

CHECKLIST AND DISTRIBUTION OF MOSSES AROUND DARKHAD VALLEY

СПИСОК И РАСПРОСТРАНЕНИЕ МХОВ ПО ДАРХАДСКОЙ КОТЛОВИНЕ

ENKHTAIVAN ENKHJARGAL^{*1,2} & TSOGIIN TSEGMED¹

ЭНХТАЙВАН ЭНХЖАРГАЛ^{*1,2}, ЦОГИЙН ЦЭГМЭД¹

Abstract

This study recorded 272 species of mosses of 121 genera and 39 families around Darkhad valley, adding 60 species to previous list. In detail, 146 species of mosses of 81 genera and 33 families are distributed in Darkhad valley and 263 species of mosses of 115 genera and 37 families occur in mountain ranges around this valley.

Резюме

Для Дархадской котловины и ее окрестностей приводится аннотированный список, включающий 272 вида мхов, относящихся к 121 родам и 39 семействам; 60 видов являются дополнением к ранее опубликованному списку. Непосредственно в самой котловине встречаются 146 видов мхов из 81 рода и 33 семейств, тогда как 263 вида из 115 родов и 37 семейств произрастают на горных хребтах, которые ее окружают.

KEYWORDS: Mongolia, mosses, checklist, Darkhad valley

INTRODUCTION

The first data on mosses in the Khuvsgul region (near Khuvsgul lake and Munkh saridag mountain) appeared in literature at the beginning of 20th century (Fedchenko, 1902). The work published in 1932 by V.F. Brotherus and L. I. Savich Lyubitskaya (1932) covered 112 species of bryophyta, including 98 species of green mosses, 10 species of liverworts and 4 species of peat mosses.

Since the joint Russian-Mongolian biological expedition began an extensive study of mosses in Mongolia, researchers recorded 232 species from Khuvsgul region, including 151 species in Darkhad valley (Abramova & Abramov, 1983; Tsegmed & Enkhjargal, 2007; Tsegmed, 2010).

Evolutionary, the Darkhad valley was filled by water, forming endorheic lake (Klinge & Sauer, 2019); the level of water raised from 1560 to 1710 m of elevation after Last Glacial Maximum (Gillespie *et al.*, 2008). Mean of filling elevation was 1638 m, suggesting filling elevation is approximately 1650 m on map grade. Hence, the territory of Darkhad valley has lower altitude with less than 1650 m but Ulaan taiga and Khoridol saridag mountain ranges with more than 1650 m (Fig. 1).

MATERIALS AND METHODS

From June to July during the years 2006–2012, a bryological survey was conducted in Tsagaannuur, Ulaan Uul, and Renchinlkhumbe soums of Khuvsgul Province. Specifically, the fieldwork was carried out in the Dark-

had Depression, which belongs to the Khuvsgul Mountain Taiga subregion of the Mongolian floristic-geographical classification.

During this period, a total of 2940 envelopes of leafy moss specimens were collected from 51 sampling sites and identified to species level. These collected specimens are currently preserved in the Bryophyte Collection (UBA) of the Botanic Garden and Institute, Mongolian Academy of Sciences.

The study area is located between 50°30' – 51°47' N latitude and 98°30' – 98°96' E longitude, at elevations ranging from 1540 to 2600 m above sea level.

The surveyed region comprises diverse ecological habitats, including high mountains, alpine zones, mountain forests, forest-steppe, slopes, meadows, wetlands, lake shores, river valleys, floodplains, groves, thickets, rocky outcrops, and various types of forests. Specimens were collected from a variety of substrates, such as water, wetlands, rocks, trees, soil, and other natural surfaces. The Darkhad valley is dominated by chernozem soil types, particularly the subtype with buried gleying or meadow-like characteristics (Dorjgotov, 2003). However, a considerable variety of other soils also occur, including weakly developed (shallow) chernozems, meadow-marsh carbonate soils, taiga sod soils, sod-carbonate soils, rocky weakly developed chernozems, sandy brown soils, and meadow brown soils (Belozertsev & Kuzmin, 2006).

