

A CHECK-LIST OF THE MOSSES OF KAMCHATKA PENINSULA (FAR EAST)

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СПИСОК МХОВ ПОЛУОСТРОВА КАМЧАТКА (ДАЛЬНИЙ ВОСТОК)

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Abstract

Results of study of moss flora of Kamchatka Peninsula (Russian Far East) is presented. The list includes 439 species and 12 varieties of mosses. Annotations include localities and reference for each species. The history of bryological exploration and bibliography on bryophyte studies of Kamchatka Peninsula is given.

Резюме

Подведены итоги изучения флоры мхов полуострова Камчатка (Дальний Восток). В статье представлены история изучения бриофлоры полуострова и библиография по изучению его бриофлоры. Аннотированный список включает 439 видов и 12 разновидностей мхов. Для каждого вида перечислены все местонахождения на основе гербарных и литературных источников.

HISTORY OF BRYOLOGICAL EXPLORATION

The first collections of bryophytes from Kamchatka were made by the participants of the Krusenstern' round-the-world travel in 1803-1806. Bryophytes in this expedition were collected by W.G. Tilesius, while most of vascular plants – by G.H. Langsdorff; they collected in Kamchatka in the neighborhood of Avatcha Bay. Collections of Tilesius was determined and published by Wahlberg (1811). This first publication on bryophytes of Kamchatka includes 31 mosses and 9 liverworts species. Based on the Kamchatka collection, Wahlberg described two new species – *Encalypta corniculata* (= *Timiella corniculata*) and *Splachnum luteum* var. *melanocaulon* (= *Splachnum melanocaulon*).

The next study in Kamchatka was conducted by A.L.C. Chamisso, who participated (together with J.F.G. von Eschscholtz and L. Choris) in the expedition of Kotzebue on «Rurik» in 1815-1818. This expedition explored surroundings of Petropavlovsk (Avacha Bay), where Chamisso gathered a small collection of mosses. This collection was studied by S.E. Bridel-Brideri, who included these data in his “Bryologia universa” (Bridel-Brideri, 1826-1827). In total, this paper includes

49 moss species. Also Bridel-Brideri reported 12 species for Kamchatka based on collections of Redowsky. However, as noted by H. Moeller (1927) and V.L. Komarov (1927), Redowsky died and did not reach Kamchatka, therefore his collections were most probably gathered near Ochotsk. Thus, the collections of Redowsky are not cited in the following checklist, and these data repeated by J.A. Weinmann (1845) and A.S. Lazarenko (1940, 1941a, 1941b, 1941-1945) are also omitted. Later Kamchatka was visited by the steamship «Blossom» during its around-the-world trip in 1825-1828, with the captain F.W. Beechey. In 1826 «Blossom» had a stop in Avatcha Bay, where the naval officer A. Collie and naturalist T. Lay gathered a small collection of plants, later studied and published by W.J. Hooker and G.A.W. Arnott (1841). Their list included 18 mosses and 1 liverwort. Later, publications of Erman (1835) and Wilson (1858) provided further data on mosses of Kamchatka, the latter publication included 10 moss species collected in Kamchatka by B. Seeman in the neighborhoods of Avatcha Bay. Thus, to the middle of XIX century, about 60 moss species were known from Kamchatka, mainly from the region of Avatcha Bay. A part of them were

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mentioned by Weinman (1845), C. Mueller (1849-1851), S.O. Lindberg, H.W. Arnell (1890), V.F. Brotherus (1914, 1918, 1931).

In the beginning of XX century, two large overland expeditions considerably expanded existing knowledge of the nature of the Peninsula, including its bryoflora. In 1908-1909 F. P. Ryabushinsky organized the Kamchatka expedition, with the support of the Russian Geographic Society. The botanic exploration of the expedition was headed by V.L. Komarov, and his team included E.K. Bezais, L.G. Ramenski and V.P. Savicz. In 1908 they studied neighborhoods of Petropavlovsk, valley of Paratunka River, and also undertook a trip from eastern to western coast, up to the village Bolsheredsk. In 1909 the middle course of Kamchatka River and eastern coast were explored, and Bezais made a trip up to the mouth of Tigil River. The route of the expedition is described by Komarov (1927). The expedition resulted in a large herbarium, including numerous bryophyte specimens, collected mostly by Savicz and Ramenski, and to less degree by Komarov and Bezais. This collection was deposited in LE, and partly identified by L.I. Savicz. Using this collection she published "Flora of peat mosses of Kamchatka" (Savicz, 1932): 13 (of 27) species of *Sphagnum* were reported for Kamchatka for the first time. Families *Fumariaceae*, *Aulacomniaceae*, *Climaciaceae*, *Rhytidiaceae* and *Polytrichaceae* were treated in the next publication (Savicz, 1934): it includes 28 species.

In 1920-1922 in the Swedish Kamchatkan expedition studied the southern part of the peninsula from Petropavlovsk and Bolsheredsk up to Lopatka Cape. The botanist, E. Hulten and entomologist, R. Malaise participated in it. The routes of the expedition were summarized by Hulten (1927). Later, in 1924-1926, Malaise visited Kamchatka a few more times, exploring also central regions of the peninsula. Bryological collections of the expeditions are in S. Melin (1924) published identification of *Sphagnum* (14 species from Hulten collections from more than 30 localities) and Moeller (1927) – of other mosses (mostly collections of Hulten, some – of Malaise). Moeller (l.c.) included in his paper also data from earlier publications, thus providing the first extended account of mosses of Kamchatka that in-

cluded 132 species and 12 subspecies. Almost a half of the species in that list were new for the peninsula. Later H. Persson studied the rest of Malaise collection and revised also specimens, identified by Moeller; his list includes 28 liverworts and 38 mosses (Persson, 1970).

In 1935-1936, the Complex Kamchatka Expedition of the Academy of Sciences of USSR explored the peninsula. Studies on geobotany and pedology were headed by L. N. Tjulina, who conducted the work on the western coast of Kamchatka, together with a geobotanist E. L. Ljubimova. Their bryophyte collections were determined by Lazarenko (and now they are in KW), who included them in his catalogue (Lazarenko 1940, 1941a, 1941b, 1941-1945). In this publication Lazarenko summarized all the available data on Far East of the USSR, indicating for Kamchatka 149 species.

In 1974-1978 Yu. N. Nechatayev collected bryophytes during his geobotanical studies in Kronozky Reserve. The results of that expedition were published (Rastitel'nost ..., 1994), including data on 60 moss species. Unfortunately the major part of the collection has been lost. The remaining part of this collection is stored in the Geobotany Dept. of Sankt-Petersburg State University; it was partly revised by the present author in 2005, revealing many misidentifications, so species from difficult groups nor re-studied by the present author are not included in the list.

In 1981 and 1990, M.S. Bocz studied peatlands in neighborhoods of Ossora, Avatcha Bay, Koryaky and Natchika. Her collections of *Sphagnum* were determined by E.O. Kuzmina, resulting in the publication of an annotated list of 27 species (Bocz, Kuzmina, 1991). Mosses collected by Bocz and also moss collection of O.A. Chernyagina were determined and published by G.V. Vyunova (1991). She listed 105 species of mosses. Unfortunately, collections of Bocz and part of this collection of Chernyagina were lost. Remaining part of Chernyagina collection is in herbarium of the Kamchatkan Branch of Pacific Institute of Geography (Russian Academy of Sciences), with a few duplicates in LE. The available part of the Chernyagina collection was revised by the present author.

In 1979, V.Ya. Cherdantseva, a bryologist from

VLAD, visited Kamchatka and then published a list of 106 mosses (based on collections of S.V. Osipov and herself, the latter collected in 21 localities, mainly along the road Petropavlovsk – Ust'-Kamchatsk – Esso, and also around Avatcha Bay (Cherdantseva, Osipov, 1998). Scattered collections from Kamchatka were published by Cherdantseva, also in various papers (Cherdantseva, 1978, 1989, 1993), including list of 78 species from Kronozky Reserve (Cherdantseva, 2003).

In 1990 and 2001-2005 the present the author carried out the bryophyte studies in different parts of the Peninsula. In the framework of the full scale exploration of South Kamchatskiy Reserve, the basins of Left and Right Kihchik, Nachilova, Bannaya and Elovka Rivers, vicinity of Ossora, Esso, Pushchino, Kljuchi, Kosyrevsk, Krutoberegovo settlements, vicinity of Shiveluch and Mutnovskij volcanoes, vicinity of Shadutka Bay, on Kluchevskaya group of volcanoes: on western slope of Ushkovsky volcano on "Kljuchevskoj Dol", vicinity of Kopyto Mt. and Bilchenok glacier. Moreover, the collections of O.A. Chernyagina from Kirevna River, volcano Mutnovskij, the Pushchino hot springs and the small collection of V. Bakalin from Middle Range were determined by the author. The results of investigations of the separate local floras, as well as history of the bryoflora of Kamchatka were published (Czernyadjeva, 1995a; 2002a; 2002b; 2002c; 2003b; 2005b; Czernyadjeva & Potemkin, 2002; 2003; Czernyadjeva & al., 2005; Czernyadjeva & Afonina, 2005).

The complex investigations of plant communities were carried out by geobotanists in cooperation with bryologists and lichenologists. Information concerning moss cover of these communities were published by Neshatayeva et al. (1997, 2003, 2004, 2005, 2006).

New and interesting discoveries of mosses from Kamchatka were published in a series of papers: Bednarek-Ochyra, Czernyadjeva (2003); Czernyadjeva (1995b,c; 2000; 2003a; 2004; 2005a; Czernyadjeva, Ignatova, 2004). All author' collection are stored at Komarov Botanic Institute (LE).

REGIONS OF KAMCHATKA

The accepted regions of Kamchatka (Fig. 1) are mostly physiographic and based on subdivision of Kamchatka by Kharkevich (1981) and

Yakubov & Chernyagina (2004), with some amendments:

Northern Kamchatka includes the territory north from the line Palana settlement – the northern point of Osernyii Peninsula. Forest vegetation is confined to river valleys, *Pinus pumila* and *Alnus fruticosa* shrubs dominate.

Western Kamchatka includes the territory of Western Kamchatka Lowland, characterized by numerous bogs alternating with *Betula ermanii* forest.

Middle Kamchatka includes mountains of the Middle Range, with elevations ca. (300-)400-1200(-3621) m.

Central Kamchatka includes the most part of the valley of Kamchatka River, characterized by forests of *Betula platyphylla*, *Larix cajanderi*, *Picea ajanensis* and in flood plain – forests of trees of Salicaceae.

Eastern Kamchatka includes the Eastern Range, with main volcanos of the Peninsula, (300-)800-1700 (-4750) m.

Southern Kamchatka is a mountain region south from the line Petropavlovsk City – Ust'-Bolscherevsk City. The main part of border is the Plotnikova River, which is an important limit for many species of vascular plants.

LIST OF SPECIES

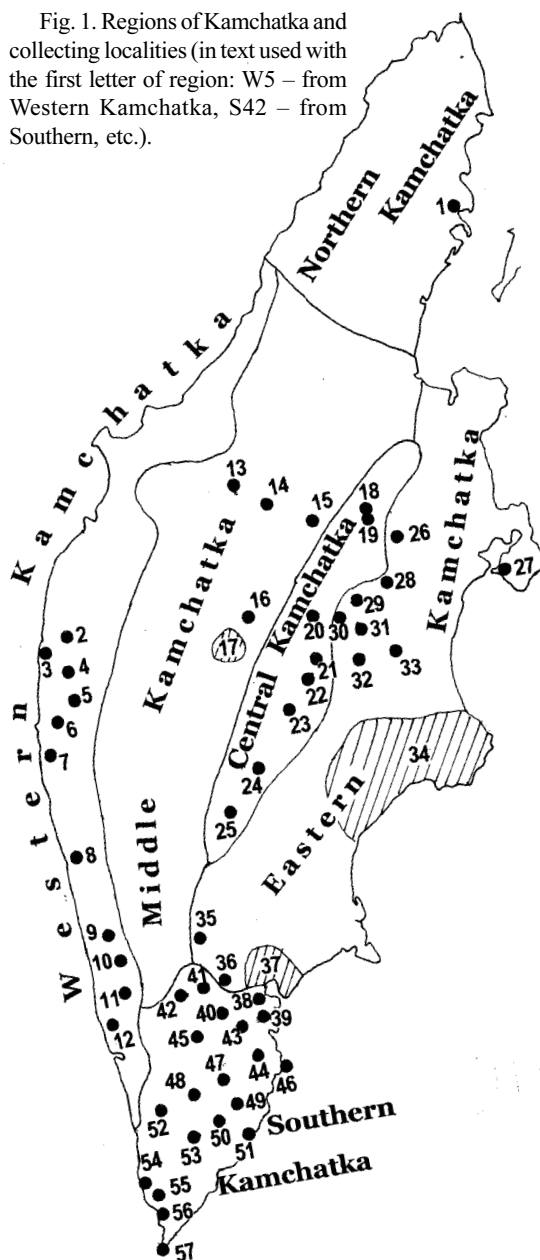
The check-list includes all the confirmed herbarium specimens, as well as literature records which are considered to be reliable by various reasons. The species that are included based on only literature data are marked by (*). The dubious records are marked (?). Localities are given in bold (cf. Fig. 1) and they are followed by a number denoting the source of information given in the section "Sources of information..." before Literature Cited section.

Abietinella abietina (Hedw.) M. Fleisch. – **N1:** 10, **W10:** 14, **M15:** 33, 36, **M17:** 8, 36, **C18:** 20, **C19:** 20, **E27:** 36, **E29:** 36, **E31:** 36, **E34:** 30, 9, **S54:** 15, **S55:** 15.

Amblystegium serpens (Hedw.) B.S.G. – **W9:** 28, **W10:** 14, **W11:** 16, **M15:** 33, 36, **M17:** 8, **C18:** 20, **C25:** 21, **E27:** 36, **E28:** 36, **E29:** 36, **E31:** 36, **S41:** 16, **S55:** 15.

Amphidium lapponicum (Hedw.) Schimp. – **W10:** 14, **M17:** 8, **C18:** 20, **E27:** 36, **E29:** 36, **E32:** 8, **S41:** 16, **S51:** 36.

Fig. 1. Regions of Kamchatka and collecting localities (in text used with the first letter of region: W5 – from Western Kamchatka, S42 – from Southern, etc.).



NORTHERN KAMCHATKA

N1 – Vicinity of Ossora Settl., including Kaspa Mt. and Karaginskij Is., $\sim 59^{\circ}16' N$, $163^{\circ}01' E$, alt. 10-400 m – окрестности пос. Оссора, включая гору Каспа и о. Карагинский (Cherdantseva, 1978; Vyunova, 1991; Czernyadjeva, 1995).

WESTERN KAMCHATKA

W2 – Sopochnaya River, including Moroshechnaya River, and Soichek River, $\sim 56^{\circ}04' N$, $155^{\circ}55' E$, alt. 10-200 m – р. Сопочная, включая рр. Морошечная и Соичек (Lazarenko, 1940, 1941b).

