

## Notes on new Agaricales of Japan 2

Haruki Takahashi

1–21–2, Nishitsuruma, Yamato-shi, Kanagawa 242–0005, Japan

Received 15 January 2001

Accepted for publication 1 June 2001

Three new species of Agaricales are described and illustrated from eastern Honshu, Japan: *Boletus rhodocarpus* sp. nov. (section *Luridi*), forming large, deep red basidiomata with a pileus covered with small, blackish brown scales, was found on ground in a highland forest dominated by *Tsuga diversifolia* and *Abies veitchii*; *Phaeomarasmium laccarioides* sp. nov. (subgenus *Carpophilus*), forming a squamulose-fibrillose, reddish brown pileus in which the pileipellis consists of chains of thick-walled sphaerocysts with heavily incrusting, brown pigment, was found on a fallen fruit of *Liquidambar styraciflua*; *Pluteus phaeocephalus* sp. nov. (subsection *Hispidodermini* of section *Celluloderma*), forming a dark brown, velvety pileus and a white stipe densely covered with dark brown punctate scales, was found on dead fallen twigs of *Quercus serrata*.

Key Words—Agaricales; *Boletus rhodocarpus*; new species; *Phaeomarasmium laccarioides*; *Pluteus phaeocephalus*.

This paper reports three new species of Agaricales which occur in the subalpine regions and the lowland forests of eastern Honshu, 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

*Boletus rhodocarpus* Uehara & Har. Takahashi, sp. nov.

Figs. 1–3

Pileo 60–110 mm lato, primo hemisphaerico, dein convexo vel applanato, cum squamulis atro-brunneis oblecto, primo albo vel pallide griseo, dein rubro, cyanescenti; carne firma, pallide flavida, ad fractionem cyanescenti; odore saporeque nullo; stipite 70–120 × 14–30 mm, subaequali vel ad basim leniter incrassato, solido, pallide flavido, superne manifeste rubro-reticulato, inferne dense rubro-punctato, cyanescenti; mycelio basali albo affixo; tubulis depressis ad stipitem, pallide flavis, ad fractionem cyanescentibus; poris subrotundatis, parvis, rubris, cyanescentibus; basidiosporis 11.5–13 × 4–5 μm, depressione suprahili praeditis, oblongo-ellipsoideis, levibus, melleis; basidiis tetrasporis; cheilocystidiis 25–32 × 5–7 μm, abundantibus, fusiformibus, rubris; pleurocystidiis cheilocystidii similibus sed hyalinis; tramate hymenophori laterali ut in typo *Boletori*; pileipelle ex hyphis repentibus haud trichodermialibus crassitunicatis composita; stipitipelle hymeniformi ex caulocystidiis late claviformibus, rubris, crassitunicatis composita; hyphis defibulatis.

Holotypus: Ad terram in silvis *Tsugae diversifoliae* (Maxim.) Masters et *Abietis veitchii* Lindl., Mt. Fuji,

Yamanashi-ken, Japonia, 2 Sept. 2000, S. Uehara & H. Takahashi (KPM-NC 0007127).

Etymology: Greek, *rhodo* (rose) + *-carpus* (-fruited).

Pileus 60–110 mm in diam, at first hemispherical, expanding to broadly convex, with inrolled then straight margin; surface dry, smooth, at first dull silky, then covered overall with blackish brown, small, appressed scales, ground color whitish to pale grayish brown when young, then red (10B7–8 to 11B7–8) or deep red (10C8 to 11C8) (under brownish scales), immediately changing to blue when bruised. Flesh up to 10 mm thick, firm, light yellow, quickly changing to blue then slowly fading to brownish when cut; odor and taste indistinct. Stipe 70–120 × 14–30 mm, subequal or somewhat enlarged toward the base, central, terete, solid; surface dry, finely reticulated on the light yellow background above by a thin-veined, deep red (10C8 to 11C8) reticulum, deep red (10C8 to 11C8) pruinose to furfureous toward the base, immediately staining blue where handled and there slowly discoloring into brownish; base covered with whitish mycelial tomentum. Tubes 7 mm deep, depressed around the stipe, light yellow, staining blue instantly when cut; pores small (2–3 per mm), subcircular, deep red (10C8 to 11C8), quickly staining blue where handled.

Basidiospores 11.5–13 × 4–5 μm [Q=length/breadth: 2.60–2.87], inequilateral with a shallow suprahilar depression in profile, oblong ellipsoid in face view, smooth, melleous, thick-walled. Basidia 25–35 × 8.5–12 μm, clavate, four-spored. Basidioles clavate. Cheilocystidia gregarious, 25–32 × 5–7 μm, fusiform, smooth, with intercellular high red (9A8 to 10A8) pigment, thin-walled. Pleurocystidia scattered, similar in shape to cheilocystidia but colorless. Hymenophoral trama bilateral-divergent of the *Boletus* subtype; elements 3.5–8 μm wide, cylindrical, smooth, colorless, thin-walled.

