

Peltigericolous fungi from Finland – three genera and six species new to Finland.

ARTO PUOLASMAA, ANNE TOIVANEN, TARJA MARSH, SEPPO HUHTINEN and SOILI STENROOS

PUOLASMAA, A., TOIVANEN, A., MARSH, T., HUHTINEN, S. & STENROOS, S. 2012: Peltigericolous fungi from Finland – three genera and six species new to Finland. – Karstenia 52: 1–50. HELSINKI. ISSN 0453-3402.

Over 2500 Finnish herbarium specimens of the lichen genus *Peltigera* were screened in search for lichenicolous fungi. A total of ca 1200 records of 41 species in 27 genera was made. The species *Dacampia rufescentis*, *Hawksworthiana peltigericola*, *Hobsoniopsis santessonii*, *Phoma epiparmelia*, *Stigmidium peltideae* and *Xenonectriella lutescens*, as well as the genera *Hawksworthiana*, *Hobsoniopsis* and *Xenonectriella* are reported as new to Finland. Species descriptions with illustrations are provided along with habitat descriptions and known distribution in the Nordic countries.

Key words: Ascomycetes, lichenicolous, lichen-forming fungi, *Peltigera*, peltigericolous.

Arto Puolasmaa & Tarja Marsh & Seppo Huhtinen, Herbarium, University of Turku, FI-20014 Turku, Finland; e-mails: arto.puolasmaa@utu.fi; tarja.marsh@utu.fi; seppo.huhtinen@utu.fi

Anne Toivanen, Iisakintie 34, FI-14200 Turenki, Finland; e-mail: anne.j.toivanen@gmail.com

Soili Stenroos, Botanical Museum, Finnish Museum of Natural History, University of Helsinki, P.O. Box 7, FI-00014 Finland; e-mail: soili.stenroos@helsinki.fi

Introduction

Lichenicolous fungi are an ecologically defined group of species that form obligate, often host specific associations with lichens. Their mode of nutrition ranges from pathogenicity to commensalism; with saprotrophism or mild parasitism probably being the most common. Over 1800 species have been described and a checklist of species described so far, with an extensive list of cited literature, has been compiled by Lawrey and Diederich (2003, 2011). The genus *Peltigera* Willd. is known to host an unusually

large number of lichenicolous fungi, many of which are known only from this host genus (e.g. Hawksworth 1980, Vitikainen 1994, Hawksworth & Miadlikowska 1997, Martínez & Hafellner 1998). The knowledge of peltigericolous microfungi and microlichens in Finland was previously scanty and this is the first systematic attempt to resolve the diversity and distribution of species associated with *Peltigera* in Finland. The genus *Peltigera* is common and widespread on most continents with 28 species reported from Finland (Stenroos et al. 2011). It includes large, foliose lichens that are mainly muscicolous or

terricolous. The thallus of *Peltigera* is broad and lobed, the ventral surfaces lack a cortex, thus leaving the lower medulla exposed (Vitikainen 1994). The lichenicolous microfungi usually occupy species-specific infection sites on the host.

Material and methods

Herbarium specimens of *Peltigera* from TUR, TUR-V and H were scanned for lichenicolous fungi. The host material consisted of ca 2500 specimens. Separation and identification of species were done by Arto Puolasmaa during 2003–2010. Searching microfungi from the dried specimens was done using a Leica S6E StereoZoom -microscope. Microscopical characteristics were studied with a Leica DMLB2 -microscope. Drawings were made using a drawing tube attached to the microscope. All measurements and drawings were made from dried material which was first mounted in water and subsequently in Congo Red (CR) to provide contrast. All species descriptions are based on measurements made during these examinations. Mean values of the length and width of spores, number of spores measured and number of collections studied are given. The specimens which were studied microscopically, and on which the species descriptions or drawings are based, are marked with an asterisk in the list of examined specimens. The reported occurrence of species in Sweden and Norway is derived from Santesson's Checklist of Fennoscandian Lichen-forming and Lichenicolous Fungi (Nordin et al. 2010). The species are presented in alphabetical order.

Results and discussion

The search of Finnish herbarium material yielded ca 1200 records of peltigericolous microfungi. In all, 41 species in 27 genera were identified. Six species and three genera are reported as new to Finland. Species are presented below with species descriptions, illustrations and distribution maps.

Arthonia fuscopurpurea (Tul.) R. Sant. – Figs. 1, 44 A

Ascomata apothecioid, arthonioid, 0.5–2 mm diam. *Asci* 20–34 × 12–18 µm, mean 28.8 × 14.9, (n=17, one collection), bitunicate, sack-shaped, often prominently thickened at the apex, foot slender, 8-spored. *Ascospores* 10–14 × 4–5 µm, mean 11.6 × 4.4 µm (n=32, one collection), septate, upper cell shorter, broader and more rounded than the lower cell, may contain gut-

tules and appear dark-coloured inside. *Paraphyses* of ascus length or longer, 2–3 µm diam, septate, branched. *Excipulum* composed of rounded, thin-walled cells, 0.5 µm diam.

Hosts: *Peltigera hymenina* (Ach.) Delise, *P. canina* (L.) Willd. and *P. rufescens* (Weiss) Humb. *Peltigera didactyla* (With.) J.R. Laundon and *P. scabrosa* Th. Fr. have also been reported as hosts for *A. fuscopurpurea* (Nordin et al. 2010). Zhurbenko & Grube (2010) list lichens in genera *Dactylina* Nyl., *Lecania* A. Massal., *Lecanora* Ach., *Nephroma* Ach., *Pseudocyphellaria* Vain., *Psoroma* Ach. ex Michx. and *Solorina* Ach. that have also been reported as hosts, but consider those accounts doubtful.

Arthonia fuscopurpurea forms dark-brown, rough-surfaced, 0.5–2 mm wide, elevated patches on the dorsal thallus of the host. Sometimes these patches merge forming larger areas. Often these patches are surrounded by a white ring of bleached host tissue. May be confused with *A. peltigerea*.

A. fuscopurpurea is an easily visible parasite whose host species are widely distributed and abundant, therefore we conclude that the sole record indicates genuine rarity of the species in Finland. The species was first recorded from Finland by Toivanen (2008). Reported also from Norway and Sweden.

Specimen studied: Varsinais-Suomi. Naantali, Rymätylä, Pakinainen, 17.V.1937 *Auer* (TUR)*.

Arthonia peltigerea Th. Fr. – Figs. 2, 44 B

Ascomata apothecioid, arthonioid, 0.5 mm diam. *Asci* 31–59 × 15–23 µm, mean 48.2 × 18.7 µm (n=10, two collections), bitunicate, ellipsoid, often prominently thickened at the apex, 8-spored. *Ascospores* 14–19 × 4–6 µm, mean 16.9 × 5.6 µm (n=20, two collections), ellipsoid-elongate, septate, upper cell slightly broader and more rounded than the lower cell, no guttules observed. *Paraphyses* of same length as the asci, 2–3 µm diam, septate, sometimes branched.

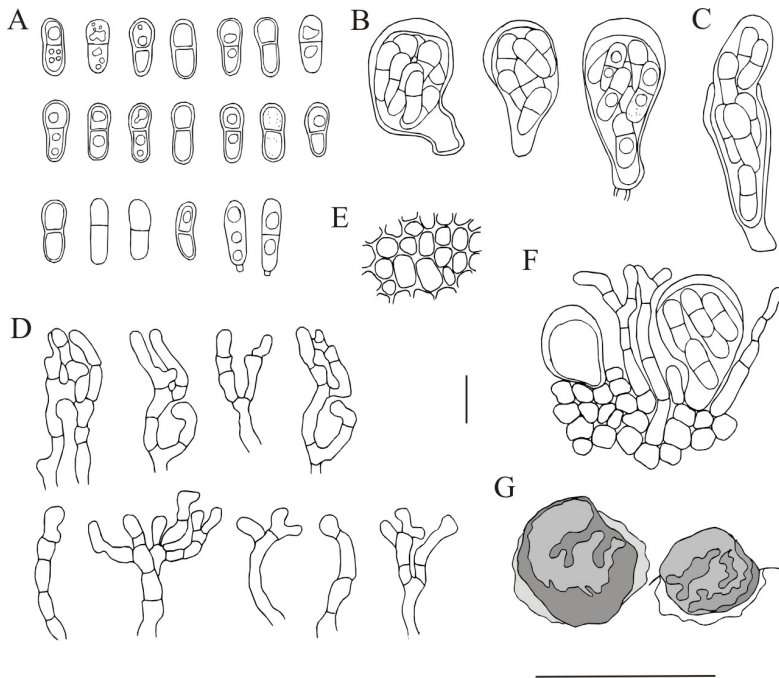


Fig. 1. *Arthonia fuscopurpurea* (1937 Auer), A = spores, B = asci, C = a discharging, bitunicate ascus, D = paraphyses, E = excipulum, F = asci, paraphyses and medullary excipulum, G = elevated patches on host thallus caused by *A. fuscopurpurea*. Bars (A–F) 10 µm, (G) 1 mm.

Hosts: *Peltigera rufescens*. *Arthonia peltigerea* has also been reported from the thalli of *P. leucophlebia* (Nyl.) Gyeln., *Solorina saccata* (L.) Ach., *S. bispora* Nyl. and *S. octospora* Arnold (Nordin et al. 2010).

Arthonia peltigerea forms dark-brown, either rough- or smooth-surfaced, partly immersed, 0.5 mm wide patches on the dorsal thallus of the host. It differs from *A. fuscopurpurea* by its darker apothecia and larger ascospores. The species was first recorded from Finland by Toivanen (2008). It has been classified as NT (Near Threatened) in the 2010 Red List of Finnish Species (Jääskeläinen et al. 2010). Reported also from Norway and Sweden.

Specimens studied: Keski-Pohjanmaa. Kokkola, Kälviä, 2.VIII.1923 Kujala (H). Kittilän Lappi. Kolari, Äkäsjokisuu 13.VII.2003 Haikonen 22560 (H). Enontekiön Lappi. Enontekiö, Kilpisjärvi, Jehkats 30.VII.1956 Huuskonen (H, TUR); N-Jehkats, 15.VIII.1958 Huuskonen (H)*; Toskalharji, 6.VIII.1947 Huuskonen (H); Toskaljärvi, VIII.1947 Huuskonen (H)*.

Capronia peltigerae (Fuckel) D. Hawksw.
– Figs. 3, 44 C

Ascomata perithecioid, partly immersed when young, with only the ostiole visible as a black spot, superficial at maturity, black, setose. *Asci* 43–84 × 8–20 µm, mean 65.9 × 13.6 µm (n=20, three collections), bitunicate, spindle- to sack-shaped, wide at the base, elongated internal canal, 8-spored. *Ascospores* 14–22.5 × 3.5–8 µm, mean 17.7 × 5.7 µm (n=30, three collections), spindle-shaped, with the other end wider than the other, 3-septate, with or without guttules. *Paraphyses* and *periphyses* absent. *Outer excipulum* of textura angularis, cells thick-walled. *Medullary excipulum* of textura globulosa, cells thin-walled, 10 µm diam.

Hosts: *Peltigera canina*, *P. didactyla*, *P. praetextata* (Sommerf.) Zopf., *P. rufescens*.

Capronia peltigerae has dark, setose perithecia, which form more or less superficially on the dor-

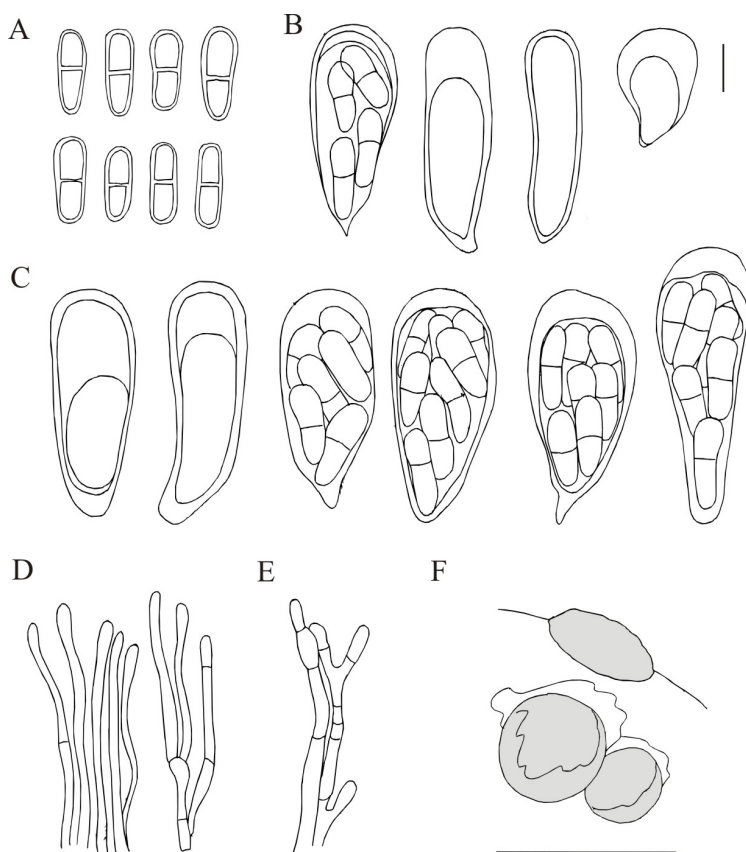


Fig. 2. *Arthonia peltigerea* (A, C–F = 1947 *Huuskonen*; B, E = 1958 *Huuskonen*), A = ascospores, B–C = asci, D–E = paraphyses, F = elevated patches on host thallus caused by *A. fuscopurpurea*. Bars (A–E) 10 μ m, (F) 1 mm.

sal side of the host. Reported also from Norway and Sweden.

Specimens studied: **Varsinais-Suomi.** Kemiönsaari, Dragsfjärd, Tynglax, 22.IV.1981 *Kvist* (H). Lohja, Kukumäki, 16.VII.2007 *Pykälä 31459, 31460* (H); Nummenkylä, 28.IV.2007 *Pykälä 30767* (H). **Uusimaa.** Kirkkonummi 1864 *Kullhem* (H). Vantaa, Kopparberg 15.VI.1948 *Lyyra* (H, two specimens)*. **Etelä-Karjala.** Miehikkälä, Kirkonkylä, 12.IX.1967 *Rintanen* (H). **Satakunta.** Kullaa, Joutsijärvi, 23.VIII.1939 *Laurila* (H). **Etelä-Häme.** Asikkala, Viitaila, 17.V.1985 *Ahti 43915 & Daniels* (H). Hämeenlinna, Lammi, Evo, 1976 *Lång* (H). Kuhmoinen, Tehi, 18.X.1911 *Linkola* (H). **Etelä-Savo.** Imatra, Sienimäki, 16.IV.1988 *Thurén 616* (H)*. **Pohjois-Savo.** Jäppilä, 18.VII.1964 *Takala* (H). Varkaus, Könönpelto, 9.V.2003 *Haikonen 22255* (H)*. **Pohjois-Karjala.** Pielisjärvi, Koli, 24.VIII.1966 *Vitikainen 2153a* (H). **Koillismaa.** Salla, Oulankajoki, 17.VII.1939 *Laurila* (H).

Corticifraga fuckelii (Rehm) D. Hawksw. & R. Sant. – Figs. 4, 44 D

Ascomata apothecioid, immersed when young, emerging through cortex at maturity, round or irregular shaped, 0.3–0.5 mm, lighter than host thallus when young, almost black at maturity. *Asci* 45–78 \times 10–21 μ m, mean 59.5 \times 13.6 μ m (n=20, three collections), elongate, thick-walled, thickened at the apices, 8-spored. *Ascospores* 12–21 \times 4–7 μ m, mean 16.0 \times 5.5 μ m (n=28, three collections), septate, occasionally with two septa, slightly constricted, the other cell often rounded and larger than the other. *Paraphyses* of ascus length, ca 5 μ m wide, septate, sometimes branched. *Excipular cells* rounded, 0.5–1 μ m diam, thin- and dark-walled.

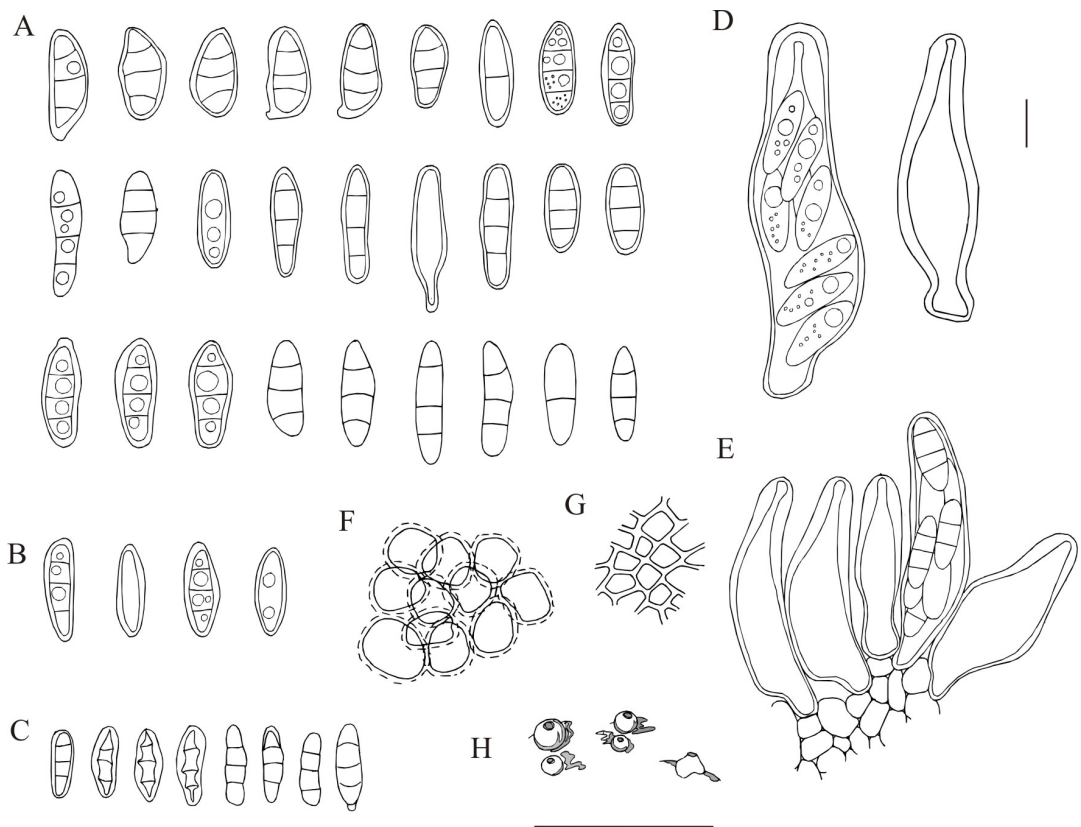


Fig. 3. *Capronia peltigerae* (A, D = Haikonen 22255; B, E = 1948 Lyyra; C, F–H Thurén 616), A–C = ascospores, D, E = asci, F, G = excipulum, H = perithecia. Bars (A–G) 10 µm, (H) 1 mm.

Hosts: *Peltigera aphthosa* (L.) Willd., *P. canina*, *P. collina* (Ach.) Schrad, *P. didactyla*, *P. extenuata* (Nyl. ex Vain.) Lojka, *P. hymenina*, *P. lepidophora* (Nyl.) Bitter, *P. leucophlebia*, *P. neopolydactyla* (Gyeln.) Gyeln., *P. praetextata*, *P. rufescens*. Reported also on *P. neckeri* Hepp ex Müll. Arg. (Nordin et al. 2010).

The apothecia of *Corticifraga fuckelii* arise scattered from the host thallus, immersed in the beginning and emerging through the dorsal host cortex, surrounded by the jagged edges of the ruptured cortex. It does not induce necrotic or bleached patches on the host. Reported also from Norway and Sweden.

Specimens studied: **Varsinais-Suomi.** Kustavi, Kunnarainen, 11.X.1983 *Alava 20751* (TUR). Lohja, Kirkonkylä, 20.VII.2004 *Pykälä 25169* (H), 13.V.2006

Pykälä 28515, 28516, 28517 (H), 16.VII.2007 *Pykälä 31451* (H), 17.X.2007 *Pykälä 32230, 32235* (H); Storö, Hermala, 21.VII.1890 *Boldt* (H)*. Parainen, Houtskär, Hyppeis, 9.VII.1992 *Bruun* (H)*; Ersby, 7.IX.1912 *Linkola* (TUR-V); Sattmark, 23.IX.1978 *Alava 18322* (TUR); Pyhänsuu, 29.VII.1911 *Linkola* (TUR). Paimio, Askala, 4.IX.1971 *Alava* (TUR), 5.X.1969 *Alava 8404* (TUR). Turku, Katariinanlaakso, 6.VII.1934 *Auer* (TUR). **Uusimaa.** Helsinki, Munkkiniemi, 10.X.1948 *Takala* (TUR). Mäntsälä, Sahajärvi-SW, 12.VII.1964 *Suominen* (H). Pornainen, Hevonselkä, 4.VIII.2001 *Ahti 61502c* (H). Sipoo, Träskby, 13.X.2006 *Pykälä 28850* (H). Vantaa, Korso 3.X.1915 *Häyrén* (TUR-V, two specimens). **Satakunta.** Rauma, Sorkka, 25.VII.1935 *Kari* (TUR). **Etelä-Häme.** Asikkala, Kissakallio 8.I.1863 *Norrlin* (H). Heinola, Lusi, 12.III.1997 *Haikonen 18375* (H). Hollola, Upila, VII.1883; Vaania 4.VIII.1874 *Vainio* (TUR-V). Hämeenlinna, Evo, Valkjärvi, 26.VII.1909 *Lång* (H)*; Mustajärvi 30.VII.1909 *Lång* (H). Jyväskylä, Korpilahti, Vaarunvuori, 1873 *Vainio* (TUR-V). Kuhmoinen, Tehi, 18.X.1911 *Linkola* (H)*. Lempäälä, Rikala, 25.IX.1988 *Kääntönen* (H)*. Nokia, Siuro, 27.VII.1990 *Kääntönen* (H)*. Pälkäne, Luopioinen, 1.VIII.1926 *Linkola* (H).

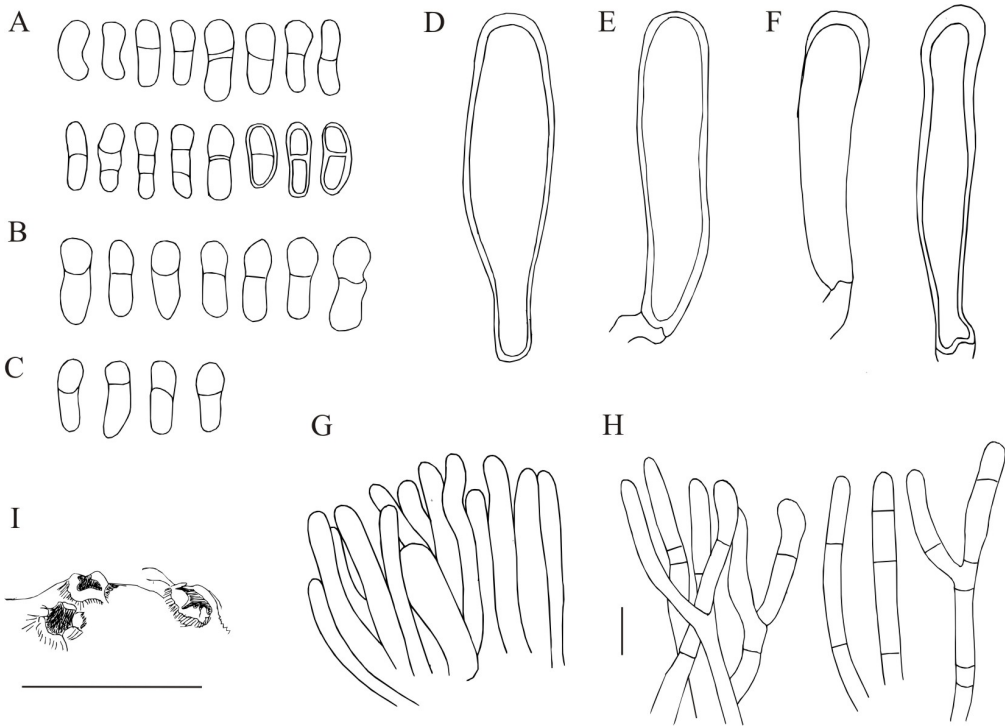


Fig. 4. *Corticifraga fuckelii* (A, D = 1911 Linkola; B, E = 1890 Boldt; C, F, G = 1992 Bruun; H = 1988 Kääntönen; I = 1909 Lång), A–C = ascospores, D–F = asci, G, H = paraphyses, I = apothecia. Bars (A–H) 10 μ m, (I) 1 mm.

Etelä-Savo. Kangasniemi, Rutakoski, 29.VI.2003 *Haikonen* 2248 (H). Kerimäki, Viitamäki, 24.VIII.1991 *Haikonen* 13336 (H). Puumala, Saha, 21.IX.2002 *Vitikainen* 16476 (H). Mäntyharju, Parish village, 9.VIII.1964 *Suominen* (H)*. **Pohjois-Häme.** Jyväskylä, Sulkula, 29.VII.1946 *Hakulinen* (TUR). **Pohjois-Karjala.** Ilomantsi, Ritovaara, 17.VII.1936 *Laurila* (TUR). **Koillismaa.** Kuusamo, Iivaara, 1877 *Wainio* (TUR-V); Kiutaköngäs, 30.VI.1949 *Takala* (TUR). **Inarin Lappi.** Utsjoki, Kevo, 2.VII.1967 *Sältin & Roms* (TUR); Kevo, Kotkapahta, 6.VIII.1964 *Hakulinen* (TUR).

Corticifraga peltigerae (Fuckel) D.

Hawksw. & R. Sant. – Figs. 5, 44 E

Ascomata apothecioid, immersed when young, superficial and rupturing host cortex at maturity, 0.2–0.3 mm, dark-brown, almost black. *Asci* 41–65 \times 7–20 μ m, mean 53.8 \times 12.8 μ m (n=20, three collections), clavate to cylindrical, thickened at the apices, 8-spored. *Ascospores* 10–25 \times 4–7 μ m, mean 15.4 \times 5.4 μ m (n=30, three collections), septate with 1–3 thick septa, end cells tapering. *Paraphyses* of ascial length or longer,

1–1.5 μ m wide, remotely septate, the apical cell expanded, sometimes with a guttule. *Excipular cells* rounded, 3–5 μ m diam, thin-walled, dark.

Hosts: *Peltigera aphthosa*, *P. canina*, *P. didactyla*, *P. horizontalis* (Huds.) Baumg., *P. leucophlebia*, *P. malacea* (Ach.) Funck, *P. neopolydactyla*, *P. polydactylon* (Neck.) Hoffm., *P. praetextata*, *P. rufescens*, *P. scabrosa*, *Lobaria linita*.

Corticifraga peltigerae is a parasitic fungus, which causes irregular, 1–2 mm wide, bleached or necrotic patches on the host thallus. The apothecia are formed in this patch, scattered or in circular formation, immersed in the beginning, rupturing the cortex unevenly, as they mature. Reported also from Norway and Sweden.

Selected specimens studied (out of 63): Ahvenanmaa. Sottunga, 26.VIII.1952 *af Hällström* (H)*. **Varsinais-Suomi.** Parainen, Ersby, 9.IX.1912 *Linkola* (H)*. Uusikaupunki, W of Käätyjärvi, 25.XII.1951 *Laine* (TUR). **Uusimaa.** Helsinki, Oulunkylä, 5.VI.1916 *Rainio* (H)*; Orimattila, Pennala, 26.IV.2002 *Haikonen* 21207 (H)*.

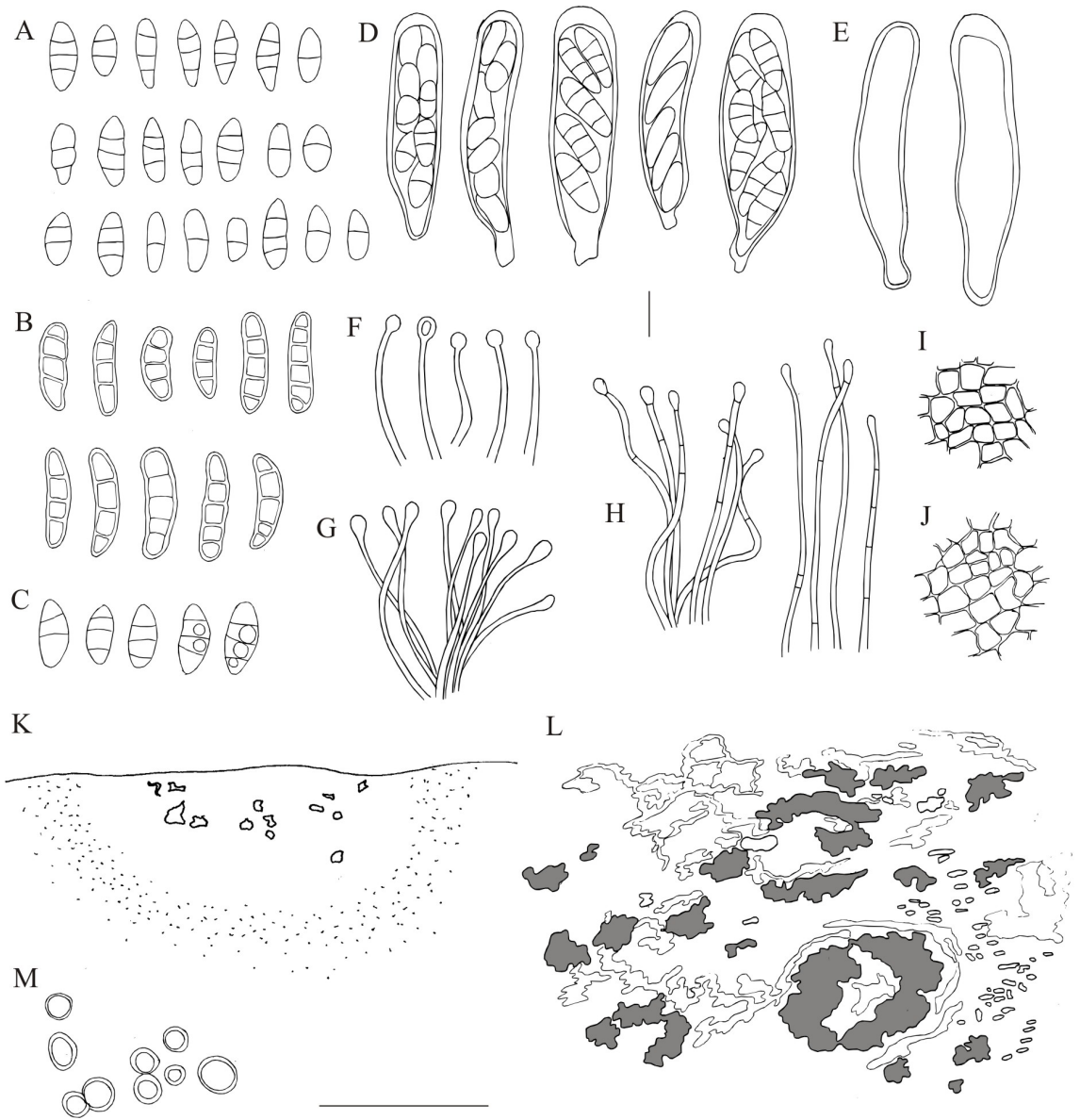


Fig. 5. *Corticifraga peltigerae* (A, D, F, G = 1947 Klingstedt; B, E, H, J, M = Vitikainen 9973; C = Haikonen 21207; I = 1916 Rainio; L = 1912 Linkola; K = 1935 Laurila), A–C = ascospores, D, E = asci, F–H = paraphyses, I, J = excipulum, K = infection patch on host thallus with a cracking cortex caused by emerging apothecia, L = dark patches on the host thallus caused by apothecia, M = mature apothecia. Bars (A–J) 10 µm, (K–M) 1 mm.

