

New and remarkable bryophyte records from Mongolia

Frank MÜLLER*

Technische Universität Dresden, Institut für Botanik, Mommsenstr. 13,
D-01062 Dresden, Germany

Abstract – Nine species of hepatics and nineteen species of mosses are reported new to Mongolia. *Fissidens sublimbatus* is new to Asia, *Didymodon maximus* and *Schistidium pruinosum* are new to Central Asia. Additional records for the floristic regions Khangai and Middle Halha are appended.

Bryophytes / Flora / Distribution / Khangai / Mongolia

INTRODUCTION

In July 2008 the author visited the Khangai and Middle Halha regions of Mongolia. The primary objective was a bryological investigation of the Tarvagatai Nuruu National Park, situated in the northern part of the Khangai Mountains. This park was created in 2000 to protect large-scale forests of Siberian Larch (*Larix sibirica*), which represent the southernmost extensions of the Siberian taiga. In addition, in the reserve the mountain steppes, glacial lakes, alpine meadows, fens, boulders, and rocks afford a variety of habitats for bryophytes.

An overview of the mosses known from Mongolia and regional distribution are provided by Tsegmed (2006). Currently, the hepatic flora of Mongolia is not well known. The last comprehensive synopsis of the hepatic flora of Mongolia was compiled by Abramov & Abramova (1983). Since then few additional publications have dealt with Mongolian hepatics. Among the bryophytes there are some species either new to Mongolia or to the floristic provinces of Mongolia. Voucher specimens are included in the herbarium of the Institute of Botany of the University of Dresden (DR).

SPECIES NEW TO MONGOLIA

Anthocerotae and Hepaticae

Lophozia murmanica Kaal.

Uliastay NNE: source area at the mountain pass Zagastayn davaa, c. 2350 m, 48°05'19"N, 097°10'18"E, Region 3 (Khangai), 22 July 2008, *F. Müller 039585*.

An arctic-alpine species known from Kola Peninsula in northern Russia, Ellesmere Island, Greenland, Spitsbergen, and northernmost Norway (Damsholt,

* Correspondence and reprints: Frank.Mueller@tu-dresden.de

2002). The systematic position of this species is controversial. Schljakov (1980) synonymized the species with *Lophozia savicziae* Schljakov, and Damsholt (2002) considered it to be a synonym of *L. wenzelii* (Nees) Steph. var. *lapponica* H. Buch & S.W. Arnell. Müller (1951-58) synonymized *L. murmanica* with *L. wenzelii*. In regard to the diagnostic features and systematic position of this species, Damsholt (2002) is followed. Important diagnostic features include the purplish secondary pigmentation, lanceolate underleaves, terminal branches, green to purplish gemmae, and 2-3lobed leaves.

***Lophozia polaris* (R.M. Schust.) R.M. Schust. et Damsh.**

Ider Sum SE: Tarvagatai Nuruu National Park, left slope of the valley of Zagaan Gol, at rock faces, c. 2400 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 25 July 2008, *F. Müller 039340*.

Probably a holarctic species known from northern Russia, Spitsbergen, Siberia, Greenland, and the arctic regions of North America (Damsholt, 2002). The Mongolian material was separated from the closely related *L. sudetica* (Nees ex Huebener) Grolle on the basis of the diagnostic features mentioned in Damsholt (2002): more oil-bodies per cell, larger median leaf cells, and reddish gemmae.

***Preissia quadrata* (Scop.) Nees**

Ider Sum SE: Tarvagatai Nuruu National Park, left slope of the valley of Zagaan Gol, on boulders at the border of a brook, c. 2500 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 25 July 2008, *F. Müller 039367*.

A boreal-alpine species that is probably circumboreal (Damsholt, 2002). The closest sites for the species are found in China and southern Siberia (Damsholt, 2002; Konstantinova *et al.*, 1992).

***Riccardia incurvata* Lindb.**

Ider Sum SE: Tarvagatai Nuruu National Park, bog at the lakeshore of Zagaan Nuur, c. 2400 m, 47°59'32"N, 097°39'30"E, Region 3 (Khangai), 26 July 2008, *F. Müller 039238*.

