

***Ceriporia amazonica* (Phanerochaetaceae, Basidiomycota), a new species from the Brazilian Amazonia, and *C. albobrunnea*, a new record to Brazil**

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Abstract

Ceriporia amazonica sp. nov. is described and illustrated from a basidioma collected in northern Brazilian Amazonia. It is characterized by a salmon pore surface when fresh and by basidiospores that are among the smallest in the genus. In addition, *C. albobrunnea* is reported as new to Brazil and a key to the species of *Ceriporia* recorded in the Neotropics is updated.

Key words: Agaricomycetes, diversity, Polyporales, taxonomy

Introduction

Ceriporia was described by Donk (1933) to accommodate white-rot species with resupinate basidiomata, poroid hymenial surface, inamyloid basidiospores, and a monomitic hyphal system with hyaline, simple-septate or sometimes clamped generative hyphae. The latter character separates it from *Ceriporiopsis*, where clamps are present on the generative hyphae as a rule (Ryvarden 1991, Ryvarden & Gilbertson 1993).

Microscopical examinations are the basis of most taxonomical *Ceriporia* studies (Gilbertson & Ryvarden 1986, Ryvarden & Iturriaga 2003). Only a few phylogenetic studies based on molecular markers have been performed as a supplement to classical taxonomical studies. The genus was at first considered monophyletic (Kim & Jung 1999), but it was recently shown that it is polyphyletic and that the presence or absence of cystidia is not considered a phylogenetic character in delimiting its species (Jia *et al.* 2014).

The genus is cosmopolitan and its species have been recorded worldwide. It currently includes almost 40 species (Jia *et al.* 2014), out of which 18 have been recorded from the Neotropics (Ryvarden & Iturriaga 2003, Coelho *et al.* 2005, Aime *et al.* 2007, Mata & Ryvarden 2010, Gomes-Silva *et al.* 2012). Only seven have been recorded from Brazil, two of which were from the Brazilian Amazonia (Gugliotta *et al.* 2013). In this study, we describe and illustrate *Ceriporia amazonica* sp. nov. In addition, *C. albobrunnea* is reported as new to Brazil and a key to neotropical species of *Ceriporia* is updated.

Material and methods

Collecting was undertaken in the Floresta Nacional do Amapá (00° 57' 49.8" N and 51° 36' 31.3" W), located in the northern Brazilian Amazonia, in the state of Amapá, in the municipalities of Porto Grande, Ferreira Gomes, and Pracuúba. The reserve is an area of 412.000 ha covered by ombrophilous dense rain forest (Pereira *et al.* 2007).

The basidiomata were analyzed according to standard methods (see Ryvarden 1991), while microscopic observations were made by examining free-hand sections of hymenia mounted in either 5% (w/v) KOH solution plus 1% (w/v) phloxine solution or Melzer's reagent (Ryvarden 1991). Color designation followed Watling (1969). Specimens were deposited in the João Murça Pires (MG) of Museu Paraense Emílio Goeldi, and the herbarium of Oslo (O).

Taxonomy

Ceriporia amazonica Soares, Sotão & Ryvarden, sp. nov. (Fig. 1: A–C)

Mycobank no.: MB 808528

This species differs from the other *Ceriporia* species by its combination of salmon basidioma, large angular pores (1–3 per mm) and small ellipsoid spores.

Holotype:—BRAZIL. Amapá: Amapá National Forest, December 2009, leg. H. Sotão 2009-278 (MG 203521, isotype in O).

Etymology:—the name refers to the region where the specimen was collected.

Basidioma annual, resupinate; pore surface salmon (45) to peach (46) colored when fresh and snuff brown (17) when dry, fading to yellowish brown, pores shallow, angular to honeycomb in a reticulate pattern, 1–3 per mm, margin narrow, concolorous with pore surface, tube layer up to 0.5 mm deep, drying brittle, subiculum thin, up to 300 µm thick, soft, white. Hyphal system monomitic, generative hyphae simple-septate, thin-walled, 2–5 µm in diam. Cystidia or other sterile hymenial elements absent. Basidia not seen. Basidiospores ellipsoid, 3×2 µm, negative in Melzer's reagent.

Distribution:—Known only from the type locality in state of Amapá, Brazil.

Ecology:—On a dead, fallen hardwood.

