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Noteworthy records of aphyllophoroid fungi in Finland (Basidiomycota)

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Abstract

We present new records of noteworthy aphyllophoroid fungi, mainly polypores and corticioids in Finland. The following 19 rare or infrequently collected species are presented with notes on their substrates: *Amylocorticium subsulphureum*, *Antrodiella parasitica*, *Ceraceomyces sulphurinus*, *Clavaria atroumbrina*, *Clavaria rosea*, *Gloeophyllum carbonarium*, *Hyphodontia flavipora*, *Junghuhnia fimbriatella*, *Lindtneria chordulata*, *Odonticium septocystidia*, *Peniophorella guttulifera*, *Perenniporia tenuis*, *Postia immitis*, *Repetobasidium vile*, *Resinicium pinicola*, *Sidera vulgaris*, *Tomentella coerulea*, *Trechispora laevis* and *Xylodon pruni*. We also list 41 aphyllophoroid fungi as new to some sections of the boreal vegetation zone in Finland.

Keywords: biogeography; boreal forest; corticioid; distribution; polypore; rare species

Introduction

Aphyllophoroid fungi constitute an artificial order of fungi in Basidiomycota. It comprises a diverse group of different kind of fungi, such as corticioids, polypores and clavarioids. According to Kotiranta et al. [1] there are 980 aphyllophoroid species found in Finland. Aphyllophoroid fungi are important in decomposition of dead wood, and, thus they play an important role in woody ecosystems. In addition to wood decayers, a part of aphyllophoroid fungi are litter decayers, ectomycorrhizal, parasitic fungi and mycoparasites [1].

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So far, there are only a few intensive inventories done in Finland that cover all aphyllophorales. Especially other aphyllophoroid fungi than polypores are time consuming to sample: for example basidiocarps of corticioids are small in size and often they grow underneath a trunk. Therefore they are demanding to find, and most of these species need to be identified with a microscope. Because of low sampling effort, most of these species are poorly known.

The first Finnish checklist of aphyllophoroid fungi was published in 2009 [1]. After this, plenty of biogeographical knowledge has accumulated especially about polypores and corticioids, and new records have been published for example by Kunttu et al. [2–6], Kotiranta and Larsson [7], Kotiranta and Shiryaev [8] and Spirin et al. [9]. In this article we present new records of aphyllophoroid fungi mainly from two larger field works that were conducted in Finland in the southern archipelago and in northern Lapland, but also some sporadic records is included.

We consider two kinds of records: rare or little collected species with five earlier records in Finland and species that are new to some section (subzone) of boreal vegetation zone in Finland.

Material and methods

The records presented in this article come from several inventories in different parts of Finland. Records are mainly made during a period from 2008 to 2013, but some older records are also included due to change of the taxonomical status. These studies are mostly connected to inventories of species assemblages in certain areas or ecological research of polypores and corticioids.

Most of the records come from inventories made by Metsähallitus, Natural Heritage Services. These records are from nature conservation areas where the purpose of the inventory has been to map species living in these areas. The inventory methods have been various. Records are also made in an ecological and biogeographical study that concentrates on polypores and corticioids in the southwestern archipelago of Finland (P. Kunttu, doctoral dissertation in preparation). Some records are made during XXI Nordic mycological congress in Rovaniemi in September 2013. Additional records are also made on field trips by authors during their leisure time.

We use Finnish national uniform grid system (27°E) according to Heikinheimo and Raatikainen [10] for coordinates and the abbreviation UCS refers to Uniform Coordinate System. Biogeographical provinces are according to Knudsen and Vesterholt [11]. Boreal and hemiboreal vegetation zones consist of 11 sections (subzones), which are represented in this article (Fig. 1) [12,13]. Voucher specimens are deposited in the herbaria of the Universities of Helsinki (H), Turku (TUR), Oulu (OULU), Slovak National Museum (BRA) and/or in the reference herbarium of Jorma Pennanen (J.P.), Kaisa Junninen (K.J.), Matti Kulju (M.K.) or Heikki Kotiranta (H.Kta).

Nomenclature is mainly according to Kotiranta et al. [1], but names of some species follow Miettinen and Larsson [14] and Bernicchia and Gorjón [15]. Nomenclature of the genus Hyphodontia sensu lato follows Hjortstam and Ryvarden [16]. The Finnish national red-listing evaluation of IUCN standard is according to Kotiranta et al. [17]. The decay stage classification of trunks (1–5) is according to Renvall [18]. Diameter of a

trunk is given at the breast height if the trunk has been unbroken and at the base if the trunk has been broken.

Material has been collected, identified or confirmed by several researches that are mentioned in the collecting information. At least five times are mentioned the following researchers: TK = Tapio Kekki, HK = Heikki Kotiranta, MK = Matti Kulju, PK = Panu Kunttu, JP = Jorma Pennanen. Collector is also the identifier if not otherwise stated. Number code after the collectors name or abbreviation of the collector is a personal sampling number of the specimen.

