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Diversity and distribution of Finnish aphyllophoroid and heterobasidioid fungi (*Basidiomycota*): An update

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Abstract. Biogeographical and ecological knowledge of aphyllophoroid fungi has increased substantially after the publication of the Finnish aphyllophoroid checklist. In this paper, we describe the occurrence and distributions of both aphyllophoroid and heterobasidioid fungi in Finland. We introduce 13 species new to Finland: *Hyphoderma lapponicum*, *Mycostilla vermiformis*, *Proterochaete adusta*, *Pseudotomentella alobata*, *Pseudoxenasma verrucisporum*, *Sistotrema subtrigonospermum*, *Spiculogloea minuta*, *Tomentella botryoides*, *Tomentella neobourdotii*, *Tomentella subtestacea*, *Tomentella subpilosa*, *Tulasnella anguifera*, and *Tulasnella interrogans*. *Proterochaete* and *Pseudoxenasma* are new genera to Finland. We also present the record of *Caudicicola gracilis* for only the second time globally. Furthermore, we present 115 new records (locations) of 53 rare or seldom collected species. In addition, we report 96 species considered new to a specific subzone of the boreal forest vegetation zone in Finland. The records contain notes on the substrata, and the ecology and distribution of nationally new species and are briefly discussed.

Key words: *Aphyllophorales*, biogeography, corticioids, polypores, wood-associated fungi

Introduction

The checklist of Finnish aphyllophoroid fungi was published in 2009 (Kotiranta et al. 2009). Since that time, substantial new information on both aphyllophoroid and heterobasidioid species has accumulated, which includes a total of 102 species new to Finland (H. Kotiranta, unpublished), 406 records of rare species, and 525 species new to some region (e.g., Kunttu et al. 2016, 2018, 2019). The species that are new to Finland can be either factually new finds or results of better understanding of species identity due to taxonomic revisions. This accumulated knowledge is mainly explained by recent extensive field inventories and studies, while areas (e.g., Kainuu province, Oulu region) and substrata (e.g., fine woody debris) that had previously received little attention have also been newly surveyed (e.g., Juutilainen 2016).

In the current paper, we present new records of aphyllophoroid and heterobasidioid fungi in Finland, where we consider three types of records: 1) species new to Finland, 2) rare or seldom collected species with a maximum of 10 previous records in Finland, and 3) species that are new to a specific subzone (section) of the boreal vegetation zone in Finland.

We considered both aphyllophoroid and heterobasidioid fungi in their broader sense, approximately following Hansen and Knudsen (1997), with the exception that the gastromycetoid genera were excluded. Although we concentrated mainly on corticioid fungi, the heterobasidioid genera (such as *Helicogloea*, *Spiculogloea*, and *Tulasnella*) were also included, since they were also included in the Finnish checklist of aphyllophoroid fungi (Kotiranta et al. 2009).

Material and methods

Most of the records in this paper were derived by mycologists from field trips and species inventories (e.g., Finnish Atlas of Fungi), but some old herbarium specimens were also studied. A common inventory method was an opportunistic search/sampling for species, which entailed a careful walk through a study site to collect visible sporocarps,

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and emphasis was placed on sampling multiple habitats and substrate qualities to collect a large number of species and to obtain a representative picture of the species composition of the study site (Stokland & Sippola 2004). Field work by the author PV during 2020 in Lapland was conducted in the form of systematic inventory of sample plots. The work was part of a Natural Resources Institute Finland LUKE led project. The majority of the records date from 2019 and 2020, but some older records were also included.

At the beginning of each fungal record, we provide the biogeographical provinces according to Knudsen and Vesterholt (2008), and Latin province names are presented on the website of FinBIF (2021a) alongside this provincial division. For each record, we named the sites at two or three levels: a municipality and a village, or a topographical site or nature conservation area. If the biogeographical province was the same as in the previous record for the same fungal species, it was not repeated. The Finnish National Uniform Coordinate System (UCS, 27°E; Heikinheimo & Raatikainen 1981) was used to present the coordinates. The forest vegetation subzones (Fig. 1) follow Ahti et al. (1968), and are also available on the online FinBIF map (FinBIF 2021b). Following the abovementioned sources, the names of the subzones were presented in English (e.g., Ostrobothnia), in contrast to the Latin names that were used for the biogeographical provinces (e.g., Ostrobottnia).

Taxonomy and nomenclature mainly follow Kotiranta et al. (2009) and Hjortstam and Ryvarden (2009), but Bernicchia and Gorjón (2010) was also used for some species, as was Spirin et al. (2019a) for genus *Protomerulius*, and Svantesson et al. (2019) for the *Pseudotomentella tristis* group. The Finnish Red List assessment of species according to the IUCN-standard corresponds to Kotiranta et al. (2019). If a species status was determined to be of least concern, it was not mentioned.

The decay stage classification (1–5) of dead wood was carried out according to Renvall (1995), with stage 1 referring to hard dead wood and stage 5 referring to completely decayed wood. This is widely used method for all tree species in the boreal forests (e.g., Korhonen 2009; Siitonen et al. 2009). The diameter of dead wood was measured at chest height if the trunk was complete and from the middle if it was broken. Here, we use the Finnish term 'kelo' to refer to dead and old-growth trunks of Scots pine (*Pinus sylvestris*) with a silvery-grey, decorticated appearance. Kelo trees are special substrata for fungi due to their extremely slow decay rate (even hundreds of years), long-lasting hard surface and chemical compounds (Leikola 1969; Niemelä et al. 2002; Venugopal et al. 2016). Classification of habitat types follows, to a large extent, the Red List assessment of habitat types in Finland (Kontula & Raunio 2018).

The material were collected, identified, and confirmed by several mycologists as described in the record details, using the following abbreviations: TH = Teppo Helo, JJ = Jari Julkunen, HK = Heikki Kotiranta, MK = Matti Kulju, OM = Otto Miettinen, AM = Aki Moilanen, JP = Jorma Pennanen, and PV = Pyry Veteli. Unless otherwise stated, the collector was also the identifier. The code after the name of the collector represents the personal sampling number of the specimen. Voucher specimens were deposited in the herbaria of the universities of Helsinki (H), Oulu (OULU), Turku (TUR), Jyväskylä (JYV) and Kuopio Natural History Museum (KUO).

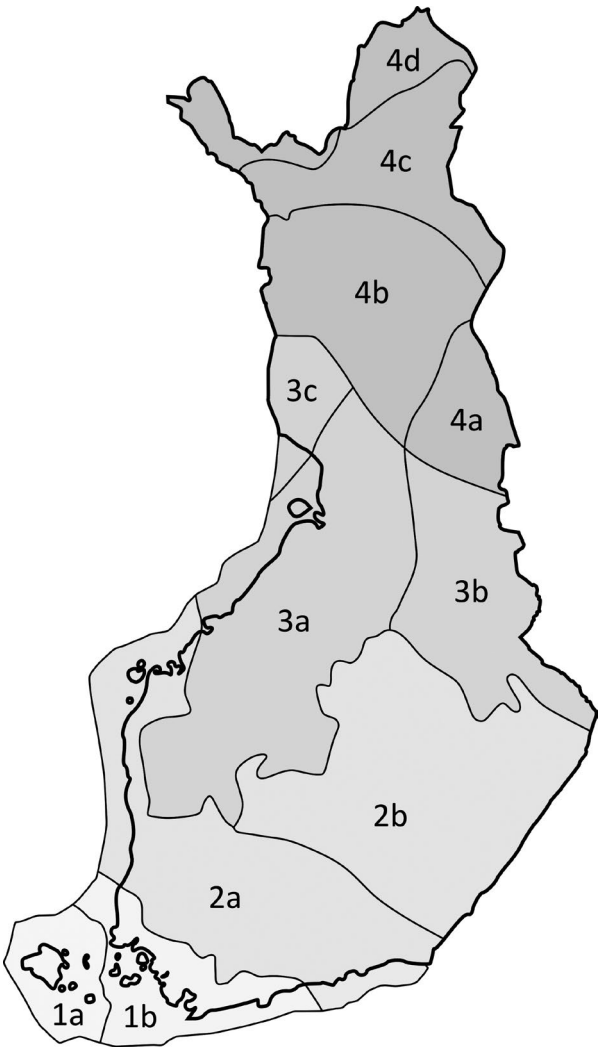

Figure 1. Boreal forest vegetation zones (1–4) and their subzones in Finland. 1a – Hemiboreal, Åland; 1b – Hemiboreal, Oak zone; 2a – Southern boreal, Southwestern Finland, and Southern Ostrobothnia; 2b – Southern boreal, Lake district; 3a – Middle boreal, Ostrobothnia; 3b – Middle boreal, Northern Carelia – Kainuu; 3c – Middle boreal, Southwestern Lapland; 4a – Northern boreal, Kuusamo District; 4b – Northern boreal, North Ostrobothnia; 4c – Northern boreal, Forest Lapland; 4d – Northern boreal, Fjeld Lapland.

Results

We discovered 13 fungal species new to Finland: *Hyphoderma lapponicum*, *Mycostilla vermiformis*, *Proterochaete adusta*, *Pseudotomentella alobata*, *Pseudoxenasma verrucisporum*, *Sistotrema subtrigonospermum*, *Spiculogloea minuta*, *Tomentella botryoides*, *Tomentella neobourdotii*, *Tomentella subtestacea*, *Tomentella subpilosa*, *Tulasnella anguifera*, and *Tulasnella interrogans*. We also present the record of *Caudicicola gracilis* for only the second time globally. Furthermore, 115 new records (locations) of 53 rare or seldom collected species (with a maximum

Table 1. Number of the new species in subzones of the boreal forest vegetation zone.

Subzone of boreal forest vegetation zone	Number of new species
Hemiboreal, Oak zone (1b)	5
Southern boreal, Southwestern Finland and Southern Ostrobothnia (2a)	3
Southern boreal, Lake district (2b)	7
Middle boreal, Ostrobothnia (3a)	19
Middle boreal, Northern Carelia – Kainuu (3b)	42
Middle boreal, Southwestern Lapland (3c)	11
Northern boreal, Kuusamo District (4a)	2
Northern boreal, North Ostrobothnia (4b)	4
Northern boreal, Fjeld Lapland (4d)	4

of ten previous records in Finland) are presented. Altogether, 96 species are reported as new to a specific subzone (section) of the boreal forest vegetation zone in Finland (Table 1).

The species are listed below in alphabetical order.

Amaurodon cyaneus (Wakef.) Kõljalg & K.H. Larsson (Fig. 2)

Distribution. New to 3b (Fig. 1).

Notes. 3rd record in Finland; previous records: Helsinki (1b) (Kotiranta et al 2009). Vulnerable.

Specimen examined. Ostrobottnia kajanensis, Sotkamo, Losonvaara, UCS 7107057:3546404, on a fallen trunk of *Populus tremula* (diam. 8 cm, decay stage 2) in an old spruce-dominated herb-rich heath forest, 6 Oct. 2018, leg. & det. TH 20180214 (OULU), conf. MK.

Amylocorticium pedunculatum Hjortstam (Fig. 3)

Distribution. New to 3b (Fig. 1).

Notes. 5th–7th records; previous records: Helsinki (1b), Lammi (2a), Luhanka (2b), and Äänekoski (2b) (Kotiranta et al. 2009; H. Kotiranta, unpublished).

Specimens examined. Ostrobottnia kajanensis, Kuhmo, Jämäsvaara SE, UCS 7099282:3624258, on a fallen small trunk of *Populus tremula* (diam. 12 cm, decay stage 4) in a mixed mesic heath forest, 8 Sept. 2016, leg. & det. JP3182 (H); Sotkamo, Naulavaara, UCS 7087212:3559108, on fallen trunk of *Picea abies* (diam. 5 cm, decay stage 3), in a middle-aged mixed herb-rich heath forests, 11 Sept. 2012, leg. P. Helo 2343 (OULU), det. TH; Sotkamo, Losonvaara, UCS 7106778:3545296, on a fallen trunk of *Picea abies* (diam. 10 cm, decay stage 3), in an old spruce-dominated mesic heath forest, 30 Sept. 2020, leg. & det. TH 20200015 (H).

Amyloxenasma allantosporum (Oberw.) Hjortstam & Ryvarden

Distribution. New to 3a (Fig. 1).

Specimen examined. Ostrobottnia ouluensis, Oulu, Karjasilta, UCS 7212887:3429705, on a stump of *Larix sibirica* (decay stage 2), in a small mesic heath forest with larch-trees planted next to the road, 26 Oct. 2019, leg. & det. AM 244 (OULU), conf. MK.

Figure 2. *Amaurodon cyaneus* in Sotkamo (TH 20180214). Photo: Teppo Helo.

Figure 3. *Amylocorticium pedunculatum* in Kuhmo, ex situ (JP3182). Photo: Jorma Pennanen.

Antrodia leucaena Y.C. Dai & Niemelä (Fig. 4)

Notes. 10th record in Finland; previous records: Raasepori (1b), Sipoo (2a), Porvoo (2a), Hyvinkää (2a), Padasjoki (2a), Hirvensalmi (2b), Ruovesi (2b), Savonranta (2b), and Hyrynsalmi (3b) (Spirin et al. 2013; Kunttu et al. 2016; FinBIF 2021c). Vulnerable.

Specimen examined. Nylandia, Helsinki, Kustaankartano, UCS 6681:3386, on fallen, decorticated trunk of *Populus tremula* (diam. 14 cm, decay stage 3) in former agricultural land, now herb-rich forest with high amounts of dead wood, dominated by *Salix caprea*, *Alnus incana* and *Ulmus glabra*, 17 Oct. 2020, leg. & det. PV 2570 (H), conf. OM.

Figure 4. *Antrodia leucaena* in Helsinki (PV 2570). Photo: Pyry Veteli.

Antrodiella parasitica Vampola (Fig. 5)

Distribution. New to 2b (Fig. 1).

Notes. 8th and 9th records in Finland; previous records: Karjalohja (1b), Lammi (2a), Padasjoki (2a), Sipoo (2a; two sites), Vantaa (2a), and Puolanka (3b) (Kotiranta et al. 2009; Kunttu et al. 2014). Vulnerable.

Specimens examined. Nylandia, Helsinki, Kustaankartano, UCS 6681:3386, on fallen *Picea abies* (diam. 35 cm, decay stage 2) in association with dead and live *Trichaptum abietinum* basidiomata, in *Picea abies* dominated old stand with high amount of coarse dead wood, 11 Oct. 2020, leg. & det. PV 2557 (H), conf. OM; Savonia borealis, Iisalmi, Poskimäki, UCS 7053991:3511039, on a fallen trunk of *Picea abies* (diam. 10 cm, decay stage 2) in a pine-dominated rocky forest, 9 Sept. 2020, leg. O. Ryhänen 1/9920 (OULU), det. MK, conf. HK.

