

FULL PAPER

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Two new records of *Mycena* sect. *Sacchariferae* from Japan and type study of *Mycena cryptomeriicola* (sect. *Sacchariferae*)

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Abstract *Mycena cupulicola* sp. nov. and *M. adscendens* var. *carpophila*, new to Japan, are described and illustrated. The former is characterized by having lageniform caulocystidia with a slightly thick-walled broadened base and no cheilocystidia. The latter is characterized by having a white pileus up to 1 mm in diameter and narrowly conical caulocystidia. *Mycena cryptomeriicola* was confirmed to have inamyloid basidiospores.

Key words *Mycena adscendens* var. *carpophila* · *Mycena cryptomeriicola* · *Mycena cupulicola* · New record · New species

Introduction

During recent surveys of minute basidiomycetes in Japan, two species belonging to *Mycena* sect. *Sacchariferae* were collected. In this article, these species are described and illustrated.

One of the species collected on decaying leaves of *Cryptomeria japonica* (L.f.) D. Don resembles *Mycena cryptomeriicola* Imazaki & Toki reported from the same substrate. However, *M. cryptomeriicola* has inamyloid basidiospores, which are unusual in sect. *Sacchariferae* (Desjardin 1995; Maas Geesteranus 1991). To confirm the micromorphology of the original description, the holotype was reexamined.

Materials and methods

Dried basidiomata were rinsed with 70% ethanol, then transferred into distilled water for rehydration. Rehydrated basidiomata were mounted for micromorphological observation in distilled water, 3% KOH plus Congo red and phloxine, or Melzer's reagent. Spore statistics included \bar{x} , the arithmetic mean of the spore length and spore width (\pm SD) for n spores measured; Q , the quotient of spore length and spore width in any one spore, indicated as a range of variation in n spores measured; and \bar{Q} , the mean of Q values (\pm SD).

Spore deposits were obtained on potato dextrose agar (PDA; Nissui, Tokyo, Japan), and subsequent multisporous cultures were isolated. Cultures were grown on PDA at 23°C in the dark for 4 weeks. The Nobles species code (Nobles 1965) was recorded for 4-week-old cultures. Extracellular oxidase reactions were tested on 4-week-old cultures according to Desjardin (1990). The following reagents were used for the reactions: (1) for laccase, syringaldazine (Marr 1979) and α -naphthol (Stalpers 1978); (2) for tyrosinase, L-tyrosine (Marr 1979) and *p*-cresol (Marr 1979); and (3) for peroxidase, hydrogen peroxide plus pyrogallol (Stalpers 1978).

All specimens cited labeled with "TNS-" were deposited in the herbarium in National Science Museum, Tokyo (TNS). Specimens cited labeled with "TRL-" were preserved personally in Laboratory for Biological Resources Research, Sankyo Co. Ltd. Cultures labeled with "SANK" were preserved in Sankyo Culture Collection.

Descriptions

Mycena cupulicola Issh. Tanaka, sp. nov. Figs. 1, 2
Pilei usque ad 3 mm diam., plano-convexi vel applanati, pulverati, albi vel pallide flavi, centro cinerei. Lamellae adnexae, albae vel pallide flavae. Stipites usque ad 20 mm longi, cum disco basali. Basidiosporae 5.8–9 × 3.2–5.2 μm, ellipsoideae, hyalinae, infirme amyloideae. Basidia 11–17 ×

