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## Two new species and one new combination of Agaricales from Japan

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**Abstract** Two new species and one new combination of Agaricales are described and illustrated from eastern Honshu, Japan, and Ishigaki Island, southwestern Japan: (1) *Gymnopus oncospermatis* comb. nov. (subsection *Vestipedes* of section *Vestipedes*), new to Japan, has pale brown to whitish, collybioid basidiomata with very close lamellae, and forms a distinct white extensive mycelial mat on the dead leaf bases of the palm *Satakentia liukiuensis* in Ishigaki Island; (2) *Hydropus aurarius* sp. nov. (subsection *floccipedes* of section *floccipedes*), forming clitocyboid basidiomata with a dark brown furfuraceous pileus and stipe and vivid yellow lamellae, found on fallen dead twigs in oak forests; and (3) *Tylopilus castanoides* sp. nov. (section *Oxydabiles*), forming medium to large, reddish-brown basidiomata with a minutely scurfy-punctate stipe, found in *Carpinio quercion* forests.

**Key words** Agaricales · *Gymnopus oncospermatis* · *Hydropus aurarius* · *Tylopilus castanoides*

### Introduction

This article reports two new species and one new combination of Agaricales that occur in the lowland forests of eastern Honshu, Japan, and Ishigaki Island, 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 Kanagawa Prefectural Museum of Natural History, Japan (KPM).

### Species descriptions

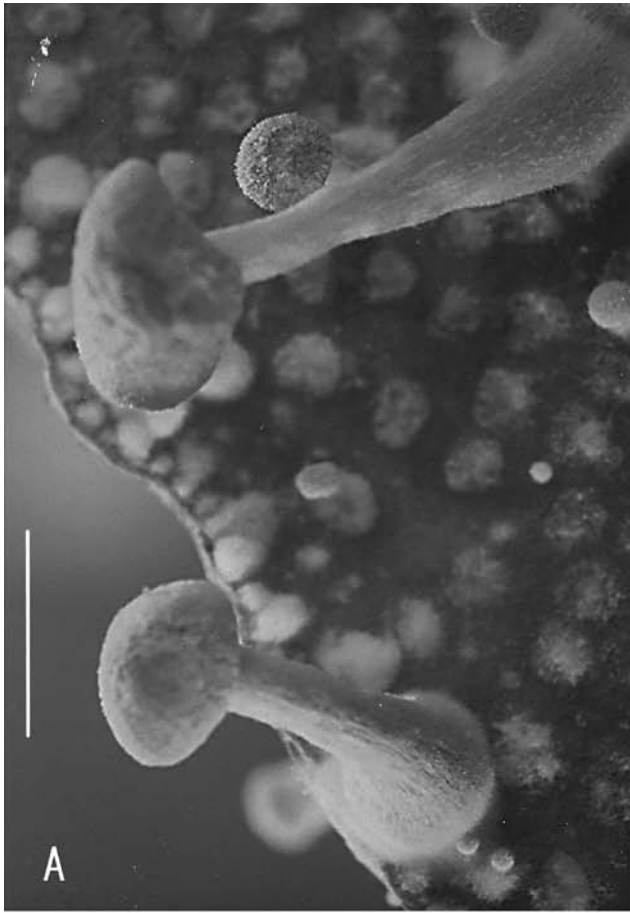
1. *Gymnopus oncospermatis* (Corner) Har. Takahashi, comb. nov. Figs. 1,2

Basionym: *Marasmius oncospermatis* Corner, Beih. Nova Hedwig, 111:81, 1996.

Pileus 8–30 mm in diameter, at first convex, then expanding to nearly plane, finally with depressed center and upturned margin, smooth, dry, dull, tomentose, at first light brown overall, then paler toward the margin, entirely whitish at maturity. Flesh very thin (up to 1.5 mm), whitish, pliant, tough, odor and taste none. Stipe 20–70 × 1.5–6 mm, subcylindrical, central or somewhat excentric, terete or compressed, at times longitudinally rugulose, woolly-tomentose toward the base, whitish at the apex, light brown elsewhere, darkening from the base upward; base covered with white, strigose mycelial tomentum attached to an extensive mycelial mat on the dead leaf bases of the palm *Satakentia liukiuensis*. Lamellae adnexed, very close (55–70 reach the stipe), with 0–1 series of lamellulae, up to 0.5 mm broad, white; edges even, concolorous.

