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## Two new species of *Ceriporia* (Basidiomycota, Polyporales) with a key to the accepted species in China

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**ABSTRACT** — Two new polypores, *Ceriporia inflata* and *C. jiangxiensis* spp. nov. are described from China: *C. inflata* is characterized by large pores (2–3 per mm), cylindrical to oblong-ellipsoid basidiospores ( $4.7\text{--}5.2 \times 2\text{--}2.4 \mu\text{m}$ ), and hyphae that swell in KOH; *C. jiangxiensis* has ellipsoid, cylindrical to oblong-ellipsoid basidiospores ( $4.8\text{--}5.8 \times 2.1\text{--}2.7 \mu\text{m}$ ), mycelioid cystidia, and distinctly thick-walled subicular hyphae. A key to accepted species of *Ceriporia* in China is provided.

**KEY WORDS** — wood-inhabiting fungi, *Phanerochaetaceae*, taxonomy

### Introduction

The principal characteristics of *Ceriporia* Donk, described by Donk (1933), are resupinate basidiocarps, an annual growth habit, a monomitic hyphal system with simple septate generative hyphae, and thin-walled, smooth, and cylindrical, oblong-ellipsoid or allantoid basidiospores (Núñez & Ryvarden 2001; Pieri & Rivoire 1997). Of the 32 *Ceriporia* species accepted worldwide (Aime et al. 2007; Bernicchia & Niemelä 1998; Buchanan & Ryvarden 1988; Dai et al. 2002; Gilbertson & Hemmes 2004; Jia & Cui 2011; Læssøe & Ryvarden 2010; Lindblad & Ryvarden 1999; Mata & Ryvarden 2010; Pieri & Rivoire 1997; Rajchenberg 2000; Ryvarden & Iturriaga 2003; Suhara et al. 2003), 16 have been recorded in China (Cui & Jia 2011; Cui et al. 2008; Dai 2012; Dai et al. 2002, 2003, 2004, 2007a,b, 2009, 2011; Dai & Penttilä 2006; Jia & Cui 2011; Li et al. 2007, 2008; Wang et al. 2009, 2011; Yuan & Dai 2008; Yuan et al. 2006).

During a taxonomic study on *Ceriporia* in China, two species new to science were found that are described and illustrated here. An identification key to *Ceriporia* species in China based on Chinese material is provided.

### Materials & methods

The studied specimens were deposited in herbaria as cited below. The microscopic procedure follows Dai (2010). Sections were studied at magnification up to  $\times 1000$  using

a Nikon Eclipse 80i microscope and phase contrast illumination. Drawings were made with the aid of a drawing tube. To present spore size variation, the 5% of measurements excluded from each end of the range are given in parentheses. Length of the basidiospore spines is not included in the measurements. Abbreviations include IKI = Melzer's reagent, IKI- = negative in Melzer's reagent, KOH = 10% potassium hydroxide, CB = Cotton Blue, CB+ = cyanophilous, CB- = acyanophilous, L = mean spore length (arithmetic average of all spores), W = mean spore width (arithmetic average of all spores), Q = variation in the L/W ratios between the specimens studied, and n = number of spores measured from a given number of specimens. Special color terms follow Petersen (1996).

### Taxonomy

*Ceriporia inflata* B.S. Jia & B.K. Cui, sp. nov.

FIG. 1

MYCOBANK MB 800809

Differs from other *Ceriporia* species by its large pores and hyphae that become swollen in KOH.

TYPE: China, Hainan Province, Qiongzong County, Limushan Forest Park, on rotten angiosperm wood, 24.V.2008, Dai 9587 (holotype, BJFC).

ETYMOLOGY: *inflata* (Lat.): referring to hyphae becoming swollen in KOH.

FRUITBODY — Basidiocarps annual, resupinate, corky to brittle when dry, up to 13 cm long, 7 cm wide, and 3 mm thick at center. Pore surface white to cream when fresh, become buff, cinnamon-buff to clay-buff when dry; pores angular to irregular, 2–3 per mm; dissepiment thin, lacerate. Margin distinct, cream, thinning out, up to 0.8 mm, sometimes pores extend to the very edge, flocculent. Subiculum cream, corky when dry, up to 1 mm thick. Tubes concolorous with pore surface, brittle when dry, up to 2 mm thick.

