

Nomenclatural novelties : T. Niskanen

*Cortinarius lindstroemii* Niskanen, Kytov. & Liimat., sp. nov.

IF557514

Holotype S F44865

Diagnosis: Pileus 1–5 cm diam., at first conical, to somewhat hemispherical, later expanded and often with a low umbo, margin with white scaly, dark brown to dark reddish brown, hygrophanous. Lamellae almost crowded, brown, rather dark already when young. Stipe 4–8 cm long, 0.3–0.6 cm thick at the apex, cylindrical, often tapering downwards, at least partly covered by white fibrils when young, brown, sometimes with a purplish tint at the apex. Context dark brown in the pileus, brown to dark brown in the stipe. Universal veil distinct, white, forming incomplete girdles on the stipe and sometimes a ring. Basal mycelium white. Odour in lamellae strong, Pelargonium-like. Basidiospores: 7.5–8.5 × 5.5–6.0 μm, broadly ellipsoid, finely to moderately verrucose, moderately dextrinoid. Lamellar trama hyphae distinctly encrusted (scabrous and spot-like encrustation) in MLZ. ITS sequence (GenBank MT112146, ex holotype) distinct from other members of sect. Flexipedes. With a sister group relationship to *C. flabellus* (UNITE UDB000745) and deviating from it by 10 substitutions and indels. Ecology and distribution: In coniferous forests, often on damp and acid habitats. Widely distributed in Europe and North America.

Specimens examined: SWEDEN. Angermanland, Sabra sn, Hallenyländ, in spruce forest with blueberry, 11 Sept. 1987, H. Lindstrom et al. CFP626 (holotype). GenBank MT112146. CANADA. Newfoundland, West coast, Gros Morne National Park, W side of Lomond River, hiking trail to Stuckless Pond, mesic to damp coniferous forest (*Abies balsamea*, *Picea*) with some *Betula*, on calcareous ground, 20 Sept. 2007, K. Liimatainen & T. Niskanen 07-241, 7000903 (H). GenBank MT112147. FRANCE. Crest-Voland (Savoie), among Sphagnum with *Picea* and *Vaccinium*, 2 Oct. 2001, A. Bidaud 01-09-121 (PC, holotype of *C. flabellus* f. *biolens*). SWEDEN. Angermanland, Stigsjö sn, Rosendalsbacken, in spruce forest with blueberry, 9 Aug. 1988, H. Lindstrom et al. CFP690, F44867 (S). USA. Washington, SE of Seattle, SE of Fairwood centre, SE of Lake Youngs, Shadow Lake, damp coniferous forest (*Tsuga heterophylla*, *Picea sitchensis*), 10 Oct. 2007, K. Liimatainen & T. Niskanen 07-427, 7001065 (H). GenBank MT112149; loc. cit. K. Liimatainen & T. Niskanen 07-429, 7001067 (H). GenBank MT112150.

Etymology: In honor of late Hakan Lindstrom, a long-term mycologist with a special interest in small species of *Telamonia*.

*Cortinarius pinisquamulosus* Kytov., Niskanen & Liimat., sp. nov.

IF557515

Holotype H 6029807

Diagnosis: Pileus 2–5 cm wide, conical, soon expanded, often with a small umbo, margin with yellowish scales, yellow brown to somewhat reddish brown, hygrophanous. Lamellae medium spaced, yellowish brown. Stipe 2–5 cm long, 0.3–0.5 cm thick at the apex, cylindrical, firm, yellow to yellow brown, darker at the base. Context in pileus dark yellowish brown, in stipe apex yellow brown, darker towards the base. Universal veil ochraceous white, often forming a ring-like zone on the stipe. Basal mycelium white. Odour in lamellae indistinct or faintly of cedar wood. Basidiospores 6.5–8.0 × 3.0–4.0 μm, av. = 7.0–7.6 × 3.5–3.7 μm, Q = 1.87–2.21, Q<sub>av.</sub> = 2.00–2.08 (229 spores, 8 specimens), narrowly cylindrical to narrowly cylindrical-fusoid to very slightly narrowly boletoid,

punctate to finely verrucose, hardly more strongly at the apex, faintly dextrinoid. Lamellar trama hyphae yellowish brown, finely to distinctly scabrous in MLZ. ITS sequence (GenBank MT112151, ex holotype) distinct from other members of sect. *Incrustati*. With a sister group relationship to *C. andreae* s. lato and deviating from it by 4 substitutions and indels. Ecology and distribution: In mixed, boreal forests. Known from Fennoscandia.