Aphanobasidium subnitens (Bourd. & Galz.) Jülich (Fig. 6)

Distribution. New to 3b (Fig. 1).

Notes. 3rd record in Finland; previous records: Luhanka (2a) and Porvoo (2a). (Kotiranta et al. 2009; Kunttu et al. 2018).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7102091:3663174, on a fallen trunk of *Picea abies* (diam. 35 cm, decay stage 4), in a very old dwarf shrub spruce mire, 5 Oct. 2020, leg. & det. TH 20200029 (OULU, H), conf. MK, HK & V. Spirin.

Athelia acrospora Jülich

Distribution. New to 3c (Fig. 1).

Specimen examined. Ostrobottnia ultima, Tervola, Pisavaara Strict Nature Reserve, Vähäloma, UCS 7353720:3412120, on a kelo branch of *Pinus sylvestris* on the ground (diam. 5 cm, decay stage 1) in an old stony mesic heath forest, 4 Oct. 2020, leg. & det. MK 67/20 (OULU).

Athelia bombacina (Pers.) Jülich

Distribution. New to 3c (Fig. 1).

Specimens examined. Ostrobottnia ultima, Tervola, Pisavaara Strict Nature Reserve, Vähäloma, UCS 7352735:3413712, on a decorticated fallen trunk of *Pinus sylvestris* (diam. 25 cm, decay stage 3) in an old pine-dominated mesic heath forest, 4 Oct. 2020, leg. & det. MK 58/20 (OULU); Ostrobottnia ultima, Tervola, Pisavaara Strict Nature Reserve, UCS 7353868:3411948, on a partly decorticated fallen trunk of *Picea abies* (diam. 23 cm, decay stage 4) in an old spruce-dominated mesic heath forest, 4 Oct. 2020, leg. & det. MK 68/20 (OULU).

Athelopsis glaucina (Bourdot & Galzin) Parmasto (Fig. 7)

Notes. 9th record in Finland; previous records: Geta (1a), Finström (1a), Helsinki (1b), Tavastia australis (2a/2b), two records in 3a, and records in 3c and 4c (FinBIF 2021c, H. Kotiranta, unpublished).

Specimen examined. Nylandia, Karjaa, Lepinjärvi, UCS 6664384:3313649, on a fallen branch of *Corylus avellana* (diam. 4 cm, decay stage 4) in a *Corylus avellana* dominated herb-rich forest, 31 Dec. 2020, leg. & det. JP 4241 (H), conf. HK.

Figure 5. *Antrodiella parasitica* in Iisalmi (O. Ryhänen 1/9920). Photo: Ossi Ryhänen.

Figure 6. *Aphanobasidium subnitens* in Kuhmo (TH 20200029). Photo: Teppo Helo.

Figure 7. *Athelopsis glaucina* in Raasepori (JP4241). Photo: Jorma Pennanen.

Biatoropsis usnearum Räsänen (Fig. 8)

Distribution. New to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Riihivaara, UCS 7127522:3654462, on *Usnea glabrescens* growing on a living *Salix caprea* (diam. 35 cm) in a very old *Picea abies* dominated paludified herb-rich heath forest, 26 Aug. 2017, leg. & det JJ 1101 (OULU). We are aware that there is also an older unpublished museum specimen (KUO) which was collected on the border of zones 3a and 3b. Because that specimen lacks

exact coordinates, we decided to publish our more accurate JJ 1101 record.

Botryobasidium ellipsosporum Holubová-Jechová

Notes. 4th record in Finland; previous records: Lammi (2a), Puolanka (3b) and Sotkamo (3b) (Kotiranta et al. 2009; Kunttu et al. 2018, 2019). The specimen was an anamorph as were the three previous Finnish collections.

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 7129643:3664595, on a fallen trunk of *Pinus sylvestris* (diam. 25, decay stage 2, kelo tree) with *Tulasnella deliquescens* and *Tylospora fibrillosa* in an old pine-dominated sub-xeric heath forest, 9 Oct. 2020, leg. & det. TH 20200039 (OULU).

Botryobasidium intertextum (Schwein.) Jülich & Stalpers

Distribution. New to 3a (Fig. 1).

Specimen examined. Ostrobottnia ouluensis, Utajärvi, Hanganvaara, Hanganhete, UCS 7220917:3490636, on a fallen trunk of *Alnus incana*, in a spruce-dominated herb-rich forest next to a stream running from a spring, 14 July 2018, leg. & det. AM 74b-18 (OULU), conf. MK.

Brevicellicium olivascens (Bres.) K.H. Larss. & Hjortstam

Distribution. New to 3a (Fig. 1).

Specimen examined. Ostrobottnia ouluensis, Oulu, Kontinkangas, UCS 7212832:3429839, on a fallen trunk of *Populus tremula*, in an aspen-dominated herb-rich heath forest adjacent to a road, 12 Oct. 2019, leg. & det. AM 140 (OULU), conf. MK.

Byssocorticium efibulatum Hjortstam & Ryvarden (Fig. 9)

Notes. 2nd record in Finland; previous record: Raasepori (1b) (Kunttu et al. 2012). Not Evaluated.

Specimen examined. Nylandia, Helsinki, Annala, UCS 6679:3387, on pieces of oak branches that were half-buried in the mulch of a mesic herb-rich forest with *Quercus robur*, *Acer platanoides* and *Pinus sylvestris*, 1 May 2020 and 10 Oct. 2020, leg. & det. PV 1814 (H) and PV 2554.

Caudicicola gracilis Kotir., Kulju & Miettinen (Fig. 10)

Notes. This is the second global record; the first record was reported in Finland, Pyhäjärvi (3a), where basidiomata were discovered growing on six *Picea abies* or coniferous stumps quite close to each other in a spruce-dominated swamp forest (Kotiranta et al. 2017). Data Deficient.

Specimen examined. Ostrobottnia ouluensis, Oulu, Holtinkylä, Sammakkokangas, UCS 7213406:3440431, on a sawn block of *Betula* sp. leaning against a tree in a moist spruce-dominated drained and transformed mire, 28 Sept. 2020, leg. & det. P. Jokikokko (OULU, H), conf. MK. This finding is described in more detail in Jokikokko (2020).

Ceraceomyces borealis (Romell) J. Erikss. & Ryvarden

Distribution. New to 2b (Fig. 1).

Specimen examined. Savonia borealis, Lapinlahti, Koirniemi, 7033:3548, on a log of *Alnus incana* (diam. 10 cm, decay stage 2), in a log pile, 12 Aug. 2020, leg. & det. PV 2091 (H).

Figure 8. *Biatoropsis usnearum* in Kuhmo (JJ 1101). Photo: Jari Julkunen.

Figure 9. *Byssocorticium efibulatum* in Helsinki (PV 2554). Photo: Pyry Veteli.

Figure 10. *Caudicicola gracilis* in Oulu. Photo: Pauli Jokikokko.

Ceraceomyces microsporus K.H. Larsson

Distribution. New to 3c (Fig. 1).

Specimen examined. Ostrobottnia ultima, Tervola, Pisavaara Strict Nature Reserve, Vähäloma, UCS 7352908:3413439, on a decorticated fallen trunk of *Pinus sylvestris* (diam. 15 cm, decay stage 2) in an old stony mesic heath forest, 4 Oct. 2020, leg. & det. MK 61/20 (OULU).

Ceriporia bresadolae (Bourdot & Galzin) Bondartsev & Singer

Distribution. New to 1b (Fig. 1).

Notes. 4th record in Finland; previous records: Muhos (3a), Oulu (3a) and Inari (4c) (Kunttu et al. 2016).

Specimen examined. Nylandia, Helsinki, Kumpula, Kymintien metsä, UCS 6679:3387, on trunk of dead standing *Pinus sylvestris* (diam. 28 cm, decay stage 2), rocky forest dominated by *Pinus sylvestris*, 14.11.2020, leg. & det. PV 2630 (H).

Clavaria greletii Boud. (Fig. 11)

Notes. 9th record in Finland; previous records: Ikaalinen (2a), Pälkäne (2a), Lappeenranta (2b), Pieksämäki (2b), Kajaani (3b; two sites), Sotkamo (3b), and Keminmaa (3c) (Kotiranta et al. 2009; Kunttu et al. 2016).

Figure 11. *Clavaria greletii* in Kuhmo (TH 20200043). Photo: Teppo Helo.

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Tönölä, UCS 711606:362590, in grassland next to road, 7 Oct. 2020, leg. & det. TH 20200043 (OULU).

Colacogloea peniophorae (Bourdot & Galzin) Oberw., R. Bauer & Bandoni

Distribution. New to 4b (Fig. 1).

Specimen examined. Ostrobottnia ultima, Rovaniemi, Vanttauskoski, 7371:3488, on fallen *Pinus sylvestris* trunk (diam. 35 cm, decay stage 5a), leg. PV 2479, det. V. Spirin.

Conferticium ravum (Burt) Ginns & Freeman

Notes. 9th record in Finland; previous records: Luhanka (2b), Korpilahti (2b), Sulkava (2b), Suonenjoki (2b), Äänekoski (2b), Konnevesi (2b), Viitasaari (2b), and Rovaniemi (3c) (Kotiranta unpubl., Kunttu et al. 2019, 2020). Vulnerable.

Specimen examined. Ostrobottnia ultima, Rovaniemi, Hirvas, UCS 7374:3427, crown branches of a fallen *Populus tremula* (diam. 30 cm, decay stage 2), in association with *Inonotus rheades*, *Phellinus tremulae*, *Trametes ochracea* and *Trichaptum abietinum*, in a somewhat paludified depression inside a mesic heath forest dominated by *Pinus sylvestris*, 21 Sept. 2020, leg. & det. PV 2456 (H).

Corticium boreoroseum Boidin & Lanq. (Fig. 12)

Distribution. New to 4a (Fig. 1).

Specimen examined. Regio kuusamoënsis, Kuusamo, Repokallio, UCS 7285176:3623085, on a fallen *Picea abies* trunk (decay stage 1-2), in a very old pine- and spruce-dominated mesic heath forest – subxeric heath forest, 6 Oct. 2018, leg. & det, JJ1274 (OULU), conf. MK.

Figure 12. *Corticium boreoroseum* in Kuusamo (JJ 1274). Photo: Jari Julkunen.

Crustoderma longicystidiatum (Litsch.) Nakasone

Notes. 2nd–3rd records in Finland; previous records: Miehikkälä (2a) (Kotiranta et al. 2009). The specimens are conspecific according to ITS-sequences. Notably, both specimens are from coniferous substrate exposed to prolonged cool and humid or wet conditions which may have been the case with the Miehikkälä-collection as well (the habitat was timber sawmill located near rapids). Whether the same holds for the species type, warrants a more thorough taxonomic treatment in the future. Critically Endangered.

Specimens examined. Tavastia borealis, Vuoritsalo, UCS 6900:3438, tree-shaded yard with long grass, on a cut piece of wood (diam. 9 cm, decay stage 3), in association with *Hyphoderma praetermissum*, *Scopuloides hydnoides*, 20 Jul. 2007, leg. & det. OM 11790.1 (H, specimen sequenced); Savonia borealis, Lapinlahti, Koirniemi, UCS 7034:3547, on a log of a *Pinus sylvestris* kelo tree (diam. 30 cm, decay 4), washed-up by a flooding river. The log was used in guiding structures in rafting operations until the 1956 waterway conversion to hydropower use. Found in association with *Hyphoderma praetermissum* and *Botryobasidium* sp., 24 Jul. 2019 leg. PV 1094 & det. PV & HK (H, specimen sequenced).

Crustoderma triste (Litsch. & Lundell) Duhem (Fig. 13)

Notes. 6th record in Finland; previous records: Jyväskylä (2b), Saarijärvi (3a), Lieksa (3b), Kuusamo (4a), and Inari (4c) (Kotiranta et al. 2009; FinBIF 2021c).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7103310:3665104, on fallen trunk of *Pinus sylvestris* (diam. 20, decay stage 4, kelo tree) with *Paullicorticium* sp. in a very old pine-dominated sub-xeric heath forest, 3 Oct. 2020, leg. TH 20200022 (OULU, H). det. MK.

Dendrothele amygdalispora Hjortstam (Fig. 14)

Distribution. New to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Kajaani, Old cemetery, UCS 71262:35347, on trunk and branch of *Salix fragilis* 'Bullata' in a park-like cemetery, 29 Oct. 2020, leg. & det. TH 20200044 (OULU).

Exidia candida var. ***cartilaginea*** (S. Lundell & Neuhoff) Spirin & V. Malysheva

Distribution. New to 3c (Fig. 1).

Figure 13. *Crustoderma triste* in Kuhmo (TH 20200022) with *Paullicorticium* sp. Photo: Teppo Helo.

Figure 14. *Dendrothele amygdalispora* in Kajaani (TH 20200044). Photo: Teppo Helo.

Specimen examined. Ostrobottnia ultima, Tervola, Pisavaara Strict Nature Reserve, Vähäloma, UCS 7352766:3413304, on a corticated fallen trunk of *Betula* sp. (diam. 10 cm, decay stage 1) in an old spruce-dominated mesic heath forest, 4 Oct. 2020, leg. & det. MK 50/20 (OULU).

Gloiothele lactescens (Berk.) Hjortstam

Notes. 2nd–3rd records in Finland: previous record: a park in Helsinki (Kotiranta et al. 2009). Near Threatened.

Specimen examined. Nylandia, Helsinki, Sibelius Park, UCS 667611:3844, on a decorticated trunk and a stump of *Tilia* sp. (diam. 35 cm, decay stage 4) plus on a board, 23 Sept. 2010 and yearly till 30 Oct. 2014, but not anymore on the stump 2016 when the trunk had been removed, leg. & det. HK 22720, 25409, 26213, 26214, 26215, 26501 (H); Helsinki, Kustaankartano, UCS 6681:3386, on fallen *Salix sp* stem (diam. 10 cm, decay stage 3), former agricultural land, now herb-rich forest with high amounts of coarse dead wood, stand dominated by *Salix caprea* and *Ulmus glabra*, 3.10.2019, leg. & det. PV 1364 (H), conf. HK.

Hapalopilus ribicola (P. Karst.) Spirin & Miettinen

Distribution. New to 3a (Fig. 1).

