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Four new species of *Crinipellis* and *Marasmius* in eastern Honshu, Japan

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Abstract Four new species of *Crinipellis* and *Marasmius* (Agaricales, Basidiomycetes) in eastern Honshu, Japan, are described and illustrated: (1) *Crinipellis conchata* sp. nov. (section *Excentricinae*), forming a conchate pileus and a strongly excentric, short stipe, was found on a dead twig of *Trachelospermum asiaticum* in Mt. Takao, Tokyo; (2) *Marasmius funalis* sp. nov. (section *Androsacei*), forming a densely white-hispid, dark brown stipe bearing numerous setiform caulocystidia, was found on a dead twig of *Cryptomeria japonica* or on leaf litter in Tokyo and Kanagawa; (3) *Marasmius maculosus* sp. nov. (section *Sicci*), having a relatively large, reddish-brown pileus distinctly mottled with pale colored spots and *Siccus*-type cheilocystidia and pileipellis cells with relatively long setulae, was found on leaf litter in the lowland forest of Kanagawa and Chiba; and (4) *Marasmius sasicola* sp. nov. (section *Marasmius*), having a small, plicate-sulcate pileus, a filiform, wiry, blackish stipe, collariate lamellae, and *Siccus*-type cheilocystidia and pileipellis elements, was found on fallen dead leaves of grass bamboo in Kanagawa.

Key words Agaricales · *Crinipellis conchata* · *Marasmius funalis* · *Marasmius maculosus* · *Marasmius sasicola*.

Introduction

A survey of agaric flora in eastern Honshu (especially Tokyo and Kanagawa), Japan, revealed the occurrence of four new species of *Crinipellis* and *Marasmius*. These species are described and illustrated here, and photographs are presented showing macroscopical features of the basi-

diomata. 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. *Crinipellis conchata* Har. Takahashi, sp. nov. Figs. 1, 2

Pileo 8–15 mm lato, conchato vel semiorbiculari, primo piloso, dein glabro, brunneolo; stipite 1–2 × 0.5–1 mm, excentrico, brunneolo, piloso, mycelio basali non affixo; lamellis adnexis vel adnatis, distantibus, brunneolis; basidiosporis 10–12 × 5–6 μm, ellipsoideis, levibus, hyalinis, inawyloideis; cheilocystidiis 15–30 × 5–10 μm, subclaviformibus, aliquot breviter lobatis; pleurocystidiis nullis; pilis pilei 60–200(–500) × 4–10 μm, crassitunicatis, pseudoamyloideis; pilis stipitis eis pilei similibus; hyphis fibulatis.

Holotypus: In ramulis delapsis *Trachelospermi asiatici*, Mt. Takao, Hachioji-shi, Tokyo, Japonia, June 15, 2000, H. Takahashi (KPM-NC-0006721).

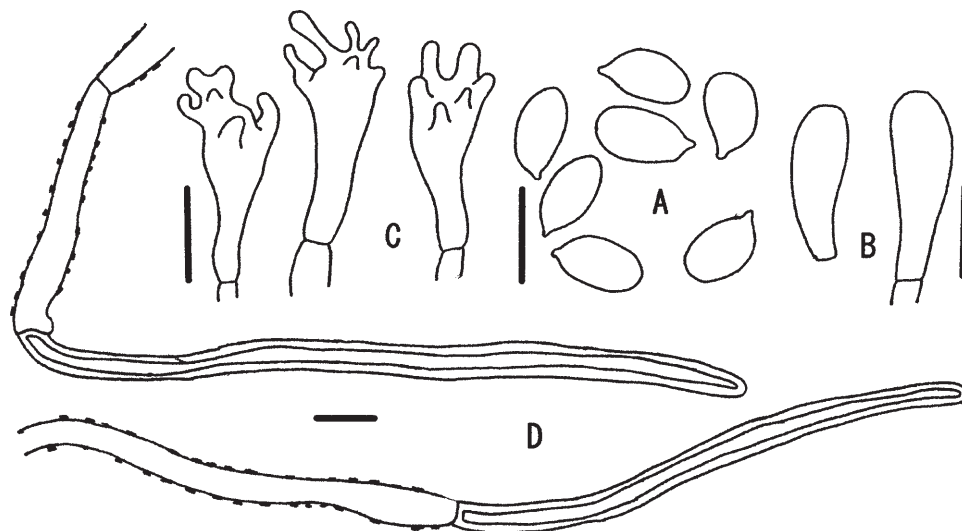
Etymology: from Latin, *conchata* = shell-shaped, referring to the shell-shaped pileus.