Spore print pure white. Basidiospores 8–10 × 3.5–4.5 μm (Q = length/breadth: 2.2–2.3, n = 20 spores per two specimens), ellipsoid, smooth, colorless, inamyloid, thin-walled. Basidia 24–30 × 6.5–8 μm, clavate, four-spored; basidioles clavate. Cheilocystidia 20–55 × 4–7 μm, forming a compact sterile edge, subcylindrical to irregularly shaped, with or without one or several digitate projections, colorless, inamyloid, thin-walled. Pleurocystidia none. Hymenophoral trama irregular; element hyphae similar to those of the pileitrama. Pileipellis a cutis of cylindrical cells 4–8 μm wide, thinly encrusted with light brown pigment, inamyloid, thin-walled; terminal cells 30–60 × 4–8 μm, subcylindrical, with or without one or several digitate projections, colorless, thin-walled. Hyphae of pileitrama 5–12 μm wide, parallel to the pileipellis elements, cylindrical, monomitic, colorless, inamyloid, thin-walled. Stipitipellis a cutis of parallel, repent hyphae 4–7 μm wide, cylindrical, with light brown intercellular pigment, inamyloid, thin-walled; caulocystidia 20–50 × 4–7 μm, subcylindrical to irregularly shaped, with

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or without one or several digitate projections, colorless, thin-walled. Stipe trama composed of longitudinally running, cylindrical hyphae 5–13 µm wide, monomitic, smooth, colorless, inamyloid, thin-walled. All tissues with clamp connections.

Known distribution: Japan (Okinawa).

Habitat: Gregarious, on dead leaf bases of a palm *Satakentia liukuensis* H.E. Moore, common.

Specimens examined: Yonehara, Ishigak-shi, Okinawa-ken, Oct. 3, 1996, collected by H. Takahashi; same place, Oct. 21, 1996, collected by H. Takahashi; same place, Nov. 5, 1996, collected by H. Takahashi; same place, KPM-NC0008777, Oct. 18, 2001, collected by H. Takahashi; same place, Oct. 30, 2001, collected by H. Takahashi; same place, Nov. 11, 2001, collected by H. Takahashi; same place, Dec. 16, 2001, collected by H. Takahashi.

Japanese name: Yashi-morino-karebatake.

Notes: Distinctive features of this species are found in its whitish, collybioid basidiomata, the very close lamellae, the cylindrical, digitate cheilocystidia, the radially arranged, more or less diverticulate pileipellis elements, the sub-cylindrical caulocystidia with digitate projections, and the distinct white extensive mycelial mat on the dead leaf bases of *Satakentia liukuensis*.

Its cutis with more or less diverticulate terminal elements in the pileipellis and the presence of well-differentiated

cheilocystidia suggest that this species is a member of the subsection *Vestipedes* in the section *Vestipedes* Antonín, Halling & Noordel. of *Gymnopus* as defined by Antonín and Noordeloos (1997). Thus, a new combination is made.

This species was recently described by Corner (1996) from Singapore as *Marasmius oncospermatis* Corner and seems to be common in tropical and subtropical palm forests.