Specimen examined. Ostrobottnia ouluensis, Liminka, Kirkonkylä, UCS 7191178:3424547, on branches of *Ribes nigrum* in the yard, 17 May 2020, leg. & det. P. Jokikokko (OULU), conf. MK.

Helicogloea dryina Spirin & Miettinen (Fig. 15)

Distribution. New to 3a–b (Fig. 1).

Figure 15. *Helicogloea dryina* in Sotkamo (TH 20200010). Photo: Teppo Helo.

Notes. 3rd–7th records in Finland; previous records: Helsinki (2a) and Vantaa (2a) (Malysheva et al. 2020; FinBIF 2021c).

Specimen examined. Ostrobottnia ouluensis, Oulu, Metsokangas, UCS 7207308:3432036, on a partly decorticated fallen trunk of *Pinus sylvestris* (diam. 15 cm, decay stage 1) in a wet forested old field, 6 Nov. 2020, leg. & det. MK 92/20 (OULU, H), conf. V. Spirin; Ostrobottnia kajanensis, Sotkamo, Losonvaara, UCS 7106773:3545205, on a fallen trunk of *Picea abies* (diam. 30 cm, decay stage 3), in an old spruce-dominated mesic heath forest, 30 Sept. 2020, leg. & det. TH 20200045 (OULU); Sotkamo, Talvivaara, UCS 7093231:3557660, on a fallen trunk of *Picea abies* (diam. 15 cm, decay stage 3), in an old spruce-dominated mesic heath forest, 24 Sept. 2020, leg. & det. TH 20200010 (OULU), conf. V. Spirin; Kuhmo, Elimyssalo, UCS 71265:36593, on a fallen trunk of *Picea abies* (diam. 10 cm, decay stage 3), in an old spruce-dominated mesic heath forest, 6 Oct. 2020, leg. TH 20200047 (OULU), det. MK; Kuhmo, Ulvinsalo, UCS 7103386:3664731, on a fallen trunk of *Picea abies* (diam. 45 cm, decay stage 4), in a very old thin-peated spruce mire, 4 Oct. 2020, leg. & det. TH 20200046 (OULU)

Hyalodon piceicola (Kühner ex Bourdot) Malysheva & Spirin (Fig. 16)

Distribution. New to 1b (Fig. 1).

Specimen examined. Nylandia, Raasepori, Fiskars, Risslaån, UCS 6672561:308094, on a piece of wood of *Picea abie*s (diam. 10 cm, decay stage 4) in a brookside herb-rich forest, 21 Jan. 2020, leg. & det. JP 4264 (H).

Figure 16. *Hyalodon piceicola* in Raasepori (JP 4264). Photo: Jorma Pennanen.

Hyphoderma lapponicum (Litsch.) Ryvarden

Distribution. New to Finland and hence new to 4d (Fig. 1).

Specimen examined. Lapponica enontekiensis, Enontekiö, Jogasjávri N, Doskaljohka W, UCS 768596:328070, on dead trunk or branch of *Betula pubescens* subsp. *czerepanovii*, in a moist to dry mountain birch forest, 27 Jul. 2020, leg. H. Väre 25318 (H), det. MK, conf. HK.

Hypochnicium subrigescens Boidin (Fig. 17)

Distribution. New to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 7126464:3660017, on a fallen branch of *Populus tremula* (diam. 30 cm, decay stage 2), in an old dwarf shrub spruce mire, 6 Oct. 2020, leg. TH 20200049 (OULU), det. MK; Kuhmo, Ulvinsalo, UCS 7103767:3665034, on a fallen trunk of *Populus tremula* (diam. 30 cm, decay stage 4), in a very old spruce-dominated mesic heath forest, 2 Oct. 2020, leg. & det. TH 20200048 (OULU).

Figure 17. *Hypochnicium subrigescens* in Kuhmo (TH 20200049). Photo: Teppo Helo.

Jaapia argillacea Bres. (Fig. 18)

Distribution. New to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7103386:3664703, on a fallen trunk of *Picea abies* (diam. 40 cm, decay stage 4) with *Jaapia ochroleuca* and *Dichostereum boreale* in a very old dwarf shrub spruce mire, 4 Oct. 2020, leg. & det. TH 20200050 (OULU), conf. MK.

Figure 18. *Jaapia argillacea* in Kuhmo (TH 20200050) with *Dichostereum boreale*. Photo: Teppo Helo.

Leptosporomyces fuscostratus (Burt) Hjortstam

Distribution. New to 3a (Fig. 1).

Specimen examined. Ostrobottnia ouluensis, Oulu, Metsokangas, UCS 7207125:3432114, on a decorticated stump of *Picea abies* (diam. 23 cm, decay stage 4) in a mesic heath forest, 4 Nov. 2020, leg. & det. MK 89/20 (OULU), conf. HK.

Lindtneria panphyliensis Bernicchia (Fig. 19)

Notes. 5th–7th records in Finland; previous records: four sites in Helsinki (Miettinen 2012).

Specimens examined. Nylandia, Helsinki, Kustaankartano, UCS 6681:3386, on a thin stem of a fallen dead *Acer platanoides* (diam. 8 cm, decay stage 2), pressed to the organic/clay soil, herb-rich site, mixed stand of old conifers with *Acer*, *Betula*, *Sorbus*, *Salix* and *Alnus* middle- and understory, 23 Oct. 2019, leg. PV 1524 (H); Helsinki, Patomäenpuisto, UCS 6682:3387, far decayed piece of deciduous wood, pressed to organic/clay soil, herb-rich site dominated by *Picea abies*, *Betula pendula* and *Acer platanoides*, 07 Nov. 2020, leg. S. Pousi, P. Tolvanen, PV 2607 (H), det. PV; Helsinki, Taivaskallio, UCS 6680:3386, on trunk of fallen *Sorbus aucuparia*, pressed to rich organic soil, nearby *Acer platanoides*, *Sorbus aucuparia* and *Pinus sylvestris*, 30 Oct. 2020, leg. PV 2589 (H).

Figure 19. *Lindtneria panphyliensis* in Helsinki (PV 2589). Photo: Pyry Veteli.

Litschauerella clematitis (Bourdot & Galzin) J. Erikss. & Ryvarden (Fig. 20)

Distribution. New to 3b (Fig. 1).

Notes. 5th record in Finland; previous records: Tammisaari (1b), Helsinki (1b), Jyväskylä (2b), and Utsjoki (4d) (Kotiranta et al. 2009; Kotiranta & Shiryaev 2013; Kunttu et al. 2018).

Specimen examined. Ostrobottnia kajanensis, Sotkamo, Losonvaara, UCS 7107287:3545992, on a fallen trunk of *Juniperus communis* (diam. 6 cm, decay stage 3), in a middle-aged spruce-dominated mesic heath forest, 28 Sept. 2020, leg. & det. TH 20200051 (OULU).

Luellia recondita (H.S. Jacks.) K.H. Larsson & Hjortstam (Fig. 21)

Distribution. New to 3b (Fig. 1).

Notes. 8th record in Finland; previous records: Eckerö (1a), Helsinki (1b), Tammisaari (1b), Kemiönsaari (1b),

Figure 20. *Litschauerella clematitis* in Sotkamo (TH 20200051). Photo: Teppo Helo.

Figure 21. *Luellia recondita* in Kuhmo (TH 2020052) with *Tulasnella pallida* and *Sistotrema autumnale*. Photo: Teppo Helo.

Hamina (2a), Jyväskylä (2b), and Rovaniemi (3c) (Kotiranta et al. 2009; Kunttu et al. 2012, 2015, 2016, 2018).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 71265:36593, on a fallen trunk of *Picea abies* (diam. 10 cm, decay stage 1) with *Tulasnella pallida* and *Sistotrema autumnale* in an old spruce-dominated mesic heath forest, 6 Oct. 2020, leg. TH 20200052 (OULU), det. MK.

Mycostilla vermiformis (Berk. & Broome) Spirin & Malysheva (Fig. 22)

Distribution. New to Finland, and hence new to 1b, 3b (Fig. 1).

Figure 22. *Mycostilla vermiformis* in Helsinki (PV 1874). Photo: Pyry Veteli.

Specimens examined. Nylandia, Helsinki, Pirkkola, UCS 6681:3384, on a log of *Picea abies* (diam. 15 cm, decay stage 3), mesic heath forest dominated by *Pinus sylvestris*, 20.5.2020, leg. & det. PV 1874 (H), conf. V. Spirin; Ostrobottnia kajanensis, Sotkamo, Talvivaara, UCS 7092462:3558456, on fallen trunk of *Picea abies* (diam. 45 cm, decay stage 3), in an old spruce-dominated mesic heath forest, 20 Aug. 2020, leg. TH 20200006 (OULU, H), det. V. Spirin.

Oligoporus romellii (Pieri & Rivoire)

Distribution. New to 4a (Fig. 1).

Specimen examined. Regio kuusamoënsis, Kuusamo, Penttilänvaara W, Kontiojoki S, UCS 7299549:3589596, on a fallen trunk of *Picea abies* (diam. 40 cm, decay stage 2/3), in a spruce-pine mire – dwarf shrub pine mire, 7 Oct. 2005, leg. T. Laitinen 732 (OULU), det. MK.

Paullicorticium ansatum Liberta (Fig. 23)

Distribution. New to 3b (Fig. 1).

Notes. 3rd record in Finland; previous records: Lammi (2a) and Padasjoki (2a) (Kotiranta et al. 2009). Near Threatened.

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 7130666:3662462, on a fallen trunk of *Pinus sylvestris* (diam. 30 cm, decay stage 3, kelo tree), in an old pine-dominated sub-xeric heath forest, 12 Oct. 2020, leg. & det. TH 20200053 (OULU), conf. MK.

Figure 23. *Paullicorticium ansatum* in Kuhmo (TH 20200053). Photo: Teppo Helo.

Peniophora cinerea (Pers.: Fr.) W.B Cooke

Distribution. New to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 71285:36651, on a fallen trunk of *Populus tremula* (diam. 10 cm, decay stage 3), in an old pine-dominated sub-xeric heath forest, 10 Oct. 2020, leg. & det. TH 20200056 (OULU), conf. MK.

Peniophora nuda (Fr.) Bres. (Fig. 24)

Distribution. New to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 71295:36645, on a fallen trunk of *Betula* sp. (diam. 30 cm, decay stage 2), in an old dwarf shrub spruce mire, 9 Oct. 2020, leg. & det. TH 20200057 (OULU), conf. MK.

Figure 24. *Peniophora nuda* in Kuhmo (TH 20200057). Photo: Teppo Helo.

Figure 25. *Peniophora pini* in Sotkamo (TH 20200058). Photo: Teppo Helo.

Peniophora pini (Schleich.: Fr.) Boidin (Fig. 25)

Distribution. New to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Sotkamo, Losonvaara, UCS 71072:35460, on a fallen branch of *Pinus sylvestris* (diam. 7 cm, decay stage 1), in a middle-aged spruce-dominated mesic heath forest, 28 Sept. 2020, leg. & det. TH 20200058 (OULU), conf. MK.

Peniophora quercina (Pers.: Fr.) W. B. Cooke (Fig. 26)

Notes. 2nd–5th records in Finland; the previous: Karjaa (1b) (Kotiranta et al. 2009). Endangered.

Specimen examined. Regio aboënsis, Perniö, Arpalahti, Kaapinmäki, UCS 6692:3285, on a fallen branch of *Quercus robur* in an herb-rich forest dominated by old oak trees, 8 Nov. 2004, leg. P. Heinonen & M.-L. Heinonen (TUR, H); Nylandia, Helsinki, Veräjälaakso, on a recently fallen branch of a large living *Quercus robur*, 20 Sept. 2014, leg. A. Käppi, det. V. Spirin (H); Helsinki, Koskela, UCS 6680:3387, on a corticated branch of *Quercus robur* (diam. 0.6 / 1.3 cm, decay stage 2) in a cultivated oak park, with *Peniophora incarnata* and *P. nuda*, 30 Nov. 2014, leg. & det. HK (H); Nylandia, Helsinki, Maunulanpuisto, UCS 6681:3384, on *Quercus robur*, colonized branches (diam. 4 cm, decay 2–3) that had fallen from standing living trees on an oak plantation in agricultural field, 20 Mar. 2020, leg. & det. PV 1722 (H).

Phellodon secretus Niemelä & Kinnunen

Distribution. New to 3c (Fig. 1).

Specimen examined. Ostrobottnia ultima, Rovaniemi, Hirvas, UCS 7374:3427, under a burnt *Pinus sylvestris* stump (diam. 17 cm, decay stage 2) together with *Hydnellum gracilipes*, in a managed mesic heath forest dominated by *Pinus sylvestris*, very small amount of coarse woody debris, with indication of past fires in the soil, 20 Sept. 2020, leg. & det. PV 2445. Vulnerable.

Phlebia subcretacea (Litsch.) M.B. Christ.

Distribution. New to 3c, 4b (Fig. 1).

Specimens examined. Ostrobottnia ultima, Rovaniemi, Hirvas, UCS 7374:3427, fallen *Pinus sylvestris* trunk (diam. 37 cm, decay stage 4), in a managed mesic heath forest, open stand with small amount of coarse dead wood 21 Sept. 2020, leg. & det. PV 2449 (H); Rovaniemi, Vanttauskoski, UCS 7371:3488, on a fallen trunk of *Pinus sylvestris* (diam. 30 cm, decay stage 5b), with *Odonticium romellii*, mesic and partly paludified heath forest with thick moss cover. Dense stand dominated by *Pinus sylvestris* mixed with *Picea abies* and *Betula* spp., with moderately large amounts of coarse dead wood including kelo pines, 25 Sept. 2020, leg. & det. PV 2494 (H).

Figure 26. *Peniophora quercina* in Helsinki (PV 1722). Photo: Pyry Veteli.

Postia persicina Niemelä & Y.C. Dai (Fig. 27)

Notes. 5th in Finland; previous records: Kuusamo (4a), Saarijärvi (3a), Hyrynsalmi (3b), and Kolari (4b) (Kotiranta et al 2009; Niemelä 2016; Kunttu et al. 2018; FinBIF 2021c). Critically Endangered.

Figure 27. *Postia persicina* in Kuhmo (JP 3198). Photo: Jorma Pennanen.

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo Strict Nature Reserve, UCS 7100248:3665269, on a fallen trunk of *Pinus sylvestris* (diam. 23 cm, decay stage 3) in an old *Vaccinum-Myrtillus* type pine-dominated mesic heath forest, 12 Sept. 2016, leg. JP 3198 (H), det. OM (specimen sequenced).