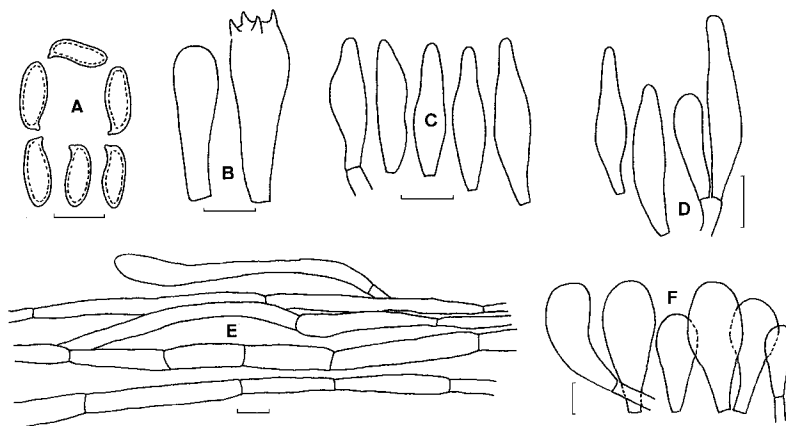


Fig. 1. *Boletus rhodocarpus*. A. Basidiospores. B. Basidium and basidiole. C. Cheilocystidia. D. Pleurocystidia. E. Elements of the uppermost layer of the pileipellis. F. Caulocystidia. Scales: 10  $\mu\text{m}$ . All figures from the holotype.

Outermost layer of pileipellis consisting of repent, appressed elements, not trichodermial; constituent hyphae 4–8  $\mu\text{m}$  wide, parallel, cylindrical, with intercellular brownish pigment, occasionally incrusting, with brownish walls up to 1  $\mu\text{m}$  thick. Innermost layer of pileipellis well differentiated from the upper stratum, made up of loosely interwoven, cylindrical elements 4–8  $\mu\text{m}$  wide, with intercellular high red (9A8 to 10A8) pigment, with high red (9A8 to 10A8) walls up to 1  $\mu\text{m}$  thick. Pileitrama of cylindrical, loosely interwoven hyphae 3–10  $\mu\text{m}$  wide, smooth, colorless, thin-walled. Stipitipellis hymeniform, consisting of caulocystidia which envelop the entire stipe surface; caulocystidia broadly clavate, smooth, with intercellular high red (9A8 to 10A8) pigment in the meshes and squamules, hyaline elsewhere, with walls up to 1  $\mu\text{m}$  thick; underlying stratum composed of parallel, repent hyphae 2.5–5  $\mu\text{m}$  wide, cylindrical, smooth, colorless, thin-walled. Stipe trama composed of longitudinally running, cylindrical cells 3.5–10  $\mu\text{m}$  wide, unbranched, smooth, colorless. Clamps absent.

Known distribution: Japan (Shizuoka, Yamanashi).

Habitat: Solitary or scattered, on ground in highland (subalpine) forests dominated by *Tsuga diversifolia* and *Abies veitchii*, July to September, common.

Specimens examined: KPM-NC 0007127 (holotype), Mt. Fuji, at alt. 1300–1700 m, Yamanashi-ken, 2 Sept. 2000, coll. S. Uehara & H. Takahashi; the same place, 6 Sept. 1988, coll. S. Uehara & H. Takahashi; the same place, 5 Aug. 1995, coll. S. Uehara & H. Takahashi; the same place, 30 Jul. 1998, coll. S. Uehara & H. Takahashi.

Japanese name: Barairo-urabeni-irogawari (named by Mr. Sadayoshi Uehara).

**Notes:** This species is characterized by its large, deep red basidiomata, the pileus covered with small, blackish brown, appressed scales which form a cutis-like structure in the outermost layer of the mature pileipellis, the finely reticulate stipe, the quick coloration blue when bruised, and the habitat in subalpine coniferous forests.

Its *Boletus*-habit of basidiomata with discolorous, minute pores suggests that this species belongs in the section *Luridi* Fr. as defined in Singer (Singer, 1986). Within this section, the beige (only when young) to red, dry pileus and the finely reticulated, red stipe of *B. rhodocarpus* are also features of such European taxa as *Boletus rhodopurpureus* Smotl. (Alessio, 1985; Breitenbach and Kränzlin, 1991), *Boletus rhodoxanthus* (Krombh.) Kallenb. (Alessio, 1985; Breitenbach and Krän-