W3 – Icha River, including Icha village and Icha fishy factory, $\sim 55^{\circ}35' N$, $155^{\circ}57' E$, alt. 10-200 m – р. Ича, включая бывший пос. Ича и Ичинский рыбкомбинат (Lazarenko, 1940, 1941a, 1941b, 1945).

W4 – Oblukovina River, $\sim 55^{\circ}17' N$, $155^{\circ}39' E$, alt. 10-200 m – р. Облуковина (Lazarenko, 1940, 1941a, 1945).

W5 – Krutogorova River, including Koopa River and Polovinka River, $\sim 55^{\circ}03' N$, $155^{\circ}40' E$, alt. 10-200 m – р. Крутогорова, включая р. Копа и р. Половинка (Savicz, 1932; Lazarenko, 1940, 1941a, 1941b, 1945; Cherdantseva, 1993).

W6 – The interfluvium of Krutogorova and Kolpakova Rivers, $\sim 54^{\circ}51' N$, $155^{\circ}43' E$, alt. 10-200 m – междуречье рр. Крутогорова и Колпакова (Vyunova, 1991).

W7 – Kolpakova River, including Kunzhik River, $\sim 54^{\circ}42' N$, $155^{\circ}46' E$, alt. 10-200 m – р. Колпакова, включая р. Кунжик (Lazarenko, 1940, 1941a, 1941-45).

W8 – Sobolevo Settl., including Vorovskaya River, Vorovskoj fishy factory, $\sim 54^{\circ}19' N$, $156^{\circ}09' E$, alt. 10-200 m – пос. Соболево, включая р. Воровская и рыбкомбинат Воровской (Savicz, 1932; Lazarenko, 1940, 1941a, 1941b, 1945).

W9 – Right Kihchik River, including Kihchik village and Kol' River, $\sim 53^{\circ}35' N$, $156^{\circ}41' E$, alt. ~ 200 m – бассейн р. Правый Кихчик, включая с. Кихчик, р. Коль (Savicz, 1932; Lazarenko, 1940, 1941a, 1941b; Neshataeva & al., 2005; author data).

W10 – Left Kihchik River, $\sim 53^{\circ}25' N$, $156^{\circ}40' E$, alt. 200-500 m – бассейн р. Левый Кихчик (Czernyadjeva, 2002).

W11 – The interfluvium of lower Bolshaya-Bystraya River and middle Nachilova River, $53^{\circ}06' N$, $156^{\circ}53' E$, alt. 250-600 m – междуречье нижн. теч. р. Быстрой-Большой и ср. теч. р. Начилова (Czernyadjeva, Potemkin, 2003).

W12 – Ust'-Bolscheredsk Sity, including lower Bolshaya-Bystraya River, Zykovaja village, $\sim 52^{\circ}49' N$, $156^{\circ}12' E$, alt. 10-50m, – г. Усть-Большерецк, включая низовья р. Большой и дер. Зыкова (Melin, 1924; Moeller, 1927; Savicz, 1932; Cherdantseva, Osipov, 1998).

MIDDLE KAMCHATKA

M13 – Middle Range, Tigil' River, nearly Belaya River, $\sim 56^{\circ}39' N$, $159^{\circ}01' E$, alt. 450 m – Срединный хр., р. Тигиль в районе впадения р. Белая (Coll. V.A. Bakalin, det. I.V. Czernyadjeva).

M14 – Middle Range, western slope of Alnej vol., valley of Shirokij glacier, $\sim 56^{\circ}39' N$, $159^{\circ}29' E$, alt. 1000-1600 m – Срединный хр., зап. склон влк. Алней, долина ледника Широкий (Coll. V.A. Bakalin, det. I.V. Czernyadjeva).

M15 – Middle Range, Alnej vol., valley of Kirev-

na River, Verhnekireunsky hot springs, 56°45' N, 160°00' E, alt. 500 m – Срединный хребет, влк. Алней, долина р. Киревна, Верхнекиреунские горячие источники (Vyunova, 1991; Coll. O.A. Chernyagina, det. I.V. Czernyadjeva).

M16 – Middle Range, vicinity of Anauna River – Срединный хребет, окрестности р. Анаун (Moeller, 1927; Persson, 1970).

M17 – Middle Range, vicinity of Esso Settl., ~55°56' N, 158°41' E, alt. 300-1600 m – Срединный хребет, окрестности пос. Эссо (Cherdantseva, 1993; Cherdantseva, Osipov, 1998; author data).

CENTRAL KAMCHATKA

C18 – Upper Elovka River, 56°55' N, 160°59' E, alt. 150m – верхнее теч. р. Еловка (Czernyadjeva, 2005b).

C19 – Middle Elovka River, 56°53' N, 160°55' E, alt. 150m – среднее теч. р. Еловка (Czernyadjeva, 2005b).

C20 – Vicinity of Kosyrevsk Settl., ~56°03' N, 159°54' E, alt. 50-150m – окрестности пос. Козыревск (Moeller, 1927; Savicz, 1934; Persson, 1970; Cherdantseva, 1993; Cherdantseva, Osipov, 1998; author data).

C21 – Vicinity of Tolbatchick village, ~55°33' N, 159°57' E – окрестности с. Толбачик (Savicz, 1934; Moeller, 1927; Persson, 1970).

C22 – Vicinity of Shtchapina village, including Shtchapinskij hot springs and Nikolka Mt., ~55°21' N, 159°26' E – окрестности с. Щапино, включая Щапинские горячие источники и окрестности г. Николка (Savicz, 1932, 1934; Moeller, 1927; Persson, 1970).

C23 – Vicinity of Kirgannik village, including of village Mashura, ~54°49' N, 158°47' E – окрестности с. Кирганник, включая с. Машура (Savicz, 1932, 1934; Moeller, 1927).

C24 – Vicinity of Sharomy village, ~54°24' N, 158°11' E – окрестности с. Шаромы (Savicz, 1934).

C25 – Vicinity of Pushchino Settl., including Pushchincky hot springs, ~54°11' N, 158°01' E, alt. 300-600 m – окрестности пос. Пушино, включая Пушинские горячие источники (Savicz, 1934; Czernyadjeva, Afonina, 2005).

EASTERN KAMCHATKA

E26 – Vicinity of Shiveluch vol., ~56°33' N, 161°15' E, alt. 200-800m, including forest nursery, 56°27' N, 161°01' E – окрестности вул. Шивелуч, включая лесхоз (Cherdantseva, Osipov, 1998; author data).

E27 – Kamchatskij Peninsula, vicinity of Krutoberegovo Settl., ~56°13' N, 162°50' E, alt. 10-400 m – п-ов Камчатский, окрестности пос. Крутоберегово (author data).

E28 – Vicinity of Kljuchi Settl., ~56°20' N, 160°50' E, alt. 10-100 m – окрестности пос. Ключи (Cherdantseva, Osipov, 1998; author data).

E29 – Kluchevskaya group of volcanos, vicinity

of Bilchenok glacier, ~56°11' N, 160°21' E, alt. 600-1500 m – Ключевская группа вулканов, окрестности ледника Бильченок (author data).

E30 – Kluchevskaya group of vol., vicinity of Kopyto Mt., 55°57' N, 160°08' E, alt. 350-700 m – Ключевская группа вулканов, окрестности г. Копыто (author data).

E31 – Kluchevskaya group of vol., western slope of Ushkovsky vol., upper Shirokij stream, “Kljuchevskoj Dol”, ~55°58' N, 160°17' E, alt. 900-1600 m – Ключевская группа вулканов, Зап. склон вул. Ушковский, верховья руч. Широкий, «Ключевской дол» (author data).

E32 – Kluchevskaya group of vol., Tolbatchick vol., 55°46' N, 160°15' E, alt. ~1000 m – Ключевская группа вулканов, вул. Толбачик (Persson, 1970; Cherdantseva, Osipov, 1998).

E33 – Kluchevskaya group of vol., middle Bolshaya Napica River, 55°56' N, 161°12' E, alt. ~100 m – Ключевская группа вулканов, среднее теч. р. Большая Хапица (author data).

E34 – Kronotsky Reserve – Кроноцкий заповедник (Savicz, 1932, 1934; Rastitel' nost...1994; Cherdantseva, 1989, 1993, 2003; Coll. of expedition of Yu.N. Neshataev, det. I.V. Czernyadjeva).

E35 – Vicinity village Malki, including Poperechnaya Mt., Poperechnaya River and Ganalskaya tundra, ~53°20' N, 157°26' E – окрестности с. Малки, включая г. Поперечная, р. Поперечная и Ганальскую тундру (Savicz, 1932, 1934; Cherdantseva, 1989; Cherdantseva, 1993).

E36 – Vicinity Settl. Natchiki, ~53°06' N, 157°44' E – окрестности с. Начики (Melin, 1924; Moeller, 1927; Savicz, 1932, 1934; Vyunova, 1991).

E37 – Vicinity Petropavlovsk Sity, including Elizovo Sity (Savoiko), Korjaski and Avatcha vol., Korjaka Settl., Korjaskaya River, north and west coasts Avatcha Bay, Nalychevskoe Lake, ~53°05' N, 158°41' E, alt. 10-400 m – окрестности г. Петропавловска-Камчатского, включая г. Елизово (Завойко), вул. Коряцкий и Авача, пос. Коряки, р. Корякская, северное и западное побережья Авачинской бухты, оз. Налычевское (Wahlenberg, 1811; Bridel-Brideli, 1826-1827, Hooker, Arnott, 1841; Wilson, 1858; Melin, 1924; Moeller, 1927; Savicz, 1932, 1934; Persson, 1970; Vyunova, 1991; Cherdantseva, Osipov, 1998; Czernyadjeva, 2000).

SOUTHERN KAMCHATKA

S38 – Vicinity Settl. Paratunka, including Settl. Termal'nyi and Nikolaevsk, ~52°44' N, 158°11' E, alt. 15-150m – окрестности пос. Паратунька, включая пос. Термальный и Николаевск (Moeller, 1927; Savicz, 1932; Vyunova, 1991; Cherdantseva, Osipov, 1998; author data).

S39 – Upper Viljucha River and Settl. Rodnikovyi,

52°39' N, 158°15' E, alt. 300m – верховья р. Вилоча и пос. Родниковый (Cherdantseva, Osipov, 1998).

S40 – Kohelok Mt., including Kaach Mt., – г. Кохелок, включая г. Каач (Moeller, 1927).

S41 – Middle Bannaja River, including hot springs, 52°54' N, 157°30' E, alt. 200-600 m – среднее течение р. Банная, включая горячие источники (Moeller, 1927; Czernyadjeva, Potemkin, 2003).

S42 – Basin Karymchina River, including Agashka, Siku, Ipelka Rivers, ~52°52' N, 157°07' E – бассейн р. Карымчина, включая рр. Агашка, Сику, Ипелька (Melin, 1924; Moeller, 1927).

S43 – Gorelji vol., 52°35' N, 158°00' E, alt. ~1100 m – вул. Горельи (Moeller, 1927; Cherdantseva, Osipov, 1998).

S44 – Skalistaya Mt., slope Mutnovskiy vol., 52°32' N, 158°12' E, alt. 800-1000 m – г. Скалистая на склоне вул. Мутновский (Cherdantseva, Osipov, 1998; Czernyadjeva et al., 2005).

S45 – Opala vol., including middle Opala River, ~52°33' N, 157°19' E – вул. Опала, включая среднее течение р. Опала (Melin, 1924; Moeller, 1927; Persson, 1970).

S46 – Vicinity Russkaya (Akhomten) Bay, ~52°25' N, 158°25' E – окрестности бух. Русская (Ахомтен) (Melin, 1924; Moeller, 1927; Persson, 1970).

S47 – Assatcha Mt., ~52°21' N, 157°50' E – г. Асача (Melin, 1924; Moeller, 1927).

S48 – Upper Savan River – верхнее течение р. Саван (Moeller, 1927).

S49 – Shadutka vol., including upper Shadutka River, ~52°04' N, 157°43' E – вул. Ходутка, включая верхнее течение р. Ходутка (Moeller, 1927; Persson, 1970).

S50 – Ksudach vol., ~51°49' N, 157°40' E – вул. Ксудач (Moeller, 1927).

S51 – Vicinity Shadutka Bay, 51°46' N, 158°22' E, alt. 5-30 m – окрестности бух. Ходутка (author data).

S52 – Vicinity Golygino Settl., including lower Opala River – окрестности бывшего пос. Гольгино, включая низовья р. Опала (Moeller, 1927).

S53 – Sahach vol., including upper Unkanakchek River – вул. Сахач, включая верхнее течение р. Унканакчек (Melin, 1924; Moeller, 1927; Persson, 1970).

S54 – Vicinity Settl. Ozernoi, including lower Ozernaj River and lower Javina River, ~51°30' N, 156°30' E, alt. ~20 m – окрестности пос. Озерной, включая низовья р. Озерная и низовья р. Явинской (Moeller, 1927; Persson, 1970; Czernyadjeva, Potemkin, 2002).

S55 – Koshelevskiy vol., including vicinity Paushchetka Settl., lower Vtoraya, Tret'ya, Chetvertaya, Holodnaya Rivers, ~51°31' N, 156°39' E, alt. 10-1000 m – вул. Кошелевский, включая окр. пос. Паужетка, низовья рр. Вторая, Третья, Четвертая, Холодная (Czernyadjeva, Potemkin, 2002; data of E. Ignatova).

S56 – Lower Kambolnaya River, including Toporkoff Island, ~51°10' N, 156°43' E alt. ~30m – низовья р. Камбальная, включая о. Топорков (Melin, 1924; Moeller, 1927; Czernyadjeva, Potemkin, 2002).

S57 – Cape Lopatka, ~50°54' N, 156°39' E alt. ~5m – мыс Лопатка (Moeller, 1927).

Anacamptodon kamchaticum Czernyadjeva – **W10**: 17, **E27**: 36,

Andreaea alpestris (Thed.) Sharp – **C18**: 20, **S44**: 22. – *nivalis* Hook. – **S43**: 8, **S44**: 22, **S46**: 27, **S55**: 15. – *rupestris* Hedw. var. *papillosa* (Lindb.) Podp. – **N1**: 10, **M14**: 36, **E29**: 36, **S55**: 15.

– *rupestris* Hedw. var. *rupestris* – **W10**: 14, **M17**: 8, **C18**: 20, **E27**: 36, **E29**: 36, **S41**: 16, **S55**: 15.

Anomobryum julaceum (P. Gaertn. et al.) Schimp. var. *concinatum* (Spruce) Lindb. – **E29**: 36, **E31**: 36. *Anomodon longifolius* (Brid.) C. C. Hartm. – **W9**: 28.

