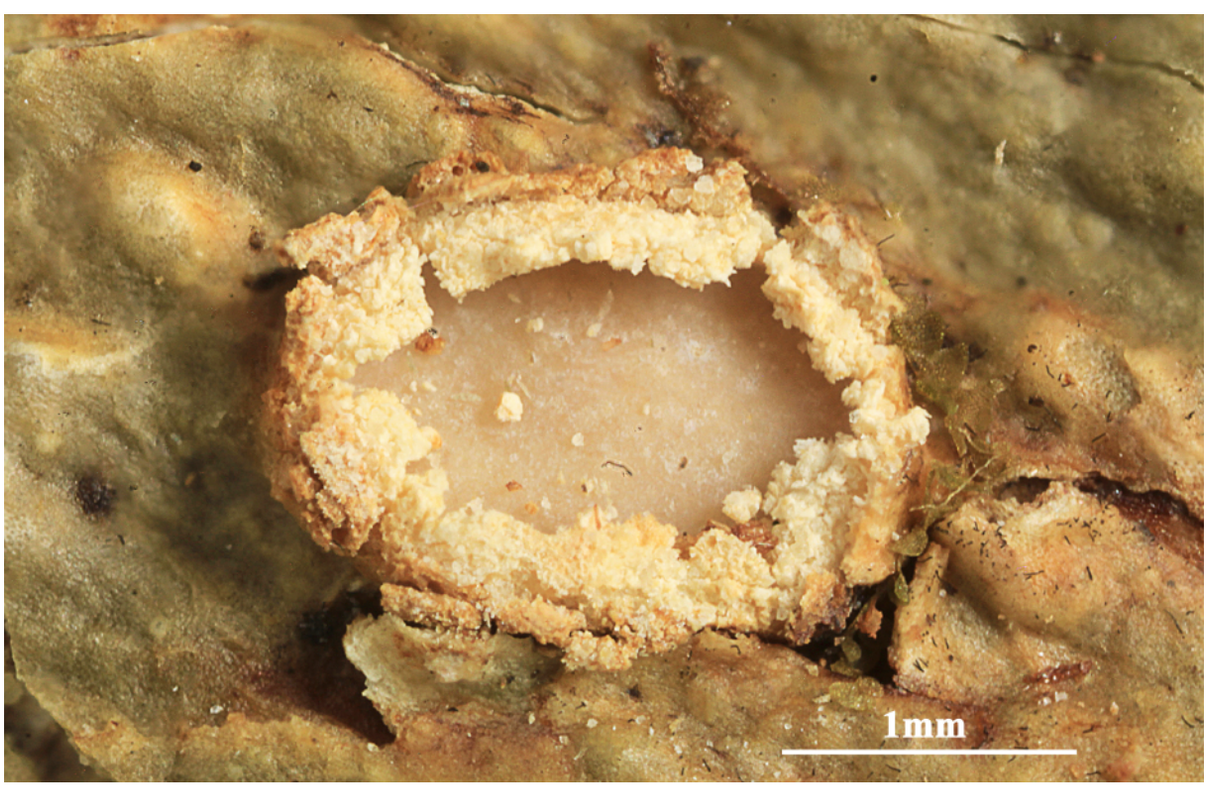
Felix Schumm & André Aptroot

Brazilian Lichens

Vol VIII - Amapá, Tocantins, Pará, São Paulo



Felix Schumm & André Aptroot

Brazilian Lichens Vol. VIII

Amapá, Tocantins, Pará

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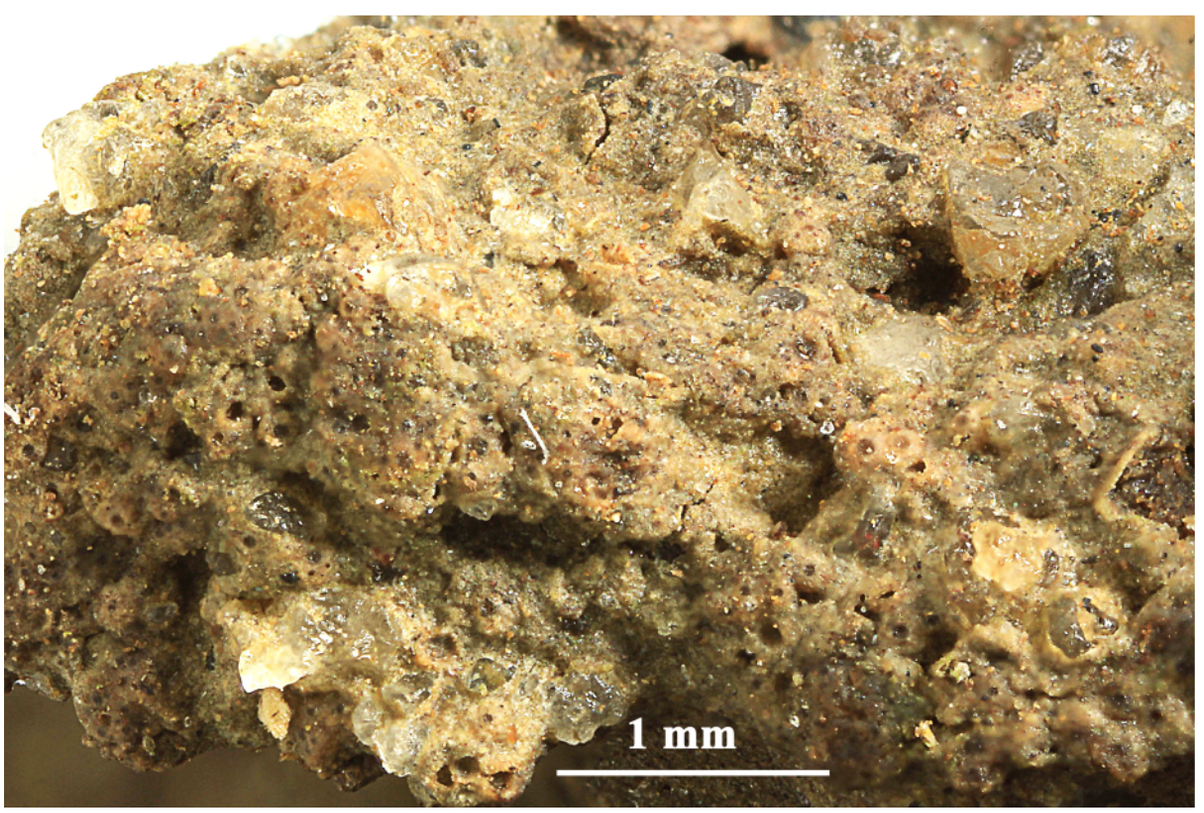
Introduction:
In this book, lichens collected in 2015 and 2016 in the Brazilian states Amapá, Tocantins and some from Pará and São Paulo are treated, including several species that were not illustrated before. Pará is one of the largest states in the Amazon. Some specimens are illustrated here from near the border of this state with Manahão. Amapá and Tocantins are tropical states in Northern Brazil. Amapá is the only Brazilian state that lies largely in the Northern Hemisphere. For many tropical species that were described from Brazil, it is their only known occurence on the Northern Hemisphere. The natural vegetation of Amapá is tropical rainforest; in Tocantins it is partly tropical rainforest, partly Cerrado with gallery forests. Before the excursions on which the specimens treated below were collected, almost no lichen species were known from either state.
For further details, see volume 1 of this book series.

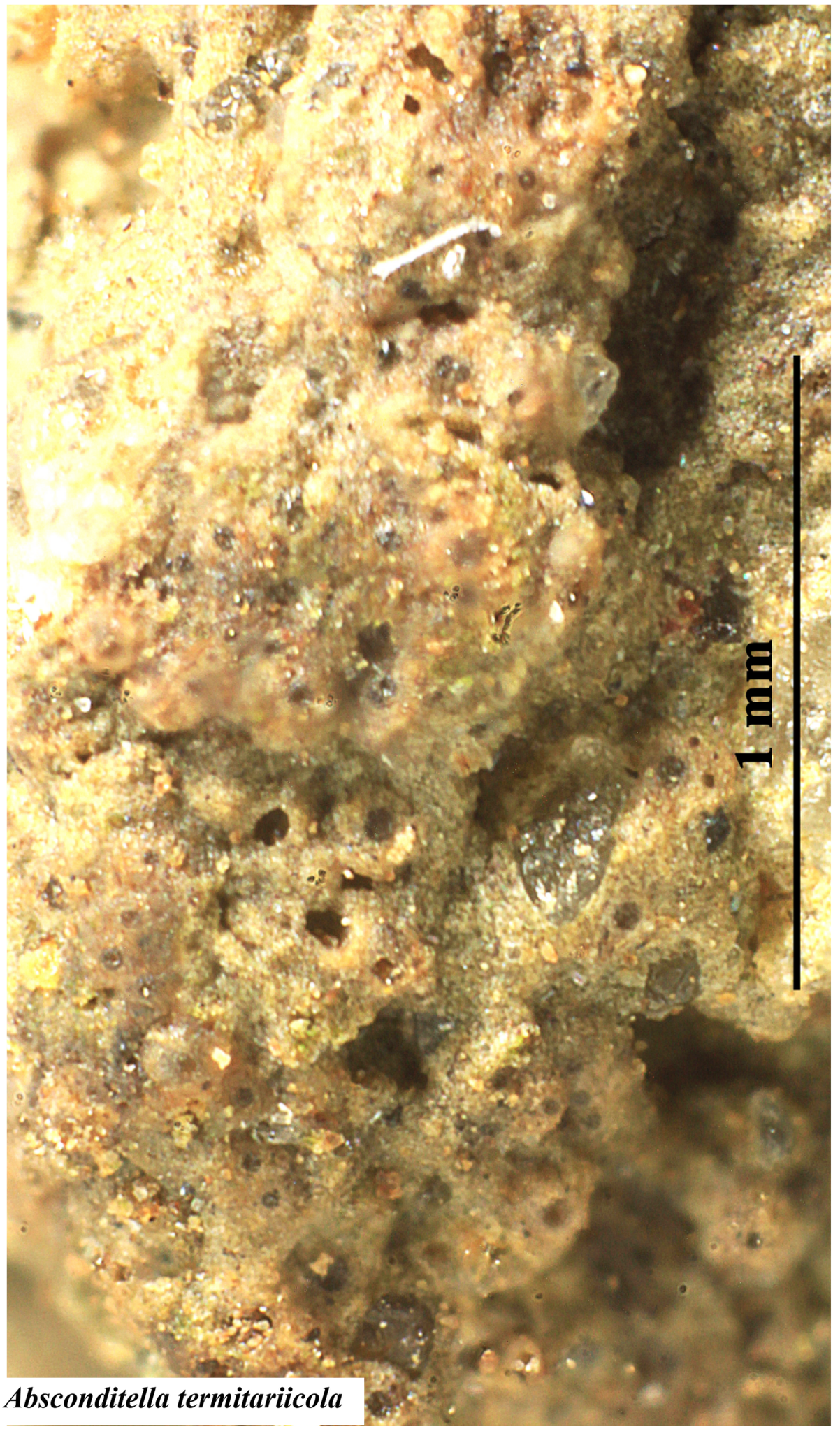
Felix Schumm & André Aptroot

N

Absconditella termitariicola Aptroot & M. Cáceres, in Cáceres & Aptroot, Bryologist 119(3): 254 (2016)

[ABL27371], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. In primary tall forest on termite nest on tree. Leg. M. Cáceres & A. Aptroot (no 27371), 20 August 2015, det. A. Aptroot 2015. - Description. Thallus thin, under 0.1 mm thick, indeterminate, somewhat shiny, smooth, olive green, without prothallus. Algae chlorococcoid, ca. 9–12 x 6–8 µm. Apothecia abundant, immersed to emergent, often partly covered by the thallus, 0.15–0.25 mm diam., pale ochraceous, disc deeply concave, medium brown, shiny, initially almost closed and then ascomata perithecioid with ostiole ca. 0.1 mm wide. Margin dull, ca. 0.1 mm wide, pale ochraceous, much higher than the disc. Excipulum pale brown, 15–20 µm thick. Hymenium gel IKI–, hyaline, 85–105 µm high; filaments of two types: unbranched, ca. 1.5 µm, septate and somewhat thickened towards the tips, and anastomosing, ca. 0.5 µm, and without recognizable tips. Asci IKI–, pyriform, 55–80 x 10–17 µm, upper part much thickened and with thin elongated ocular canal. Ascospores hyaline, IKI–, ellipsoid, 1-septate, 10–12 x 4.0–5.0 µm, ends rounded. Pycnidia not observed. Chemistry: Thallus UV–, C–, P–, K–. TLC: No substances detected.





Absconditella termitariicola

Agonimia allobata (Stizenb.) P. James, Lichenologist 24(4): 366 (1992)
= *Amphoroblastia allobata* (Stizenb.) Servít, Českoslov. Lišejn. Čeledi Verrucariaceae: 61 (1954)
= *Polyblastia allobata* (Stizenb.) Zschacke, Hedwigia 60: 8 (1919)
= *Verrucaria allobata* Stizenb., Ber. Tät. St Gall. naturw. Ges.: 501 (1882) [1880-81]

[ABL13682], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13582), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus thin, blackish, gelatinose. Perithecia globose, 0.12-0.15 mm diam. Exciplum blackish. Periphyses short. Ascospores 8/asus, hyaline, 8-10/3-septate, 13-33(-36) x 11-14 µm, hymenium I weak redish.





Agonimia allobata

Aggregatorygma isidiatum Aptroot, L.A. Santos & M. Cáceres, Fungal Diversity Notes: 1845 (2024).

[ABL27452(b)], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27452(b)), 20 August 2015, det. A. Aptroot 2015. - Thallus crustose, discontinuous, following the surface of the substratum, not corticate, dull, pale creamish white, up to 5 cm diam., under 0.1 mm thick, not surrounded by a prothallus. Isidia of thallus colour, not corticate, irregularly globose with constricted base, 0.1–0.2 mm wide and high. Photobiont trentepohlioid. Ascomata and pycnidia not observed. Chemistry: Thallus UV–, K–, P–. TLC: confluentic acid.





Aggregatorygma isidiatum

Allographa ruiziana (Fée) Lücking & Kalb, Herzogia 31(1, Teil 2): 555 (2018)
= *Graphina ruiziana* (Fée) Müll. Arg., Flora, Regensburg 63(2): 20 (1880)
= *Graphis ruiziana* (Fée) A. Massal., Memor. Lich.: 111 (1853)
= *Opegrapha ruiziana* Fée, Essai Crypt. Exot. (Paris): 27 (1825) [1824]
= *Stenographa ruiziana* (Fée) Arnold, Flora, Regensburg 53(30–31): 481 (1871) [1870]

[ABL40243], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40243), 29 October 2016, det. A. Aptroot 2016 - Thallus without lichen substances; ascocarps sessile, short, without thalline margin, with entire, completely carbonized excipulum, with concealed disc, and often with a weakly pruinose zone along the slit; hymenium clear; ascospores muriform, ca. 8/ascus, ca. 30 × 15 µm, ca. 8 × 2–3 locules.





Allographa ruiziana

Astrothelium aeneoides Aptroot, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 714 (2016)

[ABL40218], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40218), 29 October 2016, det. A. Aptroot 2016 - Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤ 8 cm diam., c. 0.2 mm thick, olive-green to olivegrey, not surrounded by a prothallus, not inducing gall formation of the host bark. Ascomata globose, 0.7–1.0 mm diam., immersed in groups of 2–5 in pseudostromata with surfaces different from that of the thallus and which are distinctly raised above the thallus, irregular to often linear in outline, sides sloping, whitish mottled with orange inside with a cream layer containing bark tissue. Wall dark brown all around, ≤ c. 70 µm thick. Ostioles apical, not fused, flat to concave, brown. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 20–25 ×6–9 µm, ends rounded, lumina diamond-shaped, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus surface UV−, thallus medulla K−; pseudostroma surface UV+ pink to orange, medulla of pseudostroma K+ blood red. TLC: an anthraquinone, probably parietin.





Astrothelium aeneoides

Astrothelium bullatum Flakus & Aptroot, in Flakus, Kukwa & Aptroot, Lichenologist 48(6): 665 (2016)

[ABL27399], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27399), 20 August 2015, det. A. Aptroot 2015. - Thallus corticate, with corticiform layer 30–50 µm thick, strongly bullate, inducing swellings of the host bark, somewhat shiny, discontinuous, covering areas ≤8 cm diam., c. 2.5 mm thick, greyish green, without prothallus, with a thick, white medullary layer incrusted with colourless crystals not dissolving in K. Ascomata globose, 0.8–1.0 mm diam., single to aggregated, totally immersed in thallus verrucae, irregular in outline, greyish green, thalline cover without bark tissue. Wall fully carbonized, not differentiated into excipulum and involucrellum, ≤ c. 90 µm wide. Ostioles mostly eccentric, not fused, flat to convex, concolourous with the thallus. Hamathecium clear. Asci 8-spored. Ascospores hyaline, I+ violet, densely muriform, without distinctly thickened median septa, narrowly ellipsoid, 140–200 × 30–45 µm, ends rounded, lumina diamond-shaped, surrounded by an ≤5 µm thick gelatinous layer. Pycnidia not observed. Chemistry: Thallus surface UV−, K−, thallus medulla K−; pseudostromata surface UV−, inner part of pseudostromata K−. TLC: no secondary substances detected.





Astrothelium bullatum

Astrothelium ferrugineum (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 860 (2016)
= *Trypethelium ferrugineum* Müll. Arg., Bot. Jb. 6: 392 (1885)

[ABL40253], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40253), 29 October 2016, det. A. Aptroot 2016 - Thallus corticate, olive-green but sparsely covered by orange pigment, uneven to shallowly verrucose. Ascomata astrothelioid, several chambers joined with eccentric, fused ostioles; joined ascomata pseudostromatic; pseudostromata 0.8–1.5 mm diam., prominent, covered by thallus and sparse orange pigment except for the blackish ostioles. Hamathecium clear. Ascospores 8 per ascus, 3-septate, 20–27 × 7–10 µm, hyaline, IKI−. Chemistry: Thallus and pseudostromata UV+ red, K+ purple, with anthraquinone.

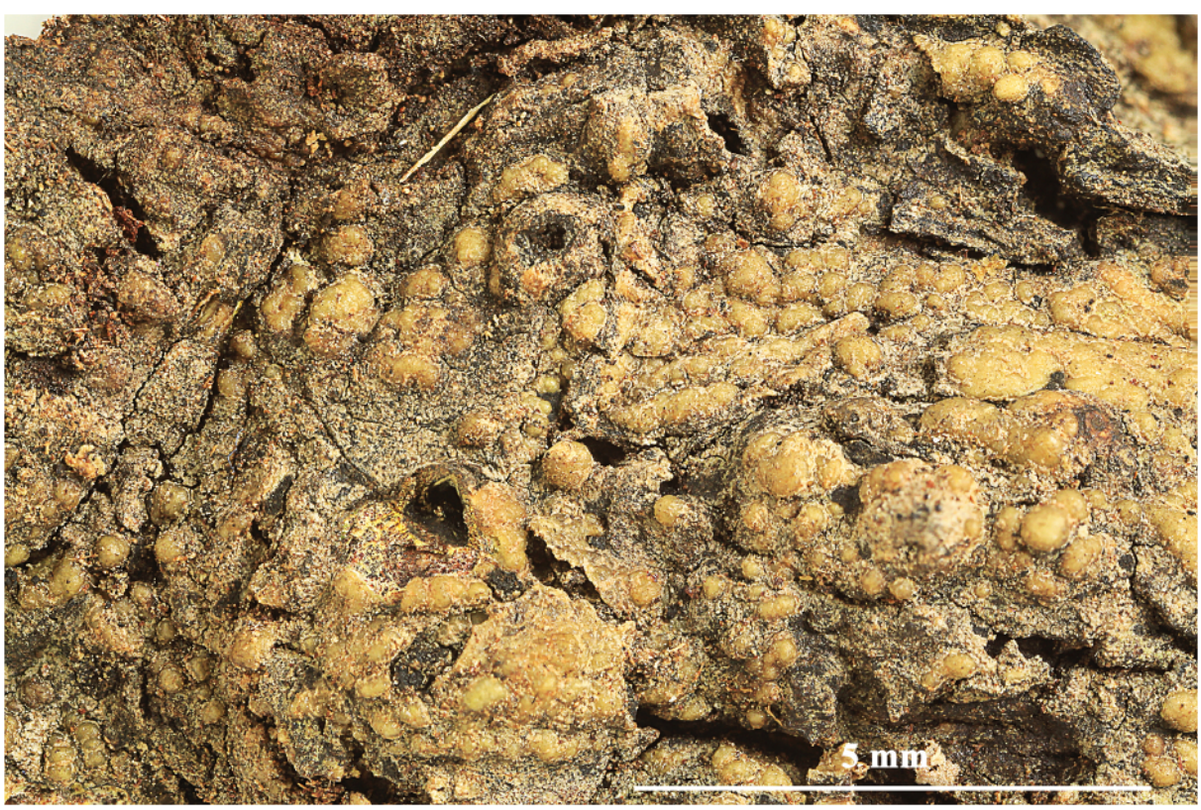




Astrothelium ferrugineum

Astrothelium flavomeristosporum Aptroot, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 617 (2016)

[ABL27373], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27373), 20 August 2015, det. A. Aptroot 2015. - Thallus corticate, smooth, somewhat shiny, continuous, greyish green, covering areas ≤9 cm diam., c. 0.2 mm thick, surrounded by a black prothallus line c. 0.1 mm wide, not inducing gall formation of the host bark. Ascomata globose, 0.8–1.2 mm diam., mostly single, occasionally 2 aggregated, in hemispherical brown pseudostromata without thallus cover. Wall carbonized, ≤ c. 120 µm thick. Ostioles apical, concave, ochraceous to brown. Hamathecium yellow to orange (at least partly), inspersed with oil globules. Asci with 4–8 ascospores. Ascospores hyaline, muriform, ellipsoid, 140–200 × 25–30 µm, with distinctly thickened median septum, ends rounded, not surrounded by a gelatinous layer. Chemistry: Thallus and pseudostromata K−, UV−. TLC: no secondary substances detected.



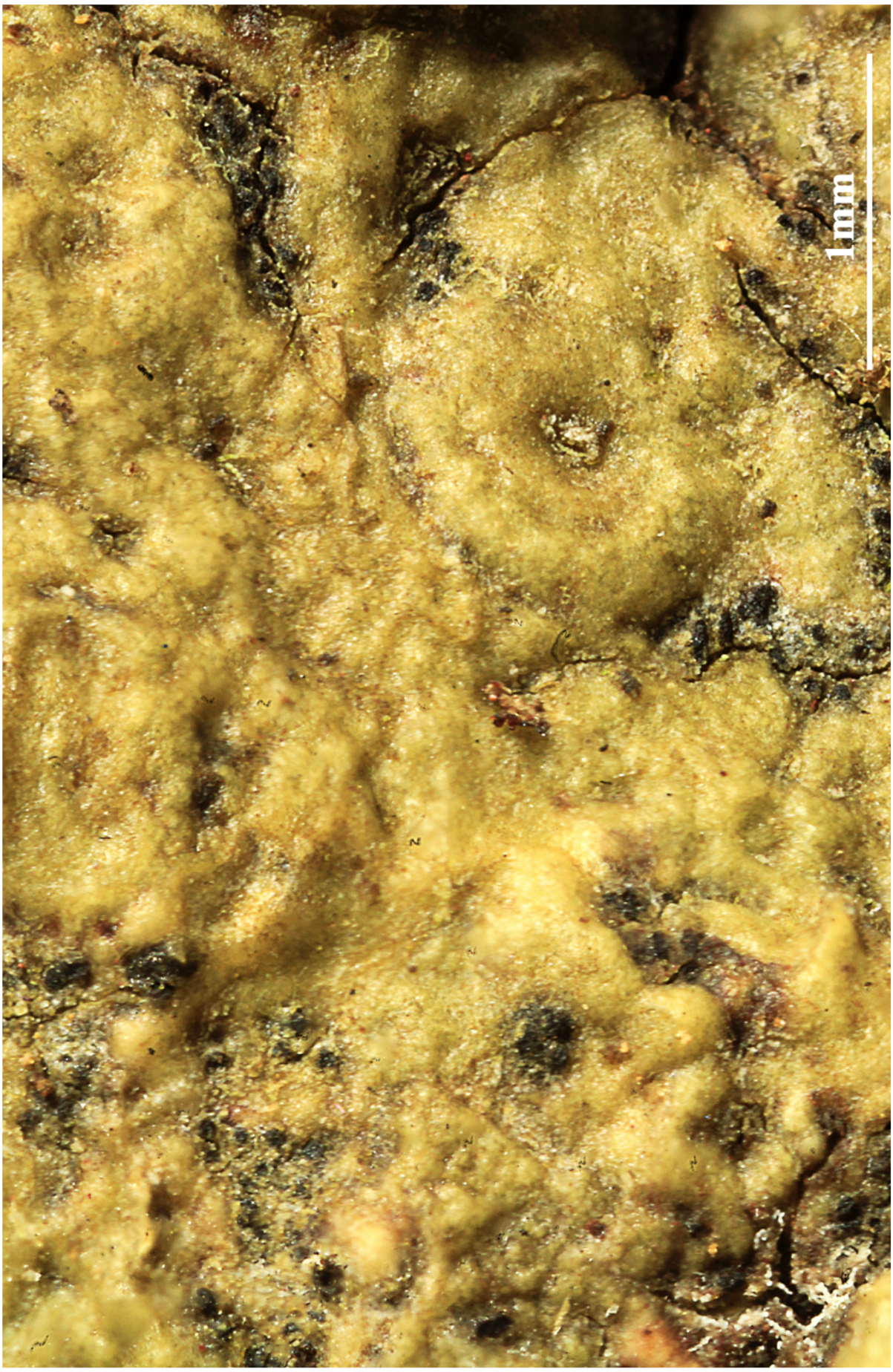


Astrothelium flavomeristosporum

Astrothelium flavomurisporum Aptroot & M. Cáceres, Lichenologist 48(6): 701 (2016)

[ABL40244], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40244), 29 October 2016, det. A. Aptroot 2016 - Thallus corticate, minutely bullate, somewhat shiny, continuous, covering areas ≤ 7 cm diam., c. 0.2 mm thick, olive-green, not surrounded by a prothallus, not inducing gall formation of the host bark. Ascomata pyriform, 0.5–0.7 mm diam., 2–5 aggregated, deeply immersed in the bark, visible only from above by the ostioles, without pseudostroma. Wall carbonized, ≤ c. 70 µm thick. Ostioles eccentric, brown, flat to concave. Hamathecium not inspersed. Ascospores 8 per ascus, hyaline, muriform, long, ellipsoid, 165–200 × 28–35 µm, not surrounded by a gelatinous layer, lumina with yellow oil, central septum much thickened. Pycnidia not observed. Chemistry: Thallus and medulla UV−, K−. TLC: no secondary substances detected.





Astrothelium flavomurisporum

Astrothelium gigantosporum (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 861 (2016)

= *Bathelium gigantosporum* Müll. Arg., Bot. Jb. 6: 394 (1885)

= *Laurera gigantospora* (Müll. Arg.) Zahlbr., in Engler & Prantl, Nat. Pflanzenfam., Teil. I (Leipzig) 1(1*): 71 (1903)

[ABL27097], Brazil, Amapá, near Provoado Abacate da Pedreina, km 34 on AP 070. 0°15' N, 50°55' W, 30 m, On tree bark in cerrado. Leg. M. Cáceres & A. Aptroot (no 27097), 18 August 2015, det. A. Aptroot 2015. - Thallus corticate, olive-green, smooth to uneven. Ascomata with apical ostioles, erumpent to prominent, covered by thallus except for dark ostioles surrounded by whitish rim. Hamathecium clear. Ascospores 2/ascus, densely muriform, 200–250 × 50–65 µm, first hyaline, then dark brown. IKI-. Chemistry: UV-, K-, TLC: no lichen substances detected.





Astrothelium gigantosporum

Astrothelium introflavidum Aptroot & M. Cáceres, in Cáceres & Aptroot, Bryologist 120(2): 172 (2017)

[ABL40248], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40248), 29 October 2016, det. A. Aptroot 2016 - Description. Thallus dull, up to 0.2 mm thick, olivaceous green, not surrounded by a prothallus. Ascomata globose to pyriform, 0.2–0.4 mm diam., deeply immersed in and below pseudostromata, in groups of 6–25. Pseudostroma not much differentiated from the thallus, c. 1–3 mm diam., ellipsoid to elongated or branched, internally pigmented with bright yellow crystals. Ostioles eccentric, fused, black, surrounded by a c. 0.1 mm wide ochraceous ring. Hamathecium not inspersed, IKI–. Ascospores 8/ascus, hyaline, 6–7-septate, 32–35 x 7–8 µm, longellipsoid, without distinctly thickened septa, not surrounded by a gelatinous sheath. Pycnidia not observed. Chemistry: Thallus UV–, C–, K–, KC–, P–; pseudostroma inside with yellow crystals, UV–, C–, P–, K+ blood red. TLC: An anthraquinone, probably parietin.





Astrothelium introflavidum

Astrothelium komposchii Aptroot, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 620 (2016)

[ABL27425], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27425), 20 August 2015, det. A. Aptroot 2015. - Thallus green, discontinuous, consisting of irregularly sinuose to moniliform rows of flattened, almost squamulose thallus lobes which mostly consist of a hyaline cortex ≤150 µm, not surrounded by a prothallus, not inducing gall formation of the bark. Ascomata almost globose, 0.8–1.3 mm diam., single, immersed in the bark below raised parts of the thallus. Wall carbonized, ≤c. 90 µm thick. Ostioles apical to rarely eccentric, not fused, erumpent, chimneylike, glossy olive-brown outside, black inside. Hamathecium inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, muriform, fusiform, 130–180 ×35–45 µm, bent, ends rounded, with a markedly thickened median septum, without gelatinous sheath. Chemistry: Thallus and pseudostromata UV−, K−. TLC: no secondary substances detected.





Astrothelium komposchii

Astrothelium nigratum (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 872 (2016)
= *Astrothelium minus var. nigratum* Müll. Arg., Bot. Jb. 6: 382 (1885)

[ABL28977], Brazil, Tocantins, near Itaguatin. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28977), 23 October 2016, det. A. Aptroot 2016. - Thallus corticate, olive-brown, smooth to uneven. Ascomata trypetheli-oid, with apical ostioles, diffusely pseudostromatic, 0.2–0.3 mm diam., immersed-erumpent, exposed and brownblack. Hamathecium clear. Ascospores 8 per ascus, 3-septate, fusiform-ellipsoid, 20–27 × 7–10 µm, hyaline, IKI−. Chemistry: Thallus and pseudostromata UV−, K−. TLC: no substances detected.

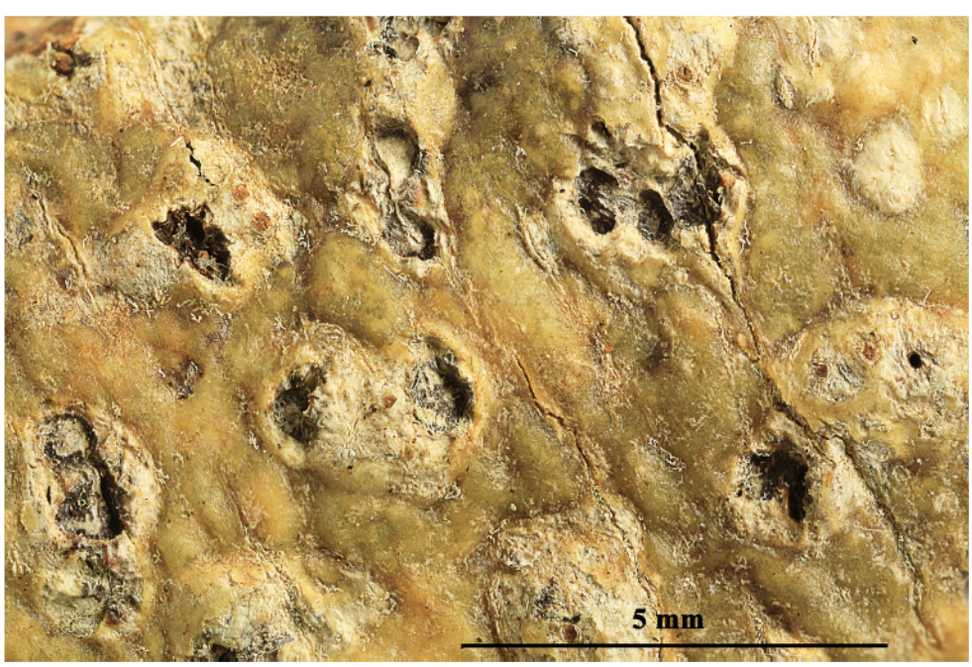




Astrothelium nigratum

Astrothelium norisianum Lücking, M.P. Nelsen & Aptroot, in Lücking, Nelsen, Aptroot, Benatti, Binh, Gueidan, Gutiérrez, Jungbluth, Lumbsch, Marcelli, Moncada, Naksuwankul, Orozco, Salazar-Allen & Upreti, Lichenologist 48(6): 651 (2016)

[ABL40189], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40189), 29 October 2016, det. A. Aptroot 2016 - Thallus crustose, corticolous, continuous, ≤ 15 cm diam., uneven to coarsely bumpy with bumps 1–5 mm diam. (gall-forming), very pale olive-yellow; in section with thick, cartilaginous cortex and with photobiont layer and thick medulla immersed in the modified periderm. Perithecia 5–10 aggregated and completely immersed in irregular to linear pseudostromata, with lateral, fused ostioles; pseudostromata 2–5 mm long and 1–3 mm wide, immersed but often developed on galls, often anastomosing, uneven, covered with a whitish layer, with one to several shared ostioles; ostioles papilliform, 0.05–0.10 mm diam., brownish; individual perithecia pyriform, arranged laterally with ostiolar channels oriented and fused irregularly, 0.3–0.5 mm wide and ≤ 1 mm long (‘high’). Excipulum in section 20–30 µm thick, dark brown to weakly carbonized; space between individual perithecia filled with amorphous, orange-brown tissue. Hamathecium composed of densely anastomosing, 0.5 µm thick, net-like paraphyses embedded in a gelatinous matrix, clear, IKI−; upper part of hamathecium and ostiolar channel strongly inspersed. Ascospores 1–2 per ascus, oblong-ellipsoid, densely muriform with distinct median constriction and thick outer wall, 150–200 × 50–60 µm, hyaline, IKI−. Secondary chemistry: Thallus and pseudostromata with lichexanthone, UV+ yellow.