Pileus 8–15 mm in diameter, conchate to semiorbicular, at first with the incurved margin, not umbonate, not sulcate, dry, at first silky-pilose overall but soon glabrescent, when young evenly colored light brown, becomin paler in age. Flesh up to 0.3 mm thick, paler concolorous with the surface, tough, odor and taste not distinctive. Stipe 1–2 × 0.5–1 mm, strongly excentric or almost lateral from the first, terete, solid, silky-pilose to fibrillose overall, entirely paler concolorous with the pileus, insititious. Lamellae adnexed to adnate, distant (8–13 reach the stipe), with 1–4 series of lamellulae, up to 2 mm broad, paler concolorous with the pileus; edges even, concolorous.

Spore print pure white. Basidiospores 10–12 × 5–6 μm (Q = length/breadth: 2, n = 20 spores per two specimens), ellipsoid to elongate-ellipsoid, smooth, colorless, inamyloid, thin-walled. Basidia not observed; basidioles 17–26 × 5–7 μm, clavate. Cheilocystidia 15–30 × 5–10 μm, forming

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Fig. 1. *Crinipellis conchata*. **A** Basidiospores. **B** Basidioles. **C** Cheilocystidia. **D** Elements of the pileipellis. All figures from the holotype. Bars 10 μ m



a compact sterile edge, clavate to subclavate, with several irregularly cylindrical apical appendages $3\text{--}10 \times 1\text{--}4\ \mu\text{m}$, colorless, inamyloid, thin-walled. Pleurocystidia none. Hymenophoral trama irregular; element hyphae similar to those of the pileitrama but often irregularly inflated (up to $17\ \mu\text{m}$ wide). Pileipellis a hypotrachial layer of cylindrical cells $50\text{--}160 \times 4\text{--}9\ \mu\text{m}$, not inflated, with brownish incrustation, inamyloid, thin- or slightly thick-walled (up to $0.5\ \mu\text{m}$ thick), occasionally with clamped septa; hairs of pileus $60\text{--}200(\text{--}500) \times 4\text{--}10\ \mu\text{m}$, arising directly from the hypotrachium, scattered, repent or erect, cylindrical, tapering to an obtuse apex or with a broadly rounded apex, smooth, hyaline, dextrinoid, with colorless walls up to $3\ \mu\text{m}$ thick, rarely with a secondary septum. Hyphae of pileitrama $3\text{--}8\ \mu\text{m}$ wide, irregularly arranged, cylindrical, not inflated, monomitic, smooth, hyaline, inamyloid, thin- or slightly thick-walled (up to $0.5\ \mu\text{m}$ thick), occasionally with clamped septa. Stipitipellis of scattered hairs arising from cutis hyphae; hairs of stipe similar to those of the pileus. Stipe trama composed of longitudinally running, cylindrical hyphae $6\text{--}15\ \mu\text{m}$ wide, monomitic, smooth, hyaline, dextrinoid, slightly thick-walled (up to $1\ \mu\text{m}$ thick).

Distribution: Japan (Tokyo).

Habitat: Gregarious on dead twigs of *Trachelospermum asiaticum* (Siebold et Zucc.) Nakai, from June to July.

Specimens examined: KPM-NC0006721 (holotype), Mt. Takao, Hachioji-shi, Tokyo, June 15, 2000; KPM-NC0008708, same place, June 20, 1998; KPM-NC0008709, same place, June 26, 1998; KPM-NC0008710, same place, June 19, 1997; KPM-NC0008711, same place, June 21, 1997; KPM-NC0008712, same place, June 28, 1997.

Japanese name: Asaritake.

Notes: This species is characterized by its light brown, glabrescent, conchate pileus, the strongly excentric or almost lateral, short (up to 2 mm long) stipe, the relatively long basidiospores ($10\text{--}12\ \mu\text{m}$ in length), the clavate cheilocystidia with several digitate apical appendages, the dextrinoid, thick-walled hairs on the pileus and stipe sur-

face, and the basidiome formation on dead branches. The combination of these characteristics suggests that this species is closely related to the section *Excentricinae* (Singer) Singer of the genus *Crinipellis* Pat., as defined by Singer (Singer 1943, 1976, 1986). *Crinipellis conchata*, however, is distinct from all other described species in the section because of its pleurotoid basidiomata made up of a conchate pileus and a strongly excentric or almost lateral, poorly developed stipe and its longer basidiospores (usually less than $10.5\ \mu\text{m}$ in length in the section). Its pleurotoid habit is also similar to the genus *Chaetocalathus* Singer (Singer 1943, 1976, 1986), which differs from the genus *Crinipellis* in forming a dorsally attached pileus with or without a rudimentary stipe never attached to the substratum and possessing either dextrinoid basidiospores or dextrinoid metuloid. Thus, *C. conchata* seems to be a phylogenetically intermediate taxon to connect *Crinipellis* with *Chaetocalathus*.

