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New and noteworthy species of white *Entoloma* (Agaricales, Entolomataceae) in China

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Abstract

Three species of *Entoloma* with white basidioma in subgenus *Alboleptonia* from China are reported in this paper. *Entoloma crocotillum* is described as new to science from high altitudes in southwestern China. It is characterized by the small, white to pinkish pileus covered with matted-appressed fibrils, relatively large basidiospores with 5–6 angles, and the common presence of clamp-connections. *Entoloma sulcatum*, a new Chinese record, and *E. stylophorum* are documented based on new collections. Additionally, ITS (internal transcribed spacer region), nLSU (nuclear large subunit), and RPB2 (RNA polymerase II second largest subunit) sequences of *E. crocotillum* were successfully generated, and the phylogenetic positions of the three species among *Alboleptonia* species and other entolomatoid groups are preliminarily analyzed based on the combined nLSU and RPB2 dataset. The phylogenetic analysis showed that *E. crocotillum* is most closely related to *E. sericellum* and that *Alboleptonia* is not a monophyletic group.

Key words: Basidiomycota, phylogeny, taxonomy

Introduction

There are differing opinions regarding the taxonomy of entolomatoid species that possess white to pale cinereous basidioma, a silky to appressed-fibrillose or minutely appressed-squamulose opaque pileus and angular spores. Some researchers accepted them as a distinct genus '*Alboleptonia* Largent & Benedict' 1970, Pegler 1983, 1997, Orton 1991a, b, Largent 1994, Baroni & Lodge 1998, Ovrebo & Baroni 2007, Henkel *et al*. 2010), while others treated them as a subgenus *Alboleptonia* of *Entoloma* (Fr.) P. Kumm. (Noordeloos 1987, 1992, 2004, Manimohan *et al*. 1995, 2006, Zhang & Li 2002, Morozova *et al*. 2012, Noordeloos & Gates 2012). Though '*Alboleptonia'* (as genus or subgenus) was found to be polyphyletic in the preliminary phylogeny of Entolomataceae (Co-David *et al*. 2009), for the time being, we accept it as a subgenus of *Entoloma* following Noordeloos (1992, 2004) because of its easily recognized macroscopic characters.

More than forty taxa of '*Alboleptonia'* have been recorded in the literature (Hesler 1967, Largent & Benedict 1970, Horak 1980, 2008, Noordeloos 1987, 1992, 2004, Manimohan *et al*. 1995, 2006, Baroni & Lodge 1998, Zhang & Li 2002, Ovrebo & Baroni 2007, Henkel *et al.* 2010, Noordeloos & Gates 2012). Although some new species of *Entoloma* have been described from China recently (He *et al*. 2011, 2012, 2013, Qi *et al*. 2012), species of '*Alboleptonia'* are poorly known in this country (Zhang & Li 2002).

During our field surveys of Entolomataceae in China, several collections representing '*Alboleptonia'* were discovered, one of which is described as new in this paper. Additionally, a new Chinese record, *E. sulcatum* (T.J. Baroni & Lodge) Noordel. & Co-David, as well as the widespread species *E. stylophorum* (Berk. & Broome) Sacc. are also presented hereafter.

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discrimination between *E. crocotillum* and *E. sericellum*. The morphological differences between the two species are discussed above. One morphological character common to both of them is the conspicuous presence of clamp-connections. *Alboleptonia* aff. *sericellum*, *E. stylophorum* and *E. sulcatum* were grouped in the same clade, while no support was received (Fig. 1). The three species were positioned in a broader clade consisting of some '*Cyanula*' species (Fig. 1). In the present analysis, *E. cephalotrichum* was nested in the clade composed of several '*Nolanea*' species, and was closest to *E. conferendum* (Britzelm.) Noordel. with a support of BS 74% and BPP 0.99 (Fig. 1).

In conclusion, the analysis based on nLSU and RPB2 sequences did not support '*Alboleptonia*' as a distinct genus or even a subgenus, which is consistent with the study by Co-David *et al*. (2009). However, the phylogenetic positions of these distinctive '*Alboleptonia*' among entolomatoid species are far from resolved at present, and further studies based on more collections and multigene sequences are needed to get a better understanding of '*Alboleptonia*'.

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