

## SHORT COMMUNICATION

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***Amanita concentrica*: a new species in *Amanita* section *Amanita* from Japan**

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**Abstract** *Amanita concentrica* sp. nov. is described from an evergreen broad-leaved forest of Chiba Prefecture with *Castanopsis cuspidata* var. *sieboldii* and *Quercus glauca*. The fungus is a medium to large, white to yellowish-white mushroom characterized by many pyramidal warts on pileus, striate margin of pileus, distinct ascending concentric rings at upper part of stipe bulb, and inamyloid basidiospores. It is considered to belong to the section *Amanita*.

**Key words** Agaricales · *Amanita concentrica* · Japan · Shiro-obi-tengutake · Taxonomy

Recently, an unidentified species of *Amanita* was found by Dr. T. Fukiharu in Chiba Prefecture, eastern Japan, from an evergreen broad-leaved forest with *Castanopsis cuspidata* (Thunb. ex Murray) Schottky var. *sieboldii* (Makino) Nakai and *Quercus glauca* Thunb. ex Murray. Here it is described as a new species, *Amanita concentrica*. Color names and codes (e.g., 1-3A1-2) in the description are according to Kornerup and Wanscher (1978).

***Amanita concentrica*** T. Oda, C. Tanaka & Tsuda, sp. nov.

Figs. 1–6

Pileus 6.0–13.6 cm latus, initio hemisphaericus, deinde convexus vel planus, saepe infundibuliformis, albus vel flavo-albus, margine striatus initio appendiculatus, verrucis numerosis pyramidalibus ornatus. Lamellae liberae vel remotae, confertae, 6–8 mm latae, albae; lamellulae truncatae vel subtruncatae. Stipes 7.5–12.2 × 1.0–2.1 cm, sursum attenuatus, basi globosus vel subclavatus, albus vel flavo-albus, superne pruinosis vel squamulosus, inferne squamosus, fistulosus vel solidus; basis bulbosa cum vestigio volvae, 2–5-gyroso concentrico praedita. Annulus saepe

pendens ad marginem pilei, membranaceus. Basidia 4-sporigera, interdum 2- vel 3-sporigera. Sporae (7.6–)8.0–10.0(–11.2) × 6.4–8.0(–8.4) μm, subgloboasae vel late ellipsoideae, inamyloideae.

Holotypus: 2 October 2000, T. Fukiharu FB-24901 (CBM).

Etymology: concentricus, referring to concentric rings at upper part of stipe bulb.

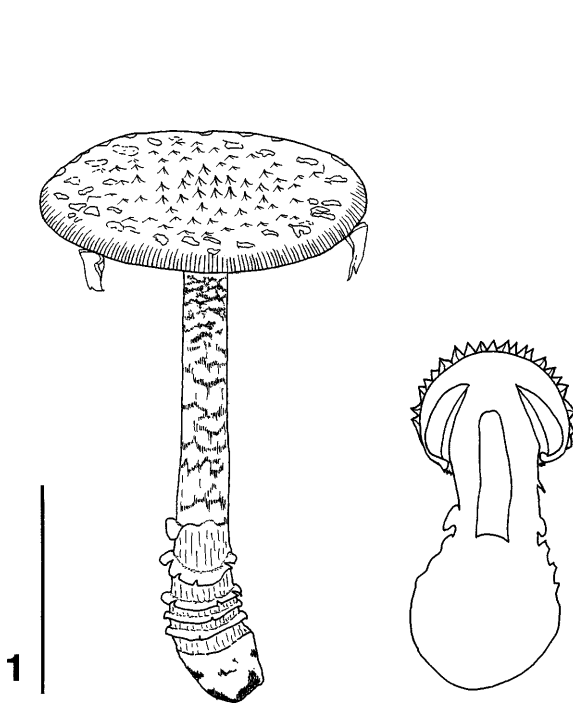
Pileus 6.0–13.6 cm in diameter, at first hemispherical, then convex to plane, often uplifted at margin when old, white to yellowish-white (1-3A1-2), decorated with many pyramidal volval warts, often becoming floccose patches toward margin of pileus, warts up to 3 mm high, up to 5 mm wide, white to yellowish-white, often discoloring to brownish-yellow, brownish-orange, grayish-orange to orange (5B-C4-8) toward tips of warts; margin striate (0.15–0.33 R), at first appendiculate with veil fragments attached, then often entire; trama white, 0.6–0.9 cm thick at the center. Lamellae free to remote, 6–8 mm broad, white, crowded; lamellulae truncate to subtruncate, in 2–6 ranks. Stipe 7.5–12.2 × 1.0–2.1 cm, attenuate upward, white to yellowish-white, upper part pruinose to fine scaly, lower part with large scales, hollow to stuffed; basal bulb globose to subclavate (2.4–3.5 × 1.2–3.3 cm); volval remnants at upper part of bulb as 2–5 distinct, ascending, concentric rings, grayish-yellow to grayish-orange (4-5B4-6). Annulus membranous, usually torn and becoming detached from stipe as the pileus expands, and often adherent to the pileus margin as appendiculate fragments.

