

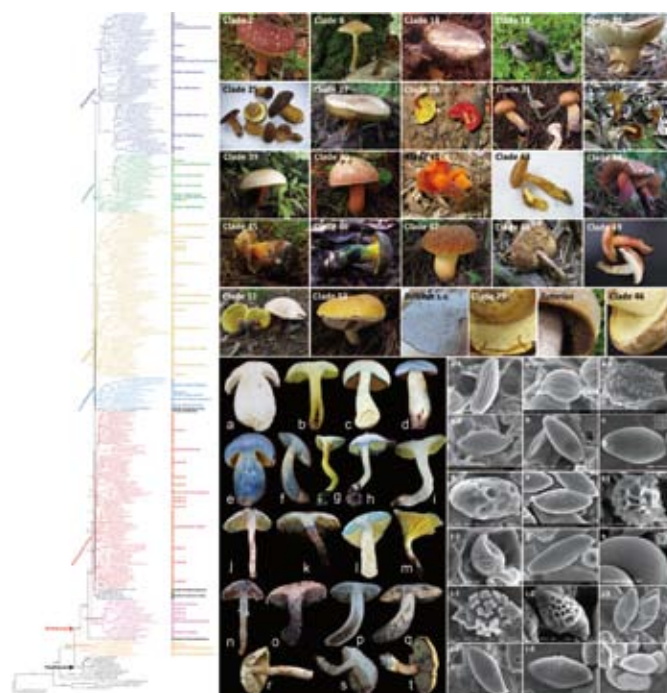
Advances in Phylogenetic Study of Fungal Family *Boletaceae*

Mushrooms in the basidiomycete family *Boletaceae* are ecologically and economically important, and have long attracted the attention of mycologists from around the world. Some of these boletes have great economic, dietary and health values, while some others are poisonous, leading to gastrointestinal symptoms of nausea and violent vomiting if eaten raw or fried. Ecologically, most *Boletaceae* species are important ectomycorrhizal (ECM) fungi in the ecosystem and can form ECM relationships with plants of more than 10 families. However, due to the morphological complexity and the limited phylogenetic information available on the various species and genera of this fungal family, *Boletaceae* was considered as one of the most complicated fungal groups. E. M. Fries, the founding father of fungal taxonomy, once said that “No genus has given me more trouble than that of the boleti.”

Based on collections in the past ten years and the collaboration with researchers from home and abroad, Prof. YANG Zhuliang at the Kunming Institute of Botany has conducted a molecular phylogenetic study of *Boletaceae* with his coworkers. They obtained DNA sequences of four genes (nrLSU, *tefl-a*, *rpb1*, and *rpb2*) from ca. 200 representative specimens of *Boletaceae*, and used molecular data and additional morphological and ultra-structural evidence to propose a phylogenetic frame of the family.

Their study revealed seven major clades at the subfamily level, namely *Austroboletoidae* subfam. nov., *Boletoidae*, *Chalciporoideae* subfam. nov., *Leccinoideae* subfam. nov., *Xerocomoideae*, *Zangioideae* subfam. nov. and the *Pulveroboletus* Group. In addition, 59 genus-level clades were identified, of which 22 were uncovered for the first time. Among the 39 known genera, 11 of them were proven to be monophyletic.

Further study indicated that the characters frequently



used in the morphology-based taxonomy of *Boletaceae*, such as basidiospore ornamentation, the color change of context when bruised, the form of the basidioma, and the stuffed pores each had multiple origins within the family. It suggested that the use of such features for high-level classification of *Boletaceae* should be de-emphasized and combined with other characters. Besides, the scientists obtained 11 types of basidiospore ornamentations in family *Boletaceae*, two of which were reported for the first time.

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