

# Notes on new Agaricales of Japan 1

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Three new species of Agaricales are described and illustrated from eastern Honshu, Japan: *Collybia effusa* sp. nov. (section *Levipedes*), forming a distinctly sulcate-striate pileus and distant lamellae, was found on dead twigs of *Cryptomeria japonica* and *Callicarpa japonica*; *Collybia macrosperma* sp. nov., forming cylindrical-fusoid, relatively large-sized basidiospores and whitish basidiomata densely covered with fine, soft hairs, was found on dead fallen twigs in a *Carpinus* and *Quercus* forest; *Marasmiellus gregarius* sp. nov. (subsection *Ramealini* of section *Rameales*), forming small, pale colored pilei and diverticulate cheilocystidia, was found on dead twigs of *Hydrangea involucrata* and *Trachelospermum asiaticum*.

Key Words—Agaricales; *Collybia effusa*; *Collybia macrosperma*; *Marasmiellus gregarius*; new species.

This paper reports three new species of Agaricales which occur in 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

*Collybia effusa* Har. Takahashi, sp. nov. Figs. 1, 2

Pileo 30–45 mm lato, primo hemisphaerico, dein plano-convexo, mox applanato et centro depresso, striato-sulcato, primo pruinoso, dein glabro, rubro-brunneo; odore saporeque nullo; stipite 30–55 × 1–3 mm, subaequali, centrali, cavo, pruinoso vel flocculoso; mycelio basali albo affixo; lamellis adnatis vel subdecurrentibus, distantibus, albis vel viridibus; basidiosporis 7–8.5 × 3.5–4 μm, ellipsoideis, levibus, hyalinis, inamyloideis; basidiis tetrasporis; cheilocystidiis 22–60 × 4–8 μm, abundantibus, subcylindraceis, levibus vel diverticulatis; pleurocystidiis nullis; pileipelle ex hyphis repentibus irregularibus non radiatim dispositis 3–8 μm latis composita; pigmento resinaceo brunneo granulatum incrustatis; caulocystidiis 35–60 × 6–10 μm, abundantibus, cylindraceis, levibus vel diverticulatis; hyphis fibulatis.

Holotypus: In ramulis delapsis *Cryptomeriae japonicae* (L.f.) D. Don, Mt. Takao, Hachioji-shi, Tokyo, Japonia, 15 Jul. 1999, W. Ikeda & H. Takahashi (KPM-NC 0005067).

Etymology: Latin, *effusus*=spreading; referring to the distant lamellae.

Pileus 30–45 mm in diam, at first hemispherical with involute margin, then plano-convex to plane, often with slightly depressed center, at first smooth but soon radially plicate to sulcate-striate almost to the disk, at first

white pruinose, glabrescent in age, evenly colored reddish brown (8D7-8 to 9D7-8) when young, then paler toward the margin. Flesh thin (up to 3 mm), white; odor and taste not distinctive. Stipe 30–55 × 1–3 mm, almost equal, central, slender, terete, hollow, white, pruinose to flocculose overall; base covered with white tomentum. Lamellae adnate to subdecurrent, distant (13–18 reach the stipe), up to 5 mm broad, moderately thin, white or sometimes yellowish green (30A5) to light green (30A6); edges even, concolorous.

Spore print pure white. Basidiospores 7–8.5 × 3.5–4 μm [Q=length/breadth: 2.1], ellipsoid, smooth, colorless, inamyloid, thin-walled. Basidia 28–38 × 7–8 μm, clavate, four-spored. Basidioles clavate. Cheilocystidia 22–60 × 4–8 μm, abundant, subcylindric, smooth or sometimes with a variable number of outgrowths, colorless, thin-walled. Pleurocystidia absent. Hymeno-

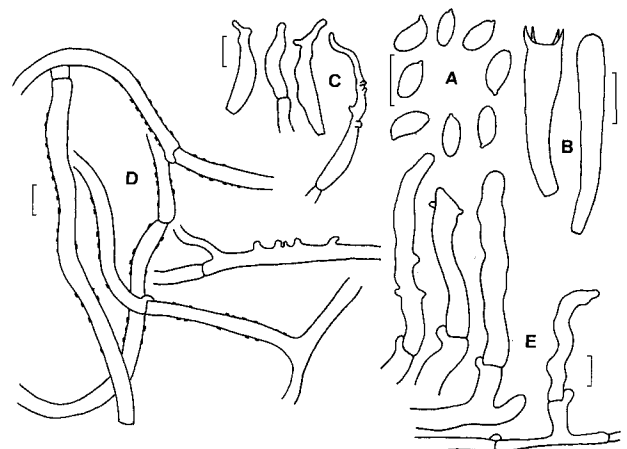


Fig. 1. *Collybia effusa*. A. Basidiospores. B. Basidium and basidiole. C. Cheilocystidia. D. Elements of the pileipellis. E. Caulocystidia. Scales: 10 μm. All figures from the holotype.

