

The Boletes of Taiwan (VIII)

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ABSTRACT : Six new boletes of the genus *Xerocomus* are recorded in Taiwan. They are *Xerocomus alutaceus* (Morgan in Peck) Dick & Snell, *X. castanellus* (Pk.) Snell & Dick, *X. junghuhnii* (Hoehn.) Sing., *X. nigromaculatus* Hongo, *X. parvus* Ying and *X. pulverulentus* (Opat.) Gilbert. In this paper, these species are described and illustrated.

KEY WORDS : *Xerocomus*, Taiwan.

INTRODUCTION

The genus *Xerocomus* is one kind of fleshy pore fungus, their pileus is tomentose and siccous. The tubes are adnate and a little decurrent to lamellate. They are linked together and have no distinct tubelets, appearing as an angular network. The tube trama is of the phylloporoid type. Hymenophores are faveolate, rather than a fused aggregation of ovals. It has been observed that a mycorrhizal relationship is essential to some wild plants, including members of the families Pinaceae, Fagaceae and Fabaceae (Cokers *et al.*, 1974). To date, more than thirty species of *Xerocomus* have been described in the world, but only three species, viz. *X. subtomentosus* (L.: Fr.) Quel. (Sawada, 1959), *X. badius* (Fr.) Kuhn.: Gilb. and *X. chrysensteron* (Bull.) Quel. (Yeh and Chen, 1980, 1981) have been recorded from Taiwan. In this paper, we describe six new records of the genus *Xerocomus* found in Taiwan.

MATERIALS AND METHODS

Fresh fruit bodies were collected and examined in fresh condition. Spore prints were made from segments of fruit bodies placed on white paper. Subsequently the fruit bodies were dried under circulating air at constant of 40°C 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 with free hand and mounted in mixture of 1% aqueous phloxine and 3% KOH solution for microscopic examination.

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RESULTS AND DISCUSSION

1. *Xerocomus alutaceus* (Morgan in Peck) Dick & Snell, *Mycologia* 53: 228. 1961.

Figs 1 & 7

Boletus alutaceus Morgan in Peck, Bull. N. Y. State Mus. 2(8):109. 1889.

Pileus 5–10 cm broad, broadly convex to nearly plane, surface siccous and subtomentose, viscid when wet, color dull yellow-brown at first to pale tan with a reddish tint in age. Context white with a reflection of pink near the tubes, 6–14 mm thick at the stipe, unchanging when bruised. Context hyphae of pileus 8–15 μm , orange-brown in Melzer's reagent. Tubes 4–12 mm long, whitish when young, becoming pale olivaceous in age, depressed around the stipe, not changing to blue when bruised. Pores 1–1.5 mm broad, olivaceous pallid but slowly brownish in age. Stipe 6–8 cm long, 1–2 cm thick, straight or curved slightly, subequal, solid, context changing to vinaceous-buff when cut, surface yellow-brown, with lines from extensions of the tubes. Spore print yellow-brown. Spores 12–15.5 x 5–6 μm , suboblong in face view, slightly inequilateral in profile, smooth. Basidia 45–57 x 12–15 μm , clavate, four sterigmata, 5–6 μm long. Pleurocystidia 60–85 x 12–14 μm , fusoid-ventricose with obtuse apex, context often ding yellow as revived in KOH. Tube trama of hyaline gelatinous hyphae somewhat divergent to the subhymenium.

This species is easily confused with *Boletus pallidus* Frost, but it does not stain blue and is not so whitish as the latter when young. Furthermore, the hyphae of the context reacts in Melzer's reagent similar to those of *Boletus roxanae* Frost.

Habitat: Solitary under *Castanopsis carlesii* (Hemsl.) Hay.

Distribution: Taiwan, China (Sichuan, Guangxi, Yunnan, Yhainan Island), North America.

Specimens examined:

Taichung: Paikoutashan, alt. 1000 m, July 6, 1995. Huang Hsin-Wen (1324).

