

Haruki Takahashi

Two new species of Agaricales from southwestern islands of Japan

Received: January 15, 2004 / Accepted: July 29, 2004

Abstract Two new species of Agaricales are described and illustrated from Yaeyama Islands, southwestern Japan: (1) *Amanita rubromarginata* sp. nov. (section *Caesareae* Sing. ex Sing. in the subgenus *Amanita*), forming brownish-orange then reddish-yellow pileus, a pale yellow, squamulose stipe with a thin, membranous, reddish-orange annulus and a thick, saccate volva, and reddish-orange marginate lamellae, found in oak forests of Ishigaki Island; and (2) *Tylopilus obscureviolaceus* sp. nov. (section *Tylopilus*), having dark purple basidiomata, white, bitter, unchanging flesh, and a finely purplish-reticulate stipe, found in oak forests of Iriomote Island.

Key words Agaricales · *Amanita rubromarginata* · *Tylopilus obscureviolaceus*

Introduction

This paper reports two new species of Agaricales that occur in the lowland forests of Yaeyama Islands, southwestern Japan. These species are described and illustrated with photographs showing macromorphological features. Color notations in parentheses are taken from Kornerup and Wanscher (1978). Specimens cited are preserved in the Kanagawa Prefectural Museum of Natural History, Japan (KPM).

Species descriptions

1. *Amanita rubromarginata* Har. Takahashi, sp. nov.

Figs. 1, 2

Pileo 40–80 mm lato, primo cylindrico-campanulato, dein plano sed saepe subumbonato, fere ad centrum

sulcato-striato, glabro, primo aurantiaco vel brunneo-aurantiaco, dein marginem versus rubro-flavido, mox in centro griseo-flavido; carne albida, sub pellicula flavida; stipite 60–120 × 5–16 mm, subcylindraco, cavo, luteolo, rubro-aurantiaco squamuloso; annuli tenuis, rubro-aurantiaco; volva saccata, membranacea, albida; lamellis liberis, albis, margo rubro-aurantiaco fimbriato; basidiosporis 8–9 × 5.5–7 μm, late ovoidies vel breviter ellipsoideis, levibus, hyalinis, inamyloideis, tenuitunicatis; hyphis fibulatis.

Holotypus: Ad terram in silvis, Bannadake, Ishigaki-shi, Okinawa-ken, Sept. 15, 2003, H. Takahashi (KPM-NC0011979).

Etymology: Latin, *rubromarginata* = red marginate, referring to the reddish-orange marginate lamellae.

Pileus 40–80 mm in diameter, at first cylindrical-campanulate, then expanding to nearly plane to slightly concave and subumbonate, long sulcate-striate from the margin toward the center, glabrous, subviscid when wet, at first orange (6B7-8) to brownish-orange (6C7-8 to 7C7-8) overall, then reddish-yellow (4B7-8) toward the margin, in age grayish-yellow (4C7) at the center. Flesh soft, 3–7 mm thick in the center of the pileus, yellowish-white, deeper yellow below the surface, odor and taste indistinct. Stipe 60–120 × 5–16 mm, subcylindrical or slightly tapering upward, central, terete, hollow, silky fibrillose, pale yellow, usually covered with reddish-orange (7B7-8), appressed, indefinite squamules forming irregular transverse zones; annulus 10–15 mm wide, thin, membranous, attached toward the stipe apex pendant, reddish-orange (7B7-8), striate; volva 20–40 × 10–25 mm, saccate, thick, bilobate, white, sometimes dingy brownish stained. Lamellae free, very close (55–70 reach the stipe), with 1–3 series of lamellulae, up to 10 mm broad, pale yellow; edges fimbriate, reddish-orange (7B7-8).

Basidiospores 8–9 × 5.5–7 μm (Q = length/breadth: 1.28–1.45, n = 20 spores per two specimens), broadly ovoid to short ellipsoid, smooth, colorless, inamyloid, thin-walled, with a large refractive guttule. Basidia 25–30 × 8–10 μm, clavate, 4-spored; basidioles clavate. Marginal tissue of lamellae (remnants of the annulus) 30–60 × 8–15 μm, gre-

H. Takahashi (✉)
284-1 Ouhama, Ishigaki, Okinawa 907-0001, Japan
Tel. +81-980-88-6302; Fax +81-980-88-6302
e-mail: har.takh@r7.dion.ne.jp