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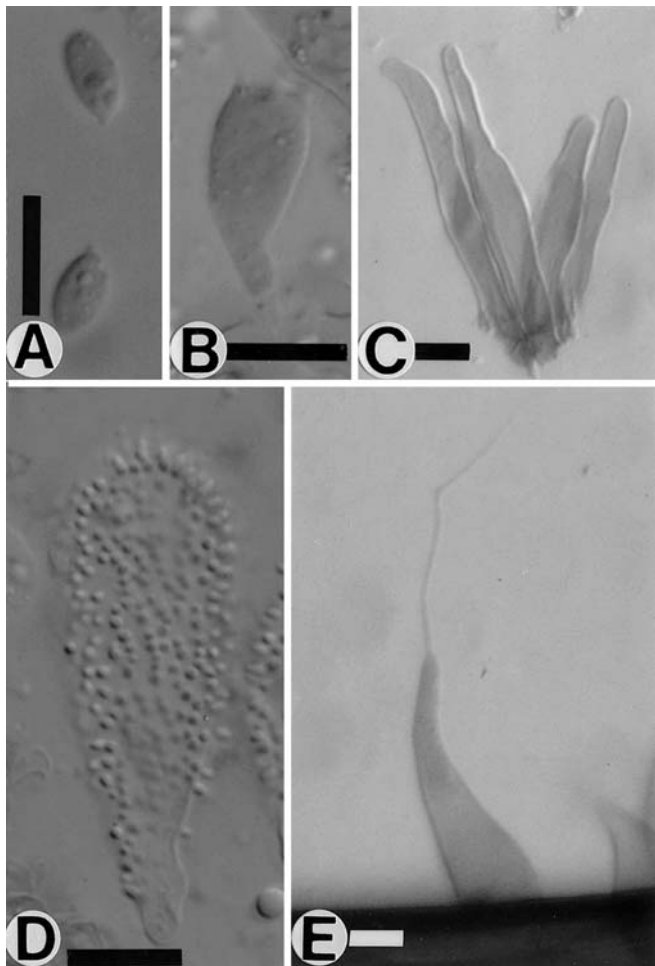


Fig. 1. *Mycena cupulicola* (TNS-F-5757). **A** Basidiospores. **B** Basidium. **C** Basal disc cystidia. **D** Pileipellis acanthocyst. **E** Caulocystidium. Bars A–E 10 μ m

7–8.5 μ m, clavata, 4-spore. Cheilo-vel pleurocystidia nulla. Pileipellis ex hyphis inflati spinulosis constans; cellulae apicales acanthocystoides, 20–45 \times 10–19 μ m, late clavatae vel clavatae, confertium spinulosae. Caulocystidia 43–135 \times 15–22 μ m, lagenaria, basaliter pachyderma. Hyphae fibulatae.

Pileus up to 3 mm in diameter, plano-convex to applanate, pulverulent, radially striate, depressed at the center in age, gray at the center, white to pale yellow toward the margin. Lamellae 10–20, reaching the stipe, adnexed, white to pale yellow. Stipe up to 20 mm long, minutely powdered, with a small basal disc. Basidiospores 5.8–9 \times 3.2–5.2 μ m (\bar{x} = 7.1 \pm 0.8 \times 4.1 \pm 0.4 μ m; Q = 1.3–2.3; \bar{Q} = 1.7 \pm 0.2; n = 25 spores per two collections), ellipsoid, smooth, hyaline, thin-walled, weakly amyloid. Basidia 11–17 \times 7–8.5 μ m, clavate, 4-spored. Cheilocystidia and pleurocystidia absent. Pileipellis a cutis of inflated hyphae with an acanthocyst as a terminal cell; hyphae densely spinulose, inamyloid. Acanthocyst 20–45 \times 10–19 μ m, broadly clavate to clavate, densely spinulose, inamyloid; spinulae up to 2 μ m long, cylindrical. Hypodermium of hyphae up to 14 μ m wide, thin-walled to slightly thick-walled, dextrinoid. Stipe