2. *Xerocomus castanellus* (Pk.) Snell & Dick, *Mycologia* 50: 57. 1958.

Figs. 2 & 8

Boletinus castanellus Peck, Bull. Torr. Bot. Club 27: 613. 1900.

Boletinus squarrosoides Snell & Dick, *Mycologia* 28: 468. 1936.

Xerocomus squarrosoides (Snell & Dick) Sing., *Farlowia* 2: 295. 1945.

Pileus 3–7 cm broad, plano-convex and depressed, surface tomentose to fibrillose, color scarlet, dark chestnut to pale yellowish brown, sometimes adorned with minute erect or resupinate dark-colored fibrillose scales. Context whitish or yellowish, changing to pale chocolate-brown. Tubes 4–6 mm long, adnato-decurrent with the tubes appearing like gills near the stipe, olive-brown, changing to blue when cut. Pores 2–3 mm broad, angular and compound, radiately arranged, concolorous with the tubes, changing to blue when bruised. Stipe 3–7 cm long, 5–10 mm broad, subequal, surface subpruinose or minutely furfuraceous, not reticulate but striate at apex, concolorous with pileus, sometimes yellowish at apex but reddish at base, changing to red when handling. Spore print pale ochraceous brown or pale yellowish brown. Spores 13.5–14 x 5.5–6 μm , ellipsoid to somewhat ovoid. Basidia 43–58 x 14–15 μm , four sterigmata, 3–4 μm long. Pleurocystidia 68–98 x 13–15.5 μm , clavate, fusiform to ventricose-rostrate, hyaline to yellow.

In 1936, Snell and Dick designated a new species *Boletinus squarrosoides*, "apparently nearest to *B. castanellus*" but distinct in its larger size, more decurrent tubes, more tufted-tomentose cap and perhaps somewhat in color of tubes and stem. Coker and Beers (1943) had suggested it should be treated as only a variety of the latter. Singer (1945) suggested *B. squarrosoides* to its synonym (*B. castanellus*). Eventually Snell and Dick (1958) accepted Singer's judgement and christened it to *Xerocomus castanellus*. From the macroscopic features view, the nomenclature of the species are complicated as above. In our two specimens collected from various places, the pileus and stem are not completely similar in either of the two. However, the microscopic features individually match with the original descriptions of *Boletinus castanellus* and *Xerocomus squarrosoides*, so we take the two specimens to be *X. castanellus*.

Habitat: Solitary under broad-leaved or bamboo forest.

Distribution: Taiwan, China (Sichuan), North America.

Specimens examined:

Taichung: Tiehphilunhsi, Sept. 30, 1994. Huang Hsin-Wen (855). Yunlin: Shihpin, May 16, 1996. Huang Hsin-Wen (1582).

3. *Xerocomus junghuhnii* (Hoehn.) Sing. Farlowia 2: 297. 1945.

Figs 3 & 9

Boletus junghuhnii Hoehn., Sitz.-ber. k. Akad. Wiss. Wien, Math. Nat. K1. 123 (I): 87. 1914.

Pileus 3 – 4.5 cm broad, convex, surface siccous, fuscous olivaceous and minutely fuscous scurfy-squamulose. Context 3 – 4 mm thick, soft, pale yellowish white, color unchanging when bruised. Tubes 2 – 4 mm thick, adnato-decurrent, yellow then olivaceous. Pores 0.5 – 1 mm broad, circular to angular, somewhat in rows towards the margin, yellow, slightly cyanescent when bruised. Stipe 4 – 7.5 cm long, 4 – 7 mm broad, cylindric and tapered toward apex with whitish mycelium around base, color palely fuscous towards the base, dull red upwards to the yellow apex, surface appressedly whitish fibrillose except the apex. Spore print palely olivaceous. Spores 9.5 – 11.5 x 5.5 – 6 μm , ellipsoid. Basidia 36 – 42 x 13 – 14.5 μm , clavate, four sterigmata, 5 – 7 μm long. Pleurocystidia 35 – 43 x 6 – 12 μm , versiform, most are fusiform or subventricose with obtuse apex, not always conspicuous. Tube trama of phylloporoid type, the hyphae 8 – 10 μm wide.

