

SHORT COMMUNICATION

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Strobilomyces mirandus Corner, a new record from Japan

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Abstract *Strobilomyces mirandus*, a bolete new to Japan, is described and illustrated. This is the first record of the species outside of the type locality in Malaysia. It is very distinct from other *Strobilomyces* species by the unusually colored yellow or golden-orange to brownish-orange of the basidiocarp.

Key words Bolete species · Morphology · *Strobilomyces mirandus* · Taxonomy · Tropical species

The genus *Strobilomyces* (Corner 1972; Nagasawa 1987; Pegler and Young 1981; Singer 1986) is almost worldwide in its distribution and is rich in species in the subtropical and tropical areas of Asia (Chiu 1948; Corner 1972; Ying and Ma 1985, Zang 1985) and Africa (Heinemann 1954; Pegler 1977), but it is also known in temperate areas of Asia (Hongo 1979, 1982; Kawamura 1954; Nagasawa 1987), North America (Singer 1945, 1970, 1986), Europe (Berkeley 1851, 1852; Singer 1945), and Australia (May and Wood 1997;) and elsewhere. Three species, *S. strobilaceus* (Scop.: Fr.) Berk., *S. confusus* Singer, and *S. seminudus* Hongo, are hitherto reported from Japan (Hongo 1979, 1982; Kawamura 1954; Nagasawa 1987, 1997). These species have been confused in Japan because of the similar

characters of their basidiocarps (Hongo 1979), and additional cryptic species are also implied within this genus (Nagasawa 1987).

Strobilomyces mirandus Corner (Corner 1972) was described from Malaysia and characterized primarily by the pileus and stipe colored golden-tawny to golden-orange within the genus *Strobilomyces*. Despite its conspicuous coloration, this species has never been reported since the original description. In 2002, 2003, and 2004, a bolete similar to *S. mirandus* was collected in an evergreen *Castanopsis-Quercus* forest in Miyazaki Prefecture, Kyusyu. After detailed examinations, these specimens were determined to be *S. mirandus*.

Macro- and microscopic characters were described and illustrated based on the Japanese collections. Microscopic observation was made in material mounted in 2.5% (w/v) KOH solution. Sixty basidiospores were measured from two specimens (CBM, FB-33928; CBM, FB-33929) of three collections at 1000×. The range and mean ± standard deviation (SD) of Q, the quotient of length to breadth of basidiospores, are described. Meshes of spore reticulum were measured under a scanning electron microscope (Philips XL-Series) at 8000×. Examined specimens are deposited in the Herbarium of the Natural History Museum and Institute, Chiba (CBM).

***Strobilomyces mirandus* Corner, Boletus in Malaysia: 61 (1972).** Figs. 1–9

Pileus 3–6 cm in diameter, at first hemispherical, then convex to plane; surface dry, more or less squarrose with small, conical, cottony scales over the center, squamulose with appressed to slightly recurved fibrillose scales toward the margin, often rimose or diffracted-scaly partially, pale yellow to golden-yellow when young, becoming golden-orange to brownish-orange when old, or olive-brown to almost blackish where damaged or tightly pressed; margin appendiculate with concolorous floccose-membranous veil. Stipe 4–7 cm long, 7–9 mm wide at the apex, 6–7.5 mm near the base, almost equal to slightly tapering toward the base, solid; surface reticulate with shallow, elongate meshes above, often with a broad woolly annular zone near the

