hyaline, bacillar, one-celled, smooth, slimy, 4–5 × 1.5 μm

Table 3.3 (continued)

Species	Conidiophores	Fertile branches	Conidiogenous cells	Conidia
K. pughii	Smooth, up to 16-septate, subulate, central element up to 360 µm high, branched; tips of central element and lateral branches fertile	Just below the middle of conidiophores	Ampulliform to lageniform, with an indistinct collarette at the apex.	Fusiform, hyaline, smooth, non-septate, 5.5–7.0 × 1–1.2 µm
K. ramifera	Setiform, subulate, smooth or verruculose, up to 300 µm high, up to 16-septate	Just below the middle of conidiophores	Ampulliform to lageniform or cylindrical, with an indistinct collarette.	Aseptate, narrowly clavate, slightly curved, (5–)6–10(–12) × 1.0–1.5(–2.0) µm
K. spissa	Simple, subulate, smooth, 170–260 µm high	Borne sub-medianly on the conidiophore at a single locus	Lageniform, with an indistinct collarette at the apex	Narrowly clavate to fusiform, slightly curved, hyaline, smooth, non-septate, 4.5–6.5(–8.0) × 1.0–1.5 µm
K. virtuosa	Setiform, subulate, smooth, 225–300 µm high, up to 17-septate, unbranched	Situated just below the middle of the main axis	Lageniform to cylindrical, with a prominent collarette.	1-septate, falcate, 20.5–34.5 × 2.0–2.5 µm

Table 3.4 Synopsis of *Menisporopsis* species

Species	Setae	Synnema width	Conidiophores	Conidia
M. anisospora	200–425 × 10–12 µm, 7–15-septate	60–80 µm	Brown to dark brown, 300–500 × 2–3 µm, single phialides 2.5–4 µm wide	Allantoid, fusiform, subsigmoid, sublunate, vermiform to irregular, aseptate, hyaline, 17–30 × 2–6 µm, 1 apical setula, 4–11 µm; 1 basal setula, 3–10 µm; 1–2(3) lateral setula, 7–10 µm
M. breviseta	97–189 µm long, 2.7–5.4 µm thick	6.5–12 µm wide	Up to 182 µm long	Curved, cylindrical or fusiform, aseptate, hyaline,14.2–24.3 × 2.4–3.6 µm, with one or two setulae at each end, setulae 4–9 µm long
M. dushanensis	207–455 µm long	8.5–22.5 µm wide	Up to 147 µm long	Curved, cylindrical or fusiform, aseptate, hyaline, 14.0–20.6 × 2.7–4.2 µm; with one or two setulae at each end, setulae 3–11 µm long
M. kobensis	250–275 µm long, 7.5–8.8 µm, septate	-	Reduced to conidiogenous cells, 75–90 µm long, below 2.5–3µm wide, up slightly to 3–3.5µm inflated, beneath the light brown, upper colorless, single phialides	0(–1)-septate, (19–)22.5–30(–32) × 4.5 µm, 1 setula at each end, 6–10 µm long
M. multisetulata	300–500 × 6–10 µm, 10–15-septate	22–40 µm	Brown, 180–220 × 1–2 µm wide, with 3–4 µm wide single phialides	Allantoid, 0-septate, 12–18 × 2.5–4 µm, 2(3) and 3(4) setulae on each end, long one 7–10 µm, short one 2–4 µm
M. novae-zelandiae	220–820 × 7–10 µm, 17-septate	14–21 µm	Pale brown, single phialides 2.8–4.3 µm wide	Curved, 1-septate, 15–18 × 2.4–3.1 µm, 1 setula at distal end and to one side of the basal scar, 4.3–5.7 µm long

Table 3.4 (continued)

Species	Setae	Synnema width	Conidiophores	Conidia
*M. pandanicola**	344–375 × 7–10.5 µm, multi-septate	14.5–23 µm	Pale brown	Lunate, conical at both ends, aseptate, guttulate, hyaline,17–22 × 2–3 µm, (1–)2 setula at each end, 4–12 µm long.
M. pirozynskii	300–500 × 5.5–6 µm, 10–15-septate	15–27 µm	Brown, 75–80 × 1.5–2 µm wide, with 2–2.5 µm wide single phialides	Allantoid, 0-septate, 16–20.5 × 2–3.5 µm, 2 setulae at each end, terminal one 7–10 µm, subterminal one 2.5–8 µm
M. pleiosetosa	100–300 × 2–4 µm, 10–15-septate	30–40 µm	Brown, 250 × 3–4 µm wide, with 1–2 µm wide single phialide	Ellipsoidal, 0-septate, 12–18 × 4–5 µm, 2–4 setulae around the conidial base and 1 at the apex, up to 6 µm long
M. profusa	150–250 × 4.5–6 µm, 10-15-septate	10 µm	Gold brown, polyphialidic, phialides 3.5–5µm wide	Curved, 0-septate, 12–15 × 2–2.5 µm, 1 setula at each end, 4.5–6 µm long
M. theobromae	200–420 × 5–7 µm, 21-septate	ca. 10 µm	Brown, monophialidic, phialides 2.5–3 µm wide	0-septate, 14–18 × 2–3 µm, 1 setula at each end, up to 10 µm long
M. trisetulosa	250–460 × 5.5–7 µm, about 20-septate	-	120–175 × 2–4µm, with 3–3.5 µm wide single phialides	Allantoid, aseptate, 12–20 × 2 µm, hyaline, 1 setula at the apex and 2 at the base, about 10 µm long

Note * Tibpromma et al. (2018) gave a measurement for conidiophores within the original description, however, based on their photo plate, this measurement is wrong, they may have muddled up conidiophores with synnema.

The placements of some genera within *Chaetosphaeriaceae* are discussed here and some of them are re-assigned.

Samuels et al. (1997) introduced the genus *Ascocodinaea* with a *Codinaea* asexual morph and placed this genus within family *Lasiosphaeriaceae*. Réblová et al. (1999) placed *Ascocodinaea* within *Chaetosphaeriaceae* based on the asci, ascospores and perithecial morphology and the *Dictyochaeta* asexual morph. However, this treatment has not been universally accepted (Huhndorf et al., 2004; Lumbsch & Huhndorf, 2007b, 2010; Maharachchikumbura et al., 2015, 2016; Wijayawardene et al., 2012, 2017a, 2018). In our phylogenetic analysis (Figure 3.1), the strain (GJS 95-184) of *A. stereicola* clustered outside of the *Chaetosphaeriaceae* (data not shown), and we exclude *Ascocodinaea* from the family.

Bahusutrabeeja was introduced by Subramanian and Bhat (1977), and typified by *B. dwaya* Subram. & Bhat, but its taxonomic placement was uncertain. Shenoy et al. (2010) placed it within family *Botryosphaeriaceae* (*Botryosphaeriales*, *Dothideomycetes*) based on phylogenetic analysis of LSU sequence data of a fresh specimen of *B. dwaya* from India. This treatment was accepted by many authors (Burgess et al., 2019; Hyde et al., 2011; Seifert et al., 2011; Slippers et al., 2017; Wijayawardene et al., 2012). However, in the present study, LSU and ITS sequences data of the *B. dwaya* ex-type strain (CBS 261.77) shows that it is phylogenetically related to *Dictyochaeta* spp. in *Chaetosphaeriaceae* (Figure 3.1). Morphologically, *Bahusutrabeeja* is similar to some genera (*Codinaea*, *Dictyochaeta*, *Dinemasporium*, *Menispora*, *Thozetella*) in *Chaetosphaeriaceae* by having phialidic conidiogenous cells and aseptate conidia with slender appendages (Gao et al., 2015a; Li et al., 2014c; Réblová et al., 1999; Seifert et al., 2011; Subramanian & Bhat, 1977). We suggest to assign the genus *Bahusutrabeeja* to the family *Chaetosphaeriaceae* based on morphology and phylogenetic analysis.

Calvolachnella Marinc., T.A. Duong & M.J. Wingf. was introduced by Hernández-Restrepo et al. (2016c) to accommodate *C. guaviyunis* (Marinc., T.A. Duong, M.J. Wingf. & C.A. Perez) Marinc., T.A. Duong, M.J. Wingf., which was previously known as *Pseudolachnella guaviyunis*. This genus is characterized by having acervular conidiomata, absence of setae in conidiomata, pale brown, septate and branched conidiophores, phialidic conidiogenous cells that produce fusiform,

hyaline to pale brown conidia (Hernández-Restrepo et al., 2016c). Hernández-Restrepo et al. (2016c) placed this genus in *Chaetosphaeriales* genera *incertae sedis*. Our phylogenetic results show that the ex-type strain of *C. guaviyunis* form a separate clade and sister to *Dictyochaeta* group within the *Chaetosphaeriaceae* (Figure 3.1). Therefore, we assign *Calvolachnella* within the family *Chaetosphaeriaceae*.

The genus *Conicomyces* was established by Sinclair et al. (1983) to accommodate a distinctive synnematous hyphomycete. Hashimoto et al. (2015) suggested to place this genus within *Chaetosphaeriaceae* based on its morphological similarity with *Pseudolachnea* and its relatives. The first phylogenetic analysis of the genus *Conicomyces* was performed by Liu et al. (2015) and confirmed its placement within *Chaetosphaeriaceae*.

The genus *Exserticlava* was established by Hughes (1978) and has a *Chaetosphaeria* sexual morph (Fernández & Huhndorf, 2005; Matsushima, 1985; Réblová & Seifert, 2003; Seifert et al., 2011). Unpublished sequence data of *E. vasiformis* (Matsush.) S. Hughes (TAMA 450) was included in our analysis, and it showed close phylogenetic relationship with *Chaetosphaeria capitata* Sivan. & H.S. Chang (SMH 3239) with high support value (99% MLBS /0.95 PP) (Figure 3.1). *Exserticlava vasiformis* was found on the holotype specimen of *C. capitata* but without a common mycelial link between them (Sivanesan & Chang, 1995). Fernández and Huhndorf (2005) confirmed the sexual-asexual connection between *C. capitata* and *E. vasiformis* by culturing ascospores *in vitro*. We confirm this connection by phylogenetic analysis (Figure 3.1).

Melanopsammella Höhn. was introduced by Höhnel (1919b) to accommodate *M. inaequalis* (Grove) Höhn. (now known as *Chaetosphaeria inaequalis* (Grove) W. Gams & Hol.-Jech.). All *Melanopsammella* species have been synonymized under the genera *Chaetosphaeria* and *Chloridium* (Réblová et al., 2016a).

Sivanesan and Chang (1997) reported a new species *Chaetosphaeria ampulliformis*, and linked it to *Hemicorynespora multiseptata* Sivan. & H.S. Chang since the latter species was collected on the perithecial neck of *C. ampulliformis*. However, this *Chaetosphaeria* species and the asexual connection were doubted and rejected by Réblová (1999) who excluded it from *Chaetosphaeriaceae* (Seifert et al., 2011). *Hemicorynespora* has been placed within *Chaetosphaeriaceae* by some studies

(Hyde et al., 2011; Maharachchikumbura et al., 2015, 2016; Wijayawardene et al., 2017a, 2018). However, no sequence data is available for *Hemicorynespora*. We follow the treatment by Réblová (1999) and Seifert et al. (2011) and exclude *Hemicorynespora* from *Chaetosphaeriaceae*.

Shenoy et al. (2010) performed the first phylogenetic analysis for the genus *Paliphora* based on LSU sequence data, and confirmed its placement within *Chaetosphaeriaceae*. This treatment was accepted by Seifert et al. (2011). However, Maharachchikumbura et al. (2015) and (2018); Wijayawardene et al. (2017a) excluded it from *Chaetosphaeriaceae*, and placed *Paliphora* as *Ascomycota* genera *incertae sedis*. In this study, *Paliphora intermedia* strains (CBS 199.95 and CBS 896.97) formed a separate clade and sister to the *Eucalyptostroma* clade (Figure 3.1), confirming the results of Crous et al. (2016a) and Crous et al. (2018c). *Eucalyptostroma* was introduced by Crous et al. (2016a) and is characterized by sporodochial, cupulate, orange-yellow conidiomata, branched and pale orange-brown conidiophores with penicillate and orange-brown conidiogenous apparatus, and producing aseptate, hyaline, smooth and ellipsoid conidia. We follow the treatment of Shenoy et al. (2010) as *Paliphora* has a close phylogenetic relationship with *Eucalyptostroma* within *Chaetosphaeriaceae*.

The monotypic genus *Paragaeumannomyces* Matsush. was established by Matsushima (1996) to accommodate *P. sphaerocellularis* Matsush. It was treated as a synonym of *Chaetosphaeria* since *P. sphaerocellularis* is identical to *Chaetosphaeria raciborskii* (Penz. & Sacc.) F.A. Fernández & Huhndorf (Lumbsch & Huhndorf, 2007a, 2007b).

Phialogeniculata Matsush., introduced by Kobayasi (1971), was treated as a synonym of *Dictyochaeta* by Kuthubutheen and Nawawi (1991a). However, this treatment was not accepted by some later studies (Hyde et al., 1998; Maharachchikumbura et al., 2015, 2016; Matsushima, 1993; Seifert et al., 2011). Hyde et al. (1998) differentiated *Phialogeniculata* from *Dictyochaeta* as it lacked setae, proliferating sympodially, and possessing geniculate conidiophores, and obclavate, septate, non-setulate conidia. We maintain both genera and place *Phialogeniculata* within the family *Chaetosphaeriaceae*.

Réblová et al. (1999) accepted the sexual genus *Porosphaerellopsis* (with *Porosphaerellopsis* asexual morph) within family *Chaetosphaeriaceae*, and treated *Porosphaeria* as a synonymy of *Porosphaerellopsis*. Réblová (2014) synonymized *Porosphaeria* and *Porosphaerellopsis* under *Sporoschismopsis*, and positioned it in the *Reticulascaceae* (*Glomerellales*, *Sordariomycetes*) based on multi-gene phylogenetic analysis.

Réblová (1999) introduced *Umbrinosphaeria* Réblová to accommodate *U. caesariata* (Clinton & Peck) Réblová with a *Sporidesmium hormiscioides* asexual morph. However, Subramanian (1992) had established the genus *Stanjehughesia* and transferred *Sporidesmium hormiscioides* to *Stanjehughesia*. Réblová et al. (2016a) suggested to use *Stanjehughesia* rather than *Umbrinosphaeria*. Meanwhile, several other suggestions were provided: (1) using *Chloridium* rather than *Gonytrichum* or *Melanopsammella*; (2) using *Menispora* rather than *Zignoëlla*; (3) using *Menisporopsis* rather than *Menisporopascus*; (4) using *Sporoschisma* rather than *Melanochaeta* (Réblová et al., 2016a).

Yang et al. (2018) studied five genera of *Sordariomycetes*, viz., *Cryptophiale*, *Cryptophialoidea*, *Nawawia*, *Neonawawia* and *Phialosporostilbe*. They confirmed the placement of *Cryptophiale*, *Cryptophialoidea*, *Nawawia* and *Phialosporostilbe* within *Chaetosphaeriaceae* based on morphological characters and phylogenetic analyses of combined LSU and ITS sequence data. However, the placements of *Neonawawia* in family- and order-level are uncertain.

In conclusion, we accept 49 genera (including three uncertain genera) within family *Chaetosphaeriaceae* and these are listed below, together with generic synonyms ([H]=hyphomycetes, [C]=coelomycetes, [S]=sexual genus, ?= uncertain classification):

***Chaetosphaeriaceae* Réblová, M.E. Barr & Samuels 1999**

Adautomilanezia Gusmão, S.S. Silva, Fiuza, L.A. Costa & T.A.B. Santos 2016[H]

Anacacumisporium Y.R. Ma & X.G. Zhang 2016[H]

Ascochalara Réblová 1999[S]

Bahusutrabeeja Subram. & Bhat 1977[H]

Brunneodinemasporium Crous & R.F. Castañeda 2012[C]

Cacumisporium Preuss 1851[H]

Calvolachnella Marinc., T.A. Duong & M.J. Wingf. 2016[C]

Catenularia Grove 1886[H]

= *Haplochalara* Linder 1933

= *Psiloniella* Costantin 1888

Chaetosphaeria Tul. & C. Tul. 1863[S]

= *Aposphaeriella* Died. 1912

= *Chaetolentomita* Maubl. 1915

= *Didymopsamma* Petr. 1925

= *Lentomita* Niessl 1876

= *Melanopsammina* Höhn. 1919

= *Miyoshia* Kawam. 1907

= *Miyoshiella* Kawam. 1929

= *Montemartinia* Curzi 1927

= *Paragaeumannomyces* Matsush. 2003

= *Trichocollonema* Höhn. 1902

= *Urnularia* P. Karst. 1866

?*Chalarodes* McKenzie 1991[H]

Chloridium Link 1809[H]

= *Bisporomyces* J.F.H. Beyma 1940

= *Cirrhomyces* Höhn. 1903

= *Gonatotrichum* Corda 1842

= *Gongromeriza* Preuss 1851

= *Gonytrichum* Nees & T. Nees 1818

= *Melanopsammella* Höhn. 1920

= *Mesobotrys* Sacc. 1880

= *Monostachys* G. Arnaud 1954

= *Piminella* G. Arnaud 1954

= *Psilobotrys* Sacc. 1879

= *Sphaeromycetella* G. Arnaud 1954

Codinaea Maire 1937[H]

Conicomyces R.C. Sinclair, Eicker & Morgan-Jones 1983[H]

Craspedodidymum Hol.-Jech. 1972[H]

Cryptophiale Piroz. 1968[H]

Cryptophialoidea Kuthub. & Nawawi 1987[H]

Dendrophoma Sacc. 1880[C]

Dictyochaeta Speg. 1923[H]

= *Menisporella* Agnihothr. 1962

Dictyochaetopsis Aramb. & Cabello 1990[H]

= *Codinaeopsis* Morgan-Jones 1976

Dinemasporium Lév. 1846[C]

Eucalyptostroma Crous & M.J. Wingf. 2016[H]

Exserticlava S. Hughes 1978[H]

?*Hyphopolynema* Nag Raj 1977[H]

Infundibulomyces Plaingam, Somrith. & E.B.G. Jones 2003[C]

Kionochaeta P.M. Kirk & B. Sutton 1986[H]

Lecythothecium Réblová & Winka 2001[S]

Menispora Pers. 1822[H]

= *Camptosporium* Link 1818

= *Ciliofusa* Clem. & Shear 1931

= *Ciliofusarium* Rostr. 1892

= *Eriomene* (Sacc.) Clem. & Shear 1931

= *Eriomenella* Peyronel 1918

= *Erionema* Maire 1906

= *Zignoëlla* Sacc. 1878

Menisporopsis S. Hughes 1952[H]

= *Menisporopascus* Matsush. 2003

Morrisiella Saikia & A.K. Sarbhoy 1985[H]

Multiguttulispora C.G. Lin & J.K. Liu[H]

Nawawia Marvanová 1980[H]

?Neonawawia J. Yang, K.D. Hyde & J.K. Liu 2018[H]

Neopseudolachnella A. Hashim. & Kaz. Tanaka 2015[C]

Paliphora Sivan. & B. Sutton 1985[H]

Phaeostalagmus W. Gams 1976[H]

Phialogeniculata Matsush. 1971[H]

Phialosporostilbe Mercado & J. Mena 1985[H]

Pseudodinemasporium A. Hashim. & Kaz. Tanaka 2015[C]

Pseudolachnea Ranoj. 1910[C]

= *Chaetopatella* I. Hino & Katum. 1958

= *Dinemasporiella* Bubák & Kabát 1912

= *Dinemasporiopsis* Bubák & Kabát 1914

Pseudolachnella Teng 1936[C]

Pyrigemmula D. Magyar & Shoemaker 2011[H]

Rattania Prabhug. & Bhat 2009[H]

Sporoschisma Berk. & Broome 1847[H]

= *Melanochaeta* E. Müll., Harr & Sulmont 1969

= *Pithospermum* Mont. 1856

Stanjehughesia Subram. 1992[H]

= *Umbrinosphaeria* Réblová 1999

Striatosphaeria Samuels & E. Müll. 1979[S]

Tainosphaeria F.A. Fernández & Huhndorf 2005[S]

Thozetella Kuntze 1891[H]

= *Thozetellopsis* Agnihothr. 1958

Verhulstia Hern.-Restr. 2017[H]

Zanclospora S. Hughes & W.B. Kendr. 1965[H]

CHAPTER 4

BELTRANIA-LIKE TAXA FROM THAILAND

This chapter is extracted from the following publications Lin et al. (2017b, 2017c)

4.1 Introduction

Xylariales is a large order of perithecial ascomycetes with eight-spored unitunicate asci, usually with a J+, apical ring and ascospores with a prominent germ pore or germ slit and is accommodated in the subclass *Xylariomycetidae* (Maharachchikumbura et al., 2016; Senanayake et al., 2015; Smith et al., 2003a). Asexual morphs of the *Xylariales* are usually hyphomycetous, with holoblastic conidiogensis. Presently there are 22 accepted families in the *Xylariales viz. Amphisphaeriaceae, Apiosporaceae, Bartaliniaceae, Beltraniaceae, Cainiaceae, Clypeosphaeriaceae, Coniocessiaceae, Diatrypaceae, Hyponectriaceae, Iodosphaeriaceae, Lopadostomaceae, Melogrammataceae, Microdochiaceae, Myelospermataceae, Pestalotiopsidaceae, Phlogicylindriaceae, Pseudomassariaceae, Requienellaceae, Robillardaceae, Sporocadaceae, Vialaeaceae* and *Xylariaceae* (Maharachchikumbura et al., 2016).

A fungal tribe named *Beltranieae* Sacc. was established by Saccardo (1884) to accommodate a single genus *Beltrania* Penzig. Nannizzi (1934) introduced *Beltraniaceae* Nann. to accommodate *Beltrania* and some similar genera, and the tribe *Beltranieae* was treated as a synonym of this family. Crous et al. (2015c) emended the family *Beltraniaceae* and accepted *Beltrania*, *Beltraniella* Subram., *Beltraniopsis* Bat. & J.L. Bezerra, *Parapleurotheciopsis* P.M. Kirk and *Pseudobeltrania* Henn.. They provided DNA evidence to support the family. Crous et al. (2015c) proposed that three more genera, *Beltraniomyces* Manohar., D.K. Agarwal

& Rao, *Porobeltraniella* Gusmão and *Subramaniomyces* Varghese & V.G. Rao, should be accepted in this family. Due to lack of reliable strains and sequence data, they could not confirm the familial relationships of these genera within the *Beltraniaceae*. Maharachchikumbura et al. (2016) accepted the genus *Subramaniomyces* within the family *Beltraniaceae* based on phylogenetic analysis. Rajeshkumar et al. (2016b) accepted the genera *Hemibeltrania* and *Porobeltraniella* and preliminarily confirmed the monophyly of all of the recognized genera based on phylogenetic analysis. Presently, eight genera, *viz.*, *Beltrania*, *Beltraniella* Subram., *Beltraniopsis* Bat. & J.L. Bezerra, *Hemibeltrania* Piroz., *Parapleurotheciopsis* P.M. Kirk, *Porobeltraniella* Gusmão, *Pseudobeltrania* Henn. and *Subramaniomyces* Varghese & V.G. Rao, are accepted in the family (Crous et al., 2015c; Maharachchikumbura et al., 2015, 2016; Rajeshkumar et al., 2016a).

The asexual morphs in *Beltraniaceae* are hyphomycetous. Stromata usually are present. Setae are present or absent, branched or unbranched and usually with a radially lobed basal cell. The conidiophores are branched or unbranched, arising from the base of setae or separate, sometimes arising from radially lobed basal cells. The conidiogenous cells are monoblastic or polyblastic, sympodial, integrated or discrete and denticulate. Separating cells are present or absent, oval to subglobose, also with one to several denticles. Conidia are biconic, lageniform to navicular, hyaline to red-brown, generally with a lightly pigmented transverse band at the widest part of the conidium, rounded or 1-denticulate or rostrate at the base and spicate or apiculate or truncate at the apex (Crous et al., 2015c).

The genus *Beltrania* was established by Penzig (1882) to accommodate *B. rhombica* Penzig. This genus contains 13 species (Crous et al., 2015c; Morelet, 2001; Rambelli & Ciccarone, 2008; Zhang & Zhang, 2003), each characterized by having dark and mostly unbranched setae with radially lobed basal cells, unbranched conidiophores arising from basal cells of setae or from separate radially lobed basal cells, sympodial and denticulate conidiogenous cells, swollen separating cells and biconic, spicate or apiculate conidia with a hyaline transverse band (Seifert et al., 2011). *Beltrania rhombica* was reported to have antibacterial activities against *Staphylococcus aureus* ATCC 25923 and *Candida albicans* (Rukachaisirikul et al., 2005).

Subramanian (1952) described a beltrania-like genus (*Beltraniella* Subram.) to accommodate *Be. odinae* Subram. Hodges and Barr (1971) obtained a *Beltraniella* asexual morph in pure cultures of *Pseudomassaria carolinensis* M.E. Barr & Hodges. Jaklitsch et al. (2016) synonymized *P. carolinensis*, under the new combination *Be. carolinensis*, based on a phylogenetic analysis. Presently, 22 species are accepted in the genus *Beltraniella* (Crous et al., 2014b; Fernando & Gusmão, 2004; Jaklitsch et al., 2016; Priya et al., 2011; Shirouzu et al., 2010).

The genus *Beltraniopsis* was established by Batista and Bezerra (1960) to accommodate *Bel. esenbeckiae* Bat. & J.L. Bezerra. Currently, there are nine species in this genus (Crous et al., 2014b; Gusmão et al., 2000; Ruiz et al., 2006), each having branched, setiform conidiophores arising from radially lobed basal cells, swollen separating cells, and biconic conidia with a median transverse hyaline band (Ellis, 1971; Seifert et al., 2011).

Pirozynski (1963) introduced the genus *Hemibeltrania* Piroz. for *H. cinnamomi* (Deighton) Piroz. and *H. nectandrae* (Bat. & H. Maia) Piroz. Twelve species are accepted in this genus (Rajeshkumar et al., 2016c), each characterized by having unbranched or sparingly branched conidiophores with radially lobed basal cells, monoblastic and polyblastic conidiogenous cells and broadly ellipsoidal, limoniform, ovoid, obovoid, cymbiform, navicular, biconic or fusiform conidia without a transverse band (Ellis, 1971; Seifert et al., 2011).

The genus *Beltrania* and its allies are mostly found in litter and on submerged wood in freshwater (Duong et al., 2008; Goh & Hyde, 1996a; Pirozynski, 1963; Sakayaroj et al., 2005). During a survey of hyphomycetes in Thailand, several *Beltrania*-like species were collected. They were shown to belong to *Beltrania*, *Beltraniella*, *Beltraniopsis*, *Hemibeltrania* and the new introduced genus in *Beltraniaceae* based on both morphology and analyses of ITS and LSU sequence data.

4.2 Materials and Methods

4.2.1 Collection and Isolation of Fungi

Dead stems, wood, and leaves from a variety of plants were collected from July 2015 to August 2016 in Chiang Rai, Chiang Mai, and Prachuap Khiri Khan provinces in Thailand. Samples were taken to the laboratory in Zip-lock plastic bags for examination. The specimens were incubated in sterile moist chambers and examined using a Motic SMZ 168 series microscope. Fungi were removed with a needle and placed in a drop of distilled water on a slide for morphological study. Photomicrographs of fungal structures were captured using a Nikon ECLIPSE 80i compound microscope with a Canon 450D digital camera. All measurements were made by the Tarosoft (R) Image FrameWork program. Photo-plates were made with Adobe Photoshop CS6 Extended version 13.0.1 (Adobe Systems, USA). Isolation onto potato dextrose agar (PDA) or malt extract agar (MEA) was performed by the single spore isolation method (Chomnunti et al., 2014; Dai et al., 2017). The material is deposited in the Herbarium of Mae Fah Luang University (MFLU), Chiang Rai, Thailand and herbarium of Kunming Institute of Botany, Chinese Academy of Sciences (HKAS), Kunming, China. Cultures are deposited at Mae Fah Luang University Culture Collection (MFLUCC), Chiang Rai, Thailand and Kunming Institute of Botany, Chinese Academy of Sciences (KUMCC), Kunming, China. Faces of Fungi and Index Fungorum numbers are registered (Index Fungorum, 2017; Jayasiri et al., 2015).

4.2.2 DNA Extraction, PCR Amplification and Sequencing

Genomic DNA was extracted from fungal mycelium grown on potato dextrose agar (PDA) or malt extract agar (MEA) at room temperature with the Fungal gDNA Kit (BioMIGA, USA) according to the manufacturer's instructions. The internal transcribed spacer region of ribosomal DNA (ITS) and large subunit nuclear ribosomal DNA (LSU) genes were amplified via polymerase chain reaction (PCR) using the following primers: ITS5 and ITS4 (White et al., 1990) for ITS, LROR and LR5 (Vilgalys & Hester, 1990) for LSU. The PCR products were sequenced with the same primers. The PCR amplification was performed in a 25 μl reaction volume

containing 12.5 μL of 2 × Power Taq PCR MasterMix (a premix and ready to use solution, including 0.1 Units/μl Taq DNA Polymerase, 500 μM dNTP Mixture each (dATP, dCTP, dGTP, dTTP), 20 mM Tris–HCl pH 8.3, 100 Mm KCl, 3 mM $MgCl_2$, stabilizer and enhancer), 1 μL of each primer (10 μM), 1 μL genomic DNA extract and 9.5 μL deionised water. The PCR thermal cycle program of ITS and LSU were followed as: initially 94 ℃ for 3 min., followed by 35 cycles of denaturation at 94 ℃ for 30 s, annealing at 55 ℃ for 50 s, elongation at 72 ℃ for 1 min., and final extension at 72 ℃ for 10 min.

4.2.3 Phylogenetic Analyses

Original sequences were checked using BioEdit version 7.0.5.3 (Hall, 1999), and most reference sequences originated from previous publications. The remaining homogenous sequences were obtained by BLAST searches (Altschul et al., 1990) from GenBank. All sequences used in this study are listed in Table 4.1. Alignments for each locus were done in MAFFT v7.307 online version (Katoh & Standley, 2016) and manually verified in MEGA 6.06 (Tamura et al., 2013). Conserved blocks were selected from the initial alignments with Gblocks 0.91b (Castresana, 2000). The interleaved NEXUS files for Bayesian inference analyses were formatted with AliView v1.19-beta1k (Larsson, 2014). Bayesian inference (BI), maximum parsimony (MP) and maximum likelihood (ML) were used for phylogenetic analyses. For Bayesian inference analysis, the best model of evolution was determined using MrModeltest v2 (Nylander, 2004). Bayesian inference analysis was done with MrBayes v 3.2.6 (Ronquist et al., 2012). Maximum parsimony analysis was performed in PAUP*4.0b10 (Swofford, 2002). Maximum likelihood analysis was performed in raxmlGUI v 1.3.1 (Silvestro & Michalak, 2012). Phylogenetic trees were drawn with TreeView 1.6.6 (Page, 1996) or FigTree v1.4.3 (Rambaut, 2017).

Table 4.1 GenBank accession numbers of isolates used in this study

Families	Species	Culture accession no.	LSU	ITS
Amphisphaeriaceae	***Seimatosporium botan***	**NBRC 104200T[a]**	**AB593731**	**AB594799**
	S. discosioides	NBRC 104201	AB593732	AB594800
	S. lichenicola	NBRC 32625 = IMI 079706 = IFO 32625	AB593726	AB594794
Apiosporaceae	*Apiospora tintinnabula*	ICMP 7019	DQ810216	-[b]
	Arthrinium aureum	**CBS 244.83 = IMI 238036[a]**	**KF144935**	**AB220251**
	A. gutiae	**CBS 135835[a]**	**KR149063**	**-**
	A. hydei	**CBS 114990 = HKUCC 3990[a]**	**KF144936**	**KF144890**
	A. kogelbergense	CBS 113332	KF144937	KF144891
	A. kogelbergense	**CBS 113333[a]**	**KF144938**	**KF144892**
Beltraniaceae	***Beltrania pseudorhombica***	**CBS 138003 = CPC 23656[a]**	**KJ869215**	**KJ869158**
	B. querna	ICMP 15825	-	EF029240
	B. querna	BCRC 34620	-	GU905994
	B. rhombica	Strain 10353	AB496423	-
	B. rhombica	CBS 141507 = CPC 27482	KX519521	KX519515
	B. rhombica	MFLUCC 15-0835	MF580252	MF580245
	Beltraniella botryospora	**TUFC 10083[a]**	**AB496426**	**-**
	Be. carolinensis	IFO 9502	DQ810233	-
	Be. endiandrae	**CBS 137976 = CPC 22193[a]**	**KJ869185**	**KJ869128**
	Be. fertilis	MFLUCC 17-2136	MF580253	MF580246
	Be. fertilis	MFLUCC 17-2137	MF580254	MF580247
	Be. fertilis	MFLUCC 17-2138	MF580255	MF580248
	Be. portoricensis	BCRC 34590	-	GU905993
	Be. portoricensis	NFCCI 3993	KX519522	KX519516
	Beltraniopsis sp.	TUFC 10081	AB496424	-
	Bel. longiconidiophorum	**MFLUCC 17-2139**	**MF580256**	**MF580249**
	Bel. longiconidiophorum	MFLUCC 17-2140	MF580257	MF580250
	Beltraniopsis neolitseae	**CBS 137974 = CPC 22168[a]**	**KJ869183**	**KJ869126**
	Hemibeltrania cinnamomi	NFCCI 3695	KT119565	KT119564
	H. cinnamomi	MFLUCC 17-2141	MF580258	MF580251
	H. cinnamomi	NFCCI 3997	KX519523	KX519517
	Hemibeltrania sp.	CL12WA	-	JQ621881
	Porobeltraniella porosa	NFCCI 3994	KX519524	KX519518
	P. porosa	NFCCI 3995	KX519525	KX519519
	P. porosa	NFCCI 3996	KX519526	KX519520
	Pseudobeltrania ocoteae	**CBS 140664 = CPC 26219[a]**	**KT950870**	**KT950856**

Table 4.1 (continued)

Families	Species	Culture accession no.	LSU	ITS
	Subramaniomyces fusisaprophyticus	CBS 418.95 = INIFAT C94/134	EU040241	EU040241
	Subsessila turbinata	**MFLUCC 15-0831[a]**	**KX762289**	**KX762288**
Pestalotiopsidaceae	***Neopestalotiopsis aotearoa***	**CBS 367.54 = ATCC 11763 = QM 381[a]**	**KM116247**	**KM199369**
	N. eucalypticola	**CBS 264.37 = BBA 5300[a]**	**KM116256**	**KM199376**
	Pestalotiopsis arceuthobii	**CBS 434.65 = ATCC 16339[a]**	**KM116243**	**KM199341**
	P. arengae	**CBS 331.92[a]**	**KM116207**	**KM199340**
	P. camelliae	CBS 443.62	KM116225	KM199336
	P. chamaeropis	**CBS 186.71[a]**	**KM116210**	**KM199326**
	Pseudopestalotiopsis cocos	**CBS 272.29[a]**	**KM116276**	**KM199378**
Robillardaceae	***Robillarda africana***	**CBS 122.75 = BCC 38220[a]**	**KR873281**	**KR873253**
	R. sessilis	CBS 101440 = BCC 37544	KR873283	KR873255
	R. sessilis	**CBS 114312[a]**	**KR873284**	**KR873256**
Outgroup	*Anthostomella leucospermi*	CBS 110126	EU552100	EU552100

Note ATCC, American Type Culture Collection, Manassas, United States; **BCC**, BIOTEC Culture Collection, Thailand; **BCRC,** The Bioresource Collection and Research Center, Taiwan, China; **CBS**, CBS-KNAW Fungal Biodiversity Centre, Utrecht, The Netherlands; **CPC**: Culture collection of Pedro Crous, housed at CBS; **HKUCC**, The University of Hong Kong Culture Collection, Department of Ecology and Biodiversity, Hong Kong, China; **ICMP**, The International Collection of Microorganisms from Plants, New Zealand; **IFO**, Institute for Fermentation Culture Collection, Osaka, Japan; **IMI**, International Mycological Institute, CABI-Bioscience, Egham, Bakeham Lane, UK; **INIFAT**, INIFAT Fungus Collection, Ministerio de Agricultura Habana; **MFLUCC**, Mae Fah Luang University Culture Collection, Chiang Rai, Thailand; **NBRC**, Distribution and Deposit of Biological Resources, Japan; **NFCCI**, National Fungal Culture Collection of India, Agharkar Research Institute, Pune, India; **QM**, Quatermaster Research and Development Center, US Army, Natick, MA, United States; **TUFC**, Tottori University Fungal Culture Collection,

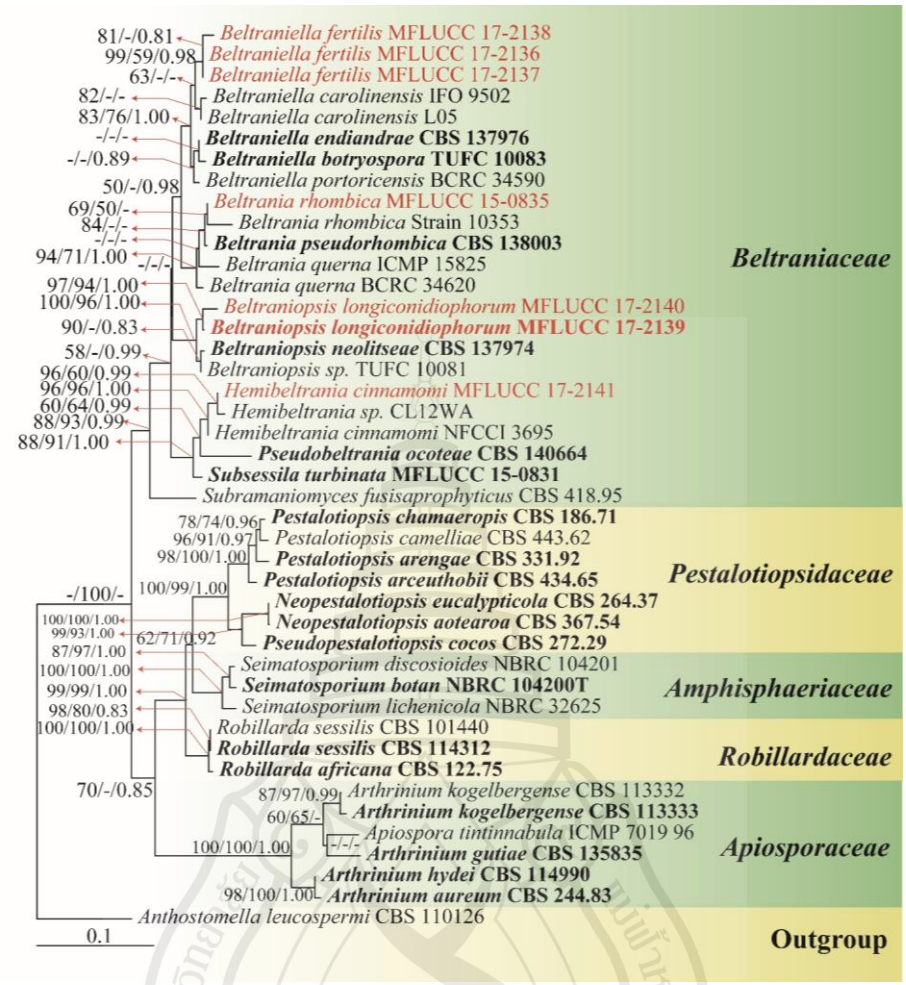
Fungus/Mushroom Resource and Research Center, Tottori, Japan; [a] The ex-type and ex-epitype cultures are in bold; [b] No data in GenBank.

4.3 Results

4.3.1 Molecular Phylogeny

The aligned sequence matrix comprises LSU (871 bp) and ITS (660 bp) sequence data for 42 taxa and one outgroup taxon for a total of 1531 characters, of which 283 were parsimony informative, 112 were parsimony-uninformative, and 1136 characters were constant. The result of maximum likelihood (ML) analysis based on combined LSU and ITS sequence data consist of five families (*Amphisphaeriaceae*, *Apiosporaceae*, *Beltraniaceae*, *Pestalotiopsidaceae* and *Robillardaceae*) within the subclass *Xylariomycetidae* is shown in Figure 4.1.

Strain *B. rhombica* (MFLUCC 15-0835) grouped together with *B. rhombica* (strain 10353) with 69% ML bootstrap support, 50% MP bootstrap support and 53% Bayesian posterior probabilities within the genus *Beltrania*. The strains of *Beltraniella fertilis* (MFLUCC 17-2136, MFLUCC 17-2137 and MFLUCC 17-2138) form a separate clade with 99% ML bootstrap support, 59% MP bootstrap support and 98% Bayesian posterior probabilities within the genus *Beltraniella*. *Beltraniopsis longiconidiophorum* (MFLUCC 17-2139 and MFLUCC 17-2140) clustered together in a well-supported clade (BSML = 97%, BSMP = 94%, BYPP = 1.00), sister to the ex-type strain of *Beltraniopsis neolitseae* (CBS 137974). *Hemibeltrania cinnamomi* (MFLUCC 17-2141) forms a clade with the strain of *H. cinnamomi* (NFCCI 3695) and an unidentified *Hemibeltrania* species (*Hemibeltrania* sp. CL12WA) with 96% ML bootstrap support, 96% MP bootstrap support and 100% Bayesian posterior probabilities. The strain of *Subsessila turbinata* (MFLUCC 15-0831) grouped together with *Pseudobeltrania ocoteae* (CBS 140664), *Hemibeltrania sp.* (CL12WA) and *Hemibeltrania cinnamomi* (NFCCI 3695) with 88% ML bootstrap support, 91% MP bootstrap support and 100% Bayesian posterior probabilities within family *Beltraniaceae*.



Note Phylogenetic tree generated from maximum likelihood (ML) analysis based on combined LSU and ITS sequence data for selected families within subclass *Xylariomycetidae*. Bootstrap support values for maximum likelihood (ML) and maximum parsimony (MP) greater than 50% and Bayesian posterior probabilities greater than 0.8 are indicated above or below the nodes as MLBS/MPBS/PP. Ex-type strains are in bold, the new isolates are in bold and red. The tree is rooted with *Anthostomella leucospermi* (CBS 110126).

Figure 4.1 Phylogenetic tree for selected families within subclass *Xylariomycetidae*

4.3.2 Taxonomy

Subsessila C.G. Lin & K.D. Hyde, gen. nov.

Index Fungorum number: IF552504; *Facesoffungi number*: FoF 02613

Etymology: In reference to the absence of conidiophores.

Type species: *Subsessila turbinata* C.G. Lin & K.D. Hyde

Saprobic on plant host. **Asexual morph:** *Colonies* on plant substrate effuse, pale brown, hairy, velvety. *Mycelium* partly superficial and partly immersed. *Stroma* absent. *Setae* numerous, erect, arising from radially lobed basal cells, straight or slightly flexuous, unbranched, 2–4-septate, thick-walled, verrucose, pale to dark brown, swollen at the base, tapering towards the apex. *Conidiophores* mostly absent or reduced to conidiogenous cells; when present, arising from the basal cells of setae, simple, aseptate, subcylindrical, pale- to mid-brown, smooth. *Conidiogenous cells* polyblastic, discrete, determinate, ampulliform, doliiform, hyaline. *Separating cells* absent. *Conidia* aggregated, acrogenous, simple, dry, straight, smooth, thin-walled, turbinate to pyriform, rostrate at proximal end, rounded at distal end, hyaline. **Sexual morph**: Undetermined.

Subsessila turbinata C.G. Lin & K.D. Hyde, sp. nov., Figure 4.2

Index Fungorum number: IF552503; *Facesoffungi number*: FoF 02614

Etymology: In reference to the conidia are turbinate

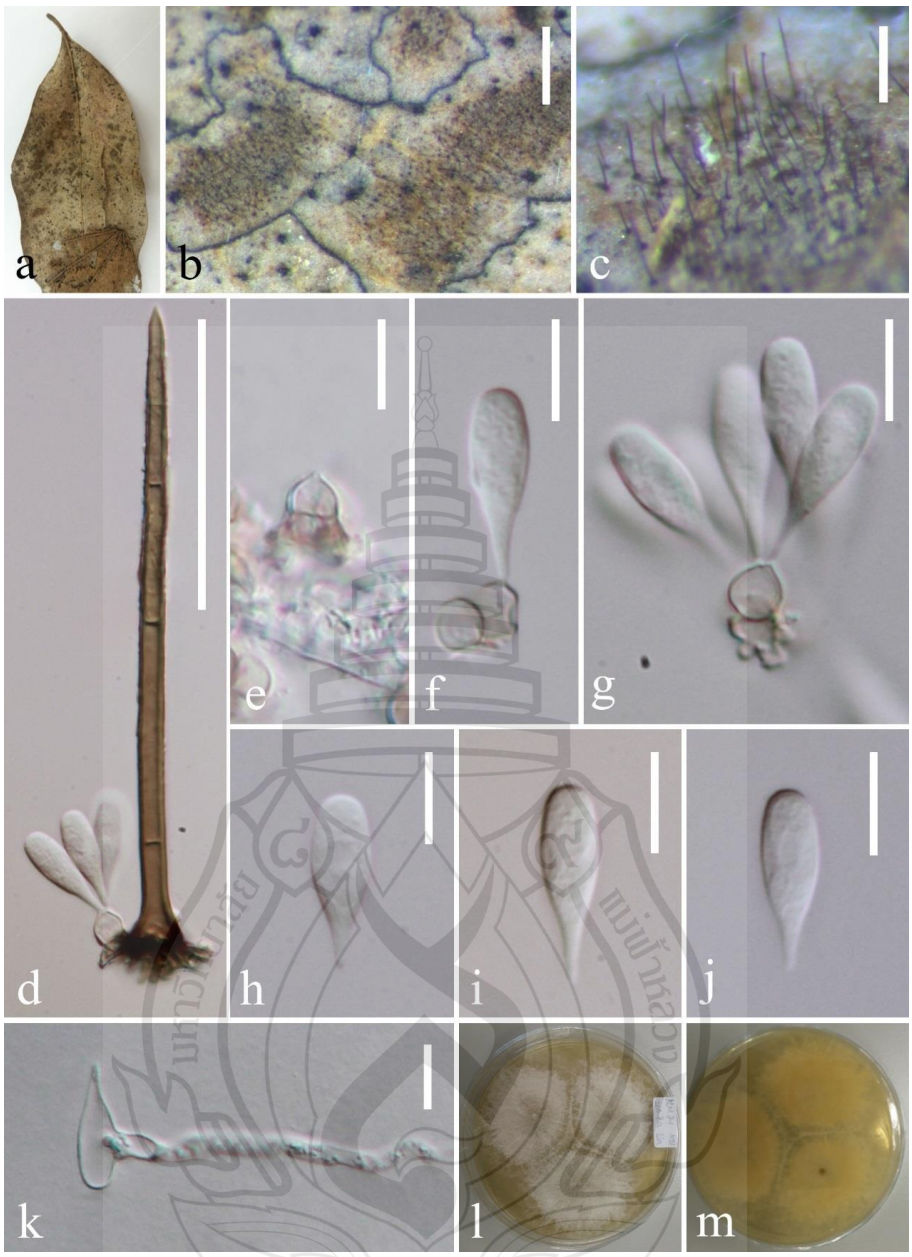
Holotype: MFLU 15-3271

Saprobic on plant host. **Asexual morph:** *Colonies* on plant substrate effuse, pale brown, hairy, velvety. *Mycelium* partly superficial and partly immersed. *Stroma* absent. *Setae* numerous, erect, arising from radially lobed basal cells, straight or slightly flexuous, unbranched, 2–4-septate, thick-walled, verrucose, medium to dark brown, 50–280 µm long, swollen at the base and 4.5–13 µm wide, 2–7 µm wide just above the swollen base, tapering to a pointed apex. *Conidiophores* mostly absent and reduced to conidiogenous cells; if present, arising from basal cells of setae, simple, aseptate, subcylindrical, pale- to mid-brown, up to 6.5 µm long, 3–7.5 µm wide. *Conidiogenous cells* polyblastic, discrete, determinate, ampulliform, doliiform, hyaline, smooth, 4.5–6.5 µm (av. = 5.5 µm, n = 30) long, 4–6 µm (av. = 5.1 µm, n = 30) wide in the broadest part. *Separating cells* absent. *Conidia* aggregated,

acrogenous, simple, dry, straight, smooth, thin-walled, turbinate to pyriform, rostrate to pointed at proximal end, broadly rounded at distal end, hyaline, 14.5–20.5 µm (av. = 17.70 µm, n = 50) long, 4.5–6.5 µm (av. = 5.50 µm, n = 50) wide in the broadest part. **Sexual morph:** Undetermined.

Culture characteristics: Conidia germinating on MEA within 12 h. Colonies on MEA effuse, pale white from above, light yellow from below, reaching a diam. of 2–3 cm in 20 days at 25 °C.

Material examined: THAILAND, Prachuap Khiri Khan, Khao Lom Muak, 11°47'3.96" – 11.24"N, 99°48'49.13" – 49'0.63"E, on decaying leaf, 29 July 2015, Chuan-Gen Lin, KLM 8-1 (MFLU 15-3271, **holotype**; HKAS, **isotype**), ex-type living culture MFLUCC 15-0831, KUMCC.



Note ***Subsessila turbinata*** **(holotype) a.** Leaf material. **b, c.** Conidiophores on the host surface. **d.** Conidiophores, seta and conidia. **e.** Short conidiophores with conidiogenous cell. **f, g.** Conidiogenous cell and conidia. **h–j.** Conidia. **k.** Germinating conidium. **l, m.** Colonies on MEA culture, l from above, m from below. Scale bars: b=500 µm, c=200 µm, d=50 µm, e–k=10 µm.

Figure 4.2 *Subsessila turbinata* (holotype)

Beltraniopsis longiconidiophorum C.G. Lin & K.D. Hyde, sp. nov., Figure 4.3 and Figure 4.4

Index Fungorum number: IF 553841; *Facesoffungi number*: FoF 03633

Etymology: In reference to the long setiform conidiophores.

Holotype: MFLU 17-1265

Saprobic on decaying leaf. ***Asexual morph*****:** *Colonies* on plant substrate effuse, velutinous, fuscous. *Mycelium* mostly immersed in the substratum. *Conidiophores* macronematous, single or in small groups, setiform, straight or flexuous, unbranched or mostly branched in the lower part, septate, smooth, thick-walled, pale brown to dark brown at the lower part, pale brown to hyaline at the upper part, 100–680 µm long, 4–6.7 µm wide at the base, tapering to a pointed apex, arising from a dark brown, swollen, radially lobed cell, 5.5–20 µm diam. *Conidiogenous cells* polyblastic, discrete, intercalary, located in the lower part of conidiophores near the base, sympodial, denticulate, smooth, ampulliform, flask-shaped, pale brown, 5–8 µm long, 4–10 µm wide at the base. *Separating cells* ellipsoidal to ovoid, thin-walled, smooth, hyaline, 5.5–9 µm (av. = 7.2 µm, n = 30) long, 3.5–6 µm (av. = 4.7 µm, n = 30) wide in the broadest part. *Conidia* arise directly from separating cells, simple, dry, straight, smooth, biconic, turbinate, rostrate to pointed at proximal end, rounded or pointed at distal end, hyaline with a hyaline supraequatorial transverse band, sometimes deeply constriction at the supraequatorial zone, 18–29 µm (av. = 24.4 µm, n = 60) long, 3–8.5 µm (av. = 5.8 µm, n = 60) wide in the broadest part. ***Sexual morph*****:** Undetermined.

Culture characteristics: Conidia germinating on PDA within 12 h. Colonies on PDA effuse, pale white from above, light yellow to dark brown from below, reaching a diam. of 4–5 cm in 3 days at 25 °C.

Material examined: THAILAND, Chiang Mai, on decaying leaf, 24 August 2016, Chuan-Gen Lin, MRC 6-1 (MFLU 17-1265, **holotype**; HKAS, **isotype**), ex-type living culture MFLUCC 17-2139, KUMCC; *ibid*, MRC 12-2 (MFLU 17-1266, **paratype**; HKAS), living culture MFLUCC 17-2140, KUMCC.

Notes: In the tree generated from maximum likelihood (ML) analysis based on combined ITS and LSU sequence data for the subclass *Xylariomycetidae* (Figure 4.1), *Beltraniopsis longiconidiophorum* (MFLUCC 17-2139 and MFLUCC

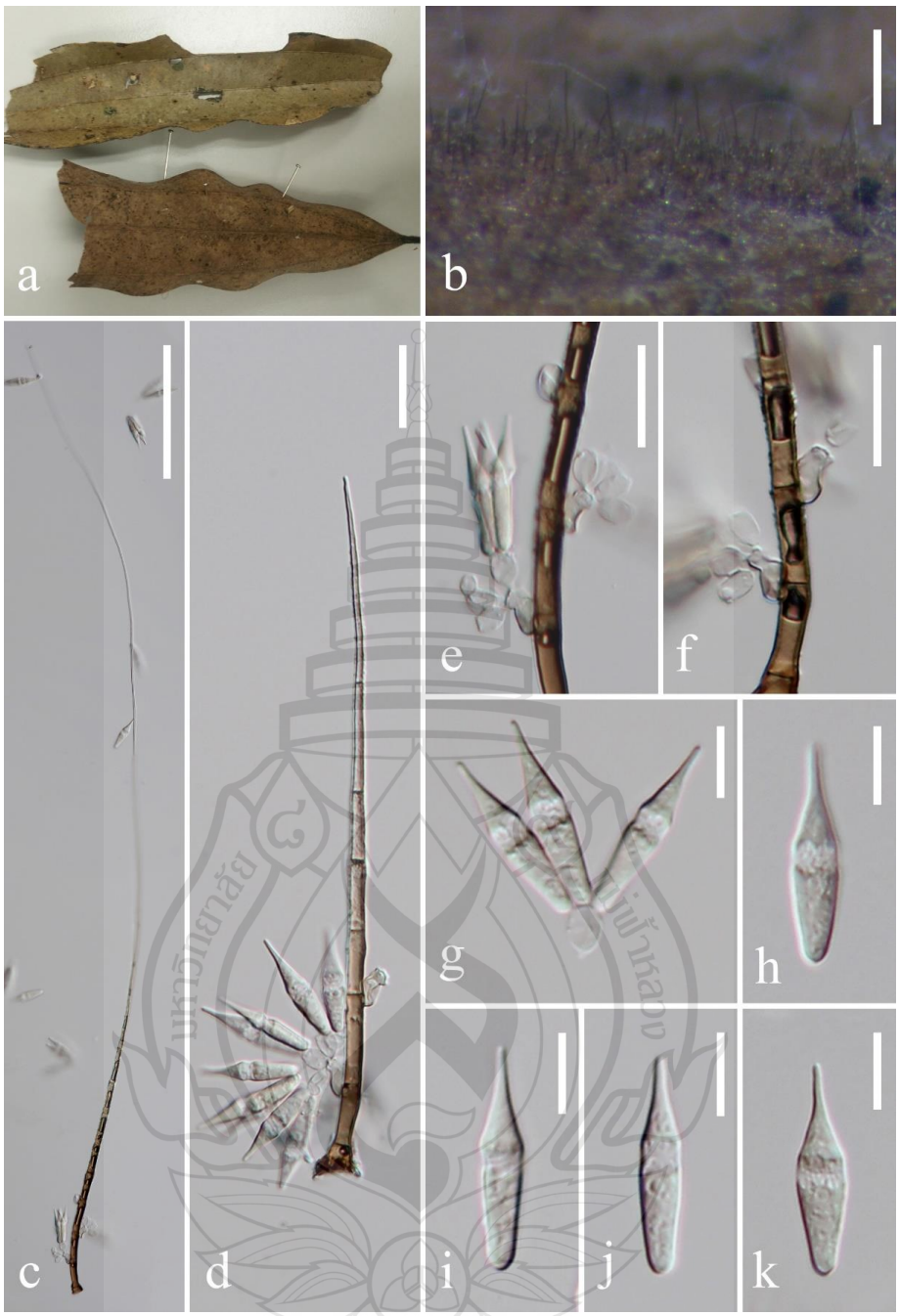
17-2140) grouped together with *Bel. neolitseae* (CBS 137974) and *Beltraniopsis* sp. (NFCCI 3695) with 100% ML bootstrap support, 96% MP bootstrap support and 100% Bayesian posterior probabilities within the family *Beltraniaceae*. *Beltraniopsis longiconidiophorum* can be distinguished from *Bel. neolitseae* by its setiform conidiophores.

Morphologically, *Beltraniopsis longiconidiophorum* is similar to several species within the genus *Beltraniopsis*. Based on the synopsis and key to *Beltraniopsis* species (Gusmão et al., 2000), *Bel. longiconidiophorum* is most similar to *Bel. ramosa* R.F. Castañeda, *Bel. esenbeckiae* Bat. & J.L. Bezerra and *Bel. tanzaniensis* Piroz. *Beltraniopsis longiconidiophorum* can be distinguished from *Bel. esenbeckiae* and *Bel. tanzaniensis* by its setiform branched conidiophores without a fertile apex. *Beltraniopsis longiconidiophorum* differs from *Bel. ramosa* in having longer setiform conidiophores and wider conidia.



Note ***Beltraniopsis longiconidiophorum*** (MFLU17-1265, **holotype**). **a** Host material, **b** Conidiophores on leaf surface, **c**–**d** Conidiophores, conidiogenous cells and conidia, **e**–**f** Conidiogenous cells and conidia, **g**–**j** Separating cell and conidia. **Scale bars**: c–d = 50 μm, e–j = 10 μm.

Figure 4.3 *Beltraniopsis longiconidiophorum* (MFLU17-1265, holotype)



Note ***Beltraniopsis longiconidiophorum*** (MFLU 17-1266, **paratype**). **a** Host material, **b** Conidiophores on leaf surface, **c**–**d** Conidiophores, conidiogenous cells and conidia, **e**–**f** Conidiogenous cells and conidia, **g**–**k** Separating cell and conidia. **Scale bars**: b = 200 μm, c = 100 μm, d–f = 20 μm, g–k = 10 μm

Figure 4.4 *Beltraniopsis longiconidiophorum* (MFLU 17-1266, paratype)

Beltrania rhombica Penz., Michelia 2(no. 8): 474 (1882), Figure 4.5

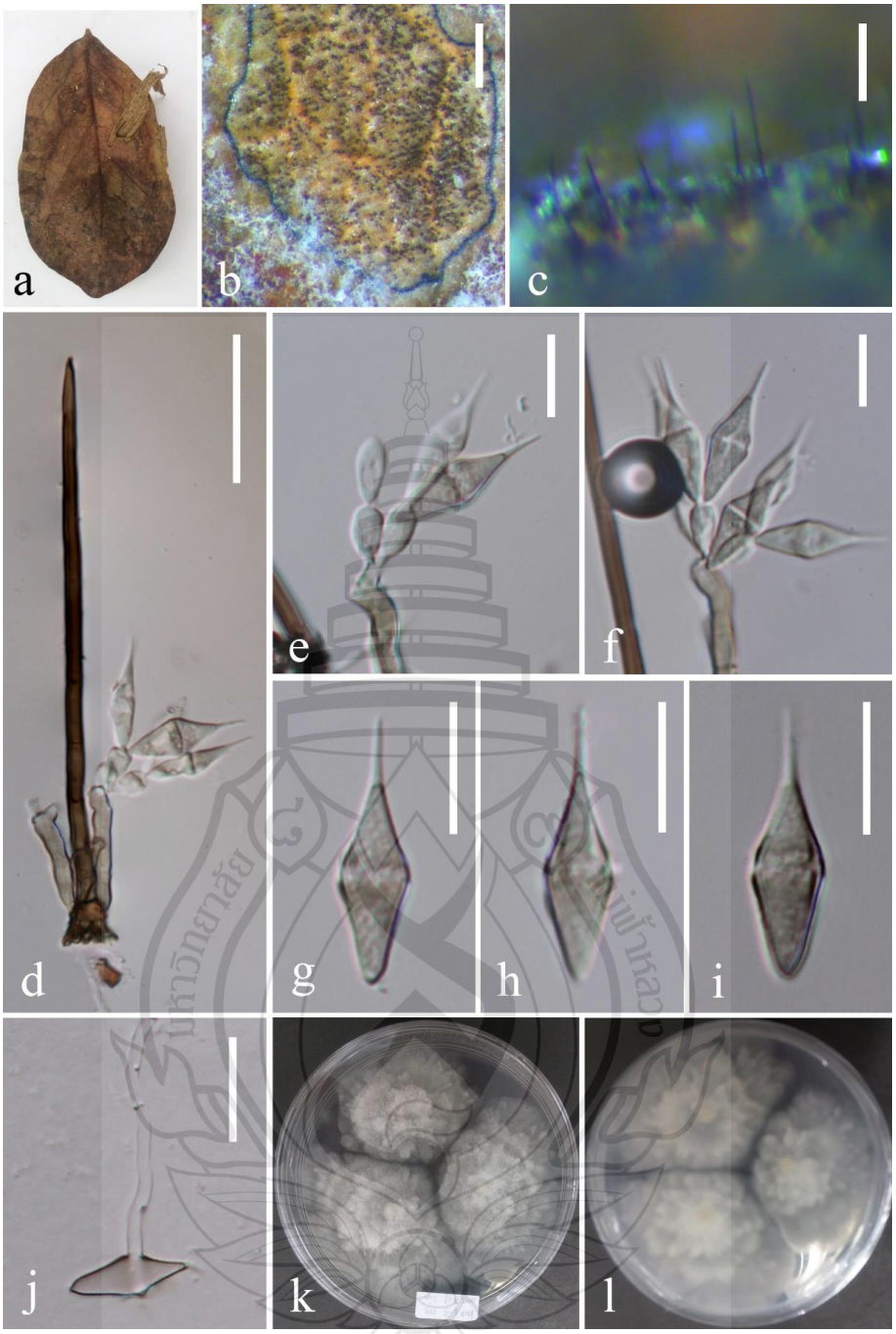
Facesoffungi number: FoF 03631

Saprobic on decaying leaf. ***Asexual morph*:** *Colonies* on plant substrate effuse, dark brown, velutinous. *Mycelium* mostly immersed in the substratum. *Setae* numerous, erect, arising from radially lobed basal cells, flexuous, unbranched, single, thick-walled, smooth, pale brown at the base, pale brown to dark brown at the middle, paler at the apex, 103–167 μm long, 4–7.5 μm wide at the base, tapering to a pointed apex, arising from a dark brown, swollen, radially lobed cell, 10–16 μm diam. *Conidiophores* macronematous, single or in small groups, straight or flexuous, septate, smooth, thick-walled, mostly geniculate at the apical region, cylindrical or clavate, pale brown, 22.5–46 μm long, 2–4.5 μm wide at the base, arising from basal cells of setae or from separate dark brown, swollen, radially lobed cells, 9–18 μm diam. *Conidiogenous cells* polyblastic, integrated, terminal, sympodial, denticulate, cylindrical, clavate, pale brown, smooth, 7.5–23 μm (av. = 13.3 μm, n = 20) long, 4–6.5 μm (av. = 4.8 μm, n = 20) wide at the base. *Separating cells* ellipsoidal, obovoid, thin-walled, smooth, hyaline, 8.8–11.5 μm (av. = 10.0 μm, n = 22) long, 4–5.7 μm (av. = 5.0 μm, n = 22) wide in the broadest part. *Conidia* arise directly from conidiogenous cells or from separating cells, acrogenous, simple, dry, straight, smooth, biconic, appendiculate, rostrate to pointed at proximal distal end, pointed at distal end, pale brown with a hyaline to subhyaline equatorial transverse band, 21–32 μm (av. = 26.1 μm, n = 35) long including appendage, 6–8.5 μm (av. = 7.3 μm, n = 35) wide in the broadest part. ***Sexual morph*:** Undetermined.