– *viticulosus* (Hedw.) Hook. et Taylor – **W10**: 14. *Aongstroemia longipes* (Sommerf.) B. S. G. – **E33**: 36. *Arctoa fulvella* (Dicks.) B.S.G. – **M17**: 8, **E29**: 36, **S41**: 16, 27, **S44**: 8, 22, **S55**: 15.

Atrichum tenellum (Roell) B.S.G. – **W11**: 16.

Aulacomnium palustre (Hedw.) Schwaegr. var. *palustre* – **N1**: 10, 33, **W10**: 14, **W11**: 16, **W12**: 27, **W6**: 33, **W9**: 36, **M14**: 36, **M15**: 33, 36, **M17**: 8, 36, **C18**: 20, **C20**: 36, **C21**: 32, **C22**: 32, **C23**: 32, **C24**: 32, **C25**: 21, **E26**: 36, **E27**: 36, **E28**: 36, **E29**: 36, **E30**: 36, **E31**: 36, **E34**: 9, 30, 32, **E35**: 32, **E36**: 32, **E37**: 23, 27, 32, **S41**: 16, 27, **S51**: 36,

S53: 27, **S55**: 15, **S56**: 15.

– *palustre* (Hedw.) Schwaegr. var. *imbricatum* B. S. G. – **E26**: 36.

– *turgidum* (Wahlenb.) Schwaegr. – **N1**: 10, **W10**: 14, **M15**: 36, **M17**: 8, 36, **E26**: 36, **E29**: 36, **E31**: 36, **E34**: 32, **E37**: 32, **E36**: 32, **S43**: 8, 27, **S45**: 27, **S55**: 15, **S56**: 15.

Barbula cf. *convoluta* Hedw. – **M15**: 36,

– *ungiculata* Hedw. – **W10**: 14.

Bartramia ithyphylla Brid. – **N1**: 10, **W10**: 14, **M15**: 33, **M17**: 8, 36, **C25**: 21, **E27**: 36, **E29**: 36, **E31**: 36, **E37**: 4, **S51**: 36, **S55**: 15.

– *pomiformis* Hedw. – **W10**: 14, **M15**: 33, 36, **M17**: 8, **C18**: 20, **C20**: 8, **C25**: 21, **E27**: 36, **E29**: 36, **E37**: 4, 8, **S38**: 8, **S41**: 16, **S51**: 36.

Bartramiopsis lescurii (James) Kindb. – **W5**: 7, **W10**: 14, **E34**: 7, **E35**: 32, **E37**: 32, **S39**: 8.

Brachytheciastrum collinum (Schleich. ex Muell. Hal.) Ignatov et Huttunen – **E29**: 36.

– *velutinum* (Hedw.) Ignatov et Huttunen – **E37**: 27.

Brachythecium albicans (Hedw.) B.S.G. – **W9**: 28, **M17**: 8, **C25**: 21, **E29**: 36, **E31**: 36.

– *buchananii* (Hook.) A. Jaeger – **C18**: 20.

– **campestre* (Muell. Hal.) B.S.G. – **W5**: 25.

- *cirrosomum* (Schwaegr.) Schimp. – E31: 36.
- *erythrorrhizon* B.S.G. s.l. – W9: 28, W10: 14, M15: 36, C18: 20, C19: 20, C25: 21, E29: 36, S41: 16.
- *mildeanum* (Schimp.) Schimp. ex Milde – W8: 25, W9: 28, M15: 36, C18: 20, C25: 21, E34: 36, S41: 16, S55: 15, S56: 15.
- *rivulare* B.S.G. – W8: 25, W9: 28, W10: 14, W11: 16, M15: 33, 36, C18: 20, C25: 21, E27: 36, E28: 36, E29: 36, E33: 36, E34: 9, S38: 27, S41: 16, S42: 27, S55: 15.
- *rotaeanum* De Not. – W9: 28, W10: 14, W11: 16, C25: 21, S41: 16.
- *salebrosum* (F. Weber et D. Mohr) Schimp. – N1: 10, W4: 25, W5: 25, W8: 25, W9: 28, W10: 14, W11: 15, M15: 33, 36, C18: 20, C19: 20, C25: 21, E28: 36, E29: 36, E33: 36, E34: 30, E37: 27, S41: 16, S42: 27, S55: 15, S56: 15.
- *turgidum* (C. C. Hartm.) Kindb. – E29: 36, E31: 36, S54: 15, S55: 15.
- *udum* (J. I. Hagen) J. I. Hagen – E29: 36.
- Breidleria pratensis* (L. F. Koch ex Spruce) Loeske – N1: 10, W11: 16, S41: 16, S55: 15, Error: 30.
- Bryhnia hultenii* Bartr. – W9: 28, W10: 14, W11: 16, E37: 29, S41: 16, S51: 36, S55: 36.
- *novae-angliae* (Sull. et Lesq.) Grout. – W2: 25, W4: 25, W9: 25, 28, W10: 14, C25: 21, E37: 29, S49: 29, S54: 15, S55: 15. Many specimens of this species don't have spine in end of nerve and can be classified as intermediate between *B. novae-angliae* and *B. hultenii*. More detailed studies are essential for specimens of *Bryhnia* from Far East.
- Bryoerythrophyllum recurvirostrum* (Hedw.) P.C. Chen – W9: 28, W10: 14, M17: 8, C18: 20, C20: 8, C25: 21, E28: 36, E29: 36, E31: 36, E34: 9, E37: 4, 8, S55: 15.
- Bryoxiphium norvegicum* (Brid.) Mitt. var. *japonicum* (Berggr.) A. et D. Loeve – W5: 25, M17: 36, C20: 8, E27: 36, E29: 36, E30: 36, E34: 9, E36: 37, S41: 16. The length of excurrent costa of perichaetial leaves differs significantly even within a specimen, so it is difficult to classify many specimens between var. *norvegicum* and var. *japonicum*.
- Bryum alpinum* J. Huds. ex With. – S44: 22.
- *amblyodon* Muell. Hal. – W10: 14, E29: 36, E37: 35, S41: 16, S54: 27, S55: 15.
- *archangelicum* B.S.G. – W10: 14, E29: 36.
- *argenteum* Hedw. – W10: 14, W11: 16, M15: 33, C18: 20, C20: 36, E29: 36, E31: 36, E34: 9, E37: 4, S38: 36, S41: 16.
- *bimum* (Schreb.) Turner – C25: 21,
- *caespitium* Hedw. – C25: 21, E29: 36, E37: 23.
- *capillare* Hedw. – W9: 36, E29: 36, E32: 8, E37: 34, 29, S41: 16.
- *creberrimum* Taylor – M15: 36, C25: 21, E29: 36, S41: 16.
- *cryophilum* O. Maort – C25: 21.
- *cyclophyllum* s.l. (Schwaegr.) B.S.G. – M17: 36, C25: 21, S41: 16, S55: 15.
- *elegans* Nees ex Brid. – M15: 36, S44: 22.
- *intermedium* (Brid.) Blandow – C25: 21, E37: 35, S44: 22.
- *laevifilum* Syed – W11: 16, C18: 20, C25: 21, S41: 16, S44: 22.
- *lonchocaulon* C. Muell. – W9: 36, E29: 36,
- *pallens* Sw. – C25: 21.
- **pallescens* Scheich. ex Schwaegr. – E32: 8, E37: 4.
- *pseudotriquetrum* (Hedw.) P. Gaertn. et al. – N1: 10, W9: 28, W10: 14, W11: 16, M15: 33, 36, M17: 36, C25: 21, S41: 16, S44: 22, S55: 15.
- *schleicheri* Schwaegr. – W10: 14, M16: 29, M17: 36, C25: 21, E27: 36, E29: 36, E34: 9, E37: 35, 29, S41: 16, S42: 27, S44: 22, S55: 15. Some authors pointed *B. schleicheri* var. *latifolium* (Schwaegr.) Schimp for the Kamchatka region. Author according to Zolotov, 2000, includes var. *latifolium* in the typical variety.
- **subneodamense* Kindb. – W12: 27,
- **uliginosum* (Brid.) B.S.G. – W12: 27.
- *weigeli* Spreng. in Bischler – W10: 14, M14: 36, C25: 21, E27: 36, E34: 9, S44: 22, S55: 15.
- Bucklandiella microcarpa* (Hedw.) Bednarek-Ochyra et Ochyra – C25: 21, E29: 36, E34: 9, S41: 16, Error: 33.
- *nitidula* (Cardot) Bednarek-Ochyra et Ochyra – W10: 36.
- *sudetica* (Funck) Bednarek-Ochyra et Ochyra – N1: 10, W10: 14, M15: 36, E29: 36, S41: 16, S44: 22, S55: 15.
- *sudetica* f. *kindbergii* (Frisvoll) Bednarek-Ochyra et Ochyra – S44: 22, S55: 15.
- Buxbaumia aphylla* Hedw. – M17: 7, 36, S41: 16.
- Callicladium haldanianum* (Grev.) H.A. Crum – W9: 28, W10: 14, W11: 16, S41: 16.
- Calliergon cordifolium* (Hedw.) Kindb. – N1: 33, 10, W3: 25, W9: 28, W10: 14, W11: 16, W12: 27, M17: 36, C18: 20, C25: 21, E34: 9, 36, E37: 27, S38: 36, S41: 16, S48: 27, S50: 27, S51: 36, S55: 15.
- *giganteum* (Schimp.) Kindb. – W9: 36, E37: 27, 33, S46: 27.
- *megalophyllum* Mikut. – S51: 36.
- *richardsonii* (Mitt.) Warnst. – W10: 14, S56: 15.
- Calliergonella cuspidata* (Hedw.) Loeske – M15: 36, E34: 36, E36: 37, E37: 23, S56: 15.
- *lindbergii* (Mitt.) Hedenaes – W10: 14, M14: 36, C19: 20, C20: 36, C25: 21, E29: 36, S38: 36, S41: 16, S50: 27, S55: 15.
- Campyliadelphus chrysophyllus* (Brid.) Kanda – M15: 33, C25: 21, E29: 36, E31: 36, S41: 16, S55: 15.
- Campylidium hispidulum* (Brid.) Ochyra – W9: 28, W10: 14, W11: 16, C18: 20, C25: 21, E28: 36, E29: 36, S41: 16.

- *sommerfeltii* (Myr.) Ochyra – **N1: 10, W9: 28, C18: 20, C25: 21, E34: 9, 30, S41: 16, S55: 15**. The differences of *C. sommerfeltii* and *C. hispidulum* in material from Kamchatka are rather small, so it is anticipated, that after a revision they may be combined.
- Campyllum protensum* (Brid.) Kindb. – **C25: 21**.
- *stellatum* (Hedw.) C. E. O. Jensen – **N1: 10, E27: 36, E29: 36, E31: 36, E37: 27, 33, S51: 36, S56: 15**.
- Campylopus atrovirens* De Not. – **S55: 38**.
- *subulatus* Schimp. – **E31: 36, S38: 38, S55: 38**.
- *schimperii* Milde – **W10: 14**.
- Ceratodon heterophyllus* Kindb. – **C25: 21, S44: 22**.
- *purpureus* (Hedw.) Brid. – **N1: 10, W9: 28, W10: 14, W11: 16, W12: 27, M13: 36, M15: 33, 36, M17: 8, 36, C18: 20, C19: 20, C20: 8, 36, C25: 21, E26: 8, 36, E27: 36, E28: 36, E29: 36, E30: 36, E31: 36, E32: 8, E33: 36, E34: 9, E37: 27, 34, 35, S38: 36, S40: 27, S41: 16, S43: 27, S44: 8, 22, S46: 27, S51: 36, S54: 15, S55: 15, S56: 15**.
- Cinclidium latifolium* Lindb. – **S56: 15**.
- *stygium* Sw. – Warnstorf 1911-17: without location; **E31: 36, S56: 15**.
- *subrotundum* Lindb. – **E34: 36, S51: 36**.
- Claopodium pellucinerve* (Mitt.) Besch. – **W10: 14, S51: 36**.
- Climacium dendroides* (Hedw.) F. Weber et D. Mohr. – **N1: 10, W3: 25, W4: 25, W9: 28, W10: 14, W11: 16, W12: 27, M15: 33, 36, M17: 8, 36, C18: 20, C19: 20, C20: 8, C23: 32, C25: 21, E27: 36, E28: 36, E29: 36, E30: 36, E32: 8, E34: 9, 30, E35: 32, E36: 32, E37: 23, 27, 32, 34, S38: 27, 32, 36, S41: 16, 27, S42: 27, S45: 27, S48: 27, S50: 27, S53: 27, S56: 27, 15**.
- *japonicum* Lindb. – **W10: 14, W11: 16, Error: 30**.
- Cnestrnum schistii* (F. Weber et D. D. Mohr) J. I. Hagen – **C18: 20**.
- Codiophorus brevisetus* (Lindb.) Bednarek-Ochyra et Ochyra – **W10: 36, M15: 36, E29: 36, S41: 36, S44: 36, S55: 36**.
- *carinatus* (Cardot) Bednarek-Ochyra et Ochyra – **W10: 2**.
- *corrugatus* Bednarek-Ochyra et Ochyra – **W10: 36, M15: 36, E29: 36, E34: 3, E36: 3, S41: 36, S44: 36**.
- *fascicularis* (Hedw.) Bednarek-Ochyra et Ochyra – **E29: 36, E37: 8, S55: 15, Error: 14, 16, 22, 27, 33**.
- Conostomum tetragonum* (Hedw.) Lindb. – **N1: 10, M17: 36, E29: 36, E37: 4, S55: 15**.
- Coscinodon cribrosus* (Hedw.) Spruce – **W10: 14**.
- Cratoneuron filicinum* (Hedw.) Spruce – **N1: 10, W10: 14, C21: 37, C25: 21, E28: 36, E34: 9, 30, E37: 37, S38: 27, S41: 16, S54: 15, S55: 15**.
- *? *Ctenidium molluscum* (Hedw.) Mitt. – **E37: 34**.
- Cynodontium asperifolium* (Lindb. et Arnell) Paris – **E26: 36**.
- *strumiferum* (Hedw.) Lindb. – **W9: 28, M15: 36, C18: 20, E26: 36, E29: 36, S41: 16, S43: 27, S55: 15**.
- *tenellum* (B.S.G.) Limpr. – **M13: 36, C18: 20, E26: 36**.
- * *Cyrtomnium hymenophyllum* (B.S.G.) Holmen – **M16: 29**.
- Dichelyma fulcatum* (Hedw.) Myrin – **M17: 1, E37: 37**.
- Dichodontium pellucidum* (Hedw.) Schimp. – **W9: 28, M17: 8, C25: 21, E27: 36, E29: 36, E33: 36, S41: 16, S54: 15**.
- Dicranella cerviculata* (Hedw.) Schimp. – **N1: 10, W6: 25, 33, W9: 28, W10: 14, W12: 27, M15: 36, S41: 16, S44: 22, S55: 15**.
- *crispa* (Hedw.) Schimp. – **C18: 20, C19: 20**.
- *heteromalla* (Hedw.) Schimp. – **W6: 33, M15: 33, S55: 15**.
- *palustris* (Dicks.) Crundw. – **W10: 14, M15: 36, C25: 21, E27: 36, S41: 27, S44: 8, 22, S46: 27, S51: 36, S55: 15**.
- * *schreberiana* (Hedw.) H.A. Crum et L. E. Anderson – **E37: 4**.
- *subulata* (Hedw.) Schimp. – **N1: 10, C19: 20, C25: 21, E26: 36, E29: 36, S41: 16, S44: 22, S55: 15, Error: 33**.
- *varia* (Hedw.) Schimp. – **W11: 16**.
- Dicranodontium denudatum* (Brid.) E. Britton – **W9: 28, W10: 14, M17: 8, S41: 16**.
- Dicranum acutifolium* (Lindb. et H. Arnell) C. Jens. ex J. G. J. G. Weinm. – **N1: 10, C21: 29, C25: 21, E29: 36, E31: 36, E34: 30, S55: 15**.
- *bergeri* Blandow in Starke – **N1: 10, W6: 33, W10: 14, W11: 16, W12: 27, M13: 36, M17: 8, 36, C19: 20, C25: 21, E34: 9, 30, 36, E37: 29, S41: 16, S42: 27, S52: 27, S55: 15**.
- *bonjeanii* De Not. – **W10: 14, M15: 33, 36, C18: 20, C19: 20, C25: 21, E27: 36, E29: 36, E30: 36, E34: 30, 36, E37: 36, S41: 16, S51: 36, S55: 15**.
- *brevifolium* (Lindb.) Lindb. – **N1: 10, M15: 36, C18: 20, C19: 20, E26: 36, E27: 36, E29: 36, E31: 36, E34: 30, E37: 37, S41: 36, S55: 15**.
- *elongatum* Schleich. ex Schwaegr. – **N1: 33, 10, W6: 33, W12: 27, M13: 36, E29: 36, E31: 36, E32: 8, E34: 30, 36, S41: 16, S43: 27, S55: 15**.
- *flagellare* Hedw. – **E26: 36, E30: 36**.
- *flexicaule* Brid. – **S46: 27, C25: 21**.
- *fragilifolium* Lindb. – **W8: 25, W9: 28, W10: 14, W11: 16, M17: 36, C20: 29, 36, E26: 36, E27: 36, E30: 36, E32: 29, E34: 9, S41: 16, S51: 36, S55: 15**.
- *fuscescens* Turner – **N1: 33, 10, W3: 25, W4: 25, W10: 14, W11: 16, W12: 27, M15: 36, M17: 36, C18: 20, C19: 20, C20: 36, C21: 27, C25: 21, E26: 8, 36, E29: 36, E30: 36, E31: 36, E33: 36, E34: 30, E36: 36, E37: 23, 27, S41: 16, S45: 27, S46: 27, S47: 27, S49: 27, S55: 15**.

