

CONTRIBUTION TO THE STUDY OF MOSSES OF THE MOUNTAINS MATAD
AND SHILIIN BOGD (EAST MONGOL REGION)

ДОПОЛНЕНИЯ ФЛОРЕ МХОВ ГОР МАТАД И ШИЛИН БОГД
(ВОСТОЧНО-МОНГОЛЬСКИЙ РАЙОН)

TSOGIIN TSEGME¹ & ENKHTAIVAN ENKHJARGAL¹

ЦОГИЙН ЦЭГМЭД,¹ ЕНХТАЙВАН ЭНХЖАРГАЛ¹

Abstract

In August 2015, we studied mosses in East Mongolia Region and collected 154 moss samples from Mt. Matad (1240 m a.s.l.) and Mt. Shiliyn Bogd (1770 m a.s.l.). As a result, 62 species from 38 genera and 24 families were identified in these samples, including 42 species new for the East Mongolia Region, where 70 moss species are now known.

Резюме

При изучении мхов Восточной Монголии в 2015 году нами были собраны 154 образца мхов с горы Матад (1240 м над ур. м.) и горы Шилийн Богд (1770 м над ур. м.), которые находятся в западной и юго-западной части Восточно-Монгольского района. В результате обработки этих материалов нами были определены 62 вида мхов, относящиеся к 38 родам и 24 семействам. Из них 42 вида впервые отмечается в Восточно-Монгольском степном районе; в настоящее время список мхов этого района насчитывает 70 видов.

KEYWORDS: East Mongolia, Matad, Shiliyn Bogd, moss species, rock field, rock walls.

INTRODUCTION

In August 2015, we provided a study of mosses in Eastern Mongol region: on August 3rd – on the Mt. Matad (Dornod aimak, Matad sum) and on August 4–5th – on the Mt. Shiliyn Bogd (Sukhbaatar aimak, Dariganga sum).

According to the floristic geographical classification, both Mt. Matad and Mt. Shiliyn Bogd belong to the Eastern Mongolian steppe Region (Grubov, 1955; Ulziihutag 1989) and are located at its west and southwest edges.

Mt. Matad is located at 46°95'50"N, 115°29'24"E, its altitude reaches 1240 m a.s.l., it is surrounded by mountain steppe and steppe vegetation.

In Dariganga volcano plateau located in the southwest of Mongolia, many remains of small volcanoes occur, and the tallest one is the mountain Shiliyn Bogd. It is located at 45°28'14"N, 114°35'02"E and has altitude 1770 m a.s.l. There are small rock fields and rock walls 1.5–2 m high at its summit. Mosses grow on shady sides of rock outcrops and at rock bases. On the southwest side of the mountain shrub thickets occur; they host few species of mosses growing in abundance on soil under bushes.

In 1970–1975, N.S. Golubkova and U. Tsogt gathered a large moss collection in the course of lichen research in Mongolia. After that, I.I. Abramov and A.L. Abramova, bryologists from the Botanical Institute in Saint Petersburg, determined part of this collection and included these data into “The Conspectus of Mongolian mosses” (Abra-

mov & Abramova, 1983). In that conspectus, nine species were recorded from the East Mongolian Region.

Further study of the collection of Golubkova and Tsogt by Tsegmed, Ignatova and Ignatov resulted in some additions to the moss flora of Mongolia (Tsegmed, 2010); 28 species were recorded in the Eastern Mongolian Region. Among them, there was one species from the Mt. Matad and ten species from the Mt. Shiliyn Bogd.

Our collection of 2015 from the Mt. Matad and Mt. Shiliyn Bogd (over 154 samples) was also identified; 62 species from 38 genera and 24 families were revealed. Among them, 42 species are new for the East Mongolian Region. The number of species known in this region increased up to 70.

An annotated list of mosses from the Mt. Matad and Mt. Shiliyn Bogd is presented below. The collection is located in the Botany Department of Biological Institute of Academy of Science of Mongolia. Species newly recorded from the East Mongolian Region are marked by asterisk.