Culture characteristics: Conidia germinating on PDA within 12 h. Colonies on PDA effuse, pale white from above, light yellow to dark brown from below, reaching a diam. of 4–6 cm in 3 days at 25 °C.

Material examined: THAILAND, Phetchaburi, Cha-am District, Kao Yai, Khao Nang Panthurat, on decaying leaf, 28 July 2015, Chuan-Gen Lin, KNP 4-5 (MFLU 17-1261, HKAS), living culture MFLUCC 15-0835, KUMCC.

Notes: *Beltrania rhombica*, the type species of the genus *Beltrania*, was reported by Penzig (1882). It is characterized by setae and conidiophores arising from radially lobed basal cells, polyblastic and sympodial conidiogenous cells, swollen separating cells and biconic, appendiculate conidia.



Note ***Beltrania rhombica*** (MFLU 17-1261). **a** Host material, **b**–**c** Conidiophores on leaf surface, **d** Conidiophores, conidiogenous cells and conidia, **e**–**f** Conidiogenous cells and conidia, **g**–**i** Conidia, **j** Germinating conidium, **k**–**l** Colonies on PDA culture. **Scale bars**: b = 500 *μm*, c = 100 *μm*, d = 50 *μm*, e–j = 20 *μm*.

Figure 4.5 *Beltrania rhombica* (MFLU 17-1261)

Beltraniella fertilis Heredia, R.M. Arias, M. Reyes & R.F. Castañeda, Fungal Diversity 11: 100 (2002), Figure 4.6

Facesoffungi number: FoF 03632

Saprobic on decaying leaf. ***Asexual morph*:** *Colonies* on plant substrate effuse, thin, pale brown. *Mycelium* mostly immersed in the substratum. *Setae* numerous, erect, arising from radially lobed basal cells, straight or flexuous, unbranched, single or in small group, thick-walled, verrucose, dark brown at the base, paler at the apex, 91–221 μm long, 3.5–13 μm wide at the base, tapering to a pointed apex, arising from a dark brown, swollen, radially lobed cell, 5.5–22 μm diam. *Conidiophores* macronematous, long setiform and short; long conidiophores single, straight, septate, verrucose, thick-walled, sometimes branched at the apical region, dark brown at the base and paler at the apex, 145–380 μm long, swollen at the base and 8.5–22.5 μm wide, 4–9 μm wide just above the swollen base, slightly tapering to a pointed apex; short conidiophores simple or branched, septate, smooth-walled, subhyaline to pale brown, thin-walled, 9–37.5 μm long, swollen at the base and 4.5–9.3 μm wide, 2–6.3 μm wide just above the swollen base. *Conidiogenous cells* polyblastic, integrated, determinate, terminal, cylindrical, oblong, hyaline to subhyaline, smooth, 5–22 μm (av. = 11.4 μm, n = 25) long, 3–7.5 μm (av. = 4.3 μm, n = 25) wide at the base. *Separating cells* ovoid or obovoid, fusiform, thin-walled, smooth, hyaline to subhyaline, 1-denticulate at each end, 7.5–11.5 μm (av. = 9.6 μm, n = 30) long, 3.5–4.6 μm (av. = 4.1 μm, n = 30) wide in the broadest part. *Conidia* arise directly from conidiogenous cells or from separating cells, aggregated, acrogenous, simple, dry, straight, smooth, thin-walled, biconic, turbinate to pyriform, rostrate to pointed at proximal end, truncate at distal end, hyaline to subhyaline with a hyaline supraequatorial transverse band, 19–25 μm (av. = 21.2 μm, n = 30) long, 5.5–8.5 μm (av. = 6.4 μm, n = 30) wide in the broadest part. ***Sexual morph*:** Undetermined.

Culture characteristics: Conidia germinating on PDA within 12 h. Colonies on PDA effuse, pale white from above, light yellow to dark brown from below, reaching a diam. of 4–5 cm in 3 days at 25 °C.

Material examined: THAILAND, Chiang Mai, on decaying leaf, 24 August 2016, Chuan-Gen Lin, MRC 3BEL (MFLU 17-1263, HKAS), living culture

MFLUCC 17-2137, KUMCC; ibid, MRC 4-1 (MFLU 17-1264, HKAS), living culture MFLUCC17-2138, KUMCC; ibid, MRC 2-1 (MFLU 17-1262, HKAS), living culture MFLUCC 17-2136, KUMCC.

Notes: A key to the genus *Beltraniella* was provided by Castañeda Ruíz et al. (1996a), while Shirouzu et al. (2010) provided a synopsis of all the accepted species. Up to this study, 22 species are accepted in the genus *Beltraniella* (Crous et al., 2014b; Fernando & Gusmão, 2004; Jaklitsch et al., 2016; Priya et al., 2011; Shirouzu et al., 2010). *Beltraniella fertilis* is similar to *Be. botryospora* Shirouzu & Tokum. as both have two types of conidiophores (long setiform and short non-setiform), polyblastic conidiogenesis, separating cells and turbinate conidia. However, *Be. fertilis* can be clearly distinguished from *Be. botryospora* by having short setae and narrower conidia. This study is the first report of *Be. fertilis* in Thailand and also the first study to produce sequence data for this species.



Note ***Beltraniella fertilis***. **a** Host material. **b** Conidiophores on host surface. **c** Setae with short conidiophores. **d** Long conidiophore with conidiogenous cell and conidium. **e** short conidiophores with conidiogenous cells and conidia. **f** Conidiogenous cells on a long conidiophore. **g**–**l** Separating cells and conidia. **Scale bars**: c–d = 50 *µm*, e–f = 20 *µm*, g–l = 10 *µm*.

Figure 4.6 *Beltraniella fertilis*

Hemibeltrania cinnamomi (Deighton) Piroz., Mycol. Pap. 90: 32 (1963), Figure 4.7

≡ *Hansfordia cinnamomi* Deighton, Mycol. Pap. 78: 14 (1960)

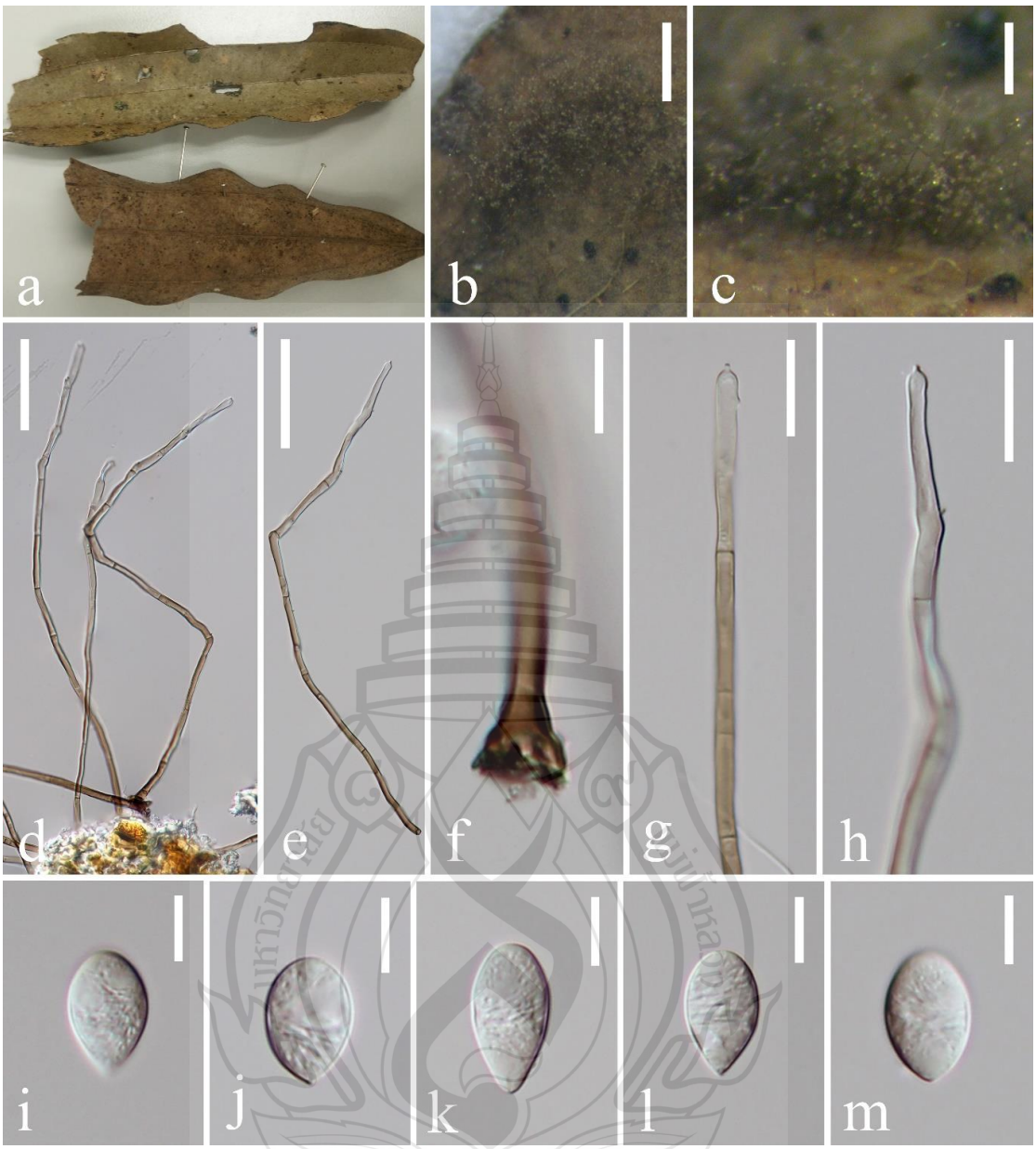
Facesoffungi number: FoF 03634

Saprobic on decaying leaf. ***Asexual morph*:** *Colonies* on plant substrate effuse, olivaceous, velvety. *Mycelium* partly superficial, partly immersed. *Setae* absent. *Conidiophores* macronematous, single or in small group, unbranched or occasionally with one branch near the apex, flexuous, septate, smooth, cylindrical, medium brown at the lower part, pale brown to hyaline at the upper part, 170–390 μm (av. = 276 μm, n = 30) long, 3–8 μm (av. = 4.7 μm, n = 25) wide at the base, arising from a dark brown, swollen, radially lobed cell, 6.9–11.8 μm (av. = 9.5 μm, n = 25) diam. *Conidiogenous cells* polyblastic, integrated, terminal becoming intercalary, sympodial, cylindrical, smooth, straight or flexuous, denticulate, hyaline to pale brown, 19.5–52 μm (av. = 32.7 μm, n = 20) long, 3–6.6 μm (av. = 4.6 μm, n = 20) wide at the broadest part; denticles cylindrical. *Conidia* solitary, acropleurogenous, simple, smooth, aseptate, obovoid or broadly ellipsoidal, hyaline, 15.5–21 μm (av. = 18.4 μm, n = 23) long, 11–13 μm (av. = 11.9 μm, n = 23) wide in the broadest part. ***Sexual morph*:** Undetermined.

Culture characteristics: Conidia germinating on PDA within 12 h. Colonies on PDA effuse, pale white from above, light yellow to dark brown from below, reaching a diam. of 4–5cm in 3 days at 25 °C.

Material examined: THAILAND, Chiang Mai, on decaying leaf, 24 August 2016, Chuan-Gen Lin, MRC 12-4 (MFLU 17-1267; HKAS), living culture MFLUCC 17-2141, KUMCC.

Notes: Deighton (1960b) initially described this species as *Hansfordia cinnamomi*. Pirozynski (1963) transferred the species to *Hemibeltrania*. It is characterized by conidiophores arising from radially lobed basal cells, polyblastic and sympodial conidiogenous cells and obovoid, ellipsoidal conidia. Today there are about ten species in the genus; this is the first report of *H. cinnamomi* in Thailand.



Note ***Hemibeltrania cinnamomi*** (MFLU 17-1267). **a** Host material. **b–c** Conidiophores on the host surface. **d–e** Conidiophores. **f** Radially lobed basal cell. **g–h** Conidiogenous cells. **i–m** Conidia. **Scale bars**: b = 500 μm, c = 200 μm, d–e = 50 μm, g–h = 20 μm, f, i–m = 10 μm

Figure 4.7 *Hemibeltrania cinnamomi* (MFLU 17-1267)

4.4 Discussion

Xylariomycetidae (Samarakoon et al., 2016; Senanayake et al., 2015; Smith et al., 2003b). Maharachchikumbura *et al.* (2016) synonymized *Amphisphaeriales* under *Xylariales*, based on a phylogenetic analysis, and 22 families were accepted, including the family *Beltraniaceae*. Crous et al. (2015c) emended the family *Beltraniaceae* within the order *Xylariales* and accepted *Beltrania*, *Beltraniella* Subram., *Beltraniopsis* Bat. & J.L. Bezerra, *Parapleurotheciopsis* P.M. Kirk and *Pseudobeltrania* Henn. Three other genera, *Hemibeltrania*, *Porobeltraniella* Gusmão and *Subramaniomyces* Varghese & V.G. Rao were accepted within the family *Beltraniaceae* based on published phylogenetic analyses (Maharachchikumbura et al., 2016; Rajeshkumar et al., 2016a). Samarakoon et al. (2016) recommend that the order *Amphisphaeriales* should be retained as a well-supported order, based on the application of divergence times. Hongsanan et al. (2017) updated the phylogeny of *Sordariomycetes* based on phylogenetic and molecular clock evidence, *Amphisphaeriales* was supported as a distinct order, and 12 families were accepted, viz. *Amphisphaeriaceae, Apiosporaceae, Beltraniaceae, Clypeophysalosporaceae, Coniocessiaceae, Hyponectriaceae, Melogrammataceae, Oxydothidaceae, Phlogicylindriaceae, Pseudomassariaceae, Sporodaceae* and *Vialaeaceae*.

In the tree generated from maximum likelihood (ML) analysis based on combined ITS and LSU sequence data for the order *Xylariales, Subsessila turbinata* (MFLUCC 15-0831) grouped together with *Pseudobeltrania ocoteae* (CPC 26219), *Hemibeltrania sp.* (CL12WA) and *Hemibeltrania cinnamomi* (NFCCI 3695) with 81% ML bootstrap support, 93% MP bootstrap support and 100% Bayesian posterior probabilities within the family *Beltraniaceae* (Figure 4.1). *Subsessila* differs from *Hemibeltrania* and *Pseudobeltrania* by the absence of distinct conidiophores, which whenever present are very short and arise from the basal cells of setae; terminal, ampulliform, doliiform, hyaline conidiogenous cells and turbinate to pyriform, subhyaline, smooth conidia which are rostrate to pointed at the proximal end and broadly rounded at the rostrate distal end. In addition, *Subsessila* has numerous,

unbranched setae arising from radially lobed basal cells. Stroma and separating cells are not observed in these three genera.

Morphologically, *Subsessila* is similar to several genera within the family *Beltraniaceae*, *viz. Beltrania*, *Beltraniella*, *Beltraniopsis* and *Porobeltraniella* in having dark setae, and conidiophores arising from radially lobed basal cells. However, *Beltrania*, *Beltraniella*, *Beltraniopsis* and *Porobeltraniella* have distinct, swollen separating cells, and conidia of these four genera are turbinate or biconic, with a hyaline transverse band or several equatorial hyaline pores. Whereas, separating cells are not present in *Subsessila*, and the conidia are turbinate to pyriform, with a rostrate to pointed proximal end and rounded distal end. The most distinguishable characters that separate *Subsessila* from *Beltrania* and other similar genera are the absence of distinct conidiophores and conidia without a hyaline transverse band in the new genus.

With the above combination of morphological features and phylogenetic analysis, we place the new genus *Subsessila*, within the family *Beltraniaceae*.

Presently, 14 genera, including our new genus, have some similar characters that are present in the "*Beltrania*-complex", *viz.*, *Beltrania* Penzig, *Beltraniella* Subram., *Beltraniomyces* Manohar., D.K. Agarwal & Rao, *Beltraniopsis* Bat. & J.L. Bezerra, *Beltramono* Rashmi Dubey, A.K. Pandey bis & Manohar., *Hemibeltrania* Piroz., *Kiliophora* Kuthub. & Nawawi, *Maxibeltrania* Rambelli, *Parabeltrania* Rambelli, *Porobeltraniella* Gusmão, *Pseudobeltrania* Henn., *Rhombostilbella* Zimm., *Scolecobeltrania* Iturr., R.F. Castañeda & R. Fernández and *Subsessila*. A synopsis of *Beltrania* and similar genera is provided in Table 4.2. These genera have unbranched or branched conidiophores and/or setae arising from radially lobed basal cells, with or without swollen separating cells, and biconic conidia with or without a hyaline equatorial or sub- or supraequatorial band. Presently six of them, *viz.*, *Beltrania*, *Beltraniella*, *Beltraniopsis*, *Hemibeltrania*, *Porobeltraniella* and *Pseudobeltrania*, are accepted in the family *Beltraniaceae*. Ten *Beltrania*-like species, *Beltrania rhombica* (Duong et al., 2008; Kodsueb et al., 2008; Monkai et al., 2013; Osono et al., 2009; Sakayaroj et al., 2005), *B. mangiferae* (Duong et al., 2008), *B. querna* (Wang et al., 2008), *Beltraniella nilgirica* (Wang et al., 2008), *Be. odinae* (Duong et al., 2008), *Be. pini* (Tokumasu et al., 1990), *Be. portoricensis* (Duong et al., 2008; Osono et al., 2009; Wang et al., 2008), *Ellisiopsis occulta* (Monkai et al., 2013), *Rhombostilbella rosea*

(Chomnunti et al., 2014) and *Subsessila turbinata* (Lin et al., 2017b), were previously reported in Thailand. This number has now increased to twelve following the present study.

Kendrick (1980) proposed that the genera of the *Beltrania*-complex must possess any three of the five features: (1) dark setae; (2) setae or conidiophores with radially lobed bases; (3) swollen separating cells; (4) biconic conidia; (5) conidia with a hyaline equatorial band. In this case, there are nine genera accepted in the *Beltrania*-complex (Table 4.3), *viz.*, *Beltrania*, *Beltraniella*, *Beltraniopsis*, *Beltramono*, *Maxibeltrania*, *Parabeltrania*, *Porobeltraniella*, *Pseudobeltrania* and *Scolecobeltrania*. *Beltraniomyces*, *Hemibeltrania*, *Kiliophora*, *Rhombostilbella* and *Subsessila* are excluded from the *Beltrania*-complex, because *Beltraniomyces* and *Subsessila* have only two of those characteristics and *Hemibeltrania*, *Kiliophora* and *Rhombostilbella* have only one of those characteristics.

Table 4.2 Synopsis of *Beltrania* and some similar genera

Genera	Setae	Conidiophores	Conidiogenous cells	Separating cells	Conidia
Beltrania	Mostly unbranched, next to conidiophores, arising from radially lobed cells	Unbranched, arising from basal cells of setae or from radially lobed cells	Polyblastic, sympodial, terminal and intercalary in conidiophores, clavate or cylindrical, denticulate	When present swollen	Acropleurogenous, biconic, spicate or apiculate, hyaline transverse band not median
Beltraniella	Sterile extensions of conidiophores or among conidiophores or absent, unbranched, arising from radially lobed basal cells	Branched, often with setiform apex, arising from radially lobed basal cells	Polyblastic, sympodial, on branches or discrete, arranged penicillately, denticulate	When present swollen	Acropleurogenous, turbinate or biconic, often caudate, distinct hyaline transverse band
Beltraniomyces	Absent	Unbranched, geniculate, not arising from radially lobed basal cells	Polyblastic, integrated, sympodial, denticles absent	Absent	Acrogenous and acropleurogenous, almost symmetrical biconic, nonspicate, median transverse hyaline band
Beltraniopsis	Unbranched, part of conidiophores or beside conidiophores, arising from radially lobed basal cells	Branched, often with a setiform apex, arising from radially lobed basal cells	Polyblastic, integrated, terminal on branches, sympodial, doliiform, denticulate	Swollen	Acropleurogenous, biconic, not symmetrical, rostrate, hyaline transverse band not median
Beltramono	Absent	Unbranched or rarely branched, usually geniculate or flexous sometimes straight, arising singly and directly from the cells of superficial mycelium	Monoblastic, terminal, integrated, determinate, non-denticulate	Swollen, ellipsoidal to spherical	Acrogenous, simple biconic, asymmetrical apiculate smooth with hyaline transverse bands, one in the widest part and anther just above the widest part, bands sometimes in the form of annular ring

Table 4.2 (continued)

Genera	Setae	Conidiophores	Conidiogenous cells	Separating cells	Conidia
Hemibeltrania	Absent or present	Unbranched or sparingly branched, straight or flexuous, rather pale olivaceous brown, smooth, arising from radially lobed basal cells	Monoblastic and polyblastic, integrated, terminal becoming intercalary, sympodial, cylindrical, denticulate; denticles conical to cylindrical	Absent	Acropleurogenous, broadly ellipsoidal, limoniform, ovoid, obovoid, cymbiform, navicular, biconic or fusiform, pale oiivaceous, smooth, 0-septate. Without transverse band
Kiliophora	Absent extension of conidiophores	Unbranched or sparingly branched, setiform, not arising from radially lobed basal cells	?Polytretic, formed about midway up the conidiophore, discrete	Absent	Acropleurogenous, subhyaline to pale brown, fusiform to broadly spindle-shaped, without transverse band
Maxibeltrania	Arising from a radially lobed base	Unbranched, arising from the setae basal cells	Monoblastic, integrated, elongating laterally of the previous fertile apical locus, endowed with cicatrized locus	Absent	Acropleurogenous, biconic, the apex acute rostrate, with subhyaline transverse band just above the middle part
Parabeltrania	None or unbranched extension of conidiophores	Unbranched, brown, arising from radially lobed basal cells	Sympodial, ?tretic, scars, intercalary in conidiophores, brown	Absent	Conical, brown, with a subapical hyaline band
Porobeltraniella	Pale brown extensions of conidiophores, arising from radially lobed basal cells	Unbranched or verticillate, setiform, erect, arising from radially lobed basal cells	Polyblastic, continuous, discrete, terminal and intercalary in conidiophores, denticulate, subhyaline to pale brown	Present or absent	Solitary or continuous, proximate end rostrate, distal end truncate, turbinate, smooth or finely verrucose with circular pores near the broadest part
Pseudobeltrania	Absent	Unbranched, arising from radially lobed basal cells	Polyblastic, sometimes monoblastic in a whorl, cylindrical or clavate, denticles large	Absent	Acropleurogenous, or acrogenous, biconic, apiculate, median transverse hyaline band
Rhombostilbella	Absent	Sparingly branched, hyaline, not arising from radially lobed basal cells	Polyblastic, sympodial, conspicuous denticles, hyaline	Absent	Biconic or rhomboid, hyaline, without transverse band

Table 4.2 (continued)

Genera	Setae	Conidiophores	Conidiogenous cells	Separating cells	Conidia
Scolecobeltrania	With or without radially lobed basal cell	Mononematous, branched, not arising from radially lobed basal cells	Monoblastic and polyblastic, discrete, sympodial, denticulate	Absent	Scolecosporous, sigmoid, vermiform to long cylindrical, curved or sinuate, brown to olivaceous, always with several hyaline or subhyaline transverse bands, smooth or verruculose
Subsessila	Numerous, erect, arising from radially lobed basal cells	Mostly absent or reduced to conidiogenous cells; when present, arising from the basal cells of setae, simple, aseptate, subcylindrical, pale- to mid-brown, smooth, short	Polyblastic, discrete, determinate, terminal, ampulliform, doliiform, hyaline	Absent	Aggregated, acrogenous, simple, dry, straight, smooth, thin-walled, turbinate to pyriform, rostrate at proximal end, rounded at distal end, hyaline

Source Manoharachary et al. (2003) and Dubey et al. (2011)

Table 4.3 Salient features of *Beltrania* and some similar genera

	Dark setae	Setae or conidiophores with radially lobed bases	Swollen separating cells	Biconic conidia	Conidia with a hyaline equatorial band
Beltrania	√	√	√	√	√
Beltraniella	√	√	√	√	√
Beltraniomyces	×	×	×	√	√
Beltraniopsis	√	√	√	√	√
Beltramono	×	×	√	√	√
Hemibeltrania	×	√	×	×	×
Kiliophora	√	×	×	×	×
Maxibeltrania	√	√	×	√	√
Parabeltrania	√	√	×	×	√
Porobeltraniella	√	√	√	×	×
Pseudobeltrania	×	√	×	√	√
Rhombostilbella	×	×	×	√	×
Scolecobeltrania	√	√	×	×	√
Subsessila	√	√	×	×	×

Source Kendrick (1980)

CHAPTER 5

CONCLUSIONS

5.1 Overall Conclusions

5.1.1 Studies on Hyaline-spored Hyphomycetes

Hyphomycetes is an artificial classification for a group of asexual fungi that produce conidia on mononematous or synnematous or sporodochial conidiophores. Hyaline-spored hyphomycetes are those hyphomycetes that produce hyaline conidia. In this study, a comprehensive study on hyaline-spored hyphomycetes is carried out.

In this study, a comprehensive outline for hyaline-spored hyphomycetees is provided and include 1080 genera with 130 synonyms, they are rich in diversity and distributed among five phyla, 26 classes, 87 orders, 204 families. For each accepted genus, notes including classification, Index Fungorum number, sexual morphs, synanamorphs, DNA sequence data, morphology and phylogeny are provided. Taxonomic position for 38 genera are re-organized in this study based on the evidences of morphology and phylogeny, and 22 of which were previously located in *Ascomycota* genera *incertae sedis*.

Hyaline-spored hyphomycetes most are in *Ascomycota* (1000 genera), some are in *Basidiomycota* (77 genera), and rarely in *Calcarisporiellomycota* (one genus), *Kickxellomycota* (one genus) and *Zoopagomycota* (one genus). *Ascomycota* is the largest fungal phylum, and more than 90 % of the hyaline-spored hyphomycetous genera belong to this phylum. In our outline for hyaline-spored hyphomycetes, there are 1000 genera located in *Ascomycota* and are in high diversity in this phylum, which distributed among 2 subphyla, 10 classes, 57 orders, 162 families. Hyaline-spored hyphomycetes in *Ascomycota* are mainly in the *Sordariomycetes* (384 genera), *Leotiomycetes* (118 genera), *Dothideomycetes* (107 genera), *Eurotiomycetes* (66 genera) and *Ascomycota* genera *incertae sedis* (288 genera). *Basidiomycota* is the second largest fungal phylum, and nearly 10 % of the hyaline-spored

hyphomycetous genera are from this phylum. In our outline for hyaline-spored hyphomycetes, there are 77 genera located in *Basidiomycota* and distribute among 4 subphyla, 14 classes, 28 orders, 40 families. Hyaline-spored hyphomycetes in *Basidiomycota* are from the subphyla *Agaricomycotina*, *Pucciniomycotina*, *Ustilaginomycotina*, *Wallemiomycotina* and uncertain subphyla, and more than 70% genera are from *Agaricomycotina*. Account for the hyaline-spored hyphomycetous genera in *Basidiomycota*, nearly 60% are from the class *Agaricomycetes* and of the remaining classes, each has only one to six genera.

In the last ten years, lots of hyaline-spored hyphomycetous genera were introduced. The main reasons maybe are: (1) lots of newly introduced genera described based on new collections from several publication series that focused on fungal taxonomy, e.g., Fungal diversity notes series, Fungal Planet series, Fungal Systematics and Evolution series, New and Interesting Fungi series, and lots of other taxonomic publications; (2) many previous genera were revised with the influence of DNA sequence data based analysis, and split into more small new genera.

DNA sequence data based analysis, especially phylogenetic analysis, are widely used in fungi taxonomy. DNA sequence data is one of the key points for each genus in our notes. Based on the database GenBank and recent publications, we found that a total of 754 hyaline-spored hyphomycetous genera were reported had DNA sequence data, and 709 of them were included in our phylogenetic analysis, 45 genera were excluded as lacking LSU sequence data. This study represents the largest analysis of hyaline-spored hyphomycetes subjected to multi-gene phylogenetic analysis with combined LSU, SSU and *rpb2* DNA sequence data to date, which includes 754 hyaline-spored hyphomycetous genera, and recognized three phyla clades, 25 classes and class-level clades, 107 orders and order-level clades, 264 families and family-level clades.

During the research, 41 taxa from 30 genera and three classes, *viz.*, *Dothideomycetes* (*Tubeufiales* 4 taxa), *Leotiomycetes* (*Helotiales* 4 taxa), and *Sordariomycetes* (*Amphisphaeriales* 6 taxa, *Chaetosphaeriales* 6 taxa, *Glomerellales* 2 taxa, *Hypocreales* 5 taxa, *Parasympodiellales* 1 taxa, *Pleurotheciales* 4 taxa, *Pseudodactylariales* 2 taxa, *Rhamphoriales* 6 taxa, *Xylariales* 1 taxa), have been illustrated based on fresh collections.

5.1.2 Studies on Hyaline-spored Chaetosphaeriaceous Hyphomycetes

The family *Chaetosphaeriaceae* is a genus-rich but confusing family. Some genera in this family are still problematic, e.g. *Codinaea*, *Codinaeopsis*, *Dictyochaeta* and *Dictyochaetopsis*, they are indistinguishable by having similar morphlogy and phylogeny.

The asexual morphos of *Chaetosphaeria* are various, and some of the sexual-asexual connection between *Chaetosphaeria* and its asexual morphs are confirmed by phylogenetic analysis, e.g. *Chloridium*, *Codinaea*, *Dictyochaeta*, *Exserohilum*, *Gonytrichum*, and *Menispora*. In addition, the sexual-asexual connection between *Chaetosphaeria capitata* and *Exserticlava vasiformis* is also confirmed by our phylogenetic analysis.

Phylogenetic results based on combined SSU, ITS and LSU sequence data showed that *Kionochaeta* is polyphyletic and species are phylogenetically located in two groups (Kionochaeta 1 and Kionochaeta 2).

The placements of some genera within *Chaetosphaeriaceae* are discussed and some of them are re-assigned. Based on morphology and phylogenetic analysis, *Ascocodinaea* and *Hemicorynespora* are excluded from this family, however, *Bahusutrabeeja*, *Calvolachnella*, *Conicomyces*, *Paliphora* and *Phialogeniculata* are accepted within *Chaetosphaeriaceae*.

A checklist of accepted 49 genera within family *Chaetosphaeriaceae*, together with generic synonyms, is provided in this study. A backbone tree based on combined LSU and ITS sequence data for the family *Chaetosphaeriaceae* is provided.

In this study, we introduce one new genus *Multiguttulispora* with its type species *M. sympodialis*, two new *Dictyochaeta* species (*D. brevis* and *D. terminaliae*), two new *Kionochaeta* species (*K. castaneae* and *K. microspora*), two new *Menisporopsis* species (*M. breviseta* and *M. dushanensis*), two new *Tainosphaeria* species (*T. aseptata* and *T. monophialidica*) along with two previously described species, *Cryptophiale udagawae* and *Dictyochaeta simplex* based on morphology and phylogenetic analysis.

5.1.3 Studies on Beltrania-like Taxa

Presently, 14 genera, including our new genus, have some similar characters that are present in the "*Beltrania*-complex". A synopsis of *Beltrania* and similar genera is provided in this study. These genera have unbranched or branched conidiophores and/or setae arising from radially lobed basal cells, with or without swollen separating cells, and biconic conidia with or without a hyaline equatorial or sub- or supraequatorial band. Presently six of them, *viz.*, *Beltrania*, *Beltraniella*, *Beltraniopsis*, *Hemibeltrania*, *Porobeltraniella* and *Pseudobeltrania*, are accepted in the family *Beltraniaceae*. In this study, one new genus (*Subsessila*) and three new species (*Beltraniella ramosiphora*, *Beltraniopsis longiconidiophora* and *Subsessila turbinata*) are introduced; *Beltrania rhombica*, *Beltraniella fertilis* and *Hemibeltrania cinnamomi* are described and illustrated; *Beltraniella fertilis* and *Hemibeltrania cinnamomi* are new records in Thailand; Fresh specimen and sequence data are needed in the future studies to resolve the uncertain species and genera, e.g., *Maxibeltrania*, *Parabeltrania*, *Rhombostilbella* and *Scolecobeltrania*.

5.2 Research Advantages

In this study, a comprehensive study for hyaline-spored hyphomycetes is provided, and the main research advantages are including:

5.2.1 New genus and taxa in the family *Chaetosphaeriaceae* are introduced based on fresh specimen from China and Thailand. The placements of some genera within *Chaetosphaeriaceae* are discussed and some of them are re-assigned. A checklist of accepted genera within family *Chaetosphaeriaceae* is provided in this study.

5.2.2 New beltrania-like taxa are introduced based on fresh specimen from China and Thailand. "*Beltrania*-complex" is discussed and a synopsis of *Beltrania* and similar genera is provided in this study.

5.2.3 Providing an outline for hyaline-spored hyphomycetes including 1080 genera with 130 synonyms. Genera notes including sexual morphs, synanamorphs, DNA sequence data, morphology were provided for all these 1080 accepted genera.

5.2.4 Taxonomic position for 38 genera were re-organized based on morphology and phylogenetic analysis.

5.2.5 Providing a backbone tree for hyaline-spored hyphomycetes. This study represents the largest analysis of hyaline-spored hyphomycetes subjected to multi-gene phylogenetic analysis with combined LSU, SSU and *rpb2* DNA sequence data to date, which includes 754 hyaline-spored hyphomycetous genera, and recognized three phyla clades, 25 classes and class-level clades, 107 orders and order-level clades, 264 families and family-level clades.

5.2.6 This study has set the foundation for the studies on hyaline-spored hyphomycetes.

5.3 Future Work

5.3.1 To update outline and notes for hyaline-spored hyphomycetes, as lots of new hyaline-spored hyphomycetes will be described in the future.

5.3.2 To continue to study the classification of hyphomycetes with different menthods.

5.3.3 To resolve the taxonomic problems for some species-rich genera, e.g. *Chaetosphaeria*.

5.3.4 To resolve the taxonomic problems for genera in *Ascomycota* genera *incertae sedis*. More work, particularly fresh collections and DNA sequence data, will be required in the future studies.

5.3.5 Many novel hyaline-spored hyphomycetous fungi from various ecosystems will undoubtedly be described in the near future.

REFERENCES

REFERENCES

Abarca, G. H., Ruiz, R. C., Arias, R. M., Saikawa, M., & Stadler, M. (2007). Anamorphic fungi from submerged plant material: *Acumispora verruculosa*, *Pleurophragmium aquaticum* and *P. miniumbonatum*. *Mycotaxon, 101*, 89–97.

Abdel-Azeem, A. M., & Abdel-Moneim, T. S. (2009). First record of *Oidiopsis taurica* causing powdery mildew of *Capparis spinosa* in Egypt. *Plant Disease, 93*(5), 555–555. https://doi.org/10.1094/Pdis-93-5-0555a

Abdel-Wahab, M. A., Nagahama, T., & Abdel-Aziz, F. A. (2009). Two new *Corollospora* species and one new anamorph based on morphological and molecular data. *Mycoscience, 50*(3), 147–155. https://doi.org/10.1007/s10267-008-0466-9

Abdollahzadeh, J., Groenewald, J. Z., Coetzee, M. P. A., Wingfield, M. J., & Crous, P. W. (2020). Evolution of lifestyles in Capnodiales. *Studies in Mycology, 95*, 381–414. https://doi.org/10.1016/j.simyco.2020.02.004

Adams, G. C., Klomparens, K. L., & Hennon, P. E. (1995). Unusual reticulated parenthosomes surround the dolipore of a hyphomycete with clamp connections, *Ditangifibulae dikaryotae* gen. et sp. nov. *Mycologia, 87*(6), 909–921. https://doi.org/10.1080/00275514.1995.12026614

Adhikari, M. K. (2004). Taxonomy and phylogeny of *Brachyconidiellopsis fimicola*, gen. et sp. nov., a sporodochial to synnematous coprophilous fungi related to the Microascales (Ascomycetes) from Nepal. *Cryptogamie Mycologie, 25*, 137–147.

Agnihothrudu, V. (1961). Notes on fungi from North-East India: V. A new genus of the helicosporous hyphomycetes. *Transactions of the British Mycological Society, 44*(1), 51–54. https://doi.org/10.1016/S0007-1536(61)80006-5

Agnihothrudu, V. (1962). Notes on fungi from North-east India. XVII. *Menisporella assamica* gen. et sp. nov. *Proceedings of the Indian Academy of Sciences - Section B, 56*(2), 97–102.

Agnihothrudu, V. (1968). *Phaeodactylium venkatesanum* gen. et sp. nov. on *Elettaria cardamomum* Mat. from Kerala. *Proceedings of the Indian Academy of Sciences - Section B, 68*(4), 206–209. https://doi.org/10.1007/BF03051769

Agusti-Brisach, C., Alaniz, S., Gramaje, D., Perez-Sierra, A., Armengol, J., Landeras, E., & Izquierdo, P. M. (2012). First report of *Cylindrocladiella parva* and *C. peruviana* associated with black-foot disease of grapevine in Spain. *Plant Disease, 96*(9), 1381–1382. https://doi.org/10.1094/Pdis-04-12-0410-Pdn

Ai, C.-C., Xia, J.-W., Zhang, X.-G., & Ma, L.-G. (2019). *Pleurotheciopsis triseptata* sp. nov. from China. *Mycotaxon, 134*(3), 439–442.

Aiello, D., Polizzi, G., Crous, P. W., & Lombard, L. (2017). *Pleiocarpon* gen. nov. and a new species of *Ilyonectria* causing basal rot of *Strelitzia reginae* in Italy. *IMA Fungus, 8*(1), 65–76.

Aiello, D., Vitale, A., Polizzi, G., & Voglmayr, H. (2020). *Ochraceocephala foeniculi* gen. et sp. nov., a new pathogen causing crown rot of fennel in Italy. *Mycokeys, 66*, 1–22. https://doi.org/10.3897/mycokeys.66.48389

Aime, M. C., Castlebury, L. A., Abbasi, M., Begerow, D., Berndt, R., Kirschner, R., . . . Rossman, A. Y. (2018). Competing sexual and asexual generic names in Pucciniomycotina and Ustilaginomycotina (Basidiomycota) and recommendations for use. *IMA Fungus, 9*(1), 75–89. https://doi.org/10.5598/imafungus.2018.09.01.06

Ajello, L., Georg, L. K., Steigbigel, R. T., & Wang, C. J. K. (1974). A case of phaeohyphomycosis caused by a new species of *Phialophora*. *Mycologia, 66*(3), 490–498. https://doi.org/10.1080/00275514.1974.12019630

Alamouti, S. M., Kim, J. J., & Breuil, C. (2006). A new *Leptographium* species associated with the northern spruce engraver, *Ips perturbatus*, in western Canada. *Mycologia, 98*(1), 149–160. https://doi.org/10.3852/mycologia.98.1.149

Alcorn, J. L., & Sutton, B. C. (1984). *Stellospora* gen. nov. (Hyphomycetes). *Mycotaxon, 20*(1), 45–48.

Almeida, D. A. C., Cruz, A. C. R., Marques, M. F. O., & Gusmao, L. F. P. (2013). Conidial fungi from the semi-arid Caatinga biome of Brazil. New and interesting Zanclospora species. *Mycosphere, 4*(4), 684–692. https://doi.org/10.5943/mycosphere/4/4/4

Almeida, F., Rodrigues, M. L., & Coelho, C. (2019). The still underestimated problem of fungal diseases worldwide. *Frontiers in Microbiology, 10*(214). https://doi.org/10.3389/fmicb.2019.00214

Altschul, S. F., Gish, W., Miller, W., Myers, E. W., & Lipman, D. J. (1990). Basic local alignment search tool. *Journal of Molecular Biology, 215*(3), 403–410.

An, K. D., Degawa, Y., Fujihara, E., Mikawa, T., Ohkuma, M., & Okada, G. (2012). Molecular phylogenetic analyses based on the nuclear rRNA genes and the intron-exon structures of the nuSSU rRNA gene in *Dictyocatenulata alba* (anamorphic Ascomycota). *Fungal Biology, 116*(11), 1134–1145. https://doi.org/10.1016/j.funbio.2012.08.005

Ando, K., & Kawamoto, I. (1986). *Arborispora*, a new genus of Hyphomycetes. *Transactions of the Mycological Society of Japan, 27*, 119–128.

Ando, K., & Nakamura, N. (2000). *Pseudosigmoidea*: a new genus for a hyphomycete (ATCC 16660) formerly identified as *Sigmoidea prolifera*. *The Journal of General and Applied Microbiology, 46*(1), 51–57. https://doi.org/10.2323/jgam.46.51

Ando, K., & Tubaki, K. (1984). Some undescribed hyphomycetes in the rain drops from intact leaf-surface. *Transactions of the Mycological Society of Japan, 25*, 21–37.

Ando, K., Tubaki, K., & Arai, M. (1987). *Trifurcospora*: A new generic name for *Flabellospora irregularis*. *Transactions of the Mycological Society of Japan, 28*, 469–473.

Anstead, G. M., Sutton, D. A., & Graybill, J. R. (2012). Adiaspiromycosis causing respiratory failure and a review of human infections due to *Emmonsia* and *Chrysosporium* spp. *Journal of Clinical Microbiology, 50*(4), 1346–1354. https://doi.org/10.1128/JCM.00226-11

Aptroot, A., & Schiefelbein, U. (2003). Additional species of *Cheiromycina* (lichenized hyphomycetes), with a key to the known species. *Mycological Research, 107*, 104–107. https://doi.org/10.1017/S0953756202007128

Arambarri, A., Cabello, M., & Mengascini, A. (1987). Estudio sistematico de los Hyfomicetes del Rio Santiago (Prov. Buenos Aires, Argentina). *Darwiniana, 28*, 293–301.

Arastehfar, A., Carvalho, A., Houbraken, J., Lombardi, L., Garcia-Rubio, R., Jenks, J. D., . . . Hoenigl, M. (2021). *Aspergillus fumigatus* and aspergillosis: from basics to clinics. *Studies in Mycology, 100*, 100115. https://doi.org/10.1016/j.simyco.2021.100115

Argôlo Magalhães, D. M., Martins Newman Luz, E. D., Magalhães, A. F., Oliveira dos Santos, M. V., Barbosa, F. R., Magalhães, L. A., . . . Bezerra, J. L. (2014). Anamorphic fungi of the atlantic forest of southern Bahia: new records and *Dactylaria pseudomanifesta* sp. nov. *Mycotaxon, 128*(1), 185–194.

Arzanlou, M., Groenewald, J. Z., Gams, W., Braun, U., Shin, H. D., & Crous, P. W. (2007). Phylogenetic and morphotaxonomic revision of *Ramichloridium* and allied genera. *Studies in Mycology, 58*, 57–93. https://doi.org/10.3114/sim.2007.58.03

Ashrafi, S., Stadler, M., Dababat, A. A., Richert-Pöggeler, K. R., Finckh, M. R., & Maier, W. (2017). *Monocillium gamsii* sp. nov. and *Monocillium bulbillosum*: two nematode-associated fungi parasitising the eggs of *Heterodera filipjevi*. *Mycokeys, 27*, 21–38.

Atkinson, G. F. (1894). *Olpitrichum*, a new genus of mucedinous fungi. *Botanical Gazette, 19*(6), 244–245.

Auger, J., Perez, I., Fullerton, R. A., & Esterio, M. (2009). First report of *Verticillium* wilt of gold kiwifruit, *Actinidia chinensis* Cv. Hort 16A, caused by *Verticillium albo-atrum* in Chile. *Plant Disease, 93*(5), 553–553. https://doi.org/10.1094/Pdis-93-5-0553b

Augustin, J. O., Groenewald, J. Z., Nascimento, R. J., Mizubuti, E. S. G., Barreto, R. W., Elliot, S. L., . . . Evans, H. C. (2013). Yet more "weeds" in the garden: fungal novelties from nests of leaf-cutting ants. *PloS One, 8*, e82265.

Badali, H., Bonifaz, A., Barrón-Tapia, T., Vázquez-González, D., Estrada-Aguilar, L., Cavalcante Oliveira, N. M., . . . De Hoog, G. S. (2010). *Rhinocladiella aquaspersa*, proven agent of verrucous skin infection and a novel type of chromoblastomycosis. *Medical Mycology, 48*(5), 696–703. https://doi.org/10.3109/13693780903471073

Badali, H., Gueidan, C., Najafzadeh, M. J., Bonifaz, A., van den Ende, A. H. G. G., & de Hoog, G. S. (2008). Biodiversity of the genus *Cladophialophora*. *Studies in Mycology, 61*, 175–191. https://doi.org/10.3114/sim.2008.61.18

Badali, H., Prenafeta-Boldu, F. X., Guarro, J., Klaassen, C. H., Meis, J. F., & De Hoog, G. S. (2011). *Cladophialophora psammophila*, a novel species of Chaetothyriales with a potential use in the bioremediation of volatile aromatic hydrocarbons. *Fungal Biology, 115*(10), 1019–1029. https://doi.org/10.1016/j.funbio.2011.04.005

Baeza-Montanez, L., Gomez-Cabrera, R., & Garcia-Pedrajas, M. D. (2010). First report of *Verticillium* wilt caused by *Verticillium dahliae* on mango trees (*Mangifera indica*) in Southern Spain. *Plant Disease, 94*(3), 380–381. https://doi.org/10.1094/Pdis-94-3-0380c

Bagagli, E., Theodoro, R. C., Bosco, S. M. G., & McEwen, J. G. (2008). *Paracoccidioides brasiliensis*: Phylogenetic and ecological aspects. *Mycopathologia, 165*(4), 197–207. https://doi.org/10.1007/s11046-007-9050-7

Bai, Q., Xie, Y., Dong, R., Gao, J., & Li, Y. (2012). First report of Volutella blight on *Pachysandra* caused by *Volutella pachysandricola* in China. *Plant Disease, 96*(4), 584–585. https://doi.org/10.1094/Pdis-11-11-0997

Bai, Y.-L., Li, J.-Y., Qiao, M., Qian, W.-Y., Yang, G.-Z., & Yu, Z.-F. (2013). *Setosynnema yunnanense* sp. nov. from submerged decaying leaves. *Mycotaxon, 125*(1), 81–85.

Baker, W. A., Partridge, E. C., & Morgan-Jones, G. (2001). Notes on hyphomycetes. LXXXI. *Acrodictyella obovata*, a new lignicolous, dematiaceous genus and species collected in Alabama. *Mycotaxon, 78*, 29–36.

Bakhshi, M., Arzanlou, M., Babai-Ahari, A., Groenewald, J. Z., & Crous, P. W. (2015). Is morphology in *Cercospora* a reliable reflection of generic affinity? *Phytotaxa, 213*(1), 22–34. https://doi.org/10.11646/phytotaxa.213.1.2

Balajee, S. A., Houbraken, J., Verweij, P. E., Hong, S. B., Yaghuchi, T., Varga, J., . . . Samson, R. A. (2007). *Aspergillus* species identification in the clinical setting. *Studies in Mycology, 59*, 39–46. https://doi.org/10.3114/sim.2007.59.05

Bandgar, S., & Patil, C. (2019). A new species of *Beltrania* from Western Ghats, India. *International Journal of Life Science, 7*(2), 325–328.

Bao, D.-F., Hyde, K. D., McKenzie, E. H. C., Jeewon, R., Su, H.-Y., Nalumpang, S., . . . Luo, Z.-L. (2021). Biodiversity of lignicolous freshwater hyphomycetes from China and Thailand and description of sixteen species. *Journal of Fungi, 7*(8), 669.

Baral, H.-O., & Haelewaters, D. (2015). *Rommelaarsia flavovirens* gen. et sp. nov. (Helotiales), a new discomycete on *Equisetum* with a peculiar asexual state. *Ascomycete.org*, *7*(6), 321–330. https://doi.org/10.25664/art-0155

Baral, H. O., Marson, G., Bogale, M., & Untereiner, W. A. (2013). *Xerombrophila crystallifera*, a new genus and species in the Helotiales. *Mycological Progress, 12*(3), 475–488. https://doi.org/10.1007/s11557-012-0854-6

Baral, H. O., Weber, E., Gams, W., Hagedorn, G., Liu, B., Liu, X., . . . Weiß, M. (2018a). Generic names in the Orbiliaceae (Orbiliomycetes) and recommendations on which names should be protected or suppressed. *Mycological Progress, 17*(1), 5–31. http://doi.org/10.1007/s11557-017-1300-6

Baral, H. O., Weber, E., & Marson, G. (2020). *Monograph of Orbiliomycetes (Ascomycota) based on vital taxonomy. Part I + II*. National Museum of Natural History Luxembourg.

Baral, H. O., Weber, E., Marson, G., & Quijada, L. (2018b). A new connection between wood saprobism and beetle endosymbiosis: the rarely reported saprobic discomycete *Tromeropsis* is congeneric with the symbiotic yeast *Symbiotaphrina* (Symbiotaphrinales, Xylonomycetes) and two asexual morphs misplaced in *Hyphozyma*. *Mycological Progress, 17*(1), 215–254. https://doi.org/10.1007/s11557-017-1340-y

Barbara, D. J., & Clewes, E. (2003). Plant pathogenic *Verticillium* species: How many of them are there? *Molecular Plant Pathology, 4*(4), 297–305. https://doi.org/10.1046/j.1364-3703.2003.00172.x

Barbosa, F. R., Fiuza, P. O., & Castañeda-Ruiz, R. F. (2020). *Ramiphialis ronuroensis* gen. and sp. nov., a hyphomycete from the Amazonian rainforest. *Mycotaxon, 135*(2), 293–298.

Barbosa, F. R., Raja, H. A., Shearer, C. A., & Gusmao, L. F. P. (2013). Some freshwater fungi from the Brazilian semi-arid region, including two new species of hyphomycetes. *Cryptogamie Mycologie, 34*(3), 243–258. https://doi.org/10.7872/crym.v34.iss2.2013.243

Bärlocher, F. (1992). *The ecology of aquatic hyphomycetes*. Springer-Verlag Berlin.

Barnes, P. D., & Marr, K. A. (2006). Aspergillosis: spectrum of disease, diagnosis, and treatment. *Infectious Disease Clinics of North America, 20*(3), 545–561. https://doi.org/10.1016/j.idc.2006.06.001

Barron, G. L. (1968). *The genera of hyphomycetes from soil*. The Williams & Wilkins Company.

Barron, G. L. (1991). A new genus of the hyphomycetes endoparasitic in bdelloid rotifers with conidia that lodge in the mastax. *Canadian Journal of Botany, 69*(3), 503–506. https://doi.org/10.1139/b91-068

Barron, G. L., & Szuarto, E. (1990). A new genus of the hyphomycetes endoparasitic in rotifers. *Mycologia, 82*(1), 134–137. http://doi.org/10.1080/00275514.1990.12025852

Barron, G. L., & Tzean, S. S. (1981). A subcuticular endoparasite impaling bdelloid rotifers using three-pronged spores. *Canadian Journal of Botany, 59*(7), 1207–1212. https://doi.org/10.1139/b81-165

Baschien, C., Tsui, C. K. M., Gulis, V., Szewzyk, U., & Marvanova, L. (2013). The molecular phylogeny of aquatic hyphomycetes with affinity to the Leotiomycetes. *Fungal Biology, 117*(9), 660–672. https://doi.org/10.1016/j.funbio.2013.07.004

Basiewicz, M., Weiss, M., Kogel, K. H., Langen, G., Zorn, H., & Zuccaro, A. (2012). Molecular and phenotypic characterization of *Sebacina uermifera* strains associated with orchids, and the description of *Piriformospora williamsii* sp nov. *Fungal Biology, 116*(2), 204–213. https://doi.org/10.1016/j.funbio.2011.11.003

Batista, A. C., & Bezerra, J. L. (1960). *Beltraniopsis* - novo gênero de fungos Dematiaceae. *Publicações. Instituto de Micologia da Universidade do Recife, 296*, 1–13.

Batista, A. C., & Nascimento, M. L. (1957). Alguns novos fungos imperfeitos do complexo de fumagina. *Anais da Sociedade de Biologia de Pernambuco, 15*(2), 345–353.

Beatrice Schol-Schwarz, M. (1968). *Rhinocladiella*, its synonym *Fonsecaea* and its relation to *Phialophora*. *Antonie Van Leeuwenhoek, 34*(1), 119–152. https://doi.org/10.1007/BF02046424

Bégum, P., & Lemaire, M. (1996). The cellulosome: An exocellular, multiprotein complex specialized in cellulose degradation. *Critical Reviews in Biochemistry and Molecular Biology, 31*(3), 201–236. https://doi.org/10.3109/10409239609106584

Belliveau, M. J. R., & Barlocher, F. (2005). Molecular evidence confirms multiple origins of aquatic hyphomycetes. *Mycological Research, 109*, 1407–1417. https://doi.org/10.1017/S0953756205004119

Ben-Daniel, B., Bar-Zvi, D., & Tsror, L. (2009). An improved large-scale screening method for assessment of *Colletotrichum coccodes* aggressiveness using mature green tomatoes. *Plant Pathology, 58*(3), 497–503. https://doi.org/10.1111/j.1365-3059.2008.01989.x

Bender, H. B. (1932). The genera of fungi imperfecti. *Mycologia*, *24*(4), 410–412. https://doi.org/10.1080/00275514.1932.12020630

Benjamin, R. K. (1963). Addenda to "The Merosporangiferous Mucorales" II. *Aliso: A Journal of Systematic and Evolutionary Botany, 5*(3), 273–288.

Berbegal, M., & Armengol, J. (2009). First report of *Verticillium* wilt of faba bean caused by *Verticillium dahliae* in Spain. *Plant Disease, 93*(4), 432–432. https://doi.org/10.1094/Pdis-93-4-0432b

Berkeley, M. J., & Broome, C. E. (1861). Notices of British fungi (952-985). *Annals and Magazine of Natural History, 7*, 449–456.

Bhat, J. (2010). *Fascinating microfungi (Hyphomycetes) of Western Ghats-India*. Broadway Book Centre.

Bhat, R. G., & Subbarao, K. V. (1999). Host range specificity in *Verticillium dahliae*. *Phytopathology®, 89*(12), 1218–1225. https://doi.org/10.1094/phyto.1999.89.12.1218

Bien, S., & Damm, U. (2020). *Arboricolonus simplex* gen. et sp. nov. and novelties in *Cadophora*, *Minutiella* and *Proliferodiscus* from *Prunus* wood in Germany. *Mycokeys, 63*, 119–161. https://doi.org/10.3897/mycokeys.63.46836

Bien, S., Kraus, C., & Damm, U. (2020). Novel collophorina-like genera and species from *Prunus* trees and vineyards in Germany. *Persoonia, 45*, 46–67. https://doi.org/10.3767/persoonia.2020.45.02

Bills, G. F., Menendez, V. G., & Platas, G. (2012). *Kabatiella bupleuri* sp nov (Dothideales), a pleomorphic epiphyte and endophyte of the mediterranean plant *Bupleurum gibraltarium* (Apiaceae). *Mycologia, 104*(4), 962–973. https://doi.org/10.3852/12-003

Bissett, J., Gams, W., Jaklitsch, W., & Samuels, G. J. (2015). Accepted *Trichoderma* names in the year 2015. *IMA Fungus, 6*(2), 263–295. https://doi.org/10.5598/imafungus.2015.06.02.02

Blackwell, M., Haelewaters, D., & Pfister, D. H. (2020). Laboulbeniomycetes: Evolution, natural history, and Thaxter's final word. *Mycologia, 112*(6), 1048–1059. https://doi.org/10.1080/00275514.2020.1718442

Blackwell, M., & Kimbrough, J. W. (1978). *Hormiscioideus filamentosus* gen. et sp. nov., a termite-infesting fungus from Brazil. *Mycologia, 70*(6), 1274–1280. https://doi.org/10.1080/00275514.1978.12020351

Blackwell, M., Samson, R. A., & Kimbrough, J. W. (1980). *Termitariopsis cavernosa*, gen. and sp.nov., a sporodochial fungus ectoparasitic on ants. *Mycotaxon, 12*(1), 97–104.

Blehert, D. S., Hicks, A. C., Behr, M., Meteyer, C. U., Berlowski-Zier, B. M., Buckles, E. L., . . . Stone, W. B. (2009). Bat white-nose syndrome: An emerging fungal pathogen? *Science, 323*(5911), 227–227. https://doi.org/10.1126/science.1163874

Boedijn, K. B. (1937). On a new genus of the Dematiaceae. *Blumea. Supplement, 1*(1), 140–141.

Boedijn, K. B. (1951). Some mycological notes. *Sydowia, 5*(3-6), 211–229.

Boekhout, T. (1991). Systematics of *Itersonilia* - a comparative phenetic study. *Mycological Research, 95*, 135–146.

Boekhout, T. (1995). *Pseudozyma bandoni* emend. *Boekhout*, a genus for yeast-like anamorphs of Ustilaginales. *The Journal of General and Applied Microbiology, 41*(4), 359–366. https://doi.org/10.2323/jgam.41.359

Boekhout, T., Theelen, B., Houbraken, J., Robert, V., Scorzetti, G., Gafni, A., . . . Sztejnberg, A. (2003). Novel anamorphic mite-associated fungi belonging to the Ustilaginomycetes: *Meira geulakonigii* gen. nov., sp. nov., *Meira argovae* sp. nov. and *Acaromyces ingoldii* gen. nov., sp. nov. *International Journal of Systematic and Evolutionary Microbiology, 53*, 1655–1664. https://doi.org/10.1099/ijs.0.02434-0

Boesewinkel, H. J. (1982). *Cylindrocladiella*, a new genus to accommodate *Cylindrocladium parvum* and other small-spored species of *Cylindrocladium*. *Canadian Journal of Botany, 60*(11), 2288–2294. https://doi.org/10.1139/b82-280

Bogale, M., Orr, M. J., O'Hara, M. J., & Untereiner, W. A. (2010). Systematics of *Catenulifera* (anamorphic Hyaloscyphaceae) with an assessment of the phylogenetic position of *Phialophora hyalina*. *Fungal Biology, 114*(5-6), 396–409. https://doi.org/10.1016/j.funbio.2010.02.006

Bonar, L. (1967). Studies on Deuteromycetes. *Mycologia, 59*(4), 596–599. https://doi.org/10.1080/00275514.1967.12018453

Bonorden, H. F. (1851). *Handbuch der allgemeinen Mykologie*. Schweizerbart'sche Verlagshandlung, Stuttgart.

Boonmee, S., Rossman, A. Y., Liu, J.-K., Li, W.-J., Dai, D.-Q., Bhat, J. D., . . . Hyde, K. D. (2014). Tubeufiales, ord. nov., integrating sexual and asexual generic names. *Fungal Diversity, 68*(1), 239–298. https://doi.org/10.1007/s13225-014-0304-7

Borges-Walmsley, M. I., Chen, D., Shu, X., & Walmsley, A. R. (2002). The pathobiology of *Paracoccidioides brasiliensis*. *Trends in Microbiology, 10*(2), 80–87. https://doi.org/10.1016/S0966-842X(01)02292-2

Borisova, V. N. (1981). *Harmoniella* - new genus of hyphomycetes. *Mikologiya i Fitopatologiya, 15*, 89–92.

Boucher, H. W., & Patterson, T. F. (2015). Aspergillosis. In D. R. Hospenthal & M. G. Rinaldi (Eds.), *Diagnosis and Treatment of Fungal Infections* (pp. 129–140). Springer International Publishing. https://doi.org/10.1007/978-3-319-13090-3_10

Braganca, H., Diogo, E. L. F., Neves, L., Valente, C., Araujo, C., Bonifacio, L., . . . Phillips, A. J. L. (2016). *Quambalaria eucalypti* a pathogen of *Eucalyptus globulus* newly reported in Portugal and in Europe. *Forest Pathology, 46*(1), 67–75. https://doi.org/10.1111/efp.12221

Braun, U. (1991). Studies on *Ramularia* and allied genera (IV). *Nova Hedwigia, 53* (3-4), 291–305.