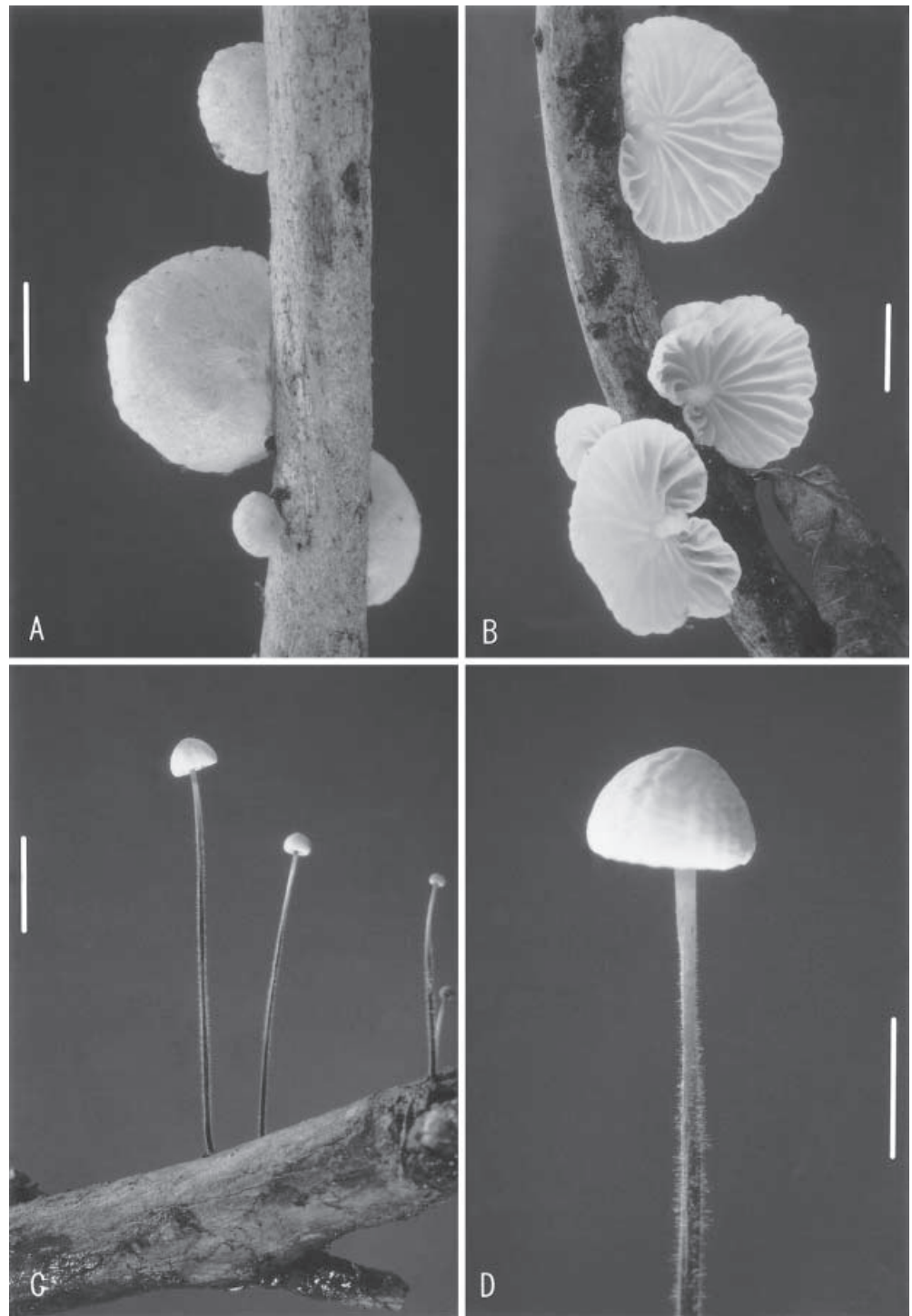
Its pleurotoid habit has superficial resemblance to the genus *Marasmiellus*, which differs in lacking dextrinoid hairs.

2. *Marasmius funalis* Har. Takahashi, sp. nov. Figs. 2, 3

Pileo 2–6 mm lato, hemisphaerico vel convexo, grabro, rubro-brunneo; stipite 20–50 \times 0.2–0.5 mm, filiformi, strigoso, fuliginoso, mycelio basali non affixo; lamellis adnexis vel adnatis, distantibus, albis; basidiosporis $6.5\text{--}8 \times 4\text{--}5\ \mu\text{m}$, ellipsoideis, levibus, hyalinis, inamyloideis; basidiis 20–25 \times $4.5\text{--}7\ \mu\text{m}$, bisporis; cheilocystidiis 10–25 \times $7\text{--}12\ \mu\text{m}$, claviformibus, aliquot lobatis; pleurocystidiis nullis; pileipelle ex hyphis repentibus cylindricis composita, granulis pigmentosis brunneis incrustata, inamyloidea, cellulis terminalibus subclaviformibus aliquot lobatis; caulocystidiis 60–200 \times $4\text{--}7\ \mu\text{m}$, setiformibus, pseudoamyloideis; hyphis afibulatis.

