Biodiversity Journal, 2015, 6 (2): 497–504

Checklist of aphyllophoroid fungi (Basidiomycota) of the Ekenäs Archipelago National Park, Southern Finland

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ABSTRACT This is the first checklist of aphyllophoroid fungi (Basidiomycota) of the Ekenäs Archipelago National Park on the Finnish south coast. The focus is on wood-dwelling polypores and corticioids. The material was collected in the years 1989, 1990, 2010 and 2012, respectively, during one or a few days each year. The field work was carried out on the two largest islands: Älgö and Jussarö. The number of species detected was 150, which is 20% of all the Finnish polypores and corticioids. Eight of the species are nationally or regionally threatened.

KEY WORDS aphyllophorales; corticioids; fungal diversity; polypores; species richness.

Received 28.02.2015; accepted 22.06.2015; printed 30.06.2015

INTRODUCTION

For the polypores and corticioids the term aphyllophorales is used solely for pragmatic reasons. Both of the groups are highly diverse and polyphyletic (Hibbett et al., 2014). In this study we concentrated on species which are saprobes, parasites or mycorrhizal, but for instance the clavarioid taxa and soil dwelling hydnaceous fungi (e.g., *Bankera* Coker & Beers ex Pouzar, *Hydnellum* P. Karst., *Hydnum* Linnaeus) are excluded.

In the checklist of Kotiranta et al. (2009) 756 corticioids and polypores are reported from Finland, and 489 of them occur on the southwestern coast of Finland where our study islands are situated. After this Finnish checklist numerous papers have been published with new records of aphyllophoroid fungi (e.g., Kunttu et al., 2010; 2012; Kotiranta & Shiryaev, 2013; Spirin et al., 2013a). There is only one earlier large scale biogeographical study of aphyllophorales from the Finnish southern archipelago (Kunttu et al., 2015).

The Ekenäs Archipelago National Park was founded in 1989. One part of the national park was former Jussarö Strict Nature Reserve which was established in 1956. The national park contains a few hundreds of islands or skerries, and the land area is 844 hectares and sea area 4577 hectares (Nordström & Tainio, 2012). It is also a part of the large Natura 2000 conservation area, dominated by sea and archipelago landscapes (Nordström & Tainio, 2012).

The national park is situated in the Gulf of Finland (approx. 59° N, 23° E) in the hemiboreal vegetation zone (Ahti et al., 1968) in section1b (see e.g., Kotiranta et al., 2009, p. 7 or Rassi et al., 2010, p. 27). It belongs to the Uusimaa biogeographical province (Hansen & Knudsen, 1997).

The national park extends from larger forested islands near the mainland out to rugged skerries and

open seascapes of the Gulf of Finland. The park is divided into inner, middle and outer archipelago zones (Häyren, 1948). The larger islands inhabit also old-growth forests suitable for pretentious wood-decayers. Small islands have been saved from intense forestry but household use for building, fodder for domestic animals and collecting of firewood have occurred. Small islands are mainly poor, rocky Scots pine (*Pinus sylvestris* Linnaeus) dominated, and in general the forests are mainly barren *Cladina*-, *Calluna*-, *Empetrum-Vaccinium*- and *Myrtillus*-site-type heath forests with only some patches of herb-rich forests (Bonn & Routasuo, 1997; Nordström & Tainio, 2012).

As a whole, the national park contains high biodiversity with rare and threatened species and habitat types, like 13 Natura 2000-habitat types according to the European Union´s Habitat Directive, and 61 threatened or near-threatened species (Nordström & Tainio, 2012; Metsähallitus, 2014).

MATERIAL AND METHODS

This study was carried out on the two largest islands of the national park: Älgö (698 hectares) and Jussarö (134 hectares). Inventories were concentrated in the southern parts of Älgö (48 hectares) and the western parts of Jussarö (66 hectares). Heikki Kotiranta (HK) surveyed and collected material during the autumns 1989 and 1990, Panu Kunttu (PK) 2010 and Jorma Pennanen (JP) 2012. Altogether these inventories contained eight days of field work.

