

# First Cuban record of *Pleurotus cystidiosus* (Agaricales: Pleurotaceae) and its asexual morph

## Primer registro de *Pleurotus cystidiosus* (Agaricales: Pleurotaceae) y su morfo asexual

Mayra Camino Vilaró<sup>1,\*</sup>, Nelis Blanco Hernández<sup>2</sup> and Julio Mena Portales<sup>2</sup>

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The genus *Pleurotus* (Fr.) P. Kumm. belongs to *Pleurotaceae*, *Agaricales*, *Agaricomycetes*, *Basidiomycota*. It is a lignicolous genus with a worldwide distribution and causes white rot of wood (Kirk & al. 2008). Its species are edible and has great economic importance for its nutritional and medicinal value (Guzmán 2000), which includes some species that produce synnemata (asexual state) (Stalpers & al. 1991; Seifert & al. 2011). Hawksworth & al. (1995) recognized 50 species for the genus; however, Kong (2004) reported the existence of more than 70 species. This number has dropped to 20 in recent years (Kirk & al. 2008).

The authors of "Fungi of the Caribbean" (Minter & al. 2001) recorded 23 species of *Pleurotus* for insular Caribbean, 12 of them in Cuba. These authors made nomenclatural changes, in which some species were reassignment to other different genera, and just five are recognized as present in Cuba, with the following current name according Index Fungorum (2017) and MycoBank (2017): *Pleurotus albidus* (Berk.) Pegler [cited as *P. calvescens* (Berk.) Singer], *P. catephes* (Berk. & M.A. Curtis) Sacc., *P. djamor* (Rumph. ex Fr.) Boedijn, *P. ostreatus* (Jacq.) P. Kumm., and *P. smithii* Guzmán. However, the synonymy between *Pleurotus cystidiosus* and *P. smithii* has been the subject of discussion due to their similarity in morphology, although some authors separated them by microscopic structures (Guzmán & al. 1991) or by rDNA sequences of the ITS region (Zervakis & al. 2004).

*Pleurotus cystidiosus* was described based on a specimen collected in the United States of America (Zervakis & al. 1992) and is widely distributed in tropical and subtropical regions of the World. It was also recorded in Argentina, Brazil, China, Greece, India, Israel, Japan,

Korea, Malaysia, Mexico, Philippines, South Africa, Taiwan, and Thailand (Guzmán & al. 1991; Zervakis & al. 1992, 2004; Zervakis 1998; Stajčić & al. 2003, 2005; Lechner & al. 2004, 2005). This species has been recorded on wood of different plants such as *Acer rubrum* L., *Acer* sp., *Broussonetia* sp., *Ficus carica* L., *Liquidambar styraciflua* L., *Populus deltoides* W. Bartram ex Marshall, *Quercus nuttallii* Palmer, *Q. velutina* Lam., *Salix nigra* Marshall, and a variety of unidentified angiosperms (Miller 1969; Zervakis & al. 1992; Zervakis 1998). Asexual states of *Pleurotus* were obtained in Brazil, Cuba, Japan, and Mexico from *P. abalonus* Han & al. (Neda & Furukawa 1987), *P. cystidiosus* (Capelari 1999), and *P. smithii* Guzmán (Guzmán & al. 1980; Hirata & Guzmán 1985; Rodríguez & Camino 1990), respectively.

The objective of this paper is to report for the first time for Cuba and for the Caribbean islands the occurrence of *Pleurotus cystidiosus* and its asexual state. The specimen studied is stored at the mycological collection in herbarium of the Ecology and Systematic Institute (HAC-M).

***Pleurotus cystidiosus*** O.K. Miller, *Mycologia* 61: 889. 1969. **nom. cons. prop.**

= *Stilbum macrocarpum* Ellis & Everh., *J. Mycol.* 2(9): 103. 1886 ≡ *Antromycopsis macrocarpa* (Ellis & Everh.) Stalpers, Seifert & Samson, *Can. J. Bot.* 69(1): 7. 1991.

= *Antromycopsis broussonetiae* Pat. & Trab., *Bull. Soc. mycol. Fr.* 13: 215. 1897.

