Dissertation Title	Microfungi Associated with Pteridophytes in Southwestern China
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ABSTRACT

Pteridophytes (ferns and their allies) constitute a vital component of global plant flora， playing significant ecological roles while providing essential resources for food, medicine, horticulture, agriculture, industry, and environmental management. As the oldest vascular plants, pteridophytes possess a wealth of ancestral characteristics relevant to plant evolution. Their associated fungi are considered to play a crucial role in facilitating plant colonization, offering unique insights into fungai and fungal symbiosis. However, this important ecological niche has long been overlooked, and there is a lack of comprehensive worldwide fungal checklists and global-scale reviews on fungi associated with pteridophytes.

This study provides a comprehensive exploration of fungi associated with ferns and their allies from a global perspective, encompassing three main components. The first component of this study is the compilation of a checklist of fungi associated with pteridophytes worldwide and their classification, based on the USDA Systematic Mycology and relevant research. A total of 1,648 fungal species, including 348 undetermined species, belonging to 611 genera, 240 families, 100 orders, 34 classes, and 11 phyla are listed. Two interesting and important fungal groups: (1) 36 genera with likely fern host-specificity (*Asterocalycella*, *Carrismyces*, *Completoria*, *Dangeardiella*, *Desmella*, *Equiseticola*, *Exoteliospora*, *Griggsia*, *Hyalopsora*, *Hysteropeltella*, *Lachnopsis*, *Massalongina*, *Melaniella*, *Milesina*, *Mixia*, *Nothodactylaria*, *Ophiodiaporthe*, *Paratrimmatostroma*, *Phacidina*, *Placothyrium*, *Platycarpa*, *Pleurothyrium*, *Poculopsis*, *Polycladium*, *Polycyclina*, *Polycyclus*, *Ptechetelium*,

Radiciseta, *Repetobasidiellum*, *Rhagadolobiopsis*, *Rommelaarsia*, *Scolecoleotia*, *Uncol*, *Uredinopsis*, *Woldmaria* and *Zymochalara*), and (2) the ten highest occurrence frequencies of fungal genera (*Cercospora*, *Hyalopsora*, *Lachnum*, *Milesina*, *Phaeosphaeria*, *Pseudocercospora*, *Ramularia*, *Taphrina*, *Uredinopsis* and *Uredo*) are discussed, providing generic notes and re-drawn photo plates.

Additionally, based on morphological and phylogenetic analyses, we identified 124 species within Ascomycota associated with pteridophytes collected from southwestern China, comprising 59 saprobic and 65 endophytic species. Among the saprobic species, we identify 59 species distributed in four classes, 11 orders, 22 families, and 38 genera. This includes the introduction of one new family, Xenoberkleasmiaceae, six new genera (*Cyatheomyces*, *Microlepicola*, *Muriformyces*, *Pseudopalawanella*, *Synnematouspora* and *Xenopleopunctum*), 38 new species, and 21 new records. Furthermore, five new combinations are also introduced: *Muriformyces micronesiacum* (≡ *B. micronesiacum*), *M. nigroapicale* (≡ *B. nigroapicale*), *Xenoberkleasmium pandani* (*B. pandani*), *X. crunisia* (*B. crunisia*), *X. typhae* (≡ *B. typhae*). *Tainosphaeria phialogeniculata* is synonymized under *T. jonesii* based on conspecific phylogenetic relationship and similar morphology, while *Periconia elaeidis* and *P. verrucosa* are synonymized under *P. cookei*.

The last part is about exploring culturable endophytic fungi isolated from *Dicranopteris* spp. in Guizhou province, southwestern China. Based on the evidence from both morphology and phylogeny, 93 strains represting 65 endophytic fungi associated with three *Dicranopteris* species (medicinal ferns) in Guizhou, China have been identified in four classes, 18 orders, 29 families and 39 genera. As a result, a new family, *Massicellisporaceae*, three new genera *viz. Massicellispora*, *Miniglobosispora* and *Pseudopopulomyces*, 29 new species and 36 new records are introduced. In addition, several species are re-evaluated; *Diaporthe hainanensis* and *D. harriottiae* are synonymized under *D. arecae*, *Colletotrichum juglandis* is synonymized as *C. simulanticitri*, while *C. gracile*, *C. oblongisporum*, and *C. nullisetosum* are combined into a single species as *C. jiangxiense*, and *Cashiella sticheri* was transferred to *Pezicula* as *P. sticheri* based on morphological and phylogenetic evidence.

The historical background, significance, numbers, diversity, lifestyle and lifestyle switching, host-specificity or preference, and host jumping of fungi associated with pteridophytes have also been discussed and reviewed. This study provides foundational data for future ecological and evolutionary research on fungi associated with pteridophytes, enhancing our understanding of their ecological roles and potential applications.

Keywords: 84 New Taxa, Checklist, Dothideomycetes, Ferns, Phylogeny, Sordariomycetes, Taxonomy