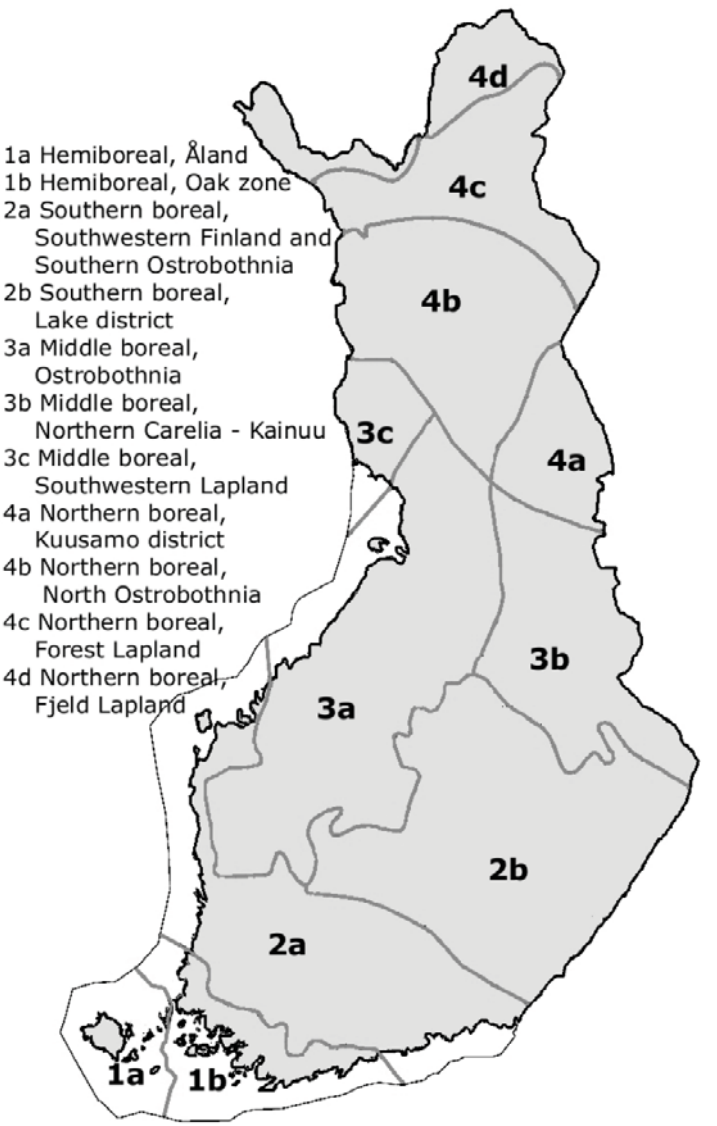

Fig. 1 Boreal and hemiboreal vegetation zones and their sections in Finland.

Results

We present new records of following 19 rare or little collected species and give notes of their substrates. These species are *Amylocorticium subsulphureum*, *Antrodiella parasitica*, *Ceraceomyces sulphurinus*, *Clavaria atroumbrina*, *Clavaria rosea*, *Gloeophyllum carbonarium*, *Hyphodontia flavipora*, *Junghuhnia fimbriatella*, *Lindtneria chordulata*, *Odonticium septocystidia*, *Peniophorella guttulifera*, *Perenniporia tenuis*, *Postia immitis*, *Repetobasidium vile*, *Resinicium pinicola*, *Sidera vulgaris*, *Tomentella coerulea*, *Trechispora laevis* and *Xylodon pruni*. We also list 41 aphyllophoroid fungi as new to some section (subzone) of the boreal vegetation zone in Finland. Species are presented in an alphabetic order.

The number of new species to some section (subzone) of boreal vegetation zone are as follows: Hemiboreal, Oak zone (1b) 2; Southern boreal, Southwestern Finland and Southern Ostrobothnia (2a) 2; Southern boreal, Lake district (2b) 2; Middle boreal, Ostrobothnia (3a) 1; Middle boreal, Northern Carelia – Kainuu (3b) 4; Middle boreal, Southwestern Lapland (3c) 11; Northern boreal, North Ostrobothnia (4b) 11; Northern boreal, Forest Lapland (4c) 8.

There are 1 critically endangered, 4 endangered, 3 vulnerable, 4 near threatened and 3 data deficient species among the taxa presented here.

List of species

Amylocorticium subsulphureum (P. Karst.) Pouzar
Specimen examined: Savonia borealis, Heinävesi, Kermajärvi, UCS 6929959:3587206, 17.IX.2008, JP SS42/2 (H + J.P.), on *Picea abies*, whole fallen trunk, diam. 30 cm, decay stage 3.
Near threatened. New to Southern boreal, Lake district (2b). This is the fourth record in Finland [1].

Anomoloma myceliosum (Peck) Niemelä & K.H. Larss.
Specimen examined: Karelia borealis, Lieksa, Möhkyrinkangas, UCS 7033531:3685196, autumn 2011, Mari E. Niemi 143 (TUR), clear cut area with 50 m^3/ha dead wood, advanced *Picea abies* trunk, diam. 25 cm.
Near threatened. New to Middle boreal, Northern Carelia – Kainuu (3b).