Specimens examined: FINLAND. Koillismaa. Kuusamo, Oulanka biological station, dry Pinus forest on sand, 20 Sep 2005, Liimatainen & Niskanen 05-184 (holotype; K(M), isotype). GenBank MT112151. SWEDEN. Angermanland. Graninge, Akroken, in dry pine forest on sand, 1 Sept. 1990, H. Lindstrom et al. CFP984, F248485 (S). FINLAND. Uusimaa. Hanko, Lappohja, dry Pinus forest on sand, 15 Oct. 1995, Kytovuori 95-2103 (H); loc. cit. 23 Oct. 2001, Kytovuori 01-040a (H). GenBank MT112153. Etela-Karjala. Anjalankoski, Kaipainen, mesic forest of Picea, Pinus, Betula, 15 Sept. 1994, Kytovuori 94-581 (H). Etela-Hame. Ruovesi, Siikakangas, Ryovarinkuoppa, dry Pinus forest, 26 Sept. 1994, Kytovuori 94-975 (H). Kainuu. Ristijarvi, Koljatinvaara, mesic Picea forest with some Pinus, Betula, Populus, Salix, 7 Sept. 2008, Kytovuori 08-1178, 6032731 (H). Pera-Pohjanmaa. Rovaniemi, Louevaara, Tuohilaki, Pinus forest with some Betula, Picea, on sand, 28 Aug. 2004, K. Liimatainen & T. Niskanen 04-480, 6029360 (H). GenBank No. MT112156.

Etymology: The name refers to the scaly pileus margin and habitat with pine. Notes: Recalls *C. heterodepressus* but is distinguished from the former by scaly pileus, somewhat longer and narrower basidiospores and encrusted hyphae of the lamellar trama.

*Cortinarius pallidibrunneus* Niskanen, Kytov. & Liimat., sp. nov.

IF557516

Holotype H 6029932

Diagnosis: Pileus 4–6.5 cm wide, at first hemisphaerical, later almost plane with a large, round umbo, finely innately fibrillose, reddish brown, paler than *C. brunneus*, somewhat paler at the margin, margin  $\frac{1}{4}$  pellucid striate, hygrophonous. Lamellae moderately spaced, adnate, at first pale brown, later darker brown. Stipe 5–11 cm long, 0.5–1.2 cm thick at the apex, 1.5–2 cm at the base, cylindrical with somewhat clavate base, somewhat paler than the pileus, dark dirty brown at the base. Context in pileus reddish brown, blackish brown at the base of the stipe. Universal veil white, very thin and sparse. Basal mycelium white. Odour in lamellae not recorded. Exsiccata: blackish brown. Basidiospores: 7.5–8.5 × 5.5–6.5  $\mu\text{m}$ , av. 7.9 × 6.1  $\mu\text{m}$ , Q= 1.23–1.34, Qav. 1.29 (60 spores, 1 specimen), broadly ovoidly ellipsoid to ovoidly subglobose, dark-coloured, somewhat dextrinoid, finely, densely, evenly, not sharply verrucose, hardly more strongly at the apex. Lamellar trama hyphae olive brown, smooth to very finely scabrous in MLZ. ITS sequence (GenBank MT112157, ex holotype) distinct from other members of *Cortinarius* sect. *Brunnei*. With a sister group relationship to *C. fibrillosibrunneus* (GenBank MT112159) and deviating from it by four substitutions and indels. Ecology and distribution: In boreal, dryish to submesic coniferous forests of *Pinus sylvestris* and *Picea abies*, among mosses.

Specimen examined: FINLAND. Varsinais-Suomi, Vihti, Haukkalampi-Kattila, Pinus dominated forest with some Picea, Populus tremula, Betula, 21 Sept 2004, Niskanen 04-898 & Kytovuori (holotype; K(M), isotype). GenBank MT112157.

