

Cortinarius bivelosimilis Kytov., Niskanen & Liimat., sp.nov.**IF553627**

Pileus 4-7 cm wide, convex to planoconvex, with a very low umbo, yellow brown to red brown, hygrophanous. Lamellae medium spaced, emarginated, greyish brown when young, with age dark brown. Stipe 5-7 cm long, 0.6-0.8 cm thick at the top, 2.0-2.5 cm thick at the base, strongly clavate to almost bulbous at the base, pale greyish brown. Universal veil white, forming girdles near the middle of the stipe. Smell raphanoid. Exsiccata very dark brown, stipe paler, greyish brown, veil sordid whitish. Basidiospores 8.2-9.1-10.2 x 5.2-5.7-6.1 μm , $av.= 8.8-9.3 \times 5.5-5.5 \mu\text{m}$, $Q=1.49-1.59-1.68$, $Q_{av}= 1.58-1.60$ (120 spores, 2 specimens), oblong-ellipsoid, with round base and apex, fairly thin-walled, fairly finely to moderately, densely, evenly, separately verrucose, only somewhat more strongly at apex, fairly strongly dextrinoid. Lamellar trama hyphae pale olive yellow in MLZ, smooth to very finely scabrous or small-spotted. ITS sequence (GenBank MF379636, holotype) distinct from other members of sect. Athabasci. With a sister group relationship to *C. bivelus* (GenBank KP866159) and deviating from it by 6 substitutions and indels.

Holotype H, Niskanen 10-014.

Ecology and distribution: In mixed, boreal forests of *Picea*, *Pinus*, *Betula* and *Populus*. Known from Europe to eastern North America. Holotype: CANADA. Quebec, near Saint Marc-des-Carrieres Saint-Alban, road to Lac Long lake (name of the road Montambault), near to water fall, mixed forest of *Betula* and *Fagus*, 26 Aug 2010, T. Niskanen 10-014 (H, holotype; K, isotype). GenBank No. MF379636. Additional specimens examined: FINLAND. Pohjois-Hame. Virrat, Hauhuu, Juntunen, mesic *Picea* forest with some *Pinus*, *Betula*, *Populus tremula*, *Salix*, 22 Aug 1998, Kytovuori 98-1356 (H)
Etymology: The name refers to the similarity with *Cortinarius bivelus*

Cortinarius boreotrichus Kytov., Niskanen & Liimat., sp.nov.**IF553619**

Pileus 1-3.5 cm wide, conical to convex to subumbonate, ochraceous to fairly pale yellowish brown, hygrophanous. Lamellae fairly distant, broad, adnate to very shallowly emarginate, pale ochre when young, somewhat darker with age. Stipe 2.5-4.5 cm long, 0.1-0.3 cm thick at the apex, 0.2-0.4 cm thick at the base, cylindrical, pale ochraceous. Universal veil white, forming an indistinct girdle on the upper part of the stipe, on pileus fairly rich, forming more or less squarrose white flocks on the 2/3 marginal part of the pileus. Exsiccata about the same colour as the fresh basidiomata. Basidiospores 7.7-8.5-9.3 x 4.8-5.2-5.4 μm , $Q=1.54-1.63-1.72$ (60 spores, 1 specimen), narrowly ellipsoid, with blunt apex, punctate to finely verrucose, only somewhat more strongly verrucose at apex, somewhat dextrinoid. Lamellar trama hyphae yellowish in MLZ, smooth to finely scabrous. ITS sequence (GenBank MF379638, holotype) distinct from other members of sect. Paleacei and differs from them by 6 or more substitutions and indels.

Holotype H 6032724.

Ecology and distribution: In northern boreal, mesotropical riverside forest with *Picea abies*, *Pinus sylvestris*, *Betula* and *Salix* spp. To date only known from Inarin Lappi, Finland. Holotype: FINLAND, Inarin Lappi, Lutto, Kesikompso, above the river bank, mesic *Picea* forest with swamp depressions, some *Pinus*, *Betula*, *Salix* spp., 14 Aug 1995, Kytovuori 95-404, H6032724, (H, holotype; K, isotype). GenBank No. MF379638
Etymology: The name refers to the affinity with *Cortinarius hemitrichus* and the boreal distribution of the species