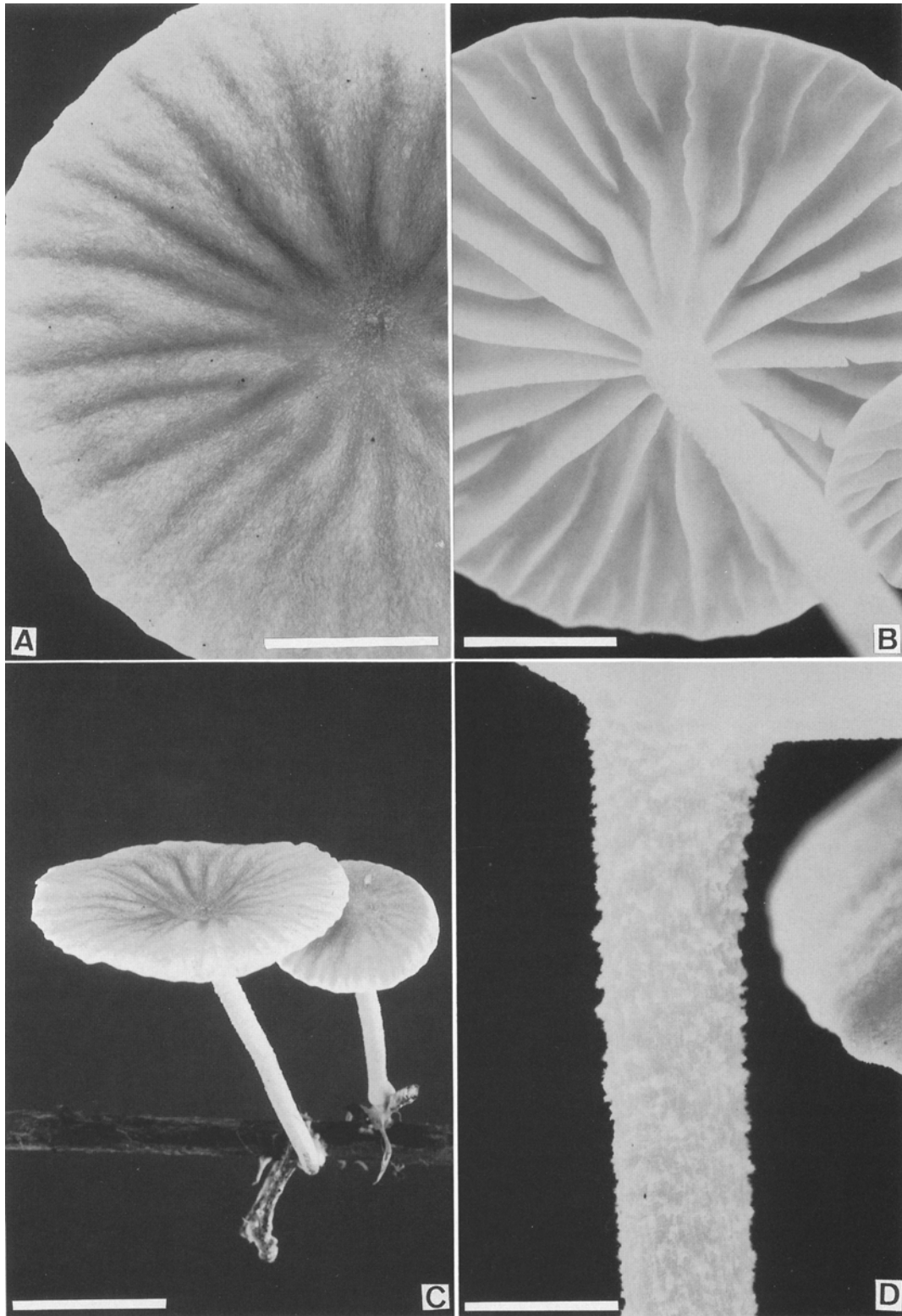


Fig. 2. Basidiomata of *Collybia effusa*. A. Surface view of the mature pileus. B. Underside view of the mature pileus. C. Mature basidiomata on a dead twig of *Cryptomeria japonica*. D. Close up of the stipe surface. Scales: A, B=10 mm; C=20 mm; D=3 mm. All figures from the holotype.

