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# North European species of Ceriporiopsis (Basidiomycota) and their Asian relatives

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The polypore genus *Ceriporiopsis* is revised, and a new combination is proposed: *Ceriporiopsis pseudogilvescens* (Pilát) Niemelä & Kinnunen. It is the correct name for the species commonly known as *C. resinascens* (Romell) Domański; the latter is a northerly taxon with narrower spores and less resinous basidiocarp. Also the related *C. aneirina* (Sommerf.) Domański, *C. balaenae* Niemelä, *C. gilvescens* (Bres.) Domański, *C. albonigrescens* Núñez, Parmasto & Ryvarden and *C. cremea* (Parmasto) Ryvarden are discussed and compared. The results are supplemented with an extensive list of spore size measurements and by a key to the species.

Key words: Basidiomycota, *Ceriporiopsis albonigrescens, Ceriporiopsis aneirina, Ceriporiopsis balaenae, Ceriporiopsis cremea, Ceriporiopsis pseudogilvescens, Ceriporiopsis resinascens,* polypore, taxonomy.

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## Introduction

The genus *Ceriporiopsis* Donk is an assemblage of white-rot-causing basidiomycetes with monomitic structure and clamped hyphae. *Ceriporiopsis* as currently understood is obviously polyphyletic, as already noted by Ryvarden (1991; Ryvarden & Gilbertson 1993). The use of molecular and other new methods has revealed that many of the species included in the genus actually belong to other genera: *C. pannocincta* (Boidin 1998, Koker et al. 2003), *C. rivulosa* (Boidin 1998, Kim et al. 2003, Koker et al. 2003), *C. subvermispora* (Greslebin et al. 2004), *C. mucida* (Rajchenberg 2003) and *C. subrufa* represent examples of this kind of aliens. In the future most likely still other taxa, now addressed to *Ceriporiopsis,* will find their place elsewhere, leaving behind a small genus of brownish polypores living on hardwood. Yao et al. (1999) found that *C. gilvescens,* the type species of the genus, is closely related to *Aurantioporus alborubescens*. According to Kim et al. (2003) *Ceriporiopsis resinascens* var. *pseudogilvescens* groups together with *Antrodiella americana.*

In this paper we summarize the knowledge of the genus from the North European point of view. Here the genus is treated *sensu stricto,* comprising species close to the generic type *C. gilvescens*. *Ceriporiopsis subrufa* is considered to belong elsewhere because of its strongly cyanophilous skeletal hyphae, a character alien to *Ceriporiopsis*.

## Materials and methods

The specimens listed are deposited in the Botanical Museum of the University of Helsinki (H), unless otherwise indicated. Herbarium abbreviations are according to Holmgren et al. (1990). In sections *Specimens examined,* the following abbreviations are used: NR=Nature Reserve, SNR=Strict Nature Reserve, NP=National Park, VF=Virgin Forest.

Microscopic studies were done and spores were measured from sections mounted in Cotton Blue (abbreviated CB): 0.1 mg aniline blue (Merck 1275) dissolved in 60 g pure lactic acid; CB+ means cyanophily, CB(+) weak but distinct cyanophilous reaction, CB– acyanophily. Amyloid and dextrinoid reactions were tested in Melzer's reagent (IKI): 1.5 g KI (potassium iodide), 0.5 g I (crystalline iodine), 22 g chloral hydrate, aq. dest. 20 ml; IKI– means neither amyloid nor dextrinoid reaction.

As a rule 30 spores were measured from each specimen selected for a closer scrutiny. Measurements were done using × 1000 magnification, phase contrast and oil immersion; eyepiece scale bar showed a 1-µm-grid, and dimensions were estimated subjectively with an accuracy of 0.1 µm. In presenting the variation of spore size, 5% of the measurements out of each end of the range are given in parentheses. L= mean length (arithmetical mean of all spores), W= mean width, Q= extreme values of the length/width ratios among the studied specimens, and n= the number of spores measured from given number of specimens.

The main reference books used were: Bondartsev (1953), Gilbertson & Ryvarden (1986–1987), Ryvarden & Gilbertson (1993–1994), Núñez & Ryvarden (2001) and Hansen & Knudsen (1997).

## Key

A revised key to *Ceriporiopsis* in Northern Europe (including *C. cremea* and *C. albonigrescens*) is presented here.

1 Pores large (1–2 per mm), basidiospores 5.9–7.0 × 3.7–4.4 µm ..... *C. aneirina*
– Pores small (3–6 per mm), basidiospores 3.0–6.0 × 1.7–3.5 µm ..... 2
2 Basidiospores 1.7–2.3 µm wide ..... 3
– Basidiospores wider than 2.3 µm ..... 4
3 Basidiospores 1.7–2.0 µm wide; basidiocarp turning black when touched ..... *C. albonigrescens*
– Basidiospores 1.8–2.3 µm wide ..... *C. gilvescens*
4 Basidiospores 2.3–2.6 µm wide ..... *C. resinascens*
– Basidiospores 2.6–3.5 µm wide ..... 5
5 Basidiospores 3.6–4.2 µm long ..... *C. balaenae*
– Basidiospores 4.5–6.0 µm long ..... 6
6 Basidiospores 4.5–6.0 µm long; oil globules common ..... *C. pseudogilvescens*
– Basidiospores 4.5–6.0 µm long; no oil globules ..... *C. cremea*

Keys for *Ceriporiopsis s.l.* have been published from tropical America by Loguercio-Leite et al. (2001), for Southern Europe by Pieri and Rivoire (1996), Central Europe by Domański (1972), all of Europe by Ryvarden and Gilbertson (1993) and Bernicchia and Ryvarden (2003). The Chinese species were keyed out by Wei and Dai (2004), and the whole East Asia is covered in the treatment by Núñez et al. (2001).

Spore dimensions of the treated species are summarized in Table 1. Measurements from the studied specimens are listed in Appendix 1.