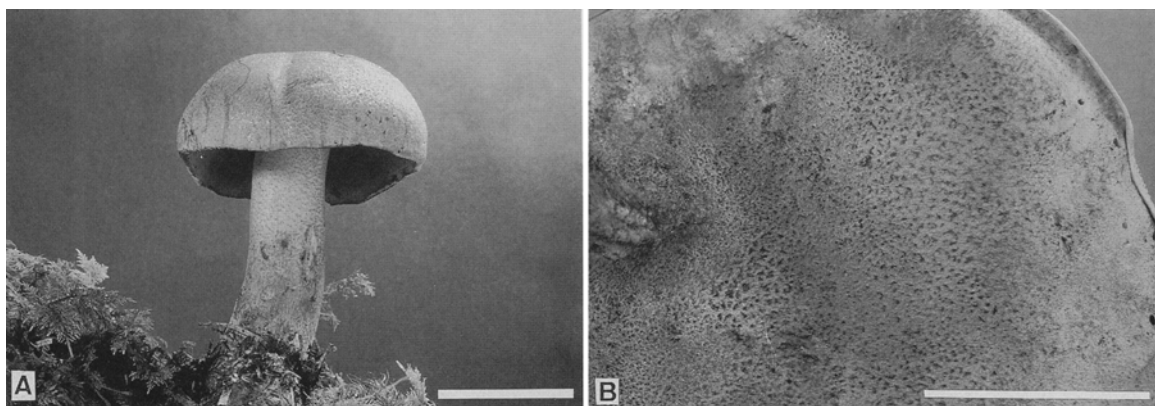


Fig. 2. Basidiomata of *Boletus rhodocarpus*. A. Mature basidioma. B. Close-up of the pileus surface covered with small, blackish brown, appressed scales. Scales: A=30 mm; B=20 mm. All figures from the holotype.

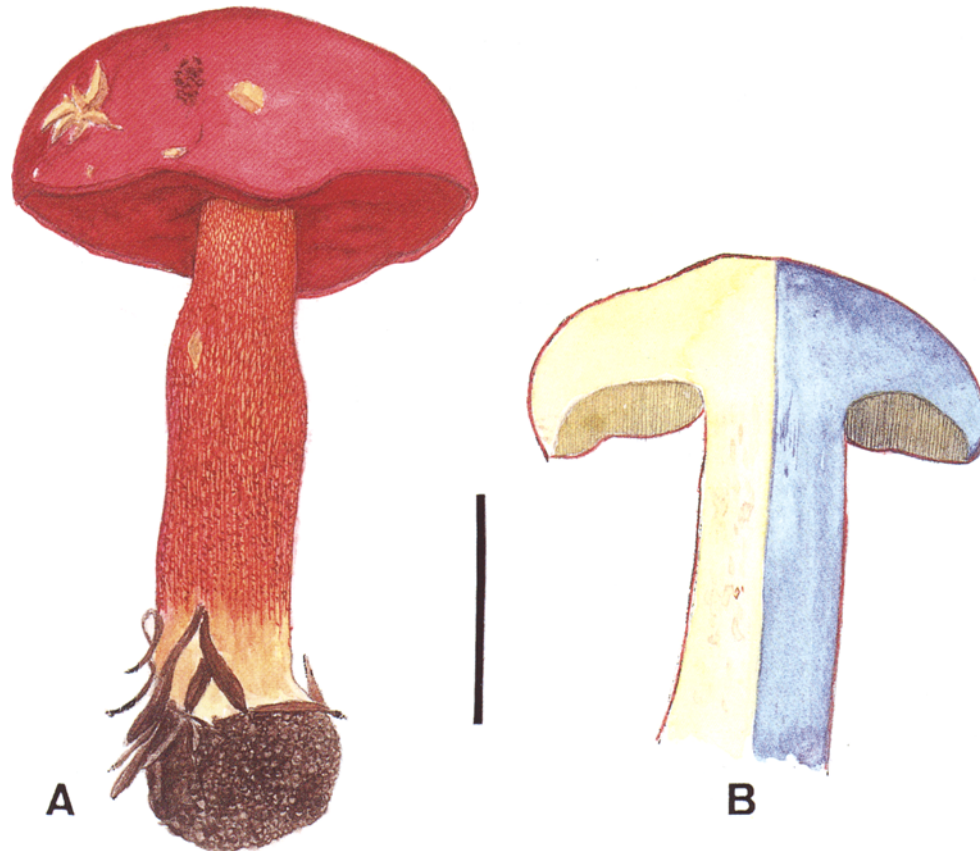


Fig. 3. Basidiomata of *Boletus rhodocarpus*. A. Mature basidioma. B. Section of the mature basidioma. Scale: 30 mm. All figures from the holotype. Picture by F. Sawada.

zlin, 1991; Singer, 1967), *Boletus satanoides* Smotl. (Singer, 1967), and *Boletus splendidus* C. Martin (Alessio, 1985; Breitenbach and Kränzlin, 1991). These species differ from *B. rhodocarpus* mainly in having a pileus without brownish scales and habitat in hardwood forests. *Boletus rhodocarpus* is also similar to two North American taxa: *Boletus flammans* E. A. Dick & Snell (Bessette et al., 2000; Dick and Snell, 1965; Grund and Harrison, 1976; Snell and Dick, 1970) and *Boletus rubroflammeus* A. H. Sm. & Thiers (Bessette et al., 2000; Smith and Thiers, 1971). *Boletus flammans* differs in having a dark red to brick red or reddish brown pileus without brownish scales and a yellow stipe base. *Boletus rubroflammeus* differs in having a deep purplish red pileus without brownish scales and habitat in broadleaved forests.

