

Amanita Pers.

JAN VESTERHOLT

Amanitopsis Roze

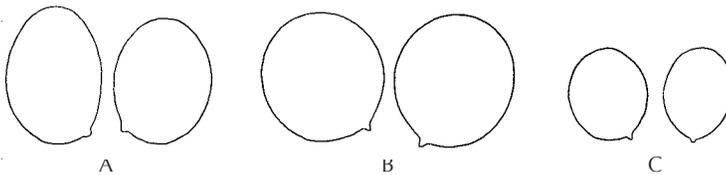
Frb with central stem, free gills, volva and often ring. Cap 20-200 mm, hemispherical, conical, ovoid or convex, later expanding with or without an umbo, smooth, radially sulcate at margin or not, greasy to almost dry, not hygrophanous, white, yellow, orange, red, greenish, olive, brown, buff or grey. Gills free, white or whitish, rarely pale greyish buff or greenish. Stem fibrillose to floccose, sometimes with girdles, white or tinged like cap. Universal veil whitish, yellowish or greyish, in some species staining brownish, in some species membranous forming a volva at the stem base, in other species breaking up into warts or patches on the cap. Partial veil absent or membranous, whitish, striate above or not, forming a ring on the stem. Smell mostly indistinct, but in some species nauseous honey-like or like raw potato. Sp deposit white.

Sp globose to ellipsoid (figs 333A-C), smooth, hyaline, amyloid or non-amyloid. Basidia mostly 4-spored. Cheilocystidia absent or little differentiated. Pileipellis a cutis or an ixocutis. Clamps present or absent.

Ectomycorrhizal, in association with deciduous and coniferous hosts. Summer to autumn. Several species poisonous, some even deadly.

30 species in the Nordic countries, 32 species in the key. Some species complexes in sect. *Vaginatae* are in need of a revision.

Lit.: Bas 1969, Contu 2000, Fraiture 1993, Knudsen & Borgen 1987, Neville & Poumarat 2004, Rune 2006, Tulloss 1994, 2000, Tulloss & Gulden 1999.



Spores: A: *Amanita argentea*, B: *A. vaginata* var. *vaginata*, C: *A. excelsa*.

1. Cap margin smooth; sp amyloid Key C, subgen. *Lepidella* p. 331
 - Cap margin becoming ± radially sulcate in expanded frb; sp non-amyloid 2
2. Partial veil forming a membranous ring; stem base bulbous Key A, subgen. *Amanita* sect. *Amanita* p. 326
 - Partial veil absent, but stem sometimes with fugacious remnants of veil; stem base not bulbous Key B, subgen. *Amanita* sect. *Vaginatae* p. 327

Key A: Subgen. *Amanita* sect. *Amanita*. Ring present; sp non-amyloid

1. Cap red, sometimes discolouring to pale orange. Cap 60-200 mm, hemispherical, then convex to expanded; universal veil forming loose, white to yellowish fragments on the cap; gills white; stem 80-250 x 10-25 mm, cylindrical to clavate, pruinose to floccose, white, with an up to 50 mm broad basal bulb with concentric rings of volval scales; ring membranous, white with a yellowish margin. Sp 8-10 x 6-7 μm, broadly ellipsoid. Under deciduous trees and conifers, most common under *Betula*, *Pinus* and *Picea*, in particular on sandy or peaty soil; summer to autumn; very common in temp.-suba., but occasional in IS; DK (LC), FI (LC), FO, IS, NO (LC), SE (LC). – C&D 837, FE 9: phot. 18, Phil 140ab, R&H 397, Ves 266, ⊙. – Poisonous.

A. muscaria (L.: Fr.) Lam. var. *muscaria*

var. *regalis* (Fr.) Bertill. (*A. regalis* (Fr.) Michael) differs in having a brown cap. In coniferous and mixed forests and in subalpine *Betula* forests, mostly with *Picea*, rarely with *Betula*; common in hemib.-suba., occasional in temp., but in DK only with one record; DK (NE, WJyl: Marbæk Plt.), FI (LC), NO (LC), SE (LC). – Däh 465, FE 9: phot. 27, pl. 26, GBW 4:19, R&H 398, Sieniop 95. – Poisonous.

