

New national and regional biological records for Finland 10. Contributions to Bryophyta and Marchantiophyta 9

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Six species of mosses (Bryophyta: *Brachythecium udum*, *Lewinskya fastigiata*, *L. elegans*, *Polyptrichastrum altaicum*, *P. septentrionale*, *Tortella densa*) and two of liverworts (Marchantiophyta: *Scapania parvifolia* and *Tritomaria exsecta*) are presented as new for Finland. One species, *Brachythecium laetum*, is removed from the Finnish checklist. New records in biogeographical provinces for 51 species of mosses and 32 species of liverworts are listed. Finally, two occurrences in biogeographical provinces are removed due to misidentifications.

Introduction

Bryophytes and their distribution ranges are relatively well known in Finland. The first bryophyte checklists were published already in the mid 1800's (Nylander & Saelan 1859, Lindberg 1879, Bomansson & Brotherus 1894), and since Brotherus' (1923) and Arnell's (1928) floras on Fennoscandian mosses and liverworts, the distributions for species have been given based on

Finland's division into biogeographical provinces (see e.g. Pihlaja & Ulvinen 2021). Despite the long history of bryological research in Finland, new species for the country are encountered annually, along with new findings that change our view of species distribution ranges in the biogeographical provinces. New national and regional records of bryophyte taxa have been published

regularly since 2010. By publishing the new records and updated regional distribution tables the Finnish Bryophyte Expert Group hopes to encourage professional and non-professional bryologists to gather new information and to deliver collected specimens into public herbaria. This serves to improve our knowledge of the Finnish bryophyte flora. It also provides the basis and background data for updating the Finnish bryophyte checklist (Pihlaja et al. 2022), distribution tables (Pihlaja & Ulvinen 2021) and national Red List assessments (Juutinen et al. 2019).

We have published the new national and regional records at intervals of one or a few years. This publication is the ninth in line after the year 2010 (Ulvinen & Syrjänen 2010, 2011, Ulvinen et al. 2012, Juutinen et al. 2013, Juutinen & Ulvinen 2014, Juutinen et al. 2015, Juutinen et al. 2016, Juutinen et al. 2018). The data on new observations has previously been compiled manually by gathering specimen data from bryologists doing fieldwork, records of incoming herbarium specimens and various observation databases. For compiling the 2021 distribution tables and the records listed here, we used a computer script that filtered the new national and regional records from the whole content of the Finnish Biodiversity Information Facility (FinBIF). FinBIF gathers data from several different sources, including the Collection Management System Kotka of Finnish herbaria, the species information system LajiGIS for environmental administration and other data sources such as citizen science observations, project datasets etc. The digitized bryophyte specimen data in the FinBIF was cross-checked against the previous distribution tables of Finnish bryophytes (Juutinen & Ulvinen 2018). Besides giving the new national and regional records, we will also evaluate the utility of the crosschecking method.

Materials and methods

The new records are based on fieldwork, the examination of herbarium collections and on a new method of cross-checking of the FinBIF database. Researchers, nature surveyors and bryophyte enthusiasts were asked to inform Kati Pihlaja or Tauno Ulvinen about the new national or regional

records and to deposit the collected specimens as vouchers to any Finnish herbarium.

Since the latest article in 2018, the digitization of the herbarium specimens into the Collection Management System Kotka of Finnish herbaria, and through that to FinBIF, has proceeded greatly. In addition, the known distribution of each bryophyte taxa in biogeographical provinces is recorded in the FinBIF database. This allowed us to perform a scripted cross-check of the content of the FinBIF against the previous distribution tables of Finnish bryophytes (Juutinen & Ulvinen 2018). Both the specimen data and the existing distribution data were obtained in machine-readable format via the public API (api.laji.fi) on the 8th of January 2021. The computer script flagged those specimens that seemed to represent an occurrence outside the species' currently recognized range. This included both new occurrences for the country and for the biogeographical provinces. It also included new occurrences for those provinces where the taxon was thought to be extirpated (†), the provinces where the occurrence of the taxon was doubtful (?) and the provinces where only literature records were known (K). As we have also tabulated the distribution data into old (≤ 1939) and new (≥ 1940) occurrences by collection date, the cross-checking provided updates on this. The script is in Python and available on Zenodo (Hopkins 2021). Using it requires an access token (used to identify the user), which can be freely obtained from api.laji.fi. Instructions on how this is done are in Zenodo. Tapani Hopkins was responsible for the crosschecking script.

Because of frequent misidentifications, both in the reported observations and in herbarium specimens, all of the flagged specimens and the new records obtained directly from collectors were assessed by bryophyte experts before they were accepted. Kati Pihlaja coordinated this work and she has compiled all the records. Only the information on new species for Finland and the new occurrences for the biogeographical provinces are included in this article. Other changes to the species distributions were used to update the latest distribution tables of all Finnish bryophytes in biogeographical provinces (Pihlaja & Ulvinen 2021), but are not presented here.

We have only accepted records based on public herbarium specimens. Observations based on

field determinations or specimens in private herbaria can not be confirmed and we regard them as uncertain. The main source of information now and in the future will be labelled, dried herbarium specimens, which provide an invaluable archive for scientific studies including biogeography, ecology, and morphological and genetic taxonomy. We had to leave out some interesting and valuable bryophyte observations, including *Acaulon muticum* and *Oleolophozia perssonii* in Regio aboënsis (LajiGIS database 9.2.2022), *Conocephalum salebrosum* in Savonia australis (LajiGIS database 9.2.2022), *Crossocalyx hellerianus* in Karelia ladogensis (Syjänen et al. 2004), *Fuscocephaloziopsis catenulata* in Karelia borealis (LajiGIS database 9.2.2022) and *Grimmia alpestris* in Regio kuusamoënsis (Juutinen et al. 2017) because of missing specimens. These will be added later if the specimens are deposited in public herbaria.

The majority of the specimen data is originally given in Finnish and translated into English here. The locality information may have been expanded to add clarity. The original specimen data as recorded in the Collection Management System Kotka can be found following the link at the end of each specimen description. For *Cephalozia*, *Fuscocephaloziopsis*, *Cephaloziella* and *Nardia* double blind determination was mostly required due to the large proportion of misidentifications in herbarium specimens (Ryömä et al. 2013).

The nomenclature follows the European checklist for bryophytes (Hodgetts et al. 2020). Abbreviations for herbaria follow the Index Herbariorum (Thiers 2018): H = Botanical Museum, Finnish Museum of Natural History, University of Helsinki, JYV = Natural History Collections of Jyväskylä University Open Science Centre, KUO = Kuopio Natural History Museum, OULU = Botanical Museum, University of Oulu, TUR = Herbarium, University of Turku. Personnel at herbaria, Ari-Pekka Huhta (OULU), Outi Vainio (KUO), Sanna Laaka-Lindberg (H), Annikki Kestilä (OULU), and Tarja Marsh (TUR) helped to locate specimens that were in for checking and to digitize specimens.

Several people have made new records in the field and others have confirmed determinations. Tauno Ulvinen has confirmed the identifications

of most of the new voucher specimens in OULU. Liisa Maanpää has checked the identifications for the voucher specimens of *Lewinskya fastigiata* (Bruch ex Brid.) Vigalondo, F. Lara & Garilleti. Sanna Huttunen confirmed identifications of *Brachythecium udum* I.Hagen. Riikka Juutinen and Timo Kypärä performed double blind determinations for *Cephalozia*, *Fuscocephaloziopsis*, *Cephaloziella* and *Nardia* specimens.

Results and discussion

We present 105 new records of bryophyte taxa for Finland and its biogeographical provinces that have come to our attention after our last article in 2018. 68 of these new national or regional records are mosses and 37 are of liverworts.

Eight species are presented as new for Finland and one species is removed. *Tortella densa* (Lorentz & Molendo) Crundwell & Nyholm and *Tritomaria exsecta* (Schmidel ex Schrad.) Schiffn. ex Loeske were found as new for Finland by Timo Kypärä. *Polytrichastrum altaicum* Ignatov & G.L.Merr. was reported to occur in Finland based on a sequenced specimen collected by Neil Bell from Utsjoki (Ivanova et al. 2014).

