

The genus *Basidiodendron* (Heterobasidiomycetes, Tremellales) in Finland

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Six species of the genus *Basidiodendron* are reported from Finland: *B. caesiocinereum* (Höhn. & Litsch.) Luck-Allen, *B. cinereum* (Bres.) Luck-Allen, *B. deminutum* (Bourdot) Luck-Allen, *B. eyrei* (Wakef.) Luck-Allen, *B. radians* (Rick) P. Roberts and *B. rimosum* (H.S. Jacks. & G.W. Martin) Luck-Allen. All but *B. cinereum* are reported for the first time. The most common species in the genus seems to be *B. caesiocinereum* followed by *B. eyrei* and *B. cinereum*. Descriptions and illustrations of each species are given as well as a key to the Finnish species. A few reference collections from Russia are also included.

Key words: *Basidiodendron*, Heterobasidiomycetes, Tremellales, taxonomy

Introduction

When compiling the checklist of aphyllorhoid fungi (*s. lato*) of Finland, we realised how poorly the resupinate Heterobasidiomycetes are known. Not only the knowledge of the distributions of the species, but also the species composition appeared to be very insufficient. After Karsten (*1834–1917), only fragmentary notes on resupinate Heterobasidiomycetes are found in the literature e.g., Laurila (1939), Ulvinen *et al.* (1981) and Hansen and Knudsen (1997).

Materials and methods

The material studied is preserved in the herbaria H, TUR and/or in the reference herbarium of

Heikki Kotiranta (H.K.). Material was requested also from JOE, KUO and OULU, but the herbaria did not contain any specimens.

Thirty spores per specimen are measured, and the measurements are made in Cotton Blue (CB) or Melzer's reagent (IKI). CB– means that the walls of the cells are not stained by Cotton Blue, and CB+ that they are stained, and IKI– that there is no reaction to Melzer's reagent. The third mountant used was 5% potassium hydroxide (KOH).

The following abbreviations are used: *L* = spore length, *L** = mean spore length, *W* = spore width, *W** = mean spore width, *Q* = range of the variation in *L/W* ratio, *Q** = quotient of the mean spore length and width (*L/W*). The *L* and *W* values given in bold include at least 90% of the spores. The measurements for each specimen are given in Table 1.

Table 1. Spore dimensions of the studied specimens. The values set in bold include at least 90% of the spores.

	L	L*	W	W*	Q	Q*
<i>B. caesiocinereum</i>						
Kotiranta 19148	(5.3–) 5.6–6.9 (–7.1)	6.3	(5.6–) 6.3–7.1	6.5	0.8–1	1
Saarenoksa 18601	(5–) 5.5–6.1	5.7	(5.5–) 5.7–6.4	6	0.9–1	0.9
Kotiranta 19211	(5.8–) 6–7 (–7.5)	6.4	6–7 (–7.2)	6.4	0.9–1.1	1
Kotiranta 19980	5.5–6.5 (–7)	6.0	5.6–6.7 (–7.4)	6.2	0.9–1	1
Kotiranta 20038	6.4–7.3 (–8.3)	7	6.9–8.4 (–9.2)	7.5	0.8–1	0.9
Kotiranta 20049	6.4–7.5 (–9)	7	(6.8–) 7–8.3 (–9.5)	7.5	0.9–1	0.9
Saarenoksa 12100	6–7	6.4	(6–) 6.5–7.2 (–7.4)	6.8	0.9–1	0.9
Kotiranta 20285	(5.5–) 5.8–7 (–7.6)	6.2	5.7–7.2 (–8)	6.4	0.9–1	1
Saarenoksa 10501	6–6.8 (–7.5)	6.4	6.2–7.2 (–7.5)	6.8	0.9–1	0.9
Saarenoksa 12900	5.7–6.6 (–6.8)	6.1	(5.9–) 6.1–7.1	6.5	0.9–1	0.9
Saarenoksa 04699	(5.5–) 5.7–6.6	6.2	6–7	6.4	0.9–1	1
Saarenoksa 04201	(5.1–) 5.3–6.2 (–6.6)	5.7	5.5–6.5 (–7.2)	6	0.9–1	1
Saarenoksa 30301	5.4–6.3 (–7)	5.9	5.7–6.7 (7.1)	6.3	0.9–1	0.9
Saarenoksa 50889	(5.7–) 5.9–7 (–7.5)	6.4	6–7.2 (–8)	6.7	0.9–1	1
Saarenoksa 50889	6–6.8 (–7)	6.4	6.3–7.4 (–7.6)	6.8	0.9–1	0.9
Saarenoksa 22889	5.5–6.3 (–6.6)	6	(5.8–) 6.2–7	6.5	0.9–1	0.9
Saarenoksa 17598	(5.5–) 6–6.8 (–7.2)	6.3	6–7 (–7.5)	6.6	0.9–1	1
Saarenoksa 18598	(5.5–) 5.7–6.6 (–7)	6.1	(5.7–) 5.9–7 (–7.6)	6.5	0.9–1	0.9
Saarenoksa 20998	6–6.6 (–6.9)	6.3	(6.3–) 6.5–7.2 (–7.5)	6.8	0.9–1	0.9
Saarenoksa 07600	(5–) 5.3–6 (–6.2)	5.5	5.4–6.2 (–6.4)	5.9	0.9–1	0.9
Kotiranta 9459	(5–) 5.5–6.5 (–7)	6	(5.5–) 5.9–6.5 (–7)	6.2	0.9–1.1	1
Kotiranta 10191	5.5–6.4 (–6.6)	5.9	(5.6–) 5.8–6.4 (–6.6)	6.1	0.9–1	1
Kotiranta 18845	(5.8–) 6–7.1 (–7.8)	6.5	6–7.2 (–7.8)	6.6	0.9–1.1	1
Kotiranta 18872	5–5.6 (–5.8)	5.3	(5.2–) 5.4–6.1	5.7	0.9–1	0.9
Laurila 27.IX.1940	(5.5–) 5.7–7 (–7.4)	6.3	6–7.3 (–7.6)	6.7	0.9–1	0.9
Söderholm 2969	(5.4–) 5.6–6.8 (–7)	6.2	(5.7–) 5.9–7.2	6.5	0.9–1	1
Söderholm 2971	5.5–6.7 (–7.2)	6.1	(5.6–) 6–7 (–7.5)	6.5	0.9–1	0.9
Kotiranta 7991	6–7	6.4	6.1–7.2	6.7	0.9–1	1
Kotiranta 4745a	6–6.7 (–6.9)	6.3	6.3–7	6.6	0.9–1	1
<i>B. cinereum</i>						
Kotiranta 16895	(9.8–) 10–11.3 (–12)	10.6	5.9–7 (–7.5)	6.4	1.5–1.9	1.7
Laurila 3.VI.1937	(9–) 10–12.8	11.2	5.2–7	6.2	1.6–2	1.8
Kotiranta 7816	(9.5–) 10–12.6 (–12.8)	10.8	(5–) 5.5–6.5 (–7)	6.1	1.5–2.1	1.8
Kotiranta 7567	(9.5–) 10.6–12.8	11.3	(5–) 6–7	6.5	1.4–2.4	1.7
Kotiranta 7572	(9–) 10–11.5 (–11.9)	10.6	(5.8–) 6–7	6.5	1.4–1.8	1.6
<i>B. deminutum</i>						
Kotiranta 19260	5–5.8 (–6.2)	5.4	(3.5–) 3.8–4.9	4.4	1.1–1.4	1.2
<i>B. eyrei</i>						
Saarenoksa 08700	4–4.6	4.3	(4.2–) 4.6–5.1 (–5.4)	4.8	0.8–1	0.9
Kotiranta 16856	4.4–4.6 (–4.8)	4.5	4.8–5.3	5	0.8–1	0.9
Saarenoksa 49590	(4.1–) 4.3–4.6	4.4	4.7–5.1 (–5.5)	5	0.8–0.9	0.9
Saarenoksa 08092	4.3–4.7	4.4	4.5–5.5	5	0.8–1	0.9
Saarenoksa 54389	(4.3–) 4.5–4.8	4.6	4.6–5.3 (–5.5)	5	0.8–1	0.9
Laurila 20.IX.1937	(4–) 4.3–4.7 (–5)	4.4	(4.4–) 4.6–5.2	4.8	0.8–1	0.9
Laurila 17.IX.1937	4.2–4.9	4.5	4.6–5.2	4.9	0.9–1	0.9
Haikonen 15689	(4–) 4.2–4.8 (–5)	4.5	4.4–5 (–5.2)	4.8	0.9–1	0.9
Weresub 23.IX.1964	4.2–4.8	4.4	4.3–4.8 (–5)	4.6	0.9–1	1
Kotiranta 18445	4.6–5.3 (–5.5)	5	4.5–5.3 (–5.5)	5	0.9–1.1	1
Kotiranta 19629	(4.2–) 4.4–5	4.6	(4.5–) 4.7–5.3 (–5.5)	5	0.9–1	0.9
<i>B. radians</i>						
Kotiranta 20148	(7.3–) 7.5–9 (–10)	8.2	(6–) 6.4–7.6	7	1.1–1.4	1.2
<i>B. rimosum</i>						
Kotiranta 19180	(9–) 9.5–11.3	10.1	(7.5–) 8–9.8 (–10.2)	8.9	1–1.3	1.1
Kotiranta 19095	(8.5–) 8.8–10.8 (–11)	9.6	(7.8–) 8–9.8 (10.2)	8.9	1–1.3	1.1
Kotiranta 20199	(9–) 9.5–11.3 (–12)	10.6	(6.7–) 8.1–9.8 (–11)	8.8	1–1.5	1.2