Etymology: The name refers to the colour of the basidiomata.

*Cortinarius clarisordidus* Niskanen, Kytov. & Liimat., sp. nov.

IF557517

Holotype H 6029922

Diagnosis: Pileus 3.5–10 cm wide, at first conical to somewhat hemisphaerical, later expanded and with an umbo, innately fibrillose, reddish brown, margin somewhat paler, hygrophonous. Lamellae

moderately spaced, adnate, dark brown. Stipe 5–9 cm long, 0.5–0.8 cm thick at the apex, 1–2.5 cm at the base, clavate, at first whitish greyish brown, darker brown with age. Context in pileus and stipe brown, dark brown at the base of the stipe. Universal veil white, very thin and sparse. Basal mycelium white. Odour in lamellae not recorded. Exsiccata blackish brown. Basidiospores  $7.5\text{--}8.5 \times 5.5\text{--}6.5 \mu\text{m}$ , av.  $7.9\text{--}6.0 \mu\text{m}$ ,  $Q= 1.25\text{--}1.42$ ,  $Q_{\text{av.}} = 1.32$  (60 spores, 1 specimen), broadly ovoidly ellipsoid to ovoidly subglobose, dark-coloured, somewhat dextrinoid, finely, densely, evenly, not sharply verrucose, hardly more strongly at apex. Lamellar trama hyphae olive brown, smooth to very finely encrusted in MLZ. ITS sequence (GenBank MT112158, ex holotype) distinct from other members of *Cortinarius* sect. *Brunnei*. With a sister group relationship to *C. fibrillosibrunneus* (GenBank MT112159) and deviating from it by four substitutions and indels. Ecology and distribution: In boreal, rich grass-herb *Picea* forests, among mosses.

Specimen examined: FINLAND. Pera-Pohjanmaa, Tornio, Kalkkima, Nature reserve (E), eutrophic, submesic *Picea* forest with *Betula*, *Populus tremula*, *Pinus*, 1 Sept. 2004, K. Liimatainen & T. Niskanen 04-631 (holotype; K(M), isotype). GenBank MT112158.

Etymology: The name refers to the colour of the basidiomata.

*Cortinarius fibrillosibrunneus* Kytov., Niskanen & Liimat., sp. nov.

IF557518

Holotype H 6082709

Diagnosis: Pileus 4–10 cm wide, at first conical, later expanding to convex to plano-convex with a low umbo, distinctly innately fibrillose, brown, margin pale greyish ochraceous, hygrophanous. Lamellae moderately spaced, adnate, brown. Stipe 5–10 cm long, 0.8–1.5 cm thick at the apex, 1.5–2.5 cm at the base, clavate, marbled greyish ochraceous brown. Context marbled dark brown. Universal veil white, very thin and sparse. Basal mycelium white. Odour in lamellae not recorded. Exsiccata blackish brown. Basidiospores  $7.5\text{--}9.0 \times 5.5\text{--}6.5 \mu\text{m}$ , av.  $= 7.9\text{--}8.3 \times 5.9\text{--}6.0 \mu\text{m}$ ,  $Q= 1.23\text{--}1.44$ ,  $Q_{\text{av.}} = 1.30\text{--}1.39$  (120 spores, 2 specimens), ovoidly to somewhat obovoidly ellipsoid to ovoidly (to obovoidly) subglobose, dark-coloured, somewhat dextrinoid, moderately to strongly, coarsely verrucose, more strongly at the apex. Lamellar trama hyphae pale sepia-coloured, mostly smooth, with some spot-like encrustations, lamellar edge sometimes with a turquoise pigment in MLZ. ITS sequence (GenBank MT112159, ex holotype) distinct from other members of *Cortinarius* sect. *Brunnei* and deviating from them by at least four substitutions and indels. Ecology and distribution: In boreal, dryish to submesic to damp coniferous forests of *Picea abies*, among mosses.

