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New lichen species of the genera *Porina* and *Byssoloma* from an urban Atlantic rainforest patch in Sergipe, NE Brazil

Marcela Eugenia da Silva CÁCERES, Marlon Wendell Oliveira dos SANTOS, Cléverton de Oliveira MENDONÇA, Danyelle Andrade MOTA and André APTROOT

Abstract: The new species *Byssoloma catillariosporum* and *Porina isidioambigua* are described from NE Brazil. The first is reminiscent of *B. leucoblepharum* but differs by the consistently uniseptate ascospores. The second is characterized by tiny isidia and black perithecia with relatively large, 3-septate ascospores. Both species were found at the Área de Proteço Ambiental (APA) Morro do Urubu, an area of *c.* 214 hectares in the large (500 000 inhabitants) city of Aracaju. It is the only urban Mata Atlântica remnant in Aracaju, with mesophytic deciduous and semi-deciduous forest, and cerrado enclaves in isolated points.

Key words: Aracaju, lichen, Mata Atlântica, *Pilocarpaceae*, *Porinaceae*, taxonomy

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Introduction

In Aracaju, the capital of Sergipe State in north-eastern Brazil, the only patch of Atlantic forest in an intermediate stage of regeneration is the Área de Proteção Ambiental (APA) Morro do Urubu, with *c.* 214 hectares. It is an area of environmental protection delimited to the north by the Sal River and to the east by the Sergipe River, and surrounded to the south and west by urban areas of the northern part of the city (Matos & Gomes 2011).

The APA Morro do Urubu was originally dominated by the Atlantic forest which is now much reduced, with only a very small patch of the forest remaining. It is considered the only urban Mata Atlântica remnant in Aracaju, with mesophytic deciduous and semi-deciduous forest, and cerrado enclaves in isolated points (Souza 2006). Part of the APA also houses the State Park José Rollemberg Leite, and a Zoo, also known as the City Park (Parque da Cidade) (Souza 2006; Matos & Gomes 2011).

The lichen flora of NE Brazil is still incompletely known, despite the pioneering work by Cáceres (2007). During a floristic lichen survey of the APA Morro do Urubu under guidance of the first author, undescribed species of *Byssoloma* and *Porina* were found. They are described below.

The genus *Byssoloma* comprises *c.* 40 species worldwide (Lücking 2008). The present those differs from all species known so far in the genus by the combination of the following characters: apothecia dark grey, margin white, byssoid, and ascospores consistently 1-septate. The genus *Porina* comprises *c.* 250 species worldwide (Lücking 2008). The present species differs from all those known so far in the genus by the combination of the following characters: thallus with isidia, black perithecia, and relatively large, 3-septate ascospores.

M. E. S. Cáceres, M. W. O. Santos and D. A. Mota: Departamento de Biociências, Universidade Federal de Sergipe, CEP: 49500-000, Itabaiana, Sergipe, Brazil.
C. O. Mendonça: Programa de Pós-graduação Ecologia e Conservação, Universidade Federal de Sergipe, CEP: 49100-000, São Cristóvão, Sergipe, Brazil.
A. Aptroot (corresponding author): ABL Herbarium, G.v.d. Veenstraat 107, NL-3762 XK Soest, The Netherlands. Email: andreaptroot@gmail.com

