

New tropical calicioid lichens from South America

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Abstract: Three new calicioid lichens are described from the Neotropics. *Mazaediothecium uniseptatum*, with 1-septate ascospores, is described from French Guiana. *Mycocalicium enterographicola*, with turbinate, green-pruinose apothecia and stalk and a distinct mazaedium, occurring lichenicolous on *Enterographa* cf. *quassiaecola* Fée, is described from Sergipe State in Brazil. *Stenocybe tropica*, with 3-septate ascospores remaining clustered in the mouth of the apothecium, and persistent asci, is described from mangrove tree bark in São Paulo State, Brazil.

Key words: Brazil, *Caliciales*, French Guiana, *Mazaediothecium*, *Mycocalicium*, *Stenocybe*

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Introduction

Lichens with the ascospore discharging into a mazaedium were traditionally united in the order *Caliciales*, together with similar taxa which are non-lichenized and/or do not form a mazaedium but have cup-shaped apothecia on slender stalks, just as most mazaediate lichens. It was always felt that neither the presence of a mazaedium nor the presence of stalked apothecia constituted a strong rationale for relatedness, and the neotropical calicioid fungi were already distributed over seven families by Tibell (1996), with some remaining genera that belong to families in the *Arthoniales* that are still partly unnamed. Phylogenetically, the species with this morphology turned out to be unrelated, and they are now distributed over at least seven orders (Tibell 1996; Tibell & Wedin 2000; Wedin *et al.* 2000; Prieto *et al.* 2013). Species of this group are usually locally rare in the tropics, where the species are mostly confined to

overhanging trees with rough or dry bark. In the Neotropics (Central and South America between the tropics of Cancer and Capricorn), around 50 species are known (Tibell 1996). Many of the c. 200 calicioid species that are known worldwide are thought to be widespread, and some of the more common species are thought to be cosmopolitan or at least palearctic or pantropical.

Calicioid lichens are relatively well known and since 1996 few if any additional species have been described from the Neotropics. In this paper, we describe three new species, all in small genera: the fourth species of the genus *Mazaediothecium*, the first lichenicolous *Mycocalicium*, and the first *Stenocybe* reported from the Neotropics.

The genus *Mazaediothecium* comprises three species (Aptroot 1991; Harada & Yamamoto 2007), two of which are neotropical (Tibell 1996). This genus belongs to the *Pyrenulaceae* (Aptroot 1991), but so far no species have been sequenced. The genus *Mycocalicium* comprises 12 accepted species (Tibell 1996, 1998, 2001; Titov 2006), four of which are neotropical (Tibell 1996). It belongs to a small separate order, the *Mycocaliciales* (Tibell & Wedin 2000), which comprises two families with five genera, of which the genus *Chaenothecopsis* (Tibell & Vinuesa 2005; Titov 2006) is by

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far the largest. The genus *Stenocybe* also belongs to this order and comprises about a dozen accepted species, many of which are bark parasites with a single tree host genus, but also some general bark-inhabiting species. No species has ever been reported from the Neotropics (Tibell 1996). Only one species is known from the Southern Hemisphere, viz. *S. bartlettii* Tibell from New Zealand (Tibell 1987).

Material and Methods

Identification and descriptive work was carried out 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

Mazaediothecium uniseptatum Aptroot **sp. nov.**

Mycobank No.: MB 812868

Mazaediothecium with ascospores 1-septate, distoseptate, a thin median euseptum also sometimes present, $7.0\text{--}12.0 \times 5.0\text{--}7.5 \mu\text{m}$, lumina angular, $1.5\text{--}2.0 \mu\text{m}$ diam.

Type: French Guiana, Saül, sentier limonade, on higher trunk of *Protium* sp. in mixed forest on lateritic

soil, alt. c. 200 m, $3^{\circ}32'N$, $53^{\circ}12'W$, 24 September 1986, D. Montfort & R. Ek 383 (L—holotype; ABL—isotype).

