Two new species of *Amanita* (Basidiomycota) from China

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Two new species of the genus *Amanita* (Agaricales) are described from China. *Amanita griseofolia* is a member of section *Vaginatae*, while *Amanita griseoverrucosa* is a representative of section *Lepidella*. They are compared with similar species and illustrated with colour photos and line drawings.

Taxonomical novelties: *Amanita griseofolia* Zhu L. Yang, *Amanita griseoverrucosa* Zhu L. Yang

The genus *Amanita* (Agaricales) in China has received much attention in the last ten years (YANG 1994, 1997, YANG, WEIß & OBERWINKLER 2004). Recent collecting and study led to the recognition of two undescribed species which are common and widely distributed in the country. They are described and illustrated herein.

Material and methods

Specimens studied are deposited in several herbaria as indicated after the collection data. Herbarium codes used follow HOLMGREN, HOLMGREN & BARNETT (1990) with one exception, which is not listed in the index: HKAS = Herbarium of Cryptogams, Kunming Institute of Botany, Chinese Academy of Sciences. Methodology and notation follow those of YANG (1997) and YANG, WEISS & OBERWINKLER (2004). Color names with first letters capitalized are from RIDGEWAY (1912); color codes of the form „4B1–2" are from KORNERUP & WANSCHER (1981).

Taxonomy

Amanita griseofolia Zhu L. Yang, **sp. nov.** Figs. 1–7

Amanita ceciliae sensu Zhu L. Yang, Biblioth. Mycol. 170: 116, 1997, *p. p.*

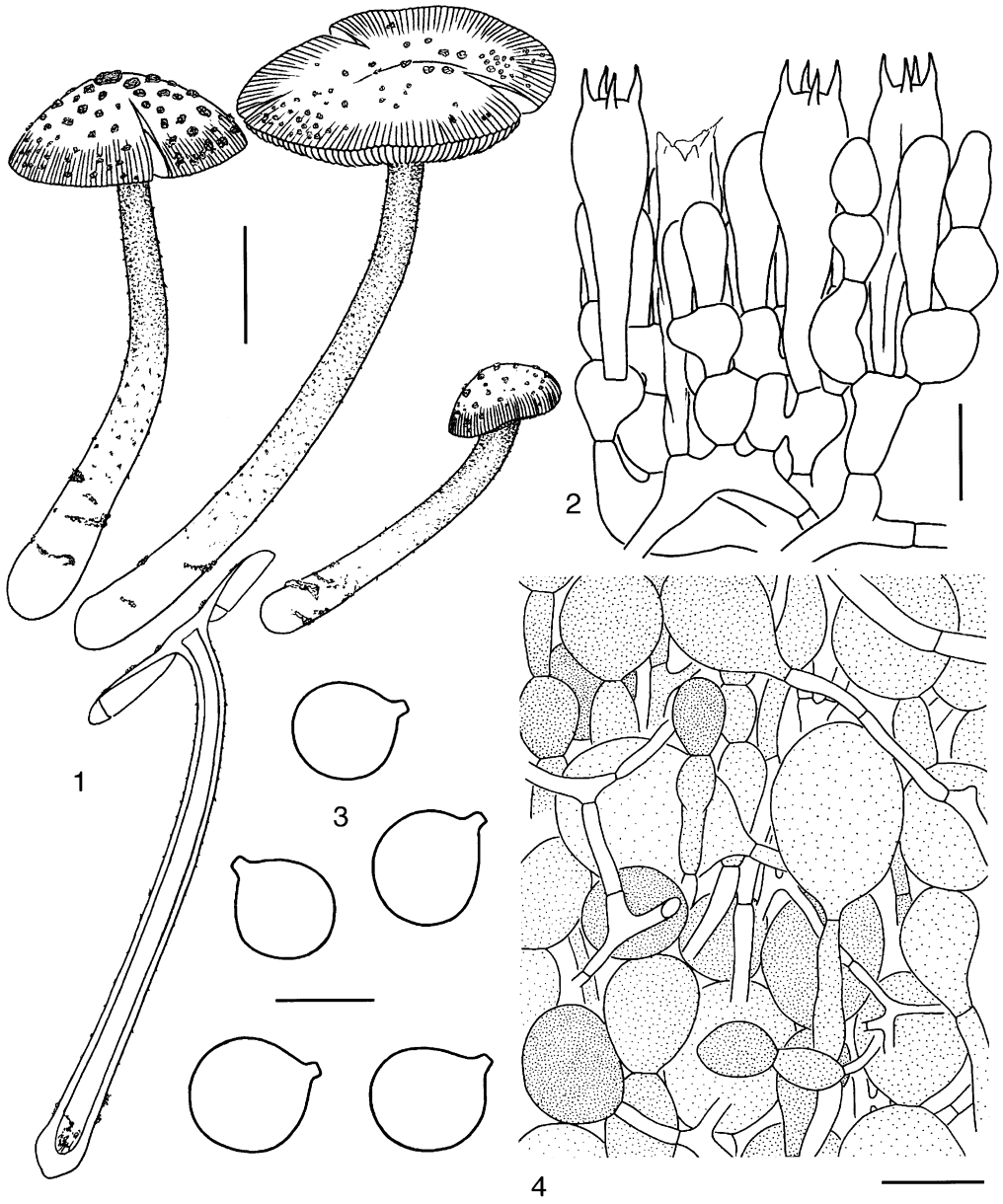
Pileus 3–7 (10.5) cm diametro, convexus vel applanatus, obscure umbonatus vel non-umbonatus, griseo-brunneus vel brunneo-griseus, non luteus, non flavus, non ochraceus, margine sulcata (0.2–0.4R), non appendiculata, reliquiis volvae coactis, flocculosis vel verrucosis, griseis vel atrogriseis ornatus. Lamellae liberae, griseolae vel griseae, confertae; lamellulae truncatae. Stipes (6) 8–17 x 0.5–1.5 cm, subcylindricus vel sursum attenuatus, haud bulbosus, albidus, cavus, squamellis griseis, fibrilloseis vel farinoseis, exannulatus, volvatus. Volva grisea vel atrogrisea, verrucolosa. Caro albida. Basidia 4-sporigera. Basidiosporae (9.5) 10.0–13.5 (16.5) x (8.5) 9.5–13.0 (15.0) µm, globosae vel subglobosae, non amyloideae. Fibulae absentes.

