

Checklist of mosses of the Pasvik State Nature Reserve (Murmansk Region, Russia)

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Abstract: The list of mosses of the Pasvik State Nature Reserve (Pasvik Reserve) consists of 197 species. Here we summarize all available data on the diversity of mosses of the Pasvik Reserve, including approximately 800 specimens collected by the authors. *Stereodon pallescens* and *Tayloria serrata* are in the Murmansk Region only known from the Pasvik Reserve. Seven species are red-listed in the Murmansk Region (*Bryum cyclophyllum*, *Buxbaumia aphylla*, *Encalypta streptocarpa*, *Psilopilum laevigatum*, *Tayloria serrata*, *Tayloria splachnoides* and *Tetradontium repandum*). *Tetradontium repandum* is included in the Red Data Book of the Russian Federation and *Tayloria splachnoides* is red-listed in Europe. The Pasvik Reserve gives a good possibility for the protection of rare mosses.

Keywords: mosses, Pasvik State Nature Reserve, Murmansk Region, rare species

INTRODUCTION

Pasvik State Nature Reserve (Pasvik Reserve) was established in 1992 to protect and facilitate studies of Europe's northernmost pine forests, extensive wetlands as well as flora and fauna. It has been a part of Pasvik-Inari Trilateral Park since 2008. The Park comprises protected areas near the Russian-Norwegian-Finnish border.

The first moss samples from the area were collected by the Finnish botanists R. Kalliola and N. Söyrinki on Kalkupya Mt in 1933 (in 1920–1944 part of the Pechenga District belonged as Petsamo to Finland). In the Herbarium of the University of Helsinki (H) the authors found 21 samples of 11 species. After the founding of the Reserve mosses were collected by V. A. Kostina (26 samples in 1994), A. V. Polikarpova (75 samples in 2003) and N. R. Kaneva (5 samples in 2003). The collections were identified and data on 83 species were published by Likhachev and Belkina (2011). Some information about the mosses from the Pasvik Reserve is also available in other publications, i.e. 17 species from Alm & Piirainen (1997); 25 – from Neshataev et al. (2011); 1 – from Maksimov & Kravchenko (2011); 69 – from Boychuk & Kuznetsov (2012); 17 – from Boychuk (2013); 2 – from Kravchenko et al. (2017); 7 – from Boychuk & Borovichev (2017). A total of 125 species are known from herbaria and the literature; this number is too small compared with that known from other Strict Nature

Reserves of the Murmansk Region. The goal of the present paper was to survey mosses from Pasvik Reserve and to make up a list of species based on all available data.

Study area

Pasvik Reserve (69°07'–69°25'N, 29°17'–29°57'E) is located in the Pechenga District, Murmansk Region, northwesternmost Russia. The Reserve covers an area of 146.8 km² (land makes up 117 km²) and is shaped as a 350 m to 10 km wide strip for 44 km along the right bank of the Paz River along the Russian-Norwegian border (Fig. 1).

Geologically, Pasvik Reserve is near the northern boundary of the Fennoscandian (Baltic) Shield. It consists of old (Archean and Proterozoic) rocks such as gabbro, amphibolites and bimica, amphibole-biotite and chlorite schists etc. in the northern part; diorites, granodiorites, plagiogranites, pyroxenites etc. in the middle part; and granites, gneisses, migmatites etc. in the southern part (Atlas of the Murmansk region, 1971; Pozhilenko et al., 2002). The crystalline basement is almost entirely covered by Quaternary deposits, mainly moraine, but is occasionally exposed on the day surface.

The Pasvik Reserve displays a denudation-tectonic relief. The destruction of rock systems,

which continued for hundreds of millions of years, triggered the formation of a plain, which was broken into small uplifted and lowered blocks by tectonic faults. The relief, shaped by the Scandinavian glacier and sea transgressions, shows an alternation of flat marine and hilly morainic plains (50 m a.s.l.) with numerous morainic hills and ridges (no more than 200 m a.s.l.) and depressions between them (Atlas of the Murmansk region, 1971). Kalkupya Mt is the highest mountain in the Reserve (357 m a.s.l.).

In accordance with the climatic zonation (Alisov, 1969), the Pasvik Reserve is in the Atlantic-Arctic domain of two belts: temperate and subarctic. The climate is considerably affected by the Nordkapp branch of the warm North Atlantic current. Warm Atlantic and cold Arctic air masses are responsible for substantial temperature variations all year round. Minimum temperatures drop to $-43\text{ }^{\circ}\text{C}$ in winter and maximum temperatures rise to $+33\text{ }^{\circ}\text{C}$ in summer. The mean annual air temperature is about $0\text{ }^{\circ}\text{C}$. Precipitation in the warm season makes up 70% of its mean annual amount (525 mm). The average duration of the frost-free period is 97 days.

The main waterway of Pasvik Reserve is the Paz River, which is a lake-river system. The river widens at many places (lakes Heyuhenyarvi, Bossoyavre, etc.), where it is connected by channels. In 1950–1978, five Russian (outside the Reserve) and two Norwegian (Skugfoss and Melkefoss dams in the Reserve) hydropower stations were established along Paz River. The Menikkajoki River, formerly a branch of the Paz River, which was regulated by dam construction (Glukhaya Plotina), flows in the northern part of the Reserve. The dam was built for the formation of the Skugfoss hydropower station reservoir. In addition to the above mentioned rivers, there are 25 lakes in the Reserve. The biggest lake is Kaskamayarvi.

The Reserve's soil cover is highly varied due to the topography and the types of Quaternary rocks. Thin illuvial-ferruginous and illuvial-humus podzols are the dominant soil subtypes (Polikarpova, 2005). They evolve on the tops and slopes of hills and ridges. Boggy-podzol and peaty-bog soils are formed in topographic hollows. Marine sediments (clay and loam), overlain by sod soils are exposed along the Paz River banks (Polikarpova et al., 2012). Primitive soils are encountered in the mountain-tundra belt of Kalkupya Mt.

In accordance with geobotanical zonation (Geobotanical zoning of the Non-Black Earth Region of the European part of the RSFSR, 2000; Elina et al., 2000), the Reserve lies in the north-taiga subzone (far northern taiga strip) and is part of the Lotto-Tuloma District of the Kola-Karelian taiga subprovince of the North European province of the Eurasian taiga domain. This territory belongs to the biogeographic province Lapponia petsamoënsis (Cajander, 1906; Uotila, 2013) Imandra floristic District – Lotto-Tulomskaya Depression (Ramenskaya, 1983).