Cortinarius cystidiobicolor Liimat. & Niskanen, sp.nov.**IF553598**

Pileus 35-50 mm, hemispherical, then broadly convex to almost plane with an umbo, red brown, hygrophanous. Lamellae medium spaced, brown. Stipe 90-110 mm long, 6-9 mm thick at apex, cylindrical to somewhat tapering downwards, silky white. Universal veil very sparse, white. Basidiospores 8.0-9.0 x 4.5-5.0 μm , $av.= 8.4 \times 4.9 \mu\text{m}$, $Q= 1.60-1.85$, $Q_{av}= 1.73$, amygdaloid with a suprahilar depression, moderately verrucose, most strongly verrucose at apex, moderately dextrinoid. Lamellar trama hyphae finely encrusted. Cheilocystidia present, variable in shape, utriform, to clavate to moliniform. ITS sequence (GenBank KX964411) distinct from other members of *Bicolores*. With a sister group relationship to *C. evernius* (GenBank KX964331, neotype) and deviating from it in the ITS region by 12 substitutions and indel positions.

Holotype H 6031410.

Ecology and distribution: In boreal coniferous forests. Producing basidiomata in autumn. Known from Northern Europe. Holotype: Finland, Etela-Hame, Lunkaa, Huhta, mesic to damp *Picea abies* dominated forest with some *Betula* and *Pinus*, Grid 27E 67447-9: 33319-22, 2 Sept 2005, Kare Liimatainen & Tuula Niskanen 05-033, H6031410 (H, holotype; K isotype). GenBank No. KX964411. Additional specimen: Sweden, IB 19630078 (IB), GenBank no. AF325593
Etymology: The name refers to the cystidia of this species and that it belongs to the section *Bicolores*

Cortinarius heterocycloideus Kytov., Niskanen & Liimat., sp.nov.**IF553601**

Pileus 2.5-8 cm wide, sharply conical to convex with a low umbo, with age expanding to planoconvex or slightly depressed with a small umbo, vividly red brown to dark vinaceous brown, darkest (purple ting) at the centre, distinctly innately fibrillose, hygrophanous. Lamellae crowded, fairly narrow, adnate to shallowly emarginated, greyish brown. Stipe 3-8 cm long, 0.5 - 1.5 cm thick, with a clavate base, silver grey to pale vinaceous brownish. Universal veil forming an indistinct olive girdle on the upper part of the stipe, as bright coral red coating below. Smell raphanoid. Exsiccata dark olive brown to blackish brown, more or less bright red colour still visible on the stipe, especially at the base. Basidiospores 7.3-8.2-9.5 x 5.2-5.5-6.1 μm , $av.= 7.7-8.9 \times 5.4-5.9 \mu\text{m}$, $Q=1.34-1.48-1.63$, $Q_{av}= 1.39-1.55$ (220 spores, 7 specimens), obovoidly ellipsoid to lacrymoid with a suprahilar depression

(often *C. carabus*- or *C. parvannulatus*-like in form), somewhat thick-walled, moderately to very strongly verrucose, most strongly verrucose at the apex, somewhat to strongly dextrinoid. Lamellar trama hyphae yellowish to yellow brownish in MLZ, mostly smooth. ITS sequence (GenBank MF379632, holotype) distinct from other members of sect. *Brunneotincti*. With a sister group relationship to *C. subheterocyclus* (GenBank MF379631) and *C. heterocyclus* and deviating from both of them by 5 substitutions and indels.

Holotype H, Toivonen & Kytovuori 06-247.

Ecology and distribution: The species is known from hemiboreal mixed forest in western Norway to northern boreal mixed forest in northern Finland and to subalpine *Betula* forests at Kilpisjärvi, Finland. It seems to be fairly rare. Holotype: NORWAY, Sor-Trondelag, Roros, Hitterdal, damp brookside forest with *Betula* and *Salix*, 20 Aug 2006, Toivonen & Kytovuori 06-247 (H, holotype; K, isotype). GenBank No. MF379632. Additional specimens examined: NORWAY. Sogn of Fjordane. Sogndal, Solvorn, rich forest of deciduous trees, 09 Sept 2000, Niskanen & Kytovuori 00-010 (H). SWEDEN. Jamtland. Frostviken, Ankarvattnet, Korallgrottan, mesic to paludified old *Picea* forest with *Betula*, *Alnus*, *Populus*, 08 Sept 2009, P. & I. Kytovuori 09-789 (H). FINLAND. Pera-Pohjanmaa, Ylitornio, Palorommas, rich *Picea* forest with some *Betula*, *Populus*, *Salix*, 18 Aug 1999, Kytovuori 99-338 (H). Enontekiön Lappi, Kilpisjärvi, Saana, subalpine *Betula* forest, 22 Aug 1988, K. & E. Bendiksen (OULU) Pikku-Malla, subalpine *Betula* forest, 29 Aug 1983, Metsanheimo (OULU) 08 Aug 1984, Metsanheimo (OULU)