***Phaeomarasmium laccarioides* Har. Takahashi, sp. nov.**

Figs. 4, 5

Pileo 7–15 mm lato, primo hemisphaerico cum margine involuto, dein plano-convexo vel applanato, squamulis vel fibrillis albis obtegenti, rubro-brunneo; odore saporeque nullo; stipite 15–30 × 1.3–3 mm, subaequali vel ad basim leniter incrassato, centrali, cavo, rubro-brunneo, primo albo-fibrilloso, dein grabro; mycelio basali albo, strigoso; lamellis adnatis vel subdecurrentibus, distantibus, rubro-brunneis; basidiosporis 5.5–7 × 4–5 μm, ellip-

soideis, levibus, brunneolis, poro germinationis omnino destitutis; basidiis tetrasporis; cheilocystidiis 25–32 × 5.5–7 μm, abundantibus, cylindraceutis vel subclaviformibus; pleurocystidiis nullis; cellulis pileipellis sphaerocystidiis, catenatis, crassitunicatis, granulis pigmentosis brunneis incrustatis; caulocystidiis cheilocystidii simili-

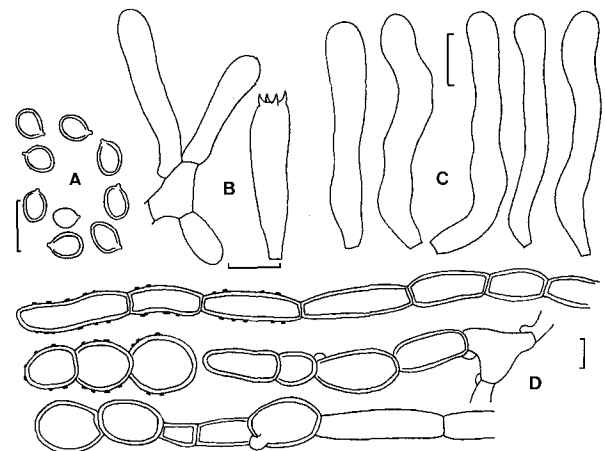


Fig. 4. *Phaeomarasmium laccarioides*. A. Basidiospores. B. Basidium and basidioles. C. Cheilocystidia. D. Elements of the pileipellis. Scales: 10 μm. All figures from the holotype.

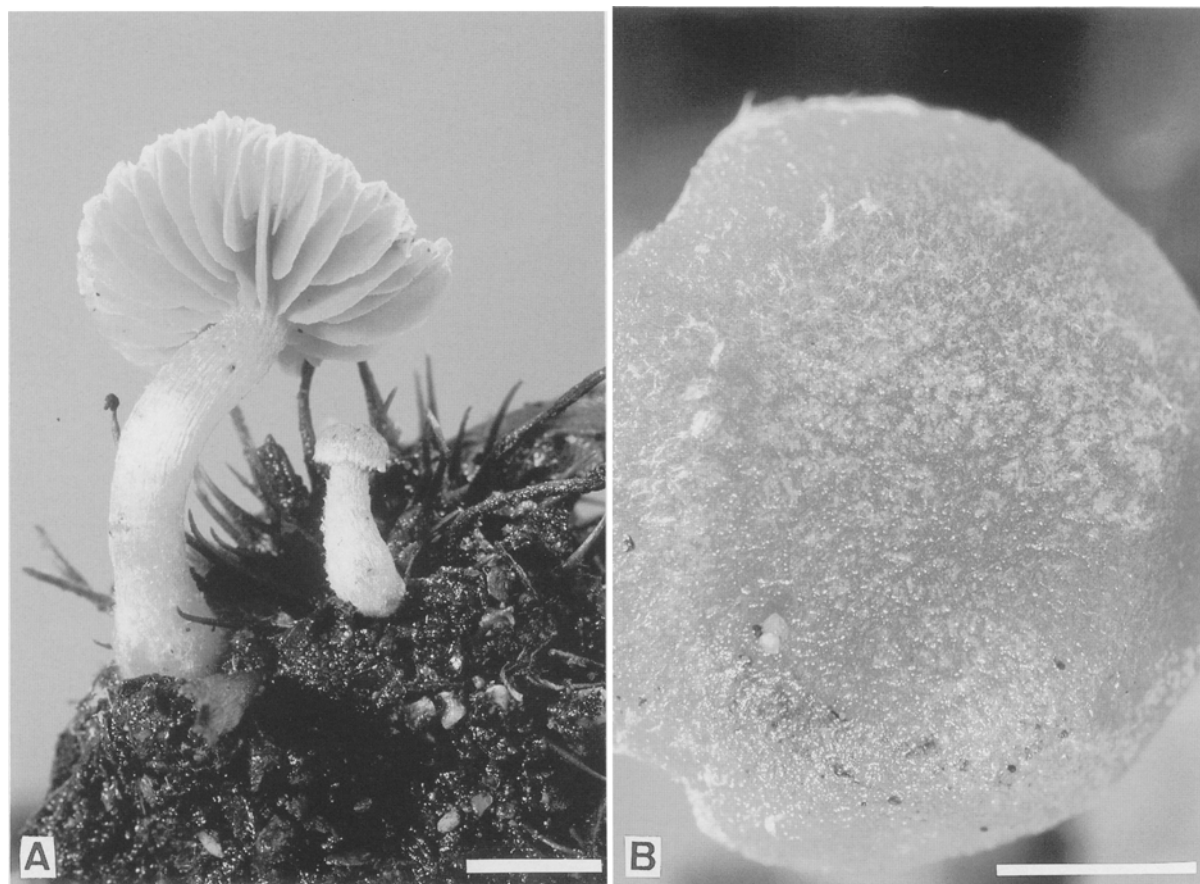


Fig. 5. Basidiomata of *Phaeomarasmium laccarioides*. A. Basidiomata on a fallen fruit of *Liquidambar styraciflua*. B. Close-up of the pileus surface. Scales: A=5 mm; B=3 mm. All figures from the holotype.

bus; hyphis fibulatis.

