

---

## A new cyanescent species of *Gyroporus* from China

---

Tai-Hui Li<sup>1,3\*</sup>, Wang-Qiu Deng<sup>2</sup> and Bin Song<sup>1,3</sup>

<sup>1</sup>Guangdong Institute of Microbiology, Guangzhou 510070, PR China

<sup>2</sup>South China Institute of Botany, Academia Sinica, Guangzhou 510650, PR China

<sup>3</sup>Systematic Mycology & Lichenology Laboratory, Institute of Microbiology, Academia Sinica, Beijing 100080, PR China

Li, T.H., Deng, W.Q. and Song, B. (2003). A new cyanescent species of *Gyroporus* from China. *Fungal Diversity* 12: 123-127.

A new bolete species discovered from Guangdong Province of China, *Gyroporus brunneofloccosus*, is formally described and illustrated. Type (HMIGD 4920) is deposited in the Herbarium of Guangdong Institute of Microbiology (HMIGD), Guangzhou.

**Key words:** basidiomycetes, Boletales, *Gyroporus brunneofloccosus*.

### Introduction

More than 30 species and varieties of *Gyroporus* have been described, including 7 reported taxa occurring in China (Chiu, 1957; Tai, 1979; Ying and Zang, 1994; Li and Song, 2000). Among these, *G. cyanescens* (Bull: Fr.) Quél. is one of the most common species. Recently, the authors re-examined some of the Chinese materials and discovered many collections previously labeled as '*Gyroporus cyanescens*' are not completely identical to that European taxon and other known taxa. A new species is therefore proposed as follows. The colour description is according to Kornerup and Wanscher (1978).

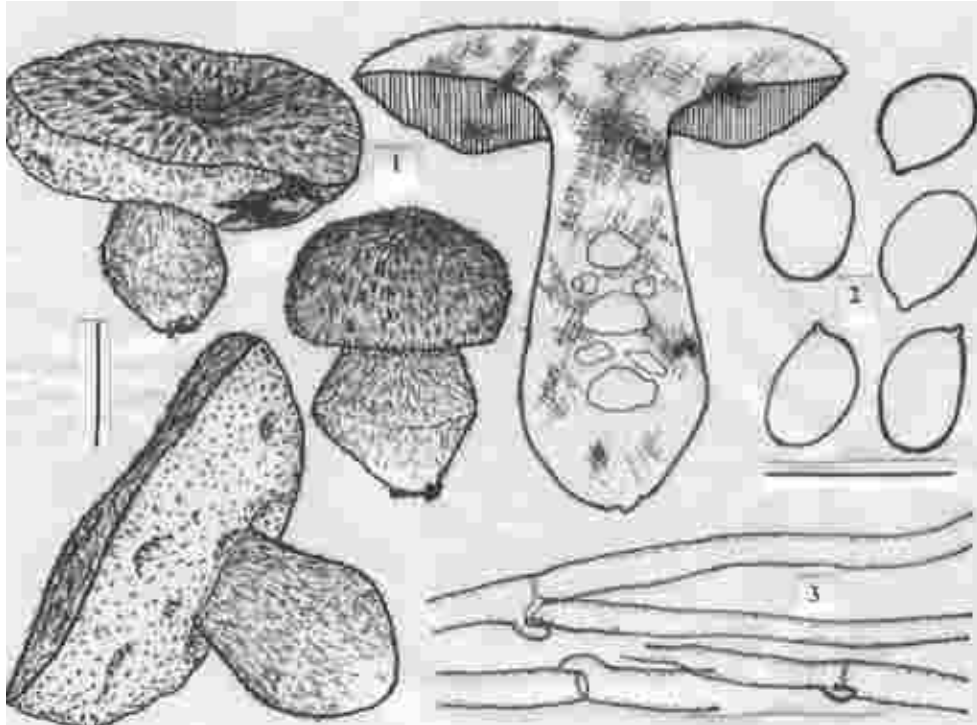
***Gyroporus brunneofloccosus* T.H. Li, W.Q. Deng & B. Song, sp. nov.**

(Figs. 1-3)

*Pileus* (3.5-)5-8 cm latus, juvenili hemisphericus vel convexus, deinde plano-convexus vel planus, brunneolo-aurantiacus vel dilute brunneus, siccus, fibrillosus, floccoso-squamulosus, crinitus vel villosus. *Contextus* albus, tactu viride caerulescens, odor et sapor indistinctus. *Tubuli* ad 3-8 mm longi, adnati, breviter subdecurrentes vel depressi ad stipitem, flavido-albidis, caerulescens, separabiles; pori concolores, tactu viride caerulescens, 1-2 per mm, subangulares vel angulares. *Stipes* fusioideus vel obclavatus, 3-5(-7) cm longus, 1-2 cm crassus apice, saepe amplificatus centro vel ad basem, subtomentosus, subpruinosis vel minute furfuraceus, impolitus, haud reticulatus, concolor cum pileo, apice paulum dilutior; plerumque obscure fibrilloso-annulatus, tomentosus vel fibrillosus, juvenili floccoso-squamulosus, crinitus vel villosus deorsum, vetero cavus. *Basidiosporae* 5-8.5(-9.5) × 4-5.3(-6)µm, late ellipsoideae,