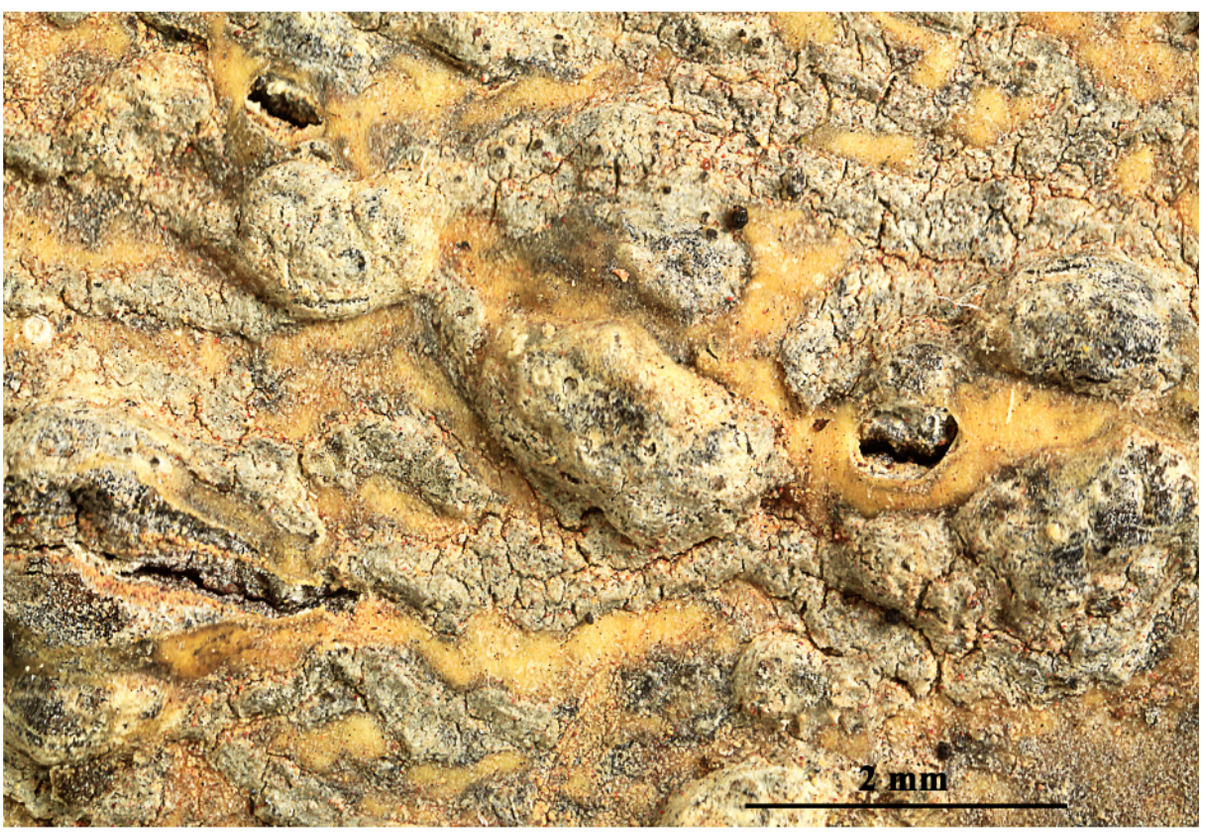
Astrothelium norisianum

Astrothelium pulcherrimum (Fée) Aptroot & Lücking, Lichenologist 48(6): 881 (2016)

= *Pseudopyrenula pulcherrima* (Fée) Vain., Acta Soc. Fauna Flora fenn. 7(no. 2): 208 (1890)

= *Trypethelium pulcherrimum* Fée, Annls Sci. Nat., sér. 1 23: 450 (1831)

[ABL27484], Brazil, Amapá, Mazagão, NE of Reserva extrativista Moracá, Ramal do Camaipi between BR 116 and Mazagão. . 0°03' S, 51°27' W, 30 m. On tree bark in cerrado. Leg. M. Cáceres & A. Aptroot (no 27484), 21 August 2015, det. A. Aptroot 2015. - Thallus corticate, light olive-brown to brownish greenish grey to yellowish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary but usually dense, 0.2–0.3 mm diam., erumpent, covered by thallus except dark ostioles surrounded by whitish rim. Hamathecium clear. Ascospores 8 per ascus, fusiform-ellipsoid, 3-septate, 15–27 × 7–10 µm, hyaline, IKI−. Chemistry: Thallus and ascomata UV+ yellow, K−, with lichexanthone (or 1,8-dihydroxy-3,6-dimethoxyxanthone).





Astrothelium pulcherrimum

Astrothelium pulcherrimum (Fée) Aptroot & Lücking, Lichenologist 48(6): 881 (2016)

= *Pseudopyrenula pulcherrima* (Fée) Vain., Acta Soc. Fauna Flora fenn. 7(no. 2): 208 (1890)

= *Trypethelium pulcherrimum* Fée, Annls Sci. Nat., sér. 1 23: 450 (1831)

[ABL28796], Brazil, Tocantins, near Itaguatins. 5°44'58" S, 47°32'24" W, 150 m. In cerrado on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28796), 22 October 2016, det. A. Aptroot 2016. - Thallus corticate, light olive-brown to brownish greenish grey to yellowish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary but usually dense, 0.2–0.3 mm diam., erumpent, covered by thallus except dark ostioles surrounded by whitish rim. Hamathecium clear. Ascospores 8 per ascus, fusiform-ellipsoid, 3-septate, 15–27 × 7–10 µm, hyaline, IKI−. Chemistry: Thallus and ascomata UV+ yellow, K−, with lichexanthone (or 1,8-dihydroxy-3,6-dimethoxyxanthone).





Astrothelium pulcherrimum

Astrothelium punctulatum Malme, Ark. Bot. 19(no. 1): 14 (1924)

[ABL27103], Brazil, Amapá, near Provoado Abacate da Pedreina, km 34 on AP 070. 0°15' N, 50°55' W, 30 m, On tree bark in cerrado. Leg. M. Cáceres & A. Aptroot (no 27103), 18 August 2015, det. A. Aptroot 2015. - Thallus corticate, olive-green to greyish, verrucose-bullate, somewhat pseudogallinducing. Ascomata trypethelioid, with apical ostioles, solitary to confluent but often dense, 0.8–1.5 mm diam., immersed-erumpent in elevated thallus portions, covered by thallus except for dark ostiole surrounded by white ring. Hamathecium heavily inspersed. Ascospores 8 per ascus, fusiform-ellipsoid, 3-septate, 23–27 × 8–9 µm, hyaline, IKI−. Chemistry: Thallus UV−, K−; ostioles UV+ yellow, K−, with lichexanthone.

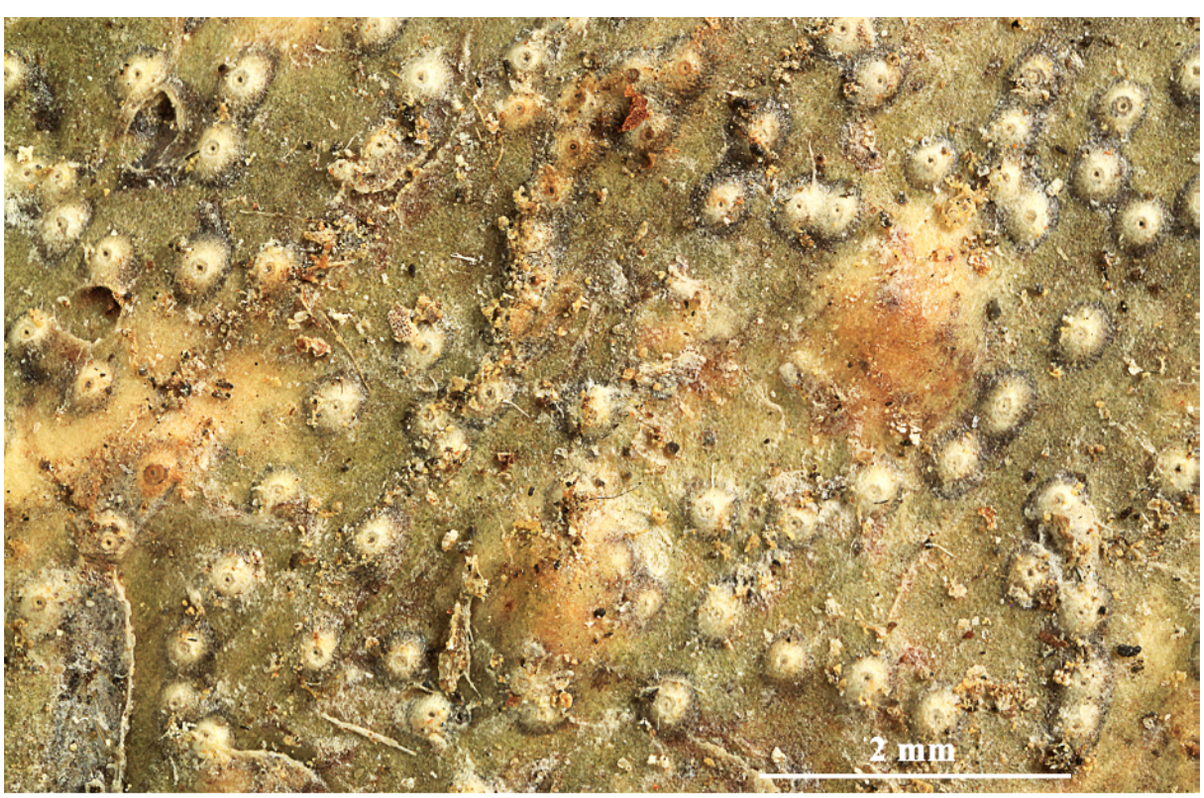




Astrothelium punctulatum

Astrothelium pupula (Ach.) Aptroot & Lücking, Lichenologist 48(6): 882 (2016)
= *Ocellularia pupula* (Ach.) Spreng., Syst. veg., Edn 16 4(1): 242 (1827)
= *Pseudopyrenula pupula* (Ach.) Müll. Arg., Flora, Regensburg 68: 331, 338 (1885)
= *Pyrenula pupula* Ach., Syn. meth. lich. (Lund): 123 (1814)
= *Segestria pupula* (Ach.) Trevis., Conspect. Verruc.: 6 (1860)
= *Trypethelium pupula* (Ach.) R.C. Harris, Lichenogr. Thomsoniana, North American Lichenology in Honor of John W. Thomson (Ithaca): 146 (1998)

[ABL27145], Brazil, Amapá, near Provoado Abacate da Pedreina, km 34 on AP 070. 0°15' N, 50°55' W, 30 m, On tree bark in cerrado. Leg. M. Cáceres & A. Aptroot (no 27145), 18 August 2015, det. A. Aptroot 2015. - Thallus corticate, greyish green to yellowish (lichexanthone colour), smooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary, 0.4–0.6 mm diam., erumpent, covered by thallus except for blackish ostiolar area. Hamathecium clear. Ascospores 8 per ascus, fusiform-ellipsoid, 3-septate, 33–40 × 10–13 µm, hyaline, IKI−. Chemistry: Thallus and ascomata UV+ yellow, K−. TLC: lichexanthone.

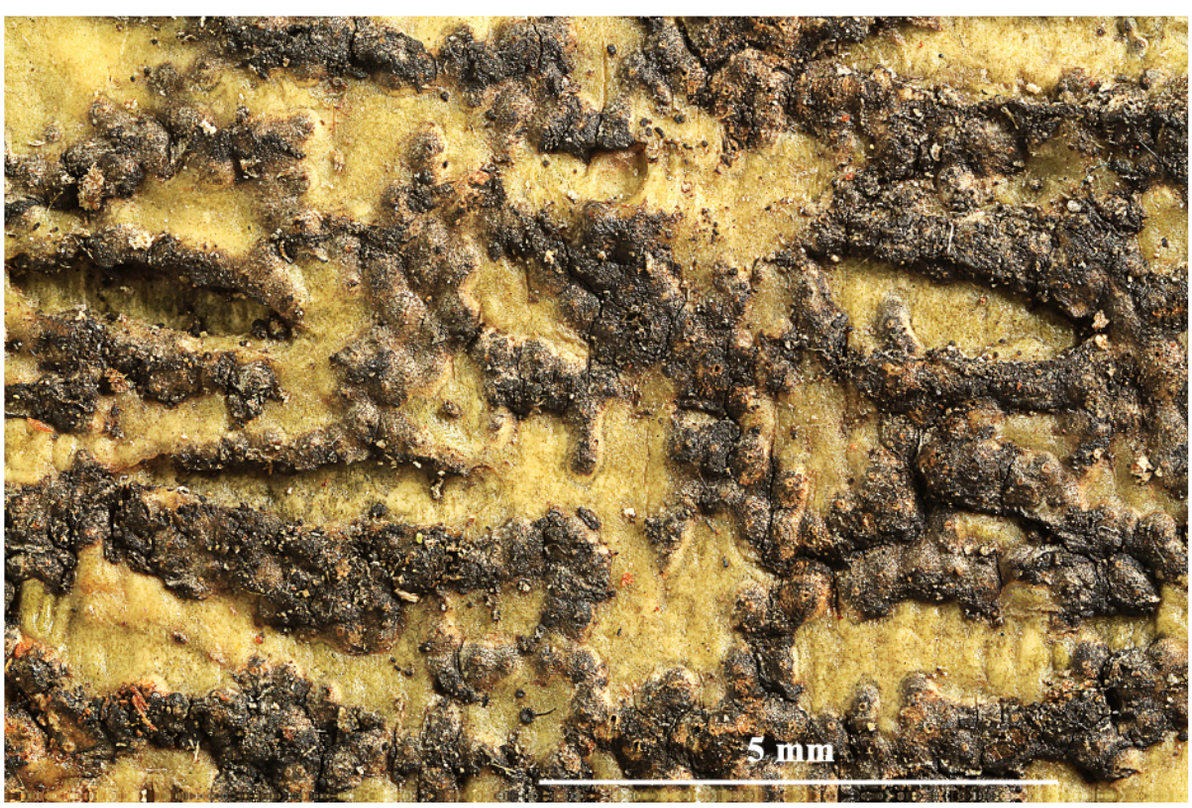




Astrothelium pupula

Astrothelium subendochryseum Lücking, M.P. Nelsen & Marcelli, in Lücking, Nelsen, Aptroot, Benatti, Binh, Gueidan, Gutiérrez, Jungbluth, Lumbsch, Marcelli, Moncada, Naksuwankul, Orozco, Salazar-Allen & Upreti, Lichenologist 48(6): 653 (2016)

[ABL40220], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40220), 29 October 2016, det. A. Aptroot 2016 - Thallus crustose, corticolous, continuous, ≤ 7 cm diam., bullate, olive-green; in section with thick, cartilaginous cortex and distinct, epiperidermal photobiont layer, and thick medulla. Perithecia 10–30 aggregated in irregular pseudostromata, with separate, apical ostioles; pseudostromata 1–3 mm diam., erumpent to prominent, ≤ 1mm high, laterally covered by an olive-green thallus layer but individual perithecia exposed in upper part, dark grey-brown; ostioles visible as black dots, 0.05–0.10 mm diam.; individual perithecia pyriform, 0.25–0.35 mm wide and 0.3–0.5´mm high. Excipulum in section 30–60 µm thick, carbonized. Hamathecium composed of densely anastomosing, 0.5 µm thick, net-like paraphyses embedded in a gelatinous matrix, clear, IKI−; ostiolar channel clear. Ascospores 8 per ascus, fusiform, 3-septate with distosepta and diamond-shaped lumina, 22–25 × 8–10 µm, hyaline, IKI−. Secondary chemistry: No substances detected.

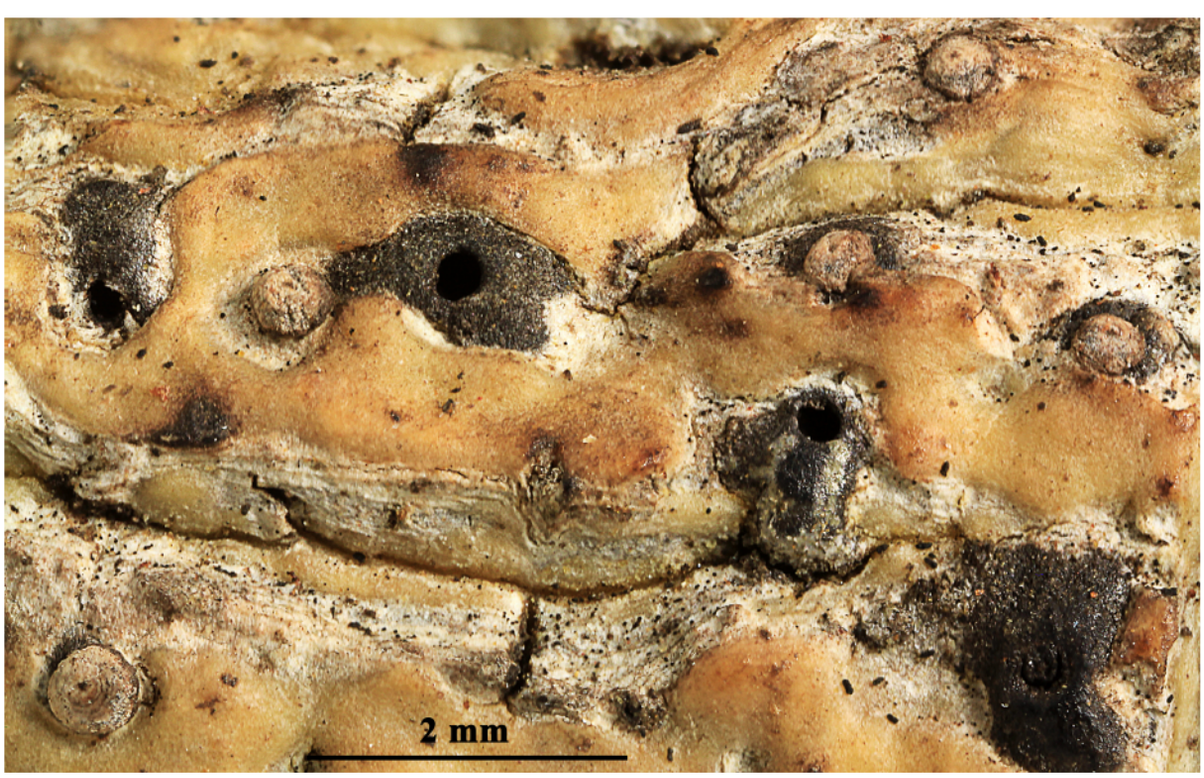




Astrothelium subendochryseum

Astrothelium supraclandestinum Aptroot & M. Cáceres, Lichenologist 48(6): 709 (2016)

[ABL27268], Brazil, Amapá, Flona, Floresta Nacional do Amapá, near station. 0°55' N, 51°36' W, 30 m. On tree bark in disturbed forest. Leg. M. Cáceres & A. Aptroot (no 27268), 19 August 2015, det. A. Aptroot 2015.- Thallus corticate, smooth to somewhat bullate, somewhat shiny, continuous, covering areas ≤7 cm diam., c. 0.1 mm thick, greenish grey, surrounded by a prothallus line c. 0.2 mm wide, infrequently inducing semiglobose galls of the host bark (lower bark locally swollen and erupting through bark). Ascomata pyriform, c. 0.5–0.8 mm diam., mostly 2–5 aggregated, mostly immersed in the bark tissue below pseudostromata. Pseudostromata indistinctly delimited, not corticate, ochraceous or concolorous with the thallus, not much raised above the thallus, ≤ 2 mm diam., rounded to somewhat irregular in outline. Wall black, ≤ c. 60 µm thick. Ostioles eccentric, fused, flat to convex, brown to black. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 5-septate, fusiform, 50–75 × 14–22 µm, ends rounded, lumina diamond-shaped, surrounded by a gelatinous layer ≤ 2 µm thick. Pycnidia frequent, in the pseudostromata. Chemistry: Thallus surface UV−, thallus medulla K−; pseudostroma UV−, K−. TLC: no secondary substances detected.

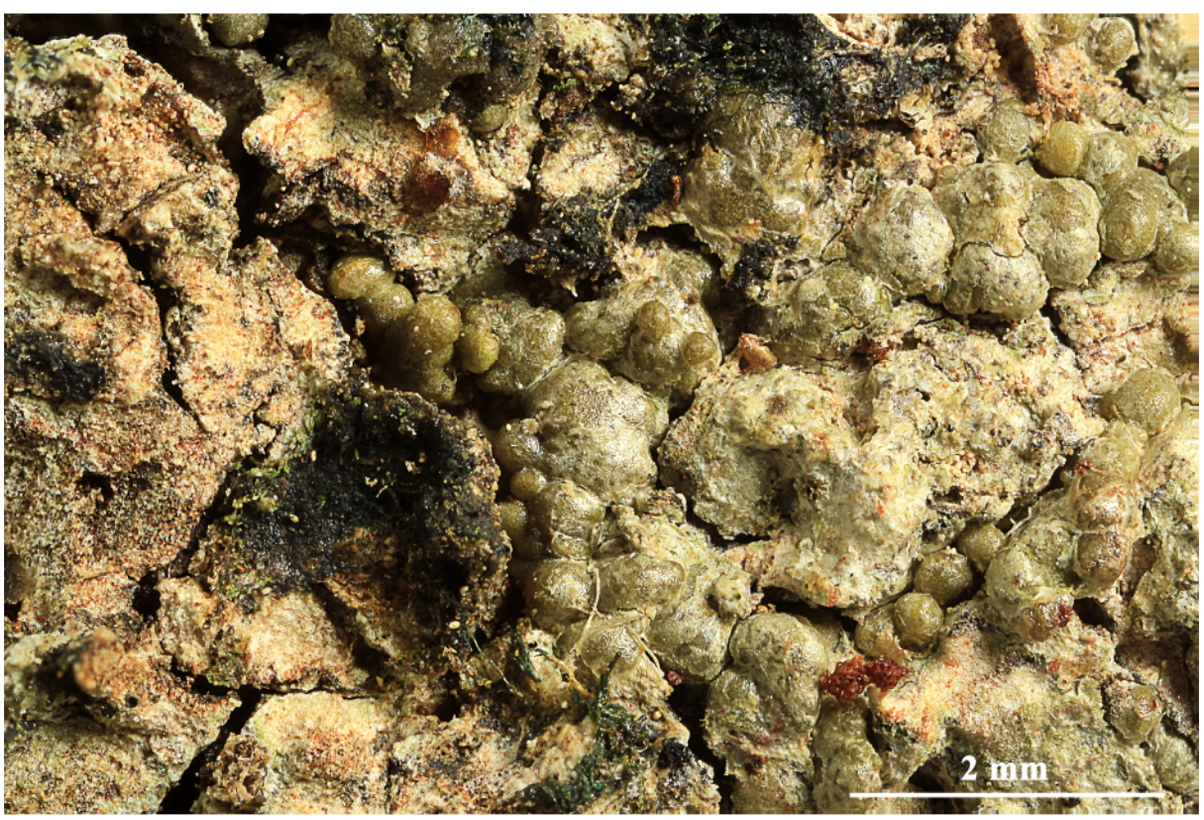




Astrothelium supraclandestinum

Astrothelium tetrasporum Aptroot & M. Cáceres, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 721 (2016)

[ABL13676], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13676), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus corticate, discontinuous, consisting of sinuose to moniliform rows of globose to slightly flattened bullate areas that become locally almost like thick squamules, which mostly consist of a hyaline cortex of ≤ 230 µm, somewhat shiny, covering areas ≤ 10 cm diam., olive-green. Ascomata pyriform, 0.7–1.3 mm diam., single, immersed in the thallus. Wall carbonized, ≤ c. 70 µm thick. Ostioles apical to eccentric, not fused, erumpent, brown, chimney-like. Hamathecium not inspersed with oil globules. Asci with 4 ascospores. Ascospores hyaline, muriform, fusiform, 145–175 × 30–35 µm, ends rounded, when young with a markedly thickened median septum, with two c. 5 µm thick polar gelatinous caps. Pycnidia not observed. Chemistry: Thallus surface UV−, thallus medulla K−. TLC: no secondary substances detected.





Astrothelium tetrasporum

Bacidia millegrana (Taylor) Zahlbr., in Wawra & Beck, Itin. Princ. S. Coburgi 2: 152 (1888)

= *Biatora luteola* var. *millegrana* (Taylor) Tuck., Gen. lich. (Amherst): 166 (1872)

= *Lecanora millegrana* Taylor, London J. Bot. 6: 159 (1847)

= *Lecidea millegrana* (Taylor) Nyl., Flora, Regensburg 41: 380 (1858)

= *Patellaria millegrana* (Taylor) Müll. Arg., Flora, Regensburg 63(18): 280 (1880)

[ABL13648], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13648), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus corticolous, effuse, wrinkled, brown black margined, granulose to verrucose, verrucae of different sizes, whitish yellow to pale brownish, rather characteristic, 54-150 µm thick. Apothecia sparse to dense, sessile, 0.2-1(-l.3) mm in diameter; uniformly brown to dark brown of variegated brown; disc plane to slightly convex, slightly pruinose; margin entire, distinct, initially pale brown, later brown, slightly thinner in mature apothecia but never excluded. Exciple colourless to pale yellow, 76-104 µm thick at margin, K-. Epithecium brown, 12-16 µm thick, K-; hymenium 80-96 µm thick, I + blue then vinose red; hypothecium colourless to pale yellow, 40-62 µm thick, K-. Spores acicular, transversely 10-15(-19)-septate, 42-78 x 3.2-4 µm; paraphyses simple to branched, thickened at apices. Thallus K + yellow, P + yellow. TLC: Atranorin, barbatic acid and brown spot at Rf value 0.57.





Bacidia millegrana

Bacidia testacea Malme, Ark. Bot. 27A(no. 5): 15, 22 (1935)

[ABL13647], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13647), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus thin greyish white, K-. Apothecia sessile, 0.5-1.2 mm diam., disc brownish, margin of the same colour. Hymenium 70-80 µm, I+ blue. Paraphyses simple, 1-1.5 µm thick. Spores 38-50 x 2.5-3 µm, 7-9-septate.





Bacidia testacea

Bacidiopsora silvicola (Malme) Kalb, Biblthca Lichenol. 88: 305 (2004)
= *Bacidia silvicola* Malme, Ark. Bot. 27A(no. 5): 15, 28 (1935)

[ABL27339], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27339), 20 August 2015, det. A. Aptroot 2015. - Exciple hyaline, spores c. 50 x 2 µm, multiseptate.



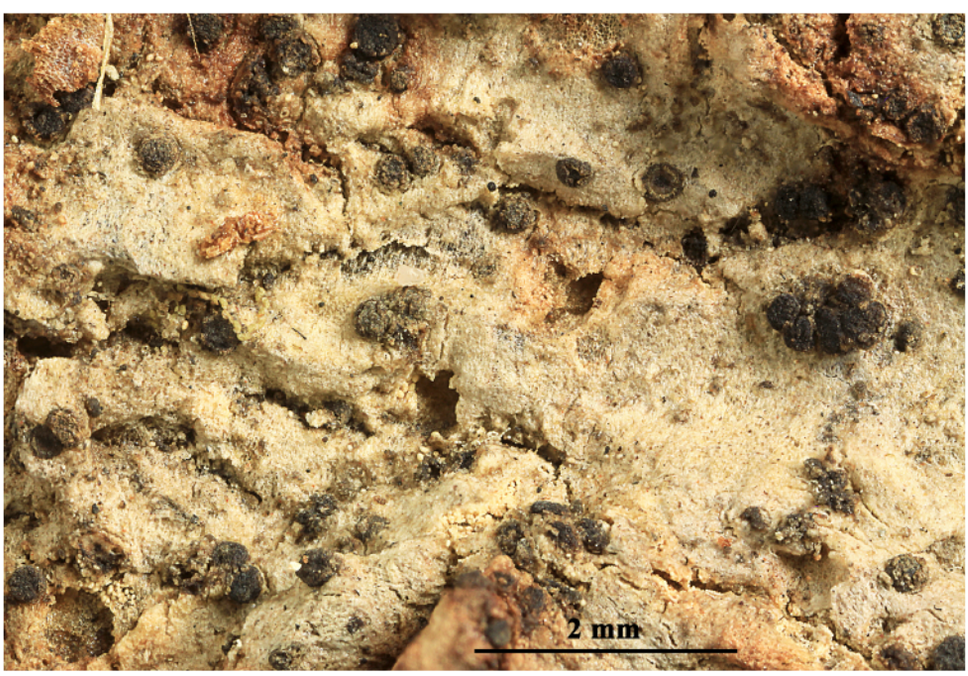




Bacidiopsora silvicola

Bactrospora myriadea (Fée) Egea & Torrente, Lichenologist 25(3): 245 (1993)
= *Coniocarpon myriadeum* Fée 1825

[IM88], Brazil, Paraná, Ila do Mel, on tree bark in Restinga. Leg. E. Gumboski & S. Elisaro, 2015 (IM88). det. A. Aptroot, 2015. - Thallus crustose, whitish continuous or slightly cracked, thin, effuse, mostly endophloeodal; prothallus usually indistinct, sometimes forming a thin, dark brown border around the thallus; I -, K/I - or slightly blue. Ascomata numerous, black, sessile, scattered, roundish or slightly irregular in outline, 0.2-0.7 mm diam., epruinose, with a distinct, smooth margin, rarely indistinct at maturity; disc plane to slightly convex, with smooth surface. Excipulum dark brown to carbonaceous, well-developed, closed or open below the subhymenium, 25-50 µm at the top and 65-120 µm at the base; with yellowish to reddish granules in the outer part of the excipulum under polarized light, I - , K/I -. Hymeniurn 100-125 µm, I+ reddish, K/I+ pale blue turning reddish. Subhymenium pale brown, 50-75 µm, I+ reddish, K/I+ pale blue, turning reddish. Apical cells of paraphysoids not or slightly thickened, richly branched and densely interwoven but not reticulate, included in a brownish gelatinous matrix with the same sort of crystalline inclusions as the excipulum. Asci 70-95(-110) x 9-12 µm. Ascospores of Patellarioides-type, 47-85(-90) x 2-3(-3.5) µm, 12-20-septate. Pycnidia immersed or semi-immersed in the thallus, punctiform, globose to subglobose, 80 µm tall and 90 µm wide; pycnidial wall apically brown, at the base pale brown. Conidia 5-7 x 1 µm, straight. Chemistry: One unidentified substance, 5,6,6 Rf classes, fluorescing at 254 and 350 nm and turning greyish green after acid and heat treatment.





Bactrospora myriadea

Caloplaca aphanotripta (Nyl.) Zahlbr., Cat. Lich. Univers. 7: 65 (1930) [1931]

= *Lacrima aphanotripta* (Nyl.) Bungartz, Søchting & Arup, in Bungartz, Søchting & Arup, Plant and Fungal Systematics 65(2): 534 (2020)

= *Lecanora aphanotripta* Nyl., Lich. Japon.: 104 (1890)

= *Placodium aphanotripta* (Nyl.) Eckfeldt, Bull. Torrey bot. Club 19(8): 249 (1892)

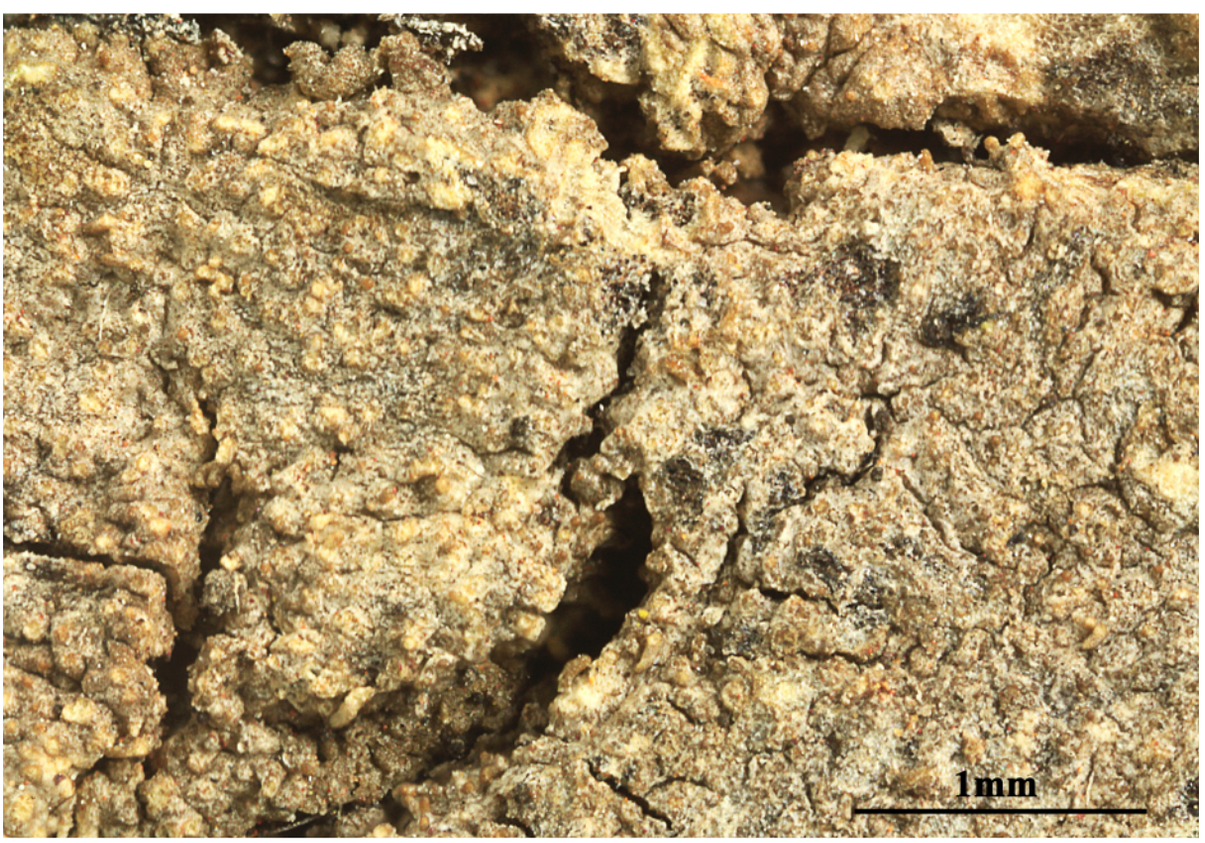
= *Placodium aphanotriptum* (Nyl.) Eckfeldt, Bull. Torrey bot. Club 19(8): 249 (1892)

[ABL28801], Brazil, Tocantins, near Itaguatins. 5°44'58" S, 47°32'24" W, 150 m. In cerrado on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28801), 22 October 2016, det. A. Aptroot 2016. - Thallus thin and very poorly developed, either as a whitish to pale bluish green, membranaceous hypothallus, or as a waxy, continuous to barely rimose crust, not distinctly delimited, effuse; surface dark olive gray, smooth, dull, epruinose, very densely covered by slightly darker, small, granular to ± coralloid to almost subsquamulose isidia that are irregularly grouped and ~ 40 µm thick. Apothecia orange to rusty orange, sparse, dispersed, immersed between the isidia, up to 1 mm in diam, 'zeorine' (i.e., with both a distinct thalline and proper margin); thalline margin composed of dark olive gray, irregularly granular isidia, epruinose, C-, K-; proper margin ~0.1 mm thick, initially prominent, later level with the disc, circular to ± flexuose, orange, slightly paler than the disc, epruinose (but in parts reacting C+ red); disc plane to very slightly convex, deep orange to rusty orange, epruinose, C-, K+ purple; epihymenium with orange pigment granules, K+ purple, C+ red, contiguous with the outer exciple; hymenium hyaline, not inspersed; proper exciple differentiated into an inner part lacking crystals, and an outer part with orange pigment granules, K+ purple, C+ red; thalline exciple in section not well developed and disintegrating; subhymenium and hypothecium not differentiated, hyaline, not inspersed; asci clavate, Teloschistes-type; ascospores 8/ascus, polaribilocular, ellipsoid to broadly ellipsoid, (7.0–)8.8–13.3(–16.3) × (3.5–)4.8–7.8(–9.8) µm, with a thick, (2.0–)3.0–6.1(– 8.9) µm wide septum (n = 42). Pycnidia not observed. Chemistry: Thallus and thalline margin P–, K–, C–, KC–, UV– (dull); apothecial disc and proper margin P–, K+ purple, C–, KC+ purplish (fading), UV– (dull); no secondary metabolites detected in the thallus, apothecia with 7-chloroemodin and fragilin.



