

**A REVISED KEY TO THE SPECIES OF MYCENA
SECTION FRAGILIPEDES OF THE NORTHERN HEMISPHERE**

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A revision of the keys to the species of *Mycena* (Pers.) Roussel section *Fragilipedes* of the Northern Hemisphere as published by Maas Geesteranus (1988a) is presented here. New taxa published between 1988 and 2003 are included, as well as some species transferred from other sections of *Mycena* and from the genus *Hydropus*. 90 taxa (87 species and 3 varieties) are included in this new key and the taxa excluded from sect. *Fragilipedes* are also mentioned. In addition to the key, 6 tables are introduced, illustrating some microscopic characters.

Viene presentata una nuova chiave di determinazione della sezione *Fragilipedes* del genere *Mycena* (Pers.) Roussel dell'Emisfero del Nord. Sono inclusi i nuovi taxa pubblicati fra il 1988 e 2003 e le specie trasferite da altre sezioni del genere *Mycena* e dal genere *Hydropus*. Sono elencate le 90 entità (87 specie e 3 varietà) menzionate in questa nuova chiave e sono elencate anche le entità escluse dalla sezione. Inoltre, con lo scopo di dare un valido aiuto per la lettura di questa chiave, sono presentate anche sei tavole nelle quali sono riportati alcuni caratteri microscopici.

Some years ago the author was asked by R.A. Maas Geesteranus to compose a new key of section *Fragilipedes*. A first, very succinct draft of the key was prepared in 2002 and sent to R.A. Maas Geesteranus for his valuable opinion. This work has been taken up again and finished after his death.

The key presented here refers in particular to the following characters: colour of the cap, hyphae of the pileipellis, hyphae of the cortex of the stipe, cheilocystidia, pleurocystidia, size and measures of the spores. Consequently, some species with variable characters (such as the smooth hyphae of the pileipellis, in species which sometimes also have sparse, distant excrescences), are keyed out in more than one part of the key. *Mycena subexcisa* (P. Karst.) Sacc., whose hyphae of the cortex of the stipe are known, is mentioned in the key among the species with smooth and diverticulate hyphae.

The key to *Mycena* sect. *Fragilipedes* (Fr.) Quél. published by Maas Geesteranus (1988a: 45–50), valuable and valid at that time (it included 54 taxa), can no longer be considered as such, at least in some parts. Many new species have been included in sect. *Fragilipedes* since 1988. Besides, some microscopic characters which appeared to be constant, such as the obvious presence in species with 4-spored basidia of clamp-connections, or the lack of the latter in species with 2-spored basidia, are not constant. It is evident that the species of this group are not fully known.

Key 3 of sect. *Fragilipedes* (Maas Geesteranus, 1988a: 46–47) considered 2-spored and 4-spored species without clamp-connections. Among the latter, *M. leptcephala* (Pers.: Fr.) Gillet, collected by Aronsen without clamps (Maas Geesteranus, 1991: 548–549), is not quoted.

In key 6 of sect. *Fragilipedes* (Maas Geesteranus, 1988a: 48–50) *M. alnetorum* J. Favre is placed among the species lacking pleurocystidia, but this character is no longer valid since some examples of this species have been observed with pleurocystidia (Senn-Irlet, 1999: 73–78).

After the publication of the key (1988), 33 new taxa (30 species and 3 varieties) of the sect. *Fragilipedes* have been published: *M. abietina* Maas Geest. (1992a: 37–38); *M. aculeata* Maas Geest. (1993: 335–337); *M. albido-rosea* Robich (2003a: 227); *M. aronsenii* Maas Geest. (1993: 337–338); *M. atrovinosa* Robich (2003a: 241); *M. austera* Aronsen (1994: 531–533); *M. bathyrrhiza* Maas Geest. (1992a: 38–39); *M. caliginosa* Maas Geest. & Enderle (1994: 373–376); *M. coalita* Maas Geest. (1992a: 39–41); *M. crocea* Maas Geest. (1991a: 390–392); *M. cyrnea* Maas Geest. (1993: 338–340); *M. eburnea* var. *roseodisca* Desjardin & Bessette (1997: 299–303); *M. erminea* Maas Geest. (1993: 340–341); *M. fuligineipapillata* Robich (2003a: 254); *M. gilvipes* M. Villarreal, Heykoop, & Maas Geest. (1998: 529–530); *M. hausknechtii* Maas Geest. (1993: 341–343); *M. lignivora* Maas Geest. (1995: 59–61); *M. maurella* Robich (1992): 49–52); *M. obtecta* Maas Geest. (1993: 343–345); *M. olivaceo-flava* M. Villarreal, Heykoop & Maas Geest. (1999: 235–237); *M. parca* Aronsen (1994: 533–535); *M. pilosella* var. *heterocystidiosa* Robich (2000: 83–88); *M. profusa* Manim. & Leelav. (1988: 573–576); *M. rubidofusca* M. Villarreal, Heykoop & Maas Geest. (1999: 237–239); *M. scirpicola* M. Villarreal, Heykoop, Esteve-Rav. & Maas Geest. (1998: 531–533); *M. spinulosipes* Robich (2003b: 129); *M. tephrophylla* Maas Geest. & Schwöbel (1989: 65–67); *M. tristis* Maas Geest. (1988d: 471–473); *M. ustalis* Aronsen & Maas Geest. (1989: 61–64); *M. valida* Maas Geest. & Münzmay (1997: 415–417); *M. verna* Maas Geest. (1998: 145–147); *M. vicina* M. Villarreal, Heykoop & Maas Geest. (1999: 239–241); *M. vitilis* var. *carsica* Robich (1999: 211–215).

The following changes have been made: *M. quinaultensis* Kauffman apud A.H. Sm. (1935: 589–590), previously included by R.A. Maas Geesteranus in sect. *Insignes* Maas Geest. (1989: 350–351), is transferred by the author of the key to sect. *Fragilipedes* (Maas Geesteranus, 1991b: 559). *Mycena mitis* Maas Geest. and *M. corrugans* Maas Geest. (1992b: 469–472), species previously included in sect. *Insignes* have been transferred to the sect. *Fragilipedes* (Villarreal, Heykoop & Maas Geest., 1999: 239). *Mycena gladiocystis* Esteve-Rav. & A. Ortega (1999: 95–103), is transferred from the sect. *Insignes* to the sect. *Fragilipedes* (Moreno, Heykoop & Romero De La Rosa, 1999: 9–13).

Mycena flocculina (Kalaméés) M. Villarreal (= *Hydropus flocculinus* Kalaméés, Folia Cryptog. Eston., 26: 7. 1987), a species with pileipellis and hyphae of the cortex of the stipe diverticulate, is transferred from genus *Hydropus* to genus *Mycena*, sect. *Fragilipedes* (Villarreal, Heykoop, Esteve-Raventós & Maas Geesteranus, 1998: 527–529).

Mycena plumipes (Kalchbr.) P.A. Moreau (= *Mycena strobilicola* J. Favre & Kühner apud Kühner) is a new combination (Moreau, 2003: 5).

The following species are excluded from the present work.

- *Mycena arata* (Berk.) Sacc. (1887: 569), because the hyphae of the pileipellis and the cortex of the stipe are known.
- *Mycena fallax* A.H. Sm. apud A.H. Sm. & D.E. Stuntz, for the doubts expressed by Maas Geesteranus (1988a: 79) over the position of this species in the genus *Mycena*.

- *Mycena nubigena* (Berk.) Sacc. (1887: 569), because of the lack of knowledge of many macro- and microscopic characters and for the doubts already expressed by Maas Geesteranus (1988b: 145): “I assumed that the species is a member of section *Fragilipedes* but more precise identification at this stage is impossible”.

KEY OF SECTION FRAGILIPEDES

Key 1

1. Pileus white, cream-white, grey-white, yellow, livid yellow, pink, orange, vinaceous or violaceous purple-brown, (the centre may be differently coloured). (Next nr. 1 see at the end of Key 1.)
2. Pileus white, cream-white, grey-white, whitish, yellow, olive-yellow, olive-green, citrine.
3. Pileus white, cream-white, grey-white, whitish.
4. Pileipellis with smooth hyphae (Fig. 3B).
 5. Cheilocystidia smooth, with rounded apex, mucronate or with apical extension (Fig. 2).
 6. Pleurocystidia present.
 7. Caulocystidia smooth.
 8. Lamellae white. Cheilocystidia clavate to fusiform with broadly rounded apex. Caulocystidia clavate to fusiform *M. sudorella*
 8. Lamellae pink-white or pale pink, concolorous or with pale edge. Cheilocystidia fusiform, lageniform, subpyriform. Caulocystidia elongate-clavate, curved, flexuose *M. albido-rosea*
 7. Caulocystidia elongate-clavate, flexuous, fusiform, with excrescences.
 9. Caulocystidia cylindrical, fusiform or irregularly shaped with excrescences 7–18 μm long. Spores 8.1–9.2 μm long. Pileus brilliant orange *M. crocea*
 9. Caulocystidia irregularly clavate, straight to curved, coarsely diverticulate. Spores 9–12 \times (–16.5) μm long. Pileus white to beige, clear brown *M. zephirus*
 6. Pleurocystidia absent. Terminal cells of the stipe up to 5 μm wide, diverticulate. Spores 6.3–9.0 μm long *M. laevigata*
 10. Lamellae white to whitish. Stipe grey lilac, vinaceous brown. Spores elongate ellipsoid or cylindrical, 9–12 \times (–16.5) μm long. Hyphae of the pileipellis 2–10 μm wide *M. zephirus*
 10. Lamellae white flushed with pale pink. Stipe watery white, firm but brittle. Spores pip shaped, 8–10 μm long. Hyphae of the pileipellis 1.5–2.5 μm wide *M. incarnatifolia*
5. Cheilocystidia lageniform, fusiform, with rounded, mucronate apex, or elongate to neck-like form, along with others with forked neck or finger-like branches (Fig. 1).
 11. Hyphae of the pileipellis 1.5–2.5 μm wide, smooth, covered with granular matter *M. incarnatifolia*
 11. Hyphae of the pileipellis 2–10 μm wide, smooth or roughened *M. zephirus*

4. Pileipellis with diverticulate hyphae (Fig. 3A).
12. Cheilocystidia smooth, with rounded apex, mucronate or with apical extension (Fig. 2).
13. Pleurocystidia present.
14. Spores elongate ellipsoid, almost cylindrical, 9–14.3 μm long.
15. Pileus and lamellae without red-brown spots.
16. Spores 9–11.6 μm long. Pileus white, finally pallid. Lamellae white. Stipe 1–1.5 mm wide. MICH, USA *M. eburnea*
16. Spores 10.7–14.3 μm long. Pileus white, then very pale creamy pink or pale cream. Lamellae whitish to pale grey, then creamy pink. Stipe 2–4 mm wide *M. erminea*
15. Pileus white to beige, clear brown, with age stained reddish brown. Lamellae 20–28, white to whitish, pale brown with red-brown spots. Stipe grey flesh-colour, grey lilac, reddish to vinaceous brown. Spores 9–12(–16) μm long *M. zephirus*
14. Spores ellipsoid, 8–10 μm long. Pileus pinkish white. Odour absent. Pileipellis and hyphae of the cortex of the stipe nodulose-diverticulate. India *M. profusa*
13. Pleurocystidia absent.
17. Stipe hyaline white, watery grey, grey-brown. Lamellae without red-brown spots. Hyphae of the pileipellis 1.5–6 μm wide.
18. Hyphae of the stipe without long hairs (Figs. 5 & 6).
19. Smooth hyphae of the cortex of the stipe.
20. Pileus 6–16 mm. Spores (6–)6.5–8(–8.5) \times 11–15(–16) μm , ellipsoid to cylindrical ellipsoid. Cheilocystidia clavate of irregular form, ovoid. Terminal cells of the hyphae of the stipe smooth *M. vitilis* var. *carsica*
20. Pileus 12–30 mm. Spores 6.5–7.5(–9) \times 10–11.5(–13) μm , ellipsoid to broadly ellipsoid. Cheilocystidia fusiform, lageniform, utriform, subcylindrical. Terminal cells of the hyphae of the stipe flexuose, with large protuberances *M. polygramma* f. *candida*
19. Diverticulate hyphae of the cortex of the stipe. Pileus ivory white. Stipe watery grey or violet-grey below *M. laevigatoides*
18. Hyphae of the stipe sprouting long hairs (Figs. 5 & 6).
21. Smooth hyphae of the stipe (or with very rare excrescences) with long thin-walled hairs (Fig. 5A). Spores ellipsoid, 8.5–10(–11) μm long. Lamellae broadly adnate, decurrent with a tooth, white tinged yellowish. Basidiomata isolate or fasciculate *M. pilosella* var. *pilosella*
21. Diverticulate hyphae of the stipe with long thick-walled hairs (Fig. 5C). Spores ellipsoid to cylindrical, (8.5–)11.5–12(–13.5) μm long. Lamellae emarginate, adnate, grey-white. Scattered *M. villicaulis*
17. Stipe grey flesh-colour, grey lilac, reddish to vinaceous brown. Lamellae white to whitish, pale brown with red-brown spots. Hyphae of the pileipellis 2–10 μm wide *M. zephirus*
12. Cheilocystidia smooth, with rounded apex, mucronate or with apical extension along with others with an elongate neck, forked neck or finger-like branches (Fig. 1).

- 22. Pleurocystidia absent.
- 23. Hyphae of the stipe without long hairs (Figs. 5 & 6).
- 24. Hyphae of the cortex of the stipe diverticulate.
 - 25. Spores 9–12 or 12.5–16.1 μm long. Stipe white, yellowish below, grey flesh-colour, grey lilac to reddish brown. Hyphae of the pileipellis up to 4.5 or 10 μm wide.
 - 26. Spores 7.2–9.4 \times 12.5–16.1 μm . Lamellae 9–11, up to 1.5 mm broad. Stipe white, yellowish below. Pileipellis hyphae 2.7–4.5 μm wide, densely covered with branched excrescences up to 30 μm long, which tend to become gelatinized *M. corrugans*
 - 26. Spores 4–5.4 \times 9–12(–16) μm . Lamellae 20–28, up to 4 mm broad. Stipe grey flesh-colour, grey lilac to reddish brown. Pileipellis hyphae 2–10 μm wide, smooth, roughened or with rare excrescences
M. zephirus
 - 25. Spores 9.8–10.5 μm long. Stipe watery grey or violet-grey below. Hyphae of the pileipellis 1.8–2.7 μm wide *M. laevigatoides*
- 24. Hyphae of the cortex of the stipe smooth.
 - 27. Pileus 6–16 mm. Spores (6–)6.5–8(–8.5) \times 11–15(–16) μm , ellipsoid to cylindrical ellipsoid. Cheilocystidia clavate, of irregular form, ovoid. Terminal cells of the hyphae of the stipe smooth
M. vitilis var. *carsica*
 - 27. Pileus 12–30 mm. Spores 6.5–7.5(–9) \times 10–11.5(–13) μm , ellipsoid to broadly ellipsoid. Cheilocystidia fusiform, lageniform, utriform, sub-cylindrical. Terminal cells of the hyphae of the stipe flexuose, with large protuberances *M. polygramma* f. *candida*
- 23. Hyphae of the stipe sprouting long hairs (Figs. 5 A–C).
 - 28. Smooth hyphae of the stipe (or with very rare excrescences) with long hairs with thin-walls (Fig. 5A). Spores ellipsoid, 8.5–10(–11) μm long. Lamellae broadly adnate, decurrent with a tooth, white tinged yellowish. Basidiomata solitary or fasciculate *M. pilosella* var. *pilosella*
 - 28. Diverticulate hyphae of the stipe with long hairs with thick walls (Fig. 5C). Spores ellipsoid to cylindrical, (8.5–)11.5–12(–13.5) μm long. Lamellae emarginate, adnate, grey-white. Scattered *M. villicaulis*
- 22. Pleurocystidia present.
 - 29. Cheilocystidia and pleurocystidia clavate, fusiform, subcylindrical, apically narrowed into a simple neck, mucronate, or covered with several coarse, branched excrescences.
 - 30. Pileus 10–40 mm wide, white, with age stained reddish brown. Stipe grey lilac to vinaceous brown. Spores elongate ellipsoid or cylindrical, 9–12(–16.5) μm long. Pileipellis 2–10 μm long, smooth or with rare excrescences. Terminal cells irregularly clavate, straight to curved, coarsely diverticulate *M. zephirus*
 - 30. Pileus 10–20 mm wide, white, finally pallid. Stipe white. Spores ellipsoid, 9–11.6 μm long. Pileipellis 1.8–6.5 μm wide, with simple to branched excrescences. Terminal cells diverticulate. MICH, USA *M. eburnea*

