

Cortinarius cacaodiscus Liimat., Niskanen & Kytov., sp.nov.**IF550846**

Type: Finland, Koillismaa, Kuusamo, Oulanka National Park, N side of Kiutakongas, rich dry, rocky pine forest with some *Picea*, *Betula*, and *Populus tremula*, on calcareous ground, 26 Aug 2007, I. Kytovuori 07-807, H6001040 (H, holotype; NY, isotype), GenBank No. KP114462. Diagnosis: Pileus 35-60 mm, convex, then low convex to almost plane with a broad umbo, dark brown, hygrophanous. Lamellae moderately spaced, dark brown. Stipe 40-80 mm long, 5-8 mm thick at apex, 8-15 mm at base, cylindrical, clavate at base, whitish fibrillose, longitudinally streaky, becoming brown with age. Basal mycelium white. Odor indistinct. Basidiospores 6.3-7.7 x 4.1-4.8 μm , $\text{av.} = 6.7 \times 4.4 \mu\text{m}$, $Q = 1.40-1.71$, $Q_{\text{av.}} = 1.55$ (in the Finnish specimen spores distinctly wider ($Q_{\text{av.}} = 1.49$) than in the Canadian one ($Q = 1.61$)), lacrymoid to amygdaloid-fusoid, with a very shallow suprahilar depression and tapering to fairly round apex, almost smooth to very finely verrucose, a bit more strongly at apex, almost indextrinoid. Lamellar trama hyphae in MLZ pale olive brownish, smooth to somewhat spotted. Microscopically very much like in *C. melleopallens*. ITS sequence (GenBank KP114462, holotype) distinct from other species of *Cortinarius* subgenus *Telamonia*. With an isolated position and deviating from the other members of the subgenus in the ITS region by more than 30 substitutions and indel positions. Ecology and distribution: In coniferous forests on calcareous ground. Producing basidiomata in late summer and autumn. Rare, to date known from Finland and Canada, Alberta. Additional specimen: Canada, Alberta, Hinton, coniferous forest on calcareous ground, 5 Sept 2011, K. Liimatainen & T. Niskanen 11-367 (H). GenBank No. KP114463. Etymology. The name refers to the color of the pileus.

Holotype I. Kytovuori 07-807, H6001040 (H).

Cortinarius montebelloensis Niskanen & Liimat., sp.nov.**IF550844**

Type: Canada, Quebec, Montebello, mixed forest (*Tsuga*, *Abies*, *Quercus*, *Populus*, and *Betula*), on clay soil, 24 Sept 2010, coll. K. Liimatainen, T. Niskanen 10-149 (H, holotype; NY, isotype), GenBank No. KP114459. Diagnosis: Pileus 60-90 mm, hemispherical, then broadly convex to almost plane, whitish grey, later very pale brown, finely fibrillose, hygrophanous. Lamellae moderately spaced, brown. Stipe 35-60 mm long, 12-25 mm thick at apex, 12-25 mm at base, clavate, greyish white fibrillose, with age and with handling the fibrillosity vanishes and the stipe becomes more concolorous with the cortex. Universal veil white, sparse. Basal mycelium white. Context in pileus brown, in stipe cortex brown, inside stipe light brown. Odor indistinct. Basidiospores 8-9(-9.5) x 5-6 μm , amygdaloid to dacryoid, strongly verrucose. Lamellar trama hyphae in MLZ not ecrusted. ITS sequence (GenBank KP114459, holotype) distinct from other members of the section *Disjungendi* and deviating from them more than 10 substitutions and indel positions. Ecology and distribution: In mixed forests. Producing basidiomata in late summer and autumn. Known from Canada, Quebec. Additional specimen: Canada, Quebec, Montebello, mixed forest (*Tsuga*, *Abies*, *Quercus*, *Populus*, and *Betula*), on clay soil, 24 Sept 2010, coll. K. Liimatainen, T. Niskanen 10-147 (H), GenBank No. KP114460. Etymology: The species was first found in Montebello, Quebec. .

Holotype T. Niskanen 10-149 (H).

Cortinarius roseivelatus Kytov., Liimat. & Niskanen, sp.nov.**IF550847**

Type: Finland, Kainuu, Sohkamo, Hiidenportti, *Picea*-dominated forest, 7 Sept 2001 coll. J. Vauras, T. Niskanen 01-2001 (H, holotype; NY, isotype), GenBank No. KP114464. Diagnosis: Pileus 2-5 cm, convex, sordid brown to yellowish brown, with a thin whitish veil at margin. Lamellae moderately spaced, brown. Stipe 4-8 cm long, 3-6 mm thick at apex, 7-17 mm at base, cylindrical, clavate at base, whitish, yellowish brown towards the base. Universal veil pink to reddish, forming a belt and some reddish spots on stipe (not visible in all basidiomata at least in dried specimens). Basidiospores 8.2-9.7 x 5.2-6.1 μm , $\text{av.} = 8.9 \times 5.5 \mu\text{m}$, $Q = 1.44-1.68$, $Q_{\text{av.}} = 1.58$ (120 spores, 3 specimens), very weakly ovoidly ellipsoid, fairly finely, densely, evenly, separately verrucose, moderately at apex, somewhat to moderately dextrinoid. Lamellar trama hyphae in MLZ smooth to finely, densely scabrous, sometimes with small spots. ITS sequence (GenBank KP114464, holotype) distinct from other species of *Cortinarius* subgenus *Telamonia*. With a sister group relationship to *C. boulderensis* (GenBank DQ499466) and deviating from it in the ITS region by ten substitutions and indel positions. Ecology and distribution: Fairly rare in mesic to submesic *Picea* forests in the boreal zone. Additional specimen: Finland, Etela-Hame, Lahti, 30 Sept 2002 I. Kytovuori H6033527 (H). Kainuu, Suomussalmi, Ammansaari, Pyykkolanvaara, mesic *Picea* forest, on ant hill, 6 Sept 2008 I. Kytovuori 08-1060, H6032742 (H). Etymology: The name refers to the color of the universal veil.