^{1*} – Corresponding author. Botanic Garden and Research Institute, Mongolian Academy of Sciences, Ulaanbaatar 13330, Mongolia. E-mail: eegii88@gmail.com

² – Автор для переписки. National University of Mongolia, Ikh Surguulin Gudamj-1, P.O.BOX -46A/523, Ulaanbaatar, 14201, Mongolia

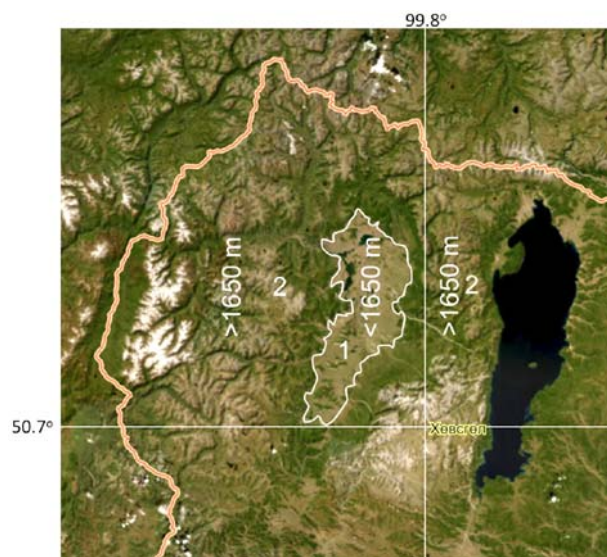


Fig. 1. The territory around Darkhad valley. 1 – Darkhad valley (<1650 m a.s.l.), 2 – Ulaan taiga and Khoridol saridag (>1650 m a.s.l.).

RESULTS AND DISCUSSION

Nowadays, there are data on 272 species of mosses, 121 genera and 39 families around Darkhad valley. In detail, 146 species of mosses of 81 genera and 33 families recorded in Darkhad valley with less than 1650 m of altitude. *Drepanocladus turgescens*, *Conardia compacta*, *Rhizomnium pseudopunctatum*, *Orthothecium strictum*, *Aloina brevirostris*, *Weissia edentula*, *Calliergonella cuspidata*, *Scorpidium scorpioides*, and *Timmia megapolitana* were found only in this valley. However, 263 species of mosses of 115 genera and 37 families were recorded in mountain ranges with more than 1650 m of altitude and 126 species were collected only in mountain ranges. The families Amblystegiaceae and Pottiaceae were dominated as from 17 to 32 species in Darkhad valley, while Pottiaceae, Dicranaceae, Grimmiaceae, Amblystegiaceae were as from 19 to 44 species.

In the list, altitude below or above 1650 m is indicated for each species as 1 – lower than 1650 m; 2 – higher than 1650 m.

Literature records are provided as follow:

(AA, 1983) – Abramova & I. I. Abramov (1983).

(TE, 2007) – Tsegmed *et al.* (2007).

(T, 2010) – Tsegmed (2010).

(BT, 2013) – Bai & Tsegmed (2013).

(AT, 2013) – Afonina *et al.* (2013).

(II, 2013) – Ignatova *et al.* (2013).

(II, 2015) – Ignatova *et al.* (2015).

Collections of E. Enkhjargal are marked with ‘E’.

LIST OF SPECIES

Abietinella abietina (Hedw.) M.Fleisch. – 1: T, 2010; 2: AA, 1983; E
Aloina brevirostris (Hook. & Grev.) Kindb. – 1: E
A. rigida (Hedw.) Limpr. – 1: AA, 1983; 1, 2: E
Amblystegium juratzkanum Schimp. – 1, 2: T, 2010; E