29. Cheilocystidia fusoid-ventricose, smooth (rarely with digitate branching at the apex). Pileus pinkish white, 5–17 mm wide. Spores ellipsoid, 8–10 μm long. Pileipellis and hyphae of the cortex of the stipe nodulose-diverticulate. India *M. profusa*
3. Pileus yellow, olive yellow, olive green, citrine.
31. Pleurocystidia absent.
32. Spores 8.5–12(–14.4) μm long.
33. Hyphae of the stipe without long hairs (Figs. 5 & 6).
34. Pileus 2–20 and 6–35 mm wide.
35. Pileus 3–20 mm wide, pure yellow to greenish or olivaceous yellow. Lamellae 15–22, edge citrine pallid to whitish. Stipe 0.5–1.5 mm wide, pale yellowish to greenish or olivaceous green. Cheilocystidia with or without a neck or with one or more apical simple or furcate excrescences
M. citrinomarginata
35. Pileus 6–35 mm wide, grey-green, olive green, olive brown, dark sepia brown. Lamellae 16–30, edge grey-green, olive green or brownish. Stipe 1–3 mm wide, concolorous with the pileus. Cheilocystidia with one or two necks, covered with variously shaped excrescences *M. viridimarginata*
34. Pileus smaller, 4–8 mm wide. Lamellae 13–15, white to yellowish, edge convex. Hyphae of the pileipellis 2.5–4 μm wide, with simple or branched excrescences up to 2 μm long. Basidiomata gregarious on humus of *Salix atrocineria* *M. olivaceoflava*
33. Hyphae of the stipe sprouting long thin-walled hairs (Fig. 5A). Pileus 3–8 mm wide, ochraceous yellow with light greenish tint, yellowish brown-grey. Cheilocystidia 12–32 μm long, irregularly clavate, swollen, apex covered with irregular finger-like excrescences . . *M. pilosella* var. *heterocystidiosa*
32. Spores 12.5–16.1 μm long. Pileus watery greyish yellow at the centre. Lamellae 9–11, up to 1.5 mm broad. Stipe white, yellowish below. Basidiomata solitary or subcaespitose, on the roots and at the bases of the stems of *Calamagrostis epigeios* *M. corrugans*
31. Pleurocystidia present.
36. Hypae of the pileipellis diverticulate (Fig. 3A).
37. Cheilocystidia 18–75 μm long.
38. Cheilocystidia lageniform, clavate, utriform, fusiform, smooth, some with the apex covered with more or less branched excrescences.
39. Pileus 6–12.5 mm wide.
40. Basidia 4-spored. Pileus pale yellow, flesh-coloured, becoming whitish. Lamellae sub flesh-coloured. Spores 3.5–4 \times 7.2–8.1 μm . Cheilocystidia lageniform or fusiform, smooth, 27–45 μm long, apex with slender neck or with coarse variously shaped, branched excrescences. USA *M. subincarnata*
40. Basidia 2-spored. Pileus bright yellow, brownish at the centre, then yellowish red-brown. Lamellae white, yellowish near the margin. Spores 7.2 \times 10.7 μm . Cheilocystidia lageniform, clavate, fusiform, 30–55 μm long, smooth, rarely branched, not infrequently abruptly attenuated at the apex *M. lutea*

- 39. Pileus up to 5.5 mm wide, vivid citrine, slightly darker and golden citrine at the centre. Lamellae whitish. Stipe concolorous with the pileus. Spores 4.3–5.4 × 8.1–9.7 μm. Cheilocystidia and pleurocystidia 18–33 μm long. Altai, Russia *M. chrysocorypha*
- 38. Cheilocystidia fusiform to lageniform, 45–75 μm long, smooth, with a long acute neck, sometimes distinctly thick-walled, often covered by resinous yellowish material at the apex. Pileus 5–10 mm wide, yellowish to brownish olivaceous *M. gladiocystis*
- 37. Cheilocystidia 80–110 μm long, fusiform to lageniform, smooth, rarely ramified at the apex into two or three short excrescences. Pleurocystidia similar. Pileus olive grey to dark grey. Stipe olive to yellow . . . *M. gilvipes*
- 36. Hypae of the pileipellis smooth (Fig. 3B).
- 41. Pileus rich yellow or brilliant orange. Lamellae yellowish to tinged flesh-colour. Stipe 50–90 mm long, concolorous with the pileus at the apex, pale below. Hyphae of the pileipellis 2.5–8 μm wide *M. crocea*
- 41. Pileus bright yellow, brownish at the centre, then yellowish red-brown. Lamellae white, yellowish near the margin. Stipe 20–30 mm long, yellow to ochraceous. Hyphae of the pileipellis 1.8–2.2 μm wide *M. lutea*
- 2. Pileus pink, pale pink, flesh-colour, orange, vinaceous or violaceous purple-brown.
- 42. Pileus pink, pale pink, flesh-colour, vinaceous or violaceous purple-brown.
- 43. Pileus with vinaceous or violaceous purple-brown tints.
- 44. Pleurocystidia absent.
- 45. Pileus 4–13 mm wide.
- 46. Pileus 4–8 mm wide, pale vinaceous brown, dingy brown or greyish brown. Lamellar edge pallid or brownish. Stipe concolorous with the pileus. Cheilocystidia ampullaceous, lageniform or utriform. Pileipellis hyphae diverticulate. Hyphae of the cortex of the stipe smooth or diverticulate. MICH, USA *M. deceptor*
- 46. Pileus up to 13 mm wide, vinaceous purplish brown, umbonate. Lamellar edge white. Stipe ochraceous yellow. Cheilocystidia fusiform, sublageniform. Pileipellis hyphae smooth or diverticulate. Hyphae of the cortex of the stipe smooth *M. aculeata*
- 45. Pileus 15–30 mm wide, with an obtuse umbo, centre pale greyish vinaceous. Lamellae up to 4 mm broad, white, then pale pink. Stipe 2–3 mm wide, firm to brittle, exuding watery fluid when broken. Hyphae of the pileipellis and of the cortex of the stipe smooth. Growing on Black Cherry log. USA
M. incarnatifolia
- 44. Pleurocystidia present.
- 47. Cheilocystidia apex with a short neck or coarse excrescences, fusiform, clavate, subcylindrical.
- 48. Cheilocystidia fusiform. Pileus 2–4 mm, faintly vinaceous to dingy pallid. Stipe filiform, watery grey, base with long whitish fibrils. Hyphae of the pileipellis densely diverticulate. Growing on the bark of a rotting hardwood log. USA *M. corticaticeps*

48. Cheilocystidia fusiform, clavate, subcylindrical. Pileus up to 30 mm wide, grey-brown suffused with purplish or violaceous tints. Stipe 1–3 mm wide, grey to blackish suffused with vinaceous tint. Hyphae of the pileipellis with short excrescences (or smooth). Growing on stumps and fallen branches of deciduous trees. USA, Canada *M. tenuicola*
47. Cheilocystidia smooth, fusiform, clavate, lageniform, ampullaceous, utriform.
49. Pileus 4–8 mm wide, pale vinaceous brown, dingy brown or greyish brown. Lamellar edge pallid or brownish. Stipe concolorous with the pileus. Cheilocystidia ampullaceous, lageniform or utriform. Pileipellis hyphae 1.8–4 μm wide. MICH, USA *M. deceptor*
49. Pileus 8–22 mm wide, brownish black with vinaceous or violaceous tints. Lamellar edge white. Stipe concolorous with the pileus. Cheilocystidia fusiform, clavate. Pileipellis hyphae 2–6 μm wide *M. atrovinosa*
43. Pileus pink, pale pink, pinkish brown, flesh-coloured.
50. Pleurocystidia absent.
51. Hyphae of the pileipellis and of the cortex of the stipe diverticulate (Figs. 3A & 4B).
52. Pileus very pale pink up to 5 mm wide. Stipe very pale pink. Cheilocystidia 45–50 μm long, fusiform to subclavate, toward the pileus margin apically truncate. Hyphae of the pileipellis 1.8–4.5 μm wide. Solitary, growing on fallen, decaying *Quercus* leaves *M. mitis*
52. Pileus centre rosy pink, margin white, 10–15 mm broad. Stipe pale grey-white, grey to brownish. Cheilocystidia 22–45 μm long, versiform, apex with a long neck or cylindrical projections. Hyphae of the pileipellis 2.5–7 μm wide. Scattered to gregarious on decayed wood in mixed forest. USA *M. eburnea* var. *roseidisca*
51. Hyphae of the pileipellis and of the cortex of the stipe smooth (Figs. 3B & 4A). Pileus dingy pinkish brown. Lamellae whitish pink then pink. Stipe pale brownish white with a slight yellowish tint. Cheilocystidia fusiform to sublageniform, smooth. On fallen branches of *Fagus* *M. lignivora*
50. Pleurocystidia present.
53. Hyphae of the pileipellis nodulose-diverticulate, 1–5 μm wide. Pileus pinkish white, subumbonate. Stipe dull white, 1–2.5 mm wide. Cheilocystidia fusoid-ventricose, smooth or rarely with digitate branching at the apex. India
M. profusa
53. Hyphae of the pileipellis diverticulate, 2.5–7 μm wide. Pileus rosy pink at the centre, margin white. Stipe pale grey-white, grey to brownish, 1 mm wide. Cheilocystidia versiform, irregularly cylindrical, clavate, fusiform, apically with a long neck or cylindrical projections. USA
M. eburnea var. *roseidisca*
42. Pileus brilliant orange (to rich yellow, fading whitish), 8–15 mm wide. Lamellae yellowish to tinged flesh-colour. Stipe concolorous with the pileus, pale below. Pileipellis with smooth hyphae. MICH, USA *M. crocea*
1. Pileus not with these colours, usually brown, grey or black Key 2

Key 2

54. Hyphae of the pileipellis diverticulate, covered with simple, branched, flexuous excrescences, spaced to crowded (Fig. 3A), generally forming dense coralloid masses (next nr. 54 see at the end of Key 4).
55. Hyphae of the cortex of the stipe diverticulate (Fig. 4B) (some species with widely spaced, almost very scattered excrescences) (next nr. 55 see at the end of Key 3).
56. Cheilocystidia fusiform, lageniform, clavate, cylindrical, smooth, rounded or mucronate apex, apical extension like a neck; neither forked nor diverticulate or branched (Fig. 2) (next nr. 56 see at the end of Key 2).
57. Pleurocystidia absent.
58. Spores up to 10–11 μm long.
59. Spores more than 10 μm long.
60. Hyphae of the cortex of the stipe without thin hair-like elements, 40–300 μm long (Figs. 5 & 6).
61. Stipe smooth, not striate.
62. Hyphae of the pileipellis and cortex of the stipe not embedded in gelatinous matter.
63. Pileus very dark grey, sepia brown, dark brown, black-brown, fuliginous, grey-brown.
64. Pileus up to 25 mm. Lamellae 14–35, fairly dark, sepia tinged grey-brown, edge white, up to 3 mm broad. Odour nitrous or alkaline; taste disagreeable. Terminal cell of the stipe 4–20 μm wide, inflated, variously shaped and branched, curved outwards, apically geniculate
M. leptocephala
64. Pileus up to 35 mm. Lamellae 15–24, darkish grey, edge greyish to whitish. Odour acidulous or raphanoid; taste mild to raphanoid. Terminal cells of the stipe 2.5–8 μm wide, infrequent, diverticulate
M. aetites
63. Pileus grey, 12.5 mm wide. Lamellae nearly free to adnexed, delicate pink. Cheilocystidia smooth, clavate to fusiform, apex gradually narrowed into a slender neck. Hyphae of the pileipellis and of the cortex of the stipe 1.8–2.5 μm wide. On pine wood. Sikkim *M. puberula*
62. Hyphae of the pileipellis and the cortex of the stipe embedded in gelatinous matter.
65. Hyphae of the pileipellis smooth or with simple to branched excrescences, 1.8–5 μm wide. Pileus 8–30 mm, dark brown, argillaceous, yellowish grey. Flesh whitish, creamy grey; odour nitrous, also alkaline or of chlorine. On coniferous wood *M. stipata*
65. Hyphae of the pileipellis densely diverticulate, 2–3 μm wide. Pileus 10–14, dark reddish brown to dark reddish grey. Flesh whitish; odour not distinctive. In humus of *Corylus avellana* *M. rubidofusca*
61. Stipe very striate to coarsely grooved, grey to brownish grey silvery, 1.5–6(–7) \times 50–180 mm. Pileus up to 60 mm wide. Lamellae 23–40, white to greyish, brownish with red-brown stains, up to 3.5 mm broad.

- Cheilocystidia fusiform, lageniform, subcylindrical, smooth or with apical or lateral excrescences *M. polygramma* f. *polygramma*
60. Thin hair-like elements (Figs. 5A & B) sprouting from the hyphae of the cortex of the stipe.
66. Pileus white with yellowish tint, cream white, grey with yellow light. Lamellae white tinged yellowish. Hairs of the stipe (Fig. 5A) 1–4.5 × 45–160(–310) μm *M. pilosella* var. *pilosella*
66. Pileus very pale brown to light grey, dark grey or dark greyish brown. Lamellae white to greyish. Hairs of the stipe (Fig. 5B) 1–1.5 × 40–300 μm . On *Rubus* roots, on dead culms of *Scirpus holoschoenus* *M. scirpicola*
59. Spores less than 10 μm long.
67. Hyphae of the cortex of the stipe without thin hair-like elements (Figs. 5 & 6).
68. Spores ellipsoid to broadly ellipsoid.
69. Pileus grey, 12.5 mm. Lamellae nearly free to adnexed, delicate pink. Cheilocystidia clavate to fusiform, apex gradually narrowed into a slender neck. Hyphae of the pileipellis and of the cortex of the stipe 1.8–2.5 μm wide. On pine wood. Sikkim *M. puberula*
69. Pileus pale fuscous to greyish brown, whitish, 5–10 mm. Lamellae adnate, decurrent. Cheilocystidia fusiform to broadly clavate. Hyphae of the pileipellis 1.8–6.5 μm wide. Hyphae of the cortex of the stipe 1.8–3.5 μm wide. Terminal cells up to 13.5 μm wide, smooth, clavate to more irregularly shaped. Scattered, growing on vegetable debris. USA *M. subfusca*
68. Spores broadly ellipsoid to subglobose, 6–7 × (6–)7–8.5 μm . Pileus 15–30 mm, brown grey, black brown. Stipe 50–80 mm long. Cheilocystidia fusiform, lageniform, utriform, subcylindrical or irregularly shaped, smooth, along with apical or lateral coarse excrescences *M. polygramma* f. *pumila*
67. Thin hair-like elements 40–300 μm long (Fig. 5B) sprouting from the hyphae of the cortex of the stipe. Pileus very pale brown to light grey, dark grey or dark greyish brown. Lamellae white to greyish. On *Rubus* roots, on dead culms of *Scirpus holoschoenus* *M. scirpicola*
58. Spores up to 12.5–15 μm long.
70. Hyphae of the cortex of the stipe without thick hair-like elements up to 300 μm long (Figs. 5 & 6).
71. Pileus with brown tint or colour.
72. Lamellae adnate.
73. Hyphae of the pileipellis not embedded in gelatinous matter. Pileus up to 35 mm. Spores ellipsoid to cylindrical.
74. Lamellae 3–4.5 mm broad. Spores 4–6.5 μm wide. Pileus umbonate. Stipe 1–3.5 mm broad. Cheilocystidia fusiform, lageniform, clavate, subcylindrical.
75. Flesh whitish; taste indistinctive or raphanoid. Stipe exuding copious watery fluid when fresh. Terminal cells 3–6 × 50–80 μm , diverticulate. On debris of various deciduous trees *M. abramsii*

75. Flesh watery sepia brown to white; taste disagreeable. Stipe not exuding copious watery fluid when fresh. Terminal cells 4–20 μm wide, inflated, variously shaped and branched, curved outwards apically geniculate. On fallen branches, among grass and moss
M. leptocephala
74. Lamellae 0.8 mm broad, pallid to buff. Spores 6.3–8 μm wide. Pileus not umbonate, dark grey to violaceous brown grey. Stipe 1–1.5 mm broad, avellaneous above, darker below. Cheilocystidia ampullaceous to lageniform. On decayed hardwood log in pine-hardwood forest. USA *M. avellaneibrunnea*
73. Hyphae of the pileipellis embedded in gelatinous matter. Pileus up to 10 mm. Spores ellipsoid to ovoid. Caulocystidia 7–20 \times 100 (or more) μm , versiform, flexuose to straight, tapering toward the apex. On decayed wood of *Juniperus*. Uzbekistan *M. flocculina*
72. Lamellae decurrent.
76. Lamellae 14–35, fairly dark, sepia tinged grey-brown. Flesh watery sepia brown to white; odour nitrous or alkaline, taste disagreeable. Spores ellipsoid 9.4–11.2(–13.5) μm long. Caulocystidia 4–20 μm wide, inflated, variously shaped and branched, curved outwards, apically geniculate. On fallen branches, among grass and moss
M. leptocephala
76. Lamellae 6–13, white to grey-white. Flesh white; odour raphanoid, taste similar weak. Spores 9.5–13(–17) μm long, elongate ellipsoid to subcylindrical. Caulocystidia 3–5 μm wide, swollen, diverticulate. On stumps and dead branches of *Alnus viridis* *M. alnetorum*
71. Pileus bluish grey, silvery greyish when dry, without brown tint or colour, 10–25 mm, obtusely umbonate. Stipe cartilaginous, concolorous with the pileus. Spores cylindrical, 10–12(–14) μm long. Cheilocystidia smooth, apex broadly rounded with an abrupt slender cylindrical neck (sometimes two necks), which is 8–12 μm long. Subcaespitose on debris in forest of *Douglas* fir. USA *M. griseiconica*
70. Thick hair-like elements up to 300 μm long (Fig. 5C) sprouting from the hyphae of the cortex of the stipe. Pileus 6–16 mm, grey-white to light grey-brown. Cheilocystidia clavate, subcylindrical, subfusiform, apex more or less abruptly narrowed into a slender neck (rarely with two necks). Terminal cells diverticulate, 4–8 \times 40–90 μm *M. villicaulis*
57. Pleurocystidia present.
77. Pileus with grey, brown, black, bluish, violaceous or vinaceous colours and tints, without olivaceous or yellowish tints.
78. Spores up to 10 μm long.
79. Pileus with grey, brown, black colours and tints, without bluish, violaceous and vinaceous colours and tints.
80. Hyphae of the cortex of the stipe without thin hair-like elements (Figs. 5 & 6).
81. Spores ellipsoid to subcylindrical.
82. Pileus grey-brown, grey, greyish black, with grey colours and tints.

