

## Two new species of *Cryptothecia* from NE Brazil

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**Abstract:** The new species *Cryptothecia fabispora* and *C. lichexanthonica* are described from NE Brazil. The first has domed asci with two large, reniform ascospores and the thallus contains psoromic acid. The second contains lichexanthonone and has globose asci. *Cryptothecia fabispora* was found at the Serra de Itabaiana National Park which represents one of the few rainforest remnants in the state, and is a transitional area with Mata Atlantica influence and also open vegetation spots like Caatinga. It was also found in Caxiuaná in Amazonian Para and may well occur elsewhere. *Cryptothecia lichexanthonica* was collected at Vale do Catimbau National Park in Pernambuco, which is in a Caatinga area.

**Key words:** *Arthoniaceae*, Caatinga, lichen, Pará, Pernambuco, Sergipe, taxonomy

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### Introduction

Two of the major vegetation types which are dominant in north-eastern Brazil are the Atlantic Rainforest and the Caatinga. Most of the work on lichen diversity currently done in this part of the country is concerned with the coastal forest patches, or Mata Atlântica, with only a few additions in some Caatinga areas (Cáceres 2007; Menezes *et al.* 2011). The Caatinga vegetation is characterized by dry open forests, with semi-arid climate conditions, a pronounced dry season, and some dense rainforest enclaves in higher altitudes.

The genus *Cryptothecia* comprises about 55 species worldwide (Wolseley & Aptroot 2009), and until recently only a few species had been formally reported from north-eastern Brazil (Cáceres 2007). During a

recent lichen survey in north-eastern Brazil, two undescribed species of *Cryptothecia* were found and these are described below. *Cryptothecia fabispora* was found at the Serra de Itabaiana National Park, in Sergipe, which represents one of the few rainforest remnants in the state, and is a transitional area with Mata Atlântica influence and also open vegetation spots like Caatinga. It was also found in Caxiuaná, in Amazonian Pará, and may well occur elsewhere. *Cryptothecia lichexanthonica* was collected at Vale do Catimbau National Park, in Pernambuco, which is a remarkable Caatinga area, located about 300 km from the coast, at an altitude range of 900–1000 m, where the species is locally common.

### Material and Methods

Identification and descriptive work was carried out in Itabaiana, Universidade Federal de Sergipe, using a Leica EZ4 stereomicroscope and a Leica DM500 compound microscope, and also in Soest using an Olympus SZX7 stereomicroscope and an Olympus BX50 compound microscope with interference contrast, connected to a Nikon Coolpix digital camera. Sections were mounted in tap water, in which all measurements were also taken. The specimens from this study are preserved

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in ISE. The chemistry was investigated by performing thin-layer chromatography (TLC) using solvent A (Orange *et al.* 2001) which, in combination with positive spot reactions, led to satisfactory identification of the substances found.

### The Species

#### ***Cryptothecia fabispora* M. Cáceres, E. L. Lima & Aptroot sp. nov.**

Mycobank No.: MB 801060

*Cryptothecia* with large, raised ascigerous areas, psoromic acid in the thallus, ascus with dome-shaped endoascus and ascospores 2 per ascus, reniform, 120–165 × 55–75 µm.

Type: Brazil, Sergipe, Areia Branca, Serra de Itabaiana National Park, on bark of tree, *c.* 440 m alt., 19 January 2010, *M. E. S. Cáceres* 7275 (ISE—holotype).

(Fig. 1)

*Thallus* spreading, covering an area of up to 5 cm diam., contiguous, mostly smooth but with occasional radial folds, pale greenish grey, *c.* 0.1–0.4 mm thick, IKI–, dull, without prothallus.

*Ascigerous zones* delimited, round to irregular in outline, raised above the thallus, 1–4 mm diam., up to 1 mm high, white, pruinose, IKI–, partly dotted with abraded soredia-like structures. *Asci* deeply immersed in the ascigerous zones, hyaline but often surrounded by dark brown tissue, especially at the upper surface, globose to pyriform, IKI–, with a dome-shaped extension in the endoascus, generally with 2 ascospores, 200–250 µm diam., wall *c.* 30 µm thick. *Ascospores* densely muriform, reniform, 120–165 × 55–75 µm, dextrinoid (IKI+ brown), ends broadly rounded, central lumina much wider than lumina at the surface of the ascospore.