Table 1. Spore dimensions of six *Ceriporiopsis* species.

| | L × W | L* | W* | Q* |
|---|---|---|---|---|
| *C. gilvescens* | 3.6–4.6 × 1.8–2.4 | 3.7–4.2 | 1.9–2.4 | 1.80–2.20 |
| *C. balaenae* | 3.6–4.2 × 2.6–3.2 | 3.8–4.2 | 2.8–3.1 | 1.30–1.50 |
| *C. pseudogilvescens* | 4.0–6.0 × 2.6–3.3 | 4.5–5.5 | 2.8–3.1 | 1.50–1.80 |
| *C. resinascens* | 4.0–6.0 × 2.2–2.7 | 4.5–5.5 | 2.3–2.6 | 1.80–2.20 |
| *C. cremea* | 4.0–6.0 × 2.7–3.5 | 4.5–5.2 | 2.8–3.1 | 1.50–1.70 |
| *C. aneirina* | 5.9–7.0 × 3.7–4.4 | 6.4–7.2 | 3.6–4.4 | 1.50–1.80 |

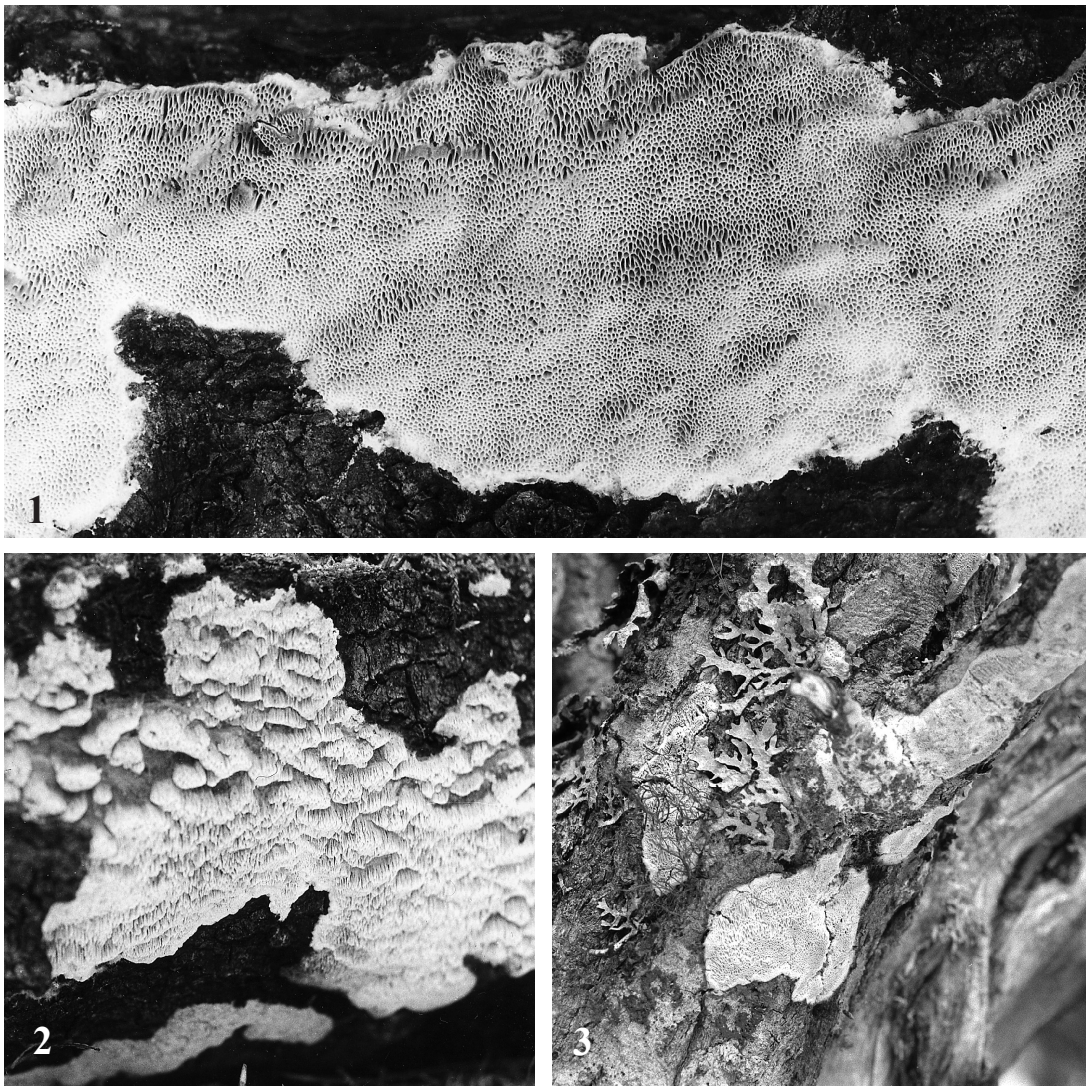
## Taxonomy

***Ceriporiopsis pseudogilvescens*** (Pilát) Niemelä & Kinnunen, **comb. nova** – Figs. 1, 2.

Basionym: *Poria pseudogilvescens* Pilát, Bull. Soc. Mycol. France 51:378, 1936. – Type: Russia. Siberia: Tomsk Region, Vasyuganje, *Betula pendula,* X.1934 *Krawtzew W 14* (PRM 498233, studied).

*Leptoporus micantiformis* Pilát, Bull. Soc. Mycol. France 51:358, 1936. – Type: Russia. Siberia: Tomsk Region, Vasyuganje, Chashanka River, *Populus,* 15.VIII.1934 *Krawtzew W 4* (PRM 38285, studied).

*Poria subpudorina* Pilát, Sborn. Národ. Mus. Praze, B, Přír. Vědy 9:105, 1953. – Type: Ukraine. Zakarpats'ka Region: Kosovská Poláná, Jalinka, *Salix caprea,* VII.1930 *Pilát* (PRM 498304, studied).




Figs. 1–3. *Ceriporiopsis* species, photographed *in situ*. – 1: *Ceriporiopsis pseudogilvescens*, young resupinate basidiocarp. Specimen *Niemelä 2775*, ×1.8. – 2: *C. pseudogilvescens*, pseudopilei. *Niemelä 2765*, ×0.9. – 3: *C. resinascens*, basidiocarps at the base of dead branch, still attached to moribund *Salix caprea*. *Niemelä 2051*, ×0.9.

= *Ceriporiopsis resinascens* auct., non sensu typi.

Basidiocarp annual, resupinate, small or up to 15 cm wide, soft and easily breakable when young, hard and brittle when dry; sometimes developing small, nodulose pseudopilei. Sterile margin sordid straw-coloured, paler than the tubes, 1–3 mm wide, not rhizomorphic. Pore surface at first white, during the best growth rose-tinted, later and when dry resin brown; pore orifices covered with light pruina. Pores angular, variable, in young margin 2–3(–4) per mm; when growing on a sloping log-side pores larger, sinuous. Section: subiculum cream coloured, tubes resin brown, contrast clear; thickness 2–3 mm.

