

Short Communication

Amanita sinensis, new to Japan and Nepal

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An *Amanita* species, known as “haikagura-tengutake” in Japan and recently collected in Nepal, is identified as *Amanita sinensis*. Previously reported only from Southwest China, this species, distributed in Japan, Southwest China, and Nepal, is now considered to be a Southeast Asiatic element.

Key Words—*Amanita*; *Amanita sinensis*; Haikagura-tengutake; Japan; Nepal.

During the phylogenetical study of the genus *Amanita* Pres., we found an interesting *Amanita* species in Nepal that forms large gray fruit-bodies with farinose to floccose pileus and stipe surfaces. It was conspecific with the *Amanita* species provisionally named “haikagura-tengutake” in Japan (Hongo and Izawa, 1994; Imazeki et al., 1988; Koyama, 1992; Okino, 1999). Unfortunately, this “haikagura-tengutake” has remained unexplored taxonomically. In this study, we identify it with *Amanita sinensis* Z. L. Yang, reported only from Southwest China (Yang, 1997), and present a revised description based on specimens from Japan, Nepal and China, including a type specimen.

Macroscopic descriptions are based on fresh or freeze-dried specimens. Color codes follow Kornerup and Wanscher (1978). Microscopic observations were made in 3% KOH, based on heat-dried or freeze-dried specimens. If necessary, the material was stained with ammoniac 1% Congo Red solution, rinsed in 10% NH₄OH, and subsequently examined in 3% KOH. Spores were measured at 1,875 \times . Notation of spores follows Tulloss et al. (1992).

Amanita sinensis Z. L. Yang, Biblioth. Mycol. 170: 23, figs. 10–14. 1997. Figs. 1, 2

Pileus 7.0–14.0 cm in diam, at first hemispherical, then convex to plane, gray, dark gray, brownish gray (5B-F1, 5-6C-E2) in center, paler toward margin; volval remnants gray to dark gray, farinose to floccose, as small warts or patches (2–5 mm wide) in center, often smaller and thinner toward margin; margin fine striate (0.14–0.27 R). Lamellae free to remote, ca. 10 mm broad, white to cream white, crowded, with edge pruinose to floccose; lamellulae few, truncate. Stipe 10.7–26 \times 0.7–3.0 cm, almost cylindrical or tapering upward, with base slightly clavate, sometimes rooting, stuffed, gray at upper part, paler to white below, pruinose to floccose; volval remnants near base as floccose small warts; annulus

apical to subapical, white, membranous, deciduous. Flesh white, often gray near the surface. Smell unremarkable in dried specimens, like decayed fish in fresh specimens.

Lamella trama bilateral; lateral strata consisting of inflated cells, ellipsoid to elongate cylindrical or clavate (26–65 \times 17–30 μ m), sometimes subglobose to pyriform (11–40 \times 10–25 μ m), and frequent branching hyphae, 2–11 μ m wide, with many clamps, vascular hyphae 3–5 μ m wide, few; mediostratum ca. 30–60 μ m wide, similar to lateral strata. Subhymenium ca. 20–40 μ m thick, usually with 2–3 layers of inflated cells, subglobose, broadly ellipsoid, ellipsoid to elongate, often clavate, pyriform, barrel-form to spindle-form (8–28 \times 6–24 μ m). Basidia (120/8/8) 39–76 \times 10–18 μ m, clavate, 4-spored, sometimes 2-spored; sterigmata 2–6 μ m long; basal clamps present at ca. 30%. Basidiospores (n=160, 8 fruit-bodies, 8 specimens) (9.2–) 10.0–12.0(–12.4) \times (6.0–)6.8–8.8(–10.0) μ m (Q=(1.20–)1.30–1.61(–1.76), \bar{Q} =1.45 \pm 0.10), broadly ellipsoid to ellipsoid, sometimes elongate, not amyloid, hyaline, smooth, leptoderm. Lamella edge sterile, with many inflated cells projecting from hymenium, globose to subglobose (10–20 \times 9–20 μ m), broadly ellipsoid, ellipsoid, clavate, sphaeropedunculate to spindle-form (13–31 \times 8–21 μ m), sometimes elongate, cylindrical to bacilliform. Pileipellis hyphae cylindrical, often branching, interwoven, \pm radially arranged, 3–16 μ m wide, sometimes clamped; vascular hyphae 3–8 μ m wide, relatively frequent. Volval remnants on pileus consisting of elements \pm vertically oriented in center, toward margin irregularly arranged; inflated cells abundant, globose to subglobose (21–40 \times 19–39 μ m), broadly ellipsoid, ellipsoid to elongate (17–50 \times 14–35 μ m), cylindrical or spindle-form to bacilliform (32–125 \times 8–31 μ m), often in short chains; hyphae cylindrical, abundant, 1–5 μ m wide; vascular hyphae occasional, 2–5 μ m wide. Stipe trama of longitudinally arranged, mostly terminal, long clavate to cylindrical cells (70–340



Fig. 1. Fruit-bodies of *Amanita sinensis*. A: *A. sinensis* from Japan (LEM 980196). B: *A. sinensis* from Nepal (LEM 980174). Scale bars = 3 cm.