The authors PK and JP used the inventory methods according to Junninen (2009), which is widely used in polypore inventories in the state owned forests. The focus was on rare, red-listed and old-growth forest indicators. HK sampled extensively both polypores and corticioids, but PK and JP concentrated more on polypores and collected corticioids only occasionally and selectively (large, hydnoid species). PK and JP made most of their inventories in the forest stands with the highest volume of dead wood, and generally these were Norway spruce, *Picea abies* (Linnaeus) H. Karsten, dominated forests.

The island of Älgö is located on the northern boundary of the national park (Fig. 1). It is the largest island of the park with some small lakes, and is mostly covered with coniferous forests intermixed with deciduous trees, like birches (*Betula* spp. Linnaeus) and aspen (*Populus tremula* Linnaeus) (Fig. 2). On the stony shores and other wet places black alder (*Alnus glutinosa* (Linnaeus) Gaertner) is common. Selectively loggings in spruce forests were made 40 years ago but part of these forests have been restored recently (Nordström & Tainio, 2012).

The island of Jussarö is located on the eastern boundary of the national park (Fig. 1), and is the second largest in the park. Such forested inlands are unusual in the outer archipelago zone. It is divided into two parts: the western part is dominated by old-growth forests with up 150 years old spruces (Fig. 3), and it has been untouched for decades, and the eastern side is strongly affected by mining, which was practised over hundred years until 1960's (Nordström & Tainio, 2012).

The specimens were identified by the authors themselves. Voucher specimens are deposited in the herbaria of Universities of Turku (TUR), Helsinki (H) and/or private collections of the authors HK and JP. The nomenclature follows mainly Kotiranta et al. (2009), but of the genus *Hyphodontia* sensu lato Hjortstam & Ryvarden (2009). Some recent combinations are according to Miettinen & Larsson (2011), Miettinen et al. (2012) and Spirin et al. (2013b). The Finnish national red-listing evaluation of the IUCN red list categories is according to Kotiranta et al. (2010).

RESULTS

A total of 150 species are listed in Table 1 in alphabetic order regardless of their systematic position. This is ca. 20% of all known species of these species groups in Finland and ca. 30% of species found from the hemiboreal oak zone (section 1b). The list comprises 66 polypores, 83 corticioids and one wood inhabiting hydnaceous species (*Mucronella bresadolae*). It is a matter of taste weather one species belongs to polypores or corticioids. For instance *Schizopora paradoxa* and the poroid *Trechispora* species are here included in corticioids. The most species-rich genera are *Phellinus* (9 species), *Peniophora* (7 species), *Postia* (7 species), *Skeletocutis* (5 species) and *Trechispora* (5 species).

Following red-listed species were found: *Amylocorticium subincarnatum* (VU), *Skeletocutis stellae* (VU), *Aporpium canescens* (NT, RT), *Fomitopsis rosea* (NT, RT), *Onnia tomentosa* (NT), *Phlebia centrifuga* (NT, RT), *Sidera lenis* (NT, RT) and *Skeletocutis odora* (NT, RT). All these species grow almost solely in old-growth forests, and nowadays their survival is dependent on protected areas.

The list of species contains three virgin forest indicators (VFI) and 11 old-growth forest indicators (OFI) of pine and spruce dominated forests (Table 1). According to the classification of old-growth forest indicators by Kotiranta & Niemelä (1996) these two forest areas reach 13 points for spruce dominated forests and 10 points for pine dominated forests.

DISCUSSION

The number of species (150) found in the Ekenäs Archipelago National Park is an expected number of species in Southern Finland if compared to the consumed time and studied area (ca. 10% of the whole land area of the national park). It is well known that fungi do not fruit every year (Straatsma et al., 2001) and species occupying narrow ecological niches may have been overlooked (Juutilainen et al., 2011). So, many more species could be found with more intensive field work, because the forests of the national park offer wide range of tree species, diversity of habitats and high volume of dead wood. Especially the corticioids are underrepresented in this material and quite common species, like *Amphinema byssoides* (Pers.: Fr.) J. Eriksson, are lacking from our list. For example, from the near-situated Archipelago Sea National Park 303 polypores and corticioids were listed (Kunttu et al., 2015).