Etelä-Karjala. Hamina, Vehkalahti, 18.VII.1914 *Krohne* (H). **Satakunta.** Kankaanpää, Luomajärvi, 29.VI.1935 *Laurila* (H)*. Rauma, Lappi, Kivikylä, 1.VIII.1957 *Sältin* (H)*. **Etelä-Häme.** Hollola, Upila, VII.1883 *Vainio* (H). Urjala, Kivijärvi, 10.IX.1950 *Fagerström* (H). **Etelä-Pohjanmaa.** Kristiinankaupunki, Lappfjärd, Torngrund,

1.VIII.1953 *Railonsala* (TUR). **Pohjois-Häme.** Tuomionniemi, 29.IV.1951 *Valovirta* (H). Äänekoski, Piilola, 3.V.1947 *Klingstedt* (H)*. **Pohjois-Savo.** Kuopio, Korsumäki, 19.V.1946 *Sepponen* (TUR). **Pohjois-Karjala.** Ilomantsi, Koitere, Laitasaari, 11.X.1948 *Leppälä* (TUR). **Keski-Pohjanmaa.** Kruunupy, Söderpåras, Storbacken

13.V.1962 *Krokfors* (H). **Oulun Pohjanmaa**. Hailuoto, Marjaniemi 10.IX.1994 *Vitikainen 13290* (H). **Koillismaa**. Kuusamo, Juuma, 12.VI.1980 *Vitikainen 9973* (H)*. **Sodankylän Lappi**. Sodankylä, Sattanen, 18.VI.1980 *Kvist* (H). **Enontekiön Lappi**. Enontekiö, Toskalharji, 18.VII.2006 *Syrjänen* (TUR) on *Lobarina linata*. **Inarin Lappi**. Utsjoki, Kevo, 16.VIII.1965 *Ahti 21042a* (H).

Dacampia rufescentis (Vouaux) D.

Hawksw. – Figs. 6, 44 F

Ascomata pseudoperithecioid, immersed. *Asci* 93–178 × 18–35 µm, mean 127.5 × 22.1 µm (n=17, three collections), bitunicate, cylindrical, thick-walled, rounded at the apex, 8-spored. *Ascospores* 22–29(–40) × 9–14.5 µm, mean 26.5 × 11.8 µm (n=31, three collections), elongate, muricate, constricted at septa, brown. *Pseudoparaphyses* 2–3.5 µm diam., septate, branching. *Ectal excipulum* composed of dark, thick-walled, elongate or cubiform cells, 6.5–15 × 1.5–5 µm. *Medullary excipulum* composed of reddish, thin-walled cells, 4–6 µm diam.

Host: *Peltigera rufescens*. The species has also been reported from *P. didactyla* (Nordin et al. 2010).

Dacampia rufescentis is reported as new to Finland. It forms necrotic, decolourized, circular, 2–3 mm wide infection areas on the host thallus. The infected area is elevated while the margins are delimited by a flat, brown ring. The ascomata are scattered in the elevated infection area, immersed, often in concentric rings, with only the ostiolar regions visible as dark spots. *D. rufescentis* is a parasitic fungus (Hawksworth 1986). All of the localities from which the host species had been collected were either in the immediate vicinity of old limestone quarries or otherwise calcareous areas. Reported also from Norway and Sweden.

Specimens studied: **Varsinais-Suomi**. Lohja, Vappula, 20.V.2006 *Pykälä 28555* (H). Parainen, Ersby, 12.X.1969 *Alava 8392a* (TUR); 9.IX.1912 *Linkola* (H)*. **Keski-Pohjanmaa**. Alajärvi, Kuparikallio, 26.VI.1907 *Backman* (H)*. **Kainuu**. Paltamo, Melalahti, 28.VII.1970 *Alava* (TUR)*. **Perä-Pohjanmaa**. Rovaniemi, Taipale, 2.IX.1981 *Kytövuori 811028* (H)*.

Graphium aphthosae Alstrup & D.

Hawksw. – Figs. 7, 44 G

Synnemata small, dark, shiny, composed of an erect bunch of conidiophores that splay out at the apex. *Conidia* 6.5–9 × 3–4.5 µm, mean 7.6 × 3.7 µm (n=33, three collections), simple, cubiform, broader at the upper end.

Hosts: *Peltigera aphthosa*, *P. canina*, *P. leucophlebia*. Reported also from *P. rufescens* (Nordin et al. 2010).

Species in the genus *Graphium* Corda are anamorphs of *Ophiostoma* Syd. & P. Syd. The genus was first recorded from Finland by Toivanen (2008). Reported also from Norway and Sweden.

Specimens studied: **Varsinais-Suomi**. Lohja, Lylyinen, 21.VI.1947 *af Hällström* (H); Varola, Päivärinteenkallio, 1.X.2005 *Pykälä 28096* (H); Immula, 6.IX.2008 *Pykälä 33669* (H). Turku, Kakskerta, 17.VIII.1934 *Kari* (TUR); Ruissalo, 29.X.1933 *Seppä* (H)*; **Uusimaa**. Helsinki, Oulunkylä, 26.I.1930 *Häyrén* (H). Orimattila, Niemi, 2.IX.1914 *Linkola* (H)*. **Etelä-Häme**. Hämeenlinna, Lammi, Evo, 28.VI.1967 *Pankakoski* (H)*. **Koillismaa**. Kuusamo, Liikasenvaara, 15.VI.1980 *Vitikainen 10103* (H)*; Rukajärvi, 11.VI.1980 *Vitikainen 9931b* (H). **Inarin Lappi**. Paatsjoki, 1909 *Renvall* (H).

Hawksworthiana peltigericola (D.

Hawksw.) U. Braun – Figs. 8, 44 H

Hawksworthiana peltigericola induces semiglobose, gall-like deformations on the host thallus. *Conidiogenous cells* are located immediately on the surface of the galls, giving the surface a matt appearance. *Conidia* 13–21(–33) × 6–10 µm, mean 17.6 × 7.5 µm (n=32, three collections), spindle-shaped, 0–1 -septate, thin-walled, attenuated with a thickened scar at the site of attachment.

Hawksworthiana U. Braun is a monotypic genus, which accommodates the mitosporic species *H. peltigericola*. The positioning of the genus is unclear.

Hosts: *Peltigera canina*, *P. collina*, *P. didactyla*, *P. neopolydactyla*, *P. polydactylon*, *P. pratextata*, *P. rufescens*.

Hawksworthiana is reported as a new genus for Finland. Reported also from Sweden.

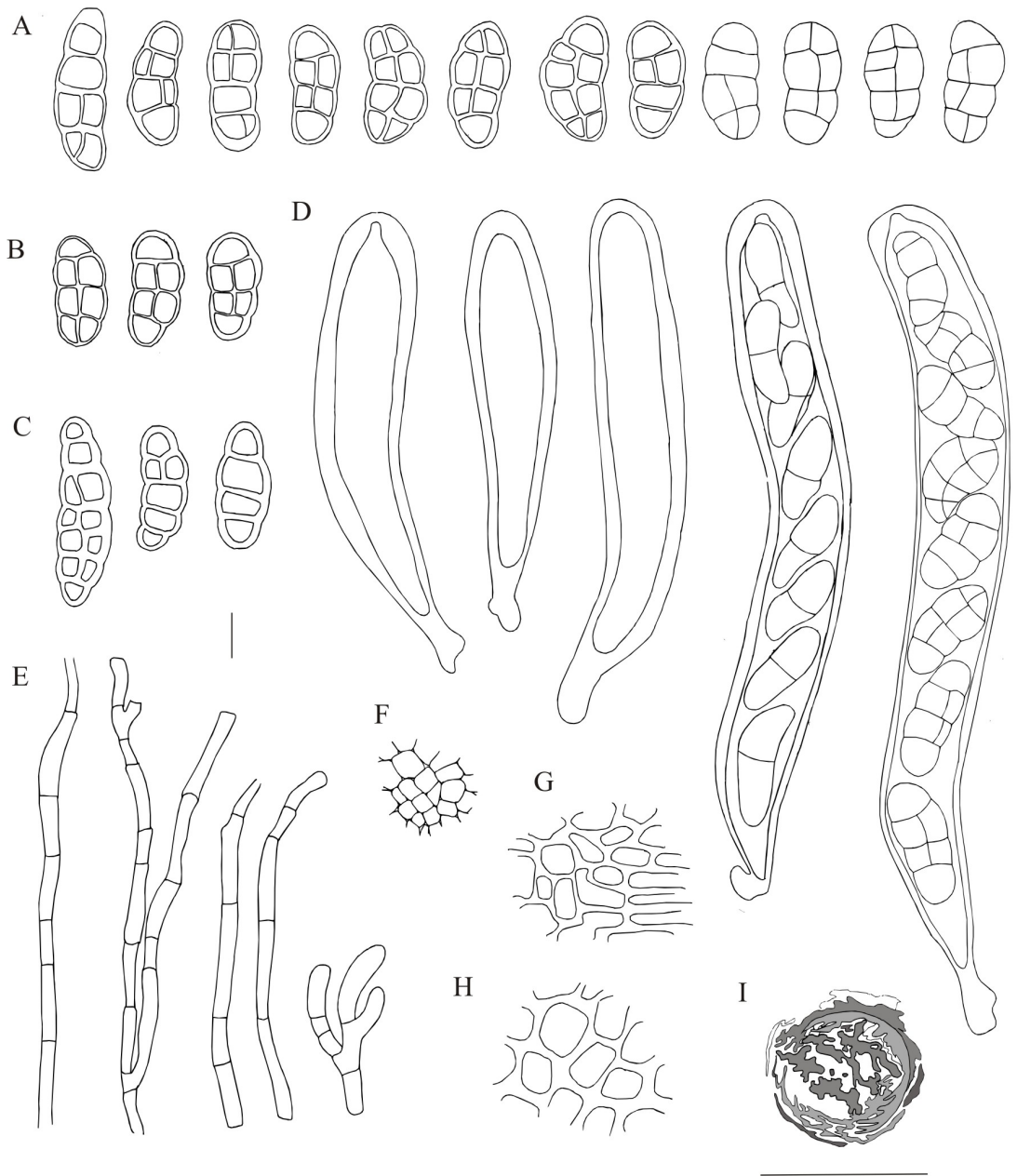


Fig. 6. *Dacampia rufescentis* (A, D, F, G, I = 1907 Backman; B, H = Kytövuori 811028; C, E = 1912 Linkola), A–C = ascospores, D = asci in different stages of maturity, E = pseudoparaphyses, F = medullary excipulum, G, H = ectal excipulum. I = elevated patch on cortex of host thallus caused by *D. rufescentis*. Bars (A–H) 10 µm, (I) 1 mm.

Specimens studied: Varsinais-Suomi. Lohja, Ojamo, 6.X.2004 Pykälä 25983 (H); Parish village, 13.V.2006

Pykälä 28516 (H). Turku, Katariinanlaakso, 7.V.1959 Mäkinen (TUR)*, 6.VI.1934 Auer (TUR)*; Tähtitornimäki, 26.IX.1926 Suza (TUR-V). Uusimaa. Pernaja, Hardom, 20.VIII.1912 Klingstedt (TUR)*. Pornainen,

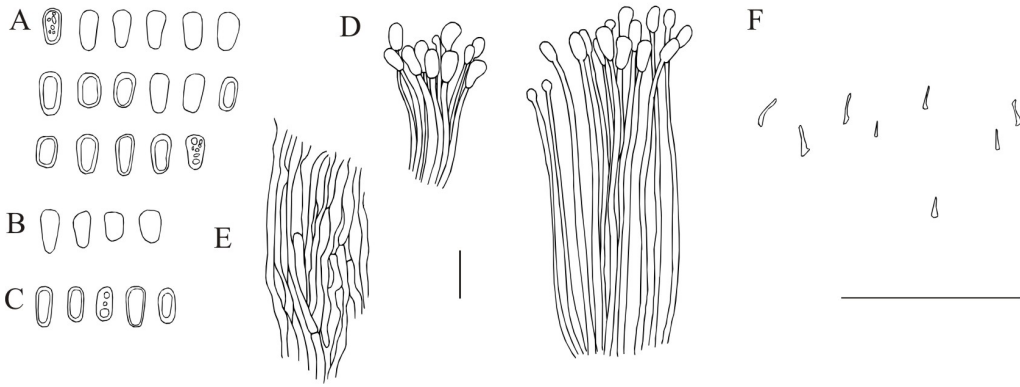


Fig. 7. *Graphium aphthosae* (A, E = 1914 Linkola; B, D, F = 1967 Pankakoski; C = 1933 Seppä), A–C = conidia, D = conidiophores, E = detail of synnema stipe, F = synnemata on host thallus. Bars (A–E) 10 µm, (F) 1 mm.

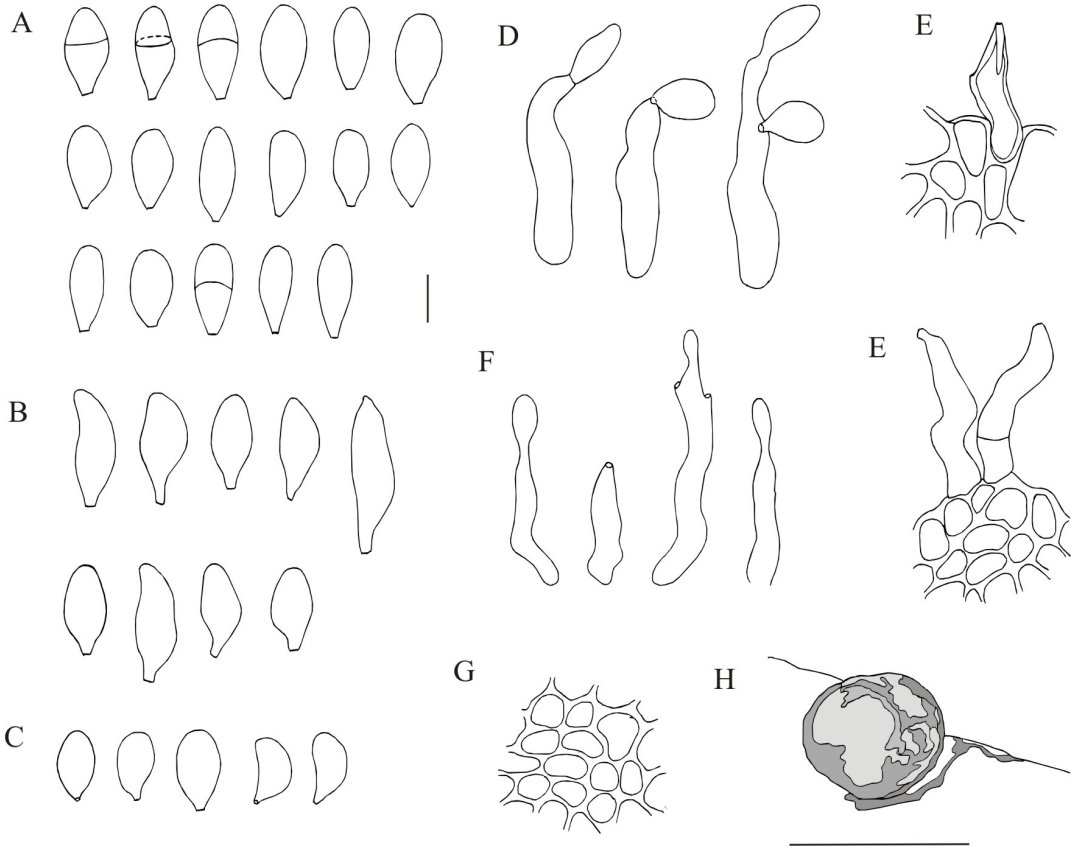


Fig. 8. *Hawksworthiana peltigericola* (A, D = 1959 Mäkinen; B, E, H = 1912 Klingstedt; C, F = 1934 Auer), A–C = conidia, D–F = conidiophores, G = excipulum, H = gall caused by *H. peltigericola* on host thallus. Bars (A–G) 10 µm, (H) 1 mm.



Fig. 9. Conidia of *Hobsoniopsis santessonii* (A = 1958 Huuskonen; B = 1934 Kari; C = 1984 Alava). Bar 10 μ m.

Hevonsekkä, 4.VIII.2001 *Ahti 61502c* (H). Tuusula, Kle-metskog, 13.VIII.1941 *Häyrén* (H). Vihti, Vihtijärvi, 10.VI.2003 *Haikonen 22424* (H). **Etelä-Savo.** Kangas-niemi, Rutakoski, 29.VI.2003 *Haikonen 22483* (H). **Kit-tilän Lappi.** Kolari, Teuravuoma, VII.1933 *Vaasio* (H).

Hobsoniopsis santessonii (Lowen & D. Hawksw.) D. Hawksw. – Figs. 9, 44 I

Sporodochia erumpent through the dorsal cortex of the host thallus, grey to yellowish. *Conidia* 7–14 \times 6–12 μ m, mean 10.2 \times 8.5 μ m (n=30, three collections), solitary, light brown to orange, filament helicoid, multicellular, walls sparsely darkly verrucose.

Host: *Peltigera scabrosa*.

Hobsoniopsis D. Hawksw. is reported as a new genus for Finland. Reported also from Norway and Sweden.

Specimens studied: **Varsinais-Suomi.** Turku, Kaksberta, 21.VIII.1934 *Kari* (TUR). **Uusimaa.** Hanko, Tvärminne, 6.VII.1911 *Linkola* (H). Pyhtää, Mogenpörtö, 11.VI.1941 *Fagerström* (H). **Etelä-Häme.** Jämsä, Seppola, 3.IX.1933 *Koskinen* (H). Hämeenlinna, Lammi, Vähä-Evo, 22.VI.1986 *Haikonen 7417* (H). Luhanka, Jutinsalo, 1873 *Vainio* (TUR-V). **Pohjois-Karjala.** Ilomantsi, Kuuksenvaara, 2.IX.1958 *Klingstedt* (H). **Perä-Pohjanmaa.** Kemijärvi, Jumisko, 18.VII.1966 *Rintanen* (H). **Koillismaa.** Kuusamo, parish village, 16.VI.1962 *Ahti 11624* (H). **Enontekiön Lappi.** Enontekiö, Kaaresu- vanto, 3.VII.1957 *Hämet* (H), 4.VII.1957 *Hämet* (H); Kilpis- järvi, Jehkats, 27.VII.1956 *Huuskonen* (H), 18.VIII.1958 *Huuskonen* (TUR)*. **Inarin Lappi.** Utsjoki, Kevo, 6.VII.1984 *Alava 20924* (TUR)*, 16.VIII.1965 *Ahti 21042a* (H); N-slopes of Ailigas, 24.VIII.1974 *Vitikainen 8361* (H).

Illosporium carneum Fr. – Figs. 10, 44 J

Sporodochia erumpent through the dorsal cortex of the host thallus, white to pink. *Conidia* 5–10 \times 3.5–7 μ m (mean 7.2 \times 4.9 μ m (n=30, four collec- tions)), 0–1 -septate, may contain guttules, a scar may be visible.

Hosts: *Peltigera canina*, *P. didactyla*, *P. hymeni- na*, *P. lepidophora*, *P. rufescens*.

Illosporium carneum is easily identified by the sporodochia it forms on the dorsal host thallus. It resembles superficially *Hobsoniopsis santes- sonii*, but their shape of conidia and choices of host differ from each other. *Illosporium carneum* has been usually accepted as the conidial state of *Pronectria* (Lawrey & Diederich 2011), with recent molecular analyses confirming its position in the Hypocreales (Sikaroodi et al. 2001). Re- ported also from Norway and Sweden.

Selected specimens studied (out of 66): **Ahvenanmaa.** Sottunga, 8.VIII.1952 *af Hällström* (H). **Varsinais- Suomi.** Kustavi, Iso-Värestus, 25.V.1988 *Mäkinen 88-65* (TUR). Turku, Kärsmäki 1.VI.1936 *Auer* (TUR). **Uusi- maa.** Hanko, railway station, 23.VII.1911 *Linkola* (H). Raasepori, Tammisaari, Strömsö 30.V.1984 *Murto 3115* (H). **Etelä-Karjala.** Lappeenranta, Ylämaa, 4.VII.1965 *Vitikainen 317* (H). **Satakunta.** Kankaanpää, Luomajärvi, 29.VI.1935 *Laurila* (H); **Etelä-Häme.** Orivesi, Siitama, 19.V.1974 *Mikkola* (H); Yliskylä, 8.VI.1982 *Thuneberg* (H)*. **Etelä-Savo.** Juva, Kaihummäki, 1.V.1983 *Viti- kainen 10461* (H). **Etelä-Pohjanmaa.** Kurikka, Mieto, 2.VII.1965 *Suominen* (H)*. **Pohjois-Häme.** Jyväskylä, Ristikivenlaakso, 18.VI.1912 *Linkola* (H). **Pohjois-Sa- vo.** Kuopio, Suovu, 3.VI.1906 *Linkola* (TUR). **Keski- Pohjanmaa.** Siikajoki, Ruukki, 19.VI.2001 *Ahti 60896* (H). **Kainuu.** Suomussalmi, Ala-Vuokki, 5.VII.1936 *Auer* (TUR). **Oulun Pohjanmaa.** Hailuoto, Marjaniemi 10.IX.1994 *Vitikainen 13290* (H). **Perä-Pohjanmaa.** Kemijärvi, Joutsijärvi, 30.VII.1964 *Suominen* (H). **Koili- smaa.** Salla, Pieni Pyhätunturi, 4.VII.1981 leg. ? (H). **Kittilän Lappi.** Kolari, Äkäsjokivarsi, Kelokämppe, 20.VII.1978 *Huuskonen* (H). **Sodankylän Lappi.** Sodan- kylä, Peurasuvalo, 18.VI.1980 *Kvist* (H). **Enontekiön Lappi.** Enontekiö, Kuonjarvarri, 2.VIII.1947 *Huuskonen* (H). **Inarin Lappi.** Inari, Inarinjärvi, 1910? *Renvall* (H). Utsjoki, Niemelä, 17.VI.1980 *Kvist* (H).

Karsteniomyces peltigerae (P. Karst.) D. Hawksw. – Figs. 11, 44 K

Conidiomata globose, 0.1–0.15 mm diam, grey- ish to pale or yellowish brown. *Macroconidia* 11.5–20 \times 3.5–5 μ m, mean 15.9 \times 4.6 μ m (n=30,

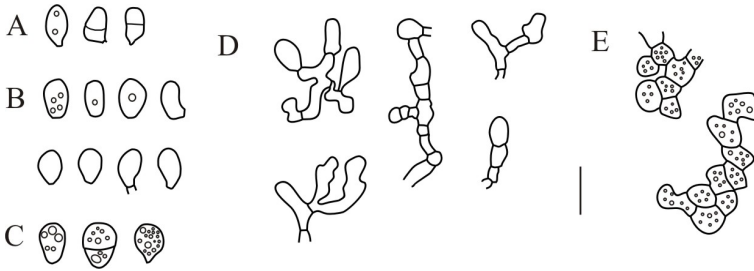


Fig. 10. *Illosporium carneum* (A, D = 1982 Thuneberg; B = 1965 Suominen; C, E = 1910 Renvall), A–C = conidia, D = conidiogenous cells, E = guttulate cells from soralia. Bar 10 μ m.

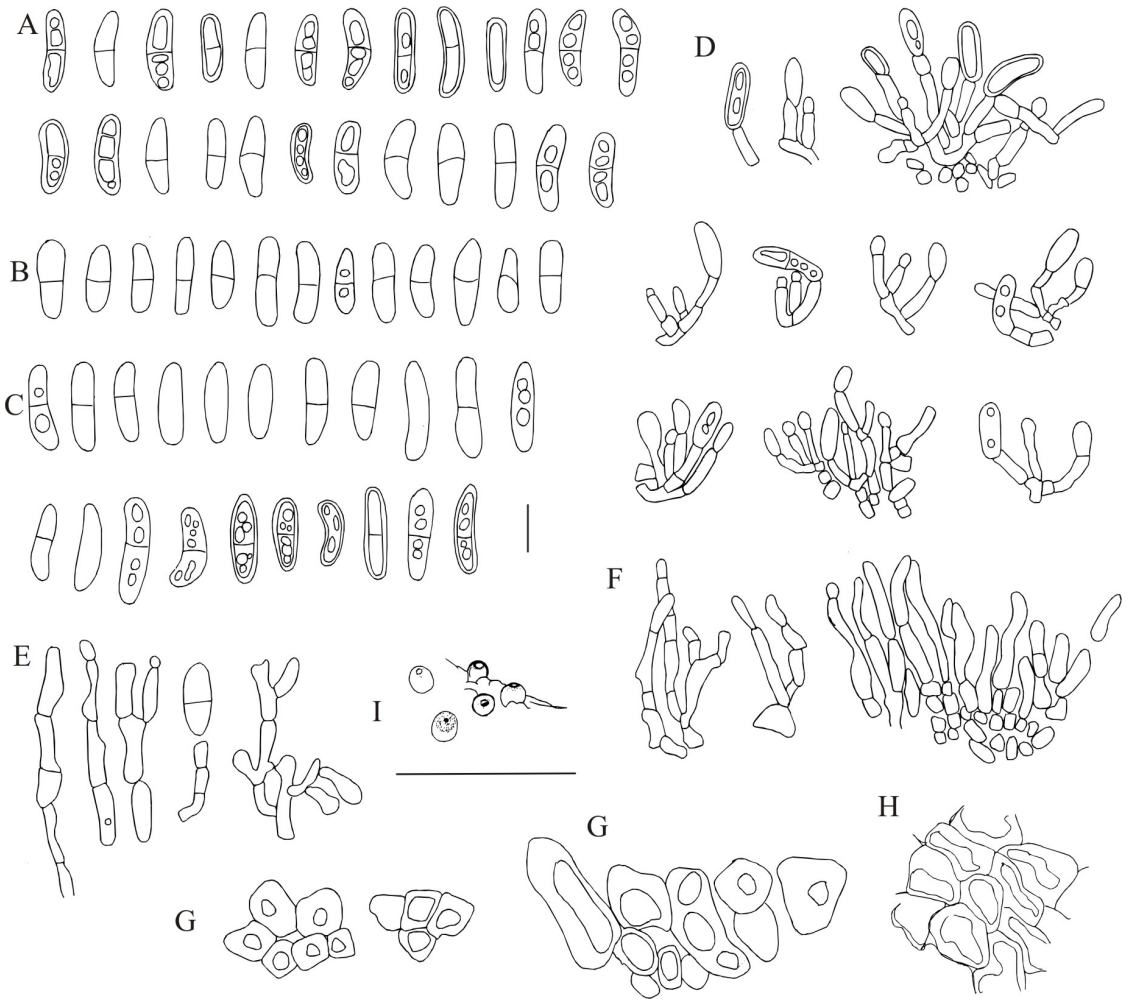


Fig. 11. *Karsteniomyces peltigerae* (A, D = 1965 Vitikainen; B, E = 1955 Kukkonen; C, F, G = 1911 Linkola; H, I = 1912 Linkola), A–C = conidia, D–F = conidiophores and conidiogenous cells, G, H ectal excipulum, I = pycnidia. Bars (A–H) 10 μ m, (I) 1 mm.

three collections), ellipsoid-elongate, often slightly curved, 0–1-septate. *Conidiophores* 2–3 µm wide, branching, septate, often constricted at septa. *Ectal excipulum* composed of densely packed, dark, thick-walled, cubiform cells, 7–15 µm diam. *Medullary excipulum* composed of thin-walled, more loosely packed cells 3.5–6.5 µm diam.

Hosts: *Peltigera canina*, *P. leucophlebia*, *P. praetextata*, *P. rufescens*.

Karsteniomyces peltigerae is the macroconidia-producing anamorph of *Scutula miliaris* (Wallr.) Trevis. It is often found without the teleomorph producing quite large amounts of aggregated pycnidia. Reported also from Norway and Sweden.

Specimens studied: **Ahvenanmaa.** Finström, Björkö, 28.V.1976 *Alava 15890* (TUR). **Varsinais-Suomi.** Kemönsaari, Västanfjärd, 29.IX.1988 *Laine* (TUR). Lohja, Paloniemi, 28.IV.2005 *Pykälä 26717* (H). Parainen, Ersby, 3.IX.1912 *Linkola* (H)*; Lampis, 10.VI.1911 *Linkola* (H). Paimio, Hirvonpään Alitupa, 27.VI.1955 *Kukkonen* (H)*. Raasepori, Bromarv 20.V.1927 *Linkola & Häyrén* (H); Hällonästrakten, 8.VIII.1890 *Boldt*. Turku, Ispoinen, 22.V.1912 *Linkola* (TUR-V); Kaksikerta, Monnonen, 12.VII.1934 *Kari* (TUR); Katariinanlaakso, 23.VII.1922 *Räsänen* (TUR); Muhkuri, 24.IX.1945 *Kallio* (TUR). Uusikaupunki, 24.II.1951 *Laine* (TUR); Käättyjärvi-W, 25.XI.1951 *Laine* (TUR). Vihti, Vanjärvi, 1896 *Lång* (TUR). **Uusimaa.** Helsinki, Fredriksberg, 1874 *Vainio* (TUR-V); Meilahti, 7.XII.1929 *Häyrén* (H); Toivola, 16.VII.1874 *Collin* (H). Hanko, Tvärminne, 1907 *Profeldt* (TUR, two specimens); Kragen, 3.VII.1911 *Linkola* (H)*; Långholmen, 7.VIII.1908 *Rancken* (H). Espoo, Railway station, 12.XI.1911 *Linkola* (TUR-V); Kasaberg 31.VIII.1913 *Linkola* (TUR-V). **Satakunta.** Sastamala, Karkku, Koski, 23.VI.1967 *Suominen* (H, two specimens). **Etelä-Häme.** Kuhmoinen, Ansiolahti, Myysälä, 10.VIII.1948 *Norrlin* (H); Päijälä, Rumavuori, 14.IV.1974 *Oittinen 5* (H). Tammela, Mustiala 1867 *Kullhem* (H). **Etelä-Savo.** Savitaipale, Kärnäkoski, 13.VIII.1981 *Vitikainen 10521, 10521b* (H). Taipalsaari, Paakkola, 5.XI.1966 *Vitikainen* (H)*. **Etelä-Pohjanmaa.** Alavus, Sapsalampi, 11.VII.1948 *Leppälä* (TUR, two specimens). **Pohjois-Savo.** Kuopio, 22.VI.1909 *Heikinheimo* (H).