Fig. 1. *Amanita rubromarginata*. **A** Basidiospores. **B** Marginal tissue of the lamellae. **C** Elements of the volval tissue. All figures from the holotype. Bars **A** 9 μm ; **B**, **C** 20 μm

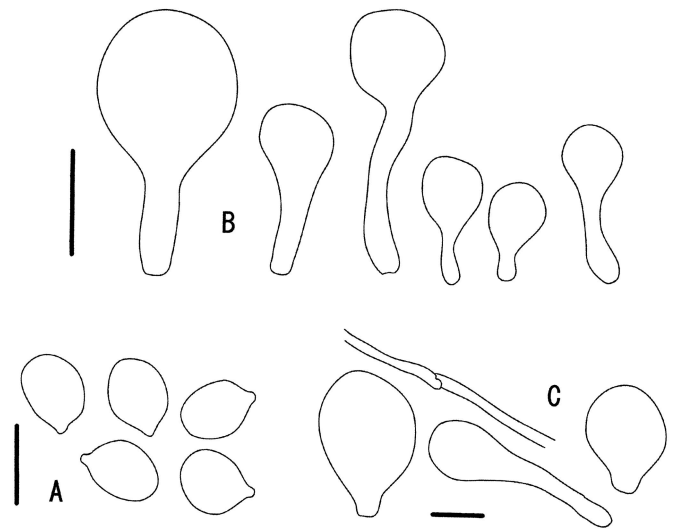
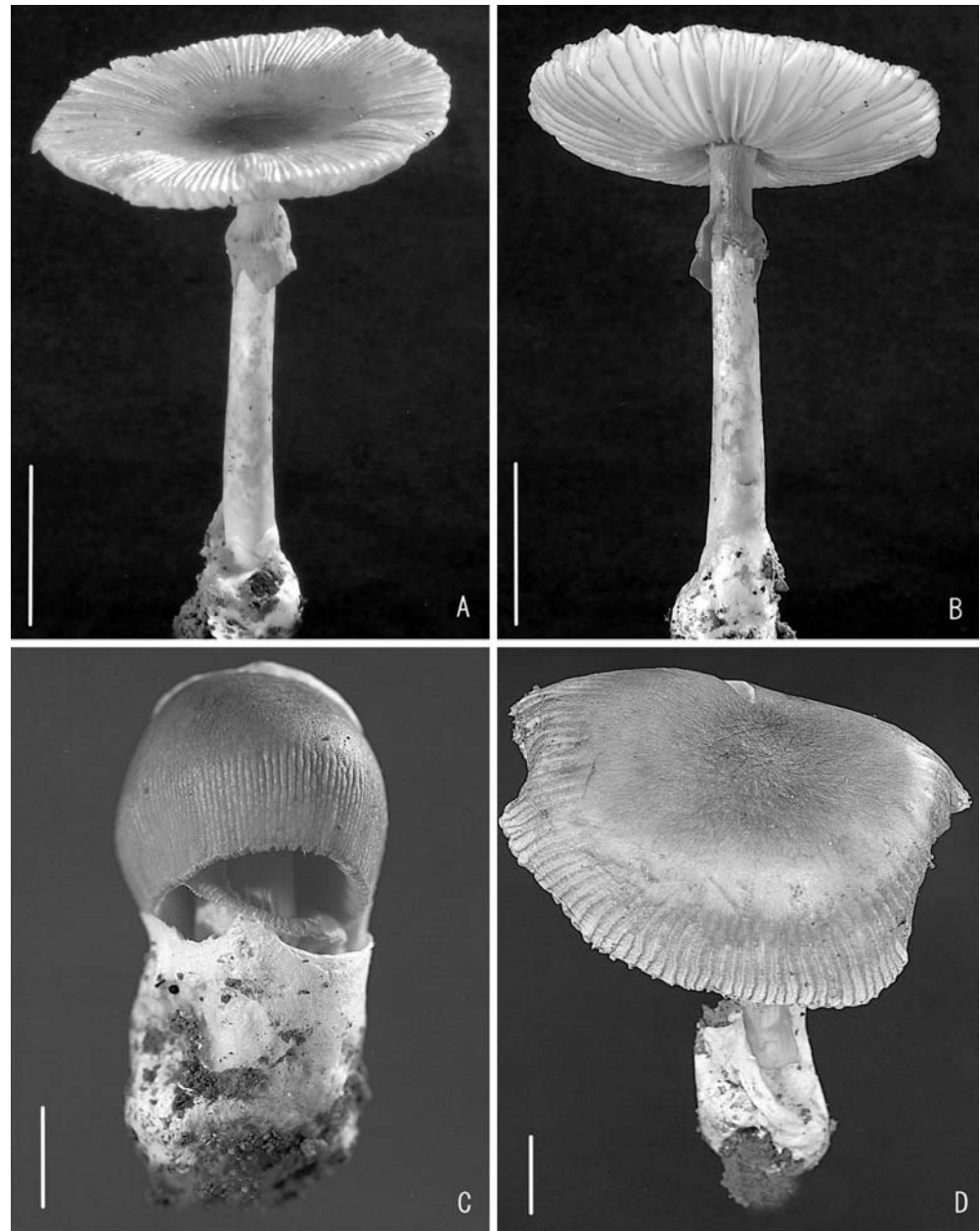