Monomitic, hyphae with clamp connections, in subiculum both thin- and thick-walled (appearing dimitic), IKI–, CB(+), thick-walled hyphae sometimes amyloid. Subiculum hyphae 2–3.5(–4) µm in diameter and sometimes with scattered crystals, among the thin-walled hyphae also some thick-walled hyphae present, with a narrow cavity, clamps and branches; hyphae interwoven. Dissepiment hyphae thin-walled, 2–2.9 µm in diameter, longitudinally interwoven; embedded in resinous matter (especially in subhymenium). Basidia 13–22 × 4.5–5.5(–6) µm, basidioles 16–22 × 4–6 µm, narrowly claviform, forming a tight palisade. Spores broadly ellipsoid, thin-walled, IKI–, CB–, (3.4–)3.8–6.0 (–7.6) × (2.4–)2.6–3.1(–3.6) µm, L=4.64 µm, W=2.89 µm, Q=1.50–1.80 (n=780/26).

The name *C. resinascens* has been interpreted in many ways in the past. Domański (1972) described three varieties and one form. Pilát's broad-spored species *Poria pseudogilvescens* has usually been considered to be a synonym or variety of *C. resinascens.* However, the type of *C. resinascens* has in average narrower spores (as already stated by Romell in the protologue; see Tabs. 2–3), indicating a different taxon. Ryvarden (1978) measured the spores of the type to be 6–8.5 × 2.5–3 µm. Variation in spore dimensions can be great between *Ceriporiopsis* specimens (Tabs. 1–2), and in a single specimen many kinds of spores can be found. Usually spore length is more variable, while the width stays more or less constant. Hence we consider that two taxa are involved, and *pseudogilvescens* is the earliest name to the taxon with broader spores.

As stated by Egeland (1911) and also suspected by Bourdot and Galzin (1928), Karsten never published a taxon with the name *Poria starbaeckii* which might have been an earlier name for this taxon (Lowe 1956).

*Ceriporiopsis pseudogilvescens* is widespread from Europe to Siberia.

*Specimens examined:* **Finland.** Uusimaa: Sipoo, Hindsby, *Salix,* 8.VII.1987 *Saarenoksa 11487;* Myras–Hindsby, *Populus,* 15.IX.1991 *Saarenoksa 34391.* Vantaa, Västra, *Betula,* 15.IX.1995 *Niemelä 5904.* Helsinki, Kumpula–Toukola, *Salix,* 28.VIII.1979 *Niemelä 1681;* Vanhakaupunki, Annala, *Salix,* 14.VII.1996 *Saarenoksa 04496;* Viikki, *Salix,* 21.IX.1996 *Saarenoksa 10096.* Tammisaari, Tvärminne, *Corylus,* 27.VIII.1971 *Niemelä & Väisälä.* Mäntsälä, Hirvihaara, *Populus,* 24.VI.1987 *Niemelä 4011.* Etelä-Häme: Lammi, Evo, Kotinen VF, *Populus,* 10.IX.1982 *Niemelä 2775.* Etelä-Savo: Juva, Halkokangas, *Salix,* 15.VII.1996 *Vehmaa 852.* Pohjois-Savo: Kangaslampi, Joutenniemi, *Salix,* 5.X.1991 *Haikonen 13253.* Pohjois-Karjala: Lieksa, Koli, *Populus,* 9.VIII.1979 *Kotiranta 1469, Niemelä 1659, 1662;* Patvinsuo NP, *Populus,* 14.IX.1989 *Penttilä 1245b.* Ilomantsi, Mekrijärvi, *Populus,* 26.VIII.1996 *Jakobsson 1938b.* Kainuu: Hyrynsalmi, Tulisuo-Varpusuo, *Populus,* 16.IX.1990 *Penttilä 1772b.* Kuhmo, Teerisuo-Losonsuo, *Populus,* 4.IX.1990 *Penttilä 1646.* Perä-Pohjanmaa: Tervola, Pisavaara SNR, Liljalaki, *Salix,* 24.VIII.1980 *Niemelä 2051, Kotiranta 2143; Populus,* 25.VIII.1980 *Kotiranta 2163 & Niemelä.* **Sweden.** Västmanland: Sala, Skuggan, Fiskarbo, 9.VIII.1949 *Morander 1435* (UPS). **Russia**. Leningrad Region: Veps Forest, *Populus,* 2.VI.2000 *Manninen 786.* Tosno Dist.: Lisino Forest, *Salix,* 7.IX.1960 *Bondartseva 277* (LE 25200). Siberia: Tomsk Region (see types). Kemerovo Region: Promyshlennov. papermill, *Populus,* IX.1966 *Shukov* (LE 25193). **Belarus.** Belovezha VF, Pezezovo forestry, *Salix,* 27.VIII.1966 *Bondartseva 229* (LE 27623). **Ukraine.** Zakarpats'ka Region (see types). **Czech Republic.** Bohemia: Sobeslav W, *Salix,* 25.VII.1973 *Niemelä, Kotlaba & Pouzar.* **France.** Savoie: Méribel-les-Allues, angiosperm, 1.IX.1990 *Pieri.* **Canada.** Québec: Poste-de-la-Baleine, *Salix,* 31.VII.1982 *Niemelä 2597.*

***Ceriporiopsis resinascens*** (Romell) Domański – Fig. 3

*Polyporus resinascens* Romell, Ark. Bot. 11 (3): 20, 1912. – Lectotype: Sweden. Torne Lappmark: Jukkasjärvi, Jebrenjokk, 28.VIII.1910 *Romell 43* (S F14660).

*Tyromyces polyetes* Parmasto, Bot. Mater. Otd. Spor. Rast. Bot. Inst. Akad. Nauk SSSR 12:239, 1959. – Type: Estonia. Harjumaa: Keila, Haju, *Populus,* VII.1951 *Parmasto* (LE 23049, studied).

Basidiocarp annual, resupinate, small, soft and easily breakable, stiff when dry. Margin creamy

white, paler than the pore surface. Pore surface first cream coloured, later and when dry straw coloured or olive brown, when old greyish ochraceous brown, rusty colours present only rarely; pores at young margin 3–5(–6) per mm, growing larger with age. Section: subiculum cream coloured; tubes concolorous with pore surface; thickness 1–2 mm.

Monomitic, hyphae with clamp connections, hyphae CB(+), IKI–. When young context hyphae thin-walled, when old both thin- and thick-walled with occasional clamps (then appearing dimitic); hyphae (1.7–)2.2–3 µm, interwoven, crystals sometimes present in between the hyphae; basal layer sometimes differentiated, with thin-walled hyphae, 3.5–5.3 µm. Dissepiment hyphae 2–2.7(–3) µm, thin-walled, longitudinally winding, a few yellow oil droplets seen between the hyphae. Basidia 14–19(–21) × 4.5–5.5 µm. Spores narrower than in *C. pseudogilvescens* or *C. balaenae,* cylindrical or tapering only a little, thin-walled, IKI–, CB–, (4.5–)4.9–6.2(–6.5) × (2.1–)2.2–2.6(–2.9) µm, L=5.0 µm, W=2.4 µm, Q=1.80–2.20 (n=660/22).