Specimens examined: FINLAND. Inarin Lappi, Inari, Lutto, Kesikompso, mesic *Picea* forest with some *Pinus*, *Betula*, 14 Aug. 1995, I. Kytovuori 95-348 (holotype; K(M), isotype). GenBank No. MT112159. FINLAND. Uusimaa, Espoo, Luukki recreation area, submesic to damp *Picea* forest with some *Betula*, no *Pinus*, 22 Aug. 2008, K. Liimatainen & T. Niskanen 08-016, 6001907 (H).

Etymology: The name refers to colour and texture of the pileus.

*Cortinarius hepaticus* Kytov., Niskanen & Liimat., sp. nov.

IF557519

Holotype H 6082710

Diagnosis: Pileus 3–9 cm wide, at first umbonate, later expanding to somewhat umbonate-depressed, umbo subacute, margin narrowly pellucid striate, chocolate brown to liver brown, somewhat waxy, matt, thin-fleshed, hygrophanous. Lamellae moderately crowded, emarginate, cinnamon brown. Stipe 3.5–10 cm long, 0.3–0.8 cm thick at the apex, cylindrical to somewhat clavate, slender, whitish silky-fibrillose. Context in the pileus concolourous with the surface, in the stipe brownish white. Universal veil white, very thin and sparse. Basal mycelium white. Odour in lamellae indistinct. Exsiccata: pileus brown, often with a dark centre. Basidiospores:  $6.0\text{--}7.5 \times 4.0\text{--}$

4.5 µm, av.= 6.2–7.3 × 4.1–4.3 µm, Q= 1.47–1.78, Qav.= 1.53–1.71 (200 spores, 6 specimens), amygdaloid to amygdaloid-fusoid, sometimes with a shallow suprahilar depression, with blunt to fairly acute apex, somewhat dark-coloured, densely, evenly, finely punctate, some somewhat more strongly at the apex, somewhat dextrinoid. Lamellar trama hyphae, olive yellowish to brownish, smooth to finely encrusted in MLZ. ITS sequence (GenBank MT112161, ex holotype) distinct from other members of *Cortinarius* subgen. *Telamonia*. With a sister group relationship to *C. fuscescens* (GenBank NR131879) and deviating from it by 3 substitutions and indels. Ecology and distribution: In southern boreal, fairly rich grass-herb forests of *Picea abies* mixed with some *Betula* and *Populus tremula*, among low mosses.

Specimens examined: FINLAND. Varsinais-Suomi, Kemio, Dragsfjard, Ekhamn's nature reserve area, *Quercus*, *Corylus* forest with some *Betula* and *Populus*, on mull soil, from *Picea* dominated area, 22 Sept. 2012, K. Liimatainen & T. Niskanen 12-052 (holotype; K(M), isotype). GenBank MT112161. FINLAND. Varsinais-Suomi, Vihti, Vesikansa, damp *Picea* forest with some *Betula*, *Populus tremula*, *Pinus*, 7 Oct. 2004, Kytovuori 04-052 (2 ex H). Uusimaa, Porvoo, Venjarvi, mesic to damp *Picea* forest with some *Populus tremula*, *Betula*, *Pinus*, 17 Sept. 2004, Liimatainen & Niskanen 04-829, 6029373 (H). Etela-Hame, Hattula, Nihattula, grass-herb *Picea* forest with some *Pinus*, *Betula*, *Populus tremula*, 8 Aug. 1996, Kytovuori 96-398, 6033580 (H). Pohjois-Hame, Hankasalmi, Ristimaki, submesic *Picea* dominated forest, 13 Sept. 2004, Kytovuori 04-051 (H).

Etymology: The name refers to the colour of the pileus.

*Cortinarius mallaensis* Kytov., Niskanen & Liimat., sp. nov.