Etymology: The name refers to the affinity to *Cortinarius heterocyclus*

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

IF553632

Pileus 5.5 cm wide, subumbonate, greyish brown, innately fibrillose, somewhat hygrophanous. Lamellae medium spaced, brown. Stipe 8 cm long, 0.5-1.0 cm thick, with a somewhat clavate base. Universal veil forming vinaceous red spots and girdles on the stipe. Exsiccata dark greyish to blackish brown, red universal veil hardly visible. Basidiospores 8.8-9.6-10.2 x 6.3-6.9-7.3 μm , $Q=1.28-1.39-1.46$, (60 spores, 1 specimen), broadly ovoid to ovoidly subglobose, thin-walled, finely (to fairly finely) verrucose, often distinctly strongly verrucose at the apex, somewhat (to moderately) dextrinoid. Lamellar trama hyphae pale olive yellowish in MLZ, smooth to very finely densely scabrous. ITS sequence (GenBank MF379633, holotype) distinct from other members of sect. *Armillati*. With a sister group relationship to *C. luteo-ornatus* (GenBank HQ845130) and deviating from it by 8 substitutions and indels.

Holotype OULU 031328.

Ecology and distribution: Known only from the holotype. Holotype: Russia, Tumen region, Yamalo-Nenetsia, Yamal Peninsula, Valley of the Ob River, along a western tributary, near Oktyabrskiy, 400 m W of the river, herb rich forest (*Alnus fruticosa*, *Picea abies*, *Aconitum*, *Veratrum*), 13 Aug 1996, Ohenoja and Paulus, F031328 (OULU, holotype), GenBank No. MF379633.

Etymology: The name refers to the country from which the species was first found and to the affinity to *Cortinarius luteo-ornatus* (syn. *Cortinarius oenochelis*)

Cortinarius subcagei Niskanen & Liimat., sp.nov.

IF553597

Pileus 20-40 mm, at first conical, then broadly conical, brown with a purplish tint, hygrophanous. Lamellae medium spaced, dark brown, with a purplish tint when young. Stipe 110-160 mm long, 4-7 mm thick at apex, cylindrical, silky whitish, purple cortex becoming visible when handled. Universal veil sparse, white. Context in pileus brown, in stipe apex and in the middle part pale purple, white at the base. Basidiospores 9.0-10.0(-10.5) x 5.0-5.5(-6.0) μm , $av.=9.6 \times 5.2 \mu\text{m}$, $Q=1.70-1.90$, $Q_{av}=1.83$, amygdaloid to narrowly amygdaloid, with a suprahilar depression, moderately verrucose somewhat dextrinoid. Lamellar trama hyphae finely to moderately encrusted. ITS sequence (GenBank KX964410) distinct from other members of *Bicolores*. With a sister group relationship to *C. cagei* (GenBank KX964295, neotype) and deviating from it in the ITS region by 13 substitutions and indel positions.

Holotype H, Olsson, Liimatainen & Niskanen 12-217.

Ecology and distribution: In coniferous forests. Producing basidiomata in autumn. Occurs in Western North America from U.S.A. California to at least Canada, British Columbia. Holotype: U.S.A, California, Humboldt co., Big Lagoon, 3 Dec 2012, *Picea* dominated forest on sandy soil, among mosses, coll. Joann Olsson and Kare Liimatainen, T. Niskanen 12-217 (H, holotype; K isotype). GenBank No. KX964410. Additional specimen: Canada, British Columbia, Vancouver Island, near Campbell River, Oct 2005, Shannon M. Berch UBCOGR194, mycorrhizal root tip, GenBank no. EU597034