Note: *A. muscaria*, the fly agaric, has been used as an insecticide as well as for different types of spiritual and medicinal purposes.

- Cap cream, yellow, buff or brown 2
- 2. Cap cream to yellow or ± pinkish buff 3
- Cap yellow brown to dark brown 4
- 3. Cap yellowish cream to yellow; in sandy *Pinus* forests. Cap 30-100 mm, hemispherical, then convex to expanded; universal veil forming loose, white fragments on the cap and/or a volva at the base; gills white; stem 50-100 x 10-20 mm, cylindrical to clavate with a bulbous base, flocculose, white; ring fugacious, white; smell indistinct. Sp 8-12 x 6-9 µm, broadly ellipsoid to ellipsoid. Autumn; occasional in temp.-hemib., rare in bore.; DK (LC), FI (DD, V), NO (LC), SE (NT). – B&K 4:151, Däh 467, Jordst 12(1), Phil 148a, Ves 270, ☉. – Poisonous.
A. gemmata (Fr.) Bertill. (*A. junquillea* Quél.)
- Cap pale pinkish buff to pinkish buff or yellowish buff; in deciduous forests. Cap 40-90 mm, convex to plane; universal veil whitish, forming a fragile volva at the base, sometimes also fragments on the cap; gills white; stem 75-150 x 10-15 mm, cylindrical with a bulbous base, whitish to pale pinkish buff; smell indistinct. Sp 10.5-13 x 6.5-9 µm, broadly ellipsoid to ellipsoid. Summer to autumn; very rare in temp.; DK (CR), SE (NE). – C&D 840, Däh 468, GBW 4:12, Phil 152b, Svp 1:9. – Poisonous.
A. eliae Quél.
- 4. Cap 60-200 mm; flesh yellow under the cuticle see *A. muscaria* var. *regalis* 1
- Cap 40-100 mm; flesh white. Cap hemispherical, then convex to expanded, yellowish brown to brown; universal veil forming loose, white fragments on the cap; gills white; stem 60-100 x 10-20 mm, cylindrical with a bulbous base, fibrillose, white; ring white, not striate; smell indistinct. Sp 10-12 x 7-9 µm, broadly ellipsoid. In forests and parks under *Fagus*, *Quercus*, *Tilia*, etc., less often in coniferous forests and in sand dunes with *Salix repens*, on neutral to calcareous soil; summer to autumn; common in temp.-hemib., occasional in southern bore.; DK (LC), FI (LC), NO (LC), SE (LC). – C&D 839, FE 9: phot. 34, Phil 145cd, R&H 398, Ves 266, ☉. – Very poisonous.
A. pantherina (DC.: Fr.) Krombh.

Key B: Subgen. *Amanita* sect. *Vaginatae* (Fr.) Quél. Ring absent; sp non-amyloid

- 1. Cap white or tinged pale grey, at least when young 2
- Cap distinctly coloured 4
- 2. Frb tall and fragile, pure white and remaining so; with deciduous and coniferous hosts in temp.-suba. see *A. vaginata* f. *alba* 18
- Frb not very tall and at the same time fragile; cap often tinged greyish or pale buff with age; with *Salix*, *Betula* or *Polygonum viviparum* in suba.-arc./alp. 3
- 3. Cap white, becoming pale buff at centre; stem 45-210 x 6-25 mm, with floccose girdles in upper part. Cap 40-140 mm, hemispherical to conical, later convex to expanded with an umbo, radially sulcate up to 0.3 the radius; universal veil white, forming a sack-like volva and sometimes a large patch on the cap; gills white; stem cylindrical to clavate, white to pale cream, ± greying with age, sometimes with fugacious remnants of veil. Sp 10-13 x 9-12.5 µm, globose to subglobose. In suba.-arc./alp. with *Salix* or *Betula*, in bore. with *Picea*; summer to

autumn; rare in bore.-arc./alp.; FI (LC), IS, NO (LC), SE. – SMT 27(2):12, 27(3):61-62.