Braun, U. (1994a). Miscellaneous notes on phytopathogenic hyphomycetes. *Mycotaxon, 51*, 37–68.

Braun, U. (1994b). Studies on *Ramularia* and allied genera (VII). *Nova Hedwigia, 58*, 191–222.

Braun, U., & Cook, R. T. A. (2012). Taxonomic manual of Erysiphales (powdery mildews). *CBS Biodiversity series, 11*, 1–707.

Braun, U., & de Jesús Yáñez-Morales, M. (2009). *Phyllactinia* and *Ovulariopsis* species on legumes. *Mycotaxon, 109*(1), 145–160.

Braun, U., & Hill, C. F. (2002). Some new micromycetes from New Zealand. *Mycological Progress, 1*(1), 19–30. http://doi.org/10.1007/s11557-006-0002-2

Braun, U., & Scheuer, C. (1995). *Acrodontiella* gen. nov. (Hyphomycetes). *Sydowia, 47*(2), 146–149.

Brielmaier-Liebetanz, U., Wagner, S., & Werres, S. (2013). First report of dieback on *Euonymus fortunei* caused by *Cylindrocladiella parva* in Germany. *Plant Disease, 97*(8), 1120–1120. https://doi.org/10.1094/Pdis-02-13-0162-Pdn

Bruton, B. D., Fish, W. W., Subbarao, K. V., & Isakeit, T. (2007). First report of *Verticillium* wilt of watermelon in the *Texas* high plains. *Plant Disease, 91*(8), 1053–1053. https://doi.org/10.1094/Pdis-91-8-1053a

Bubák, F., & Kabát, J. E. (1907). Mykologische Beiträge. IV. *Hedwigia, 46*, 288–298.

Bubici, G., Kaushal, M., Prigigallo, M. I., Gómez-Lama Cabanás, C., & Mercado-Blanco, J. (2019). Biological control agents against *Fusarium* wilt of banana. *Frontiers in Microbiology, 10*(616). https://doi.org/10.3389/fmicb.2019.00616

Burgess, T. I., Tan, Y. P., Garnas, J., Edwards, J., Scarlett, K. A., Shuttleworth, L. A., . . . Dinh, Q. (2019). Current status of the Botryosphaeriaceae in Australia. *Australasian Plant Pathology, 48*(1), 35–44.

Cabello, M., Arambarri, A., & Cazau, M. C. (1998). *Minimidochium parvum*, a new species of hyphomycete from Argentina. *Mycological Research, 102*, 383–384. https://doi.org/10.1017/S0953756297005133

Cafarchia, C., Iatta, R., Latrofa, M. S., Gräser, Y., & Otranto, D. (2013). Molecular epidemiology, phylogeny and evolution of dermatophytes. *Infection, Genetics and Evolution, 20*, 336–351. https://doi.org/10.1016/j.meegid.2013.09.005

Cai, F., & Druzhinina, I. S. (2021). In honor of John Bissett: Authoritative guidelines on molecular identification of *Trichoderma*. *Fungal Diversity, 107*(1), 1–69. https://doi.org/10.1007/s13225-020-00464-4

Cai, L., Hyde, K. D., & Tsui, C. K. M. (2006). *Genera of freshwater fungi*. Fungal Diversity Press [for the Center for Research in Fungal Diversity].

Cai, L., Tsui, C. K. M., Zhang, K. Q., & Hyde, K. D. (2002). Aquatic fungi from Lake Fuxian, Yunnan, China. *Fungal Diversity, 9*, 57–70.

Cai, L., Wu, W. P., & Hyde, K. D. (2009). Phylogenetic relationships of *Chalara* and allied species inferred from ribosomal DNA sequences. *Mycological Progress, 8*(2), 133–143. https://doi.org/10.1007/s11557-009-0585-5

Calatayud, V., & Etayo, J. (1999). *Codonmyces* and *Lichenostella*, two new genera of lichenicolous conidial fungi. *The Lichenologist, 31*(6), 593–601. https://doi.org/10.1006/lich.1999.0235

Calduch, M., Gene, J., Guarro, J., & Abdullah, S. K. (2002a). *Janetia obovata* and *Stachybotryna excentrica*, two new hyphomycetes from submerged plant material in Spain. *Mycologia, 94*(2), 355–361. https://doi.org/10.2307/3761812

Calduch, M., Gene, J., Guarro, J., Mercado-Sierra, A., & Castañeda-Ruíz, R. F. (2002b). Hyphomycetes from Nigerian rain forests. *Mycologia, 94*(1), 127–135. https://doi.org/10.2307/3761852

Campbell, J., Shearer, C., & Marvanova, L. (2006). Evolutionary relationships among aquatic anamorphs and teleomorphs: *Lemonniera*, *Margaritispora*, and *Goniopila*. *Mycological Research, 110*, 1025–1033. https://doi.org/10.1016/j.mycres.2006.04.012

Cantillo-Pérez, T., Oliveira Fiuza, P., Mena-Portales, J., & Pascholati Gusmão, L. F. (2018). Emendation of the genus *Obeliospora*: New species, combinations and new records from Brazil. *Nova Hedwigia, 106*, 325–335. https://doi.org/10.1127/nova_hedwigia/2017/0439

Carbone, I., & Kohn, L. M. (1999). A method for designing primer sets for speciation studies in filamentous ascomycetes. *Mycologia, 91*(3), 553–556.

Carmichael, J. W. (1967). Cerebral mycetoma of trout due to a *Phialophora*-like fungus. *Sabouraudia: Journal of Medical and Veterinary Mycology, 5*(2), 120–123. https://doi.org/10.1080/00362176785190211

Castañeda Ruíz, R. F., Abarca, G. H., Mota, R. M. A., Stadler, M., Saikawa, M., & Minter, D. W. (2010). *Anaselenosporella sylvatica* gen. & sp. nov. and *Pseudoacrodictys aquatica* sp. nov., two new anamorphic fungi from Mexico. *Mycotaxon, 112*(1), 65–74.

Castañeda Ruíz, R. F., Cano, J., & Guarro, J. (1996a). Notes on conidial fungi. VII. Two new species of *Beltraniella* from Cuba. *Mycotaxon, 58*, 243–251.

Castañeda Ruíz, R. F., Cano, J., & Guarro, J. (1997). Notes on conidial fungi VI. *Menisporopsis*. *Mycotaxon, 64*, 335–342.

Castañeda Ruíz, R. F., Guarro, J., & Cano, J. (1996b). Notes on conidial fungi. IV. *Hyalopleiochaeta* anam. gen. nov. and some notes on *Pleiochaeta*. *Mycotaxon, 57*, 457–462.

Castañeda Ruíz, R. F., Gusmão, L. F. P., de Moraes Júnior, V. O., Leão-Ferreira, S. M., Saikawa, M., Minter, D. W., . . . Stadler, M. (2009). Two setose anamorphic fungi: *Ampullicephala* gen. nov. and *Venustosynnema grandiae* sp. nov. *Mycotaxon, 109*(1), 275–288.

Castañeda Ruíz, R. F., Heredia Abarca, G., Arias, R. M., Saikawa, M., Minter, D. W., & Stadler, M. (2007). Anamorphic fungi from submerged plant material: *Phaeomonilia pleiomorpha*, *P. corticola* and *Cacumisporium pleuroconidiophorum*. *Mycotaxon, 100*, 327–336.

Castañeda Ruíz, R. F., Heredia, G. P., Arias, R. M., Stadler, M., & Minter, D. W. (2005). Two Hyphomycetes from submerged plant material of México. *Mycotaxon, 91*, 333–338.

Castañeda Ruíz, R. F., Hernández-Restrepo, M., Gené, J., Guarro, J., Minter, D. W., & Saikawa, M. (2013). Two new microfungi from Portugal: *Magnohelicospora iberica* gen. & sp. nov. and *Phaeodactylium stadleri* sp. nov. *Mycotaxon, 121*(1), 171–179.

Castañeda Ruíz, R. F., Iturriaga, T., Saikawa, M., Cano, J., & Guarro, J. (2001). The genus *Menisporopsis* in Venezuela with the addition of *M. anisospora* anam. sp nov from a palm tree. *Cryptogamie Mycologie, 22*(4), 259–263.

Castañeda Ruíz, R. F., & Kendrick, B. (1990). Conidial fungi from Cuba: I. *University of Waterloo Biology Series, 32*, 1–53.

Castañeda Ruíz, R. F., & Kendrick, B. (1991). Ninety-nine conidial fungi from Cuba and three from Canada. *University of Waterloo Biology Series, 35*, 1–132.

Castañeda Ruíz, R. F., Kendrick, B., & Guarro, J. (1998). Notes on conidial fungi. XVII. *Amphophialis*, anam. gen. nov. *Mycotaxon, 68*, 11–17.

Castañeda Ruíz, R. F., Saikawa, M., Decock, C., Guarro, J., & Calduch, M. (1999). *Aenigmatospora*, an enigmatic new genus of fungi from tropical leaf litter. *Cryptogamie Mycologie, 20*(2), 113–117. https://doi.org/10.1016/S0181-1584(99)80014-1

Castresana, J. (2000). Selection of conserved blocks from multiple alignments for their use in phylogenetic analysis. *Molecular Biology and Evolution, 17*(4), 540–552.

Cech, T., Diminic, D., & Heungens, K. (2010). *Cylindrocladium buxicola* causes common box blight in Croatia. *Plant Pathology, 59*(6), 1169–1169. https://doi.org/10.1111/j.1365-3059.2010.02361.x

Chaerani, R., & Voorrips, R. E. (2006). Tomato early blight (*Alternaria solani*): The pathogen, genetics, and breeding for resistance. *Journal of General Plant Pathology, 72*(6), 335–347. https://doi.org/10.1007/s10327-006-0299-3

Chary, C. M., & Ramarao, P. (1974). *Subbaromyces aquatica*, a new ascomycete from India. *Hydrobiologia, 44*(4), 475–479. https://doi.org/10.1007/bf00036311

Chaturvedi, V., & de Hoog, G. S. (2020). Onygenalean fungi as major human and animal pathogens. *Mycopathologia, 185*(1), 1–8. https://doi.org/10.1007/s11046-020-00428-x

Chaverri, P., Salgado, C., Hirooka, Y., Rossman, A. Y., & Samuels, G. J. (2011). Delimitation of *Neonectria* and *Cylindrocarpon* (Nectriaceae, Hypocreales, Ascomycota) and related genera with *Cylindrocarpon*-like anamorphs. *Studies in Mycology, 68*, 57–78. https://doi.org/10.3114/sim.2011.68.03

Cheewangkoon, R., Groenewald, J. Z., Summerell, B. A., Hyde, K. D., To-anun, C., & Crous, P. W. (2009). Myrtaceae, a cache of fungal biodiversity. *Persoonia*, *23*, 55–85. https://doi.org/10.3767/003158509x474752

Chen, A. J., Frisvad, J. C., Sun, B. D., Varga, J., Kocsube, S., Dijksterhuis, J., . . . Samson, R. A. (2016). *Aspergillus* section *Nidulantes* (formerly *Emericella*): Polyphasic taxonomy, chemistry and biology. *Studies in Mycology, 84*, 1–118. https://doi.org/10.1016/j.simyco.2016.10.001

Chen, A. J., Hubka, V., Frisvad, J. C., Visagie, C. M., Houbraken, J., Meijer, M., . . . Samson, R. A. (2017a). Polyphasic taxonomy of *Aspergillus* section *Aspergillus* (formerly *Eurotium*), and its occurrence in indoor environments and food. *Studies in Mycology, 88*, 37–135. https://doi.org/10.1016/j.simyco.2017.07.001

Chen, J., Dong, H.-L., Meng, Z.-X., & Guo, S.-X. (2010). *Cadophora malorum* and *Cryptosporiopsis ericae* isolated from medicinal plants of the Orchidaceae in China. *Mycotaxon, 112*(1), 457–461.

Chen, W. H., Zeng, G. P., Luo, Y., Liang, Z. Q., & Han, Y. F. (2017b). Morphological traits and molecular analysis for *Geomyces fujianensis* sp nov from China. *Mycosphere, 8*(1), 38–43. https://doi.org/10.5943/mycosphere/8/1/5

Cheng, X.-l., Li, W., & Zhang, T.-y. (2014). A new species of *Phaeoisaria* from intertidal marine sediment collected in Weihai, China. *Mycotaxon, 127*(1), 17–24.

Chesters, C. G. C., & Greenhalgh, G. N. (1964). *Geniculosporium serpens* gen. et sp.nov., the imperfect state of *Hypoxylon serpens*. *Transactions of the British Mycological Society, 47*(3), 393–IN314. https://doi.org/10.1016/S0007-1536(64)80012-7

Chomnunti, P., Hongsanan, S., Aguirre-Hudson, B., Tian, Q., Persoh, D., Dhami, M. K., . . . Hyde, K. D. (2014). The sooty moulds. *Fungal Diversity, 66*, 1–36. https://doi.org/10.1007/s13225-014-0278-5

Chu, W. H., Dou, Q., Chu, H. L., Wang, H. H., Sung, C. K., & Wang, C. Y. (2015). Research advance on *Esteya vermicola*, a high potential biocontrol agent of pine wilt disease. *Mycological Progress*, *14*(12). https://doi.org/10.1007/s11557-015-1137-9

Chuaseeharonnachai, C., Suetrong, S., Nuankaew, S., Somrithipol, S., Hongsanan, S., Srikitikulchai, P., . . . Boonyuen, N. (2020). *Synnematotriadelphia* gen. nov. (*S. stilboidea* comb. nov. and *S. synnematofera* comb. nov.) and *Triadelphia hexaformispora* sp. nov. in the family Triadelphiaceae. *Mycological Progress, 19*(2), 127–137. https://doi.org/10.1007/s11557-019-01547-6

Ciferri, R. (1958). Osservazioni intorno a tre fungilli dell Ólivo. *Sydowia, 11*, 282–289.

Ciferri, R., & Montemartini, A. (1959). Taxonomy of *Haplosporangium parvum*. *Mycopathologia et Mycologia Applicata, 10*(4), 303–316. https://doi.org/10.1007/BF02051638

Cmokova, A., Kolarik, M., Dobias, R., Hoyer, L. L., Janouskovcova, H., Kano, R., . . . Hubka, V. (2020). Resolving the taxonomy of emerging zoonotic pathogens in the *Trichophyton benhamiae* complex. *Fungal Diversity, 104*(1), 333–387. https://doi.org/10.1007/s13225-020-00465-3

Coetsee, C., Wingfield, M. J., Crous, P. W., & Wingfield, B. D. (2000). *Xenochalara*, a new genus of dematiaceous hyphomycetes for chalara-like fungi with apical wall building conidial development. *South African Journal of Botany, 66*(2), 99–103. https://doi.org/10.1016/S0254-6299(15)31069-3

Cole, G. T., & Kendrick, B. (1981). *Biology of conidial fungi* (Vol. 1). Academic Press.

Cole, M. S., & Hawksworth, D. L. (2001). Lichenicolous fungi, mainly from the USA, including *Patriciomyces* gen. nov. *Mycotaxon, 77*, 305–338.

Constantelos, C., Doyle, V. P., Litt, A., & Oudemans, P. V. (2011). First report of *Gliocephalotrichum bulbilium* causing cranberry fruit rot in New Jersey and Massachusetts. *Plant Disease, 95*(5), 618–619. https://doi.org/10.1094/Pdis-12-10-0926

Constantinescu, O., Holm, K., & Holm, L. (1989). Teleomorph-anamorph connections in Ascomycetes. 1–3. *Stanhughesia* (Hyphomycetes) new genus, the anamorph of *Ceramothyrium*. *Studies in Mycology, 31*, 69–84.

Constantinescu, O., & Santesson, R. (2007). *Choreospora* gen. nov., a new lichenicolous hyphomycete from Australia. *The Lichenologist, 19*(2), 177–181. https://doi.org/10.1017/s0024282987000148

Cooke, R. C. (1964). *Dactylaria clavispora*, a new nematode-trapping hyphomycete. *Transactions of the British Mycological Society, 47*(3), 307–309. https://doi.org/10.1016/S0007-1536(64)80001-2

Cooke, R. C., & Satchuthananthavale, V. (1966). Some nematode-trapping species of *Dactylaria*. *Transactions of the British Mycological Society, 49*(1), 27–32. https://doi.org/10.1016/S0007-1536(66)80031-1

Costa, P. M. O., Barbosa, M. A., Araújo, M. A. G., Malosso, E., & Castañeda-Ruiz, R. F. (2016a). *Phaeodactylium cymbisporum* sp. nov. from the Brazilian atlantic forest. *Mycotaxon, 131*(2), 435–438.

Costa, P. M. O., Barbosa, M. A., Araújo, M. A. G., Malosso, E., & Castañeda-Ruiz, R. F. (2016b). *Stachybotryna longispiralis* sp. nov. from the Brazilian atlantic forest. *Mycotaxon, 131*(2), 429–433.

Costa, P. M. O., Barbosa, M. A., Da Silva, G. V., Sosa, D., Pérez-Martinez, S., Castañeda-Ruiz, R. F., & Malosso, E. (2018). *Castanediella diversispora* sp. nov. from the Brazilian atlantic forest. *Mycotaxon, 133*(1), 63–69.

Crane, J. L. (1972). Illinois funigi. III: *Dendrosporium lobatum* and *Sporidesmium taxodii* sp.nov. *Transactions of the British Mycological Society, 58*(3), 423–426. https://doi.org/10.1016/S0007-1536(72)80092-5

Crane, J. L., & Dumont, K. P. (1978). Two new hyphomycetes from Venezuela. *Canadian Journal of Botany, 56*(20), 2613–2616. https://doi.org/10.1139/b78-313

Crane, J. L., & Schoknecht, J. D. (1973). Conidiogenesis in *Ceratocystis ulmi*, *Ceratocystis piceae*, and *Graphium penicillioides*. *American Journal of Botany, 60*(4), 346–354. https://doi.org/10.1002/j.1537-2197.1973.tb05935.x

Crous, P. W., Allegrucci, N., Arambarri, A. M., Cazau, M. C., Groenewald, J. Z., & Wingfield, M. J. (2005). *Dematiocladium celtidis* gen. sp nov (Nectriaceae, Hypocreales), a new genus from Celtis leaf litter in Argentina. *Mycological Research, 109*, 833–840. https://doi.org/10.1017/S0953756205002911

Crous, P. W., Braun, U., McDonald, B. A., Lennox, C. L., Edwards, J., Mann, R. C., . . . Groenewald, J. Z. (2021a). Redefining genera of cereal pathogens: *Oculimacula*, *Rhynchosporium* and *Spermospora*. *Fungal Systematics and Evolution, 7*, 67–98. https://doi.org/10.3114/fuse.2021.07.04

Crous, P. W., Braun, U., Wingfield, M. J., Wood, A. R., Shin, H. D., Summerell, B. A., . . . Grohenewald, J. Z. (2009). Phylogeny and taxonomy of obscure genera of microfungi. *Persoonia, 22*, 139–161. https://doi.org/10.3767/003158509x461701

Crous, P. W., Carnegie, A. J., Wingfield, M. J., Sharma, R., Mughini, G., Noordeloos, M. E., . . . Groenewald, J. Z. (2019a). Fungal Planet description sheets: 868-950. *Persoonia - Molecular Phylogeny and Evolution of Fungi, 42*(1), 291–473.

Crous, P. W., Cowan, D. A., Maggs-Kölling, G., Yilmaz, N., Larsson, E., Angelini, C., . . . Groenewald, J. Z. (2020a). Fungal Planet description sheets: 1112-1181. *Persoonia - Molecular Phylogeny and Evolution of Fungi, 45*(1), 251–409. https://doi.org/10.3767/persoonia.2020.45.10

Crous, P. W., Cowan, D. A., Maggs-Kölling, G., Yilmaz, N., Thangavel, R., Wingfield, M. J., . . . Groenewald, J. Z. (2021b). Fungal Planet description sheets: 1182-1283. *Persoonia - Molecular Phylogeny and Evolution of Fungi, 46*(1), 313–528. https://doi.org/10.3767/persoonia.2021.46.11

Crous, P. W., & Gams, W. (2000). *Phaeomoniella chlamydospora* gen. et comb. nov., a causal organism of Petri grapevine decline and esca. *Phytopathologia Mediterranea, 39*(1), 112–118.

Crous, P. W., Gams, W., Wingfield, M. J., & van Wyk, P. S. (1996). *Phaeoacremonium* gen. nov. associated with wilt and decline diseases of woody hosts and human infections. *Mycologia, 88*(5), 786–796. https://doi.org/10.1080/00275514.1996.12026716

Crous, P. W., Giraldo, A., Hawksworth, D. L., Robert, V., Kirk, P. M., Guarro, J., . . . Groenewald, J. Z. (2014a). The Genera of Fungi: Fixing the application of type species of generic names. *IMA Fungus, 5*(1), 141–160. https://doi.org/10.5598/imafungus.2014.05.01.14

Crous, P. W., Groenewald, J. Z., & Diederich, P. (2010). *Xenopolyscytalum pinae*. Fungal Planet 55. *Persoonia, 25*, 130–131.

Crous, P. W., Groenewald, J. Z., & Gams, W. (2003). Eyespot of cereals revisited: ITS phylogeny reveals new species relationships. *European Journal of Plant Pathology, 109*(8), 841–850. https://doi.org/10.1023/A:1026111030426

Crous, P. W., Groenewald, J. Z., Risède, J.-M., Simoneau, P., & Hyde, K. D. (2006a). *Calonectria* species and their *Cylindrocladium* anamorphs: Species with clavate vesicles. *Studies in Mycology, 55*, 213–226. https://doi.org/10.3114/sim.55.1.213

Crous, P. W., Groenewald, J. Z., Shivas, R. G., Edwards, J., Seifert, K. A., Alfenas, A. C., . . . Quaedvlieg, W. (2011a). Fungal Planet description sheets: 69–91. *Persoonia, 26*, 108–156. https://doi.org/10.3767/003158511x581723

Crous, P. W., Groenewald, J. Z., & Smith, I. W. (2007a). *Phlogicylindrium eucalyptorum*. *Fungal Planet, no. 20*.

Crous, P. W., Hernandez-Restrepo, M., Schumacher, R. K., Cowan, D. A., Maggs-Kolling, G., Marais, E., . . . Groenewald, J. Z. (2021c). New and Interesting Fungi. 4. *Fungal Syst Evol, 7*, 255–343. https://doi.org/10.3114/fuse.2021.07.13

Crous, P. W., Luangsa-ard, J. J., Wingfield, M. J., Carnegie, A. J., Hernández-Restrepo, M., Lombard, L., . . . Groenewald, J. Z. (2018a). Fungal Planet description sheets: 785–867. *Persoonia - Molecular Phylogeny and Evolution of Fungi, 41*(1), 238–417. https://doi.org/10.3767/persoonia.2018.41.12

Crous, P. W., Schroers, H.-J., Groenewald, J. Z., Braun, U., & Schubert, K. (2006b). *Metulocladosporiella* gen. nov. for the causal organism of *Cladosporium speckle* disease of banana. *Mycological Research, 110*(3), 264–275. https://doi.org/10.1016/j.mycres.2005.10.003

Crous, P. W., Schubert, K., Braun, U., de Hoog, G. S., Hocking, A. D., Shin, H. D., . . . Groenewald, J. Z. (2007b). *Opportunistic*, human-pathogenic species in the Herpotrichiellaceae are phenotypically similar to saprobic or phytopathogenic species in the Venturiaceae. *Studies in Mycology, 58*, 185–217. https://doi.org/10.3114/sim.2007.58.07

Crous, P. W., Schumacher, R. K., Akulov, A., Thangavel, R., Hernández-Restrepo, M., Carnegie, A. J., . . . Groenewald, J. Z. (2019b). New and Interesting Fungi. 2. *Fungal Systematics and Evolution, 3*(1), 57–134.

Crous, P. W., Schumacher, R. K., Wingfield, M. J., Akulov, A., Denman, S., Roux, J., . . . Groenewald, J. Z. (2018b). New and Interesting Fungi. 1. *Fungal Systematics and Evolution, 1*(1), 169–215. https://doi.org/10.3114/fuse.2018.01.08

Crous, P. W., Schumacher, R. K., Wingfield, M. J., Lombard, L., Giraldo, A., Christensen, M., . . . Groenewald, J. Z. (2015a). Fungal Systematics and Evolution: FUSE 1. *Sydowia*, *67*, 81–118.

Crous, P. W., Shivas, R. G., Quaedvlieg, W., van der Bank, M., Zhang, Y., Summerell, B. A., . . . Groenewald, J. Z. (2014b). Fungal Planet description sheets: 214–280. *Persoonia, 32*, 184–306. https://doi.org/10.3767/003158514x68239

Crous, P. W., Summerell, B. A., Shivas, R. G., Romberg, M., Mel'nik, V. A., Verkley, G. J. M., & Groenewald, J. Z. (2011b). Fungal Planet description sheets: 92–106. *Persoonia, 27*, 130–162. https://doi.org/10.3767/003158511x617561

Crous, P. W., Verkley, G. J. M., & Groenewald, J. Z. (2006c). Eucalyptus microfungi known from culture. 1. *Cladoriella* and *Fulvoflamma* genera nova, with notes on some other poorly known taxa. *Studies in Mycology, 55*, 53–63. https://doi.org/10.3114/sim.55.1.53

Crous, P. W., Wingfield, M. J., Alfenas, A. C., & Silviera, S. F. (1994a). *Cylindrocladium naviculatum* sp. nov., and two new vesiculate hyphomycete genera, *Falcocladium* and *Vesicladiella*. *Mycotaxon, 50*, 441–458.

Crous, P. W., Wingfield, M. J., Burgess, T. I., Carnegie, A. J., Hardy, G., Smith, D., . . . Groenewald, J. Z. (2017a). Fungal Planet description sheets: 625–715. *Persoonia, 39*(1), 270–467. https://doi.org/10.3767/persoonia.2017.39.11

Crous, P. W., Wingfield, M. J., Burgess, T. I., Hardy, G., Gene, J., Guarro, J., . . . Groenewald, J. Z. (2018c). Fungal Planet description sheets: 716–784. *Persoonia: Molecular Phylogeny and Evolution of Fungi, 40*, 240–393.

Crous, P. W., Wingfield, M. J., Burgess, T. I., Hardy, G. E. S. J., Barber, P. A., Alvarado, P., . . . Raj, K. N. A. (2017b). Fungal Planet description sheets: 558–624. *Persoonia - Molecular Phylogeny and Evolution of Fungi*, *38*(1), 240–384.

Crous, P. W., Wingfield, M. J., Burgess, T. I., Hardy, G. E. S. J., Crane, C., Barrett, S., . . . Stephenson, S. L. (2016a). Fungal Planet description sheets: 469–557. *Persoonia - Molecular Phylogeny and Evolution of Fungi*, *37*(1), 218–403.

Crous, P. W., Wingfield, M. J., Cheewangkoon, R., Carnegie, A. J., Burgess, T. I., Summerell, B. A., . . . Groenewald, J. Z. (2019c). Foliar pathogens of eucalypts. *Studies in Mycology*, *94*, 125–298. https://doi.org/10.1016/j.simyco.2019.08.001

Crous, P. W., Wingfield, M. J., Chooi, Y. H., Gilchrist, C. L. M., Lacey, E., Pitt, J. I., . . . Groenewald, J. Z. (2020b). Fungal Planet description sheets: 1042-1111. *Persoonia*, *44*, 301–459. https://doi.org/10.3767/persoonia.2020.44.11

Crous, P. W., Wingfield, M. J., Guarro, J., Cheewangkoon, R., van der Bank, M., Swart, W. J., . . . Groenewald, J. Z. (2013). Fungal Planet description sheets: 154–213. *Persoonia*, *31*, 188–296. https://doi.org/10.3767/003158513x675925

Crous, P. W., Wingfield, M. J., Guarro, J., Hernandez-Restrepo, M., Sutton, D. A., Acharya, K., . . . Groenewald, J. Z. (2015b). Fungal Planet description sheets: 320–370. *Persoonia*, *34*, 167–266. https://doi.org/10.3767/003158515x688433

Crous, P. W., Wingfield, M. J., & Kendrick, W. B. (1994b). *Kionochaeta pini* sp. nov. and *Verrucophragmia splendens* gen. nov. from leaf litter in South Africa. *Mycologia*, *86*(3), 447–450.

Crous, P. W., Wingfield, M. J., Le Roux, J. J., Richardson, D. M., Strasberg, D., Shivas, R. G., . . . Groenewald, J. Z. (2015c). Fungal Planet description sheets: 371–399. *Persoonia*, *35*, 264–327. https://doi.org/10.3767/003158515x690269

Crous, P. W., Wingfield, M. J., Lombard, L., Roets, F., Swart, W. J., Alvarado, P., . . . Groenewald, J. Z. (2019d). Fungal Planet description sheets: 951-1041. *Persoonia, 43*, 223–425. https://doi.org/10.3767/persoonia.2019.43.06

Crous, P. W., Wingfield, M. J., Richardson, D. M., Leroux, J. J., Strasberg, D., Edwards, J., . . . Groenewald, J. Z. (2016b). Fungal Planet description sheets: 400–468. *Persoonia - Molecular Phylogeny and Evolution of Fungi, 36*(1), 316–458.

Crous, P. W., Wingfield, M. J., Schumacher, R. K., Akulov, A., Bulgakov, T. S., Carnegie, A. J., . . . Groenewald, J. Z. (2020c). New and Interesting Fungi. 3. *Fungal Syst Evol, 6*, 157–231. https://doi.org/10.3114/fuse.2020.06.09

Crous, P. W., Wingfield, M. J., Schumacher, R. K., Summerell, B. A., Giraldo, A., Gene, J., . . . Groenewald, J. Z. (2014c). Fungal Planet description sheets: 281–319. *Persoonia, 33*, 212–292. https://doi.org/10.3767/003158514x685680

Cruywagen, E. M., de Beer, Z. W., Roux, J., & Wingfield, M. J. (2010). Three new *Graphium* species from baobab trees in South Africa and Madagascar. *Persoonia, 25*, 61–71. https://doi.org/10.3767/003158510x550368

Cruz, A. C. R. d., Gusmão, L. F. P., Castañeda-Ruiz, R. F., Stadler, M., & Minter, D. W. (2012). *Zelodactylaria*, an interesting new genus from semi-arid northeast Brazil. *Mycotaxon, 119*(1), 241–248.

D'Souza, M. A., & Bhat, D. J. (2012). A new species of *Pleurophragmium* from India. *Mycotaxon, 119*(1), 477–482.

da Cruz, A. C. R., Gusmão, L. F. P., & Ruíz, R. F. C. (2007). Conidial fungi from the semi-arid Caatinga biome of Brazil. *Subramaniomyces pulcher* sp. nov. and notes on *Sporidesmium circinophorum*. *Mycotaxon, 102*, 25–32.

da Cruz, A. C. R., Leão-Ferreira, S. M., Barbosa, F. R., Fernando, L., & Gusmao, P. (2009). Conidial fungi from semi-arid Caatinga biome of Brazil. New and interesting *Dictyochaeta* species. *Mycotaxon, 106*, 15–27.

Dai, D. Q., Phookamsak, R., Wijayawardene, N. N., Li, W. J., Bhat, D. J., Xu, J. C., . . . Chukeatirote, E. (2017). Bambusicolous fungi. *Fungal Diversity, 82*, 1–105. https://doi.org/10.1007/s13225-016-0367-8

Damien, E., Bungartz, F., Diederich, P., & Tibell, L. (2011). Molecular and morphological data place Blarneya in Tylophoron (Arthoniaceae). *The Lichenologist, 43*(4), 345–356.

Damm, U., Fourie, P. H., & Crous, P. W. (2010). *Coniochaeta* (*Lecythophora*), *Collophora* gen. nov and *Phaeomoniella* species associated with wood necroses of *Prunus* trees. *Persoonia, 24*, 60–80. https://doi.org/10.3767/003158510x500705

Daranagama, D. A., Camporesi, E., Liu, X. Z., Bhat, D. J., Chamyuang, S., Bahkali, A. H., . . . Hyde, K. D. (2016). *Tristratiperidium microsporum* gen. et sp nov (Xylariales) on dead leaves of *Arundo plinii*. *Mycological Progress, 15*(1). https://doi.org/10.1007/s11557-015-1151-y

Daranagama, D. A., Camporesi, E., Tian, Q., Liu, X., Chamyuang, S., Stadler, M., & Hyde, K. D. (2015). *Anthostomella* is polyphyletic comprising several genera in Xylariaceae. *Fungal Diversity, 73*(1), 203–238. https://doi.org/10.1007/s13225-015-0329-6

Daranagama, D. A., Hyde, K. D., Sir, E. B., Thambugala, K. M., Tian, Q., Samarakoon, M. C., . . . Stadler, M. (2018). Towards a natural classification and backbone tree for Graphostromataceae, Hypoxylaceae, Lopadostomataceae and Xylariaceae. *Fungal Diversity, 88*(1), 1–165. https://doi.org/10.1007/s13225-017-0388-y

Davison, E. M., Davison, P. J. N., Tan, Y. P., & Shivas, R. G. (2009). *Oedocephalum adhaerens*. Fungal Planet 31. *Persoonia, 22*, 166–167.

Day, M. J., Hall, J. C., & Currah, R. S. (2012). Phialide arrangement and character evolution in the helotialean anamorph genera *Cadophora* and *Phialocephala*. *Mycologia, 104*(2), 371–381. https://doi.org/10.3852/11-050

Dayarathne, M. C., Maharachchikumbura, S. S. N., Jones, E. B. G., Dong, W., Devadatha, B., Yang, J., . . . Zhao, R. L. (2019). Phylogenetic revision of Savoryellaceae and evidence for its ranking as a subclass. *Frontiers in Microbiology, 10*(840). https://doi.org/10.3389/fmicb.2019.00840

de Bary, A. (1854). Ueber die Entwicklung und den Zusammenhang von *Aspergillus glaucus* und *Eurotium*. *Botan Zeitung*, *12*, 425–434, 441–451, 465–471.

de Beer, Z. W., Begerow, D., Bauer, R., Pegg, G. S., Crous, P. W., & Wingfield, M. J. (2006). Phylogeny of the Quambalariaceae fam. nov., including important *Eucalyptus* pathogens in South Africa and Australia. *Studies in Mycology, 55*, 289–298. https://doi.org/10.3114/sim.55.1.289

de Beer, Z. W., Duong, T. A., Barnes, I., Wingfield, B. D., & Wingfield, M. J. (2014). Redefining *Ceratocystis* and allied genera. *Studies in Mycology, 79*, 187–219. https://doi.org/10.1016/j.simyco.2014.10.001

de Beer, Z. W., Marincowitz, S., Duong, T. A., Kim, J.-J., Rodrigues, A., & Wingfield, M. J. (2016). *Hawksworthiomyces* gen. nov. (Ophiostomatales), illustrates the urgency for a decision on how to name novel taxa known only from environmental nucleic acid sequences (ENAS). *Fungal Biology, 120*(11), 1323–1340. https://doi.org/10.1016/j.funbio.2016.07.004

de Beer, Z. W., Marincowitz, S., Duong, T. A., & Wingfield, M. J. (2017). *Bretziella*, a new genus to accommodate the oak wilt fungus, *Ceratocystis fagacearum* (Microascales, Ascomycota). *Mycokeys, 27*, 1–19.

de Beer, Z. W., Seifert, K., & Wingfield, M. (2013). A nomenclator for ophiostomatoid genera and species in the Ophiostomatales and Microascales. *Ophiostomatoid fungi: Expanding frontiers. Utrecht, CBS-KNAW Fungal Biodiversity Centre. CBS Biodiversity Series, 12*, 261–268.

de Hoog, G. S. (1972). The genera *Beauveria*, *Isaria*, *Tritirachium* and *Acrodontium* gen. nov. *Studies in Mycology, 1*, 1–41.

de Hoog, G. S. (1974). The genera *Blastobotrys*, *Sporothrix*, *Calcarisporium* and *Calcarisporiella* gen. *Studies in Mycology, 7*, 1–119.

de Hoog, G. S. (1977). *Rhinocladiella* and allied genera. *Studies in Mycology, 15*, 1–140.

de Hoog, G. S. (1979). Nomenclatural notes on some black yeast-like hyphomycetes. *Taxon, 28*(4), 347–348. https://doi.org/10.2307/1219743

de Hoog, G. S. (1985). Taxonomy of the *Dactylaria*-complex, IV. *Dactylaria*, *Neta*, *Subulispora* and *Scolecobasidium*. *Studies in Mycology, 26*, 1–60.

de Hoog, G. S., Dukik, K., Monod, M., Packeu, A., Stubbe, D., Hendrickx, M., . . . Gräser, Y. (2017). Toward a novel multilocus phylogenetic taxonomy for the Dermatophytes. *Mycopathologia, 182*(1), 5–31. https://doi.org/10.1007/s11046-016-0073-9

de Hoog, G. S., Dukik, K., Monod, M., Packeu, A., Stubbe, D., Hendrickx, M., . . . Gräser, Y. (2018). Nomenclatural novelties. *Index Fungorum, 356*, 1–2.

de Hoog, G. S., Guarro, J., Gené, J., & Figueras, M. (2000). *Atlas of clinical fungi*. Centraalbureau voor Schimmelcultures (CBS).

de Hoog, G. S., & Hermanides-Nijhof, E. J. (1977). The black yeasts and allied Hyphomycetes. *Studies in Mycology, 15*, 1–222.

de Hoog, G. S., & Morgan-Jones, G. (1978). Notes on Hyphomycetes. XXIII. *Paraphaeoisaria alabamensis* gen. et sp. nov. *Mycotaxon, 7*(1), 133–138.

de Hoog, G. S., Nishikaku, A. S., Fernandez-Zeppenfeldt, G., Padín-González, C., Burger, E., Badali, H., . . . van den Ende, A. H. G. G. (2007). Molecular analysis and pathogenicity of the *Cladophialophora carrionii* complex, with the description of a novel species. *Studies in Mycology, 58*, 219–234. https://doi.org/10.3114/sim.2007.58.08

de Hoog, G. S., & Papendorf, M. (1976). The genus *Phaeoisaria*. *Persoonia-Molecular Phylogeny and Evolution of Fungi, 8*(4), 407–414.

de Hoog, G. S., Redhead, S. A., Feng, P. Y., Jiang, Y. P., Dukik, K., & Sigler, L. (2016). (2465-2466) Proposals to conserve *Blastomyces* Gilchrist & WR Stokes against *Blastomyces* Costantin & Rolland and Ajellomycetaceae against Paracoccidioidaceae (Ascomycota: Onygenales). *Taxon, 65*(5), 1167–1169. https://doi.org/10.12705/655.19

de Hoog, G. S., & Smith, M. T. (1981). *Hyphozyma*, a new genus of yeast-like Hyphomycetes. *Antonie Van Leeuwenhoek, 47*(4), 339–352. https://doi.org/10.1007/BF02350784

de Hoog, G. S., & Smith, M. T. (2004). Ribosomal gene phylogeny and species delimitation in *Geotrichum* and its teleomorphs. *Studies in Mycology, 50*, 489–515.

de Hoog, G. S., & van Oorschot, C. A. N. (1985). Taxonomy of the *Dactylaria* complex, VI. Key to the genera and checklist of epithets. *Studies in Mycology, 26*, 97–122.

de Hoog, G. S., van Oorschot, C. A. N., & Hijwegen, T. (1983). Taxonomy of the *Dactylaria* complex II: *Dissoconium* gen.nov. and *Cordana* Preuss. *Proceedings van de Koninklijke Nederlandse Akademie van Wetenschappen Section C, 86*(2), 197–206.

de Hoog, G. S., Vicente, V. A., Najafzadeh, M. J., Harrak, M. J., Badali, H., & Seyedmousavi, S. (2011). Waterborne *Exophiala* species causing disease in cold-blooded animals. *Persoonia, 27*, 46–72. https://doi.org/10.3767/003158511x614258

de Vries, G. A. (1962). *Cyphellophora laciniata* nov. gen., nov. sp. and *Dactylium fusarioides* Fragoso et Ciferri. *Mycopathologia et Mycologia Applicata, 16*(1), 47–54. https://doi.org/10.1007/BF02136180

Dean, R., Van Kan, J. A. L., Pretorius, Z. A., Hammond-Kosack, K. E., Di Pietro, A., Spanu, P. D., . . . Foster, G. D. (2012). The Top 10 fungal pathogens in molecular plant pathology. *Molecular Plant Pathology, 13*(4), 414–430. https://doi.org/10.1111/j.1364-3703.2011.00783.x

Decock, C., Rodriguez, G. D., & Seifert, K. (2005). Taxonomy and phylogeny of *Synchaetomella lunatospora*, a new genus and species of synnematous fungi from Southeast Asia. *Antonie Van Leeuwenhoek, 88*(3), 231–240. https://doi.org/10.1007/s10482-005-7210-7

Deighton, F. C. (1960). African fungi I. *Mycological Papers, 78*(28), 1–43.

Deighton, F. C. (1969a). Microfungi. IV: Some hyperparasitic hyphomycetes, and a note on *Cercosporella uredinophila* Sacc. *Mycological Papers, 118*(26), 1–41.

Deighton, F. C. (1969b). New genera and species and redispositions of some hyphomycetes, mainly African. *Mycological Papers, 117*(30), 8–31.

Deighton, F. C. (1973). Studies on *Cercospora* and allied genera. IV. *Cercosporella* Sacc., *Pseudocercosporella* gen. nov. and *Pseudocercosporidium* gen. nov. *Mycological Papers, 133*(5), 1–62.

Deighton, F. C. (1984). *Tretovularia*, a new hyphomycetous genus. *Transactions of the British Mycological Society, 82*(4), 743–745. https://doi.org/10.1016/S0007-1536(84)80122-9

Deighton, F. C., & Pirozynski, K. A. (1972). Microfungi. V. More hyperparasitic hyphomycetes. *Mycological Papers, 128*(17), 1–110.

Delgado, G., Mena-Portales, J., Gene, J., & Guarro, J. (2005). New species of *Cryptophialoidea* and *Hughesinia* (hyphomycetes, anamorphic fungi) from Cuba. *Fungal Diversity, 20*, 31–38.

Derx, H. G. (1948). Itersonilia nouveau genre de Sporobolomycètes à mycélium bouclé. *Bulletin du Jardin Botanique de Buitenzorg, Ser. II, 17*, 465–472.

Descals, C. E., Nawawi, A., & Webster, J. (1976). Developmental studies in *Actinospora* and three similar aquatic hyphomycetes. *Transactions of the British Mycological Society, 67*(2), 207–222. https://doi.org/10.1016/S0007-1536(76)80126-X

Descals, E., Marvanová, L., & Webster, J. (1998). New taxa and combinations of aquatic hyphomycetes. *Canadian Journal of Botany, 76*(9), 1647–1659. https://doi.org/10.1139/b98-111

Descals, E., & Webster, J. (1982). Taxonomic studies on aquatic hyphomycetes: III. Some new species and a new combination. *Transactions of the British Mycological Society, 78*(3), 405–437. https://doi.org/10.1016/S0007-1536(82)80149-6

Descals, E., & Webster, J. (1983). Four new staurosporous hyphomycetes from mountain streams. *Transactions of the British Mycological Society, 80*(1), 67–75. https://doi.org/10.1016/S0007-1536(83)80164-8

Desmazières, J. B. H. J. (1827). Observations sur le Sporendonema casei, nouveau genre des Mucédinées. Annales des Sciences Naturelles, Botanique,

Desmazières, J. B. H. J. (1834). Descriptions et figures de six hyphomycètes inédites à ajouter à la flore Française. *Annales des Sciences Naturelles Botanique, 2*, 69–72.

Devaux, A. L., & Sackston, W. E. (1966). Taxonomy of *Verticillium* species causing wilt of horticultural crops in Quebec. *Canadian Journal of Botany, 44*(6), 803–811. https://doi.org/10.1139/b66-094

Dhargalkar, S., & Bhat, D. J. (2009). *Echinosphaeria pteridis* sp. nov. and its *Vermiculariopsiella* anamorph. *Mycotaxon, 108*(1), 115–122.

Diane Te Strake, W., & Dawes, C. J. (1970). Revision of the systematic position of *Saprochaete saccharophila*. *Mycologia, 62*(4), 791–796. https://doi.org/10.2307/3757666

DiCosmo, F., Berch, S., & Kendrick, B. (1983). *Cylindrotrichum*, *Chaetopsis*, and two new genera of hyphomycetes, *Kylindria* and *Xenokylindria*. *Mycologia, 75*(6), 949–973. https://doi.org/10.2307/3792651

Diederich, P. (2002). *Kalchbrenneriella*, a new genus to accommodate the lichenicolous hyphomycete *Torula cyanescens*. *The Bryologist, 105*(3), 411–414.

Diederich, P., Ertz, D., Lawrey, J. D., Sikaroodi, M., & Untereiner, W. A. (2013). Molecular data place the hyphomycetous lichenicolous genus *Sclerococcum* close to *Dactylospora* (Eurotiomycetes) and *S. parmeliae* in *Cladophialophora* (Chaetothyriales). *Fungal Diversity, 58*(1), 61–72. https://doi.org/10.1007/s13225-012-0179-4

Diederich, P., Lawrey, J. D., & Ertz, D. (2018). The 2018 classification and checklist of lichenicolous fungi, with 2000 non-lichenized, obligately lichenicolous taxa. *The Bryologist, 121*(3), 340–425.

Diederich, P., Lawrey, J. D., Sikaroodi, M., van den Boom, P. P. G., & Ertz, D. (2012). *Briancoppinsia*, a new coelomycetous genus of Arthoniaceae (Arthoniales) for the lichenicolous *Phoma cytospora*, with a key to this and similar taxa. *Fungal Diversity, 52*(1), 1–12. https://doi.org/10.1007/s13225-011-0105-1

Dissanayake, A. J., Bhunjun, C. S., Maharachchikumbura, S. S. M., & Liu, J. K. (2020). Applied aspects of methods to infer phylogenetic relationships amongst fungi. *Mycosphere, 11*(1), 2652–2676. https://doi.org/10.5943/mycosphere/11/1/18

Dita, M., Barquero, M., Heck, D., Mizubuti, E. S. G., & Staver, C. P. (2018). *Fusarium* wilt of banana: Current knowledge on epidemiology and research needs toward sustainable disease management. *Frontiers in Plant Science, 9*(1468). https://doi.org/10.3389/fpls.2018.01468

Döbbeler, P., & Davison, P. G. (2018). Frullania as a hotspot for hypocrealean ascomycetes: Ten new species from Southeastern North America. *Nova Hedwigia, 106*(1-2), 209–256. https://doi.org/10.1127/nova_hedwigia/2017/0428

Dolenc-Voljč, M., & Gasparič, J. (2017). Human infections with *Microsporum gypseum* complex (*Nannizzia gypsea*) in Slovenia. *Mycopathologia, 182*(11), 1069–1075. https://doi.org/10.1007/s11046-017-0194-9

Drechsler, C. (1960). A clamp-bearing fungus using stalked adhesive young chlamydospores in capturing amoebae. *Sydowia, 14*, 246–257.

Drechsler, C. (1970). A nematode-destroying parasite bearing lageniform conidiiferous branches on endozoic hyphae. *Sydowia, 24*, 173–176.

Drechsler, C. (1975). A nematode-destroying hyphomycete forming parallel multiseptate hyaline conidia in circular arrangement. *American Journal of Botany, 62*(10), 1073–1077. https://doi.org/10.1002/j.1537-2197.1975.tb11772.x

Dubey, R., & Moonnambeth, N. A. (2014). *Sheathnema indicum* gen. et sp. nov. a new sooty mold fungus from northern Western Ghats, India. *Journal of Threatened Taxa, 6*(12), 6549–6555. https://doi.org/10.11609/JoTT.o3514.6549-55

Duong, L. M., McKenzie, E. H. C., Lumyong, S., & Hyde, K. D. (2008). Fungal succession on senescent leaves of *Castanopsis diversifolia* in Doi Suthep-Pui National Park, Thailand. *Fungal Diversity, 30*, 23–36.

Dyko, B. J. (1978). New aquatic and water-borne hyphomycetes from the Southern Appalachian Mountains of the United States. *Transactions of the British Mycological Society, 70*(3), 409–416. https://doi.org/10.1016/S0007-1536(78)80140-5

Dyko, B. J., & Sutton, B. C. (1979). Two new and unusual deuteromycetes. *Transactions of the British Mycological Society, 72*(3), 411–417. https://doi.org/10.1016/S0007-1536(79)80147-3

Dzieciol, R., Mirzwa-Mroz, E., Zielinska, E., Winska-Krysiak, M., Wakulinski, W., Dzieciol, R., . . . Wakulinski, W. (2014). *Valdensinia heterodoxa* Peyronel as a new pathogen of blueberry in Poland. *Plant Disease, 98*(5), 688–688. https://doi.org/10.1094/Pdis-06-13-0644-Pdn

Ellis, M. B. (1971). *Dematiaceous hyphomycetes*. Commonwealth Mycological Institute.

Ellis, M. B. (1976). *More dematiaceous hyphomycetes*. Commonwealth Mycological Institute.

Emmet Rixford, M. D., & Gilchrist, T. C. (1896). Two cases of protozoan (coccidioidal) infection of the skin and other organs. *Johns Hopkins Hospital Reports, 1*, 209–268.

Eriksson, O. E., & Winka, K. (1997). Supraordinal taxa of Ascomycota. *Myconet, 1*(1), 1–16.

Evans, H. C., Stalpers, J. A., Samson, R. A., & Benny, G. L. (1978). On the taxonomy of *Monilia roreri*, an important pathogen of *Theobroma cacao* in South America. *Canadian Journal of Botany, 56*(20), 2528–2532. https://doi.org/10.1139/b78-305

Fahleson, J., Hu, Q., & Dixelius, C. (2004). Phylogenetic analysis of *Verticillium* species based on nuclear and mitochondrial sequences. *Archives of Microbiology, 181*(6), 435–442. https://doi.org/10.1007/s00203-004-0677-1

Fayette, J., Hendricks, K. E., Ozores-Hampton, M., Di Gioia, F., & Roberts, P. D. (2016). First report of powdery mildew caused by *Oidiopsis haplophylli* on garden nasturtium (*Tropaeolum majus* l.) in Florida. *Plant Disease, 100*(3), 646–647. https://doi.org/10.1094/Pdis-06-15-0697-Pdn

Feng, P. Y., de Hoog, G. S., Najafzadeh, M. J., van den Ende, A. H. G. G., Stielow, J. B., Badali, H., . . . Vicente, V. A. (2014a). *Cladophialophora abundans*, a novel species of Chaetothyriales isolated from the natural environment. *Mycological Progress, 13*(2), 381–391. https://doi.org/10.1007/s11557-013-0924-4

Feng, P. Y., Lu, Q., Najafzadeh, M. J., van den Ende, A. H. G. G., Sun, J., Li, R., . . . de Hoog, G. S. (2014b). *Cyphellophora* and its relatives in *Phialophora*: Biodiversity and possible role in human infection. *Fungal Diversity, 65*(1), 17–45. https://doi.org/10.1007/s13225-012-0194-5

Fernández, F. A., & Huhndorf, S. M. (2005). New species of *Chaetosphaeria*, *Melanopsammella* and *Tainosphaeria* gen. nov from the Americas. *Fungal Diversity, 18*, 15–57.

Fernández, F. A., Lutzoni, F. M., & Huhndorf, S. M. (1999). Teleomorph-anamorph connections: The new pyrenomycetous genus *Carpoligna* and its *Pleurothecium* anamorph. *Mycologia, 91*(2), 251–262.

Fernández, F. A., Miller, A. N., Huhndorf, S. M., Lutzoni, F. M., & Zoller, S. (2006). Systematics of the genus *Chaetosphaeria* and its allied genera: Morphological and phylogenetic diversity in north temperate and neotropical taxa. *Mycologia, 98*(1), 121–130. https://doi.org/10.3852/mycologia.98.1.121

Fernando, L., & Gusmão, P. (2004). *Porobeltraniella* gen. nov. to accommodate two species of *Beltraniella*. *Mycologia, 96*(1), 150–153. https://doi.org/10.2307/3761996

Fisher, M. C., Koenig, G. L., White, T. J., & Taylor, J. W. (2002). Molecular and phenotypic description of *Coccidioides posadasii* sp nov., previously recognized as the non-California population of *Coccidioides immitis*. *Mycologia, 94*(1), 73–84. https://doi.org/10.2307/3761847

Fisher, P. J., Webster, J., & Kane, D. F. (1976). *Peyronelina glomerulata* from submerged substrata in Britain. *Transactions of the British Mycological Society, 67*(2), 351–354. https://doi.org/10.1016/S0007-1536(76)80148-9

Fiuza, P. O., Gusmão, L. F. P., & Castañeda-Ruiz, R. F. (2016). *Synchaetomella aquatica* sp. nov. from submerged leaves from Brazil. *Mycotaxon, 130*(4), 1135–1139.

Fiuza, P. O., Silva, C. R., Borges Santos, T. A., Raja, H., Castaneda-Ruiz, R. F., & Pascholati Gusmao, L. F. (2018). *Roselymyces*, a new asexual genus of the Xylariales (Ascomycota) from Brazil. *Sydowia, 70*, 59–65.

Flakus, A., Etayo, J., Miadlikowska, J., Lutzoni, F., Kukwa, M., Matura, N., & Rodriguez-Flakus, P. (2019). Biodiversity assessment of ascomycetes inhabiting *Lobariella* lichens in Andean cloud forests led to one new family, three new genera and 13 new species of lichenicolous fungi. *Plant and Fungal Systematics, 64*(2), 283–344. https://doi.org/10.2478/pfs-2019-0022

Franco, M., Bagagli, E., Scapolio, S., & Lacaz, C. D. S. (2000). A critical analysis of isolation of *Paracoccidioides brasiliensis* from soil. *Medical Mycology, 38*(3), 185–191. https://doi.org/10.1080/mmy.38.3.185.191

Frank, J., Crous, P. W., Groenewald, J. Z., Oertel, B., Hyde, K. D., Phengsintham, P., . . . Schroers, H. J. (2010). *Microcyclospora* and *Microcyclosporella*: Novel genera accommodating epiphytic fungi causing sooty blotch on apple. *Persoonia, 24*, 93–105. https://doi.org/10.3767/003158510x510560

Fraser, L. R. (1953). A new genus of the Plectascales. *Proceedings of the Linnean Society of New South Wales, 78*, 241–246.

Frisvad, J. C., Hubka, V., Ezekiel, C. N., Hong, S. B., Nováková, A., Chen, A. J., . . . Houbraken, J. (2019). Taxonomy of *Aspergillus* section *Flavi* and their production of aflatoxins, ochratoxins and other mycotoxins. *Studies in Mycology, 93*, 1–63. https://doi.org/10.1016/j.simyco.2018.06.001

Fuckel, L. (1869). *Symbolae Mycologicae*. Julius Niedner.

Fuckel, L. (1870). Symbolae Mycologicae. Beiträge zur Kenntniss der Rheinischen Pilze. *Jahrbücher des Nassauischen Vereins für Naturkunde, 23-24*, 1–459.

Funk, A. (1973). Some mycoparasites of western bark fungi. *Canadian Journal of Botany, 51*(9), 1643–1645. https://doi.org/10.1139/b73-209

Funk, A. (1982). *Vanterpoolia*, a new genus of sporodochial hyphomycetes. *Canadian Journal of Botany, 60*(6), 973–975. https://doi.org/10.1139/b82-122

Gams, W. (1974). *Tympanosporium parasiticum* gen. et sp. nov., a hyperparasitic hyphomycete on *Tubercularia vulgaris* with pleomorphic conidiogenesis. *Antonie Van Leeuwenhoek, 40*(3), 471–479. https://doi.org/10.1007/BF00399359

Gams, W. (1978). Connected and disconnected chains of phialoconidia and *Sagenomella* gen. nov. segregated from *Acremonium*. *Persoonia, 10*(1), 97–112.

Gams, W. (2000). *Phialophora* and some similar morphologically little-differentiated anamorphs of divergent ascomycetes. *Studies in Mycology, 45*, 187–199.

Gams, W., & Boekhout, T. (1985). Pigment localization in dematiaceous hyphomycetes and the segregation of *Pseudogliomastix* gen. nov. from *Acremonium*. *Proceedings of the Indian Academy of Sciences, 94*(2-3), 273–280. https://doi.org/10.1007/bf03053144

Gams, W., Fisher, P. J., & Webster, J. (1984). *Onychophora*, a new genus of phialidic hyphomycetes from dung. *Transactions of the British Mycological Society, 82*(1), 174–177. https://doi.org/10.1016/S0007-1536(84)80229-6

Gams, W., & Hawksworth, D. L. (1975). The identity of *Acrocylindrium oryzae* Sawada and a similar fungus causing sheath-rot of rice. *Kavaka, 3*, 57–61.

Gams, W., & Holubová-Jechová, V. (1976). *Chloridium* and some other dematiaceous hyphomycetes growing on decaying wood. *Studies in Mycology, 13*.

Gams, W., & McGinnis, M. R. (1983). *Phialemonium*, a new anamorph genus intermediate between *Phialophora* and *Acremonium*. *Mycologia, 75*(6), 977–987. https://doi.org/10.1080/00275514.1983.12023783

Gams, W., O'Donnell, K., Schroers, H. J., & Christensen, M. (1998). Generic classification of some more hyphomycetes with solitary conidia borne on phialides. *Canadian Journal of Botany, 76*(9), 1570–1583. https://doi.org/10.1139/b98-104

Gams, W., Seifert, K., & Morgan-Jones, G. A. (2009). New and validated hyphomycete taxa to resolve nomenclatural and taxonomic issues. *Mycotaxon, 110*(1), 89–108.

Gams, W., & Zare, R. (2001). A revision of *Verticillium* sect. *Prostrata*. III. Generic classification. *Nova Hedwigia, 72*(3-4), 329–337.

Gams, W., & Zare, R. (2002). New generic concepts in *Verticillium* sect. *Prostrata*. *Mycological Research, 106*, 130–131. https://doi.org/10.1017/S0953756202225824

Gams, W., Zare, R., & Summerbell, R. C. (2005). (1654) Proposal to conserve the generic name *Verticillium* (anamorphic Ascomycetes) with a conserved type. *Taxon, 54*(1), 179–179.

Gamundi, I. J., Arambarri, A. M., & Bucsinszky, A. M. (1979). Micoflora de la hojarasca de Nothofagus dombeyi, II. *Darwiniana, 22*(1/3), 189–216.

Gao, J. M., Xia, J. W., Ma, Y. R., Li, Z., & Zhang, X. G. (2015a). *Blastophragma chongqingense* sp. nov. and a new record of *Bahusutrabeeja angularis* from southern China. *Mycotaxon, 130*(3), 821–825.

Gao, L., Wei, Z. Y., Wang, B., Gleason, M. L., Sun, G. Y., & Zhang, R. (2015b). A new species of *Scleroramularia* associated with sooty blotch and flyspeck in Southern China. *Phytotaxa, 226*(3), 261–268.

Garcia, D., Stchigel, A. M., Cano, J., Calduch, M., Hawksworth, D. L., & Guarro, J. (2006). Molecular phylogeny of Coniochaetales. *Mycological Research, 110,* 1271–1289. https://doi.org/10.1016/j.mycres.2006.07.007

Garibaldi, A., Bertetti, D., Ortu, G., & Gullino, M. L. (2016). First report of *Volutella* blight caused by *Pseudonectria buxi* on Japanese Boxwood (*Buxus microphylla*) in Italy. *Plant Disease, 100*(7), 1499–1500. https://doi.org/10.1094/Pdis-09-15-1027-Pdn

Garibaldi, A., Gilardi, G., & Gullino, M. L. (2007). First report of *Verticillium* wilt caused by *Verticillium dahliae* on lettuce in Italy. *Plant Disease, 91*(6), 770–770. https://doi.org/10.1094/Pdis-91-6-0770c

Gat, T., Liarzi, O., Skovorodnikova, Y., & Ezra, D. (2012). Characterization of *Alternaria alternata* causing black spot disease of *Pomegranate* in Israel using a molecular marker. *Plant Disease, 96*(10), 1513–1518. https://doi.org/10.1094/Pdis-12-11-1041-Re

Geiser, D. M., Klich, M. A., Frisvad, J. C., Peterson, S. W., Varga, J., & Samson, R. A. (2007). The current status of species recognition and identification in *Aspergillus*. *Studies in Mycology, 59*, 1–10. https://doi.org/10.3114/sim.2007.59.01

Geiser, D. M., Taylor, J. W., Ritchie, K. B., & Smith, G. W. (1998). Cause of sea fan death in the West Indies. *Nature, 394*(6689), 137–138. https://doi.org/10.1038/28079

Geldenhuis, M. M., Roux, J., Montenegro, F., de Beer, Z. W., Wingfield, M. J., & Wingfield, B. A. (2004). Identification and pathogenicity of *Graphium* and *Pesotum* species from machete wounds on *Schizolobium parahybum* in Ecuador. *Fungal Diversity, 15*, 137–151.

