

Caribbean Journal of Science, Vol. 41, No. 2, 357-359
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University of Puerto Rico, Mayagüez

**First Report of *Clathrus cf crispus*
(Basidiomycota: Clathraceae)
Occurring on Decomposing
Leaves of *Rhizophora mangle* in
Puerto Rico**

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ms. received January 18, 2005; accepted April 16,
2005

ABSTRACT.—We reported the occurrence of *Clathrus cf crispus* associated with organic matter and decomposing leaves of *Rhizophora mangle*. Hypogeous immature basidiocarps were collected near two epigeous mature basidiocarps. Although *C. crispus* has been reported previously from forested areas in Puerto Rico and Mona Island, this is the first report of the fungus occurring on decomposing mangrove leaves for Puerto Rico and the Caribbean.

KEYWORDS.—Basidiomycetes, Phallales, *Clathrus crispus*, red mangrove, Puerto Rico, Caribbean

One fourth of tropical coastlines are covered by mangroves, which occur at the boundary of terrestrial and marine environments and cover over approximately 181,000 km² worldwide (Spalding et al. 1997). Mangrove forests are characterized by one or more species of facultative halo-

phytes that occur on low energy coastlines (Kathiresan and Bingham 2001). In the Caribbean, mangroves are represented by basin and fringe forests and over wash islands (Lugo and Snedaker 1974). There are four dominant species of mangroves in the Caribbean. Moving from the intertidal landwards the community changes successively, consisting of red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*) and buttonwood (*Conocarpus erectus*). The order in this succession is directly related to the degree of the species salt tolerance (Lugo and Snedaker 1974; Chapman 1976; Tomlinson 1986).

Magüeyes is a 0.0728 km² island located immediately offshore from the fishing village of La Parguera on the southwest coast of Puerto Rico, at 17°58.3'N, 67°2.8'W. The region is classified as a subtropical dry forest (Ewel and Whitmore 1973) with an average maximum temperature of 31.4°C, average minimum temperature of 22.4°C and an average annual precipitation of 61.98mm. The island is protected by coral reefs and surrounded by a variety of tropical marine habitats, such as coral reef complexes, sea grass beds, rocky and sandy shorelines, bioluminescent bays, hypersaline pools and mangrove islets. Mangrove islets consisted primarily of *R. mangle*, although *L. racemosa*, *A. germinans*, and *C. erectus* might be found. *R. mangle* can reach up to 30 m in height and 70 cm in diameter with arching stilt roots of 2 to 4.5 m height.

Fungi have a widespread occurrence and inhabit nearly all terrestrial environments, from the Arctic to the Sahara Desert. In marine habitats, fungal species have been reported associated to seagrasses, protozoans, driftwood, corals, fishes and marine mammals. Many are obligate parasites of fishes and marine invertebrates while others are saprophytic or true pathogens such as *Cytospora rhizophorae*, causing cankers on *R. mangle* in southwestern Puerto Rico (Tattar and Wier 2002). Nieves-Rivera and Stephenson (2004) reported the occurrence of *Stemonitis splendens*, a saprophytic myxomycete on *R. mangle*. Recently, several checklists and new reports of mangrove-associated fungi have been documented

(e.g., Schmit and Shearer (2003), Nieves-Rivera et al. in press); however, there are no records of Clathraceae in *Rhizophora mangle* decomposing leaves. In Puerto Rico Phallales are poorly known, although reports do exist from xeric regions (Nieves-Rivera et al. 1998). Phallales species, also known as stinkhorns because of the fetid odor from mature basidiocarps, are mainly saprobes on dead plant materials (Alexopoulos et al. 1996). In members of the Clathraceae, the receptacle either is a hollow, perforate, subglobose headlike structure or consists of three to four spreading and sometimes arched columns united at the top. The young basidiocarp is a whitish, egg-shaped structure with conspicuous rhizomorphs at the base. Basidia bearing six to eight narrowly elliptical spores covered with mucilage develop in the gleba. After autodigestion of the gleba, the spores become enmeshed in a foul-smelling, gelatinous, greenish matrix. Flies are attracted by the odor of the sticky gleba and after feeding disseminate the spores (Alexopoulos et al. 1996). Immature and mature basidiocarps of *C. cf. crispus* on decomposing leaves of *R. mangle* are herein recorded. *Clathrus cf. crispus* Turpin, Dict. Sci. Nat. Atlas Acotyl., Tab. 49. 1820.

Description. Volva 6-10 mm diam, globose to ovoid, marked by a reticulum of grooves opening by irregular splitting at apex to slightly smooth when old, white when fresh, grayish orange at maturity, grayish brown when old, white rhizomorphs present. **Receptacle** 100x150 mm, smooth, massive rather irregular structure, arms up to about 10 mm, obconical, red. **Gleba** olive-green, slimy and fetid (similar to old cheese). **Spores** 3.8-4 x 1.8-2 µm, elliptic to cylindrical, slightly greenish with a smooth, thin-walled.

Habitat. Gregarious, hyp.—or epigeous on top soil, humus, and decomposing leaves of *R. mangle*.

Material Studied. PUERTO RICO, Lajas, La Parguera, Magüeyes Island, October 22, 2004. S. L. Maldonado-Ramírez & H. Torres-Pratts, MAPR-PAR102204

Remarks. Hypogeous when immature, then epigeous at maturity, growing on top soil and decomposing leaves of *R. mangle*



FIG. 1A-B. Immature (A) and mature (B) basidiocarps of *Clathrus* cf. *crispus* growing associated to decomposing leaves of *rhizophora mangle* and top soil.

(Fig. 1). Our specimen fit the descriptions of *C. cf. crispus* given by Nieves-Rivera et al. (1999). In Clathraceae, insects are attracted by the fetid odor of the gleba which serves as dispersal agent for the spores. The common house flies (*Musca domestica* L.) were observed feeding on gleba. Other flies and ants are attracted to strong fetid odors of introduced plants (e.g., the aroid *Amorphophallus paeoniifolius* (Dennst.) Nicols.) reported in Puerto Rico (Nieves-Rivera and Santiago-Valentín 2003).

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