Holotype: China, Yunnan, Kunming, Heilongtan, 1980 m asl., on soil in forest dominated by *Quercus* sp., *Pinus armandi*, and *P. yunnanensis*, 27. 6. 2001, Z. L. Yang 3081 (HKAS 38159).

Etymology: *griseofolia* – referring to the greyish to grey lamellae.

Basidiocarps (Figs. 1, 5–7) small to medium-sized, rarely large. Pileus 3–7 (10.5) cm diam, at first nearly campanulate to hemispherical, then convex to plano-convex, without an umbo or slightly umbonate, brownish grey to grey-brown [Natal Brown, Buffy Brown, Snuff Brown, Medal Bronze, 4B1–2, 5C2–4, 5D2–4, 5E3–5], darker over disc, becoming somewhat paler towards the margin, lacking any yellow or ochreous tint at all stages of development; margin tuberculate-striate (0.20–0.43R), non-appendiculate; volval remnants grey to dark grey [Iron Gray, somewhat darker than Smoke Gray, 4C1–2, 4D1–2, 4E1–2], verrucous to felty or farinose, sometimes irregularly formed, 0.5–1.5 mm thick, easily washed away by rain; trama thin, 2–5 mm thick, white to whitish, unchanging. Lamellae free, crowded, whitish [Cream Color, 1A1–2], but soon becoming greyish to grey [Pale Smoke Gray to Light Drab, paler than 5D2], often becoming somewhat darker when dried; lamellar edges grey to dark grey [Iron Gray, darker than Smoke Gray, 4E1–2, 5E1–3]; lamellulae truncate to subtruncate, plentiful, evenly distributed. Stipe (6) 8–17 x 0.5–1.5 cm, subcylindric or slightly tapering upward, with apex slightly expanded, white to dirty white, lower half covered with grey to greyish [Pale Smoke Gray, 4D2] fibrillose squamules, upper half densely covered with grey farinose squamules, fistulous; context white to dirty white, unchanging; basal bulb lacking; volval remnants felty to granular or verrucous, grey to dark grey [Iron Gray, Smoky Gray, Drab, 4E1–2, 5E1–3], arranged irregularly or sometimes in incomplete belts or rings at stipe base. Annulus lacking. Smell indistinct.