In Contrast to our findings, Hoehnel reported that the pore size was up to 2 mm wide. Besides unique characters like the fuscous scurfy-squamulose pileus and differently adorned stem, this species was found on rotten logs, well agreeing with Hoehnel and Singer.

Habitat: Solitary on rotten log under broad-leaved forest.

Distribution: Taiwan, Java, Borneo, North America.

Specimens examined:

Nantou: Shanlihsi, alt. 1750m, June 14, 1994. Chen Chien-Ming (1178).

4. *Xerocomus nigromaculatus* Hongo, Journ. Jap. Bot. Vol. 41: 170.

Figs. 4 & 10

Pileus 2 – 7 cm broad, convex to plane, margin incurved at first, surface siccous, with tomentose-granulose arranged to look alike rimose-areolate, color pallid argillaceous, nigrescent in age. Context soft, whitish to pale yellow, cyanoscent then rufescent

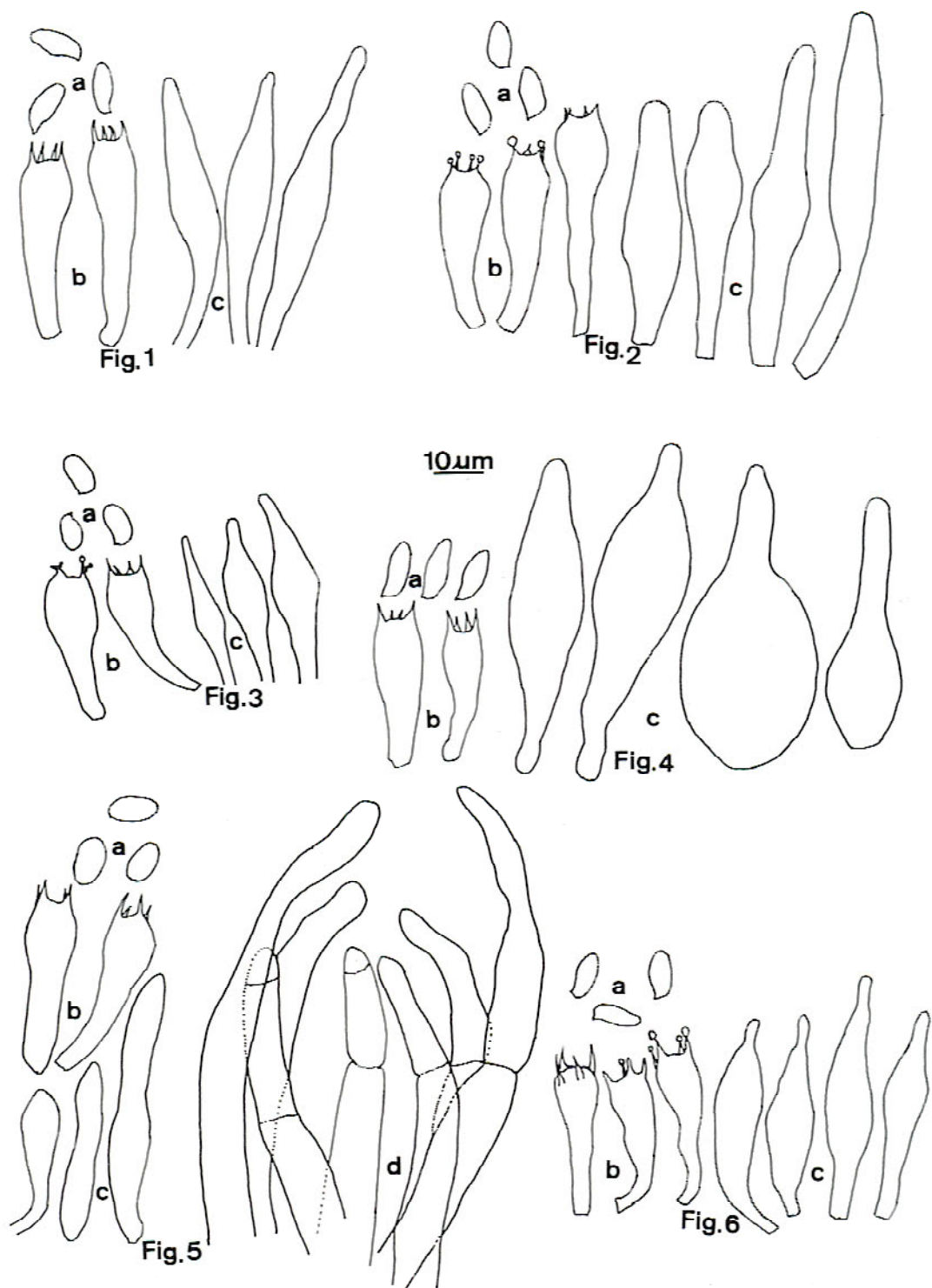


Fig. 1. *Xerocomus alutaceus*. Fig. 2. *X. castanellus*. Fig. 3. *X. junghuhnii*. Fig. 4. *X. nigromaculatus*. Fig. 5. *X. parvus*. Fig. 6. *X. pulverulentus*. a: basidiospores; b: basidia; c: pleurocystidia; d: cuticular hyphae of pileus

immediately when bruised, nigricant eventually. Stipe 2 – 5 cm long, 4 – 10 mm broad, subequal to base enlarged with whitish mycelium around base, surface concolorous with pileus, fibrillose-striate to nearly laevigate, context solid and snap easily, rufescent when cut. Tubes 5 – 12 mm long, adnato-subdecurrent, color flavous, caerulescent when cut. Pores 0.7 – 2 mm broad, rather large, angular, color flavous and cyanoscent immediately when bruised. Spore print olivaceo-brown. Spores 9 – 