Caloplaca aphanotripta





Caloplaca aphanotripta

Caloplaca chrysophthalma Degel., Svensk bot. Tidskr. 38: 56 (1944)
= *Solitaria chrysophthalma* (Degel.) Arup, Søchting & Frödén, in Arup, Søchting & Frödén 2013
= *Parmelia parietina f. citrinella* Fr. 1831

[ABL13686], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13586), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus corticolous, very thin crust, pale yellow to green, only partly dissolved into soredia; soralia breaking through cortex, almost crater-like





Caloplaca chrysophthalma

Calopadia editiae Vězda ex Chaves & Lücking [as 'editae'], in Lumbsch et al., Phytotaxa 18: 27 (2011)

[ABL28952], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28952), 23 October 2016, det. A. Aptroot 2016.- Thallus foliicolous or corticolous, continuous or marginally dispersed into rounded, confluent patches, up to 50 mm across and 20–40 µm thick, ecorticate, smooth, pale grey to brownish grey. Apothecia rounded, 0.5–1 mm diameter and 250–350 µm high; disc initially plane but becoming convex in old apothecia, light brown and with thick, pale yellowish to creme-coloured pruina; margin distinct, rather thick and prominent when young, creme-coloured. Excipulum 40–70 µm broad. Hypothecium 50–100 µm high, light brown. Apothecial base sordid brown to aeruginous. Epithecium thin, 5–10 µm high, granular, pale yellowish brown. Hymenium 100–130 µm high, colourless. Asci 90–110 × 30–35 µm. Ascospores single, oblong-ellipsoid, muriform, 50–80 × (15–)20–30 µm, 2.5–4 times as long as broad, colourless. Campylidia sessile, 0.4–0.6 mm broad; lobe well-developed, hood-shaped, grey but white to pale yellow pruinose; socle not apparent. Conidia filiform with clavate apex, 3–7-septate, 40–60 × 1–1.5 µm.





Calopadia editiae

Calopadia editiae Vězda ex Chaves & Lücking [as 'editae'], in Lumbsch et al., Phytotaxa 18: 27 (2011)

[ABL40414], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40414), 29 October 2016, det. A. Aptroot 2016 - Thallus foliicolous or corticolous, continuous or marginally dispersed into rounded, confluent patches, up to 50 mm across and 20–40 μm thick, ecorticate, smooth, pale grey to brownish grey. Apothecia rounded, 0.5–1 mm diameter and 250–350 μm high; disc initially plane but becoming convex in old apothecia, light brown and with thick, pale yellowish to creme-coloured pruina; margin distinct, rather thick and prominent when young, creme-coloured. Excipulum 40–70 μm broad. Hypothecium 50–100 μm high, light brown. Apothecial base sordid brown to aeruginous. Epithecium thin, 5–10 μm high, granular, pale yellowish brown. Hymenium 100–130 μm high, colourless. Asci 90–110 × 30–35 μm. Ascospores single, oblong-ellipsoid, muriform, 50–80 × (15–)20–30 μm, 2.5–4 times as long as broad, colourless. Campylidia sessile, 0.4–0.6 mm broad; lobe well-developed, hood-shaped, grey but white to pale yellow pruinose; socle not apparent. Conidia filiform with clavate apex, 3–7-septate, 40–60 × 1–1.5 μm.

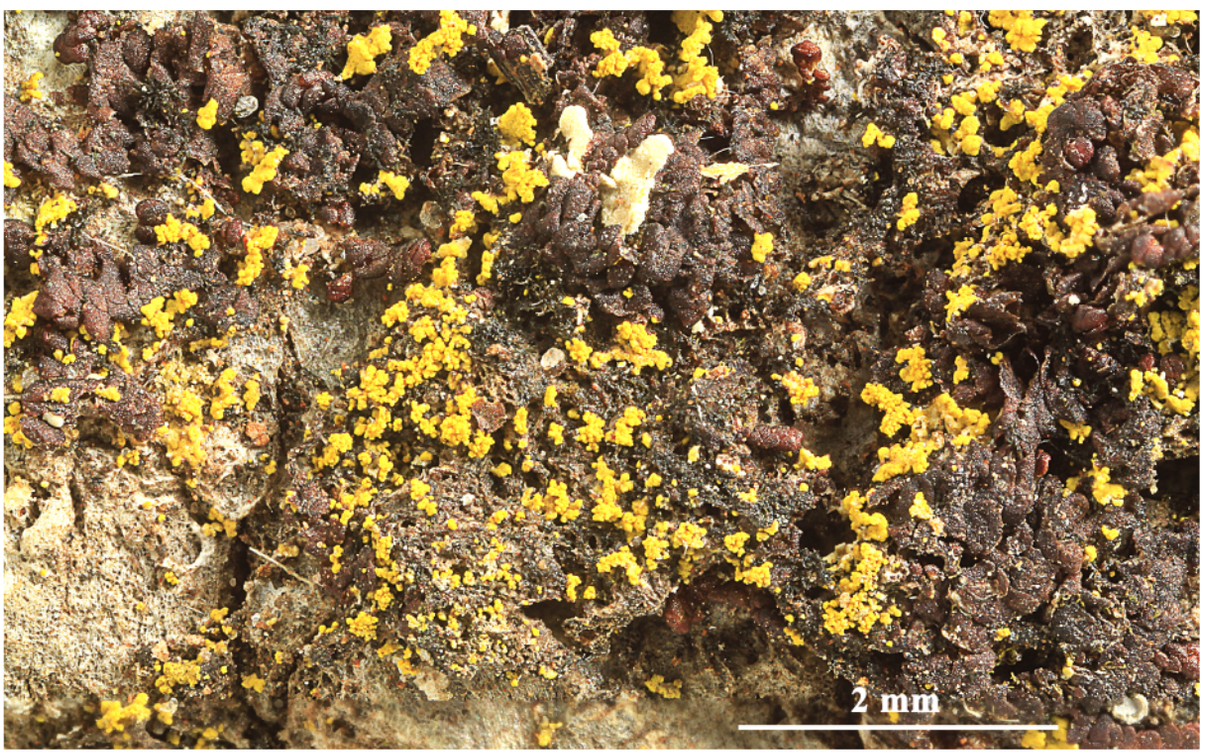


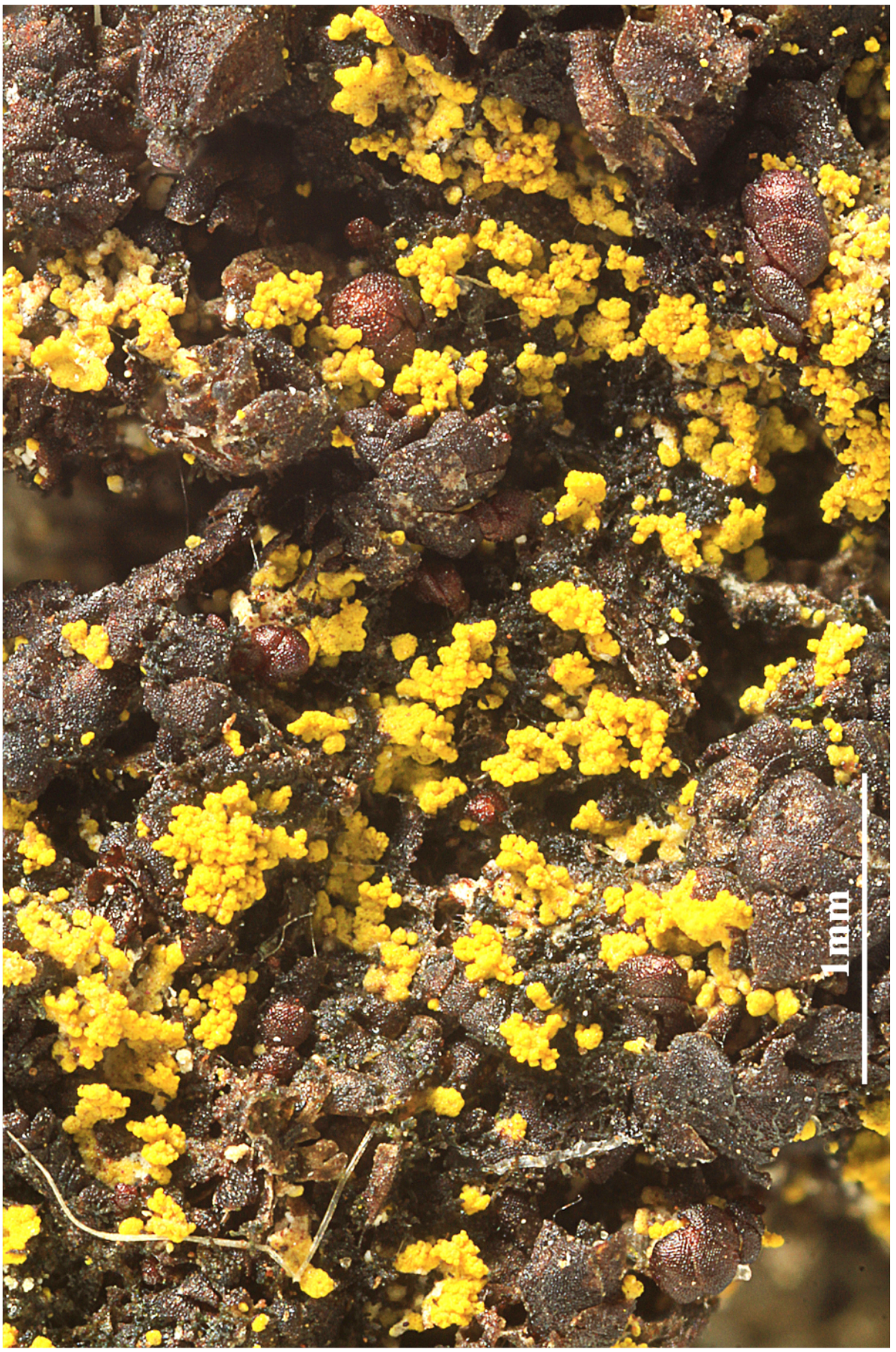


Calopadia editiae

Candelariella efflorescens R.C. Harris & W.R. Buck, Michigan Bot. 17(4): 155 (1978)

[ABL13666], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13666), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus: crustose, granular to areolate to minutely squamulose, often obscured by the soredia areoles: convex, rounded to elongated, up to 0.4 mm wide, sometimes somewhat raised from the substrate, often dissolved into soredia surface: green to green yellow to yellow, sorediate soredia: yellow, powdery, 0.02-0.05 mm wide, on the margin of the areoles and spreading inwards, forming discrete soralia or coalescing into a continuous sorediate crust Apothecia lecanorine, up to 0.75 mm wide disc: darker yellow than the thallus, ±flat margin: thin, entire or sorediate exciple: thin to thick, sometimes visible from the outside epihymenium: yellow-brown hymenium: hyaline, 55-60 µm tall; paraphyses: simple, cylindrical or with weakly swollen, with tips up to 3 µm wide; hypothecium: hyaline asci: clavate, 16-32-spored ascospores: hyaline, simple to 1-septate, oblong to narrowly ellipsoid, 12-15 x 4-5 µm Pycnidia: not seen Spot tests: K- to K+ reddish, KC-, C- Secondary metabolites: calycin, pulvinic acid, and pulvinic dilactone.

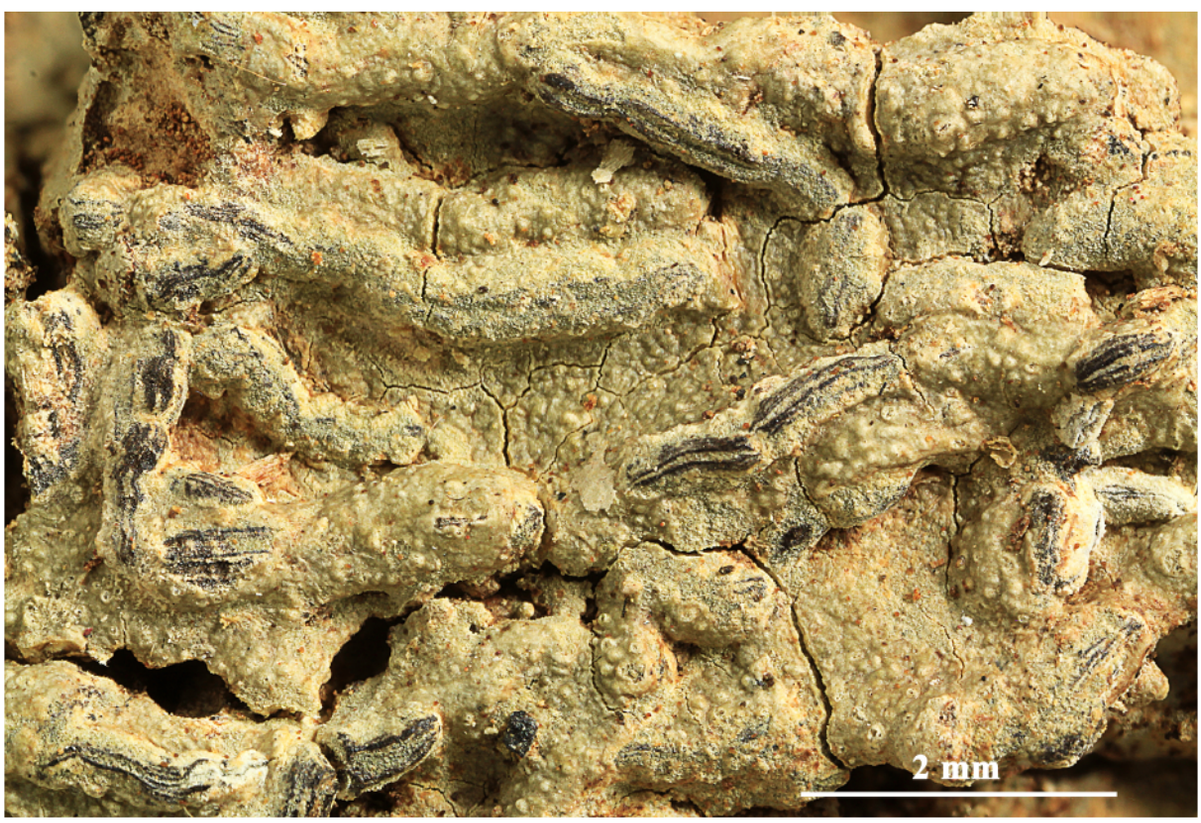




Candelariella efflorescens

Carbacanthographis clandestinospora Aptroot & M. Cáceres, in Sipman & Aptroot, Plant and Fungal Systematics 68(2): 322 (2023)

[ABL40395], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40395), 29 October 2016, det. A. Aptroot 2016 - Thallus corticolous, crustose, continuous, not corticate, dull, pale greenish grey, with scattered, somewhat irregular, concolorous, hemispherical verrucae of ~0.1 mm diam., which open apically into pseudocyphellae or almost soralia, occupying areas of up to 15 cm, under 0.1 mm thick, not surrounded by a prothallus; isidia and soralia absent. Photobiont trentepohlioid. Ascomata linear in outline, sessile, solitary, slightly wavy, rarely branched, 0.7–1.2 mm wide, up to 4 mm long, ~0.5 mm high, disc closed, labia striate, completely covered by thallus. Excipulum completely carbonized. Hamathecium ~120 µm high, finely inspersed with oil droplets, with smooth paraphyses. Ascospores 8/ascus, clavate, hyaline, I-negative, transversely septate, 23–30 × 5.5–7 µm, 7–9-septate, with thickened septa and lenticular lumina, surrounded by a 1 µm thick gelatinous sheath. Pycnidia not observed. Chemistry: Thallus UV–, K+ yellow turning orange, C–, KC–, P+ orange. TLC: stictic, cryptostictic (trace) and constictic (trace) acids.





Carbacanthographis clandestinospora

Chapsa albida (Nyl.) Lücking & Sipman, in Rivas Plata, Lücking, Sipman, Mangold, Kalb & Lumbsch, Lichenologist 42(2): 182 (2010)
= *Ocellularia albida* (Nyl.) Zahlbr., Cat. Lich. Univers. 2: 582 (1923) [1924]
= *Thelotrema albidum* Nyl., Acta Soc. Sci. fenn. 7(2): 451 (1863)

[ABL27453], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27453), 20 August 2015, det. A. Aptroot 2015. - Thallus corticolous, white to pale greenish-grey, continuous to slightly fissured, c. 0.05-0.12 mm thick, slightly uneven, matt, with a mealy to felty surface; the bark substrate in some specimens showing through the thallus surface; a white medullary layer absent. Prothallus line thin, brownish. Phenocortex absent. Photobiont layer 70-160 µm thick, with scattered photobiont cells and the inclusion of some calcium oxalate crystals, partly or entirely endophloeodal. Medulla endophloeodal. Pycnidia unknown. Apothecia dispersed, level with the thallus, angular to elongated and often slightly branched, 0.5-0.8 mm broad and up to 2.3 mm long. Margin low, jagged to lobed, slightly incurved to recurved, with a white to pale fawn, compact to felty inner surface; proper exciple fused. Disc pale brown, covered by thick white-felty to crystalline pruina. Phenocortex absent. Photobiont layer 40-70 µm thick. Periderm layer 30-40 µm thick, comprising a moderately dense, brown conglutinated prosoplectenchyma with some calcium oxalate crystals and distinct rows of periderm cells embedded between the hyphae. Proper exciple cupular, c. 10-20 µm deep and pale brown at the base, fused laterally with the periderm exciple and indistinct. Periphysoids up to 50 µm long, free, inclined towards the epihymenium, c. 2-2.5 µm wide, with up to five long rectangular cells, in the apical parts strongly moniliform and intensely adspersed with fine greyish to brownish granules. Hymenium 70-110 µm high, clear. Ascospores 8/ascus, 2-3 seriate, hyaline, transversely septate, 7-13 loculate, 19-33 × 4.5-6 µm, almost thin-walled, with subacute to rounded ends, halonate, I–. Asci narrowly clavate, c. 70-92 × 13-16 µm. Paraphyses simple, straight, 2-2.5 µm wide; tips strongly moniliform, intensely adspersed with fine greyish to brownish granules. Epihymenium unpigmented, 7-15 µm high. Chenistry: No lichen compounds detected by TLC.



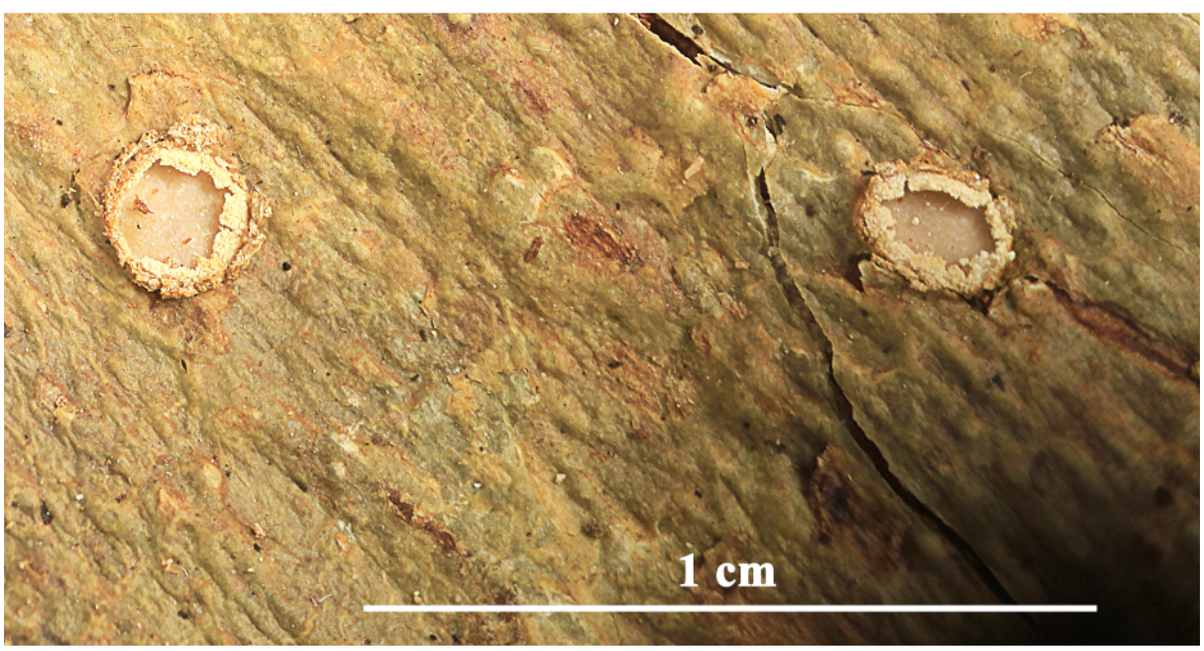
Chapsa albida



Chapsa albida

Chapsa defecta Lücking, in Sipman, Lücking, Aptroot, Chaves, Kalb & Umaña Tenorio, Phytotaxa 55: 32 (2012)

[ABL27328], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27328), 20 August 2015, det. A. Aptroot 2015. - Thallus grey-olive, smooth to uneven, with dense, prosoplectenchymatous cortex with internal splitting; photobiont layer and/or medulla with clusters of calcium oxalate crystals. Apothecia erumpent, angularrounded, 1–3 mm diam.; disc exposed, flesh-colored; margin lobulate to recurved, fused but sometimes lamellate, flesh-colored. Columella absent. Excipulum paraplectenchymatous, colorless; periphysoids present. Hymenium 120–150 µm high, clear; paraphyses unbranched. Ascospores 2–4/ascus, 11–15-septate, 80–110 x 10–14 µm, cylindrical, with thick septa and lens-shaped lumina, colorless, I+ violet-blue (amyloid). Chemistry: no substances detected by TLC.





Chapsa defecta

Coenogonium magdalenae Rivas Plata, Lücking & Lizano, in Rivas Plata, Lücking, Aptroot, Sipman, Chaves, Umaña & Lizano, Fungal Diversity 23: 286 (2006)

[ABL13596], Brazil, São Paulo, Botucatu, Pousada Mandala on SP-254, on bark in gallery forest. 22°52'47" S, 48°29'06" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13596), 9 Sept. 2012, det. A. Aptroot 2012. - Thallus crustose, corticolous or muscicolous, continuous, thin, smooth, pale greenish, 30-70 mm diam., with cartilaginous corticiform layer; white prothallus present. Photobiont *Trentepohlia*, cells angular-rounded, in irregular plates or short threads, 6-9 µm diam. Apothecia sessile with strongly constricted base, rounded, 0.7-1.3 mm diam. and 300-400 µm high; disc plane to concave, pale yellow; margin thin, prominent, with irregular surface to minutely denticulate, creme-colored. Excipulum paraplectenchymatous with radiating cell rows, 50-100 µm broad, colorless, I+ sordid yellow-green; cells partially elongated and thin-walled, in innermost parts isodiametric and thickwalled, 7-15 × 5-8 µm. Hypothecium 20-30 µm high, colorless. Hymenium 70-90 µm high, colorless, I+ blue then quickly sordid green then reddish brown. Asci 65-80 × 4-6 µm. Ascospores irregularly uniseriate, ellipsoid, 1-septate, 6-10 × 2.5-3.5 µm, 2-3 times as long as broad. Pycnidia not observed. Chemistry: no substances detected by TLC.





Coenogonium magdalenae

Coenogonium minidenticulatum Aptroot & M. Cáceres, Bryologist 119(3): 257 (2016)

[ABL27031], Brazil, Amapá, Macapá, Peixe Boi near Río Curicaca. 0°37' N, 50°55' W, 30 m. On tree bark in tall forest remnant. Leg. M. Cáceres & A. Aptroot (no 27031), 17 August 2015, det. A. Aptroot 2015. - ISOTYPE - Thallus thin, smooth, somewhat shiny, olive green, with cortex, without clear prothallus. Algae chlorococcoid, ca. 5–10 µm diam. Apothecia sessile, 0.2–0.4 mm diam., round, solitary, disc flat, dull, pale chamois colored, margin paler, usually distinctly denticulate, almost whitish, clearly higher than the disc, ca. 0.05 mm wide. Hymenium hyaline, 45–65 µm high, IKI- negative except for the ascus tips; paraphyses without clear septa towards the tip, which is somewhat clavate and up to ca. 3 µm wide; epithecium hyaline, gelatinous; hypothecium almost hyaline; excipulum hyaline, composed of dense cells with rather angular lumina of ca. 7–10 µm. Ascus with 8 ascospores. Ascospores hyaline, long-ellipsoid, 1-septate, 6–7 x 1.0–1.5 µm, with distinctly rounded ends. Pycnidia not observed. Chemistry: Thallus UV–, C–, P–, K–. No TLC performed.



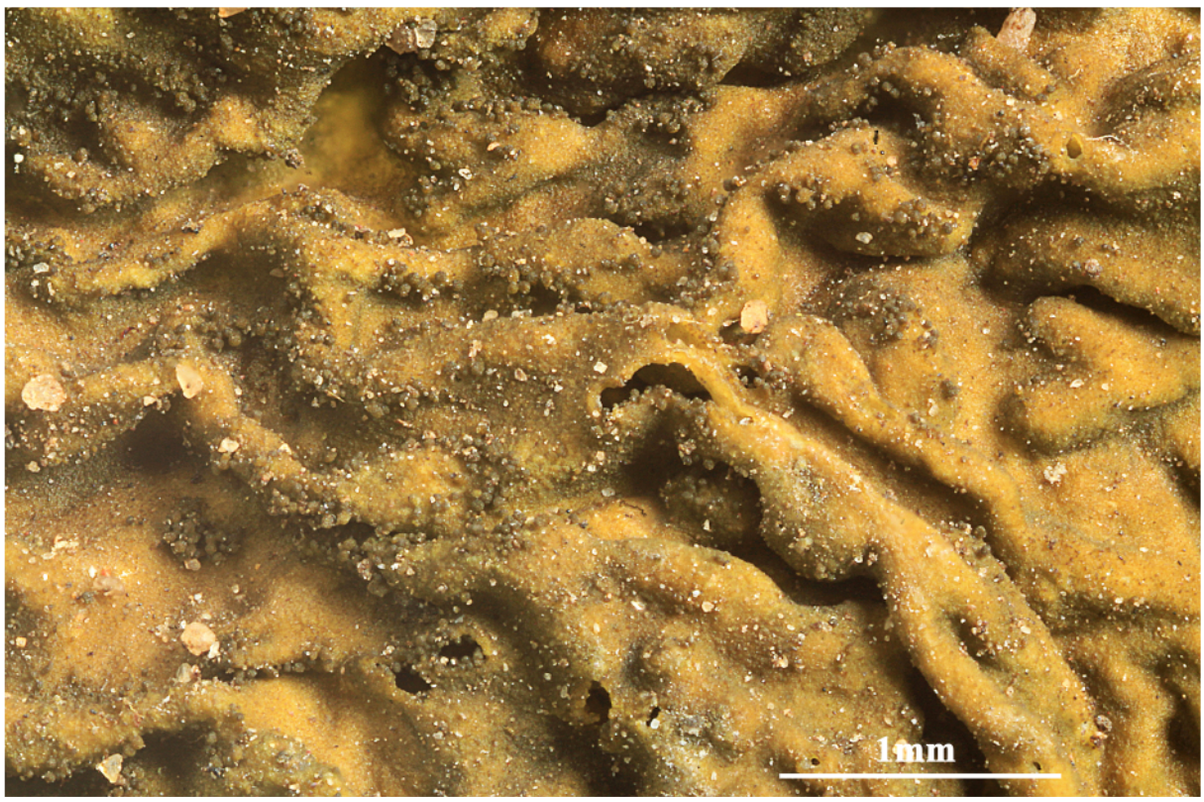


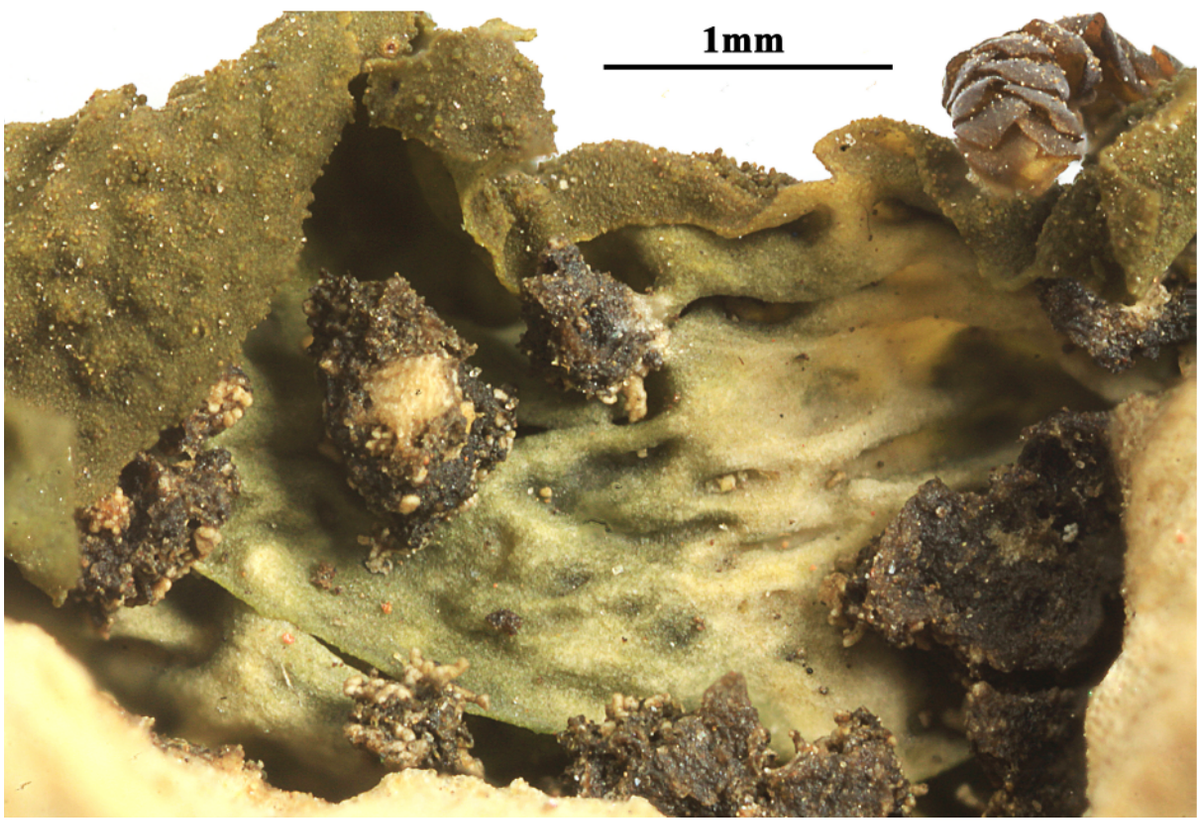
Coenogonium minidenticulatum

Collema rugosum Kremp., in Fenzl, Reise Österr. Novara Bot. 1: 128 (1870)

[ABL28984], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28984), 23 October 2016, det. A. Aptroot 2016. - Thallus to 6 cm wide, rounded, foliose, adnate, membranous, sometimes radiating, slightly to densely ridged, matt, sometimes slightly glossy, pale to dark olive-green, rarely bluish green; isidia numerous in centre, globose becoming cylindrical, simple or sparsely branched. Lobes few, elongate to rounded, imbricate, to 2 cm wide. Apothecia sparse to numerous, to 1.5 mm wide, sessile with constricted base; disc flat to slightly concave, matt, epruinose, red; thalline exciple thin, entire, smooth or finely rugose, often densely isidiate, not prominent, persistent. Asci 70–90 × 13–20 µm. Ascospores 40–75 × 4–6.5 µm, acicular to fusiform, straight or slightly curved, 4–8-celled, one or both end-cells often longer, not constricted. Pycnidia numerous, to 175 µm wide, laminal to submarginal; pycnidial gel hyaline to pale yellow. Conidia 4.5 × 1–1.5 µm, straight, sometimes slightly swollen at ends.



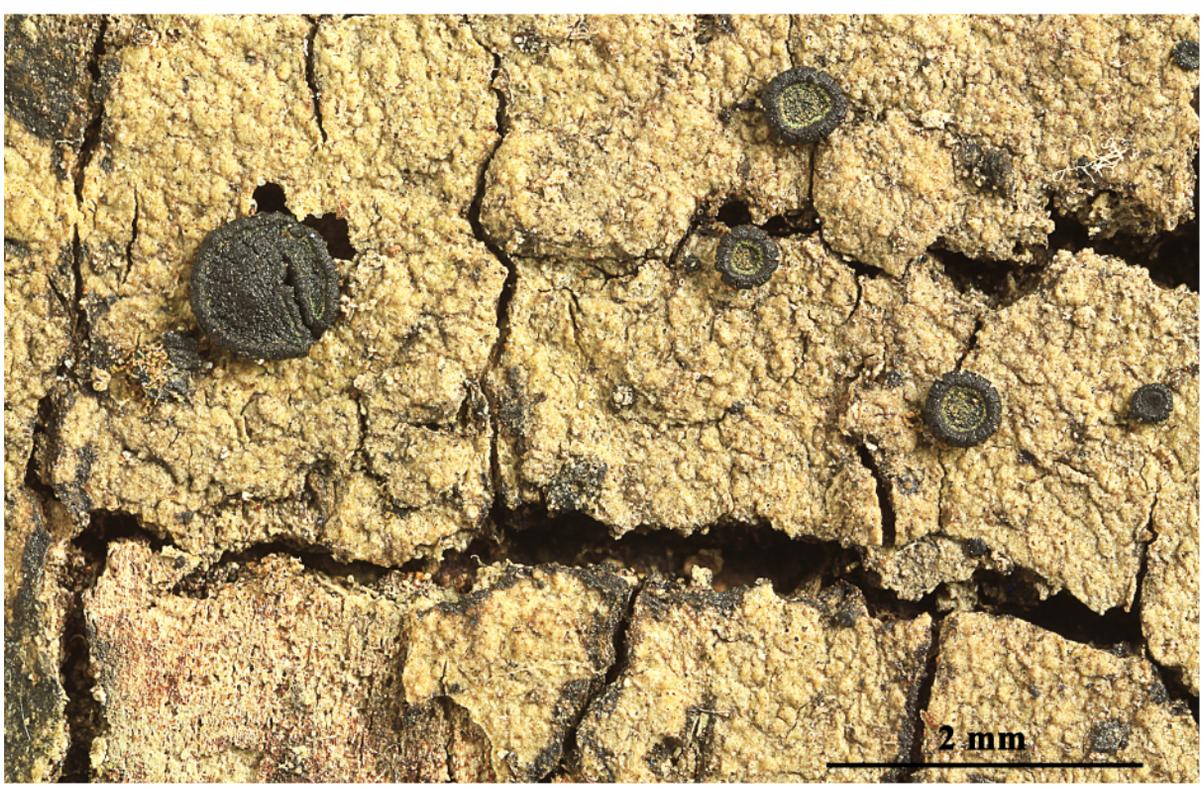




Collema rugosum

Cresponea proximata (Nyl.) Egea & Torrente, Mycotaxon 48: 328 (1993)
= *Lecanactis proximata* (Nyl.) Zahlbr., Cat. Lich. Univers. 2: 544 (1923) [1924]
= *Lecidea proximata* Nyl., Annls Sci. Nat., Bot., sér. 4 19: 356 (1863)

[ABL28878], Brazil, Tocantins, near Itaguatins. 5°45'22" S, 47°33'53" W, 150 m. In cerrado along river bark of tree. Leg. M. Cáceres & A. Aptroot (no 28878), 23 October 2016, det. A. Aptroot 2016. - Thallus corticolous, continuous, cracked-areolate, smooth, gray to green. Hypothallus ± present, brownish. Photobiont *Trentepohlia*. Apothecia numerous, scattered, sessile, constricted at base, 0.3–1.2 mm diam., with a smooth to ±crenulate margin. Disc plane to slightly convex, black, with green to ochraceous-yellowish pruina. Hymenium I+ reddish. Paraphysoids with thickened apical cell having dark brown cap formed in the outer part of cell wall. Spores hyaline, fusiform, 25–35(–38) × 5–7 µm, (1–)5–7 septate, straight to slightly curved. Chemistry: Spot test reactions: thallus K–, C–, KC–, P–. Secondary metabolites: none detected.