---

\* Corresponding author: T.H. Li; e-mail: lith@gis.sti.gd.cn



**Figs. 1-3.** *Gyroporus brunneofloccosus*. 1. Basidiocarps. 2. Basidiospores. 3. Clamp connections. Bar: 1 = 2 cm; 2 = 10  $\mu$ m; 3 = 50  $\mu$ m.

laeves, hyalinae vel flavidae. *Basidia* 20-30  $\times$  8-10.5  $\mu$ m, clavata. *Cheilocystidia* 30-40  $\times$  8-10  $\mu$ m, abunda, clavata. *Pleurocystidia* haud observabiles. *Trama hymenophori* subparallela vel leviter divergens. *Pileipellis* trichodermio cum hyphis brunneis, elementis terminalibus ad 90-160  $\mu$ m longis, 7.5-12  $\mu$ m latis. *Hyphae* fibulatis.

*Pileus* (3.5-)5-8 cm broad, hemispherical, convex to plane, brownish-orange to light brown, i.e. caramel-brown (6C6), sahara-brown (6D5) to cinnamon (6D6), dry, not viscid, pileus and stipe fibrillose, floccose-scaly to coarsely tomentose, with long hairs or villose. *Flesh* white, becoming light turquoise (24A3, 24A4) at first, then to dark turquoise (24F8) or dark blue (23F8) when exposed, odour and taste not distinctive, 6-10 mm thick at stipe. *Tubes* up to 3-8 mm deep, yellowish-white (4A2) to light yellow (4A4), cyanescent, adnate to short decurrent or depressed around the stipe, separable from the flesh; pores yellowish-white (4A2) to light yellow (4A4), 1-2 per mm, subangular to angular, becoming light turquoise (24A3, 24A4) at first, then to dark turquoise (24F8) or dark blue (23F8) where injured. *Stipe* central, 3-5(-7) cm long, 1-2 cm thick at apex, stout and usually enlarged at the middle portion or near the base, fusoid to obclavate, usually with an obscure fibrillose ring around the thickest portion, concolourous with pileus, tomentose to appressed-

**Table 1.** Comparison of the new species and its similar taxa.

Species or variety	<i>G. brunneofloccosus</i>	<i>G. cyanescens</i> var. <i>cyanescens</i>	<i>G. cyanescens</i> var. <i>violaceotinctus</i>	<i>G. phaeocyanescens</i>
Pileus characters	(3.5-)5-8 cm, caramel brown, sahara brown to cinnamon, fibrillose, floccose-scaly to coarsely tomentose, with long hairs or villose	About 5.1- 12.7 cm (2-5 unc), pale, straw-coloured, subfuliginous, velvety scaly, fibrillose to coarsely velvety	4-12 cm, pale straw coloured, appressed fibrillose, fibrils and squamules cinnamon-buff to clay coloured	Up to 4.5 cm, fulvous to snuff brown, fibrillose-rough, tomentose
Discolouration	Becoming light turquoise at first, then to dark turquoise or dark blue	Becoming blue green, dark blue or cyanescent	Immediately to dark licaceous, then indigo, finally deep blue	Blueing to indigo, lack of intermediate violet discolouration
Basidiospores ( $\mu\text{m}$ )	5-8.5(-9.5) $\times$ 4-5.3(-6); L/W* $\approx$ 1.45	(7-)9-11 $\times$ 4.5-6; L/W $\approx$ 1.8-1.9	8-10 $\times$ 5-6; L/W $\approx$ 1.64	9.3-14.7 $\times$ 5.3-6.7; L/W $\approx$ 2
Type locality	Asia (China)	Europe (France)	N. America (USA)	S. America (Guatemala)
Data cited from	Present paper	Fries (1821); Watling (1970)	Watling (1969); Smith and Thiers (1971)	Singer <i>et al.</i> (1983); Both (1993)

\* L/W: rough mean ratio of length to width of the basidiospores.

fibrillose, floccose-scaly when young especially in lower part, not reticulate, fleshy, cavernous-hollow when mature, blueing when cut. *Basidiospores* 5-8.5(-9.5)  $\times$  4-5.3(-6)  $\mu\text{m}$ , broadly ellipsoid, smooth, yellowish. *Basidia* 20-30  $\times$  8-10.5  $\mu\text{m}$ , clavate, 4-spored. *Cheilocystidia* 30-40  $\times$  8-10  $\mu\text{m}$  abundant, clavate. *Pleurocystidia* not observed. *Hymenophoral trama* subparallel to slightly divergent, yellowish. *Pileipellis* a trichodermium with tufts of radially parallel brown hyphae, terminal elements tubular, up to 90-160  $\mu\text{m}$  long, 7.5-12  $\mu\text{m}$  wide. *Clamp connections* regularly present.