Holotypus: In ramulis delapsis *Cryptomeriae japonicae*, Minkenno-mori, Machida-shi, Tokyo, Japonia, May 21, 2000, H. Takahashi (KPM-NC0006566).

Fig. 2. Basidiomata of *Crinipellis conchata* and *Marasmius funalis*. **A, B** *Crinipellis conchata*. **C, D** *Marasmius funalis*. All figures from the holotype. Bars **A, B, D** 5 mm; **C** 10 mm



Etymology: from Latin, *funalis* = ropelike, referring to the long, tough, pliant stipes.

Pileus 2–6 mm in diameter, hemispherical to convex, not expanding to plano-convex, nearly smooth or shallowly sulcate-striate toward the margin, dry, dull, glabrous, at first reddish-brown (8-9E7-8, 8-9F7-8) overall, then pale brown at maturity. Flesh very thin (up to 0.3 mm), whitish, pliant, tough, odor and taste none. Stipe 20–50 × 0.2–0.5 mm, filiform, central, terete, densely hispid to strigose with white

hairs, pale brown at the apex, blackish-brown elsewhere; base insititious, without rhizomorphs. Lamellae adnexed to adnate, distant (8–12 reach the stipe), with 0–1 series of lamellulae, up to 0.5 mm broad, white; edges even, concolorous.

Spore print pure white. Basidiospores 6.5–8 × 4–5 μm ($Q = \text{length/breadth}: 1.6, n = 20$ spores per two specimens), ellipsoid, smooth, colorless, inamyloid, thin-walled. Basidia 20–25 × 4.5–7 μm, clavate, two-spored; basidioles clavate.

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



Fig. 4. *Marasmius maculosus*. **A** Basidiospores. **B** Basidioles. **C** Cheilocystidia. **D** Elements of the pileipellis. **E** Caulocystidia. All figures from the holotype. Bars 10µm