phoral trama irregular; element hyphae similar to those of the pileitrama. Pileipellis a layer of repent, branched hyphae, not distinctly diverticulate, not radially arranged; constituent hyphae 3–8  $\mu\text{m}$  wide, interwoven, cylindrical, smooth or with a few warty or finger-like protuberances, encrusted with granules of brown pigment, thin-walled, occasionally with clamped septa. Hyphae of pileitrama 3–8  $\mu\text{m}$  wide, interwoven, cylindrical, with smooth, slightly thickened walls up to 0.5  $\mu\text{m}$ , colorless, inamyloid, occasionally with clamped septa. Stipitipellis a cutis of parallel, repent hyphae 3–10  $\mu\text{m}$  wide, cylindrical, smooth, thin-walled, colorless, inamyloid, occasionally with clamped septa; caulocystidia 35–60  $\times$  6–10  $\mu\text{m}$ , abundant, often flexuous, cylindrical, smooth or with a few knob-like diverticula. Stipe trama composed of longitudinally running, cylindrical hyphae 3–8  $\mu\text{m}$  wide, unbranched, smooth, slightly thick-walled (up to 0.5  $\mu\text{m}$  thick), colorless, inamyloid, occasionally with clamped septa.

Known distribution: Japan (Tokyo).

Habitat: Solitary to caespitose, on dead twigs of *Cryptomeria japonica* and *Callicarpa japonica*, from June to November, not common.

Specimens examined: KPM-NC 0005067 (holotype), Mt. Takao, Hachioji-shi, Tokyo, 15 Jul. 1999, coll. W. Ikeda & H. Takahashi; the same place, 7 Jun. 1999, coll. W. Ikeda & H. Takahashi; the same place, 5 Nov. 1999, coll. W. Ikeda & H. Takahashi; the same place, 29 Jun. 2000, coll. H. Takahashi.

Japanese name: Hiroha-amatake (first collected and named by Mr. Minoru Aoki).

**Notes:** This species is characterized by its distinctly sulcate-striate pileus, the conspicuously white pruinose to flocculose stipe, distant lamellae, and its habitat on dead twigs. The non-radial arrangement of its pileipellis elements without a distinct *Rameales*-structure (*Dryophila*-structure) suggest that this species belongs in the section *Levipedes* (Fr.) Quél. (Antonín and Noordeloos, 1997; Halling, 1983; Singer, 1986), where it appears to be closely related to *Collybia subcyathiformis* (Murrill) Pegler from East Africa and neotropical regions (Pegler, 1977). The latter species differs in having a dark brown pileus, a conspicuously elongated stipe, and habitat on dead leaves. *Collybia effusa* has superficial resemblance to two taxa of the section *Vestipedes* (Fr.) Quél. because of a strongly radially sulcate-striate pileus, viz. *Collybia multijuga* (Berk. & Broome) Sacc. from Sri Lanka (Pegler, 1986), and *Collybia allegretii* (De Seynes) Pegler from East Africa (Pegler, 1977). These species differ from *C. effusa* in forming a cutis of radially arranged hyphae in the pileipellis (*Confluens*-structure). North American *Collybia dysodes* Halling (Halling, 1983), which belongs to the section *Subfumosae* Singer ex Halling, has a conspicuously plicate-sulcate pileus and distant lamellae. *Collybia dysodes*, however, differs in having fetid odor, a reddish brown stipe, adnate to adnexed, light brown lamellae, and a cutis of distinctly diverticulate elements in the pileipellis.

*Collybia macrosperma* Har. Takahashi, sp. nov.