In the previous article (Juutinen & Ulvinen 2018), the taxonomy of mosses followed the previous European checklist (Hill et al. 2006) and the taxonomy of liverworts the world checklist (Söderström et al. 2016). At the end of 2020 the taxonomy in the Finnish checklist was updated to follow the recently published European checklist of bryophytes (Hodgetts et al. 2020). The taxonomic changes which elevate taxa from intraspecific to species rank in the European checklist add five new species to the Finnish checklist: *Scapania parvifolia* Warnst., *Lewinskya fastigiata* (Bruch ex Brid.) Vigalondo, F.Lara & Garilleti, *L. elegans* (Schwägr. ex Hook. & Grev.) F.Lara, Garilleti & Goffinet, *Polytrichastrum septentrionale* (Sw. ex Brid.) E.I. Ivanova, N.E. Bell & Ignatov and *Brachythecium udum* I.Hagen. All of these taxa had earlier published observations from Finland at the intraspecific level (Brotherus 1923, Nyholm 1968, Arnell 1979). One species, *Brachythecium laetum* (Brid.) Schimp. is deleted from the Finnish checklist after closer morpho-

logical studies and confirming the identification using DNA -barcoding.

In addition, we present two corrections for old regional records. These are mainly corrections of misidentifications. The number of corrections is lower here than in previous publications because little attention was paid to deletions in the occurrence in biogeographical provinces due to changed determinations. This needs more attention in the future, especially for *Lewinskya*. The updated distribution tables of all Finnish bryophytes can be found from the Internet (ymparisto.fi/Suomen_sammalet).

The computer script that searched the FinBIF database for new species occurrences in Finland and its biogeographical provinces resulted in a list of 127 flagged records. However, only about one third of these was confirmed as true new species occurrences in Finnish biogeographical provinces. The reasons for exclusion were diverse. 32 cases were excluded because of doubtful species identifications which need to be confirmed before accepting them as new records. So far, five specimens out of these 32 cases have been confirmed as false identifications. The remaining 28 are still waiting for closer examination. A further 28 cases were excluded because the reported species had major taxonomic uncertainties that need to be resolved before the identifications can be confirmed (e.g. *Moerckia hibernica* s.lat. and *Philonotis tomentella*). 14 cases had incorrect information in Kotka, mainly concerning erroneously interpreted location, biogeographical province or old synonyms of species names. This highlights the importance of the quality of the databasing process. Two cases were missing information on the latest species identification in Kotka. Three cases were marked as specimen records in Vihko or LajiGIS database, but the specimens could not be located in any public herbaria. Four excluded cases had other miscellaneous problems.

Despite these issues, the use of the computer script significantly improved the search for potential new observations, especially among older specimens in herbaria collections. As specimens are constantly digitized, the process needs to be repeated regularly. The flagged occurrences still mostly need to be confirmed by verifying the identifications and the accuracy of the digitized information in Kotka. This work is also necessary

for improving the quality of digitized specimen data. Our experiences revealed different databasing practices in different herbaria and the need to unify the use of different fields in the national collection database. When revisiting suspicious records, it is important to document what has been found, when and by whom. The whole annotation history of the specimen must be documented and databased entirely. Previous identifications and annotations should never be omitted or obscured, because they are an invaluable and integral part of the specimen and its history.

New records – Bryophyta

Andreaea alpestris (Thed.) Schimp.

FINLAND. Lapponia kittilensis (Lkk/KiL), Kolari, Ylästunturi, upper part of SE slope. On rocks. Coll. Tauno Ulvinen 28.VII.1964, det. Tauno Ulvinen 2020 (OULU id.herb.oulu.fi/0007390).

Andreaea blyttii Schimp.

FINLAND. Lapponia inarensis (Li/InL), Utsjoki, Paistunturi Wilderness Area, Caggoaivi N. Snowbed, on mineral soil. Coll. Inka Kuusisto 25.VII.2019 (TUR mus.utu.fi/TBR.125979).

Brachythecium rutabulum (Hedw.) Schimp.

FINLAND. Ostrobothnia ouluensis (Obo/OP), Oulu, park Ainolan puisto, hotel Lasaret. On the park grass. Coll. Mirka Heikkinen & Risto Virtanen 16.V.2019, det. Risto Virtanen 2019 (OULU id.herb.oulu.fi/GAL.6750).

Brachythecium udum I. Hag.

ahmansuikerosammal

FINLAND. Lapponia enontekiensis (Le/EnL), Enontekiö NW, Porojärvet, Urtašvárri W. Moist rock terrace. Coll. Heikki Roivainen 30.VII.1955, conf. Sanna Huttunen 18. II.2020. (H id.luomus.fi/HA.H4015812).

New species for Finland. The taxon has earlier been recognized at varietal level as *Brachythecium mildeanum* var. *udum* (I.Hagen) Mönk. (e.g., Nyholm 1968, Hill et al. 2006). Some old collections are present in Finnish herbaria and the morphology of four specimens from Lapponia enontekiensis was found to match with the current circumscription (Ignatov & Milytina 2010). The taxonomy of *Brachythecium udum* is still poorly understood, but molecular evidence does not favour a close relationship with *B. mildeanum* (Ignatov & Milytina 2010). The few confirmed ob-

servations are from moist arctic and alpine habitats, e.g., Alaska (Ignatov 2014) and North Russia (Murmansk, Krasnoyarsk Territory, Irkutsk Prov.; Ignatov & Milytina 2010).

Buxbaumia viridis

(Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl.

FINLAND. Ostrobothnia australis (Oa/EP), Kurikka, Jalasjärvi, Pentinmäki, Tapionmukka, river Ilvesjoki N shore. Shaded herb-rich heath forest on a steep slope with not much deadwood, on a *Picea abies* stump, diam. 30 cm, decay stage 4–5/5. Sterile, gemmae coverage 2 dm², without sporophytes. Coll. Kati Pihlaja 30.VI.2020 (TUR mus.utu.fi/TBR.126652); Tavastia borealis (Tb/PH), Laukaa, between Hitonhauta and Harisenmäki. Well rotten stump by a lush spring rivulet, in a mature, *Picea abies* dominated mixed forest. Sterile, seen on one stump, coverage 1 dm², protonema and gemmae, without sporophytes. Coll. Timo Kypärä 3068, 14.V.2020 (TUR mus.utu.fi/TBR.124351); Savonia borealis (Sb/PS), Kuopio, Puijo E slope, 100 m W from road Rypysuontie. Well rotten large spruce stump in a spruce dominated herb rich forest. Sterile, with gemmae and protonema, no sporophytes present at this stump. Gemmae germination percentage 95 % on a petri dish. Coll. Sanna Huttunen 21.VI.2020 (TUR mus.utu.fi/TBR.124348); Karelia borealis (Kb/PK), Lieksa, Ruunaa, Lieksanjoki, rapids Paasikoski, N shore. Rivershore swamp, on fallen trunk of a broadleaved tree, diam. 22 cm. Probably abundant in an area of several dm². Sterile, with protonema and gemmae. Coll. Timo Kypärä 3102, 26.V.2020 (TUR mus.utu.fi/TBR.124352); Kainuu (Ok/Kn), Kuhmo, Ulvinsalo Strict Nature Protection area, the Finnish – Russian border zone, Jylkynsuo E, Verkkolampi SW. *Myrtillus*-type mixed forest, on a rotten fallen *Populus tremula* trunk, diam. 47 cm. Abundant protonema gemmae clusters, coverage at least 1 dm². Coll. Timo Kypärä 3371, 22.IX.2020 (OULU tun.fi/GAT.1456); Ostrobothnia ultima (Obu/PeP), Rovaniemi, Vilmilä, Kemijoki, Veitsikangas, N from road 19731. An old stump in a spring dribble. Abundant gemmae and gemmae clusters. Coll. Timo Kypärä 2908, 5.IX.2019 (OULU tun.fi/GAT.993).

Calliergon richardsonii (Mitt.) Kindb.

FINLAND. Karelia ladogensis (Kl/LK), Parikkala, Intsilä, Suurmäki. Spring fen, on flark surface among other bryophytes. The collection consists of a single shoot. Coll. Tuomo Kuitunen 3874, 17.VII.2019, conf. Tauno Ulvinen 2019 (OULU id.herb.oulu.fi/GAL.6141)

Dicranum flagellare Hedw.

FINLAND. Ostrobothnia ultima (Obu/PeP), Rovaniemi, Oikarainen, Ryytäkinmukka, N shore of river Kemi-joki, between the river and highway 81, by brook Tahtamalamminoja. Shady brook depression, on a fallen pine log, diam. 30 cm, at the foot of the log. Abundant along 2 m. Coll. Timo Kypärä 2819, 26.VIII.2019 (OULU tun.fi/GAT.904); Lapponia sompiensis (Lks/SoL), Savukoski, fjell

Nivatunturi, E from the top. Mountain heath, at the side of a boulder. Coll. Kimmo Syrjänen 14.VII.2002 (TUR mus.utu.fi/TBR.101851, duplicate of TUR 103260).

Dicranum flexicaule Brid.