Pine forests make up 90% and birch forests – 10% of the Reserve's wooded area. The hill slopes display two altitude belts: forests (up to 200 m a.s.l.) are gradually succeeded by crooked birch forest (200–300), which, in turn, is succeeded by montane tundra. Various (oligotrophic, mesotrophic, eutrophic, aapa) mires make up 25% of the Pasvik Reserve. Oligotrophic mires predominate; Menikka Mire, located in the northern part of the Reserve, is the largest. Anthropogenic habitats (meadows, roadsides, etc.) occur as well.

MATERIALS AND METHODS

Materials were collected by the authors in 2011–2017 in different areas of the Pasvik Reserve (Fig. 1: 1–19), moreover, some other collections were identified. The present report is based on 800 specimens (M. A. Boychuk – 700, E. A. Borovichev – 100). Furthermore, we identified or examined a number of specimens gathered earlier by O. L. Kuznetsov (ca. 100 specimens), S. A. Kutenkov (20), G. P. Urbanavichus (5) and A. V. Kravchenko (92). Specimens are deposited in the Herbarium of the Karelian Research Centre of RAS (PTZ), Herbarium of the Polar-Alpine Botanical Garden-Institute (KPABG), Herbarium of the Institute of North Industrial Ecology Problems of the Kola Science Center of RAS (INEP), Herbarium of the University of Helsinki (H) and Herbarium of the Pasvik Reserve.

RESULTS

List of species

The taxa are arranged in alphabetical order. The nomenclature follow Ignatov et al. (2006) with some updates (Ignatov & Milyutina, 2007; Ignatov et al., 2017). Common synonyms are