'***Postia rufescens*** Spirin & Miettinen' ined.

Distribution. New to 3a (Fig. 1).

Specimen examined. Satakunta, Ikaalinen, Seitseminen National Park UCS 6876613:3309436, on a fallen trunk of *Pinus sylvestris* (diam. 20 cm, decay stage 3) in a mixed mesic heath forest, 24 Sept. 2019, leg. & det. JP 4073 (H).

Proterochaete adusta (Burt) Spirin & V. Malysheva (Fig. 28)

[Syn. *Sebacina adusta* Burt, *Protodontia oligacantha* G.W. Martin, *Exidiopsis pallida* K. Wells & Raitv.]

Distribution. New genus and species to Finland and hence new to 2a, 3b (Fig. 1).

Specimens examined. Ostrobottinia kajanensis, Kuhmo, Riihivaara, UCS 7127339:3654469, on a bark of a fallen and hollow *Populus tremula* trunk (diam. 40 cm, decay stage 2) in a very old *Picea abies* dominated thin-peated *Vaccinium myrtillus* – *Vaccinium vitis-idaea* spruce mire, 26 Aug. 2017, leg. JJ 1062 (OULU, H), det. V. Spirin; Tavastia australis, Hämeenlinna, Härkämäki UCS 6792834:3394898 (probably inaccurate), 23 Sept. 1964, leg V. Hintikka, L. Laine, V. Kujala, L. K. Weresub (H), det. V. Spirin.

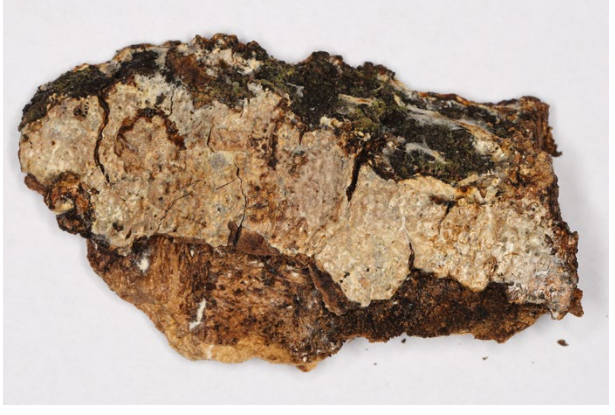

Figure 28. *Proterochaete adusta* in Kuhmo (JJ 1062). Photo: Jari Julkunen.

Protodontia subgelatinosa (P. Karst.) Pilát (Fig. 29)

[Syn. *Stypella subgelatinosa* (P. Karst.) P. Roberts]

Distribution. New to 3b, 4d (Fig. 1).

Notes. 7th–8th records in Finland; previous records: Helsinki (1b; two sites) Tammela (2a), Kangasala (2a), Petäjävesi (2b), Luhanka (2b), and Oulu (3a). (Kotiranta et al. 2009; Kunttu et al. 2012, 2018; Miettinen 2012).

Specimens examined. Savonia borealis, Sonkajärvi, Sonkalahti, UCS 7063:3525, on fallen trunk of *Betula pubescens* (diam. 25 cm, decay stage 4), on dead *Inonotus obliquus* basidioma, leg. PV 2108 (H), det.V. Spirin; locus as above, on fallen trunk of *Betula pubescens* (diam. 15 cm, decay stage 3), with *Trechispora cohaerens*, leg. PV 2105, det. V. Spirin; Lapponica enontekiensis, Enontekiö, Jogasjávri, Doskaljohka W, UCS

Figure 29. *Protodontia subgelatinosa* in Sonkajärvi (PV 2108). Photo: Pyry Veteli.

768596:328070, on a dead trunk or branch of *Betula nana*, in a moist to dry mountain birch forest, 27 Jul. 2020 H. Väre 25321 (H), det. MK, conf. HK.

Protomerulius brachysporus (Luck-Allen) Spirin & V. Malysheva (Fig. 30)

Distribution. New to 3b (Fig. 1).

Notes. 4th record in Finland; previous records: Espoo (1b), Lohja (1b), and Vehmaa (1b) (Spirin et al. 2019a).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 7128815:3665112, on a fallen trunk of *Picea abies* (diam. 25 cm, decay stage 2), in an old spruce-dominated mesic heath forest, 10 Oct. 2020, leg. & det. TH 20200036 (OULU, H), conf. MK & V. Spirin.

Figure 30. *Protomerulius brachysporus* in Kuhmo (TH 20200036) with *Tulasnella* sp. Photo: Teppo Helo.

Pseudotomentella alobata Svantesson (Fig. 31)

Distribution. New to Finland and hence new to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Kajaani, Pöllyvaara, UCS 7126:3535, on fallen trunk of *Pinus sylvestris* (diam. 12 cm, decay stage 4) in a spruce-dominated mesic heath forest, 11 Sept. 2017, leg. TH 20170035 (OULU), det. MK.

Pseudotomentella nigra (Höhn. & Litsch.) Svrček (Fig. 32)

Distribution. New to 2b, 3b (Fig. 1).

Figure 31. *Pseudotomentella alobata* in Kajaani (TH 20170035). Photo: Teppo Helo.

Figure 32. *Pseudotomentella nigra* in Kuhmo (TH 20200060). Photo: Teppo Helo.

Specimens examined. Savonia australis, Punkaharju, Kokonharju Nature Reserve UCS 6857539:3621745, on a fallen branch of *Pinus sylvestris* (diam. 7 cm, decay stage 3) in a pine dominated mesic heath forest, 21 Sept. 2009, leg. & det. JP 1019 (H); Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7103764:3665002, on a fallen trunk of *Populus tremula* (diam. 15 cm, decay stage 3), in a very old spruce-dominated mesic heath forest, 2 Oct. 2020, leg. TH 20200060 (OULU), det. MK; Sotkamo, Saukkoperä, UCS 7086573:3584216, on charred fallen trunk of coniferous tree (diam. 45 cm, decay stage 4), on the border between an old spruce-dominated mesic heath forest and a clear-cut area, 1 Sept. 2008, leg. P. Helo 1712 (OULU), det. TH & MK; Sotkamo, Talvivaara UCS 7093224:3557672, on a fallen trunk of *Picea abies* (diam. 20 cm, decay stage 3), in an old spruce-dominated mesic heath forest, 24 Sept. 2020, leg. TH 20200059 (OULU), det. MK.

Pseudotomentella sciastra Svantesson & Kõljalg

Distribution. New to 3a (Fig. 1).

Notes. 3rd record in Finland; previous records: Lammi (2a) and Jyväskylä (2b) (Svantesson et al. 2019). Note: The species is described from the *Pseudotomentella tristis* group. Most of the *P. tristis* specimens in the collections are determined incorrectly, so the distribution of the species is not reliably known. Probably quite rare.

Specimen examined. Ostrobottnia ouluensis, Oulu, Karjasilta, UCS 72128:34298, on a fallen trunk of *Populus tremula*, in an aspen-dominated herb-rich heath forest adjacent to a road, 18 Oct. 2019, leg. AM 229 (OULU), det. MK.

Pseudotomentella umbrina (Fr.) M.J.Larsen (Fig. 33)

Distribution. New to 3a–c (Fig. 1).

Notes. 5th–12th records in Finland; previous records: Parainen (1b), Lammi (2a), Ikaalinen (2a), and Ruovesi (2b) (Svantesson et al. 2019). Note: The species was separated from the *Pseudotomentella tristis* group. The most common species in this group.

Specimens examined. Karelia australis, Virolahti, Haukijärvi, UCS 6715010:3527296, on a fallen *Betula* sp. trunk (diam. 30 cm, decay stage 3) in a middle-aged – old *Picea abies* dominated herb-rich heath forest – mesic heath forest, 13 Sept. 2016, leg. JJ840 (OULU), det. MK; Ostrobottnia ouluensis, Oulu, Hietasaari, UCS 7213936:3426170, on a partly decorticated fallen trunk of Salix sp. (diam. 2 cm, decay stage 2) in a lush deciduous-dominated coastal mixed forest, 12 Sept. 2011, leg. MK 40/11 & P. & M. Helo (OULU), det. MK; Ostrobottnia ouluensis, Oulu, Hietasaari, UCS 7213902:3426075, on a partly decorticated fallen trunk of *Salix* sp. (diam. 4 cm, decay stage 2) in a dense and lush deciduous-dominated coastal mixed forest, 28 Sept. 2014, leg. & det. MK 37/14 (OULU); Ostrobottnia ultima, Rovaniemi, Pisavaara Strict Nature Reserve, Sorvanulkki, UCS 7358625:3416764, on a partly decorticated fallen trunk of *Picea abies* (diam. 35 cm, decay stage 4) in an old coniferous-dominated heath forest, 3 Oct. 2013, leg. & det. MK 56/13 (OULU); Ostrobottnia ultima, Rovaniemi, Pisavaara Strict Nature Reserve, Pitkäjänkä, UCS 7359110:3415712, on a partly decorticated stump of *Picea abies* (diam. 12 cm, decay stage 3) in an old coniferous-dominated mesic heath forest, 19 Aug. 2016, leg. MK 56/13 & A. Ruotsalainen (OULU), det. MK; Ostrobottnia kajanensis, Sotkamo, Losonvaara UCS 7107123:3544783, on a fallen trunk of *Sorbus aucuparia* (diam. 5 cm, decay stage 2), in an old spruce-dominated mesic heath forest, 15 Sept. 2020, leg. TH 20200063 (OULU), det. MK; Sotkamo, Talvivaara UCS 7092990:3557856, on a fallen trunk of *Pinus sylvestris* (diam. 12 cm, decay stage 2), in an old spruce-dominated mesic heath forest, 22 Sept. 2020, leg. TH 20200064 (OULU), det. MK; Sotkamo, Korkeakoskenpuro UCS 7089332:3558290, on a fallen trunk of *Populus tremula* (diam. 10 cm, decay stage 3), in an old spruce-dominated herb-rich heath forests, 24 Sept. 2018, leg. TH 20200223 (OULU), det. MK.

Figure 33. *Pseudotomentella umbrina* in Sotkamo (TH 20200063). Photo: Teppo Helo.

Pseudoxenasma verrucisporum K.H. Larss. & Hjortstam (Fig. 34)

Distribution. New to Finland, and hence new to 1b (Fig. 1).

Figure 34. *Pseudoxenasma verrucisporum* in Helsinki (OM 24542). Photo: Otto Miettinen.

Figure 35. *Punctularia strigosozonata* in Kouvola (JP4274). Photo: Jorma Pennanen.

Specimen examined. Uusimaa, Helsinki, Haltiala, UCS 6684747:3385328, dead, attached branch (diam. 2 cm, decay stage 2) of a recently died, standing *Picea abies* (diam. 60 cm) with *Globulicium hiemale* in an old, dense spruce forest, 28 Feb. 2021 OM 24542 (H 6200144).

Punctularia strigosozonata (Schw.) Talbot (Fig. 35)

Notes. 7th–8th records in Finland; previous records: Vehkalahti (2a), Savonranta (2b; two sites), Ilomantsi (2b and 3b; two sites), and Lieksa (3b) (Kotiranta et al. 2009). Vulnerable.

Specimens examined. Nylandia, Porvoo, Humla, UCS 6696:3430, on crown branches of a fallen dead *Populus tremula*, 19 Feb. 2020, leg. P. von Bagh, det. PV (H6083193), for site details see von Bagh (2020); Tavastia australis, Kouvola, Raajärvi UCS 6777967:3468376, on a fallen trunk of *Populus tremula* (diam. 35 cm, decay stage 2) in a clearcut area, 13 May 2020, leg. & det. JP4274 (H).

Repetobasidium vile (Bourd. & Galz.) J. Erikss. (Fig. 36)

Notes. 5th record in Finland; previous records: Tammisaari (1b), Parainen (1b), Jyväskylä (2b), and Sotkamo (3b) (Kotiranta et al. 2009; Kunttu et al. 2014, 2019).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7103332:3664690, on a fallen trunk of *Picea abies* (diam. 40 cm, decay stage 3), in a very old spruce-dominated mesic heath forest, 4 Oct. 2020, leg. & det. TH 20200065 (OULU).

Saccosoma farinacea (Höhn.) Spirin & K. Põldmaa

[syn. *Helicogloea farinacea* (Höhn.) D. P. Rogers]

Distribution. New to 2b (Fig. 1).

Notes. 8th record in Finland; previous records: Karjalohja (1b), Helsinki (1b), Lempäälä (2a), Tampere (2a), Padasjoki (2a), Kajaani (3b), and Paltamo (3b) (Kotiranta et al. 2009; Kunttu et al. 2013; Kunttu et al. 2018; Kunttu et al. 2020).

Specimen examined. Savonia borealis, Lapinlahti, Koirniemi, 7033:3548, in crown branches of a fallen old *Populus tremula* retention tree, in a young herb-rich heath forest dominated by *Picea abies* and *Betula pendula*, 16 Jun. 2020, leg. & det. PV 1935 (H) as *Saccosoma cf farinaceum*, conf. V. Spirin.

Figure 36. *Repetobasidium vile* in Kuhmo (TH 20200065). Photo: Teppo Helo.

Scytinostroma praestans (H.S. Jacks.) Donk

Distribution. New to 4d (Fig. 1).

Specimen examined. Lapponica enontekiensis, Enontekiö, Enontekiö, Jogasjávri, Doskaljohka W, UCS 768596:328070, on a dead trunk or branch of *Betula nana*, in a moist to dry mountain birch forest, 27 Jul. 2020 H. Väre 25322 (H) det. HK.

Sidera vulgaris (Fr.) Miettinen (Fig. 37)

Notes. 9th record in Finland; previous records: Nauvo (1b), Kemiönsaari (1b) Kirkkonummi (1b), Helsinki (1b & 2a; four sites), and Sipoo (2a) (Vauras 2000; Kunttu

Figure 37. *Sidera vulgaris* in Helsinki (PV 2572). Photo: Pyry Veteli.

et al. 2014, 2016; Savola 2015; Savola & Kolehmainen 2015). Near Threatened.

Specimen examined. Nylandia, Helsinki, Kustaankartano, UCS 6681:3386, on *Sorbus aucuparia* (diam. 12 cm, decay stage 3), herb-rich site with mixed stand of old conifers and *Salix caprea*, *Betula pendula*, *Sorbus aucuparia*, *Populus tremula*, *Alnus incana*, *Ulmus glabra* and *Acer platanoides* etc, with high amounts of coarse woody debris, 17 Oct. 2020, leg. & det. PV 2572 (H).

Sistotrema oblongisporum M.P. Christ. & Hauersl.