Figs. 3–4

Pileo 7–12 mm lato, primo hemisphaerico, dein convexo vel applanato, puberulo, centro pallide brunneolo, margine albo; odore saporeque nullo; stipite 15–23  $\times$  1–1.2 mm, subaequali vel ad basim leniter incrassato, cavo, albo, deorsum pallide brunneolo, puberulo; mycelio basali non affixo; lamellis adnexis, mediocriter subdistantibus, albis; basidiosporis 10–15  $\times$  4–5  $\mu\text{m}$ , cylindraco-fusoideis, levibus, hyalinis, inamyloideis; basidiis tetrasporis; cheilocystidiis cylindracois, sparsis; pleurocystidiis nullis; pileipelle ex hyphis repentibus irregularibus non radiatim dispositis interdum granulis pigmentosis brunneolis infirme incrustatis composita; pileocystidiis fusicoideo-ventricosis vel subcylindracois; caulocystidiis pileocystidii similibus; hyphis fibulatis.

Holotypus: In ramulis delapsis in silva, Ikutaryokuchi, Kawasaki-shi, Kanagawa-ken, Japonia, 4 Jul. 1999, H. Takahashi (KPM-NC 0005074).

Etymology: Greek, *macrosperma* = large spore; referring to the relatively long basidiospores as a *Collybia* sp.

Pileus 7–12 mm in diam, hemispherical to broadly conical, expanding to convex or applanate, with involute then deflexed or straight margin, smooth or slightly rugulose in age, finely pubescent, pale brownish at the center, almost white toward the margin. Flesh thin (up to 2.2 mm thick), soft, white; odor and taste indistinct.

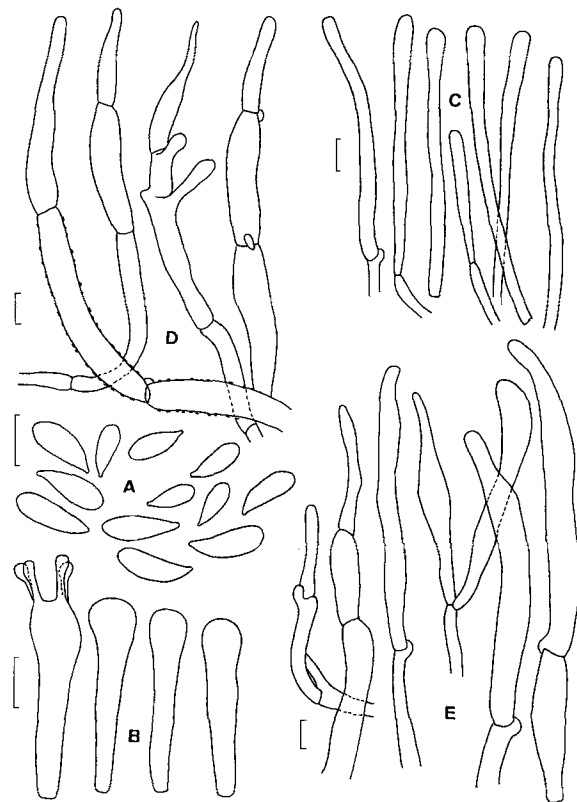


Fig. 3. *Collybia macrosperma*. A. Basidiospores. B. Basidium and basidioles. C. Cheilocystidia. D. Pileocystidia. E. Caulocystidia. Scales: 10  $\mu\text{m}$ . All figures from the holotype.