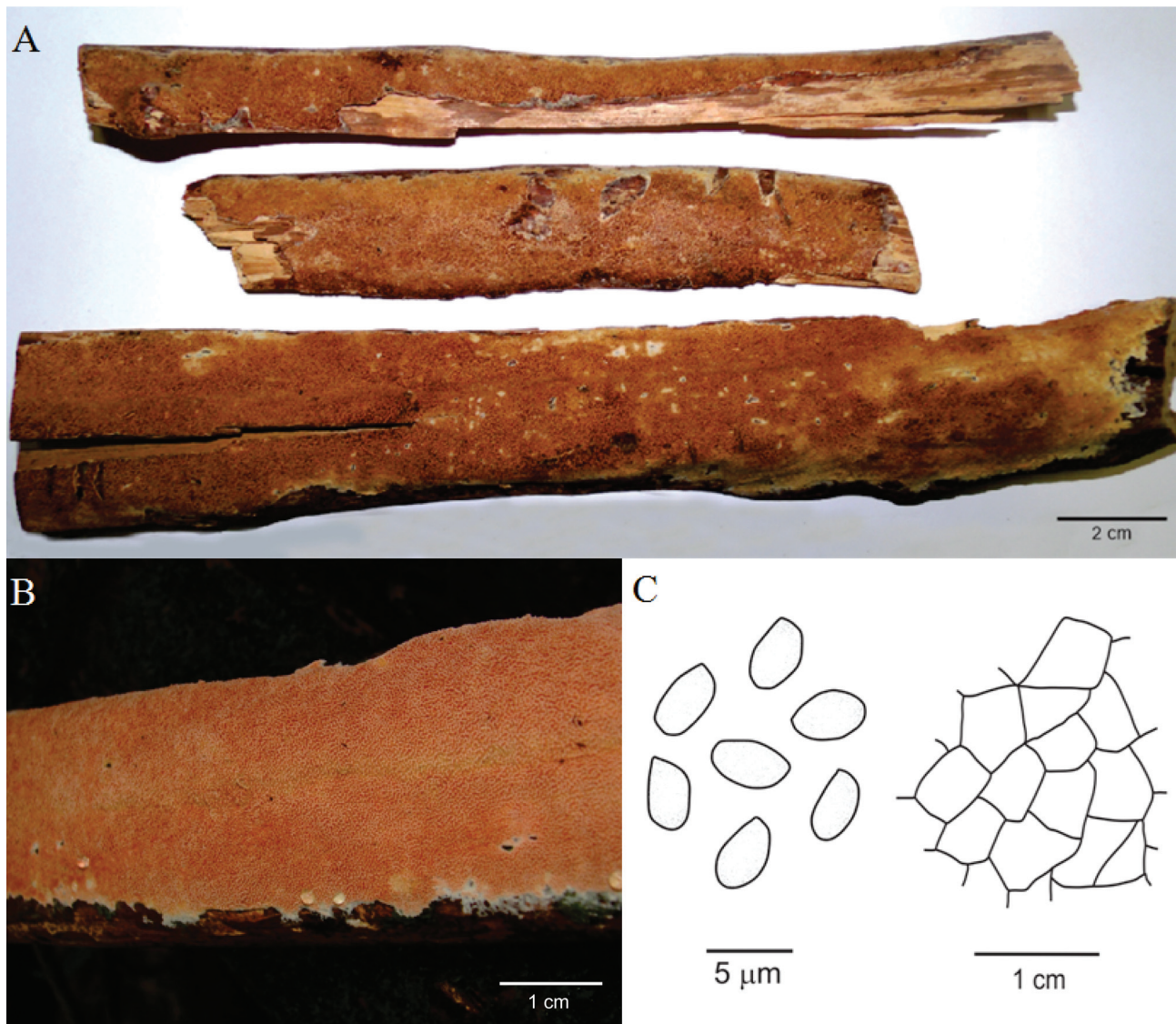


FIGURE 1. *Ceriporia amazonica* **A.** Dried basidiomata; **B.** Fresh basidiomata; **C.** Basidiospores on the left; Pores on the right. Photos: H. Sotão; drawings L. Ryvarden.

