

Two new species of *Marasmius* from eastern Honshu, Japan

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Two new species belonging to *Marasmius* (Agaricales) are described and illustrated from eastern Honshu, Japan: *Marasmius capitatus* sp. nov. (section *Epiphylli*), forming capitulate cystidia and small basidiomata with a membranous, white pileus and a minutely pubescent, filiform stipe without basal mycelium, was found on dead fallen leaves of *Cryptomeria japonica*; *Marasmius nivicola* sp. nov. (section *Globulares*), having entirely white, collybioid basidiomata with a furfureous to pruinose stipe and distinctly intervenose lamellae, was found on leaf litter of broad-leaved forest.

Key Words—Agaricales; *Marasmius capitatus*; *Marasmius nivicola*; new species.

In this report, two new species of *Marasmius* are described and illustrated on the basis of the materials collected in the lowland forests of eastern Honshu, especially Kanagawa and Tokyo, Japan. In addition, photographs are presented showing their macromorphological features. Specimens cited are preserved in the Natural History Museum and Institute, Chiba, Japan (CBM) and the Kanagawa Prefectural Museum of Natural History, Japan (KPM).

Species descriptions

Marasmius capitatus Har. Takahashi, sp. nov. Figs. 1, 2

Pileus 1–5 mm lato, primo convexo, dein plano-convexo, pruinoso, albo; stipite 6–10 × 0.2–0.4 mm, subaequali, albo, pruinoso; mycelio basali non affixo; lamellis adnatis, distantibus, intervenosis, albis; basidiosporis 8–10 × 4–4.5 μm, ellipsoideis, levibus, hyalinis, inamyloideis; basidiis 17–27 × 5–7.5 μm, tetrasporis; cheilocystidiis 35–55 × 8–12 μm, fusoido-ventricosis, capitatis; pleurocystidiis cheilocystidiis similibus; pileipellis hymeniiformibus, inamyloideis; pileocystidiis cheilocystidiis similibus; caulocystidiis 15–35 × 7–10 μm, claviformibus vel fusoido-ventricosis, capitatis, crassitunicatis; hyphis fibulatis.

Holotypus: Ad folias dejectas *Cryptomeriae japonicae* (L. f.) D. Don, Yamato-shi, Kanagawa-ken, Japonia, 25 Oct. 1999, H. Takahashi (KPM-NC-0006040).

Etymology: from Latin, *capitatus* = head-shaped; referring to the capitulate cystidia.

Pileus 1–5 mm in diam, at first hemispherical to convex with a slightly involute margin, then plano-convex, not umbonate, radially rugulose in age, membranous, dry, minutely pruinose, pure white overall. Flesh thin (up to 0.3 mm), pure white, odor and taste not distinctive. Stipe 6–10 × 0.2–0.4 mm, cylindric, central, filiform, terete, entirely pruinose to pubescent, apex

white, dark brown toward a blackish brown base; basal mycelium not seen. Lamellae adnate, distant (up to 10 reach the stipe), up to 0.5 mm broad, white, vein-like, intervenose; edges even, concolorous.

Basidiospores 8–10 × 4–4.5 μm, ellipsoid, smooth, colorless, inamyloid, thin-walled. Basidia 17–27 × 5–7.5 μm, clavate, four-spored; basidioles clavate. Cheilocystidia 35–55 × 8–12 μm, forming a compact sterile edge, fusoid-ventricose, with capitulate apex, smooth, colorless, inamyloid, thin-walled. Pleurocystidia scattered, similar to cheilocystidia. Hymenophoral