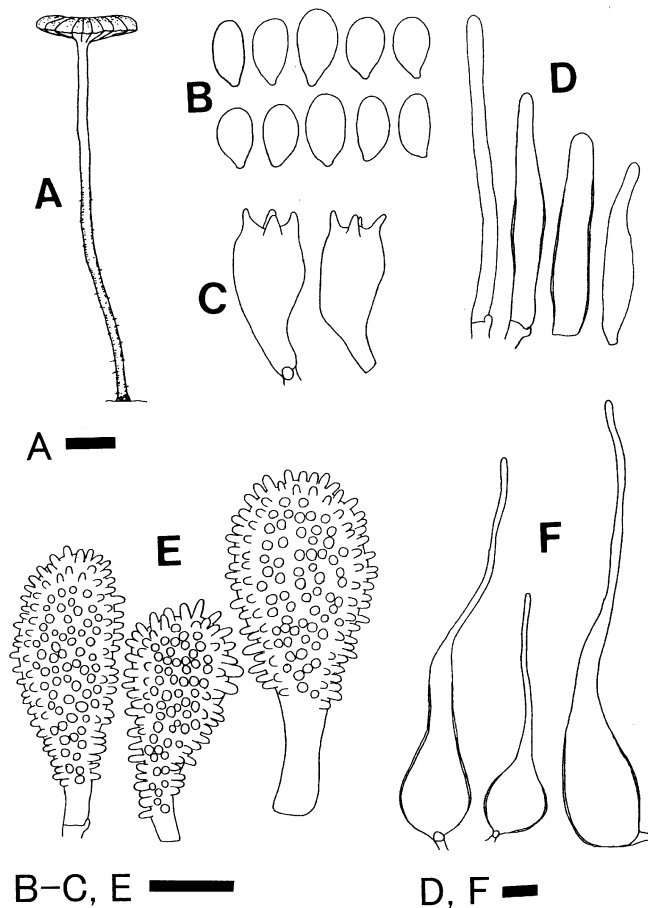


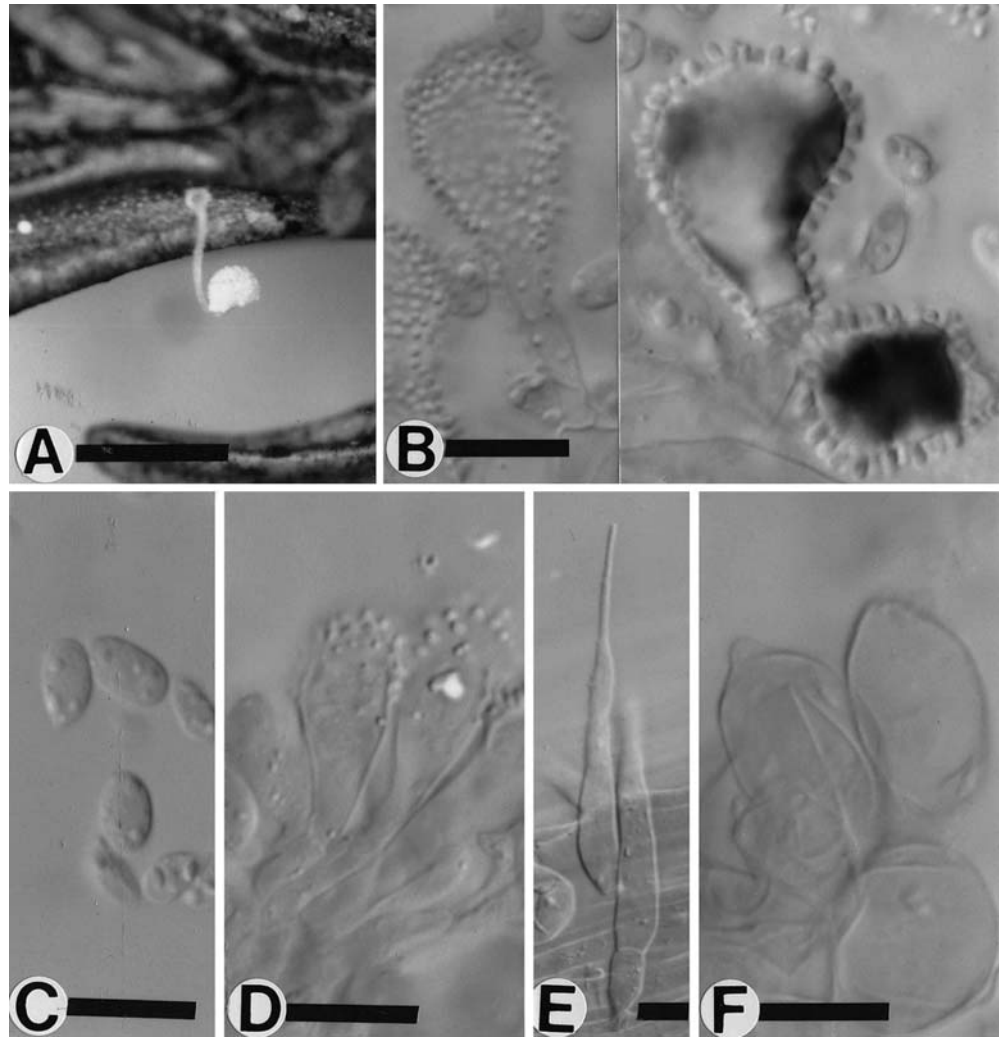
Fig. 2. *Mycena cupulicola* (TNS-F-5757). **A** Basidioma. **B** Basidiospores. **C** Basidia. **D** Basal disc cystidia. **E** Pileipellis acanthocysts. **F** Caulocystidia. Bars A 1 mm; B–F 10 μ m