A. arctica Bas, Knudsen & T. Borgen (*A. islandica* Melot)

Note: the synonymy is based on unpublished phylogenetic data (R. Kjøller pers. comm.).

- Cap tinged pale grey to silvery grey, sometimes white when young; stem 30-70 x 5-15 mm, finely floccose. Cap 20-80 mm, conical, later convex with an umbo, radially sulcate up to 0.3 the radius; universal veil whitish, forming a sack-like volva and sometimes a few patches on the cap; gills white to cream; stem cylindrical to clavate, white or tinged greyish or pinkish, sometimes with fugacious remnants of veil. Sp 10-13.5 x 9-12 μm , globose to subglobose. With dwarf *Salix*, *Betula* or *Polygonum viviparum*; summer to autumn; common in suba.-arc./alp.; FI (LC), FO, IS, NO (LC), SE (LC). – AAF 1:25, B&K 4:1421, Bol Bres 43:177, 189 & 182, R&H 394, SMT 27(3):63, ☉.

A. nivalis Grev. (*A. alpina* Contu)

- 4. Universal veil breaking up into warts or patches on the cap or stem and/or discolouring to grey, dominated by spherocysts or with an equal mixture of spherocysts and filamentous hyphae 5
- Universal veil membranous, forming a well defined volva at the base, white or externally with orange or brown stains, dominated by filamentous hyphae 12
- 5. With *Salix* or *Betula* in suba.-arc./alp. 6
- In deciduous or coniferous forests or parks in temp.-suba. 7

- 6. Cap radially sulcate up to 0.2 the radius, clay buff to greyish brown or yellowish brown, margin sometimes straw-coloured; universal veil forming small to large patches on the cap. Cap 30-120 mm, hemispherical, then convex to expanded with or without a low umbo; universal veil whitish to greyish; gills white to pale cream; stem 40-150 x 8-20(-33) mm, clavate, whitish with greyish buff to brownish girdles. Sp 9-12.5 x 8-11.5 μm , globose to subglobose. With *Salix* or *Betula*; summer; rare in arc./alp., FI (DD), NO (NE). – Bor 62, ☉.

A. groenlandica Knudsen & T. Borgen

- Cap radially sulcate up to 0.4 the radius, yellowish brown to olive brown; universal veil often forming a basal volva. Cap 35-75 mm, conical to bell-shaped, later expanded with an umbo; universal veil greyish; gills white to pale buff; stem 60-140 x 6-17 mm, clavate, whitish or tinged brownish, pruinose. Sp 9.5-13 x 8.5-11.5 μm , subglobose. With *Salix* or *Betula*; summer to autumn; very rare in arc./alp.; IS (Na), NO (NE, Troms: Kåfjord). – Bor 64, SMT 27(3):54, ☉.

A. mortenii Knudsen & T. Borgen

- 7. Cap 20-60 mm; stem 40-90 x 4-15 mm; on damp soil with deciduous trees 8
- Cap 50-200 mm; stem 90-300 x 10-55 mm; on dry soil under deciduous trees or conifers 9
- 8. Cap sepia to greyish brown or brownish grey; universal veil greyish, forming numerous small scales on the cap; sp 10-12.5 x 8-10 μm , broadly ellipsoid. Cap 20-60 mm, convex, then expanded to depressed, radially sulcate up to 0.35 the radius; gills whitish; stem 40-90 x 4-15 mm, cylindrical to clavate, flocculose, whitish to pale grey. With *Alnus incana*; summer to autumn; rare in hemib.-bore.; FI (NT), NO (VU), SE (NT). – B&K 4:138, Bol Bres 37:100, 43:164, Sieniop 91, ☉.

