

Dissertation Title	Taxonomic and Phylogenetic studies of Hyaline-spored Hyphomycetes
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Degree	Doctor of Philosophy (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, *Parasymphodiellales* 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