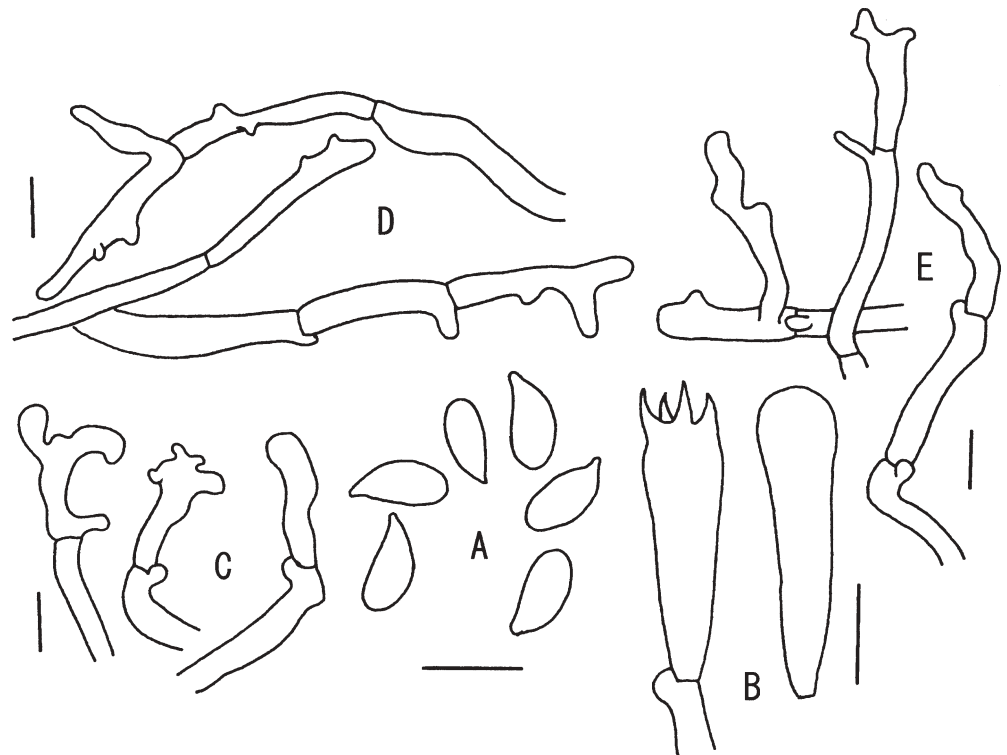
2. *Hydropus aurarius* Har. Takahashi, sp. nov. Figs. 3,4

Pileo 20–35 mm lato, primo hemisphaerico, dein convexo et centro depresso, mox concavo, umbonato, fuliginoso furfuraceo; odore saporeque nullo; stipite 50–70 × 4–5.5 mm, subaequali vel ad basim leniter incrassato, cavo, fuliginoso furfuraceo, mycelio basali albo affixo; lamellis arcuatis, decurrentibus, mediocriter subdistantibus, angustis, flavidis; basidiosporis 5–6.5 × 2.7–3.2 µm, ellipsoideis, levibus, hyalinis, inamyloideis; basidiis tetrasporis; cheilocystidiis et pleurocystidiis nullis; pileocystidiis 20–40 × 4–8 µm, subcylindraces; caulocystidiis 30–50 × 5–7 µm, subclavatis; hyphis sarcodimiticis, fibulatis.

Holotypus: In ramulis arboris delapsis in silva, Iriuda, Odawara-shi, Kanagawa-ken, Japonia, July 2, 2000, H. Takahashi (KPM-NC0006727).

Etymology: from Latin, *aurarius* = golden; referring to the vivid yellow pigments.

**Fig. 2.** *Gymnopus oncospermatis*. **A** Basidiospores. **B** Basidium and basidiole. **C** Cheilocystidia. **D** Elements of the pileipellis. **E** Caulocystidia. All figures from the holotype. Bars 10 µm



**Fig. 1.** Basidiomata of *Gymnopus oncospermatis* and *Tylopilus castanoides*. **A**, **B** from KPM-NC0008777, **C**, **D** from the holotype. Bars **A** 5 mm; **B** 150 mm; **C**, **D**

Basidioma of *Tylopilus castanoides*. **A**, **B** from KPM-NC0008777, **C**, **D** from the holotype. Bars **A** 5 mm; **B** 150 mm; **C**, **D**

Pileus 20–35 mm in diameter, at first hemispherical, then convex with depressed center, usually with a dark brownish, obtuse umbo, smooth, covered overall with minute, dark brown, fibrillose-floccose particles that crowd toward the disk, yellowish under dark brown particles. Flesh up to 1.5 mm thick, pale yellow; odor and taste not distinctive. Stipe 50–70 × 4.5–5.5 μm, almost equal or somewhat thickened toward the base, central, slender, terete, hollow, often entirely longitudinally rugulose, dark brown furfuraceous overall on the yellowish background; base covered with conspicuous white mycelioid tomentum. Lamellae arcuate-decurrent, subdistant (35–38 reach the stipe), with 1–3 series of lamellulae, up to 2.5 mm broad, yellow (3A7-8); edges concolorous.