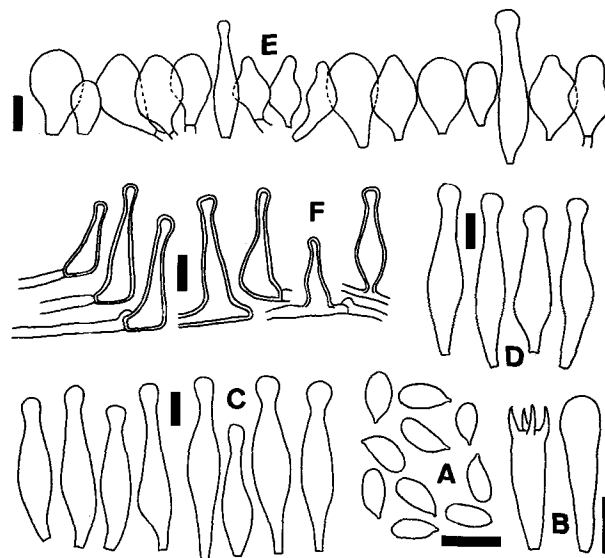


Fig. 1. *Marasmius capitatus*. A. Basidiospores. B. Basidium and basidiole. C. Cheilocystidia. D. Pleurocystidia. E. Elements of the pileipellis. F. Caulocystidia. Scales: 10 μm. All figures from the holotype.