Fig. 2. Basidiomata of *Amanita rubromarginata*. **A**, **B** from KPM-NC0010087; **C**, **D** from the holotype. Bars **A**, **B** 30 mm; **C**, **D** 10 mm



garious to scattered, narrowly clavate to pyriform, colorless or with dark orange (5A8) to orange (5A6) intracellular pigment, thin-walled. Subhymenium ramose-inflated, 20–40 μm thick, with 1–3 layers of subglobose to ellipsoid cells, 5–20 \times 5–14 μm . Hymenophoral trama narrow, bilateral; element hyphae cylindrical, clavate to subfusiform. Pileipellis a cutis of narrow cylindrical cells 4–8 μm wide, with orange (5A6) to deep orange (5A8) intracellular pigment, occasionally with clamped septa, thin-walled. Hyphae of pileitrama 5–14 μm wide, parallel to the pileipellis elements, cylindrical, colorless, thin-walled. Stipitipellis a cutis of parallel, repent hyphae 4–14 μm wide, cylindrical, with reddish yellow (4A7) to deep yellow (4A8), vacuolar pigment, thin-walled. Stipe trama composed of longitudinally running, cylindrical hyphae 8–38 μm wide, colorless, thin-walled. Volval tissue composed of 4–8 μm wide, cylindrical hyphae and scattered, oblong, broadly clavate, ellipsoidal to subglobose cells, 35–75 \times 12–40 μm .

Known distribution: Ishigaki Island (Okinawa, Japan).

Habitat: Scattered on ground in broad-leaved forests (dominated by *Quercus miyagii* Koidz. and *Castanopsis cuspidata* (Thunb. ex Murray) Schottky var. *sieboldii* (Mak.) Nakai), June to September.

Specimens examined: KPM-NC0011979 (holotype), Banna-dake, Ishigaki-shi, Okinawa-ken, Sept. 15, 2003, coll. H. Takahashi; KPM-NC0010087, same place, June 8, 2002, coll. H. Takahashi.

Japanese name: Fuchidori-tamagotake.

Notes: Distinctive features of this species are found in its orange to brownish-orange then reddish-yellow pileus, the pale yellow, squamulose stipe with a thin, membranous, reddish-orange annulus and a thick, saccate volva, and reddish-orange marginate lamellae.

Its long sulcate-striate pileus, the presence of a membranous annulus and a thick, saccate volva, and its inamyloid basidiospores suggest that this species is a member of the section *Caesareae* Singer ex Singer in the subgenus *Amanita* as defined by Singer (1986). Within the section, this species seems to be closely allied with *Amanita hemibapha* (Berk. & Broome) Sacc. var. *hemibapha*, originally described from Sri Lanka (Berkeley and Broome 1871), *Amanita hemibapha* var. *ochracea* Zhu L. Yang from southwestern China (Yang 1997), and *Amanita javanica* (Corner & Bas) T. Oda, C. Tanaka & Tsuda, originally described from Java (Boedijn 1951). These species are distinct in much larger basidiomata (pileus usually reaches 100–200 mm in diameter), a yellow annulus, and not reddish-orange marginate lamellae. Moreover, *A. hemibapha* var. *ochracea* has a ochraceous pileus and yellow marginate, white lamellae, and *A. javanica* forms wholly orange-yellow to ochre-yellow basidiomata.

In the circumscription of Corner and Bas (1962), *A. javanica* has been relegated to *A. hemibapha* on the basis of the color of basidiomata. As for *A. rubromarginata*, until further data sets become available (e.g., intertaxon mating studies, molecular sequences) I prefer to propose this taxon as distinct based on the morphological characteristics.