LIST OF SPECIES

HEPATICAЕ

**Cephaloziella microphylla* (Steph.) Douin – Mt. Matad, 1240 m alt., rocky summit, in crevices of rock, №14725.

**Frullania inflata* Gottsche – Mt. Matad, 1220 m alt., northern slope of the mountain, in rock crevices, №14725; 1240 m alt., rocky summit, on rock, №14760; Mt. Shiliyn Bogd, 1720

¹ – [Institute of Botany, Academy of Science of Mongolia, Ulaanbaatar 51, Mongolia; e-mail: tsog_tsegmid@yahoo.com]

m alt., eastern slope of the mountain, rock wall, on shady side of rock, on outcrops, №14840.

Mannia fragrans (Balb.) Frye & L. Clark – Mt. Matad, 1220 m alt., northern slope of the mountain, rock wall, on soil near rock, №14723, 14724a, 14744.

**Porella revoluta* (Lehm. & Lindenb.) Trevis. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on rock, №14844.

Reboulia hemisphaerica (L.) Raddi – Mt. Matad, 1240 m alt., rocky summit of the mountain, on rock outcrops, in crevices of rock, №14726, 14732; Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, rock fields; eastern slope of the mountain, rock wall, №14806, 14831, 14855.

MOSSES

**Amblystegium serpens* (Hedw.) Schimp. var. *juratzkanum* Schimp. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on rock surface and in crevices, №14841, 14844; western part of Shiliin Bogd, 1690 m alt., northern slope of the mountain, shrub thickets, on soil near rock, on shrub stems, №14861, 14862, 14864, 14869, 14871, 14888, 14892, 14893, 14896, 14897, 14899.

Anomodon minor (Hedw.) Lindb. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock walls, on soil near rock, №14821.

**Barbula convoluta* Hedw. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on soil at rock base, №14812, 14842.

**B. unguiculata* Hedw. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, in crevices, № 14844.

**Brachytheciastrum velutinum* (Hedw.) Ignatov & Huttunen – Mt. Matad, 1240 m alt., on the peak of mountain, in rock crevices, №14729, 14738; Mt. Shiliin Bogd, 1720 m alt., northern slope of mountain, rocky fields, on soil near rock, №14825, 14833, 14839, 14847; eastern slope of the mountain, rock wall, on rock, №14807; western part of Shiliin Bogd, 1690 m alt., northern slope of the mountain, shrub thickets, on soil near rock, №14857, 14863, 14866, 14868, 14880.

**Brachythecium buchananii* (Hook.) A. Jaeger – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock walls, on soil near rock, №14828.

**B. salebrosum* (F. Weber & D. Mohr) Schimp. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on soil near rock, №14830, 14856; western part of Shiliin Bogd, 1690 m alt., northern slope of the mountain, shrub thickets, on shrub stems, № 14870, 14879, 14892, 14898, 14895.

Bryoerythrophyllum recurvirostrum (Hedw.) P.C. Chen – Mt. Matad, 1240 m alt., at the summit of the mountain, in rock crevices, №14729; Mt. Shiliin Bogd, 1720 m alt., northern and eastern slope of the mountain, rock fields and rock walls, on soil near rock, in rock crevices, №14793, 14796, 14802, 14804, 14810; western part of mountain, 1690 m alt., shrub thickets, on rock, on bases of rock, in rock crevices, on soil near rock, №14815, 14817, 14823, 14825, 14832, 14853, 14854, 14864, 14867, 14872, 14878, 14882, 14889.

Bryum argenteum Hedw. – Mt. Matad, 1220 m alt., northern slope of the mountain, rock wall, on rock, № 14745, 14753, 14747; at the summit of the mountain, 1240 m alt., rock wall, on rock, in rock crevices, №14712, 14721, 14726, 14728; Mt. Shiliin Bogd, 1720 m alt., northern and eastern slopes of mountain, rocky fields, and rock wall, on soil near

rock, №14774, 14778, 14789, 14801, 14808, 14809, 14815, 14819, 14826; western part of Shiliin Bogd, 1690 m alt., northern slope of the mountain, shrub thickets, on soil near rock, in rock crevices, № 14881, 14885, 14889.

**B. caespiticium* Hedw. – Mt. Matad, 1240 m alt., on the peak of the mountain, in rock crevices, №14716, 14731; Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, rock fields, on soil near rock, №14777.