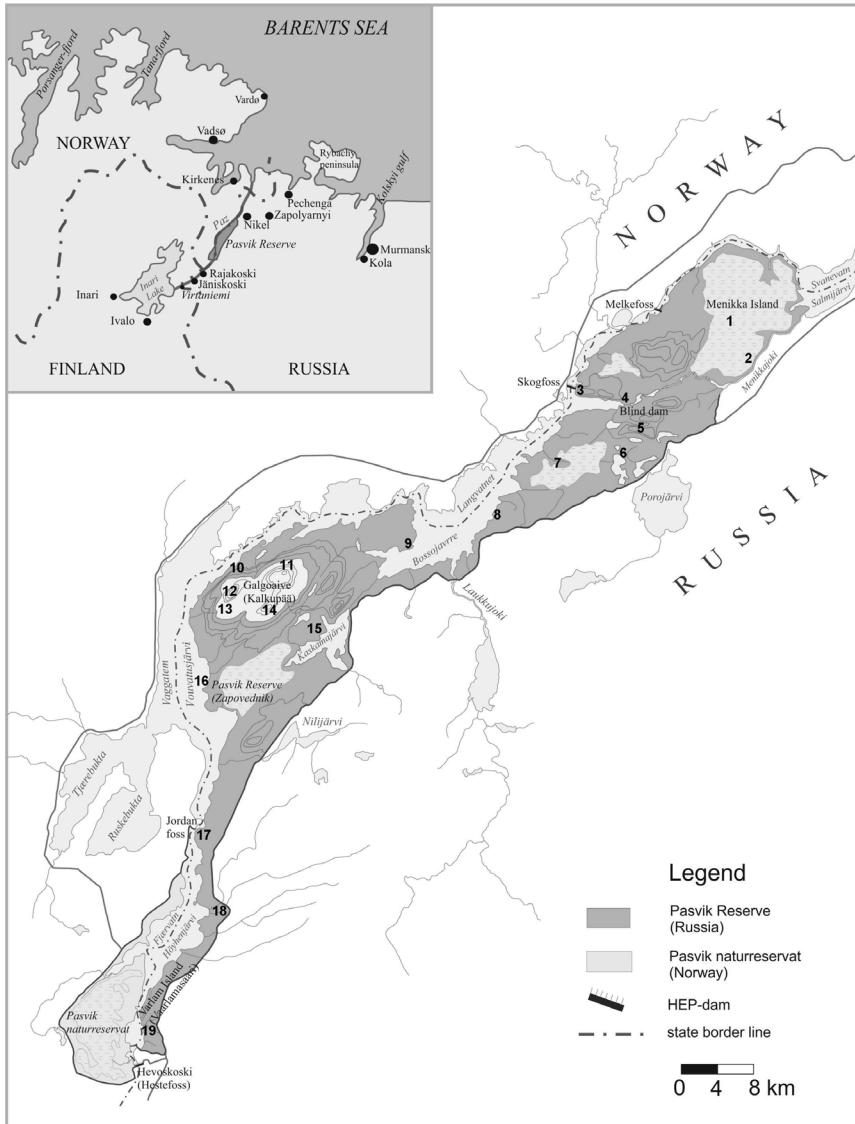


Fig. 1. The location of the Pasvik State Nature Reserve, Murmansk Region, Russia and collecting localities. I. N part of the Pasvik Reserve: 1 – Menikka Mire, $69^{\circ}23'48''\text{N } 29^{\circ}52'11''\text{E}$; 2 – Menikkajoki River bank, $69^{\circ}21'51''\text{N } 29^{\circ}45'31''\text{E}$; 3 – Skugfoss hydropower station, $69^{\circ}22'16''\text{N } 29^{\circ}42'32''\text{E}$; 4 – vicinity of Glukhaya Plotina, Menikkajoki River source, $69^{\circ}22'09''\text{N } 29^{\circ}45'11''\text{E}$; 5 – hills in the vicinity of Glukhaya Plotina, $69^{\circ}21'27''\text{N } 29^{\circ}45'21''\text{E}$; 6 – N shore of the Lake, $69^{\circ}20'50''\text{N } 29^{\circ}44'46''\text{E}$; 7 – vicinity of Latvala, $69^{\circ}20'28''\text{N } 29^{\circ}40'40''\text{E}$; II – Middle part of the Pasvik Reserve: 8 – Tahkoniemi Cape, $69^{\circ}19'29''\text{N } 29^{\circ}36'33''\text{E}$; 9 – SW shore of Bossoyavre Lake, $69^{\circ}18'37''\text{N } 29^{\circ}27'321''\text{E}$; 10 – Paz River bank, opposite Brenholmen Island and Nivasaari Island, $69^{\circ}18'47''\text{N } 29^{\circ}22'45''\text{E}$; 11 – N part of the Kalkupya Mt., $69^{\circ}18'10''\text{N } 29^{\circ}21'26''\text{E}$; 12 – NW part of the Kalkupya Mt., $69^{\circ}17'26''\text{N } 29^{\circ}19'28''\text{E}$; 13 – W of the Kalkupya Mt., $69^{\circ}17'58''\text{N } 29^{\circ}19'36''\text{E}$; 14 – E part of the Kalkupya Mt., $69^{\circ}17'15''\text{N } 29^{\circ}22'21''\text{E}$; 15 – NW shore of Kaskamayarvi Lake, $69^{\circ}16'35''\text{N } 29^{\circ}24'54''\text{E}$; 16 – Paz River bank, opposite Chevessulo Island, $69^{\circ}15'04''\text{N } 29^{\circ}18'36''\text{E}$; III. S part of the Pasvik Reserve: 17 – Paz River bank, opposite Jordanfoss, $69^{\circ}12'40''\text{N } 29^{\circ}18'29''\text{E}$; 18 – E shore Heyuhenyarvi Lake, $69^{\circ}10'14''\text{N } 29^{\circ}18'16''\text{E}$; 19 – Varlama Island, $69^{\circ}08'26''\text{N } 29^{\circ}14'46''\text{E}$.

given in square brackets, literature and herbarium sources – in parenthesis. In terms of frequency the mosses in the Pasvik Reserve are arranged as follows: frequent (species collected more than 20 times), not rare (10–20), sporadic (3–9), rare (1–2). The names of different areas where a species was collected are marked as follows: I – Northern part of the Pasvik Reserve (1–7); II – Middle part of the Pasvik Reserve (8–16); III – Southern part of the Pasvik Reserve (17–19). After the number of the area, the locality number (cf. Fig. 1) is given. Species included in the Red Data Book of Murmansk Region (2014) are marked as MR, in the Red Data Book of the Russian Federation (2008) – RF, in the Red Data Book of European Bryophytes (1995) – EB, in the Norwegian Red List for Species (Kålås et al., 2010) – NS and in the Red List of Finnish Species (Rassi et al., 2010) – FS. New species for the Pasvik Reserve are marked by asterisk.

- AMBLYSTEGIUM SERPENS (Hedw.) Bruch et al. (Likhachev & Belkina, 2011) – Sporadic. I: 4; III: 18, 19.
- *AMPHIDIUM LAPONICUM (Hedw.) Schimp. – Rare. I: 3.
- AMPHIDIUM MOUGEOTII (Bruch et al.) Schimp. (Likhachev & Belkina, 2011; Boychuk, 2013) – Sporadic. I: 3, 5; II: 10, 14, 15.
- ANDREAEA RUPESTRIS Hedw. (Likhachev & Belkina, 2011; Boychuk, 2013) – Frequent. I: 3, 4; II: 8, 10, 11, 13, 14, 15.
- *ARCTOA FULVELLA (Dicks.) Bruch et al. – Rare. II: 11.
- AULACOMNIUM PALUSTRE (Hedw.) Schwägr. (Alm & Piirainen, 1997; Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 4, 5, 6, 7; II: 10, 14, 15; III: 18, 19.
- BARTRAMIA ITHYPHYLLA Brid. (Likhachev & Belkina, 2011) – Sporadic. I: 3, 5; II: 15.
- *BARTRAMIA POMIFORMIS Hedw. – Sporadic. II: 10, 14.
- *BLINDIA ACUTA (Hedw.) Bruch et al. – Not rare. I: 3, 4; II: 10, 14.
- *BRACHYTHECIUM MILDEANUM (Schimp.) Schimp. – Sporadic. I: 7; II: 15.
- BRACHYTHECIUM RIVULARE Bruch et al. (Boychuk & Kuznetsov, 2012) – Rare. III: 19.
- BRACHYTHECIUM SALEBROSUM (F. Weber et D. Mohr) Bruch et al. (Alm & Piirainen, 1997; Likhachev & Belkina, 2011) – Sporadic. II: 8; III: 18, 19.
- *BREIDLERIA PRATENSIS (W.D.J. Koch ex Spruce) Loeske [= *Hypnum pratense* W.D.J. Koch ex Spruce] – Sporadic. I: 4, 7; III: 19.
- BRYUM ARCHANGELICUM Bruch et al. (Likhachev & Belkina, 2011) – Rare. II: 15.
- *BRYUM CREBERRIMUM Taylor – Rare. I: 4.
- BRYUM CYCLOPHYLLUM (Schwägr.) Bruch et al. (Likhachev & Belkina, 2011; Boychuk & Borovichev, 2017) – Rare. II: 8; III: 18. MR: 3.
- BRYUM PSEUDOTRIQUETRUM (Hedw.) P.Gaertn., B.Mey. et Scherb. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 4, 5, 6, 7; II: 14, 15; III: 19.
- BRYUM WEIGELII Spreng. (Boychuk & Kuznetsov, 2012) – Sporadic. I: 4, 7; III: 19.
- BUCKLANDIELLA MICROCARPA (Hedw.) Bedn.-Ochyra et Ochyra [= *Racomitrium microcarpum* (Hedw.) Brid.] (Herbarium H; Boychuk, 2013) – Not rare. I: 4; II: 10, 11, 13, 14, 15.
- BUCKLANDIELLA SUDETICA (Funck.) Bedn.-Ochyra et Ochyra [= *Racomitrium sudeticum* (Funck.) Bruch et al.] (Boychuk, 2013) – Rare. II: 14.
- BUXBAUMIA APHYLLA Hedw. (Kravchenko et al., 2017) – Sporadic. II: 14, 16; III: 17. MR: 3.
- CALLIERGON CORDIFOLIUM (Hedw.) Kindb. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 2, 4, 7; II: 10; III: 18, 19.
- CALLIERGON GIGANTEUM (Schimp.) Kindb. (Boychuk & Kuznetsov, 2012) – Not rare. I: 4, 5; III: 19.
- CALLIERGON RICHARDSONII (Mitt.) Kindb. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 4, 6, 7; III: 19.
- CALLIERGONELLA LINDBERGII (Mitt.) Hedenäs [= *Hypnum lindbergii* Mitt.] (Alm & Piirainen, 1997) – Not rare. I: 2; III: 18, 19.
- CAMPYLIUM PROTENSUM (Brid.) Kindb. [= *Campylium stellatum* var. *protensum* (Brid.) Bryhn] (Likhachev & Belkina, 2011) – Rare. I: 4.
- CAMPYLIUM STELLATUM (Hedw.) C.E.O.Jensen (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 4, 5, 6, 7; II: 14; III: 19.
- CATOSCOPIUM NIGRITUM (Hedw.) Brid. (Boychuk & Kuznetsov, 2012) – Sporadic. I: 4, 6, 7.
- CERATODON PURPUREUS (Hedw.) Brid. (Likhachev & Belkina, 2011) – Not rare. I: 3; II: 10, 15; III: 18.
- CINCLIDIUM STYGIUM Sw. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 1, 4, 5, 6, 7; II: 14.
- *CIRRIPHYLLUM PILIFERUM (Hedw.) Grout – Rare. I: 1.