**Holotypus:** In fructu delapso *Liquidambaris styracifluae* L., Ikuta-ryokuchi, Kawasaki-shi, Kanagawa-ken, Japonia, 14 May 2000, E. Sano (KPM-NC 0006568).

**Etymology:** *laccarioides*, referring to the resemblance to basidiomata of the genus *Laccaria*.

**Pileus** 7–15 mm in diam, at first hemispherical with involute margin, then plano-convex to plane, surface whitish squamulose-fibrillose all over, background evenly colored brownish red (8C7-8) to reddish brown (8D7-8 to 9D7-8). **Flesh** up to 1.5 mm, concolorous; odor and taste not distinctive. **Stipe** 15–30 × 1.3–3 mm, subequal or somewhat thickened toward the base, central, slender, terete, hollow, paler concolorous with the pileus, whitish fibrillose when young, glabrescent in age, with whitish fibrillose cortina; base covered with white strigose mycelium. **Lamellae** adnate to subdecurrent, distant (15–18 reach the stipe), up to 4 mm broad, concolorous with the pileus; edges fimbriate, concolorous.

**Basidiospores** 5.5–7 × 4–5 μm [Q=length/breadth: 1.37–1.40], ellipsoid, smooth, pale brown, thick-walled, without a germ pore. **Basidia** 28–38 × 7–8 μm, clavate, four-spored. **Basidioles** clavate. **Cheilocystidia** 25–32 × 5.5–7 μm, abundant, cylindrical to subclavate, smooth, colorless, thin-walled. **Pleurocystidia** absent. **Hymeno-**

**phoral trama** regular; element hyphae similar to those of the pileitrama. **Pileipellis** a cutis consisting of chains of highly inflated elements; constituent cells 5–20 μm wide, cylindrical or globose to oblong, often branched, heavily incrustated with granules of brown pigment, with brownish, thickened walls, occasionally with clamped septa. **Hyphae of pileitrama** 5–22 μm wide, parallel, cylindrical, with incrustating, brown pigment, with brownish, thickened walls, occasionally with clamped septa. **Stipitipellis** a cutis of parallel, repent hyphae 2–12 μm wide, cylindrical, often incrustated with granules of brown pigment, with brownish, thickened walls, occasionally with clamped septa; **caulocystidia**, scattered, similar to the cheilocystidia. **Stipe trama** composed of longitudinally running, cylindrical hyphae 7–20 μm wide, unbranched, pale brownish, slightly thick-walled, occasionally with clamped septa.

**Known distribution:** Japan (Kanagawa).

**Habitat:** Solitary to scattered, on fallen fruit of *Liquidambar styraciflua*, from May to June, not common.

**Specimens examined:** KPM-NC 0006568 (holotype), Ikuta-ryokuchi, Kawasaki-shi, Kanagawa-ken, 14 May 2000, coll. E. Sano; KPM-NC 0006722, the same place, 18 Jun. 2000, coll. H. Takahashi.

**Japanese name:** Fuuonmitake

**Notes:** This species is characterized by its small

basidiomata with a squamulose-fibrillose, reddish brown pileus, the pale brown, smooth, thick-walled basidiospores without a germ pore, the cylindrical to subclavate cheilocystidia, the pileipellis consisting of chains of highly inflated, thick-walled elements with heavily incrusting, brown pigment, and the habitat on fallen fruit of *Liquidambar styraciflua*.

Its centrally stipitate basidiomata, the less than  $8\ \mu\text{m}$  long basidiospores, and the presence of sphaerocysts in the pileipellis suggest that it is a member of the genus *Phaeomarasmium* Scherff. subgenus *Carpophilus* Singer (Singer, 1986), where it appears to be closely related to European *Phaeomarasmium granulatus* (J. E. Lange) Singer (Lange, 1939; Watling, 1967; Vellinga, 1986) which differs in having a dark brown pileus, fusiform-amygdaliform, longer basidiospores ( $8\text{--}9.5 \times 4\text{--}5.5\ \mu\text{m}$ ; Vellinga, 1986), narrowly lageniform cheilocystidia, and a terrestrial habitat. *Phaeomarasmium melanesius* Corner & Horak from Solomon Islands (Horak, 1980), which belongs to the subgenus *Phaeomarasmium* (Singer, 1986), is also similar to *P. laccarioides*. The former species, however, differs in having a ferruginous pileus, a pileipellis made up of elongated, thin-walled elements, and habitat on rotting branches.