Lasiosphaeriopsis salisburyi D. Hawksw. & Sivan. – Figs. 12, 44 L

Stromata superficial, carbonaceous, 0.4–0.6 mm. *Asci* 31–62 × 15–17 µm, mean 46.7 × 15.1 µm (n=7, one collection), clavate, rounded at the

apex, 3–6-spored. *Ascospores* 19–24 × 4.5–7 µm, mean 21.5 × 5.4 µm (n=23, one collection), 3-septate, thick-walled, the 2 middle cells thicker walled and darker than the apical cells. Unripe spores rich with small guttules. *Paraphyses* 1.5–2 µm wide, branching, septate. *Excipular cells* 10–17 µm diam., round to irregular, brown, thick-walled. In many cells a circular, ca 1.5 µm diam, pore (munk pore) was observed.

Host: *Peltigera leucophlebia*.

Lasiosphaeriopsis was reported as a new genus to Finland by Toivanen (2008). *Lasiosphaeriopsis salisburyi* forms distinctive, carbonaceous, black, verrucose, erumpent and superficial stromata. It appears to be parasitical, damaging the thallus on the site of formation, but apparently not harming the host seriously as whole. Reported also from Sweden.

Specimens studied: **Pohjois-Savo.** Suonenjoki, Keurunmäki, 10.VII.2008 *Hyvärinen*. **Kittilän Lappi.** Kittilä, Kiistala, 24.VII.1963 *Haapasaaari 383* (H)*.

Libertiella curvispora D. Hawksw. & Miqđl. – Figs. 13, 45 M

Pycnidia 0.09–0.12 mm diam, flattened-globose, pale to translucent orange, ostiole visible as a light spot. *Conidia* 6–8.5 × 1.5–2 µm, mean 6.6 × 1.9 µm (n=30, three collections), simple, often curved, rounded at both ends, thin-walled, may contain guttules. *Conidiophores* 2 µm wide, small-celled, branched, septate. *Ectal excipulum* composed of dark, thick-walled cells. *Medullary excipulum* composed of more loosely packed angular cells.

Hosts: *Peltigera canina*, *P. membranacea* (Ach.) Nyl., *P. praetextata*, *P. rufescens*.

Libertiella curvispora does not seem to harm its host; groups of pycnidia may be found scattered on the dorsal or ventral side of the host thallus. The genus *Libertiella* Speg. & Roum. is considered to be the anamorph genus of *Scutula* Tul. (Triebel et al. 1997). The species was first recorded from Finland by Toivanen (2008).

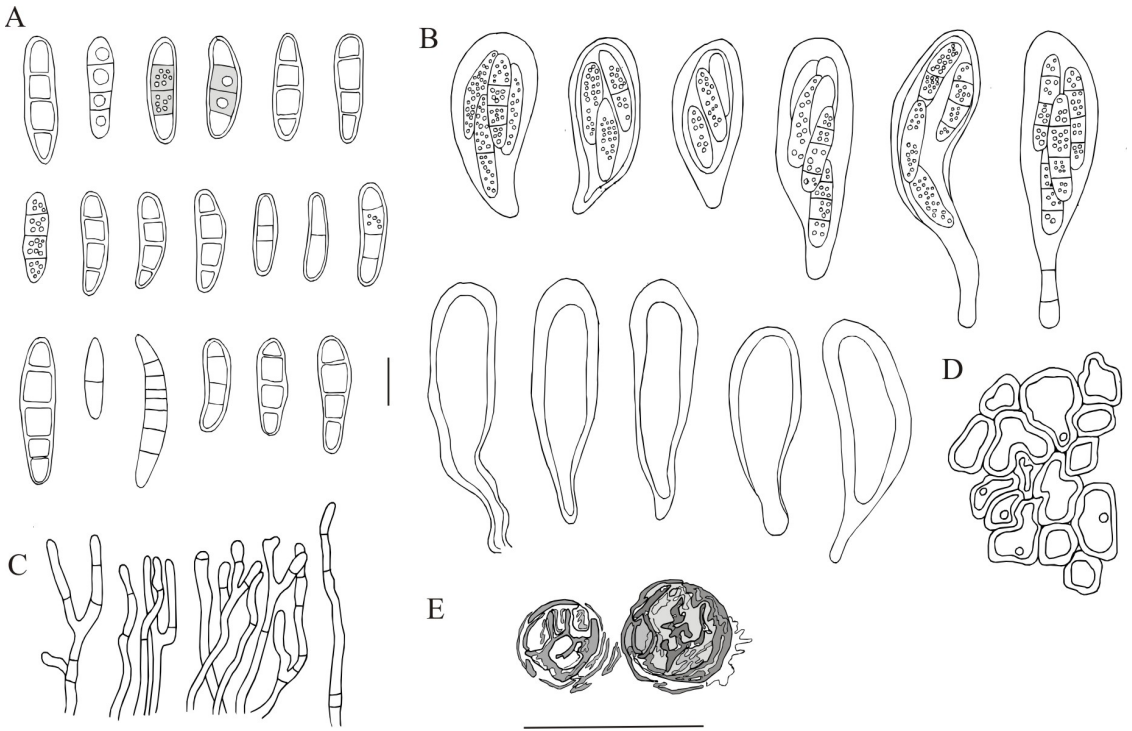


Fig. 12. *Lasio-sphaeriopsis salisburyi* (Haapasaari 383), A = ascospores, B = asci in different stages of maturity, C = paraphyses, D = excipular cells with "Munk pore", E = stromata caused by *L. salisburyi* on host cortex. Bars (A–D) 10 µm, (E) 1 mm.

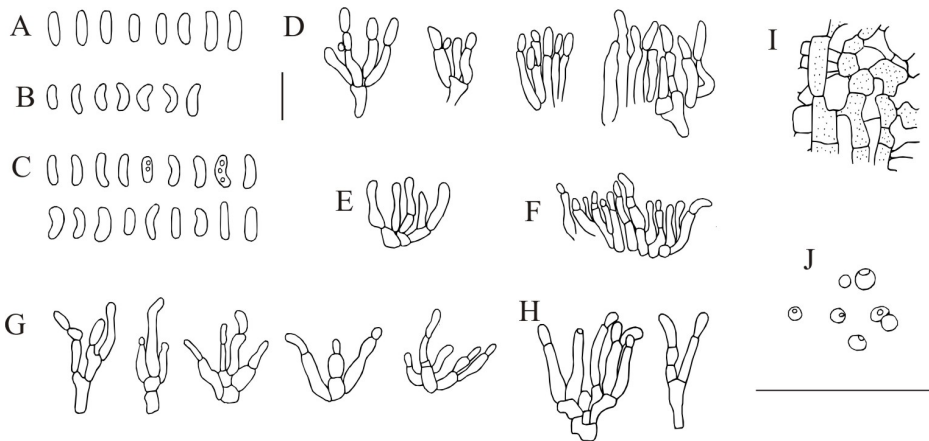


Fig. 13. *Libertiella curvispora* (A, D, I, J = 1964 Kytövuori & Kytövuori; B, E = Toivonen & Uotila 23449; C, G = 1937 Hiitonen; F = Kuusinen 2502; H = Vitikainen 6076), A–C = conidia, D–H = conidiophores and conidiogenous cells, I = medullary excipulum, J = pycnidia. Bars (A–I) 10 µm, (J) 1 mm.

Selected specimens studied (out of 75): Ahvenanmaa. Finström, Björkö, 30.V.1976 *Alava 16033* (TUR); Grelsbj, Mangelbo, 17.V.1989 *Alava 22546* (TUR). **Varsinais-Suomi.** Karjalohja, Karkali, 14.V.1962 *Koponen 3613* (H). Turku, Muhkuri, 6.X.1951 *Lindgren* (TUR). **Uusimaa.** Pernaja, Tervik, 25.VII.1992 *Piirainen & Piirainen 2398* (H). Vantaa, Kärböle, 1.V.1942 *Marklund* (H). **Etelä-Karjala.** Hamina, Vehkalahti, Pyhältö, 12.VI.1947 *Fagerström* (H). **Satakunta.** Karkku, Koski, 23.VI.1967 *Suominen* (H). Pomarkku, Sulkjärvi, 9.VI.1937 *Laurila* (H). **Etelä-Häme.** Kuhmoinen, Tapiola, 7.VIII.1937 *Norrlin* (H)*; S of Isojärvi, 5.VIII.1949 *Hiitonen* (H)*; Ruovesi, Haukkamaa, 9.VI.1964 *Kytövuori & Kytövuori* (H)*; Valkeakoski, Sääksmäki, Käräsä, 31.VIII.1917 *Norrlin* (H). **Etelä-Savo.** Juva, Kaihunmäki, 8.X.1978 *Vitikainen 8658* (H). **Etelä-Pohjanmaa.** Kristiinankaupunki, Lappfjärd, 25.VI.1946 *Railonsala* (TUR)*. Mustasaari, Hospital, 1.IV.1953 *Suominen* (H). **Pohjois-Häme.** Jyväskylä, Tuomioniemi, 29.IV.1951 *Valovirta* (H). **Pohjois-Savo.** Pieksämäki, Jäppilä, 18.VII.1964 *Takala* (H). Vieremä, Karankamäki, 10.-12.VIII.1989 *Kuusinen 2502* (H)*. **Pohjois-Karjala.** Juankoski, Säyneinen, 29.VII.1970 *Vitikainen 6076* (H)*. **Keski-Pohjanmaa.** Evijärvi, Järvelä, 21.VI.1907 *Backman* (H). Vimpeli Västerbacka, 25.IX.2003 *Haikonen 22976* (H). **Kainuu.** Hyrynsalmi, Väisälä, 18.IX.2000 *Vitikainen 16001* (H). **Oulun Pohjanmaa.** Haukipudas, Niemeläntörmä, 28.VII.1974 *Toivonen & Uotila 23449* (H)*. **Perä-Pohjamaa.** Simo, Pahnla, 4.VI.1931 *Räsänen* (H, two specimens). **Koillismaa.** Kuusamo, Juuma, 6.VII.1981 *Vitikainen 10137a* (H).

Libertiella fennica Alstrup – Figs. 14, 45 N

Pycnidia 0.1–0.12 mm diam, globose, yellowish brown to dark brown, dark around the ostiolar area. *Thallus* light coloured, grainy, visible on the host thallus. *Conidia* 3.5–6 × 2.5–4.5 µm, mean 4.8 × 3.2 µm (n=30, three collections), rounded, simple, may contain a guttule, scar conspicuous. *Conidiophores* 2 µm wide, branched, septate. *Conidiogenous cells* cylindrical, with a collarete. *Excipular cells* small and rounded, cells 2–3.5 µm diam.

Host: *Peltigera didactyla*.

Libertiella fennica appears to be commensalistic (Hawksworth & Miadlikowska 1997). Its pycnidia form on the dorsal side of the host thallus. Reported also from Norway.

Specimens studied: **Etelä-Häme.** Nastola, Immilä, 15.XI.2003 *Haikonen 23113* (H)*. **Etelä-Savo.** Kouvolaa, by the railway, 20.VIII.1949 *Klingstedt* (H). Mikkelä, Häppälä, 19.IX.2004 *Haikonen 23669* (H)*.

Libertiella malmedyensis Speg. & Roum. – Figs. 15, 45 O

Pycnidia superficial, 0.12–0.2 mm diam, globose, pale yellowish to darker, ostiole dark. *Conidia* 4–7 × 2–4.5 µm, mean 5.8 × 4.5 µm (n=30, three collections), rounded to elongate, may contain guttules. *Conidiophores* 1.5–2 µm wide, sometimes branched. *Ectal excipulum* composed of dark- and thick-walled cells, 3.5–6 µm diam. *Medullary excipulum* composed of rounded, thin-walled cells, 4–4.5 µm diam.

Hosts: *Peltigera didactyla*, *P. rufescens*.

Libertiella malmedyensis may be found either on the dorsal or the ventral side of its host. It does not seem to cause any apparent harm to its host.

The species was reported as new to Finland by Alstrup (2004) and is reported also from Sweden.

Specimens studied: **Uusimaa.** Hanko, Tvärminne, 3.VI.1929 *Pohjala* (H)*. Vantaa, Backas, 14.V.1905 *Sola* (H)*; Kärböle, Koppaberget, 1.V.1942 *Marklund* (H)*. **Satakunta.** Kokemäki, 1859 *Malmgren* (H). **Etelä-Häme.** Hollola, Kalliola, 7.IV.1985 *Haikonen 5532* (H). Orivesi, Längelmäki, 24.VIII.1987 *Miekk-oja* (H). **Pohjois-Häme.** Saarijärvi, Mahlu, 17.VIII.1933 *Koskinen* (H)*.

Lichenopeltella peltigericola (D. Hawksw.) R. Sant. – Figs 16, 45 P

Ascomata catathecioid, superficial, 40 µm diam, almost black, with setae around the ostiole. *Asci* 24–35 × 9–13 µm, mean 30.8 × 11.1 µm (n=16, three collections), bitunicate, thin-walled, sometimes thickened at the apex, 4-spored. *Ascospores* 14–22 × 3.5–5 µm, mean 18.3 × 4.4 µm (n=30, three collections), allantoid to almost straight, one end tapering, septate, slightly constricted at septum, with or without guttules. *Paraphyses* or *periphyses* not observed. *Setae* surrounding the ostiole, 18–26 × 5–9 µm, dark-coloured, thick-walled.

Hosts: *Peltigera canina*, *P. didactyla*, *P. leucophlebia*, *P. membranacea*, *P. praetextata*, *P. scabrosa*. Records were made during this study also on *Lobaria linita* and *Nephroma arcticum*

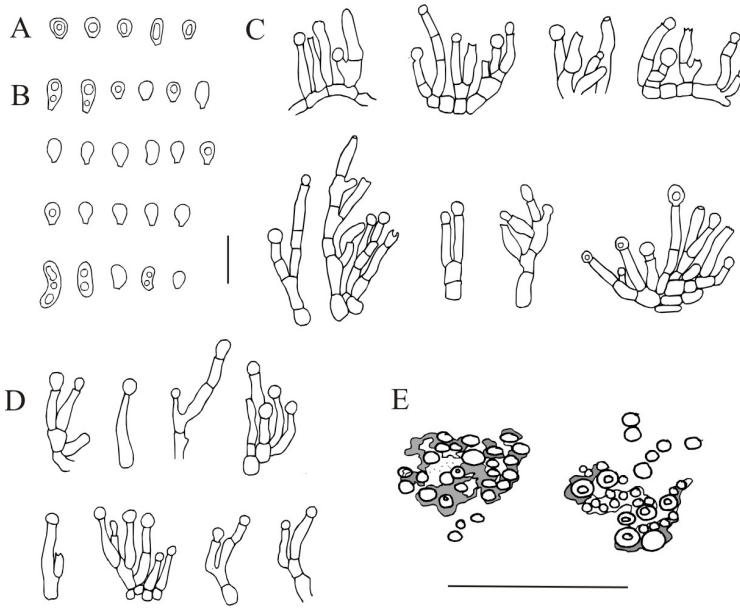


Fig. 14. *Libertiella fennica* (A, C, E = Haikonen 23113; B, D = Haikonen 23669), A, B = conidia, C, D = conidiophores and conidiogenous cells, E = pycnidia and thallus on dorsal cortex of host thallus. Bars (A–D) 10 μ m, (E) 1 mm.

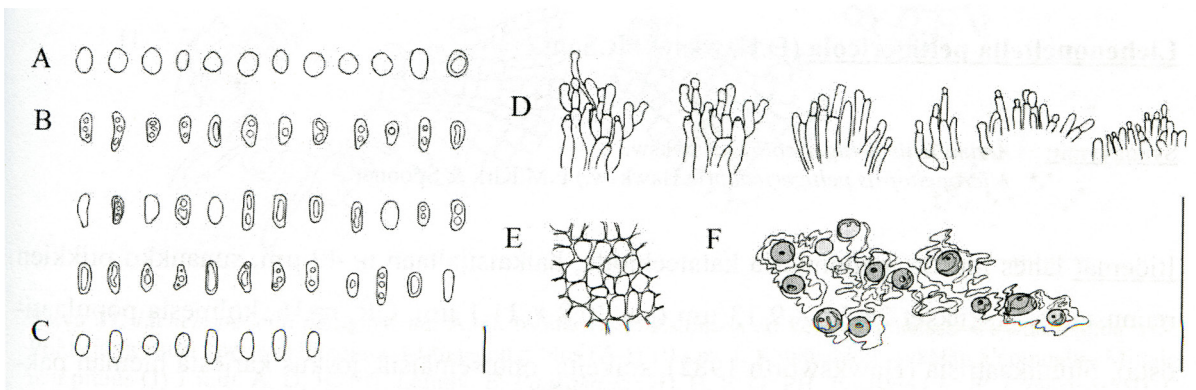


Fig. 15. *Libertiella malmedyensis* (A = 1905 Sola; B, D, E = 1942 Marklund; C, F = 1929 Pohjala), A–C = conidia, D = conidiophores and conidiogenous cells, E = excipulum, F = pycnidia on host thallus. Bars (A–E) 10 μ m, (F) 1 mm.

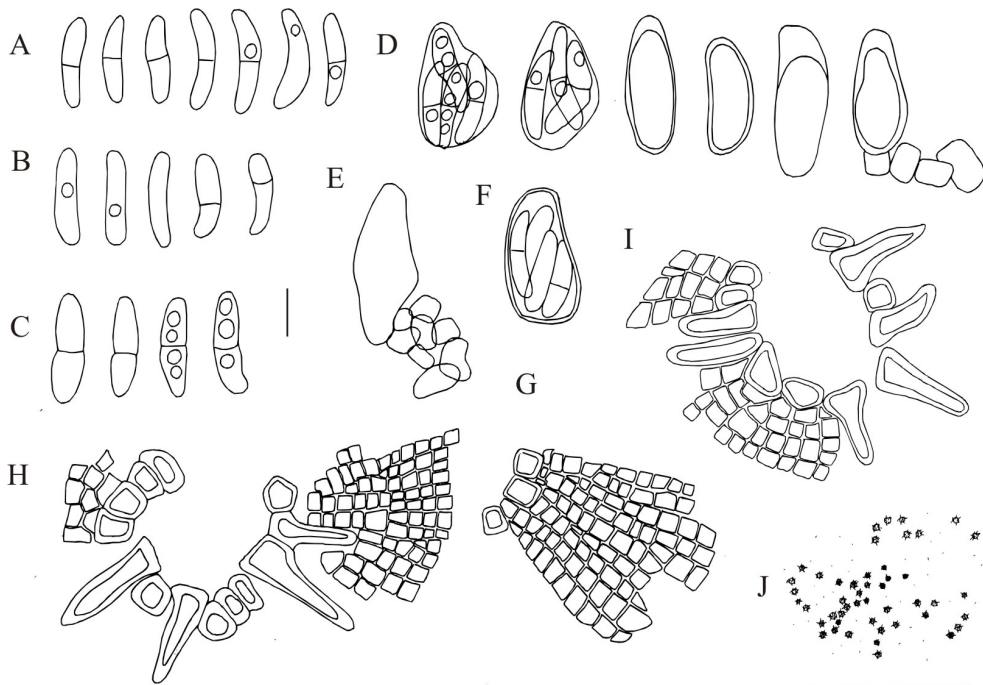


Fig. 16. *Lichenopeltella peltigericola* (A, D, H = 1967 Pankakoski; B, E, G = 1944 Klingstedt; C, F = Haikonen 13629; I = 1981 Kvist; J = 1946 Kukkonen), A–C = ascospores, D–F = asci in different stages of maturity, G = ectal excipulum, H, I = setae and cells surrounding the ostiole, J = catathecia on ventral side of host thallus. Bars (A–I) 10 μ m, (J) 1 mm.

(L.) Torss. Reported also on *Peltigera rufescens* (Spooner & Kirk 1990).

Lichenopeltella peltigericola forms ascomata on the older thalli of several *Peltigera* species, usually in groups on the veins of the underside thallus lobes, but occasionally also on the upper surface. May be confused with *Lichenopeltella santessonii*. The species was first recorded from Finland by Toivanen (2008). Reported also from Sweden and Norway.

Selected specimens studied (out of 105): Ahvenanmaa. Finström, Grelsby, 26.IX.1992 Bruum (H). Varsinais-Suomi. Kemiönsaari, Dragsfjärd, 21.IV.1981 Kvist (H)*. Masku, Karevanrahka, 18.V.1946 Kukkonen (H)*. Uusimaa. Espoo, Vällskog, 3.IV.1964 Takala (TUR). Etelä-Karjala. Hamina, Vehkalahti, Kannusjärvi, 14.VIII.1968 Fagerström (H). Satakunta. Ikaalinen, Uuraslahti 31.VIII.1935 Laurila (H, two specimens). Etelä-Häme. Lammi, Kannaila, 12.VII.1967 Pankakoski (H)*. Sysmä, Mynnilä, 19.X.1991 Haikonen 13629 (H)*. Etelä-Savo. Mikkeli, Anttola, 12.VIII.1983 Vitikainen 10877 (H). Pohjois-Häme. Jyväskylä, 12.XI.1944 Klingstedt (H)*.

Pohjois-Karjala. Lieksa, Pielisjärvi 24.VIII.1966 Vitikainen 2153 a (H). Ilomantsi, Ilaja, 17.VIII.1925 Waris (TUR, on *Nephroma arcticum*). Pohjois-Savo. Kuopio, Levänen, 5.V.1946 Leppälä (TUR, on *Nephroma arcticum*). Etelä-Pohjanmaa. Laihia, Pappila, 27.VI.1960 Takala (TUR). Perä-Pohjanmaa. Keminmaa, Kemi rural commune, 23.VII.1964 Suominen (H). Koillismaa. Kuusamo, Liikanen, 23.VII.1949 Kari (TUR, on *Nephroma arcticum*); Rukajärvi, 19.VII.1949 Koskinen (TUR, on *Nephroma arcticum*). Kittilän Lappi. Kittilä, Isovaara, 8.VIII.1877 Hjelt & Hult (H). Enontekiön Lappi. Enontekiö, Jollonoaivi, 25.VII.1957 Huuskonen (TUR, on *Lobaria linita*). Inarin Lappi. Utsjoki, Kevojoki valley, 20.VIII.1965 Ahti 20775 (H).

Lichenopeltella santessonii (P.M. Kirk & Spooner) R. Sant. – Figs. 17, 45 Q

Ascomata catathecioid, superficial, 100–120 μ m diam, dark brown, sometimes with short setae around the ostiole. Asci 34–50 \times 11–12 μ m, mean 41.9 \times 11.4 μ m (n=14, two collections), bitunicate, wall CR–, 8-spored. Ascospores 12–17 \times 3–5 μ m, mean 14.1 \times 3.5 μ m (n=33, two col-

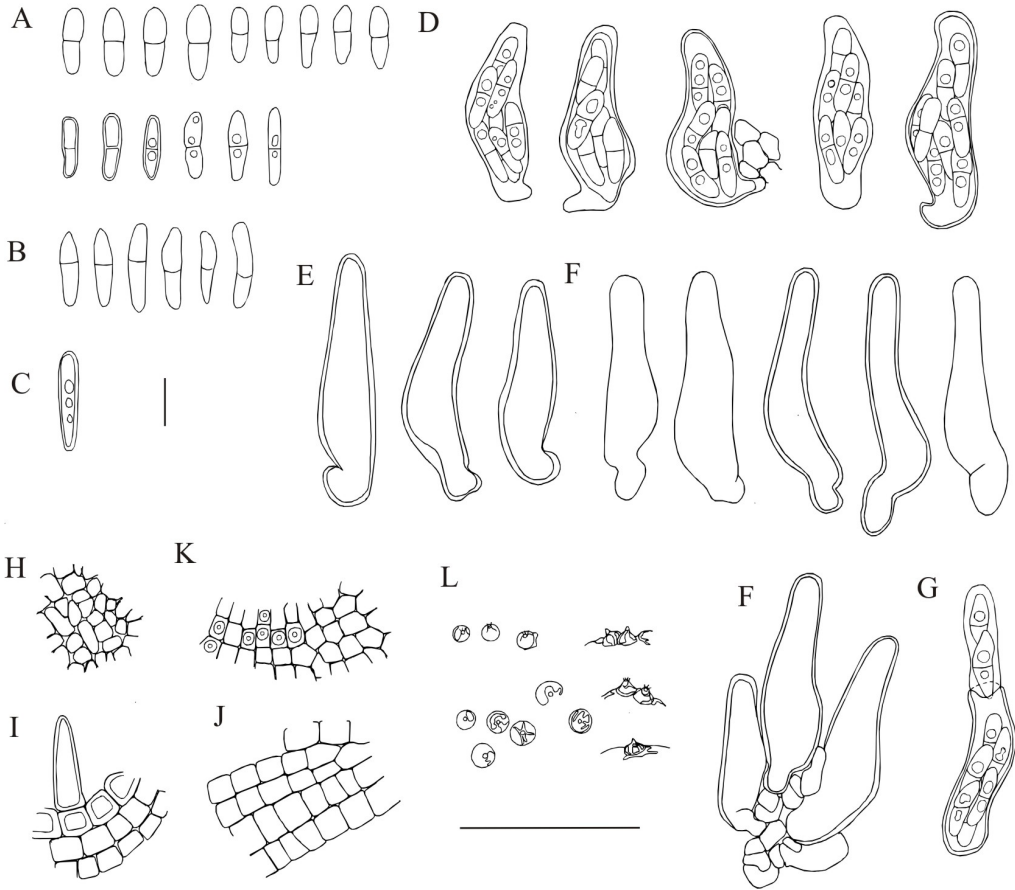


Fig. 17. *Lichenopeltella santessonii* (A, D, G–I, K = 1915 Räsänen; B, E = 1917 Lindberg; F = 1967 Fagerström; C, J = 1965 Huuskonen; L = 1933 Häyrén), A–C = ascospores, D = mature asci with ascospores, E, F = empty asci, G = opening, bitunicate ascus, H = medullary excipulum, I = seta, margin of ostiole, J = ectal excipulum, K = detail of catathecium, L = catathecia on ventral side of host thallus. Bars (A–K) 10 μ m, (L) 1 mm.

lections), septate, slightly constricted at septum, may contain guttules. *Paraphyses* or *periphyses* not observed. *Setae* surrounding the ostiole, $15 \times 4 \mu$ m, thick-walled.

Hosts: *Peltigera aphthosa*, *P. canina*, *P. leucophlebia*, *P. praetextata*, *P. rufescens*, *P. scabrosa*. Also found on *Lobaria linita*, *L. pulmonaria* (L.) Hoffm., and *Nephroma expallidum* (Nyl.) Nyl. during this study.

Lichenopeltella santessonii appears to be widespread and frequent. The catathecioid ascomata form on the older thalli of several *Peltigera* species, usually on the veins of the underside thallus

lobes, but occasionally also on the upper surface. Distinguished from *L. peltigericola* by larger ascomata, asci and ascospores. The species was first recorded from Finland by Toivanen (2008). Reported also from Sweden.

Selected specimens studied (out of 37): Ahvenanmaa. Jomala, Kungsö, 14.VIII.1945 Fagerström (H). Varsinais-Suomi. Lohja, Jalassaari, 10.IX.1917 Lindberg (H)*. Parainen, Älö, 7.1916 Pesola (H)*. Uusimaa. Espoo, Nuuksio, 18.XI.1934 Puolanne (H, two specimens). Etelä-Karjala. Miehikkälä, Virokoski, 29.VIII.1967 Fagerström (H)*. Satakunta. Eura, Kauttua, 16.XI.1946 Klingstedt (H). Etelä-Häme. Hollola, Upila, 1876 Norrlin (H). Tampere, Teisko, 3.VIII.1967 Laine (TUR, on *Lobaria pulmonaria*). Etelä-Savo. Mäntyharju, Haarala railway stop, 9.VIII.1964 Suominen (H). Pohjois-Häme.

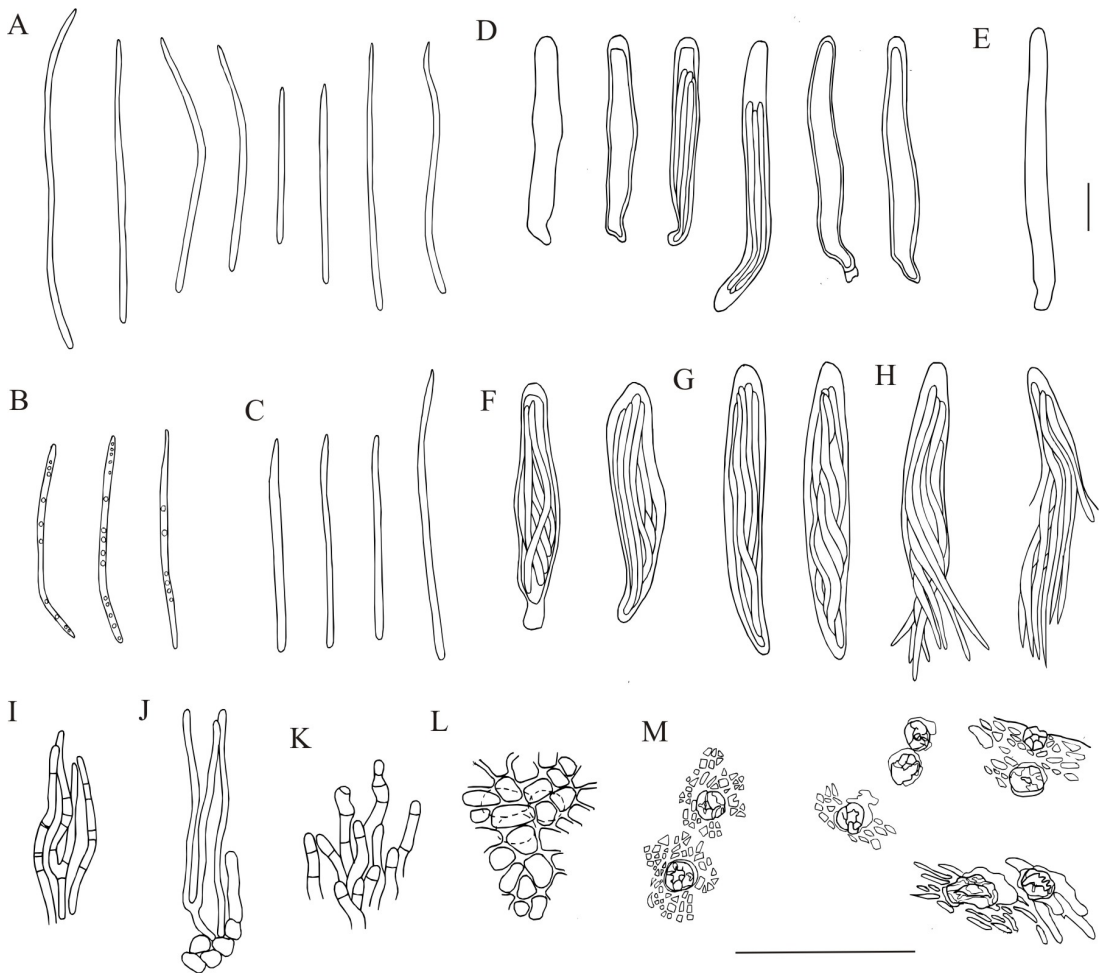


Fig. 18. *Nanostictis peltigerae* (A, D, I, L = Kytövuori & Suominen 916; B, E = 1979 Ervi; C, G, H, K = 1948 af Hällström; F = Vänskä 3389; M = 1917 Lindberg), A–C = ascospores, D–G = asci in different stages of maturity, H = broken asci with ascospores, commonly seen in squash mounts, I, J = paraphyses, K = setae, L = excipulum, M = apothecia. Bars (A–L) 10 μ m, (M) 1 mm.