Etymology: The name refers to the affinity to *Cortinarius cagei*

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

IF553617

Pileus 1-4 cm wide, first conical to hemispherical, later expanding, umbonate to subumbonate, strongly, radially, innately fibrillose, liver brown, hygrophanous, soon radially drying to light brown. Lamellae almost distant, emarginated, reddish brown. Stipe 2.5-10 cm long, 0.3-0.5 cm thick, cylindrical, very slightly clavate at the base, dirty whitish fibrillose with a weak purplish tint at the apex. Context concolorous with the pileus. Universal veil white, very thin and scanty. Exsiccata blackish brown. Basidiospores 7.3-8.1-8.8 x 4.5-4.8-5.2 μm , $av.=7.8-8.3 \times 4.9 \mu\text{m}$, $Q=1.54-1.64-1.76$, $Q_{av}=1.58-1.68$ (160 spores, 3 specimens), narrowly lacrymoid, with a prominent suprahilar depression, dark-coloured, moderately to strongly, coarsely, unevenly verrucose, often very strongly verrucose at the apex, warts angular, somewhat anastomosing, spores somewhat dextrinoid. Lamellar trama hyphae, olive to sepia brown in MLZ, moderately to strongly encrusted with sepia brown plates and spots. Stipitipellis sepia brownish, distinctly incrustated. ITS sequence (GenBank EU266656, holotype) distinct from other members of sect. *Brunnei*. With a sister group relationship to *C. carabus* (GenBank EU266661) and deviating from it by 4 substitutions and indels.

Holotype H, Kytovuori 01-026.

Ecology and distribution: In boreal, dry forests of *Pinus sylvestris*, mostly in more or less disturbed places, on bare soil or among low mosses. Maybe occasional but mostly overlooked in boreal Fennoscandia. Holotype: FINLAND, Pohjois-Savo, Nilsia,

Valkeiskyla, dryish forest of *Picea* and *Pinus*, 01 Sept 2001 P. & I. Kytovuori 01-026 (H, holotype; K, isotype). GenBank No. EU266656. Additional specimens examined: FINLAND, Kainuu, Kuhmo, Kalliojoki, Kylmansarkat, dry *Pinus* forest on sand, 30 Aug 1999, Kytovuori 99-707 (H), GenBank EU266660. SWEDEN, Jamtland, Bodsjo, Sidsjo, dryish young *Picea-Pinus* forest with some *Betula* and *Populus tremula*, 04 Sept 1997, Kytovuori 97-680 (H), GenBank EU266655
Etymology: The name refers to the affinity with *Cortinarius carabus*

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

IF553620

Pileus 40-80 cm wide, convex to low convex, with a broad umbo, dark reddish brown, strongly hygrophanous. Lamellae medium spaced, at first very pale greyish brown, with age brown. Stipe 5-10 cm long, 0.7-1.2 cm thick at the apex, 1.2-2.4 cm thick at the base, clavate to strongly clavate to almost bulbous at the base, at first silky whitish fibrillose, later very pale brown. Universal veil white, fairly sparse. Context in pileus brown, in stipe white, with a bluish tint at the apex. Smell indistinct. Exsiccata with pale brown to brown pileus and very pale brown to greyish white stipe. Basidiospores 8.4-9.3-10.2 x 5.0-5.3-5.4 μm , Q=1.62-1.75-1.86, (60 spores, 1 specimen), narrowly amygdaloid-fusoid, with a very shallow suprahilar depression, weakly thick-walled, moderately to strongly, separately, sharply verrucose, only somewhat more strongly verrucose at the apex, moderately to strongly dextrinoid. Lamellar trama hyphae pale yellow to pale olive yellow in MLZ, smooth (to very finely scabrous). ITS sequence (GenBank MF379637, holotype) distinct from other members of sect. Firmiores. With a sister group relationship to *C. biveloides* and deviating from it by 3 substitutions and indels.

Holotype H 7017733.

Ecology and distribution: In boreal, conifer dominated forests. Known from northern Europe. Holotype: NORWAY. Hordaland, Ulvik, Stokkavatnet, by the Espelandselv, planted *Picea abies* forest with some *Pinus sylvestris*, 26 Sept 2005, Liimatainen & Niskanen F05-239, H7017733. (H, holotype; K, isotype). GenBank No. MF379637. Additional specimens examined: FINLAND, Kainuu, Paltamo, Mieslahti, W of Kainuun opisto, somewhat SW sloping woodland pasture with *Betula*, *Populus*, *Alnus incana*, *Picea* and *Pinus*, 08 Sep 2008, Kytovuori 08-1352, H6033537 (H). Ristijarvi, Kivikyla, Lehtipuron lehto, fairly deep valley with mesic to grass-herb spruce forest with *Betula*, *Alnus incana*, *Salix* and large *Populus* trees, 08 Sep 2008, Kytovuori 08-1262, H6033545 (H). Notes: *Cortinarius subcarneinatus* looks morphologically like a dark *C. armeniacus*, but is more closely related to *C. biveloides*. The latter, however, has smaller spores, 7.5-8.5 x 4.5-5 μm , and yellow brown to not as dark red brown pileus as *C. subcarneinatus*

