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Boletus recapitulatus (Boletaceae), a new species from India with peculiar mushroom-shaped cells

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Abstract

Boletus recapitulatus, collected from subtropical forest in the East District of Sikkim (India) is proposed here as new to science. It is characterized by its peculiar mushroom-shaped terminal cells of hyphae in the pileus and stipe cuticles. A detailed morphological description and illustrations are provided. Besides morphological features phylogenetic analysis of ITS region is also used to separate the allied Asian and extralimital taxa.

Key words: macrofungi, Boletales, taxonomy, *Betula*, phylogeny

Introduction

The family Boletaceae is cosmopolitan and its members have great ecological and economic importance. Most of the species belonging to this family form obligate ectomycorrhizal associations with a wide variety of vascular plants and some are highly valued as wild edible food (e.g., porcini mushrooms; Dentinger *et al.* 2010; Dentinger & Suz 2014). Yet, the taxonomy of the family has long been and continues to be problematic, despite much recent molecular phylogenetic analyses (e.g., Binder & Hibbett 2006; Dentinger *et al.* 2010; Nuhn *et al.* 2013; Wu *et al.* 2014). Recently, a multilocus phylogenetic analysis including an extensive sampling of taxa from Asia presented support for 59 distinct clades putatively recognizable at the generic rank (Wu *et al.* 2014). At present, the family includes 65 genera and over 800 described species from all over the world (Chiu 1948; Wu *et al.* 2015; Arora & Frank 2014; Gelardi *et al.* 2014; Hosen *et al.* 2013; Nuhn *et al.* 2013; Vizzini 2014 a, b, c; Zhao *et al.* 2014; Zhu *et al.* 2014; Li *et al.* 2011, 2015).

While many new fungal taxa have been recently documented in east Asia, and China in particular (Wu *et al.* 2014; Dentinger & Suz 2014; Arora & Frank 2014; Zhu *et al.* 2014; Zhao et al 2014; Das & Dentinger 2015; Das *et al.* 2015), vast regions of Asia remain very poorly documented for fungi as a whole, let alone the Boletaceae. The Indian subcontinent is such a region, and even though it is known to include highly biologically diverse areas like Eastern Himalaya, Western Ghats, Western Himalaya and Indian plains, they remain essentially underexplored mycologically. To date, only 11 genera of Boletaceae have been reported from India (Singer & Singh 1971; Lakhanpal 1996; Das & Dentinger 2015; Ray & Samajpati 1979; Das 2012; Das *et al.* 2012, 2014; Parihar *et al.* 2014), although more are to be expected. Among these genera, *Boletus* s.l. is the most speciose, with 33 species currently documented for the country (Das *et al.* 2015).

Ongoing surveys of Indian macrofungi have recently uncovered a number of new or interesting species belonging to the Boletaceae (Das 2012, 2013; Das *et al.* 2012, 2015; Das & Chakraborty 2014; Parihar *et al.* 2014; Das & Dentinger 2015). Here we report a new species of Boletaceae from eastern Sikkim with distinctive mushroom-shaped cells in the pileipellis and stipitipellis, a feature not known previously from any described species of Boletaceae and rendering it difficult to assign to any of the recently segregated genera.

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