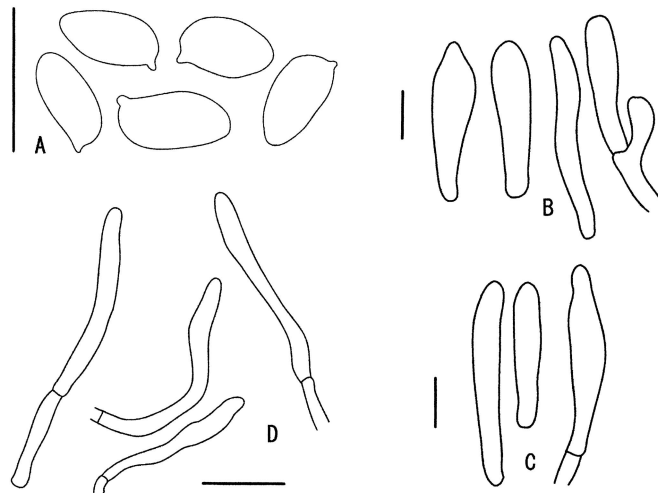


Fig. 3. *Tylopilus obscureviolaceus*. A Basidiospores. B Cheilocystidia. C Pleurocystidia. D Elements of the pileipellis. All figures from the holotype. Bars 10 μm

2. *Tylopilus obscureviolaceus* Har. Takahashi, sp. nov.

Figs. 3,4

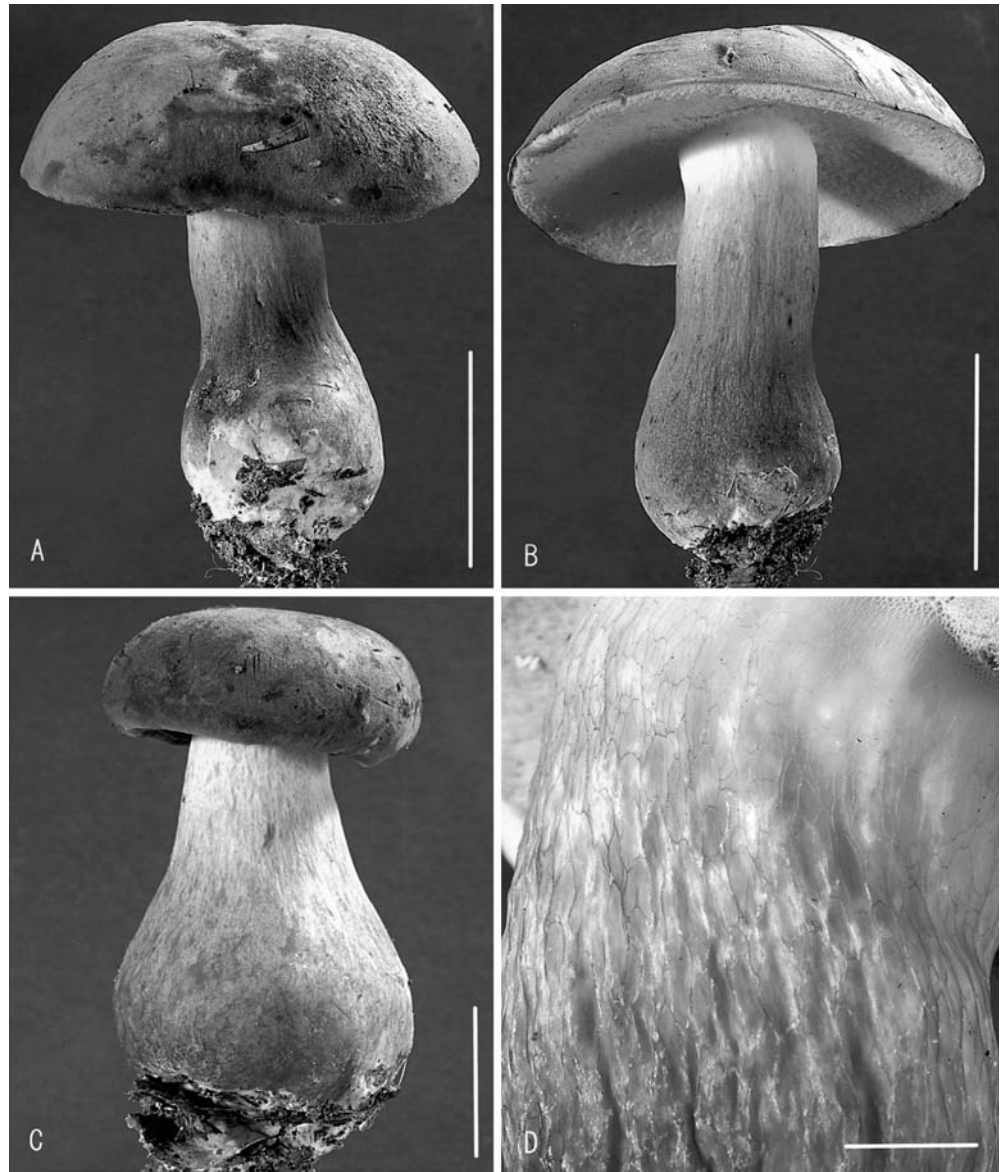
Pileo 70–100 mm lato, primo hemisphaerico, dein convexo vel applanato, subtomentoso, obscuro-violaceo; carne firma, alba, interdum ad fractionem immutabili; odore nullo; sapore felleo; stipite 80–100 \times 20–30 mm, subaequali vel ad basim leniter incrassato, solido, subtomentoso, saepe superne manifeste violaceo-reticulato, violaceo-brunneo, mycelio basali albo affixo; tubulis adnatis vel subadnatis, primo albis dein brunneo-incarnatis; poris subrotundatis, parvis, concoloribus; basidiosporis 6–7.2 \times 3.3–4 μm , ellipsoideo-subfusiformibus, depressione suprahilpraeditis, levibus, brunneo-incarnatis; basidiis tetrasporis; cheilocystidiis 30–40 \times 5–10 μm , abundantibus, subfusoides vel subcylindraceis, hyalinis; pleurocystidiis cheilocystidiis similibus; pileipelle ex hyphis trichodermialibus composita; tramate hymenophori laterali ut in typo *Boletus*; stipitipelle hymeniformi, ex caulocystidiis 13–19 \times 5–7 μm late claviformibus, brunneolis, composita; hyphis defibulatis.