A northern suboceanic species. The closest sites are found in Siberia (Damsholt, 2002).

***Scapania hyperborea* Jörg.**

Ider Sum SE: Tarvagatai Nuruu National Park, plateau area of Doloo Nuur, at boulders in a source area, c. 2700 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 25 July 2008, *F. Müller 039370*.

Probably a circumarctic species with closest sites in Siberia (Damsholt, 2002).

***Scapania paludicola* Loeske et Müll. Frib.**

Ider Sum SE: Tarvagatai Nuruu National Park, plateau area of Doloo Nuur, in a source area, c. 2700 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 25 July 2008, *F. Müller 039325*.

A boreal-montane, circumpolar to circumboreal species (Damsholt, 2002). The closest sites are in southern Siberia (Konstantinova *et al.*, 1992).

***Scapania cf. scandica* (Arnell et H. Buch) Macvicar**

Ider Sum SE: Tarvagatai Nuruu National Park, left slope of the valley of Zagaan Gol, at shaded boulders in larch forest, c. 2400 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 24 July 2008, *F. Müller 039527*.

The determination of this collection is provisional since it consists of only sterile material. The species is a subarctic-montane, amphiatlantic species (Damsholt, 2002). The nearest sites are in southern Siberia (Konstantinova *et al.*, 1992).

***Scapania subalpina* (Lindenb.) Dumort.**

Ider Sum SE: Tarvagatai Nuruu National Park, left slope of the valley of Zagaan Gol and plateau area of Doloo Nuur, in source area in larch forest, at boulders along a brook and at wet boulders in alpine meadows, c. 2400-2900 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 24 July 2008, *F. Müller 039532, 039386 & 039320*.

A subarctic-subalpine, circumpolar to circumboreal species (Damsholt, 2002). The closest sites are in southern Siberia (Konstantinova *et al.*, 1992).

***Tritomaria scitula* (Taylor) Jörg.**

Ider Sum SE: Tarvagatai Nuruu National Park, left slope of the valley of Zagaan Gol, at shaded boulders and at the forest ground in a larch forest, c. 2400 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 24 July 2008, *F. Müller 039609 & 039365*.

An arctic-alpine, circumpolar species (Damsholt, 2002). The nearest sites are in eastern and western Siberia (Konstantinova *et al.*, 1992).

Musci

***Amblyodon dealbatus* (Sw. ex Hedw.) Bruch et Schimp.**

Yaruu NE: valley of the Ich Narijn Gol, bank of a brook in pasture land, c. 2200 m, 48°08'14"N, 096°46'37"E, Region 3 (Khangai), 19 July 2008, *F. Müller 039593*. Uliastay 14 km N: valley of the Chigestejn Gol, wet bank of the river, c. 1850 m, 47°49'30.2"N, 096°53'55.4"E, Region 3 (Khangai), 22 July 2008, *F. Müller 039543*. Ider Sum SE: Tarvagatai Nuruu National Park, left slope of the valley of Zagaan Gol, in a fen, c. 2300 m, 47°57'22.6"N, 097°39'03.6"E, Region 3 (Khangai), 24 July 2008, *F. Müller 039382*.

A boreal-montane species known from Europe, North America, Greenland, northern Asia, the Caucasus, and disjunct in southern South America. The nearest sites are in southern Siberia (Ignatov *et al.*, 2006) and the Xinjiang Region in China (Redfearn *et al.*, 1996).

***Amphidium mougeotii* (Bruch et Schimp.) Schimp.**

Ider Sum SE: Tarvagatai Nuruu National Park, left slope of the valley of Zagaan Gol, at rock faces, c. 2400 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 25 July 2008, *F. Müller 039379*.

The species is widespread in boreal to temperate regions of Europe, Asia, North America, and is also known from Macaronesia. The nearest sites are in southern Siberia (Ignatov *et al.*, 2006).

***Brachythecium erythrorrhizon* Schimp.**

Tsahir N: Ogtojn Am, flood plain with *Salix* shrubs, on boulders of silicate rock, c. 2270 m, 48°14'58"N, 099°01'26"E, Region 3 (Khangai), 18 July 2008, *F. Müller 039481*.