83. Pileus grey-brown, greyish black.
84. Pileus grey-brown, smoky grey-brown.
85. Pileus grey-brown, without umbo. Lamellae grey-brown to grey. Stipe watery grey, grey, grey-brown. Spores ellipsoid to broadly ellipsoid. Cheilocystidia fusiform, sublageniform, cylindrical, a few ellipsoid, smooth. Hyphae of the pileipellis 1.8–2.5 μm wide. On vegetable detritus under *Juniperus communis*, *Picea abies*
M. aronsenii
85. Pileus pale smoky grey-brown, subumbonate. Lamellae white. Stipe pale smoky grey-brown. Spores ellipsoid. Cheilocystidia fusiform, smooth. Hyphae of the pileipellis 1.8–4.5 μm wide. On fallen dead wood in a wet thicket. USA *M. subfumosa*
84. Pileus greyish black up to 20 mm. Lamellae white, glaucescent. Stipe 2–3 \times 30–40 mm, brittle, greyish black, the base with dingy yellowish fibrils on drying. Cheilocystidia and pleurocystidia cylindrical-subfusiform, subclavate. Scattered, among shrubs on sandy humus soil in coniferous forest. Finland *M. subexcisa*
83. Pileus grey, ash grey, 9–30 mm. Lamellae whitish to pale ash grey. Stipe pale ash grey, watery grey, darker below. Cheilocystidia and pleurocystidia lageniform, fusiform, clavate, apex passing into a narrow to broader neck or without neck. On dead sticks, branches and trunks of coniferous trees. USA *M. subcana*
82. Pileus brown, sepia brown, blackish brown, without grey colours and tints.
86. Pileus sepia brown, centre dingy pinkish, without umbo. Stipe 45–70 mm long, pale sepia brown, with or without yellowish tint. Cheilocystidia and pleurocystidia fusiform to subcylindrical, simple, smooth, the neck with obtuse tip. At the edge of a forest of *Pinus* and *Quercus*. Corsica *M. cyrnea*
86. Pileus blackish brown, with or without abrupt umbo. Stipe 80–160 mm long, cartilagineous, blackish brown to pale, stained with reddish brown spots below. Cheilocystidia and pleurocystidia lageniform, fusiform, subclavate, with simple neck (or with others furcate). Among *Sphagnum* in bogs. USA *M. praelonga*
81. Spores broadly ellipsoid to subglobose.
87. Spores 6–7 μm broad.
88. Pileus 15–30 mm, umbonate, brown-grey to black-brown. Lamellae 28–32, white to grey-white. Stipe grey to dark grey. Cheilocystidia fusiform, lageniform, utriform, subcylindrical or irregularly shaped, smooth (some with a few coarse, spaced excrescences). Gregarious on woody decayed debris of *Quercus* sp. . . . *M. polygramma* f. *pumila*
88. Pileus 8–14 mm, often with fairly acute umbo, black, brown-black to bluish black. Lamellae 18, pale grey to ochraceous grey. Stipe bluish black, blackish brown, grey-brown. Cheilocystidia and pleurocystidia fusiform, smooth, broadly rounded at the apex. Solitary or in small clusters on woody residue of burned-down *Robinia pseudoacacia*
M. hausknechtii

87. Spores 4.9–5.5 μm broad. Pileus 8–10 mm, without umbo, grey-brown. Lamellae grey-brown or grey. Stipe elastic-fragile, grey, grey-brown. Cheilocystidia and pleurocystidia fusiform, sublageniform, cylindrical, a few ellipsoid, smooth. Hyphae of the cortex of the stipe sparsely covered with excrescences. Terminal cells 4–11 μm broad, variously shaped and generally coarsely diverticulate. Scattered on vegetable detritus under *Junipeus communis*, *Picea abies*
M. aronsenii
80. Thin hair-like elements 40–300 μm long (Fig. 5B) sprouting from the hyphae of the cortex of the stipe. Pileus very pale brown to light grey, dark grey or dark greyish brown. Lamellae white to greyish. On *Rubus* roots, on dead culms of *Scirpus holoschoenus* *M. scirpicola*
79. Pileus with bluish, violaceous or vinaceous colours and tints.
89. Pileus with violaceous or vinaceous colours and tints.
90. Pileus violaceous grey to fuscous on the centre, then pale brownish grey. Lamellae concolorous or white. Flesh grey. Stipe dark grey, blackish, bluish grey. Cheilocystidia and pleurocystidia fusiform, subcylindrical, clavate, mucronate with a neck (some with 2 or 3 necks) or apex broadly rounded. Hyphae of the pileipellis 2.2–3.5 μm wide. Hyphae of the cortex of the stipe diverticulate. Scattered to caespitose on *Alnus* logs. USA *M. alnicola*
90. Pileus brownish black with vinaceous or violaceous tints. Lamellae grey. Flesh white. Stipe black-brown with vinaceous or violaceous tints. Cheilocystidia and pleurocystidia clavate, fusiform with rounded apex, smooth. Hyphae of the pileipellis 2–6 μm wide. Hyphae of the cortex of the stipe smooth. Gregarious on mossy, decayed stumps of *Picea*
M. atrovinosa
89. Pileus with bluish colours and tints.
91. Pileus 20–50 mm, dark blackish fuliginous, then pale grey. Lamellae whitish to pale cinereous. Flesh cartilaginous, watery grey; odour pungent, yeast-like; taste mild. Stipe 2–6 mm broad, darker reddish brown below. Spores ellipsoid, 6.3–7.2 μm long. Hyphae of the pileipellis and of the cortex of the stipe embedded in gelatinous matter, occasionally with excrescences. Caespitose, forming dense clusters on decayed conifer logs and stumps. USA *M. overholtsii*
91. Pileus 8–14 mm, black, brown black to bluish black. Lamellae pale grey to ochraceous grey. Flesh grey-brown; odour and taste absent. Stipe 0.9–1.1 mm broad, bluish black, blackish brown, grey-brown. Spore broadly ellipsoid, 7.5–9 μm long. Hyphae of the pileipellis and of the cortex of the stipe not embedded in gelatinous matter, covered with simple, furcate, branched excrescences. Solitary or in small clusters on woody residue of burned-down *Robinia pseudoacacia*
M. hausknechtii
78. Spores more than 10 μm long.
92. Pileus grey-brown, grey, greyish black, violaceous grey, with grey colours and tints.

93. Stipe without olive, yellow or yellowish tints.
94. Hyphae of the pileipellis 1.5–4.5 μm wide.
95. Spores 7.6–11.6 μm long.
96. Pileus up to 25 mm, blackish brown, dark violaceous grey, greyish black, dark grey-brown.
97. Cheilocystidia (all the following shapes could be seen on one fruit-body) lageniform, sublageniform, fusiform, subclavate, subcylindrical, cylindrical-subfusiform.
98. Stipe 40–60 mm long, dark grey, almost blackish with distinct bluish grey cast. Pileus dark violaceous grey to fuscous. Flash grey. Lamellae grey white. Spores 4.7–5.6 \times 9–10.7 μm . Cheilocystidia fusiform, sublageniform, subcylindrical, clavate, mucronate or apex broadly rounded. Scattered to caespitose on *Alnus* logs. USA
M. alnicola
98. Stipe 80–160 mm long, cartilaginous, blackish brown to pale, becoming stained with reddish brown spots. Pileus with or without abrupt umbo, blackish brown. Flesh dingy reddish brown, dingy grey-brown. Lamellae dingy grey. Spores 6.2–7.2 \times 9.4–10.7 μm . Cheilocystidia lageniform, fusiform, subclavate, with simple (or some with furcate) neck. Scattered to gregarious among *Sphagnum* in bogs. USA *M. praelonga*
97. Cheilocystidia lageniform (at times with a furcate neck), 45–63 μm long. Pileus 8–12 mm, with small umbo, dark grey brown. Lamellae whitish. Pileus dark grey brown, minutely and sparsely puberulous. Hyphae of the cortex of the stipe 1.3–3.5 μm wide. Terminal cells 2.5–3.5 \times 45 μm , diverticulate, with excrescences 4.5–20 μm long. On moss-covered coniferous logs *M. abietina*
96. Pileus up to 35 mm, black when young, fuliginous, darker to sepia brown, without reddish brown tints. Lamellae darkish grey, grey-brown. Flesh whitish, watery sepia brown; odour acidulous or raphanoid; taste mild to raphanoid. Hyphae of the pileipellis 1.8–4.5 μm wide, tending to be gelatinized. On lawns, meadows and grassy road-sides *M. aetites*
95. Spores 9.5–13(–17) μm long, elongate ellipsoid to subcylindrical. Pileus 6–13 mm, with a distinct umbo, brown cream, whitish grey, grey cream. Lamellae up to 5 mm broad, white, clear grey. Flesh white; odour raphanoid. Cheilocystidia lageniform, fusiform, apex narrowed into a slender neck. Hyphae of the cortex of the stipe 1.5–6 μm wide. On stumps and dead branches of *Alnus viridis* *M. alnetorum*
94. Hyphae of the pileipellis 1.8–7 μm wide.
99. Cheilocystidia 25–85 μm long, fusiform, clavate, subcylindrical, apically rounded or mucronate, with a shorter or longer neck, or with excrescences.
100. Lamellae up to 4.5 mm broad, white, dingy white, pale sepia brown. Flesh with taste indistinctive or raphanoid. Stipe brown, dark sepia brown, often exuding copious watery fluid. Spores ellipsoid to cylin-

drical. Hyphae of the cortex of the stipe sparsely covered with simple to branched excrescences. On debris of various deciduous trees

M. abramsii

100. Lamellae up to 3 mm broad, fairly dark, sepia tinged grey-brown. Flesh with disagreeable taste. Stipe grey-brown to sepia brownish, suffused with a lilaceous tint. Spores ellipsoid. Hyphae of the cortex of the stipe occasionally with few coarse excrescences or smooth. On moss covered wood, fallen branches, among grass and moss

M. leptocephala

99. Cheilocystidia 50–103 μm long, fusiform, smooth. Pileus up to 20 mm. Stipe pale grey at the apex, darker grey downwards. Hyphae of the pileipellis 2.7–6.3 μm wide; terminal cells 2.5–24 \times 45–70 μm , subcylindrical, fusiform, clavate, variously shaped, covered with coarse excrescences. Hyphae of the cortex of the stipe sparsely diverticulate. Terrestrial among grass and fallen leaves under *Salix* . . . *M. austera*

93. Stipe olive, yellow to pale yellow, dark yellowish brown, shiny. Pileus 15–17 mm, dark grey or olive grey. Lamellae white to pale yellow, up to 3.5 mm broad. Flesh with strongly nitrous odour; taste sweetish. Cheilocystidia 80–110 μm long. Hyphae of the pileipellis up to 5 μm wide. Caespitose, on needles of *Pinus pinaster* *M. gilvipes*
92. Pileus dark sepia brown, black to bluish black, blackish brown, without grey colours and tints.

101. Pileus up to 55 mm, dark sepia brown, black to bluish black. Flesh blackish brown under the cuticle; odour absent. Stipe black to bluish black, dark sepia brown. Cheilocystidia and pleurocystidia fusiform, ellipsoid, ovoid, lageniform, apex with or without neck. Hyphae of the pileipellis 1.8–9 μm wide, somewhat gelatinized. On humus or mixed coniferous and hardwood forest. USA and Canada

M. coracina

101. Pileus up to 12 mm, blackish brown, not pallescent. Odour alkaline. Stipe blackish brown. Cheilocystidia and pleurocystidia cylindrical or subclavate, subfusiform, with abruptly tapered apex or a shorter or longer neck. Hyphae of the pileipellis 2.7–4.5 μm wide. In thin woods and open places. USA *M. vexans*

77. Pileus with olivaceous or yellowish tints.

102. Hyphae of the pileipellis not embedded in gelatinous matter.

103. Pileus yellow or green with olivaceous tint.

104. Pileus yellow olivaceous or brownish olivaceous, lubricous when wet. Lamellae yellowish to olivaceous. Stipe yellow olivaceous, brownish olivaceous. Cheilocystidia fusiform to lageniform with a long acute neck, sometimes distinctly thick-walled, often covered by resinous yellowish material at the apex. On fallen leaves of *Quercus ilex* subsp. *ballota*

M. gladiocystis

104. Pileus 15–17 mm, dark grey or olive grey. Lamellae white to pale yellow, up to 3.5 mm broad. Flesh with strongly nitrous odour; taste sweetish. Stipe shiny, olive, yellow to pale yellow. Spores ellipsoid to subcylindrical.