A. friabilis (P. Karst.) Bas

- Cap olive grey to greyish brown; universal veil white to ochraceous grey, breaking up into patches on the cap and lower part of stem; sp 9-13 μm , \pm globose. Cap conical, then expanded with an umbo, with a radially sulcate margin; gills white; stem 50-95 x 5-10 mm, cylindrical to clavate, white with greyish to olive fibrils. On damp soil with deciduous trees like *Betula* and *Alnus* and in subalpine *Betula* forests; autumn; occasional in bore.-suba., very rare in temp.; DK (EN), FI (LC). – Sieniop 93.

A. olivaceogrisea Kalamees

9. Stem buff grey to grey, turning dark grey when handled. Cap 60-120 mm, conical, then convex to expanded, radially sulcate up to 0.4 the radius, greyish brown; universal veil grey, forming conspicuous remnants on cap and stem; gills white to greyish white; stem 70-300 x 15-35 mm, cylindrical to clavate, floccose. Sp 11.5-14 μm , \pm globose. In deciduous forests and parks on clayey soil, especially under *Quercus* and *Fagus*; summer to autumn; rare in temp.-hemib.; DK (NT), FI (DD, V: Turku and Tenhola), SE (NT). – B&K 4:136, Däh 454, Phil 150c, R&H 394, Ves 271, .
- A. ceciliae* (Berk. & Broome) Bas (*A. strangulata* (Fr.) Roze s. auct., *A. inaurata* Secr. nom. inval.)
- Stem whitish to cream or pale buff, not turning dark grey when handled 10
10. Universal veil \pm greyish. Cap 50-120 mm, conical to convex, later expanded, radially sulcate up to 0.25-0.4 the radius, olivaceous yellow to greyish brown or olive brown; gills whitish; stem 100-200 x 10-20 mm; universal veil forming scales on the cap and/or an irregularly torn volva at the base. Sp 10-14 μm , \pm globose. With conifers and deciduous trees, especially *Picea*, on acid or calcareous soil and marine clay; summer to autumn; common in bore., occasional in temp.-hemib.; DK (NE), FI (LC), IS (Su), NO (LC), SE (LC). – B&K 4:142, Blekks 79:4, Bol Bres 43:230, GBW 4:30, SMT 27(3):52, .
- A. submembranacea* (Bon) Gröger var. *submembranacea*
var. *bispora* D.A. Reid (*A. submembranacea* (Bon) Gröger s. Reid, *A. castaneogrisea* Contu nom. inval.) differs in having a sepia cap. With *Betula* and conifers. NO. – Bol Bres 43:18, Phil 150a (as *vaginata*).
- Universal veil whitish to buff 11
11. Universal veil forming a \pm coherent volva, fragile, often damaged when picked, whitish, sometimes orange brown on the outside. Cap 60-200 mm, conical, then expanded with a broad umbo, radially sulcate up to 0.25 the radius, cream to pinkish buff; gills whitish, often with a grey-brown edge; stem 90-200 x 10-25 mm, clavate, floccose, white to cream or pale buff. Sp 9-13 μm , \pm globose. With deciduous trees on clayey or calcareous soil in parks and open forests; summer to autumn; very rare in temp.-hemib.; DK (EN), FI (DD, V: Turku), NO (NE), SE (NE). – B&K 4:140, Bol Bres 43:252, Bon 295, GBW 4:25, .
- A. lividopallescens* (Boud.) Kühner & Romagn.
- Universal veil forming numerous warts on the cap, and a belt of tissue at the base, but without a coherent volva, white, turning brownish. Cap up to 120 mm, conical to hemispherical, later expanded, radially sulcate in outer part, buff to yellowish brown or greyish brown; gills whitish; stem 100-200 x 12-20 mm, cylindrical to clavate, floccose, white, turning brownish. Sp 10-12 x 9-11 μm , subglobose. In deciduous forests; DE. – Bol Bres 37:98.
A. beckeri Huijsman
12. Cap buff yellow, yellowish, orange, yellow brown or orange brown 13
- Cap with olivaceous, grey, buff, pinkish buff, greyish brown or sepia colours 15
13. Cap yellow brown to orange brown; volva partly staining orange brown on the outside. Cap 30-80 mm, ovoid to conical, then convex to expanded or depressed with a small umbo, radially sulcate up to 0.6 the radius; universal veil forming a free, sack-like volva; gills white with a brownish tinge; stem 70-180 x 6-20 mm, clavate, fibrillose, whitish, tinged yellowish brown. Sp 10-12 μm , \pm globose. In deciduous and mixed forests, mainly under *Betula* and *Quercus* on poor, often peaty soil, more rarely under *Fagus*; summer to autumn; very common in temp.-suba.; DK (LC), FI (LC), NO (LC), SE (LC). – B&K 4:139, Däh 458, Ger 01:27, R&H 396, Ves 270, . – Edible.
A. fulva (Schaeff.: Fr.) Fr.
- Cap yellow, orange or buff yellow; volva white 14