Lamellar trama ± bilateral. Mediostratum 30–40 µm wide, composed of fairly abundant, long ellipsoid to subfusiform inflated cells (70–90 x 15–20 µm) and abundant interwoven, often anastomosing, 3–7 µm wide filamentous hyphae; vascular hyphae rare. Lateral stratum composed of fairly abundant, long ellipsoid to subfusiform inflated cells (40–60 x 10–15 µm), diverging at an angle of ca. 30° to mediostratum; filamentous hyphae fairly abundant to abundant, 3–7 µm wide, frequently branching, interwoven, sometimes anastomosing; vascular hyphae rare, 3–9 µm wide. Subhymenium (Fig. 2) 30–50 µm thick, with 2–3 (4) layers of subglobose to ovoid or shortly ellipsoid cells, 12–25 x 10–20 µm, occasionally mixed with hardly inflated cells. Basidia (Fig. 2) 40–70 x 15–20 µm, clavate, 4-spored; sterigmata 5–7 µm long; basal septa without clamps. Basidiospores (Fig. 3) [456/28/22] (9.5) 10.0–13.5 (16.5) x (8.5) 9.5–13.0 (15.0) µm [Q = 1.0–1.10 (1.18), Q = 1.04 ± 0.03], globose to subglobose, rarely broadly ellipsoid, inamyloid, colorless, hyaline, thin-walled, smooth; apiculus ca. 1 µm long. Lamellar edge as sterile, gelatinized, yellow-brown strip up to 250 µm wide in side view, predominantly composed of ovoid to subglobose, sometimes sphaeropedunculate inflated cells (20–50 x 15–35 µm), single and terminal or in chains of 2–3, colorless and hyaline, or with yellowish brown vacuolar pigments; filamentous hyphae fairly abundant to scattered, 2–7 µm wide, colorless and hyaline, sometimes with brownish vacuolar pigments, irregularly arranged or ± running parallel to the lamellar edge, elements embedded in yellow-brown amorphous matrix gradually disappearing in KOH. Pileipellis 50–100 µm thick; upper layer (20–60 µm thick) strongly gelatinized, composed of ± radially and moderately compactly arranged, 1–4 µm wide, thin-walled, colorless or brownish vacuolar pigmented filamentous hyphae; lower layer (30–50 µm thick) composed of radially and compactly arranged, 3–8 (15) µm wide filamentous hyphae with brownish yellow, vacuolar pigments; terminal cells present, 5–10 µm wide, hardly inflated; vascular hyphae rare. Volval remnants on pileus (Fig. 4) composed of ± vertically (over disc) to irregularly (on other parts of the pileus) arranged elements. Inflated cells very abundant to dominant, subglobose, ovoid to shortly ellipsoid (20–70 x 15–50 µm), sometimes broadly clavate (40–60 x 20–30 µm) or sphaeropedunculate (50–80 x 25–45 µm), often in chains of 2–3 and then terminal, thin- to slightly thick-walled (up to 0.5 µm thick), often with brownish yellow vacuolar pigments; filamentous hyphae scattered to fairly abundant, 2–7 µm



Figs 1–4. *Amanita griseofolia* (from the holotype). **Fig. 1.** Basidiocarps. **Fig. 2.** Hymenium and subhymenium. **Fig. 3.** Basidiospores. **Fig. 4.** Longitudinal section of volval remnant from pileal disc. Scale bars: 1 = 3 cm, 2 = 20 µm, 3 = 10 µm, 4 = 30 µm.

wide, frequently branching, often anastomosing, thin-walled, colorless and hyaline, sometimes with brownish yellow vacuolar pigments; vascular hyphae rare, 2–8 µm wide. Volval remnants on stipe base similar to those on the pileus, but inflated cells and filamentous hyphae irregularly arranged. Stipe trama composed primarily of longitudinally arranged, long clavate, terminal cells, 250–350 x 25–40 µm; filamentous hyphae 2–7 µm wide, scattered (in interior) or abundant (on stipe surface); vascular hyphae rare, 2–10 µm wide. Clamps absent in fruitbody.