Etymology: The name refers to the affinity with *Cortinarius biveloides* (syn. *Cortinarius carneinatus*)

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

IF553599

Pileus 2-5 cm wide, convex to subumbonate, yellowish brown to umber brown, somewhat darker at the centre, innately fibrillose with somewhat darker brown fibrils. Lamellae moderately spaced, broad, emarginated, brown. Stipe 5-10 cm long, 0.3-0.8 cm thick, mostly slender, cylindrical with somewhat radicating base, pale olive, with a tint of metallic sheen. Universal veil pale olive to reddish, forming some incomplete girdles on stipe, reddish colour especially seen at the basal part of the stipe. Smell raphanoid. Exsiccata olive brown, pileus fibrillose. Basidiospores 7.9-8.5-9.3 x 5.7-6.2-6.6 μm , Q= 1.24-1.37-1.49 (80 spores, 1 specimen), broadly ovoid to ovoidly subglobose, strongly dextrinoid, strongly verrucose, often very strongly verrucose at apex. Lamellar trama hyphae yellow, smooth. Cuticle light-coloured, the uppermost hyphae 6-12 μm wide, very pale olive, very finely scabrous. Olive pigment lumps present deep in the cuticle. ITS sequence (GenBank MF379630, holotype) distinct from other members of sect. Brunneotincti. With a sister group relationship to *C. fillionii* (GenBank HQ845171) and deviating from it by four substitutions and indels.

Holotype H, Niskanen & Kytovuori 00-041.

Ecology and distribution: In northern boreal old (virgin), *Picea abies* dominated conifer forest on calcareous ground. Known from USA, Alaska and Sweden. Holotype: SWEDEN, Dalarna, Idre, Karmorasen nature reserve, old, rich grass-herb *Picea* forest with some *Pinus*, *Betula*, *Populus tremula*, *Salix* spp., 05 Sept 2000, Niskanen & Kytovuori 00-041 (H, holotype; K, isotype). GenBank No. MF379630. Additional specimen examined: U.S.A. Alaska. Fairbanks, Ballaine Lake Trails, NE of University Campus, *Picea* dominated forest with some *Betula*, *Alnus*, *Salix*, and *Populus* on rich ground, 19 Aug 2011, Liimatainen & Niskanen 11-158 (H). Notes: The spores are somewhat more ovoid and more strongly verrucose than those of *C. fillionii*. Also the olive pigment lumps present deep in the cuticle are smaller, less distinct and less abundant than in *C. fillionii*

Etymology: The name refers to the affinity to *Cortinarius fillionii*

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

IF553618

Pileus 2-5 cm wide, first hemispherical, later expanding convex to planoconvex, with at most a low umbo, radially, innately fibrillose, dark dirty brown with somewhat paler margin, hygrophanous. Lamellae moderately spaced, adnate, dark brown. Stipe 5-9 cm long, 0.5-0.8 cm thick, fairly slender, somewhat clavate at the base, brown, somewhat striate, with a dirty white girdle at the upper part. Universal veil white, rather sparse. Exsiccata: blackish brown. Basidiospores 8.2-8.9-10.0 x 6.1-6.4-6.8 μm , av.= 8.8-9.0 x 6.4-6.5 μm , Q=1.26-1.38-1.48, Qav.= 1.37-1.40 (140 spores, 2 specimens), broadly ellipsoid, somewhat dark-coloured, fairly finely, densely, somewhat sharply verrucose, most strongly verrucose at the apex, somewhat to moderately dextrinoid. Lamellar trama hyphae olive brownish in MLZ, smooth, sometimes very finely scabrous and/or with some small sepia-coloured spots. ITS sequence (GenBank MF379639, holotype) distinct from other members of sect. Brunnei and differs from them by 6 or more substitutions and indels.

Holotype H 7017727.