14. Cap yellowish orange at centre, paler towards margin; stem yellowish cream to brownish orange with contrasting, pale orange girdles, mostly much longer than cap diam. Cap 40-100 mm, ovoid to conical, then convex to expanded or depressed with a small umbo, radially sulcate up to 0.3 the radius; universal veil forming a sack-like volva; gills white; stem 85-230 x 7-15 mm, clavate, white or tinged orange. Sp 9.5-12 x 8.5-11 μm , globose to subglobose. With deciduous trees, mostly with *Betula* and *Quercus*, less often with conifers; summer to autumn; common in hemib.-bore., occasional in suba., rare in temp.; DK (NT), FI (LC), IS, NO (LC), SE (LC). – Däh 460, GBW 4:21, Phil 152a, R&H 395, Sieniop 90, ☉.
A. crocea (Quél.) Singer
- Cap \pm uniformly buff yellow, fading with age; stem white, without contrasting girdles, not much longer than cap diam. Cap 40-90 mm, ovoid to conical, then convex to expanded or depressed with a small umbo, radially sulcate up to 0.2 the radius; universal veil forming a sack-like volva; gills white; stem 75-120 x 9-13 mm, cylindrical to clavate, white to cream, without contrasting girdles. Sp 9-12.5 x 8-10.5 μm , subglobose to broadly ellipsoid. With deciduous trees and conifers; summer to autumn; rare in temp.-suba.; DK (NA), NO (LC), SE (LC). – Blekks 79:5, Bol Bres 37:58, SMT 27(3):60, ☉.
A. flavescens (E.-J. Gilbert & S. Lundell) Contu (*A. vaginata* (Bull.: Fr.) Lam. var. *flavescens* E.-J. Gilbert & S. Lundell, *A. adnata* (W.G. Sm.) Sacc. s. Fungi Exsic. Suecici)
15. Sp ellipsoid to broadly ellipsoid (fig. 333A), $Q_{av} > 1.15$ 16
- Sp globose or subglobose (fig. 333B), $Q_{av} < 1.15$ 17
16. Volva to 107 x 62 mm and to 10 mm thick. Cap 80-115 mm, hemispherical, then convex to expanded, radially sulcate at margin, greyish with a slight olive tinge, with a slightly deeper grey zone on the inner edge of sulcation; universal veil white, developing rusty spots; gills white to cream, with floccose edge; stem 95-125 x 15-20 mm, cylindrical to clavate, developing transverse cracks, whitish. Sp 10-15 x 8.5-12 μm , broadly ellipsoid. In deciduous and coniferous, grass- and herb-rich forests; summer to autumn; rare in hemib.-bore.; FI (DD), NO (NE), SE. – Bol Bres 43:258.
A. magnivolvata Aalto (*A. mairei* Foley var. *amplivolvata* Contu)
- Volva smaller and thinner. Cap 60-100 mm, hemispherical, then convex to expanded, radially sulcate up to 0.35 the radius, silvery grey; universal veil white, forming patches on the cap and a sack-like volva; gills greyish white; stem 60-140 x 15-30 mm, clavate, appressed flocculose, greyish white. Sp. 9.5-13.5 x 8.5-10.5 μm , broadly ellipsoid (fig. 333A). With deciduous trees; summer to autumn; very rare in temp.; DK (EN), SE (Sk). – B&K 4:141, Bol Bres 43:228.
A. argentea Huijsman (*A. mairei* Foley s. auct. p.p.)
17. Volva fragile, easily breaking into pieces see *A. lividopallescens* 11
- Volva coherent 18
18. Cap grey; volva white to pale greyish without spots. Cap 30-80 mm, ovoid to conical, then convex to expanded or depressed, radially sulcate up to 0.4 the radius, grey or brownish grey; universal veil forming a whitish to pale greyish, free, sack-like volva; gills white; stem 50-130 x 5-10 mm, cylindrical to clavate, fibrillose, whitish, tinged yellowish brown. Sp 9-12 μm , \pm globose (fig. 333B). Under deciduous trees, especially *Fagus*, but also with *Betula* and conifers; summer to autumn; common in temp.-suba.; DK (LC), FI (LC), IS, NO, SE (LC). – C&D 827, GBW 4:31, Ger 01:27, SMT 27(3):53, Ves 271, ☉.
A. vaginata (Bull.: Fr.) Lam. f. *vaginata*
f. *alba* (De Seynes) Veselý differs in being pure white; DK, FI, NO. – GBW 4:31, SMT 27(3):56.
- Cap greyish brown to greyish olivaceous, olivaceous brown or dull brown; volva whitish with orange-brown spots 19