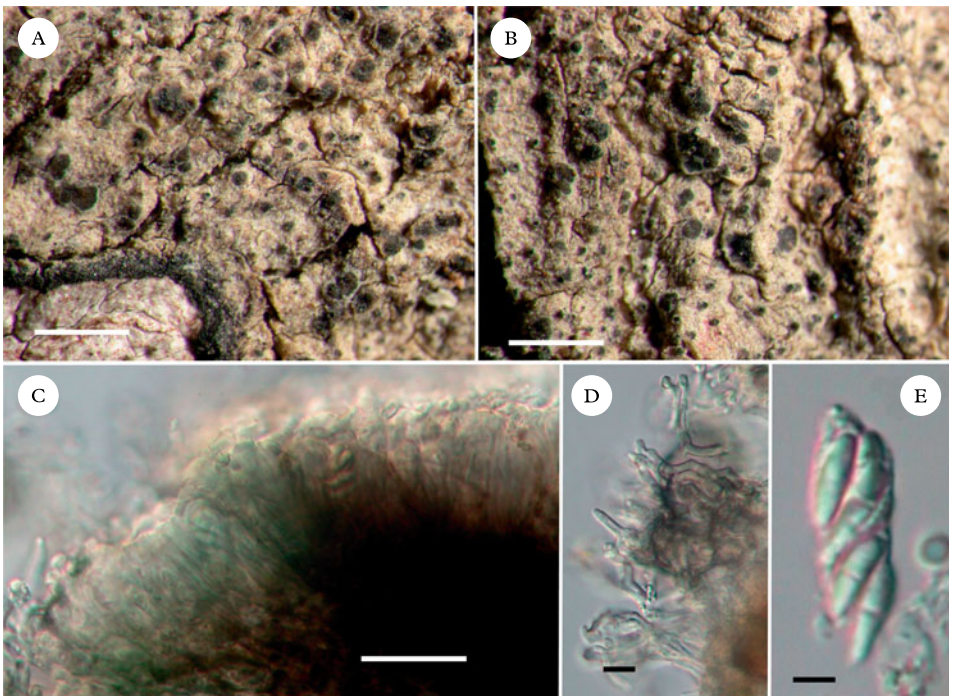

FIG. 1. *Byssoloma catillariosporum* (holotype). A & B, habitus; C, section through ascoma; D, hyphae of apothecium margin; E, ascospores. Scales: A & B = 1 mm; C = 50 μm; D = 10 μm; E = 3 μm. In colour online.

Material and Methods

Identification and descriptive work were 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 in ISE. The chemistry was investigated by performing thin-layer chromatography (TLC) using solvent A (Orange *et al.* 2001).

The Species

Byssoloma catillariosporum M. Cáceres, M. W. O. Santos & Aptroot sp. nov.

MycoBank No.: MB 802581

Byssoloma with dark grey apothecia, margin white, byssoid, and ascospores consistently 1-septate, 9–11 × 3·5–4·0 μm.

Type: Brazil, Sergipe, Aracaju, APA Morro do Urubu (Parque da Cidade), on bark of tree, *c.* 10 m alt., 12 August 2011, *M. E. S. Cáceres & M. W. O. Santos* 13697 (ISE—holotype).

(Fig. 1)

Thallus thin, not corticate, dull, starting as isolated granules of *c.* 50 μm, soon aggregating to form a nearly continuous pale greenish grey crust on a thin whitish byssoid hypothallus, greenish grey. *Algae* green, *c.* 7 μm diam.

Apothecia appressed, 0·2–0·5 mm diam.; *disc* flat, dull, brownish grey, not pruinose, margin whitish to chamois-coloured, dull, felty, *c.* 0·05 mm wide. *Hymenium* hyaline, but greenish at the bottom by the diluted pigment of the hypothecium, KOH–, IKI+ blue; *paraphyses* branched; *hypothecium* black due to high concentration of a greenish pigment, KOH; *excipulum* hyaline, with anastomosing hyphae of *c.* 3 μm wide. *Ascospores* 8 per ascus, hyaline, ellipsoid, 1-septate, 9–11 × 3·5–4·0 μm.

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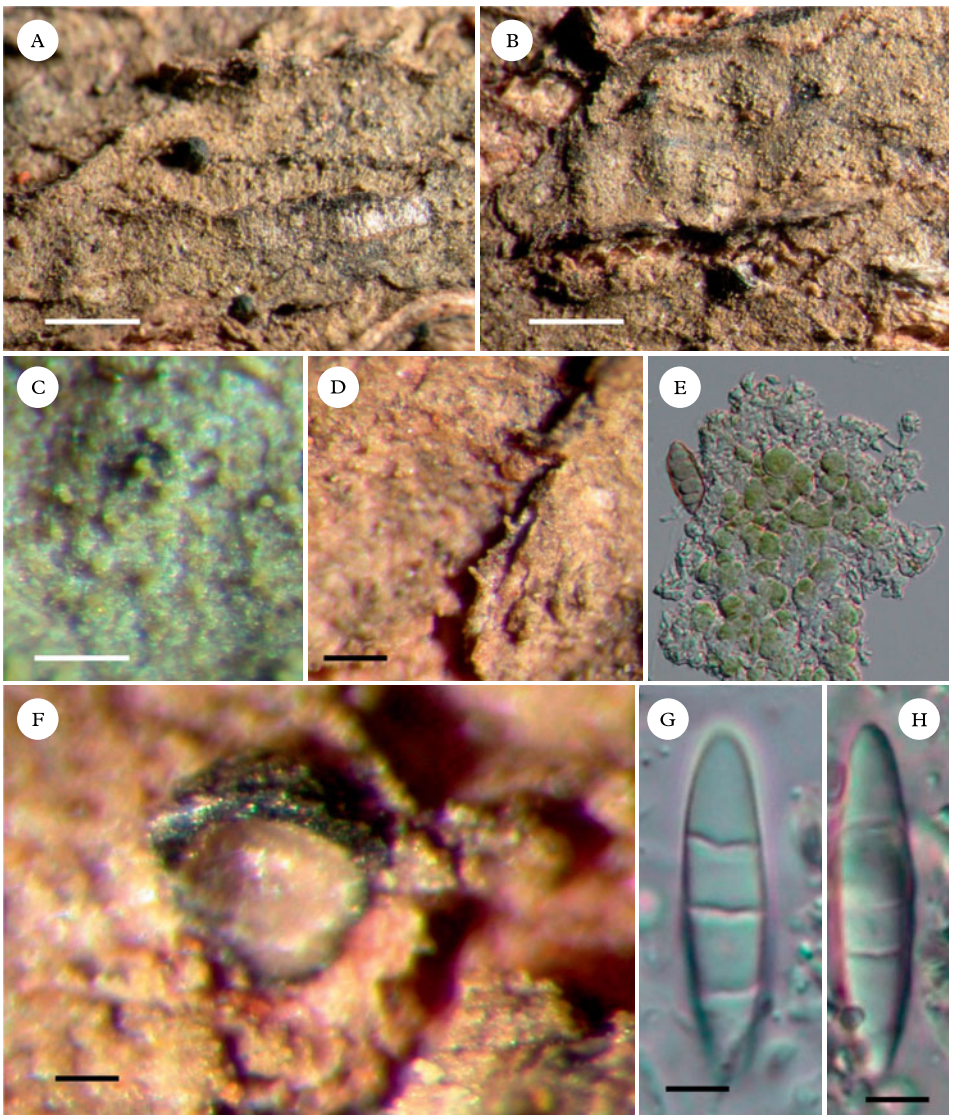