Cresponea proximata

Crypthonia corticorygmoides Aptroot & M. Cáceres, Bryologist 119(3): 258 (2016)

[ABL27327], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27327), 20 August 2015, det. A. Aptroot 2015. - ISOTYPE - Thallus ca.0.2–0.5 mm thick, dull, not corticate, felty, olive green with occasional bleached spots; medulla white; surrounded by a ca. 1 mm wide white hyphal prothallus. Algae trentepohlioid, ca. 6–9 µm diam. Ascigerous areas irregular in outline, resembling the shape of stromatoid Graphidaceae, white, ca. 2.5–15 mm diam., up to ca. 0.3 mm high, when dry with a dense pattern of deep fissures, with pale brown asci which are visible from the surface. Interascal tissue consisting of much branched and anastomosing hyphae. Ascus with 8 ascospores, clavate, 55–85 x 17–20 µm, thick-walled. Ascospores hyaline, clavate, 3–5-septate, 25–29 x 5–6 µm, upper end rounded, lower end pointed. Pycnidia not observed. Chemistry: Thallus UV–, C–, P–, K–. TLC: No substances detected.

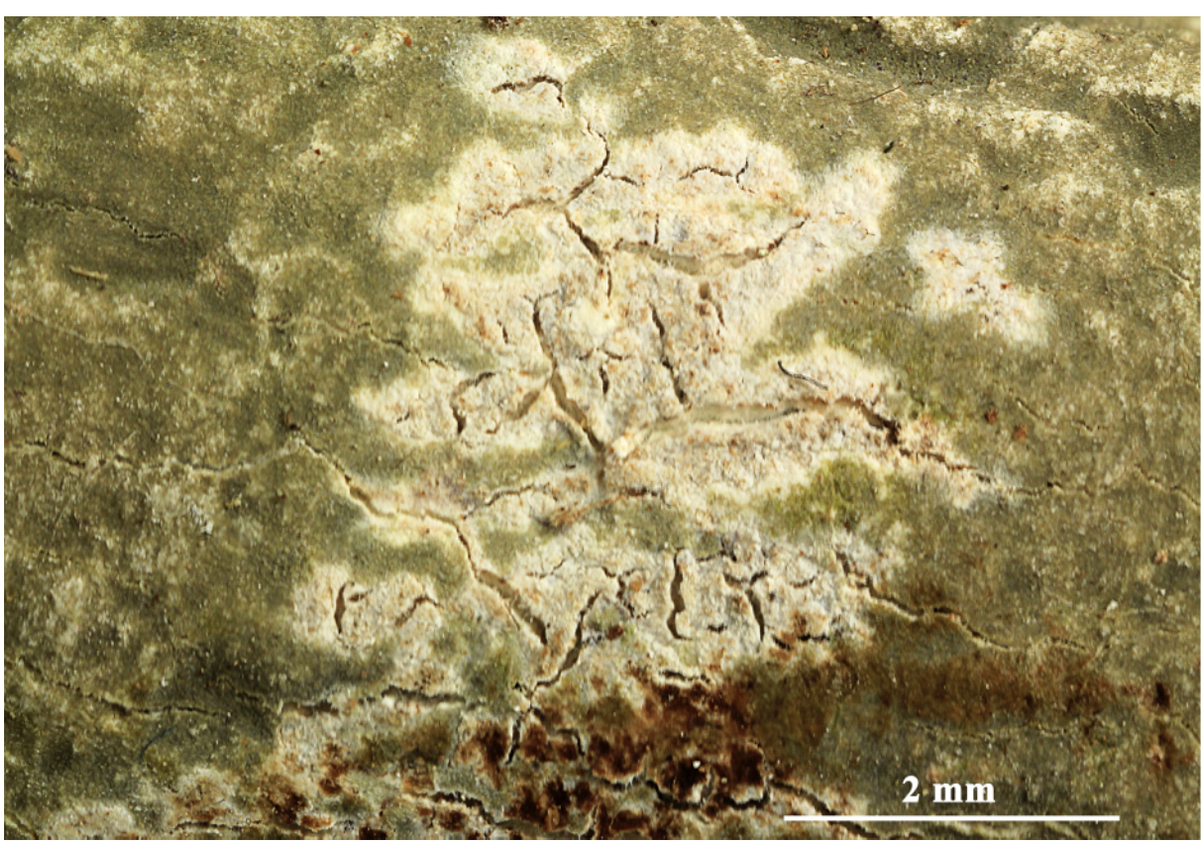




Crypthonia corticorygmoides

Crypthonia corticorygmoides Aptroot & M. Cáceres, Bryologist 119(3): 258 (2016)

[ABL27391], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27391), 20 August 2015, det. A. Aptroot 2015. - Thallus ca.0.2–0.5 mm thick, dull, not corticate, felty, olive green with occasional bleached spots; medulla white; surrounded by a ca. 1 mm wide white hyphal prothallus. Algae trentepohlioid, ca. 6–9 µm diam. Ascigerous areas irregular in outline, resembling the shape of stromatoid Graphidaceae, white, ca. 2.5–15 mm diam., up to ca. 0.3 mm high, when dry with a dense pattern of deep fissures, with pale brown asci which are visible from the surface. Interascal tissue consisting of much branched and anastomosing hyphae. Ascus with 8 ascospores, clavate, 55–85 x 17–20 µm, thick-walled. Ascospores hyaline, clavate, 3–5-septate, 25–29 x 5–6 µm, upper end rounded, lower end pointed. Pycnidia not observed. Chemistry: Thallus UV–, C–, P–, K–. TLC: No substances detected.





Crypthonia corticorygmoides

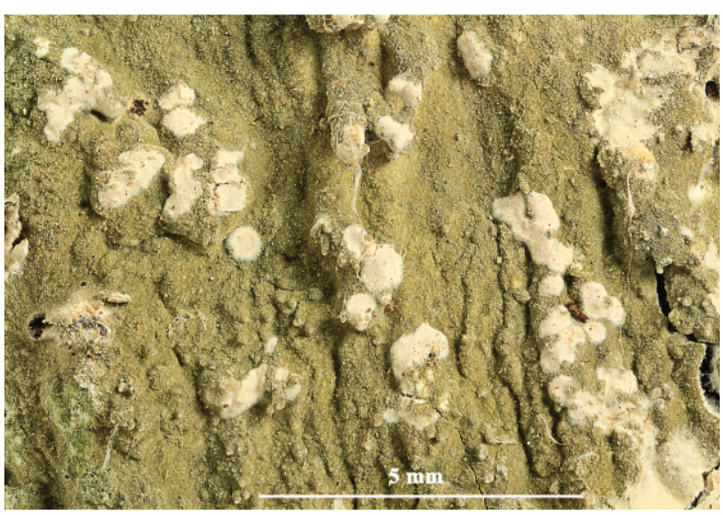
[ABL40251], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40251), 29 October 2016, det. A. Aptroot 2016 - Thallus crustose, continuous, smooth, corticate, dull, pale olivaceous green, up to 5 cm diam., < 0.1 mm thick, not surrounded by prothallus. Isidia irregular, globose to flattened and proliferating, upper surface greenish and corticate; non-corticate and cream-coloured below, c. 0.1 mmdiam. Photobiont trentepohlioid. Medulla IKI−,containing c. 1 ìm wide hyphae which are encrusted with small crystals. Ascomata and pycnidia not observed. Chemistry: Thallus UV−, K−, Pd−, C−. TLC: confluentic acid and sometimes 2′-O-methylperlatolic acid.





Crypthonia pustulata

[ABL27063], Brazil, Amapá, Macapá, Peixe Boi near Río Curicaca. 0°37' N, 50°55' W, 30 m. On tree bark in tall forest remnant. Leg. M. Cáceres & A. Aptroot (no 27063), 17 August 2015, det. A. Aptroot 2015. - Thallus more than 5 cm in diameter, deep olive-green, minutely felty to almost leprose, becoming weakly granular in the central parts, 0.1–0.2 mm thick, locally attached to the substrate by whitish to brownish tufts of rhizoidal hyphae; hypothallus free areas of the lower surface whitish to pale buff. Prothallus thin, white, up to 3 mm wide, formed of 1.0–2.5 µm wide hyphae. Pseudoisidia not seen. Photobiont layer 20–50 µm thick; photobiont cells 5–11(–20) × 3–8 µm. Medulla up to 150 µm thick, white, formed of 1.0–3.0 µm wide hyphae. Hypothallus scanty, reddish brown, formed of 2.0–3.0 µm wide hyphae. Calcium oxalate crystals numerous, 1–5(–10) µm in diameter. Ascomata few, white to pale carneous, up to 1.0 mm long and 0.8 mm wide, up to 0.12 mm tall. Hypothecium 10–55 µm tall. Hymenium 35–50 µm tall, with numerous pale brownish granules and a few small calcium oxalate crystals, I– and KI–. Epithecium 10–20 µm tall. Paraphysoids 1.0–1.5 µm wide, of the same width to swelling to 1.5–2.0 µm apically. Asci 34–45×13–14 µm, clavate; wall c.1 µm wide laterally, 3–4 µm apically (n=11). Ascospores cuneiform, wider in the upper half, (1–)2–3-septate, (8.0–)9.0–9.9–10.8(–11.0) × (3.0–)3.2–3.6–4.0(–4.0) µm. Pycnidia raised in globular to short cylindrical thallus warts up to 0.20 × 0.12 mm, often bluntly branched and the pycnidia then to 1–3 aggregated, pale brown, 0.06-0.10 mm in diameter; wall hyaline, 5–7 µm thick, of poorly conglutinated, 1.0–2.0 µm wide hyphae. Phialids bottleshaped, 7–13 × 1.5–2.5 µm. Conidia fusiform to shortly bacilliform, (4.0–)4.7–5.4–6.1(–7.0) × 1.0 µm. Chemistry: Gyrophoric acid detected with HPTLC; thallus C+ red, K–, PD–, UV–; medulla and photobiont layer I+ and KI+ sky blue in patches.





Crypthonia olivacea

[ABL40264], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40264), 29 October 2016, det. A. Aptroot 2016 - ISOTYPE -Thallus crustose, more or less continuous, following the surface of the substratum, not corticate, dull, whitish, up to 5 cm diam., under 0.1 mm thick, not surrounded by prothallus. Stromata sterile, white, c. 0. 2mm diam. Photobiont trentepohlioid. Medulla IKI-negative, containing of c. 1 µm wide hyphae which are encrusted with small crystals. Ascomata and pycnidia not observed. Chemistry: Thallus UV–, K–, P–. TLC: confluentic acid.





Crypthonia stromatica

Cryptothecia lecanorosorediata Aptroot & M. Cáceres, in Aptroot et al. Lichenologist 56.

[ABL27583], Brazil, Amapá, Macapá, Fazendhina Ecotel garden. On tree bark in garden. 0°03' N, 51°07 W, 5 m. Leg. M. Cáceres & A. Aptroot (no 27583), 22 August 2015, det. A. Aptroot 2024. - Thallus crustose, continuous, not corticate, dull, whitish, up to 5 cm diam., c. 0.1 mm thick, not surrounded by a prothallus. Soredia numerous, in irregular soralia, granular, up to c. 0.03 mm diam, whitish. Photobiont trentepohlioid. Medulla IKI- negative, containing of c. 1 µm wide hyphae which are encrusted with small crystals. Ascomata and pycnidia not observed. Chemistry: Thallus UV–, K–, P–, C+ red. TLC: lecanoric acid.



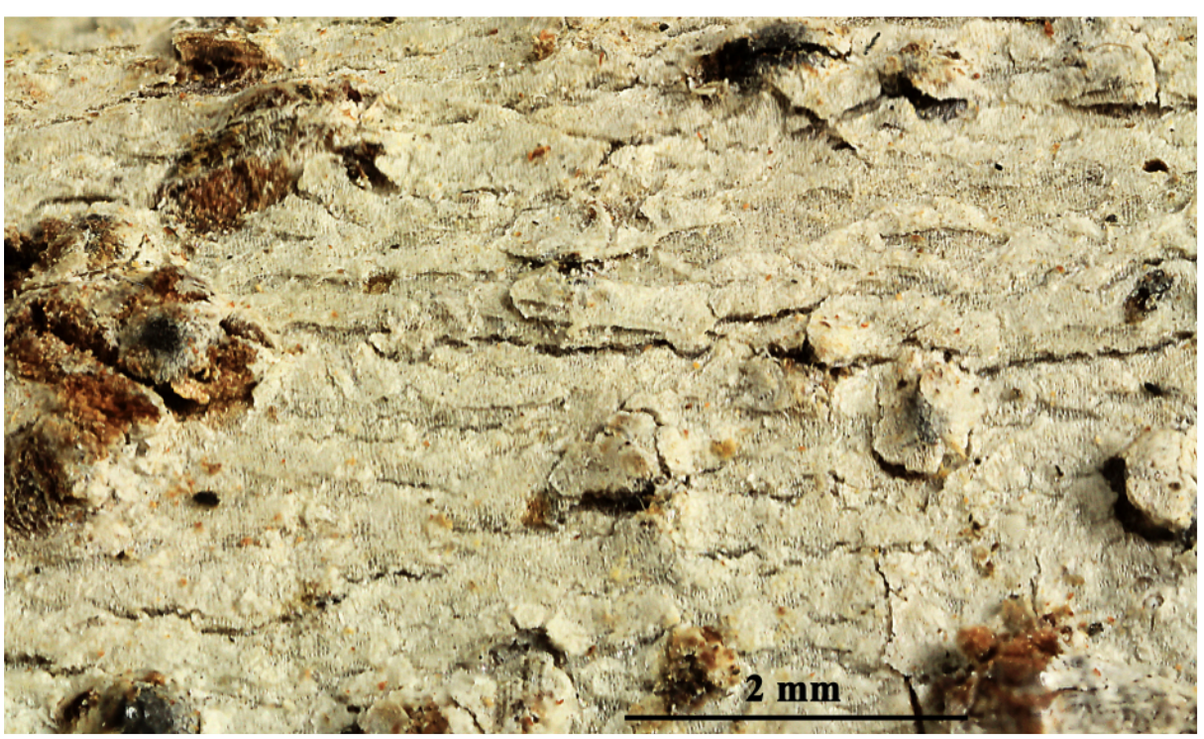


Cryptothecia lecanorosorediata

Dictyomeridium isohypocrellinum (Xavier-Leite, M. Cáceres & Aptroot) Aptroot, M.P. Nelsen & Lücking, in Aptroot & Lücking, Lichenologist 48(6): 925 (2016)

= *Polymeridium isohypocrellinum* Xavier-Leite, M. Cáceres & Aptroot , Lichenologist 45(4): 548 (2013)

[ABL27095], Brazil, Amapá, near Provoado Abacate da Pedreina, km 34 on AP 070. 0°15' N, 50°55' W, 30 m, On tree bark in cerrado. Leg. M. Cáceres & A. Aptroot (no 27095), 18 August 2015, det. A. Aptroot 2015. - Thallus crustose, continuous, not corticate, dull, pale pinkish cream-coloured, very thin and closely following the bark surface, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata ovoid to triangular, occasionally 2 with fused ostioles, superficial, somewhat glossy, 0.3–0.5 mm wide, black. Ostioles lateral, black, with red pigment inside. Hamathecium not inspersed. Ascospores muriform, 8 per ascus, hyaline, IKI-, 9–15/1–3-septate, ellipsoidal, 33–47(–55) x 11–15 µm, not constricted. Pycnidia not observed. Chemistry: UV-, red pigment in ostiole KOH+ green; iso-hypocrellin present in ostiole.



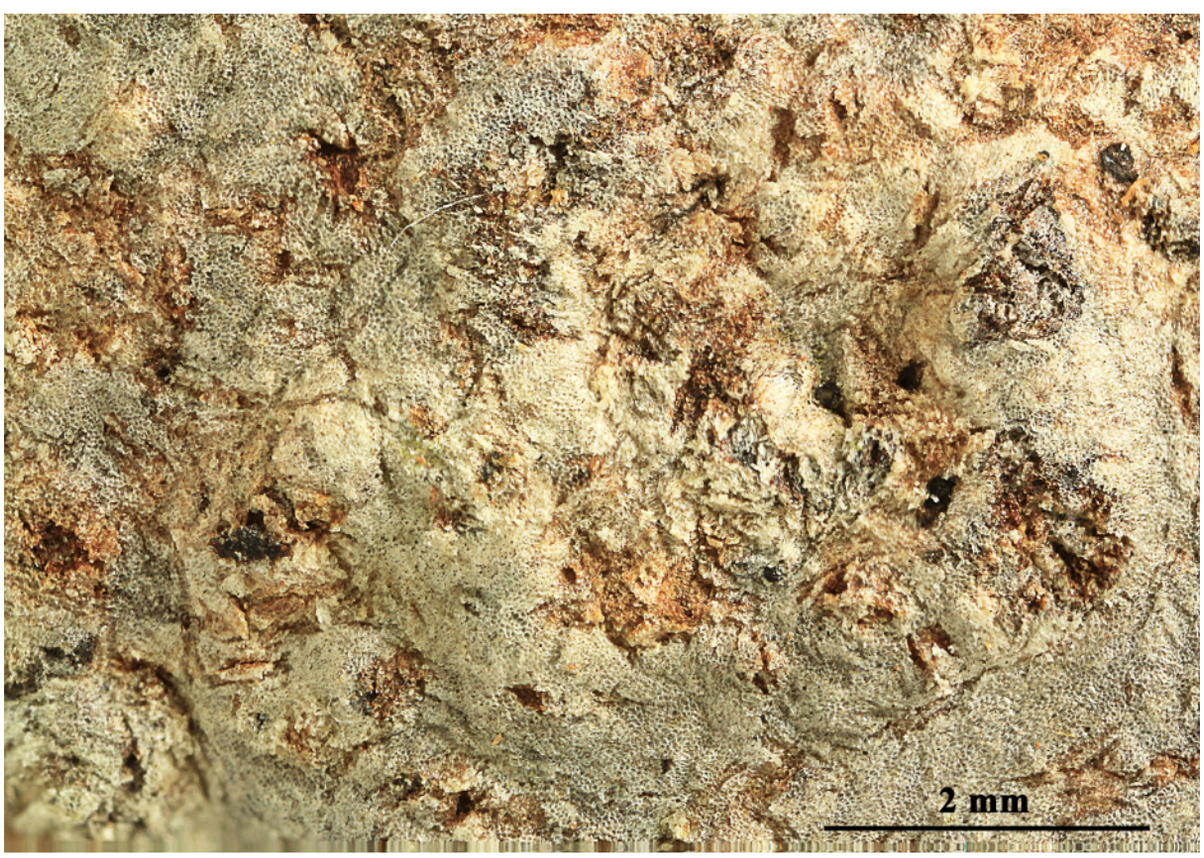


Dictyomeridium isohypocrellinum

Dictyomeridium isohypocrellinum (Xavier-Leite, M. Cáceres & Aptroot) Aptroot, M.P. Nelsen & Lücking, in Aptroot & Lücking, Lichenologist 48(6): 925 (2016)

= *Polymeridium isohypocrellinum* Xavier-Leite, M. Cáceres & Aptroot , Lichenologist 45(4): 548 (2013)

[ABL28784], Brazil, Tocantins, near Itaguatins. 5°44'58" S, 47°32'24" W, 150 m. In cerrado on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28784), 22 October 2016, det. A. Aptroot 2016. - Thallus crustose, continuous, not corticate, dull, pale pinkish cream-coloured, very thin and closely following the bark surface, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata ovoid to triangular, occasionally 2 with fused ostioles, superficial, somewhat glossy, 0.3–0.5 mm wide, black. Ostioles lateral, black, with red pigment inside. Hamathecium not inspersed. Ascospores muriform, 8 per ascus, hyaline, IKI-, 9–15/1–3-septate, ellipsoidal, 33–47(–55) x 11–15 µm, not constricted. Pycnidia not observed. Chemistry: UV-, red pigment in ostiole KOH+ green; iso-hypocrellin present in ostiole.





Dictyomeridium isohypocrellinum

Diorygma defectoisidiatum Aptroot & M. Cáceres, in Aptroot, Lücking & Cáceres, Plant and Fungal Systematics 68(2): 254 (2023)

[ABL28966], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28966), 23 October 2016, det. A. Aptroot 2016. - ISOTYPE- Thallus crustose, continuous, following the surface of the substratum, not corticate, dull, dirty creamish white, up to 7 cm diam., up to 0.1 mm thick, not surrounded by a prothallus, without hypothallus. Isidia covering most of the thallus, cylindrical, not corticate, much irregularly branched, cream, up to 0.1 mm thick, up to 0.5 mm high. Photobiont trentepohlioid. Ascomata and pycnidia not observed. Chemistry. Thallus UV–, K–, P–. TLC: nil. Etymology. The epithet refers to the absence of secondary substances and the presence of isidia.





Diorygma defectoisidiatum

Endocarpon riparium Aptroot & M. Cáceres, Bryologist 119(3): 260 (2016)

[ABL27319], Brazil, Amapá, Flona, Floresta Nacional do Amapá, near station. 0°55' N, 51°36' W, 30 m. On wood in disturbed forest. Leg. M. Cáceres & A. Aptroot (no 27319), 19 August 2015, det. A. Aptroot 2015. ISOTYPE - Thallus consisting of dense agglutinated flat squamules which are not overlapping and together form rather indeterminate colonies, corticate, smooth, somewhat shiny, olive green, bright green when wet; some margins reddish, possibly due to incrustation of iron from the substratum or from the river, without prothallus. Squamules ca. 50–80 µm thick, cortex 15–25 µm thick, diluted pale pinkish brown in the upper layer, hyaline below, cells thin-walled, lumina ca. 4–6 µm diam.; algae chlorococcoid, ca. 5–8 µm diam., often somewhat ellipsoid; lower surface with branched, hyaline rhizohyphae of ca. 3 µm thick. Squamule margins and cracks with numerous dorsiventral lobules of thallus-structure that are rather uniformly 0.1–0.2 mm diam., are easily detached and serve as asexual propagules. Ascomata and pycnidia not observed. Chemistry: Thallus UV–, C–, P–, K–. TLC: No substances detected.





Endocarpon riparium

Enterographa albopunctata Sparrius, Biblthca Lichenol. 89: 25 (2004)

[ABL27621], Brazil, Amapá, Macapá, Fazendhina Ecotel garden. On palm bark in garden. 0°03' N, 51°07 W, 5 m. Leg. M. Cáceres & A. Aptroot (no 27621), 22 August 2015, det. A. Aptroot 2024. - Thallus up to 10 cm in diam., continuous, smooth, white to yellowish, waterrepellent, c. 100 µm thick. Photobiont *Trentepohlia*. Prothallus thin, black. Upper algae-free medulla 15–20 µm thick, of densely interwoven hyphae. Medulla cream-coloured, with abundant oxalate crystals of 15–25 µm diam. Ascomata divergent, rounded to long lirelliform, rarely branched 0.07–0.15 × 0.2–0.7 mm, pale brown, not pruinose. Thalline margin c. 0.05 mm wide, inconspicuous. Excipulum 12–25 µm wide, orange in section. Hypothecium hyaline to pale straw, 50–60 µm tall, K+ greenish. Hymenium hyaline, 50–70 µm tall. Paraphysoids 0.8–1.0 µm wide, apices c. 1.0 µm wide, irregularly branched and anastomosing. Epithecium c. 20 µm tall, with few brown crystals, K–. Asci 40–50 × 12–15 µm, ellipsoid-cylindrical, 8-spored. Ascospores acicular-fusiform, 25–[27]–30 × 1.8–[2·0]–2·5 µm, 3-septate, perispore < 0.5 µm wide. Conidiomata present, randomly dispersed over the thallus, white-pruinose, prominent, rounded, 0.25–0.40 mm diam., wall dark brown in section, conidia bacilliform, slightly curved, 4–5 × 0·8–1.0 µm. Chemistry: Thallus C–, K+ yellow–red, PD+ yellow, UV–; TLC: psoromic and norstictic acids; amyloidy: epithecium, hymenium, hypothecium and excipulum I+ red, KI+ sky blue. Etymology: The epithet refers to the dominant large, white conidiomata on the thallus.





Enterographa albopunctata

Flegographa leprieurii A. Massal., Atti Inst. Veneto Sci. lett., ed Arti, Sér. 3 5: 314 (1860) [1859-1860]

= *Sarcographa heteroclita* (Mont.) Zahlbr., in Rechinger, Denkschr. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 88: 19 (1911)

= *Actinoglyphis heteroclita* (Mont.) Kremp., Nuovo G. bot. ital. 7(1): 44 (1875)

= *Actinoglyphis leprieurii* Mont., Syll. gen. sp. crypt. (Paris): 355 (1856)

= *Glyphis heteroclita* Mont., Annls Sci. Nat., Bot., sér. 2 19: 83 (1843)

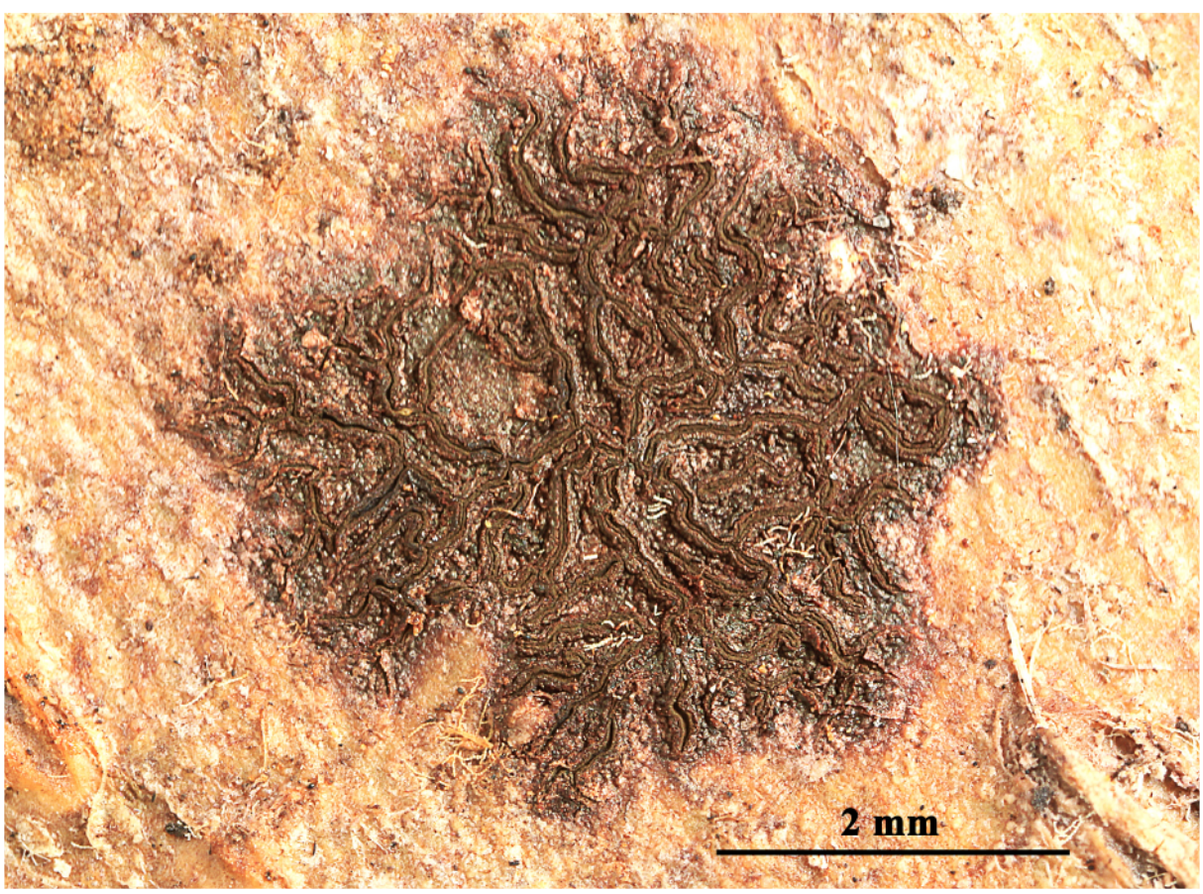
= *Graphis heteroclita* (Mont.) Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 234 (1921)

= *Graphis leprieurii* Nyl., Mém. Soc. Imp. Sci. Nat. Cherbourg 5: 130 (1858)

= *Phaeographis leprieurii* (Mont.)Staiger , Biblthca Lichenol. 85: 338 (2002)

= *Sarcographa leprieurii* Müll. Arg., Flora, Regensburg 70(5): 77 (1887)

[ABL27081], Brazil, Amapá, near Provoado Abacate da Pedreina, km 34 on AP 070. 0°15' N, 50°55' W, 30 m, On tree bark in cerrado. Leg. M. Cáceres & A. Aptroot (no 27081), 18 August 2015, det. A. Aptroot 2015. - Thallus brownish. Lirellae redbrown od brownblack, branched, 1-2 x 0.1-0.2 mm diam. Disc nearly closed, brown. Excibulum at the base not carbonized. Paraphyses 1-1.5 µm thick, somwhat anastomosing, with brown granula. Spores 8/ascus, transversally septate, (5-)-6-locular, 17-25(-30) x 6-9 µm, I- or brownish. Chemistry: Isohypocrellin (red pigment).





Flegographa leprieurii

[ABL27257], Brazil, Amapá, Flona, Floresta Nacional do Amapá, near station. 0°55' N, 51°36' W, 30 m. On tree bark in disturbed forest. Leg. M. Cáceres & A. Aptroot (no 27257), 19 August 2015, det. A. Aptroot 2015. - Thallus corticolous, epiperidermal, up to ca. 10 cm diam., continuous; surface uneven to areolate, fragile, light greenish grey, glossy; prothallus absent. Thallus in section 100–200 µm thick, with dense, prosoplectenchymatous cortex with internal splitting, 3–5 µm thick, photobiont layer 20–30 µm thick, and thick medulla, 70–150 µm thick, encrusted with large clusters of calcium oxalate crystals. Photobiont Trentepohlia; cells rounded to irregular in outline, in irregular groups, olive-green, 8–12 x 7–10 µm. Ascomata rounded to slightly irregular in outline, becoming sessile, with nearly complete thalline margin, 1.5–2.5 mm diam., 0.7–1 mm high; disc more or less exposed, thickly white-pruinose, divided by thin, irregular to radiating strands of columella; proper margin distinct, entire, visible as thick, white to cream-colored rim around the disc; thalline margin entire, uneven, pale greenish grey, glossy. Excipulum entire, orange-brown, 50–80 µm wide, fused with thalline margin; laterally covered by amorphous, orange periderm layer and algiferous, corticate thallus with large clusters of calcium oxalate crystals; columella present, forming numerous thin, irregular to radiating strands, strands up to 50 µm broad, dark brown and covered with crystal clusters; hypothecium prosoplectenchymatous, 10–15 µm high, hyaline; hymenium 80–90 µm high, hyaline, clear; epithecium indistinct, 5–10 µm high, grey-granular. Paraphyses unbranched, apically smooth; periphysoids absent; asci cylindrical to clavate, 70–80 □ 8–10 µm. Ascospores 8 per ascus, more or less uniseriate, oblong, 3-septate, 12–15 x 6–7 µm, 1.8–2.2 times as long as wide, hyaline, distoseptate with lens-shaped lumina, I+ violet-blue. Chemistry: Psoromic, subpsoromic, and 2'-O-demethylpsoromic acids; medulla P+ yellow, microscopic section K–.



Glaucotrema bahianum



Glaucotrema bahianum

Graphis copelandii Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 207 (1921)

[ABL27615], Brazil, Amapá, Macapá, Fazendhina Ecotel garden. On tree bark in garden. 0°03' N, 51°07 W, 5 m. Leg. M. Cáceres & A. Aptroot (no 27615), 22 August 2015, det. A. Aptroot 2015. - Labia entire, lirellae immersed to erumpent, excipulum laterally carbonized, hymenium clear. Ascospores muriform,1(–2) per ascus, 50 x 27 µm. Chemistry: Norstictic acid.





Graphis copelandii

[ABL27584], Brazil, Amapá, Macapá, Fazendhina Ecotel garden. On tree bark in garden. 0°03' N, 51°07 W, 5 m. Leg. M. Cáceres & A. Aptroot (no 27584), 22 August 2015, det. A. Aptroot 2015. - Thallus pale olive-green to pale fawn, smooth, dull. Ascomata conspicuous, scattered, simple, straight, curved or sinuous, rarely branched, semi-immersed, with a thick conspicuous thalline margin almost completely covering the exciple, 1–4 (–5) mm long, 0.4–0.7 mm wide; lips closed. Proper exciple completely carbonised. Hymenium 120–150 µm thick, not inspersed. Ascospores 1 per ascus, muriform, 110–125 × 25–32 µm, I+ blue. Chemistry: Norstictic acid.





Graphis cycadicola

Graphis deserpens Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 202 (1921)

[ABL28960], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28960), 23 October 2016, det. A. Aptroot 2016. - Labia entire, erumpent, with lateral thalline margin, elongate and irregularly branched; excipulum laterally carbonized; hymenium clear; ascospores muriform, 20–35 × 8–12 µm. Chemistry: Stictic acid (K+ yellow).





Graphis deserpens

Graphis pseudoserpens Chaves & Lücking, in Lücking, Chaves, Sipman, Umaña & Aptroot, Fieldiana, Bot. 46(no. 1549): 101 (2008)

[ABL27628], Brazil, Amapá, Macapá, Fazendhina Ecotel garden. On tree bark in garden. 0°03' N, 51°07 W, 5 m. Leg. M. Cáceres & A. Aptroot (no 27628), 22 August 2015, det. A. Aptroot 2015. - Thallus corticolous. 2-5 cm diam., 50-100 um thick, continuous: surface smooth to uneven, pale gray to white; prothallus absent. Thallus in section with cartilaginous upper cortex and irregular algal layer. Apothecia lirelliform. flexuose. partly branched, erumpent. with lateral thalline margin. 1-3 mm long. 0.15-0.25 mm wide. 0.12-0.16 µm high, disc concealed, proper margin distinct, labia striate, black; thalline margin developed laterally. pale gray to white. Excipulum crenulate, laterally carbonized. 20-50 um wide, black, basal parts yellowish brown; laterally covered by corticate algiferous thallus including clusters of crystals; hypothecium prosoplectenchymatous, 5-10 µm high, colorless to pale yellowish; hymenium 100-130 µm high, colorless, clear; epithecium indistinct. Paraphyses unbranched; asci clavate, 90-120 x 20—30 µm. Ascospores 8 per ascus, ellipsoid, muriform, 35-60 x 10- 15 µm, 3-5 times as long as wide, colorless. Chemistry: no substances detected by TLC.