15 x 4 – 5.5 μm , fusiform-ellipsoid, smooth. Basidia 30 – 35 x 9 – 11 μm , clavate, sterigmata four, 5 – 7 μm long. Pleurocystidia versiform, some 63 – 92 x 16 – 23 μm , subcylindric to broadly fusiform-ventricose; the others 69 – 88 x 19 – 37 μm , ventricose-rostrate, abundant, hyaline in KOH but dingy ochraceous in NH_4OH . Clamp connection absent.

The organism can be easily recognized by the black-spotted and argillaceous pileus. Particularly, the flesh change to rufescent and nigrescent color on bruising, is a unique character in the genus of *Xerocomus*.

Habitat: Scattered under *Cryptomeria* forest.

Distribution: Taiwan, Japan.

Specimens examined:

Miaoli: Jenshan, alt. 2300m, Sept. 13, 1996. Huang Hsiu-Wen (1682).

5. *Xerocomus parvus* Ying, Act. Mycol. Sin. Suppl. 1: 311. 1986. Figs 5 & 11

Pileus 1.5 – 2.0 cm broad, plane to convex, surface siccous and velutinate, color yellow at first, then vinaceous cinnamon in age. Surface of pileus composed of subhyaline to yellowish brown hyphae, terminal cells 27 – 90 x 7.2 – 10.8 μm , cylindric, some capitulate. Hymenophore yellow, tubes adnate. Pores 0.5–1 mm broad, angular, cyanoscent when bruised. Stipes 2.5 – 3.5 cm long, 3 – 5 mm thick, dull whitish, flesh whitish when young, vinaceous in age, not cyanescent when cut. Spores 11 – 14 x 6.5 – 8 μm , smooth, fusiform-elliptical, deep honey-colored in KOH. Basidia 27 – 39 x 8.7 – 10.8 μm , clavate, sterigmata four, 6 – 7 μm long. Pleurocystidia 38 – 70.5 x 5.4 – 9 μm , subcylindric or sublanceolate, numerous, hyaline. Tube trama of phylloporoid type.