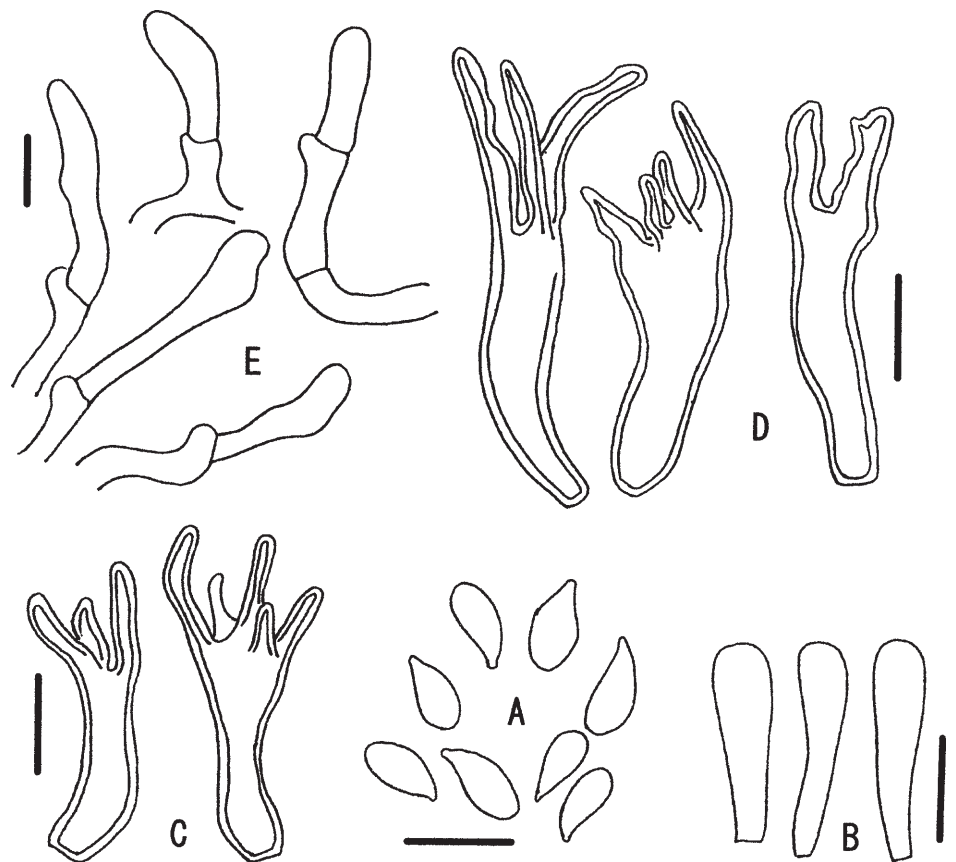
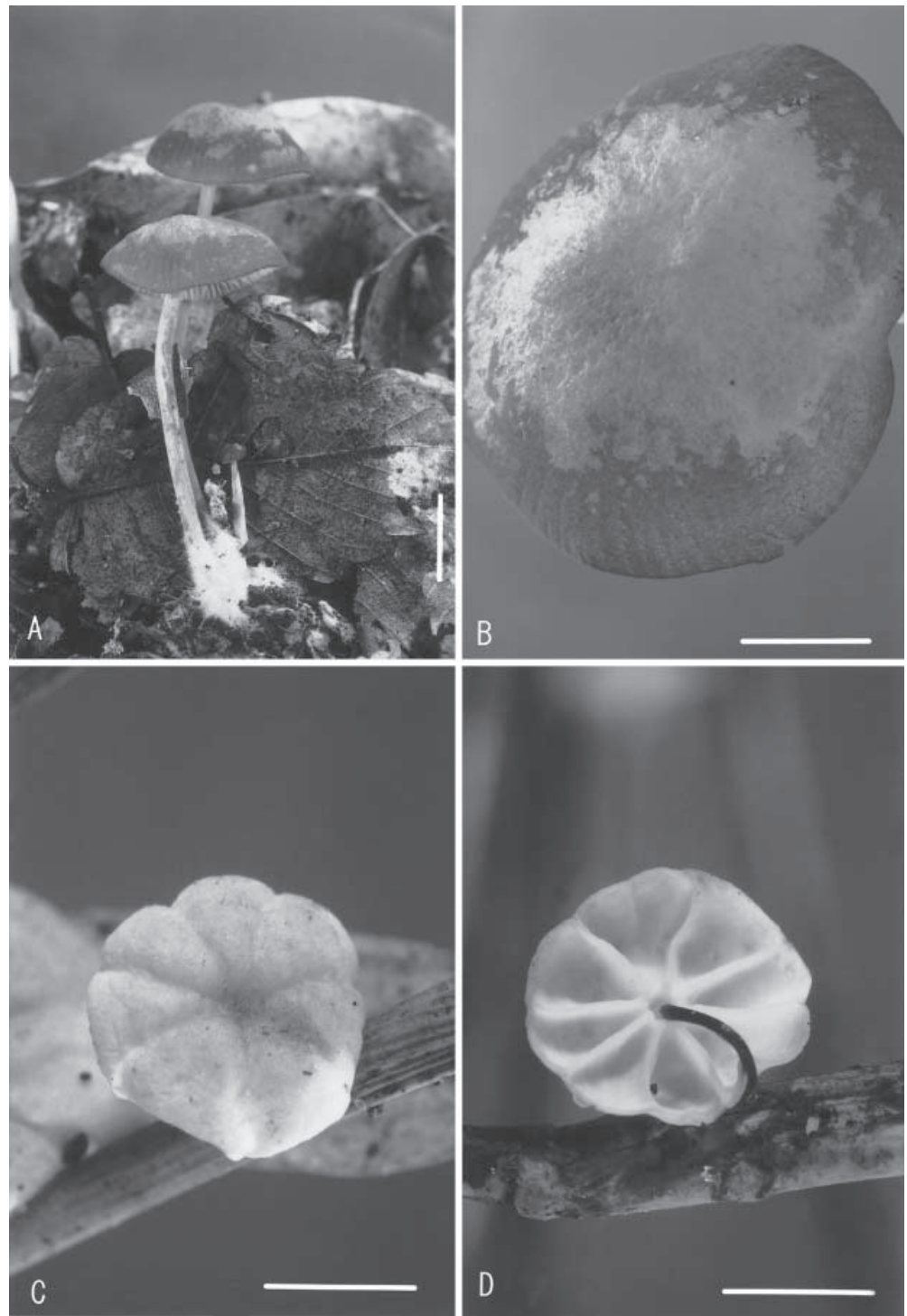


Fig. 5. Basidiomata of *Marasmius maculosus* and *Marasmius sasicola*. **A, B** *Marasmius maculosus*. **C, D** *Marasmius sasicola*. All figures from the holotype. Bars **A** 10 mm; **B** 5 mm; **C, D** 2.5 mm



Cheilocystidia $10\text{--}25 \times 7\text{--}12\ \mu\text{m}$, forming a compact sterile edge, clavate, with several irregularly cylindrical apical appendages $1\text{--}7 \times 1\text{--}1.5\ \mu\text{m}$, colorless, inamyloid, thin- or slightly thick-walled. Pleurocystidia none. Hymenophoral trama regular; element hyphae similar to those of the pileitrama but completely inamyloid. Pileipellis a cutis of cylindrical cells $2\text{--}5\ \mu\text{m}$ wide, encrusted with brown-pigmented granules, inamyloid, thin-walled; terminal cells