According to the spore dimensions, the specimens of Komarova (1959) and Christiansen (1960) represent this species. It was colour illustrated by Niemelä (2005).

*Specimens examined:* **Finland.** Varsinais-Suomi: Kaarina, Littoistenjärvi W, *Populus,* 20.IX.1936 *Laurila.* Uusimaa: Tammisaari, Bromarv, Framnäs, *Populus,* 4.X.1975 *Niemelä 532.* Helsinki, Viikki, *Salix,* 16.VI.1985 *Saarenoksa 05185;* Mustavuori, *Populus,* 27.VII.1984 *Saarenoksa 23784; Salix,* 24.VIII.1994 *Saarenoksa 09894.* Tuusula, Lahela, *Malus,* 8.IX.1991 *Saarenoksa 28391; Salix,* 13.VIII.1992 *Saarenoksa 11292.* Sipoo, Myras–Hindsby, *Salix,* 24.VII.1990 *Saarenoksa 11790.* Etelä-Häme: Ylöjärvi, Lempiäniemi, *Populus,* 22.VIII.1993 *Söderholm 2122.* Lammi, Evo, Kotinen VF, *Populus,* 17.IX.1985 *Niemelä 3281.* Kainuu: Puolanka, Kuirivaara, Muroselkä, *Populus,* 24.VIII.1993 *Penttilä 4453.* Oulun Pohjanmaa: Oulu, Letonniemi, *sine matrice,* 4.VIII.2003 *Halonen, Pippola & Wannas* (OULU, H). Koillismaa: Salla, Värriö SNR, *Sorbus,* 26.VIII.1987 *Renvall 77 & Renvall;* 2.VIII.1988 *Renvall 986 & Renvall; Populus,* 23.IX.1988 *Renvall 1387 & Renvall.* Kittilän Lappi: Aakenus, Vasalaki, *Populus,* 29.VIII.2000 *Niemelä 6823.* **Sweden.** Torne Lappmark (see types). **Estonia.** Harjumaa: Keila (see types). Vääna, Vääna-Jõesuu, *Salix,* 16.IX.1993 *Kinnunen 1.* Raplamaa: Kohila, *Salix,* 20.VIII.1942 *Jakobsen* (TAA 158149). *Sine loco, Alnus,* 19.VIII.1991 *Parmasto* (TAA 126661). **Russia.** Karelian Rep.: Medvezhegorsk Dist., River Vichka, *Populus,* 23.VI.1942 *Laurila 549.* **Czech Republic.** Moravia: Vysoká, *Populus,* 22.VIII.1991 *Vampola.*

***Ceriporiopsis aneirina*** (Sommerf.: Fr.) Domański

*Polyporus aneirinus* Sommerf., Fl. Lapponica suppl.: 278, 1826: Fr. 1828. – Type: Norway. Nordland: Saltdal, Saltdalen, in trunco subputr. *Populi,* X.1820 *Sommerfelt* (O F72702; K).

*Antrodia serena* P. Karst., Medd. Soc. F. Fl. Fenn. 6:10, 1881. – Type: Finland. Etelä-Häme: Tammela, Mustiala, *Populus,* 5.X.1880 *Karsten 2505–2506* (H, BPI 242279, S F6866, studied).

*Poria fulvescens* Bres., Atti I.R. Accad. Roveret. Sci. III 3(3):81, 1897. – Type: Slovakia. Stiavnické Pohorie: Prenčov, Mt. Sitno, *Populus tremula,* 7.VII.1892 *Kmet'* (BPI 318507, S F7375).

*Poria wasjuganica* Pilát, Bull. Soc. Mycol. France 51:382, 1936. –Type: Russia. Siberia: Tomsk Region, Vasyuganje, *Populus,* 27.IX.1934 *Krawtzew W 182* (PRM 181718, studied).

Basidiocarp annual, resupinate, small or middle-sized, quite soft, stiff when dry; at first seen as round or elliptic patches, later merging together. Margin white, thin, when dry paler than pores, 1–3 mm. Pore surface at first straw white or young amber, then cream or honey coloured, when dry resin brown; pores angular, shallow, 1–2(–3) per mm, dissepiments split when old and then pores larger. Section: subiculum white, very thin; tubes resin coloured, contrast clear; thickness 1–2 mm. Young basidiocarp with an aromatic odour of honey, apple, or rind of grapefruit, becoming stronger 1–2 hours after collecting; old and dry with no smell; taste mild.

Monomitic, hyphae with clamp connections, generative hyphae thin-walled, IKI–, CB(+), in subiculum 3.8–5(–6) µm in diameter, with a large lumen, some hyphae covered with sandy crystals (sometimes numerous). Dissepiment hyphae thin-walled, (2.6–)2.8–4.2 µm in diameter, longitudinally interwoven. Oil droplets few or none. Basidia 20–27 × 6–7(–8) µm; basidia and basidioles apically bulbous, making the hymenial palisade irregular. Spores ellipsoid, thin-walled, IKI–, CB–, (5.3–)5.6–7.0(–8.0) × (3.3–)3.7–4.4(–4.6) µm, L=6.27 µm, W=3.82 µm, Q=1.50–1.80 (n=390/13).

*Specimens examined:* **Finland.** Uusimaa: Pernaja, Fasarby, *Populus,* 10.I.1995 *Särkkä 413b.* Artjärvi, Ratula manor, *Sorbus,* 17.VIII.1990 *Haikonen 11994.* Helsinki,

*Populus,* 4.XII.1859 *Karsten 2507.* Mäntsälä, Numminen, *Populus,* 10.X.1985 *Haikonen 6620.* Vähäjärvenkalliot, *Populus,* 20.V.1997 *Bonn 207.* Vantaa, Mustavuori, *Populus,* 7.IX.1986 *Saarenoksa 37086.* Satakunta: Kankaanpää, Venesjärvi, *Populus,* 10.VI.1935 *Laurila 715.* Etelä-Häme: Tammela (see types). Lahti, *Populus,* 1988 *Niemelä 4545*. Perä-Pohjanmaa: Tervola, Pisavaara SNR, *Populus,* 25.VIII.1980 *Niemelä 2065,* Kotiranta 2168. Estonia. Jõgevamaa: Puurmani, Alam-Pedja NR, Roka, *Populus,* 8.X.2001 *Niemelä 7249, 7250.* **Russia.** Bryansk Region: Trubchevsk Dist., Kokorevka, *Populus,* VI.1915 *Bondartsev* (LE 27108). Siberia: Tomsk Region (see types). Altay Rep., Ust'-Koksa Dist., Kajtanak, *Populus,* 4.IX.1968 *Bondartseva* (LE 27105). Novosibirsk Region: Togutsin, Derguvsk forestry, *Populus,* VIII.1965 *Shukov* (LE 27107). Krasnoyarsk Terr.: Stolby NR, *Populus,* 15.V.1926 *Yavorskiy 730* (LE 27102).