- **groenlandicum* Brid. – S54: 29, Error: 27.
 — *japonicum* Mitt. – W11: 36, C25: 21, Error: 30.
 — *laevidens* R. S. Williams – E26: 36.
 — *leioneuron* Kindb. – M15: 33, E29: 36, E31: 36, S41: 16.
 — *majus* Sm. var. *majus* – N1: 10, W9: 36, W10: 14, W11: 16, W12: 27, 25, M14: 36, M15: 33, 36, M17: 36, C18: 20, C19: 20, C20: 36, C22: 27, C25: 21, E26: 8, 36, E27: 36, E29: 36, E30: 36, E33: 36, E34: 9, 30, E37: 27, S41: 16, S42: 27, S43: 27, S46: 27, S49: 27, S51: 36, S53: 27, S54: 15, S55: 15, S56: 15, 27.
 — *majus* Sm. var. *orthophyllum* A. Braun ex Milde – W9: 36, W10: 14, W11: 16, M13: 36, E29: 36, S41: 16, S51: 36.
 — *montanum* Hedw. – W9: 28, W10: 14, W11: 16, M15: 33, M17: 36, C18: 20, C19: 20, C20: 29, 36, C21: 29, C25: 21, E26: 36, E27: 36, S41: 16, S51: 36, S53: 29.
 — **muehlenbeckii* B.S.G. – W2: 25, M15: 33, Error: 29.
 — *polysetum* Sw. – M15: 33, 36, M17: 36, C18: 20, C20: 29, 36, C21: 27, E26: 36, E30: 36, E34: 30, E37: 4, 29.
 — *scoparium* Hedw. – W3: 25, W10: 14, W11: 16, M15: 36, C25: 21, E29: 36, E34: 9, 30, E36: 27, E37: 27, 34, 35, S39: 8, S40: 27, S42: 27, S45: 27, S48: 27, S52: 27, S55: 15.
 — *spadiceum* J. E. Zetterst. var. *spadiceum* – N1: 33, W6: 33, C25: 21, E29: 36, E31: 36, E34: 9, M15: 36, S55: 15, Error: 27.
 — *spadiceum* J. E. Zetterst. var. *subscabrifolium* Schljakov – E29: 36.
 — *spurium* Hedw. – W7: 25, S41: 16.
 — **tauricum* Sapehin – C21: 29, S53: 27.
Didymodon asperifolius (Mitt.) H. A. Crum et al. – E31: 36.
 — *icmadophilus* (Schimp. ex Muell. Hal.) K. Saito – E29: 36.
 — *gaochienii* B.C. Tan et Y. Jia – W9: 28.
 — *peroptus* Broth. – E29: 36.
Diphysium foliosum (Hedw.) Mohr – W10: 14.
Distichium capillaceum (Hedw.) B.S.G. – N1: 10, W5: 25, W10: 14, M15: 33, M16: 29, M17: 8, 36, C18: 20, C25: 21, E27: 36, E29: 36, E32: 8, E34: 9, E37: 34, S51: 36, S55: 15.
 — **inclinatum* (Hedw.) B.S.G. – E34: 9.
Ditrichum cylindricum (Hedw.) Grout – N1: 10, W9: 25, W10: 14, W11: 16, C18: 20, S41: 16, S44: 22.
 — *flexicaule* (Schwaegr.) Hampe – N1: 33, M16: 29, C18: 20, C22: 29, E27: 36, E29: 36, E31: 36, S41: 16, S55: 15.
 — **heteromallum* (Hedw.) E. Britton – W6: 33.
 — *lineare* (Sw.) Lindb. – W11: 16, E29: 36, S44: 22.
 — *pusillum* (Hedw.) Hampe – C25: 21, S44: 22.
Drepanocladus aduncus (Hedw.) Wartn. – N1: 10, M14: 36, M15: 33, 36, E27: 36, E28: 36, E34: 9, S44: 8.
 — *arcticus* (Williams) Hedenaes – S55: 15.
 — *polycarpus* (Blandow ex Voit) Warnst. – W11: 16, C18: 20, C25: 21, E33: 36, S41: 16.
 — *polygamus* (B.S.G.) Hedenaes – N1: 10, C22: 27, C25: 21, E27: 36, E28: 36, E29: 36, E34: 36.
 — **sendtneri* (Schimp. ex Muell. Hal.) Warnst. – E37: 27.
Echinophyllum sachalinensis (Lindb.) O'Brian – W3: 37, W5: 25, E27: 36, E34: 36, E37: 37.
Encalypta alpina Sm. – E29: 36.
 — **ciliata* Hedw. – M17: 8.
 — *rhaptocharpa* Schwaegr. – W10: 14, C18: 20, E29: 36, E31: 36, E32: 8, E34: 9.
 — **vulgaris* Hedw. – E37: 34.
Entodon concinnus (De Not.) Paris – M15: 36, E31: 36.
 — *rubicundus* (Mitt.) A. Jaeger et Sauerb. – M15: 36.
Eurhynchiadelphus eustegius (Besch.) Ignatov et Hut-tonen – W10: 36.
Eurhynchiastrum pulchellum (Hedw.) Ignatov et Hut-tunen – C18: 20, C20: 8, C25: 21, E29: 36, E34: 9, S41: 16, S55: 15, S56: 15.
Fissidens adianthoides Hedw. – C19: 20, S52: 27.
 — *bryoides* Hedw. – M16: 29, C20: 8, C18: 20, E29: 36, S41: 16.
 — *dubius* P. Beauv. – W10: 14, S41: 16.
 — *osmundoides* Hedw. – N1: 10, C25: 21, E29: 36, E31: 36, S38: 1.
 — *viridulus* (Sw.) Wahlenb. – E29: 36.
**Fontinalis antipyretica* Hedw. var. *gracilis* (Lindb.) Schimp. – W6: 33.
 — *antipyretica* Hedw. var. *antipyretica* – W7: 25, W11: 16.
 — *hypnoides* C. C. Hartm. – W12: 27, C25: 21, E34: 9.
Funaria hygrometrica Hedw. – N1: 10, W11: 16, M17: 8, C20: 36, C21: 32, C22: 32, C23: 27, 32, C25: 21, E27: 36, E28: 36, E33: 36, E34: 9, 32, E37: 34, 23, 32, S38: 36, S41: 16, S55: 15, S56: 15.
Grimmia alpestris (F. Weber et D. Mohr) Schleich. ex Nees. – E29: 24, S44: 22, S55: 15.
 — *anomala* Hampe ex Schimp. – E28: 37.
 — **donniana* Sm. – E37: 24, Error: 10.
 — *hartmanii* Schimp. – W10: 14.
 — *incurva* Schwaegr. – E29: 24, S55: 15.
 — *longirostris* Hook. – W10: 14, M15: 24, E29: 24.
 — *mollis* Bruch et Schimp. – E29: 36, S55: 36.
 — **ovalis* (Hedw.) Lindb. – M15: 33.
 — *reflexidens* Muell. Hal. – C25: 21, E29: 24, S46: 27.
Helodium blandowii (F. Weber et D. Mohr) Warnst. – N1: 33, W6: 33, W9: 36, W10: 14, W11: 16, M13: 36, M15: 33, C20: 36, C25: 21, E26: 36, E27: 36, E28: 36, E32: 27, E34: 9, E37: 23, 33, S56: 15, 27.

- Hennediella heimii* (Hedw.) R.H. Zander var *arctica* (Lindb.) R.H. Zander – E29: 36.
- **Herzogiella adscendens* (Hedw.) Z. Iwats. et W.B. Schofield – E37: 29, M16: 29, S39: 8.
- Heterocladium dimorphum* (Brid.) B.S.G. – M15: 33, M17: 8, C25: 21, E34: 36, E35: 37.
- *?*Homalothecium lutescens* (Hedw.) Robins. – E37: 34, S48: 27.
- Hygroamblystegium humile* (P. Beauv.) Vanderpoorten – W9: 28, W10: 14, S56: 27.
- **tenax* (Hedw.) Jenn. – M17: 8.
- Hygrohypnella duriuscula* (De Not.) Ignatov et Ignatova – N1: 10, W10: 14, E28: 36, S41: 16, S44: 22.
- *ochracea* (Turner ex Wilson) Ignatov et Ignatova – N1: 5, 10, W10: 14, W11: 16, M14: 36, M17: 36, C18: 20, C20: 8, C25: 21, E33: 36, E37: 29, S38: 27, S41: 16, S42: 27, S44: 8, 22, S55: 15.
- Hygrohypnum bestii* Renauld & Bryhn – N1: 13, W10: 14, C18: 20, E27: 36, E28: 36, E36: 13, E37: 13, S55: 13.
- *luridum* (Hedw.) Jenn. – M17: 36, C18: 20, C25: 21.
- Hylocomiastrum pyrenaicum* (Spruce) M. Fleisch. – W9: 28, W10: 14, W11: 16, M15: 36, M16: 29, M17: 8, C25: 21, E27: 36, E29: 36, E34: 36, S41: 16, S55: 15.
- Hylocomium splendens* (Hedw.) B.S.G. var. *obtusifolium* (Geh.) Paris – M17: 8, E29: 36, E31: 36.
- *splendens* (Hedw.) B.S.G. var. *splendens* – N1: 10, W10: 14, W11: 16, M17: 8, 36, M15: 33, 36, C18: 20, C19: 20, C20: 36, E27: 36, E29: 36, E30: 36, E32: 27, E34: 9, E37: 34, S41: 16, S51: 36, S55: 15, S56: 15.
- Hymenoloma crispulum* (Hedw.) Ochyra – N1: 10, W10: 14, M14: 36, M15: 33, 36, M17: 8, C25: 21, E26: 36, E27: 36, E29: 36, S41: 16, S44: 22, S51: 36, S55: 15.
- *intermedia* (J. J. Amman.) Ochyra – E29: 36, S55: 15.
- Hypnum cupressiforme* Hedw. – W10: 14, M17: 36, C18: 20, E27: 36, E29: 36, E34: 30, E37: 29, 34, S51: 36.
- *?*imponens* Hedw. – W5: 25.
- Isopterygiopsis alpica* (Lindb. & Arnell) Hedenaes – C18: 20, S41: 16.
- *muelleriana* (Schimp.) Z. Iwats. – W10: 14, E27: 36, E29: 36, E32: 8.
- *pulchella* (Hedw.) Z. Iwats. – M13: 36, M16: 29, C18: 20, C25: 21, E29: 36, E34: 9, E37: 34.
- *?*Isothecium alopecuroides* (Dubois) Isov. – E37: 34.
- Iwatsukiella leucotricha* (Mitt.) W. R. Buck et H. A. Crum – W9: 28, W10: 14, W11: 16.
- Kiaeria blyttii* (Schimp.) Broth. – S44: 22, S55: 15.
- *falcata* (Hedw.) J. I. Hagen – S44: 22, S55: 15.
- *glacialis* (Berrg.) J. I. Hagen – M15: 36, E29: 36, S43: 27.
- *starkei* (F. Weber et D. Mohr) J. I. Hagen – E29: 36, S41: 16, S44: 8, 22, S46: 27, S55: 15.
- Leptobryum pyriforme* (Hedw.) Wilson – N1: 10, W4: 25, W11: 16, M15: 36, M17: 36, C18: 20, C19: 20, C20: 8, 36, C22: 27, E26: 36, E27: 36, E28: 36, E29: 36, E30: 36, E33: 36, E34: 9, E37: 34, S38: 36, S41: 16, S44: 22, S55: 15.
- Leptodictyum riparium* (Schimp.) Warnst. – N1: 33, W10: 14, E28: 36, S44: 22, S55: 15, S57: 27.
- Lescuraea mutabilis* (Brid.) Lindb. – W10: 14, M15: 33.
- *incurvata* (Hedw.) Lawt. – N1: 10, M15: 33, C25: 21, E37: 34.
- *patens* (Lindb.) Arnell et C. Jens. – N1: 10, M14: 36, C18: 20, S55: 15.
- *radicosa* (Mitt.) Moenk. – W10: 14, S55: 15.
- *secunda* Arnell – C25: 21, S38: 27, S45: 27.
- Leskea polycarpa* Hedw. – N1: 10, W10: 14, C25: 21, S44: 8.
- **Limprichtia cossonii* (Schimp.) L. E. Anderson et al. – N1: 33, E37: 27.
- *revolvens* (Sw.) Loeske – N1: 10, M17: 36, E29: 36, E31: 36, E34: 36, E36: 33, E37: 33, S51: 36, S55: 15, S56: 15.
- **Loeskeobryum brevirostre* (Brid.) M. Fleisch. in Broth. – S45: 27.
- Loeskyppnum badium* (C. C. Hartm.) Paul. – M17: 8, E29: 36, E31: 36, E37: 33.
- **Meesia longiseta* Hedw. – Kabiersch, 1937 (1938) – without location.
- *triquetra* (Richter) Aongstr. – E34: 36, E36: 33, S51: 36, S55: 15, S56: 15.
- *uliginosa* Hedw. – M17: 36, E29: 36, E31: 36, E37: 4, 34.
- Mnium laevinerve* Cardot – W11: 16, S41: 16. This species was separated from *M. lycopodioides* by Savicz-Lyubitskaya & Smirnova (1970), Noguchi (1989), and Koponen (1981). Later Koponen (1994) combined them, due to numerous transitional specimens. In Kamchatkan material these taxa however are distinct, differing primarily in cells size (15-20 mm in *M. laevinerve*, 20-30 mm in *M. lycopodioides*), and also in always smooth costa in *M. laevinerve*.
- *lycopodioides* Schwaegr. (incl. *M. ambiguum* H. Muell.) – W9: 28, W10: 14, S41: 16. Czernyadjeva & Potemkin (2003) treated *M. ambiguum* as a separate species, but additional collections convinced us that these species are unseparable. Thus we follow Koponen (1994) who combined them.
- *marginatum* (Dicks.) P. Beauv. – C20: 8, C25: 21.
- *spinatum* (Voit.) Schwaegr. – W10: 14, M15: 33, S41: 16.
- *stellare* Hedw. – C18: 20, C25: 21.
- Myurella julacea* (Schwaegr.) B.S.G. – W10: 14, M15:

