



## *Polycephalomyces yunnanensis* (Hypocreales), a new species of *Polycephalomyces* parasitizing *Ophiocordyceps nutans* and stink bugs (hemipteran adults)

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### Abstract

*Polycephalomyces yunnanensis* is described as a new species that parasitizes *Ophiocordyceps nutans* and stink bugs (hemipteran adults). It is characterized by the production of a viscous mass at the apex of its synnema, and it has two types of conidia ( $\alpha$ - and  $\beta$ -conidia) and phialides ( $\alpha$ - and  $\beta$ -phialides). A morphological and ecological investigation revealed that *P. yunnanensis* is distinct from any known species in the genus. Phylogenetic analyses based on the ITS and 5-locus (nrSSU, nrLSU, *tef-1 $\alpha$* , *rpb1* and *rpb2*) data supported the treatment of this fungus as a distinct species.

**Key words:** Ecology, morphology, phylogenetic analyses, synnemata

### Introduction

The genus *Polycephalomyces* Kobayasi was established based on the species *P. formosus* Kobayasi (1941: 245) and the diagnostic characteristic of highly branched synnemata (Kobayasi 1941). *Polycephalomyces ramosus* (Peck) Mains (1948: 414) and *P. cylindrosporus* Samson & H.C. Evans (1981: 297) were later added (Mains 1948, Samson *et al.* 1981). Seifert (1985) recognized four species: *P. formosus*, *P. ramosus*, *P. cylindrosporus* and *P. tomentosus* (Schrader) Seifert (1985: 175). Species in this genus were characterized by white synnemata that may brown with age, with slimy yellow conidial masses, small conidia, terminal awl-shaped phialides or acropleurogenously developing phialides. Bischoff *et al.* (2003) segregated *P. tomentosus* from *Polycephalomyces* and transferred it to the genus *Blistum* Sutton.

Van Vooren & Audibert described *Polycephalomyces ditmarii* Van Vooren & Audibert (2005: 231) as the asexual stage of *Ophiocordyceps ditmarii* (Quél.) G.H. Sung, J.M. Sung, Hywel-Jones & Spatafora (2007: 42), parasitizing hymenopteran insects. Wang *et al.* (2012) re-examined *Peacilomyces sinensis* C.T. Chen, S.R. Xiao & Z.Y. Shi (1985: 25) and confirmed that it belonged to *Polycephalomyces* and combined it with *Polycephalomyces sinensis* (Q.T. Chen, S.R. Xiao & Z.Y. Shi) W.J. Wang, X.L. Wang, Y. Li, S.R. Xiao & Y.J. Yao (2012: 228). Kepler *et al.* (2013) followed the International Code of Nomenclature for algae, fungi and plants (McNeill *et al.* 2012) and assigned seven sexual taxa to the genus *Polycephalomyces*, which was historically reserved for only asexual taxa. These seven species were *P. cuboideus* (Kobayasi & Shimizu) Kepler & J.W. Spatafora (2013: 618), *P. kanzashianus* (Kobayasi & Shimizu) Kepler & Spatafora (2013: 618), *P. nipponicus* (Kobayasi) Kepler & Spatafora (2013: 618), *P. paracuboideus* (S. Ban, Sakane & Nakagiri) Kepler & J.W. Spatafora (2013: 618), *P. prolificus* (Kobayasi) Kepler & J.W. Spatafora (2013: 618), *P. ramosopulvinatus* (Kobayasi & Shimizu) Kepler & J.W. Spatafora (2013: 618) and *P. ryoganiensis* (Kobayasi & Shimizu) Kepler & J.W. Spatafora (2013: 618). However, this genus remains an incertae sedis member of Hypocreales and requires further resolution with the polyphasic taxonomical method.

During the investigation of *Ophiocordyceps nutans* (Pat.) G.H. Sung, J.M. Sung, Hywel-Jones & Spatafora (2007: 45), a synnematous fungus was identified that parasitizes the stromata of *O. nutans* and stink bugs. It was collected