Antrodia sitchensis (Baxter) Gilb. & Ryvarden
Specimens examined: Savonia borealis, Heinävesi, Kermajärvi, UCS 6924419:3591868, 24.IX.2008, JP HS158/4 (H + J.P.), on *Picea abies*, whole fallen trunk, diam. 45 cm, decay stage 3. *Oxalis-Myrtillus* forest type; Ostrobottnia ultima, Rovaniemi, Hyypiökivalo UCS 7358676:3487201, 11.VIII.2009, Juha Kinnunen 5194 (H), on *Picea abies*, whole fallen trunk, diam. 40 cm, decay stage 2; Savonia borealis, Savonranta, Kakonsalo, Haukiniemi, UCS 6910310:3605339, 15.IX.2009, JP 964 (H + J.P.), on *Pinus sylvestris*, broken fallen trunk, diam. 45 cm, decay stage 3, *Myrtillus* type forest.; Ostrobottnia kajanensis, Sotkamo, Talvivaara, UCS 7092700:3556644, 25.VIII.2010, Anni Markkanen 2718 (JYV), on *Picea abies*, whole fallen trunk, diam. 20 cm, decay stage 3; Karelia borealis, Lieksa, Ukonsärkkä, UCS 7032840:3689321, 22.IX.2010, Kaisa Junninen 7805 (H), on *Picea abies*, whole fallen trunk, diam. 35 cm, decay stage 3.
Endangered. New to Northern boreal, North Ostrobothnia (4b).

Antrodiella parasitica Vampola
Specimens examined: Nylandia, Sipoo, Rörstrand, UCS 6706981:3400127, 15.X.2008, Keijo Savola H/151008, det. Mari E. Niemi (H), on *Picea abies*, whole fallen trunk, diam. 28 cm, decay stage 3; Nylandia, Sipoo, Rörstrand, UCS 6706479: 3400459, 15.X.2008, Keijo Savola U/151008, det. Mari E. Niemi (H), on *Picea abies*, whole fallen trunk, diam. 37 cm, decay stage 4.
Vulnerable. This is the sixth occurrence in Finland [1].

Bjerkandera fumosa (Pers. : Fr.) P. Karst.
Specimen examined: Karelia borealis, Lieksa, Haapahaasianvaara, UCS 7031313:3687422, 19.IX.2008, Kaisa Junninen 7619, det. Tuomo Niemelä (K.J.), on *Populus tremula*, whole fallen trunk, diam. 37 cm, decay stage 2.
New to Middle boreal, Northern Carelia – Kainuu (3b).

Bulbillomyces farinosus (Bres.) Jülich
Specimen examined: Lapponia kittilensis, Muonio, Pallas-Ounastunturi National Park, Pallastunturi S, UCS 7553415:3376871, 27. VIII. 2013, JP 2565 (H, J.P.), on *Betula* sp. fallen trunk, diam. 15 cm decay stage 2, old *Hylocomium-Myrtillus* type forest.
New to Northern boreal, Forest Lapland (4c).

Calocera cornea (Batsch : Fr.) Fr.
Specimen examined: Ostrobottnia ultima, Rovaniemi, Pisajärvi nature reserve, UCS 7362840:3418095, 2.IX.2011, TK 297 (H), fallen trunk of *Betula* sp. in herb rich forest.
New to Middle boreal, Southwestern Lapland (3c).

Ceraceomyces sulphurinus (P. Karst.) J. Erikss. & Ryvarden
Specimen examined: Tavastia borealis, Savonranta, Kakonsalo, Aluslamminmäki, UCS 6908677:3601099, 10.IX.2009, JP 910 (H, J.P), on *Populus tremula*, fallen trunk, diam 50 cm, decay stage 4. Fruitbody grew on the bark and its length was few meters. Habitat was an old lakeside mixed forest.
Vulnerable. This is the third record in Finland. Earlier records are from Punkaharju 1960 (Savonia australis) and Jalasjärvi 1859 (Ostrobottnia australis) [1]. In Europe *C. sulphurinus* has been found in Germany, Netherlands, Belgium, Italy, Portugal, Spain and Belarus [15].

Ceraceomyces violascens (Fr.: Fr.) Jülich
Specimen examined: Lapponia enontekiensis, Enontekiö, Pallas-Ounastunturi National Park, Ounastunturi S, UCS 7575152:3374884, 15.VIII.2013, JP 2459, conf. MK (H, J.P.), on *Betula* sp., fallen trunk, diam. 15 cm, decay stage 4, mixed birch dominated forest.
New to Northern boreal, Forest Lapland (4c).

Ceriporiopsis aneirina (Sommerf.) Domanski
Specimen examined: Lapponia kittilensis, Kolari, Pallas-Ounastunturi National Park, Pyhätunturi NW, UCS 7513940:3383478, 2. IX. 2013, JP 2623 (H, J.P.), on *Populus tremula* fallen trunk, diam. 30 cm, decay stage 3, mixed spruce dominated forest.
Near threatened. New to Northern boreal, North Ostrobothnia (4b).

Clavaria asterospora Pat. sensu lato
Specimen examined: Ostrobottnia ultima, Tervola, Kätkävaara, UCS 7348244:3406879, 2.IX.2012, TK 580 (TUR), on track in calciferous *Picea abies* dominated forest. This is distinct from *Clavaria falcata* with ellipsoid spores.
New to Middle boreal, Southwestern Lapland (3c).