- drical. Cheilocystidia 80–110 μm long. Hyphae of the pileipellis up to 5 μm wide. Caespitose, on needles of *Pinus pinaster* *M. gilvipes*
103. Pileus 6–10 mm, bright yellow amber colour then yellowish red-brown. Lamellae white. Flesh without odour; taste absent. Stipe yellow to ochraceous. Spores ellipsoid. Cheilocystidia 30–50 μm long. Hyphae of the pileipellis 1.8–2.2 μm wide. Scattered, found on *Larix* *M. lutea*
102. Hyphae of the pileipellis embedded in gelatinous matter, 3–5 μm wide. Pileus yellow olivaceous or brownish olivaceous, lubricous when wet. Lamellae yellowish to olivaceous. Stipe yellow olivaceous, brownish olivaceous. Cheilocystidia fusiform to lageniform with a long acute neck, sometimes distinctly thick-walled, often covered by resinous yellowish material at the apex. On fallen leaves of *Quercus ilex* subsp. *ballota* *M. gladiocystis*
56. Cheilocystidia fusiform, lageniform, clavate, cylindrical, smooth, with rounded or mucronate apex, neck-like apical extension, along with others, forked with three or more excrescences, or branched (Fig. 1) Key 3

Key 3

105. Pleurocystidia absent.
106. Spores less than 11 μm long.
107. Pileus grey, brown, with avellaneous, vinaceous, reddish, yellowish tints.
108. Spores less than 10 μm long.
109. Pileus and stipe with avellaneous and vinaceous tints.
110. Pileus avellaneous, 6–10 mm, not umbonate. Stipe avellaneous, 30 mm long. Lamellae 18, white, edge convex. Spores broadly ellipsoid, 5.5–6.3 \times 8.5–8.8 μm . Cheilocystidia 16–44 μm long. Terminal cells of the hyphae of the cortex of the stipe diverticulate, curving outward. Densely caespitose on a dead basam fir log. USA *M. avellanea*
110. Pileus pale greyish brown, becoming spotted with vinaceous brown stains, umbonate. Stipe watery whitish, pale greyish brown, becoming spotted with vinaceous red stains. Lamellae whitish with some pinkish tints, spotted with vinaceous stains. Spores 5.8–6.6 \times 8.8–9.4 μm , ellipsoid. Cheilocystidia 30–70 μm long. Growing on a deciduous tree stump
M. obtecta
109. Pileus reddish brown, slightly umbilicate. Stipe reddish brown. Lamellae white. Hyphae of the pileipellis 2–7 μm wide, the narrower ones smooth, the broader ones sparsely covered with sometimes strangely shaped excrescences. On fallen twigs of deciduous trees. USA *M. pectinata*
108. Spores more than 10 μm long.
111. Stipe conspicuously striate to coarsely grooved, grey to brownish grey–silvery, 1.5–6(–7) \times 50–180 mm. Pileus up to 60 mm wide, grey-brown, dark reddish brown, pale yellowish brown. Lamellae 23–40, white to greyish, brownish with red-brown stains, up to 3.5 mm broad. Cheilocystidia fusiform, lageniform, subcylindrical, with apical or lateral excrescences or smooth. Hyphae of the pileipellis 1.8–5(–8) μm wide
M. polygramma f. *polygramma*

111. Stipe not striate, avellaneous or concolorous to the pileus, 1–2 × 10–70 mm. Pileus up to 20 mm wide, dark sepia-brown to olive-brown, fumose avellaneous, watery greyish brown. Lamellae white to pale grey. Cheilocystidia 27–30 μm long. Hyphae of the pileipellis 1.8–4.5 μm wide. Gregarious on fallen conifer logs and debris. USA *M. alcaliniformis*
107. Pileus grey, brown, without avellaneous, vinaceous, reddish, yellowish tints.
112. Spores 8.8–10.5 μm long.
113. Basidiomata scattered to gregarious.
114. Lamellae staining reddish, brown in age or when bruised. Pileus 10–30 mm, black to fuscous, blackish grey or ash-grey. Stipe pale greyish white, staining reddish, brown in age or when bruised. Basidia 30–35 μm long. Hyphae of the pileipellis embedded in gelatinous matter. Hyphae of the cortex of the stipe 1.5–3.5 μm wide. Gregarious, growing under conifers
M. subvitrea
114. Lamellae dark grey. Pileus up to 45 mm, dark grey to almost blackish, with broad, low umbo. Stipe blackish grey, then more brown to grey-brown. Basidia 35–45 μm long. Hyphae of the pileipellis not embedded in gelatinous matter. Hyphae of the cortex of the stipe 1–2 μm wide. Scattered, growing on vegetable debris (containing decayed *Picea* needles) among grass under *Betula* *M. tristis*
113. Basidiomata densely caespitose, on tree stumps and decaying wood. Pileus 10–45(–55) mm, brown, pale brown to dark watery grey. Lamellae white to pale grey, sometimes tinged flesh colour. Stipe hyaline grey, pale brown to tawny below. Spores ellipsoid or broadly ellipsoid. Basidia 27–35 μm long. Cheilocystidia covered with unevenly spaced, coarse, variously shaped excrescences (or smooth). Hyphae of the pileipellis 1.8–5 μm wide
M. pseudoinclinata
112. Spores 6–7 × (6–)7–8.5 μm long, broadly ellipsoid to subglobose. Pileus 15–30 mm, umbonate, brown-grey, black-brown. Lamellae 28–32, white to grey-white. Stipe grey to dark grey. Hyphae of the pileipellis embedded in gelatinous matter, or not. Terminal cells of the hyphae of the cortex of the stipe diverticulate, forked or branched or apically coiled, 3.5–9 μm wide. Gregarious on decayed woody debris, *Quercus* *M. polygramma* f. *pumila*
106. Spores more than 11 μm long.
115. Stipe not striate.
116. Pileus without thin-hair like elements (Figs. 5 & 6) sprouting from the hyphae of the cortex of the stipe.
117. Spores 4–8 μm wide.
118. Pileus brown, grey, black, white to beige, without argillaceous, yellowish, olive, green, avellaneous, reddish tints.
119. Stipe brown, grey, without bluish, silvery, reddish, lilaceous and vinaceous tints.
120. Pileus sepia brown, brown cream, grey-brown, whitish greyish, grey cream.
121. Spores 9–3(–17) μm long.

122. Pileus 6–13 mm, brown-cream, whitish greyish, clear grey. Flesh white; odour raphanoid; taste similar, weak. Stipe greyish to grey-brown. Spores (5.5–)6–7.5 × 9.5–13(–17) μm . Hyphae of the pileipellis 1.5–4 μm wide. Hyphae of the cortex of the stipe 1.5–6 μm wide. On stumps and dead branches of *Alnus viridis*
M. alnetorum
122. Pileus 8–35 mm, sepia-brown, grey-brown. Lamellae white to pale sepia-brown. Flesh with raphanoid or nitrous odour, or of chlorine; taste indistinctive or raphanoid. Stipe dark grey-brown to dark sepia brown, exuding copious watery fluid when fresh. Spores 4–6(–6.5) × 9–12.5(–13.8) μm . Hyphae of the pileipellis 1.8–7 μm wide. Hyphae of the cortex of the stipe 1.5–3.5 μm wide. On debris of various deciduous trees *M. abramsii*
121. Spores 8.5–11(–12) μm long. Pileus up to 35 mm, with broad umbo, fuliginous, darker to sepia brown, grey-brown. Lamellae dark grey to grey-brown. Flesh whitish; odour acidulous or raphanoid; taste mild to raphanoid. Stipe dark sepia brown, pale to watery grey. Hyphae of the cortex of the stipe 1–4 μm wide, sparsely covered with simple to branched excrescences. Scattered to gregarious on lawns, meadows and grassy road-sides *M. aetites*
120. Pileus 20 mm, greyish, sulcate. Lamellae 20, white, more greyish at the base. Flesh pallid. Stipe mouse-greyish. Spores 5.8–7.2 × 9–11.6 μm . Hyphae of the pileipellis 2.7–4.5 μm wide. Hyphae of the cortex of the stipe 1.8–3.5 μm wide. In groups on decayed stumps. India
M. bathyrrizha
119. Stipe brown, grey with bluish, silvery, reddish, lilaceous and vinaceous tints.
123. Stipe brown, grey with reddish, lilaceous and vinaceous tints.
124. Stipe grey flesh-coloured, grey lilac, reddish brown, vinaceous brown. Pileus 10–40 mm, white to beige, staining reddish brown with age. Lamellae whitish to pale brown with red-brown spots. Flesh with odour raphanoid or absent; taste mild, bitter or raphanoid. Cheilocystidia apically mucronate, with a simple or branched neck. Hyphae of the pileipellis 2–10 μm wide. Hyphae of the cortex of the stipe 2.5–5(–8) μm wide; terminal cells 4.5–16 μm wide, irregularly clavate, straight to curved, diverticulate. Scattered or gregarious under conifers but also in mixed woods *M. zephirus*
124. Stipe grey-brown, brownish, suffused with a lilaceous tint. Pileus up to 25 mm, dark grey, sepia brown, dark brown, black-brown. Lamellae fairly dark, sepia tinged grey-brown. Flesh watery sepia brown to white; odour nitrous or alkaline, taste disagreeable. Hyphae of the cortex of the stipe 1.8–4 μm wide; terminal cells 4–20 μm wide, inflated, variously shaped and branched, cystidia-like, curved outwards, apically geniculate. Solitary, gregarious or in small groups on moss covered wood, fallen branches, among grass *M. leptocephala*

123. Stipe bluish grey, silvery grey when dry, cartilaginous, 50–100 mm long. Pileus 10–25 mm, obtusely umbonate, bluish grey, silvery grey when dry. Spores $4.5\text{--}5.5(-6) \times 10(-12)\text{--}13(-14) \mu\text{m}$. Basidia $7 \times 36\text{--}44 \mu\text{m}$. Hyphae of the pileipellis $1.3\text{--}3.5 \mu\text{m}$ wide. Hyphae of the cortex of the stipe $2.2\text{--}3.2 \mu\text{m}$ wide. Subcaespitose, on debris in forest of Douglas fir. USA *M. griseiconica*
118. Pileus brown, grey, with argillaceous, yellowish, olive, green, avellaneous, reddish tints.
125. Pileus grey-green, olive-green, olive-brown, yellowish olive, avellaneous, dark reddish brown. Lamellae 16–30, whitish, greyish white with grey-green edge. Flesh white. Stipe concolorous with pileus, with yellowish tinge. Spores $6\text{--}8 \times 9.1\text{--}11(-13) \mu\text{m}$. Hyphae of the pileipellis and of the cortex of the stipe not embedded in gelatinous matter. Subcaespitose to solitary on fallen branches or decayed wood of coniferous trees
M. viridimarginata
125. Pileus dark sepia brown, pallescent, argillaceous, yellowish grey, grey. Lamellae 14–24, white, whitish, grey. Flesh whitish, grey-white, creamy grey. Spores $5.4\text{--}6.3 \times 9.2\text{--}11.6 \mu\text{m}$. Hyphae of the pileipellis and of the cortex of the stipe embedded in gelatinous matter. On coniferous wood of *Abies* *M. stipata*
117. Spores $(6.5\text{--})7\text{--}10$ (11) μm wide.
126. Pileus 5–11 mm, with a small umbo, white, somewhat creamy or with watery greyish yellow centre. Stipe 10–25 mm long, drying shiny, white, yellowish below and with age. Spores $7.2\text{--}9.4 \times 12.5\text{--}16.1 \mu\text{m}$. Cheilocystidia clavate, covered with widely spaced, very coarse, simple to branched, curved excrescences. Hyphae of the pileipellis $2.7\text{--}4.5 \mu\text{m}$ wide. On the roots and the bases of the stems of *Calamagrostis epigeios*
M. corrugans
126. Pileus 10–35(–45) mm, acutely or broadly umbonate, black-brown, dark sepia brown, frequently becoming rusty-spotted when old. Stipe 30–140 mm long, dark steel-blue then concolorous with the pileus. Spores $(6.5\text{--})7\text{--}10(-11) \times 10.3\text{--}16(-17.5) \mu\text{m}$. Cheilocystidia clavate, obpyriform, lageniform, apically broadly rounded or into a simple or furcate neck, or covered with several coarse excrescences. Hyphae of the pileipellis $1.8\text{--}6 \mu\text{m}$ wide. Solitary or caespitose on dead coniferous wood
M. silvae-nigrae
116. With thin hair-like elements (Fig. 5A) sprouting from the hyphae of the cortex of the stipe, $4\text{--}11 \times 55\text{--}200 \mu\text{m}$. Pileus 3–8 mm, ochraceous yellow with slight greenish tint. Stipe hyaline ochre, hyaline brown-grey. Spores $5\text{--}5.5(-6) \times 9\text{--}11 \mu\text{m}$. Cheilocystidia irregularly clavate, swollen, apically covered with simple, flexuose, branched or irregular finger-like excrescences. Caulocystidia clavate, diverticulate, $4\text{--}11 \times 40\text{--}90 \mu\text{m}$. On decayed needles of *Abies alba* *M. pilosella* var. *heterocystidiosa*
115. Stipe conspicuously striate to coarsely grooved, grey to brownish grey silvery, $1.5\text{--}6(-7) \times 50\text{--}180$ mm. Pileus up to 60 mm wide, grey-brown, dark reddish

- brown, pale yellowish brown. Lamellae 23–40, white to greyish, brownish with red-brown stains, up to 3.5 mm broad. Cheilocystidia fusiform, lageniform, subcylindrical, with apical or lateral excrescences or smooth. Hyphae of the pileipellis 1.8–5(–8) μm wide *M. polygramma* f. *polygramma*
105. Pleurocystidia present.
127. Pileus with grey, brown, black, bluish, violaceous or vinaceous colours and tints, without olivaceous or yellowish tints.
128. Spores more than 10 μm long.
129. Spores ellipsoid, elongate ellipsoid, subcylindrical, cylindrical.
130. Pileus brown, brownish, grey-brown, blackish brown, dark grey, not suffused with violaceous, vinaceous, lilaceous or flesh-coloured tints.
131. Spores less than 12 μm long.
132. Pileus 35–45 mm.
133. Basidiomata scattered to gregarious.
134. Pileus with broad umbo, fuliginous darker sepia brown to greyish, sepia grey-brown. Lamellae darkish grey, grey-brown. Flesh whitish, watery sepia brown; odour acidulous or raphanoid; taste mild to raphanoid. Spores 8.5–11(–12) μm long. On lawns, meadows and grassy roadsides *M. aetites*
134. Pileus blackish brown, grey-brown to pale grey-brown, fading to ash grey. Lamellae pallid to dark ash grey. Flesh greyish to whitish; odour absent; taste mild. Spores 9–10 μm long. On fallen needles and debris in coniferous trees. USA *M. robusta*
133. Basidiomata caespitose. Pileus evenly coloured, warm beige-brown. Lamellae white, greyish whitish becoming flushed with pink. Stipe horn-grey, from the base upwards turning reddish brown. Cheilocystidia fusiform, subclavate, smooth or apically branched with coarse excrescences. Pleurocystidia more slender, smooth. Hyphae of the pileipellis much branched to smooth. Growing on and around *Picea* *M. valida*
132. Pileus 8–25 mm.
135. Pileus dark brown, dark grey-brown, greyish brown, blackish brown, without violaceous tints.
136. Basidiomata scattered to gregarious.
137. Pileus 15–20 mm, with or without abrupt umbo, blackish brown to pale grey-brown. Lamellae dingy greyish. Flesh dingy reddish brown, dingy grey-brown, pliant; odour and taste indistinct. Stipe 1–2 \times 80–160 mm, cartilaginous, blackish brown to pale, becoming stained with reddish brown spots below. Cheilocystidia lageniform, fusiform, subclavate, with a simple or furcate neck. Scattered to gregarious among *Sphagnum* in bogs. USA *M. praelonga*
137. Pileus 8–12 mm, with small umbo, dark grey-brown. Lamellae whitish. Flesh dark grey-brown; odour and taste unknown. Stipe 1.5 \times 35 mm, dark grey-brown, minutely and sparsely puberulous. Cheilocystidia lageniform, stalked or not, smooth, at time with a furcate neck. Scattered on moss-covered coniferous log
M. abietina

136. Basidiomata caespitose. Pileus 3–17 mm, dark brown, finally nearly whitish. Lamellae whitish. Stipe 0.5–2 × 35–75 mm, greyish brown, later beige. Spores 4.5–5.5 × 8–11 μm . Hyphae of the pileipellis and of the cortex of the stipe not embedded in gelatinous matter, with excrescences up to 15 μm long. Caulocystidia 9 × 72 μm , clavate to cylindrical, diverticulate. On stems and dead culms of *Scirpus holoschoenus*
M. vicina
135. Pileus 10–25 mm, dark violaceous grey to fuscous. Lamellae 20–30, greyish white. Flesh grey; odour and taste mild. Stipe very dark grey, almost blackish, with distinctly bluish grey cast. Spores 9–10.7 μm long. Cheilocystidia fusiform, sublageniform, subcylindrical, clavate, mucronate or with one, two or three necks, or apex broadly rounded. Scattered to caespitose on *Alnus* logs. USA *M. alnicola*
131. Spores more than 12 μm long.
138. Pileus up to 35 mm.
139. Pileus sepia brown, grey-brown. Lamellae 18–34, white to pale sepia brown. Flesh whitish; odour raphanoid or nitrous, also of chlorine; taste indistinctive or raphanoid. Stipe dark grey-brown to dark sepia brown, exuding copious watery fluid when fresh. Spores 4–6(–6.5) × 9–12.5(–13.8) μm , ellipsoid to cylindrical. Hyphae of the pileipellis 1.8–7 μm wide. Solitary, scattered to subfasciculate on debris of various deciduous trees *M. abramsii*
139. Pileus black when young, fuliginous, darker to sepia brown, without reddish brown tints. Lamellae 15–24, darkish grey, grey-brown. Flesh whitish, watery sepia brown; odour acidulous or raphanoid; taste mild to raphanoid. Spores 5–7.1 × 8.5–11(–12) μm , ellipsoid. Hyphae of the pileipellis 1.8–4.5 μm wide. Scattered to gregarious on lawns, meadows and grassy road-sides *M. aetites*
138. Pileus 6–13 mm, brownish cream, whitish greyish, clear grey. Flesh white; odour raphanoid; taste similar, weak. Stipe greyish to grey-brown. Spores (5.5–)6–7.5 × 9.5–13(–17) μm . Hyphae of the pileipellis 1.5–4 μm wide. Hyphae of the cortex of the stipe 1.5–6 μm wide. Solitary, gregarious or caespitose on stumps and dead branches of *Alnus viridis*
M. alnetorum
130. Pileus suffused with violaceous, vinaceous, lilaceous or flesh-coloured tints.
140. Flesh with raphanoid, nitrous or alkaline odour.
141. Flesh with nitrous or alkaline odour; taste disagreeable. Pileus dark grey, sepia brown. Lamellae fairly dark, sepia tinged grey-brown. Stipe grey-brown to sepia brownish, suffused with a lilaceous tint. Spores 9.4–11.2(–13.5) μm long. Hyphae of the cortex of the stipe 1.8–4 μm wide, occasionally with a few coarse excrescences or smooth. On moss-covered wood, fallen branches, among grass and moss . . . *M. leptcephala*
141. Flesh with raphanoid odour; taste mild, bitter or raphanoid. Pileus white to beige, clear brown, stained reddish brown with age. Lamellae white to whitish, pale brown with red-brown spots. Stipe grey flesh-coloured, grey-