Ghag, S. B., Shekhawat, U. K. S., & Ganapathi, T. R. (2015). *Fusarium* wilt of banana: Biology, epidemiology and management. *International Journal of Pest Management, 61*(3), 250–263. https://doi.org/10.1080/09670874.2015.1043972

Giesbrecht, M., McCarthy, M., Elliott, M. L., & Ong, K. L. (2013). First report of *Fusarium oxysporum* f. sp *palmarum* in Texas causing *Fusarium* wilt of *Washingtonia robusta*. *Plant Disease, 97*(11), 1511–1512. https://doi.org/10.1094/Pdis-05-13-0488-Pdn

Gilchrist, T. C., & Stokes , W. R. (1898). A case of pseudo-lupus vulgaris caused by a blastomyces. *Journal of Experimental Medicine, 3*(1), 53–78. https://doi.org/10.1084/jem.3.1.53

Gilgado, F., Gené, J., Cano, J., & Guarro, J. (2007). Reclassification of *Graphium tectonae* as *Parascedosporium tectonae* gen. nov., comb. nov., *Pseudallescheria africana* as *Petriellopsis africana* gen. nov., comb. nov. and *Pseudallescheria fimeti* as *Lophotrichus fimeti* comb. nov. *International Journal of Systematic and Evolutionary Microbiology, 57*(9), 2171–2178. https://doi.org/10.1099/ijs.0.64958-0

Giraldo, A., & Crous, P. W. (2019). Inside Plectosphaerellaceae. *Studies in Mycology, 92*, 227–286. https://doi.org/10.1016/j.simyco.2018.10.005

Giraldo, A., Gene, J., Cano, J., de Hoog, S., & Guarro, J. (2012). Two new species of *Acremonium* from Spanish soils. *Mycologia, 104*(6), 1456–1465. https://doi.org/10.3852/11-402

Giraldo, A., Gene, J., Sutton, D. A., Madrid, H., Cano, J., Crous, P. W., & Guarro, J. (2014). Phylogenetic circumscription of *Arthrographis* (Eremomycetaceae, Dothideomycetes). *Persoonia, 32*, 102–114. https://doi.org/10.3767/003158514x680207

Giraldo, A., Gene, J., Sutton, D. A., Madrid, H., de Hoog, G. S., Cano, J., . . . Guarro, J. (2015). Phylogeny of *Sarocladium* (Hypocreales). *Persoonia, 34*, 10–24. https://doi.org/10.3767/003158515x685364

Gjaerum, H. B. (1971). Notes on Norwegian fungi 7–9. *Norwegian Journal of Botany, 18*, 109–111.

Goh, T. K., & Hyde, K. D. (1996a). Biodiversity of freshwater fungi. *Journal of Industrial Microbiology, 17*(5), 328–345. https://doi.org/10.1007/bf01574764

Goh, T. K., & Hyde, K. D. (1996b). *Helicoon gigantisporum* sp nov, and an amended key to the genus. *Mycological Research, 100*, 1485–1488.

Goh, T. K., & Hyde, K. D. (1997a). A revision of *Dactylaria*, with description of *D. tunicata* sp. nov. from submerged wood in Australia. *Mycological Research, 101*, 1265–1272. https://doi.org/10.1017/S0953756297004000

Goh, T. K., & Hyde, K. D. (1997b). *Delortia palmicola* and two new species from wood submerged in a freshwater stream in Australia. *Mycological Research, 101*, 42–46. https://doi.org/10.1017/S0953756296002365

Goh, T. K., & Hyde, K. D. (1997c). The generic distinction between *Chaetopsina* and *Kionochaeta*, with descriptions of two new species. *Mycological Research, 101*, 1517–1523. https://doi.org/10.1017/S0953756297004292

Goh, T. K., & Hyde, K. D. (1998). *Polybulbophiale palmicola* gen. et sp. nov.(Hyphomycetes) from Brunei. *Mycotaxon., 69*, 145–151.

Goh, T. K., & Hyde, K. D. (1999). Fungi on submerged wood and bamboo in the Plover Cove Reservoir, Hong Kong. *Fungal Diversity, 3*, 57–85.

Goh, T. K., Hyde, K. D., & Ho, W. H. (1998a). *Aquaphila albicans* gen. et sp. nov., a hyphomycete from submerged wood in the tropics. *Mycological Research, 102*(5), 587–592. https://doi.org/10.1017/S0953756297005303

Goh, T. K., & Kuo, C. H. (2018). A new species of *Helicoön* from Taiwan. *Phytotaxa, 346*(2), 141–156.

Goh, T. K., Lau, W.-Y., & Teo, K.-C. (2014). *Paliphora curviapicis* sp. nov. from Malaysia, and a synopsis of the genus. *Mycotaxon, 127*(1), 145–153.

Goh, T. K., Tsui, K. M., & Hyde, K. D. (1998b). *Elegantimyces sporidesmiopsis* gen. et sp. nov. on submerged wood from Hong Kong. *Mycological Research, 102*(2), 239–242. https://doi.org/10.1017/S095375629700470X

Golmohammadi, M., Andrew, M., Peever, T. L., Peres, N. A., & Timmer, L. W. (2006). Brown spot of tangerine hybrid cultivars Minneola, Page and Fortune caused by *Alternaria alternata* in Iran. *Plant Pathology, 55*(4), 578–578. https://doi.org/10.1111/j.1365-3059.2006.01427.x

Gomes, A. A. M., Machado, A. R., Ferreira, A. P. S., Dutra, D. C., & Pereira, O. L. (2015). Postharvest fruit rot of tomato in brazil caused by *Fusarium boothii*. *Plant Disease, 99*(4), 555–556. https://doi.org/10.1094/Pdis-09-14-0903-Pdn

Gönczöl, J., & Révay, A. (1984). *Hydrometrospora*, a new genus of leaf-litter Hyphomycetes from Hungary. *Nova Hedwigia, 40*, 199–205.

Gönczöl, J., & Révay, A. (1985). *Gorgomyces*, gen. nov. an unusual Hyphomycete from terrestrial litter of Hungary. *Nova Hedwigia, 41*, 453–461.

González, C. D., & Chaverri, P. (2017). *Corinectria*, a new genus to accommodate *Neonectria fuckeliana* and *C. constricta* sp. nov. from *Pinus radiata* in Chile. *Mycological Progress, 16*(11), 1015–1027. https://doi.org/10.1007/s11557-017-1343-8

González, G. M., Rojas, O. C., González, J. G., Kang, Y., & de Hoog, G. S. (2013). Chromoblastomycosis caused by *Rhinocladiella aquaspersa*. *Medical Mycology Case Reports, 2*, 148–151. https://doi.org/10.1016/j.mmcr.2013.08.001

Goos, R. D. (1969). The genus *Pleurothecium*. *Mycologia, 61*(6), 1048–1053. https://doi.org/10.1080/00275514.1969.12018832

Goos, R. D., & Pirozynski, K. A. (1975). Fungi of Barro Colorado Island: New and interesting Hyphomycetes. *Canadian Journal of Botany, 53*(24), 2927–2932. https://doi.org/10.1139/b75-322

Gordillo, A., & Decock, C. (2018). *Myrothecium*-like (Ascomycota, Hypocreales) species from tropical areas: *Digitiseta* gen. nov and additions to *Inaequalispora* and *Parvothecium*. *Mycological Progress, 17*(1-2), 179–190. https://doi.org/10.1007/s11557-017-1302-4

Gräfenhan, T., Schroers, H. J., Nirenberg, H. I., & Seifert, K. A. (2011). An overview of the taxonomy, phylogeny, and typification of nectriaceous fungi in *Cosmospora*, *Acremonium*, *Fusarium*, *Stilbella*, and *Volutella*. *Studies in Mycology, 68*, 79–113. https://doi.org/10.3114/sim.2011.68.04

Graney, L., Elmer, W. H., & Loyd, A. L. (2017). First report of *Fusarium* wilt of yellowwood (*Cladrastis kentukea*) caused by *Fusarium oxysporum* in the United States. *Plant Disease, 101*(1), 258–258.

Granmo, A. (2002). A new species of *Hypoxylon* (Xylariaceae). *Sydowia, 54*(1), 44–52.

Gräser, Y., Fari, M. e., Presber, W., Sterry, W., & Tietz, H. J. (1998). Identification of common dermatophytes (*Trichophyton, Microsporum, Epidermophyton*) using polymerase chain reactions. *British Journal of Dermatology, 138*(4), 576–582. https://doi.org/10.1046/j.1365-2133.1998.02165.x

Greif, M. D., Gibas, C. F. C., & Currah, R. S. (2006). *Leptographium piriforme* sp nov., from a taxonomically diverse collection of arthropods collected in an aspen-dominated forest in western Canada. *Mycologia, 98*(5), 771–780. https://doi.org/10.3852/mycologia.98.5.771

Grove, W. B. (1916). New or noteworthy fungi. V. *Journal of Botany, British and Foreign, 54*, 217–223.

Grum-Grzhimaylo, A. A., Debets, A. J. M., van Diepeningen, A. D., Georgieva, M. L., & Bilanenko, E. N. (2013). *Sodiomyces alkalinus*, a new holomorphic alkaliphilic ascomycete within the Plectosphaerellaceae. *Persoonia, 31*, 147–158. https://doi.org/10.3767/003158513x673080

Grum-Grzhimaylo, A. A., Georgieva, M. L., Bondarenko, S. A., Alfons, J., Debets, M., & Bilanenko, E. N. (2016). On the diversity of fungi from soda soils. *Fungal Diversity, 76*(1), 27.

Guarro, J., Gené, J., de Vroey, C., & Guého, E. (1992). *Hormographiella*, a new genus of hypomycetes from clinical sources. *Mycotaxon, 45*, 179–190.

Guarro, J., Punsola, L., & Von Arx, J. A. (1986). *Hormographis ramirezii*, a new keratinophilic fungus from Spanish soils. *Mycologia, 78*(6), 969–971. https://doi.org/10.1080/00275514.1986.12025360

Guatimosim, E., Schwartsburd, P. B., Crous, P. W., & Barreto, R. W. (2016). Novel fungi from an ancient niche: Lachnoid and chalara-like fungi on ferns. *Mycological Progress, 15*(12), 1239–1267.

Gulis, V., Baschien, C., & Marvanova, L. (2012). Two new *Tricladium* species from streams in Alaska. *Mycologia*, *104*(6), 1510–1516. https://doi.org/10.3852/12-081

Gumowski, P., Lech, B., Chaves, I., & Girard, J. P. (1987). Chronic asthma and rhinitis due to *Candida albicans*, *Epidermophyton*, and *Trichophyton*. *Annals of Allergy, 59*(1), 48–51.

Gusmão, L. F., Grandi, R. A., & Milanez, A. I. (2000). A new species of *Beltraniopsis* from Brazil, with a key to the known species. *Mycological Research*, *104*(2), 251–253.

Gusmão, L. F., Leao-Ferreira, S. M., Marques, M. F. O., & de Almeida, D. A. C. (2008). New species and records of *Paliphora* from the Brazilian semi-arid region. *Mycologia, 100*(2), 306–309. https://doi.org/10.3852/mycologia.100.2.306

Guterres, D. C., dos Santos, M. d. D. M., Silva, R. A. F. d., Souza, E. S. d. C., Soares, W. R. O., Pinho, D. B., & Dianese, J. C. (2020). *Cladosterigma*: An enigmatic fungus, previously considered a basidiomycete, now revealed as an ascomycete member of the Gomphillaceae. *Mycologia, 112*(4), 829–846. https://doi.org/10.1080/00275514.2020.1781501

Gutiérrez, A. H., & Portales, J. M. (1996). A new helicosporous hyphomycete collected on Roystonea regia in Cuba. *Mycological Research, 100*(12), 1483–1484. https://doi.org/10.1016/S0953-7562(96)80082-7

Haase, G., Sonntag, L., Melzer-Krick, B., & de Hoog, G. S. (1999). Phylogenetic inference by SSU gene analysis of members of the Herpotrichiellaceae, with special reference to human pathogenic species. *Studies in Mycology, 43*, 80–97.

Hahn, R. C., Rodrigues, A. M., Fontes, C. J. F., Nery, A. F., Tadano, T., Queiroz, L. d. P., Jr., & de Camargo, Z. P. (2014). Fatal fungemia due to *Paracoccidioides lutzii*. *The American journal of tropical medicine and hygiene, 91*(2), 394–398. https://doi.org/10.4269/ajtmh.13-0482

Halfeld-Vieira, B. A., Ferreira, L. M. M., & Nechet, K. L. (2007). *Bombacopsis quinata*: A new host for *Oidiopsis haplophylli* in Brazil. *Plant Pathology, 56*(6), 1040–1040. https://doi.org/10.1111/j.1365-3059.2007.01639.x

Hall, T. A. (1999). BioEdit: A user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. *Nucleic Acids Symposium Series, 41*, 95–98.

Hanlin, R. T. (1987). *Beniowskia* and its synonym *Clathrotrichum*. *Mycotaxon, 28*, 219–231.

Hansford, C. G. (1943). Contributions towards the fungus flora of Uganda.-V. Fungi imperfecti. *Proceedings of the Linnean Society of London, 155*(1), 34–67. https://doi.org/10.1111/j.1095-8312.1943.tb00340.x

Harrington, T. C., Aghayeva, D. N., & Fraedrich, S. W. (2010). New combinations in *Raffaelea*, *Ambrosiella*, and *Hyalorhinocladiella*, and four new species from the redbay ambrosia beetle, *Xyleborus glabratus*. *Mycotaxon, 111*(1), 337–361.

Harrington, T. C., Mcnew, D., Mayers, C., Fraedrich, S. W., & Reed, S. E. (2014). *Ambrosiella roeperi* sp. nov. is the mycangial symbiont of the granulate ambrosia beetle, *Xylosandrus crassiusculus*. *Mycologia, 106*(4), 835–845. https://doi.org/10.3852/13-354

Harter, L. L. (1916). Sweet-Potato Scurf. *Journal of Agricultural Research, V*(17), 787–791.

Hashimoto, A., Sato, G., Matsuda, T., Matsumura, M., Hatakeyama, S., Harada, Y., . . . Tanaka, K. (2015). Taxonomic revision of *Pseudolachnea* and *Pseudolachnella* and establishment of *Neopseudolachnella* and *Pseudodinemasporium* gen. nov. *Mycologia, 107*(2), 383–408. https://doi.org/10.3852/14-171

Hausner, G., Reid, J., Eyjólfsdóttir, G. G., Iranpour, M., & Loewen, P. C. (2008). *Basidiopycnides albertensis* gen. et sp. nov., a new anamorphic fungus with phylogenetic affinities in the *Atractiellales (Basidiomycota). Mycotaxon, 103*, 279–297.

Hawksworth, D. L. (1977). Three new genera of lichenicolous fungi. *Botanical Journal of the Linnean Society, 75*(2), 195–209. https://doi.org/10.1111/j.1095-8339.1977.tb01484.x

Hawksworth, D. L. (1984). Two interesting lichenicolous Hyphomycetes from Austria. *Beihefte zur Nova Hedwigia*(79), 373–379.

Hawksworth, D. L. (1987). Observations on three algicolous microfungi. *Notes from the Royal Botanical Garden Edinburgh, 44*, 549–560.

Hawksworth, D. L. (2011). A new dawn for the naming of fungi: Impacts of decisions made in Melbourne in July 2011 on the future publication and regulation of fungal names. *IMA Fungus, 2*(2), 155–162. https://doi.org/10.5598/imafungus.2011.02.02.06

Hawksworth, D. L., & Boluda, C. G. (2020). The enigma of Link's *Sphaeria ericophila*: Nomenclature, taxonomy, molecular phylogeny, and implications for the placement of *Metacapnodium*. *Journal of Fungal Research, 18*(4), 235–245. https://doi.org/10.13341/j.jfr.2020.8005

Hawksworth, D. L., Coppins, B. J., & James, P. W. (1979). *Blarneya*, a lichenized hyphomycete from southern Ireland. *Botanical Journal of the Linnean Society, 79*(4), 357–367. https://doi.org/10.1111/j.1095-8339.1979.tb01823.x

He, F., Lin, B., Sun, J. Z., & Liu, X. Z. (2013). *Knufia aspidiotus* sp. nov., a new black yeast from scale insects. *Phytotaxa, 153*(1), 39–50.

He, M.-Q., Zhao, R.-L., Hyde, K. D., Begerow, D., Kemler, M., Yurkov, A., . . . Kirk, P. M. (2019). Notes, outline and divergence times of Basidiomycota. *Fungal Diversity, 99*(1), 105–367. https://doi.org/10.1007/s13225-019-00435-4

He, S.-Q., Wen, Z.-H., Wang, S.-R., Zhao, G.-Q., Wang, S.-X., Liu, Y.-G., . . . Liu, Y.-G. (2015). *Dactylobotrys graminicola*: A new phytopathogen causing sheath rot of hulless barley and oats. *Mycosystema, 34*(3), 331–340. https://doi.org/10.13346/j.mycosystema.140079

Healy, R., Pfister, D. H., Rossman, A. Y., Marvanova, L., & Hansen, K. (2016). Competing sexual-asexual generic names of Pezizomycetes and recommendations for use. *IMA Fungus, 7*(2), 285–288. https://doi.org/10.5598/imafungus.2016.07.02.08

Hedger, J. N., Samson, R. A., & Basuki, T. (1982). *Scytalidium indonesiacum*, a new thermophilous hyphomycete from Indonesia. *Transactions of the British Mycological Society, 78*(2), 364–366. https://doi.org/10.1016/S0007-1536(82)80024-7

Hektoen, L., & Perkins, C. F. (1900). Refractory subcutaneous abscesses caused by *Sporothrix schenckii*, a new pathogenic fungus. *The Journal of Experimental Medicine, 5*(1), 77–89. https://doi.org/10.1084/jem.5.1.77

Henderson, D. M. (1961). *Glomospora* and *Glomopsis*. *Notes from the Royal Botanical Garden Edinburgh, 23*, 497–502.

Hennebert, G. L. (1973). *Botrytis* and *Botrytis*-like genera. *Persoonia, 7*(2), 183–204.

Hennebert, G. L. (2020). *Chromelosporium* re-evaluated, with *Chromelosporiopsis* gen. nov. and *Geohypha* stat. nov. *Mycotaxon, 135*(3), 665–718.

Hennebert, G. L., & Decock, C. (2020). A comparison of anamorphs of some *Pachyphlodes* species and the type of *Chromelosporium*: Are they congeneric? *Mycotaxon, 135*(1), 167–182.

Hennings, P. (1896). Beiträge zur Pilzflora Südamerikas. II. *Hedwigia, 36*(36), 190–246.

Hennings, P. (1909). Fungi S. Paulensis IV a cl. Puttemans collecti. *Hedwigia, 48*, 1–20.

Heredia, G., Arias-Mota, R. M., Castaneda-Ruiz, R. F., & Gamboa-Angulo, M. (2012). New species of *Hughesinia* and *Stachybotryna* and new records of anamorphic fungi from the Yucatan Peninsula, Mexico. *Mycological Progress, 11*(4), 927–935. https://doi.org/10.1007/s11557-012-0808-z

Heredia, G., Arias, R. M., Reyes, M., & Castaneda-Ruiz, C. (2002). New anamorph fungi with rhombic conidia from Mexican tropical forest litter. *Fungal Diversity, 11*, 99–107.

Heredia, G., Li, D.-W., Wendt, L., Réblová, M., Arias, R. M., Gamboa-Angulo, M., . . . Castañeda-Ruíz, R. F. (2020). *Natonodosa speciosa* gen. et sp. nov. and rediscovery of *Poroisariopsis inornata*: Neotropical anamorphic fungi in Xylariales. *Mycological Progress, 19*(1), 15–30. https://doi.org/10.1007/s11557-019-01537-8

Heredia, G., Ruiz, R. F. C., Arias, R. M., Gamboa-Angulo, M., & De La Rosa, S. C. (2013). *Minteriella cenotigena* anam. gen. & sp nov from submerged plant material in Mexico. *Mycological Progress, 12*(2), 271–275. https://doi.org/10.1007/s11557-012-0831-0

Hernández-Restrepo, M., Bezerra, J. D. P., Tan, Y. P., Wiederhold, N., Crous, P. W., Guarro, J., . . . Gené, J. (2019). Re-evaluation of *Mycoleptodiscus* species and morphologically similar fungi. *Persoonia - Molecular Phylogeny and Evolution of Fungi, 42*(1), 205–227.

Hernández-Restrepo, M., Castañeda-Ruiz, R. F., Gené, J., Guarro, J., Minter, D. W., & Stadler, M. (2013). Microfungi from Portugal: *Minimelanolocus manifestus* sp. nov. and *Vermiculariopsiella pediculata* comb. nov. *Mycotaxon, 122*(1), 135–143.

Hernández-Restrepo, M., Gené, J., Castañeda-Ruiz, R. F., Mena-Portales, J., Crous, P. W., & Guarro, J. (2017). Phylogeny of saprobic microfungi from Southern Europe. *Studies in Mycology, 86*, 53–97. https://doi.org/10.1016/j.simyco.2017.05.002

Hernández-Restrepo, M., Giraldo, A., van Doorn, R., Wingfield, M. J., Groenewald, J. Z., Barreto, R. W., . . . Crous, P. W. (2020). The Genera of Fungi – G6: *Arthrographis*, *Kramasamuha*, *Melnikomyces*, *Thysanorea*, and *Verruconis*. *Fungal Systematics and Evolution, 6*. https://doi.org/10.3114/fuse.2020.06.01

Hernández-Restrepo, M., Groenewald, J. Z., & Crous, P. W. (2016a). Taxonomic and phylogenetic re-evaluation of *Microdochium*, *Monographella* and *Idriella*. *Persoonia - Molecular Phylogeny and Evolution of Fungi, 36*(1), 57–82.

Hernández-Restrepo, M., Groenewald, J. Z., Elliott, M. L., Canning, G., McMillan, V. E., & Crous, P. W. (2016b). Take-all or nothing. *Studies in Mycology, 83*, 19–48. https://doi.org/10.1016/j.simyco.2016.06.002

Hernández-Restrepo, M., Schumacher, R. K., Wingfield, M. J., Ahmad, I., Cai, L., Duong, T. A., . . . Jabeen, S. (2016c). Fungal Systematics and Evolution: FUSE 2. *Sydowia, 68*, 193–230.

Herrera, C. S., Rossman, A. Y., Samuels, G. J., & Chaverri, P. (2013a). *Pseudocosmospora*, a new genus to accommodate *Cosmospora vilior* and related species. *Mycologia, 105*(5), 1287–1305. https://doi.org/10.3852/12-395

Herrera, C. S., Rossman, A. Y., Samuels, G. J., Lechat, C., & Chaverri, P. (2013b). Revision of the genus *Corallomycetella* with *Corallonectria* gen. nov. for *C. jatrophae* (Nectriaceae, Hypocreales). *Mycosystema, 32*(3), 518–544.

Hesseltine, C. W. (1953). Study of trickling filter fungi. *Bulletin of the Torrey Botanical Club, 80*(6), 507–514. https://doi.org/10.2307/2481965

Hidayat, I., Harahap, I., & Rahayu, G. (2014). The first phylogenetic study of *Kiliophora* (Fungi, Anamorphic Xylariales). *Mycosphere, 5*(1), 78–84. https://doi.org/10.5943/mycosphere/5/1/3

Himelick, E. B. (1969). Tree and shrub hosts of *Verticillium albo-atrum*. *Biological notes; no. 066*.

Hirooka, Y., Kawaradani, M., & Sato, T. (2014). Description of *Gibellulopsis chrysanthemi* sp nov from leaves of garland chrysanthemum. *Mycological Progress, 13*(1), 13–19. https://doi.org/10.1007/s11557-012-0887-x

Hirooka, Y., Masuya, H., Akiba, M., & Kubono, T. (2013). *Sydowia japonica*, a new name for *Leptosphaerulina japonica* based on morphological and molecular data. *Mycological Progress, 12*(2), 173–183. https://doi.org/10.1007/s11557-012-0823-0

Hirooka, Y., Rossman, A. Y., Samuels, G. J., Lechat, C., & Chaverri, P. (2012). A monograph of *Allantonectria*, *Nectria*, and *Pleonectria* (Nectriaceae, Hypocreales, Ascomycota) and their pycnidial, sporodochial, and synnematous anamorphs. *Studies in Mycology, 71*, 1–210. https://doi.org/10.3114/sim0001

Hirooka, Y., Tanney, J. B., Nguyen, H. D. T., & Seifert, K. A. (2016). Xerotolerant fungi in house dust: Taxonomy of *Spiromastix*, *Pseudospiromastix* and *Sigleria* gen. nov in Spiromastigaceae (Onygenales, Eurotiomycetes). *Mycologia, 108*(1), 135–156. https://doi.org/10.3852/15-065

Hirose, D., Degawa, Y., Inaba, S., & Tokumasu, S. (2012). The anamorphic genus *Calcarisporiella* is a new member of the Mucoromycotina. *Mycoscience, 53*(4), 256–260. https://doi.org/10.1007/s10267-011-0160-1

Hladki, A. I., & Romero, A. I. (2009). Taxonomic and nomenclatural aspects of *Hypoxylon* taxa from southern South America proposed by Spegazzini. *Mycologia, 101*(5), 733–744. https://doi.org/10.3852/09-020

Ho, W. H., Yanna, Hyde, K. D., & Hodgkiss, I. J. (2002). Seasonality and sequential occurrence of fungi on wood submerged in Tai Po Kau Forest Stream, Hong Kong. *Fungal Diversity, 10*, 21–43.

Hodges, C. S., & Barr, M. E. (1971). A new species of *Pseudomassaria* and its *Beltraniella* conidial state. *Mycologia, 63*(3), 562–566. https://doi.org/10.2307/3757552

Hodges, C. S., & Ferreira, F. A. (1981). *Korunomyces*, a new genus of fungi imperfecti from Brazil. *Mycologia, 73*(2), 334–342. https://doi.org/10.1080/00275514.1981.12021349

Höhnel, F. v. (1912). Fragmente zur Mykologie (XIV. Mitteilung, Nr. 719 bis 792). *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Klasse., 121*, 339–424.

Höhnel, F. v. (1919a). Fünfte vorläufige Mitteilung mycologischer Ergebnisse (Nr. 399–500). *Berichte der Deutschen Botanischen Gesellschaft, 37*, 153–161.

Höhnel, F. v. (1919b). Mykologische fragmente. *Annales Mycologici, 17*, 114–133.

Holubová-Jechová, V., & Castañeda Ruiz, R. F. (1986). Studies on Hyphomycetes from Cuba III. New and interesting dematiaceous taxa from leaf litter. *Ceská Mykologie, 40*, 74–85.

Hongsanan, S., Hyde, K. D., Phookamsak, R., Wanasinghe, D. N., McKenzie, E. H. C., Sarma, V. V., . . . Xie, N. (2020a). Refined families of Dothideomycetes: Dothideomycetidae and Pleosporomycetidae. *Mycosphere, 11*(1), 1553–2107. https://doi.org/10.5943/mycosphere/11/1/13

Hongsanan, S., Hyde, K. D., Phookamsak, R., Wanasinghe, D. N., McKenzie, E. H. C., Sarma, V. V., . . . Xie, N. (2020b). Refined families of Dothideomycetes: Orders and families incertae sedis in Dothideomycetes. *Fungal Diversity, 105*(1), 17–318. https://doi.org/10.1007/s13225-020-00462-6

Hongsanan, S., Maharachchikumbura, S. S. N., Hyde, K. D., Samarakoon, M. C., Jeewon, R., Zhao, Q., . . . Bahkali, A. H. (2017). An updated phylogeny of Sordariomycetes based on phylogenetic and molecular clock evidence. *Fungal Diversity, 84*(1), 25–41. https://doi.org/10.1007/s13225-017-0384-2

Hosoya, T. (2002). Hyaloscyphaceae in Japan (6): The genus *Hyphodiscus* in Japan and its anamorph *Catenulifera* gen. nov. *Mycoscience, 43*(1), 47–57. https://doi.org/10.1007/s102670200008

Hosoya, T., & Otani, Y. (1995). *Gelatinipulvinella astraeicola* gen. et sp. nov., a fungicolous discomycete and its anamorph. *Mycologia, 87*(5), 689–696. https://doi.org/10.1080/00275514.1995.12026585

Hospenthal, D. R. (2015). Hyalohyphomycosis: Infection due to hyaline moulds. In D. R. Hospenthal & M. G. Rinaldi (Eds.), *Diagnosis and Treatment of Fungal Infections* (pp. 141–149). Springer International Publishing. https://doi.org/10.1007/978-3-319-13090-3_11

Houbraken, J., Due, M., Varga, J., Meijer, M., Frisvad, J. C., & Samson, R. A. (2007). Polyphasic taxonomy of *Aspergillus* section *Usti*. *Studies in Mycology, 59*, 107–128. https://doi.org/10.3114/sim.2007.59.12

Houbraken, J., Frisvad, J. C., & Samson, R. A. (2011). Taxonomy of *Penicillium* section *Citrina*. *Studies in Mycology, 70*, 53–138. https://doi.org/10.3114/sim.2011.70.02

Houbraken, J., Kocsubé, S., Visagie, C. M., Yilmaz, N., Wang, X. C., Meijer, M., . . . Frisvad, J. C. (2020). Classification of *Aspergillus*, *Penicillium*, *Talaromyces* and related genera (Eurotiales): An overview of families, genera, subgenera, sections, series and species. *Studies in Mycology, 95*, 5–169. https://doi.org/10.1016/j.simyco.2020.05.002

Houbraken, J., & Samson, R. A. (2011). Phylogeny of *Penicillium* and the segregation of Trichocomaceae into three families. *Studies in Mycology, 70*, 1–51. https://doi.org/10.3114/sim.2011.70.01

Houbraken, J., Spierenburg, H., & Frisvad, J. C. (2012). *Rasamsonia*, a new genus comprising thermotolerant and thermophilic *Talaromyces* and *Geosmithia* species. *Antonie Van Leeuwenhoek, 101*(2), 403–421. https://doi.org/10.1007/s10482-011-9647-1

Houbraken, J., Visagie, C. M., Meijer, M., Frisvad, J. C., Busby, P. E., Pitt, J. I., . . . Samson, R. A. (2014). A taxonomic and phylogenetic revision of *Penicillium* section *Aspergilloides*. *Studies in Mycology, 78*, 373–451. https://doi.org/10.1016/j.simyco.2014.09.002

Hsieh, H. M., & Ju, Y. M. (2002). *Penicilliopsis pseudocardyceps*, the holomorph of *Pseudocordyceps seminicola*, and notes on *Penicilliopsis clavariaeformis*. *Mycologia, 94*(3), 539–544. https://doi.org/10.2307/3761788

Hsieh, H. M., Ju, Y. M., & Rogers, J. D. (2005). Molecular phylogeny of *Hypoxylon* and closely related genera. *Mycologia, 97*(4), 844–865. https://doi.org/10.3852/mycologia.97.4.844

Hsieh, S.-Y., Goh, T.-K., & Kuo, C.-H. (2021). New species and records of *Helicosporium* sensu lato from Taiwan, with a reflection on current generic circumscription. *Mycological Progress, 20*(2), 169–190. https://doi.org/10.1007/s11557-020-01663-8

Huang, F., Fu, Y. S., Nie, D. N., Stewart, J. E., Peever, T. L., & Li, H. Y. (2015). Identification of a novel phylogenetic lineage of *Alternaria alternata* causing citrus brown spot in China. *Fungal Biology, 119*(5), 320–330. https://doi.org/10.1016/j.funbio.2014.09.006

Hudson, H. J., & Ingold, C. T. (1960). Aquatic hyphomycetes from Jamaica. *Transactions of the British Mycological Society, 43*(3), 469–IN461. https://doi.org/10.1016/S0007-1536(60)80029-0

Hudson, H. J., & Sutton, B. C. (1964). *Trisulcosporium* and *Tetranacrium*, two new genera of fungi imperfecti. *Transactions of the British Mycological Society, 47*(2), 197–203. https://doi.org/10.1016/S0007-1536(64)80053-X

Hughes, S. J. (1951). *Stachylidium, Gonytrichum, Mesobotrys, Chaetopsis* and *Chaetopsella*. *Transactions of the British Mycological Society, 34*(4), 551–576. https://doi.org/10.1016/S0007-1536(51)80041-X

Hughes, S. J. (1952). Fungi from the Gold Coast. I. *Mycological Papers, 48*, 1–91.

Hughes, S. J. (1953). Conidiophores, conidia, and classification. *Canadian Journal of Botany, 31*(5), 577–659. https://doi.org/10.1139/b53-046

Hughes, S. J. (1968). Some Gymnoascaceae. *Canadian Journal of Botany, 46*(7), 939–943. https://doi.org/10.1139/b68-122

Hughes, S. J. (1978). New Zealand fungi 25. *Miscellaneous* species. *New Zealand Journal of Botany, 16*(3), 311–370.

Hughes, S. J., & Kendrick, W. B. (1965). New Zealand Fungi 4. *Zanclospora* gen. nov. *New Zealand Journal of Botany, 3*(2), 151–158. https://doi.org/10.1080/0028825X.1965.10876991

Hughes, S. J., & Kendrick, W. B. (1968). New Zealand Fungi 12. *Menispora*, *Codinaea*, *Menisporopsis*. *New Zealand Journal of Botany, 6*(3), 323–375. https://doi.org/10.1080/0028825X.1968.10428818

Hughes, S. J., & Nag Raj, T. (1973). New Zealand fungi: 20. *Fusichalara* gen. nov. *New Zealand Journal of Botany, 11*(4), 661–671.

Huhndorf, S. M., Miller, A. N., & Fernandez, F. A. (2004). Molecular systematics of the Sordariales: The order and the family Lasiosphaeriaceae redefined. *Mycologia, 96*(2), 368–387. https://doi.org/10.2307/3762068

Hujslova, M., Kubatova, A., Kostovcik, M., Blanchette, R. A., de Beer, Z. W., Chudickova, M., . . . Kolarik, M. (2014). Three new genera of fungi from extremely acidic soils. *Mycological Progress, 13*(3), 819–831. https://doi.org/10.1007/s11557-014-0965-3

Hujslova, M., Kubatova, A., Kostovcik, M., & Kolarik, M. (2013). *Acidiella bohemica* gen. et sp nov and *Acidomyces* spp. (Teratosphaeriaceae), the indigenous inhabitants of extremely acidic soils in Europe. *Fungal Diversity, 58*(1), 33–45. https://doi.org/10.1007/s13225-012-0176-7

Humphries, Z., Seifert, K. A., Hirooka, Y., & Visagie, C. M. (2017). A new family and genus in Dothideales for *Aureobasidium*-like species isolated from house dust. *IMA Fungus*, *8*(2), 299–315.

Hutchison, L. J., Untereiner, W. A., & Hiratsuka, Y. (1995). *Knufia cryptophialidica* gen. et sp. nov., a dematiaceous hyphomycete isolated from black galls of trembling aspen (*Populus tremuloides*). *Mycologia, 87*(6), 902–908. https://doi.org/10.1080/00275514.1995.12026613

Hyde, K. D., Al-Hatmi, A. M. S., Andersen, B., Boekhout, T., Buzina, W., Dawson, T. L., . . . Tsui, C. K. M. (2018). The world's ten most feared fungi. *Fungal Diversity, 93*(1), 161–194. https://doi.org/10.1007/s13225-018-0413-9

Hyde, K. D., & Goh, T. K. (1998). Fungi on submerged wood in Lake Barrine, north Queensland, Australia. *Mycological Research, 102*, 739–749. https://doi.org/10.1017/S0953756297005868

Hyde, K. D., Goh, T. K., & Steinke, T. D. (1998). Fungi on submerged wood in the Palmiet river, Durban, South Africa. *South African Journal of Botany, 64*(3), 151–162.

Hyde, K. D., Maharachchikumbura, S. S. N., Hongsanan, S., Samarakoon, M. C., Lücking, R., Pem, D., . . . Elgorban, A. M. (2017a). The ranking of fungi: A tribute to David L. Hawksworth on his 70th birthday. *Fungal Diversity, 84*(1), 1–23. https://doi.org/10.1007/s13225-017-0383-3

Hyde, K. D., McKenzie, E. H. C., & Koko, T. W. (2011). Towards incorporating anamorphic fungi in a natural classification - checklist and notes for 2010. *Mycosphere, 2*(1), 1–88.

Hyde, K. D., Norphanphoun, C., Abreu, V. P., Bazzicalupo, A., Thilini Chethana, K. W., Clericuzio, M., . . . Mortimer, P. E. (2017b). Fungal diversity notes 603–708: Taxonomic and phylogenetic notes on genera and species. *Fungal Diversity, 87*(1), 1–235. https://doi.org/10.1007/s13225-017-0391-3

Hyde, K. D., Norphanphoun, C., Maharachchikumbura, S. S. N., Bhat, D. J., Jones, E. B. G., Bundhun, D., . . . Xiang, M. M. (2020). Refined families of Sordariomycetes. *Mycosphere, 11*(1), 305–1059. https://doi.org/10.5943/mycosphere/11/1/7

Hyde, K. D., & Seifert, K. A. (1992). Tropical Australian freshwater fungi. III. *Candelosynnema ranunculosporum*, a new genus and species of synnematous hyphomycetes. *Australian Systematic Botany, 5*(4), 401–406. https://doi.org/10.1071/sb9920401

Hyde, K. D., Tennakoon, D. S., Jeewon, R., Bhat, D. J., Maharachchikumbura, S. S. N., Rossi, W., . . . Doilom, M. (2019). Fungal diversity notes 1036–1150: Taxonomic and phylogenetic contributions on genera and species of fungal taxa. *Fungal Diversity, 96*(1), 1–242. https://doi.org/10.1007/s13225-019-00429-2

Inderbitzin, P., Bostock, R. M., Davis, R. M., Usami, T., Platt, H. W., & Subbarao, K. V. (2011). Phylogenetics and taxonomy of the fungal vascular wilt pathogen *Verticillium*, with the descriptions of five new species. *PloS One, 6*(12), e28341. https://doi.org/10.1371/journal.pone.0028341

Inderbitzin, P., Davis, R. M., Bostock, R. M., & Subbarao, K. V. (2013). Identification and differentiation of *Verticillium* species and *V. longisporum* lineages by simplex and multiplex PCR assays. *PloS One, 8*(6), e65990. https://doi.org/10.1371/journal.pone.0065990

Index Fungorum. (2017). http://www.indexfungorum.org/names/Names.asp

Index Fungorum. (2019). http://www.indexfungorum.org/names/Names.asp

Ingold, C. T. (1942). Aquatic hyphomycetes of decaying alder leaves. *Transactions of the British Mycological Society, XXV*(IV), 339–417. https://doi.org/10.1016/S0007-1536(42)80001-7

Ingold, C. T. (1943a). Further observations on aquatic hyphomycetes of decaying leaves. *Transactions of the British Mycological Society, 26*(3), 104–IN102. https://doi.org/10.1016/S0007-1536(43)80015-2

Ingold, C. T. (1943b). *Triscelophorus monosporus* n. gen., n. sp., an aquatic hyphomycete. *Transactions of the British Mycological Society, 26*(3), 148–IN144. https://doi.org/10.1016/S0007-1536(43)80021-8

Ingold, C. T. (1959). *Polycladium equiseti* gen.nov., sp.nov.: An aquatic hyphomycete on *Equisetum fluviatile*. *Transactions of the British Mycological Society, 42*(1), 112–114. https://doi.org/10.1016/S0007-1536(59)80075-9

Ingold, C. T. (1987). Features of ballistospore germination in Itersonilia. *Transactions of the British Mycological Society, 89*(4), 575–578. https://doi.org/10.1016/S0007-1536(87)80093-1

Iqbal, S. H. (1974). *Pseudoanguillospora*, a new genus of hyphomycetes. *Biologia (Lahore, Pakistan), 20*, 11–16.

Ito, T., Okane, I., Nakagiri, A., & Gams, W. (2000). Two species of *Acremonium* section *Acremonium*: *A. borodinense* sp nov and *A. cavaraeanum* rediscovered. *Mycological Research, 104*, 77–80. https://doi.org/10.1017/S0953756299008977

Jacobs, A., Coetzee, M. P. A., Wingfield, B. D., Jacobs, K., & Wingfield, M. J. (2003a). Phylogenetic relationships among *Phialocephala* species and other ascomycetes. *Mycologia, 95*(4), 637–645. https://doi.org/10.2307/3761940

Jacobs, K., Holtzman, K., & Seifert, K. A. (2005). Morphology, phylogeny and biology of *Gliocephalis hyalina*, a biotrophic contact mycoparasite of *Fusarium* species. *Mycologia, 97*(1), 111–120. https://doi.org/10.3852/mycologia.97.1.111

Jacobs, K., Kirisits, T., & Wingfield, M. J. (2003b). Taxonomic re-evaluation of three related species of *Graphium*, based on morphology, ecology and phylogeny. *Mycologia, 95*(4), 714–727. https://doi.org/10.2307/3761947

Jacobs, K., Wingfield, M. J., Coetsee, C., Kirisits, T., & Wingfield, B. D. (2001a). *Leptographium guttulatum* sp nov., a new species from spruce and pine in Europe. *Mycologia, 93*(2), 380–388. https://doi.org/10.2307/3761659

Jacobs, K., Wingfield, M. J., Jacobs, A., & Wingfield, B. D. (2001b). A taxonomic re-evaluation of *Phialocephala phycomyces*. *Canadian Journal of Botany, 79*(1), 110–117. https://doi.org/10.1139/b00-137

Jaklitsch, W. M., Gardiennet, A., & Voglmayr, H. (2016). Resolution of morphology-based taxonomic delusions: *Acrocordiella*, *Basiseptospora*, *Blogiascospora*, *Clypeosphaeria*, *Hymenopleella*, *Lepteutypa*, *Pseudapiospora*, *Requienella*, *Seiridium* and *Strickeria*. *Persoonia, 37*(1), 82–105.

Jaklitsch, W. M., Réblová, M., & Voglmayr, H. (2013a). Molecular systematics of *Woswasia atropurpurea* gen. et sp. nov. (Sordariomycetidae), a fungicolous ascomycete with globose ascospores and holoblastic conidiogenesis. *Mycologia, 105*(2), 476–485. https://doi.org/10.3852/12-244

Jaklitsch, W. M., Samuels, G. J., Dodd, S. L., Lu, B.-S., & Druzhinina, I. S. (2006). *Hypocrea rufa*/*Trichoderma viride*: A reassessment, and description of five closely related species with and without warted conidia. *Studies in Mycology, 56*, 135–177. https://doi.org/10.3114/sim.2006.56.04

Jaklitsch, W. M., Samuels, G. J., Ismaiel, A., & Voglmayr, H. (2013b). Disentangling the *Trichoderma viridescens* complex. *Persoonia, 31*, 112–146. https://doi.org/10.3767/003158513x672234

Jaklitsch, W. M., & Voglmayr, H. (2012). Phylogenetic relationships of five genera of Xylariales and *Rosasphaeria* gen. nov (Hypocreales). *Fungal Diversity, 52*(1), 75–98. https://doi.org/10.1007/s13225-011-0104-2

Jaklitsch, W. M., & Voglmayr, H. (2015). Biodiversity of *Trichoderma* (Hypocreaceae) in Southern Europe and Macaronesia. *Studies in Mycology, 80*, 1–87. https://doi.org/10.1016/j.simyco.2014.11.001

James, T. Y., Kauff, F., Schoch, C. L., Matheny, P. B., Hofstetter, V., Cox, C. J., . . . Vilgalys, R. (2006). Reconstructing the early evolution of Fungi using a six-gene phylogeny. *Nature, 443*(7113), 818–822. https://doi.org/10.1038/nature05110

Jayasiri, S. C., Hyde, K. D., Ariyawansa, H. A., Bhat, J., Buyck, B., Cai, L., . . . Promputtha, I. (2015). The Faces of Fungi database: Fungal names linked with morphology, phylogeny and human impacts. *Fungal Diversity, 74*, 3–18. https://doi.org/10.1007/s13225-015-0351-8

Jayawardena, R. S., Hyde, K. D., McKenzie, E. H. C., Jeewon, R., Phillips, A. J. L., Perera, R. H., . . . Wang, Y. (2019). One stop shop III: Taxonomic update with molecular phylogeny for important phytopathogenic genera: 51–75 (2019). *Fungal Diversity, 98*(1), 77–160. https://doi.org/10.1007/s13225-019-00433-6

Jeewon, R., Yeung, S. Y. Q., & Hyde, K. D. (2009). A novel phylogenetic group within *Thozetella* (Chaetosphaeriaceae): A new taxon based on morphology and DNA sequence analyses. *Canadian Journal of Microbiology, 55*(6), 680–687. https://doi.org/10.1139/W08-148

Jiang, N., Yang, Q., Liang, Y.-M., & Tian, C.-M. (2019). Taxonomy of two synnematal fungal species from *Rhus chinensis*, with *Flavignomonia* gen. nov. described. *Mycokeys*, *60*, 17–29. https://doi.org/10.3897/mycokeys.60.46395

Jiang, Y.-L., Wu, Y.-M., Zhang, Z.-G., Kong, J.-H., Wang, H.-F., & Zhang, T.-Y. (2017). *Drechslera*, *Fusariella*, *Coniochaeta* & *Pyricularia* spp. nov. from soil in China. *Mycotaxon, 132*(3), 627–633.

Jiang, Y., Dukik, K., Muñoz, J. F., Sigler, L., Schwartz, I. S., Govender, N. P., . . . de Hoog, S. (2018). Phylogeny, ecology and taxonomy of systemic pathogens and their relatives in Ajellomycetaceae (Onygenales): *Blastomyces, Emergomyces, Emmonsia, Emmonsiellopsis*. *Fungal Diversity, 90*(1), 245–291. https://doi.org/10.1007/s13225-018-0403-y

Jiang, Y., Tsui, C. K. M., Ahmed, S. A., Hagen, F., Shang, Z., Gerrits van den Ende, A. H. G., . . . de Hoog, G. S. (2020). Intraspecific diversity and taxonomy of *Emmonsia crescens*. *Mycopathologia, 185*(4), 613–627. https://doi.org/10.1007/s11046-020-00475-4

Johnson, R. H., & Heidari, A. (2015). Coccidioidomycosis. In D. R. Hospenthal & M. G. Rinaldi (Eds.), *Diagnosis and Treatment of Fungal Infections* (pp. 205–216). Springer International Publishing. https://doi.org/10.1007/978-3-319-13090-3_17

Johnston, P. R. (1999). Some hyperparasites of Meliolinain New Zealand. *New Zealand Journal of Botany, 37*(2), 289–295. https://doi.org/10.1080/0028825x.1999.9512635

Johnston, P. R., & Baschien, C. (2020). Tricladiaceae fam. nov. (Helotiales, Leotiomycetes). *Fungal Syst Evol, 6*, 233–242. https://doi.org/10.3114/fuse.2020.06.10

Johnston, P. R., Quijada, L., Smith, C. A., Baral, H.-O., Hosoya, T., Baschien, C., . . . Townsend, J. P. (2019). A multigene phylogeny toward a new phylogenetic classification of Leotiomycetes. *IMA Fungus, 10*(1), 1. https://doi.org/10.1186/s43008-019-0002-x

Johnston, P. R., Rogers, J. D., Park, D., & Martin, N. A. (2016). *Entalbostroma erumpens* gen. et sp. nov. (Xylariaceae) from *Phormium* in New Zealand. *Mycotaxon, 131*(4), 765–771.

Johnston, P. R., Seifert, K. A., Stone, J. K., Rossman, A. Y., & Marvanova, L. (2014). Recommendations on generic names competing for use in Leotiomycetes (Ascomycota). *IMA Fungus, 5*(1), 91–120. https://doi.org/10.5598/imafungus.2014.05.01.11

Jones, E. B. G., Suetrong, S., Cheng, W. H., Rungjindamai, N., Sakayaroj, J., Boonyuen, N., . . . Pang, K. L. (2014). An additional fungal lineage in the Hypocreomycetidae (*Falcocladium* species) and the taxonomic re-evaluation of *Chaetosphaeria chaetosa* and *Swampomyces* species, based on morphology, ecology and phylogeny. *Cryptogamie Mycologie*, *35*(2), 119–138. https://doi.org/10.7872/crym.v35.iss2.2014.119

Jones, E. B. G., Zuccaro, A., Mitchell, J., Nakagiri, A., Chatmala, I., & Pang, K.-L. (2009). Phylogenetic position of freshwater and marine *Sigmoidea* species: Introducing a marine hyphomycete *Halosigmoidea* gen. nov. (Halosphaeriales). *Botanica Marina, 52*(4), 349–359. https://doi.org/10.1515/BOT.2009.006

Jones, E. E., Brown, D. S., Bleach, C. M., Pathrose, B., Barclay, C., Jaspers, M. V., & Ridgway, H. J. (2012). First report of *Cylindrocladiella parva* as a grapevine pathogen in New Zealand. *Plant Disease*, *96*(1), 144–144.

Jones, K. G., Dowd, P. F., & Blackwell, M. (1999). Polyphyletic origins of yeast-like endocytobionts from anobiid and cerambycid beetles. *Mycological Research, 103*(5), 542–546.

Jorgensen, M., & Gunnerbeck, E. (1977). Nomenclature of *Penicillium*. *Taxon, 26* (5-6), 581–582.

Jülich, W. (1984). Notes on *Subulicystidium longisporum* (Pat.) Parm. *International Journal of Mycology and Lichenology, 1*, 281–282.

Jurjevic, Z., Peterson, S. W., & Horn, B. W. (2012a). *Aspergillus* section *Versicolores*: Nine new species and multilocus DNA sequence based phylogeny. *IMA Fungus, 3*(1), 59–+. https://doi.org/10.5598/imafungus.2012.03.01.07

Jurjevic, Z., Peterson, S. W., Stea, G., Solfrizzo, M., Varga, J., Hubka, V., & Perrone, G. (2012b). Two novel species of *Aspergillus* section *Nigri* from indoor air. *IMA Fungus, 3*(2), 159–173. https://doi.org/10.5598/imafungus.2012.03.02.08

Kaida, K., Fudou, R., Kameyama, T., Tubaki, K., Suzuki, Y., Ojika, M., & Sakagami, Y. (2001). New cyclic depsipeptide antibiotics, Clavariopsins A and B, produced by an aquatic hyphomycetes, *Clavariopsis aquatica* I. Taxonomy, Fermentation, Isolation, And Biological Properties. *The Journal of Antibiotics, 54*(1), 17–21.

Kajale, S. C., Sonawane, M. S., Sharma, R., & Shouche, Y. S. (2015). *Leptoxyphium kurandae* - New record of insect gut associated sooty mould fungus from India. *Mycosphere, 6*(2), 133–138. https://doi.org/10.5943/mycosphere/6/2/2

Karsten, P. A. (1887). Symbolae ad mycologiam Fennicam. Pars XX. *Meddelanden af Societas pro Fauna et Flora Fennica, 14*, 95–102.

Katoh, K., & Standley, D. M. (2016). A simple method to control over-alignment in the MAFFT multiple sequence alignment program. *Bioinformatics, 32*(13), 1933–1942. https://doi.org/10.1093/bioinformatics/btw108

Katz, B. (1980). *Arualis carolinensis Katz*, gen. et sp. nov. *Mycotaxon, 11*(1), 230–232.

Kauffman, C. A. (2015). Sporotrichosis. In D. R. Hospenthal & M. G. Rinaldi (Eds.), *Diagnosis and Treatment of Fungal Infections* (pp. 237–244). Springer International Publishing. https://doi.org/10.1007/978-3-319-13090-3_20

Kavanagh, K. (2018). *Fungi: Biology and applications* (3th ed.). John Wiley & Sons.

Kawila, R., Chaiwarith, R., & Supparatpinyo, K. (2013). Clinical and laboratory characteristics of penicilliosis marneffei among patients with and without HIV infection in Northern Thailand: A retrospective study. *BMC Infectious Diseases, 13*, 464–464. https://doi.org/10.1186/1471-2334-13-464

Kegel, W. (1906). *Varicosporium elodeae*, ein Wasserpilz mit auffallender Konidienbildung. *Berichte der Deutschen Botanischen Gesellschaft, 24*, 213–216.

Kendrick, W. B. (1958). *Sympodiella*, a new hyphomycete genus. *Transactions of the British Mycological Society, 41*(4), 519–521. https://doi.org/10.1016/S0007-1536(58)80077-7

Kendrick, W. B. (1961). The *Leptographium* complex. *Phialocephala* gen. nov. *Canadian Journal of Botany, 39*(5), 1079–1085. https://doi.org/10.1139/b61-094

Kendrick, W. B. (1971). *Taxonomy of fungi imperfecti. Proc 1st Int Specialists' Workshop-Conf, Kananaskis, Alberta, Canada*. University of Toronto Press.

Kendrick, W. B., & Cole, G. T. (1969). Conidium ontogeny in hyphomycetes. *Trichothecium roseum* and its meristem arthrospores. *Canadian Journal of Botany, 47*(2), 345–350. https://doi.org/10.1139/b69-047

Kepler, R. M., Luangsa-Ard, J. J., Hywel-Jones, N. L., Quandt, C. A., Sung, G.-H., Rehner, S. A., . . . Shrestha, B. (2017). A phylogenetically-based nomenclature for Cordycipitaceae (Hypocreales). *IMA Fungus, 8*(2), 335–353.

Kim, S., Harrington, T. C., Lee, J. C., & Seybold, S. J. (2011). *Leptographium tereforme* sp. nov. and other Ophiostomatales isolated from the root-feeding bark beetle *Hylurgus ligniperda* in California. *Mycologia, 103*(1), 152–163. https://doi.org/10.3852/10-096

Kirk, P. M. (1981). New or interesting microfungi II. Dematiaceous hyphomycetes from Esher Common, Surrey. *Transactions of the British Mycological Society, 77*(2), 279–297. https://doi.org/10.1016/S0007-1536(81)80031-9

Kirk, P. M. (1982). New or interesting microfungi IV. Dematiaceous hyphomycetes from Devon. *Transactions of the British Mycological Society, 78*(1), 55–74.

Kirk, P. M. (1983). New or interesting microfungi. X. Hyphomycetes on *Laurus nobilis* leaf litter. *Mycotaxon, 18*(2), 259–298.

Kirk, P. M., Cannon, P. F., Minter, D. W., & Stalpers, J. A. (2008). *Ainsworth & Bisby's dictionary of the fungi* (10th ed.). CABI.

Kirk, P. M., & Sutton, B. C. (1985). A reassessment of the anamorph genus *Chaetopsina* (Hyphomycetes). *Transactions of the British Mycological Society, 85*(4), 709–717. https://doi.org/10.1016/S0007-1536(85)80267-9

Kirschner, R. (2009). *Cercosporella* and *Ramularia*. *Mycologia, 101*(1), 110–119. https://doi.org/10.3852/07-038

Kirschner, R., Bauer, R., & Oberwinkler, F. (2001). *Colacosiphon*: A new genus described for a mycoparasitic fungus. *Mycologia, 93*(4), 634–644. https://doi.org/10.1080/00275514.2001.12063195

Kirschner, R., Braun, U., Chen, Z. C., & Oberwinkler, F. (2002). *Pleurovularia*, a new genus of hyphomycetes proposed for a parasite on leaves of *Microstegium* sp. (Poaceae). *Mycoscience, 43*(1), 15–20. https://doi.org/10.1007/s102670200003

Kirschner, R., & Chen, C.-J. (2004). *Helicomyxa everhartioides*, a new helicosporous sporodochial hyphomycete from Taiwan with relationships to the *Hyaloriaceae* (*Auriculariales, Basidiomycota*). *Studies in Mycology, 50*, 337–342.

Kirschner, R., & Chen, C. J. (2008). The *Ovulariopsis* anamorph of *Phyllactinia bauhiniae* var. *cassiae*: First record outside India and morphological characterization. *Sydowia, 60*(1), 57–67.

Kirschner, R., & Liu, L. C. (2014). Mycosphaerellaceous fungi and new species of *Venustosynnema* and *Zasmidium* on ferns and fern allies in Taiwan. *Phytotaxa, 176*(1), 309–323.

Kirschner, R., & Oberwinkler, F. (1999a). A new basidiomycetous anamorph genus with cruciform conidia. *Mycoscience, 40*(4), 345–348. https://doi.org/10.1007/bf02463878

Kirschner, R., & Oberwinkler, F. (1999b). *Cylindrocarpostylus*, a new genus based on a hyphomycete rediscovered from bark beetle galleries. *Mycological Research, 103*, 1152–1156. https://doi.org/10.1017/S0953756299008631

Kirschner, R., & Piepenbring, M. (2006). A new hyphomycete genus and species with pectinate conidia from a rainforest in Panama - a living fungal fossil? *Mycological Progress, 5*(3), 136–138. https://doi.org/10.1007/s11557-006-0508-7

Kirschner, R., & Yang, Z. L. (2005). *Dacryoscyphus chrysochilus*, a new staurosporous anamorph with cupulate conidiomata from China and with affinities to the Dacrymycetales (Basidiomycota). *Antonie Van Leeuwenhoek, 87*(4), 329–337. https://doi.org/10.1007/s10482-004-6784-9

Kirschner, R., Yang, Z. L., Zhao, Q., & Feng, B. (2010). *Ovipoculum album*, a new anamorph with gelatinous cupulate bulbilliferous conidiomata from China and with affinities to the Auriculariales (Basidiomycota). *Fungal Diversity, 43*(1), 55–65. https://doi.org/10.1007/s13225-010-0038-0

Kiyuna, T., An, K. D., Kigawa, R., Sano, C., Miura, S., & Sugiyama, J. (2012). Bristle-like fungal colonizers on the stone walls of the Kitora and Takamatsuzuka Tumuli are identified as *Kendrickiella phycomyces*. *Mycoscience, 53*(6), 446–459. https://doi.org/10.1007/s10267-012-0189-9

Klaubauf, S., Tharreau, D., Fournier, E., Groenewald, J. Z., Crous, P. W., de Vries, R. P., . . . Lebrun, M. H. (2014). Resolving the polyphyletic nature of *Pyricularia* (Pyriculariaceae). *Studies in Mycology, 79*, 85–120. https://doi.org/10.1016/j.simyco.2014.09.004

Klosterman, S. J., Atallah, Z. K., Vallad, G. E., & Subbarao, K. V. (2009). Diversity, pathogenicity and management of *Verticillium* species. In *Annual Review of Phytopathology* (Vol. 47, pp. 39–62). Annual Reviews. https://doi.org/10.1146/annurev-phyto-080508-081748

Kobayasi, Y. (1971). Mycological reports from New Guinea and the Solomon Islands (1-11). *Bulletin of the National Science Museum Tokyo, 14*(3), 367–551.

Kodsueb, R., McKenzie, E. H. C., Lumyong, S., & Hyde, K. D. (2008). Diversity of saprobic fungi on Magnoliaceae. *Fungal Diversity, 30*, 37–53.

Kohlmeyer, J., Volkmann-Kohlmeyer, B., & K.M. Tsui, C. (2005). Fungi on *Juncus roemerianus*. 17. New ascomycetes and the hyphomycete genus *Kolletes* gen. nov. *Botanica Marina, 48*(4), 306–317. https://doi.org/10.1515/bot.2005.040

Koike, S. T., Bettiga, L. J., Nguyen, T. T., & Gubler, W. D. (2016). First Report of *Cylindrocladiella lageniformis* and *C. peruviana* as grapevine pathogens in California. *Plant Disease, 100*(8), 1783–1784. https://doi.org/10.1094/Pdis-02-16-0157-Pdn

Kolarik, M., Freeland, E., Utley, C., & Tisserat, N. (2011). *Geosmithia morbida* sp nov., a new phytopathogenic species living in symbiosis with the walnut twig beetle (*Pityophthorus juglandis*) on Juglans in USA. *Mycologia, 103*(2), 325–332. https://doi.org/10.3852/10-124

Kolarik, M., Hujslová, M., & Vazquéz-Campos, X. (2015). Acidotolerant genus *Fodinomyces* (Ascomycota: Capnodiales) is a synonym of *Acidiella*. *Czech Mycology, 67*(1), 37–38.

Kolarik, M., Kostovcik, M., & Pazoutova, S. (2007). Host range and diversity of the genus *Geosmithia* (Ascomycota: Hypocreales) living in association with bark beetles in the *Mediterranean area*. *Mycological Research, 111*, 1298–1310. https://doi.org/10.1016/j.mycres.2007.06.010

Kolarik, M., Kubatova, A., Pazoutova, S., & Srutka, P. (2004). Morphological and molecular characterisation of *Geosmithia putterillii*, *G. pallida* comb. nov and *G. flava* sp nov., associated with subcorticolous insects. *Mycological Research, 108*, 1053–1069. https://doi.org/10.1017/S0953756204000796

Koukol, O. (2011). New species of *Chalara* occupying coniferous needles. *Fungal Diversity, 49*(1), 75–91. https://doi.org/10.1007/s13225-011-0092-2

Koukol, O. (2012). A new species of *Infundichalara* from pine litter. *Mycotaxon, 120*(1), 343–352.

Kowalski, T., & Holdenrieder, O. (2009). The teleomorph of *Chalara fraxinea*, the causal agent of ash dieback. *Forest Pathology, 39*(5), 304–308. https://doi.org/10.1111/j.1439-0329.2008.00589.x

Kraj, W., Zarek, M., & Kowalski, T. (2012). Genetic variability of *Chalara fraxinea*, dieback cause of European ash (*Fraxinus excelsior* L.). *Mycological Progress, 11*(1), 37–45. https://doi.org/10.1007/s11557-010-0724-z

Kralovic, S. M., & Rhodes, J. C. (1995). Phaeohyphomycosis caused by *Dactylaria* (human dactylariosis): Report of a case with review of the literature. *Journal of Infection, 31*(2), 107–113. https://doi.org/10.1016/S0163-4453(95)92060-9

Kraus, C., Damm, U., Bien, S., Voegele, R. T., & Fischer, M. (2020). New species of *Phaeomoniellales* from a German vineyard and their potential threat to grapevine (*Vitis vinifera*) health. *Fungal Syst Evol, 6*, 139–155. https://doi.org/10.3114/fuse.2020.06.08

Krijgsheld, P., Bleichrodt, R., van Veluw, G. J., Wang, F., Müller, W. H., Dijksterhuis, J., & Wösten, H. A. B. (2013). Development in *Aspergillus*. *Studies in Mycology, 74*, 1–29. https://doi.org/10.3114/sim0006

Kuhnert, E., Fournier, J., Persoh, D., Luangsa-ard, J. J. D., & Stadler, M. (2014). New *Hypoxylon* species from Martinique and new evidence on the molecular phylogeny of *Hypoxylon* based on ITS rDNA and beta-tubulin data. *Fungal Diversity, 64*(1), 181–203. https://doi.org/10.1007/s13225-013-0264-3

Kukwa, M., Czarnota, P., & ubek, A. (2017). Three lichen species in *Buellia*, *Catillaria*, and *Cheiromycina*, new to Poland. *Mycotaxon, 132*(1), 177–182.