FINLAND. Karelia ladogensis (Kl/LK), Parikkala, Saari, hill Vaaroinmäki. Upper part of the stone quarry, on a rock shelf. Somewhat abundant. Coll. Tuomo Kuitunen 3897, 16.VII.2019, det. Ari Parnela 2019, conf. Tauno Ulvinen 2019 (OULU id.herb.oulu.fi/GAL.6142).

Drepanocladus sendtneri (Schimp. ex H.Müll.) Warnst.

FINLAND. Lapponia sompiensis (Lks/SoL), Sodankylä, Viiankiaapa Mire Protection Area, Pahanlaaksonmaa SE. Rich swamp fen, on peat. Singular shoots. Coll. Osmo Heikkala OH02-120819, 12.VIII.2019, det. Timo Kypärä 2019, conf. Tauno Ulvinen 2019 (OULU id.herb.oulu.fi/GAL.6136).

Encalypta rhyptocarpa Schwägr.

(*Encalypta rhyptocarpa* var. *rhyptocarpa*)

FINLAND. Tavastia borealis (Tb/PH), Rautalampi, Hankavesi, island Tervasaari ca 300 m SW. Limestone deposit [Collecting event name: Plants of the limestone deposits in eastern Finland]. Coll. Reino Fagerstén 7926, 22.VI.1989, det. Reino Fagerstén 2002 (KUO tun.fi/SBR.58005).

Exsertotheca crispa

(Hedw.) S. Olsson, Enroth & D.Quandt

(*Neckera crispa*)

FINLAND. Lapponia sompiensis (Lks/SoL), Pelkosenniemi, Pyhä-Luosto National Park, Rykimäkelo S, the southernmost gorge. A shallow but long cave at the base of the rock wall, on the cave ceiling. 5 dm² patch. Coll. Timo Kypärä 3305, 8.VIII.2020 (OULU tun.fi/GAT.1390).

Fissidens fontanus (Bach.Pyl.) Steud.

FINLAND. Ostrobothnia australis (Oa/EP), Mustasaari, Maksamaa, Norrfjärden, Kagg-Jakopos grundet. Coll. Teemu Mustasaari 3.IX.2019, det. Jon Ögård (H id.luomus.fi/HA.H5007558).

Fissidens pusillus (Wilson) Milde

FINLAND. Nylandia (N/U), Kirkkonummi, Forsdal, river Kauhalanjoki, road Forsdalintie S. Pristine, c. 140 m long rapid, on river rocks of the splash zone. 10 cm × 20 cm and 5 cm × 50 cm patches. Coll. Esa Ervasti 1240 & Esko Vuorinen 19.X.2018 (TUR mus.utu.fi/TBR.125236).

Grimmia anomala Hampe ex Schimp.

FINLAND. Satakunta (St), Kihniö, Koskenkylä, river Koskelanjoki, rapids between Myllyniemi and Markkula. On a moderately large boulder in the rapid. Coll. Ari Parnela & Tuomo Kuitunen 21.VIII.2020, conf. Tauno Ulvinen 2020 (OULU id.herb.oulu.fi/GAL.7350). See also Parnela & Kuitunen 2021.

Herzogiella turfacea (Lindb.) Z.Iwats.

FINLAND. Lapponia sompiensis (Lks/SoL), Pelkosenniemi, Pyhä-Luosto National Park, Rykimäkelä S, near river Pyhäjoki. At the seasonally moist base of a boulder, on a stone. Probably scarce, detected among another collected bryophyte specimen. Coll. Timo Kypärä 3301, 8.VIII.2020. (OULU [tun.fi/GAT.1386](https://doi.org/10.21203/rs.3.rs-1386)).

Lewinskya elegans (Schwägr. ex Hook. & Grev.)

F.Lara, Garilleti & Goffinet,

sirohiippasammal

FINLAND. Regio aboënsis (Ab/V), Parainen, Älön, Hyvilemp, near abandoned limestone quarries. On twigs of *Picea*. Coll. Reino Alava & Sakari Hinneri 14.IX.1971, conf. Tauno Ulvinen 2020 (OULU [id.herb.oulu.fi/GAL.7491](https://doi.org/10.21203/rs.3.rs-7491)); Ostrobothnia ouluensis (Obo/OP), Pudasjärvi, Kurenalus, lake Tuulijärvi E side, between Karjoperät bays, by of Hilturanta road. On trunks of *Populus* and *Salix phylicifolia*. On numerous trees. Coll. Tauno Ulvinen 29.VIII.1992 (OULU [id.herb.oulu.fi/GAL.7478](https://doi.org/10.21203/rs.3.rs-7478)); Ostrobothnia ultima (Obu/PeP), Rovaniemi, Saarenkylä, Vitikanpää, river Ounasjoki mouth SW-shore, near the NW end of a narrow alluvial island. At the base of a *Populus tremula* trunk. Numerous patches on several trees. Coll. Tauno Ulvinen 14.VIII.1992, det. Tauno Ulvinen 2020 (OULU [id.herb.oulu.fi/GAL.7485](https://doi.org/10.21203/rs.3.rs-7485)); Regio kuusamoënsis (Ks), Kuusamo, Liikasenvaara, Oulanka National Park, Nurmisaarenrinne, foot of slope Nurmisaarenrinne, NE corner of a privately owned property within Oulanka National Park. Occasionally flooded spring-fed spruce mire by a stream, on stems of *Salix myrsinifolia* and *Betula pubescens*. Copious. Coll. Martti Ohenoja 17.VII.1991, conf. Tauno Ulvinen 2020 (OULU [id.herb.oulu.fi/GAL.7486](https://doi.org/10.21203/rs.3.rs-7486)); Lapponia kittilensis (Lkk/KiL), Kittilä, Hormakumpu, river Ounasjoki E shore, confluence of tributary river Ala-Kuusanjoki, S side. Forest area, on trunks and branches of dead *Picea abies*. Coll. Martti Ohenoja 19.VII.1977, det. Martti Ohenoja 1991, conf. Tauno Ulvinen 2020 (OULU [id.herb.oulu.fi/GAL.7489](https://doi.org/10.21203/rs.3.rs-7489)); Lapponia sompiensis (Lks/SoL), Sodankylä, Ylikittinen, Jurmu NW. By roadside (location was submerged in 1970 in Porttipahta Reservoir and the occurrence is considered to be extirpated). Coll. Tauno Ulvinen, 2.IX.1958, conf. Tauno Ulvinen 2020 (OULU [id.herb.oulu.fi/GAL.7490](https://doi.org/10.21203/rs.3.rs-7490)).

New species for Finland. In earlier treatments of European bryophytes this taxon has been treated as a subspecies of *Orthotrichum speciosum* (e.g. Hill et al. 2006). The independent position had already been suggested earlier (Vitt & Darico 1997) but the status was only recently accepted in connection with the revision of the generic delimitations of *Lewinskya* F.Lara, Garilleti & Goffinet and *Orthotrichum* Hedw. (Lara et al. 2016). Hinneri (1976) reported the taxon from several biogeographical provinces in Finland but used the name *Orthotrichum speciosum* subsp. *fuscum* for

it. However, it remains to be confirmed whether Hinneri's taxonomic concept of the species and the identifications of the specimens reported by him match with the one used in recent literature (Vitt & Darico 1997, Fedosov & Doroshina 2018). The current notion of the Finnish distribution of *Lewinskya elegans* is based on the latest identifications by Tauno Ulvinen. *Lewinskya elegans* was originally assumed to be an American taxon (Vitt & Darico 1997, Lara et al. 2016, Fedosov & Doroshina 2018) and its distribution in Europe still requires clarification (Hodgetts et al. 2020). It is listed in the recent European checklist but confirmed observations are this far only published from Russia (Fedosov & Doroshina 2018). In Russia the species occurs in scattered provinces throughout the country from Kamchatsky territory and Amur in East to, e.g., Murmansk and Kursk regions in West (Fedosov & Doroshina 2018). According to Vitt & Darico (1997) *L. elegans* prefers trunks of deciduous trees, especially *Populus*, in mesic old-growth forests in North America. Hinneri (1976) claims that in Finland it has a northern and eastern range with a strong preference for alluvial forests, where it grows on trunks of *Betula*, *Picea* and *Populus* in flood zone.