Clavaria atroumbrina Corner
Specimen examined: Ostrobottnia ultima, Keminmaa, Kallinkangas, UCS 7304:3387, 5.IX.2013, Viktor Kučera (BRA CR19576), det. I. Kautmanová, on calciferous ground in graveyard.
New to Middle boreal, Southwestern Lapland (3c). One record of *Clavaria* cf. *pullei* Donk has been made in Kuhmoinen (Tavastia australis), which is most probably a synonym for *C. atroumbrina*. So this would make it the second record in Finland [1].

Clavaria fragilis Holmsk. : Fr.
Specimen examined: Ostrobottnia ultima, Rovaniemi, Kiiruna, UCS 737876:344484, 10.VIII.2010, TK 31 (TUR), in sandy yard with *Antennaria dioica*.
New to Northern boreal, North Ostrobothnia (4b).

Clavaria rosea Dalman
Specimen examined: Ostrobottnia media, Kokkola, Halkokari, UCS 708918:331036, 19.IX.2011, Terho Taarna (OULU) conf. Esteri Ohenoja, lawn in garden; Savonia australis, Kerimäki, UCS 686949:362045, 25.VII.2012, TK 554 (TUR), lawn in garden; Savonia australis, Kerimäki, Louhi, UCS 687186:360643, 17.VIII.2012, Mauri Lahti 28/12 (TUR), lawn near lime quarry.
New to Middle boreal, Ostrobothnia (3a). There are three earlier records made in Finland: Two from Saari (Karelia ladogensis) and one from Kuusamo (Regio kuusamoënsis) [1].

Clavicorona taxophila (Thom) Doty
Specimen examined: Ostrobottnia ultima, Rovaniemi, Pisajärvi, UCS 7362858:3418110, 2.IX.2011, TK 298 (TUR), mesic herb-rich forest.
New to Middle boreal, Southwestern Lapland (3c).

Clavulina rugosa (Bull. : Fr.) J. Schröt. sensu lato
Specimen examined: Ostrobottnia ultima, Rovaniemi, Savioja, UCS 734902:342663, 23.IX.2011, TK 498 (TUR), moist herb-rich forest.
New to Middle boreal, Southwestern Lapland (3c).

Gloeophyllum carbonarium (Berk & M.A. Curtis) Ryvarden
Specimens examined: Karelia borealis, Ilomantsi, Patvinsuo, UCS 6999276:3690969, 2.IX.2008, Kaisa Junninen 7492 (H), on *Pinus sylvestris*, fallen broken trunk, charred, diam. 17 cm, decay stage 2; Tavastia borealis, Savonranta, Kakonsalo, Raatelamminsalo, UCS 6908478:3602133, 24.IX.2009, JP 1039 (H, J.P.), on *Pinus sylvestris*, charred rootstalk, diam. 30 cm, decay stage 3.
Endangered. According to Kotiranta et al. [1] there are five earlier records in Finland but there are several unpublished records made in Ostrobottnia kajanensis (T. Helo, personal communication, 2014).

Hypochnicium bombycinum (Sommerf. & Fr.) J. Erikss.
Specimen examined: Lapponia enontekiensis, Enontekiö, Pallas-Ounastunturi National Park, Röyninkuru, UCS 7565306:3378545, 28.VIII.2013, JP 2574, conf. MK (H, J.P.), on living Salix sp., diam. 10 cm, old and moist, mixed spruce dominated forest.
New to Northern boreal, Forest Lapland (4c).

Hyphodontia flavipora (Cooke) Sheng H. Wu
Specimen examined: Regio aboënsis, Kemiönsaari, Dragsfjärd, Vänö, UCS 664:323, 15.XI.2008, Timo Kosonen 737-2008, det. JP (TUR), on *Alnus glutinosa*, fallen trunk, diam. 6 cm, decay stage 2.
Data deficient. There is one earlier record made in Finland: Naantali (Regio aboënsis) in 1997 [1]. Fruitbody grew on *Betula* sp.

Junghuhnia fimbriatella (Peck) Ryvarden
Savonia borealis, Tavastia borealis, Savonranta, Kakonsalo, Aluslamminmäki, UCS 6908721:3601130, 10.IX.2009, JP 912 (H, J.P.), on *Populus tremula*, fallen whole trunk, diam. 50 cm, decay stage 3. *J. fimbriatella* grew on dead fruitbody of *Ganoderma applanatum*.
This is the second record in Finland. According to Niemelä [19] the first one was found from Joensuu in 2006 (Karelia borealis). In Europe *J. fimbriatella* has been found in Germany, Poland, Switzerland, Austria, Czech Republic, former Yugoslavia area and Russia. In addition to these there are records from Kamchatka peninsula, Canada and United States. The substrates have been *Populus*, *Fagus* and *Fraxinus* [15].

Kneiffiella alienata (S. Lundell) Jülich & Stalpers
Specimen examined: Lapponia kittilensis, Muonio, Pallas-Ounastunturi National Park, Pyhäkero E, UCS 7551549:3381223, 20.VIII.2013, JP 2490, conf. HK (H, H.Kta, J.P.), on *Picea abies* fallen trunk, diam. 20 cm, decay stage 4, moist herb-rich forest.
New to Northern boreal, Forest Lapland (4c).