We studied quite little barren and rocky Scots pine dominated forest habitats and therefore some specialist species living in kelo trees have not been found in our study. Kelos are dead and old age trunks of Scots pine, and their surface is grey, hard and decorticated. Scots pine can become kelo tree mainly on dry and barren forest habitats (Leikola, 1969; Niemelä et al., 2002). It is known that kelo trees sustain specific fungal diversity (Niemelä et al., 2002). Also a comprehensive inventory of black

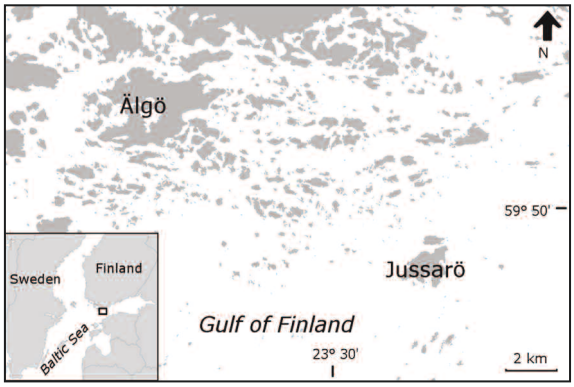

Figure 1. Location of the study islands: Ekenäs Archipelago National Park, Southern Finland.

Figure 2. Mixed forest near the shore on the island of Älgö.

Figure 3. Old-growth spruce forest on the island of Jussarö.