In the text, the Q value shows the variation between all collections (in Table 1), Q^* value the mean of all Q^* values, and the spore length and width show the variation of mean sizes of each collection and L^* the mean length of all collections and W^* the mean width of all collections, respectively. None of the measurements are from spore prints.

Biological provinces and collecting sites in Finland are indicated according to the Finnish national uniform grid system (27°E), as applied to biological material by Heikinheimo and Raatikainen (1981).

The nomenclature of corticioid fungi follows Hjortstam (1998), of polypores Niemelä (2003), and of vascular plants Hämet-Ahti *et al.* (1998). The authors are found in these publications and are not repeated here. The names “*Picea*” and “spruce” refer to *Picea abies*, “*Pinus*” or “pine” to *Pinus sylvestris*, “juniper” to *Juniperus communis*, “birch” to *Betula pendula* and *B. pubescens*, “aspen” to *Populus tremula* and “*Juniperus*” to *Juniperus communis*, respectively. The species are arranged in alphabetical order.

The authors' names in chapters “Specimens examined” are abbreviated as H.K. (Heikki Kotiranta) and R.S. (Reima Saarenoksa).

***Basidiodendron* Rick**

The basidiocarps vary very much in thickness and colour. In fresh condition very young ones form an almost invisible bloom on the wood, whereas old ones are mostly seen without difficulty. The colour of most of the species in fresh condition is bluish grey and when dry more or less pale cream or ochre with brownish spots. The hymenophore of all species turns immediately yellow in KOH. As a rule the basidiocarp does not give any hint of the species in question. All species grow on decorticate wood, which is often in a state of advanced decay.

Microscopically the genus is characterised by longitudinally septate basidia which often leave involucre (remnants of old basidia) at the bases of new ones, clamped hyphae which are normally difficult to observe (both hyphae and clamps), and normally numerous gloeocystidia. The spores are smooth (minutely rough in one

Finnish species) and sometimes produce secondary spores.

Key to the Finnish species of *Basidiodendron*

1. Spores minutely roughened, globose *B. caesiocinereum*
1. Spores smooth, globose, ellipsoid or oblong 2.
2. Spores globose, 4.4–4.9 × 4.6–5.5 μm , Q value normally smaller than 1 *B. eyrei*
2. Spores ovoid, ellipsoid or subglobose, Q value 1 or more 3.
3. Spores ovoid–ellipsoid, 5.5 × 4.5 μm *B. deminutum*
3. Spores 8–10 μm long 4.
4. Spores ellipsoid–oblong, 10–11 × 6–7 μm , Q value 1.6–1.8 *B. cinereum*
4. Spores broadly ellipsoid or subglobose, Q value 1–1.4 5.
5. Spores broadly ellipsoid, 8–9 × 6.5–7.5 μm , basidia 10–12 μm wide *B. radians*
5. Spores mostly subglobose, 9–11 × 8–10 μm , basidia 14–16 μm wide *B. rimosum*

***Basidiodendron caesiocinereum* (Höhn. & Litsch.) Luck-Allen (Figs. 1 and 7)**

Sebacina caesiocinerea (Höhn. & Litsch.) D.P. Rogers
Bourdotia caesiocinerea (Höhn. & Litsch.) Bourdot & Galzin
ex Pilát & Lindtner

Young, fresh basidiocarp bluish or greyish blue, but when dried invisible to the naked eye. Old, and well developed basidiocarps are fairly thick, porose-reticulate under the lens, whitish–greyish–pale brownish–pale ochre–dirty pale greyish brown, turning brownish when bruised, margin thinning out, usually distinct but not differentiated.

Hyphal system monomitic, hyphae clamped. Subiculum thin, hyphae parallel to the substrate, 2–4 μm wide, thin-walled in CB, somewhat mucilaginous in KOH and appear thick-walled, CB–, IKI–. Gloeocystidia numerous, not projecting above the hymenium except in very young basidiocarps, subcylindrical, basally clamped and often widened, (20–)30–40(–60) × (4–)6–7(–9) μm , when young pale yellowish, later amber or golden olive brown in IKI and KOH, strongly blue in CB. Hyphidia few, somewhat branched, very thin-walled, 1–1.5 μm wide. Basidia basally clamped, longitudinally septate, normally four-celled, 10–14(–19) × (7–)8–9(–10) μm , in well developed specimens over ten generations of