19. Volva 60-100 mm high. Cap 60-150 mm, at first conical to convex, expanding with an umbo, radially sulcate in outer part, olivaceous brown to dull brown; universal veil forming a sack-like volva with orange-brown spots; gills white with a brownish edge near cap margin; stem 70-180 x 10-30 mm, clavate, velvety, whitish to pale buff. Sp 10-12.5 μm , \pm globose. In parks under *Fagus*; summer to autumn; very rare in temp.- bore.; DK (DD), NO (NE, Hedm. Trysil). – BCat 1001, GBW 4:27, .

A. pachyvolvata (Bon) Krieglst.

- Volva 20-40 mm high. Cap 50-120 mm, at first conical to convex, expanding with an umbo, radially sulcate in outer part, greyish brown to greyish olivaceous or olivaceous brown, often appearing zonate; universal veil forming a sack-like volva with orange brown spots; gills white with a brown edge; stem 70-160 x 7-20 mm, clavate, whitish with grey to brown flocks. Sp 10-13 μm , \pm globose. In deciduous and coniferous forests, parks and pastures; summer to autumn; common in hemib.-bore., rare in temp., very rare in IS; DK (NE), FI (LC), IS (Ve), NO (LC), SE (LC). – C&D 834, Däh 462, R&H 396, Sieniorp 89, SMT 27(3):58.

A. battarrae (Boud.) Bon

Key C: Subgen. *Lepidella* (E.-J. Gilbert) Veselý. Ring present; sp amyloid

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| 1. | Universal veil forming a free, sack-like volva; smell nauseous honey-like | 2 |
| - | Universal veil breaking up into warts, scales or patches on the cap; smell indistinct, potatolike or earthy | 3 |

2. Cap radially silky-fibrillose, greyish green to olive green; stem whitish to pale greenish with a zig-zag pattern. Cap 30-120 mm, hemispherical, then convex to expanded; universal veil forming a free volva, occasionally also large patches on the cap, white; gills white; stem 40-150 x 10-20 mm, cylindrical to clavate with a 30-45 mm broad basal bulb; ring white; smell \pm nauseous honey-like. Sp 7.5-9 x 6-7.5 μm , subglobose to broadly ellipsoid (fig. 303D). Under deciduous trees, mainly *Fagus* and *Quercus* in forests and parks; summer to autumn; common in temp., occasional in hemib.; DK (LC), FI (LC), NO (LC), SE (LC). – C&D 851, FE 9: phot. 55, Phil 144a, R&H 399, Ves 265, . – Deadly poisonous.