A. serpens (Hedw.) Schimp. – 1, 2: T, 2010; E
Andreaea heinemannii Hampe & Müll. Hal. – 2: T, 2010; E
A. rupestris Hedw. – 2: T, 2010; E
Anomobryum concinnum (Spruce) A.Jaeger – 2: E
Aulacomnium acuminatum (Lindb. & Arnell) Kindb. – 2: AA, 1983; T, 2010; E
A. palustre (Hedw.) Schwägr. – 1, 2: T, 2010; E
A. turgidum (Wahlenb.) Schwägr. – 1, 2: T, 2010; E
Barbula convoluta Hedw. – 1, 2: T, 2010; E
B. unguiculata Hedw. – 1, 2: T, 2010; E
Bartramia ithyphylla Brid. – 2: T, 2010; E
B. pomiformis Hedw. – 2: T, 2010; E
Brachythecium velutinum (Hedw.) Ignatov & Huttunen – 1, 2: T, 2010; E
B. buehneri (Hook.) A. Jaeger – 2: T, 2010; E
B. cirrosum (Schwägr.) Schimp. – 1, 2: T, 2010; E
B. mildeanum (Schimp.) Schimp. ex-Milde – 1, 2: T, 2010; E
B. salebrosum (Hoffm. ex F.Weber & D.Mohr) Schimp. – 1, 2: T, 2010; E
Brothera leana (Sull.) Müll. Hal. – 2: T, 2010; E
Bryobrittonia longipes (Mitt.) D.G. Horton – 1: T, E, 2007; 1, 2: T, 2010; E
Bryoerythrophyllum alpinum (Jur.) P.C. Chen – 2: E
B. recurvirostrum (Hedw.) P.C. Chen – 1, 2: T, 2010; E
Bryum algovicum Sendtn. ex Müll. Hal. – 1, 2: T, 2010; E
B. amblyodon Müll. Hal. – 2: T, 2010; E
B. arcticum (R. Br.) Bruch & Schimp. – 1, 2: T, 2010; E
B. argenteum Hedw. – 1, 2: T, 2010; E
B. caespiticium Hedw. – 2: T, 2010; E
B. capillare Hedw. – 1, 2: T, 2010; E
B. creberrimum Taylor – 2: T, 2010; E
B. cryophilum Mårtensson – 2: E
B. pallens Sw. – 2: E
B. pseudotriquetrum (Hedw.) G. Gaertn., B. Mey. & Scherb. – 1: AA, 1983; 2: T, 2010; E
B. schleicheri Schwägr. – 1, 2: T, 2010; E
B. uliginosum (Brid.) Bruch & Schimp. – 1, 2: E
Calliergon cordifolium (Hedw.) Kindb. – 2: E
C. giganteum (Schimp.) Kindb. – 1, 2: T, 2010; E
C. richardsonii (Mitt.) Kindb. ex G. Roth – 1: AA, 1983; 2: T, 2010; E
Calliergonella cuspidata (Hedw.) Loeske – 1: T, 2010; 2: AA, 1983; E
C. lindbergii (Mitt.) Hedenäs – 1, 2: T, 2010; E
Campylidium hispidulum (Brid.) Ochyra – 2: T, 2010; E
Campyllum bambergeri (Schimp.) Hedenäs, Schlesak & D. Quandt – 2: AT, 2013; E
C. chrysophyllum (Brid.) Lange – 1, 2: T, 2010; E
C. protensum (Brid.) Kindb. – 1, 2: T, 2010; E
C. stellatum (Hedw.) C.E.O. Jensen – 1: T, 2010; 2: AA, 1983; E
Campylophyllopsis sommerfeltii (Myrin) Ochyra – 1: T, 2010; 2: AA, 1983; E
Catoscopium nigrum (Hedw.) Brid. – 2: II, 2015; E
Ceratodon purpureus (Hedw.) Brid. – 1, 2: T, 2010; E
Cinclidium arcticum (Bruch & Schimp.) Schimp. – 1, 2: T, 2010; E
Cirriphyllum piliferum (Hedw.) Grout – 2: E
Climacium dendroides (Hedw.) F. Weber et D. Mohr – 1, 2: T, 2010; E
Conardia compacta (Müll. Hal.) H. Rob. – 1: T, 2010; E
Cratoneuron filicinum (Hedw.) Spruce – 1: AA, 1983; 2: T, 2010; E