Species and authors	Status
Alutaceodontia alutacea (Fr.) Hjortstam et Ryvarden, 2002	
Amylocorticium subincarnatum (Peck) Pouzar, 1959	VU
Amylostereum chailletii (Pers.) Boidin, 1958	
Amylostereum laevigatum (Fr.) Boidin, 1958	
Antrodia serialis (Fr.) Donk, 1966	
Antrodia sinuosa (Fr.) P. Karsten, 1881	
Antrodia xantha (Fr. : Fr.) Ryvarden, 1973	
Antrodiella pallescens (Pilát) Niemelä et Miettinen, 2006	
Antrodiella serpula (P. Karst.) Spirin et Niemelä, 2006	
Aphanobasidium pseudotsugae (Burt) Boidin et Gilles, 1989	
Aporpium canescens (P. Karst.) Bondartsev et Singer, 1944	NT, RT
Asterodon ferruginosus Patouillard, 1894	OFI
Athelia acrospora Jülich, 1972	
Athelia arachnoidea (Berk.) Jülich, 1972	
Athelia epiphylla Persoon, 1822	
Basidioradulum radula (Fr.) Nobles, 1967	
Bjerkandera adusta (Willd.: Fr.) P. Karsten, 1879	
Botryobasidium botryosum (Berk. et M.A. Curtis) J. Eriksson, 1958	
Botryobasidium subcoronatum (Höhn. et Litsch.) Donk, 1931	
Bulbillomyces farinosus (Bres.) Jülich, 1974	
Byssomerulius corium (Fr.) Parmasto, 1967	
Ceraceomyces eludens K.H. Larsson, 1998	
Ceriporiopsis balaenae Niemelä, 1985	
Cerrena unicolor (Bull.: Fr.) Murrill, 1903	
Chondrostereum purpureum (Pers.: Fr.) Pouzar, 1959	
Cinereomyces lindbladii (Berk.) Jülich, 1982	
Climacocystis borealis (Fr.) Kotlaba et Pouzar, 1958	
Conferticium ochraceum (Fr.: Fr.) Hallenberg, 1980	
Coniophora arida (Fr.) P. Karsten, 1868	
Coniophora olivacea (Pers.: Fr.) P. Karsten, 1879	
Coniophora puteana (Schumach.: Fr.) P. Karsten, 1868	
Corticium roseum Persoon, 1794	
Cylindrobasidium evolvens (Fr.) Jülich, 1974	
Cytidia salicina (Fr.) Burt, 1924	
Daedaleopsis confragosa (Bolton: Fr.) J. Schröter, 1888	
Datronia mollis (Sommerf.) Donk, 1966	
Eichleriella deglubens (Berk. et Broome) D.A. Reid, 1970	
Exidiopsis calcea (Pers.: Fr.) K. Wells, 1962	
Fomes fomentarius (L.: Fr.) Fr., 1849	
Fomitopsis pinicola (Sw.: Fr.) P. Karsten, 1881	
Fomitopsis rosea (Alb. et Schwein.: Fr.) P. Karsten, 1881	NT,RT, OFI
Galzinia incrustans (Höhn. et Litsch.) Parmasto, 1965	
Ganoderma applanatum (Pers.) G.F. Patouillard, 1887	
Ganoderma lucidum (M.A. Curtis: Fr.) P. Karsten, 1881	
Globulicium hiemale (Laurila) Hjortstam, 1973	
Gloeocystidiellum porosum (Berk. et M.A. Curtis) Donk, 1931	
Gloeophyllum odoratum (Wulfen: Fr.) Imazeki, 1943	
Gloeophyllum sepiarium (Wulfen: Fr.) P. Karsten, 1882	
Gloeoporus dichrous (Fr.: Fr.) Bresadola, 1912	
Heterobasidion parviporum Niemelä et Korhonen, 1998	
Hymenochaete fuliginosa (Pers.) Bresadola, 1846	
Hymenochaete tabacina (Sowerby) Léveillé, 1846	
Hyphodontia alutaria (Burt) J. Eriksson, 1958	
Hyphodontia arguta (Fr.) J. Eriksson, 1958	
Hyphodontia pallidula (Bres.) J. Eriksson, 1958	
Hypochnicium albostramineum (Bres.) Hallenberg, 1985	
Hypochnicium bombycinum (Sommerf. et Fr.) J. Eriksson, 1958	
Hypochnicium multiforme (Berk. et Broome) Hjortstam, 1998	
Inonotus obliquus (Pers.: Fr.) Pilát, 1942	
Inonotus radiatus (Sowerby: Fr.) P. Karsten, 1881	
Ischnoderma benzoinum (Wahlenb.: Fr.) P. Karsten, 1879	
Junghuhnia nitida (Pers.: Fr.) Ryvarden, 1972	
Laxitextum bicolor (Pers.: Fr.) Lentz, 1956	
Leptoporus mollis (Pers.: Fr.) Quélet, 1886	OFI
Leptosporomyces galzinii (Bourdot) Jülich, 1972	
Leucogyrophana romellii (Fr.) Ginns, 1978	
Lobulicium occultum K.H. Larsson et Hjortstam, 1982	
Megalocystidium leucoxanthum (Bres.) Boidin, 1978	