Saarijärvi, Parish village, 15.VII.1933 Häyrén (H)*. **Pohjois-Savo.** Juankoski, Säyneinen, 8.1965 Huuskonen (H). **Perä-Pohjanmaa.** Simo, Syvälahti, 2.VIII.1915 Räsänen (H)*. **Koillismaa.** Kuusamo, Juuma, 12.VI.1980 Vitikainen 9973 (H). **Kittilän Lappi.** Kolari, Teuravuoma, 7.1933 Vaasio (H). **Enontekiön Lappi.** Enontekiö, Kilpisjärvi, SE-Saana 31.VII.1949 Huuskonen (TUR, on *Nephroma expallidum*); Porojärvet, Anjelonji, 28.VII.1955 Henssen Le 169 (TUR, on *Nephroma expallidum*). **Inarin Lappi.** Utsjoki, Linkkapahta, 12.VII.1964 Laine (TUR, on *Nephroma expallidum*).

Nanostictis peltigerae M.S. Christ.

– Figs. 18, 45 R

Ascomata apothecioid, 0.15–0.25 mm, superficial, disc-shaped, margin prominent, cracked, white. *Asci* 39–59 \times 4–6.5(–10) μ m, mean 50.5 \times 5.6 μ m (n=20, three collections), cylindrical, thin-walled, thickened at the apex. 8-spored. *Ascospores* 32–69 \times 1–2 μ m, mean 49.9 \times 1.5 μ m (n=30, three collections), hyaline, thread-like, twisted together in a bundle. *Paraphyses* 1.5–2 μ m thick, septate, branched, with the tips often

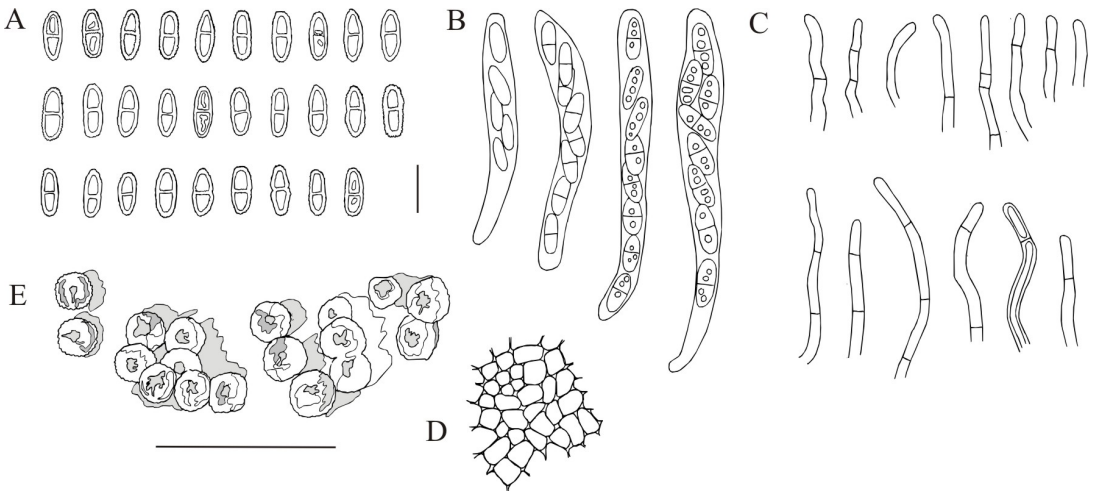


Fig. 19. *Nectriopsis lecanodes* (A = 1951 Klingstedt; B, E = Vitikainen 8680; C, D = 1945 af Hällström), A = ascospores, B = asci with unripe ascospores, C = hairs, D = excipulum, E = perithecia. Bars (A–D) 10 µm, (E) 1 mm.

somewhat swollen. *Excipular cells* rounded, ca 5 µm diam.

Hosts: *Peltigera aphthosa*, *P. canina*, *P. leucophlebia*, *P. neckeri*, *P. neopolydactyla*, *P. polydactylon*, *P. scabrosa*, *P. praetextata*, *P. rufescens*. Reported also from *Peltigera malacea*.

The white, thick-rimmed apothecia of *Nanostictis peltigerae* are usually crowded on the ventral side of the host thallus, partly immersed in the hyphae. Occasionally the apothecia may form on the dorsal side, partly immersed when young, superficial at maturity. Microscopically easily identified by the vermiform ascospores. Reported also from Norway and Sweden.

Selected specimen studied (out of 77): **Varsinais-Suomi.** Lohja, Jalassaari, 19.IX.1917 Lindberg (H, two specimens)*. **Uusimaa.** Kirkkonummi, Porkkala, 3.V.1970 Alanko 14709 (H)*. Kouvola, Elimäki, 23.IX.1958 Klingstedt (H). Mäntsälä, Ohkola, 13.X.1963 Kytövuori & Suominen 916 (H)*. Sipoo, Mårtensby, 24.VII.1948 af Hällström (H, two specimens)*. Siuntio, Övitsby, 27.VIII.1968 Vänskä 3389 (H)*. **Etelä-Karjala.** Miehikkälä, Hauhia, 8.VII.1968 Fagerström (H). **Satakunta.** Kankaanpää, Venesjärvi, 2.VII.1934 Laurila (H). **Etelä-Häme.** Jyväskylä, Korpilahti, Putkilahti, 15.VIII.1979 Ervi (H)*. **Etelä-Savo.** Hirvensalmi, Kilinkylä, 22.VI.1958 Räsänen (TUR). **Etelä-Pohjanmaa.** Alavus, Keskikylä, 2.VI.1947 Leppälä (H). **Pohjois-Häme.** Kannonkoski, Lakomäki, VI.1894 Kihlman (H). Äänekoski, Kuhnamojärvi-W, 11.V.1947 Klingstedt (H). **Pohjois-**

Savo. Heinävesi, Tyvi, 7.VI.2002 Haikonen 21373 (H). Pieksämäki, Jäppilä, 18.VII.1964 Takala (H). **Pohjois-Karjala.** Joensuu, Tuupovaara, Rekivaara, Takala 3650 (H). Polvijärvi, Sotkuma, 11.X.1964 Lehvälaiho (H). **Keski-Pohjanmaa.** Kokkola, Kälviä, Peitso, 1.VIII.1923 Kujala (H). **Kainuu.** Kajaani, Nuasjärvi, 6.VIII.1921 Huuskonen (H). **Perä-Pohjanmaa.** Simo, Syvälahti, 23.IX.1922 Räsänen (H). **Koillismaa.** Kuusamo, Paljakka, 8.VII.1981 Alava 19635, 19636, 19638 (TUR). **Enontekiön Lappi.** Enontekiö, between Palojoensuu and Muotkajärvi, 22.VII.1956 Huuskonen (H). **Inarin Lappi.** Inari, Sarviniemi, 7.VII.1910 Renvall (H).

***Nectriopsis lecanodes* (Ces.) Diederich & Schroers**
– Figs. 19, 45 S

Ascomata perithecioid, 0.18–0.26 mm, globose to subglobose, white, hairy or pruinose. *Asci* 39–70 × 4–8 µm, mean 53.4 × 6.0 µm (n=14, three collections), cylindrical, very thin-walled but slightly thickened at apex, 8-spored. *Ascospores* 8–11 × 2.5–4 µm, mean 9.6 × 3.5 µm (n=30, three collections), ellipsoid, slightly verruculose, septate, sometimes slightly constricted at septum, may contain guttules. *Setae* 2 µm diam, septate. *Excipular cells* rounded, thin-walled, 4–8 µm diam.

Hosts: *Peltigera aphthosa*, *P. canina*, *P. collina*, *P. malacea*, *P. neopolydactyla*, *P. praetextata*, *P. rufescens*. Also found during this study on *Neph-*

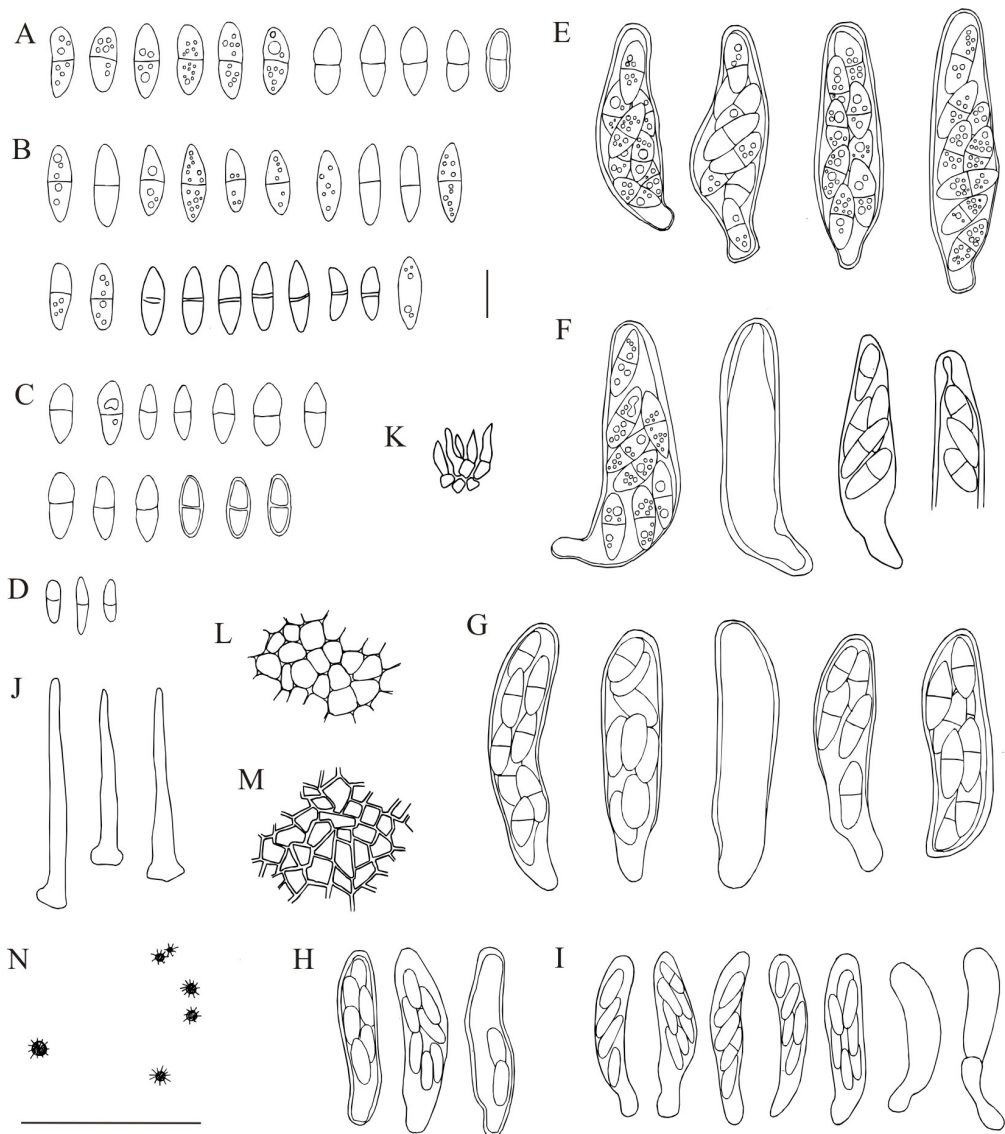


Fig. 20. *Niesslia peltigericola* (A, E, L, N = 1958 *Huuskonen*; B, F = *Takala 1271*; C, G = 1936 *Auer*; D, H, J, M = 1873 *Lang*; I = 1981 *Kvist*; K = 1955 *Henssen*), A–D = ascospores, E–I = asci in different stages of maturity, J = setae, K = cells on excipulum, L = medullary excipulum, M = ectal excipulum, N = perithecia. Bars (A–M) 10 µm, (N) 1 mm.

roma resupinatum (L.) Ach. and *Lobaria scrobiculata* (Scop.) DC.

The ascomata of *Nectriopsis lecanodes* are superficial and scattered on the dorsal cortex of the host thallus. Reported also from Norway and Sweden.

Specimens studied: **Ahvenanmaa.** Kökar, 15.VI.1934 *Kari*, on *Lobaria scrobiculata* (TUR). **Varsinais-Suomi.** Lohja, 6.IX.2008 *Pykälä 33671* (H). Salo, Särkisalo, Förby, 1.VIII.1985 *Alava 21256* (TUR). Turku, 15.X.1938 *Laurila* (H); Ispoinen, 8.IX.1908 *Linkola* (H); Kakskerta, 17.VIII.1934 *Kari* (TUR), 15.VII.1934 *Kari* (TUR); Ruisalo, 11.IX.1932 *Kari* (TUR). Vihti, Olkkala, 2.IV.1897 *Lång* (H). **Uusimaa.** Hanko, Tvärminne, 9.VIII.1978 *Vitikainen 8680* (H)*. Tuusula 12.X.1941 *Häyrén* (H). **Etelä-Häme.** Hartola, 23.VII.1945 *af Hällström* (H)*.

Jyväskylä, Korpilahti, 1873 *Vainio*, on *Nephroma resupinatum* (TUR). Koski 1871 *Vainio* (TUR). **Etelä-Savo**. Kouvola, 14.X.1951 *Klingstedt* (H)*.

Niesslia peltigericola (D. Hawksw.) Etayo
– Figs. 20, 45 T

Ascomata perithecioid, superficial, globose, black, 40–80 µm diam, setose. *Setae* prominent, 20–48 µm long, usually in the upper part of the perithecium. *Asci* 40–58 × 10–14 µm, mean 49.7 × 12.7 µm (n=20, three collections), bitunicate, cylindrical or sack-shaped, hyaline, CR–. *Ascospores* 10–15 × 4–4.5 µm, mean 13 × 4.8 µm (n=30, three collections), spindle-shaped, thin-walled, septate, sometimes slightly constricted at septum, with or without guttules. *Paraphyses* not present. *Ectal excipulum* of *textura angularis*, cells thick-walled, 4–6 µm diam. *Medullary excipulum* of *textura globosa*, cells 4–6 µm diam.

Hosts: *Peltigera aphthosa*, *P. leucophlebia*, *P. malacea*, *P. scabrosa*. Reported also on *P. britannica* (Gyeln.) Holt.-Hartw. & Tønberg (Nordin et al. 2010).

Niesslia peltigericola has a typical pyrenomycetous appearance, with its dark, setose, perithecia, which form in abundance both on the dorsal and ventral sides on older, dying or dead lobes of the host thalli. The species is common and widespread in Finland. It was first recorded from Finland by Toivanen (2008).

Selected specimens studied (out of 113): **Ahvenanmaa.** Hammarland, Signilskär, 15.VI.1969 *Björkwall* (H)*. **Varsinais-Suomi.** Karjalohja, Karkali, 31.V.1962 *Suominen & Koponen 4148* (H). Uusikaupunki, Arvassalo, 8.IV.1981 *Laine* (TUR). **Uusimaa.** Askola, Monninkylä, 25.VII.1940 *Tynni* (H). Raasepori, Tammisaari, Österby, 23.XI.1929 *Häyrén* (H). **Etelä-Karjala.** Kouvola, Anjalankoski, 21.VII.1969 *Fagerström* (H). Ylämaa, Hujakkala, 29.IV.1941 *Laurila* (H). **Satakunta.** Kankaanpää, Venesjärvi, 8.VII.1934 *Laurila* (H). **Etelä-Häme.** Luhanka, Parish village, 1873 *Lang* (H)*. Ypäjä, Vähäsuu, 4.XII.1966 *Kantee* (H). **Etelä-Savo.** Luumäki, Harattalanjärvi-N, 4.VII.1965 *Takala 1271* (H)*. Suomenniemi, Kiesilä, 8.VIII.1983 *Vitikainen 10725* (H). **Laatokan Karjala.** Parikkala, Kolmikanta, 18.IV.1987 *von Bach 139* (H). **Etelä-Pohjanmaa.** Isokyrö, Orisberg, 12.VI.1903 *Rancken* (H). Kristiinankaupunki, Lappfjärd, Pyhävuori, 3.V.1953 *Railonsala* (TUR). **Pohjois-Häme.** Jyväskylä, 21.VI.1912 *Leino* (H); Saarijärvi, Parish village, 23.IX.1959 *Ahti 9011* (H). **Pohjois-Savo.** Kuopio,

Neulamäki, 11.V.1947 *Huuskonen* (TUR). **Pohjois-Karjala.** Ilomantsi, Hattu, Ahopelto, 5.VIII.1968 *Maksimainen* (H). **Keski-Pohjanmaa.** Kokkola, Kaarlela, 23.V.1967 *Takala 3197* (H). **Kainuu.** Ristijärvi, Mustavaara, 27.VI.1936 *Auer* (H*, TUR). **Oulun Pohjanmaa.** Oulunsalo, Sanginjoki, 8.X.1973 *Ulvinen* (H). **Perä-Pohjanmaa.** Pello, Juoksenjoki, 19.VIII.1970 *Vitikainen 6622* (H). **Koillismaa.** Salla, NE of church, 31.VII.1964 *Suominen* (H); Ruuhijoki, 5.VII.1981 *Kvist* (H)*. **Kittilän Lappi.** Kittilä, Alakylä, 20.IX.1956 *Ahti* (H); Isovaara, 17.VI.1908 *Lång* (H). **Sodankylän Lappi.** Sodankylä, Nattastunturit, 10.VI.1959 *Ahti 10156* (H). **Enontekiön Lappi.** Kilpisjärvi, Saana, 18.VI.1955 *Henssen* (H, two specimens)*; Ropinsalmi, 17.VIII.1958 *Huuskonen* (H)*. **Inarin Lappi.** Utsjoki, Sujala, 11.VIII.1964 *Hakulinen* (TUR).

Peizizella epithallina (W. Phillips & Plowr.)
Sacc. – Figs. 21, 45 U

Ascomata apothecioid, superficial, disc-shaped, plane, 0.2–0.34 mm diam, colour varies from very pale to darker orange, translucent, margins often paler than the disc, very shortly stipitate, often appearing sessile. *Asci* cylindrical-clavate, unitunicate, 63–105 × 10–15 µm, mean 84.7 × 12.4 µm (n=20, one collection), thickened at the apex, 8-spored. *Ascospores* 10–14 × 4–7 µm, mean 11.3 × 4.6 µm (n=30, one collection), elongate-ellipsoid, simple, occasionally septate, slightly attenuated at the other end. *Paraphyses* of ascus length, 2 µm wide, septate, slightly swollen at the apices. *Ectal excipulum* parenchymatous, composed of thin-walled cells, 5–7 µm diam.

Hosts: *Peltigera rufescens*. Reported also on *P. lepidophora* and *P. membranacea*.

The superficial orange apothecia of *Peizizella epithallina* on the dorsal cortex of the host make this lichenicolous microfungus easily visible. This rare species was first recorded from Finland by Toivanen (2008). Reported also from Norway and Sweden.

Specimens studied: **Varsinais-Suomi.** Parainen, 9.X.1969 *Alava* (TUR). **Etelä-Häme.** Kuhmoinen, Puukkostenkylä, 21.X.1911 *Linkola* (H)*.

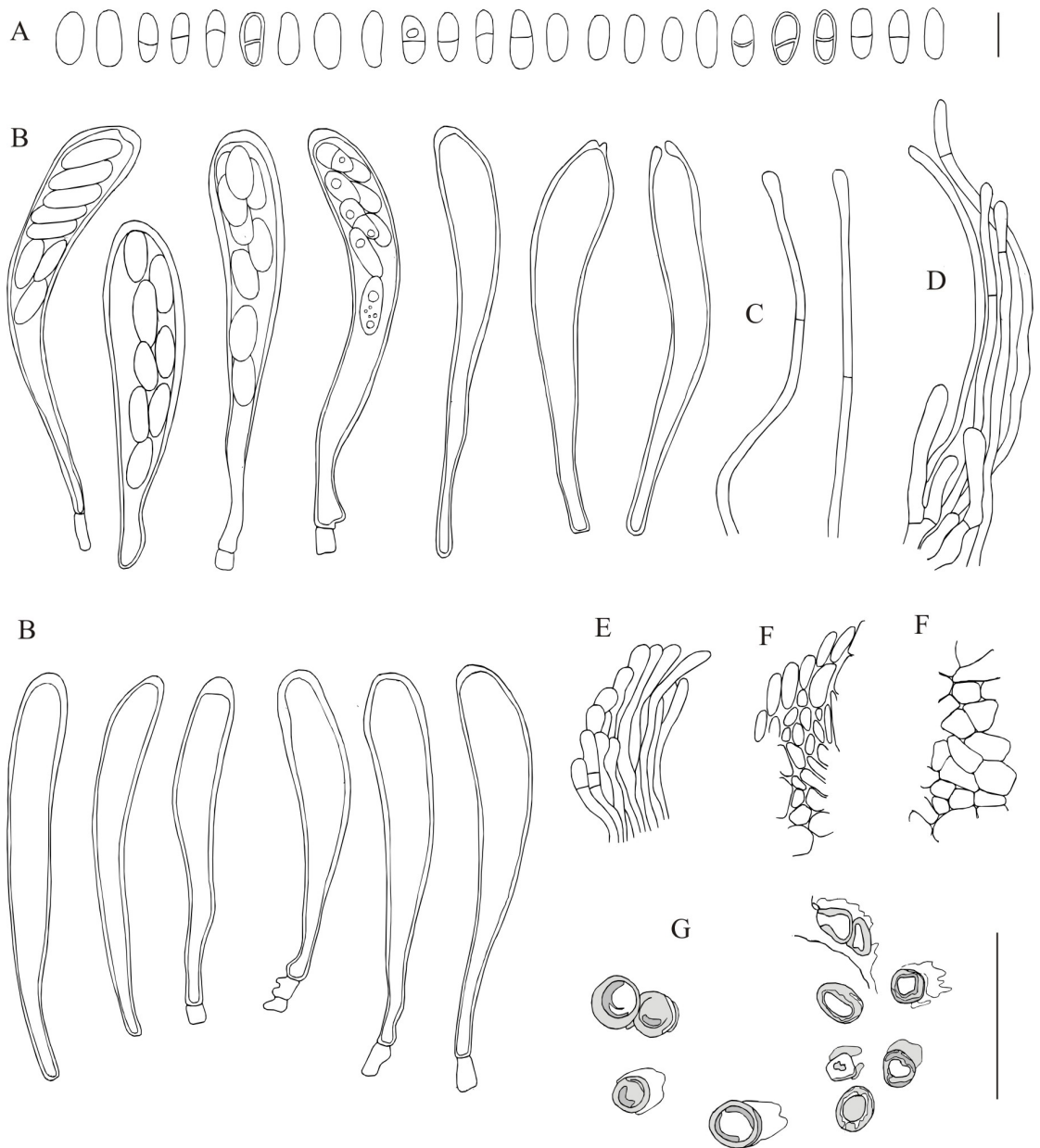


Fig. 21. *Pezizella epithallina* (1911 Linkola), A = ascospores, B = asci in different stages of maturity, C = paraphyses, D = paraphyses and unripe asci, E = detail of apothecial margin, F = excipulum, G = apothecia. Bars (A–F) 10 μ m, (G) 1 mm.

***Phoma epiparmelia* Vouaux – Figs. 22, 45 V**

Pycnidia globose, black, immersed, with only the ostiole visible. *Conidia* 4–6.5 \times 2–4 μ m, mean 5.2 \times 2.9 μ m (n=30, one collection), glo-

bose-ellipsoid. *Pycnidial* wall pseudoparenchymatous, cells 4–8 μ m diam.

Hosts: *Peltigera aphthosa*, *P. leucophlebia*.

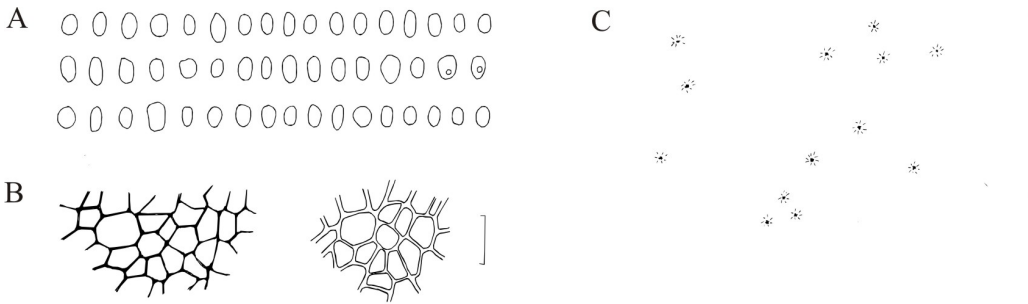


Fig. 22. *Phoma epiparmelia* (1925 Linkola), A = conidia, B = detail of host cortex cells, C = openings of pycnidia on dorsal side of host cortex. Bars (A, B) 10 μ m, (C) 1 mm.

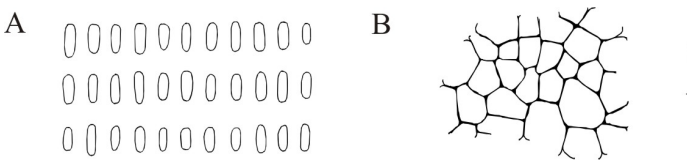


Fig. 23 *Phoma peltigerae* (1950 Fagerström), A = conidia, B = detail of host cortex cells. Bar 10 μ m.

Phoma epiparmelia lives on the dorsal host thallus and does not harm its host. May be confused with *Phoma peltigerae*. The species is reported as new to Finland.

Specimens studied: **Ahvenanmaa.** Jomala, Kungö, 13.V.1940 *Fagerström* (H). **Uusimaa.** Pernaja, Hardom, 3.VIII.1956 *Klingstedt* (H). **Koillismaa.** Salla, Kaunisjärju, 18.VII.1981 *Kvist* (H).

Phoma peltigerae (P. Karst.) D. Hawksw.
– Figs. 23, 45 W

Pycnidia globose, black, immersed, only the ostiole visible. *Conidia* 3.5–6.5 \times 1.5–2 μ m, mean 5.1 \times 1.7 μ m (n=30, three collections), elongate, hyaline. *Pycnidial wall* pseudoparenchymatous, cells 6–9 μ m diam.

The pycnidia of *Phoma peltigerae* form mostly on the dorsal host thallus either scattered or in groups. The infected area is darker than the normal colour of the host thallus. *Phoma peltigerae* differs from *Phoma epiparmelia* by its more elongate conidia and larger cells.

Hosts: *Peltigera aphthosa*, *P. canina*, *P. didactyla*, *P. leucophlebia*, *P. praetextata*, *P. rufescens*.

Specimens studied: **Ahvenanmaa.** Lemland, Nåtö, 30.VIII.1968 *Hæggström* (H). Lohja, Jantoniemi 28.V.1951 *Pusa* (H); Varola, 1.X.2005 *Pykälä* 28096 (H); Immula, 6.IX.2008 *Pykälä* 33666 (H). Turku, Ispoinen 8.IX.1908 *Linkola* (H); Ruissalo 11.IX.1932 *Kari* (TUR). **Uusimaa.** Espoo, Westend 11.XI.1936 *Malmström* (H). Helsinki, X.1896 *Lång* (H). Nurmijärvi, Kiljava railway stop, 15.VI.1964 *Suominen* (H). Orimattila, Niemi, 2.IX.1914 *Linkola* (H). Sipoo, Räberget 23.VIII.1944 *af Hällström* (H). Vantaa, Kärböle, 1.V.1942 *Marklund* (H). **Satakunta.** Pori, Toukari, 12.V.1950 *Isoviita* (H). **Etelä-Häme.** Hämeenlinna, Aulangonvuori, 6.VIII.1933 *Häyrén* (H); Lammi, Evo, 1874 *Norrin* 248b (H); Evo, Vahtervehmas, 25.X.1964 *Koponen & Suominen* (H). Orivesi, Längelmäki, 18.VIII.1952 *Pusa* (H). Nokia, Siuro, 27.7.1990 *Kääntönen* (H). Urjala, Kivijärvi, 10.IX.1950 *Fagerström* (H). **Etelä-Savo.** Kouvola, Valkeala, 16.VI.1990 *Kuusinen* 2700 (H). **Etelä-Pohjanmaa.** Alavus, Keskikylä, 2.VI.1947 *Leppälä* (H). **Pohjois-Häme.** Ähtäri 5.VII.1940 *Tynni* (H). **Pohjois-Savo.** Mikkeli, Haukivuori, 6.VI.1965 *Takala* 954 (H). Iisalmi 20.VI.1945 *Huuskonen* (H). **Pohjois-Karjala.** Juuka, Polvela, 7.VIII.1971 *Takala* 7511 (H). Lieksa, Paha-Koli, 19.VIII.1983 *Kvist* (H). Ruunaa, Tienpää 31.V.1938 *Lömfors* (H). Juankoski, Säyneinen, 29.VII.1970 *Vitikainen* 6076 (H). Joensuu, Tuupovaara, 29.VIII.1967 *Takala* 3591 (H); Tuupovaara, Öllölä, 29.X.1967 *Takala* 3738 (H). Tohmajärvi, Värtsilä, 17.VI.1915 *Linkola* (H). **Perä-Pohjanmaa.** Simo, Pahnla, 24.VII.1951 *Hakulinen* (H).

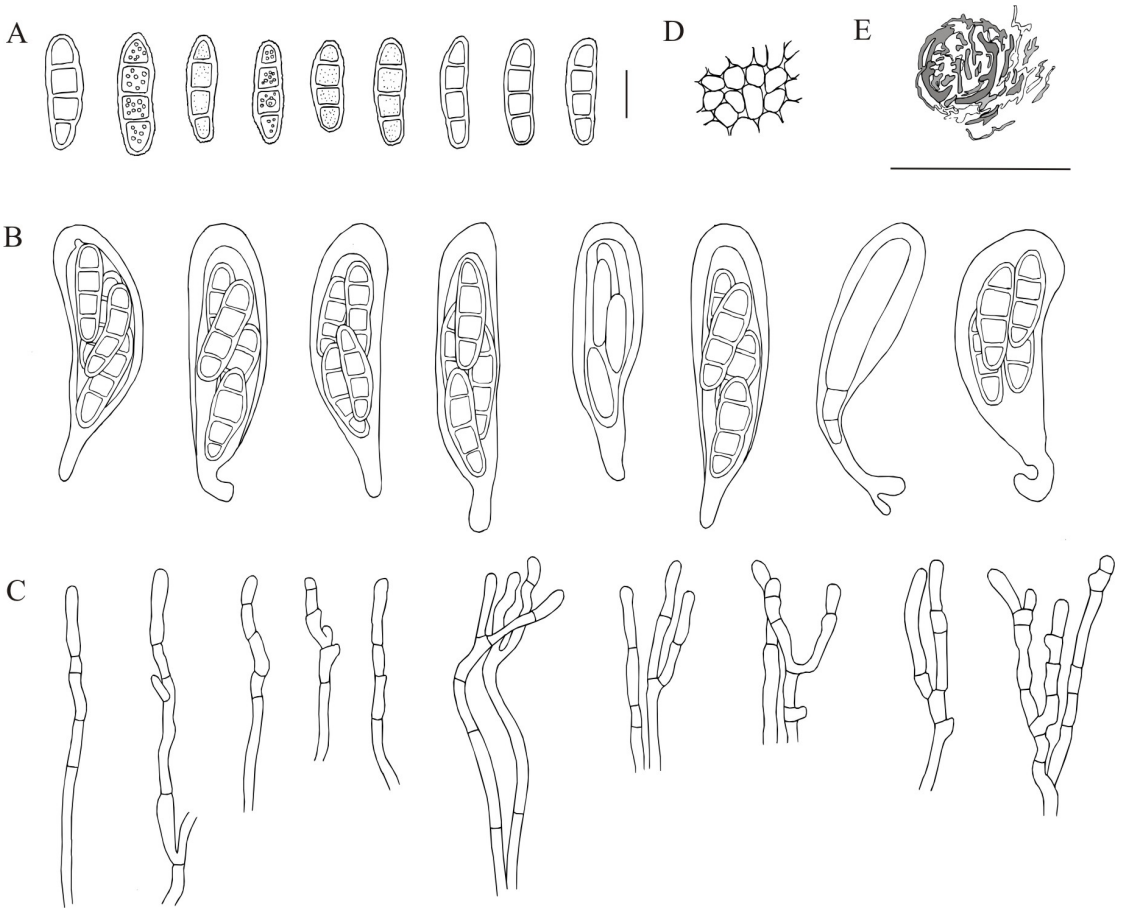


Fig. 24. *Plectocarpon peltigerae* (Haikonen 21623), A = ascospores, B = asci, C = paraphyses, D = excipulum, E = elevated patch on host thallus caused by *P. peltigerae*. Bars (A–D) 10 μ m, (E) 1 mm.