**B. capillare* Hedw. – Mt. Matad, 1220 m alt., northern slope of the mountain, on rock, №14757, 14762; on the peak of mountain, 1240 m alt., rock wall, in rock crevices, №14736; Mt. Shiliin Bogd, alt = 1720 m alt., northern slope of the mountain, rocky fields, in rock crevices, №14789.

**Bryum lonchocaulon* Müll. Hal. – Mt. Matad, 1220 m alt., northern slope of the mountain, on rock, № 14754.

**Bryum uliginosum* (Brid.) Bruch & Schimp. – western part of Shiliin Bogd mountain, 1690 m alt., northern slope of the mountain, shrub thickets, on soil and on rocks, №14874, 14882.

Ceratodon purpureus (Hedw.) Brid. – Mt. Matad, 1220 m alt., northern slope of the mountain, on rocks and in rock crevices, №14715, 14718, 14727, 14735, 14742; at the summit of the mountain, 1240 m alt., on rock outcrops, №14746, 14764, 14742; Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, rock fields, on soil near rock, №14776, 14778, 14779, 14794, 14800, 14809; western part of the mountain, 1690 m alt., shrub thickets, on rock, №14863, 14886.

**Cirriphyllum piliferum* (Hedw.) Grout – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock walls, on soil near rocks, in rock crevices, №14844, 14848.

**Didymodon constrictus* var. *flexicuspus* (P.C. Chen) K. Saito – Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, in rock crevices, №14810; eastern slope of the mountain, rock wall, on rock, №14814, 14816, 14820, 14820, 14837.

D. icmadophilus (Schimp. ex Müll. Hal.) K. Saito – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on soil near rock, №14826, 14835.

D. rigidulus Hedw. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on rock, № 14837.

**Distichium capillaceum* (Hedw.) Bruch & Schimp. – Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, rock fields, on rocks, №14806; eastern slope of the mountain, rock wall, on soil near rock on shady side, at base of rock, №14816, 14817, 14820, 14823, 14825, 14834, 14836, 14839, 14845, 14847, 14853, 14854.

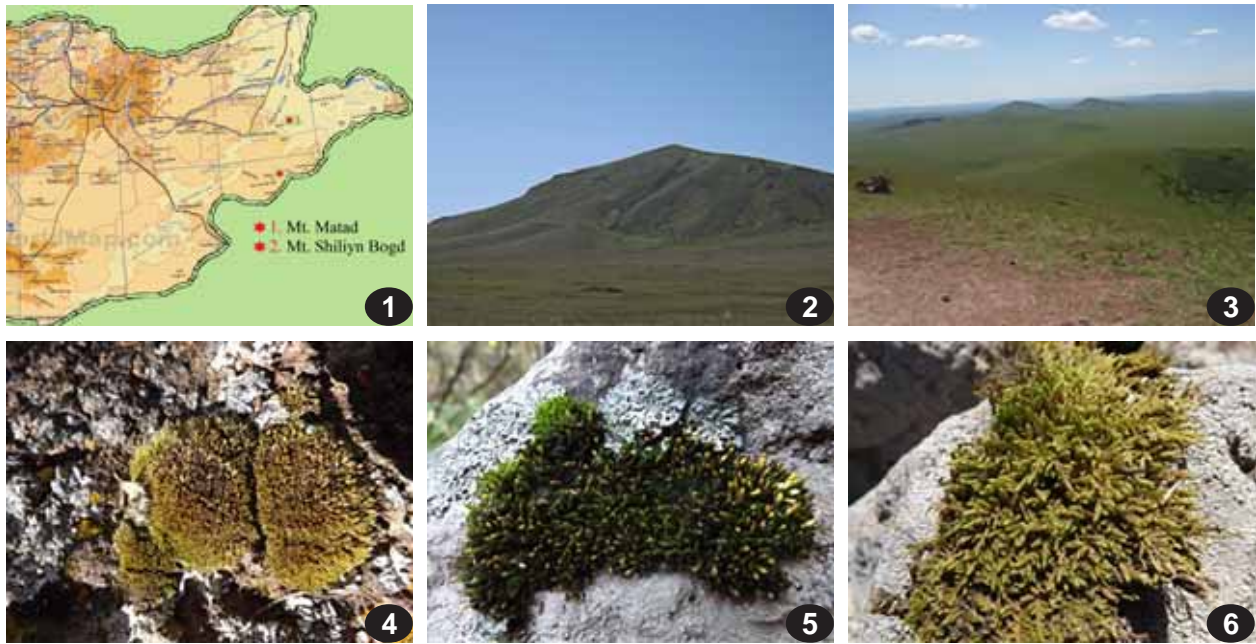
**Ecalypta alpina* Sm. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, in rock crevices, №14853.