Meruliopsis taxicola (Pers.: Fr.) Bondartsev, 1959	OFI
Mucronella bresadolae (Quél.) Corner, 1970	
Oligoporus rennyi (Berk. et Broome) Donk, 1971	
Oligoporus sericeomollis (Romell) Bondartsev, 1983	OFI
Onnia tomentosa (Fr.) P. Karsten, 1889	NT
Peniophora cinerea (Pers.: Fr.) Cooke, 1879	
Peniophora incarnata (Pers.: Fr.) P. Karsten, 1889	
Peniophora limitata (Chaillet ex Fr.) Cooke, 1879	
Peniophora nuda (Fr.) Bresadola, 1950	
Peniophora pithya (Pers.) J. Eriksson, 1950	
Peniophora polygonia (Pers.: Fr.) Bourdot et Galzin, 1928	
Peniophora violaceolivida (Sommerf.) Massee, 1890	
Peniophorella praetermissa (P. Karst.) K.H. Larsson, 2007	
Peniophorella pubera (Fr.) P. Karsten, 1889	
Phaeolus schweinitzii (Fr.) Patouillard, 1900	OFI
Phanerochaete sanguinea (Fr.) Pouzar , 1973	
Phanerochaete velutina (DC.: Fr.) P. Karsten, 1968	
Phellinus alni (Bondartsev) Parmasto, 1976	
Phellinus cinereus (Niemelä) Parmasto, 1976	
Phellinus conchatus (Pers.: Fr.) Quélet, 1886	
Phellinus ferrugineofuscus (P. Karst.) Bourdot, 1932	OFI
Phellinus igniarius (L .: Fr.) Quélet, 1886	
Phellinus laevigatus (P. Karst.) Bourdot et Galzin, 1928	
Phellinus pini (Brot.: Fr.) A. Ames, 1913	OFI
Phellinus punctatus (P. Karst.) Pilát, 1942	
Phellinus tremulae (Bondartsev) Bondartsev et Borisov, 1953	
Phlebia centrifuga P. Karsten, 1881	NT, RT,VFI
Phlebia radiata Fr., 1821	
Phlebia tremellosa (Schrad.: Fr.) Nakasone, 1984	
Phlebiella cf. *subnites* (Bourdot et Galzin) K.H. Larsson et Hjortstam, 1987	
Phlebiella sulphurea (Pers.: Fr.) Ginns et Lefebvre, 1993	
Phlebiella tulasnelloidea (Höhn. et Litsch.) Ginns et Lefebvre, 1993	
Piloderma fallax (Liberta) Stalpers, 1984	
Piptoporus betulinus (Bull.: Fr.) P. Karsten, 1881	
Polyporus brumalis (Pers.: Fr.) Fr., 1818	
Postia alni Niemelä et Vampola, 2001	
Postia caesia (Schrad.: Fr.) P. Karsten, 1881	
Postia fragilis (Fr.) Jülich, 1982	
Postia leucomallella (Murrill) Jülich, 1982	OFI
Postia ptychogaster (F. Ludw.) Vesterholt, 1996	
Postia stiptica (Pers.: Fr.) Jülich, 1982	
Postia tephroleuca (Fr.) Jülich, 1982	
Pseudotomentella mucidula (P. Karst.) Svrček, 1958	
Pycnoporellus fulgens (Fr.) Donk, 1971	OFI
Pycnoporus cinnabarinus (Jacq.: Fr.) P. Karsten, 1881	
Radulomyces confluens (Fr.: Fr.) M.P. Christensen, 1960	
Resinicium bicolor (Alb. et Schwein.: Fr.) Parmasto, 1968	
Resinicium furfuraceum (Bres.) Parmasto, 1968	
Rigidoporus populinus (Schumach.: Fr.) Pouzar, 1966	
Schizopora paradoxa (Schrad.: Fr.) Donk, 1967	
Scytinostroma odoratum (Fr.) Donk, 1956	
Scytinostroma portentosum (Berk. et M.A. Curtis) Donk, 1956	
Serpula himantioides (Fr.: Fr.) P. Karsten, 1885	
Sidera lenis (P. Karst.) Miettinen, 2011	NT, RT, VFI
Sistotrema sernanderi (Litsch.) Donk, 1956	
Skeletocutis amorpha (Fr.) Kotlaba et Pouzar, 1958	
Skeletocutis biguttulata (Romell) Niemelä, 1998	
Skeletocutis carneogrisea A. David, 1982	
Skeletocutis odora (Sacc.) Ginns, 1984	NT,RT, OFI
Skeletocutis stellae (Pilát) Jean Keller, 1979	VU, VFI
Spongiporus undosus (Peck) A. David, 1980	
Stereum hirsutum (Willd.: Fr.) Gray, 1800	
Stereum rugosum Pers.: Fr., 1794	
Stereum sanguinolentum (Alb. et Schwein.: Fr.) Fr., 1838	
Subulicystidium longisporum (Pat.) Parmasto, 1968	
Trametes hirsuta (Wulfen: Fr.) Pilát, 1939	
Trametes ochracea (Pers.) Gilbertson et Ryvarden, 1987	
Trametes pubescens (Schumach.: Fr.) Pilát, 1939	
Trametes velutina (Fr.) G. Cunningham, 1965	