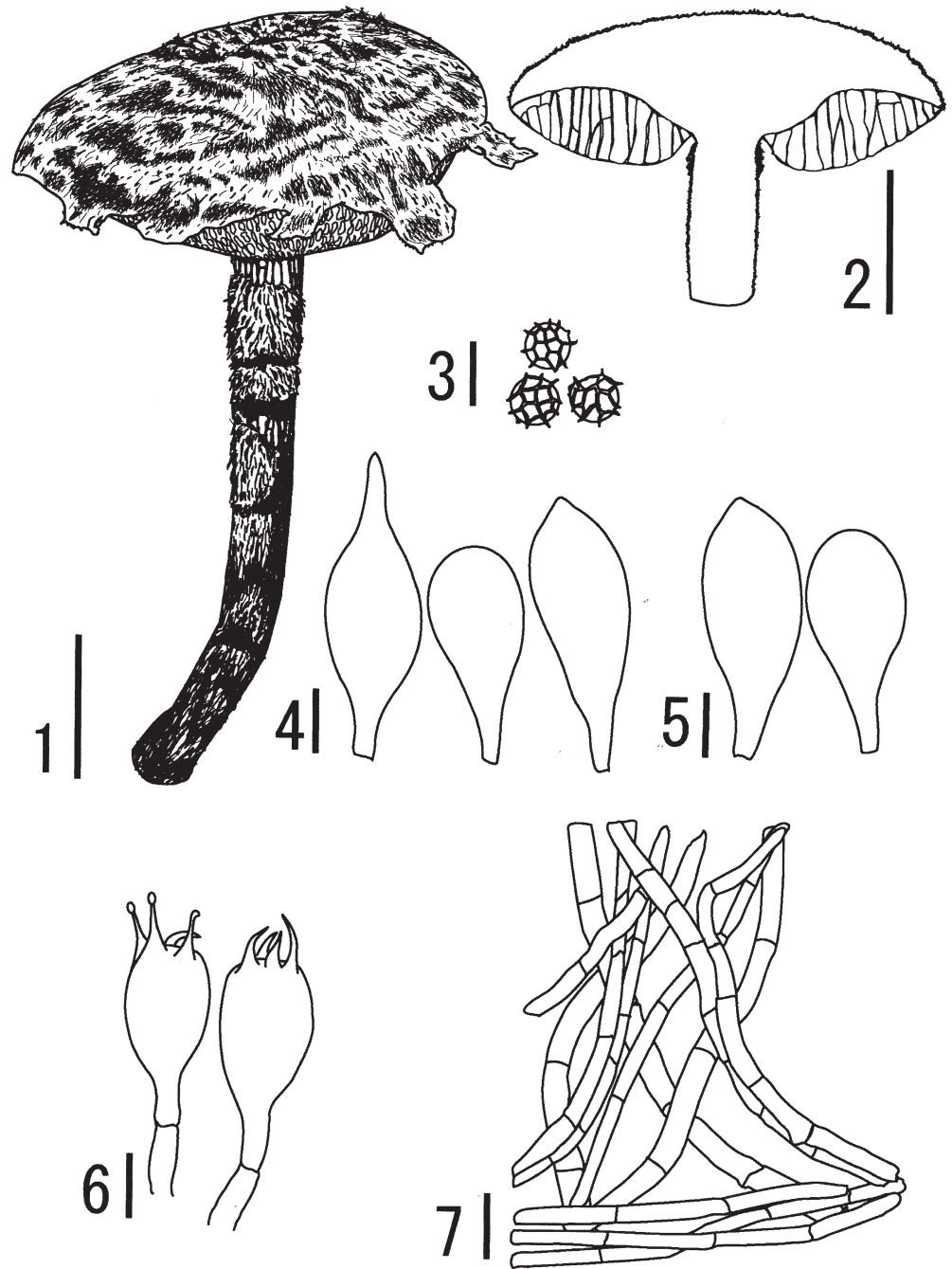
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Fig. 1–7. *Strobilomyces mirandus* (CBM, FB-33929). **1** Basidioma. **2** Vertical section view of basidioma. **3** Basidiospores. **4** Cheilocystidia. **5** Pleurocystidia. **6** Basidia. **7** Tissues of pileus surface. Bars **1, 2** 1 cm; **3–6** 10 μm ; **7** 20 μm



apex, floccose-squarrose to tomentose-squamulose downward, nearly concolorous with the pileus. Tubes up to 10 mm long, adnexed, ventricose, whitish, becoming almost black at maturity; pores up to 0.5 mm wide, whitish to grayish, distinctly turning reddish then black on bruising. Flesh up to 9 mm thick in the center of the pileus, up to 5 mm thick halfway to the margin, whitish. All parts of the basidiocarp more or less changing into reddish then black on bruising. Color of the spore-print fuscous-brown.

Basidiospores $8.5\text{--}10.0 \times 7.0\text{--}9.0 \mu\text{m}$ ($Q = 1.00\text{--}1.25$, 1.09 ± 0.05 ; range, mean \pm SD) including ornamentation, spore

body $5.5\text{--}8.0 \times 5.0\text{--}7.0 \mu\text{m}$, ($Q = 1.00\text{--}1.40$, 1.15 ± 0.09), subglobose, dark brown in KOH, reticulate with complete networks, meshes $1.0\text{--}2.0 \times 1.3\text{--}3.0 \mu\text{m}$ wide, $0.7\text{--}1.2 \mu\text{m}$ high, angular to elongated. Basidia $28\text{--}38 \times 12\text{--}21 \mu\text{m}$, clavate, 4-spored; sterigmata $5\text{--}9 \mu\text{m}$ long. Cheilocystidia $31\text{--}48 \times 12\text{--}17 \mu\text{m}$, numerous, clavate to fusiform or fusoid-ventricose, hyaline or with brownish to pale fuscous contents, thin-walled. Pleurocystidia $28\text{--}48 \times 12\text{--}16 \mu\text{m}$, abundant, clavate to ventricose or subfusoid, often with an obtuse apex, with fuscous purple contents, thin-walled. Hymenophoral trama strongly bilateral divergent, composed of