tissue monomitic; hyphae 2.5–19 μ m wide, smooth, thin-walled to slightly thick-walled, dextrinoid. Caulocystidia 43–135 \times 15–22 μ m, lageniform, smooth, hyaline, slightly thick-walled up to 1 μ m at the broadened base, inamyloid. Cystidia of the basal disc 23–108 \times 3–13 μ m, narrowly cylindrical to narrowly fusiform, smooth, thin-walled to slightly thick-walled. Clamp connections present.

Cultural features. Macromorphology on PDA: mean radius of colony at 23 $^{\circ}$ C is 3 mm, 1 week (n = 8); 9 mm, 2 weeks; 14 mm, 3 weeks. 16 mm, 4 weeks. Advancing zone appressed, fringed. Aerial mycelium floccose to downy, sometimes forming primordia, white. Reverse pale orange to grayish orange. Brown pigment diffused in the agar. Odor indistinct. Advancing zone hyphae 1.5–4 μ m diameter, tubular. Aerial hyphae 1–4 μ m diameter, tubular, smooth, hyaline, thin-walled; hyphae at the primordia diverticulate, forming textura epidermoidea. Submerged hyphae 1–3 μ m diameter, tubular, often aggregated. Conidia not observed. Clamp connections rare, observed only at hyphae of primordia. Phenoloxidase reactions (on PDA): laccase (–), tyrosinase (\pm), peroxidase (\pm). Nobles species code (PDA): (2), 4, 11, 32, 36, 39, 47, 54.

Habit, habitat. Scattered and solitary on decaying cupules of *Castanea crenata* Siebold & Zucc.

Fig. 3. *Mycena adscendens* var. *carpophila* (TNS-F-5758). **A** Dry basidioma. **B** Pileipellis acanthocysts. **C** Basidiospores. **D** Cheilocystidia. **E** Caulocystidia. **F** Basal disc cystidia. Bars **A** 1 mm; **B–F** 10 μ m



Specimens examined. Japan: Ibaraki-ken, Tsukuba-shi, Kamikawarazaki, July 14, 1997, coll. Issh. Tanaka, TRL-MU-755 (TNS-F-5757, Holotype)(culture SANK 28899); same location, June 25, 1997, coll. Issh. Tanaka, TRL-MU-639; same location, June 5, 1998, coll. Issh. Tanaka, TRL-MU-971 (culture SANK 27299).