***Pluteus phaeocephalus* Har. Takahashi, sp. nov.**

Pileo 18–23 mm lato, primo hemisphaerico, dein plano-convexo vel applanato, primo glabro, dein tomentoso, fuliginoso; odore saporeque nullo; stipite 50–65  $\times$  1.5–2.5 mm, subaequali, ad basim leviter incrassato, centrali, cavo, albo, fuliginoso furfuraceo; mycelio basali non affixo; lamellis liberis, primo albis, dein carneoseis; basidiosporis 5.5–7  $\times$  5–6  $\mu\text{m}$ , subglobois, levibus, hyalinis; basidiis tetrasporis; cheilocystidiis 25–55  $\times$  10–25  $\mu\text{m}$ , abundantibus, clavatis, fusiformibus vel

utriformibus; pleurocystidiis 45–75  $\times$  18–32  $\mu\text{m}$ , fusiformibus vel utriformibus; pileipellis hymeniformibus; caulocystidiis 25–63  $\times$  10–20  $\mu\text{m}$ , abundantibus, utriformibus vel clavatis; hyphis defibulatis.

Holotypus: In ramulis delapsis *Quercus serratae* Thunb. ex Murray, Maruyama, Iriuda, Odawara-shi, Kanagawa-ken, Japonia, 23 Apr. 2000, H. Takahashi (KPM-NC 0006556).

Etymology: Greek, *phaeo* (dark) + *-cephalus* (-headed); referring to the dark brown pileus.

Pileus 18–23 mm in diam, at first hemispherical, then plano-convex or applanate, not umbonate, smooth or sometimes irregularly wrinkled at center, not sulcate, hygrophanous, sometimes with minutely cracking surface, glabrous when young, entirely velvety-tomentose at maturity, persistently dark brown (7F7-8 to 8F7-8) overall. Flesh up to 1 mm thick, white; odor and taste not distinctive. Stipe 50–65  $\times$  1.5–2.5 mm, almost equal but sometimes subbulbous or slightly swollen at the base, central, slender, terete, hollow, white, densely covered with dark brown (7F7-8 to 8F7-8) punctate scales; basal mycelium none. Lamellae free, moderately crowded (30–38 reach the stipe), up to 1 mm broad, thin, at first white, then sordid pink; edges even, concolorous.

Basidiospores 5.5–7  $\times$  5–6  $\mu\text{m}$  [Q=length/breadth: 1.10–1.16], subglobose to broadly ellipsoid, smooth, colorless, thin-walled. Basidia 20–27  $\times$  6–8  $\mu\text{m}$ , clavate, four-spored. Basidioles clavate. Cheilocystidia 25–55  $\times$  10–25  $\mu\text{m}$ , abundant, clavate to fusiform or utriform, colorless, thin-walled. Pleurocystidia 45–75  $\times$  18–32  $\mu\text{m}$ , scattered, fusiform or utriform. Hymenophoral trama inverse; element hyphae similar to those of the pileitrama. Pileipellis a hymeniform layer of cylindrical, narrowly clavate or narrowly fusiform terminal elements, 50–120  $\times$  8–22  $\mu\text{m}$ , with a brownish vacuolar pigment, thin-walled. Hyphae of pileitrama 3–10  $\mu\text{m}$  wide, inter-

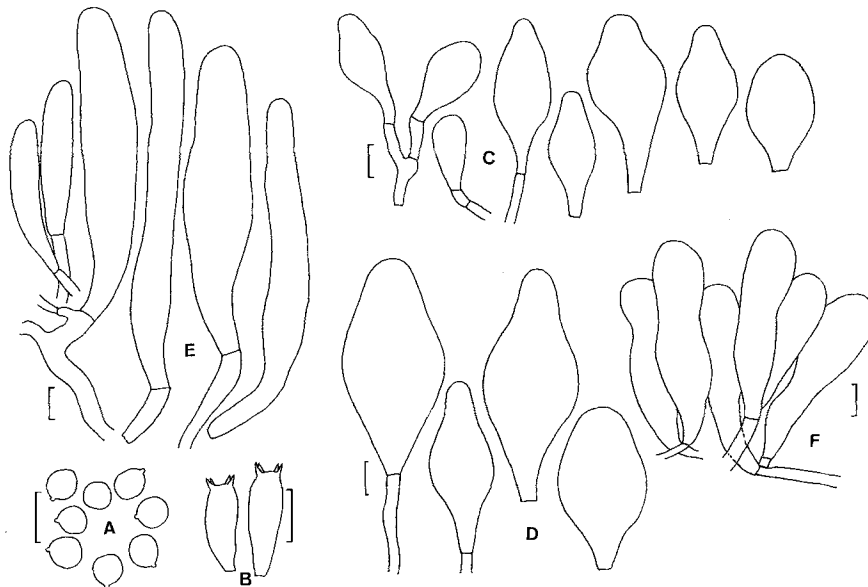


Fig. 6. *Pluteus phaeocephalus*. A. Basidiospores. B. Basidia. C. Cheilocystidia. D. Pleurocystidia. E. Elements of the pileipellis. F. Caulocystidia. Scales: 10  $\mu\text{m}$ . All figures from the holotype.