- 33, **E29:** 36, **E31:** 36, **E34:** 9, **S51:** 36.
 — *tenerrima* (Brid.) Lindb. — **E31:** 36, **E32:** 8.
 — *sibirica* (Muell. Hal.) Reimers — **C25:** 21, **E31:** 36.
Myuroclada maximowiczii (Borszcz. in Maxim.) Steere et W. B. Schofield — **W10:** 14, **S41:** 16.
Neckera pennata Hedw. — **E37:** 34, **M5:** 36.
Niphotrichum barbuloides (Cardot) Bednarek-Ochyra et Ochyra — **W10:** 36.
 — *canescens* (Hedw.) Bednarek-Ochyra et Ochyra — **N1:** 10, **W7:** 25, **W10:** 14,; **M15:** 33, 36, **M17:** 8, **C25:** 37, **C25:** 21, **E26:** 8, 36, **E29:** 36, **E31:** 36, **E32:** 8, **E33:** 36, **E34:** 9, **E35:** 37, **E37:** 27, 36, **S38:** 37, **S39:** 27, **S41:** 16, **S44:** 22, **S55:** 15.
 — *canescens* var. *latifolium* (C. E. O. Jensen) Bednarek-Ochyra et Ochyra — **W10:** 36.
 — *ericoides* (F. Weber ex Brid.) Bednarek-Ochyra et Ochyra — **W10:** 36, **C25:** 21, **E29:** 36, **E37:** 27, **S41:** 27, **S42:** 27, **S44:** 22.
 — *muticum* (Kindb.) Bednarek-Ochyra et Ochyra — **S44:** 22, **S55:** 15.
 — *panschii* (Muell. Hal.) Bednarek-Ochyra et Ochyra — **E29:** 36.
Ochyraea cochlearifolium (Venturi ex De Not.) Ignatov et Ignatova — **E29:** 36.
Oligotrichum aligerum Mitt. — **W11:** 19, **C25:** 19.
 — *hercynicum* (Hedw.) DC. — **W12:** 8, **M17:** 8, **C25:** 21, **E29:** 36, **S44:** 8, 22, **S55:** 15.
 — *parallelum* (Mitt.) Kindb. — **W10:** 14, **M14:** 36, **M15:** 33, **C25:** 21, **E27:** 36, **S39:** 8, **S41:** 16, **S44:** 22, **S46:** 27, **S55:** 15.
Onophorus compactus (B.S.G.) Schljakov — **E29:** 36, **E31:** 36.
 — *crispifolius* (Mitt.) Lindb. — **W9:** 28, **W10:** 14, **W11:** 16.
 — *wahlenbergii* Brid. — **N1:** 33, 10, **W9:** 36, **M17:** 36, **C18:** 20, **C20:** 8, 36, **E26:** 36, **E29:** 36, **E31:** 36, **E33:** 36, **E34:** 36, **E37:** 29, 34, **S41:** 16, **S55:** 15, **S56:** 15.
 — *virens* (Hedw.) Brid. var. *virens* — **N1:** 5, **E29:** 36, **E31:** 36, **E34:** 30, **Error:** 10, 15.
 — *virens* var. *serratus* (B.S.G.) Braithw. — **E29:** 36.
Orthothecium chryseum (Schwaegr.) B.S.G. — **M16:** 29, **E31:** 36.
 *?*Orthotrichum affine* Brid. — **E37:** 34.
 — *obtusifolium* Brid. — **W9:** 28, **M13:** 36, **M17:** 8, 36, **C18:** 20, **C19:** 20, **C20:** 8, **C25:** 21, **E27:** 36, **E28:** 36, **E37:** 29, **S41:** 16.
 — **pylaisii* Brid. — **M17:** 8.
 — *sordidum* Sull. et Lesq. — **W9:** 28, **W10:** 14, **W11:** 16, **M13:** 36, **M17:** 8, **C18:** 20, **C19:** 20, **C25:** 21, **E26:** 36, **E28:** 8, **E28:** 36, **E37:** 8, **S41:** 16, **S51:** 36.
 — **speciosum* Nees in Sturm — **M15:** 33.
Oxystegus tenuirostris (Hook. et Taylor) A.J.E. Smith — **N1:** 10, **W10:** 14, **M15:** 36, **C20:** 8, **C25:** 21.
Oxyrrhynchium hians (Hedw.) Loeske — **W9:** 28.
Paludella squarrosa (Hedw.) Brid. — **N1:** 5, 33, **W9:** 36, **W10:** 14, **W11:** 16, **M13:** 36, **M14:** 36, **M15:** 33, 36, **M17:** 1, **C25:** 21, **E31:** 36, **E34:** 9, 30, **E36:** 33, **E37:** 8, **S45:** 27, **S56:** 15.
 Palustriella commutata* (Hedw.) Ochyra — **E37: 4, 34.
Paraleucobryum enerve (Thed. in Hornem.) Loeske — **E29:** 36.
 — *longifolium* (Hedw.) Loeske — **W9:** 28, **W10:** 14, **M15:** 33, **C25:** 21, **E37:** 29, **S41:** 16.
Philonotis caespitosa Jur. — **N1:** 10, **W12:** 27, **C25:** 21, **S41:** 16, **S44:** 8, **S45:** 27, **S55:** 15.
 — *fontana* (Hedw.) Brid. — **N1:** 10, **W8:** 25, **M15:** 33, 36, **C25:** 21, **E33:** 36, **E34:** 9, 36, **E36:** 33, **S44:** 22, **S47:** 27, **S55:** 15.
 — *tomentella* Molendo — **N1:** 5, 10, **W10:** 14, **W11:** 16, **M14:** 36, **C18:** 20, **C25:** 21, **E29:** 36, **E31:** 36, **E33:** 36, **E34:** 36, **S41:** 16, **S44:** 22, **S45:** 27, **S46:** 27, **S51:** 36, **S55:** 15.
 — *yezoana* Besch. et Cardot ex Cardot — **S44:** 12, 22, **S55:** 12, 15.
Plagiomnium acutum (Lindb.) T. J. Kop. — **W8:** 25, **W9:** 25, 28, **W10:** 14, **W11:** 16, **M15:** 33, **M17:** 8, **C18:** 20, **E28:** 8, **E37:** 8, 27, **S41:** 16.
 — *affine* (Blandow) T. J. Kop. — **W10:** 14, **W12:** 27, **C25:** 21, **S53:** 27, **S56:** 27.
 — *curvatulum* (Lindb.) Schljakov — **N1:** 10, **W11:** 16, **M17:** 8.
 — *cuspidatum* (Hedw.) T. J. Kop. — **W9:** 28, **W11:** 16, **C18:** 20, **C25:** 21, **E28:** 8, **E28:** 36, **E34:** 9, **E37:** 27, 35, **S41:** 16.
 — *drummondii* (Bruch & Schimp.) T. J. Kop. — **S41:** 16.
 — **?elatum* (B.S.G.) T. J. Kop. — **C22:** 27.
 — *ellipticum* (Brid.) T. J. Kop. — **N1:** 10, **W9:** 36, **W10:** 14, **W11:** 16, **M15:** 33, 36, **M17:** 8, **C18:** 20, **C25:** 21, **E28:** 36, **E37:** 33, **S55:** 15, **S56:** 15.
 — *medium* (Bruch et Schimp.) T. J. Kop. — **W9:** 28, **W10:** 14, **W11:** 16, **M15:** 33, 36, **C18:** 20, **C19:** 20, **C21:** 27, **C25:** 21, **E37:** 8, **S41:** 16, **S55:** 15.
 — **rostratum* (Schrad.) T. J. Kop. — **E37:** 23, **S48:** 27.
 Plagiopus oederiana* (Sw.) H.A. Crum et L. E. Anderson — **E37: 23.
Plagiothecium cavifolium (Brid.) Z. Iwats. var. *cavifolium* — **W9:** 28, **W10:** 14, **M17:** 8, **W11:** 16, **C18:** 20, **C20:** 8, **C25:** 21, **E27:** 36, **E29:** 36, **E32:** 8, **E37:** 29, **S41:** 16, **S51:** 36, **S55:** 15.
 — *cavifolium* (Brid.) Z. Iwats. var. *imbricatum* Ukrainskaya — **W10:** 14.
 — *denticulatum* (Hedw.) B.S.G. — **N1:** 10, **W9:** 28, **W10:** 14, **W11:** 16, **C18:** 20, **C25:** 21, **E27:** 36, **E29:** 36, **E34:** 9, 36, **E37:** 23, 29, 36, **M15:** 33, 36, **M17:** 8, 36, **S39:** 8, **S41:** 16, **S44:** 22, **S45:** 27, **S46:** 27, **S53:** 27, **S53:** 27, **S55:** 15, **S56:** 15.
 — *euryphyllum* (Cardot et Ther.) Z. Iwats. — **W11:** 16, **S41:** 16, **S55:** 15.
 — *laetum* Schimp. — **N1:** 10, **W3:** 25, **W9:** 28, **W10:**