$12\text{--}22 \times 8\text{--}13\ \mu\text{m}$, subcylindrical to subclavate, colorless, thin- or slightly thick-walled, with numerous cylindrical to irregularly shaped diverticula $2\text{--}7 \times 1\text{--}2\ \mu\text{m}$. Hyphae of pileitrama $4\text{--}7\ \mu\text{m}$ wide, parallel, cylindrical, monomitic, inamyloid or weakly dextrinoid, thin-walled. Stipitipellis a cutis of parallel, repent hyphae $2.5\text{--}4.5\ \mu\text{m}$ wide, cylindrical, heavily encrusted with brown pigment, dextrinoid, thick-walled (up to $1\ \mu\text{m}$); caulocystidia $60\text{--}20 \times 4\text{--}7\ \mu\text{m}$, setiform,

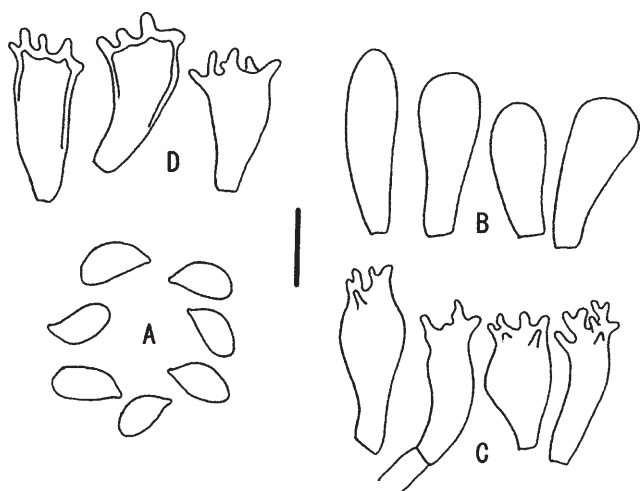


Fig. 6. *Marasmius sasicola*. **A** Basidiospores. **B** Basidioles. **C** Cheilocystidia. **D** Elements of the pileipellis. All figures from the holotype. Bars 10 μ m

erect, cylindrical, tapering to an acute or rounded apex, with smooth, colorless walls up to 2 μ m thick, dextrinoid. Stipe trama composed of longitudinally running, cylindrical hyphae 5–8 μ m wide, monomitic, with smooth, colorless walls up to 1 μ m thick, dextrinoid. Clamp connections absent.

Distribution: Japan (Kanagawa, Tokyo).

Habitat: Gregarious on dead twigs of *Cryptomeria japonica* (L. f.) D. Don or on leaf litter in lowland forest dominated by *Carpinus tschonoskii* Maxim. and *Quercus myrsinaefolia* Blume, from May to July.

Specimens examined: KPM-NC0006566 (holotype), Minkenno-mori, Machida-shi, Tokyo, May 21, 2000; Ikutaryokuchi, Kawasaki-shi, Kanagawa-ken, June 16, 2000.

Japanese name: Kenawatake.

Notes: Distinctive features of this species are found in the seemingly glabrous, brown pileus, the densely white-hispid, dark brown to black, insititious stipe bearing numerous setiform caulocystidia, the subclavate cheilocystidia with several finger-like apical appendages, and the lack of clamp connections.

Its nonhymeniform pileipellis composed of repent, interwoven elements with highly diverticulate terminal cells and its dextrinoid tramal hyphae suggest that this species belongs in the section *Androsacei* Kühner of the genus *Marasmius* Fr., as defined by Singer (1986). Within the section, *M. funalis* seems to be closely related to *Marasmius liquidambari* Singer from Mexico (Singer 1976) and Papua New Guinea (Desjardin and Horak 1997). The latter species, however, differs in lacking cheilocystidia, forming non-setiform, clavate to cylindrical caulocystidia, and having clamp connections. European *Marasmius hudsonii* (Pers.: Fr.) Fr. (Antonín and Noordeloos 1993; Breitenbach and Kränzlin 1991), which belongs to the section *Hygrometrici* Kühner, has superficial resemblance to *M. funalis*, but it differs in having a densely hairy to strigose pileus bearing inamyloid setae, nondextrinoid tramal hyphae, and clamp connections.

3. *Marasmius maculosus* Har. Takahashi, sp. nov.