- Cynodontium asperifolium* (Lindb. ex-Arnell) Paris – 2: E
C. strumiferum (Hedw.) Lindb. – 2: E
C. tenellum (Schimp.) Limpr. – 2: T, 2010; E
C. hymenophylloides (Huebener) T.J. Kop. – 1, 2: T, 2010; E
Dicranella heteromalla (Hedw.) Schimp. – 2: T, 2010; E
D. humilis R. Ruthe – 2: E
Dicranum acutifolium (Lindb. & Arnell) C.E.O. Jensen – 2: E
D. bonjeanii De Not. – 2: AA, 1983; T, 2010; E
D. brevifolium (Lindb.) Lindb. – 1, 2: T, 2010; E
D. elongatum Schleich. ex Schwägr. – 1: T, 2010; 2: AA, 1983; E
D. flagellare Hedw. – 2: T, 2010; E
D. flexicaule Brid. – 1, 2: T, 2010; E
D. fragilifolium Lindb. – 2: T, 2010; E
D. fuscescens Turner – 1, 2: T, 2010; E
D. majus Turner – 2: E
D. muehlenbeckii Bruch & Schimp. – 2: T, 2010; E
D. polysetum Sw. – 1, 2: T, 2010; E
D. scoparium Hedw. – 2: T, 2010; E
D. spadiceum J.E. Zetterst. – 2: AA, 1983; T, 2010; E
Didymodon acutus (Brid.) K. Saito – 2: E
D. asperifolius (Mitt.) H.A.Crum, Steere & L.E.Anderson – 1, 2: T, 2010; E
D. constrictus (Mitt.) K. Saito – 1, 2: T, 2010; E
D. cordatus Jur. – 1, 2: II, 2015; E
D. ferrugineus (Schimp. ex-Besch.) M.O. Hill – 1, 2: E
D. gaochienii B.C. Tan & Y. Jia – 1, 2: E
D. glaucus Ryan 2: II, 2015; E
D. hedyariformis Otnyukova – 2: T, 2010; E
D. icmadophilus (Schimp. ex Müll. Hal.) K. Saito – 1, 2: T, 2010; E
D. leskeoides K. Saito. – 2: T, 2010; E
D. perobtus Broth. – 2: T, 2010; E
D. rigidulus Hedw. – 1, 2: T, 2010; E
D. tophaceus (Brid.) Lisa – 2: E
Distichium capillaceum (Hedw.) Bruch & Schimp. – 1: AA, 1983; 2: T, 2010; E
D. inclinatum (Hedw.) Bruch & Schimp. – 1, 2: T, 2010; E
Ditrichum flexicaule (Schwägr.) Brockm. – 1: AA, 1983; 2: T, 2010; E
Drepanocladus aduncus (Hedw.) Warnst. – 1, 2: T, 2010; E
D. polygamus (Schimp.) Hedenäs – 1, 2: T, 2010; E
D. sendtneri (Schimp. ex H. Müll.) Warnst. – 1: AA, 1983; 2: T, 2010; E
D. turgescens (T. Jensen) Broth. – 1: T, 2010; E
Encalypta alpina Sm. – 1: AA, 1983; 2: T, 2010; E
E. ciliata Hedw. – 1, 2: E
E. procera Bruch – 1, 2: T, 2010; E
E. rhaptocarpa Schwägr. – 1, 2: T, 2010; E
E. vulgaris Hedw. – 1, 2: T, 2010; E
Entodon concinnus (De Not.) Paris – 1, 2: T, 2010; E
Eurhynchiastrum pulchellum (Hedw.) Ignatov & Huttunen – 1, 2: T, 2010; E
Fissidens taxifolius Hedw. – 2: BT, 2013; E
Fontinalis antipyretica Hedw. – 1, 2: T, 2010; E
F. hypnoides Hartm. – 1, 2: T, 2010; E
Funaria hygrometrica Hedw. – 1: T, 2010; 2: AA, 1983; E
Gollania turgens (Müll. Hal.) Ando – 2: T, 2010; E
Grimmia anodon Bruch & Schimp. – 2: T, 2010; E
G. elatior Bruch ex Bals.-Criv. & De Not. – 2: E
G. incurva Schwägr. – 1: AA, 1983; 2: T, 2010; E
G. longirostris Hook. – 1, 2: T, 2010; E
G. ovalis (Hedw.) Lindb. – 2: E