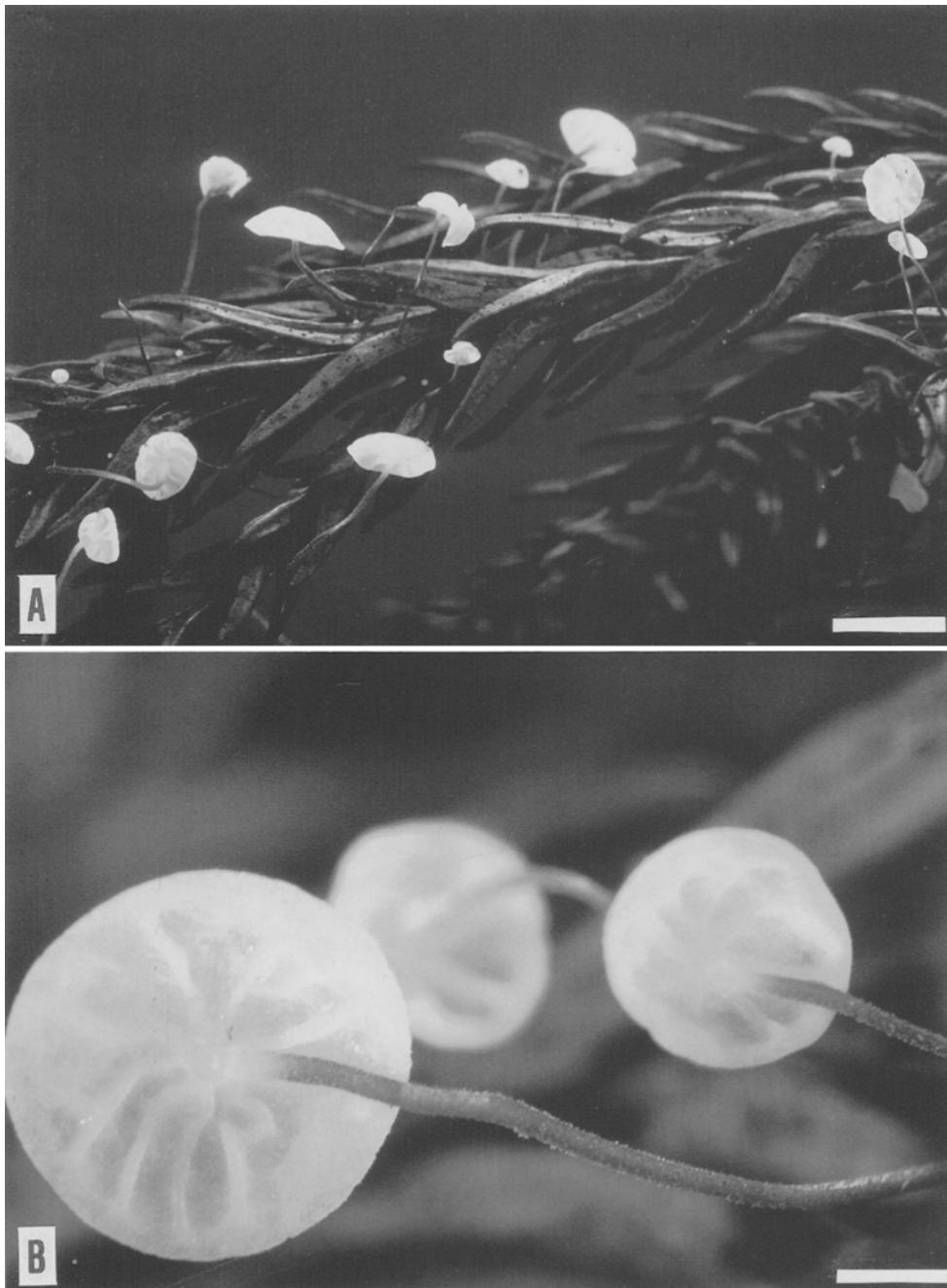


Fig. 2. *Marasmius capitatus*.

A. Basidiomata growing on dead fallen leaves of *Cryptomeria japonica*. B. Underside view. Scales: A=5 mm; B=1 mm. All figures from the holotype.

trama irregular; element hyphae similar to those of the pileitrama. Pileipellis a hymeniform layer of broadly clavate to pyriform cells $15\text{--}25 \times 9\text{--}15 \mu\text{m}$, colorless, inamyloid, thin- or rarely thick-walled; pileocystidia scattered, similar to cheilocystidia. Hyphae of pileitrama $2\text{--}5 \mu\text{m}$ wide, loosely interwoven, filiform, not inflated, smooth, colorless, inamyloid, thin-walled. Stipitipellis a cutis of parallel, repent hyphae $2\text{--}4 \mu\text{m}$ wide, cylindrical, with smooth, light brown walls up to $0.5 \mu\text{m}$ thick, in-

amyloid; caulocystidia numerous, $15\text{--}35 \times 7\text{--}10 \mu\text{m}$, clavate to fusoid-ventricose, with capitate apex, with smooth, light brown walls up to $1 \mu\text{m}$ thick, inamyloid. Stipe trama composed of longitudinally running, cylindrical hyphae $3\text{--}10 \mu\text{m}$ wide, with smooth, light brown walls up to $1.5 \mu\text{m}$ thick, inamyloid. Clamps present in all tissues.

Known distribution: Japan (Kanagawa, Tokyo).

Habitat: Scattered, on dead fallen leaves of *Cryp-*

tomeria japonica (L. f.) D. Don, from October to November, not common.

Specimens examined: KPM-NC-0006040 (holotype), on dead fallen leaves of *Cryptomeria japonica*, Mt. Takao, Hachioji-shi, Tokyo, 25 Oct. 1999; CBM-FB-24596, on dead fallen leaves of *C. japonica*, Yamato-shi, Kanagawa-ken, 16 Nov. 1999.

Japanese name: Sugino-ochibatake.

Notes: This species is characterized by its membranous, white pileus, the anastomosing, vein-like lamellae, the minutely pubescent, filiform stipe without basal mycelium, the capitate cystidia on the hymenium, pileus, and stipe, the hymeniform pileipellis composed of smooth elements, and the habitat on dead fallen leaves of *C. japonica*. The combination of these characteristics suggest that this species is a member of the section *Epiphylli* Kühner, subsection *Epiphyllini* Singer in Singer's classification (Singer, 1965, 1986). Within the subsection, *M. capitatus* seems to be most closely related to *Marasmius epiphyllus* (Pers.: Fr.) Fr., the well-described type species of the section *Epiphylli* (Antonín and Noordeloos, 1993; Breitenbach and Kränzlin, 1991; Desjardin, 1987; Gilliam, 1976), and *Marasmius tenuiparietalis* Singer from Argentina (Singer, 1969), North America (Desjardin, 1987; Gilliam, 1976), and Europe (Antonín and Noordeloos, 1993). The latter two taxa, however, differ in their non-capitate cystidia and their habitat on leaves of broad-leaved trees. The fusoid-ventricose, capitate hymenial cystidia of *M. capitatus* is comparable with those of North American *Marasmius felix* Morgan (Gilliam, 1976), but the latter species has a light yellowish pink pileus and obovate to fusoid-elliptic basidiospores, and grows on petioles of dicotyledonous herbs.