Holotypus: Ad terram in silvis, Outomi (Iriomote Island), Taketomi-cho, Okinawa-ken, May 31, 2002, H. Takahashi (KPM-NC0010099).

Etymology: Latin, *obscureviolaceus* = dark purple, referring to the dark purple basidiomata.

Pileus 70–100 mm in diameter, at first hemispherical, becoming broadly convex to nearly plane in age, with inrolled then straight margin; surface dry, subtomentose, persistently and evenly colored dark magenta (13F4-8) to dark purple (14F5-8). Flesh up to 10 mm thick, firm, white, unchanging when cut; odor indistinct, taste bitter. Stipe 80–100 \times 20–30 mm, subequal or somewhat enlarged toward the base, central, terete, solid; surface dry, subtomentose, sometimes longitudinally rugulose, often finely reticulated above by a thin-veined, purplish reticulum, paler concolorous with the pileus or more brownish, darker toward the base, whitish at the apex; base covered with whitish mycelial tomentum. Tubes up to 8 mm deep, adnate to

Fig. 4. Basidiomata of *Tylophilus obscureviolaceus*. **A, B** Mature basidiomata. **C** Immature basidioma. **D** Closeup of the surface of the stipe (showing the thin-veined, purplish reticulum). All figures from the holotype. Bars **A, B** 30 mm; **C** 15 mm; **D** 5 mm



slightly adnexed, white when young, dull pinkish in age, unchanging when cut; pores small (2–3/mm), subcircular, concolorous, unchanging where handled.

Basidiospores $6\text{--}7.2 \times 3.3\text{--}4\ \mu\text{m}$ ($Q = \text{length/breadth}$: 1.8, $n = 20$ spores per two specimens), ellipsoid-subfusiform, inequilateral with a shallow suprahilar depression in profile, smooth, pinkish, thick-walled. Basidia $15\text{--}20 \times 5\text{--}8\ \mu\text{m}$, clavate, four-spored. Basidioles clavate. Cheilocystidia gregarious, $30\text{--}40 \times 5\text{--}10\ \mu\text{m}$, subcylindrical to subfusiform, smooth, hyaline, thin-walled. Pleurocystidia scattered, similar to the cheilocystidia. Hymenophoral trama bilateral-divergent of the *Boletus* subtype; element hyphae $3\text{--}6\ \mu\text{m}$ wide, cylindrical, smooth, colorless, thin-walled. Pileipellis a trichodermium of vertically arranged, loosely interwoven elements, with reddish-brown (9D7) to brownish-red (10D7) intracellular pigment, thin-walled; terminal cells cylindrical, $30\text{--}60 \times 4\text{--}7\ \mu\text{m}$, without pilocystidia.