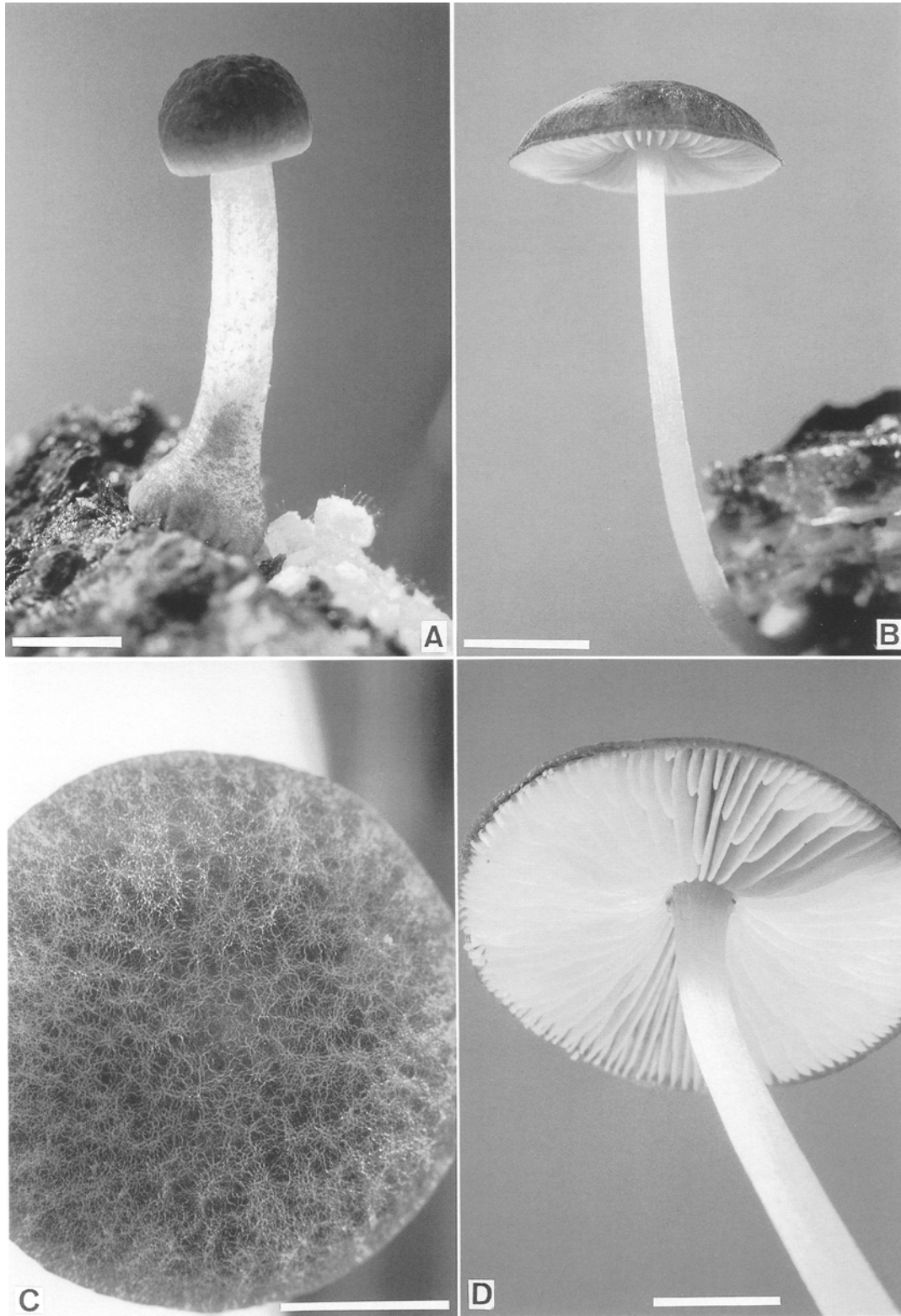


Fig. 7. Basidiomata of *Pluteus phaeocephalus*. A. Immature basidioma. B. Mature basidioma. C. Close-up of the pileus surface. D. Underside view. Scales: A=2 mm; B=10 mm; C=3 mm; D=5 mm. All figures from the holotype.

woven, cylindrical, often branched, colorless or a few with a brownish vacuolar pigment, smooth, thin-walled. Stipitipellis a cutis of parallel, repent hyphae 3–8  $\mu\text{m}$  wide, cylindrical, smooth, colorless, thin-walled; caulocystidia 25–63  $\times$  10–20  $\mu\text{m}$ , abundant, utriform or narrowly clavate to broadly clavate with median constriction, with a brownish vacuolar pigment, thin-walled. Stipe trama composed of longitudinally running, cylindrical hyphae 10–18  $\mu\text{m}$  wide, unbranched, smooth, colorless, thin-walled. Clamp connections absent.

Known distribution: Japan (Kanagawa).

Habitat: Solitary, on dead fallen twigs of *Quercus serrata*, from April to September, not common.

Specimens examined: KPM-NC 0006556 (holotype), Maruyama, Iriuda, Odawara-shi, Kanagawa-ken, 23 Apr. 2000, coll. H. Takahashi; the same place, 30 Apr. 2000, coll. H. Takahashi; the same place, 15 Sept. 2000, coll. H. Takahashi.

Japanese name: Kogecha-benihidatke.