G. pilifera P. Beauv. – 2: E
G. reflexidens Müll. Hal. – 2: T, 2010; E
G. tergestina Tømm. ex-Bruch & Schimp. – 2: E
Gymnostomum aeruginosum Sm. – 1, 2: T, 2010; E
G. calcareum Nees & Hornsch. – 1, 2: T, 2010; E
Hamatocaulis vernicosus (Mitt.) Hedenäs – 2: T, 2010; E
Haplodontium macrocarpum (Drumm.) J.R. Spence – 2: T, 2010; E
Hedwigia ciliata (Hedw.) Boucher – 1, 2: T, 2010; E
Helodium paludosum (Austin) Austin ex Broth. – 2: T, 2010; E
Hilpertia velenovskyi (Schiffn.) R.H. Zander – 1, 2: T, 2010; E
Homomallum incurvatum (Schrad. ex-Brid.) Loeske – 2: T, 2010; E
Hygroamblystegium humile (P. Beauv.) Vanderp., Hedenäs & Goffinet – 1, 2: T, 2010; E
H. varium (Hedw.) Mönk. – 1, 2: T, 2010; E
Hygrohypnella polaris (Lindb.) Ignatov & Ignatova – 2: T, 2010; E
Hygrohypnum luridum (Hedw.) Jenn. – 1, 2: T, 2010; E
H. ochraceum (Turner ex Wilson) Loeske – 1, 2: T, 2010; E
Hylocomiadelphus triquetrus (Hedw.) Ochyra & Stebel – 2: AA, 1983; T, 2010; E
Hylocomium splendens (Hedw.) Schimp. – 1: T, 2010; 2: AA, 1983; E
Hymenoloma crispulum (Hedw.) Ochyra – 2: T, 2010; E
Hymenostylium recurvirostrum (Hedw.) Dixon – 1, 2: T, 2010; E
Hypnum cupressiforme Hedw. – 2: T, 2010; E
H. plicatum (Lindb.) A. Jaeger – 2: T, 2010; E
H. recurvatum (Lindb. & Arnell) Kindb. – 1: AA, 1983; 2: T, 2010; E
H. revolutum (Mitt.) Lindb. – 1: AA, 1983; 2: T, 2010; E
H. vaucheri Lesq. – 1: AA, 1983; 2: T, 2010; E
Indusiella thianschanica Broth. & Müll. Hal. – 1, 2: T, 2010; E
Isopterygiopsis pulchella (Hedw.) Z. Iwats. – 1, 2: T, 2010; E
Jaffueliobryum latifolium Thér. – 1: AA, 1983; 1, 2: T, 2010; E
Leptobryum pyriforme (Hedw.) Wilson – 1, 2: T, 2010; E
Leptopterigynandrum austroalpinum Müll. Hal. – 2: E
Lewinskya iwatsukii (Ignatov) F. Lara, Garilleti & Goffinet – 2: T, 2010; E
L. rupestris (Schleich. ex Schwägr.) F. Lara, Garilleti & Goffinet – 1, 2: T, 2010; E
L. speciosa (Nees) F. Lara, Garilleti & Goffinet – 1, 2: T, 2010; E
Loeskygnum badium (Hartm.) H.K.G. Paul – 2: E
Meesia triquetra (L. ex Jolycl.) Ångstr. – 2: T, 2010; E
M. uliginosa Hedw. – 1, 2: T, 2010; E
Mnium marginatum (Dicks.) P. Beauv. – 1, 2: E
M. spinosum (Voit) Schwägr. – 2: T, 2010; E
M. thomsonii Schimp. – 1: T, 2010; 2: AA, 1983; E
Molendoa sendtneriana (Bruch & Schimp.) Limpr. – 2: T, 2010; E
Myurella julacea (Schwägr.) Schimp. – 1: T, 2010; 2: AA, 1983; E
M. sibirica (Müll. Hal.) Reimers – 1, 2: T, 2010; E
M. tenerrima (Brid.) Lindb. – 2: T, 2010; E
Myuroclada maximowiczii (G.G. Borshch.) Steere & W.B. Schofield – 1, 2: T, 2010; E
Neckera oligocarpa Bruch – 2: T, 2010; E
Nyholmia obtusifolia (Brid.) Holmen & E. Warncke – 1, 2: T, 2010; E