*Material examined:* CHINA, Guangdong Province Dinghu Shan Nature Reserve, scattered, gregarious to subcaespitose on soil under mixed forests or pine forests, near *Pinus massoniana*, 5 September 1980, C. Li (Herbarium of Guangdong Institute of Microbiology (HMIGD) 4588); 16 May 1981, C. Li and J.Q. Liang (HMIGD 4920, **holotype designated here**); July-August 1981, J.Q. Liang (HMIGD 4925); 7 July 1982, Y.Z. Wang and J.Q. Liang (HMIGD 5673); 31 August 1984, T.H. Li and Z.S. Bi (HMIGD 7781); 23 May 1987, T.H. Li and Z.S. Bi (HMIGD 11771); 28 July 1995, T.H. Li (HMIGD 1978); 8 September 1983, M.Z. Lian (HMIGD 20357); 29 June 1983, Lian M.Z. (HMIGD 20358); 16 May 2001, T.H. Li (HMIGD 20388).

*Notes:* The new species is undoubtedly similar to *G. cyanescens* in discolouration and some other aspects, and many collections cited herewith were originally identified as the latter (Bi *et al.*, 1993). When comparing the specimens of the two taxa, however, the first author discovered that they are obviously different in colour. The colour of the European taxon is variable to a certain extent, but it is generally much paler with a pale yellowish-white, straw-coloured to subfuliginous pileus (Fries, 1821; Watling, 1970; Alessio, 1985). Macroscopically it is most close to the variety *G. cyanescens* var. *violaceotinctus* Watling with a similar fibrillose pileus, but the latter becomes instantly indigoblue (Watling, 1969; Smith and Thiers, 1971). The dark blueing discolouration is perhaps also similar to that of *G. phaeocyanescens* Sing. & Ivory (Singer *et al.*, 1983; Both, 1993), but the basidiospores are clearly different in shape and size. Microscopically the basidiospores from all the examined collections of the new species are constantly smaller than those of the other three taxa mentioned above.

### Acknowledgements

The authors are sincerely grateful to R. Watling for providing his facilities, assistance and the European materials to the first author for the studies when the latter studied in UK. Thanks are also to Z.L. Yang of Kunming Institute of Botany, Academia Sinica, for his kind discussion with the authors on the new species. The project was supported by the National Natural Science Foundation of China (No.30270010), the National Ministry of Personnel of China, the Natural Science Foundation of Guangdong (No.990016) and Guangdong Key Laboratory of Microbial Culture Collection and Application.

### References

- Alessio, C.L. (1985). *Boletus* Dill ex L. (*sensu lato*). Koeltz Scientific Books. Germany.
- Bi, Z.S., Zheng, G.Y., Li, T.H. and Wang, Y.Z. (1993). *The Macrofungus Flora of China's Guangdong Province. Hongkong*. The Chinese University Press, Hong Kong.
- Both, E.E. (1993). *The Boletes of North America*. Buffalo Museum of Science, New York, USA.
- Chiu, W.F. (1957). *Atlas of the Yunnan Boletes*. Beijing: Science Press, PR China. [Chinese]
- Fries, E. (1821). *Systema Mycologicum*. Lundae. I.
- Kornerup, A. and Wanscher, J.H. (1978). *Methuen Handbook of Colour*. London: Eyre Methuen, UK.
- Li, T.H. and Song, B. (2000). Chinese boletes: A comparison of boreal and tropical elements. In: *Tropical Mycology 2000* (ed. A.J.S. Walley). The Millenium Meeting on Tropical Mycology, Main Meeting 2000. British Mycological Society. Liverpool: Liverpool John Moores University, UK: 4.
- Singer, R., Araujo, I. and Ivory, M.H. (1983). Ectotrophically mycorrhizal fungi of the neotropical lowlands, especially central Amazonia. J. Cramer, Germany.
- Smith, A.H. and Thiers H.D. (1971). *The Boletes of Michigan*. Michigan: The University of Michigan Press, USA.

## Fungal Diversity

- Tai, F.L. (1979). *Sylloge Fungorum Sincorum*. Beijing: Science Press, PR China.
- Watling, R. (1969). New fungi from Michigan. *Notes Royal Botanical Garden, Edinburgh* 29: 59-66.
- Watling, R. (1970). *British Fungus Flora - Agarics and Boleti, I: Boletaceae, Gomphidiaceae, Paxillaceae*. Edinburgh: Her Majesty's Stationery Office, UK.
- Ying, J.Z. and Zang, M. (1994). *Economic Macrofungi from Southwestern China*. Beijing: Science Press, PR China.

(Received 20 June 2002; accepted 17 October 2002)