- 14, **W11:** 16, **M15:** 36, **M17:** 36, **C19:** 20, **E34:** 9, 36, **S41:** 16, **S51:** 36, **S55:** 15, **C18:** 20.
- *latebricola* B.S.G. – **W9:** 28, **C25:** 21, **S41:** 16.
- *nemorale* (Mitt.) A. Jaeger – **W9:** 28, **W10:** 14, **W11:** 16, **M15:** 36, **C25:** 21, **E27:** 36, **E37:** 29, **S41:** 16, **S46:** 27, 29, **S55:** 15.
- **plathyphyllum* Moenk. – **M15:** 33, **S45:** 29.
- Platydictya jungermannioides* (Brid.) H. A. Crum – **C25:** 21.
- Platygyrium repens* (Brid.) B.S.G. – **W9:** 28, **W10:** 14, **W11:** 16, **C25:** 21, **S41:** 16.
- Pleuroidium subulatum* (Hedw.) Rabenh. – **W10:** 14, **W11:** 16.
- Pleuroziopsis ruthenica* (J. G. Weinm.) Kindb. ex E. Britton – **W7:** 25, **W10:** 14, **W11:** 16, **E37:** 32, **S41:** 16.
- Pleurozium schreberi* (Brid.) Mitt. – **N1:** 10, **W6:** 33, **W9:** 28, **W10:** 14, **W11:** 16, **M13:** 36, **M15:** 33, 36, **M17:** 8, 36, **C20:** 36, **C25:** 21, **E26:** 36, **E27:** 36, **E29:** 36, **E30:** 36, **E31:** 36, **E34:** 9, 30, **E37:** 34, **S41:** 16, **S51:** 36, **S55:** 15, **S56:** 15.
- Pogonatum contortum* (Brid.) Lesq. – **W10:** 14, **W11:** 16, **E37:** 23.
- *dentatum* (Brid.) Brid. – **W6:** 33, **W10:** 14, **W11:** 16, **W12:** 8, **C19:** 20, **C23:** 32, **C25:** 21, **E26:** 8, **E29:** 36, **E34:** 9, **E36:** 32, **S41:** 16, **S43:** 8, **S55:** 15.
- *japonicum* Sull. et Lesq. – **W11:** 16, **C20:** 7, **E34:** 7, 9, 30, **E37:** 7, 32, **S55:** 15.
- *urnigerum* (Hedw.) P.Beauv. – **N1:** 10, **W12:** 8, **C19:** 20, **C25:** 21, **E27:** 36, **E28:** 8, **E29:** 36, **E31:** 36, **E34:** 9, 36, **E37:** 4, 8, 27, 32, 36, **S38:** 8, **S44:** 22.
- Pohlia andalusica* (Hoehnel) Broth. – **E31:** 36, **C25:** 21, **S44:** 22.
- *andrewsii* A.J. Shaw – **E29:** 36, **E32:** 8, **S41:** 16.
- *annotina* (Hedw.) Lindb. – **W10:** 14, **C25:** 21, **S41:** 16, **S44:** 22, **S55:** 15.
- *bulbifera* (Warnst.) Warnst. – **N1:** 10, **S41:** 16.
- *cardotii* (Renauld et Cardot) Broth. – **S44:** 22, 11, **S55:** 15, 11.
- *cruda* (Hedw.) Lindb. – **N1:** 10, **W10:** 14, **M15:** 33, 36, **M17:** 8, 36, **C18:** 20, **C19:** 20, **C20:** 8, **C25:** 21, **E26:** 8, 36, **E27:** 36, **E28:** 36, **E29:** 36, **E30:** 36, **E32:** 8, **E34:** 9, **E37:** 27, 34, **S39:** 8, **S41:** 16, **S51:** 36, **S55:** 15.
- *crudoides* (Sull. et Lesq.) Broth. – **W10:** 14, **M15:** 36, **C25:** 21, **E29:** 36, **E31:** 36, **S41:** 16, **S55:** 15.
- *drummondii* (Muell. Hal.) A. L. Andrews – **N1:** 10, **M14:** 36, **C25:** 21, **E29:** 36, **E31:** 36, **S41:** 16, **S44:** 22, **S46:** 29, **S55:** 15.
- *filum* (Schimp.) Mart. – **N1:** 10, **W10:** 14, **C25:** 21, **E26:** 36, **E29:** 36, **E33:** 36, **E37:** 36, **S44:** 22, **S55:** 15.
- *longicollis* (Hedw.) Lindb. – **W10:** 14, **M17:** 8, **E32:** 8, **S41:** 16.
- *nutans* (Hedw.) Lindb. – **N1:** 10, **W6:** 33, **W9:** 28, **W10:** 14, **W11:** 16, **W12:** 27, **M15:** 36, **M17:** 8, 36, **C18:** 20, **C19:** 20, **C20:** 36, **C25:** 21, **E26:** 8, 36, **E27:** 36, **E28:** 36, **E29:** 36, **E30:** 36, **E31:** 36, **E32:** 8, **E33:** 36, **E34:** 9, 30, **E37:** 4, 23, 27, **S41:** 16, **S43:** 27, **S44:** 22, **S46:** 27, **S51:** 36, **S54:** 15, **S55:** 15, **S56:** 15.
- *proliger* (Lindb. ex Breidl.) Lindb. ex Arnell – **W9:** 28, **W10:** 14, **W11:** 16, **C18:** 20, **C25:** 21, **C25:** 21, **E29:** 36, **S38:** 36, **S41:** 16, **S46:** 29, **S51:** 36.
- *tundrae* A. J. Shaw – **W11:** 18, **C18:** 18.
- *wahlenbergii* (F. Weber et D. Mohr) A.L. Andrews – **N1:** 10, **W9:** 28, **M14:** 36, **M15:** 36, **M17:** 36, **C18:** 20, **C22:** 27, **C25:** 21, **E27:** 36, **E28:** 36, **E29:** 36, **E33:** 36, **E34:** 9, 36, **E37:** 36, **S41:** 16, **S43:** 27, **S44:** 8, 22, **S55:** 15, **Error:** 33.
- Polytrichastrum alpinum* (Hedw.) G.L.Sm. – **N1:** 5, 10, **W6:** 33, **W9:** 28, **W10:** 14, **W11:** 16, **W12:** 8, **M14:** 36, **M15:** 33, **M17:** 8, **C18:** 20, **C19:** 20, **C20:** 8, **C23:** 32, **C25:** 21, **E26:** 8, **E27:** 36, **E28:** 8, **E29:** 36, **E31:** 36, **E33:** 36, **E34:** 9, 30, 32, **E35:** 32, **E36:** 32, **E37:** 8, 23, 27, 32, **S38:** 32, **S39:** 8, **S40:** 27, **S41:** 16, **S44:** 22, **S45:** 27, **S46:** 27, **S52:** 27, **S53:** 27, **S55:** 15, **S56:** 27.
- *formosum* (Hedw.) G.L.Smith – **W10:** 14, **E37:** 35.
- *longisetum* (Sw. ex Brid.) G.L.Smith – **N1:** 10, **W10:** 14, **W11:** 16, **W12:** 27, **M15:** 36, **C18:** 20, **C19:** 20, **C25:** 21, **E27:** 36, **E34:** 9, **E37:** 8, 32, **S41:** 16, **S45:** 27, **S53:** 27, **S56:** 27.
- **norvegicum* (Hedw.) Schljakov – **E34:** 9, **E37:** 27, **S56:** 27, **S57:** 27.
- *sexangulare* (Floerke ex Brid.) G.L.Smith – **N1:** 5, **M14:** 36, **M15:** 36, **C25:** 21, **E29:** 36, **E32:** 8, **E34:** 9, 32, **E37:** 4, **S41:** 16, **S44:** 8, 22, **S55:** 15.
- *sphaerothecium* (Besch.) Schljakov – **E31:** 36, **E34:** 9.
- Polytrichum commune* Hedw. – **N1:** 5, 33, **W6:** 10, 33, **W9:** 36, **W10:** 14, **W11:** 16, **M15:** 36, **M17:** 8, 36, **C18:** 20, **C19:** 20, **C20:** 8, **C20:** 36, **C21:** 27, 32, **C22:** 27, **C23:** 32, **C25:** 21, **E26:** 36, **E27:** 36, **E28:** 36, **E29:** 36, **E30:** 36, **E34:** 9, 30, **E35:** 32, **E36:** 32, **E37:** 4, 23, 27, 32, 34, **S38:** 32, **S41:** 16, **S42:** 27, **S43:** 27, **S44:** 22, **S45:** 27, **S46:** 27, **S47:** 27, **S49:** 27, **S54:** 15, **S55:** 15.
- *hyperboreum* R. Br. – **N1:** 10, **W3:** 36, **M13:** 36, **E26:** 36, **E34:** 30, **E37:** 36, **S55:** 15.
- *jensenii* I. Hagen – **W6:** 33, **W10:** 14, **W12:** 27, **M15:** 33, 36, **S44:** 22, **E34:** 9, **Error:** 30.
- *juniperinum* Hedw. – **N1:** 33, 10, **W6:** 33, **W9:** 28, **W10:** 14, **W11:** 16, **M15:** 33, **M17:** 36, **C18:** 20, **C19:** 20, **C20:** 8, 36, **C21:** 32, **C23:** 32, **C24:** 32, **C25:** 21, 32, 36, **E26:** 36, **E27:** 36, **E28:** 8, 36, **E29:** 36, **E30:** 36, **E31:** 36, **E32:** 8, **E33:** 36, **E34:** 9, 30, 32, **E36:** 27, 32, **E37:** 4, 27, 32, 34, 35, **S38:** 32, 36, **S41:** 16, **S43:** 27, **S44:** 22, **S48:** 27, **S49:** 27, **S52:** 27, **S54:** 15, **S55:** 15.

- *piliferum* Hedw. – N1: 10, M14: 36, M15: 36, M17: 8, 36, C18: 20, C20: 8, 36, C25: 21, 32, E26: 8, 36, E27: 36, E29: 36, E30: 36, E32: 8, E33: 36, E34: 9, 30, 32, E35: 32, E36: 32, E37: 8, 27, 32, 36, S38: 32, S41: 16, S43: 8, S44: 8, 22, S46: 27, S51: 36, S55: 15.
- *strictum* Brid. – N1: 10, 33, W5: 32, W6: 33, W10: 14, W12: 27, M13: 36, C25: 21, E27: 36, E29: 36, E34: 9, 30, 32, E35: 32, E36: 27, 32, E37: 32, S41: 16, S42: 27, S55: 15.
- **?swartzii* C. C. Hartm. – W2: 25.
- Pseudobryum cinclidioides* (Huebener) T. J. Kop. – N1: 10, W8: 25, W9: 28, W10: 14, W11: 16, M15: 36, C25: 21, E27: 36, E34: 9, 36, S41: 16, S45: 27, S51: 36, S56: 15.
- *?Pseudocalliergon lycopodioides* (Brid.) Hedenaes – N1: 33.
- *turgescens* (T. Jensen) Loeske – E31: 36.
- Pseudoleskeella nervosa* (Brid.) Nyh. – W9: 28, W10: 14, W11: 16, M15: 33, C18: 20, E27: 36, E28: 36, S38: 8, S41: 16, S51: 36.
- *papillosa* (Lindb.) Kindb. – E29: 36.
- *tectorum* (Funck ex Brid.) Kindb. in Broth. – C18: 20.
- Pseudotaxiphyllum elegans* (Brid.) Z. Iwats. – W10: 14, S55: 15.
- Psilopilum laevigatum* (Wahlenb.) Lindb. – N1: 5, S41: 16.
- Pterigynandrum filiforme* Hedw. – W10: 14, S51: 36.
- Ptilium crista-castrensis* (Hedw.) De Not. – N1: 10, W5: 25, W10: 14, M17: 36, C18: 20, C22: 27, S41: 16, S46: 27, S55: 15.
- Pylaisia polyantha* (Hedw.) B.S.G. – W9: 28, W10: 14, W11: 16, M15: 33, M17: 36, C18: 20, C19: 20, C20: 27, C25: 21, E26: 36, E28: 36, E34: 9, E37: 8, 34, S41: 16.
- *selwynii* Kindb. – W9: 28, S41: 16.
- *subcircinata* Cardot – W9: 28, W10: 14, W11: 16, C18: 20, C19: 20, S41: 16.
- Racomitrium lanuginosum* (Hedw.) Brid. – N1: 10, W10: 14, M13: 36, M17: 8, 36, E26: 36, E29: 36, E31: 36, E32: 8, E34: 9, 30, E36: 37, E37: 4, 36, S41: 27, S44: 22, S51: 36, S54: 15, S55: 15.
- Rauella fujisana* (Paris) Reimann – W9: 28, W11: 16.
- *Rhabdoweisia crispata* (Dicks.) Lindb. – M17: 8.
- Rhizomnium andrewsianum* (Steere) T. J. Kop. – S55: 15.
- *gracile* T. J. Kop. – C18: 20, S41: 16.
- *magnifolium* (Horik.) T. J. Kop. – N1: 10, W3: 25, W9: 28, W10: 14, W11: 16, M15: 36, C18: 20, C25: 21, E27: 36, S41: 16, S56: 15.
- *nudum* (E. Britton et R. S. Williams) T. J. Kop. – N1: 5, W9: 28, W10: 14, W11: 16, M15: 33, 36, C25: 21, E34: 9, E35: 6, E37: 29, S39: 8, S41: 16, S44: 22, Error: 30.
- *pseudopunctatum* (Bruch et Schimp.) T. J. Kop. – N1: 10, W9: 28, W10: 14, C18: 20, E34: 36, S51: 36, S55: 15.
- *punctatum* (Hedw.) T. J. Kop. – C25: 21, E37: 23, 27, S42: 27, S45: 27, S56: 27.
- *striatulum* (Mitt.) T. J. Kop. – W9: 28, S41: 16.
- Rhodobryum roseum* (Hedw.) Limpr. – W5: 25, W9: 28, W10: 14, W11: 16, M15: 33, 36, C18: 20, C19: 20, E27: 36, E30: 36, E34: 9, 30, S41: 16, S42: 27, S45: 27, S51: 36, S54: 27.
- Rhytidiadelphus squarrosus* (Hedw.) Warnst. – N1: 10, W6: 33, W9: 28, W10: 14, W11: 16, M15: 33, 36, M17: 8, C25: 21, E30: 36, E34: 36, E37: 34, S41: 16, S42: 27, S45: 27, S48: 27, S50: 27, S53: 27, S55: 15, S56: 15, 27.
- *subpinnatus* (Lindb.) T. J. Kop. – N1: 10, W3: 25, W4: 25, W5: 25, W8: 25, W10: 14, W11: 16, E27: 36, E35: 32, E37: 32, S41: 16, S45: 27, S52: 27, S55: 15.
- *triquetrus* (Hedw.) Warnst. – W6: 33, W10: 14, W12: 27, E27: 36, E37: 27, 32, 34, S51: 36, S55: 15, S56: 15.
- Rhytidium rugosum* (Hedw.) Kindb. – N1: 10, W10: 14, M15: 33, M17: 8, 36, C18: 20, C20: 36, C21: 32, E27: 36, E29: 36, E30: 36, E31: 36, E34: 32, 36, E37: 32, S51: 36, S52: 27, S55: 15.
- Rigidiadelphus robustus* (Lindb.) Nog. – W10: 14, W11: 16, S41: 16.
- Saelania glaucescens* (Hedw.) Brid. – M13: 36, M15: 33, M17: 1, C18: 20, C20: 8, E29: 36, E31: 36.
- Sanionia uncinata* (Hedw.) Loeske – N1: 10, 33, W2: 25, W3: 25, W9: 28, W10: 14, W11: 16, W12: 27, M13: 36, M14: 36, M15: 33, 36, M17: 8, 36, C18: 20, C19: 20, C20: 8, 36, C25: 21, E26: 8, 36, E27: 36, E28: 36, E29: 36, E30: 36, E31: 36, E32: 8, 27, E33: 36, E34: 9, 30, E37: 23, 27, 34, 35, 36, S38: 27, 36, S41: 16, S44: 8, 22, S45: 27, S46: 27, S51: 36, S54: 15, S55: 15, S56: 15, 27.
- Schistidium agassizii* Sull. et Lesq. – E31: 36.
- **?apocarpum* (Hedw.) B.S.G. – M15: 33, M17: 8, E34: 30. These records were made for this species *sensu lato*. All available collection however were reidentified to other species.
- *dupretii* (Ther.) W. A. Weber – E29: 36.
- *frigidum* H. H. Blom – W10: 36, E29: 36, E31: 36.
- *maritimum* (Turner) B.S.G. – S55: 15.
- *papillosum* Culm. – W10: 36, M15: 36, C18: 20, E29: 36.
- *plathyphyllum* (Mitt.) Perss. – C25: 21, E29: 36.
- *pulchrum* H. H. Blom – C25: 21.
- *rivulare* (Brid.) Podp. var. *rivulare* – W10: 14, C25: 21, E37: 4, S41: 16, S44: 22, S55: 15.
- *rivulare* (Brid.) Podp. var. *latifolium* (J. E. Zetterst.) H.A. Crum et L. E. Anderson – N1: 10, S55: 15.
- *trichodon* (Brid.) Poelt var. *nutans* Blom – M16: 39.

