

Dissertation Title	Taxonomy and Phylogeny of Bambusicolous Ascomycetes in Southwest China and Thailand
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ABSTRACT

Bambusicolous ascomycetes is an interesting large fungal group on earth, with an estimated more than 1150 species. Lembosia Léveillé firstly worked on fungi associated with bamboo in 1845. Since then, the study of bambusicolous ascomycetes has gradually become a systematical science, due to its special medicinal value, taxonomic importance and ecological significance. China and Thailand have huge bamboo resources, with 762 species in 44 genera and 72 species in 17 genera, respectively. Southwest China is recognized as the richest area of bamboo species in China (accounting for more than 50% of bamboo species diversity in China). Although these regions feature rich bamboo resources, reports for bambusicolous ascomycetes in these regions are relatively few and far from reaching Hawksworth's estimation (at least six unique fungal species for each plant species).

Bambusicolous ascomycetes as pathogens influence bamboo forest development, for example, bamboo is infected by *Ceratosphaeria phyllostachydis*, which causes bamboo tip blight. Bambusicolous pathogens do damage to bamboo development, which directly influence bamboo industry. Usually through biocontrol to bambusicolous pathogens, it helps to save money and reduce losses in economic development of bamboo industry. Bambusicolous ascomycetes as endophytes, affect bamboo development, growth and ultimately the quality and quantity of compounds harvested from bamboo. Some bioactive macromolecules and secondary metabolites

extracted from bambusicolous ascomycetes has been confirmed to have some medical values. For example, rich Hypocrellin A and B can be extracted from *Rubroshiraia bambusae* and are recognized as effective photosensitizers in photodynamic reaction. Bambusicolous ascomycetes have great contributions in ecology. As decomposer, bambusicolous ascomycetes help to circulation of materials and energy flow of nutrition elements. They also enrich species composition and the structure of fungal community. In addition, bamboo-bambusicolous ascomycetes interaction have positive effects to soil and water conservation, stabilization of sands and soils, carbon balance in ecosystem.

Therefore, in this research, we focused on collecting bambusicolous ascomycetes in southwest China and Thailand, while attempting to discover new species and records associated with bamboo based on morphological observation and multigene phylogenetic analyses in order to enrich the diversity of bambusicolous ascomycetes in southwest China and Thailand.

In this research, to date, fourteen new taxa have been introduced and published viz. *Amphibambusa hongheensis*, *Arthrinium setostromum*, *Immotthia bambusae*, *Keissleriella bambusicola*, *Mendogia chiangraiensis*, *Mendogia yunnanensis*, *Occultibambusa hongheensis*, *Seriascoma bambusae*, *Ophioceras castillensis*, *Ophioceras rhizomorpha*, *Ophioceras sichuanense*, *Roussoella kunmingensis*, *Roussoella yunnanensis* and *Vamsapriya yunnana*. In addition, three new records for bambusicolous ascomycetes were reported. We revealed the asexual morph of *Roussoella pseudohysterioides* for the first time. *Pararoussoella mukdahanensis* was found as the new geographic record in China. *Occultibambusa kunmingensis* was firstly found in a terrestrial environment.

The checklist of bambusicolous ascomycetes in Thailand was updated in 2017, with 94 Thai bambusicolous ascomycetes recorded. However, there are additionally around 45 taxa of bambusicolous ascomycetes discovered in Thailand after 2017. The recent comprehensive study of bambusicolous ascomycetes in China is in 2000. The

checklist from China has not been updated for over 20 years. The science of bambusicolous ascomycetes is developing increasingly. China and Thailand are often overlooked for studying species richness and abundance of bambusicolous ascomycetes. In this study, the updated systematical checklists of bambusicolous ascomycetes in China and Thailand are provided, respectively.

This study also attempts to reveal the species richness and abundance of bambusicolous ascomycetes in China, southwest China, and Thailand, and also compares between southwest China and Thailand. Furthermore, this is the first attempt to explain the effects of bamboo host genera on species richness of bambusicolous ascomycetes in China and emphasis on southwest China.

In the present inventory based on taxonomic information, bambusicolous ascomycetes in southwest China, comprise 117 taxa in 25 orders, 47 families, and 72 genera (including three genera *incertae sedis*). Bambusicolous ascomycetes found in China, comprise 459 taxa in 47 orders, 112 families, and 261 genera (including 43 genera *incertae sedis*), while accounting for more than one-quarter of bambusicolous ascomycetes around the world. Bambusicolous ascomycetes found in Thailand comprise 139 taxa in 20 orders, 48 families, and 75 genera (including six genera *incertae sedis*). Southwest China and Thailand have a similar taxonomic distribution of bambusicolous ascomycetes in five orders, 15 families, and 19 genera. Both southwest China and Thailand have more diversity in Amphisphaeriales, Pleosporales and Xylariales, especially Pleosporales.

Most bambusicolous ascomycetes in China occur on *Bambusa* (193 species), *Phyllostachys* (146 species) and *Dendrocalamus* (49 species). Xylariales and Phyllachorales both maintain relatively species richness on *Bambusa*, *Dendrocalamus* and *Phyllostachys*. In China, bambusicolous ascomycetes are mainly distributed in Amphisphaeriales, Capnodiales, Chaetothyriales, Hypocreales, Phyllachorales, Pleosporales and Xylariales on *Bambusa*, *Dendrocalamus* and *Phyllostachys*.

Furthermore, it shows some preference for these seven fungal ascomycetous orders to bamboo genera.

Keywords: Checklist, Fungi Associated with Bamboo, Species Richness and Abundance, Taxonomy

