

Dissertation Title Microfungi Associated with Forest Plants with Emphasis on
Thymelaeaceae

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ABSTRACT

Forests are among the most important terrestrial ecosystems on Earth. Composed of trees, soils, microorganisms, animals, and fungi, they form a complex network of energy flow, matter cycling, and multi-scale biotic interactions. Forests fix carbon dioxide, release oxygen, conserve water, stabilize soils, and provide habitat for countless organisms; they also underpin climate regulation, raw-material supply, and cultural and social values for human societies. Forest plants directly serve human needs by supplying timber, medicinal resources, food, and fibers, while vegetation delivers essential ecosystem services, such as air purification, climate regulation, and water retention, that indirectly support social stability and sustainable development.

Against this backdrop, to better understand the relationships between forest plants and fungi, we conducted systematic sampling and analyses targeting saprobic fungi in forest environments and fungi associated with the *Thymelaeaceae*. Sampling covered Guizhou, Hainan, Guangxi, and Yunnan in China, as well as parts of northern Thailand. In total, 706 pure-culture isolates were obtained: 557 endophytic isolates from *Thymelaeaceae*, recovered from diverse tissues (flowers, fruits, roots, stems, and leaves); and 72 saprobic isolates from forest environments, mainly from bamboo, *Dipterocarpaceae*, *Thymelaeaceae*, and unidentified decayed wood. The endophytic isolates belong to 6 classes, 20 orders, 38 families, and 53 genera, spanning six host tissue types. The saprobic isolates are distributed across 33 genera, 19 families, 6 orders, and 3 classes.

In addition, I compiled a checklist documenting the fungal diversity associated with *Thymelaeaceae* in China. The checklist enumerates 117 fungal records, including host (*Thymelaeaceae* genera/species), geographic distribution, updated taxonomic treatments, and references. Through morphological characterization and multi-locus phylogenetic analyses, we provide detailed descriptions, illustration plates, distribution and sampling information, and resolve their taxonomic placements. Collectively, these efforts establish a traceable, comparable, and searchable baseline framework for fungal resources in forest ecosystems, especially lineages associated with *Thymelaeaceae*, and provide standardized data to support subsequent ecological, systematic, and applied research.

Keywords: 72 Saprobiic Collections, 31 New Species, 4 New Genera, 557 Endophytic Collection, *Thymelaeaceae* Fungal Checklist, Phylogeny, Taxonomy