IF557520

Holotype H 6033453

Diagnosis: Pileus 1–3 cm wide, rounded conical to convex, with a very low and broad umbo or without an umbo, sordid yellowish brown to reddish brown, darkest at the centre, universal veil forming a white rim at the margin and sometimes thin, adpressed, white scales on the pileus, hygrophanous. Lamellae fairly distant, emarginate, broad, ochraceous when young, darker brown with age. Stipe 1.5–3 cm long, 0.4–0.6 cm thick at the apex, 0.6–0.8 cm thick at the base, cylindrical with a somewhat clavate base, honey-coloured when young, darker brown with age. Context vinaceous brown in the pileus, honey-coloured in the stipe, darker brown at the base. Universal veil white, abundant, forming a sock-like covering on the basal part of the stipe with prominent, sometimes somewhat ascending, girdle near the middle of the stipe. Basal mycelium white. Odour not recorded. Exsiccata: pileus (dark) brown, universal veil sordid white. Basidiospores 9.5–12.0 × 6.0–7.0 µm, av.= 10.8–11.0 × 6.4–6.5 µm, Q= 1.54–1.84, Qav.= 1.65–1.72 (180 spores, 3 specimens), ellipsoid to amygdaloid-ellipsoid to amygdaloid-fusoid, often with a shallow suprahilar depression, often rounded at apex, fairly finely (to moderately), verrucose, often more strongly at the apex, somewhat dextrinoid. Lamellar trama hyphae pale yellow, smooth (to very finely encrusted) in MLZ. ITS sequence (GenBank MT112163, ex holotype) distinct from other members of *C.* subgenus *Telamonia* and deviating from them by at least 9 substitutions and indels. Ecology and distribution: On open heathlands, damp depressions and snowbeds from upper subalpine forests to lower oroarctic zone in Fennoscandia, also known from an ectomycorrhizal root tip on *Betula nana* from Alaska (GenBank GU998514).

Specimens examined: FINLAND. Enontekio Lappland, Enontekio, Kilpisjarvi, Malla National Park, lower oroarctic zone, snowbed, 7 Aug. 1998, von Bonsdorff & Kytovuori 98-427 (holotype; K(M), isotype). GenBank No. MT112163. FINLAND. Enontekio Lappland, Enontekio, Kilpisjarvi, Malla National Park, SE part of the fjeld Tarju, upper oroboreal – lower oroarctic zone, *Betula*, 3 Aug. 1998, von Bonsdorff & Kytovuori 98-313, 6033455 (H); lower oroarctic zone, snowbed, moist depression, 7 Aug. 1998, von Bonsdorff & Kytovuori 98-451, 6033461 (H). GenBank No. MT112164.

Etymology: The name refers to the locality from where the species was first found.

*Cortinarius bubulus* Liimat., Kytov. & Niskanen, sp. nov.

IF557521

Holotype IB, Moser 86/172

Diagnosis: Pileus 3–7 cm wide, at first hemispherical, later convex to shallowly subumbonate, hazel brown, darkest at the centre, hygrophanous. Lamellae fairly distant, emarginate, brown. Stipe 3–6 cm long, 1.5–3.5 cm thick, clavate, greyish white. Context more or less brown. Universal veil pale greyish brown, forming incomplete bands or a sock-like coating on the lower part of the stipe.

Exsiccata: pileus dark sordid brown. Basidiospores 8.5–9.5 × 5.5–6.0 μm, av. = 9.1 × 5.8 μm, Q = 1.49–1.60, Q<sub>av.</sub> = 1.56 (8 spores, 1 specimen), weakly amygdaloid to ellipsoid, somewhat thick-walled, fairly finely to moderately, densely, sharply verrucose, fairly strongly dextrinoid. Lamellar trama hyphae pale olive, smooth in MLZ. ITS sequence (GenBank DQ139983, ex holotype) distinct from other members of *Cortinarius* sect. Bovini and deviating from them by at least 8 substitutions and indels. Ecology and distribution: In mixed forests of *Picea* and *Fagus*. Known from Austria.

Specimen examined: AUSTRIA. Tirol, Brandenbergtal, oberhalb Aschau, mixed forest of *Picea*, *Fagus*, 7 Sept. 1986, M. Moser 86/172 (holotype). GenBank DQ139983. Photograph: Moser M (1983) *Die Röhrlinge und Blätterpilze: III Cortinarius* 65.

Etymology: Pertaining to cattle or bull. Related to *C. bovinus* that means ox or cow.

*Cortinarius flammeouraceus* Niskanen, Kytov., Liimat., Ammirati & Dima, sp. nov.

