

## The Boletes of Taiwan (XI)

Chien-Ming Chen<sup>(1,3)</sup> and Kai-Wun Yeh<sup>(2)</sup>

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**ABSTRACT:** Three boletes are recorded as new to Taiwan. They are *Boletinus asiaticus* Singer, *Boletus balloui* Peck and *Fuscoboletinus glandulosus* (Peck) Pomerleau & Smith, respectively. The specimens are described and illustrated.

**KEY WORDS:** Boletes, *Fuscoboletinus*.

### INTRODUCTION

Although there have been some reports of boletes from Taiwan by Chen *et al.* (1997a, b, 1998), the survey of mushroom flora is still far from complete. In this paper, three species found from central Taiwan are reported. All of them are new records. Especially this is the first description of the genus *Fuscoboletinus* in Taiwan.

### MATERIALS AND METHODS

Specimens were collected from central Taiwan and examined in fresh condition. Spore prints were made from segments of fruit bodies placed on white paper. The spore morphology was investigated under light microscope, after they were reacted with KOH solution (3%) and Melzer's reagent on glass slide respectively. All specimens were completely dried by warm air and deposited in the mycological lab. of the Taiwan Endemic Species Research Institute (TESRI). Conventional mycological techniques for examination of specimens were used throughout this study (Largent, 1977). Fruit bodies were sectioned by free hand and mounted in both 3% potassium hydroxide and Melzer's reagent for microscopic examination.

### TAXONOMY

1. *Boletinus asiaticus* Singer, Rev. Mycol., 3: 164. 1938.

Figs. 1 & 4

Pileus 4–10.5 cm broad, convex, surface dry, vinous-red or purple-red when old, floccose in the center. Context yellow, unchanging when cut. Context hyphae of pileus 4–6  $\mu$ m diam., mostly grayish brown with an olive component in KOH. Tubes 0.2–0.7 cm long, decurrent, initially yellow, becoming olive-yellow. Pores angular, 0.8–1.3 x 1–2 mm wide, radially elongated, concolorous with tubes. Stipe hollow, surface fibrillose, yellow above the remnants

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1. Taiwan Endemic Species Research Institute (C.O.A.), Chichi 552, Taiwan.

2. Department of Botany, National Taiwan University, Taipei 106, Taiwan.

3. Corresponding author.

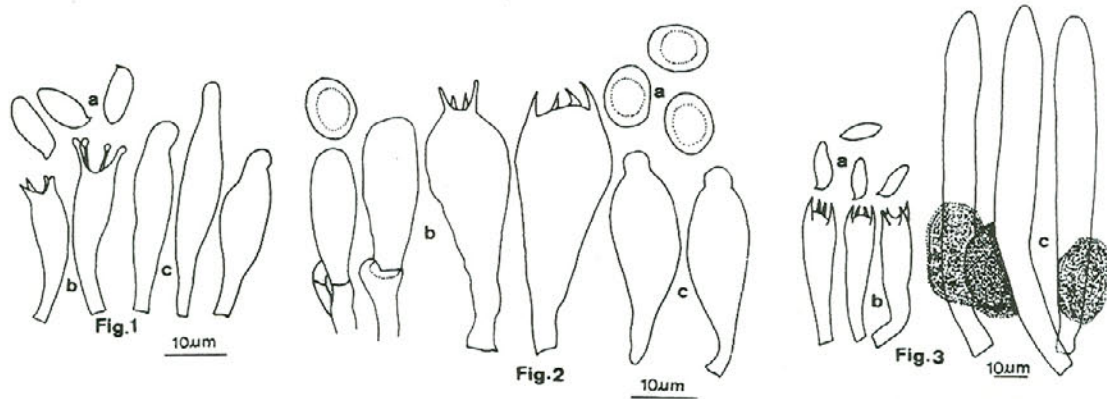


Fig. 1. *Boletinus asiaticus*. Fig. 2. *Boletus balloui*. Fig. 3. *Fuscoboletinus glandulosus*. a: basidiospores; b: basidia; c: pleurocystidia.