Koillismaa. Kuusamo, Paljakka, 14.VI.1980 *Vitikainen* 10072 (H). **Inarin Lappi.** Inari, E of Sevetijärvi road, 22.VII.1974 *Kvist* (H). Utsjoki, Kevo, Könkäänpahta, 21.VIII.1974 *Ahti & Vitikainen* 8284 (H).

Plectocarpon peltigerae Zhurb., Ertz, Diederich & Miqdl. – Figs. 24, 45 X

Ascomata stromatic, gall-forming, 0.5 mm diam. *Asci* 44–66 \times 13–16 μ m, mean 55.8 \times 14.5 μ m (n=12, one collection), clavate with thick and hyaline walls, thickened at the apex, 4-spored. *Ascospores* 19–24 \times 4.5–7.5 μ m, mean 21.2 \times 5.9 μ m (n=30, one collection), 3-septate, slightly constricted at septa, cell walls thick and hyaline

(CR–), slightly verrucose at surface, young spores smooth, with or without guttules. *Paraphyses* 2 μ m diam, longer than asci, apices slightly swollen. *Ectal excipulum* composed of dark, almost black, thin-walled cells, 3–5 μ m diam.

Host: *Peltigera leucophlebia*. The species has also been reported from *Peltigera aphthosa* (Nordin et al. 2010).

Plectocarpon peltigerae forms black, stromatic, elevated ascomata on the dorsal cortex of its host. The ascomata are surrounded by a circular depression and a flat, brown, external ring. Superficially this species may be confused with *Arthonia fuscopurpurea* or *A. peltigerea* which

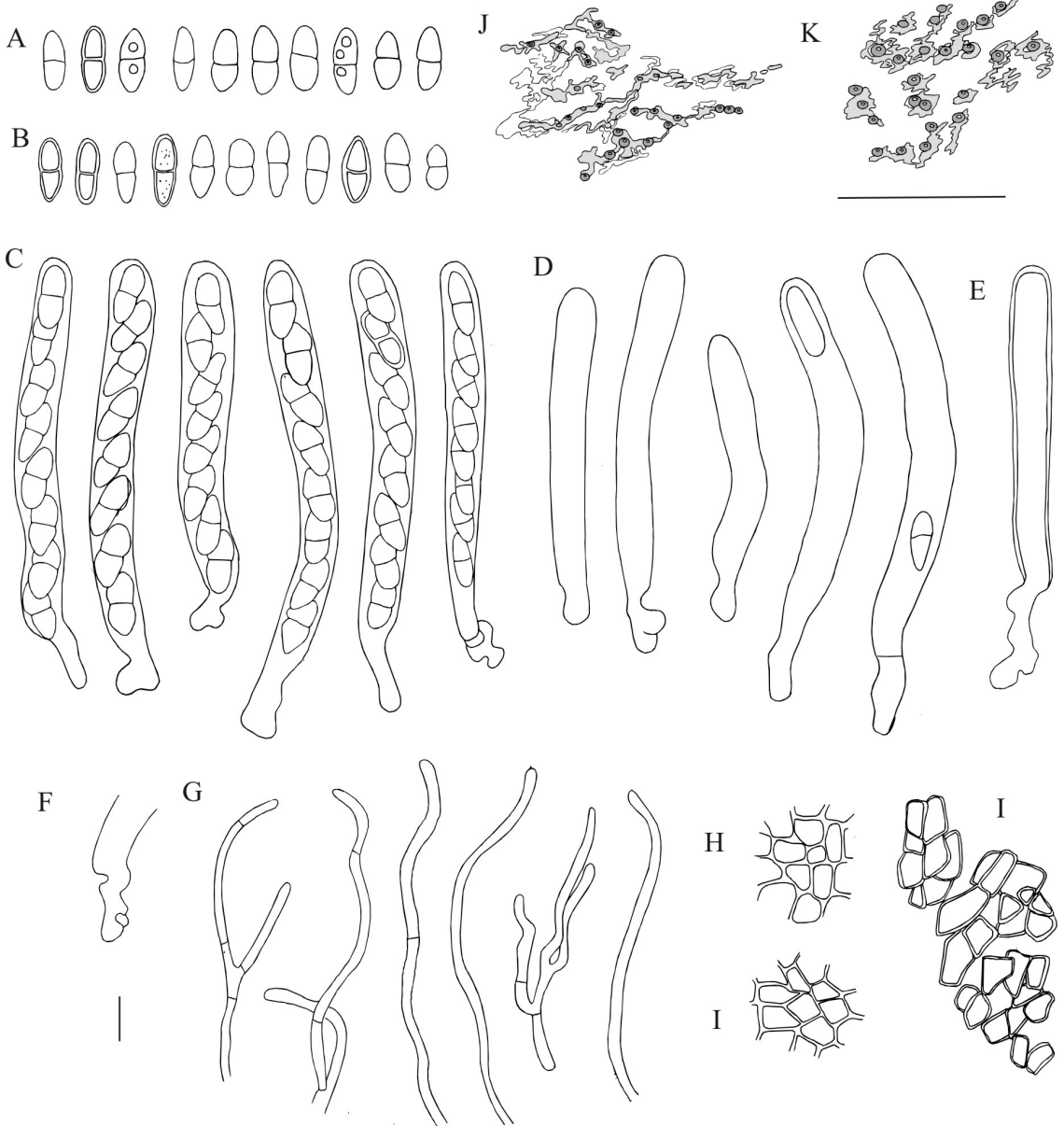


Fig. 25. *Polycoccum peltigerae* (A, C = 1915 Räsänen; B, D, I = 1935 Laurila; E–H, J = 1937 Häyrén; K = 1966 Roinainen), A, B = ascospores, C = mature asci, D, E = young asci, F = ascus base, G = pseudoparaphyses, H = medullary excipulum, I = ectal excipulum, J, K = ostioles of perithecia visible in host cortex. Bars (A–I) 10 µm, (J, K) 1 mm.

have a somewhat similar growth manner also on *Peltigera*. However, its ascomata are more gall-like and in the presence of mature asci, it is easily distinguished by its 3-septate ascospores. The species was first recorded from Finland by

Toivanen (2008). Reported also from Norway and Sweden.

Specimen studied: Pohjois-Karjala. Juuka, Pääkylä, 13.VIII.2002 Haikonen 21623 (H)*.

Polycoccum peltigerae (Fuckel) Vězda
– Figs. 25, 46 Y

Ascomata immersed, globose, dark-brown to black, ostiolar area erumpent. *Asci* 65–111 × 8–11 µm, mean 87.5 × 9.5 µm (n=20, three collections), bitunicate, elongate-clavate. 8-spored. *Ascospores* 10–16 × 4.5–6 µm, mean 13.5 × 5.2 µm (n=30, three collections), ellipsoid, thin-walled, septate, slightly constricted at septum. *Pseudoparaphyses* branched, septate, 2 µm diam. *Ectal excipulum* of *textura angularis*, cells thick-walled, 10 µm diam. *Medullary excipulum* of *textura globulosa*, cells 4–10 µm diam.

Hosts: *Peltigera didactyla*, *P. praetextata*, *P. rufescens*, *P. polydactyla*. Reported also from *P. canina* (Hawksworth 1978).

Polycoccum peltigerae causes necrotic, 2–3 mm wide, gall-like swellings on the dorsal thallus of the host. The ascomata are immersed but the papillate ostioles break through the cortex and are visible either in a scattered fashion or in circular formations. *Polycoccum peltigerae* has a *Cyclothyrium*-type anamorph (Kirk et al. 2001). Reported also from Sweden.

Specimens studied: **Varsinais-Suomi.** Lohja, Jalassaari, 19.IX.1917 Lindberg (H); Muijala, 18.V.2003 Pykälä 22765, 22769 (H); 28.IV.2007 Pykälä 30831 (H); Ojamo, 18.IV.2005 Pykälä 26582, 26584, 26600 (H). Paimio, Huso, 9.XI.1972 Alava 11422 (TUR). Parainen, Ersby, 12.X.1969 Alava 8379a, 8392a (TUR). Raasepori, Pohja, Ekerö, 12.IX.1937 Häyrén (H)*. Turku, Ispoinen, 29.IV.1923 Vainio (TUR); Muhkuri, 8.VI.1936 Auer (TUR); Ruissalo, 22.VII.1922 Kari (TUR). Kemiön-saari, Västanfjärd, Västerlillo, 5.X.1966 Roivainen (H)*. **Uusimaa.** Helsinki, Laajasalo, 5.X.1924 Häyrén (H). Lapinjärvi, Käkikoski, 23.IX.1989 Haikonen 10952 (H). Vantaa, Korso, 3.X.1915 Räsänen (H)*. **Satakunta.** Kankaanpää, Luomajärvi, 29.VI.1935 Laurila (H)*, TUR). **Etelä-Häme.** Hattula, Ellilä, 22.VIII.1933 Linkola (H). Hollola, Harsala, 1872 Vainio (TUR). **Etelä-Savo.** Imatra, Linnankoski, 24.IV.1991 Thurén 1473 (H). **Pohjois-Häme.** Jyväskylä, Tourujoki, 21.VI.1913 Linkola (H). **Pohjois-Savo.** Kuopio, Särkilähti, 30.VII.1935 Linkola (H).

Polycoccum superficiale D. Hawksw. & Miądl.
– Fig. 46 Z

Ascomata perithecioid, superficial, dark-brown to blackish. *Asci* bitunicate, 8-spored. *Ascospores* elongate-ellipsoid, septate, constricted

at septum, brown, smooth. *Pseudoparaphyses* branched and septate.

Host: *Peltigera canina*. Reported also from *Peltigera malacea*.

Polycoccum superficiale forms superficial dark-coloured perithecia on the dorsal side of the host thallus. The species was first recorded from Finland by Toivanen (2008). Reported also from Sweden.

Specimens studied: **Varsinais-Suomi.** Parainen, Houtskär, Hyppeis, 1.VII.1991 Bruun (H). **Uusimaa.** Tammissaari, Alglo 2.VIII.1978 Vitikainen 9706 (H).

Polydesmia lichenis Huhtinen & R. Sant.
– Figs. 26, 46 AA

Ascomata apothecioid, superficial, 0.16–0.34 mm diam. from light yellow to light brown, margins often paler than the disc, pruinose, margin and flanks hairy, sessile. *Asci* 83–120 × 9–13 µm, mean 101.7 × 10.2 µm (n=31, two collections), cylindric-clavate, abundant. *Ascospores* 10–25 × 3–5 µm, mean 15.9 × 4.1 µm (n=31, two collections), ellipsoid to elongate, length varies, 0–3-septate, may contain greenish guttules. *Paraphyses* ca 2 µm wide, thin, undulating, septate, branching. *Ectal excipulum* of *textura angularis*, cells 2–5 µm diam. *Hairs* thin, undulating.

Hosts: *Peltigera aphthosa*, *P. leucophlebia*.

Polydesmia lichenis has a very characteristic appearance, with its superficial, white, pruinose apothecia, that usually occur in groups on the older parts of the host, usually on the dorsal side, but occasionally also ventrally. The species was first recorded from Finland by Toivanen (2008). Reported also from Norway and Sweden.

Specimens studied: **Varsinais-Suomi.** Lohja, Immu-la, 6.IX.2008 Pykälä 33668 (H). **Uusimaa.** Helsinki, Huopalahti, 8.X.1911 Kivenheimo (H). Kirkkonummi, Porkkala, 13.XII.1987 Heino 170 (H)*. **Etelä-Häme.** Hattula, Pekola, 20.IX.1931 Häyrén (H)*. Kuhmoinen, Tehi, 18.X.1911 Linkola (H)*. Hämeenlinna, Lammi, Evo, 25.X.1964 Koponen & Suominen (H)*. **Etelä-Savo.** Suomenniemi, Kiesilä, 8.VIII.1983 Vitikainen 10712 (H)*. **Pohjois-Karjala.** Juuka, Tahkovaara, 22.VIII.1960 Huuskonen (H)*. Joensuu, Tuupovaara, Töppyniemi, 13.X.1967 Takala 3710 (H)*.

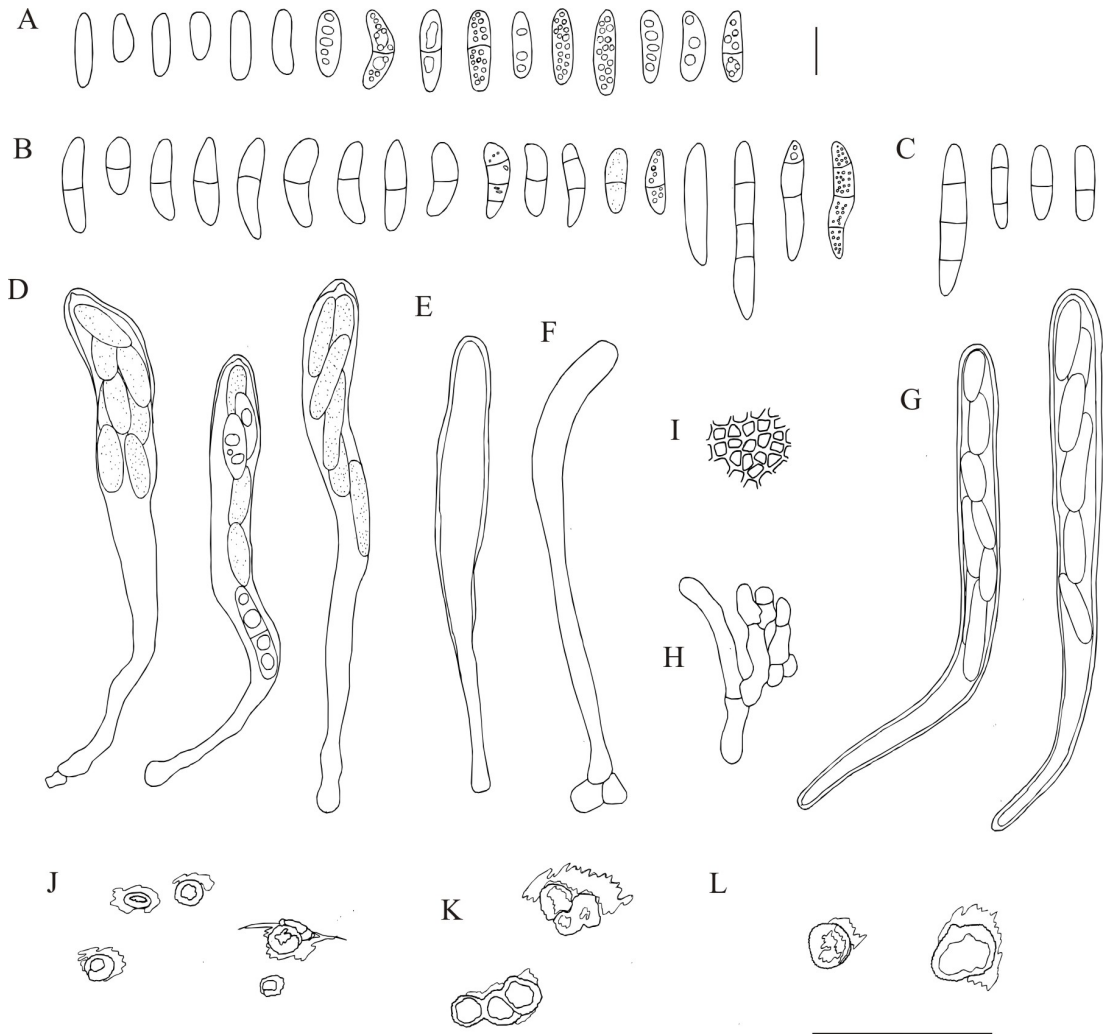


Fig. 26. *Polydesmia lichensis* (A, D, F, L = 1960 Huuskonen; B, E, H, I = Heino 170; C, G, K = 1911 Linkola; J = 1931 Häyrén), A–C = ascospores, D–G = asci in different stages of maturity, H = ascogenous cells with croziers, J–L = apothecia, I = excipulum. Bars (A–I) 10 μ m, (J–L) 1 mm.

***Pronectria erythrinella* (Nyl.) Lowen**
– Figs. 27, 46 BB

Ascomata perithecioid, immersed in the host thallus, with only the neck and ostiole erumpent, white to yellowish, the exposed part ca 0.2 mm diam. *Asci* 52–84 \times 7.5–10 μ m, mean 62.5 \times 8.8 μ m (n=20, three collections), cylindrical, thickened at the apices, 8-spored. *Ascospores* 13–22 \times 4–7 μ m, mean 17.7 \times 5.4 μ m (n=30, three

collections), roundly ellipsoid, smooth, thin-walled, septate, sometimes slightly constricted at septum, may contain guttules. *Periphyses* thin, short.

Hosts: *Peltigera canina*, *P. didactyla*, *P. hymenina*, *P. leucophlebia*.

The ascomata of *Pronectria erythrinella* are immersed in the dorsal host thallus in dense groups, only the erumpent necks are visible through

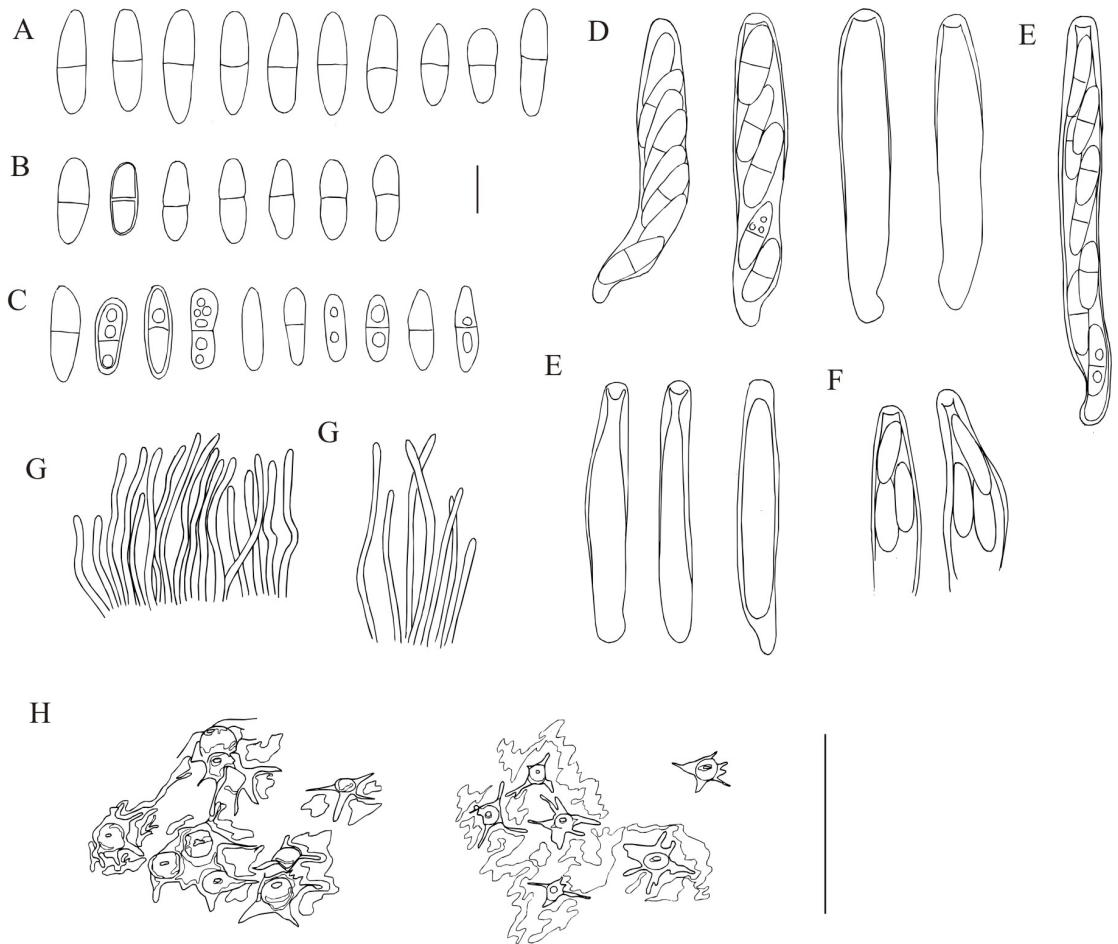


Fig. 27. *Pronectria erythrinella* (A= 1956 Klingstedt; B, D, G = 1926 Peltomaa; C, E, F = 1964 Suominen; H = 1911 Linkola), A–C = ascospores, D, E = asci, F = tips of asci, G = periphyses, H = necks of ostioles rupturing the host cortex. Bars (A–G) 10 μ m, (H) 1 mm.

cracks in the host cortex. The infection sites are grayish indicating that the species may be harmful to its host. *P. erythrinella* has an *Illosporium*-type anamorph.

Specimens studied: **Varsinais-Suomi.** Turku, Kårsämäki, 1.VI.1936 Auer (TUR); Kaarinan hautausmaa, 29.VI.1950 Merisuo (TUR). **Uusimaa.** Espoo, railway station, 12.XI.1911 Linkola (H). Sipoo, Träsk, 13.X.2006 Pykälä 29824 (H). Loviisa, Ruotsinpyhtää, Strömfors industrial area, 11.X.1956 Klingstedt (H). Hanko, Tvärminne, 7.VIII.1907 Koponen (H); Långskär 11.VIII.1907 Brofeldt (TUR). **Etelä-Häme.** Kuhmoinen, Savi-Hukki 21.X.1911 Linkola (H). Kärkölä, Järvelä, 30.VII.1926 Peltomaa (H); Järvelä, Pappila, 30.VII.1926 Peltomaa (H). **Etelä-Savo.** Imatra, Vuoksenniska, 19.VI.1922 Linkola (H). **Etelä-Pohjanmaa.** Kurikka, Mieto,

2.VII.1965 Suominen (H). **Pohjois-Häme.** Laukaa, Karlvik 6.VII.1913 Linkola (H); Nurmijärvi, Saviniemi 17.VII.1962 Hakulinen (TUR). **Pohjois-Savo.** Kuopio, Suovu, 3.VI.1906 Linkola (TUR). **Kainuu.** Suomussalmi, Ala-Vuokki, 5.VII.1936 Auer (TUR). **Perä-Pohjanmaa.** Kemijärvi, Joutsijärvi, 30.VII.1964 Suominen (H); Joutsijärvi railway yard, 30.VII.1964 Suominen (H). Rovaniemi, Muurola, 27.VII.1964 Suominen (H). **Kuusamo.** Salla, Kuoppasjoja, 31.VII.1964 Suominen (H); Pieni Pyhäntunturi 4.VII.1981? (H). **Kittilän Lappi.** Kittilä, Tepesto, 25.VII.1977 Ulvinen (TUR). **Inarin Lappi.** Utsjoki, Nuorgam, 12.VIII.1962 Hakulinen (TUR); Vetsikko, 17.VI.1980 Kvist (H).

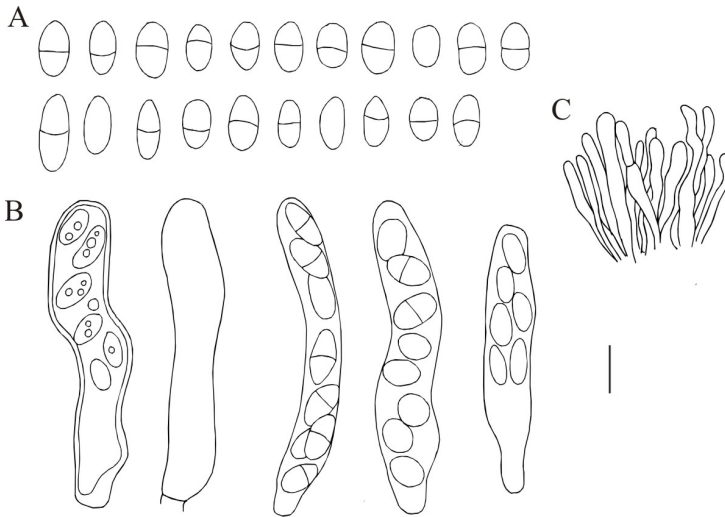


Fig. 28. *Pronectria robergei* (1939 Fagerström), A = ascospores, B = asci in different stages of maturity, C = periphyses. Bar 10 μ m.

Pronectria robergei (Mont. & Desm.)
Lowen – Figs. 28, 46 DD

Ascomata perithecioid, immersed in the host thallus, with only the neck and ostiole erumpent, yellowish, the exposed part 0.15–0.2 mm diam. *Asci* 42–67 \times 7–12 μ m, mean 59.1 \times 9.4 μ m (n=12, one collection), cylindrical, thin-walled, 8-spored. *Ascospores* 6.5–11.5 \times 3–6.5 μ m, mean 9.7 \times 5.2 μ m (n=30, one collection), roundly ellipsoid, smooth, thin-walled, septate, sometimes slightly constricted at septum, may contain guttules when young. *Periphyses* thin, thread-like.

Hosts: *Peltigera rufescens*, *P. didactyla*. Reported also from several other *Peltigera* species.

The ascomata of *Pronectria robergei* are immersed in the host thallus in dense groups. The infection sites are greyish, indicating that the species may be harmful to its host. Reported also from Norway and Sweden.

Specimens studied: Uusimaa. Helsinki, Pukinmäki, 5.V.1939 Fagerström (H)*; Santahamina, Österudden, 2.X.1979 Pekanpalo 349 (H). Etelä-Karjala. Lappeenranta, Ylämaa, 4.VII.1965 Vitikainen 317 (H)*. Satakunta. Eura, Kauttua, 27.X.1946 Klingstedt (H). Pohjois-Häme. Jyväskylä, Tourujoki, 21.VI.1913 Linkola (H)*.

Pronectria tenuispora (D. Hawksw.)
Lowen – Figs. 29, 46 EE

Ascomata perithecioid, immersed in the host thallus, with only the neck and ostiole erumpent, yellowish to orange, visible part 0.12–0.22 mm diam. *Asci* 68–105 \times 8–12 μ m, mean 83.9 \times 9.9 μ m (n=16, two collections), cylindrical, somewhat cubical and thickened at apex, 8-spored. *Ascospores* 16–22 \times 4.5–7 μ m, mean 18.6 \times 5.9 μ m (n=19, two collections), ellipsoid, hyaline (CR–), septate, septum may be thicker than cell wall, may contain grayish guttules. *Paraphyses* absent. *Periphyses* 1–1.5 μ m diam. *Ectal excipulum* of textura angularis, cells thick-walled. *Medullary excipulum* of thin-walled cells, 4–9 μ m diam.

Hosts: *Peltigera didactyla*, *P. rufescens*.

The ascomata of *Pronectria tenuispora* are immersed in the host thallus with only the protruding neck and ostiole visible. The ascomata of are usually found in the cracking cortex of the dorsal side on older parts of the thallus. The species was recorded as new to Finland by Alstrup (2004).

Specimens studied: Varsinais-Suomi. Lohja, 4.VIII.2006 Pykälä 29194 & Jääskeläinen (H); Kutsila,

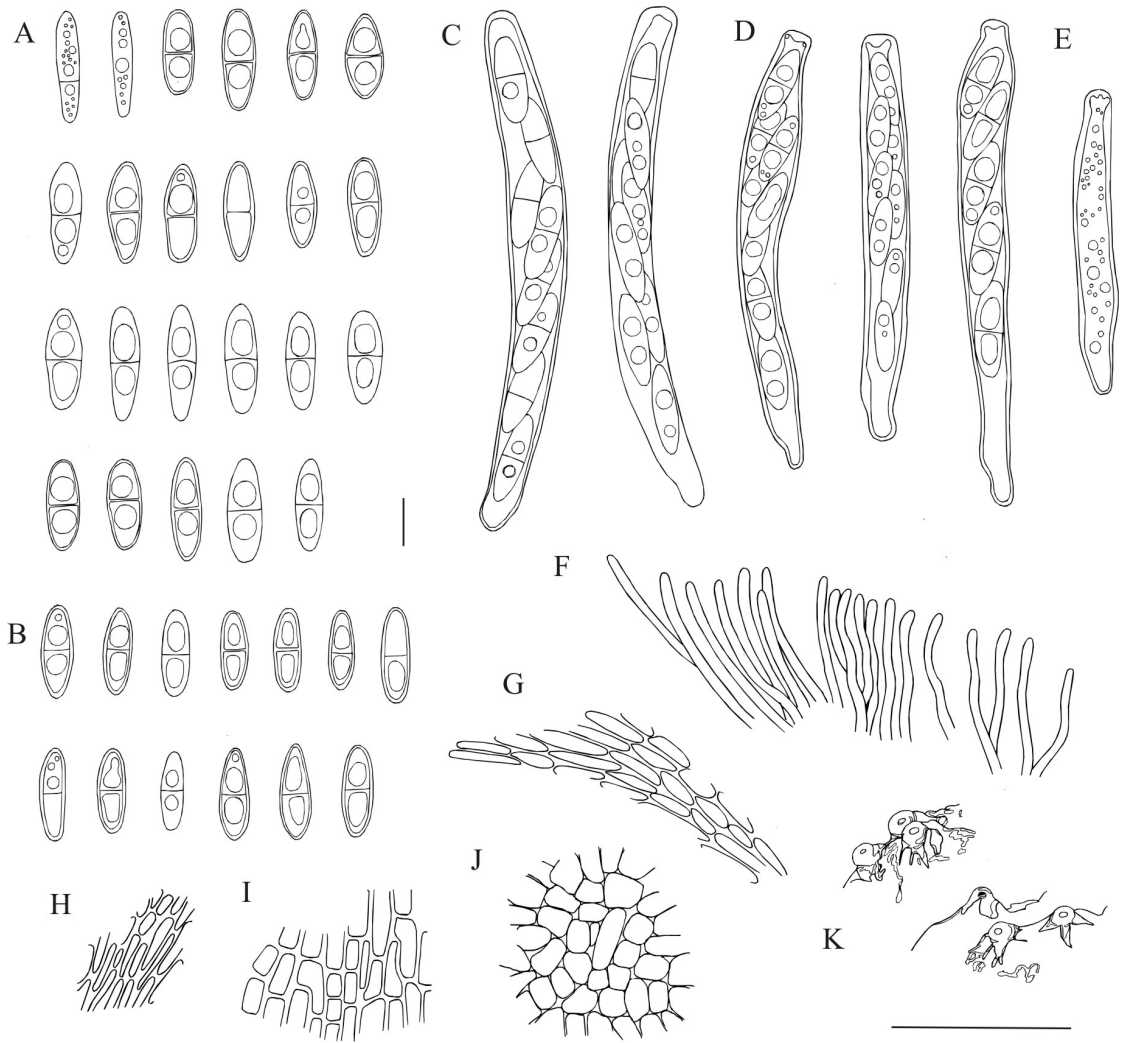


Fig. 29. *Pronectria tenuispora* (A, C, E–G, K = Haikonen 23669; B, D, H–J = Haikonen 24487), A, B = ascospores, C, D = mature asci, E = unripe asci, F = periphyses, G, H = detail from neck of perithecium, I = ectal excipulum, J = medullary excipulum, K = perithecia. Bars (A–J) 10 µm, (K) 1 mm.