Kneiffiella barba-jovis (Bull.) P. Karst.
Specimen examined: Lapponia enontekiensis, Enontekiö, Pallas-Ounastunturi National Park, Ounastunturi S, UCS 7577820:3375140, 13.VIII.2013, JP 2433 (H, J.P.), on *Betula* sp., fallen branch, diam. 5 cm, decay stage 3, pine dominated sub-xeric heath forest.
New to Northern boreal, Forest Lapland (4c).

Kneiffiella subalutacea (P. Karst.) Jülich & Stalpers
Specimen examined: Lapponia kittilensis, Kolari, Pallas-Ounastunturi National Park, Pyhätunturi NW, UCS 7514455:3382142, 2.IX.2013, JP 2615 (H, J.P.), on *Pinus sylvestris*, fallen trunk, diam. 25 cm, decay stage 3, mixed pine dominated forest.
New to Northern boreal, North Ostrobothnia (4b).

Lentaria afflata (Lagger) Corner
Specimen examined: Ostrobottnia ultima, Keminmaa, Kallinkangas nature reserve, UCS 7303990:3386811, 12.IX.2012, TK 691 (TUR), on fallen trunk of *Populus tremula*, calciferous herb-rich heath forest.
New to Middle boreal, Southwestern Lapland (3c).

Lindtneria chordulata (D.P. Rogers) Hjortstam
Specimens examined: Regio aboënsis, Kemiönsaari, Dragsfjärd, Yxskär, UCS 6650562:3223065, 5.VIII.2010, PK 6494, det. MK (TUR), on *Populus tremula*, fallen broken trunk, diam. 27, decay stage 4; Regio aboënsis, Kemiönsaari, Dragsfjärd, Storlandet, Apelholmen, UCS 6653:3247, 18.VIII.2010, PK 6709, det. MK (TUR), on *Populus tremula*, fallen whole trunk, diam. 22 cm, decay stage 1.
Vulnerable. Six records are made in Finland before: Helsinki in four places (Nylandia) on *Salix caprea*, *Salix* sp., coniferous board, *Pinus timber* and *Syringa vulgaris* (cult.) [1]; Lam-mi (Tavastia australis) on *Corylus* [1], Parainen, Nauvo on *Populus tremula* (Regio aboënsis) [5].

Macrotyphyla fistulosa (Holmsk. : Fr.) R.H. Petersen
Specimen examined: Ostrobottnia ultima, Rovaniemi, Marrasjärvi, UCS 741979:342391, 16.X.2011, TK 531 (TUR), on fallen branch of *Betula pendula*, diam. 1, xeric heath forest. Specimen was *M. fistulosa* var. *contorta* (Holmsk.) Nannf. & L. Holm.
New to Northern boreal, North Ostrobothnia (4b).

Mucronella bresadolae (Quél) Corner
Ostrobottnia ultima, Rovaniemi, Pisavaara Strict Nature Reserve, UCS 7359279:3416987, 12.IX.2013, MK 12/13 & Pekka Helo (OULU), on *Pinus sylvestris*.
New to Middle boreal, Southwestern Lapland (3c).

Odonticium septocystidia (Burt) Zmitr. & Spirin (Fig. 2)

Fig. 2 *Odonticium septocystidia*, Regio aboënsis, Salo, Kisko, Pappilanniemi, 11.X.2013, JP 2745. Photo: Jorma Pennanen.

Specimens examined: Regio aboënsis, Salo, Kisko, Pappilanniemi Nature Reserve, UCS 6687518:3303916, 11.X.2013, JP 2740, conf. HK (H, H.Kta, J.P.), on decorticated *Populus tremula* fallen branch, diam. 20 cm, decay stage 2, herb-rich heath forest; Regio aboënsis, Salo, Kisko, Pappilanniemi Nature Reserve, UCS 6687621:3304145, 11.X.2013, JP 2745, conf. HK (H, H.Kta, J.P., M.K.), on decorticated *Populus tremula* fallen trunk, diam. 12 cm, decay stage 3, herb-rich heath forest.
Endangered. New to Hemiboreal, Oak zone (1b). This is the second occurrence (on two trunks near each other) in Finland, the first was found from Tavastia australis, Lammi, Kotinen Nature Reserve in 2001 [1]. Also in this case the fruiting body grew on decorticated *Populus tremula* [1]. It seems to be rare and in Europe the distribution covers Germany, Estonia, France, Belgium, United Kingdom, Denmark, Norway, Finland, Switzerland and Caucasus [15]. In addition to these records it has been found from North America [20].

Peniophorella guttulifera (P. Karst.) K.H. Larss.
Specimen examined: Regio aboënsis, Parainen, Korppoo, Wattkast, Söderviken, UCS 6687234:3202197, PK 8179, det. MK (TUR), 9.X.2013, *Betula* sp. fallen trunk, diam. 9 cm, decay stage 2.
Near threatened. According to Kotiranta et al. [1] there are records from Helsinki 1988–1990 and Vantaa 1993 (Nylandia), Siikainen 1939 (Satakunta), Tammela 1888 (Tavastia australis) and Pieksänmaa 2006 (Savonia borealis).