### ***Ceriporiopsis balaenae*** Niemelä

Naturaliste Canadien (Rév. Ecol. Syst.) 112:449, 1985. – Type: Canada. Québec: Poste-de-la-Baleine, *Salix,* 12.VIII.1982 *Niemelä 2752* (H, isotype DAOM).

Basidiocarp annual, resupinate, small, soft when fresh, fragile when dry. Margin thin, white. Pore surface straw-white, tubes honey yellow, dry tubes light amber coloured; when young bruised parts apricot coloured and translucent. Pores angular or slightly sinuous, when old orifices becoming lacerate, pores (1–)2–3 per mm. Section: subiculum cream coloured, only 0.5 mm thick, tubes oily or vaxy translucent, total thickness 2–5 mm. No distinct odour, taste mild.

Monomitic, generative hyphae with clamp connections, thin-walled, IKI–, CB–, 2.8–3.5 µm in diameter. Subiculum hyphae loosely interwoven; no encrustations; dissepiment hyphae interwoven, IKI grey (reaction slow). Resinous matter sometimes present on subiculum hyphae. Basidia clavate, 14–18 × 4.5–5 µm. Spores ellipsoid or ovoid, thin-walled, IKI–, CB– (contents faintly CB(+), (3.4–)3.6–4.6(–5.0) × (2.5–)2.7–3.3(–3.5) µm, L=4.03 µm, W=2.89 µm, Q=1.30–1.52 (n=480/16).

The appearance of this species varies a lot, as Vampola and Pouzar (1996) have noticed. The ecology is characteristic: the species is usually found on *Salix* in riverside thickets or other moist sites. The species must be commoner than what the few collections so far indicate.

*Specimens examined:* **Finland.** Uusimaa: Helsinki, Vanhakaupunki, *Alnus,* 17.IX.1994 *Saarenoksa 18894,* 8.X.1994 *Saarenoksa 27794 & Kotiranta; Salix,* 15.VIII.1996 *Saarenoksa 08096;* Mustavuori, *Salix,* 4.X.1995 *Saarenoksa 16395, 16495.* Pohjois-Savo: Leppävirta, Sarkamäki, *Salix,* 2.VII.1993 *Haikonen 15315.* Perä-Pohjanmaa: Kemi, Perta-Aapa, *Salix,* 12.II.1991 & 15.II.1991 *Kamula.* Inarin Lappi: Utsjoki, Kevo, *Salix,* 5.IX.1970 *Niemelä 408b;* 16.VIII.1987 *Kotiranta 6371;* 15.VIII.1995 *Heinonen & Heinonen 30895F.* **Sweden.** Uppland: Ohersta Storsjön, *Salix,* 19.II.1994 *Toresson.* Värmdö, *Salix,* 4.XII.1994 *Toresson.* **Canada.** Québec: Poste-de-la-Baleine, *Salix,* 12.VIII.1982 *Niemelä 2750, 2752* (type), 2753.

## Related species

### ***Ceriporiopsis gilvescens*** (Bres.) Domański

*Poria gilvescens* Bres., Annales Mycol. 6:40, 1908. – Type: France. Vosges, *Fagus, s.d., Bourdot 3666* (BPI 240221), *3810* (NY).

*Tyromyces allantoideus* M.P. Christiansen, Dansk Bot. Ark. 19:364, 1960. Type: Denmark. Falster: *Fagus,* XII.1929 *F.H. Møller* (C, studied).

Basidiocarp annual, resupinate, effused; when fresh waxy and soft, when dry hard and fragile; margin white cream with pinkish or reddish tint, pore surface when fresh at first whitish, when dry ochraceous. Pores angular, lacerate, 4–5 per mm. Taste mild.

Monomitic, hyphae thin-walled, with clamp connections, IKI–, CB–, in trama 2–5 µm in diameter. Subiculum hyphae tightly packed, parallel, yellowish. Dissepiment hyphae subparallel, thin-walled, often slightly encrusted, 2.5–3 µm. Dissepiment edges with rod-shaped crystals. No cystidia. Basidia clavate, 15–18 × 4–5.5 µm. Spores cylindrical, hyaline, smooth, IKI–, CB(+), (3.5–)3.6–4.4(–4.6) × (1.6–)1.8–2.4(–2.5) µm, L=3.99 µm, W=2.05 µm, Q=1.95 (n=90/3).

The type species of the genus. In northern Europe the species is found in South Sweden and Denmark.

*Specimens examined:* **Denmark.** Falster (see types). **Czech Republic.** Moravia: Hostýnské Vrchy, Černava, *Fagus,* 9.VIII.1973 *Niemelä.* **Slovakia.** Kremnické Pohorie: Badinský prales, *Fagus,* 4.VIII.1973 *Niemelä, Kotlaba & Pouzar.* **China.** Jilin Prov.: Wangqing, *Populus,* 27.V.1993 *Dai 246.*

***Ceriporiopsis albonigrescens*** Núñez, Parmasto & Ryvarden

Fungal Diversity 6:107, 2001. – Type: Russia. Primorye Terr., Ternei Dist., Sikhote-Alin Biosphere Reserve, Maisa, *Abies nephrolepis,* 11.IX.1979 *Parmasto* (TAA 52514, O, H, studied).

Basidiocarp annual, resupinate, adnate, widely effused (up to 15 cm), soft when fresh, soft and fragile when dry, up to 3 mm thick. Margin 1–2 mm wide, white, cottony, no rhizomorphs. Subiculum very thin (usually less than 0.1 mm), white, cottony. Tubes 1–3.5 mm long, concolorous with pore surface, dissepiments thin. Pore surface creamy white when fresh, cream coloured when dry, blackish brown when touched. Pores angular, 4–5 per mm.

Monomitic, hyphae thin-walled, with clamp connections, IKI–, CB–, in trama 2.5–3.5 µm in diameter, densely packed in a parallel fashion. Hyphae in context 3–6 µm in diameter, more loosely interwoven. Rhomboid crystals present between hyphae. Dissepiment edges with a few robust crystals. No cystidia. Basidia clavate, 13–15 × 4–5 µm. Spores short-cylindric to oblong-ellipsoid, one side flattened, thin-walled, smooth, hyaline, IKI–, CB–, (2.9–)3.0–3.4(–3.7) × (1.6–)1.7–2.0 µm, L=3.19, W=1.79, Q=1.78 (n=30/1).

