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The genus *Menegazzia* (*Parmeliaceae*, lichenized Ascomycetes) in the Tibetan region

by

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With 3 figures

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Abstract: Material of the genus *Menegazzia* from the Tibetan region was revised. Four species were recognized, viz. two fertile (primary) species (*M. neotropica* ssp. *rotundicarpa*, *M. primaria*) and two sorediate (secondary) species (*M. subsimils, M. terebrata*). *Menegazzia neotropica* ssp. *rotundicarpa* is reported for the first time from outside the Neotropics, and *M. primaria* is reported for the first time from outside Taiwan, from a single locality near Yulong Shan. *Menegazzia subsimilis* is new to Tibet. The most common species is *M. terebrata*. Notes and illustrations of morphological variation, as well as a distribution map, are provided.

Key words: Taxonomy, lichens, *Parmeliaceae*, *Menegazzia*, China, Tibet, biogeography

Introduction

The knowledge of the lichens of the Tibetan region of China is relatively poor. The large area of highland plateaus, valleys and mountain chains influenced by Tibetan culture covers more than 2.5 million square kilometres, and lichen collecting activities have taken place only at scattered localities within this region (Obermayer 2004). The second author made extensive collections from the Tibetan region during two expeditions, one in 1994 and one in 2000. Based on these collections, numerous additions to the lichens of the Tibetan region have been published in a series of papers (see Obermayer 2004 for a list of papers). Sixty-one taxa of lichens and

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lichenicolous fungi were treated in the papers published between 1995 and 2003, whereas Obermayer (2004) treated 110 taxa, most of them not included in the previous papers, thus generating a total list of c. 160 taxa.

Numerous genera are still pending further revisions. One of these genera is *Menegazzia* A. Massal., a genus with its main centre of speciation in the Southern Hemisphere, but recent revisions have shown that further speciation of this taxon also takes place in East Asia (Aptroot et al. 2003, Bjerke 2004). Only scattered reports of *Menegazzia* exist from the mountain regions in Central East Asia. For example, Awasthi (1984) and Singh & Sinha (1994) reported one species, *M. terebrata* (Hoffm.) A. Massal., from the Indian part of the Himalayas, Nepal - confirmed also by Poelt (1990) - and Nagaland, whereas Aptroot & Feijen (2002) reported *M. terebrata* and *M. subsimilis* (H. Magn.) R. Sant. [as *M. dissecta* (Rass.) Hafellner] from Bhutan.

From areas further east there are also some reports of *M. asahinae* (Yasuda ex Asahina) R. Sant., for instance from the Hunan Province of China (Yan & Rikkinen 2000). However, as stated by Bjerke (2004), this species has been misinterpreted as a sorediate taxon by some authors, thus reports should be treated with caution.

Regarding the Tibetan Area, Hue (1899) reported *M. terebrata* [as *Parmelia pertusa* (L.) Schrank. nom. illeg.] and described the taxon *P. pertusa* f. *ventricosa* Hue from the south-easternmost part of the Tibetan Fringe Mountains (Hengduan Shan). Further reports of *M. terebrata* (in a broad sense) come from the Tibetan Kham Region (northernmost part of Yunnan and western part of Sichuan) (Zahlbruckner 1930, 1934) and from the province Xizang (Wei & Jiang 1986, including an image of *Menegazzia terebrata*).

In the present account, new data on distribution, ecology and morphological variation of the genus *Menegazzia* in the Tibetan region are presented.

Materials and methods

The Tibetan material studied is chiefly collected by the second author. Material from other areas of the World, including many type specimens, used for comparison, is housed in a number of other herbaria; see Bjerke (2004) for the most relevant specimens and herbaria. Acetone extracts of all specimens from the Tibetan region were analysed by standardized thin-layer chromatographic methods (Culberson 1972, Orange et al. 2001). In the lists of examined specimens, only brief locality descriptions are given. Additional location numbers are provided for Obermayer's collections (e.g. "2000-02.2"). See Obermayer (2004) for full information on these locations, including collection dates, latitude, longitude and altitude. The two or four first digits in the location numbers indicate year of collection. All listed examined specimens are housed in GZU, except for a few Nepalese specimens from G, thus unless stated 'G', the specimens are housed in GZU.