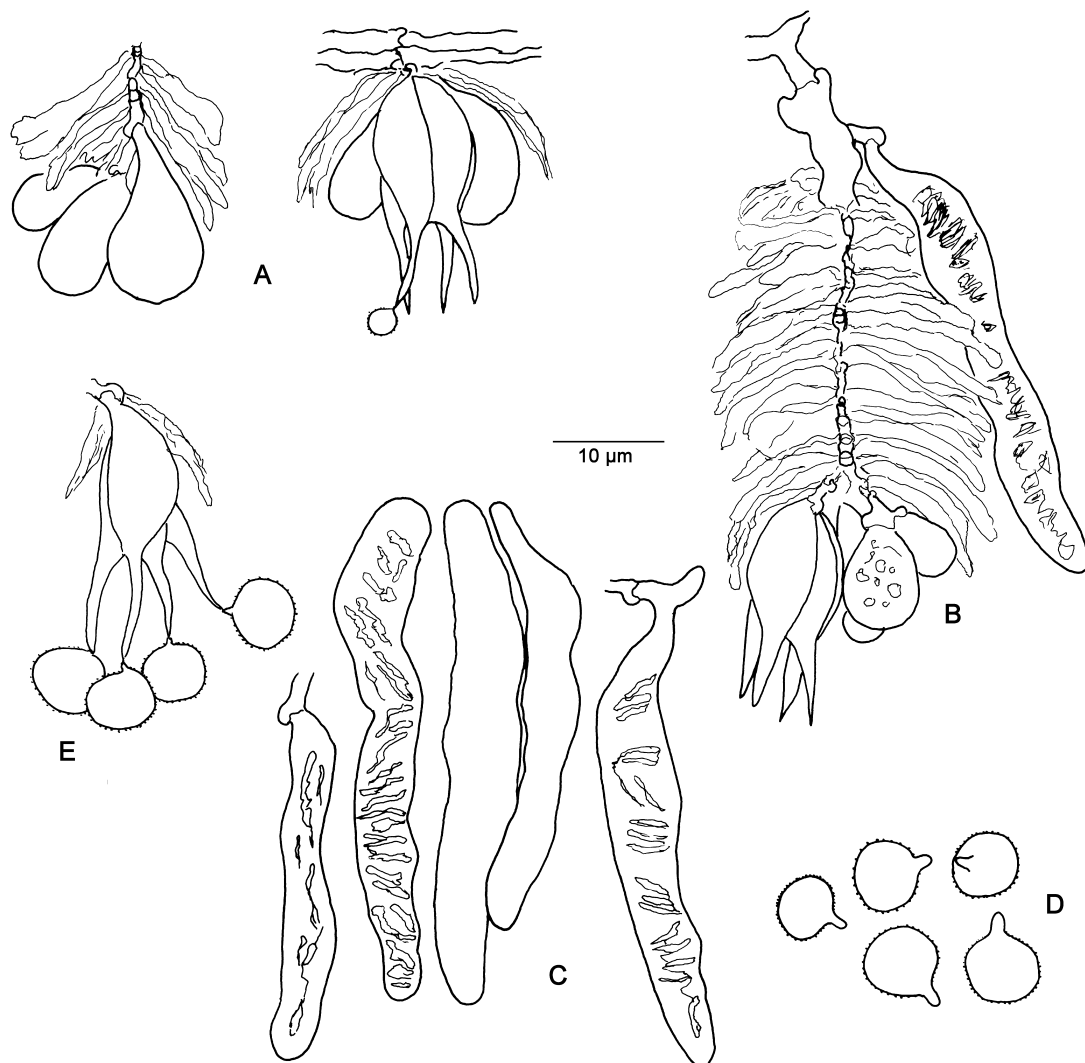


Fig. 1. *Basidioidendron caesiocinereum* (A–D from Kotiranta 19148 & Saarenoksa, E from Saarenoksa 12100 & Kotiranta). — A: Basidioles and basidia with a few involucre. — B: Basidioles, a basidium and a gloecystidium with a long axis with several generations of collapsed basidia (involucre). — C: Gloecystidia. — D: Spores. — E: Basidium and spores.

old collapsed basidia visible, with stout, up to $10\ \mu\text{m}$ long sterigmata. Each basidia-bearing unit contains one sporulating, mature basidium and 1–3 aseptate, pear-shaped basidioles. Spores globose $5.3\text{--}7 \times 5.7\text{--}7.5\ \mu\text{m}$, $L^* = 6.2\ \mu\text{m}$, $W^* = 6.5\ \mu\text{m}$, $Q = 0.8\text{--}1.1$, $Q^* = 0.9$, finely verruculose or almost smooth, thin-walled, CB– (except the ornamentation, which is CB+), IKI–, with a large, tapering, up to $2\ \mu\text{m}$ long and basally $1.5\ \mu\text{m}$ wide apiculus.

Even if the involucre are large, they are often difficult to see, and are most easily visible

in KOH when using a phase contrast microscope. The configuration of the spores is sometimes difficult to observe in a light microscope, and in some collections the majority of spores are apparently smooth (see also e.g., McGuire 1941: p. 41, Wells 1959: p. 553). The smooth spores are often also larger than the verruculose ones. The specimens with large and smooth spores are all collected from deciduous wood. In the small-spored, conifer specimens, the warts are easily seen even in KOH and the roughness is already easily observable in spores still attached

to sterigmata. However, it seems that the larger the spores are, the less verruculose they are even in specimens collected from coniferous hosts. Olive (1958) described two species of *Sebacina* (*Basidiodendron*) with spiny spores from Tahiti. According to him both are simple septate and without involucre.

The variation in the size of gloeocystidia is due to the age of the basidiocarp. In young ones they are mostly short and in old ones long. This could be observed in two specimens (*Saarenoksa* 18789 and 50889), which were collected from the same birch tree in September and again two months later.

The habitats of *B. caesiocinereum* are variable: normal acid spruce-dominated heath forests, luxuriant spruce forests with calcareous soil, grass-herb forests, old-growth spruce forests, mountain birch forests and remnants of old buildings. *Basidiodendron caesiocinereum* seems to be the most common species of the genus before *B. eyrei* and the frequency is highest in southern grass-herb forests with strongly decayed trees.

Substrates of *B. caesiocinereum* ($n = 28$):

<i>Picea abies</i>	13
<i>Betula</i> spp.	4
<i>Pinus sylvestris</i>	3
<i>Salix caprea</i>	2
<i>Alnus incana</i>	1
Unidentified deciduous wood	3
Unidentified coniferous wood	2

SPECIMENS EXAMINED: — **Finland.** Åland: Geta, Geta-bergen, dry pine-dominated rock outcrop, inside strongly decayed *Picea*, Grid 27°E 67183-4:1058-9, 24.X.2001 *H.K.* 19148 & *R.S.* (H, H.K.). Geta, Snäckö, Södergård NE, dry pasture, on soft *Picea* board, Grid 27°E 67153:1031, 24.X.2001, *R.S.* 18601 & *H.K.* (H). Lemland, Västerånga, collapsed house, on coniferous timber, Grid 27°E 66758-9:1178-9, 25.X.2001 *H.K.* 19211 & *R.S.* (H, H.K.). Varsinais-Suomi: Lohja, Lohjansaari, Kalkkimäki Nat. Res., calcareous spruce-dominated old forest, on fairly decayed, decorticated *Picea*, Grid 27°E 66837-8:3261-2, 28.VIII.2003 *H.K.* 1990 & *R.S.* (H). Lohja, Torholan luola Nat. Res., grass-herb forest, on strongly decayed, decorticated *Picea* branch together with *Kavinia himantia*, Grid 27°E 66863:3262, 17.X.2003 *H.K.* 20038 & *R.S.* (H), same place and date, on decorticated *Picea* branch, *H.K.* 20049 & *R.S.* (H.K.). Tammissaari, Bromarv, Rilax, forest park, on strongly decayed, decorticated deciduous stump, Grid 27°E 6655:280, 13.X.2000 *R.S.* 12100 & *H.K.* (H). Uusimaa: Helsinki, Koskela, pine-dominated semi open poor rock outcrop, on very strongly decayed, decorticated small *Pinus*, Grid 27°E 6680:387, 21.XI.2003 *H.K.*