Figs. 4, 5

Pileo 20–50 mm lato, primo hemisphaerico vel convexo, dein plano-convexo, hygrophano, maculoso, velutino, rubro-brunneo; stipite 50–80 \times 1.5–2.5 mm, cylindrico, cavo, pruinoso, rubro-brunneo, mycelio basali albo affixo; lamellis adnexis, subdistantibus, albis; basidiosporis 8.5–11 \times 4–5 μ m, subfusiformibus, levibus, hyalinis, inamyloideis; cheilocystidiis elementi pileipellis similibus; pleurocystidiis nullis; pileipelle hymeniformi, ex cellulis ad instar “*Marasmius* sect. *Sicci*,” pseudoamyloidea, cellulis terminalibus subclaviformibus aliquot lobatis; caulocystidiis 20–55 \times 5–8 μ m, cylindraceutis, levibus, pseudoamyloideis; hyphis fibulatis.

Holotypus: In foliis dejectis *Quercus* et *Castanopsis*, Iriuda, Odawara-shi, Kanagawa-ken, Japonia, Sept. 15, 2000, H. Takahashi (KPM-NC0007426).

Etymology: from Latin, *maculosus* = thickly spotted, referring to the pileus mottled with pale colored spots.

Pileus 20–50 mm in diameter, at first hemispherical to convex, expanding to plano-convex, smooth, striatulate when wet, hygrophanous, dull, velvety, when young reddish-brown (8D7-8 to 8E7-8) overall, somewhat paler in age, distinctly mottled with pale colored spots. Flesh up to 1 mm thick, paler concolorous with the pileus, tough, odor and taste not distinctive. Stipe 50–80 \times 1.5–2.5 mm, cylindrical, central, terete, hollow, minutely pruinose overall, whitish at the apex, concolorous with the pileus elsewhere; base covered with white, strigose mycelial hairs or tomentum attached to an extensive mycelial mat in the substratum. Lamellae adnexed, subdistant (14–17 reach the stipe), with three series of lamellulae, slightly intervenose, up to 5 mm broad, white; edges even, paler concolorous with the pileus.

Spore print pure white. Basidiospores 8.5–11 \times 4–5 μ m (Q = length/breadth: 2.1–2.2, n = 20 spores per two specimens), subfusiform, smooth, colorless, inamyloid, thin-walled. Basidia not observed; basidioles 17–22 \times 3–6 μ m, clavate. Cheilocystidia forming a compact sterile edge, similar to the pileipellis elements. Pleurocystidia none. Hymenophoral trama regular; element hyphae similar to those of the pileitrama but somewhat inflated (up to 20 μ m wide). Pileipellis a hymeniform layer of *Siccus*-type cells with long setulae, with smooth, reddish-brown walls up to 1 μ m thick, dextrinoid; main cell bodies 20–30 \times 7–12 μ m, subclavate to subcylindrical; setulae 5–20 \times 1–3 μ m, cylindrical with obtuse apex, somewhat wavy in outline, rarely forked. Hyphae of pileitrama 5–10 μ m wide, parallel, cylindrical, monomitic, inamyloid or weakly dextrinoid, thin-walled, with clamped septa. Stipitipellis a cutis of parallel, repent hyphae 3–5 μ m wide, cylindrical, dextrinoid, with smooth, brownish walls up to 0.5 μ m thick, with clamped septa; caulocystidia 20–55 \times 5–8 μ m, cylindrical to subclavate, with smooth, brownish walls up to 0.5 μ m thick, dextrinoid. Stipe trama composed of longitudinally running, cylindrical hyphae 4–9 μ m wide, monomitic, smooth, colorless, thin-walled, dextrinoid, with clamped septa.

Distribution: Japan (Kanagawa, Chiba).

Habitat: Gregarious on leaf litter in *Quercus-Castanopsis* forests, September.

Specimens examined: KPM-NC0007426 (holotype), Iriuda, Odawara-shi, Kanagawa-ken, Sept. 15, 2000; KPM-NC0008774, same place, Sept. 12, 2001; KPM-NC0007427, Izumi-shizenkouen, Chiba-shi, Chiba-ken, Sept. 30, 2000.

Japanese name: Madara-houraitake.

Notes: This species is characterized by its relatively large, reddish-brown pileus distinctly mottled with pale colored spots, the reddish-brown marginate lamellae, the *Siccus*-type cheilocystidia and pileipellis cells with relatively long setulae (up to 20 μm), and its habitat on leaf litter. The white strigose basal mycelium, the *Siccus*-type pileipellis elements, and the lack of pleurocystidia and setae suggest that this species belongs in the section *Sicci* Singer, subsection *Siccini* Singer, series *Leonini* Singer, as defined by Singer (1986). Its pileus distinctly mottled with pale colored spots is unique in the genus *Marasmius* and a useful field character to discriminate this species from most others.