Lewinskya fastigiata

(Bruch ex Brid.) Vigalondo, F.Lara & Garilleti,

kimppuhiippasammal

FINLAND. Alandia (Al/A), Eckerö, Storby, Öra, Inre fjärden W, lake Surbak area. Lush *Populus tremula* – *Alnus glutinosa* – *Fraxinus excelsior* forests. Coll. Kimmo Syrjänen 21.VI.1993, det. Liisa Maanpää 2021 (TUR [mus.utu.fi/TBR.92488](https://doi.org/10.21203/rs.3.rs-92488)); Regio aboënsis (Ab/V), Parainen, Iniö. On trunk of *Fraxinus* in rich forests of Luneklobb island, W of Åselholm village island. Coll. Sakari Hinneri 9.VII.1975, det. Liisa Maanpää 2021 (TUR [mus.utu.fi/TBR.62515](https://doi.org/10.21203/rs.3.rs-62515)); Nylandia (N/U), Raasepori, Tammissaari. Coll. Ernst Häyrén 25.XII.1898, det. Liisa Maanpää 2021 (TUR [mus.utu.fi/TBR.18855](https://doi.org/10.21203/rs.3.rs-18855)); Satakunta (St), Rauma, street Nortamonkatu. On trunk of *Acer platanoides* (cult.). Coll. Ernst Häyrén 4.VI.1938, det. Sakari Hinneri 1970, conf. Liisa Maanpää 2021 (H [id.luomus.fi/HA.H4100319](https://doi.org/10.21203/rs.3.rs-4100319)); Tavastia australis (Ta/EH), Somero, Häntälä, 100 m E-NE of Mäki-Unkila, horse pasture, on trunk of *Populus tremula*. Coll. Juha Pykälä 21.V.1993, det. Liisa Maanpää 2021 (H [id.luomus.fi/HA.H4099947](https://doi.org/10.21203/rs.3.rs-4099947)).

New species for Finland. This species has been treated earlier as a variety of *Orthotrichum affine* (= *Lewinskya affinis*), but it was recently elevated to species rank by Vigalondo et al. (2020). The Finnish material had been studied by Hin-

neri (1976; as *Orthotrichum fastigiatum* Bruch ex Brid), and the identification of herbarium material by Liisa Maanpää added one biogeographical province (Ta) to its distribution. The species is widespread throughout Europe and the Mediterranean region (Vigalondo et al. 2020). *Lewinskya fastigiata* is primarily an epiphyte on deciduous trees, but may sometimes grown also on rocks (Vigalondo et al. 2020). According to Hinneri (1976) the species prefers relative dry and open habitats such as *Fraxinus*-rich woods, parks and allee trees.

Oncophorus wahlenbergii Brid.

FINLAND. Ostrobothnia media (Om/KP), Kokkola, Kälviä, Krunni (Renögrund). On seaside rock outcrop. Coll. A.V. Auer 5.VIII.1933, det. Tauno Ulvinen 2018 (OULU id.herb.oulu.fi/GAL.4212).

Oncophorus virens (Hedw.) Brid.

FINLAND. Karelia borealis (Kb/PK), Lieksa, Pielisjärvi, Koli National Park, Mäkrä N, downstream of brook Tarhapuro. On brook stones. Coll. Timo Koponen 5910, 14.VI.1964, conf. Tauno Ulvinen 2018 (H id.luomus.fi/HA.H4260858). See also Koponen 2021.

Orthotrichum pallens Bruch ex Brid.

FINLAND. Ostrobothnia ultima (Obu/PeP), Rovaniemi, Vilmilä, Soittajanvaara, river Kemijoki S shore, by Tervakari. Mesic mixed forest, epiphytic at the base of a *Populus tremula*, diam. 30 cm. One small tuft, with sporophytes. Coll. Timo Kypärä 2898, 5.IX.2019 (OULU tun.fi/GAT.983).

Philonotis calcarea (Bruch & Schimp.) Schimp.

FINLAND. Lapponia sompiensis (Lks/SoL), Sodankylä, W of Viiankiaapa Mire Reserve, Kuusivaara N, Kenttääapa. *Cratoneuron*-spring area with clear hollows and spring fed streams. Coll. Antje Neumann 20.VIII.2019, det. Tauno Ulvinen 2019 (OULU id.herb.oulu.fi/GAL.5707).

Plagiomnium curvatulum (Lindb.) Schljakov

FINLAND. Ostrobothnia kajanensis (Ok/Kn), Suomussalmi, Raate, Lomanotko. Half open streamside thicket between rock outcrops, at the base of a rock outcrop. Coll. Ari Parnela 25.VI.1995, det. Timo Koponen 2020 (OULU id.herb.oulu.fi/GAL.7563).

Plagiothecium curvifolium Schlieph. ex Limpr.

FINLAND. Karelia ladogensis (KI/LK), Parikkala, Uukiniemi, Kirkkokallio, at the bottom of a stone quarry. On rock shelves and surfaces. Fairly abundant. Coll. Tuomo Kuitunen 3892, 16.VII.2019, conf. Ari Parnela 2019 (OULU id.herb.oulu.fi/GAL.6143).

Plagiothecium latebricola Schimp.

FINLAND. Ostrobothnia kajanensis (Ok/Kn), Kuhmo, Ulvinsalo, Losovaara, Kaurosenjoki, Ulvinsalo Strict Nature Reserve W, by river Kaurosenjoki, at the foot of hill Losovaara N. Rocky hill outcrop with a scree covered base, N exposure, in a scree cavity with still plenty of ice at the end of June, on a peat soil covered stone. Sparse, singular shoots among other mosses, gemmae. Coll. Timo Kypärä 3165, 23.VI.2020 (OULU tun.fi/GAT.1250).

Plagiothecium platyphyllum Mönk.

FINLAND. Lapponia kittilensis (Lkk/KiL), Kolari, Pallas-Yllästunturi National Park, ravine Varkaankuru, stream Varkaanoja. Spring trickles seeping beneath a large boulder and feeding stream Varkaanoja. 5 patches along 15 metres, coverage 20 dm². Coll. Riikka Juutinen 7630, 5.IX.2019, conf. Timo Kypärä 2020 (OULU tun.fi/GAK.3138).

Plagiothecium undulatum (Hedw.) Schimp.

FINLAND. Tavastia borealis (Tb/PH), Pihtipudas, Peninki, Leppäkangas. Ca 5 dm² patch. Coll. Matti Aalto 29.IX.2019, det. Riikka Juutinen 2019, conf. Tauno Ulvinen 2019 (OULU id.herb.oulu.fi/HT.28233).

Platyhypnum norvegicum (Schimp.) J.J.Amann

(*Hygrohypnum norvegicum*)

FINLAND. Lapponia sompiensis (Lks/SoL), Pelkosenniemi, Pyhä-Luosto National Park, Rykimäkelo S, Pyhäjoki. Seasonally moist base of a boulder. Fairly abundant, patch coverage at least 3 dm², with sporophytes. Coll. Timo Kypärä 3300, 8.VIII.2020 (OULU tun.fi/GAT.1385).

Pleuroidium subulatum (Hedw.) Rabenh.

FINLAND. Nylandia (N/U), Kirkkonummi, Honskby, forest W of Honskby fields. Overgrown, partly clayey forest ditch, on the ditch side clay. 2 dm². Coll. Esa Ervasti 1195, 24.IX.2018 (TUR mus.utu.fi/TBR.125205).

Pohlia annotina (Hedw.) Lindb.

FINLAND. Ostrobothnia ultima (Obu/PeP), Rovaniemi, Vilmilä, Kemijoki, Syvänojankangas, W side of stream Syväoja. Stream bank at a small waterfall, on mineral soil. ½ dm² patch, gemmae. Coll. Timo Kypärä 2915, 16.IX.2019, conf. Tauno Ulvinen 2019 (OULU tun.fi/GAT.1000).

Pohlia elongata Hedw.

FINLAND. Ostrobothnia ultima (Obu/PeP), Rovaniemi, Pisavaara Strict Nature Reserve, Teeripäri S. Exposed rock on scree slope, on low rock walls. Coll. Aune & Timo Koponen 8433, 20.VII.1965, det. Tauno Ulvinen 2018 (OULU id.herb.oulu.fi/GAL.7835). See also Koponen & Ulvinen 2021.

Pohlia melanodon (Brid.) A.J.Shaw
FINLAND. Satakunta (St), Sastamala, Kaltsila, lake Hanhijärvi, rapids in lake Hanhijärvi outlet. Clayey riverbank. Coll. Ari Parnela & Harri Arkkio 30.VIII.2019, conf. Tauno Ulvinen 2020 (OULU id.herb.oulu.fi/GAL.6577).

Pohlia sphagnicola (Bruch & Schimp.) Broth.
FINLAND. Lapponia sompiensis (Lks/SoL), Sodankylä, Viiankaapa Mire Reserve. Coll. Kristian Hassel & Kjell Ivar Flatberg 5.VIII.2019 (TUR mus.utu.fi/TBR.125909).