IF557522

Holotype H 6029919

Diagnosis: Pileus 2.5–6 cm diam., conical to hemispherical, then low convex to almost plane with an umbo, vividly red brown, later darker brown, margin orange yellow from universal veil, narrowly translucently striate, hygrophanous. Lamellae medium spaced, adnexed, dark cinnamon brown, with a yellowish edge. Stipe 4–10 cm long, 0.4–0.8 cm thick at the apex, ± cylindrical, greyish yellow fibrillose, often with a bluish tint at the top, base slightly orange red or not. Context in pileus brown, in stipe also mainly brown but sometimes with a bluish tint at the apex of the stipe, with age blackening at the base. Universal veil golden or orange yellow to brown red, sparse. Basal mycelium orange. Odour in lamellae like cedar wood. Exsiccata dark brown to blackish brown, mycelium often yellowish to red. Basidiospores 7.5–8.5(–9) × 5.0–5.5 μm, amygdaloid, fairly strongly and often sharply verrucose, strongly dextrinoid. ITS sequence (GenBank MT112165, ex holotype) distinct from other members of *Cortinarius* sect. Uracei and deviating from them by at least 18 substitutions and indels. Ecology and distribution: In herb rich, mesic *Picea* forests, often on calcareous soil. Known from Europe and western and eastern North America.

Specimens examined: FINLAND. Pera-Pohjanmaa, Tornio, Korkeamaa, Runteli nature reserve area, grass-herb mesic spruce forest (*Picea abies*) with *Betula*, *Populus tremula* and some *Pinus sylvestris*, 30 Aug. 2004, K. Liimatainen & T. Niskanen 04-554 (holotype; K(M), isotype). GenBank MT112165. CANADA. Quebec, Montebello, mixed forest, mainly hemlock, some *Pinus*, *Abies*, *Quercus*, *Populus* and *Betula*, 27 Sept. 2010, K. Liimatainen & T. Niskanen 10-175, 7057488 (H). GenBank MT112166. FINLAND. Pohjois-Häme. Virrat, 16 Oct. 2001, Kytovuori 01-001 (H). GenBank MT112167; Pera-Pohjanmaa, Tornio, 1997, Kytovuori 97-1167 (H). GenBank MT112160. SWEDEN. Medelpad, Alno sn, As brygga, in dry spruce forest on calcareous ground, H. Lindstrom et al. CFP767, F248424 (S). USA. Washington, Table Mountain, *Abies*, *Picea* and some *Pinus*, 9 Oct. 2011, J. Ammirati & K. Liimatainen (Niskanen) 11-470, 7057489 (H). GenBank MT112162. Wyoming, Moser 0260 (IB, holotype of *C. colus* var. *occidentalis*). Note: The species has been called *C. aurantiomarginatus* in the Nordic countries, a name initially introduced by J. Schäffer from Central Europe and later validated by

Moser. In the protologue the species is described as a small fungus (pileus 1-3 cm, stipe 2-3 cm) with smallish ( $6.5\text{--}7.0 \times 4.5\text{--}5.5 \mu\text{m}$ ), subglobose spores. However, our species is typically larger (pileus 2.5-6 cm, stipe 4-10 cm) and also the spores are different, amygdaloid,  $7.5\text{--}8.5 \times 5.0\text{--}5.5 \mu\text{m}$ . Therefore, we conclude that our species does not represent *C. aurantiomarginatus* and is here described as new.

*Cortinarius odoritraganus* Niskanen, Liimat. & Ammirati, sp. nov.