*Chemistry.* Thallus C–, K+ yellow, KC–, P+ yellow, UV–. TLC: psoromic acid.

*Ecology and distribution.* On smooth bark of trees in primary forest. Known only from Brazil.

*Discussion.* This species differs from all described *Cryptothecia* species by the dome-shaped endoascus, and by the combination of a thallus with psoromic acid, distinct and

raised ascigerous zones and asci with two large reniform ascospores. All known species differ in at least two of these characters. *Cryptothecia megalocarpa* (Müll. Arg.) R. Sant. is similar, as it has bisporous asci and contains psoromic acid, but it has a verrucose thallus and narrower (up to 50 µm), not reniform, ascospores. It also lacks the unique dome-shaped endoascus.

*Additional specimens examined.* **Brazil:** Pará: Melgaço, Caxiuanã National Forest, Estação Científica Ferreira Penna, on bark of tree, *c.* 30 m alt., 2009, *M. E. S. Cáceres* 9091 & 9091a (ISE).

#### ***Cryptothecia lichexanthonica* E. L. Lima, Aptroot & M. Cáceres sp. nov.**

Mycobank No.: MB 801061

*Cryptothecia* with rather small ascigerous areas, lichexanthone in the thallus, globose asci and 8 ascospores per ascus, ellipsoid, 55–75 × 22–28 µm.

Type: Brazil, Pernambuco, Buique, Vale do Catimbuco National Park, on bark of tree, *c.* 885 m alt., 7 August 2011, *E. L. Lima* 0027 (URM—holotype; ISE—isotype).

(Fig. 2)

*Thallus* spreading, covering an area up to 5 cm diam., contiguous, mostly smooth, pale greenish grey, 0.1–0.2 mm thick, dull, IKI–, surrounded by a hyphal brown hypothallus *c.* 0.3–0.6 mm wide.

*Ascigerous zones* delimited, round to irregular in outline, raised above the thallus, 0.3–0.6 mm diam., partly single but often partly fused in groups of rows, white pruinose, conspicuously black dotted by the asci, upper half with many IKI+ blue hyphae, giving the impression of being IKI+ grey. *Asci* in surface view nearly black, hyaline but often surrounded by dark brown tissue, especially at the upper surface, globose, with 8 ascospores, IKI–, 150–300 µm diam. *Ascospores* densely muriform, ellipsoid, 55–75 × 22–28 µm, dextrinoid (IKI+ brown), end rounded to somewhat pointed, lumina more or less equal and regular.

*Chemistry.* Thallus C–, K–, KC–, P–, UV+ yellow. TLC: lichexanthone.

*Ecology and distribution.* On smooth bark of trees in primary forest. Known only from