of the veil, vinous-red below it. Spore print buff-brown. Spores 9–11.5 x 4–4.5  $\mu\text{m}$ , fusiform, with one or two drops. Basidia 20–33 x 6–7  $\mu\text{m}$ , clavate, sterigmata four, 5–6  $\mu\text{m}$  long. Pleurocystidia 20–32 x 5–7  $\mu\text{m}$ , fusiform or ampullaceous, colorless. Cheilocystidia 55–89 x 8.8–12  $\mu\text{m}$ , agglutinate, clavate, often with red-brown contents. Hymenophoral trama of strongly boletinoid type, with a colored, more compactly interwoven mediostratum and a paler lateral stratum. Clamp connections constant.

There is a great deal of color variation in this species when compared with the specimens from Europe, Japan and China. The surface of pileus is dry even in wet weather and hymenophore is strongly boletinoid. However, this is a very rare fungus with a characteristic blood-colored pileus in *Boletinus*. To date, we have found it once under *Pinus taiwanensis* Hay. in Miaoli county.

Habitat: Solitary under *Pinus taiwanensis* Hay. forest.

Distribution: Taiwan, China, Japan, North America, Europe.

Specimen examined: Miaoli, Jenshan, alt. 2,115 m, Sep. 13, 1996. Huang Hsiu-Wen (# 1666).

## 2. *Boletus balloui* Peck, Bull. N. Y. State Mus. 157: 22. 1912.

Figs. 2 & 5

*Gyrodon ballouii* (Peck) Smell, Mycologia 33: 422. 1941.

*Tylopilus ballouii* (Peck) Singer, Am. Midl. Nat. 37: 105. 1947.

Pileus 5.5–12 cm broad, convex to become depressed in the center, surface subglabrous, smooth or slightly pitted in the center, slightly viscid when wet, color orange to fulvous brown. Context whitish, turning dirty lilac when fresh, 1–2 cm thick at the central pileus. Epicutis a trichodermium of elongated cylindrical hyphae, 4–8  $\mu\text{m}$  diam., golden succineous, inside granular and becoming orange brown to reddish brown in the Melzer's, rounded-obtuse at their free tips. Context hyphae of pileus 8–15  $\mu\text{m}$ , orange-brown in Melzer's reagent. Tubes up to 1.5 cm long, somewhat depressed around the stipe. Pores 0.2–0.3 mm broad, subsodiametric or near margin somewhat radially elongated, concolorous with the tubes or cream to flesh color, stained brown when bruised. Stipe 8.5–16 x 0.9–4 cm thick, slender tapered toward apex, quite bulbous at base up to 1.8–4.0 cm thick, surface finely pruinose, glabrescent, dry, solid, often with the extreme apex striate just below the hymenophore, but



Fig. 4. *Boletinus asiaticus*. Fig. 5. *Boletus balloui*. Fig. 6. *Fuscoboletinus glandulosus*.

not reticulated, veil none, basal mycelium whitish. Dermatocystidia 20–33 x 7–12  $\mu\text{m}$ , clavate. Spore print yellowish or pale ochraceous cream. Spores 8.5–10.5 x 7–8  $\mu\text{m}$ , ellipsoid to ovoid, frequently broadest below, often laterally bean-shaped, thin-walled, smooth without germ pore, inamyloid. Basidia 30–36 x 10–13  $\mu\text{m}$ , sterigmata four, 4–5  $\mu\text{m}$  long. Pleurocystidia 40–75 x 9–12  $\mu\text{m}$ , clavate to more or less ventricose, apices obtuse, not appendaged and multiguttulate. Hymenophoral trama bilateral, with a melleous mediostratum of non-gelatinized 2–4.5  $\mu\text{m}$  diam. hyphae; lateral stratum with strongly divergent, 2.7–8.3  $\mu\text{m}$  diam. hyphae. Clamp connections absent.