Notes. *Mycena cupulicola* is characterized by having no cheilocystidia and lageniform caulocystidia measuring 43–135 \times 15–22 μ m with slightly thick-walled broadened base. Lageniform caulocystidia suggest affinity with *M. nucicola* Huijsman or *M. cecidiophila* A.P. Berg, Berg-Blok, Noordel. & Uljé (Berg et al. 2000; Desjardin 1995). The former differs from *M. cupulicola* in having cheilocystidia, thin-walled caulocystidia, and acanthocysts on the basal disc. The latter differs from *M. cupulicola* in having inamyloid trama.

Mycena adscendens var. *carpophila* (J.E. Lange) Desjardin, *Bibl. Mycol.* 159: 56, 1995.

\equiv *Mycena tenerrima* var. *carpophila* J.E. Lange, *Dansk. Bot. Ark.* 1(5): 35, 1914.

Pileus up to 1 mm in diameter, convex to plano-convex, pulverulent, white. Lamellae 5–8, reaching the stipe,

adnexed, sometimes forming a pseudocollarium, white. Stipe up to 2 mm long, minutely powdered, with small basal disc. Basidiospores 5.8–8.1 \times 3.6–4.8 μ m (\bar{x} = 6.9 \pm 0.5 \times 4.2 \pm 0.3 μ m; Q = 1.4–1.9; \bar{Q} = 1.6 \pm 0.1; n = 20–25 spores per three collections), ellipsoid, smooth, hyaline, thin-walled, weakly amyloid. Basidia 9.5–19 \times 6.5–9 μ m, broadly clavate, 4-spored. Cheilocystidia 14–29(–37) \times 6–15(–18) μ m, clavate, smooth, hyaline, thin-walled, without rostrum, densely spinulose at upper portion of cell. Pleurocystidia absent. Pileipellis a cutis of inflated hyphae with an acanthocyst as a terminal cell. Acanthocyst 8–32(–51) \times (5–)7–17 μ m, broadly clavate to clavate, globose or ellipsoid, densely spinulose, inamyloid; spinulae up to 3.0 μ m long, cylindrical. Hypodermium of hyphae up to 18 μ m wide, thin-walled to slightly thick-walled, dextrinoid. Stipe tissue monomitic; hyphae 2.5–17 μ m wide, smooth, hyaline, thin-walled to slightly thick-walled, dextrinoid. Caulocystidia 33–120 \times 5–10 μ m, narrowly conical, smooth, hyaline, thin-walled to slightly thick-walled, inamyloid, often several-celled on stipe base. Cystidia of the basal disc variable in shape, ellipsoid to narrowly conical like caulocystidia; ellipsoid cystidia 10–21(–26) \times 6–13 μ m, smooth, thin-walled to slightly thick-walled. Clamp connections present.