The rhomboid crystals in between hyphae, coniferous host, white pocket rot, small spores and blackening in bruised parts are characters that are otherwise alien to the genus *Ceriporiopsis.* Therefore it is likely that this species will later be moved to some another genus.

*Specimen examined:* **Russia.** Primorye Terr. (see type).

***Ceriporiopsis cremea*** (Parmasto) Ryvarden

*Fibuloporia cremea* Parmasto, Issled. Prirody Dal'nego Vostoka: 255, 1963. – Type: Russia. Kamchatka: Klyuchi, *Populus,* 18.VIII.1960 *Parmasto* (TAA 13599, studied).

Basidiocarp annual, resupinate, effused up to 10 cm, soft when fresh, fragile when dry, margin white and rhizomorphic; pore surface pale cream. Pores 2–3 per mm, angular, dentate.

Monomitic, generative hyphae thin-walled, with clamp connections, IKI–, CB–; hyphae spaced in upper subiculum next to wood, 2–3.5 µm, lower subiculum tightly packed, 3.2–5.2 µm, dissepiment hyphae subparallel, 2.4–3.6 µm. Subiculum hyphae covered with coarse to tiny encrustations, crystals seen also among dissepiment hyphae. No cystidia, cystidioles common. Basidia clavate, 12–20 × 5–6 µm. Spores subcylindrical, thin-walled, hyaline, smooth, IKI–, CB–, (3.7–)3.9–6.4(–6.9) × (2.7–)2.9–3.5 (–3.8) µm, L=4.65 µm, W=2.99 µm, Q=1.56 (n=120/4).

*Specimens examined:* **Russia.** Sakha Rep.: Oimyakon, Burustakh, Andygytshan, *Salix (Chosenia) arbutifolia,* 30.VIII.1972 *Parmasto* (TAA 55919). Primorye Terr.: Hasan, Kedrovaya Pad', *Acer mandschurica,* 22.VII.1985 *Parmasto* (TAA 106200). Ternei Dist.: Sikhote-Alin Biosphere Reserve, Maisa, *Populus maximoviczii,* 16.IX.1990 *Parmasto* (TAA 151113). Kamchatka: Klyuchi (see type). Elizovo Region, Vakhtolka, *Salix sachalinensis,* 22.IX.1960 *Parmasto* (TAA 12481). Kozyrevsk, *Populus,* 24.VIII.1960 *Parmasto* (LE 22424, LE 206290).

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Appendix 1. Spore measurements of *Ceriporiopsis* species. Of the specimens with less than 30 measured spores, only the averages are given.