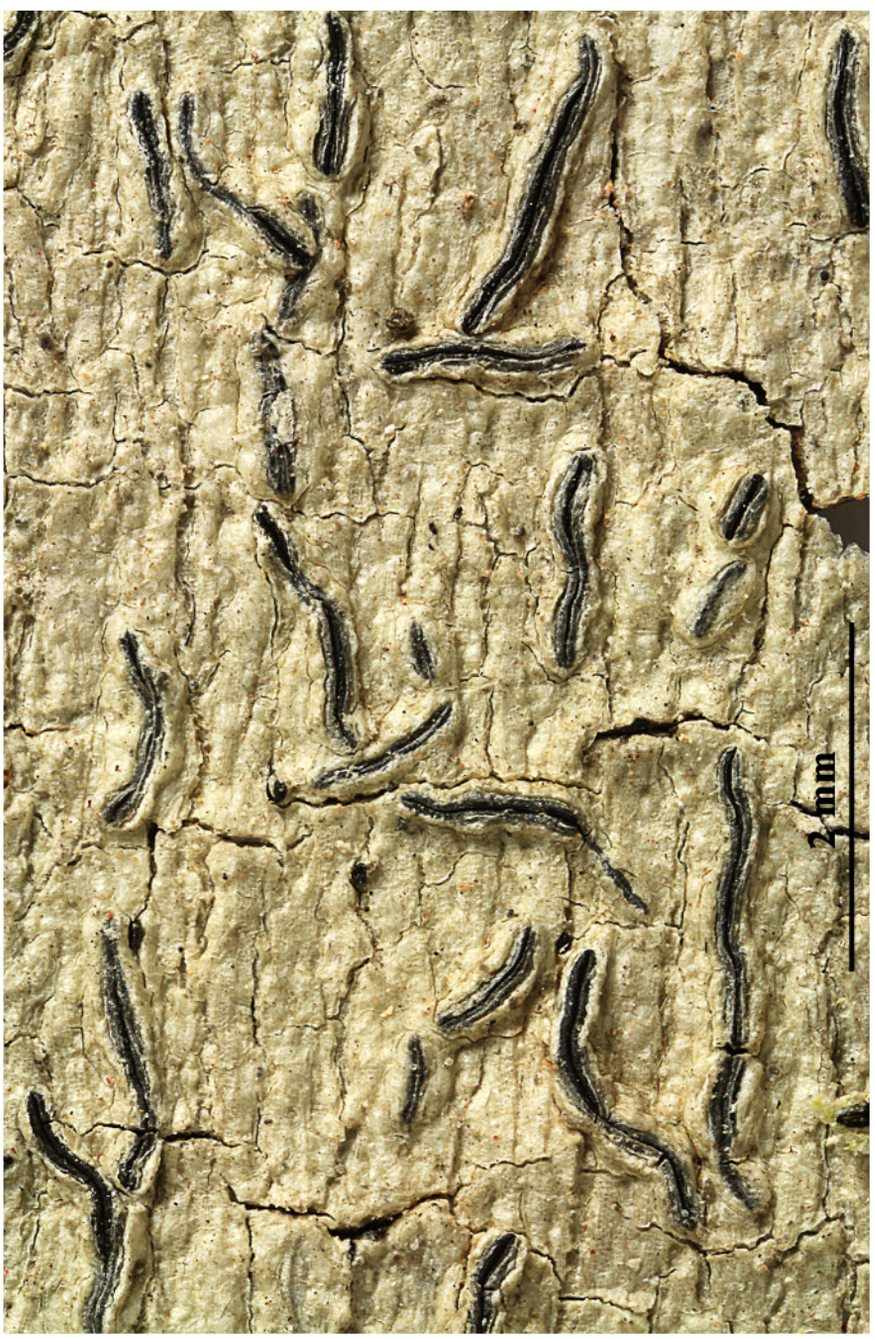
Graphis pseudoserpens

Graphis subtecta (Nyl.) Lücking, in Lücking, Archer & Aptroot, Lichenologist 41(4): 441 (2009)

= *Graphina analoga var. subtecta* (Nyl.) Zahlbr., Cat. Lich. Univers. 2: 395 (1923) [1924]

= *Graphis analoga var. subtecta* Nyl., Acta Soc. Sci. fenn. 7(2): 465 (1863)

[ABL40421], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40421), 29 October 2016, det. A. Aptroot 2016 - Lirellae erumpent, with apically thin complete thalline margin (upper part of labia dark grey), elongate and irregularly branched (negrosina-morph). Labia entire, excipulum completely carbonized; hymenium clear, ascospores muriform, 2–8 per ascus, 20-40 x 10-12 µm. Chemistry: No substances (K−, P−).





Graphis subtecta

Graphis urandrae Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 255 (1921)

[ABL27274], Brazil, Amapá, Flona, Floresta Nacional do Amapá, near station. 0°55' N, 51°36' W, 30 m. On tree bark in disturbed forest. Leg. M. Cáceres & A. Aptroot (no 27274), 19 August 2015, det. A. Aptroot 2015. - Thallus cream, corticate, without prothallus. Lirellae sessile, unbranched or once branched, a bit wavy, 0.5-3.5 x 0.4-0.6 mm, with basal thalline margin. Labia not crenate, laterally carbonized. Hymenium not inspersed. Ascospores 5-9-septate, 15-22 x 5-7 µm. Chemistry: nil.





Graphis urandrae

Halegrapha redonographoides J.C. Dantas, Lücking & M. Cáceres, in Dantas, Alves, Lücking & Cáceres, Phytotaxa 331(2): 291 (2017)

[ABL28794], Brazil, Tocantins, near Itaguatins. 5°44'58" S, 47°32'24" W, 150 m. In cerrado on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28794), 22 October 2016, det. A. Aptroot 2016. - Thallus corticolous, epiperidermal, 3–5 cm diam., continuous; surface uneven-rough, cream-colored to beige, opaque; prothallus absent but thin black prothallus line sometimes formed when bordering other lichens. Thallus in section 100–200 µm thick, ecorticate, with irregular, disrupted photobiont layer immersed between large clusters of crystals. Photobiont *Trentepohlia*; cells rounded to irregular in outline, in irregular groups, yellowish green, 8–11 × 6–9 µm. Ascomata lirelliform, flexuose, unbranched to rarely sparsely branched, immersed into thickened thallus parts resembling pseudostromata, with lateral thalline margin, 0.5–2 mm long, 0.15–0.25 mm wide, 0.15–0.2 mm high; disc concealed; labia distinct, entire, gray-black; thalline margin cream-colored. Excipulum entire, completely carbonized, 50–90 µm wide, black; laterally covered by algiferous thallus including clusters of crystals; hypothecium prosoplectenchymatous, 10–20 µm high, yellowish; hymenium 70–90 µm high, colourless, clear. Asci clavate, 60–70 × 10–12 µm. Ascospores 8 per ascus, broadly ellipsoid with rounded ends, submuriform with 3 transverse and 0–2 longitudinal septa per segment, the principal septa irregularly arrangted, 10–15 × 6–10 µm, 1.3–1.7 times as long as wide, brown, I+ purplish-red when mature. Chemistry: Norstictic acid (major), connorstictic acid (trace), thallus section with K+ yellow efflux forming red, needle-shaped crystals. - Remarks: This species is placed in the genus *Halegrapha* due to its *Graphis*-like thallus (whitish, with large crystal clusters) and ascomata (thick, carbonized labia) combined with *Phaeographis*-type ascospores (brown, small, with rounded ends)



Halegrapha redonographoides



Halegrapha redonographoides

Herpothallon brialmonticum Aptroot & Elix, in Aptroot, Thor, Lücking, Elix & Chaves, Biblthca Lichenol. 99: 34 (2009)

[ABL27466], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27466), 20 August 2015, det. A. Aptroot 2015. - Thallus corticolous, up to 3 cm diam., loosely appressed to the substrate, rather firm, often flaking off, minutely felty, dull, pale mineral grey; in section up to 300 µm thick, with many calcium oxalate crystals in the photobiont layer and with 1-2 µm wide hyphae. Hypothallus distinct below the thallus, byssoid, pinkish to dark brown, composed of 1-2 µm thick hyphae. Prothallus up to 2.5 mm wide, byssoid, usually turned upwards, pinkish. Pseudisidioid outgrowths scattered in the thallus center, wart-like, paler than the thallus to whitish, up to 0.1 x 0.1 mm. Photobiont cells single or in short, irregular threads, 6-10 x 5-7 µm. Asci and pycnidia not seen. Chemistry and spot tests: Confluentic acid [major] and three novel substances [all major], each related to brialmontin 2 (brialmontic acid, methylbrialmontic acid, dimethylbrialmontic acid), detected by TLC and HPLC; thallus and prothallus C–, K–, P+ yellow, UV–, I– and K/I–. The pink pigment could not be identified. Notes: The species is named after the three novel substances, which appear as three bright blue to green spots at Rf 5 to 6 in TDA. With HPLC they were diagnosed to be related to brialmontin 2, and they are named here brialmontic acid, methylbrialmontic acid and dimethylbrialmontic acid.





Herpothallon brialmonticum

Heterodermia albicans (Pers.) Swinscow & Krog, Lichenologist 8(2): 113 (1976)

= *Polyblastidium albicans* (Pers.) S.Y. Kondr., Lőkös & Hur, in Kondratyuk, Lőkös, Kärnefelt, Thell, Jeong, Oh, Kondratiuk, Farkas & Hur, Acta bot. hung. 63(3-4): 386 (2021)

= *Parmelia albicans* Pers., Ann. Wetter. Gesellsch. Ges. Naturk. 2(1): 17 (1810)

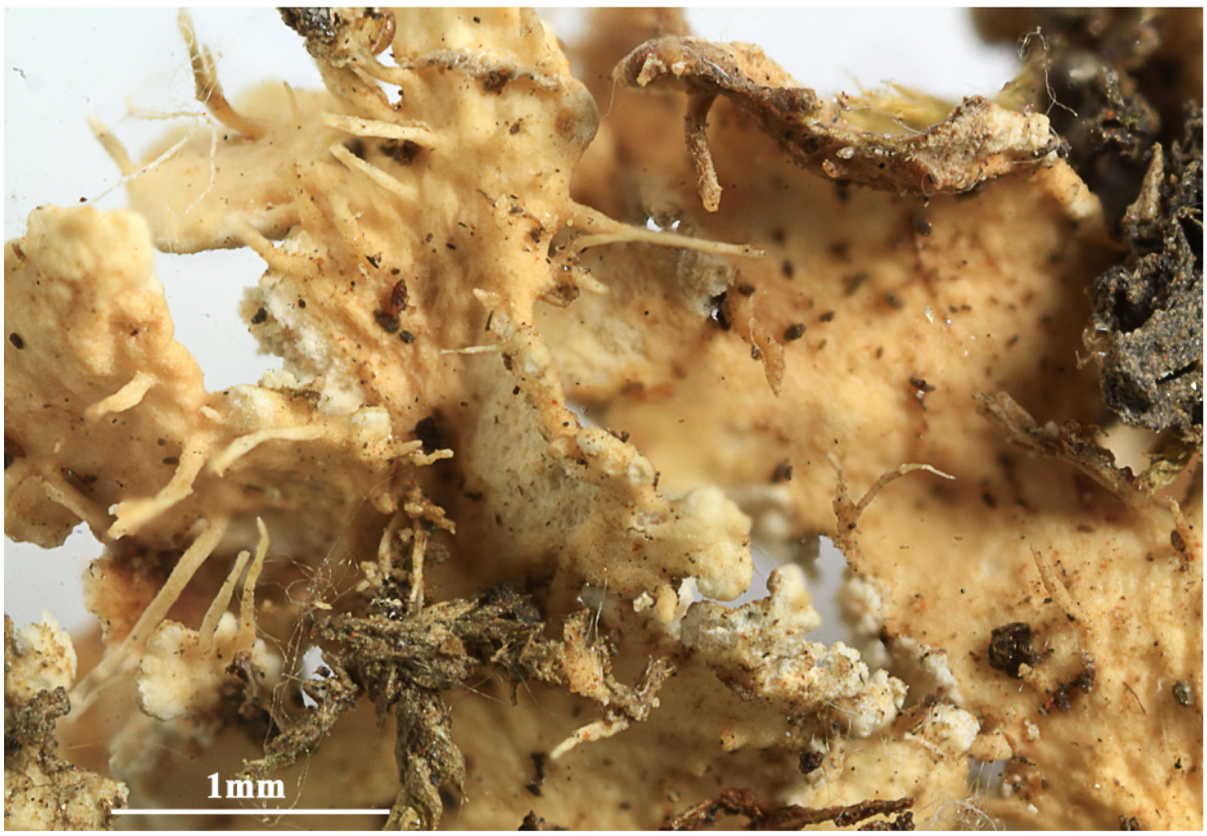
= *Physcia albicans* (Pers.) J.W. Thomson, Beih. Nova Hedwigia 7: 88 (1963)

[ABL13654], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13654), 13 Sept. 2012, det. A. Aptroot 2012. - Lobes linear, elongate, narrow, 0.5-1 mm broad, up to 3 mm long, usually richly branched, weakly convex, widening, tips without soralia, not ascending, eciliate. Upper surface gray to brownish gray, darker at lobe-tips, sometimes weakly pruinose, sorediate. Soredia white to bluish gray, in soralia arising from small lateral knob-like structures forming small, ± continous marginal soralia towards the thallus center. Upper cortex prosoplectenchymatous. Medulla white. Lower cortex: prosoplectenchymatous, together with upper one occupying more than 2/3 of the thallus thickness. Lower surface whitish to pale brownish, rarely dark gray, ± canaliculate. Rrhizines weakly developed, usually short (c. 1 mm), pale to dark brown or black. Apothecia: rare, up to 2.5 mm in diam., margin becoming sorediate; disc dark brown. Asci clavate, 8-spored. Ascospores: brown, l-septate, narrowly ellipsoid, 21-32 x 7-14 µm. Pycnidia ± common, inserted with black weakly protruding tips. Conidia bacilliform, 4-6 x 1 µm. Chemistry: cortex K+ yellow, C-, KC-, P+ yellow; medulla K+ yellow turning deep red, C-, KC-, P+ orange Secondary metabolites: cortex with atranorin and chloroatranorin; medulla with atranorin and zeorin and salazinic acid (major) and ± unidentified terpenes. - Notes: *Heterodermia albicans* is characterized and distinguished by the narrow, convex, short lobes, corticate on the lower surface. The soralia arise from marginal knob-like structures forming small, ± continous marginal soralia towards the thallus center. *Heterodermia speciosa* also has a lower cortex but has larger, ± flat lobes and lacks salazininc acid. *Heterodermia albicans* differs from *H. pseudospeciosa* by more adpressed thallus, less delimited soralia and the absence of norstictic acid. TLC is recommended to separate the two species.



Heterodermia albicans





Heterodermia albicans

Heterodermia diademata (Taylor) D.D. Awasthi, Geophytology 3: 113 (1973)
= *Anaptychia diademata* (Taylor) Kurok., Beih. Nova Hedwigia 6: 28 (1962)
= *Anaptychia major* (Nyl.) Vain., Dansk bot. Ark. 4(no. 11): 12 (1926)
= *Anaptychia sorediifera* f. *diademata* (Taylor) Lynge, Vidensk. Skrifter, I. Math.-naturv. Klasse(no. 16): 13 (1924)
= *Anaptychia speciosa* var. *diademata* (Taylor) Müll. Arg., Flora, Regensburg 71(13): 197 (1891)
= *Anaptychia speciosa* var. *major* (Nyl.) Zahlbr., Cat. Lich. Univers. 7: 742 (1931)
= *Dimelaena major* (Nyl.) Trevis., Atti Soc. ital. Sci. nat. 11: 618 (1868)
= *Heterodermia major* (Nyl.) Trevis., Atti Soc. ital. Sci. nat. 11: 618 (1868)
= *Parmelia diademata* Taylor, London J. Bot. 6: 165 (1847)
= *Physcia hypoleuca* var. *diademata* (Taylor) Müll. Arg., Flora, Regensburg 63: 277 (1880)
= *Physcia major* Nyl., Flora, Regensburg 41: 379 (1858)
= *Physcia speciosa* f. *diademata* (Taylor) Müll. Arg., Flora, Regensburg 71(13): 197 (1888)
= *Physcia speciosa* var. *diademata* (Taylor) Müll. Arg., Flora, Regensburg 71: 197 (1888)
= *Physcia speciosa* var. *major* (Nyl.) Müll. Arg., Flora, Regensburg 70: 60 (1887)
= *Pseudophyscia hypoleuca* f. *diademata* (Taylor) Hue, Nouv. Arch. Mus. Hist. Nat., Paris, 4 sér. 1: 113 (1899)
= *Pseudophyscia hypoleuca* var. *diademata* (Taylor) Hue, Nouv. Arch. Mus. Hist. Nat., Paris, 4 sér. 1: 113 (1899)

[ABL13655], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13655), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus foliose, orbicular to irregularly spreading, adnate to loosely adnate, to 15 cm wide. Lobes 0.5–2.5 mm wide, plane to weakly convex or weakly concave, sublinear-elongate, sympodially to irregularly branched, contiguous or discrete at the periphery, radiating; apices not ascending, with short lateral lobes, eciliate; isidia, phyllidia and soralia absent. Upper surface greenish white, whitish or gray, pruinose or not, rarely with marginal lobules. Medulla white. Lower surface corticate, whitish to pale brown to dirty brown towards the centre, smooth to strongly corrugated. Lower surface rhizines and marginal rhizines comparatively sparse, the latter sometimes projecting from the thallus, concolorous with the thallus or darkening at the apices, simple or irregularly or squarrosely branched. Apothecia laminal, sessile to substipitate, 1.5–5.5 mm wide; margin entire, crenulate to lobulate; disc

concave, brown to brown-black, epruinose. Ascospores Pachysporaria-type, ellipsoidal, 25−40 × 10−17 µm. Pycnidia common, immersed or slightly protruding; conidia bacilliform, 3–4 × 1 µm. Chemistry: Cortex K+ yellow, C–, KC–, P+ yellow; medulla K+ yellow, C–, P–; containing atranorin (major), zeorin (major), 16β-acetoxyhopane-6α,22-diol (major), leucotylin (minor), 6α-acetoxyhopane-16β,22-diol (minor), 6α,16β-diacetoxyhopane-22-ol (minor or trace).



Heterodermia diademata





Heterodermia diademata

Heterodermia propagulifera (Vain.) J.P. Dey, in Parker & Roane, Distr. Hist. Biota S. Appal. 4: 403 (1977)

= *Polyblastidium propaguliferum* (Vain.) Kalb, in Mongkolsuk, Meesim, Poengsungnoen, Buaruang, Schumm & Kalb, Phytotaxa 235(1): 45 (2015)

= *Anaptychia dendritica* var. *propagulifera* Vain., Philipp. J. Sci., C, Bot. 8(2): 107 (1913)

= *Anaptychia japonica* var. *reagens* Kurok., J. Jap. Bot. 35: 354 (1960)

= *Anaptychia propagulifera* (Vain.) Ozenda & Clauzade, Les Lichens (Paris): 776 (1970)

= *Anaptychia subheterochroa* var. *propagulifera* (Vain.) Kurok., J. Jap. Bot. 35: 241 (1960)

= *Heterodermia dendritica* var. *propagulifera* (Vain.) Poelt, Nova Hedwigia 9: 31 (1965)

= *Heterodermia japonica* var. *reagens* (Kurok.) J.N. Wu & Z.G. Qian, in Xu, [Cryptogamic Flora of the Yangtze Delta and Adjacent Regions] (Shanghai): 262 (1989)

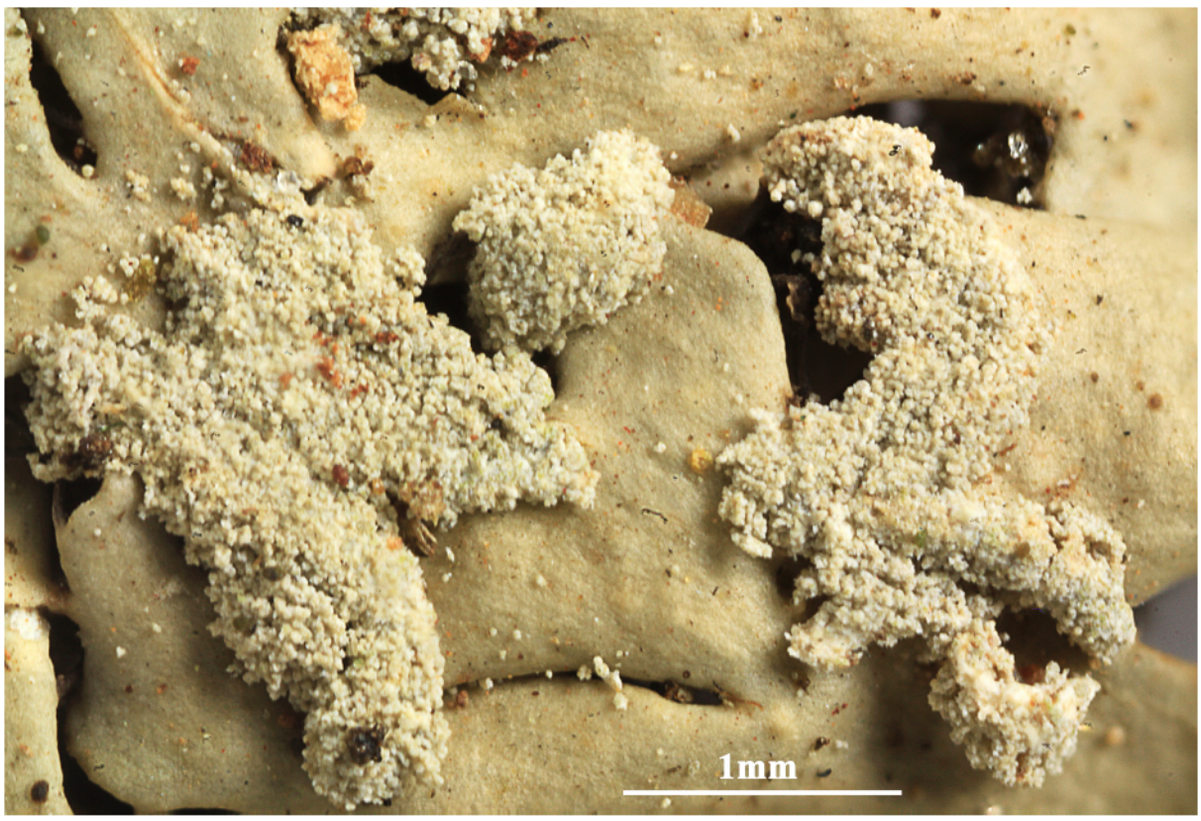
= *Heterodermia reagens* (Kurok.) Elix, Australas. Lichenol. 67: 6 (2010)

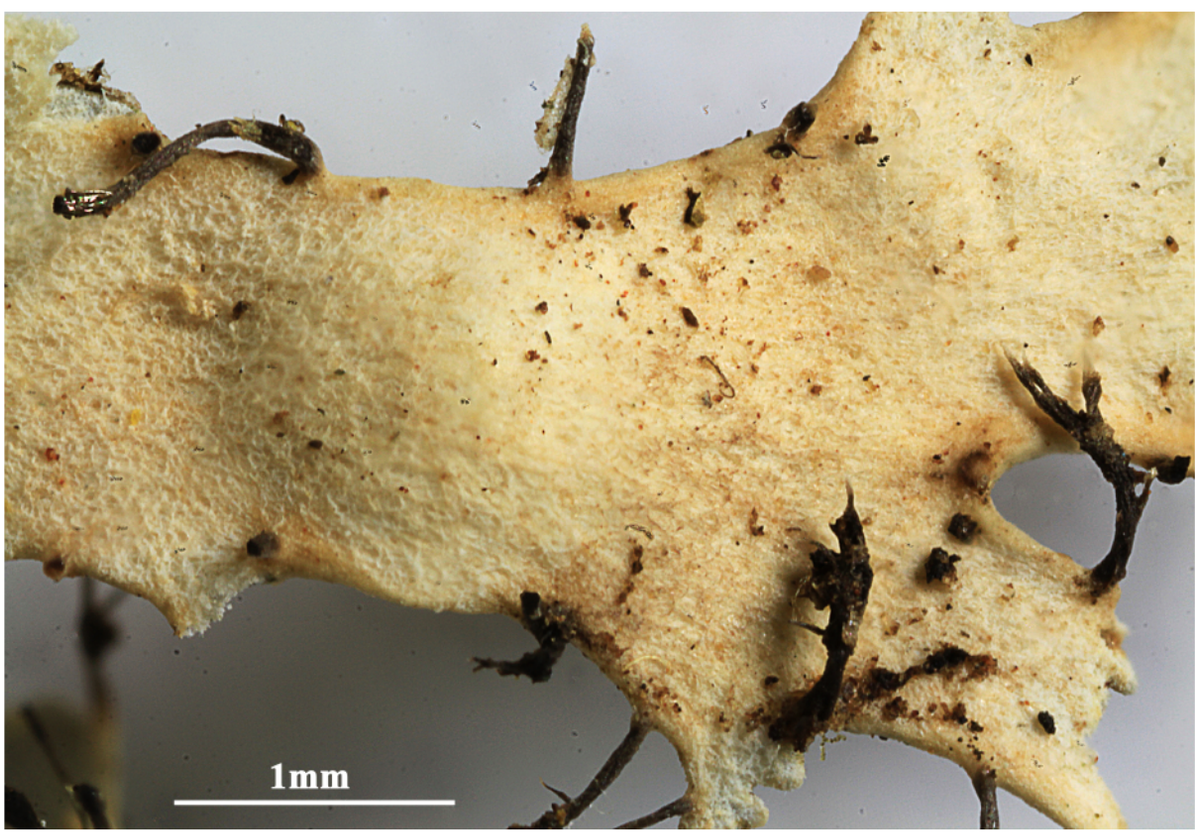
[ABL13685], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13585), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus foliose, usually irregularly spreading to rarely orbicular, loosely adnate, to 5 cm wide, but often coalescing to form colonies up to 15 cm wide. Lobes 0.7–2.0 mm wide, to ca. 2–4 (–5) mm wide at the tips, plane to weakly convex or weakly concave, sublinear-elongate, irregularly branched, radiating; apices ascending, usually discrete, ±lobulate along the lobe margins, lobules ± rounded or sparingly branched, 0.3–0.8 mm wide, developing small soralia. Upper surface greenish white, whitish to pale gray, sorediate; soredia farinose to granular; soralia on lateral or terminal lobes, occasionally spreading along the lobe margin, labriform to capitate . Medulla white. Lower surface ecorticate, arachnoid, white to violet-black in the centre, lacking yellow pigments. Rhizines marginal, black, simple or squarrosely branched, 1–3(–7) mm long. Apothecia very rare, laminal, substipitate, 1–8 mm wide; margin lobulate, lobules ecorticate, partly yellow on the lower surface, apically sorediate; disc concave, dark brown to brown-black, ±gray pruinose. Ascospores Polyblastidia-type, ellipsoidal, with 2–3 sporoblastidia, 40–45 × 20–23 μm. Pycnidia common, initially immersed, becoming emergent, visible as black dots; conidia bacilliform, 4–5 × 1 μm. Chemistry: Cortex K+ yellow, C–, KC–, P+ yellow; medulla K+ yellow then red, C–, P+ dark yellow; containing atranorin (major), zeorin (major), japonene (major), 16β-acetoxyhopane- 6α,22-

diol (trace), 6α-acetoxy-22-hydroxyhopane-25-oic acid (trace), norstictic acid (minor), connorstictic acid (trace), ± salazinic acid (minor or trace), anaptychin-5 (minor), anaptychin-1 (trace). - Remarks: This lichen is characterized by the sorediate lobe apices, an ecorticate lower surface that lacks yellow pigments, and the presence of norstictic acid. This is the depsidone-containing counterpart of *P. japonicum*.



Heterodermia propagulifera





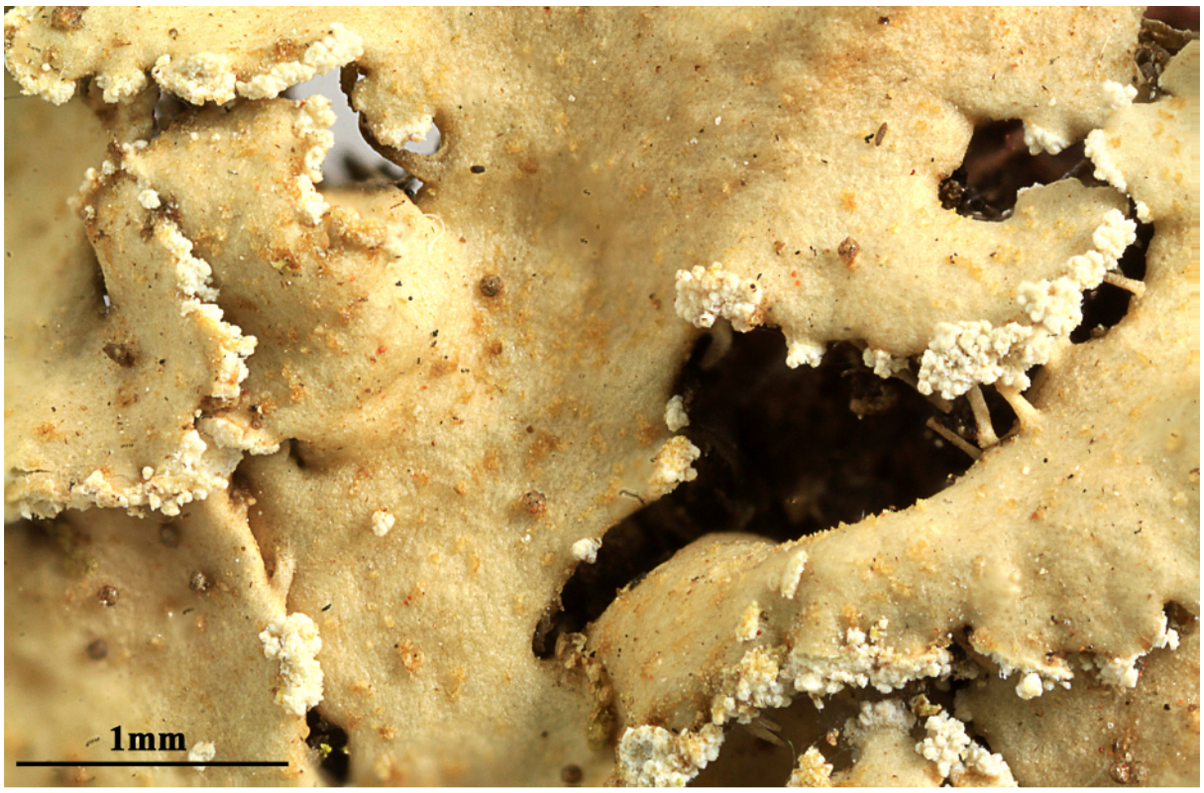
Heterodermia propagulifera

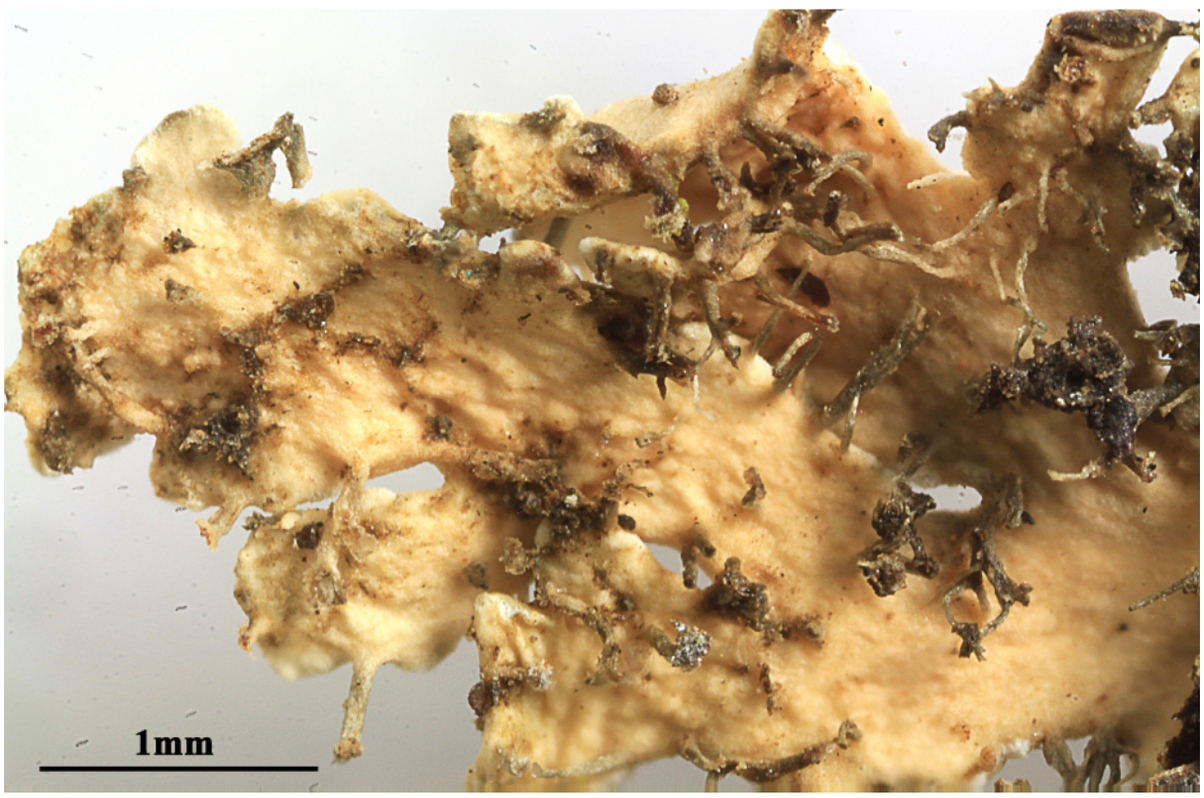
Heterodermia pseudospeciosa (Kurok.) W.L. Culb., Bryologist 69: 484 (1967)
= *Anaptychia pseudospeciosa* Kurok., J. Jap. Bot. 34: 176 (1959)

[ABL13690], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13690), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus foliose, orbicular to irregularly spreading, adnate to loosely adnate, 2–5 cm wide. Lobes comparatively small, 0.7–1.5 mm wide, plane to weakly convex, sublinear-elongate, sympodially to subdigitately branched, usually discrete at the periphery, radiating; apices not ascending, eciliate, with distinct pseudocyphellae along the margins of the lobes or on small short lateral branches. Upper surface grayish white to gray to brownish gray, ± darker at the lobe tips, pruinose or not, sorediate; soralia white to bluish gray, originating mostly from bursting pseudocyphellae, developing into subcapitate or labriform soralia. Medulla white. Lower surface corticate, whitish to pale brown, rarely dark gray in the centre. Lower surface rhizines sparse, mostly simple or sparsely branched, marginal rhizines frequent, concolorous with the thallus or becoming dark or black near the apices, irregularly branched, to 1 mm long, projecting beyond the lobes. Apothecia rare, laminal, adnate to sessile, 1–3 mm wide; margin initially crenulate, later sorediate; disc concave, brown to brown-black, epruinose. Ascospores Pachysporaria-type, ellipsoidal, 26–32 × 12–14 µm. Pycnidia immersed or slightly protruding; conidia bacilliform, 4–5 × 1 µm. Chemistry: Cortex K+ yellow, C–, KC–, P+ yellow; medulla K+ yellow then red, C–, P+ dark yellow; containing atranorin (major), zeorin (major), 16β-acetoxyhopane-6α,22-diol (major), leucotylin (minor), 6α-acetoxyhopane-16β,22-diol (trace), norstictic acid (major), connorstictic acid (minor), salazinic acid (trace). Remarks: This lichen is characterized by the bursting pseudocyphellae along the lobe margins developing into soralia and the presence of norstictic acid in the medulla. Usually the development of the soralia starts in a very early stage and it may be difficult to see the few remaining pseudocyphellae. But sometimes the development of the soralia starts late and those specimens are very similar to Heterodermia angustiloba, which however, is easily separated by the presence of dissectic acid.