FIG. 2. *Porina isidioambigua* (holotype). A & B, habitus; C, isidia; D, isidia at margin of bark flake; E, squash preparation of an isidium with single algal cells inside and cortex outside and one accidental *Pyrenula* ascospore attached; F, section through ascoma; G & H, ascospores. Scales: A & B = 1 mm; C & D = 0·1 mm; E = 10 μm; F = 50 μm; G & H = 5 μm. In colour online.

Pycnidia not observed.

Chemistry. Thallus UV−, C−, K−, KC−, P−. No substances detected with TLC.

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

Discussion. This is one of the relatively few corticolous species in the genus. It is reminiscent of *B. leucoblepharum* (Nyl.) Vain. in thallus and especially in apothecium colour (Lücking 2008) but differs, for example, by the consistently 1-septate ascospores. Five species of *Byssoloma* with 1-septate ascospores are keyed out in Lücking (2008), but

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all differ at least in apothecium colour, a character mentioned in the key for all species. The ascospores remain 1-septate throughout their development.

Porina isidioambigua M. Cáceres, M. W. O. Santos & Aptroot sp. nov.

MycoBank No.: MB 802582

Porina with thallus with isidia, black perithecia, and 3-septate ascospores of 32–37 × 6–8 μm.

Type: Brazil, Sergipe, Aracaju, APA Morro do Urubu (Parque da Cidade), on bark of tree, *c.* 10 m alt., 12 August 2011, *M. E. S. Cáceres & M. W. O. Santos* 13698 (ISE—holotype).

(Fig. 2)

Thallus corticate, smooth, continuous, thin, olive green, with dispersed but locally, especially at the margins of bark flakes, numerous simple cylindrical or gnarled corticate isidia of *c.* 50 μm high and *c.* 20 μm thick; *algae* trentepohlioid, cells single.

Ascomata perithecioid, simple, dispersed, globose, emergent, 0·2–0·3 mm diam., black, edges with thallus covering. *Wall* carbonized, thick above and in the upper half, very thin in the lower half, somewhat extending sideways as an involucrellum, without crystals, KOH−, *c.* 50 μm thick. *Ostioles* black, KOH−, apical. *Hamathecium* hyaline, not inspersed. *Asci* cylindrico-clavate, IKI−, with 8 ascospores. *Ascospores* hyaline, IKI−, 3-septate, fusiform, 32–37 × 6–8 μm, ends pointed.

Pycnidia not observed.

Chemistry. Thallus UV−, C−, K−, KC−, P−. No substances detected with TLC.

Ecology and distribution. On smooth bark of trees in forest remnant. Known only from Brazil. The species grows together with *Pyrenula cubana* (Müll. Arg.) R. C. Harris.

Discussion. This seems to be close to *Porina ambigua* Malme, from which it differs mainly by the presence of tiny isidia and the larger ascospores. Isidiate species are rare in the genus, even if taken in a wide sense, as is done here. The species belongs to *Trichothelium* in the sense of Harris (1995), *Pseudosagedia* in the sense of Hafellner & Kalb (1995) and *Zamenhofia* in the sense of Clauzade & Roux (1985). The species differs also when sterile from all known isidiate species in *Porina* in the wide sense. *Trichothelium isidiatum* R. C. Harris (Harris 1995) differs by the much more numerous and larger isidia. *Porina* (or *Zamenhofia*) *rosei* Sérus. (Smith *et al.* 2009) has somewhat similar isidia that, however, become branched, larger and heaped. *Porina* (or *Zamenhofia*) *hibernica* P. James has much larger, non-corticate isidia (Smith *et al.* 2009). *Porina conspersa* Malme and *P. distans* Vězda & Vivant can have somewhat similar isidia, but have the algal cells in plates or threads (Lücking 2008), not single as in the new species.

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