| Specimen | L × W | L* | W* | Q | Q* |
|---|---|---|---|---|---|
| *C. gilvescens* | | | | | |
| Dai 246 | 3.9–4.3(–4.6) × (1.6–)1.8–2.1 | 4.12 | 1.96 | 1.90–2.50 | 2.10 |
| 1929 Møller (*T. allantoideus*) | | 4.10 | 1.83 | | 2.25 |
| 1973 Niemelä | (3.5–)3.6–4.1(–4.2) × (1.7–)1.8–2.1(–2.2) | 3.78 | 1.97 | 1.62–2.17 | 1.91 |
| 1973 Niemelä, Kotl. & Pouz. | (3.7–)3.8–4.4(–4.5) × 2.0–2.4(–2.5) | 4.08 | 2.21 | 1.68–2.10 | 1.85 |
| *C. pseudogilvescens* | | | | | |
| Bondartseva 229 | (4.3–)5.1–6.7(–7.6) × (2.7–)2.8–3.2 | 5.71 | 2.97 | 1.48–2.45 | 1.92 |
| Bondartseva 277 | (3.6–)3.8–4.2(–4.5) × 2.6–3.0(–3.2) | 4.00 | 2.82 | 1.26–1.58 | 1.42 |
| Haikonen 13523 | (3.9–)4.0–4.7 × (2.7–)2.8–3.2(–3.3) | 4.28 | 2.93 | 1.31–1.62 | 1.46 |
| Jakobsson 1938b | (3.9–)4.2–5.0(–5.2) × 2.7–3.2 | 4.60 | 2.92 | 1.33–1.81 | 1.57 |
| Kotiranta 1469 | (3.9–)4.3–5.3(–5.7) × (2.4–)2.6–3.0(–3.1) | 4.79 | 2.81 | 1.42–1.93 | 1.70 |
| Krawtzew W 4 (*L. micantif.*) | 4.2–5.1(–5.2) × (2.7–)2.8–3.2(–3.3) | 4.67 | 2.96 | 1.31–1.86 | 1.58 |
| Krawtzew W 14 (type) | (4.1–)4.2–5.0(–5.7) × 2.6–3.0(–3.1) | 4.58 | 2.83 | 1.40–1.90 | 1.62 |
| Manninen 786 | (3.5–)3.8–4.5(–4.8) × 2.5–3.1 | 4.12 | 2.79 | 1.29–1.64 | 1.48 |
| Niemelä 1659 | (4.3–)4.6–6.0(–6.2) × (2.6–)2.8–3.2 | 5.25 | 2.99 | 1.47–2.00 | 1.76 |
| Niemelä 1681 | 4.0–5.3(–5.5) × 2.5–3.0 | 4.60 | 2.76 | 1.33–2.00 | 1.67 |
| Niemelä 2597 | (4.0–)4.3–5.6(–6.0) × 2.9–3.4(–3.6) | 4.95 | 3.10 | 1.38–1.90 | 1.60 |
| Niemelä 2775 | 3.9–4.8(–4.9) × (2.7–)2.8–3.1(–3.3) | 4.22 | 2.94 | 1.30–1.57 | 1.43 |
| Niemelä 4011 | (4.0–)4.1–4.9(–5.1) × (2.6–)2.7–3.1 | 4.51 | 2.90 | 1.28–1.75 | 1.55 |
| Niemelä 5904 | (3.8–)4.0–4.9(–5.0) × (2.4–)2.5–3.0(–3.1) | 4.43 | 2.87 | 1.33–2.00 | 1.54 |
| 1973 Niemelä, Kotl. & Pouz. | (4.0–)4.1–4.7(–5.0) × 2.3–2.9 | 4.41 | 2.68 | 1.45–1.96 | 1.64 |
| Penttilä 1245b | (3.5–)3.7–4.4(–4.8) × (2.4–)2.6–3.0 | 4.00 | 2.78 | 1.28–1.58 | 1.44 |
| Penttilä 1646 | (4.0–)4.1–4.8(–4.9) × 2.8–3.1 | 4.42 | 2.94 | 1.33–1.71 | 1.51 |
| Penttilä 1772b | (4.1–)4.2–5.5(–6.2) × (2.8–)3.0–3.3(–3.5) | 4.97 | 3.10 | 1.37–1.88 | 1.60 |
| 1990 Pieri | (4.0–)4.1–5.2(–5.9) × 2.4–3.0(–3.2) | 4.65 | 2.80 | 1.43–2.07 | 1.66 |
| 1930 Pilát (*P. subpudorina*) | | 4.98 | 3.07 | | 1.62 |
| Saarenoksa 11487 | 4.0–5.0(–5.1) × 2.5–3.0(–3.1) | 4.65 | 2.82 | 1.40–1.81 | 1.65 |
| Saarenoksa 34391 | 4.3–5.4(–5.5) × (2.5–)2.6–3.0 | 4.98 | 2.83 | 1.43–2.08 | 1.76 |
| Saarenoksa 04496 | (3.4–)3.8–4.6(–5.0) × (2.4–)2.6–3.0(–3.3) | 4.17 | 2.84 | 1.33–1.78 | 1.47 |
| Saarenoksa 10096 | (4.3–)4.6–6.4(–6.9) × (2.5–)2.8–3.1(–3.2) | 5.57 | 2.95 | 1.43–2.30 | 1.89 |
| 1966 Shukov | (4.2–)4.3–5.3(–5.8) × (2.4–)2.6–3.0(–3.1) | 4.80 | 2.83 | 1.47–2.00 | 1.70 |
| Vehmaa 852 | (3.8–)4.0–4.7(–5.2) × (2.6–)2.7–3.1(–3.2) | 4.21 | 2.89 | 1.25–1.69 | 1.46 |
| *C. resinascens* | | | | | |
| 2003 Halonen et al. | (4.5–)4.9–6.1(–6.3) × 2.3–2.7(–2.9) | 5.52 | 2.50 | 1.80–2.38 | 2.21 |
| 1942 Jakobsson | (4.0–)4.3–5.0(–5.3) × (2.1–)2.2–2.7(–2.8) | 4.63 | 2.41 | 1.65–2.36 | 1.92 |
| Kinnunen 1 | (3.9–)4.0–5.0(–5.4) × 2.2–2.9(–3.2) | 4.60 | 2.52 | 1.55–2.23 | 1.83 |
| 1936 Laurila | (5.0–)5.3–6.2(–6.3) × 2.2–2.8(–2.9) | 5.78 | 2.48 | 2.08–2.70 | 2.33 |
| Laurila 549 | 4.2–5.0(–5.2) × (2.2–)2.3–2.8(–2.9) | 4.54 | 2.56 | 1.50–2.09 | 1.78 |
| Niemelä 532 | (4.2–)4.6–5.5(–6.2) × (2.2–)2.3–2.6 | 5.09 | 2.43 | 1.68–2.38 | 2.10 |
| Niemelä 2051 | (4.5–)4.7–5.5(–6.2) × (2.2–)2.3–2.7(–2.8) | 5.07 | 2.45 | 1.67–2.48 | 2.07 |
| Niemelä 3281 | 4.1–5.1(–5.2) × 2.2–2.7(–2.8) | 4.56 | 2.48 | 1.57–2.14 | 1.84 |
| Niemelä 6823 | (4.3–)4.5–5.2(–5.3) × 2.3–2.8(–2.9) | 4.90 | 2.58 | 1.48–2.26 | 1.90 |
| 1951 Parmasto (*T. polyetes*) | (4.4–)4.6–5.2(–5.5) × 2.1–2.4(–2.5) | 4.92 | 2.27 | 1.91–2.52 | 2.17 |
| 1991 I. Parmasto | (4.2–)4.4–5.2(–5.4) × 1.9–2.1(–2.2) | 4.78 | 2.03 | 1.91–2.70 | 2.36 |
| Penttilä 4453 | (4.2–)4.4–5.2 × 2.3–2.9 | 4.79 | 2.60 | 1.64–2.26 | 1.84 |
| Renvall 77 & Renvall | (4.0–)4.3–5.3(–5.6) × 2.3–2.8(–2.9) | 4.87 | 2.56 | 1.43–2.30 | 1.90 |
| Renvall 986 & Renvall | (4.0–)4.2–5.0(–5.3) × (2.2–)2.3–2.6(–2.8) | 4.51 | 2.40 | 1.59–2.17 | 1.88 |
| Renvall 1387 & Renvall | (4.6–)4.8–6.2(–6.3) × 2.2–2.7(–2.8) | 5.41 | 2.44 | 1.77–2.70 | 2.22 |
| Romell 43 (type) | (5.1–)5.2–6.1(–7.5) × (2.2–)2.3–2.8(–3.1) | 5.77 | 2.61 | 1.96–2.42 | 2.21 |
| Saarenoksa 23784 | (4.8–)5.0–6.4(–6.5) × (2.1–)2.2–2.5 | 5.56 | 2.35 | 2.09–2.71 | 2.37 |
| Saarenoksa 05185 | 4.3–5.6(–5.9) × 2.3–2.6(–2.7) | 5.00 | 2.45 | 1.76–2.26 | 2.04 |

Appendix 1, contd.

