



## *Lactarius vividus* sp. nov. (Russulaceae, Russulales), a widely distributed edible mushroom in central and southern China

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### Abstract

*Lactarius* sect. *Deliciosi* includes a group of edible mushrooms with a worldwide geographical distribution. Although several species are considered choice edible mushrooms, taxonomic knowledge on this group in Asia is still fragmentary. A new species in *L.* sect. *Deliciosi* with orange latex, *L. vividus*, is described as an important wild edible mushroom that is widely distributed in central and southern China. Morphological analyses demonstrate that *L. vividus* encompasses high infraspecific morphological variation, which makes it difficult to clearly delimit its taxonomic boundary. Compared with other species having orange latex in *L.* sect. *Deliciosi*, *L. vividus* can be recognized by the vividly colored, subdistant to distant lamellae and heavy basidiospore ornamentation. It has been found to grow with four species of *Pinus* subg. *Pinus* including *P. latteri*, *P. massoniana*, *P. taiwanensis* and *P. thunbergii*. Phylogenetic analyses of the ITS region and glyceraldehyde-3-phosphate dehydrogenase gene (*gpd*) support species delimitation and suggest ITS and *gpd* are good DNA markers to identify this new species.

**Key words:** ectomycorrhizal fungi, milkcap, pines, taxonomy

### Introduction

*Lactarius* sect. *Deliciosi* (Fr.: Fr.) Redeuilh *et al.* is a group of edible fungi that are collected and traded commercially worldwide (Nuytinck 2005). *Lactarius* sect. *Deliciosi* can be readily identified by the orange, red, or bluish basidiocarps with orange, red or bluish latex but species boundaries are extremely difficult to delimit due to high morphological similarity and close affinity between species (Nuytinck *et al.* 2007). In Asia and North America, species that were previously identified with European names often turn out to be different species that are endemic to those continents (Nuytinck *et al.* 2006a, 2006b, 2007; Nuytinck & Ammirati 2014).

In the descriptions of Asian representatives of *L.* sect. *Deliciosi*, Nuytinck *et al.* (2006b) reported a distinct species (“*Lactarius* sp. 2”) from central-southern China (Hunan Province). In the worldwide phylogeny of *L.* sect. *Deliciosi* based on ITS region and the glyceraldehyde-3-phosphate dehydrogenase (*gpd*) gene, sequences of this species formed a very early diverging branch (Nuytinck *et al.* 2007). Additional conspecific sequences were subsequently submitted to GenBank and published by Chinese researchers (Guo *et al.* 2011b; Chen *et al.* 2013; Xue *et al.* 2013). Well-documented collections by the first author during several field trips in China over the past five years make detailed descriptions of the morphology, host specificity and geographical distribution possible.

### Material and methods

Thirteen specimens of *L. vividus* sp. nov. collected from 10 provinces in central and southern China (Fig. 1) were used for morphological observations and phylogenetic analyses. When the specimens were collected, special attention was