- lilac, reddish brown, vinaceous brown, finely floccose-puberulous. Spores 9–12(–16.5) μm long. Hyphae of the cortex of the stipe 2.5–5(–8) μm wide, covered with simple to branched excrescences. Under conifers, also in mixed forests *M. zephirus*
140. Flesh without odour. Pileus 30 mm, grey-brown suffused with purplish or violaceous tints. Lamellae whitish, cinereous, reddish-spotted. Stipe dark grey to blackish suffused with vinaceous tints, base purplish or reddish brown. Spores 8.1–10.7 μm long. Hyphae of the pileipellis 1.8–3.5 μm wide, with short cylindrical excrescences or smooth. On stumps and fallen branches of deciduous trees. USA, Canada *M. tenuicola*
129. Spores broadly ellipsoid.
142. Spores 5.6–7.2 \times 8.1–10.3 μm . Pileus up to 20 mm, murinous, ash grey to whitish grey. Lamellae whitish to grey. Stipe 1–2 \times 30–50 mm, more or less concolorous with the pileus. Hyphae of the cortex of the stipe 2.5 μm wide, glabrous or sparsely diverticulate, not gelatinized. Scattered, growing in coniferous forests *M. murina*
142. Spores 7–10(–11) \times 10.3–16(–17.5) μm . Pileus black-brown, dark sepia brown, frequently becoming rusty-spotted. Lamellae white to brownish grey, stained with red brown spots. Stipe dark steel-blue to pale concolorous. Hyphae of the cortex of the stipe 1.8–3.5 μm wide, diverticulate, weakly gelatinized. Solitary or caespitose on dead coniferous wood
M. silvae-nigrae
128. Spores up to 10 μm long.
143. Spores more than 6 μm long.
144. Pileus dingy greyish brown, reddish grey-brown, often stained reddish brown or brown vinaceous. Lamellae grey-white to brownish, spotted with reddish brown. Spores 3.7–4 \times 6.3–7.3 μm , ellipsoid. Hyphae of the pileipellis 1.8–4.5 μm wide, roughened or covered with a few scattered excrescences, embedded in gelatinous matter. On decayed wood of deciduous logs. USA, Canada *M. semivestipes*
144. Pileus brown-grey, black-brown. Lamellae white to grey-white. Spores 6–7 \times 7–8.8 μm , broadly ellipsoid to subglobose. Hyphae of the pileipellis 1.8–3.5 μm wide, diverticulate, embedded or not in gelatinous matter. On woody decayed debris, *Quercus* *M. polygramma* f. *pumila*
143. Spores smaller, 4.9–5.4 μm long. Pileus 11–18 mm, with a small pronounced or depressed umbo, pale beige to beige-brown. Lamellae pale creamy beige with pinkish tints. Cheilocystidia clavate or irregularly shaped, covered with simple to furcate, cylindrical, inflated excrescences. Hyphae of the cortex of the stipe smooth for the greater part, also with excrescences, embedded in gelatinous matter. Fasciculate in forests of *Quercus incana* and *Rhododendron arboreum* *M. coalita*
127. Pileus with olivaceous or yellowish tints.
145. Pileus 6–10 mm, bright yellow amber colour then yellowish red-brown. Lamellae white. Flesh without odour; taste absent. Stipe yellow to ochraceous. Spores ellipsoid. Cheilocystidia 30–50 μm long. Hyphae of the pileipellis 1.8–2.2 μm wide. Scattered, found on *Larix* *M. lutea*

- 145. Pileus 15–17 mm, dark grey or olive grey. Lamellae white to pale yellow, up to 3.5 mm broad. Flesh with strongly nitrous odour; taste sweetish. Stipe shiny, olive, yellow to pale yellow. Spores ellipsoid to subcylindrical. Cheilocystidia 80–110 μm long. Hyphae of the pileipellis up to 5 μm wide. Caespitose, on needles of *Pinus pinaster* *M. gilvipes*
- 55. Hyphae of the cortex of the stipe smooth (Fig. 4A) (some species with widely spaced, almost very scattered, excrescences) Key 4

Key 4

- 146. Cheilocystidia fusiform, lageniform, clavate, cylindrical, smooth, with rounded or mucronate apex, apical extension like a neck; neither forked nor diverticulate nor branched (Fig. 2).
- 147. Pleurocystidia present.
- 148. Spores up to 10 μm long.
- 149. Pileus with brown, black, grey colours without vinaceous, violaceous and yellow tints.
- 150. Hyphae of the cortex of the stipe lacking thin hair-like elements 30–300 μm long or thick-walled setae (Figs. 5 & 6).
- 151. Hyphae of the pileipellis not embedded in gelatinous matter.
- 152. Pileus grey, watery grey, dark grey, ash-grey, cream-grey, without brown or brownish tints.
- 153. Spores 7.2–10 μm or 8.1–10 μm long.
- 154. Spores 4.5–5.4(–6.5) \times 8.1–10(–11) μm . Pileus dark watery grey, fading very pale ash grey. Flesh watery greyish; odour and taste absent. Stipe 90–150 mm long. Hyphae of the cortex of the stipe 1.5–4 μm wide; terminal cells up to 21.5 μm wide, strikingly inflated and variously shaped. Gregarious in clumps of the fern *Polysticum munitum* and on fallen petioles. USA *M. fragillima*
- 154. Spores (4.5–)4.9–6.3 \times 7.2–10 μm . Pileus 9–30 mm, dark pure grey, ash grey, sandy grey. Flesh pallid grey; odour weakly raphanoid; taste none or weakly sweet. Stipe 15–45 mm long. Hyphae of the cortex of the stipe 2.5–6 μm wide; terminal cells like the hyphae, diverticulate. Solitary to gregarious, on dead stick, branches and trunks of coniferous trees. USA *M. subcana*
- 153. Spores 4.5–6 \times 9–7 μm . Pileus 7–15 mm, grey, cream grey. Lamellae narrowly adnate, grey. Stipe apex pale grey, grey-brown below. Cheilocystidia and pleurocystidia lageniform, smooth. Terminal cells of the hyphae of the cortex of the stipe clavate, 5–10 \times 45–110 μm , smooth or with few excrescences. Gregarious, growing among needles under *Juniperus communis* *M. parca*
- 152. Pileus grey with brown or beige brownish tints.
- 155. Pileus 15–30 mm, brownish beige. Stipe 2–3 \times 40–50 mm, pallid brownish, apex whitish. Cheilocystidia subfusiform, sublageniform, hardly protruding, smooth. Caespitose on the fallen decayed branches of broad-leaved trees *M. verna*

155. Pileus 6–10 mm, pale smoky grey-brown. Stipe 0.5 × 40–50 mm, pale smoky grey-brown. Cheilocystidia fusiform, smooth. Scattered, growing on fallen dead wood in a wet thicket *M. subfumosa*
151. Hyphae of the pileipellis embedded in gelatinous matter.
156. Pileus with a broad, but little pronounced, umbo or with a pointed umbo, sericeous, dark grey-brown to dark chestnut-brown. Lamellae 19–40, up to 5 mm broad, pale grey brown or cinereous or white turning pink. Flesh whitish; odour nitrous; taste absent, faint or disagreeable. Stipe 1.5–3.5 × 40–70 mm, sericeous, grey-brown. Spores 3.6–5.8 × 7.2–9.6 μm . Cheilocystidia lageniform, fusiform, clavate, subcylindrical, apex gradually or abruptly narrowed into a longer or shorter neck, or rostrate to mucronate, rarely without a neck. Single or in small groups on fallen or even buried cones of *Picea* *M. plumipes*
156. Pileus dark blackish fuliginous, becoming pale grey to pallid. Lamellae 23–27, whitish to pale cinereous, staining yellow when bruised. Flesh watery grey; odour pungent, yeast-like; taste mild. Stipe 2–6 × 40–100 mm, darker, reddish brown below. Cheilocystidia subcylindrical to sub-fusiform, smooth. Caespitose, forming dense clusters on decayed conifer logs and stumps. USA *M. overholtsii*
150. Hyphae of the cortex of the stipe with thin hair-like elements 30–300 μm long or thick-walled setae (Figs. 5 & 6).
157. Thin hair-like elements 40–300 μm long (Fig. 5B) sprouting from the hyphae of the cortex of the stipe. Pileus very pale brown to light grey, dark grey or dark greyish brown. Lamellae white to greyish. On *Rubus* roots, on dead culms of *Scirpus holoschoenus* *M. scirpicola*
157. Thin hair-like elements 30–70 μm long with widened base along with thick-walled setae 25–130 μm long (Fig. 6). Pileus brown with white brownish margin. Lamellae white to whitish. On the ground, on rotten grass debris, in close proximity to wood *M. spinulosipes*
149. Pileus with brown, black, grey colours suffused with vinaceous, violaceous or yellow tints.
158. Pileus with a small blackish grey or black umbo, (dark) greyish yellow-brown. Lamellae 18–32, white to grey-white. Flesh white, grey-white under the cuticle; odour alkaline; taste none or weakly acidulous. Stipe brownish, brown, dark or black-brown below. Spores (6.5–)7–7.5 × 8.5–9 μm (4-spored), ellipsoid to broadly ellipsoid. Cheilocystidia flexuose, some coarse clavate, smooth, with large protuberances. Hyphae of the cortex of the stipe 1.5–4.5 μm wide; terminal cells 2.5–4 × 25–40(–75) μm , flexuose, with large protuberances. Gregarious on sandy ground among needles and leaves, also on decayed stumps *M. maurella*
158. Pileus brownish black with vinaceous or violaceous tints, centre brown-black. Lamellae grey. Flesh white, dark grey under the cuticle. Stipe black-brown with vinaceous or violaceous tints. Spores 5.5–6 × 8–10 μm , ellipsoid to cylindric-ellipsoid. Cheilocystidia fusiform with rounded apex, clavate, smooth. Hyphae of the cortex of the stipe 1–3 μm wide; terminal cells 3–5 ×

- 35–110 μm , clavate, diverticulate. Gregarious on mossy, decayed stumps of *Picea* *M. atrovinosa*
148. Spores more than 10 μm long.
159. Hyphae of the pileipellis not embedded in gelatinous matter.
160. Pileus and stipe with brown, black, grey colours, without vinaceous or violaceous tints.
161. Pileus with black or brown colour.
162. Pileus up to 25 mm, dark grey, sepia brown, dark brown. Lamellae 14–35, fairly dark, sepia tinged grey-brown. Flesh watery sepia brown to white; odour nitrous or alkaline, taste disagreeable. Spores ellipsoid 9.4–11.2 (–13.5) μm long. Caulocystidia 4–20 μm wide, inflated, variously shaped and branched, curved outwards, apically geniculate. On fallen branches, among grass and moss *M. leptcephala*
162. Pileus 20 mm, greyish black, ash black. Lamellae white, glaucescent. Pileus greyish black, ash grey, the base with dingy yellowish fibrils when dried. Spores 7.6–10.5 μm long. Scattered among shrubs on sandy humus soil in coniferous forest. Finland *M. subexcisa*
161. Pileus (without black or brown colour) up to 35 mm, dark watery grey fading to very pale ash grey. Spores 4.5–5.4(–6.5) \times 8.1–10(–11) μm . Flesh watery greyish; odour and taste absent. Stipe 90–150 mm long. Spores 4.5–5.4(–6.5) \times 8.1–10(–11) μm . Hyphae of the cortex of the stipe 1.5–4 μm wide; terminal cells up to 21.5 μm wide, strikingly inflated and variously shaped. Gregarious in clumps on the fern *Polysticum munitum* and fallen petioles. USA *M. fragillima*
160. Pileus and stipe brownish black, black-brown, with vinaceous or violaceous tints. Lamellae grey. Flesh white, dark grey under the cuticle. Spores 5.5–6 \times 8–10(–10.5) μm , ellipsoid to cylindrical-ellipsoid. Cheilocystidia fusiform with rounded apex, clavate, smooth. Hyphae of the cortex of the stipe 1–3 μm wide; terminal cells 3–5 \times 35–110 μm , clavate, diverticulate. Gregarious on mossy, decayed stumps of *Picea* *M. atrovinosa*
159. Hyphae of the pileipellis 1.5–5.5 μm wide, embedded in gelatinous matter. Pileus with a small blackish grey or black umbo, (dark) greyish yellow-brown. Lamellae 18–32, white to grey-white. Flesh white, grey-white under the cuticle; odour alkaline; taste none or weakly acidulous. Stipe brownish, brown, dark or black-brown below. Spores (6–)7.5–8(–8.5) \times (7.5–)9–12 μm (2-spored), ellipsoid to broadly ellipsoid. Cheilocystidia flexuose, some coarse clavate, smooth, with large protuberances. Hyphae of the cortex of the stipe 1.5–4.5 μm wide; terminal cells 2.5–4 \times 25–40(–75) μm , flexuose, with large protuberances. Gregarious on sandy ground among needles and leaves, also on decayed stumps *M. maurella*
147. Pleurocystidia absent.
163. Hyphae of the cortex of the stipe without thin hair-like elements up to 300 μm long.
164. Pileus with grey and brown colour, without violaceous tints.
165. Spores ellipsoid, more than 8 μm long.