Pohlia wahlenbergii
(F.Weber & D.Mohr) A.L.Andrews
FINLAND. Satakunta (St), Eurajoki, Kaukomäki, Kahlankulma, by railway line. Groundwater quarry pool in an abandoned sand mine, with some fen vegetation traits featured on its banks. Coll. Esa Hankonen 4.V.2020. (TUR mus.utu.fi/TBR.126205).

Polytrichastrum altaicum Ignatov & G.L.Merr.,
vilukarhunsammal
FINLAND. Lapponia inarensis (Li/InL), Utsjoki, hill Gistuskaidi, upper NE slopes. Coll. Neil Bell 03.07.2006.007, 3.VII.2006 (H id.luomus.fi/HA.H4260919).

New species for Finland. *Polytrichastrum altaicum* was described as new to science by Ignatov & Smith Merrill (1995) based on single sequenced specimen from Altai. Additional molecular work Ivanova et al. (2014) included one Finnish accession from InL, which is this far the only known observation of the species in Finland. The species is morphologically close to *P. septentrionale* and *P. alpinum*, but the species is apparently rare worldwide. Known distribution covers few scattered observations in tundra or alpine regions, e.g., in Ural mountains (Ivanova et al. 2014).

Polytrichastrum septentrionale
(Sw. ex Brid.) E.I.Ivanova, N.E.Bell & Ignatov,
kerokarhunsammal, klotbjörnmossa
FINLAND. Lapponia inarensis (Li/InL), Utsjoki, hill Gistuskaidi, upper NE slopes. Coll. Neil Bell 02.07.2006.008, 2.VII.2006 (H id.luomus.fi/HA.H4260917).

New species for Finland. The taxon has earlier been treated as variety of *Polytrichastrum alpinum* (*P. alpinum* var. *septentrionale* (Brid.) G.L.Smith) and it has been earlier reported to occur in Finland based on collection by Ragnar Hult from KiL (Brotherus 1923). Molecular studies by Ivanova et al. (2014) confirmed independent position from *P. alpinum* and elevated the taxon at

species level. The specimen reported here from InL was among molecularly studied specimens. The occurrence in KiL and other possible older specimens in Finnish herbaria need to be checked before they can be added to the distribution table. Distribution concentrates on Arctic and on alpine regions on high mountains in North America and Europe, but world distribution is still poorly known (Ivanova et al. 2014). In Russia species occurs throughout Arctic region from Chukotksky district and Kamchatsky territory to Murmansk region and high mountains in Altai (Ivanova et al. 2014). The species grows on soil or rocks on open habitats (Ivanova et al. 2014). According to Brotherus (1923) *P. alpinum* var. *septentrionale* is in Fennoscandia mainly found in tundra above treeline.

Racomitrium affine (F.Weber & D.Mohr) Lindb.
FINLAND. Tavastia borealis (Tb/PH), Virrat, Keihäsjärvi, Sitkansolanmäki, near Leskirouvanvuori. Rocky gorge, overhanging, shady, granitic rock face. Coll. Ari Parnela 25.V.2004, conf. Tauno Ulvinen 2020 (OULU id.herb.oulu.fi/GAL.7567).

Racomitrium sudeticum (Funck) Bruch & Schimp.
(*Bucklandiella sudetica*)
FINLAND. Ostrobothnia ultima (Obu/PeP), Tervola, PISAvaara Strict Nature Reserve, N part of gorge Vähäloma, E side. Sunny side of the gorge, rock face with occasional seepage water, shadowed by trees. Aune & Timo Koponen 7916, 27.VII.1965, conf. Tauno Ulvinen 2021. (OULU id.herb.oulu.fi/GAL.7836). See also Koponen & Ulvinen 2021.

Sanionia orthothecioides (Lindb.) Loeske
FINLAND. Regio aboënsis (Ab/V), Uusikaupunki, Pyhämaa, Ketteli, Katakari. Stony seashore littoral. Coll. Orvokki Ravanko 16.IX.1973, det. Unto Laine 1990 (TUR mus.utu.fi/TBR.59798).

Schistidium confusum H.H.Blom
FINLAND, Karelia borealis (Kb/PK), Joensuu, Eno, Riutta, Kuusojä, stream Kiperäkoski, S tip of land embraced by oxbow in stream Kiperäkoski. Shady S side of biotite paragneiss rock wall, in a possibly calcareous seam. Coll. Juhani Räsänen & Marko Riikonen 17/1201s & 17/1212s, 12.IX.2017, det. Tauno Ulvinen 2020 (OULU id.herb.oulu.fi/GAL.7562).

Scorpidium cossonii (Schimp.) Hedenäs
FINLAND. Ostrobothnia australis (Oa/EP), Lapua, Simpsiö. Rich spruce-birch fen. Coll. Tapani Herttua 1960–1961, det. Heikki Roivainen 1961 (H id.luomus.fi/HA.H4260406).

Seligeria brevifolia (Lindb.) Lindb.

FINLAND. Karelia borealis (Kb/PK), Juuka, Polvela, Valkeislampi, pond Pieni-Valkeinen S. A cave in a calcareous rock outcrop, on stone surface. One shoot among *Seligeria pusilla*. Coll. Timo Kypärä 3276, 21.VII.2020 (OULU tun.fi/GAT.1361).

Seligeria pusilla (Hedw.) Bruch & Schimp.

FINLAND. Karelia borealis (Kb/PK), Juuka, Polvela, Valkeislampi, pond Pieni-Valkeinen S. A cave in a calcareous rock outcrop, on stone surface. Moderately sparse growth on at least 10 dm² area. Coll. Timo Kypärä 3276, 21.VII.2020 (OULU tun.fi/GAT.1361).

Sphagnum annulatum H.Lindb. ex Warnst.

FINLAND. Lapponia sompiensis (Lks/SoL), Sodankylä, Jeesiö, Kaarevuoma, ca 310 m NW of confluence of the streams Tuohenkiskomaaja and Kaareoja. Treeless fen, between the lawn and flark surface level. Two patches, a few meters apart, a few dm². Coll. Kati Pihlaja, 6.8.19/11, 6.VIII.2019, det. Harri Vasander 2019 (TUR mus.utu.fi/TBR.119963).

Sphagnum divinum Flatberg & Hassel

FINLAND. Karelia ladogensis (KI/LK), Parikkala, Saari Harakkalampi. Forest covered bog, in the margins of a spring pool. Coll. Tuomo Kuitunen 3853, 16.VII.2019, conf. Ari Parnela 2019 (OULU id.herb.oulu.fi/GAL.6147); Lapponia kittilensis (Lkk/KiL), Kittilä, Kallo NW, Porttivuoma, Vaarankuusikko SSE. Pine fen, hummock surface. Coll. Riikka Juutinen 7571, 8.VIII.2019, det. Jukka Laine 2019 (OULU tun.fi/GAK.3071); Lapponia sompiensis (Lks/SoL), Sodankylä, Jeesiö, Kaarevuoma E-part, ca 470 m NE of confluence of the streams Tuohenkiskomaaja and Kaareoja. Forest covered bog. Widespread. Coll. Kristian Hassel, Harri Vasander & Kjell Ivar Flatberg 6.VIII.2019 (TUR mus.utu.fi/TBR.119961).

Sphagnum flexuosum Dozy & Molk.

FINLAND. Lapponia kittilensis (Lkk/KiL), Kittilä, Kallo, Porttivuoma. Tuulijoki mires – Porttijärvi. Intermediate fen lawn. Coll. Kristian Hassel & Kjell Ivar Flatberg. 8.VIII.2019 (TUR mus.utu.fi/TBR.125903).

Sphagnum medium Limpr.

FINLAND. Karelia ladogensis (KI/LK), Parikkala, Särkisalmi, Heralamminhete. Spring-fed swamp, on lawn surface by a spring. Abundant. Coll. Tuomo Kuitunen 3884, 18.VII.2019 (OULU id.herb.oulu.fi/GAL.6148); Ostrobotnia kajanensis (Ok/Kn), Suomussalmi, Hossa, Pahamaailma, lake Pyöreä-Hoilua SW. Lakeshore swamp, among Sphagna. Coll. Ari Parnela 16.IX.2019 (OULU id.herb.oulu.fi/GAL.6218).

Sphagnum molle Sull.

FINLAND. Tavastia australis (Ta/EH), Ylöjärvi, Kuru, Seitsemien, Löytty. Drained and somewhat dried mesotrophic *Sphagnum papillosum* flark fen. Young patches, very sparse. Coll. Hanna & Raimo Heikkilä 9.VIII.1992 (H id.luomus.fi/HA.H4260877).