- CLIMACIUM DENDROIDES (Hedw.) F. Weber et D. Mohr (Alm & Piirainen, 1997; Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 3, 7; II: 15; III: 18, 19.
- CNESTRUM SCHISTI (F. Weber et D. Mohr) I. Hagen (Likhachev & Belkina, 2011) – Rare. II: 15.
- CONOSTOMUM TETRAGONUM (Hedw.) Lindb. (Herbarium H; Likhachev & Belkina, 2011; Boychuk, 2013) – Not rare. II: 10, 11, 14.
- CRATONEURON FILICINUM (Hedw.) Spruce (Alm & Piirainen, 1997) – Rare. I: 5; III: 19.
- *CYNODONTIUM STRUMIFERUM (Hedw.) Lindb. – Rare. I: 5.
- CYRTOMNIUM HYMENOPHYLLOIDES (Huebener) T.J. Kop. (Alm & Piirainen, 1997) – Sporadic. I: 5; II: 15; III: 19. FS: NT.
- *DICHODONTIUM PALUSTRE (Dicks.) M. Stech [= *Dicranella palustris* (Dicks.) Crundw.] – Rare. II: 12.
- *DICHODONTIUM PELLUCIDUM (Hedw.) Schimp. – Sporadic. I: 4; III: 18.
- *DICRANELLA CERVICULATA (Hedw.) Schimp. – Rare. I: 3.
- *DICRANELLA SUBULATA (Hedw.) Schimp. – Rare. II: 9.
- DICRANUM ACUTIFOLIUM (Lindb. et Arnell) C.E.O. Jensen (Likhachev & Belkina, 2011) – Rare. II: 10. FS: NT.
- *DICRANUM ANGUSTUM Lindb. – Not rare. I: 4, 7; II: 14, 15. NS: VU.
- DICRANUM BONJEANII De Not. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Sporadic. I: 4, 7; II: 10, 14; III: 19.
- *DICRANUM DRUMMONDII Müll. Hal. [= *Dicranum elatum* Lindb.] – Sporadic. II: 10, 14.
- DICRANUM ELONGATUM Schleich. ex Schwägr. (Herbarium H; Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 1, 3, 4, 7; II: 11, 13, 14.
- DICRANUM FLEXICAULE Brid. [= *Dicranum congestum* Brid.] (Herbarium H) – Not rare. I: 3, 4, 7; II: 10, 14; III: 19.
- DICRANUM FRAGILIFOLIUM Lindb. (Likhachev & Belkina, 2011) – Sporadic. I: 3, 4; II: 14; III: 19.
- DICRANUM FUSCESCENS Turner (Likhachev & Belkina, 2011) – Not rare. I: 3, 4; II: 10.
- DICRANUM LAEVIDENS R.S. Williams (Boychuk & Kuznetsov, 2012; Boychuk & Borovichev, 2017) – Rare. I: 1. FS: VU.
- DICRANUM MAJUS Turner (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 2, 4, 5, 6, 7; II: 15; III: 18, 19.
- DICRANUM MONTANUM Hedw. [= *Orthodicranum montanum* (Hedw.) Loeske] (Likhachev & Belkina, 2011) – Not rare. I: 3, 4, 5; II: 8, 9, 14, 15; III: 18, 19.
- *DICRANUM POLYSETUM Sw. – Rare. I: 4.
- DICRANUM SCOPARIUM Hedw. (Alm & Piirainen, 1997) – Not rare. I: 1, 4, 5; II: 9; III: 18, 19.
- DICRANUM SPADICEUM J.E. Zetterst. (Likhachev & Belkina, 2011) – Rare. II: 9. FS: NT.
- DICRANUM UNDULATUM Schrad. ex Brid. [= *Dicranum bergeri* Blandow] (Likhachev & Belkina, 2011; Boychuk, 2013) – Frequent. I: 1, 4, 6, 7; II: 12, 13, 14, 15; III: 18.
- DILUTINEURON FASCICULARE (Hedw.) Bedn.-Ochyra & Sawicki [= *Codriophorus fascicularis* (Hedw.) Bedn.-Ochyra et Ochyra, *Racomitrium fasciculare* (Hedw.) Brid.] (Boychuk, 2013) – Not rare. II: 12, 14.
- *DISTICHUM CAPILLACEUM (Hedw.) Bruch et al. – Sporadic. I: 3, 4, 5; II: 8.
- *DREPANOCLADUS ADUNCUS (Hedw.) Warnst. – Sporadic. I: 4; III: 19.
- ENCALYPTA RHAPTOCARPA Schwägr. (Likhachev & Belkina, 2011) – Rare. II: 15.
- ENCALYPTA STREPTOCARPA Hedw. (Boychuk & Borovichev, 2017) – Rare. I: 5; II: 8. MR: 3.
- EURHYNCHIASTRUM PULCHELLUM (Hedw.) Ignatov et Huttunen [= *Eurhynchium pulchellum* (Hedw.) Jenn.] (Likhachev & Belkina, 2011) – Rare. II: 15.
- *FISSIDENS ADIANTHOIDES Hedw. – Sporadic. I: 5, 6, 7; II: 10.
- FISSIDENS OSMUNDOIDES Hedw. (Likhachev & Belkina, 2011) – Sporadic. I: 4, 5; III: 19.
- FLEXITRICHUM FLEXICAULE (Schwägr.) Ignatov et Fedosov [*Ditrichum flexicaule* (Schwägr.) Hampe] (Likhachev & Belkina, 2011) – Sporadic. I: 4, 5.
- *FONTINALIS ANTIPIYRETICA Hedw. – Rare. I: 4.
- *GRIMMIA LONGIROSTRIS Hook. [= *Grimmia affinis* Hornsch.] – Rare. II: 14.
- *GRIMMIA TORQUATA Drumm. – Not rare. I: 3, 5; II: 12, 15.
- *HEDWIGIA CILIATA (Hedw.) P. Beauv. – Rare. II: 14.
- HELODIUM BLANDOWII (F. Weber et D. Mohr) Warnst. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Sporadic. I: 1, 3, 4, 7; II: 14; III: 19.
- HYGROAMBLYSTEGIUM VARIUM (Hedw.) Mönk. [= *Amblystegium varium* (Hedw.) Lindb.] (Likhachev & Belkina, 2011) – Rare. III: 18. NS: EN.
- HYGROHYPNELLA OCHRACEA (Turner ex Wilson) Ignatov et Ignatova [= *Hygrohypnum ochraceum* (Turner ex Wilson) Loeske] (Boychuk & Kuznetsov, 2012) – Rare. III: 19.