**Notes:** This species is characterized by its dark brown, velvety pileus, the white stipe densely covered with dark brown punctate scales, the hyaline, utriform to fusiform cheilocystidia and pleurocystidia, the pileipellis consisting only of cylindrical to subfusiform elements. The combination of these features suggests that it is a member of the section *Celluloderma* Fayod, the subsection *Hispidodermini* (Fayod) Vellinga & Schreurs (Vellinga, 1990; Vellinga and Schreurs, 1985). Within the subsection *Hispidodermini*, *P. phaeocephalus* appears to be closely related to several taxa with a dark brown pileus, such as *Pluteus aethalus* (Berk. & M. A. Curtis) Sacc. from neotropical regions (Pegler, 1983; Singer, 1956, 1958), *Pluteus brunneopunctus* Horak from Argentina (Horak, 1964), *Pluteus escharites* (Berk. & Broome) Sacc. from East Africa (Pegler, 1977) and Sri Lanka (Pegler, 1986), and *Pluteus striatocystis* Pegler from East Africa (Pegler, 1977). *Pluteus aethalus* differs from *P. phaeocephalus* in having brownish black lamella edges and much larger cheilocystidia (50–110  $\times$  8–18  $\mu\text{m}$ : Pegler, 1983) with a fuscous brown vacuolar pigment. *Pluteus brunneopunctus* differs in having broadly fusiform pileocystidia with an acute apex and cylindrical, much longer cheilocystidia (80–95  $\mu\text{m}$ : Horak, 1964). *Pluteus escharites* differs in having a white, fibrillose-striate stipe, and lacking pleurocystidia. *Pluteus striatocystis* differs in having a pale greyish white, glabrous stipe and pleurocystidia with thickened walls in the median region.

Acknowledgements—I am grateful to Dr. Yousuke Degawa (KPM) for allowing the specimens cited to be kept in the Kanagawa Prefectural Museum of Natural History. Thanks are also owed to Mr. Sadayoshi Uehara and Mr. Etsuzo Sano for provision of specimens, and to Mrs. Fumiko Sawada for the permis-

sion to reproduce her excellent picture of *B. rhodocarpus* in this article.

#### Literature cited

- Alessio, C. L. 1985. *Boletus* Dill. ex L. (sensu lato). Fungi Europaeri 2. Biella Giovanna, Saronno.
- Bessette, A. E., Roody, W. C. and Bessette, A. R. 2000. North American Boletes. A color guide to the fleshy pored mushrooms. Syracuse University Press, New York.
- Breitenbach, J. and Kränzlin, F. 1991. Fungi of Switzerland 3. Boletes and agarics. 1st part. Edition Mycologia, Lucerne.
- Dick, E. A. and Snell, W. H. 1965. Notes on boletes. XV. Mycologia 57: 448–458.
- Grund, D. W. and Harrison, K. A. 1976. Nova Scotian boletes. Bibl. Mycol. 47: 1–283.
- Horak, E. 1964. Fungi austroamericani. II. *Pluteus* Fr. Nova Hedwig. 8: 163–199.
- Horak, E. 1980. New and interesting species of *Phaeomarasmius* (Agaricales) from Papua New Guinea and adjacent regions. Sydowia 32: 167–180.
- Kornerup, A. and Wanscher, J. H. 1978. Methuen handbook of colour, 3rd ed. Methuen & Co., London.
- Lange, J. E. 1939. Flora Agaricina Danica 4. Copenhagen.
- Pegler, D. N. 1977. A preliminary agaric flora of East Africa. Kew Bulletin Add. Ser. VI. Her Majesty's Stationery Office, London.
- Pegler, D. N. 1983. Agaric flora of the Lesser Antilles. Kew Bulletin Add. Ser. IX. Her Majesty's Stationery Office, London.
- Pegler, D. N. 1986. Agaric flora of Sri Lanka. Kew Bulletin Add. Ser. XII. Her Majesty's Stationery Office, London.
- Singer, R. 1956. Contributions towards a monograph of the genus *Pluteus*. Trans. Br. Mycol. Soc. 39: 145–232.
- Singer, R. 1958. Monographs of the South American Basidiomycetes, especially those of the east slope of the Andes and Brazil. 1. The genus *Pluteus* in South America. Lloydia 21: 195–299.
- Singer, R. 1967. Die Röhrlinge II. Verlag Julius Klinkhardt, Bad Heilbrunn Obb.
- Singer, R. 1986. Agaricales in modern taxonomy, 4th ed. Koeltz Scientific Books, Koenigstein.
- Smith, A. H. and Thiers, H. D. 1971. The boletes of Michigan. The University of Michigan Press, Ann Arbor.
- Snell, W. H. and Dick, E. A. 1970. The boleti of northeastern North America. J. Cramer, Vaduz.
- Vellinga, E. C. 1986. The genus *Flammulaster* (Agaricales) in the Netherlands and adjacent regions. Persoonia 13: 1–26.
- Vellinga, E. C. 1990. Pluteaceae Kotl. & Pouz. In: Flora Agaricina Neerlandica vol. 2, (ed by Bas, C., Kuyper, T. H., Noordeloos, M. E. and Vellinga, E. C.), pp. 31–64. A. A. Balkema, Rotterdam.
- Vellinga, E. C. and Schreurs, J. 1985. Notulae ad Floram Agaricinam Neerlandicam-VIII. *Pluteus* Fr. in West-Europe. Persoonia 12: 337–373.
- Watling, R. 1967. The genus *Flammulaster*. Notes R. Bot. Gdn. Edinb. 28: 65–72.