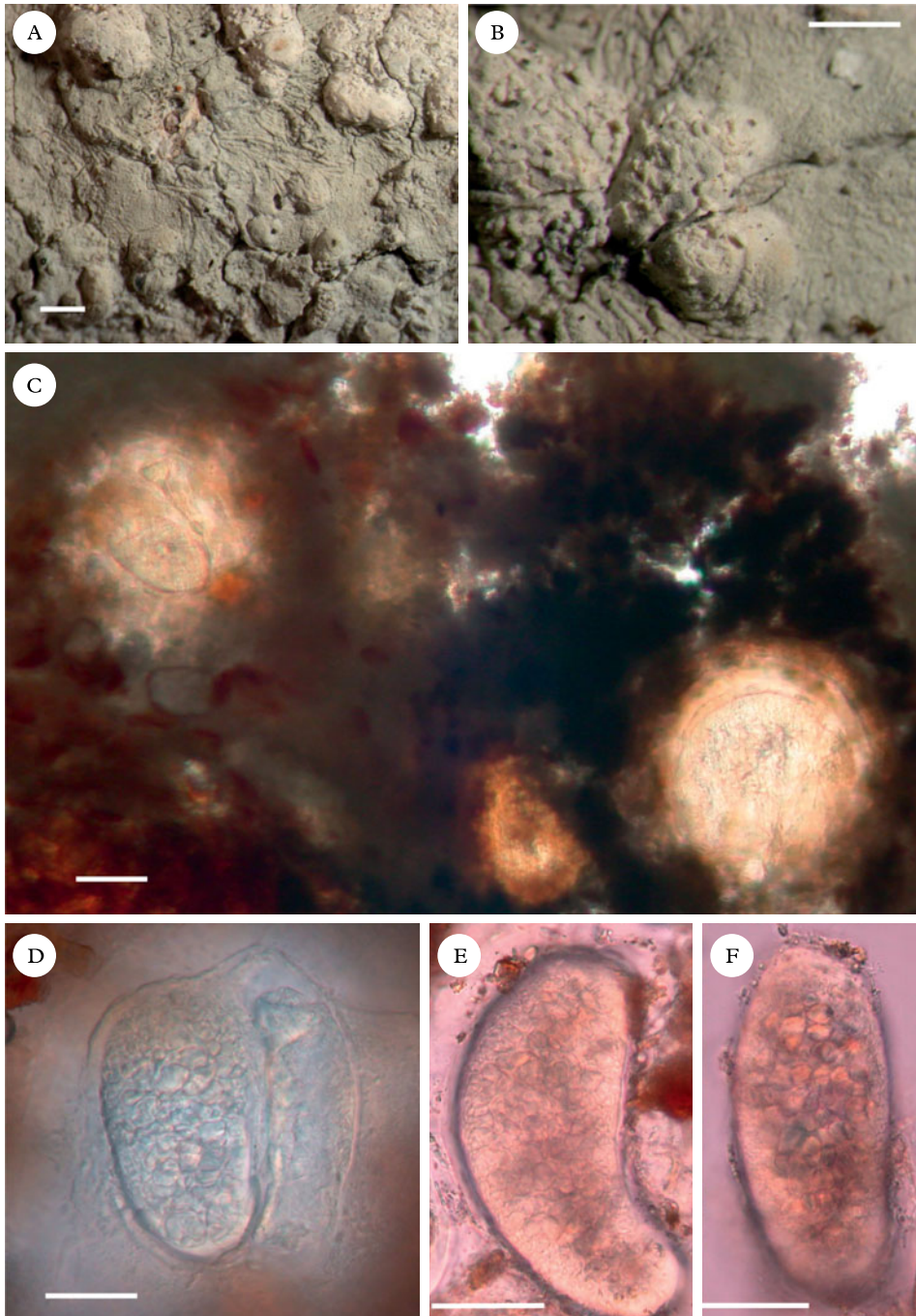


FIG. 1. *Cryptothecia fabispora* (holotype). A & B, habitus; C, section through ascigerous zone; D, ascus with 2 ascospores; E & F, ascospores (E, lateral view; F, dorsal view). Scales: A & B = 1 mm; C–F = 50  $\mu$ m. In colour online.