9.VII.2004 Pykälä 25023, 27670, 27661, 26584, 27135 (H); Ojamo, 18.IV.2005 Pykälä 26584 (H), 22.VI.2005 Pykälä 27135 (H); Pitkäniemi industrial area, 22.VI.2005 Pykälä 27670, 27661 (H). Parainen, 12.X.1969 *Alava* 8378 (TUR). **Uusimaa**. Sipoo, 13.X.2006 Pykälä 29863, 29864, 29865 (H). **Etelä-Häme**. Kärkölä, Järvelä, 9.X.2005 Haikonen 24487*, 24487 (H). Nastola, Immilä, 15.XI.2003 Haikonen 23113 (H)*. **Etelä-Savo**. Mikkeli, Häppälä, 19.IX.2004 Haikonen 23669 (H)*. **Pohjois-Savo**. Pieksämäki, Virtasalmi, Ankele, 18.VIII.2003 Haikonen 22641 (H). **Kittilän Lappi**. Kolari, Äkäsjokisuu, 13.VII.2003 Haikonen 22557 (H).

***Pyrenidium actinellum* Nyl. – Figs. 30, 46 FF**

Ascomata perithecioid, immersed to partly erumpent, subglobose to obpyriform, dark-brown, rough-surfaced, glabrous. *Asci* 63–99 × 12–16 µm, mean 83.2 × 13.7 µm (n=6, one collection), bitunicate, cylindrical, thick-walled, bent and tapering towards the base, 4-spored. *Ascospores* 18–26 × 7–10 µm, mean 21.6 × 8.3 µm (n=30, two collections), elongate-ellipsoid, 3-septate, constricted at septa, middle cells thick-walled

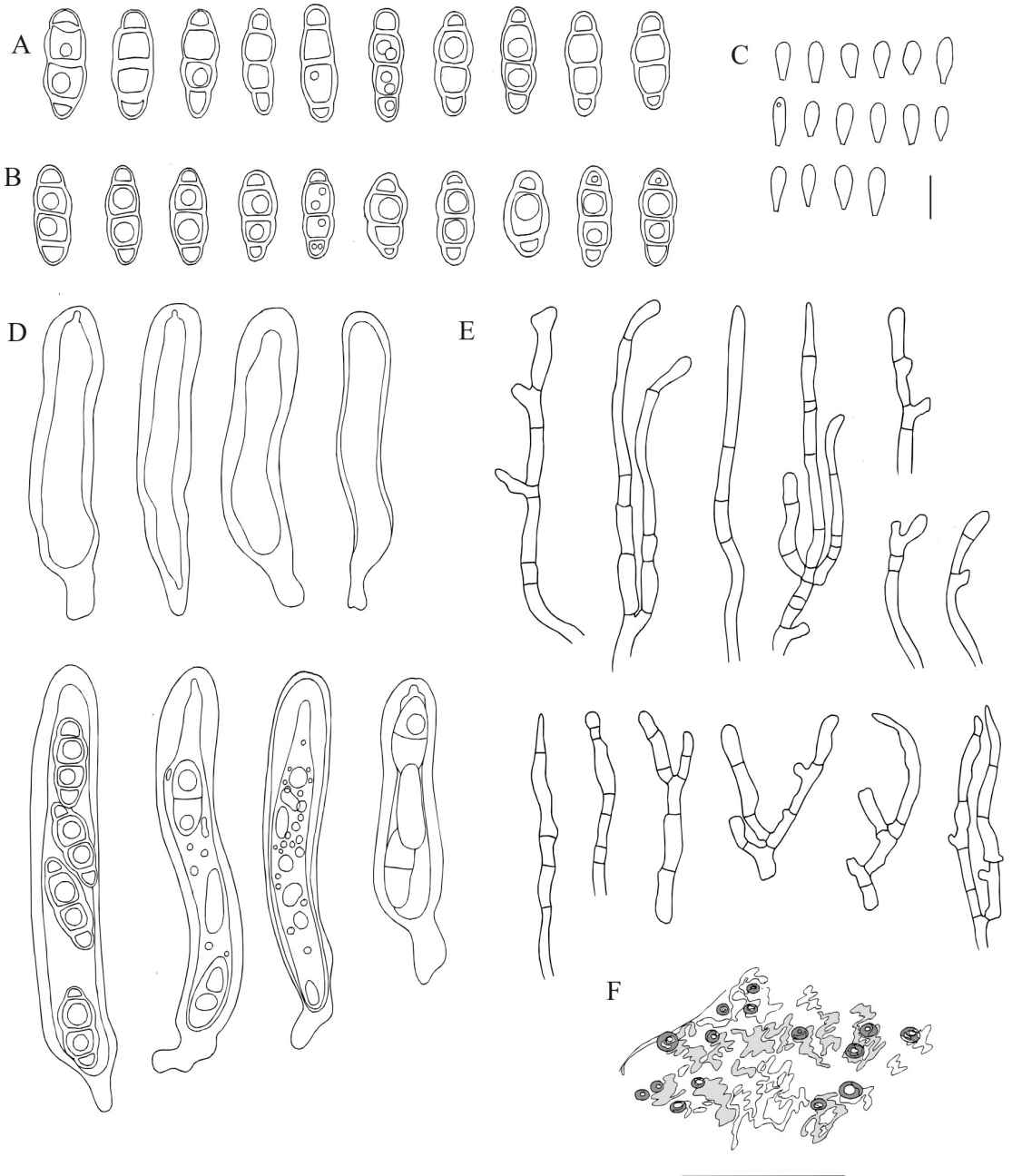


Fig. 30. *Pyrenidium actinellum* (A = 1964 Kytövuori & Kytövuori; B–F = 1986 Alava), A, B = ascospores, C = conidia, D = asci in different stages of maturity, E = paraphyses, F = necks of ostioles in host cortex. Bars (A–E) 10 μm, (F) 1 mm.

and dark, apical cells thin-walled and lighter, with or without guttules. *Pseudoparaphyses* abundant, of ascus length, 2–3 µm diam., branched, septate. *Conidia* 7.5–11 × 3–4.5 µm, drop-shaped, thin-walled, with a thickening at the site of attachment.

Hosts: *Peltigera collina*, *P. rufescens*, *P. venosa* (L.) Hoffm. Also found during this study on *Nephroma expallidum*. *Pyrenidium actinellum* occurs also on several other *Peltigera* species, as well as the lichens *Aspicilia calcarea* (L.) Körb. var. *calcarea*, *Baeomyces rufus* (Huds.) Rebert, *Diploschistes caesioplumbeus* (Nyl.) Vain., *Masalongia carnosa* (Dicks.) Körb., *Solorina crocea* (L.) Ach., *S. saccata* and *Toninia squalida* (Ach.) A.Massal. (Hawksworth 1980).

Pyrenidium actinellum forms dark swellings, 1–2 mm in diam, on the dorsal side of the host thallus, in which the ascomata are crowded. The black perithecia are from immersed to partly erumpent. Reported also from Norway and Sweden.

Specimens studied: **Ahvenanmaa.** Finström, Grelsbj, 9.VI.1986 *Alava* 21566 (TUR)*. **Etelä-Häme.** Ruovesi, SE of Helvetinkolu, 9.VI.1964 *Kytövuori* & *Kytövuori* (H)*. **Pohjois-Savo.** Kuopio, Korsumäki, 19.V.1946 *Räsänen* (TUR). **Koillismaa.** Salla, Jyrhämä, 6.VIII.1937 *Lehtonen* & *Pankakoski* (H). **Enontekiön Lappi.** Enontekiö, Porojärvet, 21.VII.1955 *Henssen* (H); Kaaresuvanto 7,5 km N, Ikäjärvi-Laivaara, 2.VII.1974 *Laine* (TUR, on *Nephroma expallidum*). **Inarin Lappi.** Utsjoki, Kotkapahta, 6.VII.1964 *Laine* (H).

Rhagadostoma brevisporum (Nav.-Ros. & Hladún) Nav.-Ros. – Figs. 31, 46 GG

Ascomata perithecioid. *Asci* 93–134 × 13–21 µm, mean 111.3 × 16.8 µm (n=20, three collections), unitunicate, clavate, thin-walled, 4-celled. *Ascospores* 26–40 × 6–9.5 µm, mean 30.8 × 7.3 µm (n=30, three collections), elongate-cylindrical, thin-walled, 0-1 septate, may contain dark or hyaline guttules. *Paraphyses* length of asci or shorter, septate, constricted at septa, branching.

Host: *Peltigera rufescens*. Reported also from *P. lepidophora*.

Rhagadostoma brevisporum forms dark-brown, subglobose to globose, irregular-surfaced infection areas, in which the perithecia are situated. The species was first recorded from Finland by Toivanen (2008). Reported also from Sweden.

Specimens studied: **Ahvenanmaa.** Kökar, Finnö NW, 3.VII.1979 *Kvist* (H)*. **Kainuu.** Paltamo, Melalahti, 28.VII.1970 *Alava* (TUR)*. **Oulun Pohjanmaa.** Kii-minki, 25.VII.1952 *Bäck* (H)*. **Enontekiön Lappi.** SE-Malla, 9.VIII.2009 *Rämä*.

Scutula dedicata Triebel, Wedin & Rambold – Figs. 32, 33, 34, 46 HH

Thallus epikapylic. *Ascomata* apothecioid, superficial, 0.2 mm diam., disc yellowish-brown to black, the margin distinctively black. *Asci* 30–45 × 8–15 µm, mean 37.7 × 10.4 µm (n=15, three collections), ellipsoid-cylindrical, thick-walled, strongly thickened at apex, abundant. *Ascospores* 8–14 × 2.5–4 µm, mean 10.1 × 3.0 µm (n=30, three collections), ellipsoid, 1-septate, may contain guttules. *Paraphyses* of ascus length or longer, 2–2.5 µm diam, septate, branching, sometimes constricted and swollen at apices. *Macroconidia* 5.5–9.5 × 2–3 µm, mean 7.2 × 2.2 µm (n=30, one collection), elongate-ellipsoid, may contain guttules. *Mesoconidia* 5–7 × 2–3 µm, mean 6.2 × 2.5 µm (n=30, three collections) ellipsoid, may contain greenish guttules.

Hosts: *Peltigera didactyla*, *P. neckeri*, *P. rufescens*.

Scutula dedicata forms an epikapylic thallus on its host, which is visible as a somewhat grainy, lighter area on which the brownish to dark apothecia are formed. It may be present on either the dorsal or ventral sides of the host thallus. *Scutula dedicata* has three different pycnidial mitosporic states of which the microconidial state has been found only once (Triebel et al. 1997) while the macroconidia producing *Karsteniomyces* state and the mesoconidia producing *Libertiella* states are more common. May be confused with *Scutula heeri*. The species was first recorded from Finland by Toivanen (2008). Reported also from Sweden.

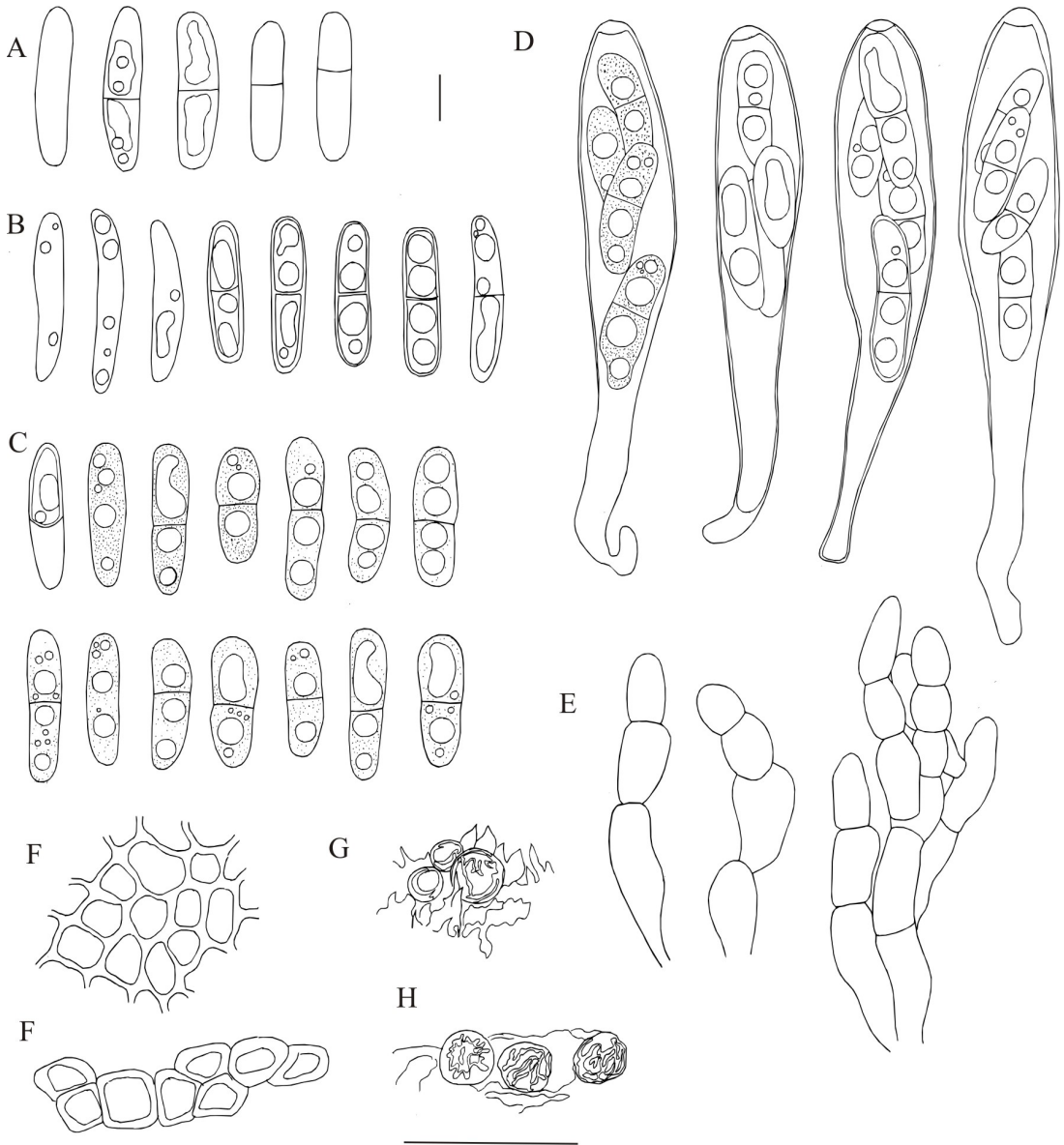


Fig. 31. *Rhagadostoma brevisporum* (A = 1952 Bäck; B, F, G = 1979 Kvist; C–E, H = 1972 Alava), A–C = ascospores, D = asci, E = paraphyses, F = excipulum, G, H = perithecia on host thallus. Bar (A–F) 10 μ m, (G–H) 1 mm.

Specimens studied: **Varsinais-Suomi.** Parainen, Houtskär, Hyppeis, 30.III.1991 Bruun (H); Parainen, Älö, 9.X.1969 Alava (TUR). Lohja, Laakspohja, 18.IX.2004 Pykälä 25665, 25666 (H). Uusikaupunki, Käätyjärvi W-side, 25.XII.1951 Laine (TUR). **Uusimaa.** Hanko, Tvärminne, 14.VII.1929 Häyrén (H)*. Pornainen, Niinikoski, 3.VIII.1976 Kvist (H)*. Raasepori, Tammisaari, 6.I.1937 Häyrén (H). **Etelä-Karjala.** Hamina, Vehkalahti, 15.VIII.1948 Fagerström (H, two specimens)*, (TUR). **Satakunta.** Lappi, Kivikylä, 1.VIII.1957 Sältin

(H). **Etelä-Häme.** Hollola, Herala, 1874 leg.? (TUR-V)*. Padasjoki, Nyystölä, 1872 leg.? (TUR-V)*; Saksala, 1872 Lang (TUR-V)*. **Pohjois-Häme.** Saarijärvi, Mahlu, 29.VI.1946 Koskinen (TUR). **Pohjois-Savo.** Lepävirta, Kirkonkylä, 20.VIII.1927 Linkola (H). **Oulun Pohjanmaa.** Ylikiihinkki, Jokikokko, 22.VIII.1968 Uotila (H). **Koillismaa.** Salla, Pieni Pyhätunturi, 4.VII.1981 leg.? (H). **Sodankylän Lappi.** Sodankylä, Sattanen, 18.VI.1980 Kvist (H)*.

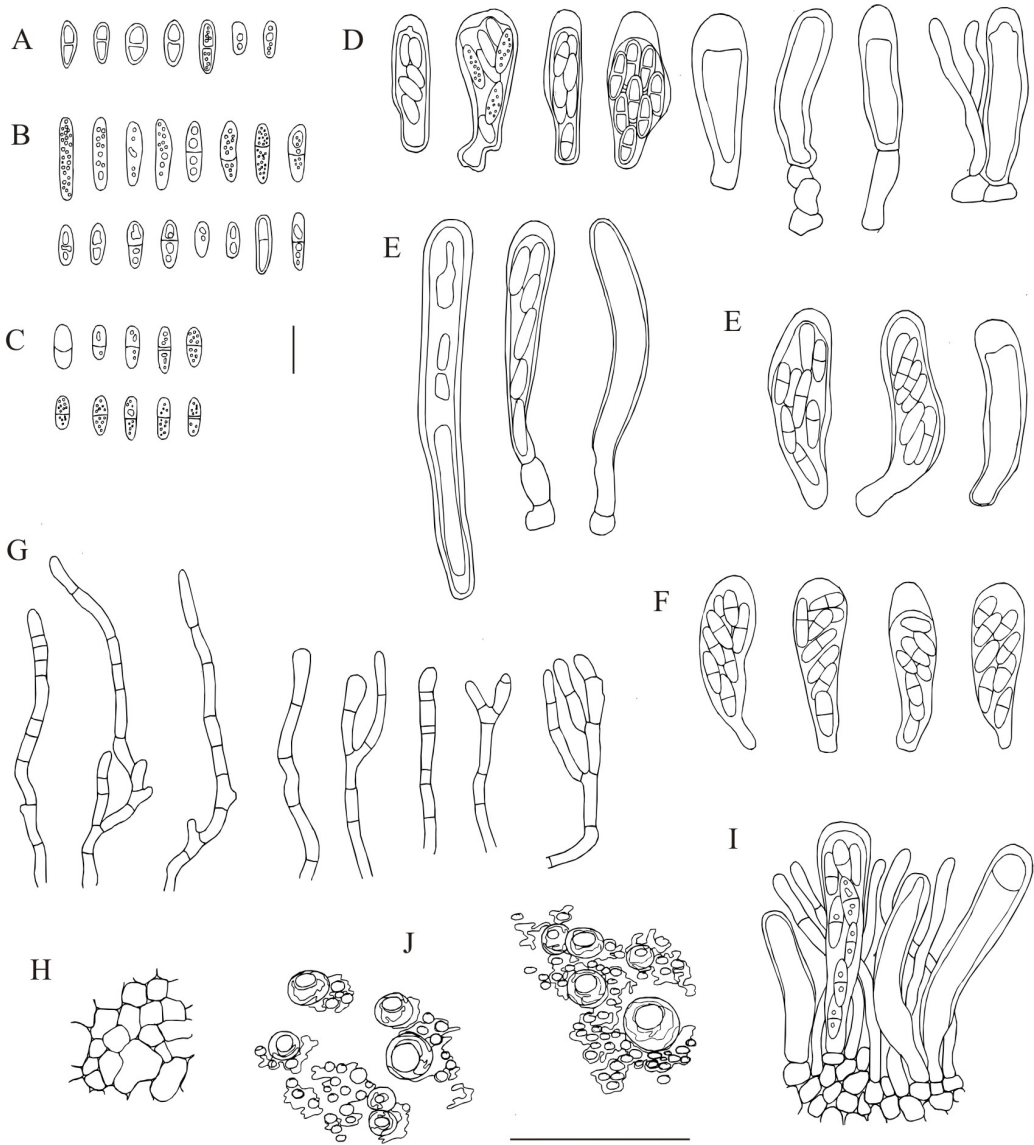


Fig. 32. *Scutula dedicata* (A, D, J=1872 Lang; B, E, G, I= TUR-V 22518; C, F, H= TUR-V 22514), A–C = ascospores, D–F = asci in different stages of maturity, G = paraphyses, H = excipulum, I = asci, paraphyses and excipular cells, J = apothecia and thallus on dorsal side of host cortex. Bars (A–I) 10 µm, (J) 1 mm.

***Scutula epiblastematica* (Wallr.) Rehm**
 – Figs. 35, 46 II

Thallus endokapylic. *Ascomata* apothecioid, from light-brown to black; round, almost globose when young, superficially on the host thallus. *Asci* 21–43 × 6–13(–17) µm, mean 29.7 × 9.1 µm (n=20, three collections), ellipsoid to cy-

lindrical, sometimes very thick-walled, strongly thickened at apex, hyaline, CR–, 8-spored. *Ascospores* 6–10 × 3–5 µm, mean 7.9 × 4.0 µm (n=30, three collections), aseptate or with 1–2 septa, slightly constricted at septa, usually thick-walled. *Paraphyses* longer than asci, 3 µm diam, sometimes thickened at apex, branching, septate, and sometimes slightly constricted at septa. *Ex-*

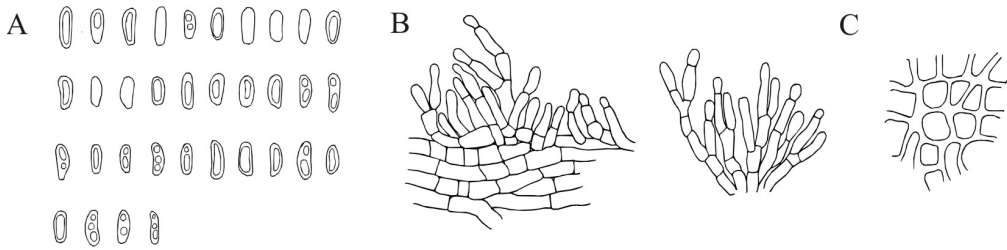


Fig. 33. Macroconidial state of *Scutula dedicata* (1976 Kvist), A = macroconidia, B = conidiophores and conidiogenous cells, C = ectal excipulum. Bar 10 μ m.

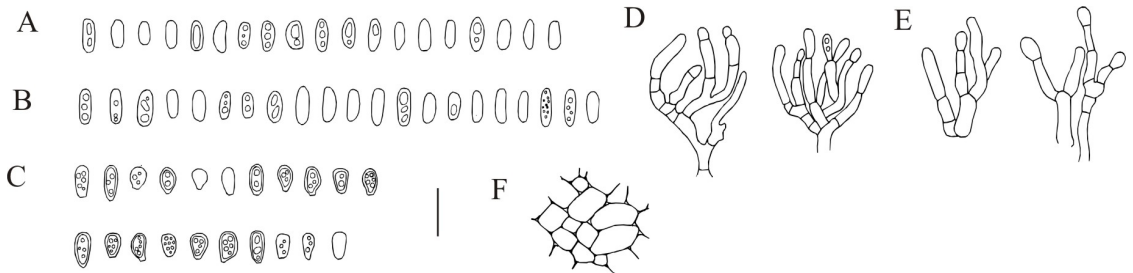


Fig. 34. Mesoconidial state of *Scutula dedicata* (A = 1980 Kvist; B, D, F = 1929 Häyrén; C, E = 1948 Fagerström), A–C = mesoconidia, D, E = conidiophores and conidiogenous cells, F = excipulum. Bar 10 μ m.

cupulum of textura globulosa, cells thick-walled, 4–10 μ m diam.

Hosts: *Peltigera aphthosa*, *P. canina*, *P. leucophlebia*, *P. neckeri*, *P. praetextata*, *P. rufescens*.

The pycnidia and apothecia of *Scutula epiblastematica* appear in aggregations on distinct infection areas. The infection area is bleached, which indicates a parasitic habit (Triebel et al. 1997). *S. epiblastematica* has an anamorphic microconidial state, and a mesoconidial *Libertiella* state (cf. *L. curvispora*) May be confused with *S. miliaris*. Reported also from Norway and Sweden.

Selected specimens studied (out of 97): Ahvenanmaa. Finström, Grelsby, Mangelbo, 17.V.1989 Alava 22548 (TUR). Varsinais-Suomi. Raasepori, Bromarv, Solböle, 19.V.1927 Linkola & Häyrén (H). Turku, Ispoinen, 29.V.1911 Linkola (TUR-V). Uusimaa. Espoo, Kauklahti, Fiskarudden, 20.VI.1932 Linkola (H). Pernaja, Hardom, VIII.1912 Klingstedt (H). Satakunta. Pori, Noormarkku, Paasjoki, 24.VIII.1937 Laurila (H). Etelä-Häme. Hämeenlinna, 30.IV.1925 Kalliola (H)*. Tammele, Kankola 1870 Kullhem (H). Tampere, Messukylä, 29.V.1902 Högman (H)*. Etelä-Savo. Taipalsaari, Karhupää, 26.VI.1966 Vitikainen 1284 (H). Kuopio, Siika-

lahti, 5.V.1946 Sepponen (TUR, H)*. Etelä-Pohjanmaa. Niinimaa, Mustaniemi, Mustakallio, 4.VII.1947 Leppälä (H)*. Pohjois-Häme. Konnevesi, 1 km NW of village school, 6.VIII.1964 Valovirta (H)*. Saarijärvi, Mahlu, 9.VIII.1935 Koskinen (H, two specimens)*. Pohjois-Savo. Kuopio, Neulaniemi, 9.XII.1945 Räsänen (H). Pohjois-Karjala. Juankoski, Säyneinen, Pisankoski, 28.V.1853 Huuskonen (H). Keski-Pohjanmaa. Vimpeli, Västerbacka, Huosianmaankallio 25.IX.2003 Haikonen 22976 (H). Kainuu. Kuhmo, Lentiira, Kylmäla, 1877 Vainio (TUR-V). Koillismaa. Kuusamo, Vuotunki, Kiukaankorva, 12.VI.1960 Hämet (H). Kittilän Lappi. Muonio, Äkässaivo, VIII.1976 Huuskonen (H)*.

Scutula heeri (Hepp ex A. Massal.) P. Karst.

– Figs. 36, 37, 46 JJ

Thallus epikapylic, homoiomerous, lighter than host thalli. *Ascospores* 10–13.5(–18) \times 4–5.5 μ m, mean 12.5 \times 5.0 μ m (n=11, one collection), ellipsoid, septate, may contain guttules. *Paraphyses* 4 μ m diam, branching, septate, slightly constricted at septa. *Macroconidia* 10–14 \times 2.5–3.5 μ m, mean 11.8 \times 3.1 μ m (n=24, one collection) elongate, septate, with or without guttules.

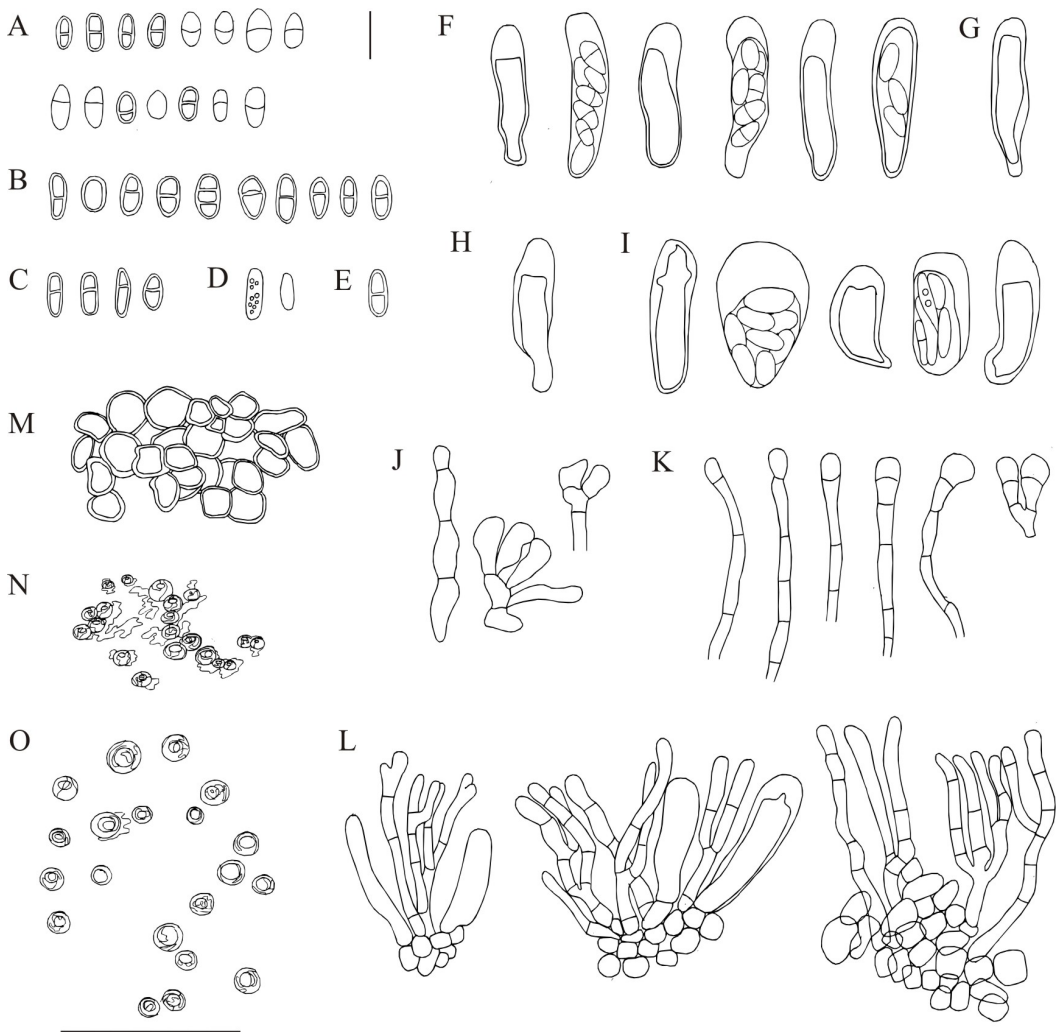


Fig. 35. *Scutula epiblastematica* (A, F = 1935 Koskinen; B, H, K = 1976 Huuskonen; C, G = 1947 Leppälä; D, I, J, M = 1946 Sepponen; E, L = 1902 Högman; N = 1925 Kalliola; O = 1964 Valovirta), A–E = ascospores, F–I = asci in different stages of maturity, J, K = tips of paraphyses, L = asci, paraphyses and excipular cells, M = ectal excipulum, N, O = apothecia. Bars (A–M) 10 µm, (N, O) 1 mm.