Ecology and distribution: In boreal, dry to mesic coniferous heath forests with *Pinus* and *Picea*, among mosses. Maybe occasional but mostly overlooked in boreal Fennoscandia. Holotype: NORWAY, Hordaland, Ulvik, Stokkavatnet, Espedalselv, planted *Picea* forest with some *Pinus*, 26 Sept 2005, Liimatainen & Niskanen F05-230, H7017727 (H, holotype; K, isotype). GenBank No. MF379639. Additional specimen examined: FINLAND, Pohjois-Karjala, Juuka, Koivuoja, Turunkangas, Juuanjoki,

dryish forest of young *Pinus* with some *Picea*, 01 Sept 1999, Kytovuori 99-721 (H)

Etymology: The name refers to the affinity with *Cortinarius glandicolor*

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

IF553600

Pileus 2-6 cm wide, convex with a low umbo, with age somewhat depressed with a small umbo, often relatively thin-fleshed, vinaceous brown with a paler margin, distinctly innately fibrillose, silky shiny when young, hygrophanous. Lamellae moderately crowded, fairly narrow, adnate to shallowly emarginated, brown. Stipe 3-6 cm long, 0.5-1.0 cm thick, with a somewhat clavate base, pale vinaceous brownish. Universal veil reddish to vinaceous brown, as diffuse spots on the stipe, the distinct vinaceous brown uppermost girdle typical to *C. heterocyclus* mostly absent. Context in the pileus concolorous with the surface, in the stipe somewhat paler. Smell raphanoid. Exsiccata: dark olive brown to blackish brown, very pale tint of reddish can be seen on the stipe and young pileus margin. Basidiospores 7.3-8.2-9.3 x 5.0-5.4-5.9 μm , $av. = 7.8-8.2(-8.7) \times 5.3-5.5 \mu\text{m}$, $Q=1.38-1.52-1.69$, $Qav. = 1.46-1.58$ (280 spores, 7 specimens), oblong-ellipsoid to weakly obovoid, somewhat thick-walled, moderately to strongly verrucose, strongly to very strongly verrucose at apex, moderately to strongly dextrinoid. Lamellar trama hyphae yellowish to yellowish brownish, smooth to very finely, densely scabrous. ITS sequence (GenBank MF379631, holotype) distinct from other members of sect. *Brunneotincti*. With a sister group relationship to *C. heterocycloideus* (GenBank MF379632) and *C. heterocyclus* and deviating from them by 5 and 3 substitutions and indels.

Holotype H 6029909.

Ecology and distribution: In *Betula* forests, forests margins and thickets, also in mixed conifer forests with solitary *Betula* trees and bushes. Seems to be fairly rare in the whole Fennoscandia. Holotype: FINLAND, Satakunta, Ikaalinen, Seitsemäinen National Park, Multiharju, old, mesic *Picea* forest with some *Pinus*, *Betula*, *Populus tremula*, 08 Sept 2005, Liimatainen & Niskanen F05-065, H6029909 (H, holotype; K, isotype). GenBank No. MF379631. Additional specimens examined: NORWAY. Finnmark. Tana, Austertana, Julelven, rich *Betula* forest, 19 Aug 1975, Ulvinen (OULU F006138). SWEDEN. Västergötland. Gotene, Kinnekulle, ornekulla, *Betula*, damp ground, 28 Sept 2004, Niskanen 04-1003 & Liimatainen (H 7017736). FINLAND. Varsinais-Suomi, Lohja, Jalassaari, Tamminiemi, rich forest with *Quercus*, *Corylus*, *Populus*, *Betula*, *Picea*, *Pinus*, *Salix*, 06 Sept 1998, Kytovuori 98-1672 (H). Etelä-Häme. Loppi, Sajaniemi, damp forest of *Betula*, *Alnus*, *Picea*, 15 Aug 1953, Tuomikoski (H). Kainuu. Suomussalmi, Naljanka, Lohivaara, *Picea* forest with grass-herb depressions, *Pinus*, *Betula*, *Populus*, *Salix*, 13 Sept 1997, Kytovuori 97-1306 (H). Kittilän Lappi. Kolari, Akaslompolo, grass-herb forest with *Betula*, *Picea*, *Salix*, 19 Aug 1998, Kytovuori 98-1194 (H)