- Oncophorus compactus* (Bruch. & Schimp.) Kindb. – 2: E
O. virens (Hedw.) Brid. – 1: T, 2010; 2: AA, 1983; E
O. wahlenbergii Brid. – 1, 2: T, 2010; E
Orthothecium chryseon (Schwägr.) Schimp. – 1, 2: T, 2010; E
O. strictum Lorentz – 1: T, 2010; E
O. anomalum Hedw. – 1, 2: T, 2010; E
Oxystegus tenuirostris (Hook. & Taylor) A.J.E. Sm. – 1, 2: T, 2010; E
Paludella squarrosa (Hedw.) Brid. – 2: T, 2010; E
Philonotis fontana (Hedw.) Brid. – 1, 2: T, 2010; E
Physcomitrium eurystomum Sendtn. – 2: E
Ph. pyriforme (Hedw.) Brid. – 1, 2: E
Plagiobryum demissum (Hook.) Lindb. – 2: T, 2010; E
Plagiomnium confertidens (Lindb. & Arnell) T.J. Kop. – 1, 2: T, 2010; E
P. cuspidatum (Hedw.) T.J. Kop. – 1, 2: T, 2010; E
P. ellipticum (Brid.) T.J. Kop. – 1, 2: T, 2010; E
P. medium (Bruch & Schimp.) T.J. Kop. – 2: T, 2010; E
Plagiopus oederianus (Sw.) H.A. Crum & L.E. Anderson – 2: II, 2015; E
Plagiothecium cavifolium (Brid.) Z. Iwats. – 2: E
P. denticulatum (Hedw.) Schimp. – 2: E
P. laetum Schimp. – 1, 2: T, 2010; E
Platydictya jungermannioides (Brid.) H.A. Crum – 2: T, 2010; E
Pleurozium schreberi (Wild. ex-Brid.) Mitt. – 2: T, 2010; E
Pogonatum urnigerum (Hedw.) P. Beauv – 2: E
Pohlia cruda (Hedw.) Lindb. – 1, 2: T, 2010; E
P. longicolla (Hedw.) Lindb. – 1, 2: T, 2010; E
P. nutans (Hedw.) Lindb. – 1, 2: T, 2010; E
P. saprophila (Müll. Hal.) Broth. – 1, 2: E
P. wahlenbergii (F. Weber & D. Mohr) A.L. Andrews – 2: T, 2010; E
Polytrichastrum alpinum (Hedw.) G.L. Sm. – 2: E
Polytrichum commune Hedw. – 2: T, 2010; E
P. formosum Hedw. – 2: E
P. jensenii I. Hagen – 2: E
P. juniperinum Hedw. – 1, 2: E
P. longisetum Sw. ex Brid. – 2: T, 2010; E
P. piliferum Hedw. – 2: T, 2010; E
P. strictum Menzies ex Brid. – 1, 2: T, 2010; E
P. swartzii Hartm. – 2: E
Pseudocrossidium revolutum (Brid.) R.H. Zander – 2: E
Pseudoleskeella nervosa (Brid.) Nyholm – 2: E
P. papillosa (Lindb.) Kindb. – 2: T, 2010; E
P. rupestris (Berggr.) Hedenäs & L. Söderstr. – 2: E
P. tectorum (Funck ex Brid.) Kindb. ex-Broth. – 1, 2: T, 2010; E
Pseudostereodon procerrimus (Molendo) M. Fleisch. – 2: T, 2010; E
Pterigynandrum filiforme Hedw. – 2: E
Pterygoneurum kozlovii Laz. – 1, 2: T, 2010; E
P. subsessile (Brid.) Jur. – 1, 2: T, 2010; E
Ptilium crista-castrensis (Hedw.) De Not. – 2: AA, 1983; T, 2010; E
Pylaisia polyantha (Hedw.) Schimp. – 1, 2: T, 2010; E
P. selwynii Kindb. – 2: T, 2010; E
Racomitrium canescens (Hedw.) Brid. – 2: T, 2010; E
R. lanuginosum (Hedw.) Brid. – 2: AA, 1983; T, 2010; E
R. panschii (Müll. Hall.) Kindb. – 2: T, 2010; E
Rhizomnium pseudopunctatum (Bruch & Schimp.) T.J. Kop. – 1: T, 2010; E
Rhodobryum roseum (Hedw.) Limpr. – 1, 2: E