Pileitrama consisting of cylindrical, loosely interwoven hyphae $4\text{--}11\ \mu\text{m}$ wide, smooth, colorless, thin-walled. Stipitipellis hymeniform, consisting of caulocystidia; caulocystidia $13\text{--}19 \times 5\text{--}7\ \mu\text{m}$, broadly clavate, smooth, with intracellular brownish pigment, thin-walled. Stipe trama composed of longitudinally running, cylindrical cells $4\text{--}10\ \mu\text{m}$ wide, sometimes branched, smooth, colorless, with thin or slightly thickened walls (up to $0.5\ \mu\text{m}$). Clamps absent.

Known distribution: Iriomote Island (Okinawa, Japan).

Habitat: Solitary to scattered, on ground in broad-leaved forests (dominated by *Quercus miyagii* Koidz. and *Castanopsis cuspidata* (Thunb. ex Murray) Schottky var. *sieboldii* (Makino) Nakai).

Specimens examined: KPM-NC0010099 (holotype), Outomi (Iriomote Island), Taketomi-cho, Okinawa-ken, May 31, 2002, coll. H.Takahashi.

Japanese name: Sumire-nigaiguchi.

Notes: This species is characterized by its medium to large, dark purple basidiomata, the white, bitter, unchanging flesh, the often finely purplish-reticulate stipe, the relatively small basidiospores, the hymeniform stipitipellis consisting of brownish, broadly clavate caulocystidia, and the habitat in *Quercus-Castanopsis* forests.

Its white, unchanging flesh and its white then pinkish pores suggest that this species belongs in the section *Tylopilus* of the genus *Tylopilus* as defined by Singer (1986). Within this section, North American *Tylopilus plumbeoviolaceus* (Snell & E.A. Dick) Singer (Bessette et al. 2000; Singer 1947; Snell 1936; Snell and Dick 1941, 1970; Wolfe 1986) and *Tylopilus neofelleus* Hongo, originally described from Japan (Hongo 1967), are similar to *T. obscureviolaceus*. The North American taxon differs in having a pileus colored more brownish or grayish when mature, much longer basidiospores (7–11 µm; Snell and Dick 1941), and hymeniform pileipellis composed of fusoid-ventricose to narrowly fusoid-ventricose pilocystidia (Wolfe 1986). *Tylopilus neofelleus* is distinct in forming a olive-brown to avellaneous pileus and purplish pores from the first.

Acknowledgments I am grateful to Dr. Yousuke Degawa (KPM) for allowing the specimens cited to be kept in the Kanagawa Prefectural Museum of Natural History.

References

- Bessette AE, Roody WC, Bessette AR (2000) North American Boletes. A color guide to the fleshy pored mushrooms. Syracuse University Press, New York
- Berkeley MJ, Broome CE (1871) On some species of the genus *Agaricus* from Ceylon. Trans Linn Soc Lond 27:149
- Boedijn KB (1951) Notes on Indonesian fungi. The genus *Amanita*. Sydowia 5:317–327
- Corner EJH, Bas C (1962) The genus *Amanita* in Singapore and Malaya. Persoonia 2:241–304
- Hongo T (1967) Notes on Japanese larger fungi (19). J Jpn Bot 42:151–159
- Kornerup A, Wanscher JH (1978) Methuen handbook of colour, 3rd edn. Methuen, London
- Singer R (1947) The Boletineae of Florida with notes on extralimital species III. Am Midl Nat 37:1–135
- Singer R (1986) Agaricales in modern taxonomy, 4th edn. Koeltz, Koenigstein
- Snell WH (1936) Notes on Boletes. V. Mycologia 28:463–475
- Snell WH, Dick EA (1941) Notes on Boletes. VI. Mycologia 33:23–37
- Snell WH, Dick EA (1970) The boleti of northeastern North America. Cramer, Vaduz
- Wolfe CB (1986) Type studies in *Tylopilus*. III. Taxa described by Walter H. Snell, Esther A. Dick, and co-workers. Mycologia 78:22–31
- Yang ZL (1997) Die *Amanita*-arten von Südwestchina. Bibl Mycol 170:1–240