Distribution. New to 3a (Fig. 1).

Specimen examined. Ostrobottnia ouluensis, Oulu, Kontinkangas, UCS 7212832:3429839, on a fallen trunk of *Populus tremula*, in an aspen-dominated herb-rich heath forest adjacent to a road, 12 Oct. 2019, leg. & det. AM 143 (OULU), conf. MK.

Sistotrema subtrigonospermum D. P. Rogers (Fig. 38)

Distribution. New to Finland, and hence new to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Sotkamo, Losonvaara, UCS 7107251:3544808, on a fallen branch of deciduous tree (diam. 1.5 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 15 Sept. 2020, leg. & det. TH 20200127 (OULU), conf. MK; at the same site UCS 7106777:3545232, on a fallen branch of *Picea abies* (diam. 1 cm, decay stage 4) with *Botryobasidium laeve* in an old spruce-dominated mesic heath forest, 30 Sept. 2020, leg. & det. TH 20200128 (OULU), conf. MK.

Spiculogloea minuta P. Roberts

Distribution. New to Finland, and hence new to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Sotkamo, Talvivaara, UCS 7093211:3557817, on a fallen trunk of *Picea abies* (diam. 15 cm, decay stage 3) with *Tulasnella allantospora* in an old spruce-dominated mesic heath forest, 23 Sept. 2020, leg. TH 20200008 (H), det. MK & TH.

Spiculogloea subminuta Hauerslev

Distribution. New to 2b, 3a, c (Fig. 1).

Notes. 4th–10th records in Finland; previous records: Kuhmo (3b), Kajaani (3b), and Inari (4c) (Kunttu et al. 2019, 2020).

Specimen examined. Karelia borealis, Värtsilä, Patsola, Savikko, Rauhanmaja W, UCS 69077:36888, on a fallen trunk of *Picea abies* in a spruce-dominated brookside forest, 24 Jun. 1995, leg. H. Väre (OULU), det. MK; Ostrobottnia media, Pyhäjärvi, Mäkikylä, Iso Kärsämäenjärvi, Kokkopuro, UCS 70904:34616, on a decorticated fallen trunk of *Pinus sylvestris* (diam. 15 cm) with *Botryobasidium subcoronatum* (Höhn. & Litsch.) Donk, in a moist coniferous-dominated brookside mixed forest, 27 Oct. 1998, leg. & det. MK 116/98 (OULU); Ostrobottnia media, Pyhäjärvi, Mäkikylä, Kärsämäenjärvet, Isolehto, UCS 70918:34632, on a fallen trunk of *Picea abies* (diam. 19 cm) with *Botryobasidium subcoronatum* (Höhn. & Litsch.) Donk, in an old spruce-dominated mesic heath forest, 26 Sept. 1999, leg. & det. MK 136/99 (OULU); Ostrobottnia ouluensis, Pudasjärvi, Sarvisuo, UCS 7223013:3493616, on a fallen trunk of *Alnus incana* with *Botryobasidium subcoronatum* (Höhn. & Litsch.) Donk, in a spruce-dominated herb-rich forest next to a stream running from a spring, 10 July 2018, leg. AM 46-18 (OULU), det. MK; Ostrobottnia kajanensis, Puolanka, Paljakka Strict Nature Reserve, Kaijansuo W, UCS 7183458:3550223, on a fallen trunk of *Picea abies* (diam. 50 cm, decay stage 3) with *Botryobasidium subcoronatum* (Höhn. & Litsch.) Donk, in an old spruce-dominated mesic heath forest, 26 Sept. 2003, leg. MK 56/03b & P. Halonen (OULU), det. MK; Ostrobottnia ultima, Rovaniemi, Pisavaara Strict Nature Reserve, UCS 7359420:3416576, on a decorticated fallen trunk of *Picea abies* (diam. 20 cm, decay stage 4) with *Botryobasidium subcoronatum* (Höhn. & Litsch.) Donk, in an old mesic heath forest, 17 Sept. 2015. leg. MK 66/15 & P. Helo (OULU), det. MK; Ostrobottnia ultima, Rovaniemi, Pisavaara Strict Nature Reserve, Alalaki E, UCS 7350666:3413522, on a decorticated partly charred fallen trunk of *Pinus sylvestris* (diam. 30 cm, decay stage 1) with *Botryobasidium subcoronatum* (Höhn. & Litsch.) Donk, in an old mesic heath forest, 11 Sept. 2020, leg. & det. MK 27/20 (OULU).

Figure 38. *Sistotrema subtrigonospermum* in Sotkamo (TH 20200127). Photo: Teppo Helo.

Tomentella botryoides (Schwein.) Bourd. & Galz. (Fig. 39)

Distribution. New to Finland and hence new to 1b (Fig. 1).

Specimen examined. Regio aboënsis, Turku, Ruissalo, Choraeus Bridge, UCS approx. 6712:3234, on a fallen trunk of *Quercus robur*, 9 Sept. 1937, leg. Matti Laurila, (TUR), det. MK; UCS 6711:3233, on a fallen branch of *Quercus robur* (diam. 10, decay stage 2) in a small herb-rich forest with oak trees, 30 Sept. 2019, leg. & det. TH 2019023 (OULU), conf. MK & E. Martini.

Figure 39. *Tomentella botryoides* in Turku (TH 2019023). Photo: Teppo Helo.

Tomentella ellisii (Sacc.) Jülich & Stalpers (Fig. 40)

Distribution. New to 3b (Fig. 1).

Note. This is probably a group of species. Therefore, the distribution of the species is not reliable.

Specimen examined. Ostrobottnia kajanensis, Sotkamo, Penikkapuro UCS 7087271:3559145, on a fallen trunk of *Populus tremula* (diam. 7 cm, decay stage 3) in an old spruce-dominated mesic heath forest around a stream, 25 Sept. 2018, leg. & det. TH 20180220 (OULU), conf. MK & E. Martini.

Figure 40. *Tomentella ellisii* in Sotkamo (TH 20180220). Photo: Teppo Helo.

Tomentella fuscocinerea (Pers.: Fr.) Donk (Fig. 41)

Distribution. New to 3b (Fig. 1).

Notes. 2nd record in Finland; previous record: Kemiönsaari (1b) (Kunttu et al. 2015).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7103751:3665047, on a fallen trunk of *Populus tremula* (diam. 5 cm, decay stage 2), in a very old spruce-dominated mesic heath forest, 2 Oct. 2020, leg. & det. TH 20200004 (OULU, H), conf. MK.

Tomentella galzinii Bourdot (Fig. 42)

Distribution. New to 3a–b (Fig. 1).

Specimens examined. Ostrobottnia ouluensis, Oulu, Kontinkangas, UCS 7212832:3429839, on a fallen trunk of *Populus tremula*, in an aspen-dominated herb-rich heath forest next to a road, 12 Oct. 2019, leg. & det. AM 130 (OULU), conf. E. Martini; Ostrobottnia kajanensis, Paltamo, Melalahti UCS 71471:35327, on a fallen trunk of *Salix caprea* (diam. 2 cm, decay stage 2) in a calcareous mesic eutrophic herb-rich forest, 24 Sept. 2019, leg. & det. TH 20190052 (OULU), conf. MK

Tomentella lapida (Pers.) Stalpers (Fig. 43)

Distribution. New to 2b, 3b (Fig. 1).

Notes. 2nd–8th records in Finland; previous record: Noormarkku (2a) (Kotiranta et al. 2009). There are more than 40 collections from the Kainuu region recorded between 2018–2020 (T. Helo, unpublished). Note: *Tomentella* specimens are often incorrectly identified. There are probably more of this species in Finnish collections.

Specimens examined. Tavastia borealis, Toivakka, Vuorilampi Nature Reserve, UCS 68852:34558, on *Populus tremula*, leg. & det. J. Purhonen (JYV); Ostrobottnia kajanensis, Hyrynsalmi, Karhisenvaara, UCS 7157343:3587655, on a fallen trunk of *Populus tremula* (diam. 35 cm, decay stage 2) in an old spruce-dominated mesic heath forest, 28 Sept. 2018, leg. & det. TH 20180221 (OULU), conf. MK; Paltamo, Melalahti, UCS 71471:35327, on a fallen trunk of *Salix caprea* (diam. 3 cm, decay stage 4) in a calcareous mesic eutrophic herb-rich forest, 24 Sept. 2019, leg. & det. TH 20190053 (OULU), conf. MK; Sotkamo, Losonvaara, UCS 3545317:7106808, on a fallen trunk of *Picea abies* (diam. 28 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 14 Aug. 2020, leg. & det. TH 20200066 (OULU, H), conf. MK & E. Martini; Puolanka, Taapuri, UCS 7106789:3545178, on a fallen trunk of *Populus tremula* (diam. 35 cm, decay stage 3) in

Figure 41. *Tomentella fuscocinerea* in Kuhmo (TH 20200004). Photo: Teppo Helo.

Figure 42. *Tomentella galzinii* in Paltamo (TH 20190052). Photo: Teppo Helo.

Figure 43. *Tomentella lapida* in Sotkamo (TH 20200066). Photo: Teppo Helo.

an old spruce-dominated mesic heath forest, 17 Aug. 2020, leg. & det. TH 20200067 (OULU), conf. MK; Sotkamo, Talvivaara, UCS 7092390:3558388, on a fallen trunk of *Populus tremula* (diam. 8 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 21 Aug. 2020, leg. & det. TH 20200122 (OULU), conf. MK; Kuhmo, Elimyssalo UCS 71265:36593, on a fallen trunk of *Picea abies* (diam. 6 cm, decay stage 3) with *Piloderma byssinum* in an old spruce-dominated mesic heath forest, 6 Oct. 2020, leg. TH 20200068 (OULU), det. MK.

Tomentella lateritia Pat. (Fig. 44)

Distribution. New to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Sotkamo, Losonvaara, UCS 7105320:3545502, on a fallen trunk of *Picea abies* (diam. 14 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 31 Aug. 2005, leg. P. Helo 1455 (OULU), det. E. Martini; Sotkamo, Losonvaara, UCS 7107300:3545992, on a fallen trunk of *Juniperus communis* (diam. 4 cm, decay stage 4) with *Piloderma sphaerosporum* in a middle-aged spruce-dominated mesic heath forest, 28 Sept. 2020, leg. & det. TH 20200005 (OULU, H), conf. MK.

Tomentella neobourdotii M.J. Larsen (Fig. 45)

Distribution. New to Finland and hence new to 3a–b (Fig. 1).

Specimens examined. Ostrobottnia ouluensis, Oulu, Nuottasaari, UCS 7212460:3426775, on a corticated fallen trunk of *Betula* sp. (diam. 13 cm, decay stage 4) in a lush deciduous-dominated mixed forest, 10 Sept. 2014 leg. MK 20/14 (OULU), det. E. Martini; Ostrobottnia kajanensis, Paltamo, Melalahti UCS 71471:35327, on a fallen trunk of *Betula* sp. (diam. 18 cm, decay stage 4) in a calcareous mesic eutrophic herb-rich forest, 24 Sept. 2019, leg. & det. TH 20190054 (OULU), conf. MK; Paltamo, Antinmäki UCS 71389:35486, on a fallen trunk of *Salix caprea* (diam. 15 cm, decay stage 2) in a mesic mesotrophic herb-rich forest, 20 Aug. 2019, leg. & det. TH 20190055 (OULU), conf. MK; Ristijärvi, Saukkovaara UCS 7151866:3559621, on a fallen trunk of *Populus tremula* (diam. 4 cm, decay stage 2) in a middle-aged deciduous-dominated herb-rich heath forest, 12 Oct. 2018, leg. & det. TH 20180222 (OULU), conf. MK

Tomentella subpilosa Litsch. (Fig. 46)

Distribution. New to Finland, and hence new to 2a, 3b (Fig. 1).

Specimen examined. Satakunta, Pori, Metallinkylä, UCS 6827887:3225781, on a fallen trunk of *Salix caprea* (diam. 10 cm, decay stage 3) in a forested old field, 2 Oct. 2019, leg. H. Lehtonen 2.10.19/16 (OULU), det. TH & MK, conf. E. Martini. Ostrobottnia kajanensis, Sotkamo, Losonvaara, UCS 7106805:3545188, on a fallen trunk of *Populus tremula* (diam. 35 cm, decay stage 4) with *Trechispora kavinioides* in an old spruce-dominated mesic heath forest, 14 Aug. 2020, leg. TH 20200069 (OULU, H), det. TH & MK, conf. E. Martini.

Tomentella subtestacea Bourdot & Galzin (Fig. 47)

Distribution. New to Finland and hence new to 3a–b (Fig. 1).

Specimens examined. Ostrobottnia ouluensis, Oulu, Hietasaari, UCS 7213925:3426179, on a partly decorticated piece of *Alnus incana* on the ground (diam. 12 cm, decay stage 3) in a dense and lush deciduous-dominated coastal mixed forest, 28 Sept. 2014, leg. MK 45/14 (OULU), det. E. Martini; Ostrobottnia kajanensis, Paltamo, Tololanmäki, UCS 7137:3551, on a fallen trunk of deciduous tree (diam. 6 cm, decay stage 3) in a spruce-dominated mesic mesotrophic herb-rich forest, 18 Aug. 2017, leg. TH 20170036 (OULU), det. MK.

Figure 44. *Tomentella lateritia* in Sotkamo (TH 20200005) with *Piloderma sphaerosporum*. Photo: Teppo Helo.

Figure 45. *Tomentella neobourdotii* in Paltamo (TH 20190054). Photo: Teppo Helo.

Figure 46. *Tomentella subpilosa* in Sotkamo (TH 20200069). Photo: Teppo Helo.

Tomentella terrestris (Berk. & Broome) M.J. Larsen (Fig. 48)

Distribution. New to 3c (Fig. 1).

Notes. 4th–12th records in Finland; previous records: Kemiönsaari (1b), Vehkalahti (2b), and Kuhmo (3b) (Kotiranta et al. 2009; Kunttu et al. 2012). Altogether there are

Figure 47. *Tomentella subtestacea* in Paltamo (TH 20170036). Photo: Teppo Helo.

Figure 48. *Tomentella terrestris* in Sotkamo (TH 20200126). Photo: Teppo Helo.

approximately 20 collections from the Kainuu province, only a selection is presented here. Note: *Tomentella* specimens are often incorrectly identified. There are probably more of this species in Finnish collections.