Marasmius nivicola Har. Takahashi, sp. nov. Figs. 3, 4

Pileo 15–50 mm lato, primo hemisphaerico, dein convexo, sulcato-striato, hygrophano, glabro, albo; carne usque ad 1.5 mm crassa, albo; stipite 20–50 × 1.5–3 mm, subaequali vel ad basim leviter incrassato, cavo, albo, albo-pruinoso; mycelio basali albo affixo; lamellis adnexis, mediocriter subdistantibus, intervenosis, albis; basidiosporis 6–8 × 3–4 μm, ellipsoideis, levibus, hyalinis, inamyloideis; basidiis 23–35 × 4–5 μm, tetrasporis; cheilocystidiis 9–20 × 5–8 μm, claviformibus; pleurocystidiis nullis; pileipellis hymeniiformibus; caulocystidiis 25–65 × 8–15 μm, claviformibus vel fusoides; hyphis fibulatis.

Holotypus: Ad folias emortuas arboris frondosae in silva, Yamato-shi, Kanagawa-ken, Japonia, 20 Jun. 1996, H. Takahashi (KPM-NC-0006038).

Etymology: from Latin, *nivicola*: nix (=snow) + -cola (=dweller); referring to the white, extensive mycelial mat.

Pileus 10–35 mm in diam, at first hemispherical with an incurved margin, then convex with a depressed center, not umbonate, center smooth, in age sulcate-striate toward the margin, hygrophanous, glabrous, evenly grayish when young, then becoming pure white overall, sometimes grayish at the disk. Flesh up to 1.5 mm thick, white or pale ochraceous, odor mild, taste none;

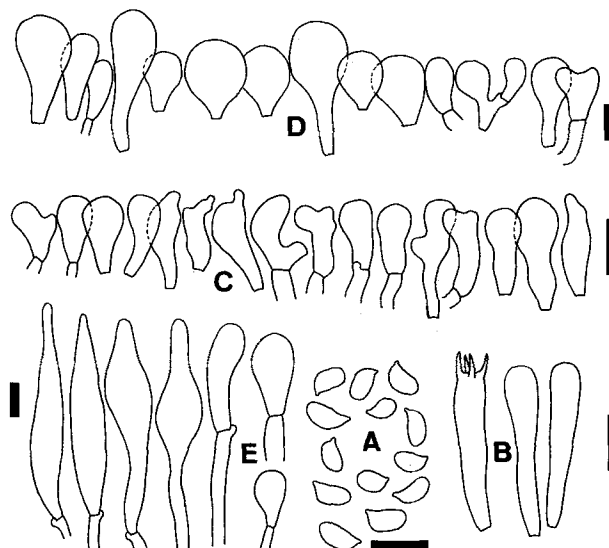


Fig. 3. *Marasmius nivicola*.

A. Basidiospores. B. Basidium and basidioles. C. Cheilocystidia. D. Elements of the pileipellis. E. Caulocystidia. Scales: 10 μm. All figures from the holotype.

consistency tough. Stipe 20–50 × 1.5–3 mm, almost equal or slightly enlarged at the base, central, slender, terete, hollow, entirely pure white or sometimes pale ochraceous only at the base, furfuraceous to pruinose over the entire length; base covered with white, mycelial tomentum attached to an extensive mycelial mat in the substratum. Lamellae adnexed, subdistant (18–22 reach the stipe), up to 2.5 mm broad, concolorous with the pileus, distinctly intervenose; edges even, concolorous.