Heterodermia pseudospeciosa





Heterodermia pseudospeciosa

Heterodermia speciosa (Wulfen) Trevis., Atti Soc. ital. Sci. nat. 11: 614 (1868)
= *Anaptychia speciosa* (Wulfen) A. Massal., Memor. Lich.: 36 (1853)
= *Borrera speciosa* (Wulfen) Mudd, Man. Brit. Lich.: 107 (1861)
= *Dimelaena speciosa* (Wulfen) Norman, Conat. Praem. Gen. Lich.: 19 (1852)
= *Hagenia speciosa* (Wulfen) De Not., G. bot. ital. 2(1.1): 184 (1846)
= *Imbricaria speciosa* (Wulfen) DC., in Lamarck & de Candolle, Fl. franç., Edn 3 (Paris) 2: 83 (1805)
= *Lichen speciosus* Wulfen, in Jacquin, Collnea bot. 3: 119 (1791) [1789]
= *Lobaria speciosa* (Wulfen) Hoffm., Deutschl. Fl., Zweiter Theil (Erlangen): 123 (1796) [1795]
= *Parmelia speciosa* (Wulfen) Ach., Methodus, Sectio post. (Stockholmiæ): 198 (1803)
= *Physcia speciosa* (Wulfen) Nyl., Act. Soc. linn. Bordeaux 21(4): 307 (1857) [1856]
= *Pseudophyscia speciosa* (Wulfen) Müll. Arg., Bull. Herb. Boissier 2(app. 1): 40 (1894)
= *Squamaria speciosa* (Wulfen) Frege, Deutsch. Botan. Taschenb. 2: 171 (1812)
= *Xanthoria speciosa* (Wulfen) Horw., Hand-list Lich. Gr. Brit.: 13 (1912)

[ABL13658], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13658), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus foliose, orbicular to irregular, adnate to loosely adnate, 2–4 cm wide, often coalescing to form colonies up to 15 cm wide. Lobes 0.5–1.5 mm wide, plane to weakly convex, sublinear-elongate, often slightly broader towards the apices, dichotomously branched, ± discrete at the periphery, radiating; apices not ascending, eciliate, with distinct pseudocyphellae along the margins of the lobes or on small short lateral branches. Upper surface grayish white to gray to brownish gray, ± darker at the lobe tips, pruinose or not, sorediate; soralia white to bluish gray, originating mostly from bursting pseudocyphellae, developing into subcapitate or labriform soralia. Medulla white. Lower surface corticate, whitish to pale brown, rarely dark gray in the centre. Marginal rhizines frequent, concolorous with the thallus or becoming dark or black near the apices, irregularly branched, to 1 mm long, projecting beyond the lobes, lower surface rhizines sparse, mostly simple or sparsely branched. Apothecia rare, laminal, adnate to sessile, 1–3 mm wide; margin initially crenulate, later sorediate; disc concave, brown to brown-black, epruinose. Apothecia rare, laminal, sessile to substipitate,

3–8 mm wide; margin crenulate at first, subsequently sorediate; disc concave, brown to brown-black, epruinose. Ascospores Pachysporaria-type, ellipsoidal, 25–37 × 14–18 µm. Pycnidia immersed or slightly protruding; conidia bacilliform, 4–5 × 1 µm. Chemistry: Cortex K+ yellow, C–, KC–, P+ yellow; medulla K+ yellow, C–, P– or P+ pale yellow; containing atranorin (major), zeorin (major), 6α-acetoxyhopane-16β,22-diol (minor), 6α-acetoxy-22-hydroxyhopane-25-oic acid (minor or trace), 6α-acetoxy-16β,22-dihydroxyhopane-25-oic acid (minor), leucotylin (trace). - Remarks: This lichen is characterized by the striking contrast between the blue-gray soralia and the paler thallus. Actually it is most similar to *Heterodermia pseudospecia*, but lacks norstictic acid in the medulla.



Heterodermia speciosa

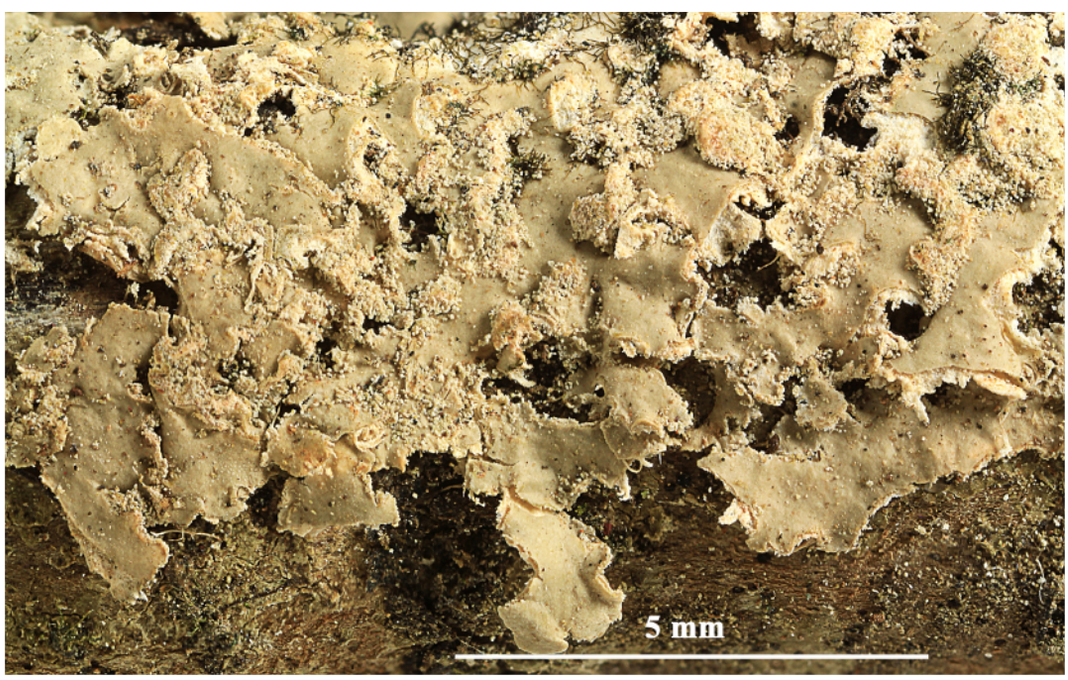




Heterodermia speciosa

Heterodermia tremulans (Müll. Arg.) W.L. Culb., Bryologist 69: 485 (1967)
= *Physcia hypoleuca var. tremulans* Müll. Arg. 1880

[ABL27615], Brazil, Amapá, Macapá, Fazendhina Ecotel garden. On palm roots in garden. 0°03' N, 51°07 W, 5 m. Leg. M. Cáceres & A. Aptroot (no 27615), 22 August 2015, det. A. Aptroot 2015. - Thallus foliose, orbicular to irregularly spreading, adnate to loosely adnate, 2–7 cm wide, often coalescing and forming colonies to 15 cm wide. Lobes 0.7–1.5 mm wide, plane to slightly convex, sublinear, ±flexuose, dichotomously to subdigitately branched, usually discrete at the periphery, radiating; apices not ascending, with short lateral lobes, eciliate. Upper surface greyish white to grey to brownish grey, ±darker at the apices, pruinose or not, sorediate; soredia whitish or greyish, granular, forming labriform soralia at the tips of the main and lateral lobes. Medulla white. Lower surface corticate, whitish to pale brown, rarely dark grey in the centre. Rhizines sparse, marginal, concolorous with the thallus or becoming darker, or even black near the apices, irregularly branched, to 1 mm long. Apothecia rare, laminal, sessile to substipitate, 1–3 mm wide; margin initially crenulate, becoming sorediate; disc concave, brown to brown-black, epruinose. Ascospores Pachysporaria-type, ellipsoidal, 23–32 × 12–14 µm. Pycnidia immersed or slightly protruding; conidia bacilliform, 4–5 × 1 µm. Chemistry: Cortex K+ yellow, C–, KC–, P+ yellow; medulla K+ yellow, C–, P– or P+ pale yellow; containing atranorin (major), zeorin (major), 16β-acetoxyhopane-6α,22-diol (major), 6α-acetoxyhopane-16β,22-diol (major), 6α,16β-diacetoxyhopane-22-ol (minor), leucotylin (minor), chloroatranorin (minor).





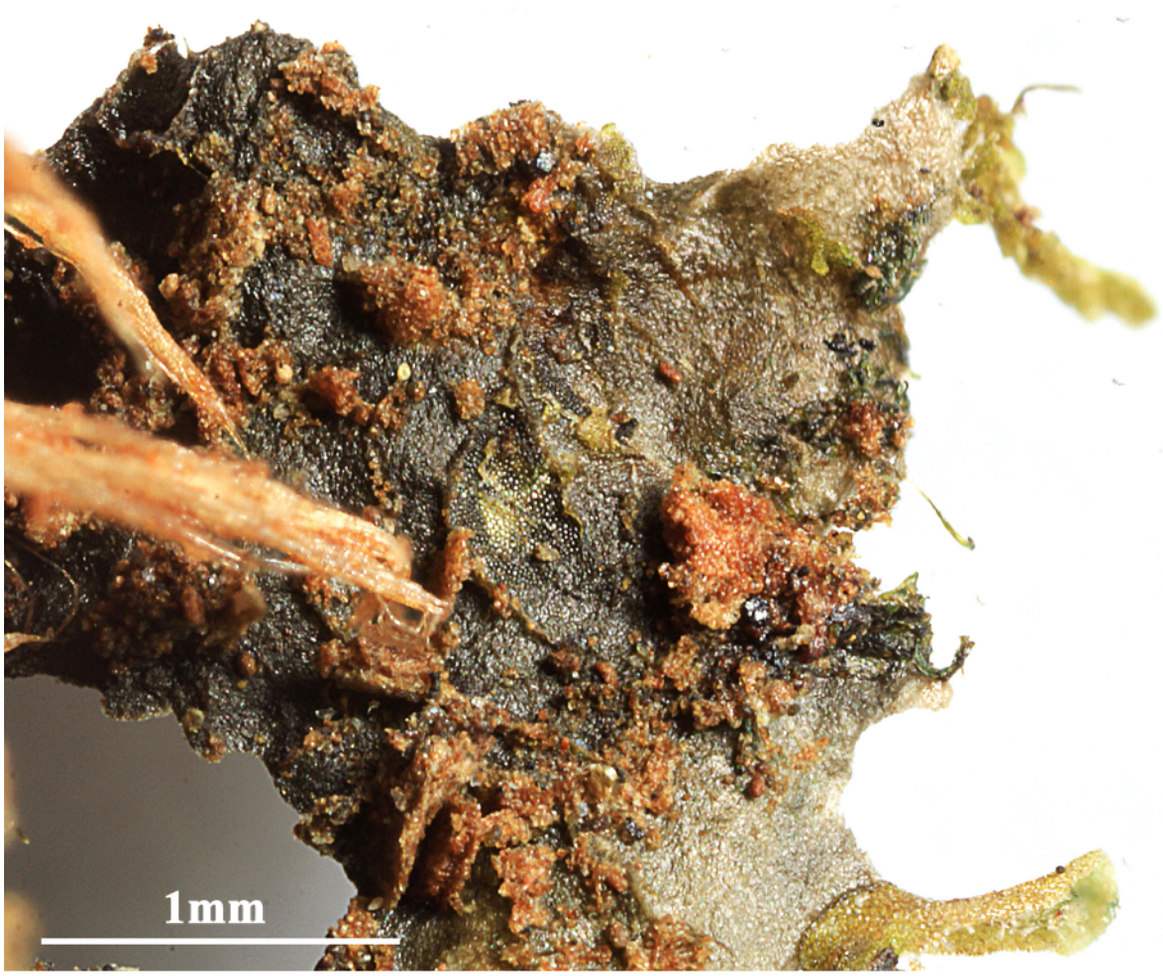
Heterodermia tremulans

Hyperphyscia syncolla (Tuck. ex Nyl.) Kalb, Lichenes Neotropici, Fascicle VI (nos 201-250) (Neumarkt): no. 230 (1983)
= *Physcia adglutinata var. syncolla* (Tuck. ex Nyl.) Nyl., Annls Sci. Nat., Bot., sér. 4 19: 311 (1863)
= *Physcia syncolla* Tuck. ex Nyl., Syn. meth. lich. (Parisiis) 1(2): 428 (1860)
= *Physciopsis syncolla* (Tuck. ex Nyl.) Poelt, Nova Hedwigia 9: 30 (1965)

[ABL13651], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13651), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus foliose, orbicular, rarely irregular, small, less than 2 cm diam., very tightly adnate, often verrucose in center, densely lobate lobes: narrow, 0.3-1.0 (-2.0) mm wide, radiating, usually plane, margins occasionally black, tips sometimes ascending upper surface: gray brown to dark brown, darker at lobe-tips, epruinose or very faintly developed pruina, soredia and isidia absent. Medulla white. Lower surface dark brown to black centrally, paler to whitish at tips, erhizinate or weakly rhizinate Apothecia: common, up to 2 mm diam., thalline margin entire to crenulate. Ascospores brown, ellipsoid, 1-septate, Pachysporaria type, 15-21 x 7-11 µm. Pycnidia ± common, inserted with black weakly protruding tips. Conidia filiform, 15-20 x 0.5-1 µm. Spot tests: cortex and medulla K-, C-, KC-, P-. Secondary metabolites none detected.



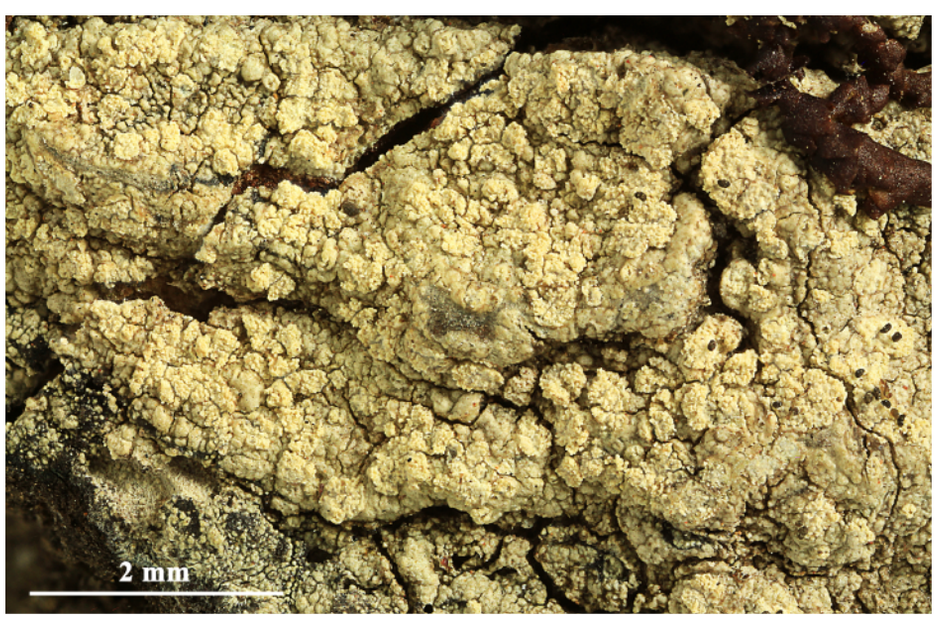


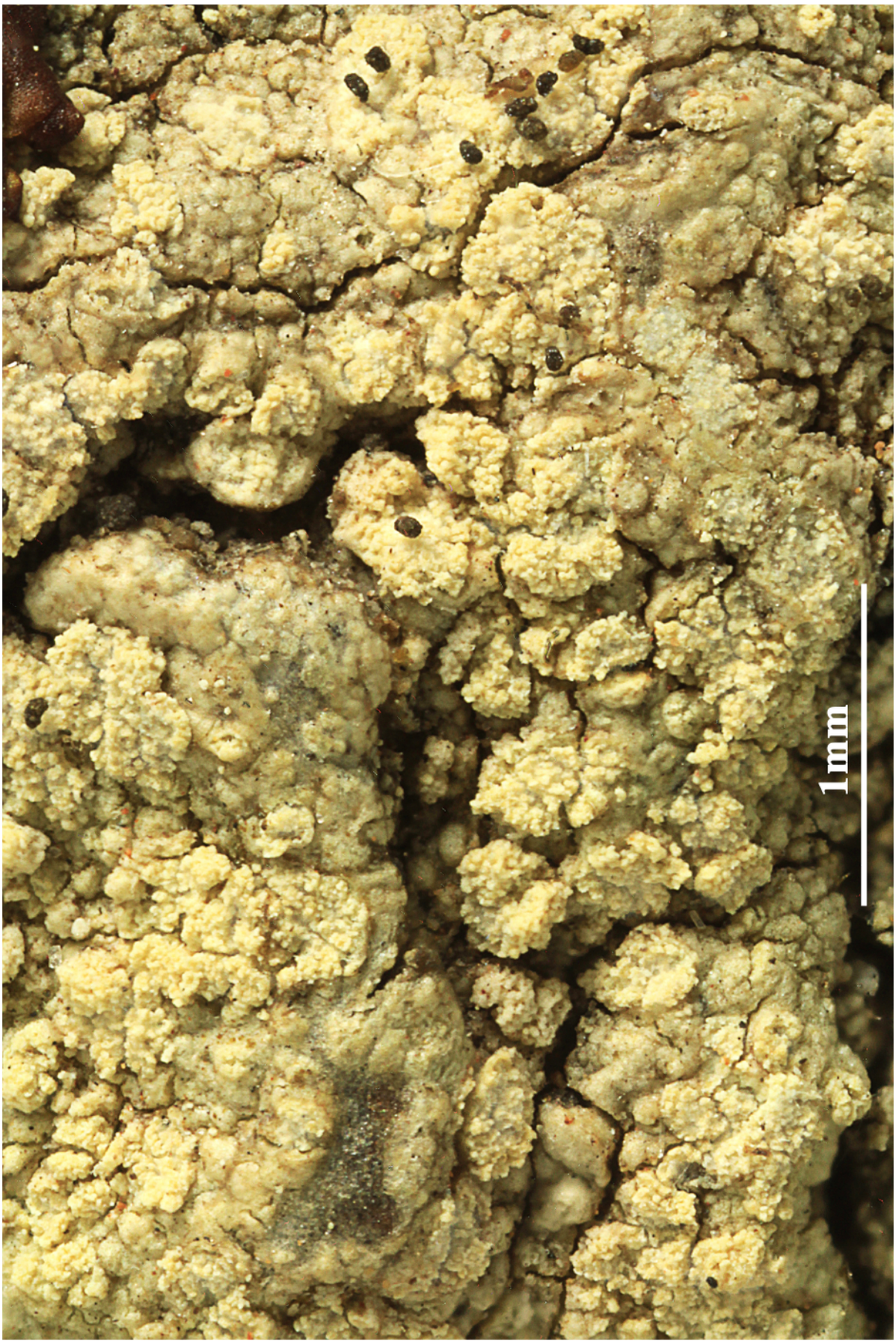


Hyperphyscia syncolla

Lecanora jamesii J.R. Laundon, Lichenologist 2: 122 (1963)

[ABL28949], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28949), 23 October 2016, det. A. Aptroot 2016. - Thallus crustaceous, indistinctly delimited, forming a distinct continuous non-areolate crust with a surface varying from smooth to granular, light grey to grey, sorediate. Hypothallus black or absent. Soredia farinose, under 0.05 mm. diam., pale citron yellow (becoming lighter in the herbarium) delimited to form soralia. Soralia to 1 mm. diam., scattered over the thallus, never forming a confluent sorediate mass, plane or convex. Apothecia uncommon, small, up to 1 mm. diam., scattered, orbicular at first but later distorted. Thalline margin to 0.2 mm. broad at first, later excluded, smooth, greyish. Disc at first below the level of the margin, later at the same level, plane, pale green, brownish green, or rarely almost black. Thecium 35-60 µm high. Epithecium 5-9 µm high, pale yellowish brown with small granular crystals. Asci clavate, 45-50 x 10-15 µm in size, thin walled, 8-spored ; spores ellipsoid, (7-) ll-14 x (4~)7-8 µm, simple, colourless, with a thin double wall. Paraphyses 1 µm thick, sparsely branched towards the non-swollen apices, closely packed and colourless. Hypothecium colourless. Thalline margin of apothecia composed of a mass of large crystal clusters with interspersed hyphae and algal cells. Medulla with clusters of algal cells interspersed with aggregations of crystals (druses). Alga a species of Chlorococcaceae, the cells 7-11 µm diam. Thallus C - , K- or + faintly yellow, KC- or + faintly yellow, P -. Soredia C - , K - or + faintly yellow, KC- or + faintly yellow, P -. Thecium I+ blue changing to sordid blueblack. Chemistry: Usnic acid, atranorin, 3,5-dichloro-2'-O-methylanziaic acid.



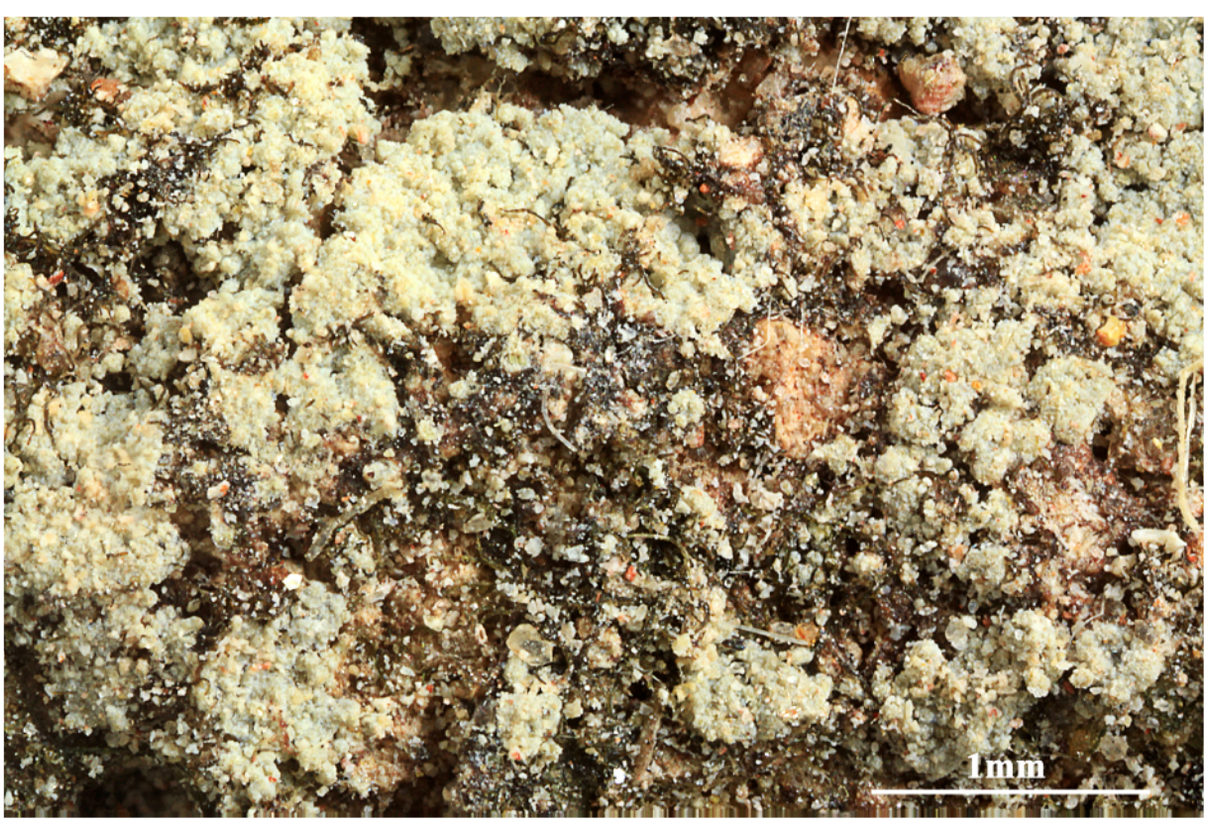


Lecanora jamesii

Lepraria pallida Sipman, Herzogia 17: 31 (2004)

[ABL13464], Brazil, São Paulo, Botucatu, near Santo António church, on soft rock in degraded cerrado forest. 22°53'59" S, 48°29'21" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13464), 14 Sept. 2012, det. A. Aptroot 2012. -

Thallus crustose, eventually several cm in diam., c. 0.1 mm thick, continuous, closely appressed to the substrate or with raised lobe tips, pale grey with a slight bluish tinge; upper side granular, smoothening towards the margins, with c. 0.1 mm wide, ecorticate granules which may become detached and soredium-like, and have a smooth surface; margins lobate, with c.
(0.3–)0.5–2.0 mm wide and long lobes, with raised marginal rim except in the smallest lobes; medulla white, thin; prothallus well developed, grey; photobiont Trebouxia-like, composed of spherical cells 10–12 µm diam.; hyphae c. 3 µm thick, densely branched, prothallus hyphae ca. 4 µm thick and scarcely branched. Chemistry: (TLC) major substances atranorin and zeorin, with unidentified fatty acids and traces of other unidentified substances. - Notes: *Lepraria pallida* is morphologically similar to *L atrotomentosa*. The main difference is in the absence of lecanoric acid in *L. pallida*.



Macroconstrictolumina lyrata (R.C. Harris) Lücking, R. Miranda & Aptroot, in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [169] (2020)

= *Arthopyrenia lyrata* R.C. Harris, in Tucker & Harris, Bryologist 83(1): 6 (1980)

= *Constrictolumina lyrata* (R.C. Harris) Lücking, M.P. Nelsen & Aptroot, in Aptroot & Lücking, Lichenologist 48(6): 921 (2016)

[ABL13687], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13587), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus thin, whitish. Ascomata with apical ostioles, solitary, 0.3–0.5 mm diam., erumpent to prominent, less commonly immersed, hemispherical. Wall usually lacking below. Asci narrowly elliptical to elliptical, usually with a distinct ocular chamber, 75–120(–130) × 20–30 µm. Ascospores 4–8 per ascus, irregularly arranged to biseriate, narrowly elliptical or narrowly ovate, 1-septate, with one or both cells weakly constricted near the middle, rarely becoming 3-septate; wall granular ornamented, perispore well developed, 18–30 × 7–12 µm (excluding perispore). Pycnidia often present. Conidia linear, 6–9 × 1µm. Chemistry: Thallus and ascomata UV−, K−. TLC: no substances detected.





Macroconstrictolumina lyrata

Malmidea amazonica (Redinger) Kalb, Rivas Plata & Lumbsch, in Kalb, Rivas Plata, Lücking & Lumbsch, Biblthca Lichenol. 106: 164 (2011)
= *Lecidea amazonica* Redinger, Hedwigia 73: 65 (1933)
= *Malcolmiella amazonica* (Redinger) Kalb & Lücking, in Lücking & Kalb, Bot. Jb. 122(1): 41 (2000)

[ABL40147], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40147), 29 October 2016, det. A. Aptroot 2016 - Thallus grrenish grey, granular, spotted with brick red, medulla partly (mostly in warts) deep yellow, sometimes developing into punctiform soredia. Apothecia mostly round to lobed and flat, c. 0.6-1.4 mm diam., disk dark brown with spotted brick red pruina, margin higher than disc, brick red.



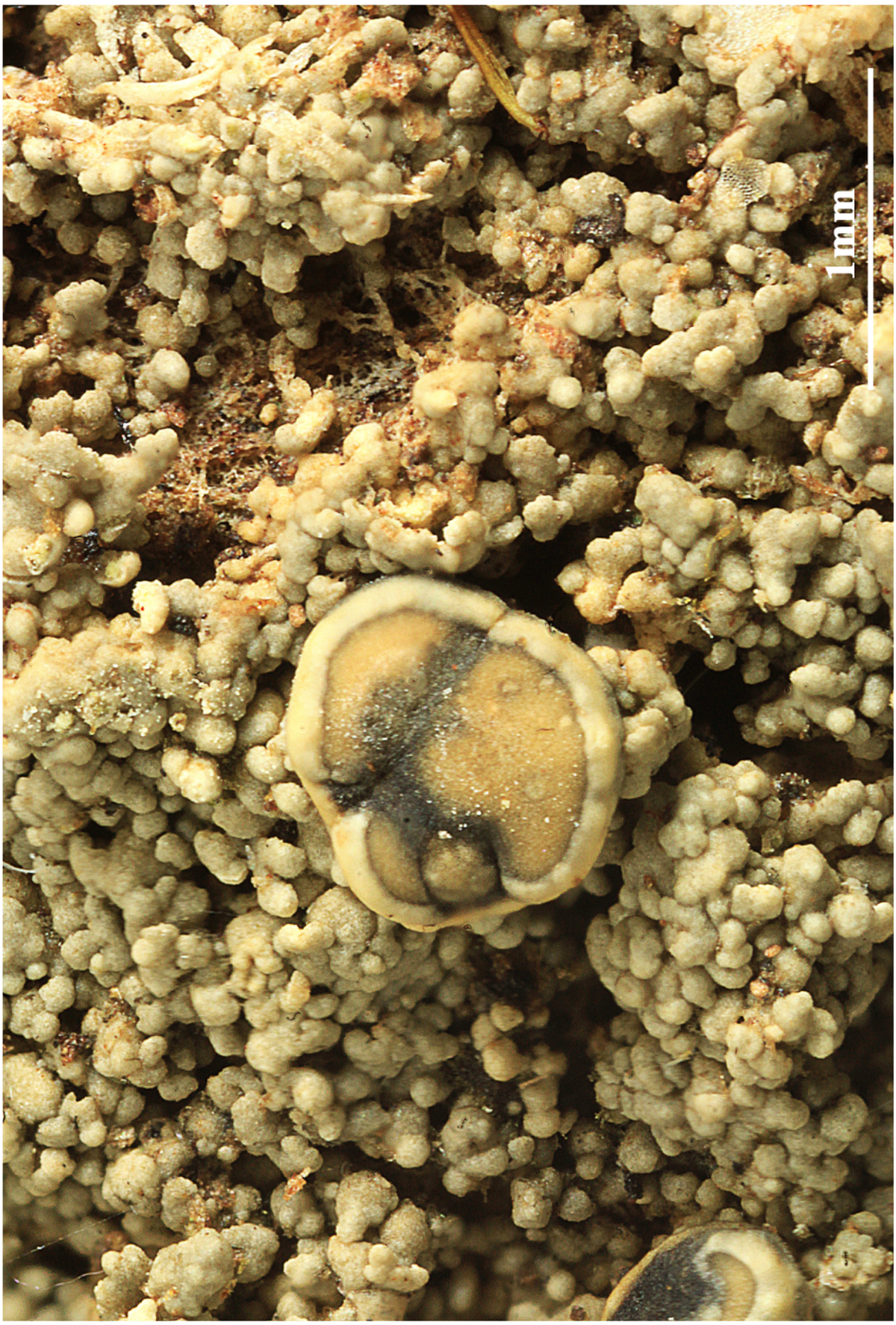


Malmidea amazonica

Malmidea coralliformis Kalb, in Kalb, Rivas Plata, Lücking & Lumbsch, Biblthca Lichenol. 106: 157 (2011)

[ABL27330], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27330), 20 August 2015, det. A. Aptroot 2015. - Thallus crustose, corticolous, continuous, 50–70 .m thick, densely verrucose, verrucae 0.2–0.3 mm high and 0.1–0.3 mm wide, often several confluent and sometimes ramificated, dull to slightly shiny, green-grey, soralia and isidia absent. Medulla of thallus and verrucae whitish, K+ orange. Photobiont chlorococcoid, cells 5–8 µm diam. Apothecia sessile, rounded, 0.7–1.1 mm diam. and 0.2–0.25 mm high; disc plane to slightly convex, chocolate brown to dark grey-brown; margin of granifera type, entire, first 0.1 mm broad and slightly prominent, later thin, 50 .m thick, and the same hight as the disk, whitish, to whitish grey. Excipulum hyaline at periphery, internally with medullary layer composed of loosely arranged periclinal hyphae with constricted septa, 50–70 µm broad, incrusted with greyish hydrophobic granules, nubilous but partly dissolving in KOH with K+ greenish yellow reaction. Subhymenium c. 15 µm high, brown; hypothecium 50–70 µm high, blackish brown, K-. Epihymenium indistinct. Hymenium 75–100 µm high, hyaline. Asci 60–70 x 13–15 µm. Ascospores 6–8 per ascus, non-septate, wall equally thickened, halonate, ellipsoid, 10–17 x 6–10 µm, halo 1 µm. Chemistry: Several unknown xantholepinones (major to trace). Notes: *Malmidea coralliformis* is very similar to *M. aurigera*, but that species contains atranorin and has smaller ascospores (10–13 x 6–8 µm)





Malmidea coralliformis

Malmidea leucogranifera M. Cáceres & Lücking, in Cáceres, Vieira, Jesus & Lücking, Lichenologist 44(6): 809 (2012)

[ABL27350], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27350), 20 August 2015, det. A. Aptroot 2015. - Thallus crustose, corticolous, continuous, 20–50 mm across and 30–70 µm thick, densely verrucose, green-grey; medulla pale yellow, K+ dark yellow. Photobiont chlorococcoid; cells 4–7 µm diam. Apothecia sessile, rounded to irregular, 0.5–1.0 mm diam. and 250–350 µm high; disc plane, orange-brown; margin thin but distinct, not prominent, cream-coloured. Excipulum externally paraplectenchymatous with small cells and loose hyphal ends, 20–50 µm broad, hyaline, internally with medullary layer composed of loosely arranged, periclinal hyphae with constricted septa, 40–60 µm broad, encrusted with hydrophobic granules, nubilous but dissolving in KOH (without visible colour reaction). Hypothecium 20–30 µm high, orange-brown, K--. Epithecium indistinct. Hymenium 80–100 µm high, colourless. Asci 70–90 x 15–20 µm. Ascospores 8 per ascus, non-septate, broadly ellipsoid, 12–16 x 7–10 µm, 1,6–2.0 times as long as broad. Pycnidia not observed. Chemistry: Two unknown substances (xantholepinones?), pale yellow medullary pigment.





Malmidea leucogranifera

Megalotremis nemorosa (R.C. Harris) Aptroot, in Aptroot, Lücking, Sipman, Umaña & Chaves, Biblthca Lichenol. 97: 71 (2008)

= *Anisomeridium nemorosum* R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 148 (1995)

[ABL27058], Brazil, Amapá, Macapá, Peixe Boi near Río Curicaca. 0°37' N, 50°55' W, 30 m. On tree bark in tall forest remnant. Leg. M. Cáceres & A. Aptroot (no 27058), 17 August 2015, det. A. Aptroot 2015. - Thallus greenish grey, corticate, smooth, superficial on the substratum, continuous, UV-. Perithecia solitary, black, globose, immersed in the thallus, 0.5–0.7 mm diam. Ostiole pale, obconical, eccentric. Hamathecium hyaline, not inspersed, IKI-, filaments profusely anastomosing. Asci without ocular cchambre. Ascospores 8/ascus, uniseriate, fusiform with rounded ends, 1-septate, constricted at the septum, 80–120 × 22–28 µm, septum median, wall 1–2 µm thick. Conidiomata not observed.