Kurtzman, C. P., Fell, J. W., & Boekhout, T. (2011). *The yeasts: A taxonomic study* (5th ed.). Elsevier Science.

Kurtzman, C. P., & Robnett, C. J. (2007). Multigene phylogenetic analysis of the *Trichomonascus, Wickerhamiella* and *Zygoascus* yeast clades, and the proposal of *Sugiyamaella* gen. nov. and 14 new species combinations. *FEMS Yeast Research, 7*(1), 141–151. https://doi.org/10.1111/j.1567-1364.2006.00157.x

Kuthubutheen, A. J., & Nawawi, A. (1987a). A new species of *Speiropsis* from Malaysia. *Transactions of the British Mycological Society, 89*(4), 584–587. https://doi.org/10.1016/S0007-1536(87)80096-7

Kuthubutheen, A. J., & Nawawi, A. (1987b). *Cryptophialoidea* gen.nov. on decaying leaves from Malaysia. *Transactions of the British Mycological Society, 89*(4), 581–583. https://doi.org/10.1016/S0007-1536(87)80095-5

Kuthubutheen, A. J., & Nawawi, A. (1988). Two new species of *Kionochaeta* (Hyphomycetes) and *K. ramifera* from Malaysia. *Transactions of the British Mycological Society, 90*(3), 437–444. https://doi.org/10.1016/S0007-1536(88)80153-0

Kuthubutheen, A. J., & Nawawi, A. (1990). *Dictyochaeta hamata* and *D. pahangensis*, two new species with lateral phialides. *Mycological Research, 94*, 840–846.

Kuthubutheen, A. J., & Nawawi, A. (1991a). *Dictyochaeta guadalcanalensis* comb. nov. and several new records of the genus in Malaysia. *Mycological Research, 95*, 1220–1223.

Kuthubutheen, A. J., & Nawawi, A. (1991b). *Dictyochaeta macrospora* sp. nov.: A litter-inhabiting Hyphomycete from Malaysia. *Mycological Research, 95*, 248–250.

Kuthubutheen, A. J., & Nawawi, A. (1991c). Eight new species of *Dictyochaeta* (Hyphomycetes) from Malaysia. *Mycological Research, 95*, 1211–1219.

Kuthubutheen, A. J., & Nawawi, A. (1991d). Key to *Dictyochaeta* and *Codinaea* species. *Mycological Research, 95*, 1224–1229.

Kuthubutheen, A. J., & Nawawi, A. (1991e). Three new species of *Dictyochaeta* with non-setose conidiophores and non-septate setulate conidia from Malaysia. *Mycological Research, 95*, 104–107.

Kuthubutheen, A. J., & Nawawi, A. (1993). *Kiliophora*: A new genus name for the Hyphomycete taxon Danaea. *Mycotaxon, 48*, 239–247.

Kuthubutheen, A. J., & Nawawi, A. (1994a). *Cryptophialoidea fasciculata* sp. nov. and *C. manifesta* comb. nov. from Malaysia. *Mycological Research, 98*(6), 686–688. https://doi.org/10.1016/S0953-7562(09)80417-6

Kuthubutheen, A. J., & Nawawi, A. (1994b). *Henicospora longissima* sp. nov., *Obeliospora triappendiculata* sp. nov., *Paraulocladium fabisporum* sp. nov. and other hyphomycetes from Malaysia. *Mycological Research, 98*(6), 677–685. https://doi.org/10.1016/S0953-7562(09)80416-4

Kuthubutheen, A. J., & Nawawi, A. (1994c). *Paracryptophiale kamaruddinii* gen. et sp. nov. from submerged litter in Malaysia. *Mycological Research, 98*(1), 125–126. https://doi.org/10.1016/S0953-7562(09)80350-X

Kwasna, H., & Bateman, G. L. (2007). *Microdochium triticicola* sp nov from roots of *Triticum aestivum* in the United Kingdom. *Mycologia, 99*(5), 765–776. https://doi.org/10.3852/mycologia.99.5.765

Lackner, M., de Hoog, G. S., Yang, L., Moreno, L. F., Ahmed, S. A., Andreas, F., . . . Liporagi Lopes, L. C. (2014). Proposed nomenclature for *Pseudallescheria*, *Scedosporium* and related genera. *Fungal Diversity, 67*(1), 1–10. https://doi.org/10.1007/s13225-014-0295-4

Laessoe, T., Srikitikulchai, P., Luangsa-ard, J. J. D., & Stadler, M. (2013). *Theissenia* reconsidered, including molecular phylogeny of the type species *T. pyrenocrata* and a new genus *Durotheca* (Xylariaceae, Ascomycota). *IMA Fungus, 4*(1), 57–69. https://doi.org/10.5598/imafungus.2013.04.01.07

Lagerberg, T., Lundberg, G., & Melin, E. (1927). Biological and practical researches into Blueing in Pine and Spruce. *Svenska Skogsvårdsföreningens Tidskrift, 2*, 145–272.

Lanoiselet, V., Cother, E. J., Ash, G., & van de Ven, R. (2001). Production, germination and infectivity of chlamydospores of *Rhynchosporium alismatis*. *Mycological Research, 105*, 441–446. https://doi.org/10.1017/S0953756201003896

Larsson, A. (2014). AliView: A fast and lightweight alignment viewer and editor for large data sets. *Bioinformatics, 30*(22), 3276–3278. https://doi.org/10.1093/bioinformatics/btu531

Latgé, J.-P. (1999). *Aspergillus fumigatus* and Aspergillosis. *Clinical Microbiology Reviews, 12*(2), 310–350.

Latinovic, N., Radisek, S., & Latinovic, J. (2014). First report of *Alternaria alternata* causing fruit rot on fig (*Ficus carica*) in Montenegro. *Plant Disease, 98*(3), 424–425. https://doi.org/10.1094/Pdis-07-13-0770-Pdn

Lazarovits, G., & Subbarao, K. (2009). Challenges in controlling *Verticillium* wilt by the use of nonchemical methods. In U. Gisi, I. Chet, & M. L. Gullino (Eds.), *Recent Developments in Management of Plant Diseases* (pp. 247–264). Springer Netherlands. https://doi.org/10.1007/978-1-4020-8804-9_18

Le, T. H. Y., Inaba, S., Tsurumi, Y., Ban, S., Dung, N. L., Hop, D. V., . . . Ando, K. (2012). *Condylospora vietnamensis*, a new Ingoldian hyphomycete isolated from fallen leaves in Vietnam. *Mycoscience, 53*(4), 326–329. https://doi.org/10.1007/s10267-011-0166-8

Le, T. H. Y., Tsurumi, Y., Van Duong, H., & Ando, K. (2020). *Geminoarcus maximus* sp. nov. and *Ceramothyrium brevis* sp. nov., two novel aquatic hyphomycetes from Viet Nam. *Vegetos, 33*(4), 641–647. https://doi.org/10.1007/s42535-020-00148-z

Lechat, C., & Fournier, J. (2015). *Varicosporella*, a new aquatic genus in the Nectriaceae from France. *Ascomycete. org, 7*(1), 1–8. https://doi.org/10.25664/art-0121

Lechat, C., Fournier, J., & Moreau, P.-A. (2016). *Xanthonectria*, a new genus for the nectrioid fungus Nectria pseudopeziza. *Ascomycete.org, 8*(4), 172–178. https://doi.org/10.25664/art-0185

Lechat, C., Fournier, J., & Priou, J.-P. (2018a). *Chrysonectria*, a new genus in the Nectriaceae with the new species *C. finisterrensis* from France. *Ascomycete.org, 10*(4), 121–125. https://doi.org/10.25664/art-0237

Lechat, C., Fournier, J., Vega, M., & Priou, J.-P. (2018b). *Geonectria*, a new genus in the Bionectriaceae from France. *Ascomycete.org, 10*(2), 81–85. https://doi.org/10.25664/art-0233

Lechat, C., Moreau, P.-A., & Bender, H. (2019). *Lasionectriopsis*, a new genus in the Bionectriaceae, based on the new species *L. germanica*. *Ascomycete.org, 11*(1), 1–4. https://doi.org/10.25664/art-0250

Lee, H. B., Mun, H. Y., Nguyen, T. T. T., Kim, J.-C., & Stone, J. K. (2016). *Abieticola koreana* gen. et sp. nov., a griseofulvin-producing endophytic xylariaceous ascomycete from Korea. *Mycotaxon, 131*(4), 749–764.

Lee, H. K., Tewari, J. P., & Turkington, T. K. (2001). A PCR-based assay to detect *Rhynchosporium secalis*, in barley seed. *Plant Disease, 85*(2), 220–225. https://doi.org/10.1094/Pdis.2001.85.2.220

Lees, A. K., & Hilton, A. J. (2003). Black dot (*Colletotrichum coccodes*): An increasingly important disease of potato. *Plant Pathology, 52*(1), 3–12. https://doi.org/10.1046/j.1365-3059.2003.00793.x

Li, D.-W., Chen, J., & Wang, Y. (2014a). Hyphomycetes: *Linodochium sinense* sp. nov. and new records from fallen *Sycopsis sinensis* leaves in China. *Mycotaxon, 126*(1), 15–22.

Li, D. W., Castañeda-Ruiz, R. F., & Schultes, N. P. (2020a). Phylogenetic placement of *Acrospeira*. *Mycotaxon, 135*(2), 299–308.

Li, D. W., Kendrick, B., & Chen, J. Y. (2012a). Two new hyphomycetes: *Codinaea sinensis* sp. nov. and *Parapleurotheciopsis quercicola* sp. nov., and two new records from Quercus phillyraeoides leaf litter. *Mycological Progress*, *11*(4), 899–905. https://doi.org/10.1007/s11557-011-0805-7

Li, D. W., Schultes, N. P., Chen, J.-Y., Wang, Y.-X., & Castañeda-Ruiz, R. F. (2017a). *Circinotrichum sinense*, a new asexual fungus from Hubei, China. *Botany, 95*(12), 1099–1108. https://doi.org/10.1139/cjb-2017-0132

Li, D. W., Schultes, N. P., & Vossbrinck, C. (2016a). *Olpitrichum sphaerosporum*: A new USA record and phylogenetic placement. *Mycotaxon, 131*(1), 123–133.

Li, G. J., Hyde, K. D., Zhao, R. L., Hongsanan, S., Abdel-Aziz, F. A., Abdel-Wahab, M. A., . . . Maharachchikumbura, S. S. N. (2016b). Fungal diversity notes 253–366: taxonomic and phylogenetic contributions to fungal taxa. *Fungal Diversity, 78*, 1–237. https://doi.org/10.1007/s13225-016-0366-9

Li, H., Sun, G., Batzer, J. C., Crous, P. W., Groenewald, J. Z., Karakaya, A., & Gleason, M. L. (2011). *Scleroramularia* gen. nov. associated with sooty blotch and flyspeck of apple and pawpaw from the Northern Hemisphere. *Fungal Diversity, 46*(1), 53–66. https://doi.org/10.1007/s13225-010-0074-9

Li, H. Y., Sun, G. Y., Zhai, X. R., Batzer, J. C., Mayfield, D. A., Crous, P. W., . . . Gleason, M. L. (2012b). Dissoconiaceae associated with sooty blotch and flyspeck on fruits in China and the United States. *Persoonia, 28*, 113–125. https://doi.org/10.3767/003158512x651157

Li, J. F., Jeewon, R., Phookamsak, R., Bhat, D. J., Mapook, A., Chukeatirote, E., . . . Mckenzie, E. H. (2018). *Marinophialophora garethjonesii* gen. et sp. nov.: A new hyphomycete associated with Halocyphina from marine habitats in Thailand. *Phytotaxa, 345*(1), 1–12.

Li, J. F., Phookamsak, R., Jeewon, R., Tibpromma, S., Maharachchikumbura, S., Bhat, D., . . . McKenzie, E. H. (2017b). Establishment of Zygosporiaceae fam. nov.(Xylariales, Sordariomycetes) based on rDNA sequence data to accommodate *Zygosporium*. *Mycosphere, 8*(10), 1855–1868.

Li, W.-J., McKenzie, E. H. C., Liu, J.-K., Bhat, D. J., Dai, D.-Q., Camporesi, E., . . . Hyde, K. D. (2020b). Taxonomy and phylogeny of hyaline-spored coelomycetes. *Fungal Diversity, 100*(1), 279–801. https://doi.org/10.1007/s13225-020-00440-y

Li, X.-X., Ma, L.-G., Xia, J.-W., & Zhang, X.-G. (2014b). Three newly recorded species of *Parasympodiella* and *Chalara* from China. *Mycotaxon, 126*(1), 121–126.

Li, X. Q., Guo, B. L., Cai, W. Y., Zhang, J. M., Huang, H. Q., Zhan, P., . . . de Hoog, G. S. (2016c). The role of melanin pathways in extremotolerance and virulence of Fonsecaea revealed by de novo assembly transcriptomics using illumina paired-end sequencing. *Studies in Mycology, 83*, 1–18. https://doi.org/10.1016/j.simyco.2016.02.001

Li, X. X., Xia, J. W., Ma, L. G., Castañeda-Ruíz, R. F., & Zhang, X. G. (2014c). A new species of *Bahusutrabeeja* from Guangxi, China. *Mycotaxon, 126*(1), 227–230.

Li, Y., Xiao, J., de Hoog, G. S., Wang, X., Wan, Z., Yu, J., . . . Li, R. (2017c). Biodiversity and human-pathogenicity of *Phialophora verrucosa* and relatives in Chaetothyriales. *Persoonia - Molecular Phylogeny and Evolution of Fungi, 38*(1), 1–19.

Li, Y. X. (2014). First report of *Gliocephalotrichum bulbilium* causing fruit rot of posthavest mangosteen in China. *Plant Disease, 98*(7), 994–995. https://doi.org/10.1094/Pdis-09-13-0917-Pdn

Li, Z., Zeng, G. P., Ren, J., Zou, X., & Han, Y. F. (2017d). *Chrysosporium leigongshanense* sp. nov. from Guizhou Province, China. *Mycosphere, 8*(8), 1210–1216. https://doi.org/10.5943/mycosphere/8/8/17

Liang, J., Han, Y., Du, W., Liang, Z., & Li, Z. (2009a). *Chrysosporium linfenense*: A new *Chrysosporium* species with keratinolytic activity. *Mycotaxon, 110*(1), 65–71.

Liang, Z. Q., Han, Y. F., Chu, H. L., & Fox, R. T. V. (2009b). Studies on the genus *Paecilomyces* in China V. *Taifanglania* gen. nov for some monophialidic species. *Fungal Diversity, 34*, 69–77.

Liang, Z. Q., Han, Y. F., Chu, H. L., & Liu, A. Y. (2005). Studies on the genus *Paecilomyces* in China. I. *Fungal Diversity, 20,* 83–101.

Liberato, J. R., & Barreto, R. W. (2005). Additions to the Brazilian Erysiphaceae: *Ovulariopsis durantae* sp nov and *Streptopodium tabebuiae* sp nov. *Fungal Diversity, 18*, 95–106.

Limber, D. P. (1940). A new form genus of the Moniliaceae. *Mycologia, 32*(1), 23–30. https://doi.org/10.1080/00275514.1940.12017391

Lin, C. G., Bhat, D. J., Liu, J.-K., Hyde, K. D., & Wang, Y. (2019a). The genus *Castanediella*. *Mycokeys, 51,* 1–14.

Lin, C. G., Chen, Y., McKenzie, E. H. C., Bhat, D. J., Ariyawansa, H. A., Hyde, K. D., . . . Wang, Y. (2016a). The genus *Fusariella*. *Mycological Progress, 15*(12), 1313–1326.

Lin, C. G., Dai, D. Q., Bhat, D. J., Hyde, K. D., Tang, L. Z., Lumyong, S., . . . Bahkali, A. H. (2017a). *Alfaria avenellae sp. nov.* from Italy. *Phytotaxa, 332*(1), 67–74. https://doi.org/10.11646/phytotaxa.332.1.7

Lin, C. G., Dai, D. Q., Bhat, D. J., Hyde, K. D., Tang, L. Z., & To-anun, C. (2017b). *Subsessila turbinata* gen. et. sp. nov. (Beltraniaceae), a Beltrania-like fungus from Thailand. *Mycological Progress, 16*(4), 393–401. https://doi.org/10.1007/s11557-017-1279-z

Lin, C. G., Hyde, K. D., Lumyong, S., & McKenzie, E. H. C. (2017c). *Beltrania*-like taxa from Thailand. *Cryptogamie, Mycologie, 38*(3), 301–319. https://doi.org/10.7872/crym/v38.iss3.2017.301

Lin, C. G., McKenzie, E. H. C., Bhat, D. J., Liu, J. K., Hyde, K. D., & Lumyong, S. (2018). *Pseudodactylaria brevis* sp. nov. from Thailand confirms the status of Pseudodactylariaceae. *Phytotaxa, 369*(4), 241–250. https://doi.org/10.11646/phytotaxa.369.4.1

Lin, C. G., McKenzie, E. H. C., Bhat, D. J., Ran, S. F., Chen, Y., Hyde, K. D., . . . Wang, Y. (2016b). Stachybotrys-like taxa from karst areas and a checklist of stachybotrys-like species from Thailan. *Mycosphere, 7*(9), 1273–1291.

Lin, C. G., McKenzie, E. H. C., Liu, J. K., Jones, E. B. G., & Hyde, K. D. (2019b). Hyaline-spored chaetosphaeriaceous hyphomycetes from Thailand and China, with a review of the family Chaetosphaeriaceae. *Mycosphere, 10*(1), 655–700.

Linde, C. C., Zala, M., Ceccarelli, S., & McDonald, B. A. (2003). Further evidence for sexual reproduction in *Rhynchosporium secalis* based on distribution and frequency of mating-type alleles. *Fungal Genetics and Biology, 40*(2), 115–125. https://doi.org/10.1016/S1087-1845(03)00110-5

Link, H. F. (1809a). Nova plantarum genera e classe Lichenum, Algarum, Fungorum. *Neues Journal für die Botanik, 3*, 1–19.

Link, H. F. (1809b). Observationes in ordines plantarum naturales. Dissertatio I. *Magazin der Gesellschaft Naturforschenden Freunde Berlin, 3*, 3–42.

Liou, J. Y., Shih, J. Y., & Tzean, S. S. (1999). *Esteya*, a new nematophagous genus from Taiwan, attacking the pinewood nematode (*Bursaphelenchus xylophilus*). *Mycological Research, 103*(2), 242–248. https://doi.org/10.1017/S0953756298006984

Liu, J. K., Chomnunti, P., Cai, L., Phookamsak, R., Chukeatirote, E., Jones, E. B. G., . . . Hyde, K. D. (2010). Phylogeny and morphology of *Neodeightonia palmicola* sp. nov. from palms. *Sydowia, 62*(2), 261–276.

Liu, J. K., Hyde, K. D., Jones, E. B. G., Ariyawansa, H. A., Bhat, D. J., Boonmee, S., . . . Camporesi, E. (2015). Fungal diversity notes 1–110: Taxonomic and phylogenetic contributions to fungal species. *Fungal Diversity, 72*, 1–197. https://doi.org/10.1007/s13225-015-0324-y

Liu, J. K., Lu, Y. Z., Cheewangkoon, R., & To-Anun, C. (2018). Phylogeny and morphology of *Helicotubeufia* gen. nov., with three new species in Tubeufiaceae from aquatic habitats. *Mycosphere, 9*(3), 495–509. https://doi.org/10.5943/mycosphere/9/3/4

Liu, J. K., Yang, J., Maharachchikumbura, S. S. N., McKenzie, E. H. C., Jones, E. B. G., Hyde, K. D., . . . Liu, Z. Y. (2016). Novel chaetosphaeriaceous hyphomycetes from aquatic habitats. *Mycological Progress, 15*(10-11), 1157–1167.

Liu, X. B., Guo, Z. K., & Huang, G. X. (2017). *Sarocladium brachiariae* sp nov., an endophytic fungus isolated from *Brachiaria brizantha*. *Mycosphere, 8*(7), 827–834. https://doi.org/10.5943/mycosphere/8/7/2

Liu, Y.-L., Xi, P.-G., He, X.-L., & Jiang, Z.-D. (2013). *Phialophora avicenniae* sp. nov., a new endophytic fungus in Avicennia marina in China. *Mycotaxon, 124*(1), 31–37.

Liu, Y. J., Whelen, S., & Hall, B. D. (1999). Phylogenetic relationships among ascomycetes: Evidence from an RNA polymerse II subunit. *Molecular Biology and Evolution, 16*(12), 1799–1808.

Lo Giudice, V., Raudino, F., di San Lio, R. M., Cacciola, S. O., Faedda, R., & Pane, A. (2010). First report of a decline and wilt of young olive trees caused by simultaneous infections of *Verticillium dahliae* and *Phytophthora palmivora* in Sicily. *Plant Disease, 94*(11), 1372–1373. https://doi.org/10.1094/Pdis-07-10-0480

Locquin, M. (1984). *Mycologie générale et structurale*. Masson.

Lombard, L., & Crous, P. W. (2012). Phylogeny and taxonomy of the genus *Gliocladiopsis*. *Persoonia, 28*, 25–33. https://doi.org/10.3767/003158512x635056

Lombard, L., Crous, P. W., Wingfield, B. D., & Wingfield, M. J. (2010). Species concepts in *Calonectria* (*Cylindrocladium*). *Studies in Mycology, 66*, 1–13. https://doi.org/10.3114/sim.2010.66.01

Lombard, L., Houbraken, J., Decock, C., Samson, R. A., Meijer, M., Réblová, M., . . . Crous, P. W. (2016). Generic hyper-diversity in *Stachybotriaceae*. *Persoonia, 36*(1), 156–246.

Lombard, L., Rodas, C. A., Crous, P. W., Wingfield, B. D., & Wingfield, M. J. (2009). *Calonectria* (*Cylindrocladium*) species associated with dying *Pinus* cuttings. *Persoonia, 23*, 41–47. https://doi.org/10.3767/003158509x471052

Lombard, L., van der Merwe, N. A., Groenewald, J. Z., & Crous, P. W. (2015). Generic concepts in Nectriaceae. *Studies in Mycology, 80*, 189–245. https://doi.org/10.1016/j.simyco.2014.12.002

Long, Q. D., Liu, L. L., Zhang, X., Wen, T. C., Kang, J. C., Hyde, K. D., . . . Li, Q. R. (2019). Contributions to species of Xylariales in China-1. *Durotheca* species. *Mycological Progress, 18*(3), 495–510. https://doi.org/10.1007/s11557-018-1458-6

Lu, Q., Decock, C., Zhang, X. Y., & Maraite, H. (2008). *Leptographium sinoprocerum* sp nov., an undescribed species associated with *Pinus tabuliformis-Dendroctonus valens* in northern China. *Mycologia, 100*(2), 275–290. https://doi.org/10.3852/mycologia.100.2.275

Lu, Y.-Z., Boonmee, S., Liu, J.-K., Hyde, K. D., McKenzie, E. H. C., Eungwanichayapant, P. D., & Kang, J.-C. (2018a). Multi-gene phylogenetic analyses reveals *Neohelicosporium* gen. nov. and five new species of helicosporous hyphomycetes from aquatic habitats. *Mycological Progress, 17*(5), 631–646. https://doi.org/10.1007/s11557-017-1366-1

Lu, Y.-Z., Liu, J.-K., Hyde, K. D., Jeewon, R., Kang, J.-C., Fan, C., . . . Eungwanichayapant, P. D. (2018b). A taxonomic reassessment of Tubeufiales based on multi-locus phylogeny and morphology. *Fungal Diversity, 92*(1), 131–344. https://doi.org/10.1007/s13225-018-0411-y

Lu, Y. Z., Liu, K. J., Hyde, K. D., Bhat, D. J., Xiao, Y. P., Tian, Q., . . . Kang, J. C. (2016). *Brunneodinemasporium jonesii* and *Tainosphaeria jonesii* spp. nov (Chaetosphaeriaceae, Chaetosphaeriales) from southern China. *Mycosphere, 7*(9), 1322–1331. https://doi.org/10.5943/mycosphere/7/9/6

Luangsa-Ard, J. J., Hywel-Jones, N. L., Manoch, L., & Samson, R. A. (2005). On the relationships of *Paecilomyces* sect. *Isarioidea* species. *Mycological Research, 109*, 581–589. https://doi.org/10.1017/S0953756205002741

Lücking, R., Aime, M. C., Robbertse, B., Miller, A. N., Aoki, T., Ariyawansa, H. A., . . . Schoch, C. L. (2021). Fungal taxonomy and sequence-based nomenclature. *Nature Microbiology, 6*(5), 540–548. https://doi.org/10.1038/s41564-021-00888-x

Lumbsch, H. T., & Huhndorf, S. M. (2007a). Notes on ascomycete systematics. Nos. 4408-4750. *Myconet, 13*, 59–99.

Lumbsch, H. T., & Huhndorf, S. M. (2007b). Outline of ascomycota–2007. *Myconet, 13*, 1–58.

Lumbsch, H. T., & Huhndorf, S. M. (2010). Myconet Volume 14. Part One. Outline of Ascomycota—2009. Part Two. Notes on Ascomycete Systematics. Nos. 4751–5113. *Fieldiana Life and Earth Sciences*, 1–64. https://doi.org/10.3158/1557.1

Luo, J., Walsh, E., & Zhang, N. (2014). Four new species in Magnaporthaceae from grass roots in New Jersey Pine Barrens. *Mycologia, 106*(3), 580–588. https://doi.org/10.3852/13-306

Luo, J., Walsh, E., & Zhang, N. (2015). Toward monophyletic generic concepts in Magnaporthales: Species with *Harpophora* asexual states. *Mycologia, 107*(3), 641–646. https://doi.org/10.3852/14-302

Luo, J., & Zhang, N. (2013). *Magnaporthiopsis*, a new genus in Magnaporthaceae (Ascomycota). *Mycologia, 105*(4), 1019–1029. https://doi.org/10.3852/12-359

Luo, Z.-L., Hyde, K. D., Bhat, D. J., Jeewon, R., Maharachchikumbura, S. S. N., Bao, D.-F., . . . Su, H.-Y. (2018). Morphological and molecular taxonomy of novel species Pleurotheciaceae from freshwater habitats in Yunnan, China. *Mycological Progress, 17*(5), 511–530. https://doi.org/10.1007/s11557-018-1377-6

Luo, Z.-L., Hyde, K. D., Liu, J.-K., Maharachchikumbura, S. S. N., Jeewon, R., Bao, D.-F., . . . Su, H.-Y. (2019). Freshwater Sordariomycetes. *Fungal Diversity, 99*(1), 451–660. https://doi.org/10.1007/s13225-019-00438-1

Luo, Z. L., Liu, J. K. J., Hyde, K. D., Jeewon, R., Bao, D. F., Bhat, D. J., . . . Su, H. Y. Freshwater Sordariomycetes *Fungal Diversity, (in process)*.

Ma, L.-G., Ma, J., Zhang, Y.-D., & Zhang, X.-G. (2011). *Craspedodidymum* and *Corynespora* spp. nov. and a new anamorph recorded from southern China. *Mycotaxon, 117*(1), 351–358.

Ma, L.-G., Xia, J.-W., Ma, Y.-R., & Zhang, X.-G. (2014). Three new species of *Pleurophragmium* from Yunnan, China. *Mycotaxon, 127*(1), 213–219.

Ma, L.-J., van der Does, H. C., Borkovich, K. A., Coleman, J. J., Daboussi, M.-J., Di Pietro, A., . . . Rep, M. (2010). Comparative genomics reveals mobile pathogenicity chromosomes in *Fusarium*. *Nature, 464*(7287), 367–373. https://doi.org/10.1038/nature08850

Ma, Y. R., Xia, J. W., Gao, J. M., Li, Z., & Zhang, X. G. (2016). *Anacacumisporium*, a new genus based on morphology and molecular analyses from Hainan, China. *Cryptogamie Mycologie, 37*(1), 45–59. https://doi.org/10.7872/crym/v37.iss1.2016.45

Ma, Z. H., Zhang, Z. D., Wang, Y. X., & Yang, X. B. (2004). *Cylindrocladium crotalariae* causing red crown rot of soybean in China. *Plant Pathology, 53*(4), 537–537. https://doi.org/10.1111/j.1365-3059.2004.01036.x

Macia-Vicente, J. G., Glynou, K., & Piepenbring, M. (2016). A new species of *Exophiala* associated with roots. *Mycological Progress, 15*(2). https://doi.org/10.1007/s11557-016-1161-4

Mack, J., Assabgui, R. A., & Seifert, K. A. (2021). Taxonomy and phylogeny of the basidiomycetous hyphomycete genus *Hormomyces*. *Fungal Syst Evol, 7*, 177–196. https://doi.org/10.3114/fuse.2021.07.09

MacKenzie, S. E., Gurusamy, G. S., Piorko, A., Strongman, D. B., Hu, T. M., & Wright, J. L. C. (2004). Isolation of sterols from the marine fungus *Corollospora lacera*. *Canadian Journal of Microbiology, 50*(12), 1069–1072. https://doi.org/10.1139/W04-103

Madrid, H., Cano, J., Gene, J., & Guarro, J. (2011). Two new species of *Cladorrhinum*. *Mycologia, 103*(4), 795–805. https://doi.org/10.3852/10-150

Madrid, H., Gene, J., Cano, J., & Guarro, J. (2012). A new species of *Leptodiscella* from Spanish soil. *Mycological Progress, 11*(2), 535–541. https://doi.org/10.1007/s11557-011-0768-8

Madrid, H., Torres, D., & Silva, V. (2016). *Harmoniella campanaensis* sp. nov. from central Chile. *Mycotaxon, 131*(3), 535–539.

Magdama, F., Sosa, D., Espinoza, F., Serrano, L., Pérez-Martinez, S., Malosso, E., . . . Castañeda-Ruiz, R. F. (2020). *Guayaquilia* gen. nov., typified by *Idriella cubensis*. *Mycotaxon, 135*(3), 501–512. https://doi.org/10.5248/135.501

Maggi, O., & Persiani, A. M. (1984). *Codinaea coffeae* and *Phialocephala xalapensis*, two new hyphomycetes from Mexico. *Mycotaxon, 20*(2), 251–258.

Maharachchikumbura, S. S. N., Hyde, K. D., Jones, E. B. G., McKenzie, E. H. C., Bhat, J. D., Dayarathne, M. C., . . . Wijayawardene, N. N. (2016). Families of *Sordariomycetes*. *Fungal Diversity, 79*, 1–317. https://doi.org/10.1007/s13225-016-0369-6

Maharachchikumbura, S. S. N., Hyde, K. D., Jones, E. B. G., McKenzie, E. H. C., Huang, S. K., Abdel-Wahab, M. A., . . . Xu, J. C. (2015). Towards a natural classification and backbone tree for *Sordariomycetes*. *Fungal Diversity, 72*, 199–301. https://doi.org/10.1007/s13225-015-0331-z

Maire, R. (1937). Fungi Catalaunici: Series altera. Contributions a l'étude de la flore mycologique de la Catalogne. *Publicacions del Instituto Botánico Barcelona, 3*, 1–128.

Malosso, E., Costa, P. M. O., Barbosa, M. A., Silva, G. V. R. D., & Castañeda-Ruiz, R. F. (2018). *Paliphora bicolorata* sp. nov. from the Brazilian Atlantic Forest. *Mycotaxon, 132*(4), 903–907.

Manandhar, J. B., & Mew, T. W. (1996). *Pinatubo oryzae* gen. et sp. nov. and its identity during routine tests of rice seed. *Mycotaxon, 60*, 201–212.

Marchal, É. (1885). Champignons coprophiles de Belgique, IVIV. *Bulletin de la Société Royale de Botanique de Belgique, 24*, 57–77.

Marchal, É. (1895). Champignons coprophiles de belgique: VII. *Bulletin de la Société Royale de Botanique de Belgique, 34*, 125–149.

Marchand, S., Cabral, D., & Wright, J. E. (1976). Tres nuevos géneros de Hifomycetes de Tierra del Fuego. *Boletín de la Sociedad Argentina de Botánica*, *17*, 63–72.

Marchisio, V. F., Fontana, A., & Mosca, A. M. L. (1977). *Anthopsis deltoidea*, a new genus and species of Dematiaceae from soil. *Canadian Journal of Botany*, *55*(2), 115–117. https://doi.org/10.1139/b77-018

Marek, S. M., Hansen, K., Romanish, M., & Thorn, R. G. (2009). Molecular systematics of the cotton root rot pathogen, *Phymatotrichopsis omnivora*. *Persoonia*, *22*, 63–74. https://doi.org/10.3767/003158509x430930

Marin-Felix, Y., Guarro, J., Ano-Lira, J. F., García, D., Iller, A. N., & Stchigel, A. M. (2018). *Melanospora* (Sordariomycetes,Ascomycota) and its relatives. *Mycokeys*, *44*, 81–122. https://doi.org/10.3897/mycokeys.44.29742

Marin-Felix, Y., Miller, A. N., Cano-Lira, J. F., Guarro, J., García, D., Stadler, M., . . . Stchigel, A. M. (2020). Re-evaluation of the order Sordariales: Delimitation of Lasiosphaeriaceae s. str., and introduction of the new families Diplogelasinosporaceae, Naviculisporaceae, and Schizotheciaceae. *Microorganisms*, *8*(9), 1430.

Marin-Felix, Y., Stchigel, A. M., Cano-Lira, J. F., Sanchis, M., Mayayo, E., & Guarro, J. (2015a). *Emmonsiellopsis*, a new genus related to the thermally dimorphic fungi of the family Ajellomycetaceae. *Mycoses*, *58*(8), 451–460. https://doi.org/10.1111/myc.12336

Marin-Felix, Y., Stchigel, A. M., Miller, A. N., Guarro, J., & Cano-Lira, J. F. (2015b). A re-evaluation of the genus *Myceliophthora* (Sordariales, Ascomycota): Its segregation into four genera and description of *Corynascus fumimontanus* sp. nov. *Mycologia*, *107*(3), 619–632. https://doi.org/10.3852/14-228

Marmolejo, J., Siahaan, S. A. S., Takamatsu, S., & Braun, U. (2018). Three new records of powdery mildews found in Mexico with one genus and one new species proposed. *Mycoscience*, *59*(1), 1–7. https://doi.org/10.1016/j.myc.2017.06.010

Marques, S. G., Pedrozo Silva, C. M., Resendes, M. A., Andreata, L. S., & Costa, J. M. L. (2004). Chromoblastomycosis caused by *Rhinocladiella aquaspersa*. *Medical Mycology, 42*(3), 261–265. https://doi.org/10.1080/13693780310001597700

Marvanová, L. (1977a). A contact biotrophic mycoparasite on aquatic hyphomycete conidia. *Transactions of the British Mycological Society, 68*(3), 485–488. https://doi.org/10.1016/S0007-1536(77)80216-7

Marvanová, L. (1977b). *Taeniospora gracilis* gen. et sp.nov. *Transactions of the British Mycological Society, 69*(1), 146–148. https://doi.org/10.1016/S0007-1536(77)80128-9

Marvanová, L. (1980). New or noteworthy aquatic hyphomycetes. *Clavatospora*, *Heliscella*, *Nawawia* and *Heliscina*. *Transactions of the British Mycological Society, 75*(2), 221–231. https://doi.org/10.1016/S0007-1536(80)80083-0

Marvanová, L. (1986). Three new hyphomycetes from foam. *Transactions of the British Mycological Society, 87*(4), 617–625. https://doi.org/10.1016/S0007-1536(86)80102-4

Marvanová, L. (1988). New hyphomycetes from aquatic environments in Czechoslovakia. *Transactions of the British Mycological Society, 90*(4), 607–617. https://doi.org/10.1016/S0007-1536(88)80066-4

Marvanová, L. (1996). Concerning *Pseudoanguillospora* and water-borne *Mycocentrospora* spp. *Czech Mycology, 49*(1), 7–20.

Marvanová, L. (1997). *Cladochasiella divergens* gen. et sp. nov. *Cryptogamie. Mycologie*, *18*(4), 285–289.

Marvanová, L., & Bandoni, R. J. (1985). Notes on *Tricladium attenuatum*. *Transactions of the British Mycological Society, 85*(4), 747–752. https://doi.org/10.1016/S0007-1536(85)80277-1

Marvanová, L., & Bärlocher, F. (1988). Hyphomycetes from Canadian streams. I. Basidiomycetous anamorphs. *Mycotaxon, 32*, 339–351.

Marvanová, L., & Bärlocher, F. (1989). Hypomycetes from Canadian streams. II: Three new taxa. *Mycotaxon, 35*(1), 85–99.

Marvanová, L., & Bärlocher, F. (1998a). Hyphomycetes from Canadian streams. III. *Arcispora bisagittaria* anam. gen. and sp. nov. *Mycologia, 90*(3), 531–536. https://doi.org/10.1080/00275514.1998.12026939

Marvanová, L., & Bärlocher, F. (1998b). New species of *Filosporella*, *Pachycladina* and *Pleuropedium* from Canadian streams. *Mycological Research, 102*, 750–754. https://doi.org/10.1017/S0953756297005522

Marvanová, L., & Bärlocher, F. (2000). Hyphomycetes from Canadian streams. V. Two new conidial basidiomycetes. *Mycotaxon, 75*, 409–423.

Marvanová, L., & Descals, E. (1985). New and critical taxa of aquatic hyphomycetes. *Botanical Journal of the Linnean Society, 91*(1-2), 1–23. https://doi.org/10.1111/j.1095-8339.1985.tb01130.x

Marvanová, L., & Descals, E. (1987). New taxa and new combinations of 'aquatic hyphomycetes'. *Transactions of the British Mycological Society, 89*(4), 499–507. https://doi.org/10.1016/S0007-1536(87)80084-0

Marvanová, L., & Iqbal, S. H. (1973). *Pleuropedium tricladioides* gen. et sp. nov. *Antonie Van Leeuwenhoek, 39*(1), 401–408. https://doi.org/10.1007/BF02578882

Marvanová, L., & Laichmanova, M. (2007). *Subulispora biappendiculata*, anamorph sp nov from Borneo (Malaysia) and a review of the genus. *Fungal Diversity, 26*(1), 241–256.

Marvanova, L., Landvik, S., Fisher, P. J., Moss, S. T., & Ainsworth, A. M. (2002). A new fungus with arthroconidia from foam. *Nova Hedwigia, 75*(1-2), 255–269. https://doi.org/10.1127/0029-5035/2002/0075-0255

Marvanová, L., & Nilsson, S. (1971). Validation of aquatic hyphomycete names. *Transactions of the British Mycological Society, 57*(3), 531–532. https://doi.org/10.1016/S0007-1536(71)80068-2

Marvanová, L., Om-Kalthoum Khattab, S., & Webster, J. (1993). *Mycofalcella calcarata*, anam. gen. et sp. nov. *Nova Hedwigia, 56*, 401–408.

Marvanová, L., Pascoal, C., & Cássio, F. (2003). New and rare hyphomycetes from streams of Northwest Portugal. Part I. *Cryptogamie Mycologie, 24*(4), 339–358.

Marvanová, L., & Stalpers, J. A. (1987). The genus *Taeniospora* and its teleomorphs. *Transactions of the British Mycological Society, 89*(4), 489–498. https://doi.org/10.1016/S0007-1536(87)80083-9

Marvanová, L., & Suberkropp, K. (1990). *Camptobasidium hydrophilum* and its anamorph, *Crucella subtilis*: A new Heterobasidiomycete from streams. *Mycologia, 82*(2), 208–217. https://doi.org/10.1080/00275514.1990.12025866

Maryani, N., Lombard, L., Poerba, Y. S., Subandiyah, S., Crous, P. W., & Kema, G. H. J. (2019). Phylogeny and genetic diversity of the banana *Fusarium* wilt pathogen *Fusarium oxysporum* f. sp. *cubense* in the Indonesian centre of origin. *Studies in Mycology, 92*, 155–194. https://doi.org/10.1016/j.simyco.2018.06.003

Mason, E. W. (1933). Annotated account of fungi received at the Imperial Mycological Institute, List II (Fasc. 2). *Mycological Papers, 3*, 1–67.

Massee, G. (1891). A new genus of Tubercularieae. *Annals of Botany, 5*(4), 509. https://doi.org/10.1093/oxfordjournals.aob.a090652

Massee, G. E. (1888). On the type of a new order of fungi. *Journal of the Royal Microscopical Society, 1888*, 173–176.

Massee, G. E. (1898). Fungi exotici, I. *Bulletin of Miscellaneous Informations of the Royal Botanical Gardens Kew, 1898*, 113–136.

Masuya, H., Wingfield, M. J., Kubono, T., & Ichihara, Y. (2004). *Leptographium pruni*, sp nov from bark beetle-infested *Prunus jamasakura* in Japan. *Mycologia, 96*(3), 548–557. https://doi.org/10.2307/3762174

Matruchot, M. (1899). Notes mycologiques. I. *Gliocephalis hyalina*. *Bulletin de la Societé Mycologique de France, 15*, 254–262.

Matsushima, K., & Matsushima, T. (1996). Fragmenta Mycologica II. *Matsushima Mycological Memoirs, 9*, 31–40.

Matsushima, T. (1971). *Microfungi of the Solomon Islands and Papua-New Guinea*. Matsushima.

Matsushima, T. (1975). *Icones microfungorum : A Matsushima lectorum*. Matsushima.

Matsushima, T. (1980). *Matsushima Mycological Memoirs, No. 01*. Matsushima.

Matsushima, T. (1982). *Matsushima Mycological Memoirs, No. 02*. Matsushima.

Matsushima, T. (1983). *Matsushima Mycological Memoirs, No. 03*. Matsushima.

Matsushima, T. (1985). *Matsushima mycological Memoirs No. 04*. Matsushima.

Matsushima, T. (1987). *Matsushima Mycological Memoirs, No. 05*. Matsushima.

Matsushima, T. (1989). *Matsushima Mycological Memoirs, No. 06*. Matsushima.

Matsushima, T. (1993). *Matsushima Mycological Memoirs, No. 07*. Matsushima.

Matsushima, T. (1995). *Matsushima Mycological Memoirs, No. 08*. Matsushima.

Matsushima, T. (1996). *Matsushima Mycological Memoirs, No. 09*. Matsushima.

Matsushima, T. (2003). *Matsushima Mycological Memoirs, No. 10*. Matsushima.

Mayers, C. G., Harrington, T. C., Masuya, H., Jordal, B. H., McNew, D. L., Shih, H. H., . . . Kietzka, G. J. (2020a). Patterns of coevolution between ambrosia beetle mycangia and the Ceratocystidaceae, with five new fungal genera and seven new species. *Persoonia, 44*, 41–66. https://doi.org/10.3767/persoonia.2020.44.02

Mayers, C. G., Harrington, T. C., McNew, D. L., Roeper, R. A., Biedermann, P. H. W., Masuya, H., & Bateman, C. C. (2020b). Four mycangium types and four genera of ambrosia fungi suggest a complex history of fungus farming in the ambrosia beetle tribe *Xyloterini*. *Mycologia, 112*(6), 1104–1137. https://doi.org/10.1080/00275514.2020.1755209

Maymon, M., Sela, N., Shpatz, U., Galpaz, N., & Freeman, S. (2020). The origin and current situation of *Fusarium oxysporum* f. sp. *cubense* tropical race 4 in Israel and the Middle East. *Scientific Reports, 10*(1), 1590. https://doi.org/10.1038/s41598-020-58378-9

Mazur, J. E., & Judson, M. A. (2001). A case report of a *Dactylaria* fungal infection in a lung transplant patient. *Chest, 119*(2), 651–653. https://doi.org/10.1378/chest.119.2.651

Mazzaglia, A., Anselmi, N., Vicario, S., & Vannini, A. (2001). Sequence analysis of the 5.8S rDNA and ITS regions in evaluating genetic relationships among some species of *Hypoxylon* and related genera. *Mycological Research, 105*, 670–675. https://doi.org/10.1017/S0953756201004142

McAlpine, D. (1903). Australian fungi, new or unrecorded. Decades V-VII. *Proceedings of the Linnean Society of New South Wales, 28*, 553–563.

McKenzie, E. H. C. (1991). Dematiaceous hyphomycetes on *Freycinetia* (Pandanaceae). 3. *Chalarodes* gen. nov. *Mycotaxon, 42*, 89–93.

McKenzie, E. H. C., Pinnoi, A., Wong, M. K. M., Hyde, K. D., & Jones, G. J. (2002). Two new hyaline *Chalara* species, and a key to species described since 1975. *Fungal Diversity, 11*, 129–139.

Medlar, E. M. (1915). A new fungus, *Phialophora verrucosa*, pathogenic for man. *Mycologia, 7*(4), 200–203. https://doi.org/10.1080/00275514.1915.12021711

Meeboon, J., & Takamatsu, S. (2017). *Microidium phyllanthi-reticulati* sp. nov. on *Phyllanthus reticulatus*. *Mycotaxon, 132*(2), 289–297.

Mel'nik, V., Lee, S., Groenewald, J. Z., & Crous, P. W. (2004). New hyphomycetes from Restionaceae in fynbos: *Parasarcopodium ceratocaryi* gen. et sp. nov., and *Rhexodenticula elegiae* sp. nov. *Mycological Progress, 3*(1), 19–28. https://doi.org/10.1007/s11557-006-0072-1

Melin, E., & Nannfeldt, J. A. (1934). Researches into the Blueing of ground wood-pulp. *Svenska Skogsvårdsföreningens Tidskrift, 32*, 397–616.

Miller, A., & Réblová, M. (2021). Phylogenetic placement of Iodosphaeriaceae (Xylariales, Ascomycota), designation of an epitype for the type species of *Iodosphaeria*, *I. phyllophila*, and description of *I. foliicola* sp. nov. *Fungal Systematics and Evolution, 8*(5), 49–64. https://doi.org/10.3114/fuse.2021.08.05

Minnis, A. M., & Lindner, D. L. (2013). Phylogenetic evaluation of *Geomyces* and allies reveals no close relatives of *Pseudogymnoascus destructans*, comb. nov., in bat hibernacula of eastern North America. *Fungal Biology, 117*(9), 638–649. https://doi.org/10.1016/j.funbio.2013.07.001

Minter, D. W., & Holubová-Jechová, V. (1981). New or interesting Hyphomycetes on decaying pine litter from Czechoslovakia. *Folia Geobotanica et Phytotaxonomica, 16*(2), 195–217. https://doi.org/10.1007/bf02851863

Monkai, J., Promputtha, I., Kodsueb, R., Chukeatirote, E., McKenzie, E. H. C., & Hyde, K. D. (2013). Fungi on decaying leaves of *Magnolia liliifera* and *Cinnamomum iners* show litter fungi to be hyperdiverse. *Mycosphere, 4*(2), 292–301. https://doi.org/10.5943/mycosphere/4/2/12

Monteiro, J. S., Gusmão, L. F. P., & Castañeda-Ruiz, R. F. (2014). *Helicodochium*, a new microfungus from submerged wood in Brazil. *Mycotaxon, 127*(1), 5–9.

Moore, D., Robson, G. D., & Trinci, A. P. J. (2011). *21st Century Guidebook to Fungi with CD* (1st ed.). Cambridge University Press.

Moore, R. (1987). Micromorphology of yeasts and yeast-like fungi and its taxonomic implications. *Studies in Mycology, 30*, 203–226.

Moreira, G. M., Abreu, L. M., Carvalho, V. G., Schroers, H. J., & Pfenning, L. H. (2016). Multilocus phylogeny of *Clonostachys* subgenus *Bionectria* from Brazil and description of *Clonostachys chloroleuca* sp nov. *Mycological Progress, 15*(10-11), 1031–1039.

Morelet, M. (1968). Sur L'illÉgitimitÉ Du Genre *Phragmographium* (Stilbellaceae). *Taxon, 17*(5), 528. https://doi.org/10.2307/1216052

Morelet, M. (2001). *Beltrania* Penzig: *B. magnoliae* sp. nov., with a taxonomic key to species. *Cryptogamie Mycologie, 22*(1), 29–33. https://doi.org/10.1016/S0181-1584(01)01058-2

Morgan-Jones, G. (1977). Notes on Hyphomycetes. XVIII. *Chaetoblastophorum ingramii* gen. et sp. nov. and *Cylindrotrichum oblongisporum* sp. nov. *Mycotaxon, 5*(2), 484–490.

Morgan-Jones, G., Sinclair, R. C., & Eicker, A. (1987). Notes on hyphomycetes. LII. *Stellomyces*, a new denticulate genus from the transvaal, South Africa. *Mycotaxon, 28*(2), 447–451.

Morgan-Jones, G., Verma, K., & Verma, R. K. (1986). *Goosiella*, a new pteridicolous, helicosporous hyphomycete genus from Madhya Pradesh, India. *Mycologia, 78*(3), 496–500. https://doi.org/10.1080/00275514.1986.12025278

Morris, E. F. (1966). Studies on the synnematous fungi imperfecti. I. *Mycopathologia et Mycologia Applicata*, *28*(1), 97–101. https://doi.org/10.1007/BF02276035

Morris, E. F., & Finley, D. E. (1967). Two new genera of Stilbellaceous fungi. *The American Midland Naturalist, 77*(1), 200–204. https://doi.org/10.2307/2423439

Mostert, L., Groenewald, J. Z., Summerbell, R. C., Gams, W., & Crous, P. W. (2006). Taxonomy and pathology of *Togninia* (Diaporthales) and its *Phaeoacremonium* anamorphs. *Studies in Mycology, 54*, 1–113. https://doi.org/10.3114/sim.54.1.1

Motiejunaite, J. (2006). *Graphium samogiticum* - a new hyphomycete species from Lithuania. *Nova Hedwigia, 83*(1-2), 249–252. https://doi.org/10.1127/0029-5035/2006/0083-0249

Mouchacca, J., & Gams, W. (1993). The hyphomycete genus *Cladorrhinum* and its teleomorph connections. *Mycotaxon, 48*, 415–440.

Moussa, T. A. A., Al-Zahrani, H. S., Kadasa, N. M. S., Moreno, L. F., Gerrits van den Ende, A. H. G., de Hoog, G. S., . . . Al-Hatmi, A. M. S. (2017a). Nomenclatural notes on *Nadsoniella* and the human opportunist black yeast genus *Exophiala*. *Mycoses, 60*(6), 358–365. https://doi.org/10.1111/myc.12600

Moussa, T. A. A., Gerrits van den Ende, B. H. G., Al Zahrani, H. S., Kadasa, N. M. S., de Hoog, S. G., & Dolatabadi, S. (2017b). The genus *Anthopsis* and its phylogenetic position in Chaetothyriales. *Mycoses, 60*(4), 254–259. https://doi.org/10.1111/myc.12591

Moustafa, A. F. (1976). *Hyalocladium*, a new hyphomycete genus from Kuwait. *Transactions of the British Mycological Society, 67*(3), 537–539. https://doi.org/10.1016/S0007-1536(76)80193-3

Muchovej, J. J., & Della Lucia, T. M. C. (1990). *Escovopsis*, a new genus from leaf cutting ant nests to replace *Phialocladus* nomen invalidum. *Mycotaxon, 37*, 191–195.

Muggia, L., Mancinelli, R., Tønsberg, T., Jablonska, A., Kukwa, M., & Palice, Z. (2017). Molecular analyses uncover the phylogenetic placement of the lichenized hyphomycetous genus *Cheiromycina*. *Mycologia, 109*(4), 588–600. https://doi.org/10.1080/00275514.2017.1397476

Mukerji, K. G. (1973). The nomenclatural status and synonymy of *Acremoniella serpentina* and *Sporormia cainia*. *Transactions of the Mycological Society of Japan, 14*, 175–176.

Mulder, J. L. (1975). *Spiralum*, a new genus from Asia. *Transactions of the British Mycological Society, 65*(3), 517–521. https://doi.org/10.1016/S0007-1536(75)80057-X

Munjal, R. L., & Kulshrestha, D. D. (1969). *Mystrosporiella*: A new genus of hyphomycetes. *Mycopathologia et Mycologia Applicata, 39*(3), 355–357. https://doi.org/10.1007/BF02052802

Nag Raj, T. R. (1977). Miscellaneous microfungi. II. *Canadian Journal of Botany, 55*(7), 757–765. https://doi.org/10.1139/b77-091

Nagaraju, D., Kunwar, I., Suresh Kumar, G., & Manoharachary, C. (2012). *Hyalocephalotrichum*, a new hyphomycetous genus from India. *Journal of Mycology and Plant Pathology, 41*(4), 589–591.

Nagaraju, D., Kunwar, I., Sureshkumar, G., & Manoharachary, C. (2011). A new synnematous hyphomycetous fungus—*Bhadradriella* gen. nov. from India. *Journal of Mycology and Plant Pathology, 41*(2), 238.

Najafzadeh, M. J., Vicente, V. A., Sun, J., Meis, J. F., & De Hoog, G. S. (2011). *Fonsecaea multimorphosa* sp nov, a new species of Chaetothyriales isolated from a feline cerebral abscess. *Fungal Biology, 115*(10), 1066–1076. https://doi.org/10.1016/j.funbio.2011.06.007

Narumi-Saito, T., Hosoya, T., Sano, T., & Harada, Y. (2006). *Nervostroma*, gen. nov. in the Sclerotiniaceae, the teleomorph of *Cristulariella*, and *Hinomyces* anam. gen. nov. to accommodate the anamorph of *Grovesinia*: Reassessment of the genus *Cristulariella*. *Mycoscience, 47*(6), 351–359. https://doi.org/10.1007/s10267-006-0313-9

Nawawi, A. (1976a). *Condylospora* gen. nov., a hyphomycete from a foam sample. *Transactions of the British Mycological Society, 66*(2), 363–365. https://doi.org/10.1016/S0007-1536(76)80077-0

Nawawi, A. (1976b). *Filosporella* gen.nov., an aquatic hyphomycete. *Transactions of the British Mycological Society, 67*(1), 173–176. https://doi.org/10.1016/S0007-1536(76)80035-6

Nawawi, A. (1985a). Another aquatic hyphomycete genus from foam. *Transactions of the British Mycological Society, 85*(1), 174–177. https://doi.org/10.1016/S0007-1536(85)80172-8

Nawawi, A. (1985b). Basidiomycetes with branched, water-borne conidia. *Botanical Journal of the Linnean Society, 91*(1-2), 51–60. https://doi.org/10.1111/j.1095-8339.1985.tb01134.x

Nawawi, A., & Kuthubutheen, A. J. (1989). *Quadricladium aquaticum* gen. et sp. nov., an aquatic hyphomycete with tetraradiate conidia. *Mycotaxon, 34*(2), 489–495.

Nawawi, A., & Kuthubutheen, A. J. (1990). *Obeliospora*, a new genus of setose, phialosporous hyphomycetes with appendaged conidia. *Mycotaxon, 37*, 395–400.

Nawawi, A., Webster, J., & Davey, R. A. (1977). *Dendrosporomyces prolifer* gen. et sp.nov., a basidiomycete with branched conidia. *Transactions of the British Mycological Society, 68*(1), 59–63. https://doi.org/10.1016/S0007-1536(77)80152-6

Nees von Esenbeck, C. D. G. (1816). *System der Pilze und Schwämme*. Stahelschen buchhandlung.

Nekoduka, S., Kanematsu, S., Tanaka, K., Harada, Y., & Sano, T. (2012). Valdensia leaf blight of highbush blueberry caused by *Valdensinia heterodoxa*, a new fungal disease in Japan. *Journal of General Plant Pathology, 78*(3), 151–159.

Nekoduka, S., Tanaka, K., Harada, Y., & Sano, T. (2010). Phylogenetic affinity of *Mycochaetophora gentianae*, the causal fungus of brown leaf spot on gentian (*Gentiana triflora*), to *Pseudocercosporella*-like hyphomycetes in Helotiales. *Mycoscience, 51*(2), 123–133. https://doi.org/10.1007/s10267-009-0021-3

Nel, W. J., Duong, T. A., Wingfield, B. D., Wingfield, M. J., & de Beer, Z. W. (2018). A new genus and species for the globally important, multihost root pathogen *Thielaviopsis basicola*. *Plant Pathology, 67*(4), 871–882. https://doi.org/10.1111/ppa.12803

Nilsson, S. (1962). Some aquatic Hyphomycetes from South America. *Svensk Botanisk Tidskrift, 56*, 351–361.

Norvell, L. L., & Redhead, S. A. (1994). *Valdensinia heterodoxa* (Sclerotiniaceae) in the United States. *Canadian Journal of Forest Research, 24*(9), 1981–1983.

Novakova, A., Hubka, V., Dudova, Z., Matsuzawa, T., Kubatova, A., Yaguchi, T., & Kolarik, M. (2014). New species in *Aspergillus* section *Fumigati* from reclamation sites in Wyoming (USA) and revision of *A. viridinutans* complex. *Fungal Diversity, 64*(1), 253–274. https://doi.org/10.1007/s13225-013-0262-5

Novakova, A., & Kolarik, M. (2010). *Chrysosporium speluncarum*, a new species resembling *Ajellomyces capsulatus*, obtained from bat guano in caves of temperate Europe. *Mycological Progress*, *9*(2), 253–260. https://doi.org/10.1007/s11557-009-0634-0

Nylander, J. (2004). *MrModeltest v2. Program distributed by the author.* In

O'Neill, T. M., Shepherd, A., Inman, A. J., & Lane, C. R. (2004). Wilt of stock (*Matthiola incana*) caused by *Fusarium oxysporum* in the United Kingdom. *Plant Pathology, 53*(2), 262–262. https://doi.org/10.1046/j.1365-3059.2003.00967.x

Obanor, F., Neate, S., Simpfendorfer, S., Sabburg, R., Wilson, P., & Chakraborty, S. (2013). *Fusarium graminearum* and *Fusarium pseudograminearum* caused the 2010 head blight epidemics in Australia. *Plant Pathology, 62*(1), 79–91. https://doi.org/10.1111/j.1365-3059.2012.02615.x

Okada, G., Takematsu, A., & Takamura, Y. (1997). Phylogenetic relationships of the hyphomycete genera *Chaetopsina* and *Kionochaeta* based on 18S rDNA sequences. *Mycoscience, 38*(4), 409–420. https://doi.org/10.1007/BF02461681

Okane, I., & Nakagiri, A. (2007). Taxonomy of an anamorphic xylariaceous fungus from a termite nest found together with *Xylaria angulosa*. *Mycoscience, 48*(4), 240–249. https://doi.org/10.1007/s10267-007-0361-9

Olejnik, I. M., Ingrouille, M., & Faull, J. L. (1999). Numerical taxonomy of the sooty moulds *Leptoxyphium, Caldariomyces* and *Aithaloderma* based on micromorphology and physiology. *Mycological Research, 103*, 333–346. https://doi.org/10.1017/S0953756298007278

Olive, L. S. (1948). Taxonomic notes on Louisiana fungi—i. *Mycologia, 40*(1), 6–20. https://doi.org/10.1080/00275514.1948.12017688

Olivier, D. L. (1983). Phyllosphere fungi which capture wind-borne pollen grains. II. *Hexacladium corynephorum* gen. et sp.nov. *Transactions of the British Mycological Society, 80*(2), 237–245. https://doi.org/10.1016/S0007-1536(83)80006-0

Onofri, S. (1983). A new *Beltraniella* species from tropical forest litter. *Mycotaxon, 17*, 242–246.

Onofri, S., Lunghini, D., Rambelli, A., & Lustrati, L. (1981). New dematiaceous hyphomycetes from tropical rain forest litter. *Mycotaxon, 13*(2), 331–338.

Osono, T., Ishii, Y., Takeda, H., Seramethakun, T., Khamyong, S., To-Anun, C., . . . Kakishima, M. (2009). Fungal succession and lignin decomposition on *Shorea obtusa* leaves in a tropical seasonal forest in northern Thailand. *Fungal Diversity, 36*, 101–119.

Oudemans, C. A. J. A. (1903). Contributions à la flore mycologique des Pays-Bas XIX. *Nederlandsch kruidkundig archief. Serie 3, 13*(1), 851–928.

Overton, B. E., Stewart, E. L., & Geiser, D. M. (2006). Taxonomy and phylogenetic relationships of nine species of *Hypocrea* with anamorphs assignable to *Trichoderma* section *Hypocreanum*. *Studies in Mycology, 56*, 39–65. https://doi.org/10.3114/sim.2006.56.02

Paap, T., Burgess, T. I., McComb, J. A., Shearer, B. L., & Hardy, G. E. S. J. (2008). *Quambalaria* species, including *Q. coyrecup* sp nov., implicated in canker and shoot blight diseases causing decline of *Corymbia* species in the southwest of Western Australia. *Mycological Research, 112*, 57–69. https://doi.org/10.1016/j.mycres.2007.10.005

Paciura, D., de Beer, Z. W., Jacobs, K., Zhou, X. D., Ye, H., & Wingfield, M. J. (2010a). Eight new *Leptographium* species associated with tree-infesting bark beetles in China. *Persoonia, 25*, 94–108. https://doi.org/10.3767/003158510x551097

Paciura, D., Zhou, X. D., De Beer, Z. W., Jacobs, K., Ye, H., & Wingfield, M. J. (2010b). Characterisation of synnematous bark beetle-associated fungi from China, including *Graphium carbonarium* sp nov. *Fungal Diversity, 40*(1), 75–88. https://doi.org/10.1007/s13225-009-0004-x

Paden, J. W. (1984). A new genus of hyphomycetes with teleomorphs in the Sarcoscyphaceae (Pezizales, Sarcoscyphineae). *Canadian Journal of Botany, 62*(2), 211–218. https://doi.org/10.1139/b84-035

Page, R. D. M. (1996). TreeView: An application to display phylogenetic trees on personal computers. *Computer Applications in the Biosciences, 12*(4), 357–358. https://doi.org/10.1093/bioinformatics/12.4.357

Pal, V. K., Masood, A., Nasim, A., & Agarwal, D. K. (2006). *Corynecercospora*-a hitherto undescribed hyphomycetous genus. *Indian Phytopathology, 59*(4), 492–495.