IF557523

Holotype H 7057490

Diagnosis: Pileus 4–8 cm diam., convex to broadly convex, later plane, sometimes with a low and broad umbo, felty-fibrillose to fibrillose scaly, pale ochraceous brown to sand brown to somewhat greyish brown, towards the margin paler, can be covered with white fibrils when young, non or somewhat hygrophanous. Lamellae adnexed, almost crowded to medium spaced, broad, at first purple to dark purple, later dark purple brown to brown. Stipe 5–10 cm long, 1–2 cm thick at the apex, up to 3.2 cm wide at the base, clavate to almost bulbous, silky fibrillose, pale greyish white with some purplish tint to pale violet, later with pale brownish colours. Universal veil white, rather sparse. Basal mycelium white. Context in pileus pale brown to brown, sometimes with a purplish tint, in stipe watery greyish white with a purplish tint to purple, base becoming pale brown with age. Odour in lamellae strong, of pears, *C. traganus*-like. Exsiccata pileus brown, stipe pale brown. Basidiospores  $9.5\text{--}11.5 \times 6.0\text{--}7.5 \mu\text{m}$ , av. =  $10.7 \times 6.8 \mu\text{m}$ ,  $Q=1.65\text{--}1.75$ ,  $Q_{av.}= 1.70$ , ellipsoid, somewhat amygdaloid-ellipsoid to broadly ellipsoid, coarsely verrucose, somewhat dextrinoid. Lamellar trama hyphae finely encrusted. ITS sequence (GenBank MT112154, ex holotype) distinct from other members of *C. sect. Telamonia*. With a sister group relationship to *C. niveotraganus* (GenBank KM273103) and deviating from it by 7 substitutions and indels. Ecology and distribution: In mixed temperate forest (*Abies*, *Betula*) and in mountain *Quercus* forest. Known from Costa Rica and eastern North America.

Specimens examined: CANADA. Quebec, Pointe-Au-Chene, coniferous dominated forest (hemlock, *Abies*) with some *Betula*, 24 Sept. 2010, K. Liimatainen & T. Niskanen 10-145 (holotype; K(M), isotype). GenBank MT112154. COSTA RICA. San José, Quebrada Trail, *Quercus* sp., 6 Jun. 2004, coll. Bryn Dentinger, J.F. Ammirati 12981 (NYBG). GenBank MT112155. USA. North Carolina, Highlands, 3 Sept. 1942, L.R. Hesler 14.339 (MICH, holotype of *C. pulchrifolius* var. *odorifer*).

Etymology: The odour of the species is similar to that of *C. traganus*.

*Cortinarius occidentalisagacitas* Liimat., Niskanen, Kytov. & Ammirati, sp. nov.

IF557524

Holotype H 7057491

Diagnosis: Pileus 2–5 cm diam., hemisphaerical to convex, with an acute umbo, smooth, vividly orange brown to red brown, hygrophanous. Lamellae medium spaced, adnexed, broad, yellowish brown. Stipe 3–4 cm long, 0.4–0.6 cm thick at the apex, cylindrical, at first yellowish white silky-fibrillose, later pale yellow brown. Context in pileus red brown, in stipe pale yellow brown. Universal veil white to pale yellow, at first forming a sock-like sheet, later fibrous. Basal mycelium white. Odour in lamellae strong, perfume-like, somewhat reminiscent of cedar wood. Basidiospores  $7.5\text{--}9.0 \times 4.5\text{--}5.0 \mu\text{m}$ , av. =  $8.3 \times 4.7$ ,  $Q= 1.62\text{--}1.90$ ,  $Q_{av.}= 1.79$  (60 spores, 1 specimen), amygdaloid to amygdaloid-fusoid, some almost dolabratus-like, some with a shallow suprahilar depression and blunt apex, punctuate to finely verrucose, most strongly at apex, somewhat dextrinoid. Lamellar trama hyphae orange yellow, smooth to distinctly finely encrusted in MLZ. ITS sequence (GenBank MT112152, ex holotype) distinct from other members of *C. sect. Parvuli*. With a sister group

relationship to *C. sagacitas* (GenBank MT112148) and deviating from it by 5 substitutions and indels. Ecology and distribution: In mixed, boreal forests. Known from western North America. Specimens examined: USA. Washington, Crystal Spring, Lost Lake, on roadside, 21 Oct. 2009, T. Niskanen 09-118 (holotype; K(M), isotype). GenBank MT112152. CANADA. British Columbia, DAVFP 28802 (UBC). GenBank EU821662. Etymology: This is the sister species of *C. sagacitas* that occurs in western North America.

*Cortinarius sagacitas* Kytov., Niskanen & Liimat., sp. nov.