166. Spores $4.5-5.4(-6.5) \times 8.1-10(-11) \mu\text{m}$. Pileus 15–35 mm, dark watery grey fading to very pale ash-grey. Flesh watery greyish; odour and taste absent. Stipe pale watery grey. Cheilocystidia lageniform, fusiform, clavate, apex gradually to abruptly narrowed into a neck, or without neck. Terminal cells of the hyphae of the cortex of the stipe up to $21.5 \mu\text{m}$ wide, strikingly inflated and variously shaped. Gregarious, in clumps of the fern *Polysticum munitum* *M. fragillima*
166. Spores $4-6.5 \times (8.1-9.4-11.2(-13.5)) \mu\text{m}$. Pileus up to 25 mm, with or without small to large umbo, dark grey, sepia-brown. Flesh watery sepia-brown; odour nitrous or alkaline; taste disagreeable. Stipe grey-brown to brownish sepia, suffused with a lilaceous tint. Cheilocystidia fusiform, lageniform, clavate, subcylindrical, apex rounded or mucronate, with a shorter or longer neck. Terminal cells of the hyphae of the cortex of the stipe $4-20 \mu\text{m}$ wide, inflated, variously shaped and branched, cystidia-like, curved outwards, apex geniculate. Solitary to gregarious, on moss-covered wood, fallen branches, among grass and moss *M. leptcephala*
165. Spores broadly ellipsoid, $(4.5-5-6 \times (6.5-7.5-8.5)) \mu\text{m}$ long. Pileus 7–11 mm, with a pointed black umbo, watery grey, dark grey. Flesh grey, black grey under the umbo; odour absent or of radish; taste absent. Stipe shining, white then grey-white, $0.5-1.5 \times 40-50 \text{ mm}$. Cheilocystidia flexuose, curved into irregular shapes smooth or with nodulose protuberances, apex rounded (or also forked). Hypae of the pileipellis with excrescences covered by thin glutinous matter. Terminal cells of the hyphae of the cortex of the stipe $2-4 \times 25-60 \mu\text{m}$, flexuose, curved, nodulose, smooth, apex rounded or forked. Five specimen, united at the base, on surfacing root of *Ulmus*
M. fuligineipapillata
164. Pileus dark grey to violaceous brown, grey to brown. Flesh concolorous with the upper surface; odour indistinct; taste slightly bitter, farinaceous. Stipe avel-laneous above, darker below. Spores $6.3-8 \times 10.8-12.5 \mu\text{m}$. Cheilocystidia ampullaceous to lageniform, apex usually drawn out into a slender neck. Hyphae of the pileipellis $1.5-3.5 \mu\text{m}$ wide, diverticulate. Gregarious on decayed hardwood log in pine-hardwood forest. USA . . . *M. avellaneibrunnea*
163. With thin hair-like elements up $300 \mu\text{m}$ long (Figs. 5A, B) sprouting from the hyphae of the cortex of the stipe.
167. Hyphae of the stipe smooth (or with very rare excrescences) with thin-walled hairs (Fig. 5A), $2.5-4 \times 60-160(-310) \mu\text{m}$. Pileus up to 14 mm, white with a slight yellow tint. Lamellae broadly adnate, decurrent with a tooth, white tinged yellowish. Spores ellipsoid, $8.5-10(-11) \mu\text{m}$ long. Caulocystidia $2-6 \times 40-110 \mu\text{m}$, diverticulate. Basidiomata isolated or fasciculate on wood of *Quercus* *M. pilosella* var. *pilosella*
167. Hyphae of the stipe smooth (or with some isolated thick excrescences) with thin-walled hairs (Fig. 5B), $1-1.5 \times 40-300 \mu\text{m}$. Pileus up to 20 mm, very pale brown to light grey, dark grey or dark greyish brown. Lamellae white to greyish. Caulocystidia $4-8 \times 20-50 \mu\text{m}$, covered with irregular excrescences. On *Rubus* roots, on dead culms of *Scirpus holoschoenus* *M. scirpicola*

146. Cheilocystidia, fusiform, lageniform, clavate, cylindrical, smooth, rounded or mucronate apex, with neck-like apical extension, along with others, forked, with three or more excrescences or branched (Fig. 1).
168. Pleurocystidia absent.
169. Spores more than 10 μm long.
170. Pileus with brown, black, grey colours, without argillaceous, yellowish, honey, green, olive and avellaneous tints.
171. Hyphae of the cortex of the stipe not embedded in gelatinous matter.
172. Spores up to 11 μm long.
173. Stipe not grooved, up to 4 mm broad.
174. Pileus fuscous to dark watery grey, brown, dark brown. Lamellae white to pale grey, sometimes with flesh-coloured tinge. Flesh greyish to whitish; odour and taste farinaceous. Stipe hyaline grey, pale brown to tawny below. Basidia 27–35 μm long. Hyphae of the pileipellis 1.8–5 μm wide. Hyphae of the cortex of the stipe 1.5–3.5 μm wide; terminal cells similar, a few diverticulate. Caespitose on tree stumps and decaying wood *M. pseudoinclinata*
174. Pileus with broad, low umbo, very dark grey to almost black. Lamellae dark grey. Flesh dark grey; odour indistinct; taste not recorded. Stipe blackish grey when young, then more brown to grey-brown. Basidia 35–45 μm long. Hyphae of the pileipellis 1.5–3.5 μm wide. Hyphae of the cortex of the stipe 1–2 μm wide; terminal cells 2–6.5 μm wide, covered with simple, cylindrical excrescences 2 \times 2.5 μm . Scattered, growing on vegetable debris (containing decayed *Picea* needles) among grass under *Betula* *M. tristis*
173. Stipe grooved, 1.5–6(–7) mm broad, cartilaginous, grey to brownish grey, silvery. Pileus up to 60 mm, with more or less pronounced umbo, brown, sepia brown, dark reddish brown. Lamellae 23–40, up to 3.5 mm broad, white to greyish, brownish, with red-brown stains. Flesh whitish to brownish; odour pleasant or disagreeable; taste raphanoid or farinaceous. Cheilocystidia fusiform, lageniform, utriform, subcylindrical or irregularly shaped, smooth or with a few coarse, unevenly, spaced apical or lateral excrescences. Hyphae of the pileipellis 1.8–5(–8) μm wide
M. polygramma f. *polygramma*
172. Spores more than 11 μm long.
175. Stipe not grooved, 0.5–3.5 mm broad.
176. Pileus up to 25 mm. Lamellae 14–35, fairly dark, sepia tinged grey-brown, edge white, up to 3 mm broad. Odour nitrous or alkaline; taste disagreeable. Spores 4–6.5 \times (8.1–)9.4–11.2(–13.5) μm . Cheilocystidia fusiform, lageniform, clavate, subcylindrical, apex rounded or mucronate, with a shorter or longer neck, or with a few excrescences. Terminal cells of the hyphae of the stipe 4–20 μm wide, inflated, variously shaped and branched, curved outwards, apically geniculate . *M. leptocephala*
176. Pileus 6–16 mm. Lamellae 22–25, white or grey-white. Spores (6–) 6.5–8(–8.5) \times 11–15(–16) μm , ellipsoid to cylindrical ellipsoid. Cheilocystidia clavate in irregular forms, ovoid, apically with one or more

- curved, flexuose, finger-like excrescences up to 25 μm long. Terminal cells of the hyphae of the stipe smooth *M. vitilis* var. *carsica*
175. Stipe grooved, 1.5–6(–7) mm broad, cartilagineous, grey to brownish grey, silvery. Pileus up to 60 mm, with more or less pronounced umbo, brown, sepia brown, dark reddish brown. Lamellae 23–40, up to 3.5 mm broad, white to greyish, brownish, with red-brown stains. Flesh whitish to brownish; odour pleasant or disagreeable; taste raphanoid or farinaeous. Cheilocystidia fusiform, lageniform, utriform, subcylindrical or irregularly shaped, smooth or with a few coarse, unevenly, spaced apical or lateral excrescences. Hyphae of the pileipellis 1.8–5(–8) μm wide
M. polygramma f. *polygramma*
171. Hyphae of the cortex of the stipe embedded in gelatinous matter. Pileus 5–28 mm, slightly umbonate or not, grey-brown, darker to sepia brown, black-brown. Lamellae 14–29, 3–4 mm broad, narrowly adnate to almost free, white to whitish, brownish or flesh-colour. Flesh dark brown at the centre, watery whitish; odour none or raphanoid. Stipe elastic-firm or even tenaceous, pale watery grey-brown. Spores 5.5–7.2 \times 9.8–12.5(–13.5) μm . Cheilocystidia clavate, fusiform, lageniform, apex with a simple or furcate neck, with branched lateral excrescences. Caulocystidia 5–10 μm wide, smooth, simple to lancet-like or diverticulate. Solitary or in twos or threes on fallen wood, twigs of deciduous trees *M. vitilis* var. *vitilis*
170. Pileus with brown, black, grey colours, with argillaceous, yellowish, honey, green, olive and avellaneous tints.
177. Pileus grey-green, olive green, olive brown, dark sepia brown. Lamellae 16–30, edge grey-green, olive green or brownish; edge grey-green, olive green or brownish. Flesh white or concolorous with the pileus; odour alkaline, nitrous or none; taste mild. Stipe concolorous with the pileus. Cheilocystidia with one or two necks, covered also with variously shaped excrescences. Hyphae of the pileipellis 2–7(–9) μm wide, with excrescences up to 21.5 μm long. Solitary to subcaespitose on fallen branches or decayed wood of coniferous trees *M. viridimarginata*
177. Pileus dark sepia brown, argillaceous, yellowish grey, dingy honey colour, greyish. Lamellae 14–24, adnate, decurrent, white to whitish. Flesh whitish to creamy grey, dark grey; odour nitrous, also alkaline or of chlorine. Stipe concolorous with the pileus pale yellow grey or ochraceous. Cheilocystidia at apex passing into a shorter or longer simple or furcate neck, or simply broadly rounded. Hypae of the pileipellis 1.8–5 μm wide, embedded in gelatinous matter. Caespitose on coniferous wood, *Abies* *M. stipata*
169. Spores up to 10 μm long.
178. Spores ellipsoid.
179. Pileus umbonate, grey, brown, black without reddish tint.
180. Pileus with a low and broad umbo, fuliginous to almost black. Lamellae white with a pinkish sheen. Stipe white with a pinkish sheen. Basidia 30–36 μm long; sterigmata 5.5 μm long. Cheilocystidia subclavate, subfusiform, lageniform, apically with a single furcate neck, rarely with several coarse excrescences. Hyphae of the pileipellis 1.8–2.7 μm wide, covered with

- cylindrical excrescences up to 13.5 μm long. Hyphae of the cortex of the stipe 1.8 μm wide. Gregarious *M. nigroalba*
180. Pileus umbonate, pale greyish brown, becoming spotted with vinaceous brown stains. Lamellae whitish with some pinkish tints, spotted with vinaceous stains. Stipe watery whitish, then pale greyish brown, becoming spotted with vinaceous red stains. Basidia 27–36 μm long; sterigmata 6.5–7 μm long. Cheilocystidia subcylindrical, sublageniform, fusiform, apex either narrowed into a slender and frequently torulose neck, or smooth or strongly branched with excrescences. Hyphae of the pileipellis 2–4.5 μm wide, covered with much branched excrescences 2–45 μm long. Hyphae of the cortex of the stipe 0.9–2.7 μm wide. Caespitose *M. obtecta*
179. Pileus slightly umbilicate, reddish brown, margin white. Lamellae white. Stipe 1 \times 40 mm, reddish brown, somewhat darker below. Basidia 23–25 μm long, Cheilocystidia 11.5–22.5 \times 35–65 μm , clavate, subfusiform or irregularly shaped, apex with a single neck or mucronate, or covered with a few straight to flexuous or branched excrescences. Hyphae of the pileipellis 2–7 μm wide, the narrower smooth, the broader diverticulate. Terminal cells of the hyphae of the cortex of the stipe up to 8 μm diverticulate. Caespitose, on fallen twigs of deciduous trees. USA *M. pectinata*
178. Spores broadly ellipsoid to subglobose, 6–7 \times (6–)7–8.8 μm . Pileus 15–30 mm, umbonate, brown-grey, black-brown. Stipe 50–80 mm long, grey, dark grey. Cheilocystidia fusiform, lageniform, utriform, subcylindrical or irregularly shaped, smooth, together with apical or lateral coarse excrescences. Caulocystidia 3.5–9 μm wide, forked or branched or apically coiled, generally with coarse excrescences 5.5–13.5 μm long *M. polygramma* f. *pumila*
168. Pleurocystidia present.
181. Spores up to 10.3 μm long.
182. Spores ellipsoid.
183. Spores very small, 2.4–2.8 \times 4.9–5.4 μm . Pileus 11–18 mm, with a small pronounced or depressed umbo, pale beige to beige-brown. Lamellae up to 2 mm broad, pale creamy beige with pinkish tints. Cheilocystidia clavate or irregularly shaped, covered with simple to furcate, cylindrical, inflated excrescences. Hyphae of the cortex of the stipe smooth for the greater part, also with excrescences, embedded in gelatinous matter. Fasciculate in forests of *Quercus incana* and *Rhododendron arboreum* *M. coalita*
183. Spores 5.5–6.7 \times 9–10 μm . Pileus up to 35 mm, blackish brown, grey-brown to pale grey-brown, fading to ash grey. Lamellae up to 4 mm broad, pallid to dark ash grey. Cheilocystidia fusiform, lageniform, ovoid, clavate, apex narrowed into a simple to furcate or branched neck, or with one to several, coarse, simple or furcate excrescences. Hyphae of the cortex of the stipe smooth or with very sparse simple or furcate excrescences, with or without gelatinous matter. On fallen needles and debris in coniferous trees. USA
M. robusta
182. Spores broadly ellipsoid to subglobose.
184. Spores 6–7 \times (6–)7–8.8 μm . Pileus umbonate, brown-grey, black-brown. Stipe 50–80 mm long, grey to dark grey. Basidia 33–38 μm long. Cheilo-

- cystidia fusiform, lageniform, utriform, subcylindrical or irregularly shaped, smooth or with a few coarse, unevenly spaced, apical or lateral excrescences. Terminal cells of the hyphae of the cortex of the stipe forked or branched or apically coiled, generally with coarse excrescences. Gregarious, on woody decayed debris, *Quercus* *M. polygramma* f. *pumila*
184. Spores 6.6–7.2 × 8.1–10.3 μm. Pileus grey with slight bluish tints (murinus), ash grey to whitish grey. Stipe 30–50 mm long, more or less concolorous with the pileus. Basidia 25–30 μm long. Cheilocystidia subfusiform, utriform, fusiform, obpyriform, clavate, smooth or apically drawn out into a single neck or covered with simple to branched excrescences. Terminal cell of the cortex of the stipe with longer excrescences. Scattered, growing on coniferous woods. Europe, USA *M. murina*
181. Spores 4–6.5 × (8.1–)9.4–11.2(–13.5) μm. Pileus up to 25 mm, without or with small to large umbo, dark grey, sepia-brown. Flesh watery sepia-brown; odour nitrous or alkaline; taste disagreeable. Stipe grey-brown to brownish sepia, suffused with a lilaceous tint. Cheilocystidia fusiform, lageniform, clavate, subcylindrical, apically rounded or mucronate, with a shorter or longer neck. Terminal cells of the hyphae of the cortex of the stipe 4–20 μm wide, inflated, variously shaped and branched, cystidia-like, curved outwards, apically geniculate. Solitary to gregarious, on moss-covered wood, fallen branches, among grass and moss *M. leptocephala*
54. Hyphae of the pileipellis smooth (some species with widely spaced, almost very scattered excrescences) (Fig. 3B) Key 5

Key 5

185. Hyphae of the cortex of the stipe covered with excrescences (Fig. 4B).
186. Pleurocystidia present.
187. Pileus with brown, black, grey colours, without purplish, violaceous and yellow tints.
188. Hyphae of the pileipellis not embedded in gelatinous matter.
189. Spores more than 10 μm long.
190. Spores 5.4–6.3 × 8.1–11 μm, ellipsoid. Pileus evenly coloured warm beige-brown. Lamellae white, greyish-whitish becoming flushed with pink. Stipe horn grey, from the base upwards turning reddish brown. Cheilocystidia fusiform, subclavate, smooth or apically branched with coarse excrescences. Pleurocystidia more slender, smooth. Hyphae of the pileipellis much branched to smooth. Caespitose. Growing on and around *Picea* *M. valida*
190. Spores 4–5.4 × 9–12(–16.5) μm, elongate ellipsoid or cylindrical. Pileus white, 10–40 mm wide, stained reddish brown with age. Stipe grey lilac to vinaceous brown. Pileipellis 2–10 μm long, smooth (or with rare excrescences). Terminal cells irregularly clavate, straight to curved, coarsely diverticulate *M. zephrus*
189. Spores smaller, only 4.9–5.4 μm long. Pileus 11–18 mm, with a small pronounced or depressed umbo, pale beige to beige-brown. Lamellae up to 2 mm broad, pale creamy beige with pinkish tints. Cheilocystidia clavate