- HYLOCOMIUM SPLENDENS (Hedw.) Bruch et al. (Alm & Piirainen, 1997; Neshataev et al., 2011; Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 3, 4, 5, 6, 7; II: 12, 14, 15; III: 18, 19.
- *HYMENOLOMA CRISPULUM (Hedw.) Ochyra [*Dicranoweisia crispula* (Hedw.) Milde] – Sporadic. I: 3, 4; II: 14.
- *ISOPTERYGIOPSIS PULCHELLA (Hedw.) Z. Iwats. [= *Isopterygium pulchellum* (Hedw.) A. Jaeger] – Rare. I: 5.
- KIAERIA BLYTTII (Bruch et al.) Broth. (Herbarium H) – Rare. II: Kalkupya Mt.
- KIAERIA GLACIALIS (Berggr.) I. Hagen (Likhachev & Belkina, 2011; Boychuk, 2013) – Rare. II: 12.
- KIAERIA STARKEI (F. Weber et D. Mohr) I. Hagen (Likhachev & Belkina, 2011; Boychuk, 2013) – Rare. II: 12.
- *LEPTOBRYUM PYRIFORME (Hedw.) Wilson – Rare. III: 19.
- LEPTODICTYUM RIPARIUM (Hedw.) Warnst. (Likhachev & Belkina, 2011) – Rare. III: 18.
- LOESKYPNUM BADIUM (Hartm.) H.K.G. Paul [= *Drepanocladus badius* (Hartm.) G. Roth] (Herbarium H; Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 4, 5, 6, 7; II: 9, 12, 14, 15.
- MEESIA TRIQUETRA (Jolycl.) Ångstr. (Boychuk & Kuznetsov, 2012) – Sporadic. I: 1, 4, 5, 7.
- MEESIA ULIGINOSA Hedw. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Sporadic. I: 4, 7; III: 19.
- *MNIUM LYCOPODIODES Schwägr. [= *Mnium ambiguum* H.Müll.] – Rare. I: 4.
- *MNIUM THOMSONII Schimp. – Rare. I: 5.
- *NECKERA OLIGOCARPA Bruch – Sporadic. I: 3, 4, 5.
- NIPHOTRICHUM CANESCENS (Hedw.) Bedn.-Ochyra et Ochyra [= *Racomitrium canescens* (Hedw.) Brid.] (Likhachev & Belkina, 2011; Boychuk, 2013) – Sporadic. I: 4; II: 14.
- *OCHYRAEA ALPESTRIS (Hedw.) Ignatov et Ignatova [= *Hygrohypnum alpestre* (Hedw.) Loeske] – Sporadic. I: 4; II: 14.
- OLIGOTRICHUM HERCYNICUM (Hedw.) Lam. et DC. (Herbarium H) – Rare. II: Kalkupya Mt.
- *ONCOPHORUS VIRENS (Hedw.) Brid. – Rare. II: 12.
- ONCOPHORUS WAHLENBERGII Brid. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012; Boychuk, 2013) – Frequent. I: 3, 4, 5, 6, 7; II: 10, 14; III: 19.
- *ORTHOTRICHUM OBTUSIFOLIUM Brid. – Sporadic. I: 4; II: 14.
- PALUDELLA SQUARROSA (Hedw.) Brid. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 4, 5, 6, 7; II: 14, 15.
- *PALUSTRIELLA FALCATA (Brid.) Hedenäs [= *Cratoneuron falcatum* (Brid.) G. Roth.] – Rare. I: 5. FS: NT.
- *PARALEUCOBRYUM LONGIFOLIUM (Hedw.) Loeske – Rare. I: 3.
- PHILONOTIS CAESPITOSA Jur. (Likhachev & Belkina, 2011) – Rare. III: 18.
- PHILONOTIS FONTANA (Hedw.) Brid. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 3, 4, 7; II: 11; III: 18, 19.
- *PHILONOTIS SERIATA Mitt. – Rare. I: 4.
- PHILONOTIS TOMENTELLA Molendo (Likhachev & Belkina, 2011) – Rare. I: 3.
- PLAGIOMNIUM CURVATULUM (Lindb.) Schljakov (Alm & Piirainen, 1997; Likhachev & Belkina, 2011) – Rare. III: 18, 19. FS: NT.
- PLAGIOMNIUM ELLIPTICUM (Brid.) T.J. Kop. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 4, 5, 6, 7; II: 15; III: 18, 19.
- PLAGIOMNIUM MEDIUM (Bruch et al.) T.J. Kop. (Alm & Piirainen, 1997) – Rare. III: 19.
- *PLAGIOPUS OEDERIANUS (Sw.) H.A. Crum et L.E. Anderson – Rare. I: 3.
- PLAGIOTHECIUM DENTICULATUM (Hedw.) Bruch et al. (Alm & Piirainen, 1997) – Sporadic. I: 4; II: 8, 10, 12, 15.
- *PLAGIOTHECIUM LAETUM Bruch et al. – Not rare. I: 3, 4, 5; II: 12, 14, 15; III: 19.
- *PLAGIOTHECIUM PILIFERUM (Sw.) Bruch et al. – Rare. I: 12.
- PLEUROZIUM SCHREBERI (Brid.) Mitt. (Alm & Piirainen, 1997; Neshataev et al., 2011; Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 3–7; II: 12, 14, 15; III: 18, 19.
- *POGONATUM DENTATUM (Brid.) Brid. – Sporadic. I: 4; II: 14.
- POGONATUM URNIGERUM (Hedw.) P. Beauv. (Likhachev & Belkina, 2011) – Sporadic. I: 3; II: 14.
- *POHLIA BULBIFERA (Warnst.) Warnst. – Sporadic. II: 10; III: 19.
- POHLIA CRUDA (Hedw.) Lindb. (Likhachev & Belkina, 2011) – Not rare. I: 3, 4, 5; II: 8, 9, 11, 12, 14, 15.
- POHLIA LONGICOLLA (Hedw.) Lindb. (Likhachev & Belkina, 2011) – Rare. II: 15.
- POHLIA NUTANS (Hedw.) Lindb. (Herbarium H; Likhachev & Belkina, 2011; Boychuk &