= *Pleurotus abalonus* Y.H. Han, K.M. Chen & S. Cheng, *9th Int. Sci. Congr. Cultivation of Edible Fungi*: 168. 1974.

Sexual state. Basidiome solitary (Figure 1A). Pileus 11 cm wide when dry, plane-convex, depressed in the middle, cracked surface, margin entire, inrolled, pale brown. Lamellae subdistant, decurrent, thin, wide, white in fresh condition and cream to beige when dry. Stipe 6.7 × 1.2 cm, eccentric, cylindric, wider at the apex, fibrillose, pale brown to grayish. Hyphal system monomitic, generative

<sup>1</sup>Jardín Botánico Nacional, Universidad de La Habana, Carretera El Rocio km 3½, Calabazar, Boyeros, La Habana, Cuba. C.P. 19230. <sup>2</sup>Instituto de Ecología y Sistemática, Carretera de Varona No. 11835, entre Oriente y Lindero, Reparto Parajón, Municipio Boyeros, La Habana, Cuba. C.P. 11900. \*Autor para correspondencia (e-mail: mcamino@fbio.uh.cu).

hyphae thin-walled, frequent clamp-connections. Basidiospores  $12-16 \times 4-6 \mu\text{m}$ , cylindrical to oblong, thin-walled, smooth, hyaline, inamyloid. Basidia 2-4-spored,  $34-40 \times 5.5-8 \mu\text{m}$ , subfusiform, thin-walled, 4 sterigmata of  $2-5 \mu\text{m}$  long, hyaline. Cheilocystidia  $23-30 \times 7.5-10.5 \mu\text{m}$ , pyriform, thin-walled, hyaline. Pleurocystidia  $38-50 \times 8-11 \mu\text{m}$ , subfusiform, thin-walled, hyaline.

Asexual state. Synnemata  $700-1500 \mu\text{m}$  tall,  $200-500 \mu\text{m}$  wide, mostly unbranched, with white to straw-coloured stipe and blackish to black capitula (Figure 1B). Arthroconidia  $15-17.5 \times 6-7 \mu\text{m}$ , narrowly ellipsoidal to cylindrical, formed on divergent hyphae in the capitulum, with beaklike basal remnants, at first hyaline, brownish to black when mature, smooth, intercalary conidia  $10.5-15.5 \times 6-7.5 \mu\text{m}$ , ellipsoidal to ovoid, basal conidia  $15-23.5 \times 3-4.5 \mu\text{m}$ , narrowly ellipsoidal to cylindrical. Blastoconidia

$1.5-3.5 \mu\text{m}$ , emerging from the stipe hyphae or clavate marginal cells and mostly remaining attached to denticles, globose to broadly ovoid.

Specimen examined: Cuba: Havana, Boyeros, Carretera Varona, km 3.5, Ecological and Systematic Institute, green areas, on dead trunk of *Casuarina equisetifolia* L., living tree, at 2.5 m above the soil, 13.X.2005, N. Blanco M 10060 (HAC-M).