A boreal-montane, circumpolar species, known from Europe, Siberia, North America. The nearest sites are in southern Siberia (Ignatov *et al.*, 2006).

***Brachythecium rivulare* Schimp.**

Ider Sum SE: Tarvagatai Nuruu National Park, left slope of the valley of Zagaan Gol, in a source area in larch forest, c. 2400 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 24 July 2008, *F. Müller 039522*.

A boreo-temperate, circumpolar species, widespread in northern Eurasia. The nearest sites are in southern Siberia (Ignatov *et al.*, 2006) and China (Redfearn *et al.*, 1996).

***Bryum neodamense* Itzigs. ex Müll. Hal.**

Yaruu NE: fen area at a mountain pass, c. 2440 m, 48°13'41"N, 096°54'19"E, Region 3 (Khangai), 19 July 2008, *F. Müller 039600*. Ider Sum SE: Tarvagatai Nuruu National Park, fen at the small lake eastward of the lake of Zagaan Nuur, c. 2400 m, 47°59'32"N, 097°39'30"E, Region 3 (Khangai), 26 July 2008, *F. Müller 039279*.

A boreal-montane, circumpolar species; widespread in northern Eurasia and northern North America with the closest sites in southern Siberia (Ignatov *et al.*, 2006), and China (Redfearn *et al.*, 1996).

***Catoscopium nigratum* (Hedw.) Brid.**

Ider Sum SE: Tarvagatai Nuruu National Park, fen at the small lake eastward of the lake of Zagaan Nuur, c. 2400 m, 47°59'32"N, 097°39'30"E, Region 3 (Khangai), 26 July 2008, *F. Müller 039290*.

A boreo-arctic-montane, circumpolar species; its distributional area includes northern and montane Europe, Turkey, Caucasus, northern Asia, North America, and Greenland. The closest sites are in southern Siberia (Ignatov *et al.*, 2006).

***Dicranella schreberiana* (Hedw.) Hilf. ex H.A. Crum et L.E. Anderson**

Yaruu NE: on open soil in pasture land at a mountain pass, c. 2440 m, 48°13'41"N, 096°54'19"E, Region 3 (Khangai), 19 July 2008, *F. Müller 039582 & 039583*.

These collections lack sporophytes, but brown, spherical rhizoidal gemmae are present. The species is a boreo-temperate, circumpolar species known from Europe, northern Asia, Caucasus, North America, New Zealand, and Tasmania. The closest sites are in southern Siberia (Ignatov *et al.*, 2006) and the Heilongjiang Region of China (Redfearn *et al.*, 1996).

***Didymodon maximus* (Syed et Crundw.) M.O. Hill**

Ider Sum SE: Tarvagatai Nuruu National Park, fen area a little eastward of the lake of Zagaan Nuur, c. 2400 m, 47°59'32"N, 097°39'30"E, Region 3 (Khangai), 26 July 2008, *F. Müller 039288*.

This is a rare moss known only from Canada (Nunavut, Northwest Territories), Alaska, two sites in the northwest of Ireland, and Wrangel Island in the Russian Far East (Zander, 2007; Belikovitch *et al.*, 2006; Ignatov *et al.*, 2006). *Didymodon maximus* is well described, illustrated, and keyed in Zander (2007), Jiménez *et al.* (2005), and Smith (2004). After a critical comparison of the Mongolian material with the features of the species given in these sources, there is no doubt in attributing the material to this species. The Mongolian record is the first one in Central Asia.

***Drepanocladus longifolius* (Mitt.) Broth. ex Paris**

Ider Sum SE: Tarvagatai Nuruu National Park, floating in a lake in the plateau of Doloo Nuur, c. 2600 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 25 July 2008, *F. Müller 039358*, det. L. Hedenäs.

The species is widely distributed in the temperate to arctic zones of North America and Eurasia. In addition it is known from South America, Kerguelen, and Australia (Hedenäs, 2003). The nearest sites are in southern Siberia (Ignatov *et al.*, 2006).