Taxonomic remarks:—The salmon-coloured basidioma makes this a conspicuous species when observed in the field. *Ceriporia spissa* (Schwein. ex Fr.) Rajchenb. has a similar color, but it has pores ranging from 7–9 per mm and allantoid basidiospores (Aime *et al.* 2007). In addition, the basidiospores of *C. amazonica* are among the smallest in the genus and should aid in the identification of the species. *Ceriporia incrustata* M. Mata & Ryvarden and *C. microspora* I. Lindblad & Ryvarden have basidiospores of similar size ($3\text{--}3.5 \times 1.8\text{--}2\text{ }\mu\text{m}$ and $3\text{--}3.5 \times 1.5\text{--}2\text{ }\mu\text{m}$, respectively), but smaller pores (6–8 per mm in both species). Besides, the former has ochraceous basidiomata and the latter, white basidiomata (Lindblad & Ryvarden 1999, Mata & Ryvarden 2010).

Ceriporia albobrunnea Ryvarden & Iturriaga, Mycologia 95(6): 1070 (2003).

Description:—Ryvarden & Iturriaga (2003).

Distribution:—It was known only from Venezuela, but now it is also known in Brazil.

Ecology:—The species has been reported on dead, fallen hardwood (Ryvarden & Iturriaga 2003).

Specimens examined:—BRAZIL. Amapá: Amapá National Forest, December 2009, leg. H. Sotão 2009-289 (MG 205212).

Taxonomic remarks:—This species is characterized by the large angular pores (2–3 per mm), pale whitish brown pore surface when fresh, and cylindrical basidiospores, $4\text{--}4.5 \times 1.5\text{ }\mu\text{m}$ (Ryvarden & Iturriaga 2003). However, the Brazilian specimen has a cream to beige pore surface which becomes ochraceous upon drying. Further, it has slightly different basidiospores ($4.5\text{--}5.5 \times 1.25\text{--}2.5\text{ }\mu\text{m}$) than reported in the original collection from Venezuela.

Key to Neotropical species of *Ceriporia* (colors refer to dried basidiomata) updated from Gomes-Silva *et al.* (2012) and Ryvarden (2014)

1. Cystidia present in the hymenium2
- Cystidia absent in the hymenium4
2. Basidiomata deep reddish brown, basidiospores ellipsoid, cystidia smooth..... *C. subspissa* Aime & Ryvarden
- Basidiomata white to pale cream or black to dirty white, basidiospores globose to allantoid, cystidia with apical encrustation3
3. Basidiomata black to dirty white, basidiospores globose 5–6 μm *C. merulioidea* Ryvarden
- Basidiomata white to pale cream, basidiospores allantoid 4–4.5 $\times$ 1 μm *C. cystidiata* Ryvarden & Iturriaga
4. Basidiomata pinkish to dark purple, or cream, reddish cream, reddish orange to brownish red5
- Basidiomata white to cream, ochre, pale lemon yellow, pale green, pale brown to cinnamon.....8
5. Basidiomata cream to reddish cream or brownish red, pores 7–9 per mm *C. spissa*
- Basidiomata pinkish buff to dark purple to reddish orange, pores 2–5 per mm.....6
6. Basidiomata pink, reddish orange to grayish white, basidiospores oblong to short cylindrical, 3.5–5 $\times$ 2–2.5 μm , clamp connections present..... *C. excelsa* (S. Lundell) Parmasto
- Basidiomata pinkish buff to dark brownish purple, basidiospores allantoid to oblong ellipsoid, clamp connections absent.....7
7. Basidiomata pinkish buff to pinkish brown, basidiospores oblong to ellipsoid, 3.5–4.5 $\times$ 1.5–2.5 μm *C. tarda* (Berk.) Ginns
- Basidiomata pinkish tan to dark brownish purple, basidiospores allantoid, 5–6 $\times$ 2–2.5 μm *C. purpurea* (Fr.) Donk
8. Basidiospores 7–9 μm long9
- Basidiospores shorter than 7 μm 10
9. Basidiomata white, cream to orange, basidiospores allantoid, 6–10 $\times$ 2.5–3.5 μm *C. reticulata* (Hoffm.) Domanski
- Basidiomata pale lemon yellow, basidiospores oblong ellipsoid to subcylindrical, 7–8 $\times$ 3.2–3.5 μm *C. citrina* M. Mata & Ryvarden
10. Basidiospores allantoid to cylindrical11
- Basidiospores subcylindrical, ellipsoid to subglobose.....15
11. Basidiomata cinnamon to pale green, basidiospores allantoid, 4–6 $\times$ 1.5 μm *C. viridans* (Berk. & Broome) Donk
- Basidiomata white, cream to tan, whitish brown to yellowish, basidiospores allantoid, cylindrical to slightly oblong ellipsoid...12
12. Basidiomata cream to tan or whitish brown, basidiospores cylindrical to slightly oblong ellipsoid13
- Pore surface cream to dark yellow or warm yellow, basidiospores cylindrical to allantoid14
13. Pores angular 2–3 per mm, basidiospores cylindrical, 4–4.5 $\times$ 1.5 μm *C. albobrunnea*
- Pores round 3–5 per mm, basidiospores cylindrical to slightly oblong ellipsoid, 4–5 $\times$ 2–2.5 *C. alachuana* (Murril) Hallenberg
14. Pore surface warm yellow, basidiospores 4–5 $\times$ 2 μm *C. aurea* Ryvarden
- Pore surface cream to dark yellow, basidiospores 4.5–5 $\times$ 1.2–1.5 μm *C. retamoana* Rajchenberg
15. Basidiospores subcylindrical to oblong ellipsoid16
- Basidiospores subglobose, 4–5(6) $\times$ 3.5–4.5(5) μm *C. xylostromatoides* (Berk.) Ryvarden
16. Pore surface evenly brown when dry17
- Pore surface white, cream to pale tan or buff when dry18
17. Pores round, 6–8 per mm, basidiomata cinnamon when dry, cream to pale brown when fresh *C. ferrugineocincta* (Murril) Ryvarden
- Pores angular, 1–3 per mm, basidiomata cinnamon to brownish, when dry, salmon when fresh *C. amazonica*
18. Pores 6–8 per mm, basidiospores 3–3.5 $\times$ 1.5–2 μm 19