Lamella trama bilateral. Mediostratum (about 50–70 μm wide) and lateral strata consisting of frequently branching, often clamped hyphae, 2–6 μm wide, and cylindrical, cylindro-clavate, clavate to subfusiform cells 50–140 × 10–27 μm; vascular hyphae rare or absent. Subhymenium about 10–50 μm thick, inflated-ramose, usually of 1–3 layers of variously inflated cells 8–22 × 4–13 μm, mainly ellipsoid, pyriform, clavate, doliiform, subfusiform to irregularly shaped. Basidia 43–60 × 8–12 μm, clavate, 4-spored, sometimes 2- or 3-spored; sterigmata 1–5 μm long; basal clamps present. Basidiospores [60 spores measured from 3 fruit-bodies] (7.6–)8.0–10.0(–11.2) × 6.4–8.0 (–8.4) μm, Q

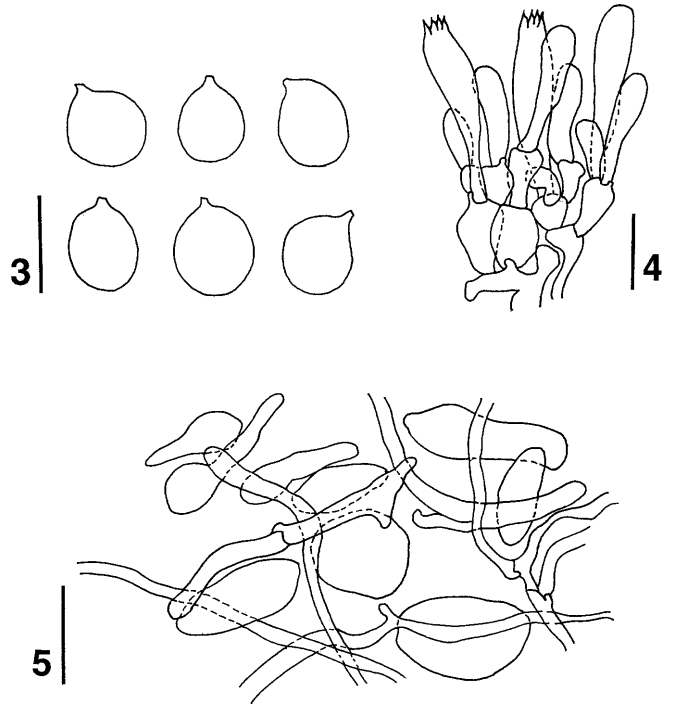
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(length/width ratio) = (1.00–)1.05–1.31 (–1.33),  $\bar{Q} = 1.19 \pm 0.08$ , subglobose to broadly ellipsoid, sometimes globose or ellipsoid, inamyloid, hyaline, smooth. Pileipellis about 240–400  $\mu\text{m}$  thick, two-layered; upper layer about 140–200  $\mu\text{m}$  thick, consisting of strongly gelatinized, interwoven, colorless hyphae, 1–5  $\mu\text{m}$  wide; lower layer about 80–200  $\mu\text{m}$  thick, consisting of interwoven, colorless hyphae, 2–10  $\mu\text{m}$  wide, with many clamps. Volval remnants on pileus mainly