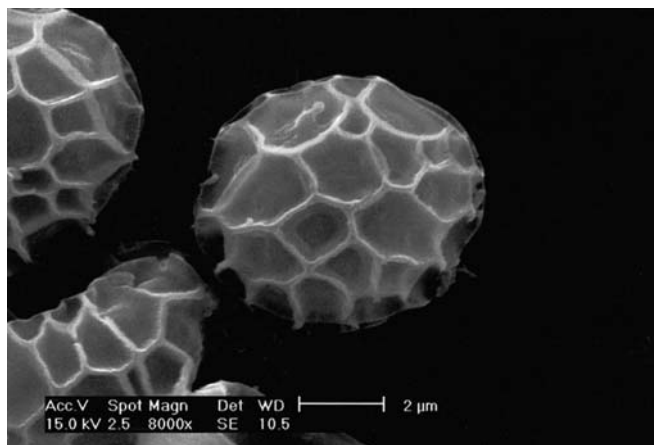


Fig. 8. Basidiospores of *Strobilomyces mirandus* (CBM, FB-33929), scanning electron microscopy (SEM) image. Bar 2 μm



Fig. 9. Basidiomata of *Strobilomyces mirandus* in the habitat (CBM, FB-33929). Bar 1 cm

hyphae 4–10 μm wide, scarcely branched. Pileipellis composed of subradially arranged cylindrical hyphae with brownish contents, 5–10 μm wide. Cottony scales of the pileus composed of hyphae similar to those of pileipellis, ascending in bundles, the end cells often slightly attenuated toward the apex. Pileus trama composed of strongly gelatinized, interwoven hyphae, 3–12 μm wide. Stipitipellis composed of cylindrical hyphae, longitudinally arranged, 7–15 μm wide. Hyphae of stipe scales conspicuously branched, brownish, 5–12 μm wide. Stipe trama consisting of frequently branching, interwoven, gelatinized hyphae, 3–10 μm wide. All hyphae without clamp connections.

Japanese name: Tora-iguchi.

Specimen examined: Mt. Murabaki, Nobeoka-shi, Miyazaki Prefecture, Kyusyu, Japan, at altitude about 200m, inclination angle 10°, gentle slope to the south, in evergreen forest, coll. by S. Kurogi, July 10, 2002 (CBM, FB-33928); the same place, July 12, 2003 (CBM, FB-33929); the same place, July 6, 2004 (CMB, FB-34452).

Habitat: Solitary or gregarious in small groups on the ground in a broad-leaved evergreen forest with *Castanopsis cuspidata* (Thunb. ex Murray) Schottky var. *sieboldii* (Makino) Nakai, *Quercus gilva* Bl., and *Q. salicina* Bl, especially occupied by *Q. gilva*.

Distribution: Tanjong Sedili Kecil, Johore, Malaysia (holotype; not traced in Herbarium, Royal Botanic Garden, Edinburgh where holotypes of other *Strobilomyces* spp. described by Corner are deposited); Japan, as indicated above.

We identified the Japanese specimens as *S. mirandus* because the macro- and micromorphological characters agree well with the original description of the species in most aspects. However, it should be noted that in the Japanese material examined, the “golden-tawny to golden orange” color of the carpophores seen in the type (Malaysian) material and emphasized as a significant character of the species by Corner (1972) was observed only in aged specimens; when younger, yellow coloration was dominant in the Japanese material. In addition to the yellow- to orange-

tinted carpophores unusual in the genus, *S. mirandus* is well characterized microscopically by having clavate to ventricose pleurocystidia with subacute apex or short obtuse projection and spores reticulate with complete networks.

This is the first record of *S. mirandus* since the original description based on the material from a tropical rainforest in Malaysia. So far we know, it has not been collected in Japan outside of the one locality of Miyazaki Prefecture reported here, in spite of the conspicuous appearance of its carpophore and the wide distribution of similar warm temperate forests with *Castanopsis* and evergreen *Quercus* in western Japan, which may suggest that the occurrence of the species in Japan is rare and/or limited in the range of distribution.

Many *Strobilomyces* species are ectomycorrhizal (Matsuda and Hijii 1999; Singer 1986). *Strobilomyces mirandus* may also form an ectomycorrhizal relationship with *Castanopsis* and/or with *Quercus* trees, the only ectomycorrhizal tree species at the collection site.

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