Perenniporia tenuis (Schwein.) Ryvarden
Specimen examined: Karelia borealis, Lieksa, Jeremianvaara, UCS 7026980:3686433, October 2011, Olli Manninen (TUR), clear cut area with 50 m^3/ha partly fallen retention trees, advanced decayed trunk of *Populus tremula*, diam. 23 cm.
Critically endangered. There are five earlier records in Finland [1].

Phanerochaete calotricha (P. Karst.) J. Erikss. & Ryvarden
Specimen examined: Lapponia enontekiensis, Enontekiö, Pallas-Ounastunturi National Park, Röyninkuru, UCS 7565649:3378816, JP 2580 (H, J.P.), conf. HK, 28.VIII.2013, on *Sorbus aucuparia* fallen trunk, diam. 5 cm, decay stage 3, old and moist, mixed spruce dominated forest.
New to Northern boreal, Forest Lapland (4c).

Piloderma olivaceum (Parmasto) Hjortstam
Specimen examined: Regio aboënsis, Perniö, Arpalahti, Kaapinmäki, UCS 669254:328513, 13.X.2003, Maija-Liisa & Pekka Heinonen 850-2003, det. MK (TUR), on *Pinus sylvestris*; Satakunta, Säkylä, Iso-Säkylä, UCS 6778:3255, 16.X.2001, Maija-Liisa & Pekka Heinonen 842-2001, det. MK (TUR), on *Pinus sylvestris*; Tavastia australis, Somero, Palikainen, UCS 672402:331858, 26.X.1998 Maija-Liisa & Pekka Heinonen 952-1998, det. MK (TUR), on *Pinus sylvestris*; Tavastia australis, Ruovesi, Susimäki Nature Reserve, UCS 686426:335466, 14.IX.1999 Maija-Liisa & Pekka Heinonen 685-1999, det. MK (TUR), on *Pinus sylvestris*; Karelia borealis, Lieksa, Säynäsemä, UCS 7038:3683, 23.VIII.1999 Maarit Similä & Mari Niemi 501/1999, det. MK (TUR), on *Pinus sylvestris*; Karelia borealis, Lieksa, Vilponkangas, UCS 7024:3691, 16.VIII.1999 Maarit Similä & Mari Niemi 150/1999, det. MK (TUR), on *Pinus sylvestris*; Ostrobottnia ultima, Rovaniemi, Pisavaara Strict Nature Reserve, UCS 7359276:3416918, 12.IX.2013, MK 15/13 & Pekka Helo (OULU), on *Pinus sylvestris*.

New to Hemiboreal, Oak zone (1b), Southern boreal, Southwestern Finland and Southern Ostrobothnia (2a), Southern boreal, Lake district (2b), Middle boreal, Northern Carelia – Kainuu (3b), Middle boreal, Southwestern Lapland (3c). Kotiranta et al. [1] presents only one record from Finland, but after that many records *P. olivaceum* have emerged (H. Kotiranta, personal communication, 2014).

Piloderma sphaerosporum Jülich
Specimen examined: Karelia borealis, Lieksa, Kitsi I, 7023:3689, 19.VIII.1999 Maarit Similä & Mari Niemi 325/1999, det. MK (TUR), on *Pinus sylvestris*; Karelia borealis, Lieksa, Säynäsemä, 7038:3683, 23.VIII.1999 Maarit Similä & Mari Niemi 517/1999, det. MK (TUR), on *Pinus sylvestris*; Ostrobottnia ultima, Rovaniemi, Pisavaara Strict Nature Reserve, UCS 7359311:3416972, 12.IX.2013, MK 11b/13 & Pekka Helo (OULU), on *Pinus sylvestris*.
New to Middle boreal, Northern Carelia – Kainuu (3b) and Middle boreal, Southwestern Lapland (3c).

Polyporus squamosus (Huds. : Fr.) Fr.
Specimen examined: Ostrobottnia ultima, Rovaniemi, Kukanniemi, UCS 737736:344429, 18.VI.2013, TK 899 (TUR), on stumps of *Salix caprea* at riverbank.
In Finland there are two different ecological forms. This belongs to the rarer one, that is found on *Betula* and *Salix* stumps at sea, lake and river shores.
New to Northern boreal, North Ostrobothnia (4b).

Postia immitis (Peck) Niemelä
Specimen examined: Regio aboënsis, Kemiönsaari, Dragsfjärd, Kuggskär, UCS 6638:3240, 30.IX.2008, PK 3991, det. JP, (TUR), on *Alnus glutinosa*, dead standing trunk, diam. 23 cm, decay stage 1.
Data deficient. There are five earlier records in Finland: Jomala (Alandia), three sites in Helsinki (Nylandia) and Kirkkonummi (Nylandia). Subtrates have been *Fraxinus*, *Betula*, *Alnus incana* and *Juglans ailanthifolia*.

Postia perdelicata (Murrill) M.J. Larsen & Lombard
Specimen examined: Tavastia australis, Pirkkala, Kaitalankulma, Saukkolampi, UCS 68192:33248, 22.VIII.2013, Unto Söderholm 4608, det. Viacheslav Spirin (OULU), on *Pinus sylvestris*.
Endangered. New to Southwestern Finland and Southern Ostrobothnia (2a).