***Fissidens osmundoides* Hedw.**

Ider Sum SE: Tarvagatai Nuruu National Park, fen at the lakeshore of Zagaan Nuur and a little eastward of the lake of Zagaan Nuur, c. 2400 m, 47°59'32"N, 097°39'30"E, Region 3 (Khangai), 26 July 2008, *F. Müller* 039311, 039276 & 039332, conf. R.A. Pursell.

A boreo-arctic-montane, circumpolar species, distributed in northern and montane areas of Europe, Asia, North America, Greenland. The closest sites are in southern Siberia (Ignatov *et al.*, 2006) and China (Redfearn *et al.*, 1996).

***Fissidens sublimbatus* Grout**

Lun: near Shumuul, at soil covered rock crevices of silicate rocks in steppe area, 47°47'20"N, 105°07'22"E, Region 8 (Middle Halha), 15 July 2008, *F. Müller* 039503, det. R.A. Pursell.

Fissidens sublimbatus, a species of western North America, was recently discovered by Ros *et al.* (2001) in Morocco and the Canary Islands, and by Bruggeman-Nannenga in Blockeel *et al.* (2004) in Argentina. **It is reported here as new for Asia.** The species is expected to be more widely distributed in the arid areas of Asia.

***Funaria microstoma* Bruch ex Schimp.**

Yaruu NE: on open soil in a fen area at a mountain pass, c. 2440 m, 48°13'41"N, 096°54'19"E, Region 3 (Khangai), 19 July 2008, *F. Müller* 039573.

This species may be overlooked because of its similarities with the more common *F. hygrometrica* Hedw. The species has a sub-cosmopolitan distribution and is known from North America, South America, Europe, Asia, and Australia. The species is more or less widely distributed in mountainous regions of China (Li X.-J. *et al.*, 2003), but unknown from Siberia (Ignatov *et al.*, 2006).

***Grimmia muehlenbeckii* Schimp.**

Tsahir N: Ogtojn Am, flood plain with *Salix* shrubs, on boulders of silicate rock, c. 2270 m, 48°14'58"N, 099°01'26"E, Region 3 (Khangai), 18 July 2008, *F. Müller* 039453.

The species is known from Europe, North Africa, North America, and Asia. Surprisingly, the species is not mentioned for Mongolia in the comprehensive treatment of the Mongolian species of *Grimmia* (Tsegmed & Ignatova, 2007). The closest sites are nearby in southern Siberia (Ignatov *et al.*, 2006; Ignatova & Muñoz, 2004).

***Orthotrichum alpestre* Hornsch. ex Bruch et Schimp.**

Yaruu NW: Ulaagchnij Har Nuur, mountain range at the southern side of the lake, on boulders between *Salix* shrubs, c. 2300 m, 48°18'07"N, 096°11'05"E, Region 3 (Khangai), 21 July 2008, *F. Müller* 039542.

A boreal-montane, circumpolar species, known from northern and montane Europe, Greenland, Siberia, Kashmir, and North America. The closest sites are in southern Siberia (Ignatov *et al.*, 2006).

***Plagiobryum zierii* (Hedw.) Lindb.**

Ider Sum SE: Tarvagatai Nuruu National Park, left slope of the valley of Zagaan Gol, at rock faces, c. 2400 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 25 July 2008, *F. Müller* 039287.

A boreo-arctic-montane, circumpolar species, known from northern and montane areas of Europe, Africa, Asia, North America, and South America. The closest sites are in southern Siberia (Ignatov *et al.*, 2006) and China (Redfearn *et al.*, 1996).

***Plagiothecium piliferum* (Sw.) Schimp.**

Ider Sum SE: Tarvagatai Nuruu National Park, left slope of the valley of Zagaan Gol, at rock faces, c. 2400 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 25 July 2008, *F. Müller 039344*.

A boreal-montane, circumpolar species, known from montane and northern areas of Europe, northern Asia, North America, and Greenland. The nearest sites are located in southern Siberia (Ignatov *et al.*, 2006) and China (Redfearn *et al.*, 1996).