Tortella densa

(Lorentz & Molendo) Crundw. & Nyholm,

ruostekiertosammal, alvarkalkmossa

FINLAND. Karelia borealis (Kb/PK), Juuka, Polvela, isthmus between lake Valkealampi and pond Pieni-Valkeinen. Calcareous rock bank. Scant, few small tufts. Coll. Timo Kypärä 3247, 16.VII.2020, conf. Sanna Huttunen 2021. (TUR mus.utu.fi/TBR.125936).

New species for Finland. *Tortella densa* was found by Timo Kypärä in connection with field inventories of bryophyte flora by Parks and Wildlife Finland. *Tortella densa* occurs in Juuka by lake Valkealampi on SW-facing exposed, dry calcareous lake shore cliffs with *Pseudoleskeella nervosa*, *Flexitrichum flexicaule* and *Schistidium trichodon*.

Of other *Tortella* species occurring in Finland *T. densa* could be confused with *T. rigens* and *T. inclinata*. Additional records were therefore searched, though without success, among herbarium specimens of *Tortella inclinata* at Turku University Herbarium (TUR). *Tortella rigens* occurs in Finland only in Åland archipelago in islands in outer archipelago, where it was found in 2013 (Huttunen et al. 2014). Northernmost populations of *T. inclinata* in Finland are from South Savo.

In Sweden and England *Tortella densa* is found in rock crevices and exposed calcareous rocks with thin layer of earth (Crundwell and Nyholm 1962, Hallingbäck et al. 2008). Distribution in northern Europe comprises mainly of scattered populations with exception of Swedish alvar regions in Öland and Gotland (Nyholm 1989, Hallingbäck et al. 2008). Northernmost populations in Europe are known from Norway from Tromsø and Nordreisa in Troms and Finnmark provinces (Crundwell and Nyholm 1962, Hallingbäck et al. 2008; Artsdatabanken 2022). Distribution is poorly known from some parts of Europe, but it has been reported at least from UK, Ireland, several Central European countries and from Spain, Italy, Croatia and Greece in Mediterranean region (Fedosov & Ignatova 2009). Outside Europe *Tortella densa* occurs in North America, where it oc-

curs in a few northern states and provinces: British Columbia, Northwest Territories, Alaska, Michigan, Vermont and Wisconsin (Eckel 2007). In Asia *T. densa* has been reported from Turkey (Crundwell and Nyholm 1962) and from one locality in Russia, from Krasnoyarsk Territory (Fedorov & Ignatova 2009).

Ulota bruchii Hornsch. ex Brid.

(*Ulota crispa* var. *norvegica*)

FINLAND. Satakunta (St), Ikaalinen, Seitsemäinen National Park, Kovero, pond Koverolampi, N of Kovero farm main building. Grazed grassland by pond, fallen *Populus tremula* deadwood log. A small tuft. Coll. Timo Kypärä 2740, 25.VI.2019, conf. Kimmo Syrjänen 2019. (OULU tun.fi/GAT.825).

Warnstorfia pseudostraminea

(Müll.Hal.) Tuom. & T.J.Kop.

FINLAND. Nylandia (N/U), Kirkkonummi, Meiko Nature Conservation Area, Dorgarn forest area, pond Kommelpott. Mire margined pond, among *Sphagna*. Sparse. Coll. Esa Ervasti 1236, 15.X.2018 (TUR mus.utu.fi/TBR.125232); Satakunta (St), Ylöjärvi, Kuru, river Liesijoki, Parinkosket rapids. Rotten log boom in the riverbank spruce forest. Coll. Ari Parnela & Tuomo Kuitunen 20.X. 2018, det. Ari Parnela 2018 (OULU id.herb.oulu.fi/GAL.4882).

New records – Marchantiophyta

Aneura maxima (Schiffn.) Steph.

FINLAND. Kainuu (Kn), Sotkamo, Hiidenportti National Park, Urpovaara, lower part of S slope. Spring seepage in a spruce fen. A patch of at least 4 dm². Coll. Timo Kypärä 3374, 28.IX.2020 (OULU tun.fi/GAT.1459).

Aneura mirabilis (Malmb.) Wickett et Goffinet

(*Cryptothallus mirabilis*)

FINLAND. Ostrobothnia ultima (Obu/PeP), Rovaniemi, Vanttauskoski, Hyypiöniemi, N from Isonkivenjänkä but S from the road. A spring complex with spruce fen features, beneath *Sphagna*. A few thalli, possibly common and abundant. Coll. Timo Kypärä 2943, 20.IX.2019 (OULU tun.fi/GAT.1028).

Apopellia endiviifolia (Dicks.) Nebel & D.Quandt

(*Pellia endiviifolia*)

FINLAND. Ostrobothnia ultima (Obu/PeP), Tervola, Loue, Isomännikkö. Lime quarry, on compacted calcareous gravel. Abundant. Coll. Tuomo Kuitunen 3681, 25.VIII.2018 (OULU id.herb.oulu.fi/GAL.6203).

Calypogeia fissa (L.) Raddi

FINLAND. Nylandia (N/U). Kirkkonummi, Myllykylä, Meiko nature protection area, a rivulet flowing out from lake Mustjärvi. At the side of a rivulet flowing in a spruce fen, on rotten fallen spruce. 10 cm × 100 cm patch. Coll. Esa Ervasti 1173, 21.VIII.2018 (TUR mus.utu.fi/TBR.125190).

Cephalozia macounii (Austin) Austin

FINLAND. Satakunta (St). Ikaalinen, Seitsemäinen National Park, Multiharju ridge, E-part. On very old rotten log of which ca 1 m bare from forest moss cover. Seemingly fairly abundant, probably several dozen of cm², with perianths. Coll. Timo Kypärä 2739, 24.VI.2019, conf. Kimmo Syrjänen 2019 (double blind determination not done) (OULU tun.fi/GAT.824); Karelia borealis (Kb/PK). Lieksa, Ruunaa, between mire Lakkapääsuo and the road to Neitiniemi. Moist kettlehole in a maturing pine forest, on rotten wood. Approximately 50 cm² patch. Coll. Timo Kypärä 2760, 8.VII.2019, conf. Kimmo Syrjänen 2019 (double blind determination not done) (OULU tun.fi/GAT.845).

Cephaloziella divaricata (Sm.) Schiffn.

FINLAND. Ostrobothnia ultima (Obu/PeP). Rovaniemi, Pisavaara Nature Reserve, W from Sorvanulikki. On rotten fallen log, diam. 25 cm, decay stage 4. Coll. Riikka Juutinen 7582, 28.VIII.2018, det. Timo Kypärä 2020 (double blind determination not done) (OULU tun.fi/GAK.2494).

Cephaloziella spinigera (Lindb.) Jørg.

FINLAND. Tavastia borealis (Tb/PH). Pihtipudas, Peninki, E shore of lake Elämäjärvi, N part of mire Suurusneva. *Sphagnum fuscum* dominated ditched pine mire, at the side of a hummock, on peat. Probably scarce. Coll. Timo Kypärä 3180, 2.VII.2020, double blind determination: det. Timo Kypärä 2020, Riikka Juutinen 2021 (OULU tun.fi/GAT.1265).

Diplophyllum obtusifolium (Hook.) Dumort.

FINLAND. Ostrobothnia ultima (Obu/PeP), Rovaniemi, Oikarainen, Kemijoki, by river Kuohunkijoki above Haapakoski. Margin of *Equisetum sylvaticum* spruce mire, on fine grained mineral soil exposed by a fallen tree. 4 dm² patch, with perianths. Coll. Timo Kypärä 2867, 1.IX.2019 (OULU tun.fi/GAT.952).

Fuscocephaloziopsis affinis Lindb. ex. Steph.

(*Cephalozia affinis*)

FINLAND. Karelia borealis (Kb/PK), Lieksa, Ruunaa, Ruunaa Nature Reserve, Finnish-Russian border zone, hill Kivivaara N slope, at the base of the hill. Spruce-pine-mire, fallen *Pinus sylvestris* kelo log, diam. 33 cm. 1 dm², fertile. Coll. Timo Kypärä, 2.VI.2020, double blind determination: det. Timo Kypärä 2020, Riikka Juutinen 2021 (OULU tun.fi/GAT.1214).

Fuscocephaloziopsis catenulata

(Huebener) Våna & L.Söderstr.

(Cephalozia catenulata)

FINLAND. Satakunta (St), Pirkanmaa, Ikaalinen, Seitsemäinen National Park, Multiharju, N part of Multiharju on N side of road, ca 100 m NW of parking lot. Old *Pinus sylvestris* -dominated *Vaccinus myrtillus* -type coniferous forest, old fallen (possibly?) *Pinus sylvestris* log, diam. 34 cm. Abundant, three patches with 3,3 dm² coverage, perianths. Coll. Timo Kypärä 3013, 16.IV.2020, double blind determination: det. Timo Kypärä 2020, Riikka Juutinen 2021 (OULU [tun.fi/GAT.1098](https://doi.org/10.21203/rs.3.rs-1098)).