HYPHAL STRUCTURE — Hyphal system monomitic; generative hyphae with simple septa, IKI-, CB+, swollen in KOH.

CONTEXT — Generative hyphae hyaline, thick-walled with a wide lumen, frequently branched at right angle, with frequent simple septa, more or less constricted at septa, interwoven, usually covered by small pale yellowish crystals, 4–8 µm in diam.

TUBES — Tramal hyphae hyaline, thin- to slightly thick-walled, frequently branched, with frequent simple septa, sometimes constricted at septa, subparallel along the tubes, covered by abundant tiny hyaline to pale yellowish crystals, 3.8–5 µm in diam; cystidia and cystidioles absent; basidia clavate, with four sterigmata and a basal simple septum, 12.9–19 × 3.8–4.2 µm; basidioles in shape similar to basidia, but smaller.

SPORES — Basidiospores allantoid to cylindrical, hyaline, thin-walled, smooth, some slightly curved, IKI-, CB-, (4.5–)4.7–5.2(–5.3) × 2–2.4(–2.5) µm, L = 4.93 µm, W = 2.15 µm, Q = 2.29 (n = 30/1).

TYPE OF ROT — White rot.

ADDITIONAL SPECIMEN EXAMINED — CHINA, JIANGXI PROVINCE, FENYI COUNTY, Dagang Mountain, on fallen trunk of *Alnus*, 17.IX.2008 Dai 10376 (BJFC).

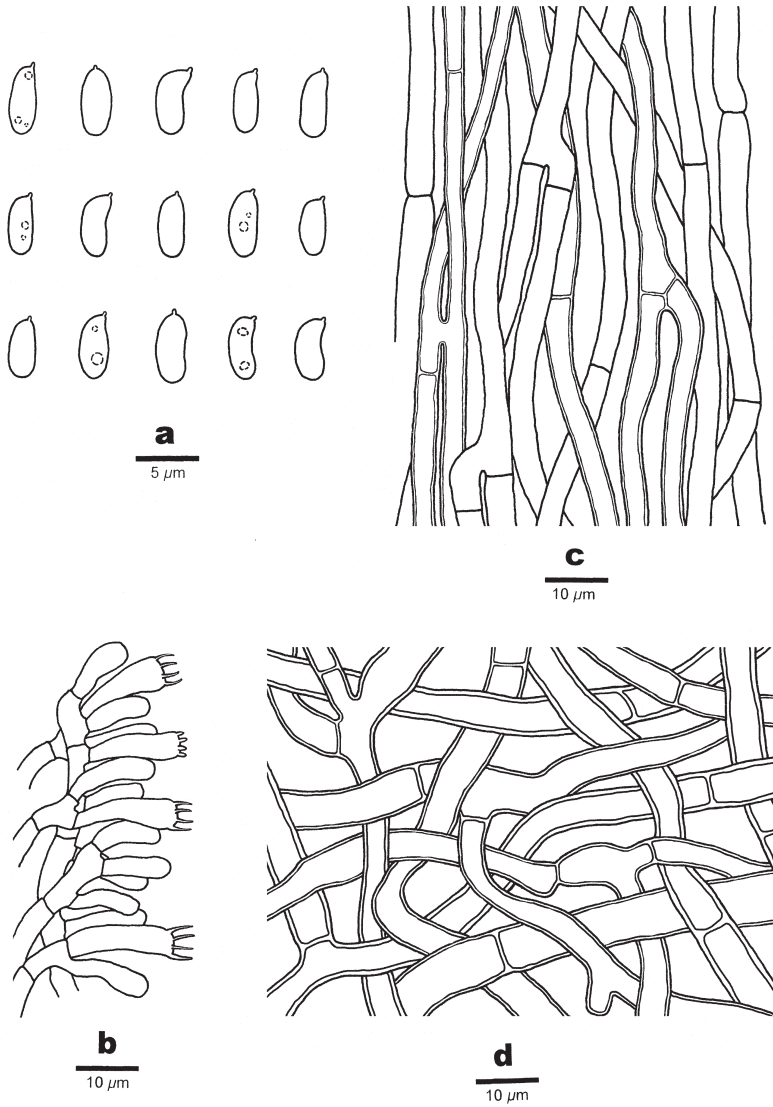


FIG. 1. *Ceriporia inflata* (holotype), microscopic structures.

a: Basidiospores. b: A section of hymenium. c: Hyphae from trama. d: Hyphae from subiculum.