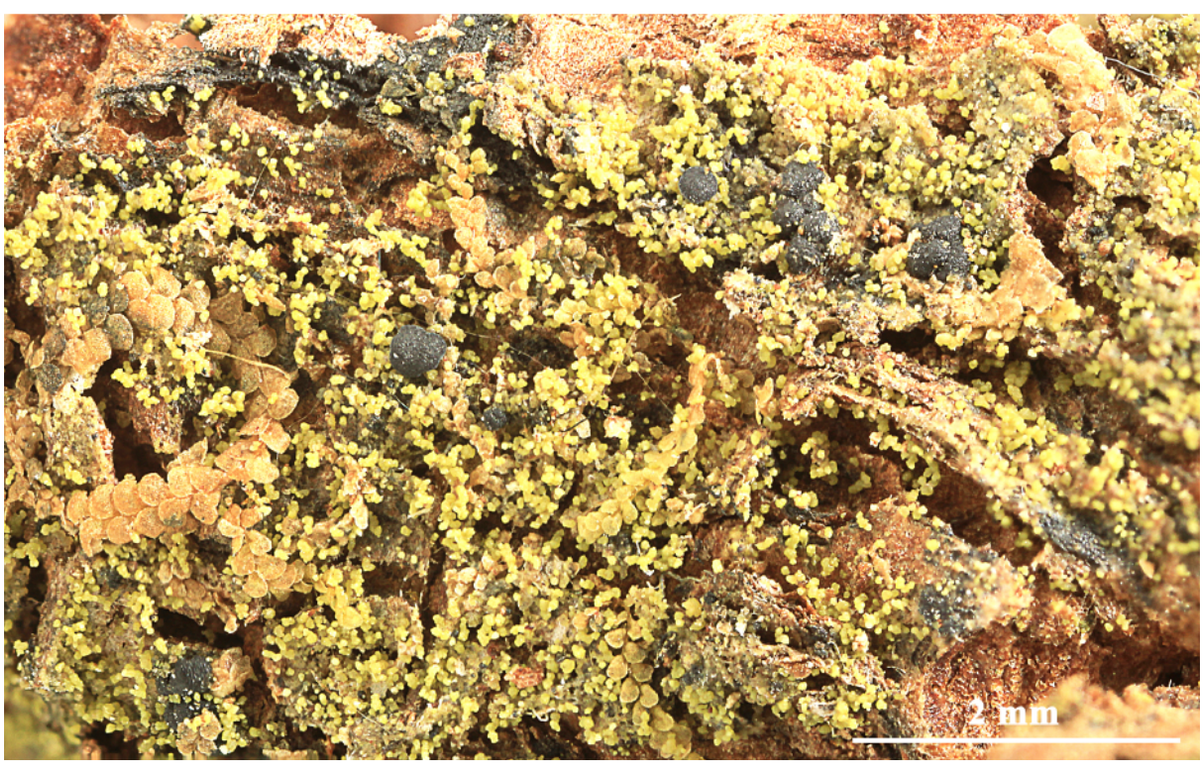


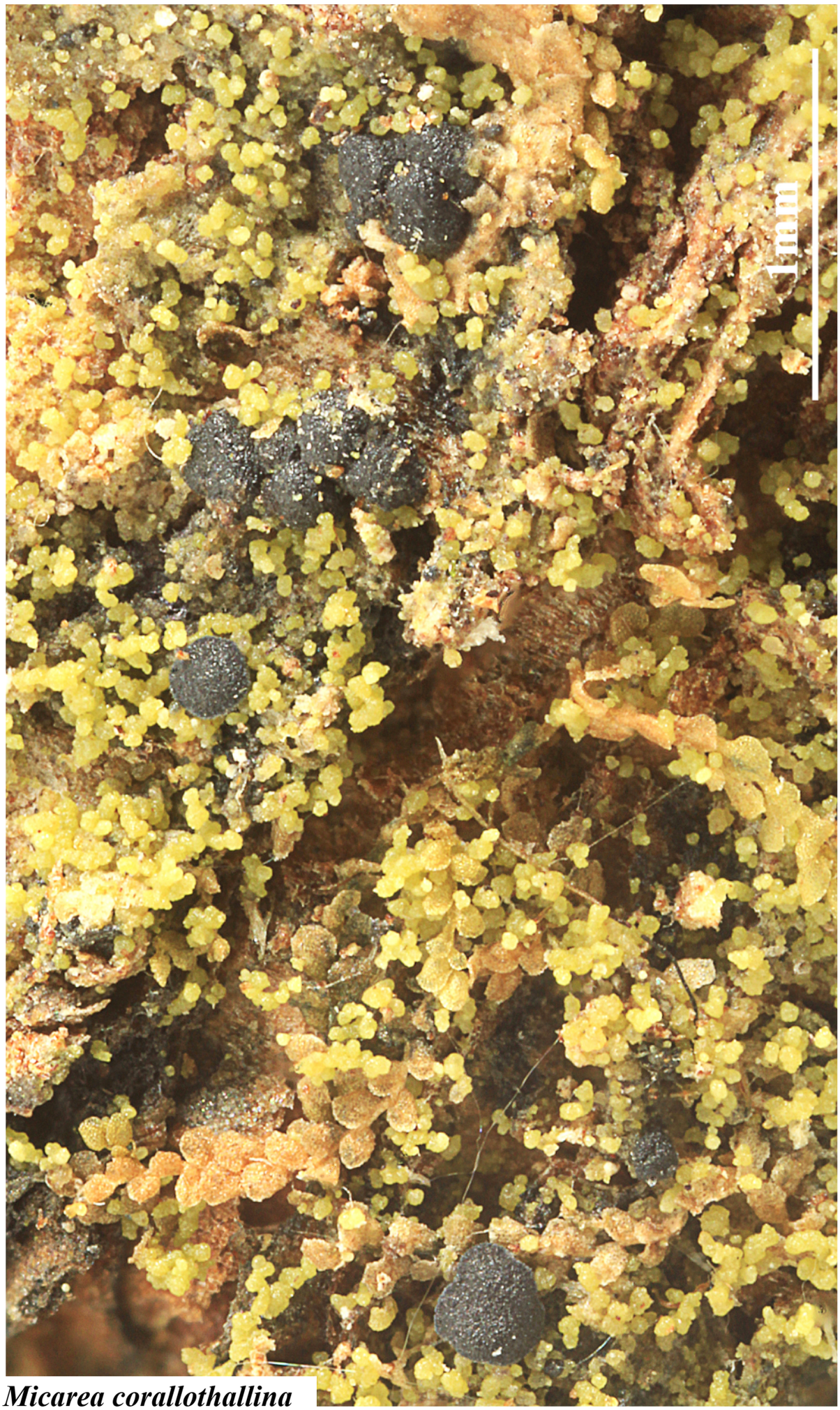


Megalotremis nemorosa

Micarea corallothallina M. Cáceres, D.A. Mota & Aptroot, Lichenologist 45(3): 372 (2013)

[ABL27440], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27440), 20 August 2015, det. A. Aptroot 2015. - Thallus 0.2–0.4 mm thick, dull, consisting of isolated, irregularly densely branched isidioid green granules of c. 50 mm thick (proliferating goniocysts somewhat like blastidia), with a hyaline cortex. Algae myrmecioid, c. 3–5 µm diam. Apothecia appressed, initially between the thallus granules, later often emergent, up to 0.2 mm diam., usually aggregated in botryose groups of 2–25, forming clusters of up to 1.2 mm diam.; disc globose, pale yellowish. Hymenium hyaline, 25–35 µm high, paraphyses glued and sparse; hypothecium hyaline; excipulum inconspicuous. Ascus with 8 ascospores, arranged in 2 loose bundles. Ascospores hyaline, curved, (0–)1-septate, 15–17 x 3´.0–3.5 mm, with rounded ends. Pycnidia not observed. Chemistry. Thallus and apothecia UV-, C-, K-, KC-, P-. No pigments visible and no lichen substances detected with TLC.





Micarea corallothallina

[ABL28835], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28835), 23 October 2016, det. A. Aptroot 2016. - ISOTYPE - Thallus crustose, continuous, smooth, not corticate, whitish, up to 3 cm diam., under 0.1 mm thick, not surrounded by prothallus. Soredia not in soralia, dispersed on the thallus, not numerous, c. 0.02 mm diam., whitish. Photobiont trentepohlioid. Medulla IKI-negative, containing of c. 1 µm wide hyphae without crystals. Ascomata and pycnidia not observed. Chemistry. Thallus UV–, K–, P–. TLC: 2'-O-methylperlatolic acid. This species is well characterized by the small soredia and the presence of 2'-O-methylperlatolic acid. All other so far described species in the genus (Jagadeesh Ram & Sinha 2016) are fertile.





Myriostigma minisorediatum

Myriotrema neofrondosum Sipman, Trop. Bryol. 5: 85 (1992)

[ABL27574], Brazil, Amapá, Mazagão, Reserva extrativista Moracá, along BR 156. 0°02' S, 51°45' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27574), 21 August 2015, det. A. Aptroot 2024. - Thallus light grey-green, smooth to uneven, producing schizidia, with dense, prosoplectenchymatous cortex; schizidia 0.2–0.4 mm diam., irregularly rounded and arranged in pustule-like aggregates; photobiont layer and medulla with clusters of calcium oxalate crystals. Apothecia immersed, rounded, 0.2-0.3 mm diam.; disc covered by narrow, 0.1-0.2 mm wide pore, invisible; margin entire, flesh-colored. Columella absent. Excipulum prosoplectenchymatous, colorless; periphysoids absent. Hymenium 60–70 µm high, clear; paraphyses unbranched. Ascospores 8/ascus, 3-septate, 10–15 x 6–7 µm, ellipsoid, with thick septa and lensshaped lumina, colorless, I+ violet-blue (amyloid). Chemistry: hypoprotocetraric and 4-O-demethylnotatic acids, lichexanthone. - Remarks: This is one of three schizidiate species in *Myriotrema*, all differing chiefly in chemistry and ascospore septation (if apothecia are known). *M. frondosolucens* lacks ascomata but has stictic acid and lichexanthone, whereas *M. frondosum* Hale differs in its submuriform ascospores and psoromic acid. Except for the schizidia, *M. neofrondosum* is most similar to *M. congestum* and *M. microporellum* the latter having an apically brown excipulum and larger ascospores.





Myriotrema neofrondosum

Nyungwea anguinella (Nyl.) Aptroot, in Aptroot & Cáceres, Lichenologist 49(6): 614 (2017)

= *Chiodecton anguinellum* (Nyl.) Vain., Bot. Tidsskr. 29: 370 (1909)

= *Enterographa anguinella* (Nyl.) Redinger, Reprium nov. Spec. Regni veg. 43: 62 (1938)

= *Opegrapha anguinella* (Nyl.) Ertz & Diederich, in Ertz, Miądlikowska, Lutzoni, Dessein, Raspé, Vigneron, Hofstetter & Deiderich, Mycol. Res. 113(1): 146 (2009)

= *Stigmatidium anguinellum* Nyl., Annls Sci. Nat., Bot., sér. 4 19: 381 (1863)

[ABL27614], Brazil, Amapá, Macapá, Fazendhina Ecotel garden. On tree bark in garden. 0°03' N, 51°07 W, 5 m. Leg. M. Cáceres & A. Aptroot (no 27614), 22 August 2015, det. A. Aptroot 2015. - Thallus: crustose, up to 5 cm in diam., continuous to rimose to areolate, 100-200 µm thick; prothallus: thin, gray surface: white to dull gray-green, smooth, water repellent cortex: absent medulla: cream-colored, with abundant crystals 15-25 µm in diam., upper part without algae, 1015 µm thick, composed of densely interwoven hyphae Ascomata: always present, often crowded, apothecioid in section, rounded to short lirelliform, rarely branched 0.2 x 0.2-0.5 mm disc: pink to red-brown, epruinose margin: thalline, 0.1-0.4 mm wide, prominent to disappearing in specimens with thin thalli exciple: pale orange in section, 15-25 µm wide epihymenium: brown-orange, c. 20 µm thick, with crystals of c. 0.8 µm in diam., K- hymenium: hyaline, 60-100 µm tall, without crystals and oil drops; paraphysoids: c. 1 µm wide, apices 1-1.5 µm wide, irregularly branched and anastomosed hypothecium: hyaline, 25-50 µm thick, K- asci: cylindrical, 60-75 x 15-17 µm, 8-spored ascospores: hyaline, 6-11 septate, ellipsoid-fusiform to acicular-fusiform, (25-)30-40(-52) x 2.3-3 µm, with a gelatinous sheath up to 2.5 µm thick Pycnidia: often present, randomly dispersed over the thallus, dark brown-black, immersed, punctiform, 100 µm in diam. at ostiole, up to 150 µm in section, wall with orange crystals 5-7 µm in diam. conidia: filiform, curved or sigmoid, 1523 x 0.8 µm Spot tests: K+ pale yellow, C-, KC-, P+ yellow Chemistry: psoromic acid (sometimes in trace amounts but always with clear P+ yellow spot test reaction of the thallus surrounding the apothecia).



Nyungwea anguinella



Nyungwea anguinella

Nyungwea anguinella (Nyl.) Aptroot, in Aptroot & Cáceres, Lichenologist 49(6): 614 (2017)
= *Chiodecton anguinellum* (Nyl.) Vain., Bot. Tidsskr. 29: 370 (1909)
= *Enterographa anguinella* (Nyl.) Redinger, Reprium nov. Spec. Regni veg. 43: 62 (1938)
= *Opegrapha anguinella* (Nyl.) Ertz & Diederich, in Ertz, Miądlikowska, Lutzoni, Dessein, Raspé, Vigneron, Hofstetter & Deiderich, Mycol. Res. 113(1): 146 (2009)
= *Stigmatidium anguinellum* Nyl., Annls Sci. Nat., Bot., sér. 4 19: 381 (1863)

[ABL28953a], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28953a), 23 October 2016, det. A. Aptroot 2016. - Thallus: crustose, up to 5 cm in diam., continuous to rimose to areolate, 100-200 µm thick; prothallus: thin, gray surface: white to dull gray-green, smooth, water repellent cortex: absent medulla: cream-colored, with abundant crystals 15-25 µm in diam., upper part without algae, 1015 µm thick, composed of densely interwoven hyphae Ascomata: always present, often crowded, apothecioid in section, rounded to short lirelliform, rarely branched 0.2 x 0.2-0.5 mm disc: pink to red-brown, epruinose margin: thalline, 0.1-0.4 mm wide, prominent to disappearing in specimens with thin thalli exciple: pale orange in section, 15-25 µm wide epihymenium: brown-orange, c. 20 µm thick, with crystals of c. 0.8 µm in diam., K- hymenium: hyaline, 60-100 µm tall, without crystals and oil drops; paraphysoids: c. 1 µm wide, apices 1-1.5 µm wide, irregularly branched and anastomosed hypothecium: hyaline, 25-50 µm thick, K- asci: cylindrical, 60-75 x 15-17 µm, 8-spored ascospores: hyaline, 6-11 septate, ellipsoid-fusiform to acicular-fusiform, (25-)30-40(-52) x 2.3-3 µm, with a gelatinous sheath up to 2.5 µm thick Pycnidia: often present, randomly dispersed over the thallus, dark brown-black, immersed, punctiform, 100 µm in diam. at ostiole, up to 150 µm in section, wall with orange crystals 5-7 µm in diam. conidia: filiform, curved or sigmoid, 1523 x 0.8 µm Spot tests: K+ pale yellow, C-, KC-, P+ yellow Chemistry: psoromic acid (sometimes in trace amounts but always with clear P+ yellow spot test reaction of the thallus surrounding the apothecia).



Nyungwea anguinella



Nyungwea anguinella

[ABL27456], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27456), 20 August 2015, det. A. Aptroot 2015. - Thallus corticolous, epiperidermal, up to c. 7 cm diam., continuous; surface verrucose, light greyish olive; prothallus absent. Thallus in section 100–150 µm thick, with loose, irregular, cartilaginous cortex, 10–15 µm thick, photobiont layer 50–100 µm thick, and indistinct medulla, partially encrusted orange pigment granules. Photobiont *Trentepohlia*; cells rounded to irregular in outline, in irregular groups, yellowish green, 9–12 × 8–10 µm. Ascomata rounded, prominent, with complete but often eroding thalline margin, 0.7–1.2 mm diam., 0.3–0.4 mm high; disc covered by 0.1–0.2 mm wide pore filled with white-pruinose columella; proper margin thin, entire, visible as white rim around the pore; thalline margin entire, verrucose, light greyish olive. Excipulum entire, apically carbonized, laterally covered by a thick layer of brown periderm and above with a massive layer of orange medulla, together with periderm 200–300 µm thick, fused with thalline margin; laterally covered by corticate algiferous thallus; columella present, finger-like, 50–100 µm broad, upper half carbonized; hypothecium prosoplectenchymatous, 10–20 µm high, hyaline; hymenium 150–200 µm high, hyaline, clear; epithecium distinct, 10–15 µm high, gray-granular. Paraphyses unbranched, apically smooth; periphysoids absent; asci cylindrical, 130–170 × 30–40 µm. Ascospores 1–2 per ascus, oblong, 21–29-septate, 70–150 × 15–20 µm, 5–8 times as long as wide, hyaline, distoseptate with lens-shaped lumina, I+ violet-blue. Chemistry: unidentified orange anthraquinone, K+ purple.



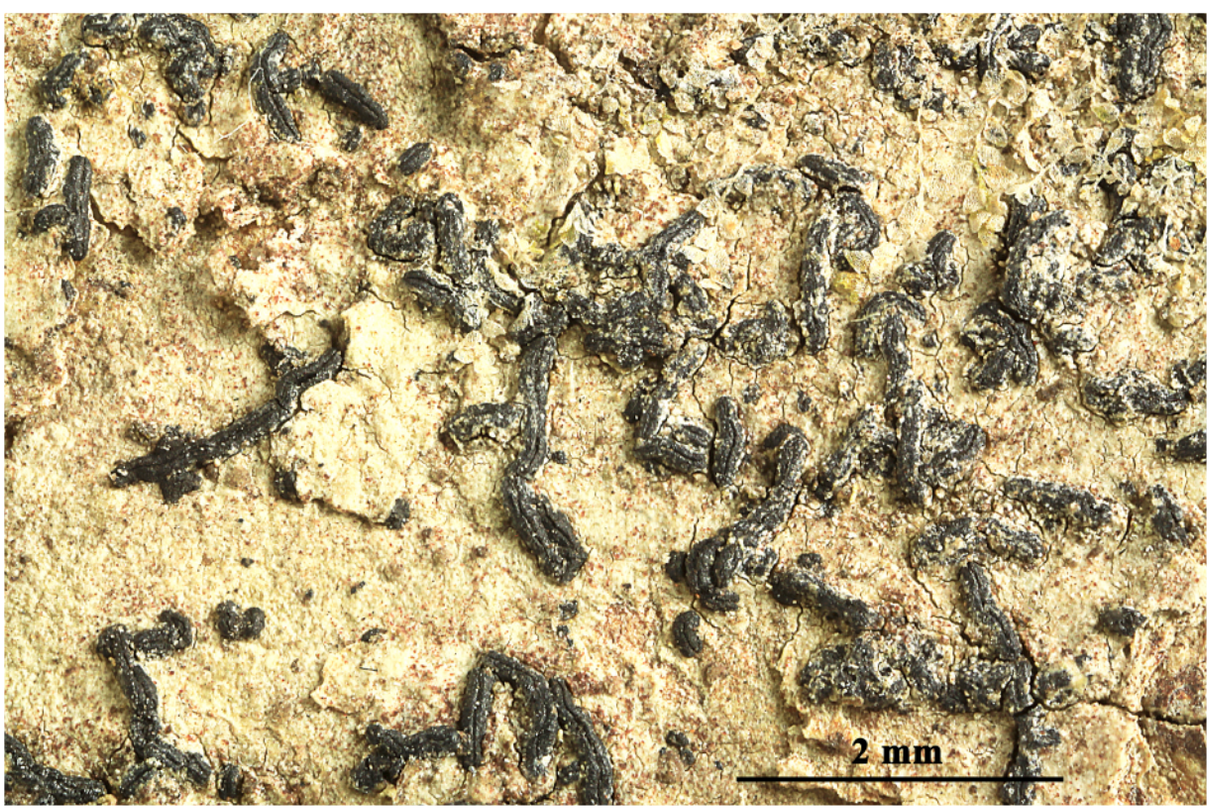
Ocellularia submordenii



Ocellularia submordenii

Opegrapha multiseptata Müll. Arg., Flora, Regensburg 63(3): 43 (1880)
= *Opegrapha multiseptata* f. *brevicarpa* (Redinger) Redinger, Caderno de Pesquisa, Série Botânica 18(2): 66 (2006)
= *Opegrapha multiseptata* f. *depressa* Redinger, Ark. Bot. 29A(no. 19): 36 (1940)
= *Opegrapha multiseptata* var. *brevicarpa* Redinger, Ark. Bot. 29A(no. 19): 36 (1940)
= *Opegrapha multiseptata* var. *plicatula* Redinger, Ark. Bot. 29A(no. 19): 36 (1940)

[ABL28912], Brazil, Tocantins, near Itaguatins. 5°45'22" S, 47°33'53" W, 150 m. In cerrado along river bark of tree. Leg. M. Cáceres & A. Aptroot (no 28912), 23 October 2016, det. A. Aptroot 2016. - Thallus c. 60 µm thick, K-. Lirellae 2.5 x 0.2-0.3 mm diam.; hypothecium brownish, 25 µm; hymenium 90-100 µm, I+ reddish; paraphyses densely branched; asci 80-100 x 15 µm. Spores 8/ascus, hyaline, 11-17-septate, 40-60 x 3-5 µm.





Opegrapha multiseptata

Opegrapha riograndensis Redinger, Ark. Bot. 29A(no. 19): 32 (1940)

[ABL28991], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28991), 23 October 2016, det. A. Aptroot 2016. - Thallus creamish white, not corticate. Lirellae unbranched, up to 2 mm long, c. 0.25 mm wide, basally thallus-covered. Ascospores 7-9-septate, 40-55 x 6-8 µm, central lumina much larger than terminal lumina, surrounded by a 1 µm wide gelatinous sheath.

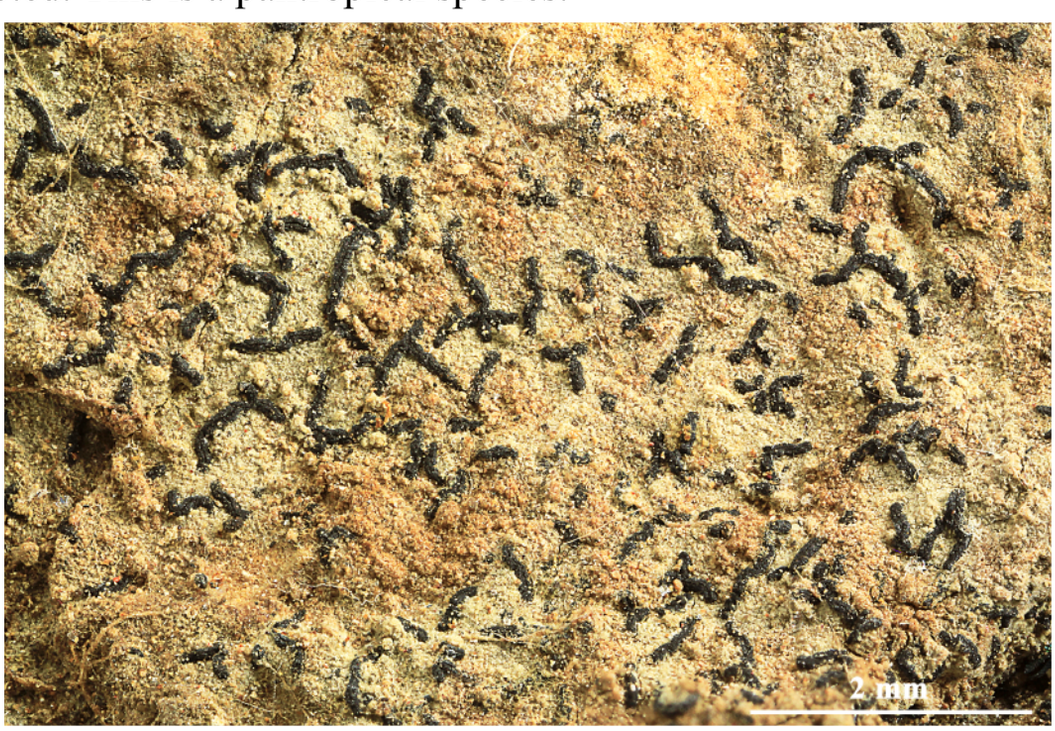




Opegrapha riograndensis

Opegrapha subrimulosa Nyl., Flora, Regensburg 49: 293 (1866)

[ABL27179], Brazil, Amapá, Macapá, Fazendinha, Ecotel Garden, on tree bark in garden. 0°03' N, 51°07' W, 5m. Leg. M. Cáceres & A. Aptroot (no 27179), 18 August 2015, det. A. Aptroot 2015. - Thallus very thin to inconspicuous, continuous to finely cracked, smooth, white or greenish grey, matt or slightly shiny, up to 50 µm thick. Prothallus absent. Ascomata sparsely distributed to numerous, very rarely grouped by 2- , lirelliform, simple or rarely with one branch up to 200 µm long, sessile, black, not pruinose, straight, curved or rarely slightly flexuose, small, 0.2-1.5(-2) × 0.1-0.15 mm; hymenial disc always a slit, not pruinose. Excipulum dark brown, K+ olivaceous (Atra-brown), N+ reddish brown, continuous below the hymenium, 15-33 µm wide laterally, 5-45 µm wide at base. Subhymenium pale brown, 5-15 µm tall, K+ olivaceous, I+ red. Hymenium hyaline, not inspersed with oil droplets, 45-60 µm tall; hymenial gel I+ red, K/I+ blue. Paraphysoids branched, anastomosing, 1-1.5 µm wide, not or slightly enlarged at the apex, up to 2 µm wide. Epihymenium hyaline to pale brown, I+ red, K-. Asci cylindric-clavate or ellipsoid, 8-spored, 35-50 × 10-17 µm, with an apical K/I+ blue ring. Ascospores narrowly ellipsoid, hyaline, 3-septate, septation starts with one median septum, not constricted at the septa, cells more or less equal in size and twice longer than wide, (12.5-)13.4-17.5(-22.5) × (2.5-)2.9-3.7(-4.5) µm, l/w ratio 4.2-5.4 (N=72); perispore 1-1.5 µm wide, hyaline, becoming dark brown granulose when over-mature (at a very late stage). Pycnidia not observed. Chemistry: Thallus K–, C–, KC–, PD–, UV–; TLC: no lichen products detected. This is a pantropical species.





Opegrapha subrimulosa

Opegrapha trilocularis Müll. Arg., Bull. Herb. Boissier 1: 132 (1893)

[ABL27214], Brazil, Amapá, Macapá, Fazendinha, Ecotel Garden, on tree bark in garden. 0°03' N, 51°07' W, 5m. Leg. M. Cáceres & A. Aptroot (no 27214), 18 August 2015, det. A. Aptroot 2015. - Thallus endophloedal, bark-coloured. Ascomata few, scattered more or less evenly over the thallus, very rarely grouped by 2-5, lirelliform, simple, more rarely bifurcate or with 1-3 branches up to 0.6 mm in length, strongly sessile, black, not pruinose, usually straight, rarely curved, rarely slightly flexuose, long and narrow, 0.35-1.4(-2.1) × 0.1-0.13(-0.19) mm; hymenial disc a slit becoming sometimes narrowly exposed, up to 180 µm wide, black, not pruinose. Excipulum dark brown to slightly olivaceous, K+ olivaceous, N+ slightly reddish, continuous below the hymenium where it is often paler, 20-50 µm laterally, 13-25 µm at base. Subhymenium hyaline, 8-11 µm tall, I+ red. Hymenium hyaline, not inspersed with oil droplets, 48-65 µm tall; hymenial gel I+ red, K/I+ blue in lower concentration, greenish in higher concentration. Paraphysoids branched, anastomosing, 1-1,5 µm wide, not distinctly enlarged at the apex. Epihymenium hyaline to pale brown, K-, I+ red. Asci ellipsoid to clavate, (4-)8-spored, with a thick wall at the apex and a long and narrow ocular chamber, with a well visible apical K/I+ blue ring, 47-58 × 11-17 µm (5). Ascospores ellipsoid to oblong, hyaline, 2 septate, septation starts with one submedian septum, not constricted at the septa, cells about 1.5 to 2 times longer than wide, (14.5-)16.0-20.2(-23) × (3.5-)3.7-4.1(-4.5) µm, l/w ratio 4.1-5.3 (N=46); perispore 1 µm wide, hyaline, brown pigmentation not observed. Pycnidia not observed. Chemistry: Thallus K–, C–, KC–, PD–, UV–; TLC: no lichen products detected.

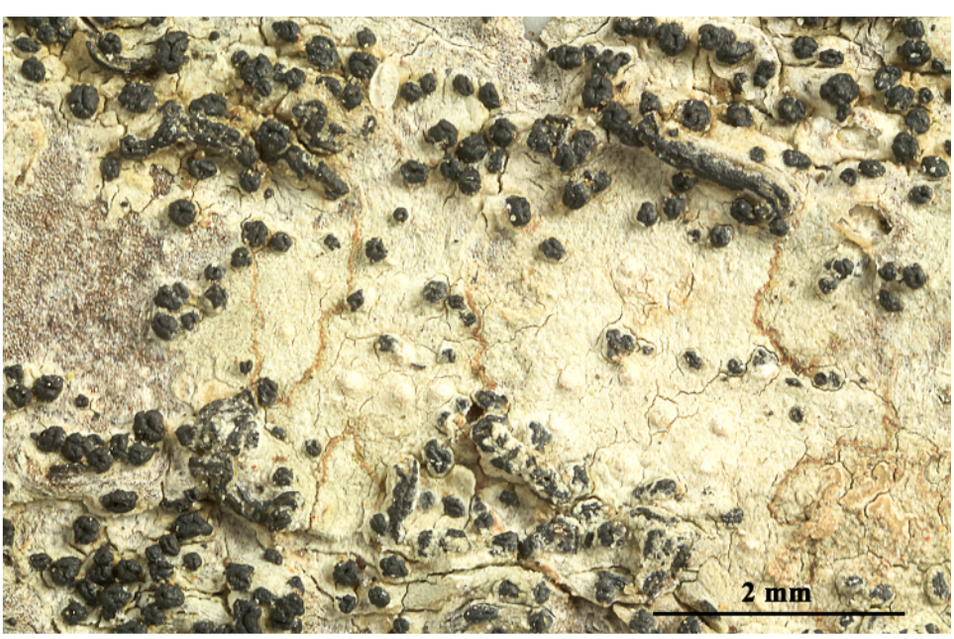




Opegrapha trilocularis

Opegrapha vermicellifera (J. Kunze) J.R. Laundon, Lichenologist 2: 139 (1963)
= *Opegrapha fuscella* (Fr.) Almb., Bot. Notiser, Suppl. 1(no. 2): 137 (1948)
= *Opegrapha hapaleoides* Nyl., Flora, Regensburg 52(19): 296 (1869)
= *Pyrenotea fuscella* Fr., Sched. Crit. Lich. Suec., Fasc. 7: 2 (1826)
= *Pyrenotea vermicellifera* J. Kunze, in Reichenbach & Schubert, Lich. Exsicc.: no. 60 (1823)
= *Pyrenula vermicellifera* (J. Kunze) Link, Grundr. Krauterk. 3: 221 (1833)
= *Segestrella fuscella* (Fr.) Fr., Summa veg. Scand., Sectio Prior (Stockholm): 120 (1845)
= *Segestrella vermicellifera* (J. Kunze) Fr., Summa veg. Scand., Sectio Prior (Stockholm): 120 (1845)

[ABL28992], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28992), 23 October 2016, det. A. Aptroot 2016. - Thallus thin, smooth, continuous or finely rimose-cracked, often forming extensive pale grey or medium grey patches. Apothecia (0.3–) 0.6–1.2 (–1.6) × 0.09–0.15 (–0.25) mm, 0.02–0.50 mm high, rather rare and often confined to restricted areas on the thallus, elongate, narrow, semi-immersed, serpentine, infrequently furcate or in scattered stellate clusters; disc a slit, occasionally partially exposed; exciple sometimes furrowed and/or grey-pruinose, K–; epithecium brown; hymenium 50–60 µm tall, I–. Ascospores 16–25 (–30) × 3–4 µm, 4-7-septate, with rather pointed ends. Pycnidia prominent, white- to pale grey-pruinose, (0.1–) 0.15–0.25 mm diam. and 0.15–0.2 (–0.4) mm high; young pycnidia semi-immersed, chestnut-brown with a pale ostiole, K–; conidia (3–) 4–7 × 1–1.5 µm, straight, bacilliform. Thallus and pycnidia C–, K–, KC–, Pd–, UV– (no lichen products detected by TLC).





Opegrapha vermicellifera

Opegrapha vulgata (Ach.) Ach., Methodus, Sectio prior (Stockholmiæ): 20 (1803)
= *Graphis vulgata* (Ach.) Wallr., Fl. crypt. Germ. (Norimbergae) 1: 327 (1831)
= *Graphis vulgata* var. *periblastetica* Wallr., Fl. crypt. Germ. (Norimbergae) 1: 327 (1831)
= *Hysterina vulgata* (Ach.) Gray, Nat. Arr. Brit. Pl. (London) 1: 506 (1821)
= *Lichen vulgatus* Ach., Lich. suec. prodr. (Linköping): 21 (1799) [1798]
= *Opegrapha atra* var. *vulgata* (Ach.) Schaer., Lich. helv. spicil. 7: 325 (1836)
= *Opegrapha cinerea* Chevall., J. Phys. Chim. Hist. nat. Arts 94: 41 (1822)
= *Opegrapha confluens* (Ach.) Stizenb., Flora, Regensburg 48: 75 (1865)
= *Opegrapha devulgata* Nyl., Flora, Regensburg 62: 358 (1879)
= *Opegrapha lithyrga* var. *confluens* Ach., Lich. Univ.: 247 (1810)
= *Opegrapha vulgata* var. *cinerea* (Chevall.) Blomb. & Forssell, Enum. Pl. Scand.: 102 (1880)
= *Opegrapha vulgata* var. *devulgata* (Nyl.) H. Olivier, Expos. Lich. Ouest France, Suppl. 2: 200 (1902)
= *Opegrapha vulgata* var. *parallela* Müll. Arg., Bull. Herb. Boissier 1(2): 56 (1893)
= *Pyrenotea lutea* Leight., Brit. Sp. Ang. Lich.: 68 (1851)

[ABL40223], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40223), 29 October 2016, det. A. Aptroot 2016 - Thallus: thin, smooth and continuous to ± rimose surface: white, gray, to pale or deep brown, often with an olive or greenish tinge Ascomata: (0.3-)0.5-2(-3) x 0.1-0.2(-0.25) mm, sub-immersed to sessile, scattered to clustered, simple or often furcate, sometimes stellate or forming interlinking network; disc: slit-like, slightly widening when old exciple: closed below, K- hymenium: (45-)50-60(-65) µm, I+ reddish; subhymenium 15-30 µm; epihymenium: brownish; paraphysoids: to 1 µm wide asci: cylindric-clavate, 43-55 x 11-12 µm (Vulgata-type) ascospores: narrowly fusiform, ± tapered at one end, straight or slightly curved, hyaline, 4-7(-8)-septate, (15-)19-30(-40) x (2.5-)3-4(-4.5) µm (Vulgata-type) Pycnidia: often numerous, immersed, intermixed with the lirellae conidia: curved, 9-18 x 1 µm Spot tests: thallus K-, C-, KC-, P- Secondary metabolites: none detected. Note: *Opegrapha vulgata* differs from *O. niveoatra* mainly by its longer conidia.