Table 1/1. Aphyllophoroid fungi of the Ekenäs Archipelago National Park. Red list status in Finland: VU = Vulnerable, NT = Near Threatened, RT = Regionally Threatened. Indicator species: VFI = Virgin Forest Indicator, OFI = Old-growth Forest Indicator (continued).

Species and authors	Status
Trechispora cohaerens (Schw.) Jülich et Stalpers, 1980	
Trechispora farinacea (Pers.: Fr.) Liberta, 1966	
Trechispora hymenocystis (Berk. et Broome) K.H. Larsson, 1994	
Trechispora mollusca (Pers.: Fr.) Liberta, 1974	
Trechispora subsphaerospora (Litsch.) Liberta, 1973	
Trichaptum abietinum (Pers.: Fr.) Ryvarden, 1972	
Trichaptum fuscoviolaceum (J.C. Schmidt: Fr.) Kreisel, 1972	
Tubulicrinis accedens (Bourdot et Galzin) Donk, 1956	
Tylospora fibrillosa (Burt) Donk, 1960	
Vesiculomyces citrinus (Pers.) E. Hagström, 1977	
Vuilleminia comedens (Nees: Fr.) Maire, 1902	
Xylodon asperus (Fr.) Hjortstam et Ryvarden, 2009	
Xylodon brevisetus (P. Karst.) Hjortstam et Ryvarden, 2009	

Table 1/2. Aphyllophoroid fungi of the Ekenäs Archipelago National Park. Red list status in Finland: VU = Vulnerable, NT = Near Threatened, RT = Regionally Threatened. Indicator species: VFI = Virgin Forest Indicator, OFI = Old-growth Forest Indicator.

alders could reveal more aphyllophoroid species, therefore that black alder hosts many rare or little collected species in Finland (Kunttu et al., 2011; 2012; 2014).

Based on the indicator points of Jussarö and Älgö, these are valuable in the view of nature conservation. Particularly on Jussarö, the spruce dominated old-growth forest is very valuable in the sense of forest biodiversity. It has been estimated to be one of the most representative old-growth forests on the south coast of Finland (Nordström & Tainio, 2012). Remote location and early protection in 1956 have saved forests of western Jussarö. Also in general, isolated location have saved some archipelago areas from large-scale intensive forestry and this explains why certain forests in the archipelago have a high degree of naturalness. Precisely 11% of land area of the Ekenäs Archipelago National Park is boreal natural forest according to Natura 2000-habitat type definition (Metsähallitus, 2014).

Relatively many aphyllophoroid fungi found here have a preference, or are even depending on old-growth forests. Many of these are today common only in protected areas in northern or eastern Finland (Renvall, 1995; Lindgren, 2001; Sippola et al., 2005). It is obvious that the distribution of these species has earlier covered almost the whole Finland, but as a result of forceful forestry with large clear-cuttings these species have viable populations nowadays only in the large protected areas in northern and eastern Finland. Small old-growth forest fragments are maybe not large enough to preserve the most pretentious virgin forest species. This is especially alarming since the dispersal ability of many fungal species with specialised resources and habitat requirements is weak; it affects the occurrences of these species in fragmented landscapes (Norros et al., 2012) and therefore colonization of species can be slow after disturbance (Kouki et al., 2011). The Finnish southern archipelago is far away from the present occurrence sites of these wood-inhabiting fungi with strict habitat requirements related to natural characteristics of forests and thus the returning of these species can be a long process.

ACKNOWLEDGMENTS

Metsähallitus, Parks & Wildlife Finland is thanked for good cooperation in the field work as well as the help of The Finnish Border Guard for transportation to Jussarö. We also thank Sanna-Mari Kunttu for drawing the map.