Specimens examined. Tavastia borealis, Rautalampi, Iso Niinivuori, UCS 6934420:3487177, on a decorticated fallen trunk of *Juniperus communis* (diam. 6 cm, decay stage 1) in a mesic heath forest, 16 Sept. 2017, leg. MK 39/17 & et al., OULU, det. MK; Ostrobottnia kajanensis, Sotkamo, Losonvaara, UCS 7106795:3545403, on a fallen trunk of deciduous tree (diam. 4 cm, decay stage 2) in an old spruce-dominated mesic heath forest, 14 Aug. 2020, leg. & det. TH 20200125 (OULU); and at the same site UCS 7107180:3544769, on a fallen trunk of *Picea abies* (diam. 17 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 15 Sept. 2020, leg. & det. TH 20200126 (OULU); Puolanka, Taapuri, UCS 7164697:3541850, on a fallen trunk of *Betula* sp. (diam. 20 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 17 Aug. 2020, leg. & det. TH 20200123 (OULU); Sotkamo, Talvivaara, UCS 7092452:3558387, on a fallen trunk of *Picea abies* (diam. 20 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 21 Aug. 2020, leg. & det. TH 20200124 (OULU); Sotkamo, Viltonvaara UCS 7084168:3561684, on a fallen trunk of *Betula* sp. (diam. 18 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 1 Oct. 2018, leg. & det. TH 20200223 (OULU); Hyrynsalmi, Karhisenvaara UCS 7157342:3587734, on a fallen trunk of *Populus tremula* (diam. 25 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 28 Sept. 2018, leg. & det. TH 20200224 (OULU): Ostrobottnia ultima, Tervola, Pisavaara Strict Nature Reserve, Alalaki, UCS 7350633:3413306, on a decorticated partly charred stump of *Pinus sylvestris* (decay stage 2) in an old dry heath forest, 2 Sept. 2020, leg. & det. MK 20/20 (OULU) and on the same site UCS 7350612:3413510, on a decorticated fallen trunk of *Pinus sylvestris* (diam. 10 cm, decay stage 3) in an old mesic heath forest, 11 Sept. 2020, leg. & det. MK 26/20 (OULU).

Tomentellopsis echinospora (Ellis) Hjortstam

Distribution. New to 4b (Fig. 1).

Specimen examined. Ostrobottnia ultima, Rovaniemi, Vanttauskoski, UCS 7371:3488, fallen trunk of *Pinus sylvestris* (diam. 26 cm, decay stage 2), 24 Sept. 2020, leg. & det. PV 2483 (H).

Tomentellopsis submollis (Svrček) Hjortstam

Distribution. New to 4b (Fig. 1).

Specimen examined. Ostrobottnia ultima, Rovaniemi, Rättiselkä, UCS 7402:3464, fallen trunk of *Pinus sylvestris* (diam. 50 cm, decay stage 5) in an *Empetrum-Myrtillus* heath forest with a high amount of dead wood, 17 Sept. 2020, leg. & det. PV 2397 (H).

Tomentellopsis zygodesmoides Ellis & Hjortstam (Fig. 49)

Distribution. New to 3b (Fig. 1).

Notes. 3rd record in Finland; previous records: Kemiönsaari (1b) and Tuusula (2a) (Kotiranta et al. 2009; Kunttu et al. 2012).

Specimen examined. Ostrobottnia kajanensis, Sotkamo, Losonvaara UCS 7106771:3545279, on a fallen trunk of *Populus tremula* (diam. 8 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 30 Sept. 2020, leg. TH 20200070 (OULU), det. MK.

Figure 49. *Tomentellopsis zygodesmoides* in Sotkamo (TH 20200070). Photo: Teppo Helo.

Trechispora incisa K.H. Larsson (Fig. 50)

Notes. 2nd record in Finland; previous record: Lohja (1a) (Kotiranta et al. 2009).

Specimen examined. Nylandia, Raasepori, Karjaa, Lepinjärvi, UCS 6664277:3313401, on a broken trunk of *Betula pendula* (diam. 30 cm, decay stage 4) in a mixed herb-rich heath forest, 28 Oct. 2020, leg. & det. JP 4355 (H), conf. HK.

Figure 50. *Trechispora incisa* in Raasepori (JP 4355). Photo: Jorma Pennanen.

Figure 51. *Trechispora microspora* in Sotkamo (TH 20200071). Photo: Teppo Helo.

Trechispora laevis K.H. Larsson

Distribution. New to 3a (Fig. 1).

Specimen examined. Ostrobottnia ouluensis, Oulu, Knuutilankangas, UCS 72111:34313, on a stump of *Populus tremula*, in a moist brookside forest, 12 Oct. 2019, leg. AM 164 (OULU), det. MK; Ostrobottnia ouluensis, Oulu, Iinatti, UCS 7209158:3434103, on a branch of *Pinus sylvestris* (decay stage 3), in a small pine-dominated mesic heath forest, 6 May 2020, leg AM 284 (OULU), det. MK.

Trechispora microspora (P. Karst.) Liberta (Fig. 51)

Distribution. New to 3a–b (Fig. 1).

Specimens examined. Ostrobottnia ouluensis, Utajärvi, Hanganvaara, Hanganhete, UCS 7220912:3490586, on a fallen trunk of *Picea abies*, in a spruce-dominated herb-rich forest next to a stream running from a spring, 14 Jul. 2018, leg. & det. AM 79-18 (OULU), conf. MK; Ostrobottnia kajanensis, Sotkamo, Losonvaara UCS 7107109:3544787, on a fallen trunk of *Juniperus communis* (diam. 1.5 cm, decay stage 2) in an old spruce-dominated mesic heath forest, 15 Sept. 2020, leg. & det. TH 20200071 (OULU), conf. MK.

Trechispora minuta K.H. Larss.

Distribution. New to 3a (Fig. 1).

Specimen examined. Ostrobottnia ouluensis, Oulu, Karjasilta, UCS 7212919:3429700, on a fallen trunk of *Larix sibirica*, in a small mesic heath forest with larch-trees planted next to the road, 26 Oct. 2019, leg. AM 274 (OULU), det. MK.

Trechispora stellulata (Bourdot & Galzin) Liberta

Distribution. New to 4d (Fig. 1).

Specimen examined. Lapponica enontekiensis, Enontekiö, Jogasjávri N, Doskaljohka W, UCS 768596:328070, on a dead trunk or branch of *Betula pubescens* subsp. *czerepanovii*, in a moist to dry mountain birch forest, 27 Jul. 2020, H. Väre 25319 (H), det. MK, conf. HK.

Tremella polyporina D. A. Reid.

Notes. 6th record in Finland; previous records: Helsinki (1b), Lammi (2a), Tampere (2a), Hyrynsalmi (3b), and Inari (4c) (Pippola & Kotiranta 2008; Kotiranta et al. 2009; Miettinen 2012; Kunttu et al. 2016).

Figure 52. *Tretomyces microsporus* in Sotkamo (TH 20200072). Photo: Teppo Helo.

Specimen examined. Nylandia, Helsinki, Pirttipolunpuisto, UCS 6680:3385, fallen trunk of *Picea abies* (diam. 25 cm, decay stage 3), inside a *Postia* sp. basidioma, 8 Nov. 2020, leg. & det. PV 2616 (H).

Tretomyces microsporus Kotir., Saaren. & K.H. Larss. (Fig. 52)

Notes. 7th record in Finland; previous records: Paltamo (3a), Oulu (3a), Lieksa (3b; two sites), Suomussalmi (4a), and Inari (4c) (Kotiranta et al. 2009; Kunttu et al. 2015, 2018, 2019).

Specimen examined. Ostrobottnia kajanensis, Sotkamo, Katajavaara UCS 71056:35956, on a charred stump of *Pinus sylvestris* (diam. 35 cm, decay stage 4) in an old pine-dominated sub-xeric heath forest, 6 Nov. 2020, leg. & det. TH 20200072 (OULU).

Tubulicrinis angustus (D.P. Rogers & Weresub) Donk (Fig. 53)

Distribution. New to 3b (Fig. 1).

Specimens examined. Ostrobottnia kajanensis, Sotkamo, Losonvaara UCS 710718:354477, on a fallen branch of *Picea abies* (diam. 1.5 cm, decay stage 2) in an old spruce-dominated mesic heath forest, 15 Sept. 2020, leg. & det. TH 20200073 (OULU), conf. MK; at the same site UCS 710718:354477, on a fallen branch of *Populus tremula* (diam. 2 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 15 Sept. 2020, leg. & det. TH 20200074 (OULU), conf. MK.

Figure 53. *Tubulicrinis angustus* in Sotkamo (TH 20200074). Photo: Teppo Helo.

Figure 54. *Tubulicrinis effugiens* in Kuhmo (TH 20200024). Photo: Teppo Helo.

Tubulicrinis effugiens (Bourdot & Galzin) (Fig. 54)

Distribution. New to 3c (Fig. 1).

Notes. 7th–8th records in Finland; previous records: Pihtipudas (3a), Lieksa (3b), Kuusamo (4a), Muonio (4b), Salla (4c), Savukoski (4c) (Kotiranta et al. 2009; H. Kotiranta, unpublished).

Specimens examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7102550:3662494, on a fallen trunk of *Pinus sylvestris* (diam. 5 cm, decay stage 3, kelo tree) in a middle-aged pine-dominated sub-xeric heath forest with a high amount of dead wood, 5 Oct. 2020, leg. & det. TH 20200024 (OULU, H), conf. MK; Ostrobottnia ultima, Tervola, Pisavaara Strict Nature Reserve, Alalaki E, UCS 7351155:3413354, on a decorticated piece of *Pinus sylvestris* on the ground (diam. 10 cm, decay stage 2), in a mountain boulder field, 11 Sept. 2020, leg. & det. MK 45/20 (OULU).

Tubulicrinis globisporus K.H. Larss. & Hjortstam (Fig. 55)

Distribution. New to 3b (Fig. 1).

Notes. 4th–6th records in Finland; previous records: Padasjoki (2a), Inari (4c; two sites) (Kotiranta et al. 2009; Kunttu et al. 2019).

Specimens examined. Ostrobottnia kajanensis, Puolanka, Murtiovaara, UCS 7182:3530, on a fallen trunk of *Pinus sylvestris* (decay stage 4), in a spruce-dominated mesic heath forest, 16 Aug. 2020, leg. & det. AM 289 (OULU), conf. MK; Kuhmo, Ulvinsalo, UCS 7102496:3662822, on a fallen trunk of *Pinus sylvestris* (diam. 40 cm, decay stage 4, kelo tree) in an old pine-dominated sub-xeric heath forest with a high amount of dead wood, 5 Oct. 2020, leg. & det. TH 20200025 (OULU, H); Kuhmo, Elimyssalo, UCS 7129656:3664650, on a fallen trunk of *Pinus sylvestris* (diam. 20 cm, decay stage 4, kelo tree) in an old pine-dominated sub-xeric heath forest, 9 Oct. 2020, leg. & det. TH 20200034 (H), and at the same site UCS 7129639:3664585, on a fallen trunk of *Pinus sylvestris* (diam. 40 cm, decay stage 4, kelo tree) in an old old pine-dominated sub-xeric heath forest, 9 Oct. 2020, leg. & det. TH 20200075 (OULU).

Tubulicrinis inornatus (H.S. Jacks. & D.P. Rogers) Donk (Fig. 56)

Notes. 7th record in Finland; previous records: Lammi (2a), Padasjoki (2a), Pieksämäki (2b), Saarijärvi (3a), Kuhmo (3b), and Rovaniemi (3c) (Kotiranta et al. 2009; FinBIF 2021c).

Figure 55. *Tubulicrinis globisporus* in Kuhmo (TH 20200034). Photo: Teppo Helo.

Figure 56. *Tubulicrinis inornatus* in Kuhmo (TH 20200076). Photo: Teppo Helo.

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 7128689:3664898, on a fallen trunk of *Pinus sylvestris* (diam. 40 cm, decay stage 3, kelo tree) in an old spruce-dominated mesic heath forest, 10 Oct. 2020, leg. & det. TH 20200076 (OULU), conf. MK.

Tubulicrinis propinquus (Bourdot & Galzin) Donk (Fig. 57)

Distribution. New to 3b (Fig. 1).

Specimens examined. Ostrobottnia kajanensis, Kuhmo,

Figure 57. *Tubulicrinis propinquus* in Kuhmo (TH 20200032) with *Botryobasidium botryosum* and *Sistotrema brinkmannii*. Photo: Teppo Helo.

Figure 58. *Tulasnella allantospora* in Kuhmo (TH 20200079). Photo: Teppo Helo.

Elimyssalo, UCS 71265:36593, on a fallen trunk of *Picea abies* (diam. 20 cm, decay stage 2) in an old spruce-dominated mesic heath forest, 6 Oct. 2020, leg. TH 20200032 (OULU), det. MK, and at the same site UCS 7126433:3660163, on a fallen branch of *Picea abies* (diam. 5 cm, decay stage 3) in an old dwarf shrub spruce mire, 7 Oct. 2020, leg. TH 20200077 (OULU), det. MK.

Tulasnella allantospora Wakef. & A. Pearson (Fig. 58)

Notes. 7th–8th records in Finland; previous records: Lohja (1b), Kirkkonummi (1b), Porvoo (2a), Muurame (2b), Sotkamo (3b), and Suomussalmi (3b) (Kotiranta et al. 2009; Kunttu et al. 2018, 2019).

Specimens examined. Ostrobottnia kajanensis, Sotkamo, Talvivaara, UCS 7093211:3557817, on a fallen trunk of *Picea abies* (diam. 15 cm, decay stage 3) with *Spiculogloea minuta* in an old spruce-dominated mesic heath forest, 23 Sept. 2020, leg. & det. TH 20200008 (H), conf. MK; UCS 70934:35570, on a fallen trunk of *Picea abies* (diam. 40 cm, decay stage 4) with *Botryobasidium botryosum* in an old spruce-dominated mesic heath forest, 29 Sept. 2020, leg. & det. TH 20200078 (OULU); Kuhmo, Elimyssalo, UCS 7130599:3662312, on a fallen trunk of *Pinus sylvestris* (diam. 45 cm, decay stage 3, kelo tree) with *Athelia* sp. in an old pine-dominated sub-xeric heath forest, 12 Oct. 2020, leg. & det. TH 20200079 (OULU).

Tulasnella anguifera P. Roberts (Fig. 59)

Distribution. New to Finland, and hence new to 3b (Fig. 1).