consisting of variously inflated cells 17–80  $\times$  7–45  $\mu\text{m}$ , irregularly mixed with frequently branching, interwoven, often clamped, hyphae 2–7  $\mu\text{m}$  wide; vascular hyphae rare. Elements of volval remnants on stipe bulb similar to those on pileus, but with more frequent hyphae. Stipe trama of longitudinally arranged, clavate, cylindro-clavate to cylindrical cells (110–300  $\times$  26–45  $\mu\text{m}$ ), mixed with 2–6  $\mu\text{m}$  wide hyphae; vascular hyphae rare or absent; tissues in central



**Figs. 1, 2.** *Amanita concentrica*. 1 Mature fully expanded fruit-body (holotype). 2 Sectioned immature fruit-body (holotype). Bars 1 5 cm; 2 2.5 cm



**Figs. 3–5.** *Amanita concentrica* (holotype). 3 Basidiospores. 4 Hymenium and subhymenium. 5 Elements of volval warts on pileus. Bars 3 10  $\mu\text{m}$ ; 4 20  $\mu\text{m}$ ; 5 25  $\mu\text{m}$

**Fig. 6.** Mature and immature fruit-bodies of *Amanita concentrica* (holotype). Bar 5 cm



cylinder of stipe consisting of abundant inflated cells 25–90 × 18–35 μm, mainly ovate, clavate, pyriform to fusiform, irregularly mixed with frequently branching, interwoven, clamped hyphae, 3–10 μm wide. Annulus consisting of frequently branching, interwoven, clamped hyphae, 2–10 μm wide, irregularly mixed with variously inflated cells 24–90 × 12–50 μm.

Japanese name: Shiro-obi-tengutake.

Specimens examined: Japan; Arakashi-zawa, Kiyosumi-yama, Amatsu-kominato-cho, Awa-gun, Chiba Prefecture, altitude about 300m, in an evergreen broad-leaved forest with *Castanopsis cuspidata* (Thunb. ex Murray) Schottky var. *sieboldii* (Makino) Nakai and *Quercus glauca* Thunb. ex Murray, 2 October 2000, T. Fukiharu FB-24901 (Holotype, CBM), TNS-F-101526 (Isotype, TNS).

Distribution: Chiba (Japan).

Remarks: The gross morphology of *A. concentrica* is reminiscent of white members of the section *Lepidella* of the subgenus *Lepidella*, in particular those with pyramidal volval warts on the pileus, such as *A. cokeri* (J.-E. Gilbert & Kühner) J.-E. Gilbert f. *roseotincta* Nagas. & Hongo, *A. virgineoides* Bas, and others. However, the members of subgenus *Lepidella* have amyloid basidiospores and a

nonstriate pileus margin, differing from *A. concentrica*. *Amanita concentrica*, having inamyloid basidiospores, a striate pileus margin, and a bulbous stipe base, clearly belongs to the section *Amanita* of the subgenus *Amanita*. In this section, it is very similar to *A. muscaria* (L. : Fr.) Pers. var. *alba* Peck from North America. However, the latter differs in having larger, broadly ellipsoid to elongate basidiospores, which are (7.9–) 9.4–12 (–14.1) × (6.3–) 7–8.7 (–9.4) μm and have a Q value of 1.19–1.69 (average, 1.41), according to Jenkins (1977).

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## References

- Kornerup A, Wanscher JH (1978) *Methuen handbook of colour*, 3rd edn. Methuen, London  
 Jenkins DT (1977) A taxonomic and nomenclatural study of the genus *Amanita* section *Amanita* for North America. *Bibl Mycol* 57:1–126