20285 & *R.S.* (H). Helsinki, Kumpula, moist grass-herb forest, on partly corticated, felled, strongly decayed *Salix caprea*, Grid 27°E 6679:387, 13.X.2001 *R.S.* 10501 (H). Helsinki, Kumpula, Kymintie, spruce-dominated heath-forest site type, on very strongly decayed, decorticated *Betula* sp. stump, Grid 27°E 6679:387, 12.XI.2000 *R.S.* 12900 (H), approximately same place, on coniferous board, 13.XI.1999 *R.S.* 04699 (H), on strongly decayed, decorticated large *Picea* stump, 16.IX.2001 *R.S.* 04201 (H), on decorticated, fairly decayed thin *Picea*, 7.X.2001 *R.S.* 31301 (H). Helsinki, Myllypuro - Puotinharju, grass-herb forest, on strongly decayed, decorticated *Betula* sp., Grid 27°E 6680:392, 3.IX.1989 *R.S.* 50889 and same tree, 4.XI.1989 *R.S.* 50889 (H). Helsinki, Vanhakaupunki, Annala, grass-herb forest, on strongly decayed, decorticated *Alnus incana*, Grid 27°E 6679:387, 10.IX.1989 *R.S.* 22889 (H), about same place, dry grass-herb forest, on strongly decayed deciduous (*Betula/Populus*) stump together with *Sistotrema muscicola*, 18.IX.1998 *R.S.* 17598 (H), on strongly decayed, corticated deciduous stump together with *Hyphoderma setigerum*, 20.IX.1998 *R.S.* 18598 (H), on strongly decayed, decorticated *Betula* sp. stump, 1.X.1998 *R.S.* 20998 (H, H.K.). Helsinki, Viikki, Hakala, cut, luxuriant heath-forest site type, on decorticated, strongly decayed *Picea* stump, Grid 27°E 6680:389, 1.X.2000 *R.S.* 07600 (H). Inkoo, Sommarv Nat. Res., collapsed house, on *Pinus* timber, Grid 27°E 66489:3466, 25.V.1991 *H.K.* 9458 (H.K.) and same house, on *Pinus* timber together with *Diplomitoporus lindbladii* and *Oligoporus sericeomollis*, 24.V.1992 *H.K.* 10191 (H.K.). Tammissaari, Gullö, Edesbacka, fairly old spruce-dominated forest, on *Picea* roots and litter, Grid 27°E 66523:2982, 27.IX.2001 *H.K.* 18845 & *R.S.* (H, H.K.) and on large decorticated, strongly decayed *Picea* stump, together with *Piloderma byssinum* and *Resinicium bicolor*, Grid 27°E 66522:2985, *H.K.* 18872 & *R.S.* (H.K.). Satakunta: Noormarkku, Sulkjärvi, moist forest, on large decorticated *Salix caprea*, Grid 27°E 6846:234, 27.IX.1940 Laurila (H). Etelä-Häme: Orivesi, Pukala, Leenansaari, on decorticated, strongly decayed *Picea*, Grid 27°E 6844:350, 15.IX.1999 Söderholm 2969 (TUR 127475) and on decorticated *Picea*, Söderholm 2971 (TUR 127451). Pohjois-Savo: Vieremä, Koukomäki, old spruce-dominated forest, on fairly small, fairly hard, decorticated *Picea*, Grid 27°E 7096:504, 6.X.1989 *H.K.* 7991, Niemelä & Penttilä (H.K.). Enontekiön Lappi: Enontekiö, Kilpisjärvi, Pikku Malla Strict Nat. Res., open mountain birch forest, on strongly decayed, decorticated *Betula pubescens* ssp. *czerepanovii*, together with *Pseudotomentella umbrina*, Grid 27°E 767:25, 2.IX.1983 *H.K.* 4745a (H.K.).

***Basidiodendron cinereum* (Bres.) Luck-Allen (Figs. 2 and 7)**

Sebacina cinerea Bres.

Bourdota cinerea (Bres.) Bourdot & Galzin

Reported earlier by Laurila (1939).

Basidiocarps are as in *B. caesiocinereum*, except the very old ones, which may be almost

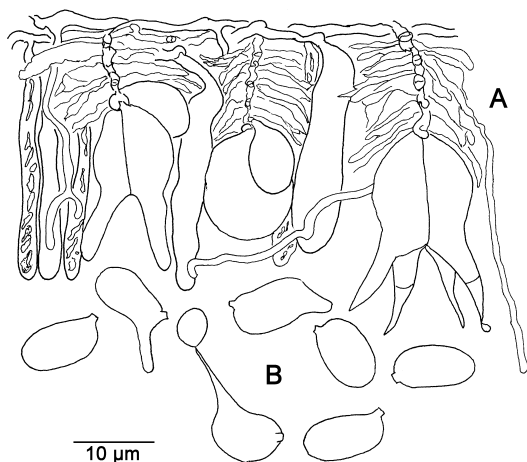


Fig. 2. *Basidiodendron cinereum* (from Kotiranta 16895 & Saarenoksa). — **A:** Section through the basidiocarp showing basidioles, basidia with involucres, hyphidia and gloeocystidia. — **B:** Spores.

smooth. The colour is as in *B. caesiocinereum*, i.e., reminiscent of *Phlebiella pseudotsugae*.

Hyphal system monomitic, all hyphae clamped, thin-walled, (1)–2–2.5 µm in diam. appearing only in the extremely thin subiculum. Cystidia numerous, basally clamped, cylindrical, when young pale yellowish, later golden brown, (26)–30–40(–50) × (3)–6–7(–10) µm. Hyphidia few, somewhat branched, often seen only around basidioles, 0.8–1.5 µm in diam., very thin-walled. Basidia basally clamped, longitudinally septate, 15–16(–18) × 11–12 µm with four (sometimes two) stout, normally 15 µm long sterigmata, which may have adventitious septa. The involucres are very thin-walled and less numerous than in *B. caesiocinereum*. Spores ellipsoid, ovoid or oblong, fairly often slightly depressed, frequently forming secondary spores, 10.6–11.3 × 6.1–6.5 µm, $L^* = 10.9$ µm, $W^* = 6.3$ µm, $Q = 1.4$ –2.4, $Q^* = 1.7$, thin-walled, CB–, IKI–, with a wide, but short, apiculus.

Basidiodendron cinereum grows on hardwoods and conifers in diverse habitats from luxuriant broad-leaved grass-herb forests to spruce-dominated old-growth forests. Even if it is not yet found in northernmost Lapland, we believe that it grows also there.