REMARKS — *Ceriporia albobrunnea* Ryvarden & Iturr., recently described from Venezuela by Ryvarden & Iturriaga (2003), resembles *C. inflata* in similar pores (2–3 per mm, from the type) and basidiospores [4–5.1(–5.4) × (1.7–)1.9–2.2

(–2.4)  $\mu\text{m}$ ,  $L = 4.6 \mu\text{m}$ ,  $W = 2.05 \mu\text{m}$ ,  $Q = 2.24$  ( $n = 30/1$ ), from the type)], but in *C. albobrunnea* tramal and subicular hyphae are very similar, while in *C. inflata* subicular hyphae are distinctly thick-walled and tramal hyphae are thin-walled. In addition, hyphae do not become swollen in KOH and dissepiments are thick and entire in *C. albobrunnea*, contrasting with hyphae that swell in KOH and thin lacerate dissepiments in *C. inflata*.

*Ceriporia davidii* (D.A. Reid) M. Pieri & B. Rivoire from France (Pieri & Rivoire 1997), has a similar hyphal but is differentiated from *C. inflata* by wider basidiospores [(4.2–)4.6–6(–6.5)  $\times$  (2–)2.2–2.9(–3)  $\mu\text{m}$ ,  $L = 5.08 \mu\text{m}$ ,  $W = 2.58 \mu\text{m}$ ,  $Q = 1.97$  ( $n = 30/1$ , measured from the type)] that taper towards the apiculus and hyphae that do not swell in KOH.

***Ceriporia jiangxiensis*** B.S. Jia & B.K. Cui, sp. nov.

FIG. 2

MYCOBANK MB 800810

Differs from other *Ceriporia* species by its variably shaped basidiospores, presence of cystidia, distinctly thick-walled subicular hyphae, and occasional clamp connections.

TYPE: China, Jiangxi Province, Fenyi County, Dagang Mountain, on fallen angiosperm trunk, 21.IX.2009, Cui 7712 (holotype, BJFC).

ETYMOLOGY: *jiangxiensis* (Lat.): referring to the local province name of Jiangxi.

**FRUITBODY** — Basidiocarps annual, resupinate, brittle when dry, up to 8 cm long, 6 cm wide, and 2 mm thick. Pore surface cream, buff, cinnamon-buff when dry; pores angular to irregular, 3–4 per mm; dissepiment thin, entire to lacerate. Margin distinct, cream, cottony, up to 1.6 mm wide. Subiculum cream, corky when dry, up to 0.5 mm thick. Tubes concolorous with pore surface, brittle when dry, up to 1.5 mm thick.

**HYPHAL STRUCTURE** — Hyphal system monomitic; generative hyphae mostly with simple septa but rarely bearing clamp connections, IKI–, CB+, tissues unchanged in KOH.

**CONTEXT** — Generative hyphae hyaline, distinctly thick-walled with a wide lumen, frequently branched at right angle, interwoven, usually covered by fine hyaline to pale yellowish crystals, 3.5–10  $\mu\text{m}$  in diam.

**TUBES** — Tramal hyphae hyaline, thin- to slightly thick-walled, frequently branched, interwoven, covered by abundant hyaline to pale yellowish crystals, 2.5–4.5  $\mu\text{m}$  in diam; cystidia present, mycelioid, hyaline, thin-walled, 46–61.5  $\times$  4–6  $\mu\text{m}$ ; basidia clavate, with four sterigmata and a basal simple septum, 11–22.2  $\times$  3.6–5  $\mu\text{m}$ ; basidioles in shape similar to basidia, but slightly smaller.