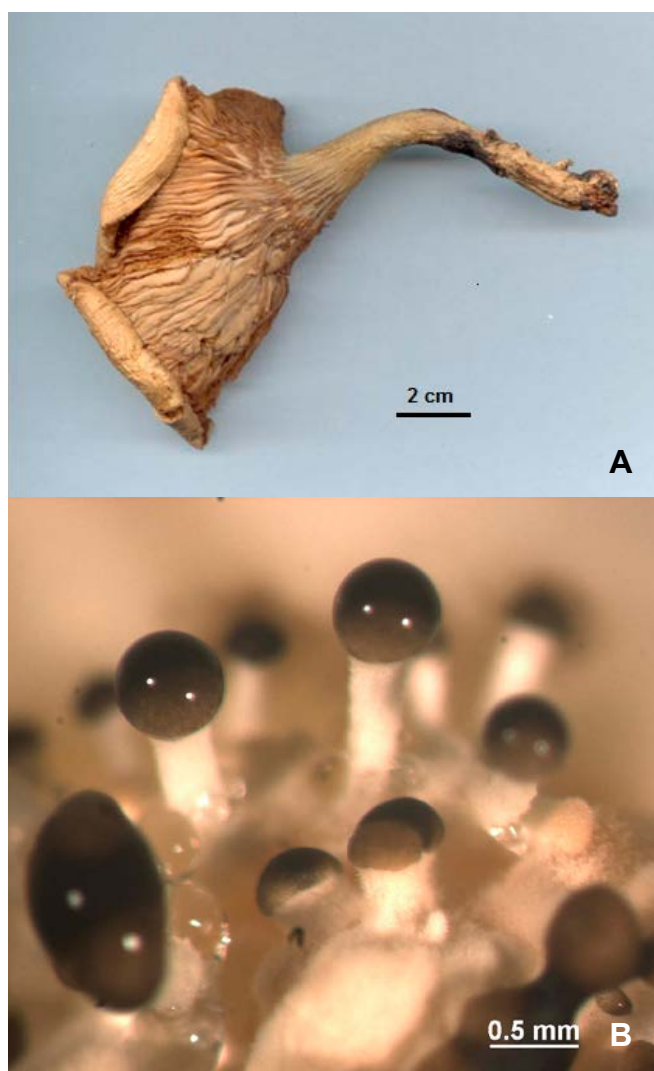
The microscopic characteristics studied in sexual morphs of *Pleurotus cystidiosus* are agree with those described by Guzmán & al. (1991), mostly in the shape and size of cheilocystidia and pleurocystidia. These characteristics separate it from *P. smithii*, in which the cheilocystidia are subcylindric and larger, and pleurocystidia are present in young specimens.

The cultural and morphological characteristics of the asexual state obtained in this study fit with the species described as *Antromycopsis macrocarpa* (Ellis & Everh.) Stalpers, Seifert & Samson following Stalpers & al. (1991).

Asexual morphs of *Pleurotus* were described in the hyphomycetes genus *Antromycopsis* Pat. & Trab. (Stalpers & al. 1991). However, the International Code of Nomenclature for Algae, Fungi and Plants (Greuter & Rankin 2012) following the criteria of "one fungus one name" does not allow to name sexual and asexual states separately, so the asexual morphs of *Pleurotus* are named currently by the name of the sexual morphs to which they are linked.

The substrate, *Casuarina equisetifolia*, it is not mentioned as such in in Miller (1969), Zervakis & al. (1992, 2004), Zervakis (1998), Stajić & al. (2003, 2005), Lechner & al. (2004, 2005). Our is therefore the first report of *Casuarina equisetifolia* as a host plant for *Pleurotus cystidiosus*. *Casuarina equisetifolia* is an introduced tree widely distributed in Cuba (Matos 1973; Betancourt 1999). It is considered as an invasive plant by Oviedo & González-Oliva (2015).

There is an interesting coincidence in the ecology of Cuban specimens of *Pleurotus cystidiosus* and *P. smithii*. Both were collected on dead parts of trunk of living plants at the same height (2 m from the ground level). The first collection of *P. smithii* to be made in Mexico (Guzmán 1975) was also collected at a similar height on an old *Schinus molle* L. tree. Additional Cuban specimens finds are necessary to assess the full ecological range of this species, particularly of whether the occurrence reported here was fortuitous or conditioned by the requirements species of the species, neither of which is frequent in Cuba.



**Fig. 1. A.** Basidioma of *Pleurotus cystidiosus*, specimen N. Blanco M 10060 (HAC). **B.** Synnemata of *Pleurotus cystidiosus* in malt extract agar. Photos: Nelis Blanco.

**Fig. 1. A.** Basidioma de *Pleurotus cystidiosus*, espécimen N. Blanco M 10060 (HAC). **B.** Sinemas de *Pleurotus cystidiosus* en agar extracto de Malta. Fotos: Nelis Blanco.

The finding of *Pleurotus cystidiosus* and its asexual morph is the first record for Cuba and the Caribbean islands. *Pleurotus cystidiosus* it is the sixth *Pleurotus* found in Cuba. *Casuarina equisetifolia* is recorded as a new substrate for *P. cystidiosus*.

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