Among the species in this paper, *B. cinereum* is easily distinguished by the shape of the spores and the size of basidia. Only *B. rimosum* has basidia, which are clearly over 10 µm wide, but

the shape of the spores is quite different and involucres absent, or almost so. According to Roberts (1997) *B. pini* has somewhat similar-shaped spores, but even larger, viz. 12.5–14.5 × 6.5–8 µm. It also lacks involucres.

Substrates of *B. cinereum* ($n = 5$):

<i>Picea abies</i>	3
<i>Alnus glutinosa</i>	1
<i>Quercus robur</i>	1

SPECIMENS EXAMINED: — **Finland.** Varsinais-Suomi: Tammissaari, Tenhola, Lökkudden Nat. Res., dryish grass-herb forest, on strongly decayed, decorticated *Quercus robur* branch, Grid 27°E 665:278, 13.X.2000 H.K. 16895 & R.S. (H.K.). Satakunta: Siikainen, Vuorijärvi, Vääräneva, on large decorticated *Alnus glutinosa*, Grid 27°E 6866-7:239, 3.VI.1937 Laurila (H). Perä-Pohjanmaa: Rovaniemi comm., Pisavaara Strict Nat. Res., Sorvannulikka N-slope, spruce-dominated old-growth forest, on decorticated *Picea* twig, Grid 27°E 735:41, 4.IX.1989 H.K. 7816 (H.K.). Kittilän Lappi: Kittilä, Homevuotso Nat. Res., spruce-dominated old-growth forest, on a small, decorticated *Picea* fallen over a bog, Grid 27°E 7519:398-9, 28.VIII.1989 H.K. 7567 (H.K.) and on partly very hard, decorticated *Picea*, H.K. 7572 (H.K.).

Basidiodendron deminutum (Bourdot)

Luck-Allen (Figs. 3 and 7)

Sebacina deminuta Bourdot

Bourdotia deminuta (Bourdot) Bourdot & Galzin

Basidiocarp very thin, reticulate, almost white, margin not differentiated, thinning out.

Hyphal system monomitic, hyphae clamped, thin-walled, (1.5)–2–2.5 µm wide. Gloeocystidia basally clamped, fairly abundant, cylindrical or tubular with more or less hyaline, or only slightly yellowish contents, (26)–30–55(–59) × (6)–8–12 µm. Hyphidia few, very thin-walled, somewhat branched, 1–1.5 µm wide. Basidioles basally clamped, subglobose, when mature ovoid, very thin-walled, four-celled 9–10 × 7–8 µm with four, rather thin, up to 9 µm long sterigmata, which in rare cases are forked. Involucres very thin-walled, difficult to see. Spores smooth, oblong or ovoid, 5–5.8(–6.2) × (3.5)–3.8–4.9 µm, $L^* = 5.4$ µm, $W^* = 4.4$ µm, $Q = 1.1$ –1.4, $Q^* = 1.2$, very thin-walled, CB–, IKI–, with up to 0.8 µm long apiculus.

Our specimen is undoubtedly very young and the description of the basidiocarp given by Luck-Allen (1963) is fairly different from ours. How-

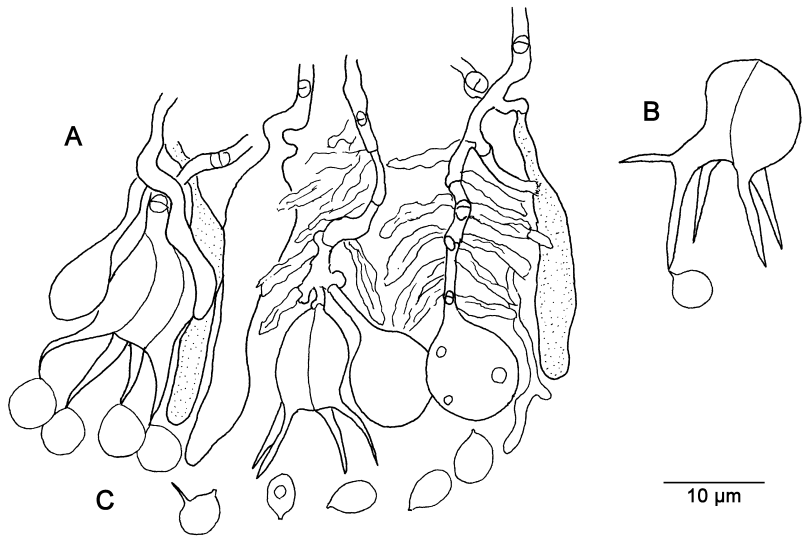


Fig. 3. *Basidiodendron deminutum* (from Kotiranta 19260 & Saarenoksa). — **A:** Section through the basidiocarp showing basidioles, basidia with involucres, a hyphidium and gloeocystidia. — **B:** Basidium with one forked sterigma. — **C:** Spores.

ever, the microscopical details fit well. The size of the spores comes close to that of *B. eyrei*, but the shape is different (in *B. eyrei* the Q value is smaller than 1, in *B. deminutum* greater than 1), and the apiculus of *B. deminutum* is clearly larger than that of *B. eyrei*. We agree with Luck-Allen (1963) and Torkelsen (1997) that *B. deminutum* is separate from *B. eyrei*, unlike McGuire (1941: p. 40) who had “a strong suspicion that they are simply variations of the same species ...”, and Olive (1958).

SPECIMENS EXAMINED: — **Finland.** Åland: Sund, Lillnäsberget Nat. Res., old luxuriant spruce-dominated forest, inside strongly decayed white-rotted *Picea*, Grid 27°E 6698-9:115, 25.X.2001 H.K. 19260 & R.S. (H.K.).

***Basidiodendron eyrei* (Wakef.) Luck-Allen**
(Figs. 4 and 7)

Sebacina eyrei Wakef.

Bourdotia eyrei (Wakef.) Bourdot & Galzin

Basidiocarp fairly thick, pale ochraceous or fawn, brown when bruised, at first porulose-reticulate, when mature continuous, smooth, seldom with a few minute papillae, cracking somewhat when old, and showing the pale subiculum, margin not differentiated, thinning out.

Hyphal system monomitic, hyphae clamped. Subiculum very thin, hyphae parallel to the sub-

strate, 2–3 μm wide, thin- to somewhat thick-walled in KOH, very difficult to observe in CB, faintly CB+. Gloeocystidia basally clamped, thin-walled, subcylindrical or tubular, apically obtuse, widest at basal part, at first hyaline, later yellowish and when mature with golden brown contents, (25–)30–45(–55) \times (5–)6–7(–8) μm , most easily seen in KOH, in CB contents dark blue. Hyphidia extremely rare, very thin-walled, not branched, less than 1.5 μm wide. Basidia basally clamped, normally four-celled, at first ovoid, when ripe somewhat tulip-shaped, 10–14 \times 7–8 μm , with easily visible involucres (in KOH), which may form a row of dead basidia over 30 μm long. The fertile axis giving rise to basidioles, basidia and involucres, fairly thin-walled, 2–2.5 μm wide, relatively easily seen in KOH. Spores smooth, subglobose or globose, 4.3–5 \times 4.6–5 μm , $L^* = 4.5 \mu\text{m}$, $W^* = 4.9 \mu\text{m}$, $Q = 0.8\text{--}1.1$, $Q^* = 0.9$, thin- or somewhat thick-walled, CB+ (mostly very faintly), IKI–, with a small apiculus.