Results

The species

Menegazzia neotropica Bjerke ssp. **rotundicarpa** Bjerke & Sipman, Mycotaxon 91: 420. 2005.

NOTES: These are the first reports of this taxon outside the Neotropics. Previously, it was only known from a few montane sites in Mexico, Costa Rica and Venezuela

(Bjerke et al. 2005). The nominal subspecies is only known from the northern parts of South America (Bjerke 2002). *M. neotropica* ssp. *rotundicarpa* is characterized by narrow lobes with few perforations, brownish-black lobe tips, small, circular apothecia (Fig. 1A), and large ascospores. The specimens from the south-eastern Tibetan Fringe Mountains have identical morphology and chemistry as the neotropical specimens. The only differences detected are that the Tibetan specimens tend to have underdeveloped or sterile asci, and that the largest spores are slightly larger, viz. to 88 µm long in the Tibetan specimens, as compared to 74 µm long in the neotropical specimens (Bjerke 2002, Bjerke et al. 2005). We do not find these minor differences sufficiently important for treating the Tibetan specimens as a separate taxon. It differs from the other primary species known from East Asia (*M. asahinae*, *M. anteforata* Aptroot, M.-J. Lai & Sparrius and *M. primaria* Aptroot, M.-J. Lai & Sparrius) by having less convex, narrower lobes, more brownish lobe tips, fewer perforations, smaller apothecia (compare Figs. 1A and 1C) and much larger spores.

The specimens were collected within a restricted area in the province Sichuan (Fig. 2) between 2180 m and 3240 m above sea level right east of the mountain Gongga Shan (7556 m). It grows on various phorophytes of the *Abies fabri* forest system, among others on *Betula utilis*, *Rhododendron* spp. and *Salix* spp.

The disjunctive distribution of this subspecies is peculiar. Few other lichens are known to have a similar, restricted type of distribution, but several species show a more continuous, pantropical distribution range, often preferring the wet slopes of the mountains in the Neotropics and the Palaeotropics (Sipman 2002). One such species is *Acroscyphus sphaerophoroides* Léveillé, which is known from Tibet, Bhutan, Nepal, Sikiang, Yunnan and Japan in Asia, and from a few, scattered localities along the mountain chains in the Americas, viz. from Canada, Mexico, Peru and Patagonia (Sato 1967, Tibell 1996, Aptroot & Feijen 2002). It is not unlikely that *M. neotropica* ssp. *rotundicarpa* also is more widespread than the available records suggest. Its habitat preferences in the Neotropics and in the Tibetan Fringe Mountains are quite similar. In both areas, it prefers humid, montane forests close to the tree line.

SPECIMENS EXAMINED: PROV. SICHUAN: SE-Tibetan Fringe Mountains (= Hengduan Shan), Daxue Shan, Gongga Shan, Hailougou glacier and forest park, W. Obermayer 08585 (loc. 2000-02.3), 08760, 08765 (loc. 2000-04.1), 08857, 08858, 08859, 08864 (loc. 2000-03.3). - SE-Tibetan Fringe Mountains (= Hengduan Shan), 68 km WSW of Ya'an, road from Tianquan to the Erlang Shan-tunnel, W of Xing Gou, W. Obermayer 08040 (loc. 2000-02.2).

Menegazzia primaria Aptroot, M.-J. Lai & Sparrius, Bryologist 106: 159. 2003.

NOTES: This recently described species is hitherto only known from Taiwan (Aptroot et al. 2003). One specimen belonging to this species from Yulong Shan, which is situated in the southermost part of the Tibetan Fringe Mountains (=Hengduan Shan), 315 kilometres south-west of Gongga Shan (Fig. 2), was seen. The lobes of this specimen are of the "*terebrata*"-type (Fig. 1B), exactly as described by Aptroot et al. (2003). The apothecia (Fig. 1C) are larger than those illustrated by Aptroot et al. (2003), but they did not provide any size measurements of the apothecia. The spores fall well within the size ranges given by Aptroot et al. (2003). The description of the taxon *Parmelia pertusa* f. *ventricosa* (Hue 1899) corresponds well with the description of *M. primaria*, and that taxon may very well belong to this species.