**E. ciliata* Hedw. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on soil near rock, №14833, 14836, 14848.

**E. rhapsocarpa* Schwägr. – Mt. Matad, 1220 m alt., near summit, on soil near rock, №147246; mt. Shiliin Bogd, 1720 m alt., northern and eastern slopes of the mountain, rock field and rock wall, on soil near rock, in rock crevices, №14774, 14794, 14798, 14799, 14800, 14801, 14804, 14810, 14815, 14824, 14827, 14845, 14853.

**E. vulgaris* Hedw. – Mt. Matad, 1220–1240 m alt., at the summit of the mountain, on rock outcrops, in rock crevices, №14722, 14736, 14742.

**Entodon concinnus* (De Not.) Par. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on rock, №14826, 14839.



Figs. 1–6: Study areas (1) Mt. Shiliyn Bogd, NE side (2), volcano plateau of Dariganga and shrub grove in the western part of Mt. Shiliyn Bogd (3), and mosses common in the area: *Jaffuelobryum latifolium* (4), *Orthotrichum anomalum* (5) and *Hypnum vaucheri* (6).

Eurohypnum leptothallum (Müll. Hal.) Ando – Mt. Matad, 1220 m alt., northern slope of the mountain, on rock, №14750, 14761; at the summit of the mountain, 1240 m alt., on rock, №14711, 14734; Mt. Shiliyn Bogd, 1720 m alt., northern slope of the mountain, rock fields, on soil near rock, №14812, 14821, 14845, 14854, 14864, 14853; eastern slope of the mountain, rock wall, in shady side of rock, on rock, №14769.

**Fabronia ciliaris* (Brid.) Brid. – Mt. Matad, 1240 m alt., at the summit of the mountain, in rock crevices, №14726, 14727; Mt. Shiliyn Bogd, 1720 m alt., northern slope of the mountain, rock fields, on rock, №14787, 14792.

Fissidens bryoides Hedw. – Mt. Shiliyn Bogd, 1720 m alt., northern slope of the mountain, rock fields, on soil near rock in shady side of rock, №14812, 14823; eastern slope of the mountain, rock wall, on soil near rock, №14805.

**Funaria hygrometrica* Hedw. – Mt. Shiliyn Bogd, 1720 m alt., northern and eastern slopes of the mountain, rock field and rock walls, on soil at the bottom of rock, №14776, 14779, 14842.

**Grimmia alpestris* (F. Weber & D. Mohr) Schleich. – Mt. Matad, 1240 m alt., at the summit of the mountain, in rock crevices, №14733.

**G. anodon* Bruch & Schimp. – Mt. Shiliyn Bogd, 1720 m alt., eastern slope of the mountain, rock wall, shadowy side of rock, on soil, №14751.

G. elatior Bruch ex Bals.-Criv. & De Not. – Mt. Shiliyn Bogd, 1720 m alt., northern slope of the mountain, rock fields, on rock, №14781, 14785.

Grimmia longirostris Hook. – Mt. Matad, 1220 m alt., northern slope of the mountain, rock wall, on rock, №14747, 14758, 14759, 14766a; the summit of the mountain, 1240 m alt., on rock, in rock crevices, on base of rock, №14713, 14719, 14730, 14737; Mt. Shiliyn Bogd, 1720 m alt., northern slope of the mountain, rocky fields, in rock crevices, №14780, 14783, 14787; eastern slope of the mountain, rock walls, shady side of rock, №14850, 14853, 14855.

**G. reflexidens* Müll. Hal. – Mt. Matad, 1220 m alt., northern slope of the mountain, on rock outcrops, №14745; at the summit of the mountain, 1240 m alt., on rock, №14724.