-	Pores 1–5 per mm, basidiospores longer than 4 µm	20
19.	Basal hyphae strongly encrusted, basidiospores $3\text{--}3.5 \times 1.8\text{--}2$ µm	<i>C. incrustata</i>
-	Basal hyphae more or less smooth, basidiospores $3\text{--}3.5 \times 1.5\text{--}2$ µm	<i>C. microspora</i>
20.	Basidiospores $4\text{--}4.5 \times 1.7\text{--}2.2$ µm, hyphae encrusted in the margin, pores 2–3 per mm	<i>C. angulata</i> Gomes-Silva, Ryvarden & Gibertoni
-	Basidiospores 2.5–3 µm wide, non-encrusted hyphae, pores 1–3 per mm	21
21.	Basidiospores $4.5\text{--}5.5 \times 2.5\text{--}2.8$ µm, pore surface straw-colored, pores angular to irregular, 1–3 per mm, up to 3 mm deep	<i>C. straminea</i> Ryvarden
-	Basidiospores $5\text{--}6 \times 2.6\text{--}3$ µm, pore surface cream-colored, pores angular to hexagonal, 1–2 per mm, up to 0.5 mm deep,	<i>C. dentipora</i> Ryvarden

Conclusion

Up to now, seven species of *Ceriporia* Donk have been recorded from Brazil: *C. angulata*, *C. mellea* (Berk. & Broome) Ryvarden, *C. purpurea*, *C. spissa*, *C. tarda*, *C. viridans*, *C. xylostomatoides* (Rajchenberg 1987, Loguercio-Leite & Wright 1991, Silveira & Guerreiro 1991, Nietiedt & Guerrero 2000, Coelho *et al.* 2005, Meijer 2006, Gomes-Silva *et al.* 2012), two of which (*C. angulata* and *C. spissa*) are from the Brazilian Amazonia. However, the presence of *C. mellea* is doubtful, since it is a species of paleotropical distribution (Núñez & Ryvarden 2001, Jia *et al.* 2014). During recent field trips in the region, one new species (*C. amazonica*) and a new record from Brazil (*C. albobrunnea*) were discovered. Thus, eight species of *Ceriporia* are currently confirmed from Brazil, four of which occur in the Brazilian Amazonia, indicating the importance of frequent inventories in the area.

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