Specimens examined: CHINA, Beijing, Tanzhesi, on soil, 25. 7. 1958, S. C. Teng 6063 (HMAS 22610); Beijing, Tanzhesi, on soil, 29. 7. 1959, W. X. Wang and X. L. Kong 74 (HMAS 26499); Hainan, Changjiang, Bawangling, 1350 m asl., on soil in broad-leaved forest, 24. 8. 1990, Q. Chen (GDGM 16689); Hainan, Ledong, Jianfengling, 900 m asl., on soil in broad-leaved forest, 25. 9. 1987, Z. S. Bi and T. H. Li (GDGM 12414); Henan, Shiziping, on soil, 26. 8. 1968, H. Z. Li et al. 162b (HMAS 35975b); Jilin, Antu, Changbaishan, 1750 m asl., on soil, 5. 8. 1960, Y. C. Yang et al. 564 (HMAS 29135); Jilin, Antu, Changbaishan, no date, Z. X. Xie 820373 (IFP); Xizang (Tibet), Bomi, Galongla, 3000 m asl., on soil in forest, 24. 8. 1982, X. L. Mao 227 (HMAS 51439).Yunnan, Chuxiong, Zixishan, 2400 m asl., on soil under trees of *Lithocarpus* sp. and *Pinus armandi*, 2. 8. 2001, Z. L. Yang 3144 (HKAS 38321); Yunnan, Guangnan, Maojie, 1500 m asl., 27. 6. 1959, Q.Z. Wang 688 (HMAS 26498); Yunnan, Kunming, 17. 6. 1973, Y. C. Zong et al. 155 (HMAS 36284); Yunnan, Kunming, on soil, 30. 6. 1973, Q. M. Ma et al. 285 and Y. C. Zong et al. 285 (HMAS 36036 and 37441 respectively); Yunnan, Kunming, Dapiji, on soil under trees of *Quercus* sp., 8. 7. 1942, W. F. Chiu 8216 (HMAS 4216); Yunnan, Kunming, Heilongtan, 21. 8. 1987, Y. Xuan 1385 (HKAS 18318); Yunnan, Kunming, Heilongtan, 1980 m asl., on soil in forest dominated by *Quercus* sp., *Pinus armandi*, and *P. yunnanensis*, 27. 6. 2001, Z. L. Yang 3081 (HKAS 38159, HOLOTYPE); Yunnan, Kunming, Heilongtan, on soil in forest with species of *Quercus* and *Pinus*, 30. 6. 1991, Z. L. Yang 1074 (HKAS 24219); Yunnan, Kunming, Heilongtan, 1980 m asl., on soil under trees of *Picea* sp., 4. 9. 1999, Z. L. Yang 2628 (HKAS 34081); Yunnan, Kunming, Jindian, 1700 m asl., on soil, 29. 9. 1995, Z. L. Yang 2199 (HKAS 29630); Yunnan, Kunming, Jindian, on soil under *Pinus* sp., 4. 8. 1995, M. Wang 3 (HKAS 32507); Yunnan, Songming, Liangyushan, on soil in forest, 17. 9. 1979, G. H. Feng 13 (HKAS 4646); Yunnan, Yingjiang, Xima, 1700 m asl., on soil under trees of *Lithocarpus* sp., 16. 7. 2003, Z. L. Yang 3708 (HKAS 42894).

Notes: *Amanita griseofolia*, a member of *Amanita* subgenus *Amanita* section *Vaginatae* (Fr.) Quél. in the sense of YANG (1997), is characterized by its small to medium-sized, slender fruitbody with grey to dark grey, felty to verrucose or farinose, easily removed volval remnants on a grey, dark grey to brownish grey pileus, greyish to grey lamellae, a slender greyish stipe, felty to granular or verrucose, grey to dark grey volval remnants in incomplete belts around the non-bulbous stipe base, and globose to subglobose, inamyloid basidiospores.

HKAS 4646, 18318, 24219, and 32507, as well as HMAS 4216 and 36284 were regarded as *A. ceciliae* by YANG (1997). However, *A. ceciliae* (Berk. et Broome) Bas, originally described from Europe, differs from *A. griseofolia* by its much more robust fruitbody with a yellow-brown, reddish brown to grey-brown or olive-brown pileus covered with lighter colored (greyish to brownish) volval remnants, white lamellae with white edges, and a relatively thicker stipe. Furthermore, the volval remnants at the base of the stipe of *A. ceciliae* often form a ring-zone above a strangulate region and a floccose, nearly cupulate structure at the very base of the stipe (PHILLIPS 1990, BREITENBACH & KRÄNZLIN 1995), and there are more filamentous hyphae in the volval remnants of European *A. ceciliae* [France, Jura, near Noga, 2. 10. 1992, C. Bas 9341 (L)] than in *A. griseofolia*. The basidiospores of *A. ceciliae* are slightly larger than those of *A. griseofolia* (TULLOSS, OVREBO & HALLING 1992, BREITENBACH & KRÄNZLIN 1995).