Postia tephroleuca (Fr.) Jülich
Specimen examined: Lapponia enontekiensis, Enontekiö, Pallas-Ounastunturi National Park, Suastunturi E, UCS 7573150:3376710, 25.VIII.2013, JP 2546 (H, J.P.), on *Pinus sylvestris* fallen trunk, diam. 35 cm, decay 2, mixed pine dominated heath forest.
New to Northern boreal, Forest Lapland (4c).

Pseudotomentella nigra (Höhn. & Litsch.) Svrček
Specimen examined: Lapponia kittilensis, Kolari, Pallas-Ounastunturi National Park, Pyhätunturi S, UCS 7510511:3383718, 9.VIII.2013, JP 2415 (H, J.P.), on *Populus tremula* fallen trunk, diam. 12 cm, decay stage 4, mixed pine dominated forest.
New to Northern boreal, North Ostrobothnia (4b).

Radulomyces confluens (Fr. : Fr.) M.P. Christ.
Specimen examined: Lapponia kittilensis, Kolari, Pallas-Ounastunturi National Park, Kukastunturinlehto, UCS 7507610:3382076, 8.VIII.2013, JP 2405, det. MK, (H, J.P.), on unknown deciduous tree, diam. 10 cm, decay stage 3, moist mixed spruce dominated forest.
New to Northern boreal, North Ostrobothnia (4b).

Ramariopsis crocea (Pers. : Fr.) Corner
Specimen examined: Ostrobottnia ultima, Rovaniemi, Sinettä, UCS 7399580:3429269, 2.IX.2013, TK 1030 (TUR), on ground in herb-rich *Picea* forest.
New to Northern boreal, North Ostrobothnia (4b).

Ramariopsis tenuiramosa Corner
Specimen examined: Ostrobottnia ultima, Tervola, Raemäki Nature Reserve, UCS 734369:341733, 2.IX.2012, TK 579 (TUR), on ground in calciferous herb-rich forest with *Dryopteris* sp.
New to Middle boreal, Southwestern Lapland (3c).

Repetobasidium vile (Bourdot & Galzin) J. Erikss.
Specimen examined: Regio aboënsis, Parainen, Korppoo, Västra Tvigölpan, UCS 6674:3198, 21.VII.2010, PK 6122a, det. MK, conf. HK (TUR), on *Alnus glutinosa*, fallen broken trunk, diam. 17 cm, decay stage 4.
This is the third record in Finland. Earlier records from Tammisaari (Regio aboënsis) and Jyväskylä (Tavastia borealis) [1].

Resinicium pinicola (J. Erikss.) J. Erikss. & Hjortstam
Specimen examined: Regio aboënsis, Parainen, Nauvo, Fårö, UCS 665:320, 25.–27. VII.2010, PK 6249, det. MK, conf. HK (TUR), *Pinus sylvestris*, fallen whole trunk, diam. 20 cm, decay stage 1; Regio aboënsis, Kemiönsaari, Örö, UCS 68428:32380, 28.IX.2013, coll. & det. Unto Söderholm 4622, conf. HK (TUR/H), on fallen trunk of *Pinus silvestris*.
There is only one earlier record in Finland: Parainen (Regio aboënsis) in 2000–2001 and fruitbody grew there on *Pinus sylvestris* [1].

Sidera vulgaris (Fr.) Miettinen
Specimen examined: Nylandia, Kirkkonummi, Kuokkamaa Nature Reserve, UCS 6670640:3367597, 28.X.2009, Keijo Savola S281009, det. Juha Kinnunen, on *Picea abies*, whole fallen trunk, diam. 7 cm, decay stage 4.
This is the second record in Finland. Earlier it has been found only from Nauvo (Regio aboënsis) 1997 where it grew on *Picea abies* [21].

Sistotrema dennisii Malencon
Specimen examined: Lapponia sompiensis, Pelkosenniemi, Pyhä-Luosto National Park, Huttujärvi S, UCS 7435172:3500868, 10.IX.2013, JP 2669 (H, J.P.), on burned *Pinus sylvestris* fallen trunk, diam. 30 cm decay stage 3, burned pine dominated sub-xeric heath forest.
Data deficient. New to Northern boreal, North Ostrobothnia (4b).

Tomentella coerulea (Bres.) Höhn. & Litsch.
Specimen examined: Lapponia enontekiensis, Enontekiö, Pallas-Ounastunturi National Park, Hetta, Onnasjärvet, UCS 7588466:3366002, 29.VIII.2013, JP 2588 (H, J.P.), on *Salix caprea* fallen branch, diam. 10, decay stage 3, mixed pine dominated forest.
New to Northern boreal, Forest Lapland (4c). This is the second record in Finland. The first record is from Pisavaara Strict Nature Reserve in Rovaniemi (Ostrobottnia ultima) and it was made in 1980 [1].

Tomentella stuposa (Link) Stalpers
Specimen examined: Ostrobottnia ultima, Rovaniemi, Pisavaara Strict Nature Reserve, Sorvanulkki, UCS 7358592:3416681, 3.X.2013, MK 52/13 (OULU), on *Picea abies*.
New to Middle boreal, Southwestern Lapland (3c).