**SPORES** — Basidiospores variable in shape, allantoid, ellipsoid, cylindrical to oblong-ellipsoid, hyaline, thin-walled, smooth, IKI–, CB–, sometimes bearing one or two small guttules, (4.7–)4.8–5.8(–5.9)  $\times$  (2–)2.1–2.7(–2.8)  $\mu\text{m}$ ,  $L = 5.24 \mu\text{m}$ ,  $W = 2.35 \mu\text{m}$ ,  $Q = 2.23$  ( $n = 30/1$ ).

**TYPE OF ROT** — White rot.

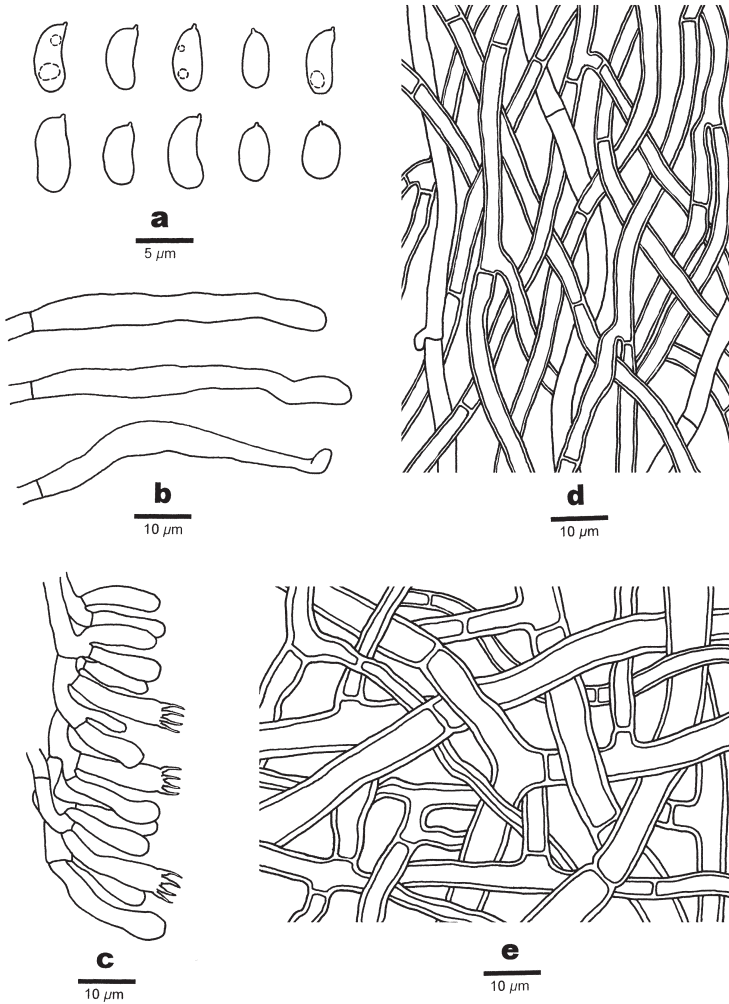


FIG. 1. *Ceriporia inflata* (holotype), microscopic structures.  
a: Basidiospores. b: Cystidia. c: A section of hymenium.  
d: Hyphae from trama. e: Hyphae from subiculum.

REMARKS — Macroscopically, *Ceriporia jiangxiensis* is similar to *C. lacerata* N. Maek. et al., which differs in having broadly ellipsoid spores [ $4.25\text{--}5 \times 2.5\text{--}2.75 \mu\text{m}$  (av.  $4.5 \pm 0.3 \times 2.6 \pm 0.1 \mu\text{m}$ ,  $n = 20$ )] and lacking cystidia (Suhara et al. 2003).

*Ceriporia camaresiana* (Bourdot & Galzin) Bondartsev & Singer has similar basidiospores (5.5–6 × 2.3–2.8 µm) but is distinguished from *C. jiangxiensis* by larger pores (1–3 per mm), thin-walled subicular hyphae, and an absence of cystidia (Pieri & Rivoire 1997).

*Ceriporia alba* M. Pieri & B. Rivoire from France (Pieri & Rivoire 1997) shares similar pores (3–4 per mm) and cream-colored pore surface with *C. jiangxiensis*, but its holotype has longer basidiospores [(5.1–)5.2–6.3 × 2–2.8 µm, L = 5.84 µm, W = 2.35 µm, Q = 2.49 (n = 30/1)], thin- to slightly thick-walled subicular hyphae, and no cystidia.