IF557525

Holotype H 6033517

Diagnosis: Pileus 2–6 cm diam., hemispherical to convex, usually with a small and acute umbo, smooth, vividly orange brown to red brown, hygrophanous. Lamellae medium spaced, adnexed, broad, yellowish brown. Stipe 2–7 cm long, 0.4–0.9 cm thick at the apex, cylindrical, sometimes tapering at the base, at first yellowish white silky-fibrillose, later pale yellow brown. Context in pileus red brown, in stipe pale yellow brown. Universal veil white to pale yellow, at first forming a sock-like sheet, later fibrous. Basal mycelium white. Odour in lamellae strong, perfume-like, somewhat reminiscent of cedar wood. Basidiospores  $7.5\text{--}9.5 \times 4.5\text{--}5.0 \mu\text{m}$ , av. =  $8.4\text{--}4.5 \mu\text{m}$ ,  $Q = 1.66\text{--}2.02$ ,  $Q_{av.} = 1.87$ , narrowly amygdaloid-fusoid to almost cylindrical, with a shallow suprahilar depression and blunt apex, almost smooth to punctuate, somewhat dextrinoid. Lamellar trama hyphae golden yellow, smooth in MLZ. ITS sequence (GenBank MT112148, ex holotype) distinct from other members of *Cortinarius* sect. *Parvuli*. With a sister group relationship to *C. occidentalisagacitas* (GenBank MT112152) and deviating from it by 5 substitutions and indels. Ecology and distribution: In dry, sandy heathlands with *Pinus*. Known from Northern Europe. Specimen examined: FINLAND. Sompion Lappi. Pelkosenniemi, Suvanto, dry open meadow on sand, few young *Pinus*, 28 Aug. 2008, Kytovuori 08-0270 (holotype; K(M), isotype). GenBank MT112148. Etymology: The name refers to the odour of the lamellae.

*Cortinarius scabridipileus* Kytov., Liimat. & Niskanen, sp. nov.

IF557526

Holotype H 7000550

Diagnosis: Pileus 1.5–4 cm diam., unequally plano-convex to very shallowly plano-depressed, usually with a very low and a small umbo, evenly cacao brown to hazel brown with ochraceous, small squarrose scales, margin narrowly whitish, hygrophanous. Lamellae fairly distant, somewhat emarginate, brown, with a somewhat paler edge. Stipe 3–5 cm long, 0.2–0.5 cm thick at the apex, cylindrical, somewhat tapering or thickened at the base, whitish silky-fibrillose, with brownish, longitudinal hygrophanous veins, brown at the base. Context in pileus brown, marbled pale brown in the stipe, darker at the base. Universal veil more or less whitish, forming a faint girdle at the middle of the stipe. Exsiccata: uniformly (pale) brown. Basidiospores  $7.5\text{--}9.0 \times 5.0\text{--}6.0 \mu\text{m}$ , av. =  $8.2\text{--}5.7 \mu\text{m}$ ,  $Q = 1.34\text{--}1.56$ ,  $Q_{av.} = 1.44$  (60 spores, 1 specimen), ellipsoid to obovoidly ellipsoid to obovoidly subglobose, strongly verrucose, most strongly at the apex, strongly dextrinoid. Lamellar trama hyphae wide-celled, yellow to orange, very strongly encrusted in MLZ. ITS sequence (GenBank MT112168, ex holotype) distinct from other members of sect. *Hinnulei*. With a sister group relationship to *C. hinnuleoarmillatus* (GenBank NR\_131790) and deviating from it by 11 substitutions and indels. Ecology and distribution: only known in a grass-herb *Fagus* forest on calcareous soil in the hemiboreal zone. Specimen examined: SWEDEN. Ostergotland, V. Tollstad, Omberg, SW of Hoje, at the crossing of Turistvagen and Sjutbanavagen, mesic *Fagus sylvatica* forest, calcareous soil, 125 m.s.l., UTM VE 8 6, 07 Oct. 2007, M. Toivonen & I. Kytovuori 07-2028 (holotype; K(M), isotype). GenBank MT112168.

Notes: *Cortinarius scabridpileus* is a fairly small, brown, minutely scaly *Telamonia*, which somewhat resembles *C. castaneopallidus*, *C. quercoconicus* and *C. angelesianus* in external appearance and encrustations of the lamellar trama hyphae but the shape and size of the basidiospores distinguishes it from these species.

Etymology: The name refers to the scaly pileus.