REFERENCES

Ahti T., Hämet-Ahti L. & Jalas J., 1968. Vegetation zones and their sections in northwestern Europe. Annales Botanici Fennici, 5: 169–211.

Bonn T. & Routasuo P. (Eds.), 1997. Tammisaaren saariston kansallispuiston kasvillisuus ja kasvisto. Metsähallituksen luonnonsuojelujulkaisuja A 67. Metsähallitus, Vantaa, 90 pp.

Hansen L. & Knudsen H. (Eds.), 1997. Nordic macromycetes 3. Heterobasidioid, aphyllophoroid and gastromycetoid basidiomycetes. Nordsvamp, Copenhagen, 444 pp.

Hibbett D.S., Bauer R., Binder M., Giachini A.J., Hosaka K., Justo A., Larsson E., Larsson K.H., Lawrey J.D., Miettinen O., Nagy L.G, Nilsson R.H. & Thorn R.G., 2014. Agaricomycetes. In: McLaughlin D.J. & Spatafora J.W. (Eds.) 2014. The Mycota, A Compre-

hensive Treatise on Fungi as Experimental Systems for Basic and Applied Research. Vol. VII. Systematics and Evolution, 2nd Edition. Springer-Verlag, Berlin Heidelberg, 373–429.

Hjortstam K. & Ryvarden L., 2009. A checklist of names in *Hyphodontia* sensu stricto - sensu lato and *Schizopora* with new combinations in *Lagarobasidium*, *Lyomyces*, *Kneiffiella*, *Schizopora* and *Xylodon*. Synopsis Fungorum, 26: 33–55.

Häyren E., 1948. Skärgårdens längzoner. In: Lindberg H. (Ed.) 1948. Skärgårdsboken. Nordenskiöld-Samfundet i Finland, Helsingfors, 242–256.

Junninen K., 2009. Kääpäkartoitusten yleisohje. Metsähallitus Natural Heritage Services, 3 pp.

Juutilainen K., Halme P., Kotiranta H. & Mönkkönen M., 2011. Size matters in studies of dead wood and wood-inhabiting fungi. Fungal Ecology, 4: 342–349. DOI: 10.1016/j.funeco.2011.05.004

Kotiranta H. & Niemelä T., 1996. Threatened polypores in Finland. 2nd revised edition. Finnish Environment Institute & Edita, Helsinki, 184 pp. (In Finnish with English summary)

Kotiranta H. & Shiryaev A., 2013. Notes on Aphyllophoroid fungi (Basidiomycota) in Kevo, collected in 2009. Kevo Notes, 14: 1–22.

Kotiranta H., Saarenoksa R. & Kytövuori, I., 2009. Aphyllophoroid fungi of Finland. A Check-list with ecology, distribution, and threat categories. Norrlinia, 19: 1–223.

Kotiranta H., Junninen K., Saarenoksa R., Kinnunen J. & Kytövuori I., 2010. Aphyllophorales & Heterobasidiomycetes. In: Rassi P., Hyvärinen E., Juslén A. & Mannerkoski I. (Eds.) 2010. The 2010 Red List of Finnish Species. Ministry of the Environment & Finnish Environment Institute, Helsinki, 249–263.

Kouki J., Hyvärinen E., Lappalainen H., Martikainen P. & Similä M., 2011. Landscape context affects the success of habitat restoration: large-scale colonization patterns of saproxylic and fire-associated species in boreal forests. Diversity and Distributions, 18: 348–355. DOI: 10.1111/j.1472-4642.2011.00839.x

Kunttu P., Kulju M. & Kotiranta H., 2010. Rare corticioid fungi in Finland - records of new and little collected species (Basidiomycota). Karstenia, 50: 35–44.

Kunttu P., Kulju M. & Kotiranta H., 2012. New national and regional biological records for Finland 2. Contributions to the Finnish aphyllophoroid funga (Basidiomycota). Memoranda Societas Fauna Flora Fennica, 88: 61–66.

