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A new greenish gilled species of *Marasmius* (*Agaricales*) from Hainan Island, China

Yi-Hua Yang[1,2], Chun-Ying Deng[3] & Tai-hui Li[2*]

[1] *Chuxiong Institute of Forestry Sciences & Chuxiong Extending Station of Forestry Technology, Chuxiong 675005, China*

[2] *Guangdong Provincial Key Laboratory of Microbial Culture Collection and Application, Guangdong Open Laboratory of Applied Microbiology, State Key Laboratory of Applied Microbiology (Ministry-Guangdong Province Jointly Breeding Base), South China, Guangdong Institute of Microbiology, Guangzhou 510070, China*

[3] *Hainan Key Laboratory for Sustainable Utilization of Tropical Bioresource, Hainan University, Haikou, Hainan 570228, China*

[*] Correspondence to: *mycolab@263.net*

Abstract —*Marasmius subviridiphyllus* is described as a new species from China supported by macro- and microscopic characters. It is classified in sect. *Marasmius* and characterized by its collariate greenish lamellae, developed rhizomorphs, slender fruiting bodies, dull red sulcate pileus with a small greenish white disc, middle sized basidiospores (8.8–10.6 × 3.9–5 μm), *Siccus*-type cheilocystidia, and pileipellis broom cells. The holotype (GDGM 26402) is deposited in the Fungal Herbarium of Guangdong Institute of Microbiology (GDGM).

Key words — *Basidiomycetes, Marasmiaceae,* morphology, taxonomy

Introduction

Marasmius (*Basidiomycota, Marasmiaceae*) is a large genus with complex and diverse morphological characters, for which six sections are accepted (Wilson & Desjardin 2005). Representatives of sect. *Marasmius* are characterized by their collariate lamellae, insititious stipe, and hymeniform pileipellis with *Rotalis*- or *Siccus*-type broom cells. More than 200 species belong to this section (Singer 1964, 1976; Desjardin & Horak 1997, Desjardin & Ovrebo 2006, Antonín 2003, 2007; Antonín & Buyck 2006, Antonín & Noordeloos 2010).

Twenty-two species of *Marasmius* sect. *Marasmius* have been recorded in China (Bi et al. 1985, 1993, 1997; Chang & Mao 1995, Keissler & Lohwag 1937, Li & Bau 2003, Li et al. 1994, Mao 1998, Shao & Xiang 1997, Tai 1979, Teng 1936, Zhuang 2005). During a survey in Hainan Province, we discovered a new species belonging to sect. *Marasmius,* which we describe and illustrate here.

Materials & methods

Specimens were annotated and photographed in the field, dried in an electric drier at a temperature of 70°C, and then preserved in the herbarium. Spacing of lamellae spacing is accompanied by the number of lamellae reaching the pileus margin from the stipe, and the series number indicates the number of lamellulae between lamellae. Color terms and notations follow those of Kornerup & Wanscher (1978). Fungal tissues were mounted in 5% KOH and Melzer's reagent for microscopic examination. Spore statistics include: x_m, the arithmetic mean of the spore length by spore width (± standard deviation) for n spores measured in a single specimen; Q, the quotient of spore length by spore width in any one spore, indicated as a range of variation in n spores measured; Q_m, the mean of Q-values in a single specimen; n, the number of spores measured per specimen; s, the number of specimens involved. Specimens are deposited in Fungal Herbarium of Guangdong Institute of Microbiology (GDGM). Authors of fungal names are cited according to the International Plant Names Index Authors website (http://www.ipni.org/ipni/authorsearchpage.do).

Taxonomy

Marasmius subviridiphyllus Chun Y. Deng, Yi H. Yang & T.H. Li, **sp. nov.** Figs 1, 2

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Differs from *Marasmius nigrobrunneus* by its dull red pileus, pale green lamellae, and narrower basidiospores.

Type: China, Hainan Province, Ledong County, Jiaxi Provincial Nature Reserve, 22 July 2009, Chun Y. Deng (**Holotype**, GDGM 26402).

Etymology: *sub-* = almost, *viridis* = green, *phyllum* = lamella; referring to the greenish lamellae.

Pileus 3–7 mm, hemispherical to convex when young, umbilicate to depressed at the center, deeply sulcate, glabrous, mostly reddish gray to dull red (8B2–3; 9B3), with a minute papilla at a small greenish white to greenish (29A2–3) disc. Lamellae collariate near to the stipe, or subfree with the broken collar when mature, distant (13–14), with 0–1 lamellulae, greenish white (29A2, 30A2) to pale green (29A3). Stipe 30–60 mm long, 0.2–0.5 mm thick, deep chestnut, brownish gray (8F2–3) to fuliginous or black, shiny, glabrous, insititious, equal, arising from black rhizomorphs.

Basidiospores 8.8–10.6 × 3.9–5 μm, [x_m = 9.3 × 4.8 μm, Q = 1.68–2.4, Q_m = 1.9, n = 20 spores, s = 1 specimen], ellipsoid, smooth, thin-walled, hyaline, inamyloid. Basidia 26–32 × 6–8 μm, clavate, 2- or 4- spored, thin-walled, hyaline, inamyloid. Basidioles 15–23 × 6–8 μm, fusoid, clavate, thin-walled, hyaline, inamyloid. Lamellae edge sterile. Cheilocystidia 10–30 × 6–11 μm, clavate, subcylindrical or irregular in outline, broom cells of the *Siccus*-type, with several apical cylindrical to conical appendages or branched setulae 1–7 × 1–1.5 μm, thin- or thick-walled. Pleurocystidia absent. Hyphae of hymenophoral trama and the pileus trama thin-walled, hyaline, dextrinoid,

Fig. 1: *Marasmius subviridiphyllus* (Holotype, GDGM 26402).
Scale bar = 1 cm. (Photo: Chun Y. Deng).

non-gelatinized. Stipitipellis consisting of parallel, thin-walled, brown, dextrinoid hyphae. Pileipellis a hymeniform layer of *Siccus*-type broom cells: main body 23–32 × 6–10 µm, cylindrical, subglobose to clavate, thin- to thick-walled, hyaline, inamyloid; apical setulae 2–7 × 1–2 µm, cylindrical to conical, rarely forked or warted, thin- to thick-walled, light brown in KOH, inamyloid. Caulocystidia absent. Clamp connections present in all tissues.