Amanita griseofolia is also similar to *A. beckeri* Huijsman ex Huijsman, *A. cinctipes* Corner et Bas, *A. sororcula* Tulloss, Ovrebo et Halling, and *A. liquii* Zhu L. Yang, M. Weiß et Oberw. However, *Amanita beckeri,* originally described from Europe, differs from *A. griseofolia* by its differently

Figs 5–9. Basidiocarps of *Amanita griseofolia* and *A. griseoverrucosa*. **Figs 5–7.** *Amanita griseofolia* (Figs 5–6 HKAS 34081, Fig. 7 HKAS 42894). **Figs 8–9.** *Amanita griseoverrucosa* (HKAS 36587). Scale bars: all = 3 cm.

colored pileus, white volval remnants browning in age, but never becoming grey or darker, white to cream lamellae with brownish spots in age, and smaller basidiospores (HUIJSMAN 1962a, 1962b, TULLOSS 1994).

Amanita cinctipes, originally described from Singapore, is distinguished from *A. griseofolia* by its abundant volval remnants on the base of the stipe forming 2–4 rings, much thinner pileipellis, smaller basidia, and smaller basidiospores (CORNER & BAS 1962).

Amanita sororcula, originally described from Colombia, South America, differs from *A. griseofolia* by its smaller fruitbody, thinner pileipellis with common vascular hyphae, and somewhat smaller and less perfectly globose basidiospores (TULLOSS, OVREBO & HALLING 1992).

Amanita liquii, originally described from southwestern China, differs from *A. griseofolia* by its larger, much more robust and fleshier fruitbody with a dark brown to blackish pileus covered with thicker and darker volval remnants, thicker pileipellis, somewhat larger basidia, and larger basidiospores. Furthermore, the pigment in the cells of volval remnants of *A. liquii* is much darker than the similarly located pigment in *A. griseofolia*, and the volval remnants at the stipe base of *A. liquii* are more abundant than those of *A. griseofolia* (YANG, WEISS & OBERWINKLER 2004).

Amanita griseoverrucosa Zhu L. Yang ex Zhu L. Yang, **sp. nov.** Figs. 8–13

Protonym: *Amanita griseoverrucosa* Zhu L. Yang, Biblioth. Mycol. 170: 155, Abb. 126–129, 1997 (nom. inval.; as "nom. prov.", no Latin descr.)

Pileus (5) 7–15 cm latus, convexus vel applanatus, griseolus, deinde albidus, reliquiis volvae verrucosis vel conicis, 1–3 mm latis et altis, griseolis vel griseis ornatus, margine appendiculata, non striata. Lamellae liberae, albae, confertae, lamellulis attenuatis. Stipes 6–15 x 0.7–3 cm, subcylindricus, albus, albidus vel griseolus, annulatus, squamellis griseolis vel griseis ornatus; Bulbus fusiformis vel subglobosus, 1.5–4 (5) cm latus, reliquiis volvae verrucosis, griseis. Annulus albus vel albidus, apicalis vel subapicalis, fragilis. Caro alba. Basidia 4-sporigera. Basidiosporae (7.0) 8.0–11.0 (13.5) x (4.5) 5.5–7.0 (9.0) µm, ellipsoideae, interdum lato-ellipsoideae vel elongatae, amyloideae. Fibulae absentes.