- Schistostega pennata* Hedw. – W9: 28, C18: 20, C19: 20, E34.: 9, E35: 6, M17: 7, 8, 36.
- Sciurohypnum glaciale* var. *dovrense* (Limpr.) Ochyra – E29: 36.
- *glaciale* (B.S.G.) Ignatov et Huttunen var. *glaciale* – C25: 21, Error: 25, 27.
- *latifolium* (Kindb.) Ignatov et Huttunen – M16: 29, E29: 36, E31: 36, E34: 9, Error: 15.
- *oedipodium* (Mitt.) Ignatov et Huttunen – W9: 28, W10: 14, C18: 20, C19: 20, C25: 21, E26: 36, E29: 36, E33: 36, E34: 30, S41: 16, S44: 22.
- *ornellanum* (Molendo) Ignatov et Huttunen – W9: 28.
- *plumosum* (Hedw.) Ignatov et Huttunen s.l. – C18: 20, C20: 8, C25: 21, E29: 36, S41: 16, S51: 36.
- *populeum* (Hedw.) Ignatov et Huttunen – W2: 25, C25: 21, E34: 30, E37: 23, S51: 36.
- *reflexum* (Starke) Ignatov et Huttunen – N1: 10, W3: 25, W4: 25, W9: 28, W10: 14, W11: 16, W12: 27, M15: 33, 36, M17: 36, C18: 20, C19: 20, C20: 36, C25: 21, E26: 36, E27: 36, E28: 36, E29: 36, E30: 36, E31: 36, E33: 36, E34: 9, 30, E36: 27, E37: 8, 27, 36, S38: 36, S39: 8, S40: 27, S41: 16, S42: 27, S43: 27, S44: 22, S45: 27, S46: 27, S51: 36, S53: 27, S54: 27, S55: 15, S56: 15.
- *starkei* (Brid.) Ignatov et Huttunen – N1: 10, W2: 25, W3: 25, W4: 25, W5: 25, W8: 25, W9: 25, 28, W10: 14, W11: 16, W12: 27, M15: 33, M17: 8, C18: 20, C19: 20, C25: 21, E26: 36, E27: 36, E29: 36, S39: 8, S41: 16, S44: 22, S55: 15.
- *unicifolium* (Broth. et Paris) Ochyra et Zarnowiec – C18: 20, C25: 21, E27: 36.
- Scorpidium scorpioides* (Hedw.) Limpr. – N1: 33, E34: 30, E37: 33, S51: 1, S56: 15.
- Sphagnum angustifolium* (Russow) C. E. O. Jensen – W9: 36, W10: 14, W11: 16, W12: 25, C23: 31, C25: 21, E34: 30, 31, E35: 31, E36: 31, E37: 31, S38: 31, S41: 16, S44: 22, S56: 15, 25.
- *balticum* (Russow) Russow ex C. E. O. Jensen – C22: 31, E36: 31, S44: 22, S56: 15.
- *capillifolium* (Ehrh.) Hedw. – W10: 14, W11: 16, M15: 36, E29: 36, E34: 9, 31, S41: 16, S56: 15.
- *centrale* Arnell et C. E. O. Jensen – W10: 14, S38: 31, S53: 25, S55: 15, S56: 15.
- *compactum* DC. in Lam. et DC. – W10: 14, M17: 8, E29: 36, E34: 9, 31, 36, E36: 31, E37: 31, S41: 16, S51: 36, S55: 15.
- *contortum* Schultz – W10: 14, E36: 31, S41: 16.
- *cuspidatum* Ehrh. ex Hoffm. – W10: 14.
- *fallax* (H. Klinggr.) Isov. – W10: 14, W11: 16, W12: 25, 31, E36: 31, S38: 31, S44: 22.
- *fimbriatum* Wilson in Wilson et Hook. f. – W11: 16, W12: 25, 31, E34: 9, 30, 31, 36, E36: 31, S38: 31, S41: 16, S44: 22, S55: 15.
- *flexuosum* Dozy et Molk. – W11: 16.
- *fuscum* (Schimp.) H. Klinggr. – W5: 31, W9: 31, 36, W10: 14, W11: 16, W12: 25, C23: 31, E34: 9, 30, 31, E35: 31, E36: 31, E37: 31, S38: 31, S41: 16, S51: 36.
- *girgensohnii* Russow – N1: 10, W8: 31, W9: 31, 36, W10: 14, M13: 36, M15: 36, M17: 8, 36, C22: 31, E29: 36, E32: 8, E34: 9, 30, 31, E35: 31, E36: 25, 31, E37: 31, S38: 31, S41: 16, S44: 22, S45: 25, S47: 25, S56: 25.
- **jensenii* H. Lindb. – E34: 31.
- *lindbergii* Schimp. ex Lindb. – W5: 31, W10: 14, W11: 16, W12: 25, E34: 31, 30, 36, E36: 31.
- *magellanicum* Brid. – W10: 14, W11: 16, W12: 25, E34: 9, E37: 31, S38: 31, S51: 36, S56: 15.
- **majus* (Russow) S. Jens. – E34: 31, E36: 31, S38: 31.
- **obtusum* Warnst. – S38: 31.
- *papillosum* Lindb. W9: 36, W10: 14, W11: 16, E34: 30, 36, E37: 31, S38: 31.
- **platyphyllum* (Lindb. ex Braithw.) Sull. ex Warnst. – E35: 31, E36: 31, E37: 31, S38: 31.
- **pulchrum* (Lindb.) Warnst. – W8: 31, E37: 31.
- *riparium* Aongstr. – W9: 36, W10: 14, W11: 16, W12: 25, E34: 9, 31, 36, E36: 31, E37: 25, 31, S38: 31, S44: 22, S46: 25, S55: 15.
- *rubellum* Wilson – W9: 36, M13: 36, C22: 31, E34: 30, E36: 31, E37: 31, S38: 31.
- *russowii* Warnst. – W8: 31, W9: 36, W10: 14, W11: 16, E34: 30, 31, E36: 31, E37: 31, S38: 31, S41: 16, S44: 22, S46: 25.
- *squarrosom* Crome – W9: 36, W10: 14, M17: 8, C22: 31, E28: 36, E34: 9, 30, 31, E36: 31, E37: 23, 31, 35, S38: 31, 36, S46: 25, S56: 15, 25.
- *subsecundum* Nees – C25: 21, E34: 9, E36: 25, 31, E37: 25, 31, S38: 31, S46: 25.
- *tenellum* (Brid.) Bory – W10: 14, E36: 31, E37: 31, S38: 31.
- *teres* (Schimp.) Aongstr. ex C. C. Hartm. – W10: 14, M15: 36, C23: 31, C25: 21, E34: 30, E35: 31, E36: 31, E37: 31, S38: 31, S42: 25, S46: 25, S53: 25, S56: 15.
- *warnstorffii* Russow – W9: 36, W10: 14, M13: 36, M17: 8, C22: 31, C23: 31, C25: 21, E34: 9, 30, 31, E35: 31, E36: 31, E37: 31, S45: 25, S53: 25, S56: 15.
- *Splachnum luteum* Hedw. – E37: 4.
- **melanocaulon* (Wahlenb.) Schwaegr. – E37: 34.
- **rubrum* Hedw. – E37: 4.
- *sphaericum* Hedw. – N1: 5.
- Stereodon bambergeri* (Schimp.) Lindb. – E31: 36, Error: 8.
- *callichroum* (Brid.) Braithw. – W10: 14, M16: 29, Error: 27, 30.
- *holmenii* (Ando) Ignatov et Ignatova – M13: 36.
- *hamulosum* (B.S.G.) Lindb. – E31: 36, S39: 8.

- *pallescens* (Hedw.) Mitt. – N1: 10, W9: 28, W10: 14, W11: 16, E27: 36, S41: 16, S45: 27, S51: 36, S55: 15.
- *plicatulum* Lindb. – N1: 10, W7: 25, W9: 28, W10: 14, W11: 16, M15: 36, M17: 36, C18: 20, C19: 20, C25: 21, E27: 36, E29: 36, E34: 9, 36, S41: 16, S46: 29, S51: 36, S55: 15.
- *revolutus* (Mitt.) Lindb. – C18: 20, E29: 36.
- **subimponens* (Lesq.) Broth. – Flora i rastitel'nost... (2002), without locality.
- *vaucheri* (Lesq.) Lindb. et Broth. – C18: 20.
- Straminergon stramineum* (Dicks. ex Brid.) Hedenaes – N1: 10, 33, W9: 36, W10: 14, W11: 16, M13: 36, M15: 33, M17: 8, C25: 21, E34: 9, 30, S41: 16, 27, S44: 22, S45: 27, S46: 27, S55: 15.
- Syntrichia norvegica* F. Weber – W10: 14, M15: 36, C25: 21, E27: 36, E29: 36, S41: 16.
- *ruralis* (Hedw.) F. Weber & D. Mohr – N1: 10, M15: 36, M17: 8, C18: 20, C25: 21, E28: 36, E29: 36, E37: 8, S41: 16, S51: 36, S55: 15, Error: 33.
- Tayloria lingulata* (Dicks.) Lindb. – N1: 5, M14: 36, S55: 15.
- *splachnoides* (Sclleich. ex Schwaegr.) Hook. – M15: 36.
- Tetraphis pellucida* Hedw. – W9: 28, W10: 14, W11: 16, M17: 8, 36, C18: 20, C19: 20, C20: 8, 36, E27: 36, E30: 36, S41: 16.
- Tetraplodon angustatus* (Hedw.) B.S.G. – C18: 20.
- *mnioides* (Hedw.) B.S.G. – N1: 10, W6: 33, W12: 27, M13: 36, E29: 36, E31: 36, E34: 9, 36, E37: 4, S43: 27, S48: 27, S55: 15.
- *urceolatus* (Hedw.) B.S.G. – M17: 8, E29: 36, E34: 36.
- Thamnobryum alopecurum* (Hedw.) Gangulee – W10: 14, M15: 36, S41: 16, S55: 15.
- Thuidium philibertii* Limpr. – W10: 14, M15: 33, 36, E29: 36, E31: 36.
- *recognitum* (Hedw.) Lindb. – E29: 36.
- Timmia austriaca* Hedw. – E29: 36.
- **comata* Lindb. et Arnell – E34: 9.
- **megapolitana* Hedw. – M16: 29.
- *Timmiella corniculata* (Wahlenb.) Broth. – E37: 34.
- Tomentypnum nitens* (Hedw.) Loeske – N1: 10, W10: 14, M17: 36, E29: 36, E34: 9, 30, E36: 33, E37: 27, 33, S51: 36, S55: 15, S56: 15, 27.
- Tortella arctica* (Arnell) Crundw. et Nyholm – E29: 36.
- *fragilis* (Hook. et Wilson) Limpr. – W10: 14, M13: 36, M14: 36, E29: 36, E37: 8.
- *tortuosa* (Hedw.) Limpr. – W10: 14, M15: 33, E29: 36, E31: 36.
- Tortula cernua* (Huebener) Lindb. – C25: 21.
- *hoppeana euryphylla* (Hedw.) Sander – N1: 10, W10: 14, E37: 4.
- *mucronifolia* Schwargr. – M17: 8, E29: 36.
- *obtusifolia* (Schwargr.) Math. – E29: 36.
- *systylia* (Schimp.) Lindb. – E31: 36.
- Trachycystis flagellaris* (Sull. et Lesq.) Lindb. – W9: 28, W10: 14, E37: 8.
- *ussuriense* (Maack et Regel) T. J. Kop. – W10: 14, S55: 15.
- Trematodon ambiguus* (Hedw.) Hornsch. – E31: 36, E37: 37.
- Ulota crispa* (Hedw.) Brid. – W9: 28, W10: 14, W11: 16, M15: 36, S38: 27, S41: 16.
- *drummondii* (Hook. et Grev.) Brid. – W9: 28, W10: 14, W11: 16, S41: 16, S55: 15.
- Warnstorfia exannulata* (B.S.G.) Loeske – N1: 10, 33, W10: 14, M15: 36, C25: 21, E29: 36, E33: 36, E34: 9, 30, E37: 33, S41: 16, S51: 36, S55: 15, S56: 15.
- *fluitans* (Hedw.) Loeske – N1: 33, W7: 25, W11: 16, W12: 27, C25: 21, E28: 36, S44: 22, S55: 15, S56: 15.
- *pseudostraminea* (Muell. Hal.) Tuom. et T. J. Kop. – S44: 22, S55: 15.
- *sarmentosa* (Wahlenb.) Hedenaes – N1: 10, 33, W10: 14, W11: 16, M17: 36, E29: 36, E34: 30, S38: 27, S46: 27, S55: 15, S56: 15.
- *tundrae* (Arnell) Loeske – N1: 10, E34: 36, S55: 15.
- Weissia controversa* Hedw. cf. – E31: 36.
- Zygodon rupestris* (Lindb. ex C. C. Hartm.) Lindb. ex E. Britton – W9: 28, W11: 16, M13: 36, C25: 21, E26: 36.

EXCLUDED TAXA

- Amblystegium radicale* Schimp. – 10 – specimens are absent in herbarium, determination is doubtful.
- Anomodon rostratus* (Hedw.) Schimp. – 33 – European species, determination is erroneous.
- Aulacomnium acuminatum* (Lindb. et Arnell) Kindb. – 33 – redetermined by author as *A. palustre*.
- Brachythecium rutabulum* (Hedw.) B.S.G. – 25, 27, – redetermined by Persson, 10 – specimens be absent in herbarium, determination is doubtful.
- Bryum veronense* De Not. – 33 – redetermined by author in *B. argenteum*.
- Codriophorus acicularis* (Hedw.) P. Beauv. – 10, 16 – redetermined by H. Bednarek-Ochyra in *Codriophorus mollis*.
- Bucklandiella heterosticha* (Hedw.) Bednarek-Ochyra et Ochyra – 30, 33, – redetermined by Bednarek-Ochyra and Ignatova in *Bucklandiella sudetica*.
- Dicranum angustum* Lindb. – 8, 10, 15, 30, 33, – all studied specimens redetermined.
- D. congestum* Brid. – all specimens redetermined as *D. fuscescens* and other species.
- D. hamulosum* Mitt. – 15 – redetermined by E. Ignatova in *D. fuscescens*.
- D. viride* (Sull.) Lindb. – (Flora i rastitel'nost...2002)

– this species is pointed in some geobotanical paper on determination by Cherdantseva and other bryologist. However all collections were found to be in fact *D. fragilifolium*.

Encalypta brevicollis (B.S.G.) Bruth ex Aongstr. – 33 – redetermined by author in *E. rhapsocarpa*

Hamatocaulos vernicosus – 30 – redetermined by author in *Sanionia uncinata*.

Herzogiella striatella (Brid.) Z. Iwats. – 15 – specimens be absent in herbarium, determinations is doubtful.

Hygroamblystegium varium (Hedw.) Moenk. – 33 – redetermined by author in *Sciurohypnum reflexum*

Hygrohypnum alpinum (Lindb.) Loeske – 10 – redetermined by author in *Hygrohypnella duriuscula*.

Ochyraea molle – 10 – redetermined by author in *Hygrohypnella bestii* (Czernyadjeva, 2000).

Hylocomiastrum umbratum (Hedw.) Fliesch. in Broth. – 33 – redetermined by author in *H. pyrenaicum*.

Mnium ambiguum H. Muell. – 16 – redetermined by author in *M. lycopodioides*.

Palustriella decipiens (De Not.) Ochyra – 33 – redetermined by author in *Drepanocladus aduncus*.

Plagiomnium undulatum (Hedw.) T. J. Kop. – 27, 25 – European species, determination is erroneous.

Pogonatum aloides Hedw. – 4 – according to Savicz (1934), specimens was redetermined by Lindberg to *Pogonatum capillare* and was collected by Redowsky, i.e. not in Kamchatka.

P. nanum (Hedw.) P. Beauv. – 4, 27, – according to Savicz (1934), was collected by Redowsky, i.e. not

in Kamchatka.

Polytrichum remotifolium P. Beauv. = (*P. glabrum*) – 4 – African species, according to Savicz (1934), determination is doubtful.

Rhynchostegium confertum (Dicks.) B.S.G. – 33 – redetermined by author.

Schistidium confertum (Funck) B.S.G. – 20 – redetermined by E. Ignatova.

