



***Lactarius* subgenus *Russularia* (Russulaceae) in Southeast Asia: 1. Species with very distant gills**

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Abstract

This article introduces four new species of *Lactarius* subgenus *Russularia* from Southeast Asia with descriptions and illustrations of macromorphological and microscopic characters. *Lactarius laccarioides* and *L. sublaccarioides* were discovered in Northern Thailand, and *L. pasohensis* and *L. stubbei* in Malaysia. These four species share some striking macroscopic features that are unique in the subgenus: distant gills and a very thin-fleshed and deeply striate to sulcate pileus, which gives them the aspect of *Laccaria* species in the field. Molecular analysis of the ITS gene region shows that these four species are not as closely related within *Lactarius* subgenus *Russularia* as their similar appearance in the field would suggest.

Introduction

Since the splitting of the milkcaps among *Lactarius* Pers., *Lactifluus* (Pers.) Roussel and *Multifurca* Buyck & V. Hofst. (Buyck *et al.* 2008, 2010), *Lactarius* sensu novo now comprises three large subgenera: *L.* subg. *Plinthogalus* (Burl.) Hesler & A.H. Sm., *L.* subg. *Piperites* (Fr. ex J. Kickx f.) Kauffman and *L.* subg. *Russularia* (Fr. ex Burl.) Kauffman. *Lactarius* species are one of the most important ectomycorrhizal taxa in many ecosystems world-wide. *Lactarius*, in contrast to *Lactifluus*, seems to have its main distribution in the Northern Hemisphere, particularly in temperate regions, but is also well represented in the Southern Hemisphere. In Southeast Asia, the biodiversity of the genus is best explored in Malaysia, Indonesia, Thailand and Papua New Guinea. In contrast to the other subgenera, *Lactarius* subg. *Plinthogalus* seems evenly distributed in both temperate and tropical regions (Stubbe *et al.* 2007). Extensive surveys in tropical Asian regions resulted in 24 new taxa described from Indonesia (Verbeken *et al.* 2001), Papua New Guinea (Verbeken & Horak 2000, Verbeken *et al.* 2002), Malaysia (Stubbe *et al.* 2007, 2008) and Northern Thailand (Le *et al.* 2007b). *Lactarius* subg. *Piperites* has numerous representatives in temperate areas, both in Europe and in North America, but is very poorly represented in tropical Africa (Verbeken & Walley 2010), and about 20 species have been described from tropical Asia (Verbeken & Horak 1999, 2000, Verbeken *et al.* 2001, Nuytinck *et al.* 2006, Le *et al.* 2007a). The third subgenus, *L.* subg. *Russularia*, also seems to be dominant in temperate zones. It is poorly represented in South America, and apparently completely absent in Africa (except for an introduced species with pine plantations in South Africa (Verbeken 1996, Verbeken & Walley 2010)). A thorough overview of the diversity in this subgenus is lacking, mainly due to undersampling in many areas, but also due to the lack of local identification tools which has resulted in the uncritical use of European and North American names (Wang & Liu 2002, Wang 2007). Research in Southeast Asia has shown that representatives of this subgenus are ectomycorrhizal with trees in Fagaceae (*Quercus* spp., *Castanopsis* spp. and *Lithocarpus* spp.), Dipterocarpaceae (*Dipterocarpus* spp. and *Shorea* spp.) and Pinaceae (*Pinus* spp.) (Yuwa-Amornpitak *et al.* 2006, Stubbe *et al.* 2007, Le *et al.* 2007a, Phosri *et al.* 2012).

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