- Kuznetsov, 2012) – Frequent. I: 1, 3, 4, 5, 7; II: 12, 14, 15; III: 19.
- **POHLIA PROLIGERA* (Kindb.) Lindb. ex Broth. – Rare. III: 18, 19.
- POHLIA WAHLENBERGII* (F. Weber et D. Mohr) A.L. Andrews (Likhachev & Belkina, 2011) – Sporadic. I: 4; III: 18.
- POLYTRICHAstrum ALPINUM* (Hedw.) G.L. Sm. (Likhachev & Belkina, 2011; Boychuk, 2013) – Not rare. I: 3, 4; II: 12, 14; III: 18, 19.
- POLYTRICHUM COMMUNE* Hedw. (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012; Boychuk, 2013) – Not rare. I: 3, 4; II: 10, 14, 15; III: 19.
- POLYTRICHUM HYPERBOREUM* R. Brown (Neshataev et al., 2011) – Sporadic. II: 12, 14.
- POLYTRICHUM JUNIPERINUM* Hedw. (Alm & Piirainen, 1997; Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 3; II: 13, 15; III: 18, 19.
- **POLYTRICHUM LONGISETUM* (Sw. ex Brid.) [= *Polytrichastrum longisetum* (Sw. ex Brid.) G.L. Sm.] – Sporadic. I: 4; II: 14; III: 19.
- POLYTRICHUM PILIFERUM* Hedw. (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk, 2013) – Sporadic. II: 14.
- POLYTRICHUM STRICTUM* Brid. (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 1, 3, 4, 6; II: 14, 15.
- POLYTRICHUM SWARTZII* Hartm. (Boychuk & Kuznetsov, 2012) – Sporadic. III: 19.
- PSEUDOBRYUM CINCLIDIODES* (Huebener) T.J. Kop. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 1, 4, 6, 7; II: 15; III: 18, 19.
- PSEUDOCALLIERGON TRIFARIUM* (F. Weber et D. Mohr) Loeske (Boychuk & Kuznetsov, 2012) – Sporadic. I: 4, 5, 6, 7; II: 14.
- **PSEUDOLESKEELLA TECTORUM* (Funck ex Brid.) Kindb. ex Broth. – Sporadic. I: 3, 5; II: 8.
- PSILOPIUM LAEVIGATUM* (Wahlenb.) Lindb. (Boychuk & Borovichev, 2017; Kravchenko et al., 2017) – Rare. II: 10. MR: 3; NS: VU, FS: CR.
- **PTERIGYNANDRUM FILIFORME* Hedw. – Rare. II: 14.
- **Ptilium CRISTA-CASTRENSIS* (Hedw.) De Not. – Sporadic. II: 12, 14.
- **PYLAISIA POLYANTHA* (Hedw.) Bruch et al. – Sporadic. III: 18.
- RACOMITRIUM LANUGINOSUM* (Hedw.) Brid. (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk, 2013) – Not rare. II: 11, 12, 14.
- RHIZOMNIUM PSEUDOPUNCTATUM* (Bruch et Schimp.) T.J. Kop. (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 3, 4, 5, 6, 7; II: 14, 15; III: 18, 19.
- RHIZOMNIUM PUNCTATUM* (Hedw.) T.J. Kop. (Alm & Piirainen, 1997) – Sporadic. I: 6; III: 19.
- RHYTIDIADDELPHUS SQUARROSUS* (Hedw.) Warnst. (Alm & Piirainen, 1997) – Sporadic. III: 19.
- **RHYTIDIADDELPHUS TRIQUETRUS* (Hedw.) Warnst. – Sporadic. I: 7; II: 14; III: 19.
- **SAELANIA GLAUDESCENS* (Hedw.) Broth. – Rare. I: 3.
- SANIONIA UNCINATA* (Hedw.) Loeske (Alm & Piirainen, 1997; Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 3, 4, 5, 6, 7; II: 9, 11, 12, 15; III: 19.
- **SCHISTIDIUM AGASSIZII* Sull. et Lesq. – Sporadic. I: 4.
- **SCHISTIDIUM PAPILLOSUM* Culm (Boychuk, 2013) – Sporadic. II: 14; III: 19.
- **SCHISTIDIUM PULCHRUM* H.H. Blom. – Rare. III: 19.
- **SCIURO-HYPNUM CURTUM* (Lindb.) Ignatov [*Sciuro-hypnum oedipodium* (Mitt.) Ignatov et Huttunen, *Brachythecium curtum* (Lindb.) Limpr., *Brachythecium oedipodium* (Mitt.) A.Jaeger] – Sporadic. I: 2; III: 19.
- SCIURO-HYPNUM POPULEUM* (Hedw.) Ignatov et Huttunen [= *Brachythecium populeum* (Hedw.) Bruch et al.] (Likhachev & Belkina, 2011) – Rare. III: 18.
- SCIURO-HYPNUM REFLEXUM* (Starke) Ignatov et Huttunen [= *Brachythecium reflexum* (Starke) Bruch et al.] (Likhachev & Belkina, 2011) – Sporadic. III: 18, 19.
- SCIURO-HYPNUM STARKEI* (Brid.) Ignatov et Huttunen [= *Brachythecium starkei* (Brid.) Bruch et al.] (Alm & Piirainen, 1997; Likhachev & Belkina, 2011) – Rare. III: 18, 19.
- SCORPIDIUM COSSONII* (Schimp.) Hedenäs [= *Limprichtia cossonii* (Schimp.) L.E. Anderson, *Drepanocladus cossonii* (Schimp.) Loeske, *D. intermedius* (Lindb.) Warnst.] (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 5, 6, 7; II: 14; III: 18, 19.
- SCORPIDIUM REVOLVENS* (Sw. ex anon.) Rubers [= *Limprichtia revolvens* (Sw. ex anon.) Loeske, *Drepanocladus revolvens* (Sw. ex anon.) Warnst.] (Herbarium H, Boychuk & Kuznetsov, 2012) – Frequent. I: 4, 6, 7; II: 14; III: 18, 19.
- SCORPIDIUM SCORPIOIDES* (Hedw.) Limpr. (Boychuk & Kuznetsov, 2012) – Frequent. I: 4, 5, 6, 7; II: 14, 15; III: 19.