Spore print pure white. Basidiospores 5–6.5 × 2.7–3.2 μm ( $Q = \text{length/breadth}: 1.8\text{--}2.0$ ,  $n = 20$  spores per two specimens), ellipsoid, smooth, colorless, inamyloid, thin-walled. Basidia 25–30 × 5–6 μm, clavate, four-spored. Cheilocystidia and pleurocystidia absent. Hymenophoral trama regular; hyphae similar to those of the pileitrama but with vivid yellow (3A8), intercellular, coagulate pigments. Pileipellis a cutis of cylindrical cells 3–8 μm wide, smooth, colorless, or with yellowish-brown (5E6-7 to 5F6-7) contents, thin-walled, occasionally with clamped septa; pileocystidia 20–40 × 4–8 μm, subcylindrical, decumbent, sometimes aggregate, with yellowish-brown (5E6-7 to 5F6-7), vacuolar pigments. Hyphae of pileitrama 3–25 μm wide, parallel to the pileipellis elements, sarcodimitic, intermixed with filamentous, short hyphae and very long, strongly inflated, unbranched, subfusiform hyphae, color-

less, inamyloid, thin-walled, occasionally with clamped septa. Stipitipellis a cutis of parallel, repent hyphae 3–8 μm wide, cylindrical, colorless or pale yellow, inamyloid, thin-walled, occasionally with clamped septa; caulocystidia 30–50 × 5–7 μm, subclavate, smooth, with yellowish-brown (5E6-7 to 5F6-7), vacuolar pigments, thin-walled. Hyphae of stipe trama 5–18 μm wide, longitudinally running, sarcodimitic, very long, strongly inflated, unbranched, subfusiform to cylindrical, smooth, colorless or pale yellow, inamyloid, thin- or slightly thick-walled, occasionally with clamped septa.

Known distribution: Japan (Kanagawa, Miyagi, Tochigi).

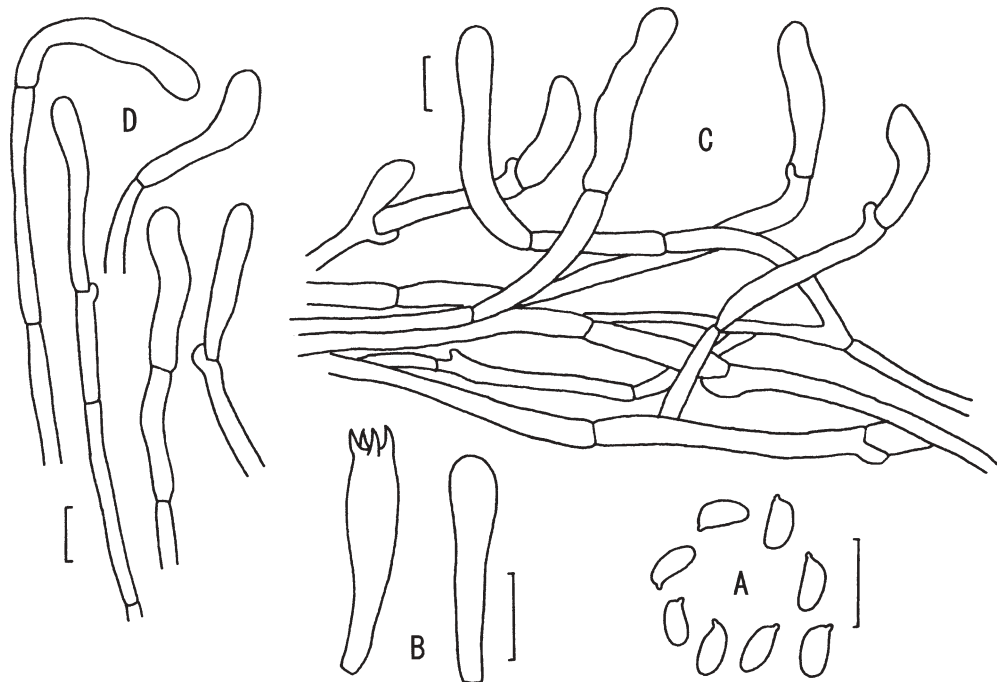
Habitat: Solitary to scattered, on fallen dead twigs in lowland oak forests.

Specimens examined: KPM-NC0006727 (holotype), Iriuda, Odawara-shi, Kanagawa-ken, July 2, 2000, collected by H. Takahashi; same place, Aug. 21, 2000, collected by H. Takahashi; same place, Sept. 5, 2000, collected by H. Takahashi; KPM-NC0008684, Ryuoukyo, Fujiwara-cho, Tochigi-ken, Aug. 25, 2001, collected by Y. Shibata; KPM-NC0008685, Mt. Aoba, Sendai-shi, Miyagi-ken, Aug. 5, 2001, collected by Y. Goto and Y. Ando.