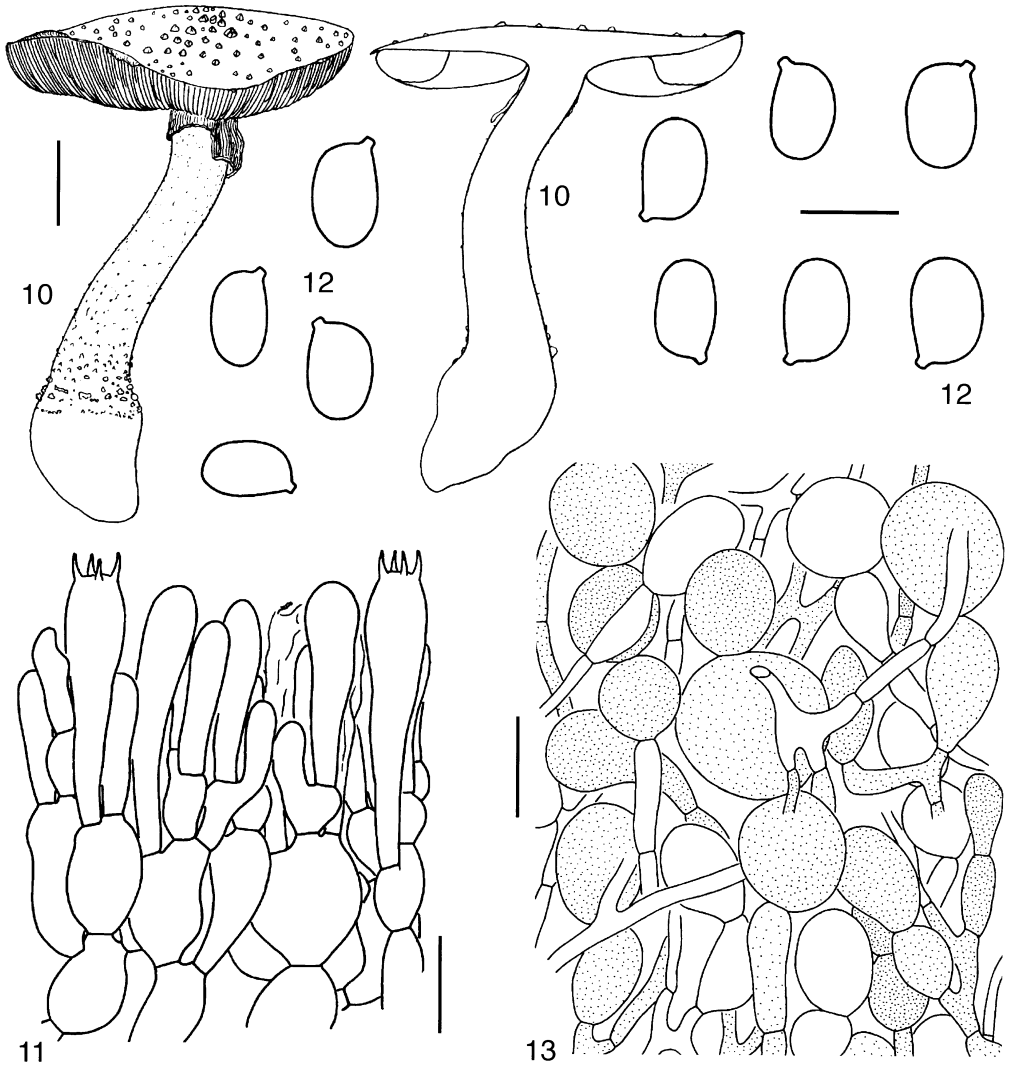
Holotype: China, Yunnan, Kunming, Heilongtan, 1980 m asl., on soil, 14. 9. 2001, Z. L. Yang 3200 (HKAS 38459).

Basidiocarps (Figs. 8–10) medium-sized to large. Pileus (5) 7–15 cm in diam., convex to applanate, dirty white to greyish [Pale Smoke Gray, paler than 4B1–2], sometimes grey [Smoke Gray], covered with grey to greyish [Smoke Gray to Pale Gray, 4B1–2, 4D1–2], verrucous to conical volval remnants 1–3 (4) mm wide and high, apical parts of volval remnants sometimes becoming whitish when mature (probably bleached by rain); margin smooth, appendiculate; context white, unchanging. Lamellae nearly free, white to very pale cream [paler than Cream Color, 1A1–2], crowded, up to 1.5 cm in height; lamellulae attenuate. Stipe 6–15 x 0.7–3 cm, subcylindric or slightly attenuate upwards, annulate, surface white to whitish or greyish [paler than Pale Smoke Gray, much paler than 4B1–2], lower part covered with grey to greyish [Pale Gray, 4B1–2], fibrillose squamules, upper part covered with white farinose squamules; context white, stuffed; bulb ventricose to subglobose, 1.5–4 (5) cm wide, subradicate, upper part of bulb and basal part of stipe covered with grey to greyish, verrucous or irregularly formed volval remnants. Annulus apical to subapical, white to whitish, friable. Odour none.

Lamellar trama bilateral; mediostratum 30–50 µm wide, made up of long ellipsoid to fusiform cells (50–120 x 10–20 µm), mixed with fairly abundant, branching, filamentous hyphae, 2–7 (12) µm wide; vascular hyphae rare, occasionally locally conspicuous. Lateral stratum made up of fusiform to clavate cells (35–90 x 10–22 µm), mixed with fairly abundant to abundant, filamentous hyphae,