Clamp connections absent.

The yellowish basidiocarp and small spores are characteristics of this taxon. It is distinct from *X. microcarpus* Corner in having yellow basidioma, narrower spores, thinner pleurocystidia and hyphae size of pileus cuticle.

Habitat: Solitary under broad-leaved forest.

Distribution: Taiwan, China(Sichuan).

Specimens examined:

Nantou: Shanlihsi, alt. 1750m, July 27, 1994. Chen Chien-Ming (651).

6. *Xerocomus pulverulentus* (Opat.) Gilbert, Les Boletes, p.116. 1931. Figs 6 & 12

Boletus pulverulentus Opatowski, Wieg. Archiv. Naturgesch. 2: 27. 1836.

Pileus 3 – 6 cm broad, convex to plane, even with uplifted margin in age, surface siccous, dull, velutinous to subtomentose, becoming glabrous when older, viscid when wet, color dark yellow-brown to blackish brown, margin entire, decurved, becoming plane or uplifted.



Fig. 7. *Xerocomus alutaceus*. Fig. 8. *X. castanellus*. Fig. 9. *X. junghuhni*. Fig. 10. *X. nigromaculatus*. Fig. 11. *X. parvus*. Fig. 12. *X. pulverulentus*.

Context soft and spongy, up to 1 cm thick or more, color yellow but changing to blue so rapidly as to obscure original color. Tubes 6 – 10 mm long, adnate to subdecurrent, yellow but instantly blue when bruised and slowly sordid brownish. Pores 1 mm broad at maturity, angular, color yellow, bluing quickly when bruised. Stipe 4 – 7 cm long, 1 – 2 cm thick, equal or nearly so, solid, bright yellow at the apex, changing to reddish brown and pubescent below, context yellow instantly turning blue when cut, surface of apex pruinose, not truly reticulate but often with raised lines, base blacking brown from handling. Spore print dark olivaceous to olive-brown. Spores 14 – 17.5 x 4 – 6.5 μm , fusiform-ellipsoid with blunt-ended or truncate. Basidia 28 – 45 x 10 – 11.5 μm , clavate, four sterigmata, 5 – 7 μm long. Pleurocystidia 45 – 70 x 10 – 16 μm , fusoid to clavate with elongated tapering apices, abundant, yellowish in KOH. Tube trama divergent from mediostratum which stains brown in KOH, hyphae 3 – 5 μm wide.

The species is intermediate between *Boletus subtomentosus* and *B. badius* but with many features not present in either of the two, such as the blackish brown pileus, the quick change to blue, the relatively broad pores and the dextrinoid context of pleurocystidia in Melzer's reagent.

Habitat: Scattered or solitary under broad-leaved forest.

Distribution: Taiwan, North America, Europe.

Specimens examined:

Nantou: Sun Moon Lake, alt. 850m, Sept. 8, 1994. Huang Hsiu-Wen (799). Taichung: Paikoutashan, alt. 1000m, July 5, 1995. Huang Hsiu-Wen (1267). Nantou: Shanlihsi, alt. 1750m, June 17, 1997. Chen Chien-Ming (1804).

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臺灣之網孔蕈類(八)

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摘 要

本文報導在臺灣發現的六種絨蓋牛肝菌屬新紀錄種，分別是淡棕絨蓋牛肝菌 (*Xerocomus alutaceus* (Morgan in Peck) Dick & Snell)、栗色絨蓋牛肝菌 (*Xerocomus castanellus* (Pk.) Snell & Dick)、爪哇絨蓋牛肝菌 (*Xerocomus junghuhnii* (Hoehn.) Sing.)、黑斑絨蓋牛肝菌 (*Xerocomus nigromaculatus* Hongo)、小絨蓋牛肝菌 (*Xerocomus parvus* Ying) 及粉被絨蓋牛肝菌 (*Xerocomus pulverulentus* (Opat.) Gilbert).

關鍵詞：絨蓋牛肝菌屬、台灣。

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