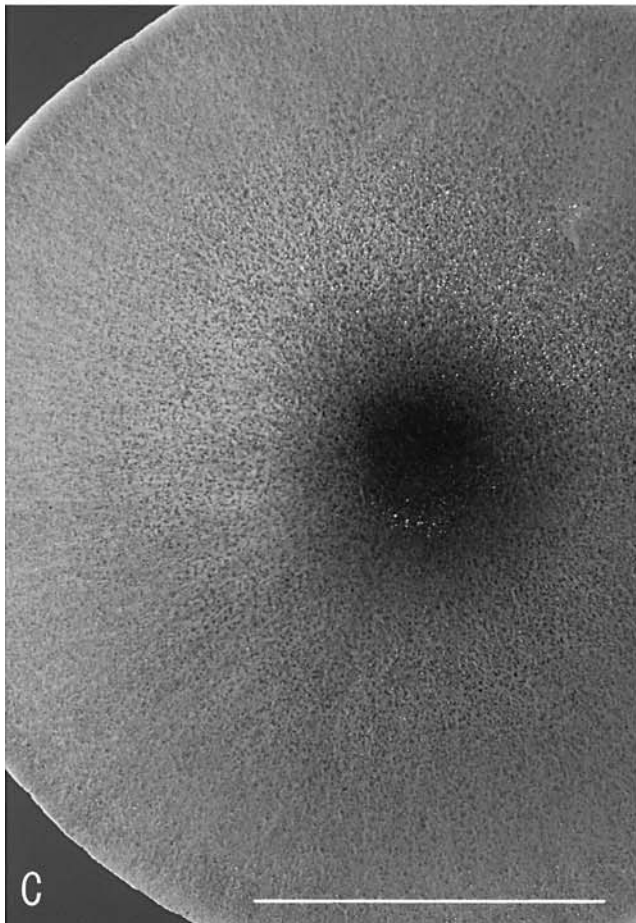
Japanese name: Kihida-sakazukitake.

Notes: The important combination of features delimiting this species is its clitocyboid basidiomata with a dark brown furfuraceous pileus and stipe, the vivid yellow lamellae, the relatively small basidiospores, the sarcodimitic trama, and its habitat on fallen dead twigs. These characteristics place this species in the genus *Hydropus* section *Floccipedes* Kühner ex Singer subsection *Floccipedes* (Singer 1986). The

**Fig. 3.** *Hydropus aurarius*. **A** Basidiospores. **B** Basidium and basidiole. **C** Elements of the pileipellis. **D** Caulocystidia. All figures from the holotype. Bars 10 μm



**Fig. 4.** Basidiomata of *Hydropus aurarius*. **A** Immature basidiomata. **B** Mature basidioma. **C** Closeup of the mature pileus. **D** Closeup of the lamellae. All figures from the holotype. Bars **A** 10 mm; **B** 20 mm; **C** 10 mm; **D** 5 mm



presence of sarcodimitic tramal hyphae suggests that this species belongs in the genus "*Trogia*" as defined by Corner (1966). However, because the concept is too wide, I do not accept the generic circumscription of "*Trogia*" (*sensu* Corner). Its clitocyboid habit and vivid yellow lamellae have superficial resemblance to the genus *Gerronema* (Singer 1986), which differs in having mostly filamentous, monomitic tramal hyphae and usually lacking fuscous pigments in the terminal elements of the pileipellis and stipitipellis.

This species seems to be allied with several neotropical taxa, viz. *Hydropus citrinus* Singer (Singer 1982), *Hydropus xanthosarx* Singer & Grinling (Singer and Grinling 1967), *Gerronema icterinum* (Singer) Singer (Pegler 1983), and "*Trogia*" *citrina* Corner (Corner 1966). *Hydropus citrinus* and *H. xanthosarx* differ in forming cheilocystidia and having a glabrous pileus and stipe. *Gerronema icterinum* and *T. citrina* primarily differ in having a glabrescent pileus and stipe colored sulfur yellow to mustard yellow. Moreover, *T. citrina* has two-spored basidia. *Hydropus aurarius* is also similar to "*Trogia*" *straminea* Corner (1966) from Singapore, which differs in having pale ochraceous lamellae, much larger basidiospores, and ventricose-lanceolate pileocystidia that form palisadoderm in the pileipellis.