- or irregularly shaped, covered with simple to furcate, cylindrical, inflated excrescences. Hyphae of the cortex of the stipe smooth for the greater part, also with excrescences, embedded in gelatinous matter. Fasciculate in forest of *Quercus incana* and *Rhododendron arboreum* *M. coalita*
188. Hyphae of the pileipellis embedded in gelatinous matter, 1.8–4.5 μm wide, roughened or covered with a few scattered excrescences. Pileus dingy greyish brown, reddish grey-brown, often stained reddish brown or brown vinaceous. Lamellae grey-white to brownish, spotted with reddish brown. Stipe cartilaginous concolorous with the pileus, yellowish above, base reddish or blackish brown. Spores 3.7–4 \times 6.3–7.3 μm , ellipsoid. Cheilocystidia clavate, subcylindrical, fusiform or irregularly shaped, smooth or apically furcate, or with a few coarse, obtuse excrescences. On decayed wood of deciduous logs. USA, Canada *M. semivestipes*
187. Pileus brown, black or grey, with purplish, violaceous and yellow tints.
191. Pileus 6–10 mm, bright yellow to amber-coloured, then yellowish red-brown. Lamellae white. Flesh without odour; taste absent. Stipe yellow to ochraceous. Spores ellipsoid. Cheilocystidia 30–50 μm long. Hyphae of the pileipellis 1.8–2.2 μm wide. Scattered, found on *Larix* *M. lutea*
191. Pileus 30 mm, grey-brown suffused with purplish or violaceous tints. Lamellae whitish, cinereous, reddish spotted. Flesh without odour. Stipe dark grey to blackish suffused with vinaceous tints, base purplish or reddish brown. Spores 8.1–10.7 μm long. Hyphae of the pileipellis 1.8–3.5 μm wide, with short cylindrical excrescences or smooth. On stumps and fallen branches of deciduous trees. USA, Canada *M. tenuicola*
186. Pleurocystidia absent.
192. Pileus brown, black, grey with argillaceous, ochraceous, reddish, yellowish, honey and avellaneous tints.
193. Hyphae of the pileipellis not embedded in gelatinous matter.
194. Pileus 6–10 mm, not umbonate, avellaneous. Stipe avellaneous. Spores broadly ellipsoid, 5.5–6.3 \times 8.5–8.8 μm . Cheilocystidia clavate, apex with one or more cylindrical, simple, branched, obtuse excrescences, rarely without excrescences. Hyphae of the pileipellis with scattered excrescences (or smooth). Terminal cells of the hyphae of the cortex of the stipe diverticulate, curving outward. Densely caespitose on a dead balsam fir log. USA
M. avellanea
194. Pileus 20–30 mm, slightly umbilicate, reddish brown. Stipe reddish brown. Hyphae of the pileipellis 2–7 μm wide, the narrower smooth, the broader diverticulate. Hyphae of the cortex of the stipe sparsely diverticulate (or smooth). On fallen twigs of deciduous trees. USA *M. pectinata*
193. Hyphae of the pileipellis embedded in gelatinous matter.
195. Pileus white to whitish, discolouring ochraceous cream, with yellow-brown or rusty brown spots. Flesh white; odour none; taste indistinctive. Spores 3.5–4.7 \times 6.3–9 μm , ellipsoid. Hyphae of the cortex of the stipe embedded or not in gelatinous matter. In small groups, densely caespitose on decayed wood and stumps of conifers *M. laevigata*

195. Pileus dark sepia brown, pallescent, argillaceous, yellowish grey, grey. Flesh grey-white, creamy grey; odour nitrous, also alkaline or of chlorine. Spores $5.4-6.3 \times 9.2-11.6 \mu\text{m}$, ellipsoid, somewhat elongated. Hyphae of the cortex of the stipe embedded in gelatinous matter. On coniferous wood, *Abies*
M. stipata
192. Pileus brown, black, grey without argillaceous, ochraceous, reddish, yellowish, honey and avellaneous tints.
196. Pileus fuscous to dark watery grey, brown, dark brown. Lamellae white to pale grey, sometimes with flesh-coloured tints. Flesh greyish to whitish; odour and taste farinaceous. Stipe hyaline grey, pale brown to tawny below. Basidia $27-35 \mu\text{m}$ long. Hyphae of the pileipellis $1.8-5 \mu\text{m}$ wide. Hyphae of the cortex of the stipe $1.5-3.5 \mu\text{m}$ wide; terminal cells similar, a few diverticulate. Caespitose on tree stumps and decaying wood *M. pseudoinclinata*
196. Pileus white to beige, clear brown, stained reddish brown with age. Lamellae white to whitish, pale brown with red-brown spots. Flesh concolorous; odour absent or raphanoid; taste mild, bitter or raphanoid. Stipe grey lilac to vinaceous brown. Spores $4-5.4 \times 9-12(-16.5) \mu\text{m}$, elongate ellipsoid or cylindrical. Pileipellis $2-10 \mu\text{m}$ long, smooth (or with rare excrescences). Terminal cells irregularly clavate, straight to curved, coarsely diverticulate
M. zephirus
185. Hyphae of the cortex of the stipe smooth (Fig. 4A).
197. Pleurocystidia present.
198. Hyphae of the pileipellis not embedded in gelatinous matter.
199. Spores more than $10 \mu\text{m}$ long.
200. Spores $5-6.7(-7) \times 8.5-11.2 \mu\text{m}$. Pileus $15-60 \text{ mm}$, dark sepia brown to black-brown, suffused with beige tints or whitish. Lamellae $25-40$, up to 10 mm broad, pale greyish to white, sometimes tinged pinkish or flesh-colour. Stipe $2-8 \times 30-80 \text{ mm}$, greyish white to white. Cheilocystidia $40-150 \mu\text{m}$ long, fusiform, lageniform, conical, subcylindrical, clavate, smooth, apex broadly rounded or with a short or longer neck. Terminal cells of the hypae of the cortex of the stipe up to $9 \mu\text{m}$ wide, smooth or somewhat branched more or less pronouncedly curved outwards. Solitary, gregarious or subfasciculate in small groups *M. niveipes*
200. Spores $(6-7)-8.5(-9) \times 9-11.8(-13.5) \mu\text{m}$. Pileus up to 28 mm , black, bluish black, grey-brown. Lamellae white then dark grey. Cheilocystidia clavate to fusiform, smooth, apically broadly rounded or mucronate, rarely with a longer, slender neck. Terminal cells of the hyphae of the cortex of the stipe up to $22.5 \mu\text{m}$ wide, cylindrical, narrowly to broadly, clavate, ellipsoid, smooth, rarely furcate. Gregarious to caespitose, or solitary on needles of *Juniperus*. Norway *M. ustalis*
199. Spores smaller, only $4.9-5.4 \mu\text{m}$ long. Pileus $11-18 \text{ mm}$, with a small but pronounced or depressed umbo, pale beige to beige-brown. Lamellae up to 2 mm broad, pale creamy beige with pinkish tint. Cheilocystidia clavate or irregularly shaped, covered with simple to furcate, cylindrical, inflated excrescences. Hyphae of the cortex of the stipe smooth for the greater part,

- also with excrescences, embedded in gelatinous matter. Fasciculate in forest of *Quercus incana* and *Rhododendron arboreum* *M. coalita*
198. Hyphae of the pileipellis embedded in gelatinous matter.
201. Hyphae of the cortex of the stipe not embedded in gelatinous matter.
202. Spores more than 10 μm long.
203. Spores (6–)7.5–8 \times (7.5–)9–12 μm (2-spored), ellipsoid to broadly ellipsoid. Pileus with a small blackish grey or black umbo, grey-yellow-brown, dark grey-yellow-brown. Lamellae 18–32, white to grey-white. Flesh white, grey-white under the cuticle; odour alkaline; taste none or weakly acidulous. Cheilocystidia flexuose, some coarse clavate, smooth, with large protuberances. Hyphae of the cortex of the stipe 1.5–4.5 μm wide; terminal cells 2.5–4 \times 25–40(–75) μm , flexuose, with large protuberances. Gregarious on sandy ground among needles and leaves, also on decayed stumps *M. maurella*
203. Spores 4.5–7 \times 7.5–12 μm , ellipsoid. Pileus grey-brown, black-brown. Lamellae 28–38, up to 8 mm broad. Flesh whitish, grey-brown, with red spots; odour nitrous; taste mild. Cheilocystidia fusiform, sublageniform, smooth, with obtuse apex, more rarely with apical excrescences. Hyphae of the cortex of the stipe 3–8(–10) μm wide; terminal cells 5–19 μm wide, smooth, cylindrical, with rounded apex. Fasciculate or gregarious on decayed wood of deciduous trees *M. algeriensis*
202. Spores less than 10 μm long.
204. Spores 3.6–5.8 \times 7.2–9.6 μm , more or less pronouncedly phaseoliform. Pileus sericeous, dark grey-brown, dark chestnut. Lamellae pale grey brown or cinereous or white turning pink. Flesh whitish; odour nitrous; taste absent, faint or disagreeable. Stipe sericeous, grey-brown. Cheilocystidia lageniform, fusiform, clavate, subcylindrical, apex gradually or abruptly narrowed into a longer or shorter neck, or rostrate to mucronate, rarely without a neck. Caulocystidia 45–100(–120) μm long, cylindrical, to cystidia-like. Single or in small groups on fallen or even buried cones of *Picea* *M. plumipes*
204. Spores (6.5–)7–7.5 \times 8.5–9 μm (4-spored), ellipsoid to broadly ellipsoid. Pileus grey-yellow-brown, dark grey-yellow-brown. Lamellae white to grey-white. Flesh white, grey-white under the cuticle; odour alkaline; taste none or weakly acidulous. Cheilocystidia flexuose, some coarse clavate, smooth, with large protuberances. Hyphae of the cortex of the stipe 1.5–4.5 μm wide. Caulocystidia 25–40(–75) μm long, flexuose, with large protuberances. Gregarious on sandy ground among needles and leaves, also on decayed stumps *M. maurella*
201. Hyphae of the cortex of the stipe embedded in gelatinous matter.
205. Pileus up to 25 mm, brownish grey, margin yellowish grey. Lamellae greyish pale yellow or fuliginous pale yellow, edge pallid. Stipe concolorous with the pileus. Spore 7.3–9 μm long, ellipsoid. Cheilocystidia 27–40 μm long, subellipsoid, subutriform, subclavate, with obtuse apex. Caulocystidia subclavate, furcate or branched. Fasciculate, under *Acer pseudoplatanoides*, among sawdust and humus in the city *M. caliginosa*

205. Pileus up to 40 mm, black-brown, pale brown, viscid but gelatinous pellicle not separable. Lamellae whitish then grey. Stipe viscid, concolorous with the pileus. Cheilocystidia 58–95 μm long, subcylindrical, sublageniform, fusiform, smooth, frequently long-stalked. Caulocystidia smooth, curved to coiled, sometimes branched. Gregarious, growing on introduced conifer needles. USA *M. quinaultensis*
197. Pleurocystidia absent.
206. Hyphae of the pileipellis not embedded in gelatinous matter.
207. Pileus brown, black, grey, without vinaceous, pinkish, reddish tints.
208. Pileus up to 15(–20) mm.
209. Pileus 10–15(–20) mm, dark fuliginous to fuscous, fading to dingy brownish grey. Stipe watery white, exuding watery fluid when broken. Spores 3.6–4.7 \times 8.8–11.6 μm , cylindrical. Basidia 30–38 μm long. Hyphae of the pileipellis 1.8–5.5 μm wide. Terminal cells of the hyphae of the cortex of the stipe 2.5–8 μm wide, geniculate and curved outward. Gregarious on log and stumps of *Douglas* fir. USA *M. fuliginella*
209. Pileus 5–13 mm, sepia brown-black. Lamellae whitish-grey, smoky grey. Stipe sepia brown-black. Spores 5.4–6.7 \times 9–11.5 μm , ellipsoid. Basidia 27–30 μm long. Hyphae of the pileipellis 1–3 μm wide. Terminal cells of the hyphae of the cortex of the stipe 2.5–3.5 μm wide, diverticulate. Fasciculate or subfasciculate. In a large, decaying trunk of conifer
M. tephrophylla
208. Pileus up to 45(–50) mm, fuscous to dark watery grey, brown, dark brown. Lamellae white to pale grey, sometimes tinged flesh-colour. Flesh greyish to whitish; odour and taste farinaceous. Stipe hyaline grey, pale brown to tawny below. Hyphae of the pileipellis 1.8–5 μm wide. Hyphae of the cortex of the stipe 1.5–3.5 μm wide; terminal cells similar, a few diverticulate. Caespitose on tree stumps and decaying wood *M. pseudoinclinata*
207. Pileus brown, black, grey, with vinaceous, pinkish or reddish tints.
210. Pileus brown with pinkish or reddish tints.
211. Pileus dingy pinkish brown with minute papilla. Lamellae whitish pink then pink. Stipe pale brownish white with a slight yellowish tint. Cheilocystidia fusiform to sublageniform, smooth. Hyphae of the pileipellis 1.8–2.7 μm wide. On fallen branches of *Fagus* *M. lignivora*
211. Pileus reddish brown, margin white, slightly umbilicate. Lamellae white. Stipe reddish brown. Cheilocystidia, subfusiform or irregularly shaped, apex with a single neck or mucronate or covered with few straight to flexuous or branched excrescences. Hyphae of the pileipellis 2–7 μm wide. Caespitose on fallen twigs of deciduous trees. USA *M. pectinata*
210. Pileus 15–30 mm, pale greyish vinaceous fading to almost snow white. Lamellae up to 4 mm broad, white, then pale pink. Flesh watery white, snow white; odour and taste mild. Stipe 2–3 mm wide, firm to brittle, exuding watery fluid when broken. Hyphae of the pileipellis covered with granular matter. Growing on a Black Cherry log. USA *M. incarnatifolia*
206. Hyphae of the pileipellis embedded in gelatinous matter.

212. Pileus white to whitish, discolouring cream ochraceous, with yellow-brown or rusty brown spots. Flesh white; odour none; taste indistinct. Spores $3.5\text{--}4.7 \times 6.3\text{--}9 \mu\text{m}$, ellipsoid. Hyphae of the cortex of the stipe embedded or not in gelatinous matter. In small groups, densely caespitose on decayed wood and stumps of conifers *M. laevigata*
212. Pileus dark sepia brown, pallescent, argillaceous, yellowish grey, grey. Flesh grey-white, creamy grey; odour nitrous, also alkaline or of chlorine. Spores $5.4\text{--}6.3 \times 9.2\text{--}11.6 \mu\text{m}$, ellipsoid, somewhat elongated. Hyphae of the cortex of the stipe embedded in gelatinous matter. On coniferous wood, mostly *Picea abies*, but also known from *Abies alba*, *Larix*, *Fagus* *M. stipata*

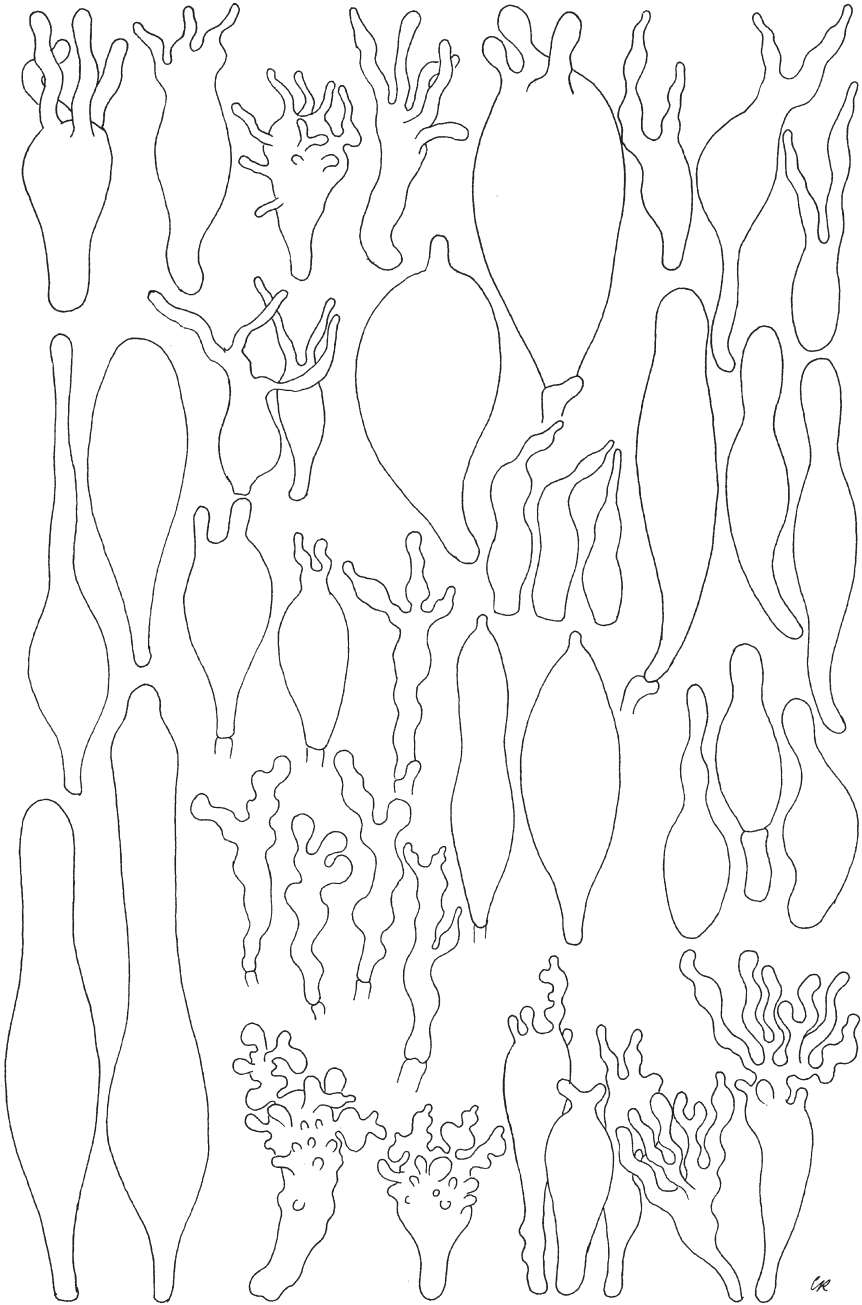


Fig. 1. Cheilocystidia of type 1: lageniform, fusiform, rounded with mucronate apex, or diverticulate with finger-like excrescences.