Trechispora kavinioides de Vries
Specimens examined: Ostrobottnia ultima, Tervola, Pisavaara Strict Nature Reserve, Liljalaki, UCS 7353795:3414058, 19.IX.2013, MK 37/13 & Anna-Liisa Ruotsalainen (OULU), on *Picea abies*; Lapponia kittilensis, Kolari, Pallas-Ounastunturi National Park, Pyhätunturi NW, UCS 7512609:3382953, 3.IX.2013, JP 2639 (H, J.P.), on *Pinus sylvestris*, fallen trunk., diam. 15 cm, decay stage 3, old and moist, mixed pine dominated forest.
New to Middle boreal, Southwestern Lapland (3c) and Northern boreal, North Ostrobothnia (4b).

Trechispora laevis K.H. Larss.
Specimen examined: Ostrobottnia ultima, Rovaniemi, Pisavaara Strict Nature Reserve, Sorvanulkki, UCS 7358390:3416346, 3.X.2013, MK 49/13 (OULU), on coniferous tree.
New to Middle boreal, Southwestern Lapland (3c). There are seven earlier records from Finland, from the hemiboreal or south boreal zones Parainen (3 records), Helsinki, Lammi, Padasjoki and Suomussalmi [1,2,5].

Xylodon pruni (Lasch) Hjortstam & Ryvarden
Specimen examined: Regio aboënsis Parainen, Korppoo, Wattkast, Nystu, UCS 6686910:3202985, 10.X.2013, PK 8206, det. MK, conf. HK (TUR), on *Juniperus communis*, stump diam. 18 cm, decay stage 2.
There are three earlier records in Finland: Finström (Alandia), Karjalohja and Tammisaari (Regio aboënsis). Fruitbodies have been found on decorticated *Ulmus glabra* and twig of *Thuja plicata* [1].

Discussion

The new records of aphyllophoroid fungi presented in this paper are mainly from expected regions, located near to the earlier known area of their distribution. However, the records of some species are far away from the earlier findings: *Clavulina rugosa* and *Trechispora laevis* were found from Lapland in northern Finland but earlier they were known only from southern Finland. This means that the distance between the new and the old localities of these fungi is hundreds of kilometers.

The most remarkable records in this paper are *Odonticium septocystidia* and *Junghuhnia fimbriatella*, the second records in Finland. Both species are considered to be rare

worldwide, despite that these have been found in many European countries, Russia and North America [15]. Also *Ceraceomyces sulphurinus* seems to be rare in reality despite the fact that its colorful basidiocarp is easy to notice. Only three records have been made in Finland, and occurrences exist in seven other countries in Europe [15].

In addition to these rarely found species there is only one earlier record in Finland for the following species: *Clavaria atroumbrina*, *Hyphodontia flavipora*, *Resinicium pinicola*, *Sidera vulgaris* and *Tomentella coerulea*. *Resinicium pinicola* seems to occur in maritime areas, all three records in Finland are from the archipelago of the Baltic Sea. *Sidera vulgaris* is a common species in Estonia, so it is possible that in the future it will become more common in Finland as well. It looks like that *Pseudotomentella nigra* is a northern species in Finland: all the Finnish records are from Lapland.

The high amount of new information has accumulated after the publication of the Finnish checklist of aphyllophorales [1]. This indicates that the aphyllophoroid fungi are still poorly known in Finland.

In general, for many aphyllophoroid fungi species the few records are from distant geographic locations and it is difficult to imagine that their distributions would be so scattered in reality. Most likely there are numerous sites where many of these little collected species occur between the scattered current occurrences. To establish which species are truly rare, more effort should be put on inventories. Occurrence of aphyllophorales, especially corticioids and clavarioids are poorly known in all parts of Finland, especially in Åland Islands, Ostrobothnia and Lapland. The archipelago area and Lapland are biogeographically inadequately known parts of Finland because of their somewhat remote location. These areas are also hard to access by researchers. For example, there are 423 species of aphyllophorales found in the Åland Islands [1,5]. Comparing this amount of species to numbers in other biogeographic provinces in southern Finland, it is obvious that dozens of species can still be found there.

Traditionally species inventories have been mainly done in protected areas, but for example in southern Finland only 2.3% of forests are strictly protected [22], and therefore very large areas are not ever inventoried. Also our records are mainly from protected areas.

Accumulation of knowledge of other aphyllophorales than polypores is slow and quite sporadic because there are only few researchers working with aphyllophorales in Finland. Particularly comparing this effort to vast forest area of 22.8 million hectares in Finland [22]. Of course certain portion of aphyllophoroid fungi are rare in reality, for example on the basis of specialization in certain habitat or substrate. The fungal community occupying the smallest dead wood fractions seems to be especially poorly known [23]. The fruiting bodies of many corticioids are so small and inconspicuous that these are hard to find. This is one reason why accumulation of records of some genera is slow. Also taxonomical problems and changes are confusing, and this is not a tempting point of view for amateur mycologists.

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Authors' contributions

The following declarations about authors' contributions to the research have been made: gave an original idea, wrote the first version of the manuscript and finished it, made collections: PK; made collections and commented the manuscript: JP; TK; made collections and identifications of specimens and commented the manuscript: MK; made collections (here noted with her girl's name Mari E. Niemi) and commented, corrected and finished the manuscript: MS.

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