### 3. *Tylophilus castanoides* Har. Takahashi, sp. nov.

Figs. 1, 5

Pileo 30–80 mm lato, primo hemisphaerico, dein convexo vel appanato, tomentosus, rubro-brunneo; carne firma, alba, interdum ad fractionem rufescenti; odore saporeque nullo; stipite 50–110 × 7–17 mm, subaequali vel ad basim leniter incrassato, solido, superne manifeste punctato, inferne tomentosus, non reticulatus, rubro-brunneo; mycelio basali albo affixo; tubulis depressis ad stipitem, primo albis dein brunneo-incarnatis; poris subrotundatis, parvis, concoloribus; basidiosporis 9–11 (–13) × 3.5–4 μm, depressione suprahili praeditis, oblongo-ellipsoideis, levibus, brunneo-

incarnatis; basidiis tetrasporis; cheilocystidiis 13–25 × 4–6 μm, abundantibus, subclavatis vel subcylindraceis, hyalinis; pleurocystidiis 30–60 × 6–10 μm, fusoido-ventricosus, hyalinis; pileipelle ex hyphis trichodermialibus composita, granulis pigmentosis brunneis incrustata; caulocystidiis 20–45 × 4–7 μm, numerosis, cylindraceis, granulis pigmentosis brunneis incrustata; hyphis defibulatis.

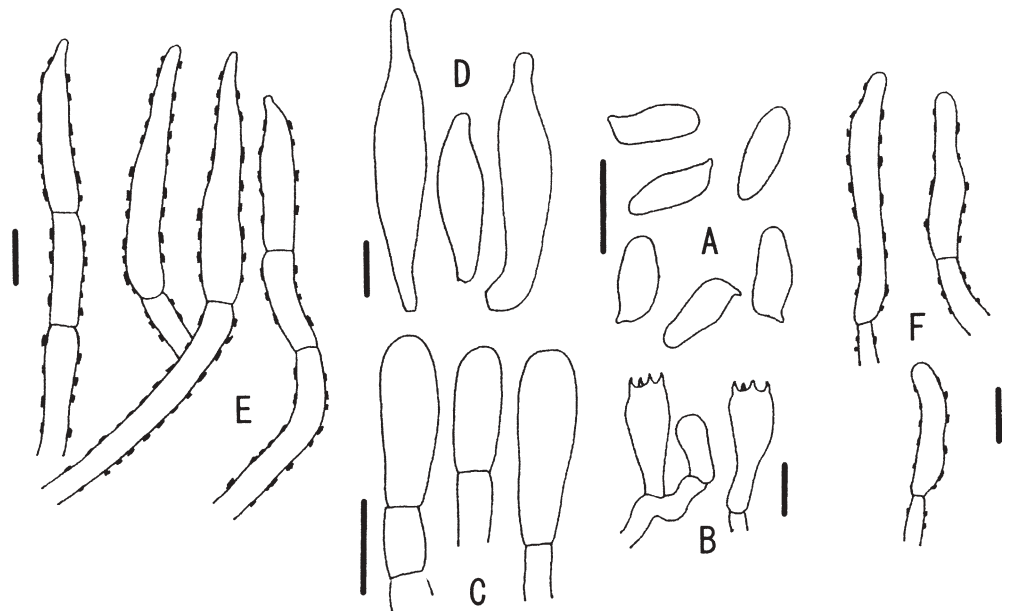
Holotypus: Ad terram in silvis *Carpinio quercionis*, Ageo-shi, Saitama-ken, Sept. 14, 2001, S. Uehara (KPM-NC0008776).

Etymology: Latin, *castanoides* = castaneous, referring to the reddish-brown basidiomata.

Pileus 30–80 mm in diameter, at first hemispherical, becoming broadly convex to nearly plane in age, with inrolled then straight margin; surface dry, tomentose, sometimes finely areolate to conspicuously rimose in age, evenly colored reddish-brown (9D7-8, 9E7-8, or 9F7-8). Flesh up to 10 mm thick, firm, white, unchanging or gradually rufescent when cut; odor and taste indistinct. Stipe 50–110 × 7–17 mm, subequal or somewhat enlarged toward the base, central, terete, solid; surface dry, minutely scurfy-punctate above, tomentose below, smooth, not reticulate, entirely concolorous with the pileus; base covered with whitish mycelial tomentum. Tubes 5–15 mm deep, depressed around the stipe, white when young, dull pinkish in age, unchanging; pores small (2–3/mm), subcircular, concolorous, unchanging.

