



Phylogeny and taxonomy of *Ceriporiopsis* (Polyporales) with descriptions of two new species from southern China

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Abstract

Phylogenies of *Ceriporiopsis* and related genera were studied using DNA sequences from the ITS+28S nuclear ribosomal RNA gene regions. Two species, *Ceriporiopsis alboaurantia* and *C. semisupina*, are described as new to science. *Ceriporiopsis alboaurantia* is characterized by annual growth habit, resupinate basidiocarps with white pore surface when fresh, turning to apricot-orange to dark orange upon drying, monomitic hyphal system with clamped generative hyphae encrusted with pale yellow crystals, ellipsoid and thin-walled basidiospores ($4\text{--}5 \times 3\text{--}3.3 \mu\text{m}$), and plenty of pale-yellow to pale-orange oily substances in subiculum and trama. *Ceriporiopsis semisupina* is distinguished by annual, effused-reflexed basidiocarps with greyish brown to reddish brown pore surface, monomitic hyphal system with clamped generative hyphae bearing crystalline incrustation, long-clavate basidia, ellipsoid and thin-walled basidiospores ($4\text{--}4.5 \times 3\text{--}3.3 \mu\text{m}$). Like previous study, the phylogenetic analysis presented here also showed that *Ceriporiopsis* is not monophyletic and the sampled species were grouped in four clades, including phlebia clade, residual polyporoid clade, tyromyces clade and gelatoporia clade.

Key words: Phanerochaetaceae, polypore, wood-rotting fungi

Introduction

Ceriporiopsis Domański (Phanerochaetaceae, Polyporales) was typified by *C. gilvescens* (Bres.) Domański. It is characterized by a combination of annual, resupinate basidiocarps, monomitic hyphal structure with clamp connections, and subcylindrical to ellipsoid basidiospores. This combination is not uncommon for many polypores and is likely homoplasious. In addition, its hyphae and spores are acyanophilous and negative in Melzer's reagent. It is a cosmopolitan genus occurring in temperate, boreal, and tropical areas, and causing white rot (Gilbertson & Ryvarden 1986, Ryvarden & Gilbertson 1993, Núñez & Ryvarden 2001).

Lack of robust morphological features for the genus has resulted in a number of names combined under *Ceriporiopsis* generic name. The MycoBank database (<http://www.mycobank.org>) includes 64 specific and infraspecific names in *Ceriporiopsis* and Index Fungorum (<http://www.indexfungorum.org>) registers 61 ones, but some species were transferred to other genera according to the Index Fungorum database, and the actual number of species is much lower; until now about 30 species were recognized by polypore specialists in the genus worldwide (Hattori 2002, Bernicchia & Ryvarden 2003, Kinnunen & Niemelä 2005, Fortey & Ryvarden 2007, Læssøe & Ryvarden 2010, Tomšovský *et al.* 2010, Vlasák *et al.* 2012, Cui 2013).

Recently, molecular study employing multi-gene datasets by Binder *et al.* (2013) has helped to clarify the generic relationships of polyporoid fungi and to provide phylogenetic overview of the Polyporales. They demonstrated that the type species of *Ceriporiopsis* (*C. gilvescens*) belongs to the phlebioid clade, but appeared to be grouped with smooth, merulioid and hydneaceous genera, such as *Ceraceomyces* Jülich, *Ceriporia* Donk, *Gloeoporus* Mont., *Merulius* Haller, *Mycoacia* Donk, *Phanerochaete* P. Karst. and *Phlebia* Fr. Phylogenetic study of European *Ceriporiopsis* taxa inferred from the combined data of the large subunit nuclear rRNA gene (nLSU) and mitochondrial small subunit rRNA (mtSSU) gene sequences, suggested that 1) the genus is polyphyletic, 2) the type *Ceriporiopsis gilvescens* was grouped with *Phlebia* spp., 3) the taxa of *Ceriporiopsis* s.l. (Tomšovský *et al.*

In gelatoporia clade, *Poria subvermispora* Pilát was combined in *Gloeoporus* by Eriksson (1958) based on its resupinate basidiocarps and monomitic hyphal system. Later Niemelä (1985) transferred it to the genus *Gelatoporia* for its acyanophilous hyphae and allantoid basidiospores. Gilbertson & Ryvarden (1985) put it into *Ceriporiopsis* by its resupinate basidiocarps with white to pale cream pore surface. Tomšovský *et al.* (2010) revealed that the taxon belongs to the phlebia clade, and put it into *Gelatoporia*. However, recent phylogenetic studies showed that it clustered into the gelatoporia clade (Miettinen & Rajchenberg 2012, Binder 2013). Our research also showed that it is clustered in a separate gelatoporia clade (Fig. 1). Morphologically, *Gelatoporia subvermispora* (Pilát) Niemelä differs from *Ceriporiopsis alboaurantia* and *C. semisupina* by having allantoid basidiospores (Niemelä 1985).

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