Pan, R., Guan, M., Xu, D., Gao, X., Yan, X., & Liao, H. (2009). *Cylindrocladium* black rot caused by *Cylindrocladium parasiticum* newly reported on peanut in China. *Plant Pathology, 58*(6), 1176–1176. https://doi.org/10.1111/j.1365-3059.2009.02170.x

Papendorf, M. C. (1967). Two new genera of soil fungi from South Africa. *Transactions of the British Mycological Society, 50*(1), 69–75. https://doi.org/10.1016/S0007-1536(67)80065-2

Papendorf, M. C. (1969). *Leptodiscella africana* gen. et comb.nov. *Transactions of the British Mycological Society, 53*(1), 145–147. https://doi.org/10.1016/S0007-1536(69)80021-5

Papendorf, M. C., & Upadhyay, H. P. (1969). *Botryoderma lateritium* and B. *Rostratum* gen. et spp.nov. from soil in South Africa and Brazil. *Transactions of the British Mycological Society, 52*(2), 257–265. https://doi.org/10.1016/S0007-1536(69)80038-0

Park, M. J., Han, J. G., & Shin, H. D. (2008). A novel finding of powdery mildew caused by *Oidiopsis haplophylli* on spinach. *Plant Pathology, 57*(6), 1175–1175. https://doi.org/10.1111/j.1365-3059.2008.01914.x

Parker, K. G. (1959). *Verticillium hadromycosis* of deciduous tree fruits. *Plant disease reporter; suppl. 255*.

Patouillard, N. T., & Hariot, P. (1900). Énumération des champignons récoltés par M.A. Chevalier au Sénégal et dans le Soudan occidental. *Journal de Botanique (Morot), 14*, 234–246.

Paulin-Mahady, A. E., Harrington, T. C., & McNew, D. (2002). Phylogenetic and taxonomic evaluation of *Chalara*, *Chalaropsis*, and *Thielaviopsis* anamorphs associated with *Ceratocystis*. *Mycologia, 94*(1), 62–72. https://doi.org/10.2307/3761846

Paulus, B., Gadek, P., & Hyde, K. D. (2003). Two new species of *Dactylaria* (anamorphic fungi) from Australian rainforests and an update of species in *Dactylaria sensu lato*. *Fungal Diversity, 14*, 143–156.

Pegg, G. F., & Brady, B. L. (2002). *Verticillium wilts*. CABI Publishing.

Pegg, G. S., O'Dwyer, C., Carnegie, A. J., Burgess, T. I., Wingfield, M. J., & Drenth, A. (2008). *Quambalaria* species associated with plantation and native eucalypts in Australia. *Plant Pathology, 57*(4), 702–714. https://doi.org/10.1111/j.1365-3059.2008.01840.x

Pegg, K., Moore, N., & Bentley, S. (1996). Fusarium wilt of banana in Australia: A review. *Australian Journal of Agricultural Research, 47*(5), 637–650. https://doi.org/10.1071/AR9960637

Pei, W. H., Cao, J. F., Yang, M. Y., Zhao, Z. J., & Xue, S. M. (2015). First report of black rot of *Medicago saliva* caused by *Cylindrocladium parasiticum* (teleomorph *Calonectria ilicicola*) in Yunnan Province, China. *Plant Disease, 99*(6), 890–891. https://doi.org/10.1094/Pdis-11-14-1171-Pdn

Pelaez, F., & Castaneda Ruiz, R. F. (1996). *Amoenodochium humicola* anam. gen. et sp. nov., a new sporodochial hyphomycete from Indian soil. *Mycotaxon, 60*, 257–262.

Pelaez, F., Gonzalez, V., Platas, G., Sanchez-Ballesteros, J., & Rubio, V. (2008). Molecular phylogenetic studies within the Xylariaceae based on ribosomal DNA sequences. *Fungal Diversity, 31*, 111–134.

Pem, D., Gafforov, Y., Jeewon, R., Hongsanan, S., Promputtha, I., Doilom, M., & Hyde, K. D. (2018). Multigene phylogeny coupled with morphological characterization reveal two new species of *Holmiella* and taxonomic insights within Patellariaceae. *Cryptogamie, Mycologie, 39*(2), 193–209.

Penzig, O. (1882). *Beltrania*, un nuovo genere di Ifomiceti. *Nuovo Giornale Botanico Italiano, 14*(2), 72–75.

Pereira-Carvalho, R. C., Sepúlveda-Chavera, G., Armando, E. A. S., Inácio, C. A., & Dianese, J. C. (2009). An overlooked source of fungal diversity: Novel hyphomycete genera on trichomes of cerrado plants. *Mycological Research, 113*(2), 261–274. https://doi.org/10.1016/j.mycres.2008.11.005

Perera, R. H., Maharachchikumbura, S. S. N., Bhat, J. D., Al-Sadi, A. M., Liu, J. K., Hyde, K. D., . . . Liu, Z. Y. (2016). New species of *Thozetella* and *Chaetosphaeria* and new records of *Chaetosphaeria* and *Tainosphaeria* from Thailand. *Mycosphere, 7*(9), 1301–1321. https://doi.org/10.5943/mycosphere/7/9/5

Perez-Hernandez, A., Serrano-Alonso, Y., Aguilar-Perez, M. I., Gomez-Uroz, R., & Gomez-Vazquez, J. (2014). Damping-off and root rot of pepper caused by *Fusarium oxysporum* in Almeria Province, Spain. *Plant Disease, 98*(8), 1159–1160. https://doi.org/10.1094/Pdis-02-14-0212-Pdn

Perez-Sierra, A., Alvarez, L. A., Henricot, B., Garcia-Jimenez, J., & Armengol, J. (2006). *Cylindrocladium pauciramosum* causes root and collar rot of *Polygala myrtifolia* in Spain. *Plant Pathology, 55*(2), 298–298. https://doi.org/10.1111/j.1365-3059.2005.01277.x

Perrone, G., Susca, A., Cozzi, G., Ehrlich, K., Varga, J., Frisvad, J. C., . . . Samson, R. A. (2007). Biodiversity of *Aspergillus* species in some important agricultural products. *Studies in Mycology, 59*, 53–66. https://doi.org/10.3114/sim.2007.59.07

Persoon, C. H. (1794). Neuer Versuch einer systematischen Eintheilung der Schwämme. *Neues Magazin für die Botanik, 1*, 63–80.

Persoon, C. H. (1801). *Synopsis Methodica Fungorum*. Apud Henricum Dieterich.

Pesante, A. (1957). Osservazioni su una carie del platana. *Annali della Sperimentazione Agaria, 11*, 249–266.

Peterson, S. W., Jurjevic, Z., Bills, G. F., Stchigel, A. M., Guarro, J., & Vega, F. E. (2010). Genus *Hamigera*, six new species and multilocus DNA sequence based phylogeny. *Mycologia, 102*(4), 847–864. https://doi.org/10.3852/09-268

Petrak, F. (1949). Neue Hyphomyzeten-Gattungen aus Ekuador. *Sydowia, 3*, 259–266.

Pettersson, O. V., Leong, S. L. L., Lantz, H., Rice, T., Dijksterhuis, J., Houbraken, J., . . . Schnurer, J. (2011). Phylogeny and intraspecific variation of the extreme xerophile, *Xeromyces bisporus*. *Fungal Biology, 115*(11), 1100–1111. https://doi.org/10.1016/j.funbio.2011.06.012

Peyronel, B. (1918). Micromiceti di val Germanasca. *Nuovo Giornale Botanico Italiano, 25*, 405–464.

Peyronel, B. (1923). Sopra un singolare parassita polifago: *Valdensia heterodoxa* n. gen. et n. sp. *Le Stazioni Sperimentali Agrarie Italiane, 56*, 521–538.

Phadke, C. H., & Rao, V. G. (1980). *Pseudogliophragma*, a new genus of Hyphomycetes. *Norwegian Journal of Botany, 27*, 127–130.

Phookamsak, R., Boonmee, S., Norphanphoun, C., Wanasinghe, D. N., de Silva, N. I., Dayarathne, M. C., . . . Hyde, K. D. (2016). Schizothyriaceae. *Mycosphere, 7*(2), 154–189. https://doi.org/10.5943/mycosphere/7/2/7

Phookamsak, R., Hyde, K. D., Jeewon, R., Bhat, D. J., Jones, E. B. G., Maharachchikumbura, S. S. N., . . . Xu, J. (2019). Fungal diversity notes 929–1035: Taxonomic and phylogenetic contributions on genera and species of fungi. *Fungal Diversity, 95*(1), 1–273. https://doi.org/10.1007/s13225-019-00421-w

Piatek, M., Lutz, M., & Yorou, N. S. (2015). A molecular phylogenetic framework for *Anthracocystis* (Ustilaginales), including five new combinations (inter alia for the asexual *Pseudozyma flocculosa*), and description of *Anthracocystis grodzinskae* sp nov. *Mycological Progress, 14*(10). https://doi.org/10.1007/s11557-015-1114-3

Pinheiro, B. G., Hahn, R. C., Camargo, Z. P. d., & Rodrigues, A. M. (2020). Molecular tools for detection and identification of *Paracoccidioides* species: Current status and future perspectives. *Journal of Fungi, 6*(4), 293.

Pinnoi, A., Jones, E. B. G., McKenzie, E. H. C., & Hyde, K. D. (2003). Aquatic fungi from peat swamp palms: *Unisetosphaeria penguinoides* gen. et sp. nov., and three new *Dactylaria* species. *Mycoscience, 44*(5), 377–382. https://doi.org/10.1007/S10267-003-0124-1

Pinnoi, A., Lumyong, S., Hyde, K. D., & Jones, E. B. G. (2006). Biodiversity of fungi on the palm *Eleiodoxa conferta* in Sirindhorn peat swamp forest, Narathiwat, Thailand. *Fungal Diversity, 22*, 205–218.

Pinruan, U., Hyde, K. D., Lumyong, S., McKenzie, E. H. C., & Jones, E. B. G. (2007). Occurrence of fungi on tissues of the peat swamp palm *Licuala longicalycata*. *Fungal Diversity, 25*, 157–173.

Pinruan, U., Sakayaroj, J., Hyde, K. D., & Jones, E. B. G. (2008). *Thailandiomyces bisetulosus* gen. et sp nov (Diaporthales, Sordariomycetidae, Sordariomycetes) and its anamorph *Craspedodidymum*, is described based on nuclear SSU and LSU rDNA sequences. *Fungal Diversity, 29*, 89–98.

Pirozynski, K. A. (1962). *Circinotrichum* and *Gyrothrix*. *Mycological Papers, 84*, 1–28.

Pirozynski, K. A. (1963). *Beltrania* and related genera. *Mycological Papers*, *90*, 1–37.

Pirozynski, K. A. (1968). *Cryptophiale*, a new genus of Hyphomycetes. *Canadian Journal of Botany, 46*(9), 1123–1127. https://doi.org/10.1139/b68-148

Pirozynski, K. A. (1969). Reassessment of the genus *Amblyosporium*. *Canadian Journal of Botany, 47*(2), 325–334. https://doi.org/10.1139/b69-044

Pirozynski, K. A., & Patil, S. D. (1970). Some setose Hyphomycetes of leaf litter in south India. *Canadian Journal of Botany, 48*(3), 567–581. https://doi.org/10.1139/b70-079

Pitt, J. I. (1979). *Geosmithia* gen. nov. for *Penicillium lavendulum* and related species. *Canadian Journal of Botany, 57*(19), 2021–2030. https://doi.org/10.1139/b79-252

Pitt, J. I., Lantz, H., Pettersson, O. V., & Leong, S. L. L. (2013). *Xerochrysium* gen. nov and *Bettsia*, genera encompassing xerophilic species of *Chrysosporium*. *IMA Fungus*, *4*(2), 229–241. https://doi.org/10.5598/imafungus.2013.04.02.08

Pitt, J. I., & Taylor, J. W. (2016). (2441) Proposal to conserve the name *Aspergillus* (Fungi: Eurotiales: Trichocomaceae) with a conserved type to maintain also the name *Eurotium*. *Taxon, 65*(3), 631–632. https://doi.org/10.12705/653.17

Ploetz, R. C. (2015). *Fusarium* wilt of banana. *Phytopathology®, 105*(12), 1512–1521. https://doi.org/10.1094/phyto-04-15-0101-rvw

Polizzi, G., Aiello, D., Castello, I., Parlavecchio, G., Vitale, A., & Nigro, F. (2009a). First report of crown rot caused by *Cylindrocladium pauciramosum* on scarlet honey myrtle in Italy. *Plant Disease, 93*(11), 1217–1217. https://doi.org/10.1094/Pdis-93-11-1217a

Polizzi, G., Aiello, D., Guarnaccia, V., Vitale, A., Perrone, G., & Stea, G. (2010). First report of *Fusarium* wilt of paper flower (*Bougainvillea glabra*) caused by *Fusarium oxyporum* in Italy. *Plant Disease, 94*(4), 483–483. https://doi.org/10.1094/Pdis-94-4-0483a

Polizzi, G., Vitale, A., Aiello, D., Castello, I., Guarnaccia, V., & Parlavecchio, G. (2009b). First record of crown and root rot caused by *Cylindrocladium pauciramosum* on brush cherry in Italy. *Plant Disease, 93*(5), 547–547. https://doi.org/10.1094/Pdis-93-5-0547a

Polizzi, G., Vitale, A., Castello, I., Groenewald, J. Z., & Crous, P. W. (2006). *Cylindrocladium* leaf spot, blight, and crown rot, new diseases of mastic tree seedlings caused by *Cylindrocladium scoparium*. *Plant Disease, 90*(8), 1110–1110. https://doi.org/10.1094/Pd-90-1110b

Ponnappa, K. M. (1975). *Parasympodiella* gen.nov. *Transactions of the British Mycological Society, 64*(2), 344–345. https://doi.org/10.1016/S0007-1536(75)80126-4

Prabhugaonkar, A., & Bhat, D. J. (2009). *Rattania setulifera*, an undescribed endophytic hyphomycete on rattans from Western Ghats, India. *Mycotaxon, 108*(1), 217–222.

Pratibha, J. (2013). *Jayarambhatia rhizophorae* gen. et sp. nov., an asexually reproducing fungus from Goa, India. *Mycotaxon, 125*(1), 139–144.

Pratibha, J., Bhat, D. J., & Prabhugaonkar, A. (2016). Molecular phylogeny of *Speiropsis pedatospora*. *Mycosphere, 7*(5), 679–686. https://doi.org/10.5943/mycosphere/7/5/12

Pratibha, J., Hyde, K. D., & Bhat, D. J. (2004). *Ceeveesubramaniomyces*, a new dematiaceous hyphomycete genus from India. *Kavaka, 32,* 21–26.

Pratibha, J., Nguyen, H. D. T., Mel'nik, V. A., Bhat, D. J., White, G. P., & Seifert, K. A. (2015). Lectotypification, epitypification, and molecular phylogeny of the synnematous hyphomycete *Pseudogliophragma indicum*, the second genus in the Wiesneriomycetaceae. *Mycoscience, 56*(4), 387–395. https://doi.org/10.1016/j.myc.2014.12.002

Pratibha, J., & Prabhugaonkar, A. (2017). Notes on two rare fungal isolates from Western Ghats, Goa India. *Kavaka, 49*, 28–31.

Pratibha, S. J., Gawas, P., Shenoy, B. D., Hyde, K. D., & Bhat, D. J. (2005). *Chalara indica* sp nov and *Sorocybe indicus* sp nov from India. *Cryptogamie Mycologie, 26*(2), 97–103.

Preuss, G. T. (1851). Übersicht untersuchter Pilze, besonders aus der Umgegend von Hoyerswerda. *Linnaea, 24*, 99–153.

Prillieux, É. E. (1891). *Endoconidium temulentum nov. gen., nov. sp. Prillieux et Delacroix-champignon donnant au seigle des propriétés vénéneuses*.

Printzen, C. (2007). New records of *Cheiromycina* species, a genus of lichenized hyphomycetes, with *C. reimeri* sp nov and a revised key to the species. *Nova Hedwigia, 84*(1-2), 261–267. https://doi.org/10.1127/0029-5035/2007/0084-0261

Priya, S., Nagaveni, H., Kunwar, I., & Manoharachary, I. (2011). A new pathogenic species of *Beltraniella* from India. *Journal of Mycology and Plant Pathology, 41*(1), 20–23.

Promputtha, I., Hyde, K., Lumyong, P., Ehc, M., & Lumyong, S. (2003). *Dokmaia monthadangii* gen. et sp. nov., a synnematous anamorphic fungus on *Manglietia garrettii*. *Sydowia, 55*(1), 99–103.

Promputtha, I., Lumyong, S., Lumyong, P., McKenzie, E. H. C., & Hyde, K. D. (2002). Fungal succession on senescent leaves of *Manglietia garrettii* in Doi Suthep-Pui National Park, northern Thailand. *Fungal Diversity, 10*, 89–100.

Puja, G., Shenoy, B. D., Hyde, K. D., & Bhat, D. J. (2006). *Echinosphaeria macrospora* sp nov., teleomorph of *Vermiculariopsiella endophytica* sp nov. *Cryptogamie Mycologie, 27*(1), 11–20.

Punithalingam, E., & Spooner, B. M. (2011). *Miricatena prunicola* (Hyphomycetes), a new genus and species causing leaf spots of *Prunus serotina* in the UK. *Kew Bulletin, 66*(4), 637–642.

Qiao, M., Du, X., Zhang, Z., Xu, J., & Yu, Z. (2018). Three new species of soil-inhabiting *Trichoderma* from southwest China. *Mycokeys, 44*, 63–80.

Qiao, M., Zheng, H., Zhang, Z., & Yu, Z.-F. (2019). *Seychellomyces sinensis* sp. nov. from China. *Mycotaxon, 134*(2), 391–398.

Quaedvlieg, W., Binder, M., Groenewald, J. Z., Summerell, B. A., Carnegie, A. J., Burgess, T. I., & Crous, P. W. (2014). Introducing the consolidated species concept to resolve species in the Teratosphaeriaceae. *Persoonia, 33*, 1–40. https://doi.org/10.3767/003158514x681981

Quan, Y., Muggia, L., Moreno, L. F., Wang, M., Al-Hatmi, A. M. S., Menezes, N. d. S., . . . de Hoog, S. (2020). A re-evaluation of the Chaetothyriales using criteria of comparative biology. *Fungal Diversity, 103*(1), 47–85. https://doi.org/10.1007/s13225-020-00452-8

Quandt, C. A., Kepler, R. M., Gams, W., Araujo, J. P. M., Ban, S., Evans, H. C., . . . Spatafora, J. W. (2014). Phylogenetic-based nomenclatural proposals for Ophiocordycipitaceae (Hypocreales) with new combinations in *Tolypocladium*. *IMA Fungus, 5*(1), 121–134. https://doi.org/10.5598/imafungus.2014.05.01.12

Quijada, L., Johnston, P. R., Cooper, J. A., & Pfister, D. H. (2018). Overview of Phacidiales, including *Aotearoamyces* gen. nov. on Nothofagus. *IMA Fungus, 9*(2), 371–382. https://doi.org/10.5598/imafungus.2018.09.02.08

Rainer, J., & De Hoog, G. S. (2006). Molecular taxonomy and ecology of *Pseudallescheria*, *Petriella* and *Scedosporium prolificans* (Microascaceae) containing opportunistic agents on humans. *Mycological Research, 110*, 151–160. https://doi.org/10.1016/j.mycres.2005.08.003

Rainer, J., & Kaltseis, J. (2010). Diversity in *Scedosporium dehoogii* (Microascaceae): *S. deficiens* sp. nov. *Sydowia*, *62*(1), 137–147.

Rajeev, S., Sutton, D. A., Wickes, B. L., Miller, D. L., Giri, D., Meter, M. V., . . . Guarro, J. (2009). Isolation and characterization of a new fungal species, *Chrysosporium ophiodiicola*, from a mycotic granuloma of a black rat snake (Elaphe obsoleta obsoleta). *Journal of Clinical Microbiology, 47*(4), 1264–1268. https://doi.org/10.1128/JCM.01751-08

Rajeshkumar, K. C., Crous, P. W., Groenewald, J. Z., & Seifert, K. A. (2016a). Resolving the phylogenetic placement of *Porobeltraniella* and allied genera in the *Beltraniaceae*. *Mycological Progress*, *15*(10), 1119–1136. https://doi.org/10.1007/s11557-016-1234-4

Rajeshkumar, K. C., Marathe, S. D., Madhusudhanan, K., & Castaneda-Ruiz, R. F. (2016b). Taxonomic re-evaluation and phylogenetic position of *Hemibeltrania cinnamomi* within Xylariales. *Mycotaxon*, *131*(1), 87–94. https://doi.org/10.5248/131.87

Rakeman, J. L., Bui, U., Lafe, K., Chen, Y.-C., Honeycutt, R. J., & Cookson, B. T. (2005). Multilocus DNA sequence comparisons rapidly identify pathogenic molds. *Journal of Clinical Microbiology, 43*(7), 3324–3333. https://doi.org/10.1128/JCM.43.7.3324-3333.2005

Ramaley, A. W. (1996). *Comminutispora* gen. nov. and its *Hyphospora* gen. nov. anamorph. *Mycologia, 88*(1), 132–136. https://doi.org/10.1080/00275514.1996.12026633

Ramaley, A. W. (2002). *Stomiopeltopsis nolinae* and its synanamorph *Parvosympodium nolinae* from leaves of Nolina (Agavaceae). *Mycotaxon, 83*, 327–334.

Rambaut, A. (2017). *Molecular evolution, phylogenetics and epidemiology*. http://tree.bio.ed.ac.uk/

Rambelli, A., & Ciccarone, C. (2008). New and interesting dematiaceous hyphomycetes from Costa Rica forest litters. *Quaderni di Botanica Ambientale e Applicata, 19,* 125–152.

Rampersad, S. N. (2008). First report of *Verticillium dahliae* causing wilt in pumpkin in Trinidad. *Plant Disease, 92*(7), 1136–1136. https://doi.org/10.1094/Pdis-92-7-1136a

Rangel, E. (1917). Algunos fungos nobas do Brasil. *Arquivos do Jardim Botânico do Rio de Janeiro, 2*, 69–74.

Rannala, B., & Yang, Z. (1996). Probability distribution of molecular evolutionary trees: A new method of phylogenetic inference. *Journal of Molecular Evolution, 43*(3), 304–311. https://doi.org/10.1007/BF02338839

Ranzoni, F. V. (1953). The aquatic hyphomycetes of California. *Farlowia, 4*, 353–398.

Rao, N. K., Manoharachary, C., & Goos, R. D. (1988). Forest litter hyphomycetes from Andhra Pradesh, India. III. a new synnematous hyphomycete. *Mycologia, 80*(6), 896–899. https://doi.org/10.1080/00275514.1988.12025748

Rashmi, D., Pandey, A., & Manoharachary, C. (2011). *Beltramono*-a hitherto undescribed hyphomycetes genus. *Journal of Mycopathological Research, 49*(2), 321–324.

Réblová, M. (1999). Studies in *Chaetosphaeria* sensu lato. III. *Umbrinosphaeria* gen. nov. and *Miyoshiella* with *Sporidesmium* anamorphs. *Mycotaxon, 71*, 13–43.

Réblová, M. (2000). The genus *Chaetosphaeria* and its anamorphs. *Studies in Mycology, 45*, 149–168.

Réblová, M. (2009). Teleomorph of *Rhodoveronaea* (Sordariomycetidae) discovered and re-evaluation of *Pleurophragmium*. *Fungal Diversity, 36*, 129–139.

Réblová, M. (2014). *Sporoschismopsis angustata* sp nov., a new holomorph species in the Reticulascaceae (Glomerellales), and a reappraisal of *Sporoschismopsis*. *Mycological Progress, 13*(3), 671–681. https://doi.org/10.1007/s11557-013-0949-8

Réblová, M., Barr, M., & Samuels, G. (1999). Chaetosphaeriaceae, a new family for *Chaetosphaeria* and its relatives. *Sydowia, 51*(1), 49–70.

Réblová, M., & Gams, W. (1999). Teleomorph-anamorph connections in Ascomycetes. 1. *Cylindrotrichum* and *Cacumisporium* anamorphs of *Chaetosphaeria*. *Publication of the Czech Scientific Society for Mycology, 51*(1), 1–40.

Réblová, M., Gams, W., & Seifert, K. A. (2011a). *Monilochaetes* and allied genera of the Glomerellales, and a reconsideration of families in the Microascales. *Studies in Mycology, 68*, 163–191. https://doi.org/10.3114/sim.2011.68.07

Réblová, M., Gams, W., & Stepanek, V. (2011b). The new hyphomycete genera *Brachyalara* and *Infundichalara*, the similar *Exochalara* and species of '*Phialophora* sect. *Catenulatae*' (Leotiomycetes). *Fungal Diversity, 46*(1), 67–86. https://doi.org/10.1007/s13225-010-0077-6

Reblova, M., Jaklitsch, W. M., Reblova, K., & Stepanek, V. (2015). Phylogenetic reconstruction of the Calosphaeriales and Togniniales using five genes and predicted RNA secondary structures of ITS, and *Flabellascus tenuirostris* gen. et sp. nov. *PloS One, 10*, e0144616.

Réblová, M., Kolařík, M., Nekvindová, J., Miller, A. N., & Hernández-Restrepo, M. (2021a). Phylogeny, global biogeography and pleomorphism of *Zanclospora*. *Microorganisms, 9*(4), 706.

Réblová, M., Miller, A. N., Rossman, A. Y., Seifert, K. A., Crous, P. W., Hawksworth, D. L., . . . Wijayawarden, N. N. (2016a). Recommendations for competing sexual-asexually typified generic names in Sordariomycetes (except Diaporthales, Hypocreales, and Magnaporthales). *IMA Fungus*, *7*(1), 131–153. https://doi.org/10.5598/imafungus.2016.07.01.08

Réblová, M., Mostert, L., Gams, W., & Crous, P. W. (2004). New genera in the *Calosphaeriales*: *Togniniella* and its anamorph *Phaeocrella*, and *Calosphaeriophora* as anamorph of *Calosphaeria*. *Studies in Mycology, 50*, 533–550.

Réblová, M., Nekvindová, J., & Hernández-Restrepo, M. (2021b). Reflections on *Menisporopsis*, *Multiguttulispora* and *Tainosphaeria* using molecular and morphological data. *Journal of Fungi*, *7*(6), 438.

Réblová, M., & Seifert, K. A. (2003). Six new species of *Chaetosphaeria* from tropical rain forests in Thailand and redescription of *Chaetosphaeria hiugensis*. *Sydowia, 55*(2), 313–347.

Réblová, M., & Seifert, K. A. (2011). Discovery of the teleomorph of the hyphomycete, *Sterigmatobotrys macrocarpa,* and epitypification of the genus to holomorphic status. *Studies in Mycology, 68,* 193–202. https://doi.org/10.3114/sim.2011.68.08

Réblová, M., Seifert, K. A., Fournier, J., & Štěpánek, V. (2012). Phylogenetic classification of *Pleurothecium* and *Pleurotheciella* gen. nov. and its dactylaria-like anamorph (Sordariomycetes) based on nuclear ribosomal and protein-coding genes. *Mycologia, 104*(6), 1299–1314. https://doi.org/10.3852/12-035

Réblová, M., Seifert, K. A., Fournier, J., & Štěpánek, V. (2016b). Newly recognised lineages of perithecial ascomycetes: The new orders Conioscyphales and Pleurotheciales. *Persoonia, 37*(1), 57–81. https://doi.org/10.3767/003158516X689819

Réblová, M., Seifert, K. A., & White, G. P. (2006). *Chaetosphaeria tortuosa*, the newly discovered teleomorph of *Menispora tortuosa*, with a key to known *Menispora* species. *Mycological Research, 110,* 104–109. https://doi.org/10.1016/j.mycres.2005.09.003

Réblová, M., & Štěpánek, V. (2018). Introducing the Rhamphoriaceae, fam. nov. (Sordariomycetes), two new genera, and new life histories for taxa with *Phaeoisaria*- and *Idriella*-like anamorphs. *Mycologia, 110*(4), 750–770. https://doi.org/10.1080/00275514.2018.1475164

Réblová, M., Štěpánek, V., & Schumacher, R. K. (2014). *Xylochrysis lucida* gen. et sp nov., a new lignicolous ascomycete (Sordariomycetidae) with holoblastic conidiogenesis. *Mycologia, 106*(3), 564–572. https://doi.org/10.3852/13-266

Réblová, M., Untereiner, W. A., & Réblová, K. (2013). Novel evolutionary lineages revealed in the Chaetothyriales (fungi) based on multigene phylogenetic analyses and comparison of its secondary structure. *PloS One, 8*(5), e63547. https://doi.org/10.1371/journal.pone.0063547

Réblová, M., Untereiner, W. A., Štěpánek, V., & Gams, W. (2017). Disentangling *Phialophora* section *Catenulatae*: Disposition of taxa with pigmented conidiophores and recognition of a new subclass, Sclerococcomycetidae (Eurotiomycetes). *Mycological Progress, 16*(1), 27–46. https://doi.org/10.1007/s11557-016-1248-y

Reddy, S. M., & Reddy, S. S. (1977). A new species of *Codinea*. *Sydowia, 30*(1-6), 186–188.

Rehner, S. (2001). *Primers for Elongation Factor 1-α (EF1-α)*. http://ocid.NACSE.ORG/research/deephyphae/EF1primer.pdf

Rehner, S. A., & Samuels, G. J. (1994). Taxonomy and phylogeny of *Gliocladium* analysed from nuclear large subunit ribosomal DNA sequences. *Mycological Research, 98*(6), 625–634. https://doi.org/10.1016/S0953-7562(09)80409-7

Restrepo, A. M., Tobón Orozco, A. M., Gómez, B. L., & Benard, G. (2015). Paracoccidioidomycosis. In D. R. Hospenthal & M. G. Rinaldi (Eds.), *Diagnosis and Treatment of Fungal Infections* (pp. 225–236). Springer International Publishing. https://doi.org/10.1007/978-3-319-13090-3_19

Revay, A., & Gonczol, J. (2007). *Hyalocamposporium*, a new genus of hyphomycetes from submerged wood. *Fungal Diversity, 25*, 175–185.

Révay, Á., Gönczöl, J., & Descals, E. (2009). *Tulipispora ingoldii* (Hyphomycetes) gen. et sp. nov. from submerged wood. *Nova Hedwigia, 88*(1-2), 41–48. https://doi.org/10.1127/0029-5053/2009/0088-0041

Reynolds, D. R. (1989). *Briania* gen. nov. and *Briania fruticetum* sp. nov. *Pacific Science, 43*(2), 161–165.

Ribeiro, M. F., Rocha, F. B., & Barreto, R. W. (2007). First record of powdery mildew caused by *Oidiopsis haplophylli* on *Tropaeolum majus* in Brazil. *Plant Pathology, 56*(2), 355–355. https://doi.org/10.1111/j.1365-3059.2007.01529.x

Rice, A. V., & Currah, R. S. (2005a). *Oidiodendron*: A survey of the named species and related anamorphs of *Myxotrichum*. *Studies in Mycology, 53*, 83–120. https://doi.org/10.3114/sim.53.1.83

Rice, A. V., & Currah, R. S. (2005b). Profiles from Biolog FF plates and morphological characteristics support the recognition of *Oidiodendron fimicola* sp. nov. *Studies in Mycology, 53*, 75–82. https://doi.org/10.3114/sim.53.1.75

Rifai, M. A. (1968). The hyphomycete genus *Dactylaria* Sacc. *Reinwardtia, 7*(4), 357–374.

Rivera, K. G., & Seifert, K. A. (2011). A taxonomic and phylogenetic revision of the *Penicillium sclerotiorum* complex. *Studies in Mycology, 70*, 139–158. https://doi.org/10.3114/sim.2011.70.03

Robert, V., Decock, C., & Castañeda Ruíz, R. F. (2000). *Siamia luxuriosa* gen. et sp. nov., a new synnematous hyphomycete from Thailand. *Mycological Research, 104*(7), 893–895. https://doi.org/10.1017/S0953756299002129

Roberts, P. (1997). New Heterobasidiomycetes from Great Britain. *Mycotaxon, 63*, 195–216.

Rodrigues, A. M., Beale, M. A., Hagen, F., Fisher, M. C., Terra, P. P. D., de Hoog, S., . . . de Camargo, Z. P. (2020). The global epidemiology of emerging *Histoplasma* species in recent years. *Studies in Mycology, 97*, 100095. https://doi.org/10.1016/j.simyco.2020.02.001

Rodríguez-Andrade, E., Cano-Lira, J. F., Wiederhold, N., Pérez-Cantero, A., Guarro, J., & Stchigel, A. M. (2021). A revision of malbranchea-like fungi from clinical specimens in the United States of America reveals unexpected novelty. *IMA Fungus*, *12*(1), 25. https://doi.org/10.1186/s43008-021-00075-x

Rodríguez-Andrade, E., Stchigel, A. M., Terrab, A., Guarro, J., & Cano-Lira, J. F. (2019). Diversity of xerotolerant and xerophilic fungi in honey. *IMA Fungus, 10*, 1–30. https://doi.org/10.1186/s43008-019-0021-7

Roehrich, C. R., Jaklitsch, W. M., Voglmayr, H., Iversen, A., Vilcinskas, A., Nielsen, K. F., . . . Degenkolb, T. (2014). Front line defenders of the ecological niche! Screening the structural diversity of peptaibiotics from saprotrophic and fungicolous *Trichoderma*/*Hypocrea* species. *Fungal Diversity, 69*(1), 117–146. https://doi.org/10.1007/s13225-013-0276-z

Rogers, J. D., Ju, Y.-M., & San Martin, F. (1997). *Jumillera* and *Whalleya*, new genera segregated from *Biscogniauxia*. *Mycotaxon, 64*, 39–50.

Roldan, A., Descals, E., & Honrubia, M. (1989). Pure culture studies on *Tetracladium*. *Mycological Research, 93*, 452–465.

Roldán, A., & Honrubia, M. (1989). *Descalsia*, a new aquatic hyphomycete anamorph genus. *Mycological Research, 92*(4), 494–497. https://doi.org/10.1016/S0953-7562(89)80198-4

Roldán, A., Marvanová, L., & Honrubia, M. (1990). Two new hyphomycetes from Spanish streams. *Mycological Research, 94*(2), 243–248. https://doi.org/10.1016/S0953-7562(09)80622-9

Romero, A. I., Cabral, D., & Lopez, S. E. (1989). Studies on xylophilous fungi from Argentina. IV. Anamorphs of basidiomycetes on *Eucalyptus viminalis* (Myrtaceae). *Mycotaxon, 34*(2), 429–440.

Ronquist, F., Teslenko, M., van der Mark, P., Ayres, D. L., Darling, A., Höhna, S., . . . Huelsenbeck, J. P. (2012). MrBayes 3.2: Efficient Bayesian phylogenetic inference and model choice across a large model space. *Systematic Biology, 61*(3), 539–542.

Rosa, C. A., Jindamorakot, S., Limtong, S., Nakase, T., Lachance, M.-A., Fidalgo-Jiménez, A., . . . Morais, P. B. (2009). Synonymy of the yeast genera *Moniliella* and *Trichosporonoides* and proposal of *Moniliella fonsecae* sp. nov. and five new species combinations. *International Journal of Systematic and Evolutionary Microbiology, 59*(2), 425–429. https://doi.org/10.1099/ijs.0.65117-0

Rossi, W., & Blackwell, M. (1990). Fungi associated with African earwigs and their relationship to South American Forms. *Mycologia, 82*(1), 138–140. https://doi.org/10.1080/00275514.1990.12025853

Rossman, A. Y., Adams, G. C., Cannon, P. F., Castlebury, L. A., Crous, P. W., Gryzenhout, M., . . . Walker, D. M. (2015a). Recommendations of generic names in Diaporthales competing for protection or use. *IMA Fungus, 6*(1), 145–154. https://doi.org/10.5598/imafungus.2015.06.01.09

Rossman, A. Y., Allen, W. C., Braun, U., Castlebury, L. A., Chaverri, P., Crous, P. W., . . . White, J. F. (2016). Overlooked competing asexual and sexually typified generic names of Ascomycota with recommendations for their use or protection. *IMA Fungus, 7*(2), 289–308. https://doi.org/10.5598/imafungus.2016.07.02.09

Rossman, A. Y., Crous, P. W., Hyde, K. D., Hawksworth, D. L., Aptroot, A., Bezerra, J. L., . . . Zhang, Y. (2015b). Recommended names for pleomorphic genera in Dothideomycetes. *IMA Fungus, 6*(2), 507–523. https://doi.org/10.5598/imafungus.2015.06.02.14

Rossman, A. Y., Samuels, G. J., Rogerson, C. T., & Lowen, R. (1999). *Genera of Bionectriaceae, Hypocreaceae and Nectriaceae (Hypocreales, Ascomycetes)* (Vol. 42). Centraalbureau voor Schimmelcultures (CBS).

Rossman, A. Y., Seifert, K. A., Samuels, G. J., Minnis, A. M., Schroers, H. J., Lombard, L., . . . Chaverri, P. (2013). Genera in Bionectriaceae, Hypocreaceae, and Nectriaceae (Hypocreales) proposed for acceptance or rejection. *IMA Fungus, 4*(1), 41–51. https://doi.org/10.5598/imafungus.2013.04.01.05

Roy, R. Y., & Leelavathy, K. M. (1966). *Phialotubus microsporus* gen. et sp.nov., from soil. *Transactions of the British Mycological Society, 49*(3), 495–498. https://doi.org/10.1016/S0007-1536(66)80095-5

Rudolph, B. A. (1931). *Verticillium* hadromycosis. *Hilgardia, 5*(9), 197–361.

Ruiz, R. F. C., Minter, D. W., Stadler, M., Saikawa, M., & Camino-Vilaro, M. (2006). Anamorphic fungi from submerged leaves in Cuba: *Brevicatenospora enteroproliferata* gen. et. sp. nov. and *Beltraniopsis aquatica* sp. nov. *Mycotaxon, 96*, 151–158.

Ruiz, R. F. C., Velasquez, S., Cano, J., Saikawa, M., & Guarro, J. (2002). *Phaeoisaria aguilerae* anam. sp nov from submerged wood in Cuba with notes and reflections in the genus *Phaeoisaria*. *Cryptogamie Mycologie, 23*(1), 9–18.

Rukachaisirikul, V., Kaewbumrung, C., Phongpaichit, S., & Hajiwangoh, Z. (2005). Eudesmane sesquiterpenes from the aquatic fungus *Beltrania rhombica*. *Chemical & Pharmaceutical Bulletin, 53*(2), 238–240. https://doi.org/10.1248/cpb.53.238

Saccardo, P. A. (1880). Conspectus generum fungorum Italiae inferiorum nempe ad Sphaeropsideas, Melanconieas et Hyphomyceteas pertinentium systemate sporologico dispositorum. *Michelia, 2*, 1–38.

Saccardo, P. A. (1882). Fungi boreali-americani. *Michelia, 2*(8), 564–582.

Saccardo, P. A. (1884a). Miscellanea Mycologica V. *Atti dell´Istituto Veneto Scienze, 2*, 460.

Saccardo, P. A. (1884b). *Sylloge fungorum omnium hucusque cognitorum* (Vol. 4). Sumptibus auctoris.

Saccardo, P. A. (1884c). Sylloge fungorum: Sylloge sphaeropsidearum et melanconiearum. *Sylloge Fungorum, 3*, 1–840.

Saikawa, M., & Kaneko, M. (1994). Electron microscopy of infection of nematodes by *Dactylaria haptotyla*. *Mycoscience, 35*(1), 89–94. https://doi.org/10.1007/BF02268534

Sakayaroj, J., Phongpaichit, S., & Jones, E. B. G. (2005). Viability and biodiversity of freshwater hyphomycetes in foam at Ton Nga Chang. Wildlife-Sanctuary, Songkhla, southern Thailand. *Fungal Diversity, 18*, 135–145.

Sakinah, M. A. I., & Latiffah, Z. (2013). First report of *Gliocephalotrichum bacillisporum* causing fruit rot of Rambutan (*Nephelium lappaceum*) in Malaysia. *Plant Disease, 97*(8), 1110–1111. https://doi.org/10.1094/Pdis-09-12-0831-Pdn

Saksena, S. B. (1954). A new genus of Moniliaceae. *Mycologia, 46*(5), 660–666.

Salgado-Salazar, C., Rossman, A. Y., & Chaverri, P. (2016). The genus *Thelonectria* (Nectriaceae, Hypocreales, Ascomycota) and closely related species with cylindrocarpon-like asexual states. *Fungal Diversity, 80*(1), 411–455. https://doi.org/10.1007/s13225-016-0365-x

Salkin, I. F., & Dixon, D. M. (1987). *Dactylaria constricta*: Description of two varieties. *Mycotaxon, 29*, 377–381.

Salt, G. A. (1974). Etiology and morphology of *Geniculodendron pyriforme* gen. et sp.nov., a pathogen of conifer seeds. *Transactions of the British Mycological Society, 63*(2), 339–IN320. https://doi.org/10.1016/S0007-1536(74)80179-8

Samarakoon, M. C., Hyde, K. D., Promputtha, I., Hongsanan, S., Ariyawansa, H. A., Maharachchikumbura, S. S. N., . . . Mapook, A. (2016). Evolution of Xylariomycetidae (Ascomycota: Sordariomycetes). *Mycosphere, 7*(11), 1746–1761. https://doi.org/10.5943/mycosphere/7/11/9

Samson, R. A. (1974). *Paecilomyces* and some allied hyphomycetes. *Studies in Mycology, 6*, 1–119.

Samson, R. A., Houbraken, J., Varga, J., & Frisvad, J. C. (2009). Polyphasic taxonomy of the heat resistant ascomycete genus *Byssochlamys* and its *Paecilomyces* anamorphs. *Persoonia, 22*, 14–27. https://doi.org/10.3767/003158509x418925

Samson, R. A., Peterson, S. W., Frisvad, J. C., & Varga, J. (2011a). New species in *Aspergillus* section *Terrei*. *Studies in Mycology, 69*, 39–55. https://doi.org/10.3114/sim.2011.69.04

Samson, R. A., & Polonelli, L. (1978). *Myriodontium keratinophilum*, gen. et sp. nov. *Persoonia*, *9*(4), 505–509.

Samson, R. A., Varga, J., Meijer, M., & Frisvad, J. C. (2011b). New taxa in *Aspergillus* section *Usti*. *Studies in Mycology, 69*, 81–97. https://doi.org/10.3114/sim.2011.69.06

Samson, R. A., Varga, J., Witiak, S. M., & Geiser, D. M. (2007). The species concept in *Aspergillus*: Recommendations of an international panel. *Studies in Mycology, 59*, 71–73. https://doi.org/10.3114/sim.2007.59.09

Samson, R. A., Visagie, C. M., Houbraken, J., Hong, S. B., Hubka, V., Klaassen, C. H. W., . . . Frisvad, J. C. (2014). Phylogeny, identification and nomenclature of the genus *Aspergillus*. *Studies in Mycology, 78*, 141–173. https://doi.org/10.1016/j.simyco.2014.07.004

Samson, R. A., Yilmaz, N., Houbraken, J., Spierenburg, H., Seifert, K. A., Peterson, S. W., . . . Frisvad, J. C. (2011c). Phylogeny and nomenclature of the genus *Talaromyces* and taxa accommodated in *Penicillium* subgenus *Biverticillium*. *Studies in Mycology, 70*, 159–183. https://doi.org/10.3114/sim.2011.70.04

Samuels, G. J. (1988). Species of *Nectria* (Ascomycetes, Hypocreales) having orange perithecia and colorless, striate ascospores. *Brittonia, 40*(3), 306–331. https://doi.org/10.2307/2807484

Samuels, G. J., Candoussau, F., & Magni, J.-F. (1997). Fungicolous pyrenomycetes 2. *Ascocodinaea* gen. nov., and reconsideration of *Litschaueria*. *Mycologia, 89*(1), 156–162.

Samuels, G. J., Dodd, S. L., Lu, B.-S., Petrini, O., Schroers, H.-J., & Druzhinina, I. S. (2006a). The *Trichoderma koningii* aggregate species. *Studies in Mycology, 56*, 67–133. https://doi.org/10.3114/sim.2006.56.03

Samuels, G. J., Ismaiel, A., Mulaw, T. B., Szakacs, G., Druzhinina, I. S., Kubicek, C. P., & Jaklitsch, W. M. (2012). The *Longibrachiatum* clade of *Trichoderma*: A revision with new species. *Fungal Diversity, 55*(1), 77–108. https://doi.org/10.1007/s13225-012-0152-2

Samuels, G. J., Overton, B. E., & Gams, W. (2006b). *Hypocrea* and *Trichoderma* studies marking the 90th birthday of Joan M. Dingley. *Studies in Mycology, 56*, vi–ix. https://doi.org/10.1016/S0166-0616(14)60135-4

Samuels, G. J., Rogers, J. D., & Nagasawa, I. (1987). Studies in the Amphisphaeriaceae (sensu lato) 1. *Callodiscula japonica* and its anamorph, *Acanthodochium collodisculae*. *Mycotaxon, 28*(2), 453–459.

San-Blas, G., Niño-Vega, G., & Iturriaga, T. (2002). *Paracoccidioides brasiliensis* and paracoccidioidomycosis: Molecular approaches to morphogenesis, diagnosis, epidemiology, taxonomy and genetics. *Medical Mycology, 40*(3), 225–242. https://doi.org/10.1080/mmy.40.3.225.242

Sandoval-Denis, M., Gené, J., Sutton, D. A., Cano-Lira, J. F., de Hoog, G. S., Decock, C. A., . . . Guarro, J. (2016). Redefining *Microascus*, *Scopulariopsis* and allied genera. *Persoonia - Molecular Phylogeny and Evolution of Fungi*, *36*(1), 1–36.

Sanoamuang, N., Jitjak, W., Rodtong, S., & Whalley, A. J. S. (2013). *Gelatinomyces siamensis* gen. sp nov (Ascomycota, Leotiomycetes, incertae sedis) on bamboo in Thailand. *IMA Fungus, 4*(1), 71–87. https://doi.org/10.5598/imafungus.2013.04.01.08

Sati, S. C., Arya, P., & Belwal, M. (2009). *Tetracladium nainitalense* sp nov., a root endophyte from Kumaun Himalaya, India. *Mycologia, 101*(5), 692–695. https://doi.org/10.3852/08-192

Sati, S. C., Pathak, R., & Belwal, M. (2014). Occurrence and distribution of Kumaun Himalayan aquatic hyphomycetes: *Lemonniera*. *Mycosphere, 5*(4), 545–553. https://doi.org/10.5943/mycosphere/5/4/7

Sati, S. C., & Tiwari, N. (1992). A new species of *Tricladium* from Kumaun Himalaya, India. *Mycological Research, 96*, 229–232.

Saurat, C., Fourrier, C., & Ioos, R. (2012). First report of blight disease on *Buxus* caused by *Cylindrocladium buxicola* in France. *Plant Disease, 96*(7), 1069–1069. https://doi.org/10.1094/Pdis-03-12-0242-Pdn

Scattolin, L., & Montecchio, L. (2007). First report of damping-off of common oak plantlets caused by *Cylindrocladiella parva* in Italy. *Plant Disease, 91*(6), 771–771. https://doi.org/10.1094/Pdis-91-6-0771b

Schenck, S., Kendrick, W. B., & Pramer, D. (1977). A new nematode-trapping hyphomycete and a reevaluation of *Dactylaria* and *Arthrobotrys*. *Canadian Journal of Botany, 55*(8), 977–985. https://doi.org/10.1139/b77-115

Scheuer, C., Bauer, R., Lutz, M., Stabentheiner, E., mel'nik, V. A., & Grube, M. (2008). *Bartheletia paradoxa* is a living fossil on *Ginkgo* leaf litter with a unique septal structure in the Basidiomycota. *Mycological Research, 112*(11), 1265–1279. https://doi.org/10.1016/j.mycres.2008.06.008

Schneider, R., & Arx, J. A. (1966). Zwei neue, als Erreger von Zweigsterben nachgewiesene Pilze: Kabatina thujae n. g., n. sp. und K. juniperi n. sp. *Journal of Phytopathology, 57*(2), 176–182. https://doi.org/10.1111/j.1439-0434.1966.tb04722.x

Schoch, C. L., Sung, G.-H., López-Giráldez, F., Townsend, J. P., Miadlikowska, J., Hofstetter, V., . . . Spatafora, J. W. (2009). The Ascomycota Tree of Life: A phylum-wide phylogeny clarifies the origin and evolution of fundamental reproductive and ecological traits. *Systematic Biology, 58*(2), 224–239. https://doi.org/10.1093/sysbio/syp020

Schroers, H.-J., Samuels, G. J., Seifert, K. A., & Gams, W. (1999). Classification of the mycoparasite *Gliocladium roseum* in *Clonostachys* as *C. rosea*, its relationship to *Bionectria ochroleuca*, and notes on other *Gliocladium*-like fungi. *Mycologia, 91*(2), 365–385. https://doi.org/10.1080/00275514.1999.12061028

Schroers, H. J. (2001). A monograph of *Bionectria* (Ascomycota, Hypocreales, Bionectriaceae) and its *Clonostachys* anamorphs. *Studies in Mycology, 46*, 1–211.

Schroers, H. J., Samuels, G. J., Zhang, N., Short, D. P. G., Juba, J., & Geiser, D. M. (2016). Epitypification of *Fusisporium* (*Fusarium*) solani and its assignment to a common phylogenetic species in the *Fusarium solani* species complex. *Mycologia, 108*(4), 806–819. https://doi.org/10.3852/15-255

Schultes, N. P., Murtishi, B., & Li, D. W. (2017). Phylogenetic relationships of *Chlamydomyces*, *Harzia*, *Olpitrichum*, and their sexual allies, *Melanospora* and *Sphaerodes*. *Fungal Biology, 121*(10), 890–904. https://doi.org/10.1016/j.funbio.2017.07.004

Schwartz, I. S., Kenyon, C., Feng, P., Govender, N. P., Dukik, K., Sigler, L., . . . de Hoog, G. S. (2015). 50 years of emmonsia disease in humans: The dramatic emergence of a cluster of novel fungal pathogens. *PLOS Pathogens, 11*(11), e1005198. https://doi.org/10.1371/journal.ppat.1005198

Seaver, F. J. (1942). Photographs and descriptions of cup-fungi—xxxvii. *Pezicula purpurascens*. *Mycologia, 34*(4), 412–415. https://doi.org/10.1080/00275514.1942.12020911

Seifert, K. A. (1985a). A monograph of *Stilbella* and some allied hyphomycetes. *Studies in Mycology, 27*, 1–235.

Seifert, K. A. (1985b). *Stachycoremium*, a new genus of synnematous hyphomycetes. *Mycologia, 77*(6), 987–990. https://doi.org/10.1080/00275514.1985.12025193

Seifert, K. A., & Gams, W. (2001). The taxonomy of anamorphic fungi. In D. J. McLaughlin, E. G. McLaughlin, & P. A. Lemke (Eds.), *Systematics and Evolution: Part A* (pp. 307–347). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-662-10376-0_14

Seifert, K. A., Hughes, S. J., Boulay, H., & Louis-Seize, G. (2007). Taxonomy, nomenclature and phylogeny of three cladosporium-like hyphomycetes, *Sorocybe resinae*, *Seifertia azaleae* and the *Hormoconis* anamorph of *Amorphotheca resinae*. *Studies in Mycology, 58*, 235–245. https://doi.org/10.3114/sim.2007.58.09

Seifert, K. A., Louis-Seize, G., Samson, R. A., & Boekhout, T. (1997). *Remersonia*, a new genus for *Stilbella thermophila*, a thermophilic mould from compost. *Canadian Journal of Botany, 75*(7), 1158–1165. https://doi.org/10.1139/b97-828

Seifert, K. A., Morgan-Jones, G., Gams, W., & Kendrick, B. (2011). *The genera of hyphomycetes*. CBS-KNAW Fungal Biodiversity Centre.

Seifert, K. A., & Okada, G. (1988). *Gloeosynnema*, a new genus of synnematous hyphomycetes with basidiomycetous affinities. *Mycotaxon, 32*, 471–476.

Seifert, K. A., & Samuels, G. J. (2000). How should we look at anamorphs? *Studies in Mycology, 45*, 5–18.

Selbmann, L., Onofri, S., Zucconi, L., Isola, D., Rottigni, M., Ghiglione, C., . . . Schiaparelli, S. (2015). Distributional records of Antarctic fungi based on strains preserved in the Culture Collection of Fungi from Extreme Environments (CCFEE) Mycological Section associated with the Italian National Antarctic Museum (MNA). *Mycokeys, 10*, 57–71.

Senanayake, I. C., Maharachchikumbura, S. S. N., Hyde, K. D., Bhat, J. D., Jones, E. B. G., McKenzie, E. H. C., . . . Camporesi, E. (2015). Towards unraveling relationships in Xylariomycetidae (Sordariomycetes). *Fungal Diversity, 73*, 73–144. https://doi.org/10.1007/s13225-015-0340-y

Sepúlveda, V. E., Márquez, R., Turissini, D. A., Goldman, W. E., Matute, D. R., & Taylor, J. W. (2017). Genome sequences reveal cryptic speciation in the human pathogen *Histoplasma capsulatum*. *mBio, 8*(6), e01339–01317. https://doi.org/10.1128/mBio.01339-17

Serrato-Diaz, L. M., Latoni-Brailowsky, E. I., Rivera-Vargas, L. I., Goenaga, R., & French-Monar, R. D. (2012). First report of *Gliocephalotrichum bulbilium* and *G. simplex* causing fruit rot of rambutan in Puerto Rico. *Plant Disease, 96*(8), 1225–1226. https://doi.org/10.1094/Pdis-02-12-0210-Pdn

Sérusiaux, E., & Diederich, P. (2005). *Lambinonia*, a new genus for *Melanconium strigulae*, a lichenicolous hyphomycete on foliicolous species of *Strigula*. *The Lichenologist, 37*(6), 499–506. https://doi.org/10.1017/s0024282905015124

Sharma, R., Kulkarni, G., Sonawane, M. S., & Shouche, Y. S. (2013). New record of *Scedosporium dehoogii* from India. *Mycotaxon, 124*(1), 239–245.

Shaw, D. E. (1972). *Ingoldiella hamata* gen. et sp.nov., a fungus with clamp connexions from a stream in north Queensland. *Transactions of the British Mycological Society, 59*(2), 255–IN210. https://doi.org/10.1016/S0007-1536(72)80010-X

Shaw, D. E., & Sutton, B. C. (1985). A new aero-aquatic hyphomycete from Papua New Guinea and Australia. *Botanical Journal of the Linnean Society, 91*(1-2), 25–36. https://doi.org/10.1111/j.1095-8339.1985.tb01131.x

Shearer, C. A., & Crane, J. L. (1971). Fungi of the chesapeake bay and its tributaries. I. Patuxent River. *Mycologia, 63*(2), 237–260. https://doi.org/10.2307/3757758

Shen, M., Zhang, J. Q., Zhao, L. L., Groenewald, J. Z., Crous, P. W., & Zhang, Y. (2020). Venturiales. *Studies in Mycology, 96*, 185–308. https://doi.org/10.1016/j.simyco.2020.03.001

Shenoy, B. D., Jeewon, R., & Hyde, K. D. (2007). Impact of DNA sequence-data on the taxonomy of anamorphic fungi. *Fungal Diversity, 26*(1), 1–54.

Shenoy, B. D., Jeewon, R., Wang, H., Amandeep, K., Ho, W. H., Bhat, D. J., . . . Hyde, K. D. (2010). Sequence data reveals phylogenetic affinities of fungal anamorphs *Bahusutrabeeja*, *Diplococcium*, *Natarajania*, *Paliphora*, *Polyschema*, *Rattania* and *Spadicoides*. *Fungal Diversity, 44*(1), 161–169. https://doi.org/10.1007/s13225-010-0059-8

Shenoy, B. D., Jeewon, R., Wu, W. P., Bhat, D. J., & Hyde, K. D. (2006). Ribosomal and RPB2 DNA sequence analyses suggest that *Sporidesmium* and morphologically similar genera are polyphyletic. *Mycological Research, 110,* 916–928. https://doi.org/10.1016/j.mycres.2006.06.004

Shirouzu, T., Hirose, D., Oberwinkler, F., Shimomura, N., Maekawa, N., & Tokumasu, S. (2013). Combined molecular and morphological data for improving phylogenetic hypothesis in *Dacrymycetes*. *Mycologia, 105*(5), 1110–1125. https://doi.org/10.3852/12-147

Shirouzu, T., Hirose, D., Tokumasu, S., To-Anun, C., & Maekawa, N. (2010). Host affinity and phylogenetic position of a new anamorphic fungus *Beltraniella botryospora* from living and fallen leaves of evergreen oaks. *Fungal Diversity, 43*, 85–92. https://doi.org/10.1007/s13225-010-0037-1

Shirouzu, T., Hosaka, K., Nam, K. O., Weir, B. S., Johnston, P. R., & Hosoya, T. (2017). Phylogenetic relationships of eight new *Dacrymycetes* collected from new Zealand. *Persoonia - Molecular Phylogeny and Evolution of Fungi, 38*(1), 156–169.

Siboe, G. M., Kirk, P. M., & Cannon, P. F. (1999). New dematiaceous hyphomycetes from Kenyan rare plants. *Mycotaxon, 73*, 283–302.

Sigler, L. (2013). *Ophidiomyces ophiodiicola* (Guarro, Deanna A. Sutton, Wickes & Rajeev) Sigler, Hambleton & Paré in Sigler. Nomenclatural novelties. *Index Fungorum, 19*, 1–1.

Sigler, L., & Carmichael, J. W. (1976). Taxonomy of *Malbranchea* and some other hyphomycetes with arthroconidia. *Mycotaxon, 4*(2), 349–488.

Sigler, L., & Congly, H. (1990). Toenail infection caused by *Onychocola canadensis* gen. et sp. nov. *Journal of Medical and Veterinary Mycology, 28*(5), 405–417. https://doi.org/10.1080/02681219080000511

Sigler, L., & Gibas, C. F. C. (2005). Utility of a cultural method for identification of the ericoid mycobiont *Oidiodendron maius* confirmed by ITS sequence analysis. *Studies in Mycology, 53*, 63–74. https://doi.org/10.3114/sim.53.1.63

Sigler, L., Guarro, J., Currah, R. S., & Punsola, L. (1987). Taxonomy of *Oncocladium flavum* and its relationship to *Malbranchea flava*. *Mycotaxon, 28*(1), 119–130.

Sigler, L., Hambleton, S., Flis, A., & Pare, J. (2002). *Auxarthron* teleomorphs for *Malbranchea filamentosa* and *Malbranchea albolutea* and relationships within *Auxarthron*. *Studies in Mycology, 47*, 111–122.

Sigler, L., Hambleton, S., & Paré, J. A. (2013). Molecular characterization of reptile pathogens currently known as members of the *Chrysosporium* anamorph of *Nannizziopsis vriesii* complex and relationship with some human-associated isolates. *Journal of Clinical Microbiology, 51*(10), 3338–3357. https://doi.org/10.1128/JCM.01465-13

Sikaroodi, M., Lawrey, J. D., Hawksworth, D. L., & Depriest, P. T. (2001). The phylogenetic position of selected lichenicolous fungi: *Hobsonia*, *Illosporium*, and *Marchandiomyces*. *Mycological Research, 105*(4), 453–460. https://doi.org/10.1017/S0953756201003768

Silva, C. R., Castañeda-Ruiz, R. F., & Pascholati Gusmão, L. F. (2014). *Anacraspedodidymum*, a new genus from submerged wood in Brazil. *Mycotaxon, 128*(1), 11–15.

Silva, R. M. F., Oliveira, R. J. V., Bezerra, J. D. P., Bezerra, J. L., Souza-Motta, C. M., & Silva, G. A. (2019). *Bifusisporella sorghi* gen. et sp. nov. (Magnaporthaceae) to accommodate an endophytic fungus from Brazil. *Mycological Progress, 18*(6), 847–854. https://doi.org/10.1007/s11557-019-01494-2

Silva, S. S., & Gusmão, L. F. P. (2013). Conidial fungi from the semi-arid Caatinga Biome of Brazil. A new species of *Dictyochaeta*. *Mycosphere, 4*(4), 701–705. https://doi.org/10.5943/mycosphere/4/4/6

Silva, S. S. d., Gusmão, L. F. P., & Castañeda-Ruiz, R. F. (2016). *Arthromoniliphora araucariae* gen. & sp. nov. from Brazilian pine. *Mycotaxon, 131*(4), 821–826.

Silvestro, D., & Michalak, I. (2012). raxmlGUI: A graphical front-end for RAxML. *Organisms Diversity & Evolution, 12*(4), 335–337.

Simpson, J. A. (2000). *Quambalaria*, a new genus of eucalypt pathogens. *Australasian Mycologist, 19*(2), 57–62.

Sinclair, R. C., Boshoff, S., & Eicker, A. (1997). *Sympodioplanus*, a new anamorph genus from South Africa. *Mycotaxon, 64*, 365–374.

Sinclair, R. C., Eicker, A., & Morgan-Jones, G. (1983). *Conicomyces*, a unique synnematous hyphomycete genus from South Africa. *Mycologia, 75*(6), 1100–1103.

Singer, R. (1970). *Omphalinae* (Clitocybeae-Tricholomataceae Basidiomycetes). *Flora Neotropica, 3*, 1–84.