Ecology & distribution—Saprotrophic, gregarious on dead branches, sticks, etc. of dicotyledonous plants. In mixed forest, China (Hainan). July.

Comments— The main characters of *Marasmius subviridiphyllus* are the reddish gray to dull red, glabrous pileus, slender and shiny stipe, collariate pale green lamellae, black rhizomorphs, and *Siccus*-type pileipellis broom cells, and cheilocystidia. It belongs in sect. *Marasmius* subsect. *Sicciformes* according to Antonín (1991) and Wilson & Desjardin (2005). The pale green lamellae are distinctive within subsect. *Sicciformes*, because almost all known species in the subsection have white, yellowish white, or cream lamellae.

Among the species with tiny dark basidiomata, the new species resembles *M. nigrobrunneus* (Pat.) Sacc. and its provisional form *M. nigrobrunneus* "f. *cinnamomeus,*" *M. ruforotula* Singer, and *M. subruforotula* Singer. *Marasmius*

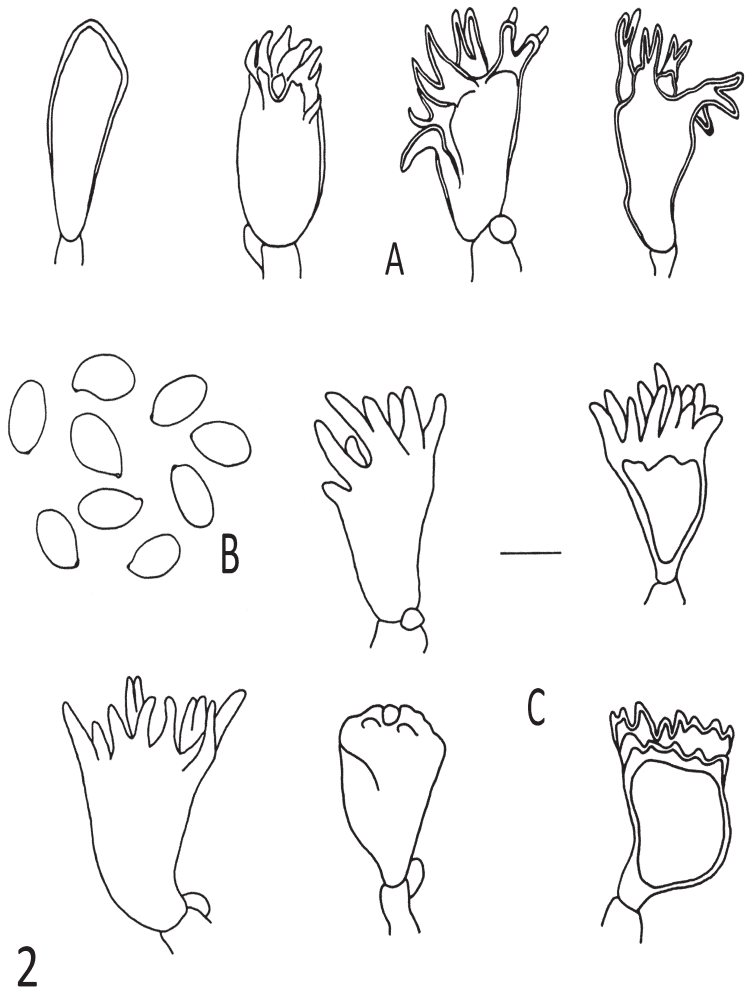

Fig. 2: *Marasmius subviridiphyllus* (Holotype, GDGM 26402).
A. Cheilocystidia; B. Basidiospores; C. Pileipellis. Scale bars = 10 μm.

nigrobrunneus is separated by a grayish brown pileus and broader basidiospores (5–6 μm) (Patouillard 1893, Singer 1958, 1976; Pegler 1983, 1986; Antonín 2007), and *M. nigrobrunneus* "f. *cinnamomeus*" differs in its brown to orangish brown pileus and the presence of smooth cells in the pileipellis and fewer broom cells (Wannathes et al. 2009); *M. subruforotula* differs in having smaller

broom cells in the pileipellis and cheilocystidia and coralloid cells among apical setulae (Singer 1964, Antonín & Buyck 2006). *Marasmius ruforotula* differs in closer (≤17) and marginate lamellae, longer stipe, absence of rhizomorphs, and inamyloid pileus and lamellar trama (Singer 1948, Wannathes et al. 2007)

Marasmius bekolacongoli Beeli, *M. grandiviridis* Wannathes et al., and *M. galbinus* T.H. Li & Chun Y. Deng resemble the new species in having green lamellae, but all three have a hymeniform pileipellis composed of smooth cells and belong to *Marasmius* sect. *Globulares* (Beeli 1928, Antonín 2007, Wannathes et al. 2009, Deng & Li 2011).

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