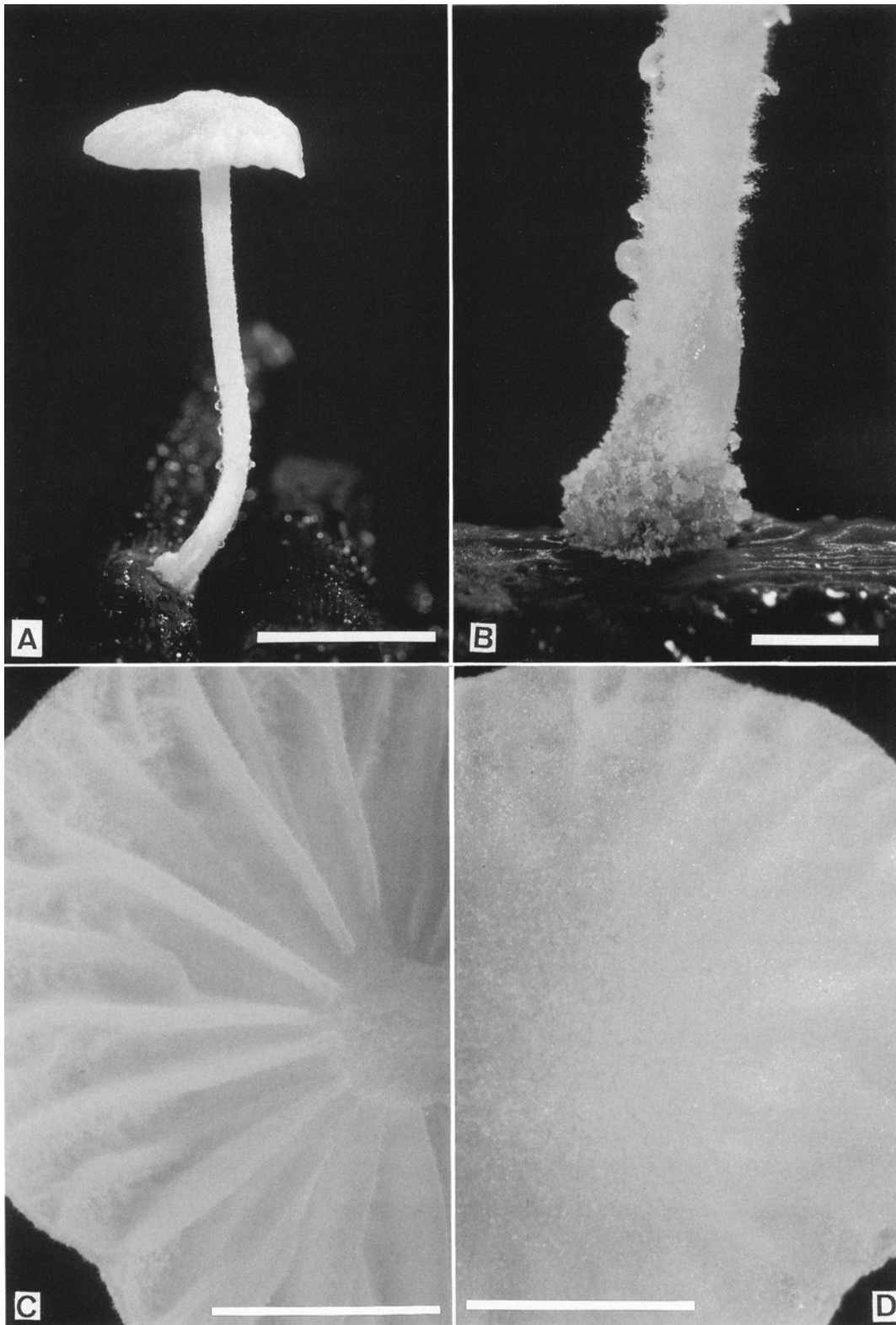


Fig. 4. Basidiomata of *Collybia macrosperma*. A. Mature basidioma. B. Close-up of the stipe base. C. Underside view of the mature pileus. D. Surface view of the mature pileus. Scales: A=10 mm; B=1 mm; C, D=3 mm. All figures from the holotype.

Stipe 15–23 × 1–1.2 mm, equal but subbulbous at the base, central, terete, hollow, whitish above, pale brownish toward the base, smooth, finely pubescent overall, denser toward the base, without basal mycelium. Lamellae adnexed, subdistant (17–22 reach the stipe), narrow (up to 1.2 mm broad), thin, white; edges finely pubescent, concolorous.

Basidiospores 10–15 × 4–5  $\mu\text{m}$  [Q=length/breadth: 2.5–3.0], cylindrical-fusoid, slightly curved in profile, smooth, colorless, inamyloid, thin-walled. Basidia 40–50 × 8–10  $\mu\text{m}$ , clavate, four-spored. Basidioles clavate. lamella-edge fertile, with long, hair-like cheilocystidia; cheilocystidia scattered or aggregated into fasciculate groups, strongly protruding beyond hymenium (up to 50  $\mu\text{m}$ ), 42–80 × 4–6  $\mu\text{m}$ , filiform to cylindrical, with obtuse apex, smooth, colorless, inamyloid, thin-walled. Pleurocystidia absent. Elements of hymenophoral trama 4–10  $\mu\text{m}$  wide, cylindrical, subparallel, smooth, colorless, thin-walled, occasionally with clamped septa. Pileipellis a layer of repent, branched hyphae, not radially arranged; constituent hyphae 3–10  $\mu\text{m}$  wide, interwoven, cylindrical, smooth, sometimes weakly encrusted with granules of brown pigment, thin-walled, occasionally with clamped septa; pileocystidia 30–70 × 4–10  $\mu\text{m}$ , scattered, suberect to erect, fusoid-ventricose or subcylindrical, with obtuse or subacute apex, colorless or weakly encrusted with granules of brown pigment, thin-walled. Pileitrama of cylindrical or somewhat inflated, loosely interwoven hyphae 4–15(–24)  $\mu\text{m}$  wide, smooth, colorless, inamyloid, thin-walled, occasionally with clamped septa. Stipitipellis a cutis of parallel, repent hyphae 3–10  $\mu\text{m}$  wide, cylindrical, with scattered, suberect to erect caulocystidia, smooth, colorless, thin-walled, occasionally with clamped septa; caulocystidia similar to pileocystidia but longer and broader, 30–95 × 4–15  $\mu\text{m}$ . Stipe trama composed of longitudinally running, cylindrical hyphae 5–15  $\mu\text{m}$  wide, unbranched, smooth, colorless, inamyloid, occasionally with clamped septa.