- SPHAGNUM ANGUSTIFOLIUM (C.E.O. Jensen ex Russow) C.E.O. Jensen (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 4, 6, 7; II: 12, 14, 15; III: 18.
- SPHAGNUM BALTICUM (Russow) C.E.O. Jensen (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 1, 4, 6; II: 14, 15; III: 18.
- SPHAGNUM CAPILLIFOLIUM (Ehrh.) Hedw. [=S. *nemoreum* Scop.] (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 1, 4, 5; II: 14, 15.
- SPHAGNUM CENTRALE C.E.O. Jensen (Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 1, 5, 6; II: 12, 14, 15; III: 19.
- SPHAGNUM COMPACTUM Lam. et DC. (Neshataev et al., 2011; Boychuk & Kuznetsov, 2012; Boychuk, 2013) – Not rare. I: 1, 4, 6, 7; II: 14.
- SPHAGNUM CONTORTUM Schultz (Boychuk & Kuznetsov, 2012) – Not rare. I: 4, 6, 7; II: 14; FS: NT.
- *SPHAGNUM FALLAX (H. Klinggr.) H. Klinggr. – Rare. I: 1.
- SPHAGNUM FIMBRIATUM Wilson (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Sporadic. I: 1, 4; II: 10, 15; III: 19.
- *SPHAGNUM FLEXUOSUM Dozy et Molck. – Rare. II: 15.
- SPHAGNUM FUSCUM (Schimp.) H. Klinggr. (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 3, 4, 5, 6, 7; II: 12, 14, 15; III: 18.
- SPHAGNUM GIRGENSOHNII Russow (Likhachev & Belkina, 2011; Neshataev et al., 2011) – Sporadic. I: 14.
- SPHAGNUM JENSENI H. Lindb. (Boychuk & Kuznetsov, 2012) – Sporadic. I: 3, 4.
- SPHAGNUM LINDBERGHII Schimp. (Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 4, 6; II: 9, 10, 11, 14, 15.
- SPHAGNUM MAGELLANICUM Brid. (Boychuk & Kuznetsov, 2012) – Sporadic. I: 1; II: 14, 15.
- SPHAGNUM MAJUS (Russow) C.E.O. Jensen (Boychuk & Kuznetsov, 2012) – Rare. II: 15.
- *SPHAGNUM OBTUSUM Warnst. – Rare. I: 1.
- SPHAGNUM PAPILLOSUM Lindb. (Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Sporadic. I: 4; II: 14, 15.
- SPHAGNUM PLATYPHYLLUM (Lindb. ex Braithw.) Warnst. (Boychuk & Kuznetsov, 2012) – Sporadic. I: 6; III: 19.
- SPHAGNUM RIPARIUM Ångstr. (Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 2, 4, 6; II: 10, 14, 15; III: 19.
- SPHAGNUM RUSSOWII Warnst. (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 3, 4, 6, 7; II: 10, 14, 15; III: 19.
- SPHAGNUM SQUARROSUM Crome (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 1, 4, 7; II: 10, 14; III: 19.
- SPHAGNUM SUBFULVUM Sjörs (Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 6, 7; II: 14; III: 19.
- SPHAGNUM SUBSECUNDUM Nees (Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Sporadic. Not rare. I: 6, 7; II: 15; III: 19.
- SPHAGNUM TENELLUM (Brid.) Pers. ex Brid. (Boychuk & Kuznetsov, 2012) – Sporadic. I: 4; II: 15.
- SPHAGNUM TERES (Schimp.) Ångstr. (Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 4, 5, 6, 7; II: 14; III: 19.
- SPHAGNUM WARNSTORFII Russow (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 4, 5, 6, 7; II: 14, 15; III: 19.
- SPLACHNUM LUTEUM Hedw. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 1, 4, 5, 6, 7; II: 11, 14, 15; III: 19.
- *SPLACHNUM RUBRUM Hedw. – Rare. II: 14.
- *SPLACHNUM SPHAERICUM Hedw. [=S. *ovatum* Hedw.] – Rare. I: 4.
- *SPLACHNUM VASCULOSUM Hedw. – Rare. I: 4; II: 9.
- *STEREODON HOLMENII (Ando) Ignatov et Ignatova [=*Hypnum holmenii* Ando] – Rare. I: 3.
- STEREODON PALLESCENS (Hedw.) Mitt. [=*Hypnum pallescens* (Hedw.) P. Beauv.] (Boychuk & Borovichev, 2017) – Rare. II: 8.
- STRAMINERGON STRAMINEUM (Dicks. ex Brid.) Hedenäs [=*Calliergon stramineum* (Dicks. ex Brid.) Kindb.] (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 4, 5, 6, 7; II: 10, 11, 14, 15; III: 18, 19.
- TAYLORIA LINGULATA (Dicks) Lindb. (Likhachev & Belkina, 2011) – Rare. I: 4; II: 9.
- TAYLORIA SERRATA (Hedw.) Bruch et al. (Maksimov & Kravchenko, 2011) – Rare. III: 19. MR: 4, NS: EN.
- TAYLORIA SPLACHNOIDES (Schleich. ex Schwägr.) Hook. (Boychuk & Borovichev, 2017) – Rare. II: 9. MR: 2, EB: V, NS: NT, FS: EN.
- *TETRAPHIS PELLUCIDA Hedw. – Not rare. I: 3, 4, 5; II: 13, 14, 15.