Kunttu P., Kulju M. & Kotiranta H., 2015. Checklist of aphyllophoroid fungi (Basidiomycota) of the Archipelago Sea National Park, Southwest Finland. Check List, 11(2): 1587. DOI: 10.15560/11.2.1587.

Kunttu P., Kulju M., Pennanen J., Kotiranta H. & Halme P., 2011. Additions to the Finnish aphyllophoroid fungi. Folia Cryptogamica Estonica, 48: 25–30.

Kunttu P., Pennanen J., Kekki T., Kulju M. & Suominen M., 2014. Noteworthy records of aphyllophoroid fungi in Finland (Basidiomycota). Acta Mycologica, 49: 221–235. DOI: 10.5586/am.2014.017

Leikola M., 1969. On the termination of diameter growth of Scots pine in old age in northernmost Finnish Lapland. Silva Fennica, 3: 50–61. (In Finnish with English summary)

Lindgren M., 2001. Polypore (Basidiomycetes) species richness and community structure in natural boreal forests of NW Russian Karelia and adjacent areas in Finland. Acta Botanica Fennica, 170: 1–41.

Metsähallitus 2014. Metsähallituksen selvitys Suomenlahden merikansallispuistojen täydentämistarpeista ja -mahdollisuuksista. Metsähallitus, Helsinki, 105 pp.

Miettinen O. & Larsson K.-H., 2011. *Sidera*, a new genus in Hymenochaetales with poroid and hydnoid species. Mycological Progress, 10: 131–141. DOI: 10.1007/s11557-010-0682-5

Miettinen O., Spirin V. & Niemelä T., 2012. Notes on the genus *Aporpium* (Auriculariales, Basidiomycota), with a new species for temperate Europe. Annales Botanici Fennici, 49: 359–368. DOI: 10.5735/085.049.0607

Niemelä T., Wallenius T. & Kotiranta H., 2002. The kelo tree, a vanishing substrate of specified wood-inhabiting fungi. Polish Botanical Journal, 47: 91–101.

Nordström M. & Tainio E., 2012. Tammisaaren saariston ja Hangon itäisen saariston hoito- ja käyttösuunnitelma. Metsähallituksen luonnonsuojelujulkaisuja C 78. Metsähallitus, Jyväskylä, 144 pp.

Norros V., Penttilä R., Suominen M. & Ovaskainen O., 2012. Dispersal may limit the occurrence of specialized wood decay fungi already at small spatial scales. Oikos 121: 961–974. DOI: 10.1111/j.1600-0706.2012.20052.x

Rassi P., Hyvärinen E., Juslén A. & Mannerkoski I. (Eds.), 2010. The 2010 Red List of Finnish Species. Ministry of the Environment & Finnish Environment Institute, Helsinki, 685 pp.

Renvall P., 1995. Community structure and dynamics of wood-rotting Basidiomycetes on decomposing conifer trunks in northern Finland. Karstenia, 35: 1–51.

Sippola A.-L., Mönkkönen M. & Renvall P., 2005. Polypore diversity in the herb-rich woodland key habitats of Koli National park in eastern Finland. Biological Conservation, 126: 260–269. DOI: 10.1016/j.biocon.2005.06.002

Spirin V., Vlasák J., Niemelä T. & Miettinen O., 2013b. What is *Antrodia* sensu stricto? Mycologia, 105: 1555–1576. DOI: 10.3852/13-039

Spirin V., Miettinen O., Pennanen J., Kotiranta H. & Niemelä T., 2013a. *Antrodiahyalina*, a new polypore from Russia, and *A. leucaena*, new to Europe.

Mycological Progress, 12: 53–56. DOI: 10.1007/s11557-012-0815-0

Straatsma G., Ayer F. & Egli S., 2001. Species richness, abundance, and phenology of fungal fruit bodies over 21 years in a Swiss forest plot. Mycological Research, 105: 515–523. DOI:10.1017/S0953756201004154