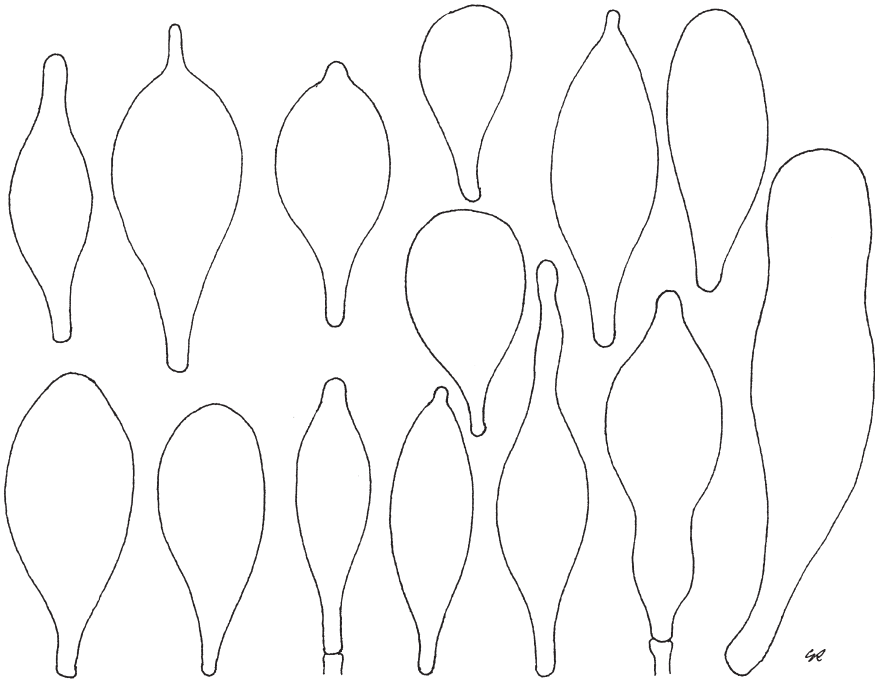


Fig. 2. Cheilocystidia of type 2: smooth, with rounded apex, mucronate or with apical extension.

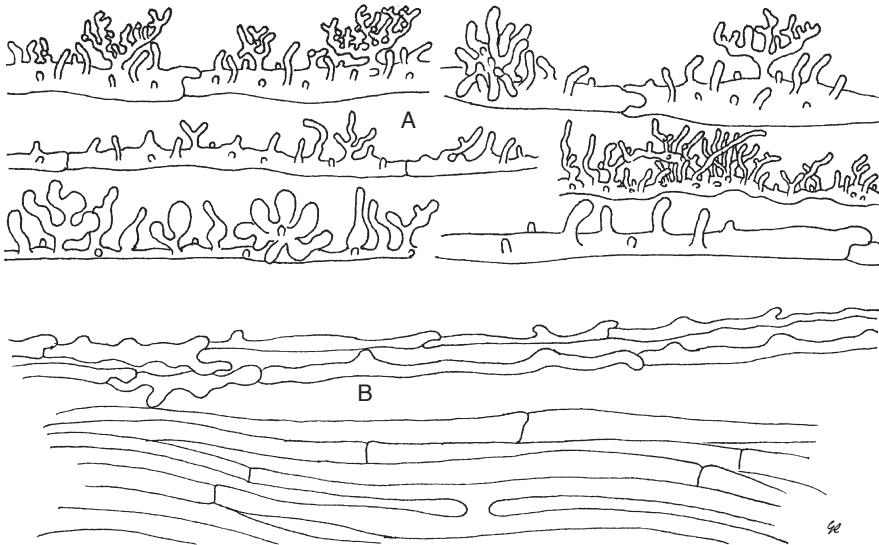


Fig. 3. Pileipellis types. A. Diverticulate; B. smooth or with scattered excrecences.

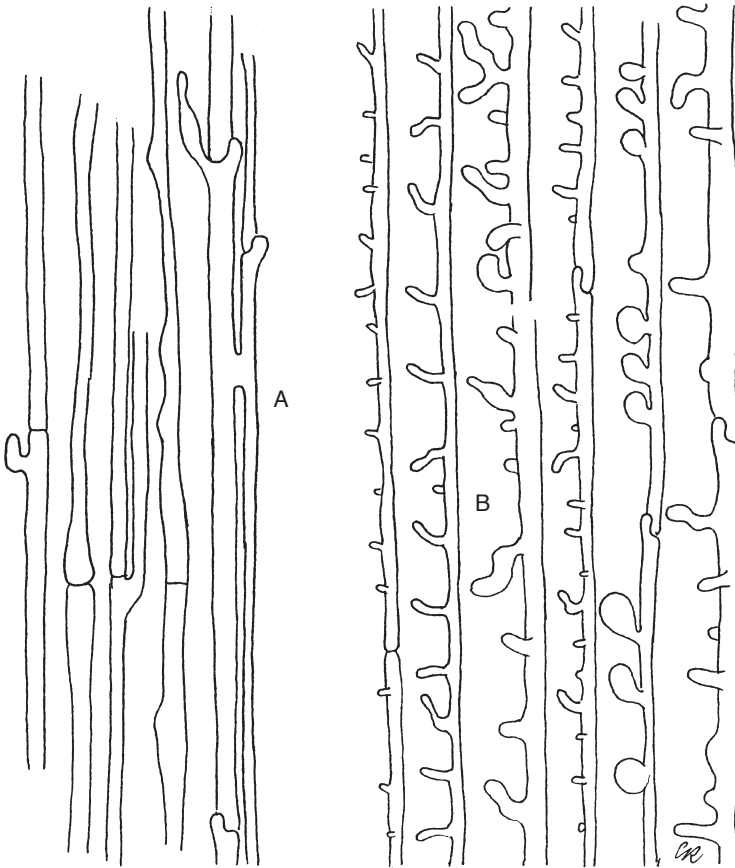


Fig. 4. *Stipitipellis* types. A. Cutis with smooth hyphae; B. cutis with diverticulate hyphae.

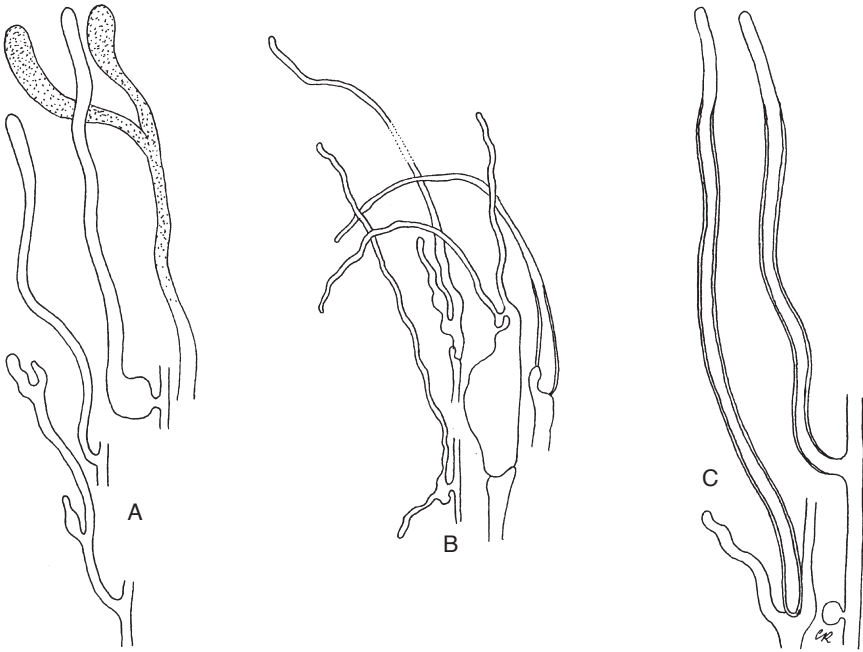


Fig. 5. Hairs on stipe. A, B. Simple thin-walled, hair-like hairs; c. thick-walled hairs.



Fig. 6. Setae on stipe.

LIST OF THE SPECIES INCLUDED IN THE KEY

<i>Mycena abietina</i> Maas Geest.	pp. 14, 20
<i>Mycena abramsii</i> (Murrill) Murrill	pp. 10, 15, 18, 21
<i>Mycena aculeata</i> Maas Geest.	p. 7
<i>Mycena aetites</i> (Fr.) Quél.	pp. 9, 14, 18, 20, 21
<i>Mycena alcaliniformis</i> (Murrill) Murrill	p. 17
<i>Mycena algeriensis</i> Maire apud Kühner	p. 33
<i>Mycena alnetorum</i> J. Favre	pp. 11, 14, 18, 21
<i>Mycena alnicola</i> A. H. Sm.	pp. 13, 14, 21
<i>Mycena aronsenii</i> Maas Geest.	pp. 12, 13
<i>Mycena atrovinosa</i> Robich	pp. 8, 13, 25
<i>Mycena austera</i> Aronsen	p. 15
<i>Mycena avellanea</i> (Murrill) Murrill	pp. 16, 31
<i>Mycena avellaneibrunnea</i> Thiers	pp. 11, 26
<i>Mycena bathyrrizha</i> Maas Geest.	p. 18
<i>Mycena caliginosa</i> Maas Geest. & Enderle	p. 33
<i>Mycena chrysocorypha</i> Singer	p. 7
<i>Mycena citrinomarginata</i> Gillet	p. 6
<i>Mycena coalita</i> Maas Geest.	pp. 22, 29, 31, 33
<i>Mycena coracina</i> Maas Geest.	p. 15
<i>Mycena corrugans</i> Maas Geest.	pp. 5, 6, 19
<i>Mycena corticaticeps</i> Kauffman apud A. H. Sm.	p. 7
<i>Mycena crocea</i> Maas Geest.	pp. 3, 7, 8
<i>Mycena cyrnea</i> Maas Geest.	p. 12
<i>Mycena deceptor</i> Maas Geest.	pp. 7, 8
<i>Mycena eburnea</i> Maas Geest.	pp. 4, 5, 8
<i>Mycena erminea</i> Maas Geest.	p. 4
<i>Mycena flocculina</i> (Kalaméés) M. Villarreal	p. 11
<i>Mycena fragillima</i> A. H. Sm.	pp. 23, 25, 26
<i>Mycena fuligineipapillata</i> Robich	p. 26
<i>Mycena fuliginella</i> A. H. Sm.	p. 34
<i>Mycena gilvipes</i> M. Villarreal, Heykoop & Maas Geest.	pp. 7, 15, 16, 23
<i>Mycena gladiocystis</i> Esteve-Rav. & A. Ortega	pp. 7, 15, 16
<i>Mycena griseiconica</i> Kauffman	pp. 11, 19
<i>Mycena hausknechtii</i> Maas Geest.	pp. 12, 13
<i>Mycena incarnatifolia</i> A. H. Sm.	pp. 3, 7, 34
<i>Mycena laevigata</i> (Lasch) Gillet	pp. 3, 31, 35
<i>Mycena laevigatoides</i> Maas Geest.	pp. 4, 5
<i>Mycena leptcephala</i> (Pers.: Fr.) Gillet	pp. 9, 11, 15, 18, 21, 25, 26, 27, 30
<i>Mycena lignivora</i> Maas Geest.	pp. 8, 34
<i>Mycena lutea</i> Bres.	pp. 6, 7, 16, 22, 31
<i>Mycena maurella</i> Robich	pp. 24, 25, 33
<i>Mycena mitis</i> Maas Geest.	p. 8
<i>Mycena murina</i> (Murrill) Murrill	pp. 22, 30
<i>Mycena nigroalba</i> Métrod	p. 29

<i>Mycena niveipes</i> (Murrill) Murrill	p. 32
<i>Mycena obtecta</i> Maas Geest.	pp. 16, 29
<i>Mycena olivaceoflava</i> M. Villarreal, Heykoop & Maas Geest.	p. 6
<i>Mycena overholtsii</i> A. H. Sm. & Sohl.	pp. 13, 24
<i>Mycena parca</i> Aronsen	p. 23
<i>Mycena pectinata</i> (Murrill) Murrill	pp. 16, 29, 31, 34
<i>Mycena pilosella</i> Maas Geest. var. <i>pilosella</i>	pp. 4, 5, 10, 26
<i>Mycena pilosella</i> Maas Geest. var. <i>heterocystidiosa</i> Robich	pp. 6, 19
<i>Mycena plumipes</i> (Kalchbr.) P. A. Moreau	pp. 24, 33
<i>Mycena polygramma</i> (Bull.: Fr.) Gray f. <i>polygramma</i>	pp. 10, 16, 20, 27, 28
<i>Mycena polygramma</i> f. <i>candida</i> (Gillet) Buch.	pp. 4, 5
<i>Mycena polygramma</i> f. <i>pumila</i> J. E. Lange	pp. 10, 12, 17, 22, 29, 30
<i>Mycena praelonga</i> (Peck) Sacc.	pp. 12, 14, 20
<i>Mycena profusa</i> Manim. & Leelav.	pp. 4, 6, 8
<i>Mycena pseudoinclinata</i> A. H. Sm.	pp. 17, 27, 32, 34
<i>Mycena puberula</i> (Berk.) Sacc.	pp. 9, 10
<i>Mycena quinaultensis</i> Kauffman apud A. H. Sm.	p. 34
<i>Mycena robusta</i> (A. H. Sm.) Maas Geest.	pp. 20, 29
<i>Mycena rubidofusca</i> M. Villarreal, Heykoop & Maas Geest.	p. 9
<i>Mycena scirpicola</i> M. Villarreal, Heykoop & Maas Geest.	pp. 10, 13, 24, 26
<i>Mycena semivestipes</i> (Peck) A. H. Sm.	pp. 22, 31
<i>Mycena silvae-nigrae</i> Maas Geest. & Schwöbel	pp. 19, 22
<i>Mycena spinulosipes</i> Robich	p. 24
<i>Mycena stipata</i> Maas Geest. & Schwöbel	pp. 9, 19, 28, 32, 35
<i>Mycena subcana</i> A. H. Sm.	pp. 12, 23
<i>Mycena subexcisa</i> (P. Karst.) Sacc.	pp. 12, 25
<i>Mycena subfumosa</i> (Murrill) Murrill	pp. 12, 24
<i>Mycena subfusca</i> A. H. Sm.	p. 10
<i>Mycena subincarnata</i> (Peck) Sacc.	p. 6
<i>Mycena subvitrea</i> A. H. Sm.	p. 17
<i>Mycena sudorella</i> Singer	p. 3
<i>Mycena tenuicola</i> (Murrill) Murrill	pp. 8, 22, 31
<i>Mycena tephrophylla</i> Maas Geest. & Schwöbel	p. 34
<i>Mycena tristis</i> Maas Geest.	pp. 17, 27
<i>Mycena ustalis</i> Aronsen & Maas Geest.	p. 32
<i>Mycena valida</i> Maas Geest & Münzmay	pp. 20, 30
<i>Mycena verna</i> Maas Geest.	p. 23
<i>Mycena vexans</i> (Peck) Sacc.	p. 15
<i>Mycena vicina</i> M. Villarreal, Heykoop & Maas Geest.	p. 21
<i>Mycena villicaulis</i> Maas Geest.	pp. 4, 5, 11
<i>Mycena viridimarginata</i> P. Karst.	pp. 6, 19, 28
<i>Mycena vitilis</i> (Fr.) Quél. var. <i>carsica</i> Robich	pp. 4, 5, 28
<i>Mycena vitilis</i> var. <i>vitilis</i>	p. 28
<i>Mycena zephirus</i> (Fr.: Fr.) P. Kumm.	pp. 3, 4, 5, 18, 22, 30, 32

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