Fuscocephaloziopsis lunulifolia

(Lindb. ex Steph.) Våna et L.Söderstr.

(Cephalozia lunulifolia)

FINLAND. Karelia borealis (Kb/PK), Ilomantsi, Hattuvaara, Koivusuo Strict Nature Reserve NW, Raiskonaho old growth forest S part. A mire depression in a *Vaccinus myrtillus* type mixed old growth forest, old fallen log, diam. 30 cm. Abundant along 1 m, perianths Coll. Timo Kypärä 3071, 18.V.2020, double blind determination: det. Timo Kypärä 2020, Riikka Juutinen 2021 (OULU [tun.fi/GAT.1156](https://doi.org/10.21203/rs.3.rs-1156)).

Fuscocephaloziopsis loitlesbergeri

(Schiffn.) Våna et L.Söderstr.

(Cephalozia loitlesbergeri)

FINLAND. Tavastia australis (Ta/EH), Kangasala, Pakkala, Teinivuori. Small pristine pine mire, at the sides of a path, among *Sphagna*. Abundant. Coll. Tuomo Kuitunen 1901, 10.XI.2011, double blind determination: det. Tuomo Kuitunen 2011, Timo Kypärä 2018 (OULU [id.herb.oulu.fi/GAL.4687](https://doi.org/10.21203/rs.3.rs-4687)).

Gymnocolea borealis (Frisvoll & Moen) R.M.Schust.

FINLAND. Lapponia sompiensis (Lks/SoL), Sodankylä, Jeesiö, Kaarevuoma. Rich fen. Coll. Kristian Hassel & Kjell Ivar Flatberg 6.VIII.2019 (TUR [mus.utu.fi/TBR.125904](https://doi.org/10.21203/rs.3.rs-125904)).

Heterogemma laxa (Lindb.) Konstant. & Vilnet*(Lophozia laxa)*

FINLAND. Lapponia kittilensis (Lkk/KiL), Kittilä, Kallo, Porttivuoma, lake Kesä-Porttijärvi E. Intermediate fen lawn. Coll. Eva Mikulášková 8.VIII.2019, det. Eva Mikulášková & Kristian Hassel, conf. Kimmo Syrjänen 2020 (TUR [mus.utu.fi/TBR.126668](https://doi.org/10.21203/rs.3.rs-126668)); Lapponia sompiensis (Lks/SoL), Sodankylä, Jeesiö, Kaarevuoma W, near Perttamo-oja. *Sphagnum fuscum* -hummock. Coll. Kristian Hassel & Kjell Ivar Flatberg 6.VIII.2019 (TUR [mus.utu.fi/TBR.125905](https://doi.org/10.21203/rs.3.rs-125905)).

Marchantia polymorpha L. subsp. *montivagans*

Bischl. & Boissel.-Dub.

FINLAND. Ostrobotnia ouluensis (Obo/OP), Pudasjärvi, Valtionmaa, Vengasvaara, river Mertajoki W. *Impatiens*-spring. Coll. Risto Virtanen 20.V.2003, conf. Tauno Ulvinen 2007 (OULU [tun.fi/GAK.2682](https://doi.org/10.21203/rs.3.rs-2682)).

Mylia taylorii (Hook.) Gray

FINLAND. Ostrobotnia kajanensis (Ok/Kn), Sotkamo, Hiidenportti National Park, W part, Portinsalo, Rasilampi. Outlet stream of pond Rasilampi. *Equisetum sylvaticum* spruce mire, on an old deadwood log fallen across the stream, diam 25 cm. Dense mat with 1 dm² coverage. Coll. Timo Kypärä 3160, 17.VI.2020 (OULU [tun.fi/GAT.1245](https://doi.org/10.21203/rs.3.rs-1245)).

Nardia compressa (Hook.) Gray

FINLAND. Tavastia australis (Ta/EH), Ylöjärvi, Kuru, Seitsemäinen National Park, Iso Kivijärvi, Keinusalo, S shore of lake Iso Kivijärvi. Rocky lakeshore, on shore gravel at water's edge, between boulders on mineral soil. Abundant cover on ¼ m². Coll. Timo Kypärä 2750, 26.VI.2019, conf. Kimmo Syrjänen 2019 (OULU [tun.fi/GAT.835](https://doi.org/10.21203/rs.3.rs-835)). Double blind determination not done.

Nowellia curvifolia (Dicks.) Mitt.

FINLAND. Savonia borealis (Sb/PS), Pieksämäki, Haapaaho, Kivilampi, Tulilampi, pond Kivilampi S, pond Tulilampi N. Paludified lakeshore forest, on fallen *Pinus sylvestris* kelo log, diam. 35 cm. Coverage ca 3 dm² along 1,5 m. Coll. Timo Kypärä 3035, 22.IV.2020 (OULU [tun.fi/GAT.1120](https://doi.org/10.21203/rs.3.rs-1120)); Karelia borealis (Kb/PK), Ilomantsi, Pötsövaara, Pärttylisuo, Honkavaara, swamp Pärttylisuo E, hill Honkavaara NW. On a fallen *Pinus sylvestris* kelo log on a ditch bank. Sparse, single shoots among other mosses. Coll. Timo Kypärä 2772, 10.VII.2019 (OULU [tun.fi/GAT.857](https://doi.org/10.21203/rs.3.rs-857)).

Odontoschisma denudatum (Mart.) Dumort.

FINLAND. Lapponia sompiensis (Lks/SoL), Sodankylä, Viiankiaapa. Mesotrophic spruce mire forest margin, on the bark of a well rotten birch. Coll. Sami Hamari SH0129818, 29.VIII.2018, det. Riikka Juutinen 2018 (OULU [id.herb.oulu.fi/GAL.4676](https://doi.org/10.21203/rs.3.rs-4676)).

Odontoschisma fluitans (Nees) L.Söderstr. & Våna*(Cladopodiella fluitans)*

FINLAND. Karelia ladogensis (Kl/LK), Parikkala, Särksalmi, Heralamminhete. Spring-fed mire, among *Sphagna*. Abundant. Coll. Tuomo Kuitunen 3883, 18.VII.2019 (OULU [id.herb.oulu.fi/GAL.6149](https://doi.org/10.21203/rs.3.rs-6149)).

Oleolophozia perssonii

(H.Buch & S.W.Arnell) L.Söderstr., De Roo & Hedd.

(Lophozia perssonii)

FINLAND. Karelia borealis (Kb/PK), Juuka, Polvela, Valkealampi, Juuanjärvi, at E side of lake Valkealampi N part. At the base of a calcareous rocky slope, on an overgrowing patch of bare soil exposed under the root plate of a fallen tree. Probably quite scarce, was found during the examination of a 10 cm² patch of another species collected from the site. With gemmae. Coll. Timo Kypärä 3229, 15.VII.2020 (OULU [tun.fi/GAT.1314](https://doi.org/10.21203/rs.3.rs-1314)).

Radula lindenbergiana Gottsche ex C.Hartm.

FINLAND. Ostrobothnia kajanensis (Ok/Kn), Suomussalmi, Malahvianvaara, Murhisalo Natura 2000 protected area, Louhenkangas N, middle reach of rapid Louhenkoski. On a stone on the riverbank. Fairly abundant on the rapid stones, one fertile patch with male shoots, ca ½ dm². Coll. Timo Kypärä 3340, 1.IX.2020 (OULU [tun.fi/GAT.1425](https://doi.org/10.21203/rs.3.rs-1425)).

Riccardia latifrons (Lindb.) Lindb. subsp. *arctica*

R.M.Schust. & Damsh.

FINLAND. Ostrobothnia kajanensis (Ok/Kn), Kuhmo, Lauvuskylä, Jämäsvaara Natura 2000 protected area, lake Pitkäjärvi NE end. Oligotrophic treeless *Sphagnum* bog by forest pond. Sparsely on ½ m² area. Coll. Timo Kypärä 3361, 14.IX.2020 (OULU [tun.fi/GAT.1446](https://doi.org/10.21203/rs.3.rs-1446)).

Riccia canaliculata Hoffm.

FINLAND. Tavastia australis (Ta/EH), Hartola, Ruskeala, pond Isoranta W side. Exposed, muddy sandbank covered with fine silt. Few small patches on 3 m² area. Coll. Teppo Häyhä 1389, 31.VII.2019, det. Timo Kypärä 2020 (OULU [id.herb.oulu.fi/GAL.7672](https://doi.org/10.21203/rs.3.rs-7672)).

Riccia rhenana Lorb. ex Müll.Frib.