A. phalloides (Vaill.: Fr.) Link var. *phalloides*

var. *alba* Costantin & Dufour differs in being pure white. DK, SE. – BCat 902, Bol Bres 43:106, FE 9: phot. 56.

Note: *A. phalloides* has destructive effects on liver and kidneys and is responsible for more deadly incidents in Europe than any other agaric.

- Cap smooth, white; stem white, floccose. Cap 30-120 mm, conical, then bell-shaped to expanded with an umbo, often asymmetrical; universal veil forming a free volva, white; gills white to cream; stem 60-160 x 6-20 mm, cylindrical to clavate with a 20-40 mm broad basal bulb; ring white; smell \pm nauseous honey-like. Sp 7-8 μm , \pm globose. Under deciduous trees and conifers on acid soil; summer to autumn; common in temp.-southern bore., rare, but locally common in middle bore.-suba., in FI north to PeP and Ks; DK (LC), FI (LC), NO (LC), SE (LC). – C&D 854, FE 9: phot. 60, Phil 148c, 149d, R&H 399, Ves 264, . – Deadly poisonous.

A. virosa (Fr.) Bertill.

Note: *A. virosa* has destructive effects on liver and kidneys and is often responsible for deadly incidents in Europe.

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|----|--|---|
| 3. | Smell like potato; ring smooth or indistinctly striate on the upper side | 4 |
| - | Smell indistinct or earthy; ring distinctly striate on the upper side | 5 |

4. Cap greyish brown; ring blackening. Cap 30-90 mm, bell-shaped, then convex with a low umbo, greyish brown; universal veil may form loose, brownish grey fragments on the cap; gills white; stem 60-110 x 5-12 mm, cylindrical to clavate with a rounded basal bulb; ring thin; smell potato-like. Sp 8-10 μm , \pm globose. On poor soil under conifers, less often with deciduous trees, also in subalpine *Betula* forests; summer to autumn; very common in

hemib.-bore., common in temp., rare in suba.; DK (LC), FI (LC), NO (LC), SE (LC). – Däh 473, FE 9: phot. 92, Phil 146a, R&H 400, Ves 269, ☉.

A. porphyria Alb. & Schw.: Fr.

- Cap whitish to pale greenish yellow; ring not blackening. Cap 30-100 mm, hemispherical, then convex to expanded; universal veil forming loose, whitish to buff fragments on the cap; gills white; stem 40-120 x 5-20 mm, cylindrical to clavate with a 20-40 mm broad, rounded basal bulb; ring white; smell potato-like. Sp 8-10 x 7-9 μm , subglobose. In deciduous and coniferous forests; summer to autumn; very common in temp.-hemib. common in southern bore.; DK (LC), FI (LC), NO (LC), SE (LC). – C&D 855, Phil 147d, R&H 400, Svp 48:21, Ves 265, ☉.

A. citrina (Schaeff.) Pers. f. *citrina* (*A. mappa* (Batsch) Quél.)

f. *alba* (Pers.) Quél. differs in being pure white. DK, NO, SE. – B&K 4:147, Däh 475, FE 9: phot. 88, Phil 147c.

5. Flesh very slowly turning brownish red when bruised and where eaten by slugs and larvae. Cap 50-150 mm, hemispherical, then convex to expanded, reddish buff to pale reddish brown; universal veil forming loose, whitish to reddish brown fragments on the cap; gills white; stem 60-150 x 15-40 mm, cylindrical to clavate with a rounded basal bulb; ring white, striate; smell indistinct. Sp 8-9 x 6-7 μm , broadly ellipsoid. Under deciduous trees and conifers; summer to autumn; very common in temp.-hemib., common in bore., occasional in suba.; DK (LC), FI (LC), NO (LC), SE (LC). – C&D 842, FE 9: phot. 83, Phil 143d, R&H 401, Ves 268, ☉. – Edible.