Host: *Peltigera rufescens*.

The superficial appearance of *S. heeri* is very much like that of *S. dedicata*. They both form an epikapylic thallus with dark apothecia on the host. The *Karsteniomyces* state of *S. heeri* develops a distinct thallus also in the absence of the teleomorph. Microscopically *S. heeri* is distinguished from *S. dedicata* by its larger ascospores and much larger macroconidia. *S. heeri*

has been classified as NT (Near Threatened) in the 2010 Red List of Finnish Species (Jääskeläinen et al. 2010). It was first recorded from Finland by Toivanen (2008). Previous reports of the species (Santesson et al. 2004) have proved to be misidentifications. Reported also from Sweden.

Specimens studied: **Uusimaa.** Hanko, Tvärminne, 3.VII.1911 Linkola (H)*. Helsinki, Vuosaari, 20.IX.2005 Pykälä 27951 (H). **Koillismaa.** Salla, Oulankajoki, 13.VII.1937 Lehtonen & Pankakoski (H)*.

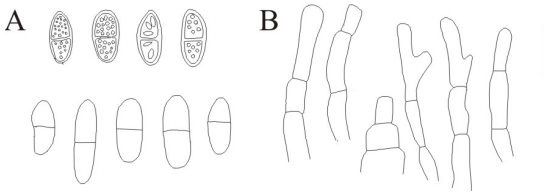


Fig. 36. *Scutula heeri* (1937 Lehtonen & Pankakoski), A = ascospores, B = paraphyses. Bar 10 µm.

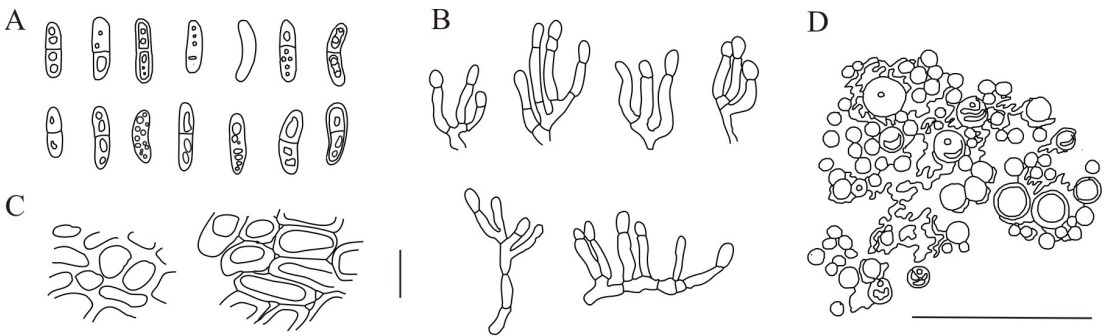


Fig. 37. Macroconidial state of *Scutula heeri* (1911 Linkola), A = macroconidia, B = conidiophores and conidiogenous cells, C = ectal excipulum, D = pycnidia and thallus of *Scutula heeri* on host. Bars (A–C) 10 µm, (D) 1 mm.

***Scutula miliaris* (Wallr.) P. Karst.**
– Figs. 38, 47 KK

Thallus endokaplyic. *Ascوماتа* apothecioid, superficial, round, light-brown to blackish. *Asci* 28–58 × 8–14.5, mean 39 × 10.9 µm (n=20, four collections), ellipsoid, thickened at the apex, 8-spored. *Ascospores* 8–15 × 4–7 µm, mean 12.2 × 5.2 µm (n=30, four collections), ellipsoid to spindle-shaped, non-septate or with one septum. *Paraphyses* of ascus length or slightly longer, 1.5–3 µm diam, a little widened at the apex, septate, branched.

Hosts: *Peltigera canina*, *P. rufescens*, *P. malacea*, *P. leucophlebia*.

The light brown apothecia of *Scutula miliaris* are scattered or sometimes aggregated on the dorsal side of the host thallus. *Scutula miliaris* has a microconidial state, and a well distinguished macroconidial *Karsteniomyces peltigerae* anamorph. It differs from *Scutula epiblastematica*

by not causing visible damage on the host and by its larger ascospores. The *Karsteniomyces peltigerae* anamorph differs from the other *Karsteniomyces* types anamorphs by forming an endokaplyic thallus, and having large, septate conidia. Reported also from Norway and Sweden.

Selected specimens studied (out of 90): **Varsinais-Suomi.** Kemiönsaari, Dragsfjärd, Tynglax, 22.IV.1981 *Kvist* (H)*. Paimio, Hirvonpään alitupa, 27.VI.1955 *Kukkonen* (H)*. Uusikaupunki, Käätyjärvi-W, 25.XI.1951 *Laine* (TUR, two specimens). **Uusimaa.** Helsinki, Meilahti 5.XI.1911 *Linkola* (TUR-V). **Etelä-Häme.** Kuhmoinen, Päijälä, Rumavuori, 14.IV.1974 *Oittinen* 5 (H)*. Tammela, Mustiala, 1869 *Kullhem* (H, four specimens). **Pohjois-Häme.** Jyväskylä, Ristikivenlaakso, 2.VIII.1912 *Linkola* (TUR-V). **Pohjois-Savo.** Kuopio, Neulamäki, 14.XII.1933 *Lumiala* (H)*. **Kainuu.** Suomussalmi, Kianta, Parish village, 25.VI.1877 leg.? (TUR-V). **Perä-Pohjanmaa.** Kemijärvi, Pyhätunturi, 12.VIII.1925 *Linkola* (H). **Koillismaa.** Kuusamo, Juuma, Jäkälävuoma, 6.VII.1981 *Lempäinen* (TUR). Salla, Savinajoki, 8.VII.1939 *Laurila* (H). **Sodankylän Lappi.** Pelkosenniemi, Pyhätunturi, 12.VIII.1925 *Linkola* (H). **Inarin Lappi.** Utsjoki, Kevo, Keneskoski E, 25.VIII.1974 *Ahti* 29796 & *Santesson* (H).

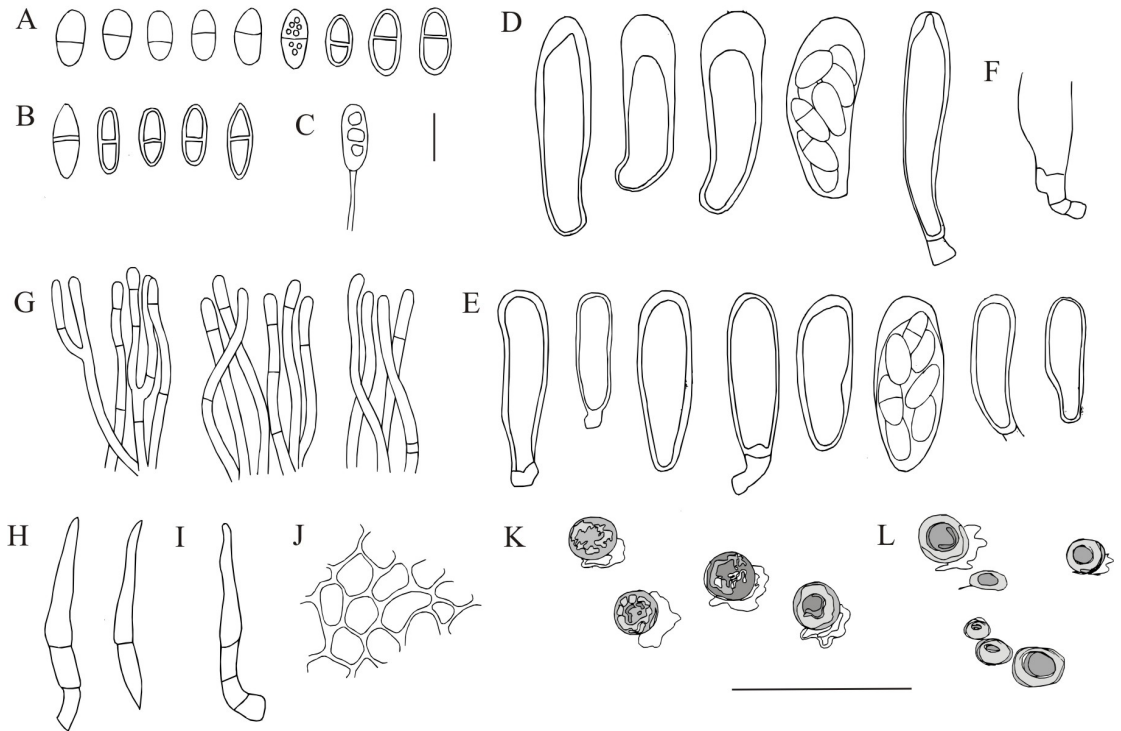


Fig. 38. *Scutula miliaris* (A, C, D, F, H, J, K = *Oittinen* 5; B, E, I, L = 1981 *Kvist*; G = 1933 *Lumiala*), A–C = ascospores, D, E = asci in different stages of maturity, F = ascus base, G = paraphyses, H, I = setae, J = excipulum, K, L = apothecia. Bars (A–J) 10 μ m, (K, L) 1 mm.

Stigmatidium leucophlebiae Cl. Roux & Triebel
– Figs. 39, 47 LL

Ascomata pseudoperithecioid, immersed, black, globose, 50–70 μ m. *Asci* 22–30 \times 9–14 μ m, mean 26.5 \times 11.9 μ m (n=8, two collections), clavate, thickened at the apex, only few (4–5) in each fruit body, 8-spored. *Ascospores* 12–16 \times 3–4 μ m, mean 12.9 \times 3.3 μ m (n=13, two collections), septate, upper cell slightly broader and more rounded than the lower cell, may contain greenish guttules. *Paraphyses* or *periphyses* not observed (contra to Roux & Triebel 1994). *Ectal excipulum* of *textura angularis*, cells thick-walled, densely packed, 5–8 μ m diam. *Medullary excipulum* of *textura globulosa*, cells thin-walled, 2–5 μ m diam.

Host: *Peltigera leucophlebia*.

The only visible signs of *S. leucophlebiae* on the host thallus are the ostioles of the ascomata, which appear as tiny, circular pores, while the rest of the fruit bodies are completely immersed in the matrix. Can be confused with *S. peltideae*. The species was first recorded from Finland by Toivanen (2008). Reported also from Sweden.

Specimens studied: **Varsinais-Suomi.** Salo, Kisko, 1.IX.1971 *Laine* (TUR); 1.IX.1971 *Alava & Alho* (TUR). **Etelä-Häme.** Hollola, Upila, 1876 *Norrlin* (H). **Oulun Pohjanmaa.** Kiiminki, Talkkunamaa, 5.VI.1923 *Räsänen* (H)*. **Koillismaa.** Kuusamo, Juuma, 14.VII.1951 *Bäck* (H)*.

Stigmatidium peltideae (Vain.) R. Sant.
– Figs. 40, 47 MM

Ascomata pseudoperithecioid, immersed, globose, 50–70 μ m, black. *Asci* 22–39 \times 10–18 μ m, mean 28.3 \times 13.9 μ m (n=16, three collec-

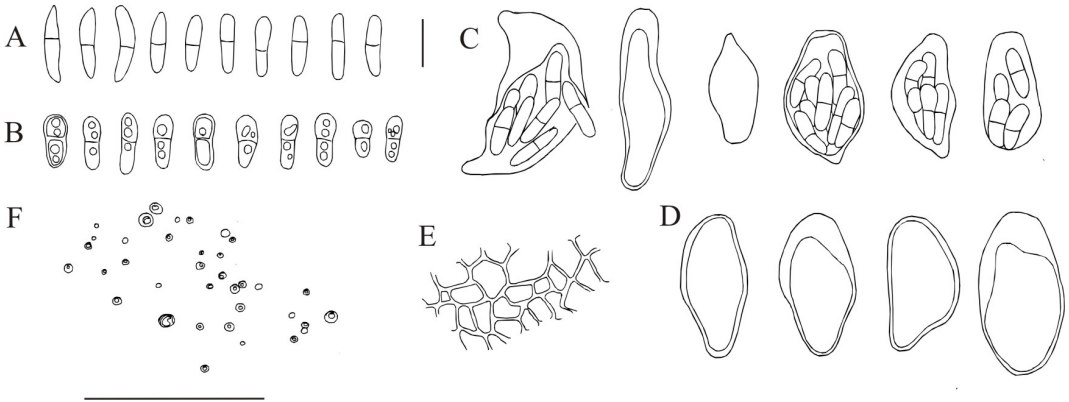


Fig. 39. *Stigmidium leucophlebiae* (A, C, E, F = 1951 Bäck; B, D = 1923 Räsänen), A, B = ascospores, C, D = asci, E = extal excipulum, F = perithecia in the host cortex. Bars (A–E) 10 μ m, (F) 1 mm.

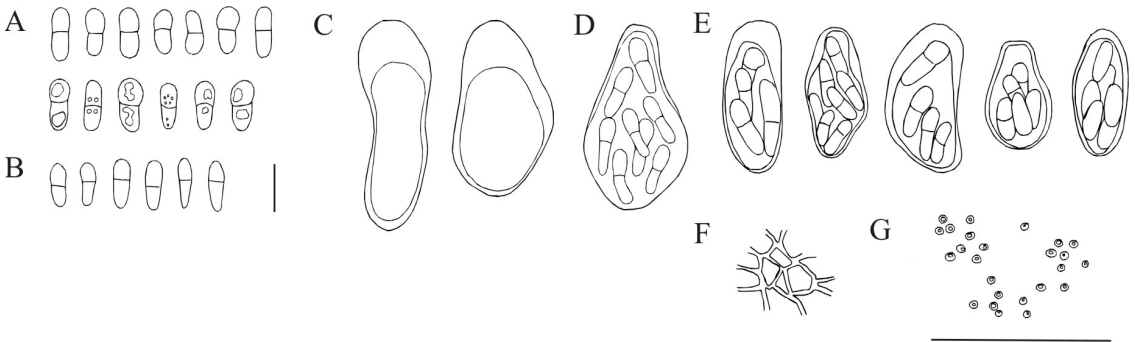


Fig. 40. *Stigmidium peltideae* (A, C = 1905 Collan; B, E, G = 1947 Huuskonen; D, F = 1936 Häyrén), A, B = ascospores, C–E = asci, F = ectal excipulum, G = pseudoperithecia in the host thallus. Bars (A–F) 10 μ m, (G) 1 mm.

tions), bitunicate, ellipsoid, thickened at the apex, only few (4–5) in each fruit body, 8-spored. *Ascospores* 8–12.5 \times 2.5–4.5 μ m, mean 10.4 \times 3.5 μ m (n=30, three collections), septate, sometimes slightly constricted, cell slightly unequal in length, with or without guttules. *Paraphyses* or *periphyses* not observed. *Ectal excipulum* of textura angularis, cells thick-walled, densely packed, 5–8 μ m diam. *Medullary excipulum* of thin-walled cells, 5–8 μ m diam.

Hosts: *Peltigera aphthosa*, *P. leucophlebia*, *P. praetextata*, *P. venosa*. The species has also been reported from *P. canina*, *P. membranacea* and *P. rufescens* (Nordin et al. 2010).

Although it is common and widely distributed *S. peltideae* is reported as new to Finland. As with the previous species, the only visible signs of its presence on the host thallus are the ostioles of the ascomata, which appear as tiny, circular pores, while the rest of the fruit bodies are completely immersed in the matrix. *S. peltideae* differs from the previous species mainly by its smaller ascospores. Reported also from Norway and Sweden.

Selected specimens studied (out of 26): **Varsinais-Suomi.** Lohja, Immula, 6.IX.2008 Pykälä 33670 (H). Salo, Kisko, Leilä, 2.IX.1969 Vitikainen 5936 (H). **Uusimaa.** Espoo, Bastvik, 13.XII.1936 Häyrén (H)*. **Etelä-Karjala.** Hamina, Vehkalahti, Vehkjärvi, 7.VIII.1967 Fagerström (H). **Etelä-Häme.** Hämeenlinna, Ruunumylly, 15.X.1964 Huvinen (H). **Etelä-Savo.** Mäntyhar-

ju, Toivola, 10.IX.1917 *Linkola* (H). **Pohjois-Häme.** Jyväskylä, Korpilahti, Vaarunvuori, 25.VI.1916 *Linkola* (H). **Pohjois-Savo.** Kuopio, Halkosaari, 28.V.1905 *Collan* (H)*. **Pohjois-Karjala.** Ilomantsi, Kuuksenvaara, 2.IX.1958 *Klingsstedt* (H). Kontiolahti, Kolvananuuro, V.1940 *Huuskonen* (H). **Keski-Pohjanmaa.** Evijärvi, Järvelä, 21.VI.1907 *Backman* (H, two specimens). **Perä-Pohjanmaa.** Simo, 3.VI.1915 *Räsänen* (H). **Koillismaa.** Kuusamo, Juuma, 14.VII.1951 *Bäck* (H). **Kittilän Lappi.** Kittilä, Alakylä, 20.IX.1956 *Ahti 268* (H); Levitunturi, Kuru, 25.VII.1936 *Räsänen* (H). **Enontekiön Lappi.** Enontekiö, Kaaresuvanto, 20.VII.1947 *Huuskonen* (H)*.

Thelocarpon epibolum Nyl – Figs. 41, 47 NN

Ascomata perithecioid, yellowish, superficial. *Asci* 65–161 × 17–30 µm, mean 116.3 × 21.3 µm (n=12, three collections), unitunicate, sack-shaped, thin-walled, multispored. *Ascospores* 5–13 × 2–3 µm, mean 7.5 × 2.5 µm (n=34, three collections), elongate, simple. *Paraphyses* of ascus length or longer, 1.5 µm diam, sometimes slightly swollen at the apices.

Hosts: *Peltigera aphthosa*, *P. canina*, *P. leucophlebia*, *P. venosa*. Also found during this study on *Nephroma arcticum* and *Solorina octospora*. *Thelocarpon epibolum* has a wide range of substrates, and has also been reported from *Sphagnum* mosses and decaying wood, from polyporaceous fungi, and from forest litter etc. (Kocourková-Horáková 1998).

Thelocarpon epibolum is easily visible, as the fruit bodies are almost completely superficial and brightly coloured. Two variations are sometimes recognized based on ascospore size. *T. epibolum* var. *epibolum* is frequent in Finland, while *T. epibolum* Nyl. var. *epithallinum* (Leight.) G. Salisb., with larger ascospores, is less common. Here, both variations are included in the distribution map. Recorded also from Norway and Sweden.

Specimens studied: **Varsinais-Suomi.** Lohja, Virkkala church, 20.VII.2004 *Pykälä 25153, 25161* (H); Immula, 6.IX.2008 *Pykälä 33669* (H); Karstu, S of Ilvesmäki, 20.IX.2008 *Pykälä 33958* (H), 20.IX.2008 *Pykälä 33959* (H). Raasepori, Bromarv, Solböle 1964 *Laitinen* (H). Salo, Kisko, 27.X.1988 *Alava 22426* (TUR). Turku, Kaksikerta, 17.VIII.1934 *Kari* (TUR). Vihti, Olkkala 2.XI.1897 *Lång* (H). **Uusimaa.** Hanko, Tvärminne, 1910 *Häyrén* (H). Kirkkonummi, 28.IX.1913 *Collander* (H). Loviisa, Ruotsinpyhtää, Gäddbergsö, 16.VIII.1984 *Vitikainen 11146* (H). Nurmijärvi, Kiljava, 15.VI.1964 *Haapasaari*

1397 (H). Orimattila, Niemi, 2.IX.1914 *Linkola* (H). Pernaja, Hardom, 8.1916 *Klingsstedt* (H). Raasepori, Tammissaari, Bromarv, 1964 *Laitinen* (H); Tammissaari, Älgö 24.VI.1952 *Hämet* (H). Sipoo, Råberget, 6.VIII.1949 *af Hällström* (H); Märtnensby, 20.VII.1948 *af Hällström* (H). **Etelä-Karjala.** Hamina, Vehkalahti, 18.VII.1914 *Krohn* (H). Kouvola, Anjalankoski, 12.VI.1967 *Fagerström* (H). **Satakunta.** Kankaanpää, Venesjärvi, 8.VII.1934 *Laurila* (H, two specimens). Pori, Ahlainen, 31.VIII.1939 *Laurila* (H). Sastamala, Tyrvä, 68128, 8.VIII.1910 *Heikinheimo* (H). Siikainen, Petkele, 24.VIII.1936 *Laurila* (H). **Etelä-Häme.** Hattula, Pekola, 20.IX.1931 *Häyrén* (H)*. Humppila, Myllynkulma, 29.VIII.1952 *Fagerström* (H). Janakkala, Harviala, 23.VIII.1931 *Linkola* (H). Kuhmoinen, Tehi, 18.X.1911 *Linkola* (H). Orivesi, Mulkoila, 18.VIII.1952 *Pusa* (H). Vilppula, Pohjaslahti, 8.VII.1987 *Kytövuori 87072a* (H)*. Urjala, Kormunti, 15.VI.1952 *Fagerström* (H). Ylöjärvi, Kuru, 27.VI.1968 *Toivonen* (H). Ypäjä, Vähäsuo, 3.XII.1966 *Kantee* (H). **Etelä-Savo.** Imatra, Itä-Siitola, 29.VIII.1950 *Rauhala* (H). Rantasalmi, Voinsalmi, 9.VI.1986 *Haikonen 7384* (H)*. Suomeniemi, Kiesilä, 8.VIII.1983 *Vitikainen 10725* (H). **Etelä-Pohjanmaa.** Kristiinankaupunki, Lappfjärd, Pyhävuori, 30.VIII.1946 *Railonsala* (TUR) on *Nephroma arcticum*. Vaasa, Sundom, 28.VII.1950 *Bäck* (H). **Pohjois-Häme.** Jyväskylä, 21.VI.1912 *Leino* (H); Korpilahti, 1874 *Lang* (H); Ylistö 18.VI.1913 *Linkola* (H). Pihtipudas, Muurajärvi N-end, 5.VII.1964 *Suominen* (H). Saarijärvi, Hännilä, 25.VIII.1944 *Koskinen* (H); Pyhä-Häkki National park, 26.VIII.1943 *Koskinen* (H). **Pohjois-Savo.** Joroinen, Huutokosken asemasta 1,5 km Joroisiin, 22.VII.1965 *Suominen* (H). Kuopio, Suovu 3.VIII.1906 *Linkola* (H); Korsumäki, 19.V.1946 *Räsänen* (TUR). Suonenjoki, Kutumäki, 1.VIII.1971 *Takala 7502* (H). **Pohjois-Karjala.** Juuka, Mataravaara, 8.IX.1970 *Takala 5763* (H); Tahkovaara, 22.VIII.1960 *Huuskonen* (H); Kontiolahti, Kolvananuuro, V.1940 *Huuskonen* (H). **Keski-Pohjanmaa.** Kannus, Eskola railway yard, 3.VII.1964 *Suominen* (H). **Kainuu.** Puolanka, Väyrylä, 29.VII.1970 *Alava* (TUR). **Perä-Pohjanmaa.** Keminmaa, church, 24.VII.1964 *Suominen* (H). **Koillismaa.** Kuusamo, Juuma, 6.VII.1981 *Skytén 3204* (H); Virkkula, Konttainen, 7.VII.1981 *Skytén 3261* (H). **Kittilän Lappi.** Kittilä, Alakylä, 20.IX.1956 *Ahti* (H). Muonio, Äkäsjokivarsi, VIII.1963 *Huuskonen* (H). **Sodankylän Lappi.** Savukoski, Sokli 18.VIII.1975 *Vuokko 183* (H). **Enontekiön Lappi.** Enontekiö, Hetta, 1867 *Norrlin* (H); 5.IX.1965 *Takala 1998* (H). Kälpijärvi, Saana, 1.VIII.1956 *Huuskonen* (TUR) on *Solorina octospora*. **Inarin Lappi.** Inari, Paatsjoki, *Renvall* (H).

Xenonectriella lutescens (Arnold) Weese – Figs. 42, 47 OO

Ascomata perithecioid, 150 µm diam, yellowish in dried herbaria specimens, colour around the ostiole lighter or darker. *Asci* 74–99 × 20–28 µm, mean 86.2 × 23.7 µm (n=9, one collection), cylindrical, thick-walled. *Ascospores* 19–25 × 7–9 µm, mean 22.6 × 8.2 µm (n=30, one collection), broadly fusoid, muricate, outer wall thick, CR+

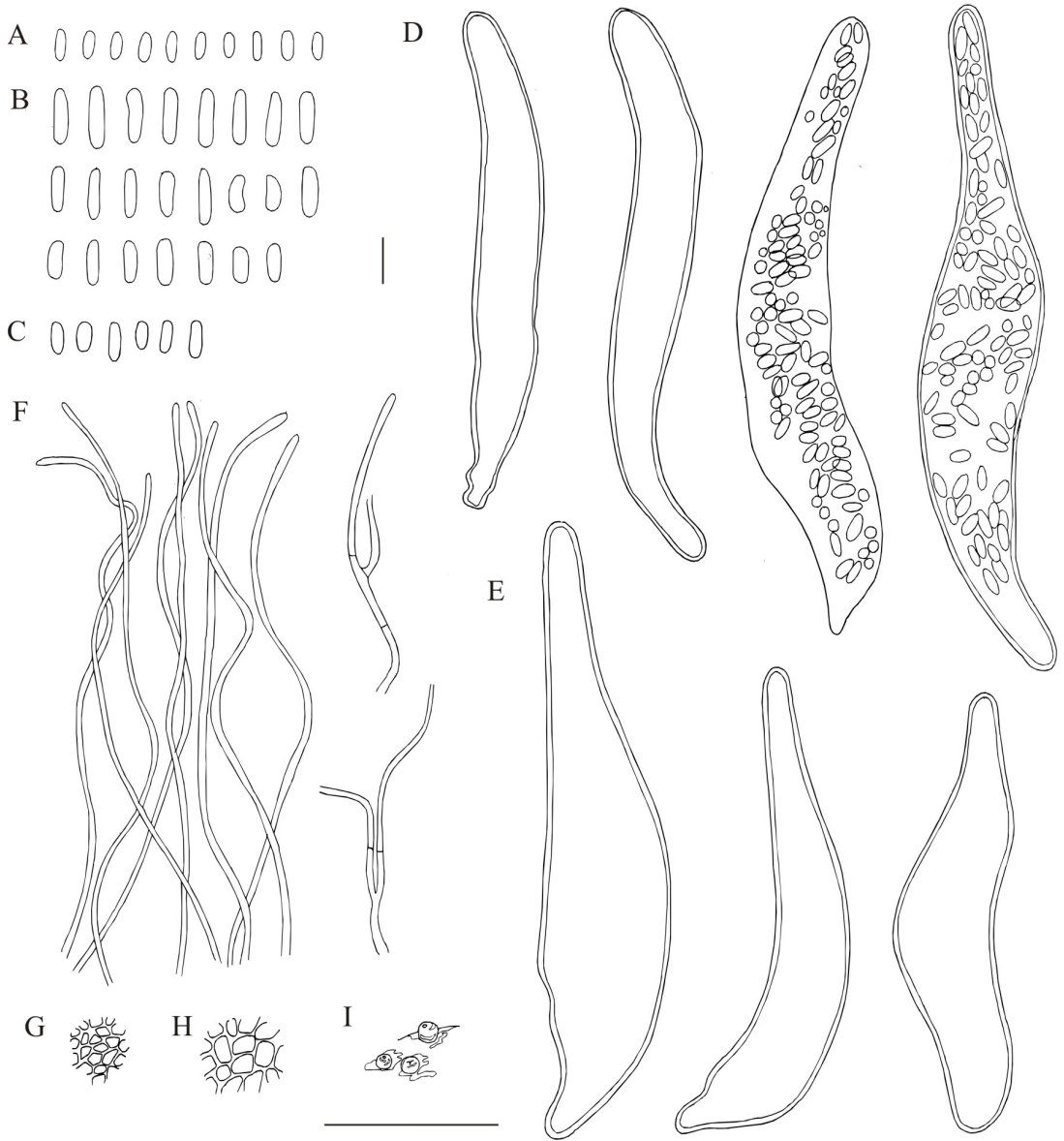


Fig. 41. *Thelocarpon epibolum* (A, D, F–H = Haikonen 7384; B, E = Kytövuori 87072a; C, I = 1931 Häyrén), A–C = ascospores, D, E = asci, F = paraphyses, G = excipulum, H = ectal excipulum, J = perithecia. Bars (A–H) 10 µm, (J) 1 mm.