Basidiospores 6–8 × 3–4 μm, ellipsoid, colorless, smooth, inamyloid, thin-walled. Basidia 23–35 × 4–5 μm, clavate, four-spored; basidioles clavate. Cheilocystidia 9–20 × 5–8 μm, forming a compact sterile edge, clavate, smooth, often nodose or shortly lobed, colorless, inamyloid, thin-walled. Pleurocystidia none. Hymenophoral trama regular, colorless, dextrinoid, with cylindric hyphae 4–15 μm wide. Pileipellis hymeniform, consisting of broadly clavate to pyriform (*Globularis*-type) cells 15–40 × 6–17 μm, colorless, inamyloid, thin-walled. Hyphae of pileitrama 4–17 μm wide, subparallel, loosely interwoven, subcylindric, smooth, colorless, dextrinoid. Stipitipellis a cutis of parallel, repent hyphae 3–6 μm wide, cylindric, smooth, colorless or pale melleous, dextrinoid, thin-walled; caulocystidia numerous, 25–65 × 8–15 μm, clavate to fusoid, smooth, colorless, dextrinoid, thin-walled. Stipe trama composed of longitudinally running, cylindric hyphae 4–15 μm wide, smooth, colorless or pale melleous, dextrinoid, thin-walled. All tissues with clamp connections.

Known distribution: Japan (Kanagawa, Tokyo).

Habitat: Scattered to caespitose on leaf litter of broad-leaved forest dominated by *Quercus serrata* Thunb. and *Aphananthe aspera* (Thunb.) Planch., from June to November, common.



Fig. 4. *Marasmius nivicola*.

A-C. Basidiomata growing on leaf litter. D. Underside view. Scales: A-C=10 mm; D=5 mm. All figures from the holotype.

Specimens examined: KPM-NC-0006038 (holotype), on leaf litter in broad-leaved forest, Yamato-shi, Kanagawa-ken, 20 Jun. 1996; CBM-FB-24595, on leaf litter in broad-leaved forest, Yamato-shi, Kanagawa-ken, 8 Oct. 1998; KPM-NC-0006037, on leaf litter in broad-leaved forest, Mt. Takao, Hachioji-shi, Tokyo, 7 Jul. 1999.

Japanese name: Yuki-houraitake (first collected and named by Mr. Minoru Aoki).

Notes: The diagnostic features of this species are its entirely white, collybioid basidiomata with a furfuraceous to pruinose stipe and distinctly intervenose lamellae, the white, extensive mycelial mat attached to base of the stipe, and the inconspicuous, occasionally nodose, clavate cheilocystidia.

The collybioid habit, the dextrinoid tramal hyphae, and the hymeniform pileipellis composed of *Globularis*-type cells suggest the placement of this taxon in the genus *Marasmius* section *Globulares* Kühner in Singer's classification (Singer, 1986). Within the section, *M. nivicola* has some features in common with neotropical *M. cohortalis* Berk. in Vidensk. (Pegler, 1983; Singer, 1958, 1965, 1976), such as a white pileus, white or cream, intervenose and anastomosing lamellae, white, tomentose basal mycelium, and inconspicuous, small to medium-sized cheilocystidia. According to Singer's descriptions (Singer, 1958, 1965, 1976), *M. cohortalis* has a chestnut brown stipe and frequently nodulose or hook-bearing pileipellis elements. *Marasmius nivicola* is also similar to *M. pellucidus* Berk. & Broome from New Caledonia (Desjardin and Horak, 1997) and Sri Lanka (Berkeley and Broome, 1875), and *Marasmius papyraceus* Masee from Singapore (Corner, 1996). These species, however, differ in having non-intervenose lamellae and a brown to reddish brown stipe.

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