A. rubescens (Pers.: Fr.) Gray f. *rubescens*

f. *alba* (Coker) Sartory & Maire differs in being white. DK, NO. – Däh 475, FE 9: phot. 84, pl. 86.

- Flesh unchanged or turning brown where eaten by slugs and larvae 6
- 6. Gills pale greyish buff or greenish; universal veil forming acute, persistent scales on the cap. Cap 30-90 mm, hemispherical, then convex to expanded, greyish cream to greyish buff; universal veil whitish to pale buff; stem 40-80 x 15-40 mm, clavate with widened, but pointed-radicating base with concentric scales, whitish to greyish white; ring whitish; smell indistinct or earthy. Sp 9-12 x 6-8 μm , ellipsoid. In *Fagus* forests on limestone; summer to autumn; very rare in temp.; DK (EN). – B&K 4:158, Däh 480, FE 9: phot. 45, Svp 22:1, Ves 267.

A. solitaria (Bull.: Fr.) Mérat (*A. echinocephala* (Vittad.) Quél.)

- Gills white; remnants of universal veil on cap polygonal, wart-like or floccose, persistent or fugacious 7
 - 7. Bright yellow colours present on cap margin, ring margin or stem base. Cap 50-100 mm, hemispherical, then convex to expanded, cream to buff yellow; universal forming loose, yellowish to buff fragments on the cap; gills white; stem 50-100 x 10-20 mm, cylindrical to clavate with a bulbous base, white; ring whitish; smell indistinct. Sp 8-10 x 6-7 μm , ellipsoid. In deciduous forests and parks on limestone or rich soil; summer to autumn; rare in temp.; DK (NT), SE (VU). – GBW 4:37, Phil 146b, R&H 401, SMT26(2):53, Ves 269.
- A. franchetii* (Boud.) Fayod (*A. aspera* (Pers.) Pers. s. auct.)
- Without yellow colours 8
 - 8. Cap 80-200 mm, whitish to pale sordid greyish; universal veil forming large, whitish to greyish, polygonal to amorphous, sometimes fluffy scales on the cap. Cap hemispherical, then convex to expanded; gills white; stem 100-200 x 20-30 mm, cylindrical to clavate with a bulbous base, white; ring white; smell indistinct. Sp 10-13.5 x 7-8.5 μm , ellipsoid. On calcareous soil under deciduous trees; late summer to late autumn; rare in temp.; DK (VU), SE (VU). – C&D 843, Däh 479, FE 9: phot. 49, pl. 52-53, Phil 146c, Ves 267, ☉.
- A. strobiliformis* (Vittad.) Bertill.
- Cap 30-140 mm, buff to greyish brown; universal veil forming whitish to greyish warts or patches on the cap. Cap hemispherical, then convex to expanded; gills white; stem 60-140 x

8-25 mm, cylindrical to clavate with a bulbous base, whitish, often with brown spots at base; ring whitish, striate; smell indistinct or faintly potato-like. Sp 7-10 × 6-8 μm, subglobose (fig. 333C). In deciduous and coniferous forests, parks, etc.; summer to autumn; common in temp.-hemib., occasional in southern bore.; DK (LC), FI (LC), NO (LC), SE (LC). – C&D 841, FE 9: phot. 75-77, pl. 82-87, Phil 142a, R&H 402, Ves 268, .

A. excelsa (Fr.: Fr.) Bertill. f. *excelsa* (*A. spissa* (Fr.) P. Kumm.)

f. *alba* (Quél.) Neville & Poumarat differs in being white; DK, NO (Hedm: Strange). – FE 9: phot. 78.