(Fig. 1)

Thallus greyish white, not corticate, dull and almost hyphal, surrounded by a dark brown hyphal prothallus line. Associated algae trentepohlioid.

Apothecia numerous, sessile, black, dull, with golden yellow pruina in upper half, c. 0.2 mm diam. and up to 0.6 mm high, cylindrical; margin not clearly visible. *Excipulum* black. *Hamathecium* not interspersed with oil droplets, covered by a thick mazaedium layer. *Hamathecium* filaments simple. *Asci* soon disintegrating (no mature intact asci observed); immature asci clavate-cylindrical, up to c. $60 \times 8 \mu\text{m}$. *Ascospores* pale grey, ellipsoid to broadly fusiform, 1-septate, distoseptate, a thin median euseptum also sometimes present, $7.0\text{--}12.0 \times 5.0\text{--}7.5 \mu\text{m}$, lumina angular, $1.5\text{--}2.0 \mu\text{m}$ diam.

Pycnidia unknown.

Chemistry. Pruina on apothecium a K+ violet anthraquinone.

Ecology. On higher tree trunks of *Protium* sp. in mixed forest on lateritic soil.

Discussion. All three *Mazaediothecium* species known so far have submuriform ascospores.

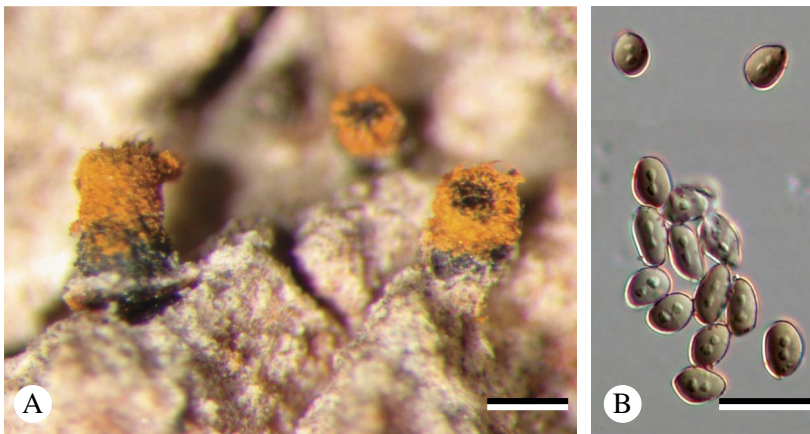


FIG. 1. *Mazaediothecium uniseptatum*, holotype. A, habitus; B, ascospores. Scales: A = 0.2 mm; B = 20 μm . In colour online.

***Mycocalicium enterographicola*
Aptroot & M. Cáceres sp. nov.**

Mycobank No.: MB 812869

Mycocalicium with turbinate, green-pruinose apothecia, lichenicolous on *Enterographa* cf. *quassiaecola* Fée.

Type: Brazil, Sergipe, Povoado Pedrinhas, Mata da Fazenda Cafuz, alt. 75 m, 10°48'22"S, 37°16'46"W, 20 September 2013, *M. Cáceres* & *A. Aptroot* 18384 (ISE—holotype; ABL—isotype).

(Fig. 2)

Lichenicolous on *Enterographa* cf. *quassiaecola* Fée, whose thallus surface is broken up, and becoming fluffy and nearly leprose, not corticate, ochraceous grey. Associated algal cells (originating from the *Enterographa*) globose to ellipsoid, 7–11 × 6–10 µm, trentepohlioid but green.

Apothecia numerous, dark greenish black, dull, with green pruina below, c. 0.1 mm diam., turbinate (broadly pin-shaped); margin not clearly visible. *Stalk* bright yellow below, dark green at the tip, to 0.15 mm tall, c. 0.05 mm wide, internally yellowish, of densely branched c. 2.0–2.5 µm wide hyphae, unchanged in K. *Excipulum* aeruginose. *Hamathecium* often covered by a thick mazaedium layer. Hamathecium filaments simple, c. 1.0 µm wide. Ascogenous hyphae c. 2.0–3.0 µm wide, with croziers. *Asci* cylindrical, rather persistent, 30–35 × 3.0–3.5 µm, with 8 uniseriate ascospores, tip tapering, with apical thickening of c. 2.0 × 1.0 µm without central perforation. *Ascospores* dark grey, ellipsoid, not septate, 7.0–8.0 × 2.0–2.5 µm, wall not ornamented.