3–7 µm wide, diverging at an angel of 30°–60° to the central stratum; clamp-connexions absent. Subhymenium (Fig. 11) 30–45 (55) µm thick, with 2–3 (4) layers of subglobose, ovoid to broadly ellipsoid cells, 12–25 (30) x 10–20 µm, sometimes mixed with a few hardly inflated cells. Basidia (Fig. 11) 40–65 x (8) 10–13 µm, clavate, 4-spored, rarely 1- or 3-spored; sterigmata 3–5 µm long; basal septa without clamp-connexions. Basidiospores (Fig. 12) [500/22/18] (7.0) 8.0–11.0 (13.5) x (4.5) 5.5–7.0 (9.0) µm [Q = (1.12) 1.27–1.75 (2.0), Q = 1.50 ± 0.14], mostly ellipsoid, occasionally broad ellipsoid or elongate, rarely subglobose, colourless, hyaline, thin-walled, amyloid; apiculus small. Lamellar edge mainly consisting of sphaeropedunculate to pyriform (20–26 x 14–16 µm) or clavate cells (30–45 x 12–16 µm), single and terminal, or in chains of 2–3 and then terminal; mixed with scattered filamentous hyphae, 3–6 µm wide. Pileipellis hardly to slightly differentiated, 40–70 µm thick, made up of ± radially arranged, filamentous hyphae, 2–8 (12) µm wide, colourless and hyaline, occasionally with brownish to yellowish vacuolar pigments, not or barely gelatinized; vascular hyphae rare, 5–10 µm wide. Volval remnants on pileus (Fig. 13) made up of ± vertically arranged elements: inflated cells abundant to very abundant, subglobose to ovoid (20–70 x 15–60 µm), sometimes ellipsoid (40–60 x 18–40 µm), thin-walled, with brownish to greyish vacuolar pigmentation, sometimes colourless and hyaline, often in chains of 2–3 (4); filamentous hyphae fairly abundant, 2–9 µm wide, frequently branching, colourless and hyaline or with brownish to greyish vacuolar pigmentation; vascular hyphae rare, occasionally locally conspicuous, 3–10 µm wide. Elements in the base of volval remnants irregularly arranged: inflated cells abundant, ellipsoid to fusiform (30–90 x 25–50 µm) or ovoid to subglobose (30–55 x 25–40 µm), often with brownish to greyish vacuolar pigments; filamentous hyphae fairly abundant to abundant, 2–9 µm wide, with brownish to greyish vacuolar pigments. Volval remnants on the upper bulb of stipe composed of ± irregularly arranged elements: inflated cells abundant, subglobose (20–50 x 17–48 µm) to ellipsoid (35–95 x 14–50 µm) or clavate (50–75 x 15–30 µm), mixed with abundant filamentous hyphae. Stipe trama primarily composed of longitudinally arranged, long clavate, terminal cells (200–360 x 15–30 µm), mixed with scattered (in interior) to abundant (on stipe surface) filamentous hyphae, 2–8 µm wide; vascular hyphae rare to locally conspicuous, 3–10 µm wide. Annulus composed of very abundant clavate to broadly clavate or pyriform inflated cells (30–70 x 12–20 µm), usually single and terminal, thin-walled, colourless and hyaline, mixed with fairly abundant, thin-walled, colourless, filamentous hyphae 2–10 µm wide.