Etymology: The name refers to the affinity to *Cortinarius heterocyclus*

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

IF553629

Pileus 30-70 cm wide, hemispherical, then low convex to plane, sometimes with a low and broad umbo, greyish-purplish brown to ochraceous brown, innately fibrillose, with hygrophanous streaks. Lamellae medium spaced to distant, dark purplish brown, later brown. Stipe 6-12 cm long, 0.5 - 1.1 cm thick, cylindrical to somewhat clavate, very pale brownish grey with a purplish tint. Universal veil white, distinct, forming complete and incomplete girdles on stipe. Sometimes at first forming a sock-like sheet on the stipe. Context at first purple, later in pileus and at the base of the stipe more brown. Smell faint, pleasant or indistinct. Basidiospores 9.3-10.3-11.6 x 6.1-6.6-7.3 μm , $av. = 10.2-10.4 \times 6.5-6.7 \mu\text{m}$, $Q=1.42-1.55-1.66$, $Qav. = 1.53-1.60$ (148 spores, 4 specimens), narrowly obovoid to obovoid-lacrymoid, with a suprahilar depression and round apex, somewhat thick-walled, somewhat dark-coloured, moderately, densely verrucose, more strongly verrucose at the apex, moderately dextrinoid. Lamellar trama hyphae yellowish in MLZ, smooth (to very finely scabrous). ITS sequence (GenBank MF379634, holotype) distinct from other members of sect. *Telamonia*. With a sister group relationship to *C. ionophyllus* and *C. ultimionophyllus* (GenBank MF379635) and deviating from them by more than 8 substitutions and indels.

Holotype H 7017742.

Ecology and distribution: In spruce dominated forests on somewhat eutrophic to rich ground. To date only known from Fennoscandia. Holotype: NORWAY, Troms, Balsfjord, Strupfjellet, mesic to damp, somewhat eutrophic, planted, mossy *Picea* forest with some *Betula*, 10 Aug 2006, Liimatainen & Niskanen F06-050, H7017742 (H, holotype; K, isotype). GenBank No. MF379634. Additional specimens examined: NORWAY. Bardu, Setermoen, somewhat eutrophic, planted, mossy *Picea* forest, 05 Aug 2006, Liimatainen & Niskanen F06-015 (H 7017564). Målselv, near Skjold, mesic to damp, somewhat eutrophic, mossy *Picea* forest with some *Betula*, 08 Aug 2006, Liimatainen & Niskanen F06-025 (H 7017567). SWEDEN. Jamtland, Frostviken sn, 2 km N Jormvattnet, in spruce forest on rich ground, 20 Aug 1990, H. Lindstrom et al. CFP974, F248449 (S)

Etymology: The name refers to the affinity to *Cortinarius ionophyllus*

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

IF553628

Pileus 35-70 cm wide, hemispherical, then low convex to plane, sometimes with a low and broad umbo, greyish-purplish brown to ochraceous brown, innately fibrillose, with hygrophanous streaks. Lamellae medium spaced to distant, dark purplish brown, later brown. Stipe 7-11 cm long, 0.5 - 1 cm thick, cylindrical to somewhat clavate, very pale brownish grey with a purplish tint. Universal veil white, distinct, forming complete and incomplete girdles on stipe. Context at least at first purple. Smell not recorded. Basidiospores 9.5-10.4-11.8 x 6.3-6.7-7.3 μm , $av. = 10.3-10.5 \times 6.7 \mu\text{m}$, $Q=1.46-1.55-1.64$, $Qav. = 1.53-1.57$ (120 spores, 2 specimens), narrowly lacrymoid, with a prominent suprahilar depression and round to very weakly tapering apex, somewhat thick-walled, somewhat dark-coloured, fairly finely to moderately, densely, sharply verrucose, strongly verrucose at the apex, moderately dextrinoid. Lamellar trama hyphae yellow in MLZ, smooth (to very finely scabrous). ITS sequence (GenBank MF379635, holotype) distinct from other members of sect. *Telamonia*. With a sister group relationship to *C. ionophyllus* and deviating from it by 3 substitutions and indels.

Holotype H 7000967.

Ecology and distribution: In mixed boreal forests. Known from northern Europe, Finland and from eastern North America, Canada.

Holotype: CANADA, Newfoundland, Avalon Peninsula, Salmonier Nature Park, mesic to damp Picea dominated forest with some Abies, Larix, Betula, 28 Sept 2007, Liimatainen & Niskanen 07-303, H7000967) (H, holotype; K, isotype). GenBank No. MF379635. Additional specimen examined: FINLAND. Inari Lapland, Utsjoki, Kevo, Jesnalvarri, mesic to damp Betula forest with some solitary Pinus, Populus tremula, 16 Aug 1995, Kytovuori 95-507 (H).