| Specimen | L × W | L* | W* | Q | Q* |
|---|---|---|---|---|---|
| Saarenoksa 11790 | (3.8–)4.0–4.7(–5.0) × 2.3–2.7(–2.8) | 4.29 | 2.52 | 1.46–1.96 | 1.70 |
| Saarenoksa 28391 | 4.2–5.0(–5.1) × 2.3–2.7(–2.8) | 4.65 | 2.45 | 1.56–2.17 | 1.90 |
| Saarenoksa 11292 | (3.8–)4.0–6.2(–6.5) × (2.2–)2.3–2.7(–2.8) | 5.06 | 2.45 | 1.65–2.70 | 2.07 |
| Saarenoksa 09894 | (4.5–)4.6–5.8(–6.1) × 2.2–2.6(–2.7) | 5.22 | 2.36 | 1.92–2.55 | 2.21 |
| Söderholm 2122 | (4.2–)4.5–5.7(–6.1) × (2.2–)2.4–2.7(–2.8) | 5.06 | 2.49 | 1.72–2.55 | 2.03 |
| Vampola (Exsicc. 89) | (4.5–)4.6–5.8(–6.1) × 2.2–2.6 | 5.11 | 2.33 | 1.88–2.65 | 2.19 |
| *C. balaenae* | | | | | |
| Haikonen 15315 | (3.7–)3.8–4.2 × (2.4–)2.5–3.0(–3.2) | 4.01 | 2.78 | 1.28–1.67 | 1.44 |
| Heinonen 30895F | (3.4–)3.6–4.1(–4.5) × (2.4–)2.6–3.0 | 3.88 | 2.78 | 1.23–1.73 | 1.40 |
| 2.II.1991 Kamula | (3.8–)3.9–4.5(–5.0) × (2.4–)2.6–3.0(–3.2) | 4.16 | 2.77 | 1.27–1.71 | 1.50 |
| 15.II.1991 Kamula | (3.7–)4.0–4.6(–4.7) × (2.4–)2.6–3.0 | 4.21 | 2.79 | 1.28–1.68 | 1.51 |
| Kotiranta 6371 | (3.6–)3.8–4.6(–4.9) × (2.5–)2.6–3.1(–3.3) | 4.11 | 2.90 | 1.27–1.70 | 1.42 |
| Niemelä 408b | (3.5–)3.7–4.1(–4.5) × (2.4–)2.6–3.0(–3.1) | 3.90 | 2.72 | 1.14–1.67 | 1.43 |
| Niemelä 2750 | (3.4–)3.6–4.2 × (2.6–)2.7–3.0(–3.1) | 3.85 | 2.87 | 1.23–1.50 | 1.34 |
| Niemelä 2752 (type) | (3.6–)3.8–4.3 × (2.5–)2.6–3.0 | 4.09 | 2.83 | 1.31–1.45 | 1.45 |
| Niemelä 2753 | 4.0–5.3(–5.6) × (2.7–)2.8–3.1(–3.6) | 4.52 | 2.98 | 1.33–1.71 | 1.52 |
| Saarenoksa 18894 | (3.4–)3.6–4.2(–4.3) × (2.5–)2.7–3.0(–3.1) | 3.91 | 2.86 | 1.26–1.44 | 1.37 |
| Saarenoksa 27794 | (3.6–)3.7–4.1(–4.4) × (2.7–)2.8–3.1(–3.3) | 3.93 | 2.96 | 1.21–1.40 | 1.33 |
| Saarenoksa 16395 | 3.6–4.3(–4.5) × (2.7–)2.8–3.2(–3.3) | 3.99 | 2.98 | 1.20–1.63 | 1.34 |
| Saarenoksa 16495 | (3.2–)3.3–4.1(–4.3) × 2.5–3.0 | 3.62 | 2.77 | 1.14–1.54 | 1.31 |
| Saarenoksa 08096 | (3.6–)3.8–4.2(–4.5) × 2.7–3.2 | 4.05 | 2.92 | 1.37–1.50 | 1.39 |
| 19.II.1994 Toresson | (3.8–)4.0–4.8(–5.0) × 2.9–3.5(–3.8) | 4.26 | 3.15 | 1.24–1.44 | 1.35 |
| 4. XII.1994 Toresson | (3.7–)3.9–4.3 × 2.9–3.4 | 4.06 | 3.13 | 1.18–1.43 | 1.30 |
| *C. aneirina* | | | | | |
| 1915 Bondartsev | (5.6–)6.0–7.0(–7.2) × (3.6–)3.8–4.1(–4.2) | 6.44 | 3.92 | 1.44–1.89 | 1.64 |
| 1968 Bondartseva | (5.0–)5.3–6.6(–7.1) × (3.1–)3.3–4.0(–4.2) | 5.75 | 3.59 | 1.28–1.94 | 1.60 |
| Bonn 207 | (4.6–)5.3–7.0(–7.2) × (3.4–)3.6–4.1(–4.3) | 6.01 | 3.83 | 1.35–1.71 | 1.57 |
| Haikonen 6620 | 5.0–6.3(–6.7) × (3.0–)3.5–4.1(–4.2) | 5.61 | 3.85 | 1.28–1.63 | 1.46 |
| Yavorskiy 730 | (5.2–)5.3–7.2(–7.8) × (3.5–)3.6–4.2 | 6.13 | 3.82 | 1.30–2.05 | 1.60 |
| Karsten 2505, 2506 (*A. serena*) | | 6.70 | 4.18 | | 1.60 |
| Krawtzew W 182 (*P. wasjug.*) | | 6.93 | 4.05 | | 1.71 |
| Laurila 715 | (5.3–)5.8–7.2(–8.1) × (3.5–)3.6–4.1(–4.3) | 6.53 | 3.83 | 1.23–2.03 | 1.70 |
| Niemelä 7249 | (5.3–)5.5–6.8(–6.9) × 3.7–4.2 | 6.06 | 3.98 | 1.39–1.68 | 1.52 |
| Niemelä 7250 | (5.5–)6.2–7.4(–7.5) × (3.6–)3.8–4.3(–4.5) | 6.52 | 4.05 | 1.45–1.76 | 1.61 |
| Saarenoksa 37086 | (5.4–)5.7–6.8(–6.9) × 3.5–4.2(–4.3) | 6.16 | 3.86 | 1.42–1.83 | 1.59 |
| 1965 Shukov | (6.1–)6.7–8.5(–9.2) × (3.0–)3.2–3.8 | 7.50 | 3.50 | 1.89–2.49 | 2.14 |
| 1820 Sommerfelt (type) | | 6.83 | 3.98 | | 1.72 |
| *C. cremea* | | | | | |
| Parmasto TAA 12481 | (3.7–)3.9–5.2(–5.9) × (2.7–)2.8–3.5(–3.6) | 4.51 | 3.02 | 1.32–1.71 | 1.49 |
| Parmasto TAA 13599 (type) | (3.8–)4.0–4.8(–5.0) × (2.6–)2.7–3.1(–3.2) | 4.31 | 2.88 | 1.31–1.72 | 1.50 |
| Parmasto TAA 55919 | (4.2–)4.6–6.4(–6.9) × (2.7–)2.9–3.5(–3.8) | 5.22 | 3.10 | 1.39–2.16 | 1.68 |
| Parmasto TAA 151113 | 3.9–5.2(–5.5) × 2.7–3.1 | 4.56 | 2.95 | 1.38–1.78 | 1.55 |
| *C. albonigrecens* | | | | | |
| Parmasto TAA 52514 (type) | (2.9–)3.0–3.4(–3.7) × (1.6–)1.7–2.0 | 3.19 | 1.79 | 1.61–2.00 | 1.78 |
| *C. subrufa* | | | | | |
| 1990 Vampola (Exsicc.74) | (4.8–)5.0–6.0(–7.0) × 3.6–4.2(–4.5) | 5.56 | 3.91 | 1.23–1.67 | 1.42 |