Pycnidia unknown.

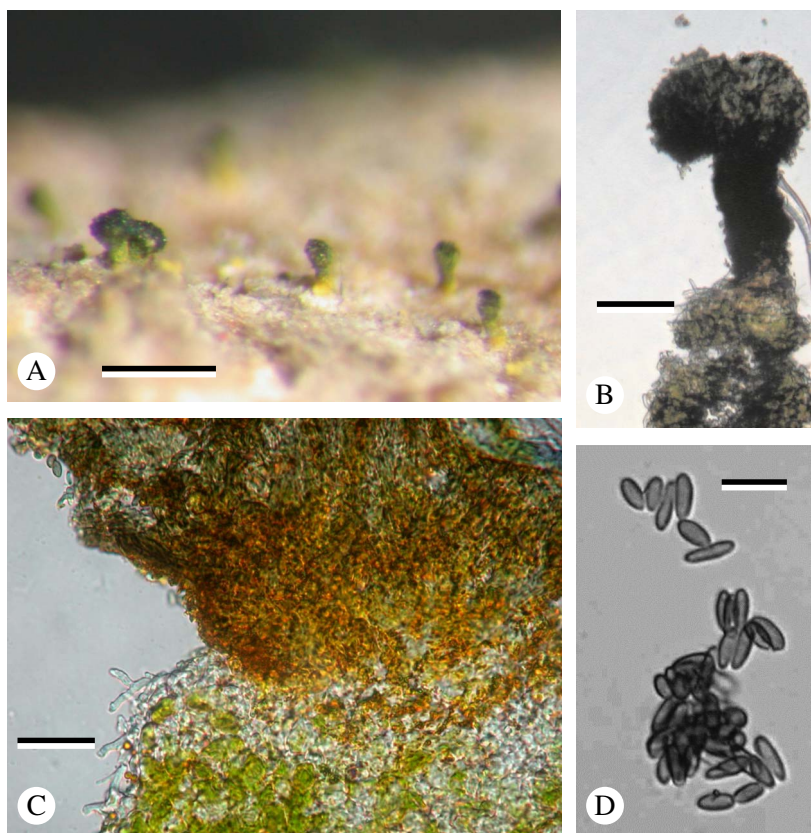


FIG. 2. *Mycocalicium enterographicola*, holotype. A, holotype; B, ascoma; C, stalk and host thallus; D, ascospores. Scales: A = 0.25 mm; B = 0.05 mm; C = 25 µm; D = 10 µm. In colour online.

Chemistry. Pulvinic acid on the stalk and apothecium head.

Ecology. On thallus of *Enterographa* cf. *quassiaecola* on tree trunks in Atlantic rainforest.

Discussion. All *Mycocalicium* species known so far are saprobes, mostly growing on decaying wood. This is the first lichen parasite in the genus. It is strongly reminiscent of *M. calicioides* (Nádvorník) Tibell (Tibell 1996), which also has a green pruina, but with a thinner layer on the capitulum of the apothecium only, not on the stalk. The incurved apothecium margin and the abundant presence of pulvinic acid are characters that it has in common with several species of *Mycocalicium*, but not with other genera in the *Mycocaliciales*. The presence of a distinct mazaedium layer is unusual in the whole order. The lifestyle of the new species is interpreted here as lichenicolous because it was found to occur only on thalli of an *Enterographa*, the morphology of which species was altered, making its identification to species level dubious.

***Stenocybe tropica* Aptroot sp. nov.**

Mycobank No.: MB 812870

Stenocybe on mangrove tree bark, ascospores 3-septate, distoseptate, $46\text{--}71 \times 14\text{--}21 \mu\text{m}$, remaining

clustered in the mouth of the apothecium, asci persistent.

