



Association of ectomycorrhizal fungi with *Picea crassifolia* (Pinaceae, Piceoidae) from high-altitude stands in Mount Helan Nature Reserve, China

Y.J. Fan^{1*}, T. Grebenc³, J. Wei⁴, Y.L. Zhao¹, W. Yan^{4*} and L.B. Wang²

¹Baotou Teacher's College, Biological Science and Technology Institute, Baotou, China

²Key Laboratory of Tree Breeding and Cultivation, State Forestry Administration, Research Institute of Forestry, Chinese Academy Forestry, Beijing, China

³Slovenian Forestry Institute, Ljubljana, Slovenia

⁴Inner Mongolia Agricultural University, Forestry Institute, Inner Mongolia, China

*These authors contributed equally to this study.

Corresponding author: L.B. Wang

E-mail: wlibing@163.com

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ABSTRACT. We investigated the diversity of ectomycorrhiza associated with the endemic *Picea crassifolia* in Mount Helan National Nature Reserve in Inner Mongolia, China. Toward this objective, we conducted morphological and molecular identification of ectomycorrhizae in soil cubes taken from pure *P. crassifolia* stands. Eleven types of ectomycorrhizal (ECM) organisms were separated, briefly described, and identified. Nine morphotypes belonged to the

phylum Basidiomycotina [*Amphinema byssoides*, *Cortinarius* sp (cf. *limonius*), *Cortinarius vernus*, *Inocybe* cf. *nitidiscula*, *Inocybe* sp 1, *Sebacina incrustans*, *Sebacina* sp, *Suillus luteus*, and *Piceirhiza tuberculata* x *Picea crassifolia* (comb. Nov.)], and two morphotypes to the phylum Ascomycotina (*Cenococcum geophilum* and *Helvella* sp). The diversity of ECM organisms in *P. crassifolia* was lower than that reported by other studies on spruce or pine forests, or on sporocarp diversity in the high-mountain forests of China. Most of the fungi in the rhizosphere did not correspond to species previously recorded as sporocarps above ground. Here, several new ectomycorrhiza morphotypes are proposed and described. We also confirmed the ectomycorrhizal status of the genus *Sebacina* (order Sebaciales).

Key words: Mount Helan (China); Diversity; Ectomycorrhizal; Morphological and molecular identification; ITS nrDNA sequencing; *Picea crassifolia* Kom. (Qinghai spruce) stand