- TETRAPLONDON ANGUSTATUS (Hedw.) Bruch et al. (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Not rare. I: 3, 4, 5; II: 13, 14; III: 19.
- TETRAPLONDON MNIODES (Hedw.) Bruch et al. (Boychuk & Kuznetsov, 2012) – Not rare. I: 4; II: 13, 14; III: 19.
- TETRODONTIUM REPANDUM (Funck) Schwägr. (Boychuk & Borovichev, 2017) – Rare. II: 11. MR: 3, RF: 36, FS: NT.
- *THUIDIUM RECOGNITUM (Hedw.) Lindb. – Rare. I: 7.
- *TIMMIA AUSTRIACA Hedw. – Rare. I: 5.
- TOMENTYPNUM NITENS (Hedw.) Loeske (Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 4, 5, 6, 7; II: 14, 15.
- *TORTELLA TORTUOSA (Hedw.) Limpr. – Sporadic. I: 4, 5.
- *ULOTA CURVIFOLIA (Wahlenb.) Lilj. – Rare. I: 3.
- WARNSTORFIA EXANNULATA (Bruch et al.) Loeske [= *Drepanocladus exannulatus* (Bruch et al.) Warnst.] (Herbarium H; Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 4, 6, 7; II: 10, 14, 15; III: 18, 19.
- WARNSTORFIA FLUITANS (Hedw.) Loeske [= *Drepanocladus fluitans* (Hedw.) Warnst.] (Likhachev & Belkina, 2011; Neshataev et al., 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 1, 3, 4, 6, 7; II: 10, 14; III: 19.
- WARNSTORFIA PROCERA (Renauld et Arnell) Tuom. [= *Drepanocladus procerus* (Renauld et Arnell) Warnst.] (Boychuk & Kuznetsov, 2012) – Not rare. I: 3, 4, 5, 6; II: 10, 14; III: 19.
- WARNSTORFIA SARMENTOSA (Wahlenb.) Hedenäs [= *Calliargon sarmentosum* (Wahlenb.) Kindb.] (Herbarium H; Likhachev & Belkina, 2011; Boychuk & Kuznetsov, 2012) – Frequent. I: 4, 5, 6, 7; II: 11, 13, 14.
- WARNSTORFIA TUNDRAE (Arnell) Loeske [= *Drepanocladus tundrae* (Arnell) Loeske] (Alm & Pirainen, 1997) – Sporadic. I: 4, 5; II: 10, 12.

DISCUSSION

As a result of our research, the list of mosses of the Pasvik Reserve (0,1% of the Murmansk Region's area) includes 197 species (41% of the moss flora of the Murmansk Region). High number of species is due to various habitats in Pasvik Reserve (all those known in the Murmansk Region, except for maritime, high alpine and spruce forest). Seventeen species were known only from Herbarium (H) or literature sources:

Bryum archangelicum, *Campylium protensum*, *Cnestrum schisti*, *Dicranum acutifolium*, *D. spadicum*, *Encalypta raptocarpa*, *Eurhynchiastrum pulchellum*, *Hygroamblystegium varium*, *Kiaeria blyttii*, *K. glacialis*, *K. starkei*, *Leptodictyum riparium*, *Oligotrichum hercynicum*, *Philonotis caespitosa*, *P. tomentella*, *Pohlia longicolla*, *Sciuro-hypnum populeum*.

The majority of the listed mosses are fairly common species in the Murmansk Region. However, 70 species (ca. 35%) are known, at present, in the Pasvik Reserve from 1–2 locations and are considered as rare. Most of them are sporadic in the Region (for example, *Brachythecium rivulare*, *Cirriphyllum piliferum*, *Cnestrum schistii*, *Cratoneuron filicinum*, *Dicranum polysetum*, *Encalypta raptocarpa*, *Grimmia longirostris*, *Leptodictyum riparium*, *Mnium thomsonii*, *Paraleucobryum longifolium*, *Saelania glaucescens*, *Sphagnum fallax*, *Splachnum sphaericum*, *Tayloria linguata*, etc).

In the present study, new findings of some very rare species were discovered, that increase our knowledge of their distribution pattern in the Murmansk Region. *Stereodon pallescens* was found for the first time in the Murmansk Region (Boychuk & Borovichev, 2017). This species is common in the south and mid-taiga and is scarce in the northern taiga. In the Murmansk Region *Tayloria serrata* is only known from the Pasvik Reserve (Maksimov & Kravchenko, 2011). The calciphytic moss *Encalypta streptocarpa* is reported for the third time from Murmansk Region. It was found in the Salmiyarvi Town area (Roivainen, 1929) and Kutsa Reserve (Shlyakov & Konstantinova, 1982; Ulvinen, 1996). *Tayloria splachnoides* was previously only known from the Khibiny Mts (Shlyakov, 1961) and Lovozersky Mts (Belkina et al., 1991). *Dicranum laevidens* was collected in the Pasvik Reserve in 2011, later it was reported from Kandalaksha State Nature Reserve (Kozhin & Ignatova, 2012) and the east shore of the Kola Peninsula (Kozhin et al., 2017). *Tetradontium repandum* is very rare in Russia, and in the Murmansk Region it has only been known from Malaya Konya Mt (Belkina, 2001), Nizhnyaya Kumazhya Mt. (Red Data Book of Murmansk Region, 2014) and Khibiny Mts (Fedosov, 2012).

The Pasvik Reserve is well suited for the protection of rare mosses: seven species (*Bryum cyclophyllum*, *Buxbaumia aphylla*, *Encalypta streptocarpa*, *Psilopilum laevigatum*, *Tayloria*

serrata, *T. splachnoides*, *Tetradontium repandum*) are listed in the Red Data Book of Murmansk Region (2014); one species (*Tetradontium repandum*) in the Red Data Book of Russian Federation (2008); five species (*Dicranum angustum*, *Hygroamblystegium varium*, *Psilopilum laevigatum*, *Tayloria serrata*, *T. splachnoides*) in the 2010 Norwegian Red List for Species (Kålås et al., 2010); ten species (*Cyrtomnium hymenophylloides*, *Dicranum acutifolium*, *D. laevidens*, *D. spadiceum*, *Palustriella falcata*, *Plagiomnium curvatulum*, *Psilopilum laevigatum*, *Sphagnum contortum*, *Tayloria splachnoides*, *Tetradontium repandum*) in the 2010 Red List of Finnish Species (Rassi et al., 2010) and one species (*Tayloria splachnoides*) is listed in the Red Data Book of European Bryophytes (1995).

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