OTHER SPECIMENS EXAMINED: *Ceriporia alba*. FRANCE, VERNAI, In arboretis, Forêt de la Joux, Jura, Gallia. Ad lignum angiospermarum, 26.V.1995, Rivoire 1078 (TYPE, LY).

*C. albobrunnea*. VENEZUELA, ESTADO BOLIVAR, Sifontes, Tumerermo, Carretera Tumerermo Bochínche Camp. Maderero de Lut., on hardwood. 17.XI.1994, Ryvar den 35238 (TYPE, O).

*C. davidii*. FRANCE, ORLIENAS. 3.I.2007, Rivoire 3052 (TYPE, LY).

#### Key to species of *Ceriporia* in China

1. Hyphal system dimitic ..... *C. totara* (G. Cunn.) P.K. Buchanan & Ryvar den
1. Hyphal system monomitic ..... 2
2. Hyphae swollen in KOH ..... *C. inflata*
2. Hyphae unchanged in KOH ..... 3
3. Cystidia present ..... 4
3. Cystidia absent ..... 7
4. Pores 1–2 per mm ..... *C. mellea* (Berk. & Broome) Ryvar den
4. Pores 3–5 per mm ..... 5
5. Spores >2 µm wide ..... *C. jiangxiensis*
5. Spores <2 µm wide ..... 6
6. Pores pinkish buff when dry; spores oblong-ellipsoid, <5 µm long  
..... *C. nanlingensis* B.K. Cui & B.S. Jia
6. Pores dark brown when dry; spores allantoid, >5 µm long. .... *C. purpurea* (Fr.) Donk
7. Spores >8 µm long. .... *C. reticulata* (Hoffm.) Domański
7. Spores <8 µm long. .... 8
8. Spores >2.5 µm wide ..... 9
8. Spores <2.5 µm wide ..... 10
9. Spores ellipsoid to broadly ellipsoid, tramal hyphae parallel ..... *C. lacerata*
9. Spores cylindrical to allantoid, tramal hyphae interwoven ..... *C. camaresiana*
10. Spores allantoid ..... 11
10. Spores ellipsoid to cylindrical, or cylindrical but a little curved ..... 13
11. Spores narrowly allantoid, not tapering. .... *C. spissa* (Schwein.) Rajchenb.
11. Spores allantoid, tapering towards apiculus ..... 12

12. Pores cream, cinnamon, orange, green, 3–6 per mm;  
spores mostly >4 µm long ..... *C. viridans* (Berk. & Broome) Donk
12. Pores salmon, clay-pink to brownish vinaceous, 5–8 per mm;  
spores mostly <4 µm long . . . *C. aurantiocarnescens* (Henn.) M. Pieri & B. Rivoire
13. Spores cylindrical, a little curved, mostly >4 µm long . . . . . 14
13. Spores ellipsoid to cylindrical, not curved, mostly <4 µm long . . . . . 15
14. Pores rose-pink when fresh; tramal hyphae fairly thick-walled, frequently  
branched . . . . . *C. tarda* (Berk.) Ginns
14. Pores cream when fresh; tramal hyphae thin-walled, rarely branched . . . . *C. davidii*
15. Pores sulphur; spores ellipsoid . . . . . *C. sulphuricolor* Bernicchia & Niemelä
15. Pores cream, orange or purple; spores cylindrical to oblong-ellipsoid . . . . . 16
16. Pores orange or purple when fresh, 2–3 per mm; subicular hyphae mostly >6 µm in  
diam . . . . . *C. excelsa* (S. Lundell) Parmasto
16. Pores cream when fresh, 3–6 per mm; subicular hyphae <6 µm in diam . . . . . 17
17. Pores 3–4 per mm; tramal hyphae distinctly thick-walled, interwoven  
. . . . . *C. crassitunicata* Y.C. Dai & Sheng H. Wu
17. Pores 4–6 per mm; tramal hyphae thin- to fairly thick-walled, parallel  
. . . . . *C. alachuana* (Murrill) Hallenb.

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