Specimens examined: CHINA, Fujian, Sanming, Yangshan, on soil, 13. 8. 1974, H. Z. Li et al. 215 (HMAS 37396); Guangdong, Boluo, Luofushan, 1000 m asl., on soil, 17. 6. 1987, G. Li (GDGM 12011); Guangdong, Dapu, Fengxi, 550–600 m asl., on soil in broad-leaved forest, 28. 5. 1986, R. Z. Tong (GDGM 10568); Guangdong, Guangzhou, Yihua, on soil in mixed forest with *Pinus massoniana* and *Lithocarpus* spp., 2. 9. 1999, Y. L. Chen et al. 16 (HKAS 37168); Fengkai, Heishiding, 3300 m asl., on soil in mixed forest, 5. 8. 1986, T. H. Li (GDGM 11458); Guangdong, Longmen, Nankunshan, on soil, 7. 7. 1987, Q. Chen (GDGM 12072); Hainan, Changjiang, Bawangling, 1000 asl., on soil in broad-leaved forest, 14. 6. 1989, Q. Chen (GDGM 15214); Jiangsu, Linggusi, on soil in broad-leaved forest, 17. 8. 1957, S. C. Teng 4907 (HMAS 20335); Sichuan, Mianning, Lingshansi, 2400 m asl., on soil in forest with species of *Castanopsis* and *Quercus*, 22. 9. 1999, Z. L. Yang 2719 (HKAS 34185); Yunnan, Jingdong, Fenghuangshan, 1260 m asl., on soil under trees of *Pinus kesiya* var. *langbianensis*, 25. 8. 1991, Z. L. Yang 1633 (HKAS 24182); Yunnan, Jingdong, near the city Jingdong, on soil, 30. 7. 1998, X. H. Wang 526 (HKAS 32878); Yunnan, Jinggu, Yongping, 1800 m asl., on soil in pine forest, 20. 8. 1994, S. Uchiyama (TNS-F-175877); Yunnan, Kunming, Heilongtan, 1980 m asl., on soil, 14. 9. 2001, Z. L. Yang 3200 (HKAS 38459, HOLOTYPE); Yunnan, Lijiang, Laojunshan, 3400 m asl., on soil in forest with species of *Picea*, *Quercus*, and *Rhododendron*, 16. 8. 2000, Z. L. Yang 2935 and 2943 (HKAS 36587 and 36593 respectively); Yunnan, Luxi, Chenguan, on soil in forest with species of Pinaceae and Fagaceae, 3. 7. 1997, X. J. Li 74 (HKAS 3665); Yunnan, Simao, Caiyanghe, 1600 m asl., on soil under trees of Fagaceae, 19. 6. 2000, M. Zang 13880 (HKAS 36202); Yunnan, Yiliang, near the city Yiliang, on soil, 1. 9. 1999, Z. L. Yang 2626 (HKAS 34070).



Figs 10–13. *Amanita griseoverrucosa* (from the holotype). **10.** Basidiocarp. **11.** Hymenium and subhymenium. **12.** Basidiospores. **13.** Longitudinal section of volval remnant from pileus. Scale bars: 10 = 3 cm, 11 = 20 µm, 12 = 10 µm, 13 = 30 µm.

Notes: *Amanita griseoverrucosa*, belonging in *Amanita* subgenus *Lepidella* (J.-E. Gilbert) Veselý emend. Corner et Bas sect. *Lepidella* (YANG 1997), is characterized by its medium-sized to large fruitbody with a dirty white to greyish pileus covered with grey to greyish, verrucous to conical, volval remnants, a fugacious annulus, broad ellipsoid to ellipsoid, amyloid basidiospores, and the absence of clamps.

Amanita griseoverrucosa may be keyed out in subsect. *Solitariae* Bas stirps *Cinereoconia* of sect. *Lepidella* in the system of BAS (1969). In that stirps, *A. griseoverrucosa* is similar to *A. griseofari-*

nosa Hongo, *A. vestita* Corner et Bas, and *A. cinereoconia* G. F. Atk. *Amanita griseofarinosa,* originally described from Japan, has a smaller fruitbody with darker coloured, farinose to tomentose volval remnants on the pileus, and proportionally wider basidiospores. Furthermore, the volval remnants on the pileus of *A. griseofarinosa* consist of irregularly arranged elements with more inflated cells and fewer filamentous hyphae (YANG 1997, YANG & DOI 1999, YANG's unpublished data). *Amanita vestita*, originally described from Singapore, has a much smaller fruitbody with umber, buff to brownish floccose-felted volval remnants consisting of irregularly arranged elements, and slightly smaller basidiospores (CORNER & BAS 1962, BAS 1969, YANG, LI & WU 2001). *Amanita cinereoconia*, originally described from the USA, has a rather slender fruitbody with a pileus covered with pulverulent to small warted volval remnants, and longer and narrower basidiospores with higher Q. In addition, *A. cinereoconia* has a peculiar smell like "old ham" or "chloride of lime" (BAS 1969, JENKINS 1986).

Amanita griseoverrucosa looks like *A. japonica* Bas, *A. miculifera* Bas et Hatan., and *A. onusta* (Howe) Sacc. However, the latter three species have rather common clamps and were placed in different stirpes by BAS (1969) and BAS & HATANAKA (1984). Furthermore, *A. japonica* and *A. miculifera,* both originally described from Japan, usually have a much more strongly rooting bulb and darker coloured volval remnants on the pileus. *Amanita miculifera* additionally has somewhat larger basidiospores (BAS & HATANAKA 1984). *Amanita onusta*, described from the USA, has a smaller fruitbody with an often deeply rooting and sometimes sinuous or contorted bulb and a pileus with deeper coloured (dark grey to brownish grey or grey-brown) pyramidal to conical volval remnants (BAS 1969, JENKINS 1986, TULLOSS et al. 1995).

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