Rhytidium rugosum (Hedw.) Kindb. – 1: AA, 1983; 2: T, 2010; E
Saelania glaucescens (Hedw.) Broth. – 2: II, 2015; E
Sanionia uncinata (Hedw.) Loeske – 1, 2: T, 2010; E
Sarmentypnum exannulatum (Schimp.) Hedenäs – 2: T, 2010; E
S. sarmentosum (Wahlenb.) Tuom. & T.J. Kop. – 2: AA, 1983; T, 2010; E
Schistidium crenatum H.H. Blom. – 2: T, 2010; E
Sch. helveticum (Schkuhr) Deguchi – 1, 2: T, 2010; E
Sch. liliputanum (Müll. Hal.) Deguchi – 2: T, 2010; E
Sch. papillosum Culm. – 1, 2: T, 2010; E
Sch. platyphyllum (Mitt.) Perss. – 2: E
Sch. pulchrum H.H. Blom. – 1, 2: T, 2010; E
Sciuro-hypnum oedipodium (Mitt.) Ignatov & Huttunen – 2: E
Scorpidium cossonii (Schimp.) Hedenäs – 1, 2: T, 2010; E
S. revolvens (Sw.) Rubers – 2: AA, 1983; T, 2010; E
S. scorpioides (Hedw.) Limpr. – 1: T, 2010; 2: AA, 1983; E
Sphagnum angustifolium (Russow) C.E.O. Jensen – 2: T, 2010; E
Sph. capillifolium (Ehrh.) Hedw. – 2: AA, 1983; T, 2010; E
Sph. fuscum (Schimp.) H. Klinggr. – 2: T, 2010; E
Sph. girgensohnii Russow – 2: T, 2010; E
Sph. orientale L.I. Savicz – 2: E
Sph. rubellum Wilson – 2: T, 2010; E
Sph. russowii Warnst. – 2: T, 2010; E
Sph. squarrosus Crome – 1, 2: T, 2010; E
Sph. teres (Schimp.) Lngstr. ex C. Hartm. – 2: T, 2010; E
Sph. warnstorffii Russow – 2: AA, 1983; T, 2010; E
Splachnum ampullaceum Hedw. – 2: T, 2010; E
S. rubrum Hedw. – 1, 2: T, 2010; E
S. sphaericum Hedw. – 2: E
Stereodon callichrous (Brid.) Brid. – 2: T, 2010; E
S. subimponens (Lesq.) Broth. – 1, 2: T, 2010; E
Straminergon stramineum (Dicks. ex-Brid.) Hedenäs – 2: E
Syntrichia pagorum (Milde) J.J. Amann – 1, 2: T, 2010; E
S. ruralis (Hedw.) F. Weber & D. Mohr – 1, 2: T, 2010; E
S. sinensis (Müll. Hal.) Ochya – 1, 2: T, 2010; E
S. submontana (Broth.) Ochya – 1, 2: T, 2010; E
Tayloria acuminata Hornsch. – 2: T, 2010; E
T. froelichiana (Hedw.) Mitt. ex-Broth. – 2: E
Tetraplodon angustatus (Hedw.) Bruch & Schimp. – 1, 2: T, 2010; E
T. mnioides (Hedw.) Bruch & Schimp. – 1, 2: T, 2010; E
T. urceolatus (Hedw.) Bruch & Schimp. – 2: T, 2010; E
Thuidium assimile (Mitt.) A. Jaeger. – 1: AA, 1983; 2: T, 2010; E
Timmia bavarica Hessel. – 1, 2: T, 2010; E
T. comata Lindb. & Arnell – 2: E
T. megapolitana Hedw. – 1: T, 2010; E
Timmia norvegica J.E. Zetterst. – 1, 2: T, 2010; E
Tomentypnum nitens (Hedw.) Loeske – 1: T, 2010; 2: AA, 1983; E
Tortella alpicola Dixon – 2: T, 2010; E
T. fragilis (Drumm.) Limpr. – 1: T, 2010; 2: AA, 1983; E
T. inclinatr (R. Hedw.) Limpr. – 1, 2: T, 2010; E
T. tortuosa (Schrad. ex Hedw.) Limpr. – 1: AA, 1983; 2: T, 2010; E
Tortula acaulon (With.) R.H. Zander – 1, 2: T, 2010; E
T. altipes (Broth.) R.H. Zander – 2: II, 2013; E
T. hoppeana (Schultz) Ochya – 2: II, 2015; T, 2010; E