Hedwigia ciliata (Hedw.) P. Beauv. – Mt. Matad, 1220 m alt., northern slope of the mountain, on rock, №14750; at the summit of the mountain, 1240 m alt., on rock, №14717; Mt. Shiliyn Bogd, 1720 m alt., northern slope of the mountain, rock fields, on rock, №14782, 14791, 14792.

Hypnum vaucheri Lesq. – Mt. Shiliyn Bogd, 1720 m alt., northern slope of the mountain, rock fields, on soil near rock, №14813, 14818, 14822, 14827, 14832, 14854, 14853; eastern slope of the mountain, rock wall, in shadow side of rock, on rock, №14771, 14774, 14784, 14790, 14794; western part of Shiliyn Bogd mountain, 1690 m alt., northern slope of the mountain, shrub thickets, on stem shrubs, №14886, 14893.

Jaffuelobryum latifolium Thér. – Mt. Shiliyn Bogd, 1720 m alt., northern and eastern slopes of mountain, rock fields and rock walls, on rock outcrops, №14768, 14810, 14814, 14846, 14849, 14851.

**Leptobryum pyriforme* (Hedw.) Wilson – western part of Shiliyn Bogd mountain, 1690 m alt., northern slope of the mountain, shrub thickets, on soil near rock, №14878, 17881.

**Leptodontium flexifolium* (Dicks.) Hampe – Mt. Matad, 1240 m alt., at the summit, in rock crevices, №14736.

**Mnium spinosum* (Voit) Schwägr. – Mt. Shiliyn Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on soil near rock, in rock crevices, №14831, 14841, 14845, 14847.

**Myuroclada maximowiczii* (G.G. Borshch.) Steere & W.B. Schofield – Mt. Matad, 1240 m alt., at the summit of the mountain, on rock, №14728; western part of Shiliyn Bogd mountain, 1690 m alt., northern slope of the mountain, shrub thickets, on rock, №14866, 14868, 14870, 14872, 14874.

Orthotrichum anomalum Hedw. – Mt. Matad, 1220 m alt., northern slope of the mountain, rock wall, on rock, №14750, 14754; at the summit of the mountain, 1240 m alt., on rock, in rock crevices, on bases of rock, №14714, 14716, 14740;

- Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, rocky fields, on shady side of rock, on rock outcrops, №14819, 14824, 14840; eastern slope of the mountain, rock walls, shady side of rock, on rock, №14775, 14790, 14791; western part of Shiliin Bogd mountain, 1690 m alt., northern slope of the mountain, shrub thickets, on stem of shrubs, №14860, 14883, 14885, 13887, 13889.
- **Plagiomnium acutum* (Lindb.) T.J. Kop. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock walls, on soil on base rock, on rock, №14838.
- **P. cuspidatum* (Hedw.) T.J. Kop. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on soil near rock, №14834, 14836, 14839, 14853.
- Pseudocrossidium revolutum* (Brid.) R.H. Zander – Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, rock fields, on soil at base of rock, № 14770.
- **Pseudoleskeella catenulata* (Brid. ex Schrad.) Kindb. – Mt. Shiliin Bogd, 1720 m, northern slope of the mountain, rock fields, on soil near rock, №14797.
- **P. nervosa* (Brid.) Nyholm – Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, rock fields, on soil near rock, №14771.
- **P. rupestris* (Berggr.) Hedenäs & L. Söderstr. – Mt. Shiliin Bogd, 1720 m, eastern slope of the mountain, rock walls, on rock, №14829.
- P. tectorum* (Funck ex Brid.) Kindb. ex Broth. – Western part of Shiliin Bogd mountain, 1690 m alt., northern slope of the mountain, shrub thickets, on rock, № 14890.
- Pylaisia polyantha* (Hedw.) Schimp. – Mt. Matad, 1220 m alt., northern slope of the mountain, on rock outcrops, №14752, 14765; at the summit of the mountain, 1240 m alt., on rock, №14741; western part Mt. Shiliin Bogd, 1690 m alt., northern slope of the mountain, shrub thickets, on rock, on stems of shrubs, № 14886.
- Rhytidium rugosum* (Hedw.) Kindb. – Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, rock fields, on rock, №14786.
- **Schistidium pulchrum* H.H.Blom – Mt. Matad, 1220 m alt., northern slope of the mountain, rock wall, on rock, №14750, 14752, 14760, 14762; at the summit of the mountain, 1240 m alt., on rock, № 14720; Mt. Shiliin Bogd, 1720 m, northern slope of the mountain, rock fields, on rock, №14773, 14783, 14792; eastern slope of the mountain, rock walls, shady side of rock, on rock, №14840, 14842.
- **Syntrichia caninervis* Mitt. – Mt. Shiliin Bogd, 1690 m alt., western part of mountain, shrub thickets, in rock crevices, №14850.
- S. pagorum* (Milde) J.J. Amann – Mt. Matad, 1220-1240 m alt., at the summit of the mountain, on rock outcrops, in rock crevices, on soil near rock, on bases rock, №14724, 14729, 14737, 14747, 14748, 14755, 14763; Mt. Shiliin Bogd, 1720 m alt., northern and eastern slopes of mountain, rock fields, rock wall, on rock, №14775, 14813, 14851, 14884.
- **S. sinensis* (Müll. Hal.) Ochyra – Mt. Matad, 1220 m alt., northern slope of the mountain, in rock crevices, №14743; Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock walls, shady side of rock, on soil, №14822.
- **Syntrichia submontana* (Broth.) Ochyra – Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, rock fields, on rock, №14788.
- **Tortula atrovirens* (Sm.) Lindb. – Mt. Shiliin Bogd, 1720 m alt., northern slope of the mountain, rock field, on soil near rock, №14814, 14837; eastern slope of the mountain, rock wall, in rock crevices, № 14805, 14808.
- Tortula mucronifolia* Schwägr. – Mt. Shiliin Bogd, 1720 m alt., eastern slope of the mountain, rock wall, on rock, №14803, 14806; northern slope of the mountain, rock fields, on soil near rock, in rocky crevices, on shady side rock, on bases of rocks, №14822, 14834, 14854, 14853.