Holotype T. Niskanen 01-2001 (H).

Cortinarius roseocastaneus Niskanen, Liimat. & Kytov., sp.nov.**IF550845**

Type: Finland, Varsinais-Suomi, Turku, Ruissalo, Honkapiirtti, deciduous forest of *Quercus robur*, *Corylus avellana* and some *Betula* on mull soil, 13 Sept 2008, coll. K. Liimatainen & T. Niskanen, T. Niskanen 08-094, H6001997 (H, holotype; NY, isotype), GenBank No. KP114461. Diagnosis: Pileus 15-30 mm, very dark brown to blackish brown, hygrophanous. Lamellae brown when young, later dark brown. Stipe 30-60 mm long, 2-4 mm thick at apex, cylindrical, at first whitish silky-fibrillose, soon pale brown, reddening from base. Universal veil white, becoming pinkish red to vinaceous red. Context dark brown in pileus, pale brown in stipe. Odor in lamellae indistinct. Basidiospores 7.0-8.4 x 4.5-5.2 μm , $\text{av.} = 7.6-4.9 \mu\text{m}$, $Q = 1.46-1.68$, $Q_{\text{av.}} = 1.56$ (100 spores, 2 specimens), obovoid to weakly lacrymoid, with a low suprahilar depression, moderately to strongly verrucose, most strongly at apex. Lamellar trama hyphae in MLZ smooth to very densely, finely scabrous. ITS sequence (GenBank KP114461, holotype)

distinct from other species of *Cortinarius* subgenus *Telamonia*. Deviating from the closest members of the subgenus in the ITS region by at least 19 substitutions and indel positions. Ecology and distribution: In deciduous forest of *Quercus robur*, *Corylus avellana* and some *Betula* on mull soil. Producing basidiomata in autumn. To date, only known from Finland but most likely wide spread. Additional specimen: Finland, Varsinais-Suomi, Turku, Ruissalo, Honkapirtti, deciduous forest of *Quercus robur*, *Corylus avellana* and some *Betula* on mull soil, 3 Sept 2008, T. Niskanen & K. Liimatainen 08-072, H6001968 (H). Etymology: The name refers to the colors of the basidiomata.

Holotype T. Niskanen 08-094, H6001997 (H).

Cortinarius squamivenetus Kytov., Liimat. & Niskanen, sp.nov.

IF550843

Type: Finland, Koillismaa, Kuusamo, Oulanka National Park, Camping pale - Puukkorinne, rich mixed forest (*Picea*, *Pinus*, *Populus*), 1 Sept 2007, coll. T. Niskanen, I. Kytovuori & K. Liimatainen, T. Niskanen 07-119 (H, holotype; NY, isotype), GenBank No. KP114458. Diagnosis: Pileus 40-90 mm, hemispherical, then low convex with a low umbo, yellow brown to olivaceous brown, in color like in *C. venetus* but covered by black appressed fibrillose scales. Lamellae somewhat crowded to moderately spaced, olivaceous yellow, later olivaceous brown. Stipe 50-130 mm long, 5-15 mm thick at apex, 10-20 mm at base, cylindrical, clavate at base, olivaceous yellow. Universal veil yellow brown, sparse on stipe and pileus margin. Context pale olivaceous yellowish brown. Odor in lamellae faintly of radish. UV fluorescence (366 nm): positive. Basidiospores 5.9-7.0 x 5.2-6.1 μm , av. = 6.4 x 5.5 μm , Q = 1.08-1.22, Qav. = 1.16 (120 spores, 3 specimens), subglobose, moderately, sharply verrucose, moderately to fairly strongly dextrinoid. Scales of pileus cuticle with liquorice-colored, intracellular pigment. ITS sequence (GenBank KP114458, holotype) distinct from other members of the section *Veneti* and deviating from them more than 10 substitutions and indel positions. Ecology and distribution: In coniferous forests on calcareous ground. Producing basidiomata in late summer and autumn. Very rare, to date known from Finland, from northern boreal zone, maybe eastern. Additional specimens: Finland, Koillismaa, Kuusamo, Oulanka National Park, Korvasvaara, rich *Picea* forest, 19 Aug 1983 Seppanen 66 (H); 18 Aug 2002 Ohenoja, Ruotsalainen & Takala (OULU, H). Etymology: The name refers to affinity to *C. venetus* and scaly pileus.

Holotype T. Niskanen 07-119 (H).