Type: Brazil, São Paulo, Praia de Peruíbe near Itanhaém, alt. 1 m, 9 July 1979, K. Kalb & J. Poelt (GZU—holotype).

(Fig. 3)

Saprotrophic on bark.

Apothecia sparse, glossy black, without pruina below, capitulum c. 0.3 mm diam. and up to 0.5 mm high, overall shape cylindrical to clavate; margin clearly visible, glossy, incurved when young. **Stalk** glossy black, to 0.8 mm tall, c. 0.15 mm wide, internally dark brown, dense, brittle; individual hyphae not very discernible. **Excipulum** black. Ascospores remaining clustered on the mouth of the apothecium in a mazaedioid way. **Asci** cylindrical, persistent, up to c. $300 \times 25 \mu\text{m}$, with 8 uniseriate ascospores, tip thick-walled, with ocular chamber. **Ascospores** dark brown, fusiform to broadly fusiform, 3-septate, distoseptate, $46\text{--}71 \times 14\text{--}21 \mu\text{m}$, tips mostly pointed, lumina regularly to irregularly angular to diamond-shaped or partly rounded, middle lumina mostly pentangular with an outward pointed tip, outer lumina much smaller than central lumina and not separated from the wall by endospore; often seemingly protruding as an almost hyaline tip.

Pycnidia unknown.

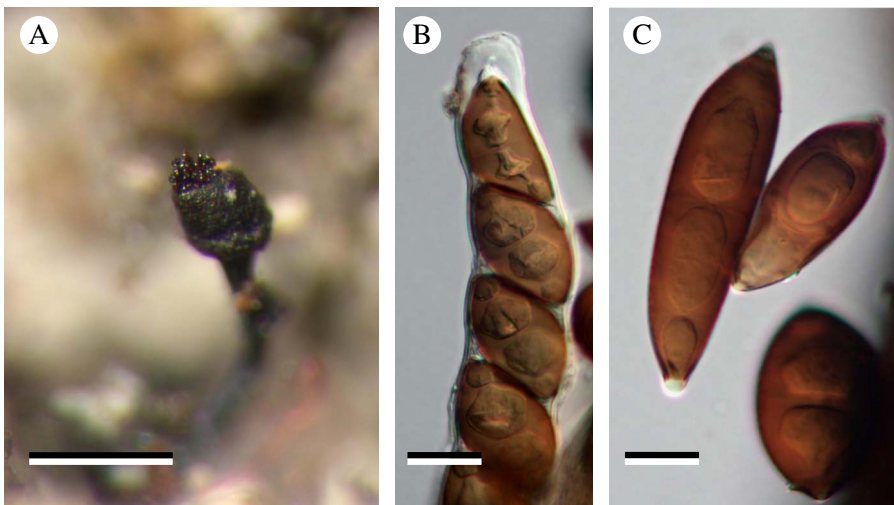


FIG. 3. *Stenocybe tropica*, holotype. A, habitus; B, ascus; C, ascospores. Scales: A = 0.5 mm; B & C = 15 μm . In colour online.

Chemistry. No secondary substances detected.

Ecology. On tree trunks in mangrove forest.

Discussion. This species belongs without doubt to the genus *Stenocybe*, which is characterized by the combination of calicioid apothecia and brown distoseptate ascospores with angular to diamond-shaped lumina. This species has much larger ascospores than any of the consistently 3-septate *Stenocybe* species known. It is close to the European-Macaronesian *S. septata* (Leight.) A. Massal, which differs by the variously 1–6-septate ascospores and the evanescent asci (Giavarini & Purvis 2009), and generally occurs on *Ilex* bark. The shape of the lumina of this species, as illustrated by Tibell (1984: 629), also seems to be different; the outward tips of the larger lumina are flattened, so that the middle lumina are clearly sexangular. Still, it is possible that the new species rather represents an aberrant disjunct population of *S. septata*.

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