FINLAND. Tavastia australis (Ta/EH), Valkeakoski, Ritvala, Oitti, NE base of point Oitinkinnas. Growing on pollen scum at the waterline, left dry by lowering water level. Sparse. Coll. Harri Arkkio 22.VIII.2019, det. Timo Kypärä 2020 (OULU [id.herb.oulu.fi/GAL.6397](https://doi.org/10.21203/rs.3.rs-6397)).

Scapania apiculata Spruce

FINLAND. Ostrobothnia kajanensis (Ok/Kn), Sotkamo, Hiidenportti area, Porkkasalo, Porkkavaara, NE of Hiidenportti National Park, hill Porkkavaara SW slope. Fairly large spring-fed mire, on a *Populus tremula* deadwood log, diam. 30 cm, in a trickle of spring water. Scarce, single shoots among other bryophytes on a 5 dm² area, gemmae. Coll. Timo Kypärä 3147, 9.VI.2020 (OULU [tun.fi/GAT.1232](https://doi.org/10.21203/rs.3.rs-1232)).

Scapania curta (Mart.) Dumort.

FINLAND. Lapponia sompiensis (Lks/SoL), Pelkosenniemi, Pyhäntunturi, Kiimasselkä. Cabin resorts, on trodden driveway margin. Coll. Tuomo Kuitunen 3594, 1.VIII.2018, conf. Ari Parnela 2018 (OULU [id.herb.oulu.fi/GAL.4686](https://doi.org/10.21203/rs.3.rs-4686)).

Scapania parvifolia Warnst. **notkokinnassammal**

FINLAND. Ostrobothnia kajanensis (Ok/Kn), Kuhmo, area W of Ulvinsalo Strict Nature Reserve, hill Riihivaara S, pond Koukkulampi S. A spruce mire patch in a pine bog

forest, vertical rock outcrop, N exposition, moist vertical rock crevice. Sparsely along 0,5 meters, several shoots, perianths. Coll. Timo Kypärä 3163, 23.VI.2020, det. Riikka Juutinen 2021 (TUR [mus.utu.fi/TBR.126669](https://doi.org/10.21203/rs.3.rs-126669)); Lapponia kittilensis (Lkk/KiL), Muonio, Pallastunturit. Coll. August Johan Malmberg July 1867, det. Hans Buch 1926, conf. A.R. Perry 1969 (H [id.luomus.fi/HA.H4262659](https://doi.org/10.21203/rs.3.rs-4262659)); Lapponia inarenensis (Li/InL), Utsjoki, Kotkapahta N, river Kevojoki. Rivershore. Coll. Unto Laine 16.VIII.1969, det. Kimmo Syrjänen 2015 (TUR [mus.utu.fi/TBR.122371](https://doi.org/10.21203/rs.3.rs-122371)).

New species for Finland. In earlier treatments of European liverworts, *Scapania parvifolia* has often been treated as an intraspecific taxon under *Scapania scandica* (Arnell & H.Buch) Macvicar (Damsholt 2002). In the most recent European checklist of bryophytes it was recognized at species level (Hodgetts et al. 2020). *Scapania parvifolia* has been reported to occur in Finland before the recent taxonomic changes (Kb and Lk; Buch 1928). Occurrence in Lapponia kemensis refers to the specimen from Pallastunturit in H, but no specimen was located from Karelia borealis in any herbaria. The species grows on soil, especially on peaty soil, on the ground in forests and rarely on decaying wood (Arnell 1979). According to Damsholt (2002) the species is Arctic-alpine and continental, and in Fennoscandia it is known to occur in Svalbard, Norway and Sweden (Hodgetts & Lockhart 2020). In Central Europe it occurs in Austria, Germany, Czech Republic, Poland, Romania and Slovakia, but in most countries it has been assessed as threatened (Hodgetts & Lockhart 2020). It is more common in European parts of Russia (Hodgetts & Lockhart 2020) and in Russia its distribution reaches to Easternmost territories (Choi et al. 2012). Besides Eurasia, *Scapania parvifolia* occurs in North America (Choi et al. 2012).

Scapania umbrosa (Schrad.) Dumort.

FINLAND. Lapponia kittilensis (Lkk/KiL), Kittilä, Kallo, Porttivuoma, Tuulijoki mires – Porttijärvi. Decaying log in forest margin. Coll. Kristian Hassel & Kjell Ivar Flatberg 8.VIII.2019, det. Kristian Hassel 2020 (TUR [mus.utu.fi/TBR.125910](https://doi.org/10.21203/rs.3.rs-125910)).

Solenostoma hyalinum (Lyell) Mitt.

(*Jungermannia hyalina*)

FINLAND. Ostrobothnia australis (Oa/EP), Alavus, lake Vetämäjärvi, Tervalva lakeshore. On a stone. Coll. Artturi Railonsala 26.IX.1932, det. Hans Buch 1943 (TUR [mus.utu.fi/TBR.33928](https://doi.org/10.21203/rs.3.rs-33928)).

Tritomaria exsecta

(Schmidel ex Schrad.) Schiffn. ex Loeske,
kätökämmensammal, skugglobmossa

FINLAND. Ostrobothnia ultima (Obu/PeP), Rovaniemi, Jokela, Kemijoki, Tulkkiaapa N, Hirvikari SW. By a small tributary flowing to river Kemijoki. Mesic *Picea abies* heath forest, on an old tree stump. Sparse patch covering ca ½ dm², gemmae. Coll. Timo Kypärä 2883, 2.IX.2019, conf. Kimmo Syrjänen (OULU [tun.fi/GAT.968](https://doi.org/10.21203/rs.3.rs-1968168/v1)).

New species for Finland. *Tritomaria exsecta* was found by Timo Kypärä from Rovaniemi growing on decaying logs in a river valley. According to Damsholt (2002) the species grows mostly on decaying logs and peaty soil but also on sandy soil and shaded acidic rock walls in moist forests. It has sometimes been confused with more common *Tritomaria exsectiformis*, but differs by smaller leaf cell size and by lack of distinct trigones as well as gemmae shape and size (Arnell 1979, Damsholt 2002, Artfakta 2022). *Tritomaria exsecta* has western, temperate-montane distribution on circumboreal area. In Europe it is widespread on lowland areas but avoids alpine sites. In the Nordic countries it is known from hemiboreal and western boreal regions in Denmark, Sweden and Norway, and the new Finnish locality thus extends the species distribution further north in Fennoscandia (Damsholt 2002, Hodgetts & Lockhart 2020). Sporophytes are unknown in Nordic populations (Damsholt 2002). It is assessed as threatened in Sweden, Ireland, Canary Islands and Hungary (Hodgetts & Lockhart 2020).

Tritomaria scitula (Taylor) Jørg.

FINLAND. Karelia borealis (Kb/PK), Juuka, Polvela, Valkealampi, tip of small headland at SE part of lake Valkealampi. Calcareous rock, in a notch. ½ dm² patch, gemmae. Coll. Timo Kypärä 3258, 20.VII.2020, conf. Kimmo Syrjänen 2020 (OULU [tun.fi/GAT.1343](https://doi.org/10.21203/rs.3.rs-1968168/v1)).

Corrections – Bryophyta***Brachythecium laetum*** (Brid.) Schimp.

FINLAND. Regio aboënsis (Ab/V). Länsi-Turunmaa, Houtskari, Nätaholm. Coll. Turkkka Korvenpää, 13.8.2008 (TUR [mus.utu.fi/TBR.116496](https://doi.org/10.21203/rs.3.rs-1968168/v1)). The only Finnish specimen was sequenced and comparison of its ITS1-5.8S-ITS2 sequence with the data in GenBank confirmed it to be *Brachythecium salebrosum*. In addition, morphological studies on the specimen found autoicous sexual condition

which is typical to *B. salebrosum* but not found in *B. laetum*. Occurrence in Ab is deleted. To present knowledge, the species does not occur in Finland.

Corrections – Marchantiophyta***Fuscocephaloziopsis affinis*** Lindb. ex Steph.

FINLAND. Ostrobothnia kajanensis (Ok/Kn). Kuhmo, Vepsä, Teerisuo-Lososuo Mire protection area, Kortevaara. Coll. Risto Virtanen, 11.IX.1992, det. Sanna Laaka 1993 (*Fuscocephaloziopsis humulifolia*), Anna Mäkelä 2010 (*Fuscocephaloziopsis* cf. *affinis*) (OULU [id.herb.oulu.fi/GAL.8618](https://doi.org/10.21203/rs.3.rs-1968168/v1)). The identification is uncertain and the specimen could be either *Fuscocephaloziopsis affinis* or *F. humulifolia*. This was the only specimen from Ok, so occurrence is deleted.

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