***Racomitrium panschii* (Müll. Hal.) Kindb.**

Ider Sum SE: Tarvagatai Nuruu National Park, plateau of the Doloo Nuur, in alpine meadows, c. 2800 m, 47°57'23"N, 097°39'04"E, Region 3 (Khangai), 25 July 2008, *F. Müller 039295*.

An arctic, circumpolar species. The species is known from Arctic regions of northern Asia and North America, Svalbard, and Greenland (Frisvoll, 1983). The closest sites are situated in southern Siberia, e. g. in the Altai Mountains (Frisvoll, 1983; Ignatov *et al.*, 2006).

***Schistidium pruinosum* (Schimp.) G. Roth**

Tsahir N: Ogtojn Am, flood plain with *Salix* shrubs, on boulders of silicate rocks near a brook, c. 2270 m, 48°14'58"N, 099°01'26"E, Region 3 (Khangai), 18 July 2008, *F. Müller 039438*.

This is the first record of this species for Central Asia. It is otherwise known from Europe, Iceland, Turkey, and the Caucasus. The Mongolian material belongs to a form of the species with short (or no) hair points, as characteristic for the species on moist ledges in Scandinavia (Blom, 1998). All other features of the material are identical with typical *S. pruinosum*.

***Schistidium pulchrum* H.H. Blom**

Tariat E: canyon of the Chuluut Gol, on silicate rocks, c. 1800 m, 48°09'56"N, 100°17'48"E, Region 3 (Khangai), 17 July 2008, *F. Müller 039430*.

The areal of the species includes northern Europe, the Alps, northern Asia, and North America. The record of the species in Mongolia is not surprising since it is a common species in the Asian part of Russia, from the Arctic to southern Siberia and the Russian Far East (Blom *et al.*, 2006).

SPECIES NEW FOR FLORISTIC REGIONS OF MONGOLIA

In addition to the species mentioned above as new for Mongolia, a number of species were collected that are not recorded in Tsegmed (2006) and Abramov & Abramova (1983) for the floristic regions Khangai (region 3) and Middle Halha (region 8) of Mongolia. The following are new entries for these regions.

Species new for Khangai (region 3)

Anthocerotae and Hepaticae: *Anastrophyllum minutum* (Schreb.) R.M. Schust., *Aneura pinguis* (L.) Dumort., *Athalamia hyalina* (Sommerf.) S.Hatt., *Cephaloziella*

hampeana (Nees) Schiffn., *Mannia pilosa* (Hornem.) Frye et L. Clark, *Riccia sorocarpa* Bisch., *Scapania brevicaulis* Taylor.

Musci: *Bryum cyclophyllum* (Schwägr.) Bruch et Schimp., *Bryum dichotomum* Hedw., *Cyrtomnium hymenophylloides* (Huebener) Nyholm ex T.J. Kop., *Fissidens adianthoides* Hedw., *Fontinalis hypnoides* Hartm., *Funaria pulchella* H. Philib., *Gymnostomum calcareum* Nees & Hornsch., *Hamatocaulis vernicosus* (Mitt.) Hedenäs, *Hennediella heimii* (Hedw.) R.H. Zander, *Orthotrichum iwatsukii* Ignatov, *Orthotrichum pallens* Bruch ex Brid., *Pterygoneurum subsessile* (Brid.) Jur., *Rhizomnium pseudopunctatum* (Bruch et Schimp.) T.J. Kop.

Species new for Middle Halha (region 8)

Anthocerotae and Hepaticae: *Riccia cavernosa* Hoffm., *Riccia sorocarpa* Bisch.

Musci: *Barbula convoluta* Hedw., *Didymodon acutus* (Brid.) K. Saito, *Eurohypnum leptothallum* (Müll. Hal.) Ando, *Funaria pulchella* H. Philib., *Phascum cuspidatum* Schreb. ex Hedw., *Polytrichum piliferum* Schreb. ex Hedw., *Pseudocrossidium revolutum* (Brid.) R.H. Zander, *Syntrichia princeps* (De Not.) Mitt.

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