S. flexipilum (Lindb. ex Broth.) Roth – 14 – redetermined by E. Ignatova in *S. frigidum*.

S. strictum (Turner) Mart. – 14 – redetermined by E. Ignatova in *S. papillosum*.

Sphagnum imbricatum (Hornsch.) Russow – (Jensen, 1909) – according to Savicz (1932), was collected by Redowsky, i.e. not in Kamchatka.

S. subtile (Russ.) Warnst. – 30 – specimens is absent in herbaria.

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SYNONYMS

- Acrocladium cuspidatum* (L.) Lindb. = *Calliergonella cuspidata*
Amblystegium kochii B. S. G. = *Hygroamblystegium humile*
Amblystegium riparium (L.) B. S. G. = *Leptodictyum riparium*
Amblystegium saxatile Schimp. = *Amblystegium radiale*
Amblystegium varium (Hedw.) Lindb. = *Hygroamblystegium varium*
Anisothecium squarrosum (Starke) Lindb. = *Dicranella palustris*
Anisothecium squarrosum var. *tenellum* Broth. = *Dicranella palustris*
Anosothecium crispum (Schreb.) Lindb. = *Dicranella crispa*
Brachythecium collinum (Schleich. ex Muell. Hal.) B. S. G. = *Brachytheciastrum collinum*
Brachythecium dovrense (Limpr.) Schljakov = *Sciurohypnum glaciale* var. *dovrense*
Brachythecium glaciale B.S.G. = *Sciurohypnum glaciale*
Brachythecium latifolium Kindb. = *Sciurohypnum latifolium*
Brachythecium oedipodium (Mitt.) A. Jaeger = *Sciurohypnum oedipodium*
Brachythecium plumosum (Hedw.) B.S.G. = *Sciurohypnum plumosum*
Brachythecium populeum (Hedw.) B.S.G. = *Sciurohypnum populeum*
Brachythecium reflexum (Starke) Schimp. = *Sciurohypnum reflexum*
Brachythecium starkei (Brid.) B.S.G. = *Sciurohypnum starkei*
Brachythecium unicifolium Broth. et Paris = *Sciurohypnum unicifolium*
Bryoxiphium savatieri (Husn.) Mitt. = *B. norvegicum* var. *japonicum*
Bryum cernuum (Sw.) Lindb. = *B. uliginosum*
Bryum imbricatum (Schwaegr.) B. S. G. = *B. amblyodon*
Bryum inclinatum (Sw.) B.S.G. = *B. amblyodon*
Bryum neodamense Itzig. var. *ovatum* (Jur.) Lindb. et Arnell = *B. subneodamense*
Calliergon sarmentosum (Wahlenb.) Kindb. = *Warnstorfia sarmentosa*
Calliergon sarmentosum var. *fallaciosum* (Milde) Roth = ?*Warnstorfia sarmentosa*
Calliergon stramineum (Dicks. ex Brid.) Kindb. = *Straminergon stramineum*
Camphothecium lutescens (Hedw.) B.S.G. = *Homalothecium lutescens*
Camphothecium trichoides (Neck.) Broth. = *Tomentypnum nitens*
Campylium chrysophyllum (Brid.) Lange = *Campyldelphus chrysophyllum*
Campylium hispidulum (Brid.) Mitt. = *Campylidium hispidulum*
Campylium polygamum (B.S.G.) C. E. O. Jensen = *Drepanocladus polygamus*
Campylium sommerfeltii (Myr.) Lange = *Campylidium sommerfeltii*
Campylium zemliae C. E. O. Jensen = *Drepanocladus arcticus*
Campylium adscendens (Lindb.) Perss. = *Herzogiella adscendens*
Ceratodon purpureus (Hedw.) Brid. var. *rotundifolium* Berggr. = *Ceratodon heterophyllum*
Cirriphyllum cirrhosum (Schwaegr.) Grout = *Brachythecium cirrosium*
Cratoneuron commutatum (Hedw.) G. Roth = *Palustriella commutata*
Cratoneuron decipiens (De Not.) Loeske = *Palustriella decipiens*
Cratoneuron filicinum (L.) Roth. var. *fallax* (Brid.) Moenkem. = *C. filicinum*
Cratoneuron glaucum (Lam.) Broth. = *Palustriella commutata*
Desmatodon cernuus (Huebener) B.S.G. = *Tortula cernua*
Desmatodon latifolius (Hedw.) Brid. = *Tortula hoppeana*
Desmatodon systylius Schimp. = *Tortula systylia*
Dicranoweisia crispula (Hedw.) Lindb. = *Hymenoloma crispulum*
Dicranoweisia intermedia J. J. Amman. = *Hymenoloma intermedia*
Dicranum fuscescens Turner var. *congestum* (Brid.) Husn. = *Dicranum fuscescens*
Dicranum fuscescens Turner var. *flexicaule* (Brid.) Wilson = *Dicranum flexicaule*
Dicranum rupicola (Kindb.) Press. = *D. acutifolium*
Dicranum undulatum Brid. = *D. bergeri*
Dicranum undulatum Ehrh. = *Dicranum polysetum*
Ditrichum tenuifolium (Schrad.) Lindb. = *D. cylindricum*
Drepanocladus badius (Hartm.) Roth = *Loeskyrium badium*
Drepanocladus exannulatus (B. S. G.) Warnst. = *Warnstorfia exannulata*
Drepanocladus exannulatus var. *tundrae* (Arnell) Dietz. = *Warnstorfia tundrae*
Drepanocladus fluitans (L.) Warnst. = *Warnstorfia fluitans*
Drepanocladus intermedius (Lindb.) Warnst. = *Limprichtia cossonii*
Drepanocladus lycopodioides (Schwaegr.) Warnst. = *Pseudocalliergon lycopodioides*

- Drepanocladus pseudostramineus* (C. Mull.) G. Roth
 = *Warnstorfia pseudostraminea*
Drepanocladus revolvens (Sw.) Warnst. = *Limprichtia revolvens*
Drepanocladus uncinatus (Hedw.) Warnst. = *Sanionia uncinata*
Drepanocladus wilsonii (Schimp.) Moenkem. = *D. sendtneri*
Encalypta extinctoria (L.) Sw. = *E. vulgaris*
Eurhynchium hians (Hedw.) Sande Lac. = *Oxyrrhynchium hians*
Eurhynchium pulchellum (Hedw.) Jenn. = *Eurhynchiastrum pulchellum*
Grimmia alpestris Schleich. var. *stomata* Loeske f. *sesitata* (De Not.) Loeske = *G. reflexidens*
Grimmia alpicola Sw. = *Schistidium rivulare*
Grimmia sessitana De Not. = *G. reflexidens*
Helodium lanatum (Stroem) Broth. = *H. blandowii*
Helodium sachalinense (Lindb.) Broth. = *Echinophyllum sachalinensis*
Hylogrimmia mollis (B.S.G.) Loeske = *Grimmia mollis*
Hygrohypnum bestii (Renauld & Bryhn) Holz. ex Broth. = *Hygrohypnella bestii*
Hygrohypnum cochlearifolium (Venturi ex De Not.) Broth. = *Ochyraea cochlearifolium*
Hygrohypnum duriusculum (De Not.) D. W. Jamieson = *Hygrohypnella duriuscula*
Hygrohypnum molle (Hedw.) Loeske = *Ochyraea molle*
Hygrohypnum ochraceum (Turner ex Wilson) Loeske = *Hygrohypnella ochraceum*
Hylocomium brevirostre (Ehrh.) B. S. G. = *Loeskeobryum brevirostre*
Hylocomium proliferum (L.) Lindb. = *H. splendens*
Hylocomium pyrenaicum (Spruce) Lindb. = *Hylocomiastrum pyrenaicum*
Hylocomium umbratum (Hedw.) B. S. G. = *Hylocomiastrum umbratum*
Hypnum arcuatum Lindb. = *Calliargonella lindbergii*
Hypnum bambergeri Schimp. = *Stereodon bambergeri*
Hypnum callichroum Brid. = *Stereodon callichroum*
Hypnum hamulosum B.S.G. = *Stereodon hamulosum*
Hypnum holmenii Ando = *Stereodon holmenii*
Hypnum lindbergii Mitt. = *Calliargonella lindbergii*
Hypnum pallescens (Hedw.) P.Beauv. = *Stereodon pallescens*
Hypnum plicatulum (Lindb.) A. Jaeger = *Stereodon plicatulus*
Hypnum pratense L. F. Koch ex Spruce = *Breidleria pratensis*
Hypnum revolutum (Mitt.) Lindb. = *Stereodon revolutus*
Hypnum reptile Mich. = *Stereodon pallescens*
Hypnum vaucheri Lesq. = *Stereodon vaucheri*
Isopterygium elegans (Brid.) Lindb. = *Pseudotaxiphylum elegans*
Isopterygium pulchellum (Hedw.) Jaeg. et Sauerb. = *Isopterygiopsis pulchella*
Isothecium viviparum (Neck.) Lindb. = *I. alopecurum*
Leptodictyum humile (P. Beauv.) Ochyra = *Hygroamblystegium humile*
Leskeella nervosa (Brid.) Loeske = *Pseudoleskeella nervosa*
Lescuraea atrovirens Monk. = *Lescuraea incurvata*
Lesquereuxia secunda (Arnell) Broth. = *Lescuraea secunda*
Meesia trichodes Spruse = *M. uliginosa*
Mniobryum albicans (Wahlenb.) Limpr. = *Pohlia wahlenbergii*
Mniobryum wahlenbergii (Web. et Mohr) Jenn. = *Pohlia wahlenbergii*
Mnium ambiguum H. Muell. = *M. lycopodioides*
Mnium cinclidioides (Blytt) Huben. = *Pseudobryum cinclidioides*
Mnium cuspidatum (L.) Neck. = *Plagiomnium cuspidatum*
Mnium medium B. S. G. = *Plagiomnium medium*
Mnium nudum Briitt. et Williams = *Rhizomnium nudum*
Mnium punctatum (L.) Reich. = *Rhizomnium punctatum*
Mnium rostratum Schrad. = *Plagiomnium rostratum*
Mnium rugicum Brid. = *Plagiomnium ellipticum*
Mnium seligeri Jur. = *Plagiomnium elatum*
Mnium trichomanes Mitt. = *Plagiomnium acutum*
Mnium undulatum (L.) Weis. = *Plagiomnium undulatum*
Nyholmiella obtusifolia (Brid.) Holmen = *Orthotrichum obtusifolium*
Orthodicranum flagellare (Hedw.) Loeske = *Dicranum flagellare*
Orthodicranum hamulosum (Mitt.) Broth. = *Dicranum hamulosum*
Orthodicranum montanum (Hedw.) Loeske = *Dicranum montanum*
Orthodicranum strictum (Schleich. ex D. Mohr) Culm. = *Dicranum tauricum*
Philonotis caespitosa Wils. f. *fileszens* Loeske = *P. caespitosa*
Plagiothecium roeseanum B. S. G. = *P. cavifolium*
Plagiothecium sylvaticum (Brid.) B. S. G. = *P. nemorale*
Pogonatum capillare (Rich.) Brid. = *P. dentatum*
Pogonatum grandifolium (Lindb.) Jaeg. = *P. japonicum*
Pogonatum polytrichoides (L.) Brockm. = *P. nanum*
Polytrichum alpinum L. = *Polytrichastrum alpinum*
Polytrichum alpinum var. *septentrionale* (Roehl.) Lindb. = *Polytrichastrum norvegicum*
Polytrichum alpinum var. *sylvaticum* (Menz.) Lindb. = *Polytrichastrum alpinum*
Polytrichum attenuatum Menz. = *Polytrichastrum formosum*

- Polytrichum commune* L. var. *minus* Weis. = *P. commune*
- Polytrichum commune* L. var. *uliginosum* Hueben. = *P. commune*
- Polytrichum contortum* Menz. = *Pogonatum contortum*
- Polytrichum gracile* Menz. = *Polytrichastrum longisetum*
- Polytrichum gracile* var. *anomalum* (Milde) I. Hag. = *Polytrichastrum. longisetum*
- Polytrichum formosum* Hedw. = *Polytrichastrum formosum*
- Polytrichum longisetum* Sw. ex Brid. = *Polytrichastrum longisetum*
- Polytrichum pilosum* (Weis) Neck. = *P. piliferum*
- Polytrichum pilosum* var. *pusillum* Moll. = *P. piliferum*
- Polytrichum remotifolium* P.B. = *P. glabrum*
- Polytrichum sexangulare* Floerke ex Brid. = *Polytrichastrum sexangulare*
- Pseudoleskea incurvata* (Hedw.) Loeske = *Leskuraea incurvata*
- Pseudoleskea patens* (Lindb.) Kindb. = *Leskuraea patens*
- Pseudoleskea radicata* (Mitt.) Kindb. = *Leskuraea radicata*
- Pseudoleskea secunda* (Arnell) Broth. = *Leskuraea secunda*
- Racomitrium aciculare* (Hedw.) Brid. = *Codriophorus acicularis*
- Racomitrium brevisetum* Lindb. = *Codriophorus brevisetus*
- Racomitrium canescens* (Hedw.) Brid. = *Niphotrichum canescens*
- Racomitrium canescens* (Timm.) Brid. var. *ericoides* (Web.) B. S. G. = *Niphotrichum ericoides*
- Racomitrium carinatum* Cardot = *Codriophorus carinatum*
- Racomitrium ericoides* (F. Weber ex Brid.) Brid. = *Niphotrichum ericoides*
- Racomitrium fasciculare* (Hedw.) Brid. = *Codriophorus fascicularis*
- Racomitrium heterostichum* (Hedw.) Brid. = *Bucklandiella heterosticha*
- Racomitrium hypnoides* (L.) Lindb. = *R. lanuginosum*
- Racomitrium microcarpon* (Hedw.) Brid. = *Bucklandiella microcarpa*
- Racomitrium sudeticum* (Funck) B.S.G. = *Bucklandiella sudetica*
- Racomitrium sudeticum* f. *kindbergii* Frisvoll = *Bucklandiella sudetica* f. *kindbergii*
- Rhytidiadelphus calvescens* (Wils.) Broth. = *Rhytidiadelphus subpinnatus*
- Scleropodium ornellanum* (Molendo) Lorentz = *Sciurohypnum ornellanum*
- Sphagnum apiculatum* H. Lindb. = *S. fallax*
- Stroemia obtusifolia* Brid. = *Orthotrichum obtusifolium*
- Swartzia montana* (Sw.) Hag. = *Distichium capillaceum*
- Tetraplodon bryoides* (Zoega) Lindb. = *T. mnioides*
- Tetraplodon bryoides* var. *cavifolius* (Schimp.) Moll. = *T. mnioides*
- Tortula ruralis* (Hedw.) Lindb. = *Syntrichia ruralis*
- Tortula euryphylla* R. H. Zander = *T. hoppeana*
- Trichodon cylindricus* (Hedw.) Schimp. = *Ditrichum cylindricum*