Distinct features of this species was the relatively short spores and was one of the most intricate nomenclatorial problems (Singer, 1947) as its short spores mostly belonging to genus *Tylophillus* and *Gyrodon*. But the tubes in *Boletus* are yellow at first and brown olivaceous as they mature, in contrast to the white or grey to pink or red in *Tylophillus*. In addition, this species has a convexo-plate pileus, not infundibuliform as in *Gyrodon*. This species is somewhat similar to *B. peralbidus*, even in color. Fortunately they can easily be distinguished by simple measurements of the breadth of the spores.

Habitat: Scattered under broad-leaved trees.

Distribution: Taiwan, China, Singapore, Malaysia, Japan, North America.

Specimen examined: Changhua, Ershui, alt. 500m, Aug. 12, 1998. Huang Shoei-Ian.

**3. *Fuscoboletinus glandulosus* (Peck) Pomerleau & Smith, Brittonia 14: 162. 1962.**

Figs. 3 &amp; 6

*Boletinus glandulosus* Peck, *Bull. N. Y. State Mus.* 131: 34. 1909.  
*Suillus glandulosus* (Peck) Singer, *Lilloa* 22: 657. 1949.

Pileus 2.5–5 cm broad, broadly conic to convex, the margin incurved, expanding to broadly conic-umbonate with a decurved margin, margin typically appendiculate with veil fragments, surface glutinous, viscid when wet, coarsely fibrillose, cuticle at first ochre-red, fading in age, context up to 0.8 cm thick, yellow, changing to pinkish gray upon exposure. Tubes adnate to decurrent, about 5 mm deep, bright yellow. Pores concolorous with tubes, angular, 1–1.5 mm broad, smaller toward the pileus margin, often compound, changing to reddish or brownish when injured, spotted brown from tufts of cystidia. Stipe 3–5 x o. 6–1 cm thick, enlarged downward with a clavate base, solid, context white in the interior or brownish at the base, cortex yellowish, lower portion sheathed with remains of a fibrillose coating similar to the fibrils of the pileus and breaking into patches, apex yellow and somewhat reticulate with decurrent lines from the tube. Spore print dull purplish drab. Spores 8–12 (14) x 4.5–5  $\mu\text{m}$ , smooth, narrowly ovate in face view, narrowly inequilateral in profile view. Basidia 30–37 x 8–10  $\mu\text{m}$ , subcylindric to clavate, colorless in KOH solution, sterigmata four, 4–5  $\mu\text{m}$ . Pleurocystidia 55–70 x 5–7  $\mu\text{m}$ , subcylindric, flexuous or straight and with a subacute to obtuse apex, colorless and thin-walled, usually with bister incrusting material near the base. Hymenophoral trama gelatinous and divergent. Pileus trichodermium of loosely tangled hyphae with short inflated cells near apex and with orange-buff content revived in KOH solution. Clamp connections absent.

This species has a extremely viscid pileus and is recognized by the dense woolly, dry red coating on the pileus and stipe. The flesh stains reddish on bruising and this color persists on cut surface of dried specimen. Its spore deposit is purplish, not cinnamon to olive of the genus *Suillus* (Smith and Thiers, 1971). It is mycorrhizal with species *Picea* or *Pinus*.

Habitat: Scattered under *Pinus taiwanensis* Hay. forest.

Distribution: Taiwan, China, North America.

Specimen examined: Miaoli, Jenshan, alt. 2,055m, Sep. 13, 1996. Huang Hsiu-Wen (# 1663).

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## 臺灣之網孔蕈類(十一)

陳建名<sup>(1,3)</sup>、葉開溫<sup>(2)</sup>

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## 摘 要

本文報導在臺灣首次發現的三種牛肝菌新紀錄種，分別是亞洲假牛肝菌(*Boletinus asiaticus* Singer)、黃蓋牛肝菌(*Boletus balloui* Peck)、粘柄褐孔小牛肝菌(*Fuscoboletinus glandulosus* (Peck) Pomerleau & Smith)，本文對這些標本加以描述與繪圖。

關鍵詞：牛肝菌，褐孔小牛肝菌屬。

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1.行政院農委會臺灣特有生物研究保育中心，集集鎮552，臺灣，中華民國。  
2.國立台灣大學植物系，臺北市106，臺灣，中華民國。  
3.通信連絡員。