Sivanesan, A., & Chang, H. S. (1995). *Pseudofuscophialis lignicola* gen. et sp. nov. and *Chaetosphaeria capitata* sp. nov. from wood in Taiwan. *Mycological Research, 6*(99), 711–716.

Sivanesan, A., & Chang, H. S. (1997). *Chaetosphaeria ampulliformis* sp. nov. associated with a *Hemicorynespora* anamorph, and a key to *Hemicorynespora* species. *Mycological Research, 101*, 845–848. https://doi.org/10.1017/S0953756297003493

Sivanesan, A., & Sutton, B. C. (1985). Microfungi on *Xanthorrhoea*. *Transactions of the British Mycological Society, 85*(2), 239–255. https://doi.org/10.1016/S0007-1536(85)80186-8

Sivanesan, A., & Watling, R. (1980). A new mitosporic basidiomycete. *Transactions of the British Mycological Society, 74*(2), 424–431. https://doi.org/10.1016/S0007-1536(80)80177-X

Sivichai, S., & Jones, E. B. G. (2004). *Stauriella* gen. nov., proposed for a new lignicolous basidiomycetous anamorph from freshwater in Thailand. *Sydowia, 56*(1), 131–136.

Six, D. L., Harrington, T. C., Steimel, J., McNew, D., & Paine, T. D. (2003). Genetic relationships among *Leptographium terebrantis* and the mycangial fungi of three western Dendroctonus bark beetles. *Mycologia, 95*(5), 781–792. https://doi.org/10.2307/3762006

Skerlev, M., & Miklić, P. (2010). The changing face of *Microsporum* spp infections. *Clinics in Dermatology, 28*(2), 146–150. https://doi.org/10.1016/j.clindermatol.2009.12.007

Slippers, B., Crous, P. W., Jami, F., Groenewald, J. Z., & Wingfield, M. J. (2017). Diversity in the Botryosphaeriales: Looking back, looking forward. *Fungal Biology, 121*(4), 307–321.

Smith, G. J. D., Liew, E. C. Y., & Hyde, K. D. (2003). The Xylariales: A monophyletic order containing 7 families. *Fungal Diversity, 13,* 185–218.

Smith, S. N., DeVay, J. E., Hsieh, W. H., & Lee, H. (2001). Soil-borne populations of *Fusarium oxysporum* f. sp *vasinfectum*, a cotton wilt fungus in California fields. *Mycologia, 93*(4), 737–743. https://doi.org/10.2307/3761828

Sogonov, M. V., Schroers, H. J., Gams, W., Dijksterhuis, J., & Summerbell, R. C. (2005). The hyphomycete *Teberdinia hygrophila* gen. nov., sp. nov. and related anamorphs of *Pseudeurotium* species. *Mycologia, 97*(3), 695–709. https://doi.org/10.1080/15572536.2006.11832799

Sokolski, S., Piche, Y., Laitung, B., & Berube, J. A. (2006). Streams in Quebec boreal and mixed-wood forests reveal a new aquatic hyphomycete species, *Dwayaangam colodena* sp nov. *Mycologia, 98*(4), 628–636. https://doi.org/10.3852/mycologia.98.4.628

Somrithipol, S. (2006). *Lauriomyces sakaeratensis* sp nov., a new hyphomycete on decaying *Dipterocarpus costatus* fruits from Sakaerat Biosphere Reserve, Thailand. *Nova Hedwigia, 82*(1-2), 209–215. https://doi.org/10.1127/0029-5035/2006/0082-0209

Somrithipol, S., & Jones, E. B. G. (2007). *Lauriomyces cylindricus* and *Lauriomyces ellipticus* spp. nov., two new hyphomycetes from tropical forest of Thailand. *Nova Hedwigia, 84*(3-4), 479–486. https://doi.org/10.1127/0029-5035/2007/0084-0479

Somrithipol, S., Sudhom, N., Tippawan, S., & Jones, E. B. G. (2007). A new species of *Falcocladium* (Hyphomycetes) with turbinate vesicles from Thailand. *Sydowia, 59*(1), 148–153.

Spegazzini, C. (1886). Fungi guaranitici. Pugillus I. *Anales de la Sociedad Científica Argentina, 22*, 186–224.

Spegazzini, C. (1908). Hongos de la yerba mate. *Anales del Museo Nacional de Historia Natural Buenos Aires, 17*(10), 111–141.

Spegazzini, C. (1910). Mycetes argentinenses, series V. *Anales del Museo Nacional de Historia Natural Buenos Aires, ser. 3, 13*, 329–467.

Spegazzini, C. (1923). Algunos hongos de Tierra del Fuego. *Physis Revista de la Sociedad Argentina de Ciencias Naturales, 7*, 9–23.

Spooren, M. (2014). A new species of *Bloxamia* from freshwater in the Netherlands. *Mycosphere, 5*(2), 346–349. https://doi.org/10.5943/mycosphere/5/2/8

Sprague, R. (1958). Some leafspot fungi on Western Gramineae—XII. *Mycologia, 50*(6), 814–830. https://doi.org/10.1080/00275514.1958.12024776

Sri-Indrasutdhi, V., Tsui, C. K. M., Chuaseeharonnachai, C., Yamaguchi, K., Suetrong, S., Okane, I., . . . Boonyuen, N. (2015). *Helicocentralis hyalina* gen. et sp nov., an aero-aquatic helicosporous fungus (Leotiomycetes, Ascomycota) in Thailand. *Mycological Progress, 14*(10). https://doi.org/10.1007/s11557-015-1103-6

Stadler, M., Fournier, J., Laessoe, T., Decock, C., Persoh, D., & Rambold, G. (2010). *Ruwenzoria*, a new genus of the Xylariaceae from Central Africa. *Mycological Progress, 9*(2), 169–179. https://doi.org/10.1007/s11557-009-0623-3

Stadler, M., Kuhnert, E., Peršoh, D., & Fournier, J. (2013). The Xylariaceae as model example for a unified nomenclature following the "One Fungus-One Name" (1F1N) concept. *Mycology, 4*(1), 5–21. https://doi.org/10.1080/21501203.2013.782478

Stalper, J. A. (1984). A revision of the genus *Sporotrichum*. *Studies in Mycology, 24*, 1–105.

Stalpers, J. A. (1974). Revision of the genus *Oedocephalum* (Fungi imperfecti). *Proceedings van de Koninklijke Nederlandse Akademie van Wetenschappen Section C, 77*(4), 383–401.

Stalpers, J. A. (2000). The genus *Ptychogaster*. *Karstenia, 40*, 167–180.

Stalpers, J. A., Redhead, S. A., May, T. W., Rossman, A. Y., Crouch, J. A., Cubeta, M. A., . . . Thorn, R. G. (2021). Competing sexual-asexual generic names in Agaricomycotina (Basidiomycota) with recommendations for use. *IMA Fungus, 12*(1), 22. https://doi.org/10.1186/s43008-021-00061-3

Stamatakis, A. (2014). RAxML version 8: A tool for phylogenetic analysis and post-analysis of large phylogenies. *Bioinformatics, 30*(9), 1312–1313. https://doi.org/10.1093/bioinformatics/btu033

Stolk, A. C., & Dakin, J. C. (1966). *Moniliella*, a new genus of Moniliales. *Antonie Van Leeuwenhoek, 32*(1), 399–409. https://doi.org/10.1007/BF02097491

Stolk, A. C., & Hennebert, G. L. (1968). New species of *Thysanophora* and *Custingophora* gen. nov. *Persoonia, 5*(2), 189–199.

Stolk, A. C., & Samson, R. A. (1971). Studies on *Talaromyces* and related genera I. *Hamigera* gen. nov. and *Byssochlamys*. *Persoonia, 6*(3), 341–357.

Straatsma, G., & Samson, R. A. (1993). Taxonomy of *Scytalidium thermophilum*, an important thermophilic fungus in mushroom compost. *Mycological Research, 97*, 321–328.

Su, H. Y., Hyde, K. D., Maharachchikumbura, S. S. N., Ariyawansa, H. A., Luo, Z. L., Promputtha, I., . . . Zhou, D. Q. (2016). The families *Distoseptisporaceae* fam. nov., *Kirschsteiniotheliaceae*, *Sporormiaceae* and *Torulaceae*, with new species from freshwater in Yunnan Province, China. *Fungal Diversity, 80*(1), 375–409. https://doi.org/10.1007/s13225-016-0362-0

Su, L., Guo, L. Y., Hao, Y., Xiang, M. C., Cai, L., & Liu, X. Z. (2015). *Rupestriomyces* and *Spissiomyces*, two new genera of rock-inhabiting fungi from China. *Mycologia, 107*(4), 831–844. https://doi.org/10.3852/14-305

Su, Y. Y., & Cai, L. (2013). *Rasamsonia composticola*, a new thermophilic species isolated from compost in Yunnan, China. *Mycological Progress, 12*(2), 213–221. https://doi.org/10.1007/s11557-012-0827-9

Subramanian, C. V. (1952). Fungi Imperfecti from Madras—III. *Proceedings of the Indian Academy of Sciences - Section B, 36*(6), 223–228. https://doi.org/10.1007/bf03050466

Subramanian, C. V. (1956a). Hyphomycetes-I. *Journal of the Indian Botanical Society, 35*, 53–91.

Subramanian, C. V. (1956b). Hyphomycetes - II. *Journal of the Indian Botanical Society, 35*, 446–494.

Subramanian, C. V. (1957a). Hyphomycetes-III Two new genera, *Dwayaloma* and *Sadasivania*. *Journal of the Indian Botanical Society, 36*, 61–67.

Subramanian, C. V. (1957b). Hyphomycetes—IV. *Proceedings of the Indian Academy of Sciences - Section B, 46*(5), 324–335. https://doi.org/10.1007/BF03053847

Subramanian, C. V. (1958). Hyphomycetes-VI two new genera, *Edmundmasonia* and *Iyengarina*. *Journal of the Indian Botanical Society, 37*, 401–407.

Subramanian, C. V. (1962). The classification of the Hyphomycetes. *Nelumbo, 4*(1–4), 249–259.

Subramanian, C. V. (1972). *Padixonia*, a new genus of hyphomycetes. *Current Science, 41*(8), 282–283.

Subramanian, C. V. (1977). Revisions of Hyphomycetes - I. *Kavaka, 5*, 93–98.

Subramanian, C. V. (1984). On Aegerita webberi Fawcett. *Kavaka, 12*, 63–66.

Subramanian, C. V. (1992). A reassessment of *Sporidesmium* (Hyphomycetes) and some related taxa. *Proceedings of the Indian Academy of Sciences (Plant Sciences) Section B, 58*(4), 179–190.

Subramanian, C. V. (1992/1993). Validation of names of some taxa (Hyphomycetes). *Kavaka, 20/21*(1-2), 57–58.

Subramanian, C. V. (1993). *Phialocorona pleomorpha* gen. et sp. nov. and its synanamorphs. *Cryptogamie Mycologie, 14*(1), 45–55.

Subramanian, C. V., & Bhat, D. J. (1977). *Bahusutrabeeja*, a new genus of the hyphomycetes. *Canadian Journal of Botany, 55*(16), 2202–2206. https://doi.org/10.1139/b77-249

Subramanian, C. V., & Chandrashekara, K. V. (1977). *Lindquistia*, a new hyphomycete genus. *Boletín de la Sociedad Argentina de Botánica, XVIII*(1-2), 145–151.

Subramanian, C. V., & Chandrashekara, K. V. (1978). Two interesting coprophilous hyphomycetes: *Bahukalasa samala* gen. et sp. nov. and *Candelabrella elegans* sp. nov. *Kavaka, 6*, 41–48.

Subramanian, C. V., & Lodha, B. C. (1964). Four new coprophilous hyphomycetes. *Antonie Van Leeuwenhoek, 30*(1), 317–330. https://doi.org/10.1007/BF02046737

Subramanian, C. V., & Lodha, B. C. (1968). Two interesting coprophilous fungi from India. *Current Science, 37*(9), 245–248.

Subramanian, C. V., & Reddy, K. R. C. (1966). *Petrakiopsis elegans*, a new hyphomycete. *Sydowia, 20*, 339–341.

Subramanian, C. V., & Sudha, K. (1978). *Ardhachandra*, a new genus of the hyphomycetes. *Canadian Journal of Botany, 56*(7), 729–731. https://doi.org/10.1139/b78-081

Subramanian, C. V., & Sudha, K. (1987). Hyphomycetes from leaf litter - III. *Kavaka, 15*, 11–13.

Sugiyama, J., Nam, K.-O., & Hosoya, T. (2020). *Metacapnodium neesii*: A new combination for a metacapnodiaceous sooty mould and its phylogenetic position inferred from DNA sequences. *Journal of Fungal Research, 18*(4), 246–257. https://doi.org/10.13341/j.jfr.2020.8002

Sugiyama, M., Summerbell, R., & Mikawa, T. (2002). Molecular phylogeny of onygenalean fungi based on small subunit (SSU) and large subunit (LSU) ribosomal DNA sequences. *Studies in Mycology, 47*, 5–23.

Suh, S. O., Blackwell, M., Kurtzman, C. P., & Lachance, M. A. (2006). Phylogenetics of Saccharomycetales, the ascomycete yeasts. *Mycologia, 98*(6), 1006–1017. https://doi.org/10.3852/mycologia.98.6.1006

Suija, A., van den Boom, P., Zimmermann, E., Zhurbenko, M. P., & Diederich, P. (2017). Lichenicolous species of *Hainesia* belong to Phacidiales (Leotiomycetes) and are included in an extended concept of *Epithamnolia*. *Mycologia, 109*(6), 882–899.

Summerbell, R. C., Gueidan, C., Guarro, J., Eskalen, A., Crous, P. W., Gupta, A. K., . . . Starink, M. (2018). The protean *Acremonium*. *A. sclerotigenum*/*egyptiacum*: Revision, food contaminant, and human disease. *Microorganisms, 6*(3), 88.

Summerbell, R. C., Gueidan, C., Schroers, H. J., de Hoog, G. S., Starink, M., Rosete, Y. A., . . . Scott, J. A. (2011). *Acremonium* phylogenetic overview and revision of *Gliomastix*, *Sarocladium*, and *Trichothecium*. *Studies in Mycology, 68*, 139–162. https://doi.org/10.3114/sim.2011.68.06

Summerell, B. A., Groenewald, J. Z., Carnegie, A. J., Summerbell, R. C., & Crous, P. W. (2006). Eucalyptus microfungi known from culture. 2. *Alysidiella*, *Fusculina* and *Phlogicylindrium* genera nova, with notes on some other poorly known taxa. *Fungal Diversity, 23*, 323–350.

Sun, F. F., Sun, S. L., & Zhu, Z. D. (2016a). Occurrence of *Verticillium* wilt caused by *Verticillium dahliae* on Mung Bean in Northern China. *Plant Disease, 100*(8), 1792–1792. https://doi.org/10.1094/Pdis-01-16-0084-Pdn

Sun, J. Z., Dong, C. H., Liu, X. Z., Liu, J. K., & Hyde, K. D. (2016b). *Calcarisporium cordycipiticola* sp nov., an important fungal pathogen of *Cordyceps militaris*. *Phytotaxa, 268*(2), 135–144. https://doi.org/10.11646/phytotaxa.268.2.4

Sun, J. Z., Liu, X.-Z., Hyde, K. D., Zhao, Q., Maharachchikumbura, S. S. N., Camporesi, E., . . . Lumyong, S. (2017). *Calcarisporium xylariicola* sp. nov. and introduction of Calcarisporiaceae fam. nov. in Hypocreales. *Mycological Progress, 16*(4), 433–445. https://doi.org/10.1007/s11557-017-1290-4

Sun, J. Z., Liu, X.-Z., McKenzie, E. H. C., Jeewon, R., Liu, J.-K., Zhang, X.-L., . . . Hyde, K. D. (2019). Fungicolous fungi: Terminology, diversity, distribution, evolution, and species checklist. *Fungal Diversity, 95*(1), 337–430. https://doi.org/10.1007/s13225-019-00422-9

Sundari, R., Vikineswary, S., Yusoff, M., & Jones, E. B. G. (1996). *Corollospora besarispora*, a new arenicolous marine fungus from Malaysia. *Mycological Research, 100*, 1259–1262.

Sung, G. H., Spatafora, J. W., Zare, R., Hodge, K. T., & Gams, W. (2001). A revision of *Verticillium* sect. *Prostrata*. II. Phylogenetic analyses of SSU and LSU nuclear rDNA sequences from anamorphs and teleomorphs of the Clavicipitaceae. *Nova Hedwigia*, *72*(3-4), 311–328.

Sushma, R., Prasher, I., & Gautam, A. (2021). The hyphomycetous genus *Ceratocladium*-An overview. *Annals of the Romanian Society for Cell Biology*, 4525–4528.

Sutton, B. C. (1969). *Minimidochium setosum* n. gen., n. sp. and *Dinemasporium aberrans* n. sp. from West Africa. *Canadian Journal of Botany, 47*(12), 2095–2100. https://doi.org/10.1139/b69-303

Sutton, B. C. (1973a). Hyphomycetes from Manitoba and Saskatchewan, Canada. *Mycological Papers, 132*, 1–143.

Sutton, B. C. (1973b). Some hyphomycetes with holoblastic sympodial conidiogenous cells. *Transactions of the British Mycological Society, 61*(3), 417–429. https://doi.org/10.1016/S0007-1536(73)80112-3

Sutton, B. C. (1984). Notes on *Titaea* (hyphomycetes). *Transactions of the British Mycological Society, 83*(3), 399–413. https://doi.org/10.1016/S0007-1536(84)80036-4

Sutton, B. C., Alcorn, J. L., & Fisher, P. J. (1982). A synanamorph of *Parasympodiella laxa*. *Transactions of the British Mycological Society, 79*(2), 339–342. https://doi.org/10.1016/S0007-1536(82)80124-1

Sutton, B. C., & Hodges, C. S. J. (1975). Eucalyptus microfungi: Two new hyphomycete genera from Brazil. *Nova Hedwigia, 26*, 527–533.

Sutton, B. C., & Melnik, V. A. (1992). *Phaeostalagmus rossicus* sp. nov. from Russia. *Mycological Research, 96*(11), 908–910.

Sutton, B. C., & Muhr, L.-E. (1986). *Cheiromycina flabelliformis* gen. et sp. nov. on *Picea* from Sweden. *Nordic Journal of Botany, 6*, 831–836. https://doi.org/10.1111/j.1756-1051.1986.tb00486.x

Sutton, B. C., & Pascoe, I. G. (1987). *Argopericonia* and *Tryssglobulus*, new hyphomycete genera from Banksia leaves. *Transactions of the British Mycological Society, 88*(1), 41–46. https://doi.org/10.1016/S0007-1536(87)80183-3

Sutton, B. C., & Patil, S. D. (1966). *Mahabalella* nov. gen., a new hyphomycete genus. *Nova Hedwigia, 11*, 203–207.

Sutton, B. C., & Pirozynski, K. A. (1965). Notes on microfungi. II. *Transactions of the British Mycological Society, 48*(3), 349–366. https://doi.org/10.1016/S0007-1536(65)80055-9

Sutton, B. C., Shamoun, S. F., & Crous, P. W. (1996). Two leaf pathogens of *Ribes* spp. in North America, *Quasiphloeospora saximontanensis* and *Phloeosporella ribis*. *Mycological Research, 100*(8), 979–983. https://doi.org/10.1016/S0953-7562(96)80051-7

Sutton, D. A., Marín, Y., Thompson, E. H., Wickes, B. L., Fu, J., García, D., . . . Guarro, J. (2013). Isolation and characterization of a new fungal genus and species, *Aphanoascella galapagosensis*, from carapace keratitis of a *Galapagos tortoise* (Chelonoidis nigra microphyes). *Medical Mycology, 51*(2), 113–120. https://doi.org/10.3109/13693786.2012.701767

Swofford, D. L. (2002). *PAUP*: Phylogenetic Analysis Using Parsimony and other methods, version 4.0 b10*. Sunderland, MA: Sinauer Associates.

Sydow, H. (1930). Fungi venezuelani. *Annales Mycologici, 28*, 29–224.

Sydow, H., & Petrak, F. (1922). Ein Beitrag zur Kenntnis der Pilzflora Nordamerikas, insbesondere der nordwestlichen Staaten. *Annales Mycologici, 20*, 178–218.

Sydow, H., & Sydow, P. (1912). Mycotheca germanica Fasc. XXII - XXIII. *Annales Mycologici, 10*, 445–451.

Tamura, K., Stecher, G., Peterson, D., Filipski, A., & Kumar, S. (2013). MEGA6: Molecular evolutionary genetics analysis version 6.0. *Molecular Biology and Evolution, 30*(12), 2725–2729. https://doi.org/10.1093/molbev/mst197

Tanaka, E., Shimizu, K., Imanishi, Y., Yasuda, F., & Tanaka, C. (2008). Isolation of basidiomycetous anamorphic yeast-like fungus *Meira argovae* found on Japanese bamboo. *Mycoscience, 49*(5), 329–333. https://doi.org/10.1007/s10267-008-0429-1

Tang, A. M. C., Jeewon, R., & Hyde, K. D. (2009). A re-evaluation of the evolutionary relationships within the Xylariaceae based on ribosomal and protein-coding gene sequences. *Fungal Diversity, 34*, 127–155.

Tanney, J. B., Nguyen, H. D. T., Pinzari, F., & Seifert, K. A. (2015). A century later: Rediscovery, culturing and phylogenetic analysis of *Diploöspora rosea*, a rare onygenalean hyphomycete. *Antonie Van Leeuwenhoek, 108*(5), 1023–1035. https://doi.org/10.1007/s10482-015-0555-7

Tanney, J. B., & Seifert, K. A. (2013). *Rasamsonia pulvericola* sp nov., isolated from house dust. *IMA Fungus, 4*(2), 205–212. https://doi.org/10.5598/imafungus.2013.04.02.06

Tanney, J. B., & Seifert, K. A. (2020). Mollisiaceae: An overlooked lineage of diverse endophytes. *Studies in Mycology, 95*, 293–380. https://doi.org/10.1016/j.simyco.2020.02.005

Tanney, J. B., Visagie, C. M., Yilmaz, N., & Seifert, K. A. (2017). *Aspergillus* subgenus *Polypaecilum* from the built environment. *Studies in Mycology, 88*(Supplement C), 237–267. https://doi.org/10.1016/j.simyco.2017.11.001

Taylor, J. J. (1970). *Dexhowardia tetraspora*: A new hyphomycete with possible basidiomycete affinity. *Mycopathologia et Mycologia Applicata, 40*(3), 305–308. https://doi.org/10.1007/BF02051783

Taylor, J. W. (2011). One Fungus = One Name: DNA and fungal nomenclature twenty years after PCR. *IMA Fungus, 2*(2), 113–120. https://doi.org/10.5598/imafungus.2011.02.02.01

Teixeira, M. M., Theodoro, R. C., de Carvalho, M. J. A., Fernandes, L., Paes, H. C., Hahn, R. C., . . . Felipe, M. S. S. (2009). Phylogenetic analysis reveals a high level of speciation in the *Paracoccidioides* genus. *Molecular Phylogenetics and Evolution, 52*(2), 273–283. https://doi.org/10.1016/j.ympev.2009.04.005

Teixeira, M. M., Theodoro, R. C., Oliveira, F. F. M. d., Machado, G. C., Hahn, R. C., Bagagli, E., . . . Soares Felipe, M. S. (2013). *Paracoccidioides lutzii* sp. nov.: Biological and clinical implications. *Medical Mycology, 52*(1), 19–28. https://doi.org/10.3109/13693786.2013.794311

Thaung, M. M. (1979). Two new microfungi from Burma. *Transactions of the British Mycological Society, 72*(2), 333–337. https://doi.org/10.1016/S0007-1536(79)80055-8

Thaxter, R. (1903). New or Peculiar North American Hyphomycetes. III. *Botanical Gazette, 35*(3), 153–159.

Thaxter, R. (1914). On certain peculiar fungus-parasites of living insects. *Botanical Gazette, 58*(3), 235–253.

Thaxter, R. (1920). Second note on certain peculiar fungus-parasites of living insects. *Botanical Gazette, 69*(1), 1–27.

Tian, E.-j., & Matheny, P. B. (2021). A phylogenetic assessment of *Pholiota* and the new genus *Pyrrhulomyces*. *Mycologia, 113*(1), 146–167. https://doi.org/10.1080/00275514.2020.1816067

Tibell, L., & Constantinescu, O. (1991). *Catenomycopsis rosea* gen. et sp. nov (Hyphomycetes), anamorph of *Chaenothecopsis haematopus*. *Mycological Research, 95*(5), 556–560. https://doi.org/10.1016/S0953-7562(09)80068-3

Tibpromma, S., Hyde, K. D., McKenzie, E. H. C., Bhat, D. J., Phillips, A. J. L., Wanasinghe, D. N., . . . Karunarathna, S. C. (2018). Fungal diversity notes 840–928: Micro-fungi associated with Pandanaceae. *Fungal Diversity, 93*(1), 1–160. https://doi.org/10.1007/s13225-018-0408-6

To-anun, C., Kom-un, S., Sunawan, A., Fangfuk, W., Sato, Y., & Takamatsu, S. (2005). A new subgenus, *Microidium*, of *Oidium* (Erysiphaceae) on *Phyllanthus* spp. *Mycoscience, 46*(1), 1–8.

Tokumasu, S., Tubaki, K., & Manoch, L. (1990). A preliminary list of hyphomycetes isolated from pine leaf litter of Thailand. *Reports of the Tottori Mycological Institute (Japan), 28*, 185–190.

Toledo-Hernández, C., Zuluaga-Montero, A., Bones-González, A., Rodríguez, J. A., Sabat, A. M., & Bayman, P. (2008). Fungi in healthy and diseased sea fans (*Gorgonia ventalina*): Is *Aspergillus sydowii* always the pathogen? *Coral Reefs, 27*(3), 707–714. https://doi.org/10.1007/s00338-008-0387-2

Traaen, A. E. (1914). Untersuchungen über bodenpilze aus Norwegen. *Nyt Magazin for Naturvidenskaberne, 52*, 19–121.

Travadon, R., Lawrence, D. P., Rooney-Latham, S., Gubler, W. D., Wilcox, W. F., Rolshausen, P. E., & Baumgartner, K. (2015). *Cadophora* species associated with wood-decay of grapevine in North America. *Fungal Biology, 119*(1), 53–66. https://doi.org/10.1016/j.funbio.2014.11.002

Triest, D., De Cremer, K., Piérard, D., & Hendrickx, M. (2016). Unique phylogenetic lineage found in the *Fusarium*-like clade after re-examining BCCM/IHEM fungal culture collection material. *Mycobiology, 44*(3), 121–130. https://doi.org/10.5941/MYCO.2016.44.3.121

Tsui, C. K. M., Goh, T. K., & Hyde, K. D. (1997). A new species of *Dactylaria* from Hong Kong. *Sydowia, 49*(2), 182–186.

Tsui, C. K. M., Goh, T. K., Hyde, K. D., & Hodgkiss, I. J. (1999). Reflections on *Menisporopsis*, with the addition of *M. multisetulata* sp. nov. from submerged wood in Hong Kong. *Mycological Research, 103*(2), 148–152.

Tsui, C. K. M., Goh, T. K., Hyde, K. D., & Hodgkiss, I. J. (2001a). New records or species of *Dictyochaeta*, *Endophragmiella* and *Ramichloridium* from submerged wood in Hong Kong freshwater streams. *Cryptogamie Mycologie, 22*(2), 139–145. https://doi.org/10.1016/S0181-1584(01)80005-1

Tsui, C. K. M., Goh, T. K., Hyde, K. D., & Hodgkiss, I. J. (2001b). New species or records of *Cacumisporium*, *Helicosporium*, *Monotosporella* and *Bahusutrabeeja* on submerged wood in Hong Kong streams. *Mycologia, 93*(2), 389–397. https://doi.org/10.2307/3761660

Tsui, C. K. M., Sivichai, S., Rossman, A. Y., & Berbee, M. L. (2007). *Tubeufia asiana*, the teleomorph of *Aquaphila albicans* in the Tubeufiaceae, Pleosporales, based on cultural and molecular data. *Mycologia, 99*(6), 884–894. https://doi.org/10.3852/mycologia.99.6.884

Tsuneda, A., Chen, M. H., & Currah, R. S. (2001). Conidiomatal morphogenesis and pleomorphic conidiogenesis in *Scleroconidioma sphagnicola*. *Mycologia, 93*(6), 1164–1173. https://doi.org/10.2307/3761676

Tsuneda, A., Davey, M. L., Hambleton, S., & Currah, R. S. (2008). *Endosporium*, a new endoconidial genus allied to the Myriangiales. *Botany, 86*, 1020–1033. https://doi.org/10.1139/B08-054

Tsuneda, A., Davey, M. L., Tsuneda, I., & Currah, R. S. (2010). Two new dothideomycetous endoconidial genera from declining larch. *Botany, 88*(5), 471–487. https://doi.org/10.1139/b10-015

Tsuneda, A., Thormann, M. N., & Currah, R. S. (2000). *Scleroconidioma*, a new genus of dematiaceous hyphomycetes. *Canadian Journal of Botany, 78*(10), 1294–1298. https://doi.org/10.1139/b00-107

Tubaki, K. (1958). Studies on the Japanese hyphomycetes. V. Leaf & stem group with a discussion of the classification of hyphomycetes and their perfect stages. *The Journal of the Hattori Botanical Laboratory, 20*, 142–244. https://doi.org/10.18968/jhbl.20.0_142

Tubaki, K. (1989). *Digitodochium*, a new staurosporous anamorph genus. *Sydowia, 41*, 344–348.

Tubaki, K., & Yokoyama, T. (1971). Notes on the Japanese Hyphomycetes. V. *Transactions of the Mycological Society of Japan, 12*, 18–28.

Tulasne, E. L. R., & Tulasne, C. (1863). *Selecta Fungorum Carpologia: Ea documenta et icones potissimum exhibens quae varia fructuum et seminum genera in eodem fungo simul aut vicissim adesse demonstrent. Xylariei, Valsei, Sphaeriei* (Vol. 2). In imperiali typographeo.

Tulloch, M. (1973). A new synnematous hyphomycete. *Transactions of the British Mycological Society, 60*(1), 155–IN123. https://doi.org/10.1016/S0007-1536(73)80073-7

Turland, N. J., Wiersema, J. H., Barrie, F. R., Greuter, W., Hawksworth, D. L., Herendeen, P. S., . . . Smith, G. F. (2018). *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017*. Koeltz Botanical Books. https://doi.org/10.12705/Code.2018

Tzean, S. S., & Chen, J. L. (1991). Two new species of *Dactylaria* from Taiwan. *Mycological Research, 95*(8), 1000–1004. https://doi.org/10.1016/S0953-7562(09)80098-1

Tzean, S. S., & Estey, R. H. (1991). *Geotrichopsis mycoparasitica* gen. et sp. nov. (Hyphomycetes), a new mycoparasite. *Mycological Research, 95*(12), 1350–1354. https://doi.org/10.1016/S0953-7562(09)80383-3

Udagawa, S.-I., & Uchiyama, S. (1998). Three new hyphomycetes isolated from soil and feather debris. *Canadian Journal of Botany, 76*(9), 1637–1646. https://doi.org/10.1139/b98-107

Udagawa, S.-I., & Uchiyama, S. (1999). *Cryptumbellata,* a new hyphomycete genus from soil. *Mycotaxon, 70*, 185–192.

Ulloa, M., & Hanlin, R. T. (2000). *Illustrated dictionary of mycology*. American Phytopathological Society (APS Press).

Untereiner, W. A., Scott, J., Naveau, F., Currah, S., & Bachewich, J. (2002). Phylogeny of *Ajellomyces*, *Polytolypa* and *Spiromastix* (Onygenaceae) inferred from rDNA sequence and non-molecular data. *Studies in Mycology, 47*, 25–35.

Untereiner, W. A., Yue, Q., Chen, L., Li, Y., Bills, G. F., Štěpánek, V., & Réblová, M. (2019). *Phialophora* section *Catenulatae* disassembled: New genera, species, and combinations and a new family encompassing taxa with cleistothecial ascomata and phialidic asexual states. *Mycologia, 111*(6), 998–1027. https://doi.org/10.1080/00275514.2019.1663106

Upadhyay, H. P., Cavalcanti, W. A., & Silva, A. A. (1986). Two new synnematous hyphomycete genera from Brazil. *Mycologia, 78*(3), 493–496. https://doi.org/10.1080/00275514.1986.12025277

Urairuj, C., Khanongnuch, C., & Lumyong, S. (2003). Ligninolytic enzymes from tropical endophytic Xylariaceae. *Fungal Diversity, 13*, 209–219.

Vaidya, G., Lohman, D. J., & Meier, R. (2011). SequenceMatrix: Concatenation software for the fast assembly of multi-gene datasets with character set and codon information. *Cladistics, 27*(2), 171–180. https://doi.org/10.1111/j.1096-0031.2010.00329.x

Vakili, N. G. (1989). *Gonatobotrys simplex* and its teleomorph, *Melanospora damnosa*. *Mycological Research, 93*, 67–74.

Valenzuela, E., & Garnica, S. (2000). *Pseudohelicomyces*, a new anamorph of *Psilocybe*. *Mycological Research, 104*(6), 738–741. https://doi.org/10.1017/S0953756299002117

Van Beverwijk, A. L. (1951). Zalewski's '*Clathrosphaera spirifera*'. *Transactions of the British Mycological Society, 34*(3), 280–IN287. https://doi.org/10.1016/S0007-1536(51)80053-6

Van Beverwijk, A. L. (1953). Helicosporous Hyphomycetes. I. *Transactions of the British Mycological Society, 36*(2), 111–IN113. https://doi.org/10.1016/S0007-1536(53)80056-2

Van Beverwijk, A. L. (1954). Three new fungi: *Helicoon pluriseptatum* n. sp. *Papulaspora pulmonaria* n. sp. and *Tricellula inaequalis* n. gen., n. sp. *Antonie Van Leeuwenhoek, 20*(1), 1–16. https://doi.org/10.1007/BF02543704

van den Brink, J., Samson, R. A., Hagen, F., Boekhout, T., & de Vries, R. P. (2012). Phylogeny of the industrial relevant, thermophilic genera *Myceliophthora* and *Corynascus*. *Fungal Diversity, 52*(1), 197–207. https://doi.org/10.1007/s13225-011-0107-z

van der Linde, J. A., Six, D. L., De Beer, W. Z., Wingfield, M. J., & Roux, J. (2016). Novel ophiostomatalean fungi from galleries of *Cyrtogenius africus* (Scolytinae) infesting dying *Euphorbia ingens*. *Antonie Van Leeuwenhoek, 109*(4), 589–601. https://doi.org/10.1007/s10482-016-0661-1

van der Meer, J. H. H. (1925). *Verticillium* wilt of herbaceous and woody plants. *Mededelingen Landbouwhogeschool Wageningen, 28*(2), 1–82.

van der Waals, J. E., Pitsi, B. E., Marais, C., & Wairuri, C. K. (2011). First report of *Alternaria alternata* causing leaf blight of potatoes in South Africa. *Plant Disease, 95*(3), 363–363. https://doi.org/10.1094/Pdis-11-10-0820

Van Emden, J. H. (1974). *Staheliella*, a new genus of hyphomycetes from tropical soil. *Acta Botanica Neerlandica, 23*(3), 251–256.

van Oorschot, C. A. N. (1985). Taxonomy of the *Dactylaria* complex V. A review of *Arthrobotrys* and allied genera. *Studies in Mycology, 26*, 61–96.

Van Zuydam, N. R., Paciura, D., Jacobs, K., Wingfield, M. J., Coetzee, M. P. A., & Wingfield, B. D. (2010). Barcoding and microcoding using “identiprimers” with *Leptographium* species. *Mycologia, 102*(6), 1274–1287. https://doi.org/10.3852/09-291

Vanderaa, H. A., & Samson, R. A. (1994). A new species of *Helicoon*. *Mycological Research, 98*, 74–76.

Varga, J., Due, M., Frisvad, J. C., & Samson, R. A. (2007a). Taxonomic revision of *Aspergillus* section *Clavati* based on molecular, morphological and physiological data. *Studies in Mycology, 59*, 89–106. https://doi.org/10.3114/sim.2007.59.11

Varga, J., Frisvad, J. C., Kocsubé, S., Brankovics, B., Tóth, B., Szigeti, G., & Samson, R. A. (2011a). New and revisited species in *Aspergillus* section *Nigri*. *Studies in Mycology, 69*, 1–17. https://doi.org/10.3114/sim.2011.69.01

Varga, J., Frisvad, J. C., & Samson, R. A. (2007b). Polyphasic taxonomy of *Aspergillus* section *Candidi* based on molecular, morphological and physiological data. *Studies in Mycology, 59*, 75–88. https://doi.org/10.3114/sim.2007.59.10

Varga, J., Frisvad, J. C., & Samson, R. A. (2010a). *Aspergillus* sect. *Aeni* sect. nov., a new section of the genus for *A. karnatakaensis* sp nov and some allied fungi. *IMA Fungus*, *1*(2), 197–205.

Varga, J., Frisvad, J. C., & Samson, R. A. (2010b). Polyphasic taxonomy of *Aspergillus* section *Sparsi*. *IMA Fungus*, *1*(2), 187–195.

Varga, J., Frisvad, J. C., & Samson, R. A. (2011b). Two new aflatoxin producing species, and an overview of *Aspergillus* section *Flavi*. *Studies in Mycology, 69*, 57–80. https://doi.org/10.3114/sim.2011.69.05

Varghese, K. M., & Rao, V. (1979). Forest microfungi–I. *Subramaniomyces*, a new genus of hyphomycetes. *Kavaka, 7*, 83–85.

Vázquez-Campos, X., Kinsela, A. S., Waite, T. D., Collins, R. N., & Neilan, B. A. (2014). *Fodinomyces uranophilus* gen. nov. sp. nov. and *Coniochaeta fodinicola* sp. nov., two uranium mine-inhabiting Ascomycota fungi from northern Australia. *Mycologia, 106*(6), 1073–1089. https://doi.org/10.3852/14-013

Vera, M., Sosa, D., Magdama, F., Quevedo, A., Espinoza, F., Serrano, L., . . . Castañeda-Ruiz, R. F. (2020). *Similitrichoconis wongii* gen. & sp. nov. from Ecuador. *Mycotaxon, 135*(4), 829–838.

Verkley, G. J. (2005). *Brefeldochium pruinosum*, gen. et sp. nov., the anamorph of *Polydesmia pruinosa* (Hyaloscyphaceae, Helotiales, Ascomycota). *Nova Hedwigia, 80*(3-4), 503–510.

Vicente, V. A., Najafzadeh, M. J., Sun, J., Gomes, R. R., Robl, D., Marques, S. G., . . . de Hoog, G. S. (2014). Environmental siblings of black agents of human chromoblastomycosis. *Fungal Diversity, 65*(1), 47–63. https://doi.org/10.1007/s13225-013-0246-5

Videira, S. I. R., Groenewald, J. Z., Braun, U., Shin, H. D., & Crous, P. W. (2016). All that glitters is not *Ramularia*. *Studies in Mycology, 83,* 49–163. https://doi.org/10.1016/j.simyco.2016.06.001

Videira, S. I. R., Groenewald, J. Z., Nakashima, C., Braun, U., Barreto, R. W., de Wit, P. J. G. M., & Crous, P. W. (2017). Mycosphaerellaceae – Chaos or clarity? *Studies in Mycology, 87*, 257–421. https://doi.org/10.1016/j.simyco.2017.09.003

Vijaykrishna, D., Mostert, L., Jeewon, R., Gams, W., Hyde, K. D., & Crous, P. W. (2004). *Pleurostomophora*, an anamorph of *Pleurostoma* (*Calosphaeriales*), a new anamorph genus morphologically similar to *Phialophora*. *Studies in Mycology, 50,* 387–395.

Vilgalys, R., & Hester, M. (1990). Rapid genetic identification and mapping of enzymatically amplified ribosomal DNA from several *Cryptococcus* species. *Journal of Bacteriology, 172*(8), 4238–4246.

Villavicencio, M., Sosa, D., Vera, M., Espinoza, F., Quevedo, A., Magdama, F., . . . Castañeda-Ruiz, R. F. (2020). *Zanclospora bicolorata* sp. nov. from Ecuador. *Mycotaxon, 135*(4), 895–900.

Vincent, M. A., & Blackwell, W. H. (1987). Proposal to conserve *Botryosporium* (Fungi). *Taxon, 36*(1), 158–159.

Visagie, C. M., Hirooka, Y., Tanney, J. B., Whitfield, E., Mwange, K., Meijer, M., . . . Samson, R. A. (2014a). *Aspergillus, Penicillium* and *Talaromyces* isolated from house dust samples collected around the world. *Studies in Mycology, 78,* 63–139. https://doi.org/10.1016/j.simyco.2014.07.002

Visagie, C. M., & Houbraken, J. (2020). Updating the taxonomy of *Aspergillus* in South Africa. *Studies in Mycology, 95*, 253–292. https://doi.org/10.1016/j.simyco.2020.02.003

Visagie, C. M., Houbraken, J., Frisvad, J. C., Hong, S. B., Klaassen, C. H. W., Perrone, G., . . . Samson, R. A. (2014b). Identification and nomenclature of the genus *Penicillium*. *Studies in Mycology, 78*, 343–371. https://doi.org/10.1016/j.simyco.2014.09.001

Vitale, A., Aiello, D., Castello, I., Parlavecchio, G., & Polizzi, G. (2008). First report of crown rot and root rot caused by *Cylindrocladium pauciramosum* on *Feijoa* (*Feijoa sellowiana*) in Italy. *Plant Disease, 92*(11), 1590–1590. https://doi.org/10.1094/Pdis-92-11-1590b

Vitale, A., & Polizzi, G. (2008). First record of leaf spots and stem lesions on *Pistacia lentiscus* caused by *Cylindrocladium pauciramosum* and *C. scoparium* in Italy. *Plant Pathology, 57*(2), 384–384. https://doi.org/10.1111/j.1365-3059.2007.01669.x

Vittal, B. P. R., & Dorai, M. (1986). *Civisubramaniania eucalypti* gen. et sp. nov. *Transactions of the British Mycological Society, 87*(3), 482–485. https://doi.org/10.1016/S0007-1536(86)80231-5

Vogelsang, S., & Shamoun, S. F. (2002). Growth, sporulation, and conidia discharge of *Valdensinia heterodoxa*, a foliar pathogen of salal, as influenced by temperature and photoperiod in vitro. *Mycological Research, 106*, 480–490. https://doi.org/10.1017/S0953756202005737

Voglmayr, H. (1997). *Helicoon myosuroides* sp nov and *Helicoon dendroides* sp nov, two new aero-aquatic hyphomycetes. *Mycological Research, 101*, 337–340. https://doi.org/10.1017/S0953756296002675

Voglmayr, H., & Krisai-Greilhuber, I. (1997). *Pseudoclathrosphaerina evamariae* gen. et sp. nov. and *Sympodioclathra globosa* gen. et sp. nov., two aeroaquatic fungi similar to *Clathrosphaerina*. *Mycologia, 89*(6), 942–951. https://doi.org/10.1080/00275514.1997.12026865

Voglmayr, H., Park, M.-J., & Shin, H.-D. (2011). *Spiroplana centripeta* gen. & sp. nov., a leaf parasite of *Philadelphus* and *Deutzia* with a remarkable aeroaquatic conidium morphology. *Mycotaxon, 116*(1), 203–216.

Voglmayr, H., & Yule, C. M. (2006). *Polyancora globosa* gen. sp. nov., an aeroaquatic fungus from Malaysian peat swamp forests. *Mycological Research, 110*(10), 1242–1252. https://doi.org/10.1016/j.mycres.2006.07.001

von Arx, J. A. (1957). Revision der zu Gloeosporium gestellten Pilze. *Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde, 51*(3), 1–153.

von Arx, J. A. (1973). Centraalbureau voor Schimmelcultures, Progress Report 1972. *Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde, 61*, 59–81.

von Arx, J. A. (1981a). On *Monilia sitophila* and some families of Ascomycetes. *Sydowia, 34*, 13–29.

von Arx, J. A. (1981b). *The genera of fungi sporulating in pure culture* (3rd ed.). J Cramer.

von Arx, J. A., & Hennebert, G. L. (1965). Deux champignons ambrosia. *Mycopathologia et Mycologia Applicata, 25*(3), 309–315. https://doi.org/10.1007/BF02049918

von Arx, J. A., & Olivier, D. L. (1952). The taxonomy of *Ophiobolus graminis* Sacc. *Transactions of the British Mycological Society, 35*(1), 29–33. https://doi.org/10.1016/S0007-1536(52)80005-1

von Höhnel, F. (1902). Fragmente zur Mykologie (I. Mitteilung). *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I, 111*, 987–1056.

von Höhnel, F. (1909a). Fragmente zur Mykologie (VII. Mitteilung, Nr. 289 bis 353). *Sitzungsberichten der Kaiserliche Akademie der Wissenschaften in Wien Mathematische-Naturwissenschaftliche Klasse, Abt. 1, 118*, 813–904.

von Höhnel, F. (1909b). Fragmente zur Mykologie VIII. Mitteilung, Nr. 354 bis 406. *Sitzungsber Kais Akad Wiss Wien Math-Naturwiss K1 Abt 1, 118*, 1157–1246.

von Höhnel, F. (1916). Fragmente zur Mykologie (XVIII. Mitteilung, Nr. 944 bis 1000). *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I, 125*, 27–138.

von Klopotek, A. (1967). *Blastobotrys nivea* gen.nov., sp.nov. *Archiv für Mikrobiologie, 58*, 92–96. https://doi.org/10.1007/BF00691172

Vuillemin, P. (1910a). Les Conidiosporés. *Bulletin de la Société des Sciences de Nancy, 3*(11).

Vuillemin, P. (1910b). Matériaux pour une classification rationelle des Fungi Imperfecti. *Comptes rendus hebdomadaires des séances de l'Académie des sciences, 150*, 882–884.

Vuillemin, P. (1911). Les Aleuriosporés. *Bulletin de la Société des Sciences de Nancy, 3*(12), 151–175.

Walsh, E., Luo, J., Naik, A., Preteroti, T., & Zhang, N. (2015). *Barrenia*, a new genus associated with roots of switchgrass and pine in the oligotrophic pine barrens. *Fungal Biology, 119*(12), 1216–1225. https://doi.org/10.1016/j.funbio.2015.09.010

Walsh, E., Luo, J., & Zhang, N. (2014). *Acidomelania panicicola* gen. et sp. nov. from switchgrass roots in acidic New Jersey pine barrens. *Mycologia, 106*(4), 856–864. https://doi.org/10.3852/13-377

Wanasinghe, D. N., Phukhamsakda, C., Hyde, K. D., Jeewon, R., Lee, H. B., Gareth Jones, E. B., . . . Karunarathna, S. C. (2018). Fungal diversity notes 709–839: Taxonomic and phylogenetic contributions to fungal taxa with an emphasis on fungi on Rosaceae. *Fungal Diversity, 89*(1), 1–236. https://doi.org/10.1007/s13225-018-0395-7

Wang, C. J. K., & Sutton, B. C. (1984). Two new synnematous genera: *Chalarodendron* and *Paradidymobotryum*. *Mycologia, 76*(3), 569–572. https://doi.org/10.1080/00275514.1984.12023883

Wang, H.-k., Hyde, K. D., Soytong, K., & Lin, F.-c. (2008). Fungal diversity on fallen leaves of *Ficus* in northern Thailand. *Journal of Zhejiang University SCIENCE B, 9*(10), 835–841. https://doi.org/10.1631/jzus.B0860005

Wang, H., Wang, Z., Liu, F., Wu, C. X., Zhang, S. F., Kong, Xiang B., . . . Zhang, Z. (2019a). Differential patterns of ophiostomatoid fungal communities associated with three sympatric Tomicus species infesting pines in south-western China, with a description of four new species. *Mycokeys, 50*, 93–133.

Wang, M., Jiang, X., Wu, W., Hao, Y., Su, Y., Cai, L., . . . Liu, X. (2015a). Psychrophilic fungi from the world's roof. *Persoonia, 34*, 100–112. https://doi.org/10.3767/003158515x685878

Wang, Q. M., Begerow, D., Groenewald, M., Liu, X. Z., Theelen, B., Bai, F. Y., & Boekhout, T. (2015b). Multigene phylogeny and taxonomic revision of yeasts and related fungi in the Ustilaginomycotina. *Studies in Mycology, 81*, 55–83. https://doi.org/10.1016/j.simyco.2015.10.004

Wang, X., Wang, T. T., Wang, J. C., Guan, T. L., & Li, H. M. (2014). Morphological, molecular and biological characterization of *Esteya vermicola*, a nematophagous fungus isolated from intercepted wood packing materials exported from Brazil. *Mycoscience, 55*(5), 367–377. https://doi.org/10.1016/j.myc.2014.01.002

Wang, X. W., Bai, F. Y., Bensch, K., Meijer, M., Sun, B. D., Han, Y. F., . . . Houbraken, J. (2019b). Phylogenetic re-evaluation of *Thielavia* with the introduction of a new family Podosporaceae. *Studies in Mycology, 93*, 155–252. https://doi.org/10.1016/j.simyco.2019.08.002

Wang, X. W., Yang, F. Y., Meijer, M., Kraak, B., Sun, B. D., Jiang, Y. L., . . . Houbraken, J. (2019c). Redefining *Humicola* sensu stricto and related genera in the Chaetomiaceae. *Studies in Mycology, 93*, 65–153. https://doi.org/10.1016/j.simyco.2018.07.001

Wang, Y., Hyde, K. D., McKenzie, E. H. C., Jiang, Y. L., Li, D. W., & Zhao, D. G. (2015c). Overview of *Stachybotrys* (*Memnoniella*) and current species status. *Fungal Diversity, 71*, 17–83. https://doi.org/10.1007/s13225-014-0319-0

Wang, Y., Jie, C.-Y., Hyde, K. D., Jiang, Y.-L., Zhang, T.-Y., & Zhao, D.-G. (2017). *Chloridium terricola* sp. nov. from China. *Mycotaxon, 132*(1), 79–86.

Wang, Z., Wang, C. Y., Gu, L. J., Wang, Y. B., Zhang, Y. A., & Sung, C. K. (2011). Growth of *Esteya vermicola* in media amended with nitrogen sources yields conidia with increased predacity and resistance to environmental stress. *Canadian Journal of Microbiology, 57*(10), 838–843. https://doi.org/10.1139/W11-068

Weber, G., Spaaij, F., & Gams, W. (1994). *Ticogloea*, a new genus of hyphomycetes from roots of *Ticodendron incognitum* from Costa Rica. *Mycological Research, 98*(6), 660–664. https://doi.org/10.1016/S0953-7562(09)80413-9

Weber, G., Spaaij, F., & Oberwinkler, F. (1989). *Myxocephala*, a new genus of hyphomycetes from roots and soil. *Sydowia, 41*, 360–366.

Wei, C. Z., Harada, Y., & Katumoto, K. (1997). *Pseudodidymella fagi* gen. et sp. nov. and its hyphomycete anamorph *Pycnopleiospora fagi* gen. et sp. nov. on Fagus crenata in Japan. *Mycologia, 89*(3), 494–502.

White, T. J., Bruns, T., Lee, S., & Taylor, J. (1990). Amplification and direct sequencing of fungal ribosomal RNA genes for phylogenetics. In M. A. Innis, D. H. Gelfand, J. J. Sninsky, & T. J. White (Eds.), *PCR protocols: A guide to methods and applications* (pp. 315–322). Academic Press.

Whitton, S. R., Hyde, K. D., & McKenzie, E. H. C. (2000). *Dictyochaeta* and *Dictyochaetopsis* species from the Pandanaceae. *Fungal Diversity, 4*, 133.

Whitton, S. R., McKenzie, E. H. C., & Hyde, K. D. (2012). *Fungi Associated with Pandanaceae*. Springer Netherlands.

Wijayawardene, D. N. N., Crous, P. W., Kirk, P. M., Hawksworth, D. L., Boonmee, S., Braun, U., . . . Hyde, K. D. (2014). Naming and outline of Dothideomycetes-2014 including proposals for the protection or suppression of generic names. *Fungal Diversity, 69*(1), 1–55. https://doi.org/10.1007/s13225-014-0309-2

Wijayawardene, D. N. N., Hyde, K. D., Al-Ani, L. K. T., Tedersoo, L., Haelewaters, D., Rajeshkumar, K. C., . . . Thines, M. (2020). Outline of Fungi and fungus-like taxa. *Mycosphere, 11*(1), 1060–1456. https://doi.org/10.5943/mycosphere/11/1/8

Wijayawardene, D. N. N., Hyde, K. D., Anand, G., Dissanayake, L. S., Tang, L. Z., & Dai, D. Q. (2021). Towards incorporating asexually reproducing fungi in the natural classification and notes for pleomorphic genera. *Mycosphere, 12*(1), 238–405. https://doi.org/10.5943/mycosphere/12/1/4

Wijayawardene, D. N. N., Hyde, K. D., Lumbsch, H. T., Liu, J. K., Maharachchikumbura, S. S. N., Ekanayaka, A. H., . . . Phookamsak, R. (2018). Outline of Ascomycota: 2017. *Fungal Diversity, 88*(1), 167–263. https://doi.org/10.1007/s13225-018-0394-8

Wijayawardene, D. N. N., Hyde, K. D., Rajeshkumar, K. C., Hawksworth, D. L., Madrid, H., Kirk, P. M., . . . Karunarathna, S. C. (2017a). Notes for genera: Ascomycota. *Fungal Diversity, 86*(1), 1–594. https://doi.org/10.1007/s13225-017-0386-0

Wijayawardene, D. N. N., Hyde, K. D., Tibpromma, S., Wanasinghe, D. N., Thambugala, K. M., Tian, Q., . . . Fu, L. (2017b). Towards incorporating asexual fungi in a natural classification: Checklist and notes 2012–2016. *Mycosphere, 8*, 1457–1555.

Wijayawardene, D. N. N., Hyde, K. D., Wanasinghe, D. N., Papizadeh, M., Goonasekara, I. D., Camporesi, E., . . . Wang, Y. (2016). Taxonomy and phylogeny of dematiaceous coelomycetes. *Fungal Diversity, 77*, 1–316. https://doi.org/10.1007/s13225-016-0360-2

Wijayawardene, D. N. N., McKenzie, E. H. C., & Hyde, K. D. (2012). Towards incorporating anamorphic fungi in a natural classification - checklist and notes for 2011. *Mycosphere, 3*(2), 157–228. https://doi.org/10.5943/mycosphere/3/2/5

Wildeman, E. d. (1894). Notes Mycologiques. Fasc. 3. *Annales de la Societé Belge de Microscopie, 18*, 135–161.

Williamson, B., Tudzynski, B., Tudzynski, P., & Van Kan, J. A. L. (2007). *Botrytis cinerea*: The cause of grey mould disease. *Molecular Plant Pathology, 8*(5), 561–580. https://doi.org/10.1111/j.1364-3703.2007.00417.x

Wilson, M., Noble, M., & Gray, E. (1954). *Gloeotinia*—A new genus of the Sclerotiniaceae. *Transactions of the British Mycological Society, 37*(1), 29–32. https://doi.org/10.1016/S0007-1536(54)80063-5

Wittstein, K., Cordsmeier, A., Lambert, C., Wendt, L., Sir, E. B., Weber, J., . . . Stadler, M. (2020). Identification of *Rosellinia* species as producers of cyclodepsipeptide PF1022 A and resurrection of the genus *Dematophora* as inferred from polythetic taxonomy. *Studies in Mycology, 96*, 1–16. https://doi.org/10.1016/j.simyco.2020.01.001

Woodburn, D. B., Miller, A. N., Allender, M. C., Maddox, C. W., Terio, K. A., & Warnock, D. W. (2019). *Emydomyces testavorans*, a new genus and species of onygenalean fungus isolated from shell lesions of freshwater aquatic turtles. *Journal of Clinical Microbiology, 57*(2), e00628–00618. https://doi.org/10.1128/JCM.00628-18

Woudenberg, J. H. C., Meijer, M., Houbraken, J., & Samson, R. A. (2017). *Scopulariopsis* and scopulariopsis-like species from indoor environments. *Studies in Mycology, 88*, 1–35. https://doi.org/10.1016/j.simyco.2017.03.001

Wrzosek, M., Dubiel, G., Gorczak, M., Pawłowska, J., Tischer, M., & Bałazy, S. (2016). New insights on the phylogeny and biology of the fungal ant pathogen *Aegeritella*. *Journal of Invertebrate Pathology, 133*, 1–7. https://doi.org/10.1016/j.jip.2015.11.005

Wu, W., Sutton, B. C., & Gange, A. C. (1997a). Description of *Avesicladiella* gen. nov. (hyphomycetes) for two undescribed leaf litter microfungi. *Mycoscience, 38*(1), 11–15. https://doi.org/10.1007/bf02464963

Wu, W., Sutton, B. C., & Gange, A. C. (1997b). Notes on three fungicolous fungi: *Anastomyces microsporus* gen. et sp. nov., *Idriella rhododendri* sp. nov. and *Infundibura adhaerens*. *Mycological Research, 101*(11), 1318–1322. https://doi.org/10.1017/S0953756297004097

Wu, W. P., & McKenzie, E. H. C. (2003). *Obeliospora minima* sp nov and four other hyphomycetes with conidia bearing appendages. *Fungal Diversity, 12*, 223–234.

Wu, W. P., & Sutton, B. C. (1995). *Fumagopsis complexa* sp nov, a species with complicated conidial morphology. *Mycological Research, 99*, 1450–1452.

Wu, W. P., Sutton, B. C., & Gange, A. C. (1996). *Dactylaria endophytica* sp. nov., an endophyte from leaves of *Prunus lusitanica*. *Mycological Research, 100*, 524–526.

Wu, Y.-M., Xu, J.-J., Kong, J.-H., & Zhang, T.-Y. (2015). New species of *Graphium* and *Periconia* from China. *Mycotaxon, 129*(2), 397–401.

Wu, Y.-M., Xu, J.-J., Wang, H.-F., & Zhang, T.-Y. (2013a). *Geosmithia tibetensis* sp. nov. and new *Gibellulopsis* and *Scopulariopsis* records from Qinghai-Tibet. *Mycotaxon, 125*(1), 59–64.

Wu, Y.-M., Xu, J.-J., Wang, H.-F., & Zhang, T.-Y. (2013b). *Radulidium xigazense* sp. nov., *Rhinocladiella tibetensis* sp. nov., and three new records of *Ramichloridium* from China. *Mycotaxon, 125*(1), 123–130.

Wu, Y.-M., & Zhang, T.-Y. (2009). New species of *Phialosporostilbe* and *Pleurothecium* from soil. *Mycotaxon, 110*(1), 1–4.

Wu, Y.-M., & Zhang, T.-Y. (2011a). Three new species of *Scytalidium* from soil. *Mycotaxon, 114*(1), 205–210.

Wu, Y.-M., & Zhang, T.-Y. (2011b). Two new species of *Phialophora* from soil. *Mycotaxon, 115*(1), 251–254.

Wu, Y.-M., & Zhang, T.-Y. (2013). A new species and new record of *Chloridium* from the Qinghai-Tibet Plateau Area, China. *Mycotaxon, 123*(1), 277–280.

Xia, J.-W., Ma, Y.-R., Gao, J.-M., Li, Z., & Zhang, X.-G. (2015a). *Codinaea jianfenglingensis* sp. nov. and new records from southern China. *Mycotaxon, 130*(3), 835–841.

Xia, J.-W., Ma, Y.-R., & Zhang, X.-G. (2015b). *Anungitea guangxiensis* and *Ellisembia longchiensis*, two new species from southern China. *Mycotaxon, 130*(1), 41–46.

Xu, X.-L., Zeng, Q., Lv, Y.-C., Jeewon, R., Maharachchikumbura, S. S. N., Wanasinghe, D. N., . . . Yang, C.-L. (2021). Insight into the systematics of novel entomopathogenic fungi associated with armored scale insect, *Kuwanaspis howardi* (Hemiptera: Diaspididae) in China. *Journal of Fungi, 7*(8), 628.

Xu, Z.-H., Zhang, K., Zhang, X.-G., Castañeda-Ruíz, R. F., & Ma, J. (2019). *Cacumisporium fusiforme* sp. nov. from Jiangxi, China. *Mycotaxon*, *134*(2), 275–279.

Yaguchi, T., Udagawa, S., & Nishimura, K. (2005). *Geosmithia argillacea* is the anamorph of *Talaromyces eburneus* as a heat resistant fungus. *Cryptogamie Mycologie*, *26*(2), 133–141.

Yamaguchi, K., Chuaseeharonnachai, C., Huhtinen, S., Tsurumi, Y., Sri-Indrasutdhi, V., Boonyuen, N., . . . Nakagiri, A. (2020). Phylogeny and taxonomic revision of the genus *Candelabrum*, aero-aquatic fungi. *Mycoscience, 61*(6), 265–281. https://doi.org/10.1016/j.myc.2020.02.004

Yamaguchi, K., Degawa, Y., & Nakagiri, A. (2009). An aero-aquatic fungus, *Peyronelina glomerulata*, is shown to have teleomorphic affinities with cyphelloid basidiomycetes. *Mycoscience, 50*(3), 156–164. https://doi.org/10.1007/s10267-008-0467-8

Yang, C.-L., Wang, J.-Y., Xia, J.-W., Ma, Y.-R., Gao, J.-M., & Zhang, X.-G. (2016). *Phaeomonilia nanningensis* sp. nov. and a new *Craspedodidymum* record from southern China. *Mycotaxon, 131*(3), 547–551.

Yang, H., Ariyawansa, H. A., Wu, H. X., & Hyde, K. D. (2014). The genus *Leptoxyphium* (Capnodiaceae) from China. *Phytotaxa*, *176*(1), 174–183.