The habitats of *B. eyrei* are normally grass-herb forests with abundant dead broadleaved trees and it seems to be a more southern species in Finland than *B. caesiocinereum*. All the collections are from deciduous wood.

Substrates of *B. eyrei* ($n = 11$):

<i>Populus tremula</i>	3
<i>Tilia cordata</i>	3

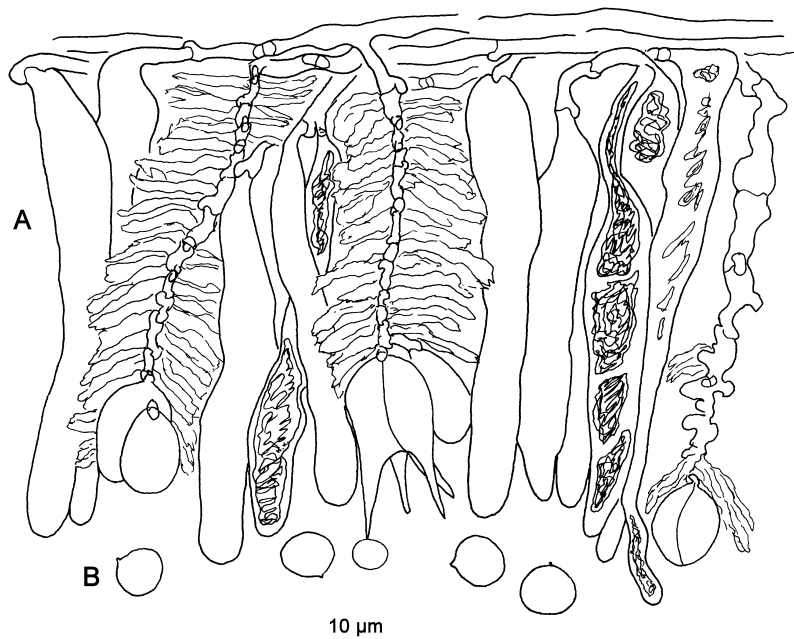


Fig. 4. *Basidiodendron eyrei* (from Weresub et al. 23.IX.1964). — **A**: Section through the basidiocarp showing basidioles, basidia with involucres and gloeocystidia. — **B**: Spores.

<i>Prunus padus</i> (incl. <i>Padus racemosa</i>)	2
<i>Alnus fruticosa</i>	1
<i>Betula</i> sp.	1
<i>Salix</i> sp.	1

Basidiodendron radians (Rick) P. Roberts
(Figs. 5 and 7)

Basidiodendron nodosum Luck-Allen

SPECIMENS EXAMINED: — **Finland**. Varsinais-Suomi: Tammisaari, Tenhola, Lökkuden Nat. Res., dryish grass-herb forest, on decorticated, thin *Tilia cordata*, Grid 27°E 6665:278, 13.X.2000 R.S. 08700 & H.K. (H) and on strongly decayed, decorticated *Tilia cordata* branch, H.K. 16856 & R.S. (H.K.). Uusimaa: Myllypuro–Puotinharju, grass-herb forest, on decorticated, fairly decayed, thin *Populus*, Grid 27°E 6680:392, 9.VIII.1990 R.S. 49590 & H.K. (H), and on similar *Populus*, Grid 27°E 6679:393, 9.VIII.1992 R.S. 08092 (H). Vantaa, Tammisto Nat. Res., grass-herb forest, on decorticated part of fairly decayed, corticated *Prunus padus*, Grid 27° 6686:387, R.S. 54389 (H). Satakunta: Noor-markku, Sulkjärvi, fairly strongly decayed, decorticated *Tilia cordata* branch, Grid 27°E 6846:234, 20.IX.1937 Laurila (H, ex HPP 1251). Siikainen, Vuorijärvi, Vääräneva, on decorticated, fairly strongly decayed large *Betula*, Grid 27°E 6866-7:239, 17.IX.1937 Laurila (H, ex HPP 1250). Etelä-Häme: Asikkala, Pyhäsuo, decorticated *Salix* sp., Grid 27°E 6791:418, 24.IX.1993 Haikonen 15689 (H). Lammi, Evo, Vahtervehmas, spruce-dominated old-growth forest, on decorticated *Populus*, Grid 27°E 679:39, 23.IX.1964 Weresub, Kujala, Hintikka & Laine (H). **Russia**. Altay Rep.: Teletskoje lake, Katka bay, Atkichu river, luxuriant, mixed old-growth forest, on partly corticated *Alnus fruticosa*, 51°46'N, 87°41'E, 12.VIII.2001 H.K. 18445 (H.K.). Bashkortostan Rep.: Viláy, grass-herb forest, on decorticated *Padus racemosa*, 54°48'N, 57°20'E, 15.VIII.2002 H.K. 19629 (H.K.).

Basidiocarp thin, whitish, porulose, at first smooth, later with subglobose or almost globose, irregularly dispersed nodulae which are brownish inside ($\times 50$), margin not differentiated, thinning out.

Hyphal system monomitic, hyphae clamped. Subiculum very thin, hyphae very thin-walled, 1.5–2 μm wide, richly clamped, forming a net-like structure. Gloeocystidia subclavate, without a basal appendice, with thickened walls, (17–)20–26(–33) μm . The nodules consist of old, golden brown gloeocystidia. Hyphidia few, only slightly branched, very thin-walled, 1–1.5 μm wide. Basidia almost globose, normally four-celled, without involucres, 11–14(–19) \times 10–12 μm , usually with 10 μm , seldom up to 20 μm long sterigmata. Spores broadly ellipsoid or subglobose, (7.3–)7.5–9(–10) \times (6–)6.4–7.6 μm , $L^* = 8.2 \mu\text{m}$, $W^* = 7 \mu\text{m}$, $Q = 1.1–1.4$, $Q^* = 1.2$, with up to 1.2 μm long apiculus, thin-walled CB–, IKI–.