Basidiospores 9–11 (–13) × 3.5–4 μm (Q = length/breadth: 2.60–2.75, *n* = 20 spores per two specimens), inequilateral with a shallow suprahilar depression in profile, oblong ellipsoid in face view, smooth, pinkish, thick-walled. Basidia 30–42 × 9–12.5 μm, clavate, four-spored. Basidioles clavate. Cheilocystidia gregarious, 13–25 × 4–6 μm, subclavate to subcylindrical, smooth, hyaline, thin-walled. Pleurocystidia scattered, narrowly ventricose-fusiform, smooth, hyaline, thin-walled. Hymenophoral trama parallel to each other, not divergent; elements similar to those of

**Fig. 5.** *Tylophilus castanoides*.  
**A** Basidiospores. **B** Basidia and basidiole.  
**C** Cheilocystidia.  
**D** Pleurocystidia. **E** Elements of the pileipellis.  
**F** Caulocystidia.  
 All figures from the holotype.  
 Bars 10 μm



the pileitrama. Pileipellis a trichodermium of vertically and compactly arranged elements, heavily encrusted with reddish-brown, granular pigments that are completely dissolved in  $\text{NH}_4\text{OH}$ , thin-walled; terminal cells 4–7  $\mu\text{m}$  wide, cylindrical, often with mucronate apices. Pileitrama of cylindrical loosely interwoven hyphae 4–11  $\mu\text{m}$  wide, smooth, colorless, thin-walled. Stipitipellis a cutis of parallel, repent hyphae 2.5–5  $\mu\text{m}$  wide, cylindrical, colorless or thinly encrusted with reddish-brown pigments, thin-walled; caulocystidia 20–45  $\times$  4–7  $\mu\text{m}$ , numerous, erect, cylindrical, heavily encrusted with reddish-brown, granular pigments that are completely dissolved in  $\text{NH}_4\text{OH}$ , thin-walled. Stipe trama composed of longitudinally running, cylindrical cells 4–10  $\mu\text{m}$  wide, unbranched, smooth, colorless. Clamps absent.

Known distribution: Japan (Saitama, Tokyo).

Habitat: Solitary to scattered, on ground in *Carpinus quercion* forests, August to September, not common.

Specimens examined: KPM-NC0008776 (holotype), Ageo-shi, Saitama-ken, Sept. 14, 2001, collected by S. Uehara; Mt. Takao, Hachioji-shi, Tokyo, Aug. 12, 1985, collected by H. Takahashi; same place, Aug. 4, 1998, collected by W. Ikeda and H. Takahashi.

Japanese name: Kuriiro-nigaiguchi (first collected and named by Mr. Minoru Aoki).

Notes: This species is characterized by its medium to large, reddish-brown basidiomata, the white, unchanging, or gradually rufescent flesh, the minutely scurfy-punctate, not reticulate stipe, the cylindrical, often mucronate terminal elements of the pileipellis, which are heavily encrusted with reddish-brown, granular pigments, and the habitat in *Carpinus quercion* forests.

Its white, rufescent flesh and its white then pinkish pores suggest that this species belongs in the section *Oxydabiles* Singer of the genus *Tylopilus* as defined by Singer (1986). Within this section, Malaysian *Boletus brunneirubens* Corner (Corner 1972) appeared to be closely allied with this species. The Malaysian taxon differs in having a strong odor, a fawn ochraceous, slightly reticulate stipe, and clavate to ventricose cheilocystidia. The reddish-brown pileus and stipe and rufescent flesh of *Tylopilus castanoides*

are also comparable with North American *Tylopilus ferrugineus* (Frost) Singer (Bessette et al. 2000; Snell and Dick 1970) and *Tylopilus humilis* Thiers (Thiers 1966, 1975). *Tylopilus ferrugineus* differs in having a finely reticulate stipe and not heavily encrusted pileipellis elements. *Tylopilus humilis* is distinct in forming a poorly developed, short, often excentric stipe, nonencrusted pileipellis elements, and mucronate caulocystidia.

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