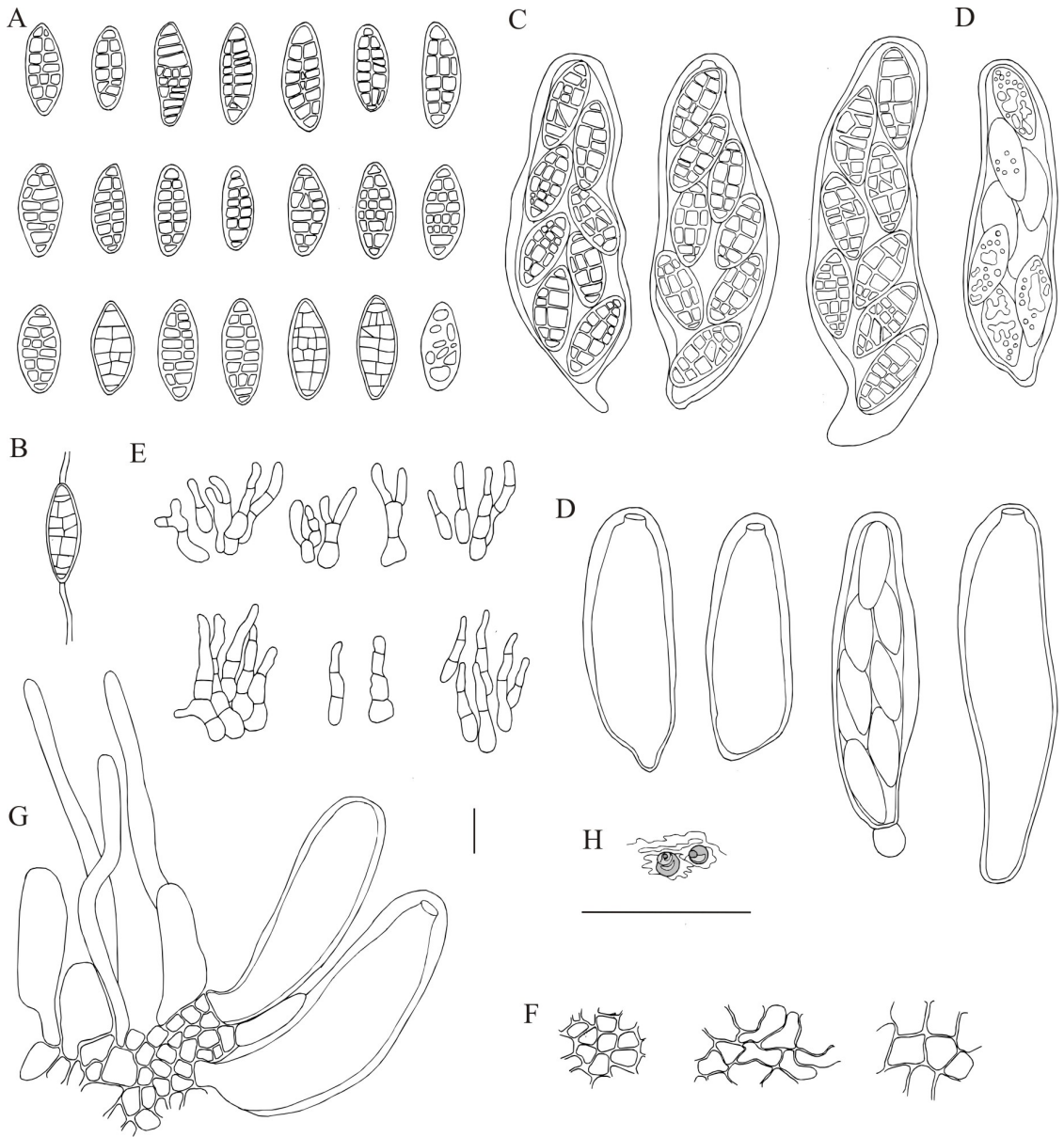


Fig. 42. *Xenonectriella lutescens* (1916 Anttila), A = ascospores, B = germinated ascospore, C = mature asci, D = unripe asci, E = periphyses, F = excipulum, G = paraphyses, young asci and excipulum, H = perithecia. Bars (A–G) 10 μ m, (H) 1 mm.

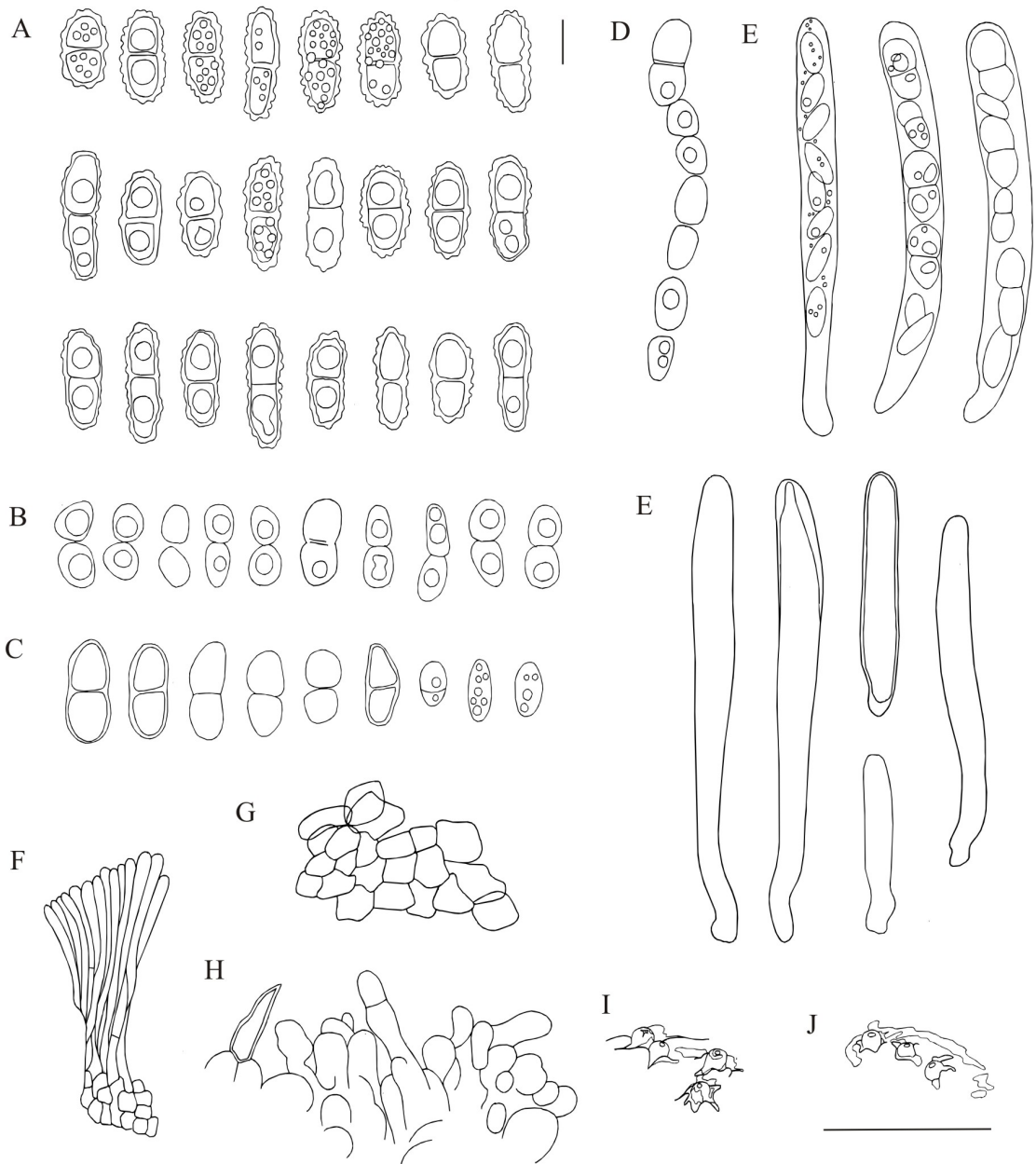


Fig. 43. *Xenonectriella ornamentata* (A, B, D, F, H, I = *Vitikainen 10057a*; E, G, J = *Ahti & Vitikainen 8284*; C = *Ahti & Vitikainen 8299*), A = mature ascospores, B–D = unripe ascospores, F = detail of neck of perithecia, G, H = ectal excipulum, I, J = elongated necks of ostioles rupturing the host cortex, H = marginal excipulum. Bars (A–H) 10 μ m, (I, J) 1 mm.

at maturity. *Paraphyses* of ascus length or longer, 5–7 µm diam, not easily visible. *Periphyses* ca 4 µm wide at base, septate, bending and branching. *Ectal excipulum* cells thick-walled, 6–7 µm diam. *Medullary excipulum* cells thin-walled, 4–5 µm diam, globose.

Hosts: *Peltigera canina*, *P. didactyla*. Reported also from *Collema fasciculare* (L.) Weber ex F.H. Wigg. (Nordin et al. 2010) and *Solorina* sp. (Rossman 1999).

Xenonectriella is reported as a new genus to Finland. Ascomata are partially or totally immersed in the substratum, with the protruding papillae visible as orange spots. Reported also from Norway.

Specimens studied: **Varsinais-Suomi.** Lohja, Virkkala church, 20.VII.2004 *Pykälä 25161* (H). **Uusimaa.** Sipoo, Löparö, 12.VIII.1916 *Anttila* (H)*. **Etelä-Häme.** Längelmäki, Päijälä, 10.VII.1986 *Miekk-oja* (H). **Etelä-Savo.** Kouvola, 20.VIII.1949 *Klingstedt* (H).

Xenonectriella ornamentata (D. Hawksw.)
Rossman – Figs. 43, 46 CC

Ascomata perithecioid, immersed in the host thallus at first but breaking through the cortex at

maturity, obpyriform to subglobose, orange-red to bright red, translucent, glabrous, the exposed part 100–150 µm diam. *Asci* 67–101 × 7–10 µm, mean 87.7 × 8.6 µm (n=20, two collections), unitunicate, cylindrical, thin-walled, producing 8-spore initials, but mature asci are constantly 4-spored. *Ascospores* 15–28 × 7.5–10.5 µm, mean 22.4 × 8.5 µm (n=24, one collection), elongate, thick-walled, septate, with or without guttules, ornamented with conspicuous, irregularly shaped tubercles. *Paraphyses* absent. *Periphyses* thin, hyaline, not easily visible. *Ectal excipulum* cells thin-walled, 4–12 µm diam.

Hosts: *Peltigera didactyla*, *P. rufescens*. Reported also from *Peltigera lepidophora* (Nordin et al. 2010).

Ascomata of *Xenonectriella ornamentata* are partially or totally immersed in the substratum, with the protruding papillae visible as orange spots. The species was recorded as new to Finland by Alstrup (2004, as *Pronectria ornamentata*). Reported also from Norway and Sweden.

Specimens studied: **Koillismaa.** Kuusamo, Paljakka, 14.VI.1980 *Vitikainen 10057a* (H)*. Salla, Jyrhämä, 6.VIII.1937 *Auer* (TUR). **Inarin Lappi.** Utsjoki, Kevo, Könkäänpahta, 21.VIII.1974 *Ahti & Vitikainen 8284* (H)*, 8299 (H)*.

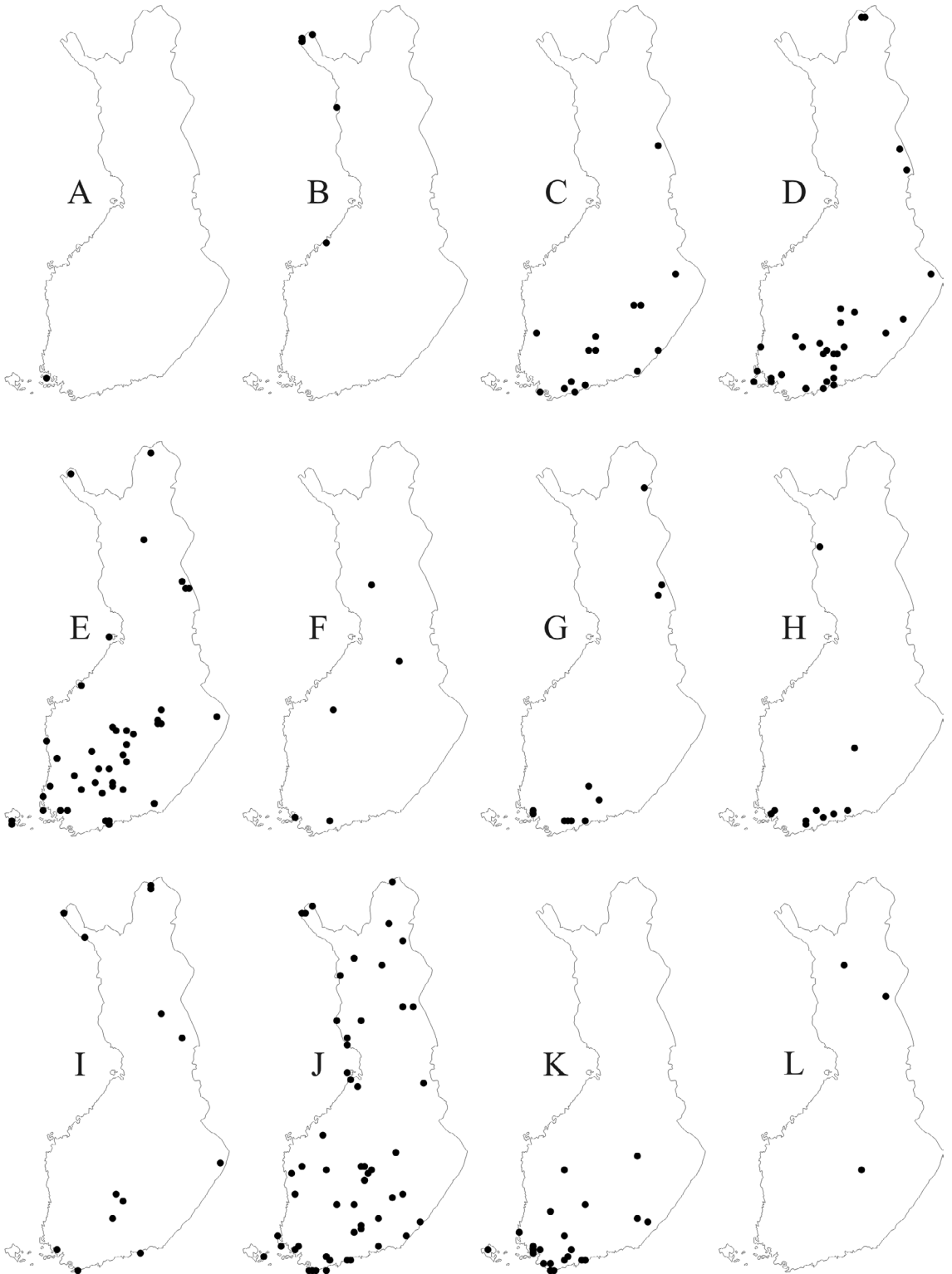


Fig. 44. Distribution maps of species A-L.

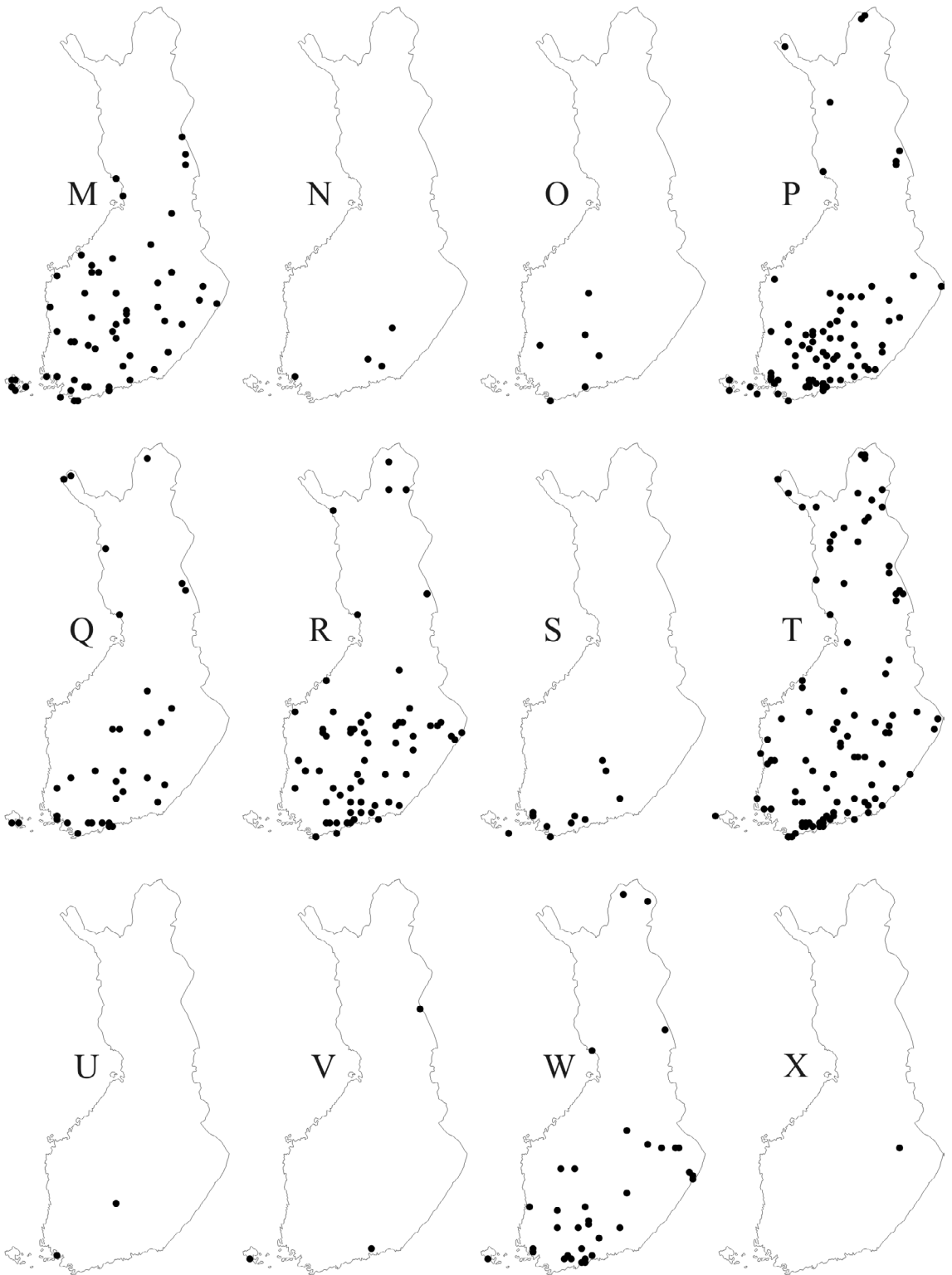


Fig. 45. Distribution maps of species M-X.

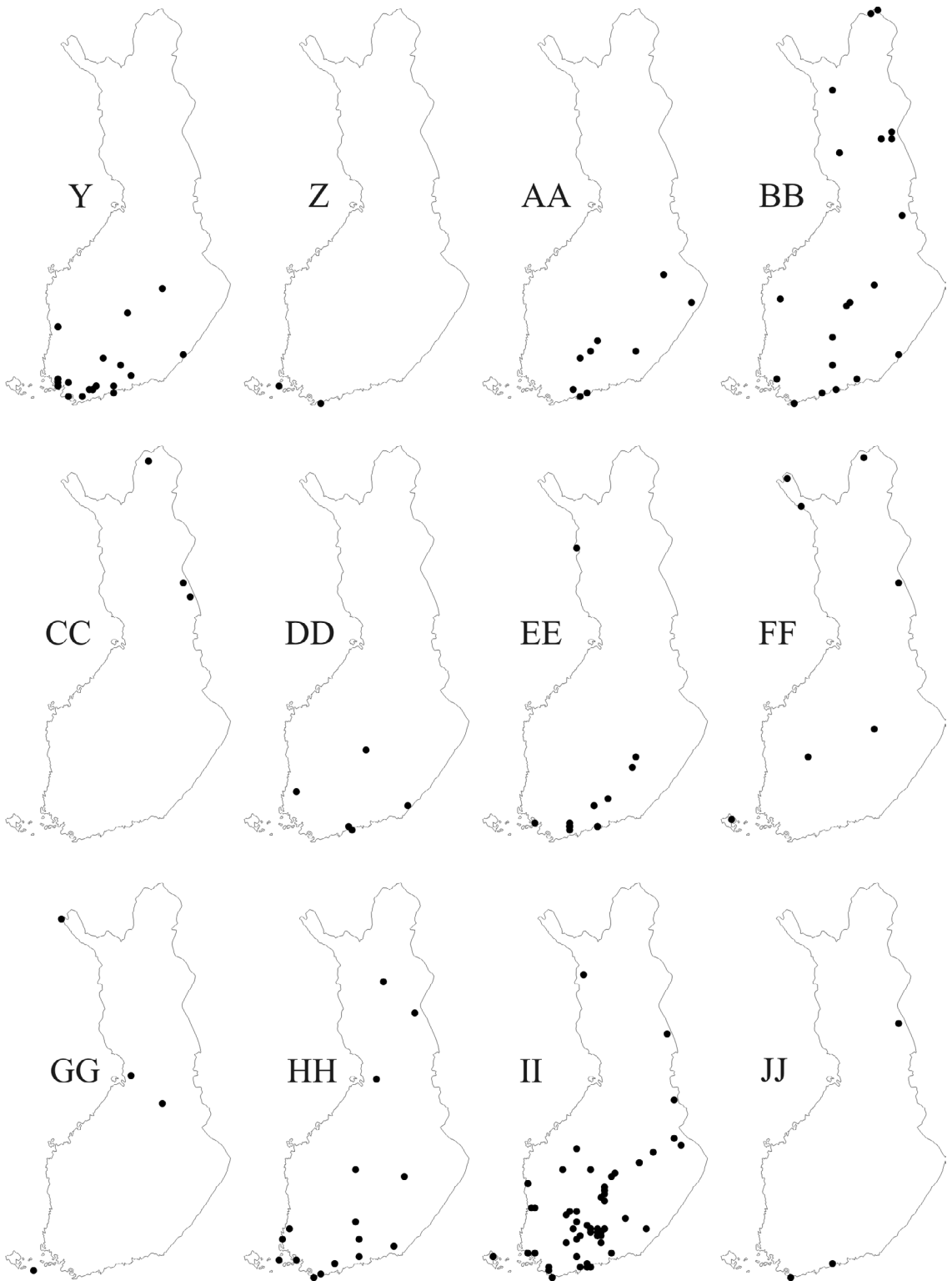


Fig. 46. Distribution maps of species Y-JJ.

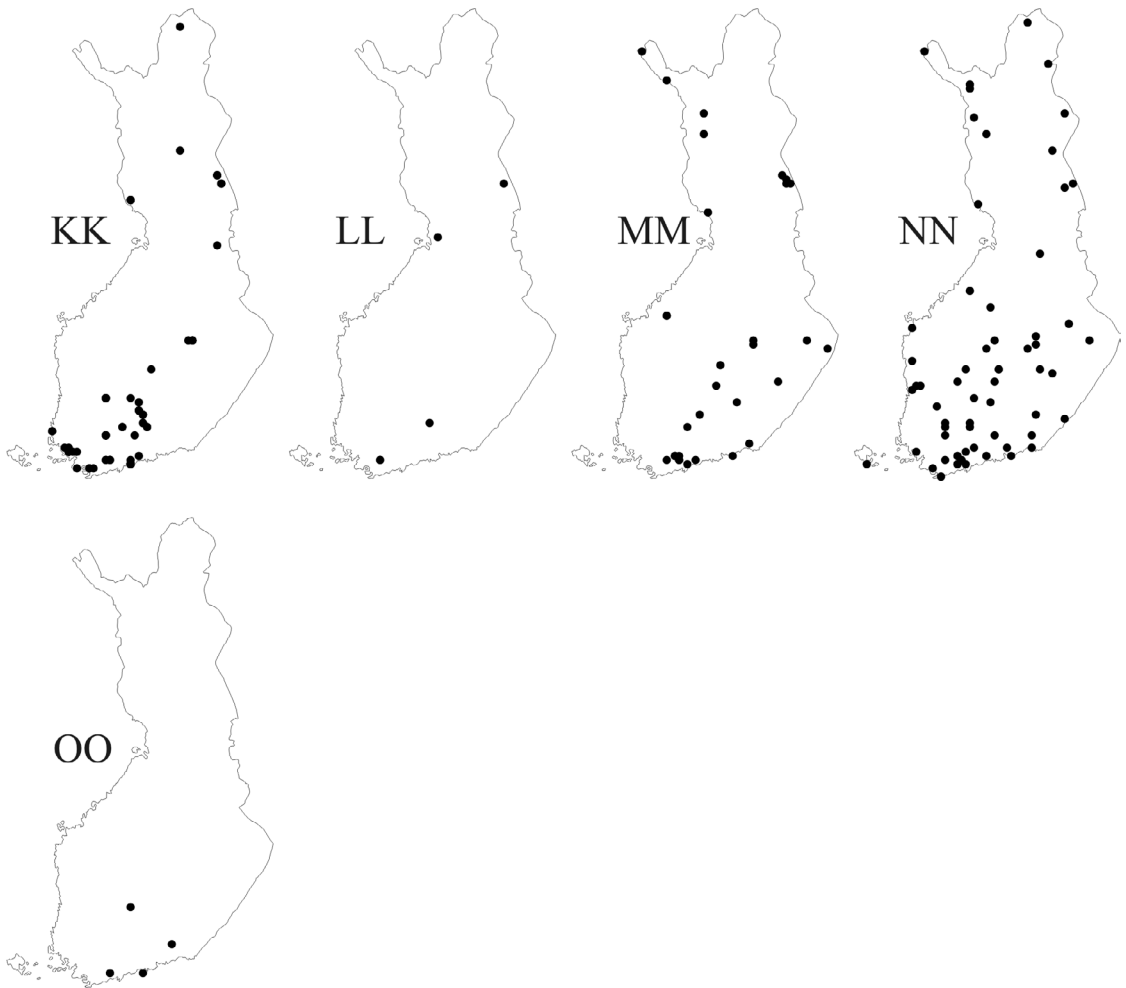


Fig. 47. Distribution maps of species KK-OO.

Appendix. The distribution of peltigericolous species in Finland. A) *Arthonia fuscopurpurea*. B) *Arthonia peltigerea*. C) *Capronia peltigerae*. D) *Corticifraga fuckelii*. E) *Corticifraga peltigerae*. F) *Dacampia rufescentis*. G) *Graphium aphthosae*. H) *Hawksworthiana peltigericola*. I) *Hobsoniopsis santessonii*. J) *Illosporium carneum*. K) *Karsteniomyces peltigerae*. L) *Lasio-sphaeriopsis salisburyi*. M) *Libertiella curvispora*. N) *Libertiella fennica*. O) *Libertiella malmedyensis*. P) *Lichenopeltella peltigericola*. Q) *Lichenopeltella santessonii*. R) *Nanostictis peltigerae*. S) *Nectriopsis lecanodes*. T) *Niesslia*

peltigericola. U) *Pezizella epithallina*. V) *Phoma epiparmelia*. W) *Phoma peltigerae*. X) *Plectocarpon peltigerae*. Y) *Polycoccum peltigerae*. Z) *Polycoccum superficiale*. AA) *Polydesmia lichensis*. BB) *Pronectria erythrinella*. CC) *Xenonectriella (Pronectria) ornamentata*. DD) *Pronectria robergei*. EE) *Pronectria tenuispora*. FF) *Pyrenidium actinellum*. GG) *Rhagadostoma brevisporum*. HH) *Scutula dedicata*. II) *Scutula epiblastematica*. JJ) *Scutula heeri*. KK) *Scutula miliaris*. LL) *Stigmidium leucophlebiae*. MM) *Stigmidium peltideae*. NN) *Thelocarpon epibolum*. OO) *Xenonectriella lutescens*.

Acknowledgements: We thank Veikko Rinne for important assistance with the making of the distribution maps and Ernest Emmett for improving the English. The research group was funded by the Ministry of Environment in Finland during the research program of deficiently known and threatened forest species (PUTTE).

References

- Alstrup, V. 2004: New records in distribution of lichens and lichenicolous fungi. – *Graphis Scripta* 16: 46–57.
- Hawksworth, D. L. 1978: Notes on British lichenicolous fungi: II. – Notes from the Royal Botanical Garden Edinburgh 36: 181–197.
- Hawksworth, D. L. 1980: Notes on some fungi occurring on Peltigera, with a key to accepted species. – *Transactions of the British Mycological Society* 74: 363–386.
- Hawksworth, D. L. 1986: Notes on British lichenicolous fungi: V. – Notes from the Royal Botanic Garden Edinburgh 43: 497–519.
- Hawksworth, D. L. & Miadlikowska, J. 1997: New species of lichenicolous fungi occurring on Peltigera in Ecuador and Europe. – *Mycological Research* 101: 1127–1134.
- Jääskeläinen, K., Pykälä, J., Rämä, H., Vitikainen, O., Haikonen, V., Högnabba, F., Lommi, S. & Puolasmaa, A. 2010: Jäkälät – Lichens. In: Rassi, P., Hyvärinen, E., Juslén, A. & Mannerkoski, I. (eds) 2010: The 2010 Red List of Finnish Species: 278–310. Ympäristöministeriö & Suomen ympäristökeskus.
- Kocourková-Horáková, J. 1998: Distribution and ecology of the genus *Thelocarpon* (Lecanorales, Thelocarpaceae) in the Czech Republic. – *Czech Mycology* 50: 271–302.
- Lawrey, J. D. & Diederich, P. 2003: Lichenicolous fungi: interactions, evolution and biodiversity. *Bryologist* 106: 80–120.
- Lawrey, J. D. & Diederich, P. 2011: Lichenicolous fungi – worldwide checklist, including isolated cultures and sequences available. – URL: <http://www.lichenicolous.net> [7/24/2011].
- Lumbsch, H. T. & Huhndorf, S.M. (eds.) 2007: Outline of Ascomycota – 2007. – *Myconet* 13: 1–58. The Field Museum, Chicago.
- Martínez, I. & Hafellner, J. 1998: Lichens and lichenicolous fungi on Peltigerales in the Iberian Peninsula and the Canary Islands. – *Mycotaxon* 69: 271–310.
- Nordin, A., Moberg, R., Tønsberg, T., Vitikainen, O., Dalsätt, Å., Myrda, M. & Ekman, S. 2010: Santesson's Checklist of Fennoscandian Lichen-forming and Lichenicolous Fungi. Museum of Evolution, Uppsala University, Uppsala, Sweden.
- Rossman, A.Y., Samuels, G.J., Rogerson, C.T. & Lowen, R. 1999: Genera of Bionectriaceae, Hypocreaceae and Nectriaceae (Hypocreales, Ascomycetes) – *Studies in Mycology* 42: 1–248.
- Roux, C. & Triebel, D. 1994: Révision des espèces de *Stigmidium* et de *Sphaerellothecium* (champignons lichénicoles non lichénisés, Ascomycetes) correspondant à *Pharcidia epicymatia* sensu Keissler ou à *Stigmidium schaeferi* auct. – *Bulletin de la Société Linnéenne de Provence* 45: 451–542.
- Santesson, R. 1960: Lichenicolous fungi from northern Spain. – *Svensk Botanisk Tidskrift* 54: 499–522.
- Santesson, R., Moberg, R., Nordin, A., Tønsberg, T. & Vitikainen, O. 2004: Lichenforming and lichenicolous fungi of Fennoscandia. Museum of Evolution, Uppsala University. Majornas CopyPrint AB, Göteborg. 359 pp.
- Sikaroodi, M., Lawrey, J.D., Hawksworth, D.L., & De Priest, P.T. 2001: The phylogenetic position of selected lichenicolous fungi: *Hobsonia*, *Illosporium*, and *Marchandiomyces* – *Mycological Research* 105: 453–460.
- Spooner, B.M. & Kirk, P.M. 1990: Observations on some genera of *Trichothyriaceae*. – *Mycological Research* 94: 223–230.
- Stenroos, S., Ahti, T., Lohtander, K. & Myllys, L. (toim.) 2011: Suomen jäkäläopas. – *Norrinia* 21: 1–534. [In Finnish]
- Toivanen, A. 2008: Microfungi living on Peltigera in Finland. – MSc. study. University of Helsinki. 111 pp. [In Finnish]
- Triebel, D., Wedin, M. & Rambold, G. 1997: The genus *Scutula* (lichenicolous ascomycetes, Lecanorales): species on the Peltigera canina and P. horizontalis groups. – *Symbolae Botanicae Upsalienses* 32: 323–337.
- Vitikainen, O. 1994: Taxonomic revision of Peltigera (lichenized Ascomycotina) in Europe. – *Acta Botanica Fennica* 152: 1–96.
- Vitikainen, O., Ahti, T., Kuusinen, M., Lommi, S. & Ulvinen, T. 1997: Checklist of lichens and allied fungi of Finland. – *Norrinia* 6: 1–123.
- Zhurbenko, M.P. & Grube, M. 2009: *Arthonia pannariae* (Arthoniaceae, Arthoniales), a new lichenicolous fungus from northern Holarctic. – *Graphis Scripta* 22: 47–51.