According to Torkelsen (1997) the apiculus is small and there are only few gloeocystidia. Our specimen does not fit well in that concept,

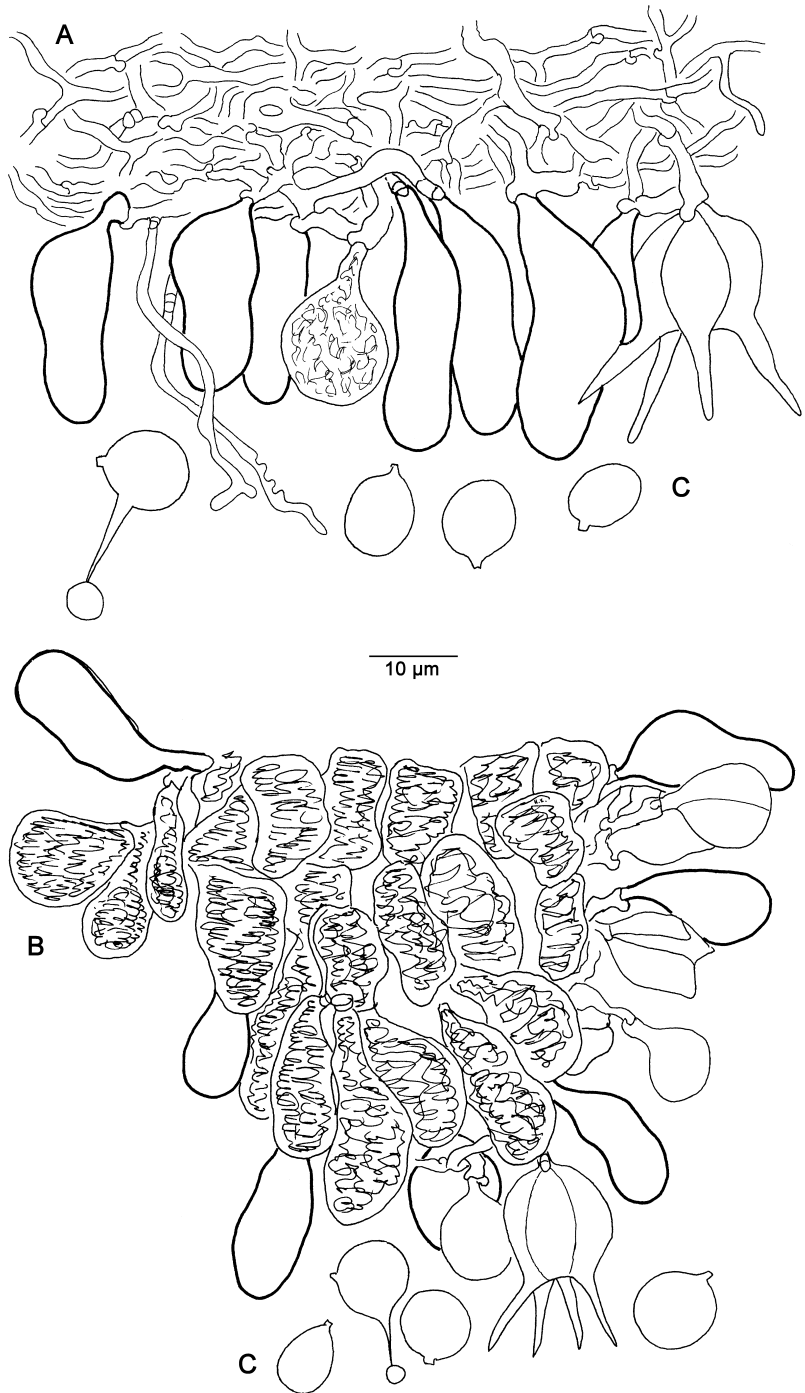


Fig. 5. *Basiodendron radians* (from Kotiranta 20148 & Saarenoksa). — **A:** Section through the basidiocarp showing a basidiolate, a basidium, hyphidia and young gloeocystidia. — **B:** Section through a nodule showing basidiolae, a basidium and gloeocystidia at different stages of development. — **C:** Spores.

but the descriptions of Luck-Allen (1963) and Roberts (1996) are in accordance with our specimen, except that the Finnish specimen has clear nodules ($\times 50$) and the young gloeocystidia are somewhat thick-walled.

SPECIMENS EXAMINED: — **Finland.** Uusimaa: Kirkkonummi, Järsö, poor pine-dominated rock outcrop, on large, dead, decorticated *Juniperus communis* together with *Athelia* cf. *acrospora*, *Globulicium hiemale* and *Tubulicrinis glebulosus* coll., Grid 27°E 6660:358, 7.XI.2003 H.K. 20148 & R.S. (H, H.K.).

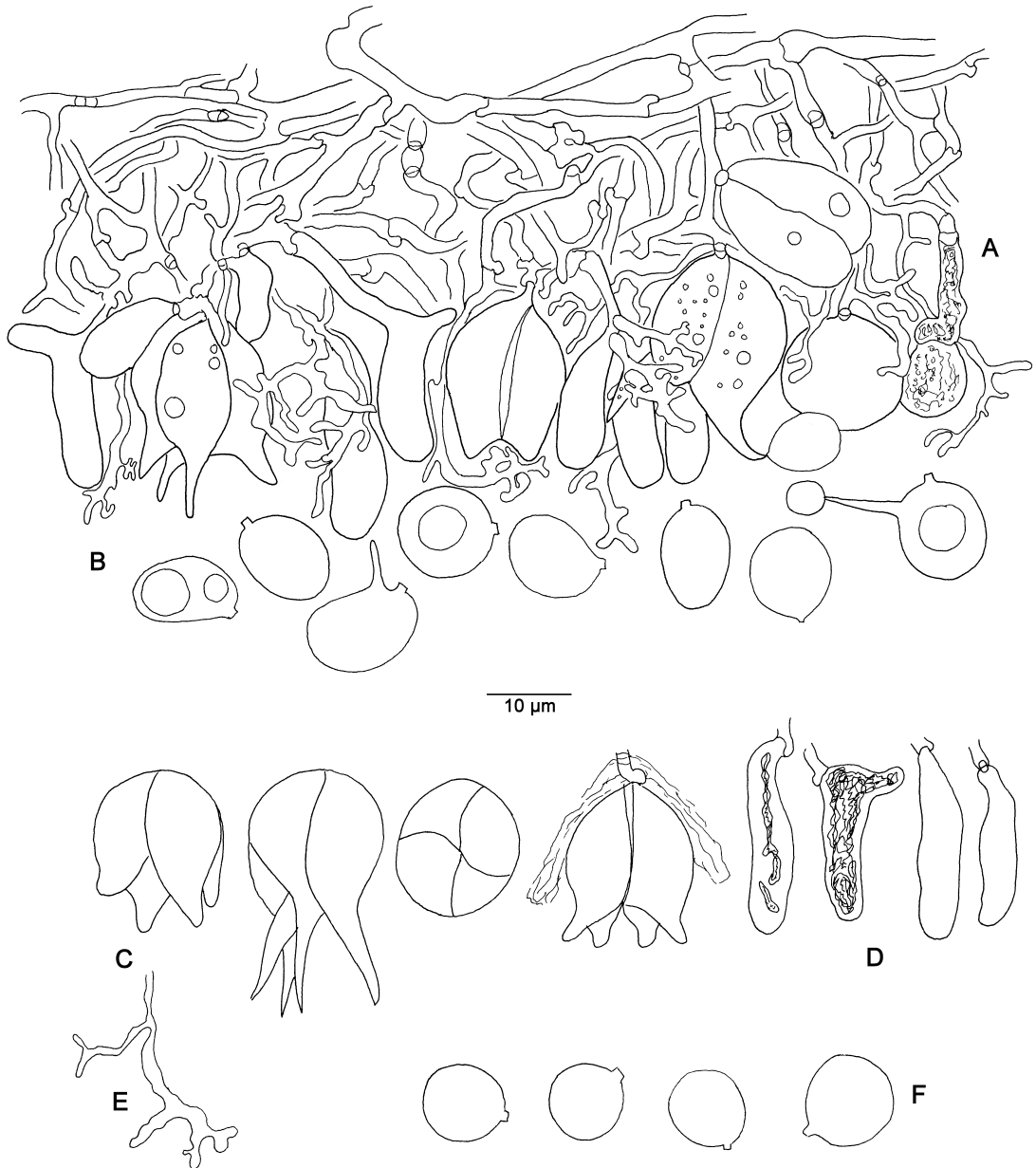


Fig. 6. *Basidiodendron rimosum* (A–B from Kotiranta 20199 & Saarenoksa, C–F from Kotiranta 19180 & Saarenoksa). — A: Section through the basidiocarp showing basidioles, basidia, highly branched hyphidia and gloeocystidia. — B: Spores. — C: Basidia. — D: Gloeocystidia. — E: A hyphidium. — F: Spores.