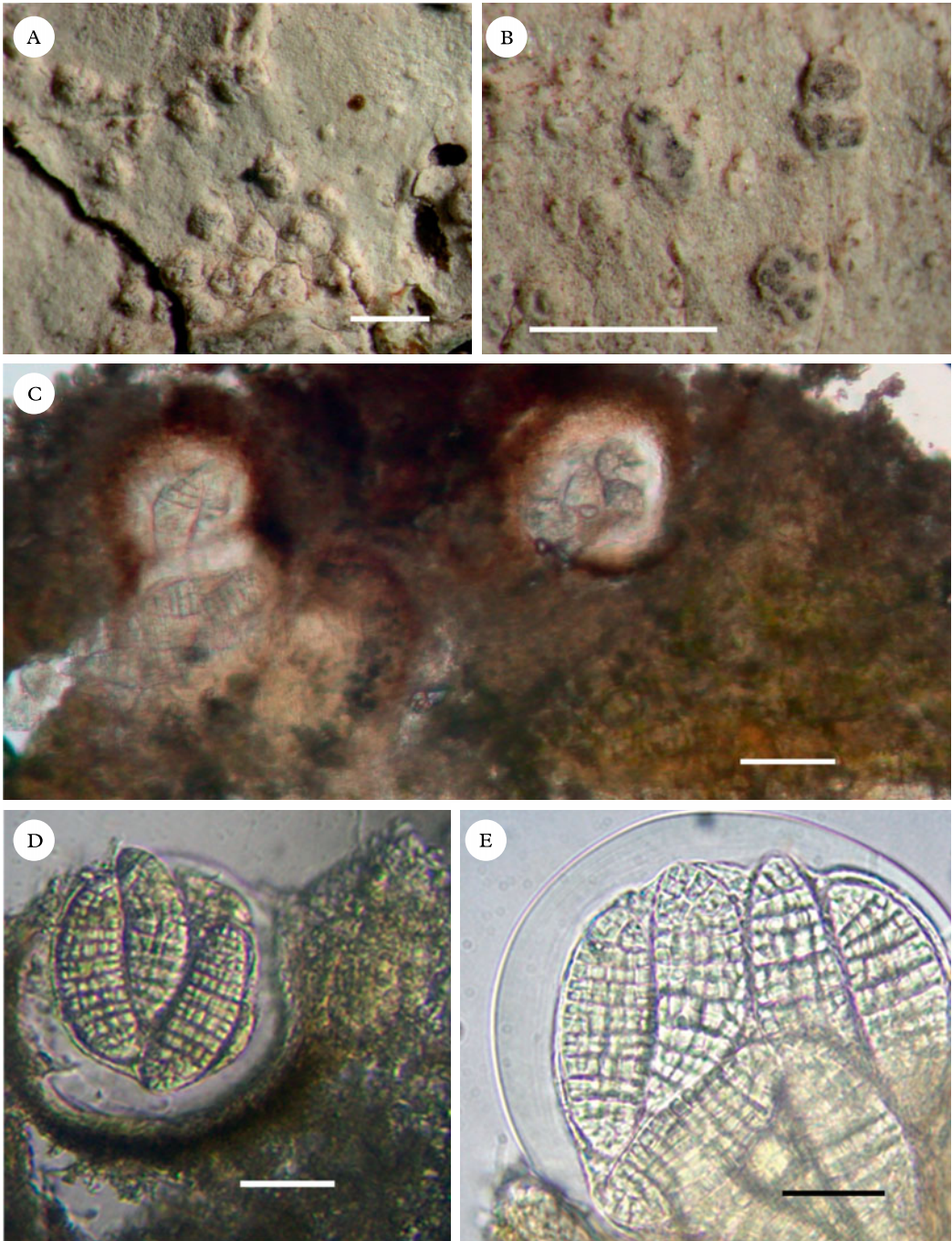


FIG. 2. *Cryptothecia lichexanthonica* (holotype). A & B, habitus; C, section through ascigerous zone; D & E, asci with ascospores. Scales: A & B = 1 mm; C = 100  $\mu$ m; D & E = 25  $\mu$ m. In colour online.

Brazil. It grows together with *Polymeridium quinqueseptatum* (Nyl.) R. C. Harris.

*Discussion.* The chemical, lichexanthone, is rare in the genus and otherwise known only from *Cryptothecia assimilis* Makhija & Patw., which differs by the pyriform and pedicellate asci and larger (generally over 1 mm diam.) ascigerous areas.

*Additional specimens examined.* **Brazil:** Pernambuco: Buíque, Vale do Catimbau National Park, on bark of tree, c. 885 m alt., 2012, E. L. Lima 741, 753, 773, 776, 779, 780, 782, 789 & 810 (URM).

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