

Dissertation Title Taxonomy and Phylogeny of Freshwater Fungi from Plateau Lakes in Yunnan, China

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ABSTRACT

Lignicolous freshwater fungi are a special ecological group, referring to those fungal taxa that occur on woody debris submerged in freshwater habitats. They are widely distributed in lotic and lentic habitats, and play a key role in the decomposition of submerged wood in freshwater habitats, breaking down lignocelluloses and releasing nutrients, all of which are important for ecosystem functioning. Yunnan Province is one of the hot spots for fungal research in China, with particularly remarkable fungal diversity, but there is still a significant knowledge gap in our understanding of lignicolous freshwater fungi in lentic habitats compared with lotic freshwater habitats. This study collected submerged wood specimens from several plateau lakes in Yunnan Province, China. Based on morphological and phylogenetic analyses, more than 180 lignicolous freshwater fungi species were identified. The species diversity, community composition, and possible influencing factors of lignicolous freshwater fungi in Yunnan plateau lakes were explored. The lignicolous freshwater fungi recorded in this study were primarily distributed in *Dothideomycetes* and *Sordariomycetes*, with several species reported in *Eurotiomycetes* and *Leotiomycetes*. 82 lignicolous freshwater fungal species in *Dothideomycetes* and *Sordariomycetes* were described and illustrated in detail, belonging to twelve genera, ten families, and nine orders. Based on molecular evidence and morphological characteristics,

a new genus *Paralentithecium* was established to accommodate *P. aquaticum* and the new species *P. suae*; 50 new species, viz., *Apiospora fuxianhuensis*, *A. hongheensis*, *Aquimassariosphaeria aquatica*, *Astrosphaeriella yunnanensis*, *Beverwykella grandispora*, *Chloridium guttulatum*, *C. yunnanense*, *Cryptocoryneum sinense*, *Dematiosporium hydei*, *D. muriforme*, *Dictyocheirospora multiappendiculata*, *D. suae*, *Floricola aquatica*, *Fuscocatenula guttulata*, *Hermatomyces hongheensis*, *Hongkongmyces cylindricisporus*, *H. guttulatus*, *H. hongheensis*, *H. yunnanensis*, *Kirschsteiniothelia dujuanhuensis*, *Lindgomyces yunnanensis*, *Lolia fusiformispora*, *Obliquifusoideum sinense*, *Paralentithecium suae*, *Paramirandina guttulata*, *Periconia dujuanhuensis*, *P. hongheensis*, *P. yunnanensis*, *Pseudodactylaria guttulata*, *Pseudostanjehughesia tripospora*, *P. verrucosa*, *Pseudotetraploa aquatica*, *Roussoella dujuanhuensis*, *Setoseptoria suae*, *Sporidesmiella dujuanhuensis*, *S. guttulata*, *S. hongheensis*, *S. hydei*, *Sporidesmium dianchiense*, *Sp. distoseptatum*, *Sp. guttulatum*, *Sp. hongheense*, *Sp. hydei*, *Sp. kunmingense*, *Sp. yangzonghaiense*, *Sp. yunnanense*, *Triplosphaeria yunnanensis*, *Vikalpa dujuanhuensis*, *V. sphaerica*, *Xylolentia aquatica* are introduced. Nine species viz., *A. guangdongensis*, *A. marii*, *C. chlamydosporum*, *Lentithecium yunnanensis*, *Lonicericola qujingensis*, *Multiguttulispora dimorpha*, *Occultibambusa jonesii*, *Tainosphaeria phialogeniculata*, and *Thozetella wenyngiae* were reported for the first time from freshwater habitats. Five species, viz., *Codinaea paniculata*, *Dematipyriiforma nilotica*, *Halobyssothecium phragmitis*, *Ha. unicellulare* and *Setoseptoria phragmitis* were reported in China for the first time. 18 known species were rediscovered and reported. The composition analysis of the lignicolous freshwater fungi community in Dianchi Lake, Yangzonghai Lake, Xingyunhu Lake, and Dujuanhu Lake showed that each lake contains endemic species, which can be used as indicators for assessing ecosystem health and water quality. At present, there is limited knowledge about lignicolous freshwater fungi in the Plateau lakes of the Yunnan Province. The knowledge about the community structure, species composition, diversity, and distribution characteristics of lignicolous freshwater fungi in this region is limited. The study of

lignicolous freshwater fungi in plateau lakes is of great significance for understanding the occurrence and evolution of lignicolous freshwater fungal species, biodiversity, ecological functions, and scientific research.

Keywords: 51 new taxa, Lignicolous freshwater fungi, Taxonomy, Phylogeny, *Dothideomycetes*, *Sordariomycetes*, Yunnan Plateau Lakes