Known distribution: Japan (Kanagawa).

Habitat: Solitary to caespitose, on dead twigs in lowland forests dominated by *Carpinus tschonoskii* Maxim., *Quercus myrsinaefolia* Blume, and *Quercus serrata* Thunb. ex Murray, July, not common.

Specimens examined: KPM-NC 0005074 (holotype), Ikuta-ryokuchi, Kawasaki-shi, Kanagawa-ken, 4 Jul. 1999, coll. H. Takahashi; the same place, 10 Jul. 1999, coll. H. Takahashi.

Japanese name: Oomino-amatake.

**Notes:** The collybioid habit, the inamyloid basidiospores and tramal tissues, and the *Dryophila*-type pileipellis structure suggest that this species is closely allied with the section *Levipedes* of the genus *Collybia* in Singer's (1986) classification. However, *C. macrosperma* is distinguishable from other taxa belonging to *Collybia* by its basidiomata densely covered with minute, soft hairs, the insititious stipe, the scattered, projecting, filiform cheilocystidia on the fertile lamella edges, and its relatively long basidiospores (reaching to 15  $\mu\text{m}$  long). Until further taxonomic information concerning allied species becomes available, I prefer provisionally to relegate

this taxon to the genus *Collybia* (s.l.).

*Marasmiellus gregarius* Har. Takahashi, sp. nov.

Figs. 5, 6

Pileo 3–8 mm lato, primo hemisphaerico, dein convexo, mox plano-convexo, striato-sulcato, tomentososo, pallide brunneolo vel albo; odore saporeque nullo; stipite 2–4 × 0.5–0.9 mm, subaequali vel ad basim leviter incrassato, centrali, cavo, deorsum brunneolo, pruinoso vel flocculoso; mycelio basali non affixo; lamellis adnexis, distantibus, albis vel pallide brunneolis; margine fimbriato; basidiosporis 6.5–8 × 4–5  $\mu\text{m}$ , ellipsoideis, levibus, hyalinis, inamyloideis; basidiis tetrasporis; cheilocystidiis 25–55 × 10–15  $\mu\text{m}$ , abundantibus, cylindratis vel subclavatis, diverticulatis; pleurocystidiis nullis; pileipelle ex hyphis repentibus cylindricis vix vel non inflatis 3–13  $\mu\text{m}$  latis hyalinis tenuiparietalibus cum diverticutis copiosis verruciformibus vel digitiformibus instructibus constanti; hyphis fibulatis.

Holotypus: In ramulis delapsis *Hydrangeae involucae* Siebold, Mt. Takao, Hachiouji-shi, Tokyo, Japonia, 15 Jul. 1999, W. Ikeda & H. Takahashi (KPM-NC 0005065).

Etymology: Latin, *gregarius* = gregarious; referring to the gregarious growth habit.

Pileus 3–8 mm in diam, at first hemispherical with involute margin, then convex, finally plano-convex, at first smooth but soon radially grooved at margin, entirely felted-tomentose, usually entirely pale brown, rarely whitish overall. Flesh very thin (up to 1 mm), light brown; odor and taste not distinctive. Stipe 2–4 × 0.5–0.9 mm, almost equal but sometimes subbulbous or slightly swollen at the base, central, slender, terete, hollow, deep concolorous with the pileus, paler toward the apex, pruinose to flocculose above, strigose toward the insititious base. Lamellae adnate, distant (8–11 reach the stipe), narrow (up to 1 mm broad), thin, whitish or pale brown; edges fimbriate, concolorous.