Marasmius coklatus Desjardin, Retnowati, & Horak, recently described from Indonesia (Desjardin et al. 2000), is most similar to *M. maculosus* in having relatively large basidiomata and forming broom cells with long setulae (Mrs. A. Retnowati, personal communication). *Marasmius coklatus*, however, differs in having a dark chocolate-brown pileus, remote to distant (10–15), much broader (4–12 mm), grayish-brown, nonmarginate lamellae, and numerous setiform cystidia in the pileipellis, hymenium, and stipitipellis.

4. *Marasmius sasicola* Har. Takahashi, sp. nov. Figs. 5, 6

Pileo 5–10 mm lato, convexo, plicato-striato, granuloso, primo brunneo, dein albo; stipite 2–3 \times 0.3–0.4 mm, filiformi, glabro, fuliginoso, mycelio basali non affixo; lamellis adnexis vel adnatis, collariatis, distantibus, albis; basidiosporis 8–10 \times 4–5 μm , ellipsoideis, levibus, hyalinis, inamyloideis; cheilocystidiis elementi pileipellis similibus sed hyalinis; pleurocystidiis nullis; pileipelle hymeniformi, ex cellulis ad instar "*Marasmius* sect. *Sicci*," pseudoamyloidea, cellulis terminalibus subclaviformibus, aliquot lobatis; caulocystidiis nullis; hyphis fibulatis.

Holotypus: In foliis dejectis Sasae, Ikuta-ryokuchi, Kawasaki-shi, Kanagawa-ken, Japonia, June 24, 2001, H. Takahashi (KPM-NC0008686).

Etymology: *Sasicola*, referring to the habitat on leaves of *Sasa* sp.

Pileus 5–10 mm in diameter, convex, not expanding to plano-convex, plicate-striate, dry, dull, minutely granulate overall, glabrescent in age, at first light brown overall, then paler toward the margin, almost whitish at maturity. Flesh very thin (up to 0.4 mm), whitish, pliant, tough, odor and taste none. Stipe 2–3 \times 0.3–0.4 mm, wiry, filiform, central, terete, dark brown to black overall, glabrous; base insititious, without rhizomorphs. Lamellae adnexed to adnate, distant with no lamellulae (6–8 reach the stipe), sometimes collariate, up to 2 mm broad, white; edges terete, concolorous.

Basidiospores 8–10 \times 4–5 μm (Q = length/breadth: 2, n = 20 spores per two specimens), ellipsoid, smooth, colorless, inamyloid, thin-walled. Basidia not observed; basidioles 18–26 \times 6–10 μm , clavate. Cheilocystidia forming a com-

pact sterile edge, similar to the pileipellis elements but colorless. Pleurocystidia none. Hymenophoral trama irregular; element hyphae similar to those of the pileitrama. Pileipellis a hymeniform layer of *Siccus*-type cells, with smooth, reddish-brown walls up to 1 μm thick, dextrinoid; main cell bodies 17–27 \times 7–10 μm , clavate to subclavate; setulae 2–8 \times 0.5–2 μm , cylindrical with obtuse apex, rarely forked. Hyphae of pileitrama 5–14 μm wide, monomitic, irregularly arranged, cylindrical, dextrinoid, thin-walled, with clamped septa. Stipitipellis a cutis of parallel, repent hyphae 3–6 μm wide, cylindrical, inamyloid, with smooth brown walls up to 1 μm thick, with clamped septa; caulocystidia none. Stipe trama composed of longitudinally running, cylindrical hyphae 4–11 μm wide, monomitic, with smooth, colorless walls up to 0.5 μm thick, dextrinoid, with clamped septa.

Distribution: Japan (Kanagawa).

Habitat: Gregarious on fallen dead leaves of grass bamboo (*Sasa* sp.) in lowland forests, June.

Specimens examined: KPM-NC0007424, Ikuta-ryokuchi, Kawasaki-shi, Kanagawa-ken, June 18, 2000; KPM-NC0007425, same place, June 19, 2000; KPM-NC0008686 (holotype), same place, June 24, 2001; KPM-NC0008687, same place, June 28, 2001; KPM-NC0008688, same place, July 3, 2001.

Japanese name: Sasa-no-houraitake.

Notes: This species is characterized by its small, pale colored, plicate-sulcate pileus, the filiform, wiry, blackish stipe, the collariate, distant lamellae, the *Siccus*-type cheilocystidia and pileipellis elements, and its habitat on fallen dead leaves of grass bamboo. Its central insititious stipe, the collariate lamellae, and its *Siccus*-type pileipellis elements suggest that this species belongs in the section *Marasmius*, subsection *Penicillati* Singer, as defined by Singer (1986).

Marasmius subconiatius Petch, originally described from Sri Lanka (Pegler 1986; Petch 1948) and recently reported from Indonesia (Desjardin et al. 2000), is phenetically similar to *M. sasicola*. The former species, however, differs in forming a noninsititious stipe and moderately distant, non-collariate, orange-marginate lamellae bearing pale yellow cheilocystidia.

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