Peter Roberts (in litt.) informed us that in Kew there is one more *B. radians* specimen, which we have not seen: Etelä-Häme: Padasjoki, Vesijako Strict Nat. Res., spruce-dominated old-growth forest, on *Picea* wood, 14.IX.1994 Ryvarden 34549 (K).

Basidiodendron rimosum (H.S. Jacks. & G.W. Martin) Luck-Allen (Figs. 6 and 7)

Sebacina rimosa H.S. Jacks. & G.W. Martin

Basidiocarp resupinate, thin, under lens ($\times 50$)

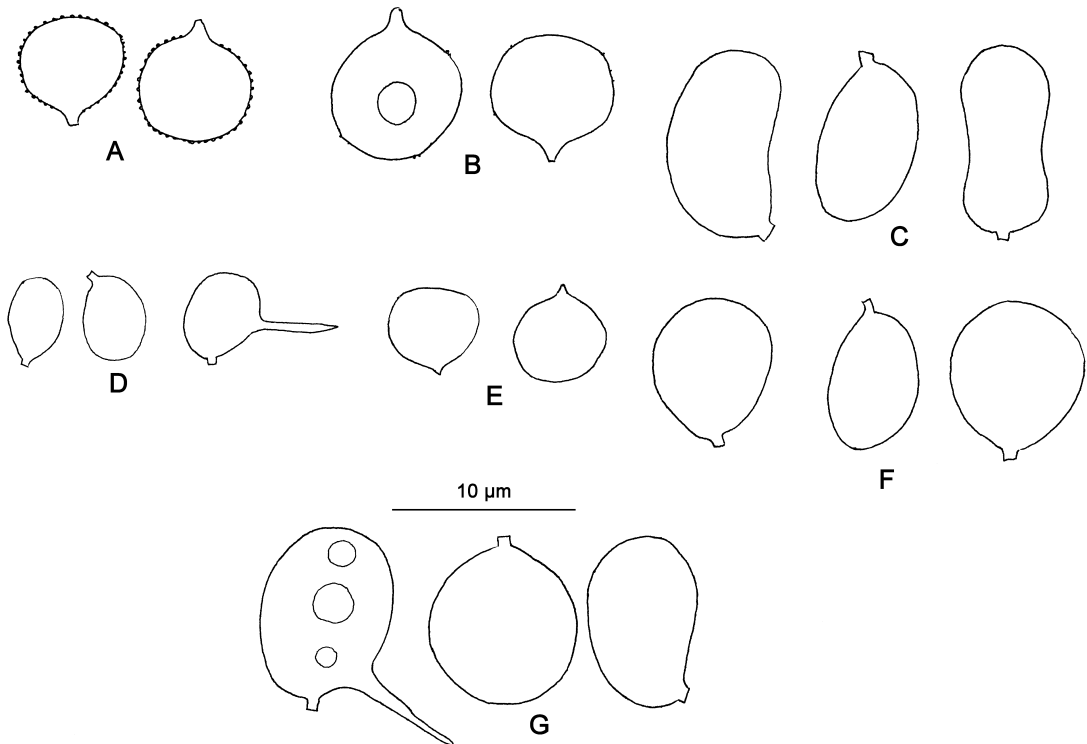


Fig. 7. Spores of *Basidiodendron* species. — **A–B:** (**A** from Saarenoksa 18601 & Kotiranta, **B** from Saarenoksa 12100 & Kotiranta) *Basidiodendron caesiocinereum*. — **C:** (from Kotiranta 7567) *Basidiodendron cinereum*. — **D:** (from Kotiranta 19260 & Saarenoksa) *Basidiodendron deminutum*. — **E:** (from Saarenoksa 08092) *Basidiodendron eyrei*. — **F:** (from Kotiranta 20148 & Saarenoksa) *Basidiodendron radians*. — **G:** (from Kotiranta 19095 & Saarenoksa) *Basidiodendron rimosum*.

porose-reticulate, dirty whitish, pale cream or pale ochre; in dry state almost invisible to the naked eye, margin not differentiated, thinning out or distinct.

Hyphal system monomitic, hyphae clamped. Subicular hyphae richly branched, thin-walled in IKI, with slightly thickened walls in KOH, 2–3(–4.5) μm wide, forming a net-like structure. Gloeocystidia numerous, cylindrical or finger-like, often with a basal appendice, (15–)20–30(–37) \times 4–6 μm , when young with pale yellow homogeneous contents, when old golden brown, thin-walled. Hyphidia common, richly branched, very thin-walled, 1–1.5 μm wide. Basidia subglobose, normally four-celled, mostly without involucre, 15–18 \times 14–16 μm , with 10–15(–17.5) μm long sterigmata, which may rarely be forked. Spores subglobose or broadly ellipsoid, 9.6–10.6 \times 8.8–8.9 μm , $L^* = 10.1 \mu\text{m}$, $W^* = 8.9 \mu\text{m}$, $Q = 1–1.5$,

$Q^* = 1.1$, thin- or very thin-walled, CB–, IKI–, with a relatively small apiculus.

According to Luck-Allen (1963) the “dendrophyses [hyphidia] are absent or obscure” in *B. rimosum*. In our specimens the hyphidia are almost invisible in IKI, but in KOH very prominent, showing the arboriform, highly branched structure. It seems that the hyphidia are covered with some mucilaginous layer which is soluble in KOH. Another interesting feature is that the spores are almost invisible in KOH, but fairly easily seen in IKI.

The habitats of *B. rimosum* vary from normal spruce-dominated mesic forests to wooded pastures and very poor, sunny rock outcrops. All the collection are made in southern Finland.

Substrates of *B. rimosum* ($n = 3$):

Juniperus communis 3

SPECIMENS EXAMINED: — **Finland.** Åland: Finström, Norrböle SW, managed spruce-dominated mesic forest, on dead *Juniperus* twigs, Grid 27°E 67061-2:1106-7, 24.X.2001 H.K. 19180 & R.S. (H, H.K.). Geta, Snäckö, Södergård, dry wooded pasture, on decorticated *Juniperus*, Grid 27°E 67153:1031, 24.X.2001 H.K. 19095 & R.S. (H, H.K.). Uusimaa: Kirkkonummi, Sevals, Kasaberget, pine-dominated poor, dry rock outcrop, on dead *Juniperus* together with *Amylostereum laevigatum* and *Athelia acrospora*, Grid 27°E 66646-7:3588-9, 7.XI.2003 H.K. 20199 & R.S. (H.K.).

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