T. laureri (Schultz) Lindb. – 2: E
T. mucronifolia Schwägr. – 1: AA, 1983; 2: E
T. obtusifolia (Schwägr.) Mathieu – 2: AA, 1983; T, 2010; E
Trichostomum arcticum Kaal. – 1. 2. T, 2010; E
T. crispulum Bruch – 1, 2: T, 2010; E
T. planifolium (Dixon) R.H. Zander – 1, 2: E
Ulota curvifolia (Wahlenb.) Sw. – 2: T, 2010; E
Weissia edentula Mitt. – 1: II, 2013; E
Zygodon sibiricus Ignatov, Ignatova, Z. Iwats. & B.C. Tan – 1, 2: T, 2010; E

LITERATURE CITED

- ABRAMOVA, A.L. & I.I. ABRAMOV. 1983. Conspectus of bryoflora of People Republic of Mongolia. 221 pp.
- AFONINA O.M., TS. TSEGMED & E. ENKHJARGAL. 2013. New moss records from Mongolia. – *Arctoa* **22**: 258.
- BAI, X.-L. & TS. TSEGMED. 2013. New moss records from Mongolia. – *Arctoa* **22**: 258.
- BELOZERTSEVA I.A. & V.A. KUZMIN. 2006. Soils of the Darhad Basin (Northern Mongolia). – *Geography and Natural Resources* **2**: 143–151.
- BROTHERUS, V.F. & I.I. SAVICH. 1932. List of mosses, collected by A. A. Elenkin in the 1902s in Sayan mountains and in Mongolia. – *Izvestiya botanicheskogo sada AN SSSR* **30(1-2)**: 81–96.
- DORJGOTOV, D. 2003. Soils of Mongolia. – *Ulaanbaatar, Admon*, 287 pp. (in Mongolian)
- FEDCHENKO, A.A. 1902. Materials for flora on the peak Mynk Cardik mountains and coasts Hubsugul Lake. – *Prilozhenie k protokolu zasedaniya Obshchestva Estestvoispytatelej pri Kazanskom Univivertete, Kazan*, **201**: 17–19.
- GILLESPIE, A.R., R.M. BURKE, G. KOMATSU. A. & BAYASGALAN. 2008. Late Pleistocene glaciers in Darhad basin, northern Mongolia. – *Quaternary Research* **69(2)**: 169–187.
- IGNATOVA, E.A., M.S. IGNATOV, O.M. AFONINA, TS. TSEGMED & YU.S. MAMONTOV. 2015. New bryophyte records from Mongolia. – *Arctoa* **24**: 258–260.
- IGNATOVA, E.A., M.S. IGNATOV & TS. TSEGMED. 2013. New moss records from Mongolia. – *Arctoa*, **22**: 258.
- KLINGE, M. & D. SAUER. 2019. Spatial pattern of Late Glacial and Holocene climatic and environmental development in Western Mongolia—a critical review and synthesis. – *Quaternary Science Reviews* **210**: 26–50.
- TSEGMED, TS. & E. ENKHJARGAL. 2007. New moss species in Khovsgol region. – *Botanikiin Khureelengiin Erdem Shinzhilgeenii Buteel* **17**: 6–10.
- TSEGMED, TS. 2010. Moss flora of Mongolia. – *Russian-Mongolian Complex Biological Expedition RAS and MAS, Moscow*. **56**: 634.
- TSEGMED, TS., E. ENKHJARGAL, M.S. IGNATOV & E.A. IGNATOVA. 2007. New moss records from Mongolia. – *Arctoa* **16**: 211–212.

Received 17 November 2025

Accepted 15 December 2025