Specimens examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7102656:3662948, on a fallen trunk of *Pinus sylvestris* (diam. 25 cm, decay stage 4, kelo tree) with *Athelia bombacina* in a very old pine-dominated mesic heath forest, 8 Oct. 2020, leg. & det. TH 20200080 (OULU), conf. HK, and at the same site UCS 71026:36629, on a fallen trunk of *Pinus sylvestris* (diam. 25 cm, decay stage 4, kelo tree) with *Athelia bombacina*, *Sistotremastrum suecicum*, *Tulasnella permacra* and *Tulasnella albida* in an old pine-dominated mesic heath forest, 8 Oct. 2020, leg. & det. TH 20200081 (OULU).

Tulasnella bourdotii Jülich (Fig. 60)

Notes. 2nd–5th records in Finland; previous record: Lieksa (3b) (Kotiranta et al. 2009).

Specimens examined. Ostrobottnia kajanensis, Sotkamo, Losonvaara UCS 7107282:3546032, on a fallen branch of *Pinus*

Figure 59. *Tulasnella anguifera* in Kuhmo (TH 20200081) with *Athelia bombacina*. Photo: Teppo Helo.

Figure 60. *Tulasnella bourdotii* in Kuhmo (TH 20200086). Photo: Teppo Helo.

sylvestris (diam. 5 cm, decay stage 4) in an old spruce-dominated mesic heath forest, 28 Sept. 2020, leg. & det. TH 20200082 (OULU), conf. MK; Sotkamo, Talvivaara UCS 70934:35570, on a fallen trunk of *Picea abies* (diam. 35 cm, decay stage 4) in an old spruce-dominated mesic heath forest, 29 Sept. 2020, leg. & det. TH 20200083 (OULU); UCS 7093442:3557179, on a fallen trunk of *Picea abies* (diam. 15 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 29 Sept. 2020, leg. & det. TH 20200084 (OULU); Kuhmo, Ulvinsalo, UCS 7101930:3662971, on a fallen trunk of *Pinus sylvestris* (diam. 50 cm, decay stage 4, kelo tree) with *Tubulicrinis accedens* in a very old spruce-dominated mesic heath forest, 5 Oct. 2020, leg. & det. TH 20200085 (OULU), conf. MK; UCS

7102630:3663068, on a fallen trunk of *Pinus sylvestris* (diam. 10 cm, decay stage 4, kelo tree) in a very old pine-dominated mesic heath forest, 8 Oct. 2020, leg. & det. TH 20200086 (OULU); Kuhmo, Elimyssalo, UCS 7129321:3665284, on a fallen trunk of *Picea abies* (diam. 20 cm, decay stage 3) in an old pine-dominated sub-xeric heath forest, 10 Oct. 2020, leg. & det. TH 20200087 (OULU).

Tulasnella brinkmannii s.l. Bres. (Fig. 61)

Notes. 5th record in Finland; previous records: Suonenjoki (2b), Ristijärvi (3b), Sotkamo (3b), and Suomussalmi (3b) (Kunttu et al. 2018, 2019).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 71265:36593, on a fallen trunk of *Picea abies* (diam. 12 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 6 Oct. 2020, leg. TH 20200089 (OULU), det. MK.

Figure 61. *Tulasnella brinkmannii* in Kuhmo (TH 20200089). Photo: Teppo Helo.

Tulasnella cystidiophora Höhn. & Litsch. (Fig. 62)

Distribution. New to 2b, 3b (Fig. 1).

Notes. 2nd–3rd records in Finland; previous record: Tammela (2a) (Kotiranta et al. 2009).

Specimens examined. Tavastia borealis, Rautalampi, Etelä-Konnevesi National Park, UCS 6941550:3484986, on a fallen decorticated trunk of *Betula* sp. (diam. 18 cm, decay stage 2), in a mixed old-growth forest, 20 Sept. 2015 leg. & det. J. Purhonen 6603 (JYV), det. MK conf. HK; Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 7126591:3660135, on a fallen trunk of *Populus tremula* (diam. 27 cm, decay stage 2) in an old pine-dominated sub-xeric heath forest, 7 Oct. 2020, leg. TH 20200090 (OULU), det. MK.

Figure 62. *Tulasnella cystidiophora* in Kuhmo (TH 20200090). Photo: Teppo Helo.

Tulasnella deliquescens (Juel) Juel (Fig. 63)

Notes. 7th–10th records in Finland; previous records: Helsinki (1b), Jyväskylä (2b), Puolanka (3b), Hyrynsalmi (3b), Suomussalmi (3b), and Sodankylä (4c) (Kotiranta et al. 2009; Kunttu et al. 2018, 2019).

Specimens examined. Ostrobottnia kajanensis, Sotkamo, Talvivaara, UCS 7092997:3557674, on a fallen branch of *Populus tremula* (diam. 4 cm, decay stage 2) in an old spruce-dominated mesic heath forest, 22 Sept. 2020, leg. TH 20200091 (OULU), det. MK; Sotkamo, Losonvaara, UCS 7107262:3545992, on a fallen trunk of *Juniperus communis* (diam. 2 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 28 Sept. 2020, leg. & det. TH 20200092 (OULU); Kuhmo, Ulvinsalo, UCS 7103531:3664853, on a fallen branch of *Pinus sylvestris* (diam. 1 cm, decay stage 2, kelo tree) in a very old spruce-dominated mesic heath forest, 4 Oct. 2020, leg. & det. TH 20200093 (OULU); UCS 7102673:3662961, on a fallen trunk of *Pinus sylvestris* (diam. 25 cm, decay stage 4, kelo tree) in an old pine-dominated mesic heath forest, 8 Oct. 2020, leg. & det. TH 20200095 (OULU); Kuhmo, Elimyssalo, UCS 7126326:3660131, on a fallen branch of *Populus tremula* (diam. 4 cm, decay stage 2) in an old spruce-dominated mesic heath forest, 7 Oct. 2020, leg. TH 20200094 (OULU), det. MK; UCS 7129643:3664595, on a fallen trunk of *Pinus sylvestris* (diam. 25 cm, decay stage 2, kelo tree) in an old pine-dominated sub-xeric heath forest, 9 Oct. 2020, leg. & det. TH 20200039 (OULU); UCS 7129726:3664908, on a fallen trunk of *Betula* sp. (diam. 20 cm, decay stage 1) in an old pine-dominated sub-xeric heath forest, 10 Oct. 2020, leg. & det. TH 20200096 (OULU); UCS 7130472:3662572, on a fallen branch of *Picea abies* (diam. 1 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 12 Oct. 2020, leg. & det. TH 20200097 (OULU).

Figure 63. *Tulasnella deliquescens* in Kuhmo (TH 20200095) with *Coniophora olivacea*. Photo: Teppo Helo.

Tulasnella fuscoviolacea Bres. (Fig. 64)

Notes. 4th–5th records in Finland; previous records: Tammela (2a), Jyväskylä (2b), and Sotkamo (3b) (Kotiranta et al. 2009; Kunttu et al. 2018, 2019).

Specimens examined. Ostrobottnia kajanensis, Sotkamo, Talvivaara, UCS 71093368:3556912, on a fallen branch of *Picea abies* (diam. 1 cm, decay stage 2) in an old spruce-dominated mesic heath forest, 29 Sept. 2020, leg. & det. TH 20200098

Figure 64. *Tulasnella fuscoviolacea* in Kuhmo (TH 20200100). Photo: Teppo Helo.

(OULU), and at the same site UCS 71093368:3556912, on a fallen branch of *Picea abies* (diam. 1.5 cm, decay stage 2) in an old spruce-dominated mesic heath forest, 29 Sept. 2020, leg. & det. TH 20200099 (OULU); Kuhmo, Ulvinsalo, UCS 7103781:3665067, on a fallen trunk of *Populus tremula* (diam. 35 cm, decay stage 3) in a very old spruce-dominated mesic heath forest, 2 Oct. 2020, leg. & det. TH 20200100 (OULU), and at the same site UCS 7103759:3665054, on a fallen trunk of *Populus tremula* (diam. 25 cm, decay stage 2) in a very old spruce-dominated mesic heath forest, 2 Oct. 2020, leg. & det. TH 20200101 (OULU).

Tulasnella interrogans P. Roberts (Fig. 65)

Distribution. New to Finland, and hence new to 3b (Fig. 1).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7102582:3662587, on a fallen branch of *Pinus sylvestris* (diam. 1 cm, decay stage 3, kelo tree) with *Athelia acrospora* in a middle-aged pine-dominated mesic heath forest with a high amount of dead wood of the previous tree generation, 8 Oct. 2020, leg. & det. TH 20200102 (OULU), conf. MK & HK.

Figure 65. *Tulasnella interrogans* in Kuhmo (TH 20200102) with *Athelia acrospora*. Photo: Teppo Helo.

Tulasnella pallida Bres. (Fig. 66)

Distribution. New to 3a (Fig. 1).

Notes. 5th–7th records in Finland; previous records: Marttila (1b), Ylöjärvi (2b), Sotkamo (3b), and Puolanka (3b) (Kotiranta et al. 2009; Kunttu et al. 2020).

Specimens examined. Ostrobottnia ouluensis, Oulu, Iinatti, UCS 7209158:3434103, on a stump of *Salix caprea* (decay stage 3), in a small pine-dominated mesic heath forest, 6 May 2020, leg. & det. AM 276 (OULU), conf. MK; Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 71265:36593, on a fallen trunk of *Picea abies* (diam. 10 cm, decay stage 1) with *Luellia recondita* and *Sistotrema autumnale* in an old spruce-dominated mesic heath forest, 6 Oct. 2020, leg. TH 20200103 (OULU), det. MK and at the same site UCS 7128711:3665035, on a fallen trunk of *Picea abies* (diam. 10 cm, decay stage 3) in an old

Figure 66. *Tulasnella pallida* in Kuhmo (TH 20200105). Photo: Teppo Helo.

spruce-dominated mesic heath forest, 10 Oct. 2020, leg. & det. TH 20200105 (OULU), conf. MK; Kuhmo, Ulvinsalo, UCS 7102677:3662983, on a fallen trunk of *Pinus sylvestris* (diam. 8 cm, decay stage 2) with *Tubulicrinis subulatus* and *Xylodon brevisetus* in a very old pine-dominated mesic heath forest, 8 Oct. 2020, leg. & det. TH 20200104 (OULU).

Tulasnella permacra P. Roberts

Notes. 6th–8th records in Finland; previous records: Helsinki (1b), Tammisaari (1b), Sotkamo (3b; two sites), and Puolanka (3b) (Kotiranta et al. 2009; Kunttu et al. 2018, 2019, 2020).

Specimens examined. Ostrobottnia kajanensis, Sotkamo, Losonvaara, UCS 7107510:3545128, on a fallen trunk of *Picea abies* (diam. 25 cm, decay stage 2) with *Coniophora olivacea*, *Tubulicrinis strangulatus* and *Tylospora fibrillosa* in an old spruce-dominated mesic heath forest, 7 Sept. 2020, leg. & det. TH 20200107 (OULU), and at the same site UCS 7107559:3545188, on a fallen trunk of *Populus tremula* (diam. 10 cm, decay stage 3) with *Athelia epiphylla* in an old spruce-dominated mesic heath forest, 8 Sept. 2020, leg. & det. TH 20200108 (OULU); Kuhmo, Elimyssalo, UCS 7129534:3664519, on a fallen trunk of *Betula* sp. (diam. 15 cm, decay stage 4) with *Piloderma byssinum* and *Amphinema byssoides* in an old spruce-dominated mesic heath forest, 9 Oct. 2020, leg. & det. TH 20200111 (OULU); Kuhmo, Ulvinsalo, UCS 71026:36629, on a fallen trunk of *Pinus sylvestris* (diam. 25 cm, decay stage 4, kelo tree) with *Athelia bombacina*, *Sistotremastrum suecicum*, *Tulasnella anguifera* and *Tulasnella albida* in an old pine-dominated mesic heath forest, 8 Oct. 2020, leg. & det. TH 20200081 (OULU); UCS 71026:36629, on a fallen trunk of *Pinus sylvestris* (diam. 23 cm, decay stage 3, kelo tree) with *Tylospora fibrillosa* in a very old pine-dominated mesic heath forest, 8 Oct. 2020, leg. & det. TH 20200110 (OULU).

Tulasnella thelephorea (Juel) Juel

Notes. 7th record in Finland; previous records: Lohja (1b), Inkoo (1b), Kajaani (3b; two sites), Lieksa (3b), and Utsjoki (4d) (Kotiranta et al. 2009; Kunttu et al. 2018, 2019).

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7103786:3665057, on a fallen trunk of *Betula* sp. (diam. 20 cm, decay stage 3) with *Athelia fibulata* in a very old spruce-dominated mesic heath forest, 2 Oct. 2020, leg. & det. TH 20200112 (OULU), conf. MK.

Vararia racemosa (Burt) Rog. & Jacks. ssp. ***lapponica*** Hallenberg (Fig. 67)

Distribution. New to 3b (Fig. 1).

Notes. 2nd record in Finland; previous record: Salla (4c) (Kotiranta et al. 2009). Data Deficient.

Specimen examined. Ostrobottnia kajanensis, Kuhmo, Elimyssalo, UCS 71265:36593, on a fallen trunk of *Picea abies* (diam. 45 cm, decay stage 3) with *Tomentella stuposa*, *Xylodon brevisetus* s.str. and *Botryobasidium subcoronatum* in an old spruce-dominated mesic heath forest, 6 Oct. 2020, leg. TH 20200031 (OULU), det. MK.

Xenasma pruinosum (Pat.) Donk (Fig. 68)

Distribution. New to 2a (Fig. 1).

Notes. 4th record in Finland; previous records: Luhanka (2b), Jyväskylä (2b), and Kajaani (3b) (Kotiranta et al. 2009; Kunttu et al. 2018).

Specimen examined. Tavastia australis, Kuhmoinen, Kissakulma, Vierula UCS 6823647:3405308, on a fallen branch of *Salix caprea* (diam. 10 cm, decay stage 2) in a summer house garden, 22 Sept. 2019, leg. & det. JP 4170 (H), conf. HK.

Xenasmatella borealis (K.H. Larss. & Hjortstam) Duhem (Fig. 69)

Notes. 9th–10th records in Finland; previous records: Helsinki (1b), Kuhmoinen (2b), Petäjävesi (2b), Kajaani (3b), Lieksa (3b), Puolanka (3b), Sodankylä (4c), and Salla (4c) (Kotiranta et al. 2009; Kunttu et al. 2018, 2020).