× 12–45 μm), mixed with 2–11 μm wide hyphae, rarely clamped; vascular hyphae present, but not so frequent, 3–15 μm wide. Annulus of many inflated cells (17–30 × 11–25 μm), broadly ellipsoid, ellipsoid, elongate, clavate, pyriform, sometimes globose; hyphae cylindrical, interwoven, 2–4 μm wide.

Specimens examined: Japan: Itoigawa-shi, Niigata Pref., 11 Aug. 1996, T. Oda (LEM 960255); Kutsukimura, Shiga Pref., elev. 200 m, 1 Aug. 1998, T. Oda and C. Tanaka (LEM 980196); Kutsuki-mura, Shiga Pref., elev. 200 m, 2 Aug. 1998, T. Oda and C. Tanaka (LEM 980227); Ichihara-shi, Chiba Pref., elev. 50–100 m, 15 Oct. 1994, Chiba Mycol. Club (CBM-FB-12189). China: Luoishan, Xichang, elev. 2000 m, 21 July 1992, P. Q. Sun (HKAS 25761, Typus); Yuanmou, Yunnan, 5. Aug. 1998, X. H. Wang (HKAS 32873). Nepal: Nagarkot, Kathmandu, elev. 1900 m, 11 July 1998, T. Oda (LEM 980113), Nagarkot, Kathmandu, elev. 1900 m, 11 July 1998, T. Oda (LEM 980120), Nagarkot, Kathmandu, elev. 1900 m, 26 July 1998, T. Oda (LEM 980174).

Habitat and distribution: Solitary or gregarious in small groups on the ground. Nepal, in plantation of *Pinus roxburghii* Sarg.; China (reported only from Southwest area), in coniferous and mixed forests with *Pinus* (e.g., *P. yunnanensis* Franchet) and *Quercus* (Yang, 1997); Japan, in deciduous broad-leaved and mixed forests with Fagaceae (e.g., *Fagus crenata* Blume, *Quercus mongolica* Fisch. var. *grosseserrata* Rehd. et Wils., *Q. serrata* Thunb.) and *P. densiflora* Sieb. et Zucc. In Japan, the occurrence of this species is confirmed in the following regions: Ibaraki Pref. (Imazeki et al., 1988), Chiba Pref. (CBM-FB-12189), Nagano Pref. (Imazeki et

al., 1988), Niigata Pref. (LEM 960255), Shiga Pref. (LEM 980196, LEM 980227) and Ehime Pref. (Okino, 1999).

Remarks: As Yang (1997) mentioned, *A. sinensis* belongs to section *Amanita* of subgenus *Amanita* based on its non-amyloid spores and more-or-less bulbous stipe base. At present, the edibility of this species is unknown. *Amanita sinensis* appears to have an ectomycorrhizal relationship with trees of Fagaceae and/or *Pinus* from the data on its habitat presented in this study and by Yang (1997). Hongo and Yokoyama (1978) defined the species which range from central or western Japan to the highlands of Southeast Asia (including the mountain sides of the Himalayas) as “Southeast Asiatic elements” in the Agaricales. *Amanita sinensis*, distributed in Japan, Southwest China and Nepal, is considered

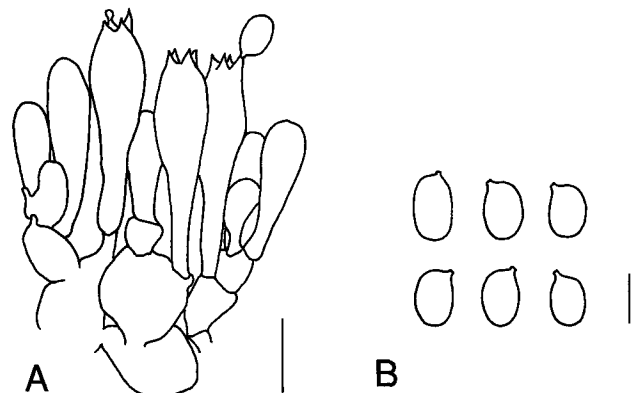


Fig. 2. *Amanita sinensis*. A: Hymenium and subhymenium. B: Basidiospores. Scale bars: A = 20 μm ; B = 10 μm .

one of these elements.

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Literature cited

- Hongo, T. and Izawa, M. 1994. Kinoko. Yama-Kei Publishers, Tokyo. (In Japanese.)
- Hongo, T. and Yokoyama, K. 1978. Mycofloristic ties of Japan to the continents. Mem. Shiga Univ. **28**: 76–80.
- Imazeki, R., Otani, Y. and Hongo, T. 1988. Fungi of Japan. Yama-Kei Publishers, Tokyo. (In Japanese.)
- Kornerup, A. and Wanscher, J. H. 1978. Methuen handbook of colour, 3rd ed. Eyre Methuen, London.
- Koyama, S. 1992. 150 species Poisonous fungi in Japan. Hoozuki, Nagano. (In Japanese.)
- Okino, T. 1999. Ehime-no-kinoko-zukan. Ehime Shinbunsha, Matsuyama. (In Japanese.)
- Tulloss, R. E., Ovrebo, C. L. and Halling, R. E. 1992. Studies on *Amanita* (Amanitaceae) from Andean Colombia. Mem. New York Bot. Gard. **66**: 1–46.
- Yang, Z. L. 1997. Die *Amanita*-Arten von Südwestchina. Biblioth. Mycol. **170**: 1–240.