Yang, J., Liu, N. G., Liu, J. K., Hyde, K. D., Jones, E. B. G., & Liu, Z. Y. (2018). Phylogenetic placement of *Cryptophiale*, *Cryptophialoidea*, *Nawawia*, *Neonawawia* gen. nov. and *Phialosporostilbe*. *Mycosphere, 9*(6), 1132–1150. https://doi.org/10.5943/mycosphere/9/6/5

Yanna, Ho, W. H., Goh, T. K., & Hyde, K. D. (2000a). A new species of *Everhartia* associated with leaf spots of *Phoenix hanceana* from Hong Kong. *Botanical Journal of the Linnean Society, 134*, 465–470.

Yanna, Ho, W. H., Goh, T. K., & Hyde, K. D. (2000b). *Craspedodidymum nigroseptatum* sp nov., a new hyphomycete on palms from Brunei Darussalam. *Mycological Research, 104*, 1146–1151.

Yanna, & Hyde, K. D. (2002). New saprobic fungi on fronds of palms from northern Queensland, Australia. *Australian Systematic Botany, 15*(6), 755–764. https://doi.org/10.1071/SB01015

Yen, J. M. (1983). Studies on parasitic fungi from South East Asia, 49. Parasitic fungi from Malaysia, 25: *Semipseudocercospora* gen. nov. *Mycotaxon, 17*, 361–363.

Yen, L. T. H., Yamaguchi, K., Tsurumi, Y., Hop, D. V., & Ando, K. (2018). *Hamatispora*, a new genus of aquatic fungi in Microthyriales isolated from fallen leaves in Vietnam. *Mycoscience, 59*(6), 467–472. https://doi.org/10.1016/j.myc.2018.04.004

Yokoyama, T. (1974). *Hyalohelicomina*, a new genus of hyphomycetes. *Transactions of the Mycological Society of Japan, 15*, 158–160.

Yu, Z.-F., Lv, Y.-F., Feng, B., & Qiao, M. (2019). *Lemonniera yulongensis* sp. nov. from Yunnan, China. *Mycotaxon, 134*(1), 177–181.

Zaffarano, P. L., McDonald, B. A., & Linde, C. C. (2011). Two new species of *Rhynchosporium*. *Mycologia, 103*(1), 195–202. https://doi.org/10.3852/10-119

Zamora, J. C., & Ekman, S. (2020). Phylogeny and character evolution in the Dacrymycetes, and systematics of Unilacrymaceae and Dacryonaemataceae fam. nov. *Persoonia, 44*, 161–205. https://doi.org/10.3767/persoonia.2020.44.07

Zare, R., & Gams, W. (2001a). A revision of *Verticillium* section *Prostrata*. IV. The genera *Lecanicillium* and *Simplicillium* gen. nov. *Nova Hedwigia, 73*(1-2), 1–50.

Zare, R., & Gams, W. (2001b). A revision of *Verticillium* section *Prostrata*. VI. The genus *Haptocillium*. *Nova Hedwigia, 73*(3-4), 271–292.

Zare, R., & Gams, W. (2016). More white verticillium-like anamorphs with erect conidiophores. *Mycological Progress, 15*(10-11), 993–1030. https://doi.org/10.1007/s11557-016-1214-8

Zare, R., Gams, W., & Culham, A. (2000). A revision of *Verticillium* sect. *Prostrata*. I. Phylogenetic studies using ITS sequences. *Nova Hedwigia, 71*(3/4), 465–480.

Zare, R., Gams, W., & Evans, H. C. (2001). A revision of *Verticillium* section *Prostrata*. V. The genus *Pochonia*, with notes on *Rotiferophthora*. *Nova Hedwigia, 73*(1-2), 51–86.

Zare, R., Gams, W., & Schroers, H. J. (2004). The type species of *Verticillium* is not congeneric with the plant-pathogenic species placed in *Verticillium* and it is not the anamorph of *'Nectria' inventa*. *Mycological Research, 108*, 576–582. https://doi.org/10.1017/S0953756204009839

Zare, R., Gams, W., Starink-Willemse, M., & Summerbell, R. C. (2007). *Gibellulopsis*, a suitable genus for *Verticillium nigrescens*, and *Musicillium*, a new genus for *V. theobromae*. *Nova Hedwigia, 85*(3-4), 463–489. https://doi.org/10.1127/0029-5035/2007/0085-0463

Zeng, J., Feng, P., van den Ende, A. H. G. G., Xi, L., Harrak, M. J., & de Hoog, G. S. (2014). Multilocus analysis of the *Exophiala jeanselmei* clade containing black yeasts involved in opportunistic disease in humans. *Fungal Diversity, 65*(1), 3–16. https://doi.org/10.1007/s13225-013-0226-9

Zeng, Z. Q., & Zhuang, W. Y. (2018). Discovery of a second species of *Hyalocylindrophora* and the phylogenetic position of the genus in Bionectriaceae. *Mycologia, 110*(5), 941–947. https://doi.org/10.1080/00275514.2018.1507371

Zhan, P., Dukik, K., Li, D., Sun, J., Stielow, J. B., Gerrits van den Ende, B., . . . de Hoog, G. S. (2018). Phylogeny of dermatophytes with genomic character evaluation of clinically distinct *Trichophyton rubrum* and *T. violaceum*. *Studies in Mycology, 89*, 153–175. https://doi.org/10.1016/j.simyco.2018.02.004

Zhang, H., Dong, W., Hyde, K. D., Maharachchikumbura, S. S. N., Hongsanan, S., Jayarama Bhat, D., . . . Zhang, D. (2017a). Towards a natural classification of Annulatascaceae-like taxa: Introducing Atractosporales ord. nov. and six new families. *Fungal Diversity, 85*(1), 75–110. https://doi.org/10.1007/s13225-017-0387-z

Zhang, M., & Zhang, T.-Y. (2003). A new species of *Beltrania* (Hyphomycetes) from China. *Mycosystema, 22*(4), 520–521.

Zhang, N., Luo, J., Rossman, A. Y., Aoki, T., Chuma, I., Crous, P. W., . . . Xu, J. R. (2016a). Generic names in Magnaporthales. *IMA Fungus, 7*(1), 155–159. https://doi.org/10.5598/imafungus.2016.07.01.09

Zhang, Y., Liu, F., Wu, W. P., & Cai, L. (2015). A phylogenetic assessment and taxonomic revision of the thermotolerant hyphomycete genera *Acrophialophora* and *Taifanglania*. *Mycologia, 107*(4), 768–779. https://doi.org/10.3852/14-173

Zhang, Y., Wu, W. P., Hu, D. M., Su, Y. Y., & Cai, L. (2014). A new thermophilic species of *Myceliophthora* from China. *Mycological Progress, 13*(1), 165–170. https://doi.org/10.1007/s11557-013-0904-8

Zhang, Y. D., Ma, J., Ma, L. G., Castaneda-Ruiz, R. F., & Zhang, X. G. (2011). New species of *Phaeodactylium* and *Neosporidesmium* from China. *Sydowia, 63*(1), 125–130.

Zhang, Y. W., Chen, W. H., Zeng, G. P., Wang, Y. R., Zou, X., Han, Y. F., . . . Liang, Z. Q. (2016b). Two new *Chrysosporium* (Onygenaceae, Onygenales) from China. *Phytotaxa, 270*(3), 210–216. https://doi.org/10.11646/phytotaxa.270.3.5

Zhang, Z.-F., Zhou, S.-Y., Eurwilaichitr, L., Ingsriswang, S., Raza, M., Chen, Q., . . . Cai, L. (2021). Culturable mycobiota from Karst caves in China II, with descriptions of 33 new species. *Fungal Diversity, 106*(1), 29–136. https://doi.org/10.1007/s13225-020-00453-7

Zhang, Z., Dong, C., Chen, W., Mou, Q., Lu, X., Han, Y., . . . Liang, Z. (2020). The enigmatic Thelebolaceae (Thelebolales, Leotiomycetes): One new genus *Solomyces* and five new species. *Frontiers in Microbiology, 11*(2618), 1–15. https://doi.org/10.3389/fmicb.2020.572596

Zhang, Z. F., Liu, F., Zhou, X., Liu, X. Z., Liu, S. J., & Cai, L. (2017b). Culturable mycobiota from Karst caves in China, with descriptions of 20 new species. *Persoonia - Molecular Phylogeny and Evolution of Fungi, 39*(1), 1–31.

Zhao, S. G., & Shamoun, S. F. (2006). The effects of culture media, solid substrates, and relative humidity on growth, sporulation and conidial discharge of *Valdensinia heterodoxa*. *Mycological Research, 110*, 1340–1346. https://doi.org/10.1016/j.mycres.2006.08.001

Zhaxybayeva, O., & Gogarten, J. P. (2002). Bootstrap, Bayesian probability and maximum likelihood mapping: Exploring new tools for comparative genome analyses. *BMC Genomics, 3*, 4–4. https://doi.org/10.1186/1471-2164-3-4

Zheng, H., Li, J., Guo, J.-S., Qiao, M., & Yu, Z.-F. (2021). *Anacraspedodidymum submersum* sp. nov. (Chaetosphaeriaceae, Chaetosphaeriales), a new species of freshwater hyphomycetes from southwest China. *International Journal of Systematic and Evolutionary Microbiology, 71*(2). https://doi.org/10.1099/ijsem.0.004650

Zheng, H., Wan, Y., Li, J., Castañeda-Ruiz, R. F., & Yu, Z. (2020). *Phialolunulospora vermispora* (Chaetosphaeriaceae, Sordariomycetes), a novel asexual genus and species from freshwater in southern China. *Mycokeys, 76*, 17–30. https://doi.org/10.3897/mycokeys.76.57410

Zheng, H., Yang, X.-Q., Deng, J.-S., Xu, J.-P., & Yu, Z.-F. (2019a). *Beltrania sinensis* sp. nov., an endophytic fungus from China and a key to species of the genus. *International Journal of Systematic and Evolutionary Microbiology*. https://doi.org/10.1099/ijsem.0.003897

Zheng, H., Zhang, Z., Wen, Z., F Castañeda-Ruiz, R., & ZeFen, Y. (2019b). *Blastosporium persicolor* gen. et sp. nov., a new helotialean fungus. *Mycokeys, 51*, 55–64. https://doi.org/10.3897/mycokeys.51.30798

Zhou, X. D., Jacobs, K., Kirisits, T., Chhetri, D. B., & Wingfield, M. J. (2008). *Leptographium bhutanense* sp nov., associated with the root collar weevil *Hylobitelus chenkupdorjii* on *Pinus wallichiana* in Bhutan. *Persoonia, 21*, 1–8. https://doi.org/10.3767/003158508x332435

Zhu, Z.-X., Xu, H.-X., Zhuang, W.-Y., & Li, Y. (2017). Two new green-spored species of *Trichoderma* (Sordariomycetes, Ascomycota) and their phylogenetic positions. *Mycokeys, 26*, 61–75.

Zhu, Z. X., & Zhuang, W. Y. (2015). *Trichoderma* (Hypocrea) species with green ascospores from China. *Persoonia, 34*, 113–129. https://doi.org/10.3767/003158515x686732

Zhuang, J., Zhu, M., Zhang, R., Yin, H., Lei, Y., Sun, G., & Gleason, M. L. (2010). *Phialophora sessilis*, a species causing flyspeck signs on bamboo in China. *Mycotaxon, 113*(1), 405–413.

Zhuang, W.-Y., Nong, Y., & Luo, J. (2007). New species and new Chinese records of Bionectriaceae and Nectriaceae (Hypocreales, Ascomycetes) from Hubei, China. *Fungal Diversity, 24*, 347–357.

Zimmermann, A. (1902). Über einige an tropischen Kulturpflanzen beobachtete Pilze, II. *Centralblatt für Bakteriologie und Parasitenkunde, 8*, 216–221.

zu Solms-Laubach, H. G. (1887). *Penicilliopsis clavariaeformis*: Ein neuer javanischer Ascomycet. *Annales du Jardin Botanique de Buitenzorg, 6*, 53–72.

APPENDICES

APPENDIX A

PUBLICATIONS

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Hyaline-spored chaetosphaeriaceous hyphomycetes from Thailand and China, with a review of the family Chaetosphaeriaceae

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Abstract

Chaetosphaeriaceae is a genus-rich, but taxonomically confused family and there is a need of more detailed studies on their asexual and sexual morphs and investigation of phylogenetic relationships to similar genera in other families. In this study, a survey of hyaline-spored chaetosphaeriaceous hyphomycetes yielded ten new taxa, including one new genus (*Multiguttulispora*) and nine new species (*Dictyochaeta brevis*, *D. terminaliae*, *Kionochaeta castaneae*, *K. microspora*, *Menisporopsis breviseta*, *M. dushanensis*, *Multiguttulispora sympodialis*, *Tainosphaeria aseptata* and *T. monophialidica*). In addition, *Cryptophiale udagawae* and *Dictyochaeta simplex* are described and illustrated. Support for the new taxa are provided by morphological comparison and DNA sequence data analyses. Phylogenetic analysis of SSU, ITS and LSU sequence data showed that *Kionochaeta* is polyphyletic and species are phylogenetically located in two groups (*Kionochaeta 1* and *Kionochaeta 2*). In addition, a synopsis for *Kionochaeta* and *Menisporopsis* species, an updated phylogenetic tree and outline for Chaetosphaeriaceae are provided.

Key words – 10 new taxa – asexual morph – phylogeny – Sordariomycetes – Sordariomycetidae – taxonomy

Introduction

The family *Chaetosphaeriaceae* was introduced by Locquin (1984) for *Chaetosphaeria* Tul. & C. Tul., *Loramyces* W. Weston, *Niesslia* Auersw., *Rhagadostoma* Körb. and *Zignoëlla* Sacc., but was not validly published (Réblová et al. 1999). Réblová et al. (1999) re-described the family *Chaetosphaeriaceae* and accepted *Ascocodinaea* Samuels, Cand. & Magni, *Chaetosphaeria*, *Melanochaeta* E. Müll., Harr & Sulmont, *Melanopsammella* Höhn., *Porosphaerella* E. Müll. & Samuels, *Porosphaerellopsis* Samuels & E. Müll. and *Striatosphaeria* Samuels & E. Müll. Presently, 38 genera are accepted within the family *Chaetosphaeriaceae* (Maharachchikumbura et al. 2016, Wijayawardene et al. 2018).

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Beltrania-like taxa from Thailand

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Abstract – Four *Beltrania*-like taxa, *viz*., *Beltrania rhombica, Beltraniella fertilis, Beltraniopsis longiconidiophora sp. nov.* and *Hemibeltrania cinnamomi* were identified during a survey of hyphomycetes in Thailand. Each species is provided with a description and a molecular analysis. The new species is introduced based on morphological and molecular differences and compared with similar taxa. *Beltraniella fertilis* and *H. cinnamomi* are new records for Thailand.

***Beltrania*-complex / Beltraniaceae / Phylogeny / Taxonomy / Xylariomycetidae**

INTRODUCTION

The family Beltraniaceae Nann. was introduced by Nannizzi in 1934 to accommodate the genus *Beltrania* Penz. and some similar genera, and the tribe Beltranieae was treated as a synonym of this family (Pirozynski, 1963). Presently, eight genera, *viz*., *Beltrania*, *Beltraniella* Subram., *Beltraniopsis* Bat. & J.L. Bezerra, *Hemibeltrania* Piroz., *Parapleurotheciopsis* P.M. Kirk, *Porobeltraniella* Gusmão, *Pseudobeltrania* Henn. and *Subramaniomyces* Varghese & V.G. Rao, are accepted in the family (Crous *et al.*, 2015b; Maharachchikumbura *et al.*, 2015, 2016; Rajeshkumar *et al.*, 2016a). The conidia of these genera are very distinctive, often being biconic, with or without a hyaline equatorial, subequatorial or supraequatorial band, and with or without swollen separating cells. The unbranched or branched conidiophores and/or setae arise from radially lobed basal cells (Ellis, 1971, 1976; Seifert *et al.*, 2011).

The genus *Beltrania* was established by Penzig (1882) to accommodate *B. rhombica* Penzig. This genus contains 13 species (Morelet, 2001; Zhang & Zhang, 2003; Rambelli & Ciccarone, 2008; Crous *et al.*, 2015b), each characterized by

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ORIGINAL ARTICLE

Subsessila turbinata gen. et. sp. nov. (Beltraniaceae), a *Beltrania*-like fungus from Thailand

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Abstract A new monotypic *Beltrania*-like genus, *Subsessila*, with its type species *S. turbinata*, is described, illustrated and compared with similar genera. The new genus is introduced in the family Beltraniaceae based on phylogenetic analysis and morphological characters. *Subsessila* can be easily distinguished from other *Beltrania*-like genera by dark setae arising from radially lobed basal cells, mostly lacking macronematous conidiophores. Conidiogenous cells are ampulliform or doliiform and produce turbinate to clavate conidia with rostrate proximal end and rounded distal end. Evidence for establishment of the new genus is provided based on morphological comparison and DNA sequence data analyses.

Keywords *Beltrania* complex · Phylogeny · Taxonomy · Xylariales

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Introduction

Xylariales is a large order of perithecial ascomycetes with eight-spored unitunicate asci, usually with a J+ apical ring and ascospores with a prominent germ pore or germ slit and is accommodated in the subclass Xylariomycetidae (Smith et al. 2003; Senanayake et al. 2015; Maharachchikumbura et al. 2016). Asexual morphs of the Xylariales are usually hyphomycetous, with holoblastic conidiogenesis (Maharachchikumbura et al. 2015, 2016). Presently, there are 22 accepted families in the Xylariales, viz. Amphisphaeriaceae, Apiosporaceae, Bartaliniaceae, Beltraniaceae, Cainiaceae, Clypeosphaeriaceae, Coniocessiaceae, Diatrypaceae, Hyponectriaceae, Iodosphaeriaceae, Lopadostomaceae, Melogrammataceae, Microdochiaceae, Myelospermataceae, Pestalotiopsidaceae, Phlogicylindriaceae, Pseudomassariaceae, Requienellaceae, Robillardaceae, Sporocadaceae, Vialaeaceae and Xylariaceae (Maharachchikumbura et al. 2015, 2016).

A fungal tribe named Beltranieae Sacc. was established by Saccardo (1886) to accommodate a single genus *Beltrania* Penzig. Nannizzi (1934) introduced Beltraniaceae Nann. to accommodate *Beltrania* and some similar genera, and the tribe Beltranieae was treated as a synonym of this family. Crous et al. (2015b) emended the family Beltraniaceae and accepted *Beltrania*, *Beltraniella* Subram., *Beltraniopsis* Bat. & J.L. Bezerra, *Parapleurotheciopsis* P.M. Kirk and *Pseudobeltrania* Henn. They provided DNA sequence data to support the family. Crous et al. (2015b) proposed that three more genera, *Beltraniomyces* Manohar., D.K. Agarwal & Rao, *Porobeltraniella* Gusmão and *Subramaniomyces* Varghese & V.G. Rao, should be accepted in this family. Due to the lack of reliable strains and sequence data, they could not confirm the familial relationships of these genera within the Beltraniaceae. Maharachchikumbura et al. (2016)

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Stachybotrys-like taxa from karst areas and a checklist of stachybotrys-like species from Thailand

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Abstract

During a survey of hyphomycetes from karst areas in Thailand, four stachybotrys-like taxa, *viz*., *Cymostachys garethjonesii* sp. nov., *Memnoniella oblongispora* sp. nov., *M. nilagirica* comb. nov. and *Stachybotrys microspora* were identified and are provided with descriptions in this paper. The new species are introduced based on morphological and molecular differences and compared with similar or related taxa. *Memnoniella nilagirica* and *Stachybotrys microspora* are new records for Thailand. An annotated checklist of stachybotrys-like taxa in Thailand is provided based on previous publications and database searches.

Key words – karst – new species – phylogeny – *Stachybotryaceae* – taxonomy

Introduction

The family *Stachybotryaceae*, typified by *Stachybotrys* Corda, was established by Crous et al. (2014) to accommodate *Myrothecium* Tode, *Peethamabra* Subram. & Bhat and *Stachybotrys* Corda. Maharachchikumbura et al. (2015, 2016) accepted four additional genera *Albosynnema* E.F. Morris, *Parasarcopodium* Melnik et al., *Sarcopodium* Ehrenb. and *Scopinella* Lév. within this family, based on morphological features and phylogenetic analysis. Lombard et al. (2016) revised this family by combining morphology and multi-locus phylogenetic analyses using *cmdA*, ITS, *rpb2*, *tef1* and *tub2* datasets. Presently, 33 genera are accepted in the family *Stachybotryaceae* (Lombard et al. 2016).

The genus *Stachybotrys* (*Stachybotryaceae*, Hypocreales) was established by Corda (1837) to accommodate *Stachybotrys atra* Corda 1837 (now known as *S. chartarum* (Ehrenb.) S. Hughes 1958) (Bisby 1943, Seifert et al. 2011). *Stachybotrys* is characterized by macronematous, mononematous, branched or unbranched conidiophores, with discrete, determinate, terminal, phialidic conidiogenous cells, with unicellular, smooth or variously ornamented conidia, produced in a slimy mass or in chains (Ellis 1971, Jong & Davis 1976, Pinruan et al. 2004b, Seifert et al.

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ORIGINAL ARTICLE

The genus *Fusariella*

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Abstract The genus *Fusariella*, typified by *F. atrovirens*, is characterised by semi- to macronematous, mononematous conidiophores, with cylindrical, subulate or lageniform phialidic conidiogenous cells that produce catenate, septate, curved to straight, subhyaline to brown conidia. During a survey of hyaline-spored hyphomycetes from karst areas in Thailand, we collected a new species of *Fusariella* with curved conidia and introduce it in this paper as *Fusariella curvata* sp. nov. In addition, all hitherto described species of *Fusariella* are reviewed. The result of phylogenetic analyses, based on combined SSU, LSU, TEF and RPB2 sequence data, indicates that the genus belongs in the family Bionectriaceae (Hypocreales, Sordariomycetes).

Keywords Bionectriaceae · *Fusariella* · Karst · New species · Phylogeny

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Introduction

The family Bionectriaceae (Hypocreales, Sordariomycetes) was established by Rossman et al. (1999) and consolidated in recent studies by Maharachchikumbura et al. (2015, 2016), who accepted 38 genera in the family. The sexual morphs of Bionectriaceae are characterised by uniloculate perithecial, rarely cleistothecial ascomata that are white, yellow, orange to tan or brown, do not change colour in KOH or lactic acid, and are generally superficial, lacking a stroma, or immersed in the substratum (Rossman et al. 1999; Maharachchikumbura et al. 2016). The asexual morphs in Bionectriaceae are hyphomycetous, acremonium- or gliocladium-like. The conidiogenous cells are phialidic and produce unicellular to multi-septate, ellipsoidal, fusiform to subfusiform, hyaline to greenish hyaline or bright-coloured conidia (Rossman et al. 1999; Maharachchikumbura et al. 2016).

The genus *Fusariella* Sacc. was established by Saccardo (1884) to accommodate *Fusariella atrovirens* (Berk.) Sacc., and is characterised by semi-macronematous, mononematous, unbranched or variously branched conidiophores, with curved, cylindrical, subulate or lageniform, hyaline to pale brown phialides that produce catenate, acrogenous, straight or slightly curved, fusiform, cylindrical, clavate or obclavate, subhyaline to brown conidia (Hughes 1949; Chabelska-Frydman 1964; Roy and Rai 1968; Ellis 1971, 1976; Seifert et al. 2011). Nineteen species epithets for *Fusariella* are listed in Index Fungorum (2016) and MycoBank (2016; http://www.mycobank.org/). In this study, all species are revisited and a synopsis to the species of *Fusariella* is provided.

Although the genus *Fusariella* has been known for more than 130 years since it was established by Saccardo (1884), its natural classification is still uncertain because of the lack of molecular data and a comprehensive taxonomic treatment (Index Fungorum 2016). In this study, we propose taxa at

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Alfaria avenellae sp. nov. from Italy

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Abstract

A new species *Alfaria avenellae*, is described, illustrated and compared with other *Alfaria* species. Evidence for the new species is provided by morphological comparison and sequence data analyses. *Alfaria avenellae* can easily be distinguished from other *Alfaria* species by its distinct synnemata, long conidiophores (up to 350 µm) and pale green to dark green conidia. Phylogenetic analysis of combined LSU and ITS sequence data was carried out to determine the phylogenetic placement of this new species within the genus *Alfaria* and provide evidence to support the establishment of our new species.

Key words: Asexual morph, hyphomycetes, phylogeny, *Stachybotryaceae*, taxonomy

Introduction

The fungal genus *Alfaria* was established by Crous *et al.* (2014) to accommodate a new plant pathogen, *A. cyperi-esculenti* Crous, N.J. Montaño-Mata & García-Jim., associated with leaf tip dieback and tuber rot of tiger nut (*Cyperus esculentus*) in Spain. This pathogen can affect the leaf, tuber and inflorescences and result in leaf apical necrosis and tuber rot in the early stages of plant development (Crous *et al.* 2014). *Alfaria* belongs in the family *Stachybotryaceae*, order Hypocreales, class Sordariomycetes (Maharachchikumbura *et al.* 2015, 2016, Wijayawardene *et al.* 2016).

The asexual morphs in *Alfaria* are hyphomycetous. Conidiomata are simple or myrothecium-like, sporodochial or mycelial. Setae are present or absent. Conidiophores are distinct, unbranched or verticillately or penicillately branched with phialidic conidiogenous cells which produce cylindrical to ellipsoidal to ossiform, hyaline to lightly pigmented, aseptate conidia that are aggregated in dry or slimy olivaceous green to mouse grey to black masses (Lombard *et al.* 2016).

During a survey of hyphomycetes in Italy, an undescribed *Alfaria* species was collected. The fungus is described and illustrated here as a new species in *Alfaria*, based on morphology and phylogenetic analysis of ITS and LSU sequence data.

Materials and methods

Collection and isolation of fungi

Dead stems of *Avenella* sp. (*Poaceae*) were collected during 2014 to 2015 in Italy and taken to the laboratory in Zip-lock plastic bags for examination. The specimens were examined using a Motic SMZ 168 series microscope. The fungus was removed with a needle and placed in a drop of distilled water on a slide for morphological study.

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Pseudodactylaria brevis sp. nov. from Thailand confirms the status of Pseudodactylariaceae

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Abstract

A new species, *Pseudodactylaria brevis*, is described, illustrated and compared with other *Pseudodactylaria* and *Dactylaria*-like taxa. Evidence for the new species is provided by morphological comparison and sequence data analyses. *Pseudodactylaria brevis* can be distinguished from other *Pseudodactylaria* and *Dactylaria*-like species by its short hyaline conidiophores and fusiform, 1-septate hyaline conidia. Phylogenetic analysis of LSU and ITS sequence data was carried out to determine the phylogenetic placement of the species and confirm the taxonomic status of Pseudodactylariaceae.

Keywords: 1 new taxon, asexual morph, hyphomycetes, phylogeny, Sordariomycetidae

Introduction

The genus *Dactylaria* Sacc. was introduced by Saccardo (1880). It is a heterogeneous genus with 172 epithets listed in Index Fungorum (June, 2018). The generic concept of *Dactylaria* has become confused and was revised several times (Bhatt & Kendrick 1968, Rifai 1968, Schenck *et al.* 1977, de Hoog 1985, de Hoog & van Oorschot 1985, van Oorschot 1985, Goh & Hyde 1997, Paulus *et al.* 2003). *Dactylaria sensu lato* is characterized by hyaline or brown, thin-walled, aseptate to several septate conidia produced on denticles from sympodially developing, erect, hyaline or brown, unbranched or sparingly branched conidiophores (de Hoog 1985, de Hoog & van Oorschot 1985, van Oorschot 1985, Goh & Hyde 1997, Seifert *et al.* 2011).

Many hitherto reported genera share some similarities with *Dactylaria sensu lato* (de Hoog & van Oorschot 1985, Goh & Hyde 1997, Réblová *et al.* 2012). de Hoog & van Oorschot (1985) listed 38 *Dactylaria*-like genera, e.g. *Arthrobotrys*, *Dactylella*, *Lactydina* and *Neta*, etc. and provided a key to these taxa. Réblová *et al.* (2012) introduced the genus *Pleurotheciella* with *Dactylaria*-like asexual morph (Wijayawardene *et al.* 2017b). The taxonomy of the *Dactylaria sensu lato* and *Dactylaria*-like genera is still confused, and further work, especially phylogenetic analysis based on DNA sequence data, is required to confirm their taxonomic placement.

The genus *Pseudodactylaria* Crous was introduced by Crous *et al.* (2017) for two *Dactylaria*-like species, *P. hyalotunicata* (K.M. Tsui *et al.*) Crous and *P. xanthorrhoeae* Crous, within the family *Pseudodactylariaceae* Crous and order Pseudodactylariales Crous. *Pseudodactylaria* is similar to *Dactylaria sensu lato*, but can be distinguished by the morphology of its conidiophores and conidia.

Pseudodactylariaceae is included within subclass Sordariomycetidae (Eriksson & Winka 1997) and class Sordariomycetes, which is the second largest class of Ascomycota (Maharachchikumbura *et al.* 2015, 2016, Hyde *et al.* 2017, Wijayawardene *et al.* 2018).

During a survey of hyphomycetes in Thailand, a *Dactylaria*-like species was collected. It was shown to belong to the genus *Pseudodactylaria* and is the third species to be included in Pseudodactylariaceae based on morphology and phylogeny analyses of combined LSU and ITS sequence data.

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RESEARCH ARTICLE

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The genus *Castanediella*

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Abstract

Two new species, *Castanediella brevis* and *C. monoseptata*, are described, illustrated and compared with other *Castanediella* taxa. Evidence for the new species is provided by morphological comparison and sequence data analyses. *Castanediella brevis* can be distinguished from other *Castanediella* species by the short hyaline conidiophores and fusiform, aseptate hyaline conidia, while *C. monoseptata* differs from other *Castanediella* species by its unbranched conidiophores and fusiform, curved, 0–1-sepatate, hyaline conidia. Phylogenetic analysis of combined ITS and LSU sequence data was carried out to determine the phylogenetic placement of the species. A synopsis of hitherto described *Castanediella* species is provided. In addition, *Castanediella* is also compared with morphologically similar-looking genera such as *Idriella*, *Idriellopsis*, *Microdochium*, *Neoidriella*, *Paraidriella* and *Selenodriella*.

Keywords

new taxa, Castanediellaceae, hyphomycetes, phylogeny, Sordariomycetes

Introduction

Hernández-Restrepo et al. (2017) introduced the family *Castanediellaceae* for the genus *Castanediella* within Xylariales and it was consolidated in recent study by Wijayawardene et al. (2018). The asexual morphs in *Castanediellaceae* are hyphomycetous and characterized by macronematous, mononematous or sporodochial, branched, brown to pale brown conidiophores, with monoblastic or polyblastic, sympodial, discrete, cylindrical to lageni-

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Fungal diversity notes 367–490: taxonomic and phylogenetic contributions to fungal taxa

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Fungal diversity notes 603–708: taxonomic and phylogenetic notes on genera and species

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Abstract
This is the sixth in a series of papers where we bring collaborating mycologists together to produce a set of notes of several taxa of fungi. In this study we introduce a new family *Fuscostagonosporaceae* in Dothideomycetes. We also introduce the new ascomycete genera *Acericola*, *Castellaniomyces*, *Dictyosporina* and *Longitudinalis* and new species *Acericola italica*, *Alternariaster trigonosporus*, *Amarenomyces dactylidis*, *Angustimassarina coryli*, *Astrocystis bambusicola*, *Castellaniomyces rosae*, *Chaetothyrina artocarpi*, *Chlamydotubeufia krabiensis*, *Colletotrichum lauri*, *Collodiscula chiangraiensis*, *Curvularia palmicola*, *Cytospora mali-sylvestris*, *Dictyocheirospora cheirospora*, *Dictyosporina ferruginea*, *Dothiora coronillae*, *Dothiora spartii*, *Dyfrolomyces phetchaburiensis*, *Epicoccum cedri*, *Epicoccum pruni*, *Fasciatispora calami*, *Fuscostagonospora cytisi*, *Grandibotrys hyalinus*, *Hermatomyces nabanheensis*, *Hongkongmyces thailandica*, *Hysterium rhizophorae*, *Jahnula guttulaspora*, *Kirschsteiniothelia rostrata*, *Koorchalomella salmonispora*, *Longitudinalis nabanheensis*, *Lophium zalerioides*, *Magnibotryascoma mali*, *Meliola clerodendri-infortunati*, *Microthyrium chinense*, *Neodidymelliopsis moricola*, *Neophaeocryptopus spartii*, *Nigrograna thymi*, *Ophiocordyceps cossidarum*, *Ophiocordyceps issidarum*, *Ophiosimulans plantaginis*, *Otidea pruinosa*, *Otidea stipitata*, *Paucispora kunmingense*, *Phaeoisaria microspora*, *Pleurothecium floriforme*, *Poaceascoma halophila*, *Periconia aquatica*, *Periconia submersa*, *Phaeosphaeria acaciae*, *Phaeopoacea muriformis*, *Pseudopithomyces kunmingnensis*, *Ramgea ozimecii*, *Sardiniella celtidis*, *Seimatosporium italicum*, *Setoseptoria scirpi*, *Torula gaodangensis* and *Vamsapriya breviconidiophora*. We also provide an amended account of *Rhytidhysteron* to include apothecial ascomata and a J+ hymenium. The type species of *Ascotrichella*

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Fungal diversity notes 1036–1150: taxonomic and phylogenetic contributions on genera and species of fungal taxa

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Abstract
This article is the tenth series of the Fungal Diversity Notes, where 114 taxa distributed in three phyla, ten classes, 30 orders and 53 families are described and illustrated. Taxa described in the present study include one new family (viz. Pseudoberkleasmiaceae in Dothideomycetes), five new genera (*Caatingomyces*, *Cryptoschizotrema*, *Neoacladium*, *Paramassaria* and *Trochilispora*) and 71 new species, (viz. *Acrogenospora thailandica*, *Amniculicola aquatica*, *A. guttulata*, *Angustimassarina sylvatica*, *Blackwellomyces lateris*, *Boubovia gelatinosa*, *Buellia viridula*, *Caatingomyces brasiliensis*, *Calophoma humuli*, *Camarosporidiella mori*, *Canalisporium dehongense*, *Cantharellus brunneopallidus*, *C. griseotinctus*, *Castanediella meliponae*, *Coprinopsis psammophila*, *Cordyceps succavus*, *Cortinarius minusculus*, *C. subscotoides*, *Diaporthe italiana*, *D. rumicicola*, *Diatrypella delonicis*, *Dictyocheirospora aquadulcis*, *D. taiwanense*, *Digitodesmium chiangmaiense*, *Distoseptispora dehongensis*, *D. palmarum*, *Dothiorella styphnolobii*, *Ellisembia aurea*,

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Fungal diversity notes 1151–1276: taxonomic and phylogenetic contributions on genera and species of fungal taxa

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Abstract

Fungal diversity notes is one of the important journal series of fungal taxonomy that provide detailed descriptions and illustrations of new fungal taxa, as well as providing new information of fungal taxa worldwide. This article is the 11th contribution to the fungal diversity notes series, in which 126 taxa distributed in two phyla, six classes, 24 orders and 55 families are described and illustrated. Taxa in this study were mainly collected from Italy by Erio Camporesi and also collected from China, India and Thailand, as well as in some other European, North American and South American countries. Taxa described in the present study include two new families, 12 new genera, 82 new species, five new combinations and 25 new records on new hosts and new geographical distributions as well as sexual-asexual reports. The two new families are *Eriomycetaceae* (Dothideomycetes, family *incertae sedis*) and *Fasciatisporaceae* (*Xylariales*, Sordariomycetes). The twelve new genera comprise *Bhagirathimyces* (*Phaeosphaeriaceae*), *Camporesiomyces* (*Tubeufiaceae*), *Eriocamporesia* (*Cryphonectriaceae*), *Eriomyces* (*Eriomycetaceae*), *Neomonodictys* (*Pleurotheciaceae*), *Paraloratospora* (*Phaeosphaeriaceae*), *Paramonodictys* (*Parabambusicolaceae*), *Pseudoconlarium* (Diaporthomycetidae, genus *incertae sedis*), *Pseudomurilentithecium* (*Lentitheciaceae*), *Setoapiospora* (*Muyocopronaceae*), *Srinivasanomyces* (*Vibrisseaceae*) and *Xenoanthostomella* (*Xylariales*, genera *incertae sedis*). The 82 new species comprise *Acremonium chiangraiense*, *Adustochaete nivea*, *Angustimassarina camporesii*, *Bhagirathimyces himalayensis*, *Brunneoclavispora camporesii*, *Camarosporidiella camporesii*, *Camporesiomyces mali*, *Camposporium appendiculatum*, *Camposporium multiseptatum*, *Camposporium septatum*, *Canalisporium aquaticium*, *Clonostachys eriocamporesiana*, *Clonostachys eriocamporesii*, *Colletotrichum hederiicola*, *Coniochaeta vineae*, *Conioscypha verrucosa*, *Cortinarius ainsworthii*, *Cortinarius aurae*, *Cortinarius britannicus*, *Cortinarius heatherae*, *Cortinarius scoticus*, *Cortinarius subsaniosus*, *Cytospora fusispora*, *Cytospora rosigena*, *Diaporthe camporesii*, *Diaporthe nigra*, *Diatrypella yunnanensis*, *Dictyosporium muriformis*, *Didymella camporesii*, *Diutina bernali*, *Diutina sipiczkii*, *Eriocamporesia aurantia*,

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The numbers of fungi: is the descriptive curve flattening?

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Abstract
The recent realistic estimate of fungal numbers which used various algorithms was between 2.2 and 3.8 million. There are nearly 100,000 accepted species of Fungi and fungus-like taxa, which is between 2.6 and 4.5% of the estimated species. Several forums such as Botanica Marina series, Fungal Diversity notes, Fungal Biodiversity Profiles, Fungal Systematics and Evolution—New and Interesting Fungi, Mycosphere notes and Fungal Planet have enhanced the introduction of new taxa and nearly 2000 species have been introduced in these publications in the last decade. The need to define a fungal species more accurately has been recognized, but there is much research needed before this can be better clarified. We address the evidence that is needed to estimate the numbers of fungi and address the various advances that have been made towards its understanding. Some genera are barely known, whereas some plant pathogens comprise numerous species complexes and numbers are steadily increasing. In this paper, we examine ten genera as case studies to establish trends in fungal description and introduce new species in each genus. The genera are the ascomycetes *Colletotrichum* and *Pestalotiopsis* (with many species or complexes), *Atrocalyx*, *Dothiora*, *Lignosphaeria*, *Okeanomyces*, *Rhamphoriopsis*, *Thozetella*, *Thyrostroma* (relatively poorly studied genera) and the basidiomycete genus *Lepiota*. We provide examples where knowledge is incomplete or lacking and suggest areas needing further research. These include (1) the need to establish what is a species, (2) the need to establish how host-specific fungi are, not in highly disturbed urban areas, but in pristine or relatively undisturbed forests, and (3) the need to establish if species in different continents, islands, countries or regions are different, or if the same fungi occur worldwide? Finally, we conclude whether we are anywhere near to flattening the curve in new species description.

Keywords 11 new taxa · *Atrocalyx* · *Colletotrichum* · *Dothiora* · fungal numbers · Host-specificity · *Lepiota* · *Lignosphaeria* · *Okeanomyces* · *Pestalotiopsis* · *Rhamphoriopsis* · *Thozetella* · *Thyrostroma*

Introduction

The estimated numbers of fungi have always been a compelling topic with numerous discussion papers over time. Mycologists have always pondered over how many fungal species there are, as this has important implications for conservation practices. Fungi, including the seen mushrooms and unseen microorganisms are diverse and form an integral component of life's genetic diversity, but their actual numbers are poorly understood and the estimates available so far are debatable. Hawksworth (1991) provide a comprehensive account and argument for the numbers being 1.5 million. This was based on, amongst other metrics, there being circa six taxa as unique to each plant species. Since this critical paper, there have been several revisions (Table 1) with estimates ranging from 0.5 to 13.2 million, and the latest estimate being 11.7–13.2 million (Wu et al. 2019). Hawksworth and Lücking (2017) based their estimates (2.2–3.8 M), taking into account cryptic species, the rates and patterns at which new species are being described, unexplored niches and DNA based species from environmental DNA. New generation sequencing has also provided

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One stop shop III: taxonomic update with molecular phylogeny for important phytopathogenic genera: 51–75 (2019)

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Abstract
This is a continuation of a series focused on providing a stable platform for the taxonomy of phytopathogenic fungi and organisms. This paper focuses on 25 phytopathogenic genera: *Alternaria*, *Capnodium*, *Chaetothyrina*, *Cytospora*, *Cyphellophora*, *Cyttaria*, *Dactylonectria*, *Diplodia*, *Dothiorella*, *Entoleuca*, *Eutiarosporella*, *Fusarium*, *Ilyonectria*, *Lasiodiplodia*, *Macrophomina*, *Medeolaria*, *Neonectria*, *Neopestalotiopsis*, *Pestalotiopsis*, *Plasmopara*, *Pseudopestalotiopsis*, *Rosellinia*, *Sphaeropsis*, *Stagonosporopsis* and *Verticillium*. Each genus is provided with a taxonomic background, distribution, hosts, disease symptoms, and updated backbone trees. A new database (Onestopshopfungi) is established to enhance the current understanding of plant pathogenic genera among plant pathologists.

Keywords Classification · Database · Plant pathology · Phylogeny · Taxonomy · Symptoms · Systematics

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Fungal diversity notes 253–366: taxonomic and phylogenetic contributions to fungal taxa

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A taxonomic reassessment of Tubeufiales based on multi-locus phylogeny and morphology

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Abstract
This study deals with an extensive taxonomic reevaluation focusing on phylogenetic relationships and morphological characterization of Tubeufiales, especially those helicosporous hyphomycetes which are difficult to identify. Based on evidence from DNA sequence data and morphology, we introduce 13 new genera in the family Tubeufiaceae, *viz. Acanthotubeufia*, *Dematiohelicoma*, *Dematiohelicomyces*, *Dematiohelicosporum*, *Dematiotubeufia*, *Helicoarctatus*, *Helicohyalinum*, *Helicotruncatum*, *Neochlamydotubeufia*, *Neohelicoma*, *Pleurohelicosporium*, *Pseudohelicomyces* and *Pseudohelicoon*; transfer *Chaetosphaerulina* from Dothideomycetes genera *incertae sedis*, and *Artocarpomyces* and *Helicodochium* from Ascomycetes genera *incertae sedis* into Tubeufiaceae; introduce 52 new species, *viz. Berkleasmium fusiforme*, *B. longisporum*, *Chlamydotubeufia cylindrica*, *Dematiohelicosporum guttulatum*, *Helicoarctatus aquaticus*, *Helicodochium aquaticum*, *Helicohyalinum infundibulum*, *Helicoma aquaticum*, *H. brunneisporum*, *H. cocois*, *H. rufum*, *H. fusiforme*, *H. longisporum*, *H. multiseptatum*, *H. rubriappendiculatum*, *H. septoconstrictum*, *H. tectonae*, *Helicomyces hyalosporus*, *Helicosporium aquaticum*, *H. flavisporum*, *H. setiferum*, *H. vesicarium*, *H. viridiflavum*, *Neochlamydotubeufia fusiformis*, *Neohelicomyces hyalosporus*, *Neohelicosporium acrogenisporum*, *N. astrictum*, *N. ellipsoideum*, *N. irregulare*, *N. krabiense*, *N. laxisporum*, *N. ovoideum*, *Pleurohelicosporium parvisporum*, *Pseudohelicomyces aquaticus*, *P. hyalosporus*, *Tubeufia abundata*, *T. bambusicola*, *T. brevis*, *T. brunnea*, *T. chlamydospora*, *T. dictyospora*, *T. eccentrica*, *T. fangchengensis*, *T. hechiensis*, *T. inaequalis*, *T. krabiensis*, *T. rubra*, *T. sessilis*, *T. sympodihylospora*, *T. sympodilaxispora*, *T. taiwanensis* and *T. tratensis*; provide 43 new combinations, *viz. Acanthohelicospora guianensis*, *Acanthotubeufia filiforme*, *Berkleasmium aquatica*, *B. guangxiense*, *B. latisporum*, *B. thailandicum*, *Dematiohelicoma perelegans*, *D. pulchrum*, *Dematiohelicomyces helicosporus*, *Dematiotubeufia chiangraiensis*, *Helicohyalinum aquaticum*, *Helicoma elinorae*, *H. gigasporum*, *H. hongkongense*, *H. linderi*, *H. nematosporum*, *H. pannosum*, *H. serpentinum*, *Helicomyces chiayiensis*, *Helicotruncatum palmigenum*, *Neochlamydotubeufia khunkornensis*, *Neohelicoma fagacearum*, *Neohelicomyces pallidus*, *Neohelicosporium abuense*, *N. aurantiellum*, *N. griseum*, *N. morganii*, *N. myrtacearum*, *N. nizamabadense*, *N. sympodiophorum*, *N. taiwanense*, *N. vesiculiferum*, *Pseudohelicomyces indicus*, *P. paludosus*, *P. talbotii*, *Pseudohelicoon gigantisporum*, *P. subglobosum*, *Tubeufia dentophora*, *T. geniculata*, *T. lilliputea*, *T. machaerinae*, *T. sympodiophora* and *T. xylophila*; introduce 16 new records, *viz. Dictyospora thailandica*, *Helicomyces colligatus*, *H. torquatus*, *Neohelicosporium guangxiense*, *N. hyalosporum*, *N. parvisporum*, *Thaxteriellopsis lignicola*, *Tubeufia aquatica*, *T. chiangmaiensis*, *T. cylindrothecia*, *T. filiformis*, *T. guangxiensis*, *T. laxispora*, *T. parvispora*, *T. roseohelicospora* and *T.*

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Freshwater Sordariomycetes

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Abstract
Sordariomycetes is one of the largest classes of Ascomycota that comprises a highly diverse range of fungi mainly characterized by perithecial ascomata and inoperculate unitunicate asci. Freshwater Sordariomycetes play an important role in ecosystems and some of them have the potential to produce bioactive compounds. This study documents and reviews the freshwater Sordariomycetes, which is one of the largest and important groups of fungi in aquatic habitats. Based on evidence from DNA sequence data and morphology, we introduce a new order Distoseptisporales, two new families, viz. Ceratosphaeriaceae and Triadelphiaceae, three new genera, viz. *Aquafiliformis*, *Dematiosporium* and *Neospadicoides*, 47 new species, viz. *Acrodictys fluminicola*, *Aquafiliformis lignicola*, *Aquapteridospora fusiformis*, *Arthrinium aquaticum*, *Ascosacculus fusiformis*, *Atractospora aquatica*, *Barbatosphaeria lignicola*, *Ceratosphaeria aquatica*, *C. lignicola*, *Chaetosphaeria aquatica*, *Ch. catenulata*, *Ch. guttulata*, *Ch. submersa*, *Codinaea yunnanensis*, *Conioscypha aquatica*, *C. submersa*, *Cordana aquatica*, *C. lignicola*, *Cosmospora aquatica*, *Cylindrotrichum submersum*, *Dematiosporium aquaticum*, *Dictyochaeta cangshanensis*, *D. ellipsoidea*, *D. lignicola*, *D. submersa*, *Distoseptispora appendiculata*, *D. lignicola*, *D. neorostrata*, *D. obclavata*, *Hypoxylon lignicola*, *Lepteutypa aquatica*, *Myrmecridium aquaticum*, *Neospadicoides aquatica*, *N. lignicola*, *N. yunnanensis*, *Ophioceras submersum*, *Peroneutypa lignicola*, *Phaeoisaria filiformis*, *Pseudostanjehughesia lignicola*, *Rhodoveronaea aquatica*, *Seiridium aquaticum*, *Sporidesmiella aquatica*, *Sporidesmium lageniforme*, *S. lignicola*, *Tainosphaeria lunata*, *T. obclavata*, *Wongia aquatica*, two new combinations, viz. *Acrodictys aquatica*, *Cylindrotrichum aquaticum*, and 9 new records, viz. *Chaetomium globosum*, *Chaetosphaeria cubensis*, *Ch. myriocarpa*, *Cordana abramovii*, *Co. terrestris*, *Cuspidatispora xiphiago*, *Sporidesmiella hyalosperma*, *Stachybotrys chartarum*, *S. chlorohalonata*. A comprehensive classification of the freshwater Sordariomycetes is presented based on updated literature. Phylogenetic inferences based on DNA sequence analyses of a combined LSU, SSU, RPB2 and TEF1α dataset comprising species of freshwater Sordariomycetes are provided. Detailed information including their habitats distribution, diversity, holotype, specimens collected and classification are provided.

Keywords 47 new taxa · Asexual morphs · Phylogeny · Sexual morphs · Taxonomy

Introduction

Shearer (1993) defined freshwater ascomycetes in a broad ecological sense as "all ascomycetes that occur on submerged or partially submerged substrates in aquatic habitats". Freshwater fungi have also been defined as "fungi that the whole or part of their life cycle rely on freshwater" (Thomas 1996). The definition of Shearer (1993) has been regarded as the best current working definition for the freshwater ascomycetes (Cai et al. 2003a, 2014), and we follow the definition of Shearer (1993) in this study.

Lignicolous freshwater fungi are those that grow on submerged woody debris in freshwater streams, ponds,

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The families *Distoseptisporaceae* fam. nov., *Kirschsteiniotheliaceae*, *Sporormiaceae* and *Torulaceae*, with new species from freshwater in Yunnan Province, China

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Abstract During a north–south latitudinal survey of aquatic fungi on submerged wood and herbaceous material in streams in the Asian region, we collected several hyphomycetous taxa. This paper is part of a series where we provide illustrated accounts of these taxa and place them in a natural classification in the fungi. DNA sequence based phylogenies in recent literature have shown that *Dendryphion*, *Sporidesmium* and Torula-like species are polyphyletic in the phylum Ascomycota and their taxonomyhas been problematic due to a lack of understanding of the importance of morphological characters used to delimit taxa, as well as the lack of ex-type or reference strains. Based on multi-locus phylogenies together with morphology, we propose the novel family *Distoseptisporaceae* (Sordariomycetes) and three novel genera *Neotorula* (*Pleosporales*, Dothideomycetes), *Distoseptispora* (Sordariomycetes) and *Pseudosporidesmium* (Sordariomycetes). In addition, *Dendryphion aquaticum*, *D. submersum*, *Distoseptispora fluminicola*, *D. aquatica*, *Kirschsteiniothelia submersa*, *Neotorula aquatica*, *Sporidesmium aquaticum*, *S. submersum* and *S. fluminicola* are introduced as new species. *Pseudosporidesmium knawiae comb. nov.* is proposed to accommodate *Sporidesmium knawiae* in Sordariomycetes. The polyphyletic nature of *Dendryphion*, *Sporidesmium* and Torula-like species are par-

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Refined families of Sordariomycetes

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Dendryphiella fasciculata sp. nov. and notes on other *Dendryphiella* species

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Liu NG, Hongsanan S, Yang J, Lin CG, Bhat DJ, Liu JK, Jumpathong J, Boonmee S, Hyde KD, Liu ZY 2017 – *Dendryphiella fasciculata* sp. nov. and notes on other *Dendryphiella* species. Mycosphere 8(9), 1575–1586, Doi 10.5943/mycosphere/8/9/12

Abstract

Dendryphiella is an asexual morph genus placed in the family Dictyosporiaceae. During our study on brown-spored hyphomycetes, a new taxon *D. fasciculata* was found on decaying wood collected in Chiang Mai Province, Thailand. The new species is characterized by mononematous, fasciculate conidiophores with polytretic, terminal and intercalary conidiogenous cells. Conidia are fusiform to ellipsoidal, pale brown and aseptate when young, becoming brown or dark brown, verrucose and 3-septate when mature. The phylogenetic analysis of combined ITS and LSU sequence data showed that isolates of *Dendryphiella* form a well-supported clade in Dictyosporiaceae, and *Dendryphiella fasciculata* is phylogenetically distinct from other species. *Dendryphiella fasciculata* is therefore introduced here with a description and morphological illustrations. Taxonomic notes and a key to *Dendryphiella* species are provided.

Key words – asexual morph – Dictyosporiaceae – Phylogeny – Pleosporales

Introduction

The family Dictyosporiaceae was first mentioned in Liu et al. (2015) and Boonmee et al. (2016) validly introduced the family based on type genus, *Dictyosporium* Corda. The asexual morph genera in Dictyosporiaceae are characterized by sporodochial, punctiform or effuse colonies, mononematous, hyaline to brown conidiophores, with reduced to standard and blastic or tretic conidiogenous cells, and cheiroid or fusiform conidia with or without appendages (Goh et al. 1999, Cai et al. 2002, Liu et al. 2015, Boonmee et al. 2016). Some genera have been linked to their sexual morphs, such as *Dictyosporium* and *Pseudocoleophoma* Kaz. Tanaka & K. Hiray (Liu et al. 2015, Tanaka et al. 2015).

The genus *Dendryphiella* was established by Ranojevic (1914) with the type species *D. interseminata* (Berk. & Ravenel) Bubák. The genus is characterized by macronematous conidiophores with polytretic, integrated conidiogenous cells at the swollen tip and at intercalary

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Mycosphere Notes 102–168: Saprotrophic fungi on *Vitis* in China, Italy, Russia and Thailand

Jayawardena RS[1,2], Hyde KD[2], Chethana KWT[1,2], Daranagama DA[2], Dissanayake AJ[1,2], Goonasekara ID[2], Manawasinghe IS[1,2], Mapook A[2,3], Jayasiri SC[2], Karunarathna A[2,4], Li CG[2], Phukhamsakda C[2], Senanayake IC[2], Wanasinghe DN[2], Camporesi E[5,6], Bulgakov TS[7], Li XH[1], Liu M[1], Zhang W[1], Yan JY[1]

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Abstract

This is the third paper in the series, *Mycosphere notes*, wherein we provide notes on various fungal taxa. In this set of notes, we deal with species found on the grape genus, *Vitis*, one of the most important economically important crops, grown worldwide. We provide notes on 67 taxa, including two new species, *Alternaria italica* and *Alfaria vitis*, an asexual morph for *Alfaria cyperi-esculenti* and 41 new host records or distribution records. The taxonomic placement of most taxa discussed in this study is based on a modern taxonomic framework based on analysis of multi-gene sequence data.

Key words – 2 new species – *Alfaria vitis* – *Alternaria italica* – Grapevine – Molecular phylogeny – New host records – Saprotrophs

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A dynamic portal for a community-driven, continuously updated classification of *Fungi* and fungus-like organisms: outlineoffungi.org

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Additions to the Genus *Arthrinium* (Apiosporaceae) From Bamboos in China

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Arthrinium has a widespread distribution occurring in various substrates (e.g., air, soil debris, plants, lichens, marine algae and even human tissues). It is characterized by the basauxic conidiogenesis in the asexual morph, with apiospores in the sexual morph. In this study, seventeen isolates of *Arthrinium* were collected in China. Based on their morphology and phylogenetic characterization, four new species (*A. biseriale*, *A. cyclobalanopsidis*, *A. gelatinosum*, and *A. septatum*) are described and seven known species (*A. arundinis*, *A. garethjonesii*, *A. guizhouense*, *A. hydei*, *A. neosubglobosa*, *A. phyllostachium* and *A. psedoparenchymaticum*) are identified, of which the sexual morph of three species (*A. guizhouense*, *A. phyllostachium* and *A. psedoparenchymaticum*) and asexual morph of *A. garethjonesii* are reported for the first time. The detailed descriptions, illustrations and comparisons with related taxa of these new collections are provided. Phylogenetic analyses of combined ITS, LSU, TUB2, and TEF sequence data support their placements in the genus *Arthrinium* and justify the new species establishments and identifications of known species.

Keywords: 4 new taxa, asexual-sexual morphs, multi-genes, phylogeny, taxonomy

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INTRODUCTION

The genus *Arthrinium* Kunze belongs to the family Apiosporaceae, which was introduced by Hyde et al. (1998) and typified by the genus *Apiospora* (Ellis, 1971; Seifert et al., 2011; Hyde et al., 2020). *Arthrinium* is the largest genus within Apiosporaceae and it has a widespread distribution on variety of hosts, 77 species have been recorded by Species Fungrom (March, 2021). Classification of *Arthrinium* was primarily based on conidial shape, conidiophores, sterile cells, and the presence of setae. Some morphologically different taxa (genera) grouped with *Arthrinium* when use the molecular data (Crous and Groenewald, 2013). Thus, those characteristics could be not fully inferred about the phylogenetic relationships for *Arthrinium* (Crous and Groenewald, 2013; Wang et al., 2018; Pintos et al., 2019). Except for being reported as saprobes (Agut and Calvo, 2004; Crous and Groenewald, 2013; Dai et al., 2016, 2017; Jiang et al., 2018; Wang et al., 2018; Jiang et al., 2019, 2020; Luo et al., 2019; Pintos et al., 2019; Yan et al., 2019; Mapook et al., 2020; Senanayake et al., 2020a; Tang et al., 2020), the species of *Arthrinium* also includes phytopathogenic fungi, for instance, *A. arundinis* causing brown culm

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Lentimurisporaceae, a new pleosporalean family with divergence times estimates

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Abstract – The new hyphomycetous genus *Lentimurispora,* based on *L. uniformis* sp. *nov.* collected from decaying wood in Phayao, Thailand, is introduced. It is characterized by micronematous conidiophores, monoblastic conidiogenous cells, and muriform, lenticular conidia with dark brown central cells and paler peripheral cells. Phylogenetic analysis based on the combined LSU, SSU and *TEF1*α sequences data of 110 taxa was carried out to infrer their phylogenetic relationships. The new genus formed a well-supported monophyletic clade with *Bahusandhika indica, Berkleasmium micronesicum* and *Be. nigroapicale* within Pleosporales. A new family, Lentimurisporaceae is established to accommodate this clade. Divergence times establishment was performed and the results showed that the new family was diverged approximately 78 (49–118) MYA.

Asexual morphs / Evolution / Hyphomycetes / Phylogeny / Taxonomy

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Fifteen fungicolous Ascomycetes on edible and medicinal mushrooms in China and Thailand

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Abstract

Edible and medicinal mushrooms are extensively cultivated and commercially consumed in many countries, especially in China and Thailand. A number of fungicolous fungi could cause deformation or decomposition of mushrooms. Investigation of taxonomic diversity and exact identification are initial and crucial steps to understand interactions between fungicolous taxa and their hosts as well as to propose better disease management strategies in the mushroom industry. In this study, during a survey of fungicolous fungi on eight edible and medicinal mushrooms from mushroom farms and from the wild in China and Thailand, 15 taxa were identified based on morphological characteristics and DNA sequence data analyses. Three new species, including *Sporothrix ganoderma* (Ophiostomatales) on cultivated *Ganoderma lucidum* in China; *Hypomyces fistulina* (Hypocreaceae) on *Fistulina* species in China; and *Hypomyces boletus* on *Boletus* species in Thailand are described and introduced here. Other species recovered from China include *Aspergillus pseudoglaucus* (Trichocomaceae) on a wild *Helvella* species; *Fusarium sonali* (Nectriaceae) on cultivated *Morchella importuna; Clonostachys rosea* f. *catenulata* (Bionectriaceae) and *Paecilomyces hepiali* (Cordycipitaceae) on cultivated *Ophiocordyceps sinensis*; *Polycephalomyces sinensis* (Ophiocordycipitaceae) on wild *Ophiocordyceps sinensis*; *Lecanicillium fungicola* var. *aleophilum* (Cordycipitaceae) and *Hypomyces rosellus* on cultivated *Agaricus bisporus*; *Paecilomyces formosus* (Trichocomaceae) on *Fistulina*; *Hypomyces aurantius* (Hypocreaceae) on *Panellus* species; *Trichoderma atrobrunneum* (Hypocreaceae) on cultivated *Ganoderma lucidum*. *Hypomyces boletiphagus* (Hypocreaceae) on *Boletus* sp. and *Cladobotryum protrusum* (Hypocreaceae) were recovered on a decayed mushroom from Thailand. This study enriches our current taxonomic knowledge on the diversity of fungicolous fungi in these regions.

Key words – 3 new taxa – caterpillar fungi – fungal disease – mycoparasites – *Hypomyces*

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APPENDIX B

CHEMICAL REAGENTS AND MEDIA

1. Lactophenol-Cotton Blue is used to highlight fungal structures for viewing with the compound light microscope. Cotton blue is the most popular stain for observing pseudoparaphyses, septate or ascus walled. This gives excellent clarity and is also suitable for most fungal groups

Phenol (crystals) 20 g

Lactic acid 16 ml

Glycerol 31 ml

Dissolve phenol in distilled water, add lactic acid, glycerol and 0.05 g of Poirrier's (cotton) blue or acid fuchsin.

2. Melzer's Reagent is a good general mounting medium that clears the material somewhat and allows particularly brilliant resolution with a microscope, and is used for identification of ascomycete fungi. The amyloid reaction of asci changed to blue or heavily purple colours.

Chloral hydrate 100 g

Potassium iodide 5 g

Iodine 1.5 g

Distilled water 100 ml

3. Malt Extract Agar (MEA) used for fungal cultivation

Agar 15 g

Peptone 0.78 g

Glycerol 2.35 g

Dextrin 2.75 g

Maltose, Technical 12.75 g

Suspend 33.6 g of malt extract agar in distilled water and mix thoroughly. Heat with frequent agitation and boil for 1 minute to completely dissolve the power and bring volume to 1000 ml. Autoclave at 121^{o}C for 15 minutes

4. Potato dextrose agar (PDA) used for fungal cultivation

Potato starch (from the infusion) 4 g

Dextrose 20 g

Agar 15 g

Suspend 39 g of Potato dextrose agar in distilled water and mix thoroughly. Heat with frequent agitation and boil for 1 minute to completely dissolve the powder and bring volume to 1000 ml. Autoclave at 121^{o}C for 15 minutes.