Specimens examined. Ostrobottnia kajanensis, Kuhmo, Ulvinsalo, UCS 7103599:3665407, on a fallen trunk of *Pinus sylvestris* (diam. 4 cm, decay stage 3, kelo tree) in a very old spruce-dominated mesic heath forest, 13 Oct. 2020, leg. & det. TH 20200121 (OULU), and at the same site UCS 7102648:3662954, on a fallen trunk of *Pinus sylvestris* (diam. 6 cm, decay stage 3, kelo tree) in a very old pine-dominated mesic heath forest, 8 Oct. 2020, leg. & det. TH 20200117 (OULU); Kuhmo, Elimyssalo, UCS 7130440:3662325, on a fallen branch of *Pinus sylvestris* (diam. 6 cm, decay stage 2, kelo tree) in an old pine-dominated sub-xeric heath forest, 12 Oct. 2020, leg. & det. TH 20200119 (OULU), and at the same site UCS 71265:36593, on a fallen trunk of *Juniperus communis* (diam. 3 cm, decay stage 3) in an old spruce-dominated mesic heath forest, 6 Oct. 2020, leg. TH 20200116 (OULU), det. MK.

Xylodon borealis (Kotir. & Saaren.) Hjortstam & Ryvarden

Distribution. New to 3a (Fig. 1).

Specimen examined. Ostrobottnia ouluensis, Pudasjärvi, Sarvisuo, UCS 7209158:3434103, on a fallen trunk of *Populus tremula*, in a spruce-dominated herb-rich forest next to a stream running from a spring, 11 July 2018, leg. AM 66-18 (OULU), det. MK.

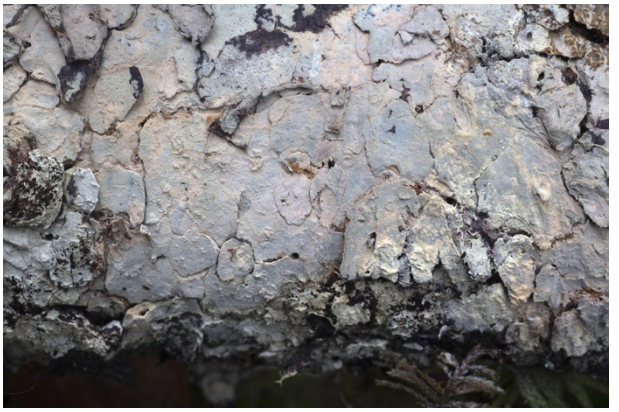

Figure 67. *Vararia racemosa* in Kuhmo (TH 20200031). Photo: Teppo Helo.

Figure 68. *Xenasma pruinosum* in Kuhmoinen (JP 4170). Photo: Jorma Pennanen.

Figure 69. *Xenasmatella borealis* in Kuhmo (TH 20200119). Photo: Teppo Helo.

Discussion

Species new to Finland

Hyphoderma lapponicum has been reported from Sweden, Norway, Spain, and one in unpublished (H. Kotiranta) record from Russian Far East (Eriksson & Ryvarden 1975; GBIF Secretariat 2019). The ecology of the species seems to be poorly known, and its delimitation against *H. obtusiforme* deserves further study.

Mycostilla vermiformis is distributed in temperate and boreal forests of Europe, and it has been found in Sweden, Norway, Denmark, Russia, Poland, Czech Republic, United Kingdom, and France (see Spirin et al. 2019b). The hosts described by Spirin et al. (2019b) were *Picea abies* and *Pinus sylvestris*. In Finland, basidiomata grew on coarse trunks of intermediately decayed *Picea abies*. The site in Helsinki is now partly destroyed. Previous reports of *Stypella vermiformis* in Finland represent another species. For the taxonomy of the complex see Spirin et al. (2019b).

Proterochaete adusta (Alvarenga et al. 2019) has been collected from USA (Idaho), Canada (Alberta, British Columbia), China (Jilin), Russia (Primorie, Khabarovsk), Norway (Møre and Romsdal) (Alvarenga et al. 2019), Germany (Thuringenia, Saxony, North Rhine-Westphalia) (Rödel et al. 2020) and now Finland (Kainuu, South Häme).

In the USA, *P. adusta* grew on a decorticated *Populus trichocarpa* trunk (Burt 1915), in Canada on *Populus trichocarpa* and *Acer negundo* (Martin 1953; Alvarenga et al. 2019), in Russia on an undescribed deciduous tree and a *Betula pseudosieboldianum* (Wells & Raitviir 1966; Alvarenga et al. 2019), in Norway on an undescribed hardwood (Alvarenga et al. 2019), in Germany on fallen *Populus* trunks (five records), inside a rotten *Populus* stump (one record), and on a fallen *Quercus* trunk (one record) (Rödel et al. 2020), and in Finland on the bark of a fallen and hollow *Populus tremula* trunk (2017 record). There is no description of the substrate in the 1964 Finnish record. In summary, *P. adusta* seems to demand, or at least to prefer, deciduous trees, especially *Populus* as its substrate (Rödel et al. 2020).

With the exception of substrate, the ecology of *P. adusta* remains unrecorded. Rödel et al. (2020) report that one of their specimens grew on an eastern bank of a river. The 2017 Finnish record grew on a very old *Picea abies* dominated thin-peated *Vaccinium myrtillus – Vaccinium vitis-idaea* spruce mire with a substantial amount of dead wood. *Populus tremula* and *Salix caprea* were secondary species in the forest. There is no description of the ecology in the 1964 Finnish record.

The fresh basidioma from the 2017 Finnish record was smooth – finely tuberculate, very thin and almost transparent. A cross section of the dry basidioma was a minimum of 20–40 µm compared to the cross sections 100–300 µm (Alvarenga et al. 2019) or 110–220 µm (Rödel et al. 2020). The dry basidioma of the 1964 Finnish record is rather finely grandinoid – finely tuberculate.

Pseudotomentella alobata has been reported in Sweden, Norway and Slovenia (Svantesson et al. 2019). To date, data on habitat are scarce, but recent Scandinavian collections have been made in old-growth coniferous or mixed forests on soil with high pH (Svantesson et al. 2019). The species is described from the *Pseudotomentella tristis* group. Most of the *P. tristis* specimens in the collections are incorrectly identified, so the distribution of the species is not reliably known. It is probably quite rare.

According to GBIF Secretariat (2019), *Pseudoxenasma verrucisporum* is known in Sweden, Norway and Austria. Eriksson et al. (1981) report that this species typically inhabits conifer branches in closed, moist forests, often growing together with *Globulicium hiemale*, as in the case of the Finnish collection. In a Nordic context, the species appears to be southern (most finds are from the hemiboreal zone), although it may extend further north along the seacoast. The species has not been found in Russia, which would indicate that it may have an oceanic distribution (V. Spirin, pers. comm.). Most collections have been made close to the coast, where it can be locally common. Overall, the species appears to be rather rare. The collection from Helsinki fits well with this general pattern, as it was found in an old, closed spruce forest on the southern coast of Finland.

Sistotrema subtrigonospermum is a globally distributed species: records have been reported in several countries in Europe, Africa, North and South America, India, and Polynesia (see Martini 2021a). Typical substrata include advanced decayed lying trunks and fallen branches of deciduous trees (e.g., *Fagus*, *Quercus*, *Populus*, *Salix*), but there are collections from coniferous tree too (see Martini 2021a). The majority of substrata have been advanced or strongly decayed. The basidiomata in Finland inhabited fallen thin and decayed branches of deciduous trees and *Picea abies*.

Spiculogloea minuta has been reported in France, Germany, Norway, Russia, and United Kingdom (GBIF Secretariat 2019; Roberts 1997; Trichies 2002; Rödel 2014; Spirin 2016; Spirin 2019b). The known substrata of this parasite species are *Helicogloea lagerheimii*, *Hyphoderma argillaceum*, *Mycostilla vermiformis*, *Phanerochaete sordida*, *Tubulicrinis accedens*, *Tulasnella allantospora*, *T. eichleriana*, *T. saveloides*, *T. tomaculum* and *T. violea* (Roberts 1997; Trichies 2002; Rödel 2014; Spirin 2016; Spirin 2019b). The Finnish specimen was collected in association with *Tulasnella allantospora* on a decayed *Picea abies* trunk.

Tomentella botryoides is a widely distributed species that has been found in many countries in Europe, as well as in Morocco, Caucasus, Russian Far East, India and North America (see Martini 2021b). The collections have been made both from deciduous (e.g., genera *Quercus*, *Fagus*, *Betula*) and coniferous trees (e.g., genera *Thuja*, *Abies*, *Pinus*, *Pseudostuga*), where the substrate were mainly intermediately or strongly decayed lying trunks and branches (see Martini 2021b).

Tomentella neobourdotii has been reported in Sweden, Estonia, Denmark, Russian Federation, Belarus, Germany, Czech Republic, Austria, Switzerland, Liechtenstein, France, Italy, Spain, Portugal, Macedonia, Georgia, Iran and the USA (GBIF Secretariat 2019; Martini 2021c). It has been mainly collected from decayed trunks of deciduous trees (Martini 2021c).

Tomentella subpilosa has been reported in Denmark, Austria, France, Switzerland, Czech Republic and Slovakia (Svrček 1960; GBIF Secretariat 2019; Martini 2019d). It has been mainly collected from decayed trunks or on branches of *Larix decidua*, *Abies alba*, *Pinus halepensis*, *P. sylvestris*, *Picea abies*, *Fagus sylvatica*, *Populus* sp, although basidiomata have also been

found growing on bark or hard surfaced wood (Svrček 1960; Martini 2019).

Tomentella subtestacea has a global distribution and GBIF Secretariat (2019) has listed it in Sweden, Norway, Denmark, Estonia, Russian Federation, Belarus, Ukraine, Germany, Poland, Belgium, France, Czech Republic, Hungary, United Kingdom, Spain, Azerbaijan, USA, Mexico and Laos. Ecological requirements are unknown or unreported. Previously *Tomentella* aff. *subtestacea* was reported in Finland in 1979 (Kotiranta et al. 2009), although the identity of the specimen remained unclear.

Tulasnella anguifera has previously been reported only in France and United Kingdom (Roberts 1992; GBIF Secretariat 2019; Trichies 2002) and was collected from decayed trunks or branches of *Picea abies*, *Picea* sp., and *Prunus spinosa* (Roberts 1992; Trichies 2002). Both Finnish specimens grew inside basidiomata of *Athelia bombacina* on decorticated *Pinus sylvestris* kelo trees. The second specimen occurred on the same trunk, in association with *Sistotremastrum suecicum*, *Tulasnella permacra*, and *Tulasnella albida*.

Tulasnella interrogans has been reported in Belgium, France, United Kingdom, and Spain (Roberts 1992; Dämon 2001; GBIF Secretariat 2019), where it was collected from decayed trunks or branches of *Corylus* sp., *Picea* sp., *Salix* sp. and inside a basidioma of *Botryobasidium subcoronatum* (Roberts 1992; Trichies 2002). A Finnish specimen grew under and around basidioma of *Athelia bombacina* on a decorticated kelo branch of *Pinus sylvestris*. The habitat had been thinned at some point, but substantial amounts of decaying pine wood were still present onsite from the previous tree generations.

Tulasnella is a genus whose species' ecology, biogeography, substrata and habitat requirements are poorly known. Notes on habitats in old collections are often incompletely described and hence do not allow conclusions to be drawn. Many of the *Tulanella* species appear to favor herb-rich forests, but some occur in very diverse biotopes and can even be found in barren places. It is possible that some *Tulasnella* species even prefer old-growth forests. In fact, our specimens of these two *Tulasnella* species were found in one of the finest natural forests in Finland. Nonetheless, the number of collections is still insufficient to draw conclusions about the ecological requirements of these species.

The red-list status of the species new to Finland has not been assessed.

Species with only one previous global record

The second global record of *Caudicicola gracilis* was found in Oulu, Finland. The basidioma grew on a sawn block of *Betula* sp. that was leaning against a tree in a rather moist spruce-dominated drained and transformed mire. The first recording of *C. gracilis* was in 2014–2015 in Pyhäjärvi, central Finland and was described as a new species (Kotiranta et al. 2017). The habitat was a boreal wooded, drained minerotrophic mire. Spruce was the dominant tree species intermixed with pine, birch and some willow. All the basidiomata grew on the undersides of spruce or pine stumps (roots) and could only be seen after the stumps had been lifted from the ground (Kotiranta et al. 2017). However, if this is the typical growth habit of this species, then it will be a difficult species to detect. *Caudicicola gracilis* appears to be a wood- or litter-decomposer, since there are no mycorrhizal species in *Steccherinaceae* or in *Polyporales* (Hibbett et al. 2014).

Significant extensions of the known distribution range

Most of the new records were found in expected regions, relatively close to their previously known distribution. Nonetheless, the records of some species were located far from their earlier finds or were found in an unexpected location. This 'expansion' of the species' distribution range can be largely explained by the increasing survey activity in different parts of Finland. The new record of *Trechispora stellulata* in Enontekiö is 570 km north from the nearest previous record in Puolanka. The new record of *Ceriporia bresadolae* in Helsinki extends its known range by 500 km to the south. However, it should be noted that collections identified as *C. bresadolae* in Estonia (Runnel et al. 2021), are actually closer than the previous collections in Finland (NATARC 2019). Similarly, the new records of *Protodontia subgelatinosa* in Enontekiö, *Amaurodon cyaneus*, *Protomerulius brachysporus* and *Tomentella fuscocinerea*, all in Kuhmo, were found approximately 500 km further north compared to previous records. *Tomentellopsis zygodesmoides* was found in Sotkamo, which is situated 400 km north of the nearest previously known location in Tuusula.

Conclusions

The occurrence and distribution of many aphyllophoroid fungal species are still poorly known in Finland, as demonstrated by this article. Our new records indicate that many species most likely do not have such a scattered distribution as suggested by previous records. Thus, there are still large gaps in our knowledge of their ecology, biogeography, substrata and habitat requirements. The reasons behind this include time-consuming sampling, small basidiomata that are difficult to find, narrow ecological niches (substratum), changing taxonomy, and challenges in species identification. For example, the fungal communities that occupy the smallest fractions of woody debris seem to be poorly known, since this substrate has been commonly overlooked. However, new records are reported frequently and, therefore, knowledge accumulates all the time. New information on aphyllophoroid fungi will be gathered when performing field surveys in poorly studied areas and neglected habitats, or on species with tiny basidiomata. More effort should be allocated into field studies to establish which species are truly rare and to determine the actual distribution range. Naturally, a certain portion of aphyllophoroid fungal species are truly rare or geographically restricted, for example, due to habitat specialization. All such additional knowledge of species occurrence and habitats is important for a deeper understanding of diversity, ecology and conservation requirements of aphyllophoroid fungi.

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