Spore print pure white. Basidiospores 6.5–8 × 4–5  $\mu\text{m}$  [Q=length/breadth: 1.6], ellipsoid, smooth, colorless, inamyloid, thin-walled. Basidia 22–27 × 5–6.5  $\mu\text{m}$ , clavate, four-spored. Basidioles clavate. Cheilocystidia 25–55 × 10–15  $\mu\text{m}$ , abundant, cylindrical to subclavate, with a variable number of digitate, 2–11  $\mu\text{m}$  long projec-

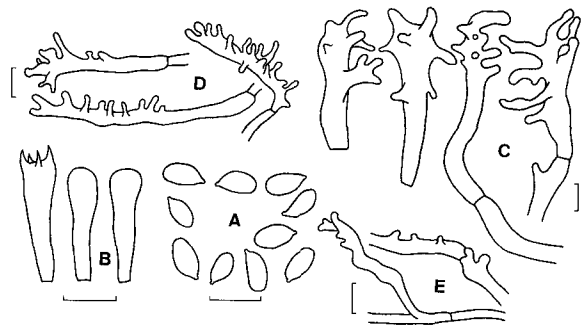


Fig. 5. *Marasmiellus gregarius*. A. Basidiospores. B. Basidium and basidioles. C. Cheilocystidia. D. Elements of the pileipellis. E. Elements of the stipitipellis. Scales: 10  $\mu\text{m}$ . All figures from the holotype.