DISCUSSION

The most common species in the study are include *Ceratodon purpureus*, *Distichium capillaceum*, *Encalypsa rhabdocarpa*, *Bryoerythrophyllum recurvirostrum*, *Syntrichia pagorum*, *Schistidium pulchrum*, *Grimmia longirostris*, *Bryum argenteum*, *Orthotrichum anomalum*, *Eurohypnum leptothallum*, and *Hypnum vaucheri*. *Jaf-fueliobryum latifolium* was found to be very very common on the Mt. Shiliin Bogd, and its absence in the Mt. Matad is strange, although it could be simply overlooked there. Some East Asian species, i.e., *Eurohypnum leptothallum*, *Myuroclada maximowiczii* and *Anomodon minor* we found to be rather frequent in the East Mongolian region (Tsegmed & Korobkov, 2013).

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LITERATURE CITED

- [ABRAMOV, I.I. & A.L. ABRAMOVA] АБРАМОВ И.И., А.Л. АБРАМОВА. 1983. Конспект флоры мхов Монгольской Народной Республики. – [Конспект флоры мхов Монгольской Народной Республики] *Л., Наука* [Leningrad, Nauka], 222 pp.
- [ULZIYKHUTAG, N.] УЛЗИЙХУТАГ Н. 1989. Монгол орны ургамлын аймгийн тойм. – [The survey of the flora of Mongolia] *Ulaanbaatar*, 207 pp.
- [TSEGMEDE, TS.] ЦЭГМЭДЦ. 2010. Флора мхов Монголии. – [Moss flora of Mongolia] *Москва, Российская академия наук и Академия наук Монголии* [Moscow, Russian Academy of Sciences and Mongolian Academy of Sciences], 634 pp.
- [TSEGMEDE, TS. & A.A. KOROBKOV] ЦЭГМЭДЦ., А.А. КОРОБКОВ. 2013. Изучение мхов восточной части Монголии. – [The study mosses of the eastern part of Mongolia] *Шины Академийн Бот. хур. Бутээл* [SHINY Akademiiin Bot. khyr Butaee] **25**: 13–18.
- [GRUBOV, V.I.] ГРУБОВ В.И. 1955. Конспект флоры Монгольской народной республики. – [Конспект флоры Монгольской Народной Республики] *М.–Л., Труды Монгольской Комиссии АН СССР* [Moscow and Leningrad. Trudy Mongol'skoi Komissii Akademii Nauk SSSR], 220 pp.