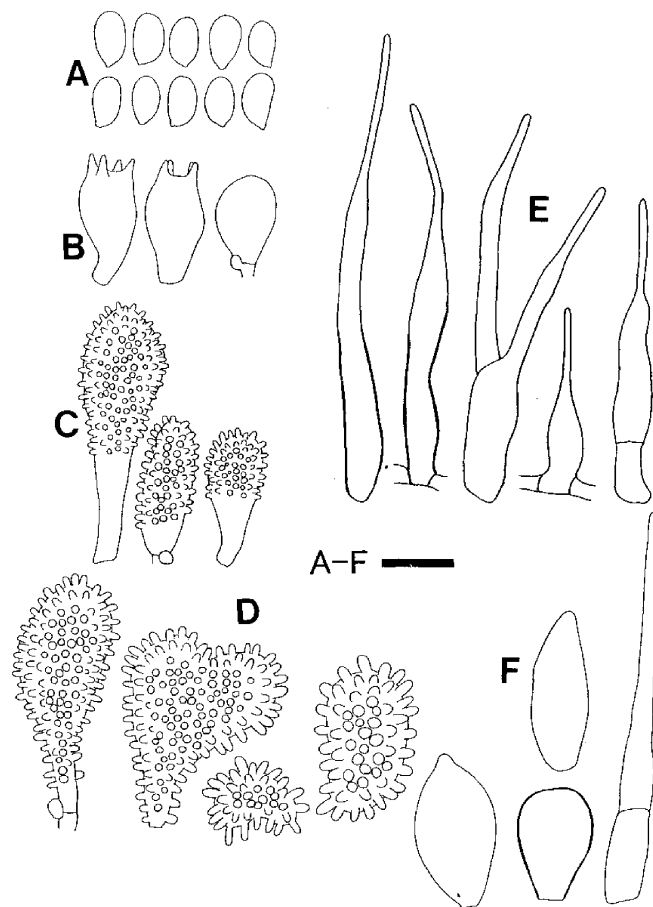


Fig. 4. *Mycena adscendens* var. *carpophila* (TNS-F-5758). **A** Basidiospores. **B** Basidia and basidiole. **C** Cheilocystidia. **D** Pileipellis acanthocysts. **E** Caulocystidia. **F** Basal disc cystidia. Bars A–F 10 μ m

Habit, habitat in Japan. Scattered and solitary on decaying scaly leaves of *Cryptomeria japonica*.

Specimens examined. Japan: Iwate-ken, Oosako-machi, June 30, 1997, coll. Issh. Tanaka, TRL-TMH-64. Ibaraki-ken, Gozenyama-mura, Aug. 29, 1996, coll. Issh. Tanaka, TRL-TMH-32 (TNS-F-5758); Kasama-shi, Mt. Bucho, June 25, 1998, coll. Issh. Tanaka, TRL-TMH-63. Gunma-ken, Kiryu-shi, Sept. 18, 1997, coll. Issh. Tanaka, TRL-TMH-65. Shiga-ken, Kutsuki-mura, Oct. 1, 2000, coll. Issh. Tanaka, TRL-TMH-61. Kyoto-fu, Kyoto-shi, Hanase-toge, Sept. 19, 2002, coll. Issh. Tanaka, TRL-MU-1787.

Notes. The foregoing Japanese specimens accorded well with *M. adscendens* var. *carpophila* in having 4-spored basidia, narrowly conical caulocystidia measuring 33–120 \times 5–10 μ m, and narrower basidiospores (3.6–4.8 μ m) than *M. adscendens* (Lasch) Maas Geest. var. *adscendens* (5–6 μ m) (Desjardin 1995). Clavate, non rostrate cheilocystidia of the Japanese specimens were considered to be within the

variation of this taxon because *M. adscendens* was reported to have variable cheilocystidia (Maas Geesteranus 1983). In combination of their habitat on decaying scaly leaves of *C. japonica* and having small white pilei (1 mm in diameter), the Japanese specimens resemble *M. cryptomeriicola*. However, *M. cryptomeriicola* differs in having inamyloid basidiospores.

Mycena cryptomeriicola Imazeki & Toki, Bull. Gov. Forest Exp. Sta. 79: 8, 1955 (“*cryptomeriicola*”)

Holotype specimen. Japan: Shiga-ken, Inukami-gun, Ootaki-mura, July 1954, coll. Toki. No F. 3857 (TFM).

The holotype consists of four basidiocarps and several stipe fragments. Basidiospores observed in this study were inamyloid, and dimensions were 6.6–8.7 \times 4.7–5.7 μ m (\bar{x} = 7.9 \pm 0.5 \times 5.1 \pm 0.3 μ m, Q = 1.3–1.7, \bar{Q} = 1.5 \pm 0.1, n = 20). It is slightly wider than that (7–9 \times 4–5 μ m) in the original description (Imazeki and Toki 1955). Detailed micromorphology, except basidiospores and pileipellis acanthocysts, could not be observed because the holotype was in poor condition. All hymenial cells had collapsed. The presence of clamp connection was unclear. This taxon suggests affinity with *M. adscendens* var. *adscendens* or *M. adscendens* var. *carpophila* (Desjardin 1995). However, a type study could not clarify a relationship to *M. adscendens*. Although we tried to collect new specimens of this taxon, all specimens collected on decaying scaly leaves of *C. japonica* have amyloid basidiospores.

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