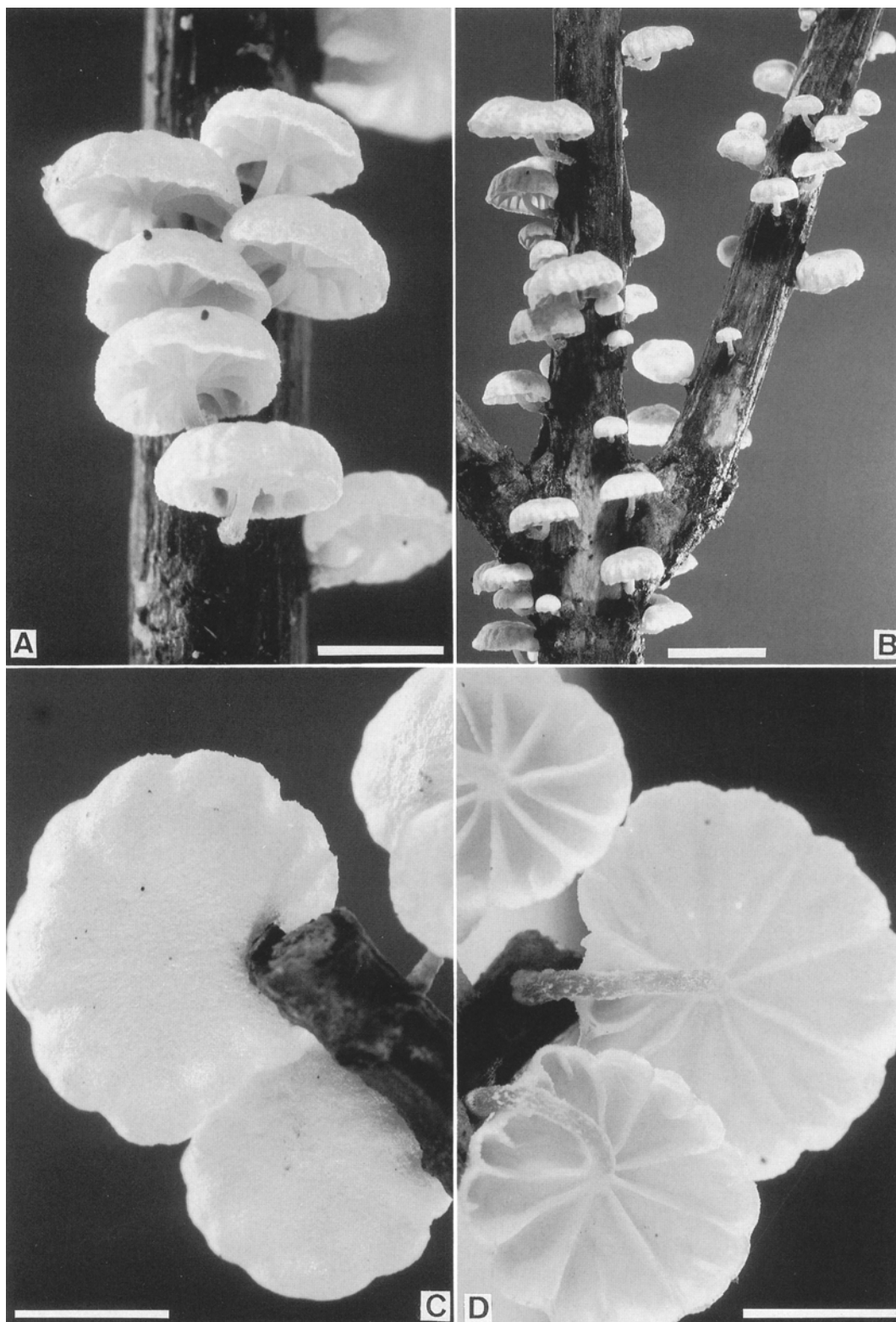


Fig. 6. Basidiomata of *Marasmiellus gregarius*. A, B. Mature basidiomata on a dead twig of *Hydrangea involucrata*. C. Surface view of the mature pilei. D. Underside view of the mature pilei. Scales: A=5 mm; B=8 mm; C, D=3 mm. All figures from the holotype.

tions, colorless, thin-walled. Pleurocystidia absent. Hymenophoral trama subregular to irregular; element hyphae similar to those of the pileitrama. Pileipellis a layer of repent, irregularly arranged hyphae, with strongly developed *Rameales*-structure; constituent hyphae 3–13  $\mu\text{m}$  wide, interwoven, cylindric, with abundant warty or finger-like protuberances, with intercellular brown pigment among the hyphae, not incrustated, thin-walled, occasionally with clamped septa. Hyphae of pileitrama 3–10  $\mu\text{m}$  wide, interwoven, cylindric, walls thin, smooth, pale melleous, inamyloid, occasionally with clamped septa. Stipitipellis a cutis of parallel, repent hyphae 2–5  $\mu\text{m}$  wide, cylindric, diverticulate, inamyloid, brown walls up to 0.5  $\mu\text{m}$  thick, occasionally with clamped septa, without caulocystidia. Stipe trama composed of longitudinally running hyphae, hyphal cells 20–55  $\times$  6–14  $\mu\text{m}$ , cylindric, unbranched, with smooth, inamyloid, colorless walls up to 1.5  $\mu\text{m}$  thick, occasionally with clamped septa.

Known distribution: Japan (Tokyo).

Habitat: gregarious, on dead twigs of *Hydrangea involucrata* Siebold and *Trachelospermum asiaticum* (Siebold et Zucc.) Nakai, from June to July, not common.

Specimens examined: KPM-NC 0005065 (holotype), Mt. Takao, Hachioji-shi, Tokyo, 15 Jul. 1999, coll. W. Ikeda & H. Takahashi; the same place, 25 Jun. 1998, coll. W. Ikeda & H. Takahashi; the same place, 28 Jun. 2000, coll. H. Takahashi.

Japanese name: Satoyama-houraitake.

**Notes:** This species is characterized by its pale brown, small, collybioid basidiomata, the basidiospores less than 10  $\mu\text{m}$  long, the cylindric to subclavate cheilocystidia with numerous fine diveticula, and the pileipellis with a distinct *Rameales*-structure. This combination of characters suggests placement of this taxon in the section *Rameales* (J. E. Lange) Singer, subsection *Ramealini* Singer (Singer, 1973, 1986). Within the section, *M. gregarius* appears to be closely allied with North American *Marasmiellus appalachienensis* Desjardin (Desjardin, 1997) and *Marasmiellus ramealis* (Bull.: Fr.) Singer

from Europe and North America. *Marasmiellus appalachienensis* differs from *M. gregarius* in having pure white pilei, a reddish stipe base, and broadly clavate or vesiculose caulocystidia. *Marasmiellus ramealis* differs in having pinkish brown or yellowish brown pilei, subcylindric, longer basidiospores (7.5–11  $\mu\text{m}$ : Antonín and Noordeloos, 1993), and pileipellis strongly incrustated with brown pigment.

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