Opegrapha vulgata



Opegrapha vulgata

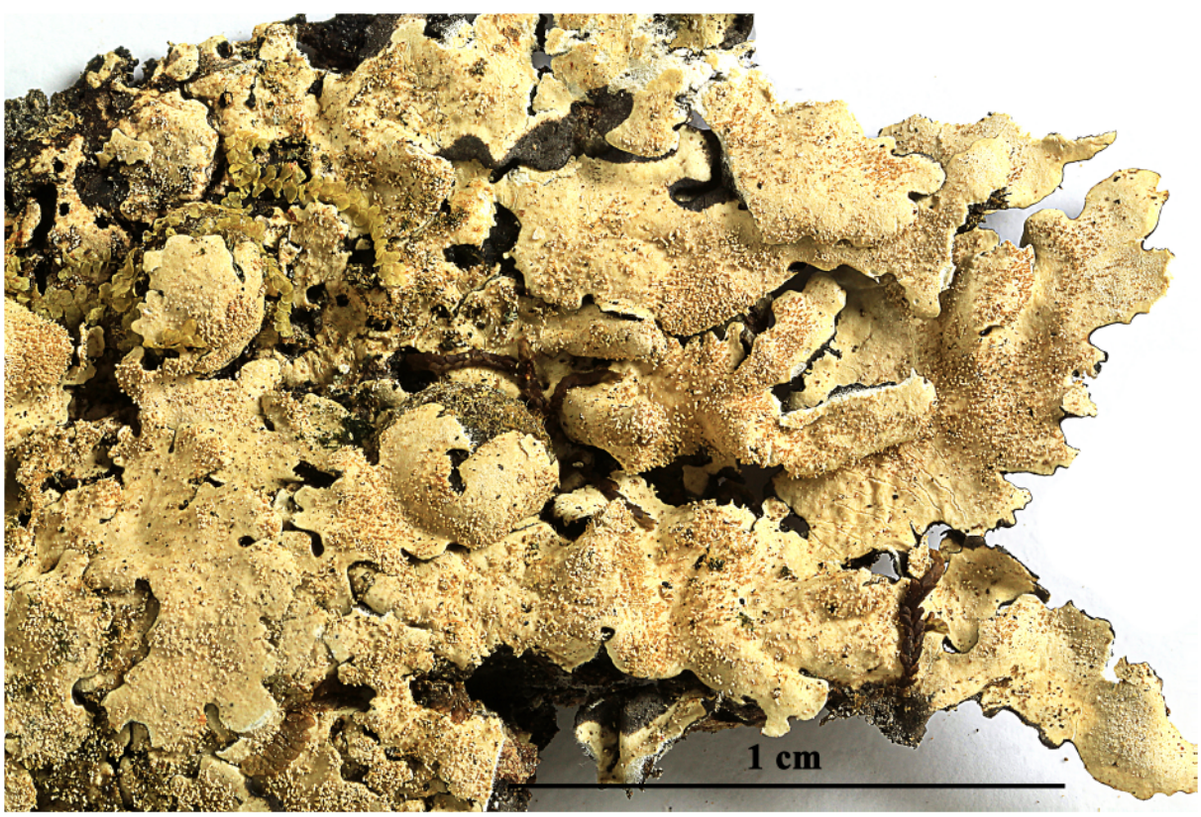
Parmelinella amazonica (Nyl.) A.S. Rodrigues, A.P. Lorenz & Canêz, Bryologist 124(3): 356 (2021)

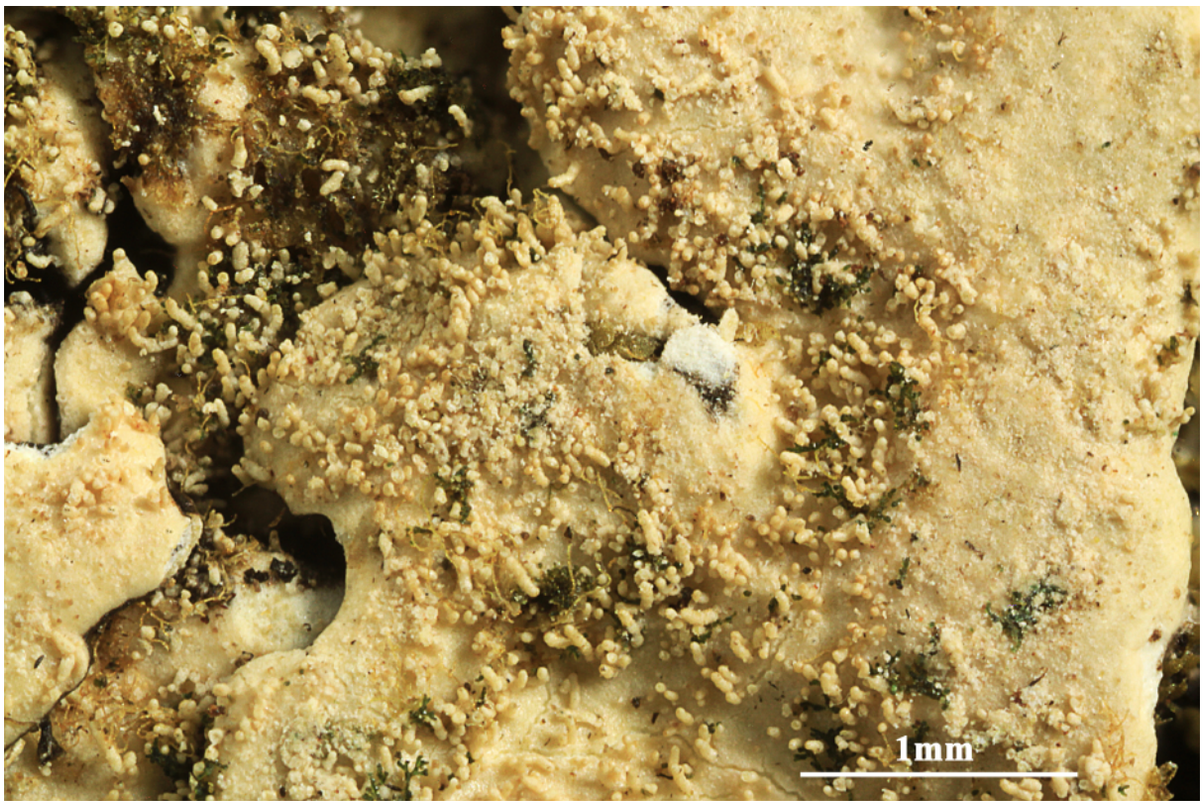
= *Canoparmelia amazonica* (Nyl.) Elix & Hale, in Elix, Johnston & Verdon, Mycotaxon 27: 278 (1986)

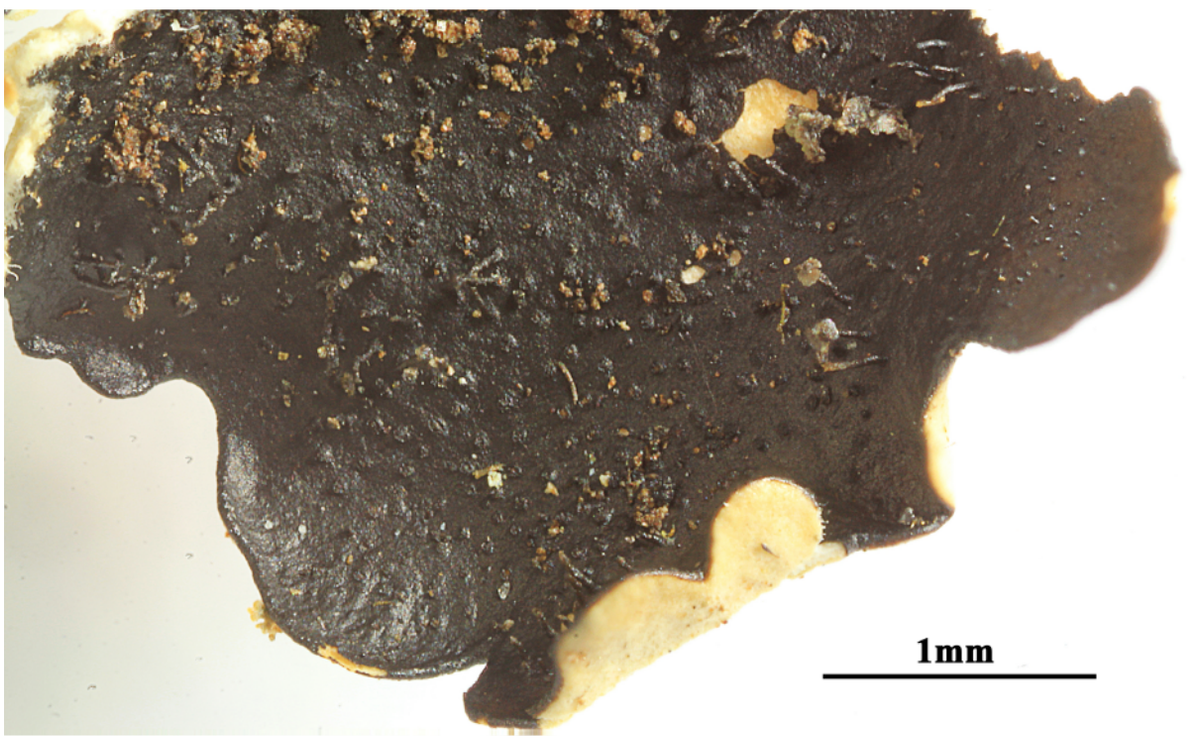
= *Parmelia amazonica* Nyl., Flora, Regensburg 68: 611 (1885)

= *Pseudoparmelia amazonica* (Nyl.) Hale, Phytologia 29(3): 189 (1974)

[ABL27320], Brazil, Amapá, Flona, Floresta Nacional do Amapá, near station. 0°55' N, 51°36' W, 30 m. On tree bark in disturbed forest. Leg. M. Cáceres & A. Aptroot (no 27320), 19 August 2015, det. A. Aptroot 2015. - Thallus closely adnate on bark, 5-10 cm broad, light mineral gray and turning buff in the herbarium; lobes subirregular, apically rotund, 2-6 mm wide, contiguous; upper surface plane, continuous, moderately isidiate, the isidia rarely branched, to 2 mm high; lower surface black, densely rhizinate except for a narrow naked or papillate zone along the margins. Apothecia rare, 1-3 mm in diameter; spores 8.8-10 x 13-16 µm. Chemistry: Cortex K + yellow, medulla K -, C-, KC + rose, P+ red; atranorin and protocetraricacid.







Parmelinella amazonica

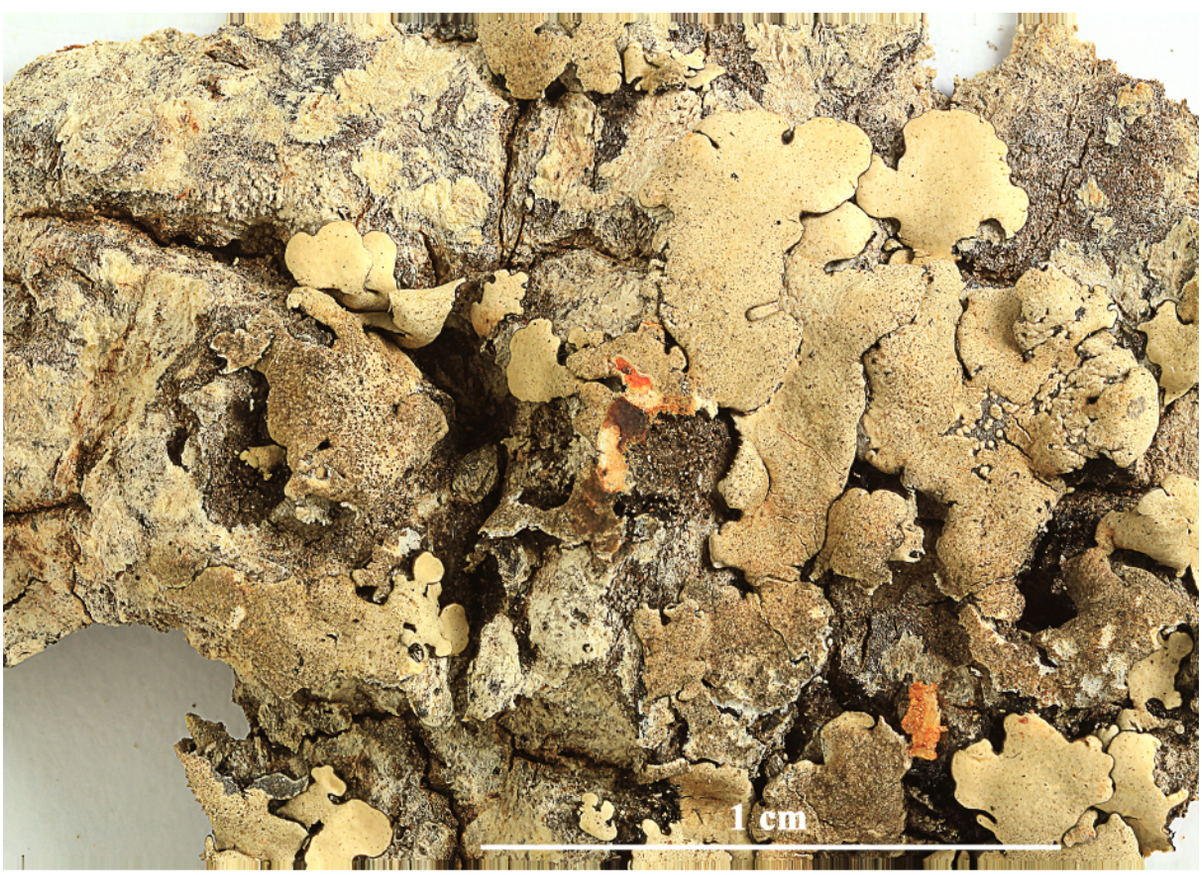
Parmelinella cinerascens (Lynge) Benatti & Marcelli, in Benatti, Opuscula Philolichenum 11: 27 (2012)

= *Canoparmelia cinerascens* (Lynge) Elix & Hale, in Elix, Johnston & Verdon, Mycotaxon 27: 278 (1986)

= *Parmelia cinerascens* Lynge, Ark. Bot. 13(no. 13): 104 (1914)

= *Pseudoparmelia cinerascens* (Lynge) Hale, Phytologia 29(3): 189 (1974)

[ABL28799], Brazil, Tocantins, near Itaguatins. 5°44'58" S, 47°32'24" W, 150 m. In cerrado on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28799), 22 October 2016, det. A. Aptroot 2016. - Thallus adnate, fragile, ashy mineral gray, 4-5 cm broad; lobes short, becoming imbricate, 1-3 mm wide; upper surface plane, irregularly cracked with age, densely isidiate, isidia cylindrical, simple or branched; lower surface black, rhizines moderate to sparse. Apothecia abundant, adnate; spores 8.6 x 12 µm. Chemistry: Cortex K+ yellow; medulla K+ yellow turning red, C-, KC-, P+ orange; atranorin and salazinic acid.

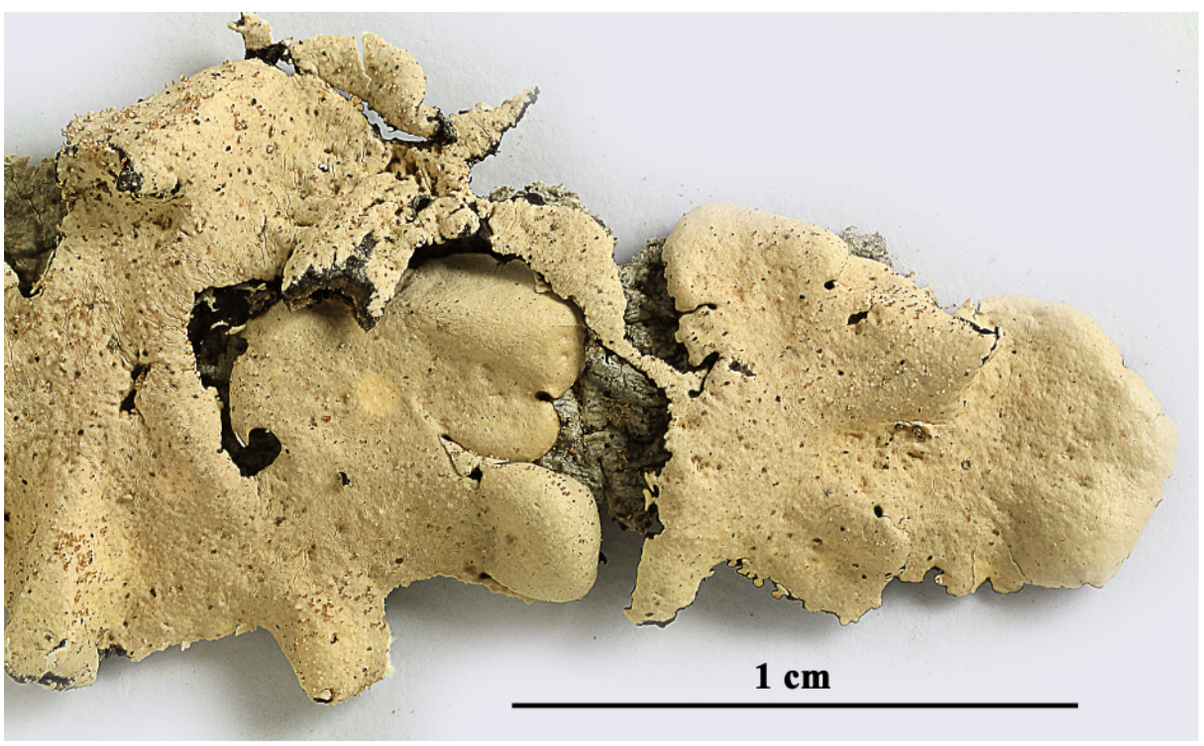


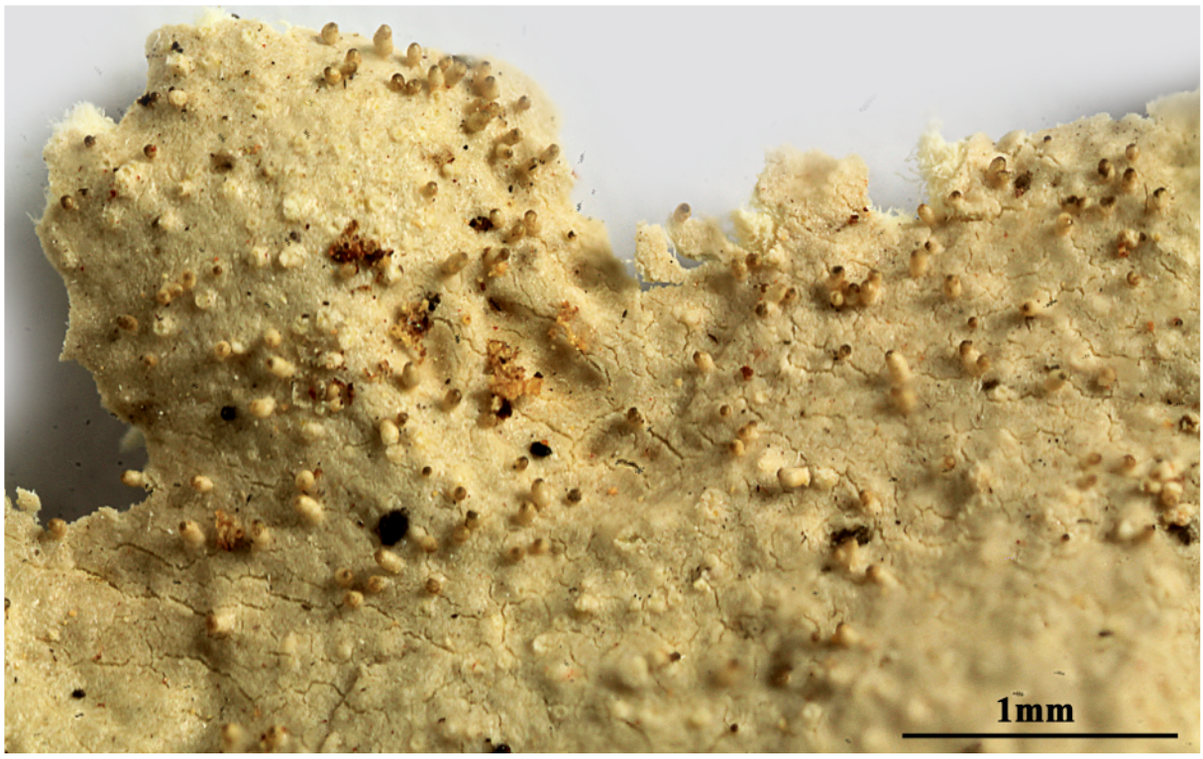


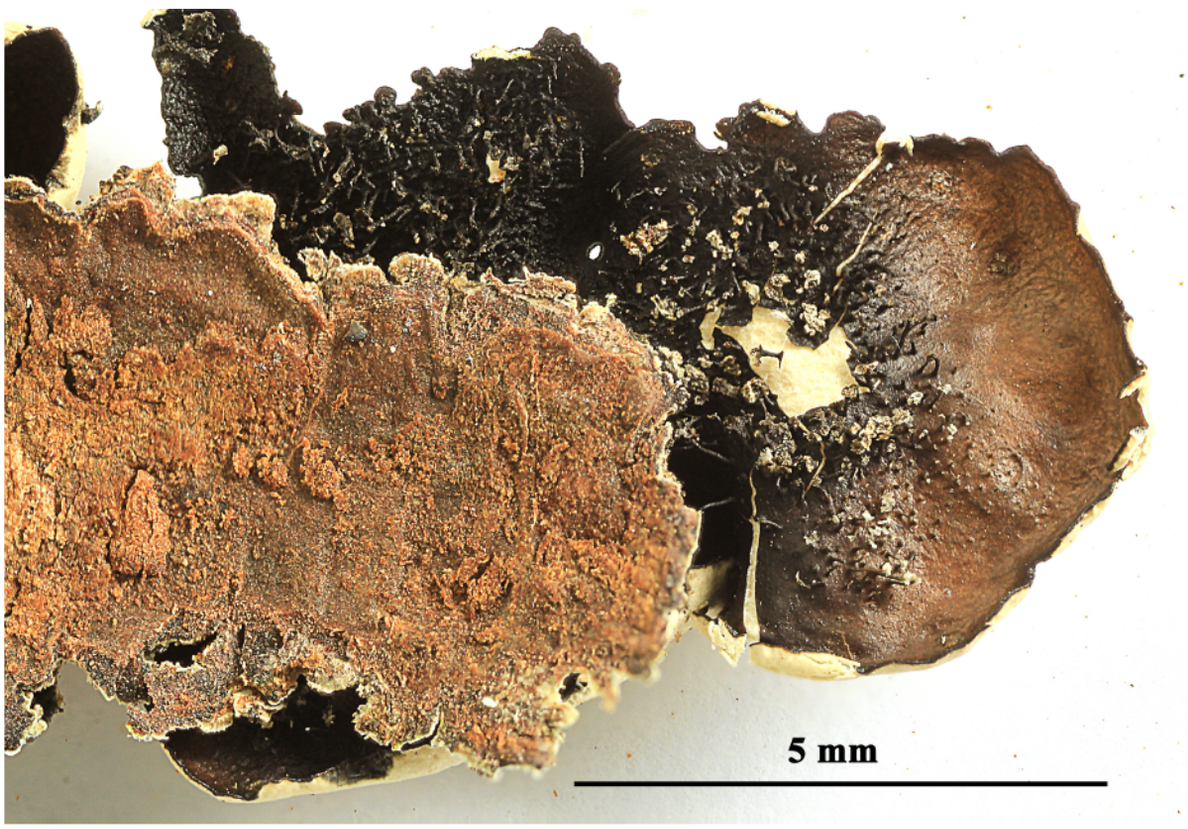
Parmelinella cinerascens

Parmelinella cinerascens (Lynge) Benatti & Marcelli, in Benatti, Opuscula Philolichenum 11: 27 (2012)
= *Canoparmelia cinerascens* (Lynge) Elix & Hale, in Elix, Johnston & Verdon, Mycotaxon 27: 278 (1986)
= *Parmelia cinerascens* Lynge, Ark. Bot. 13(no. 13): 104 (1914)
= *Pseudoparmelia cinerascens* (Lynge) Hale, Phytologia 29(3): 189 (1974)

[ABL27575], Brazil, Amapá, Mazagão, Reserva extrativista Moracá, along BR 156. 0°01' S, 51°51' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27575), 21 August 2015, det. A. Aptroot 2024. - Thallus adnate, fragile, ashy mineral gray, 4-5 cm broad; lobes short, becoming imbricate, 1-3 mm wide; upper surface plane, irregularly cracked with age, densely isidiate, isidia cylindrical, simple or branched; lower surface black, rhizines moderate to sparse. Apothecia abundant, adnate; spores 8.6 x 12 µm. Chemistry: Cortex K+ yellow; medulla K+ yellow turning red, C-, KC-, P+ orange; atranorin and salazinic acid.







Parmelinella cinerascens

Peltula brasiliensis (Zahlbr.) Büdel, Kauff & Bachran, in Kauff, Bachran, Schultz, Hofstetter, Lutzoni & Büdel, Lichenologist 50(3): 324 (2018)
= *Neoheppia brasiliensis* Zahlbr., Denkschr. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 83: 144 (1909)

[ABL27322], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. In primary tall forest on submerged rock along river. Leg. M. Cáceres & A. Aptroot (no 27322), 20 August 2015, det. A. Aptroot 2015. - Thallus crustose, gelatinous, dark brown, deeply fissured, c. 1 mm thick, with unicellular cyanobacteria, often surrounded by a thin whitish prothallus. Ascomata fully immersed, closed, wall pale, up to 0.8 mm diam. Ascospores 8/ascus, ellipsoid, hyaline.





Peltula brasiliensis

Phaeographis diversula (Nyl.) Zahlbr., Cat. Lich. Univers. 2: 371 (1923) [1924]
= *Graphis diversula* Nyl. 1890

[ABL27032], Brazil, Amapá, Macapá, Peixe Boi near Río Curicaca. 0°37' N, 50°55' W, 30 m. On tree bark in tall forest remnant. Leg. M. Cáceres & A. Aptroot (no 27032), 17 August 2015, det. A. Aptroot 2015. - Thallus olivaceous green, corticate. Lirellae immersed, wavy, branched, up to 4 mm long, c. 0.2 mm wide. Disc dark brown, almost closed. Labia no thallus-covered, cream, c. 0.1 mm wide. Hamathecium not inspersed. Ascospores brown, 3-septate, 16-18 x 6.5-7.5 µm.





Phaeographis diversula

Phyllopsora breviuscula (Nyl.) Müll. Arg., Bull. Herb. Boissier 2(app. 1): 45 (1894)

= *Lecidea breviuscula* Nyl., in Triana & Planchon, Annls Sci. Nat., Bot., sér. 4 19: 339 (1863)

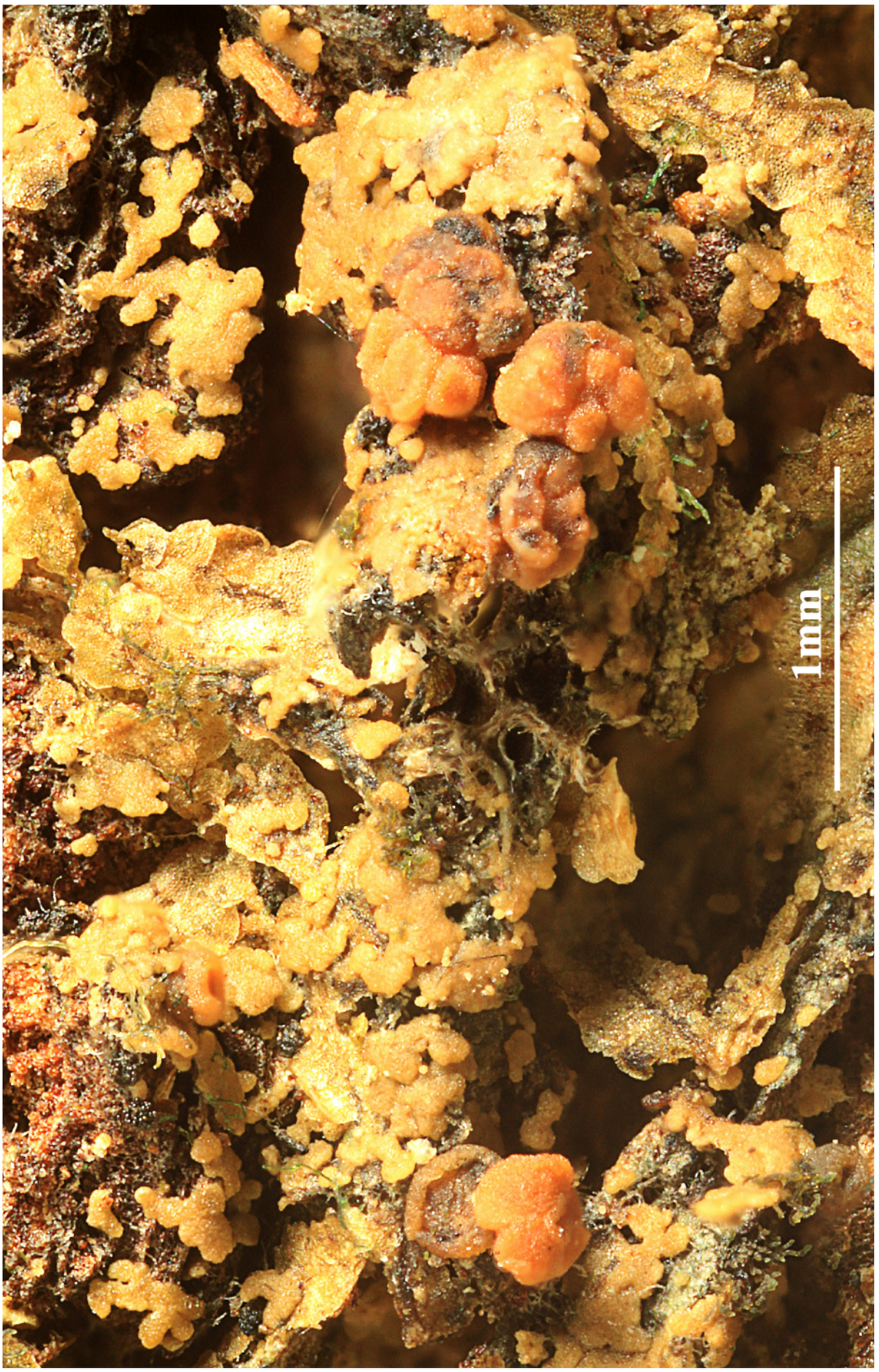
= *Lecidea parvifolia* * *breviuscula* (Nyl.) Nyl., Annls Sci. Nat., Bot., sér. 5 7: 321 (1867)

= *Phyllopsora parvifolia* var. *breviuscula* (Nyl.) Brako, Mycotaxon 35(1): 15 (1989)

= *Psora breviuscula* (Nyl.) Müll. Arg., Bull. Herb. Boissier 2(app. 1): 45 (1894)

[ABL27291], Brazil, Amapá, Flona, Floresta Nacional do Amapá, near station. 0°55' N, 51°36' W, 30 m. On tree bark in disturbed forest. Leg. M. Cáceres & A. Aptroot (no 27291), 19 August 2015, det. A. Aptroot 2015. - Thallus of overlapping and adjoined squamules, the squamules 0.5-1 mm wide, thick and convex, mainly glabrous above, pubescent and fibrillose at margins, noncorticate below, adnate to prothallus or somewhat ascending. Upper cortex transitional between types 1 and 2, more than 50 µm thick. Isidia absent. Prothallus red, thick. Apothecia with excipulum and hypothecium colourless; spores 6-8(-10) x 3-5 µm, simple or with a pseudoseptum.

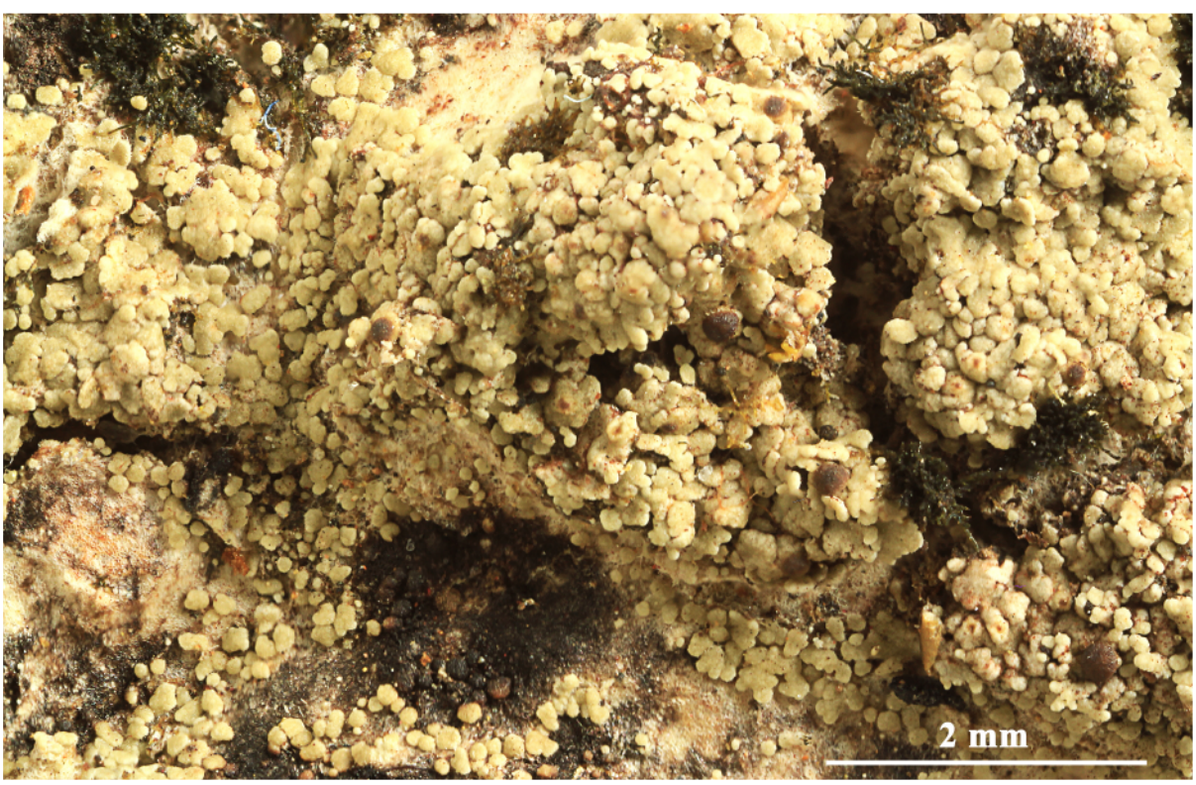


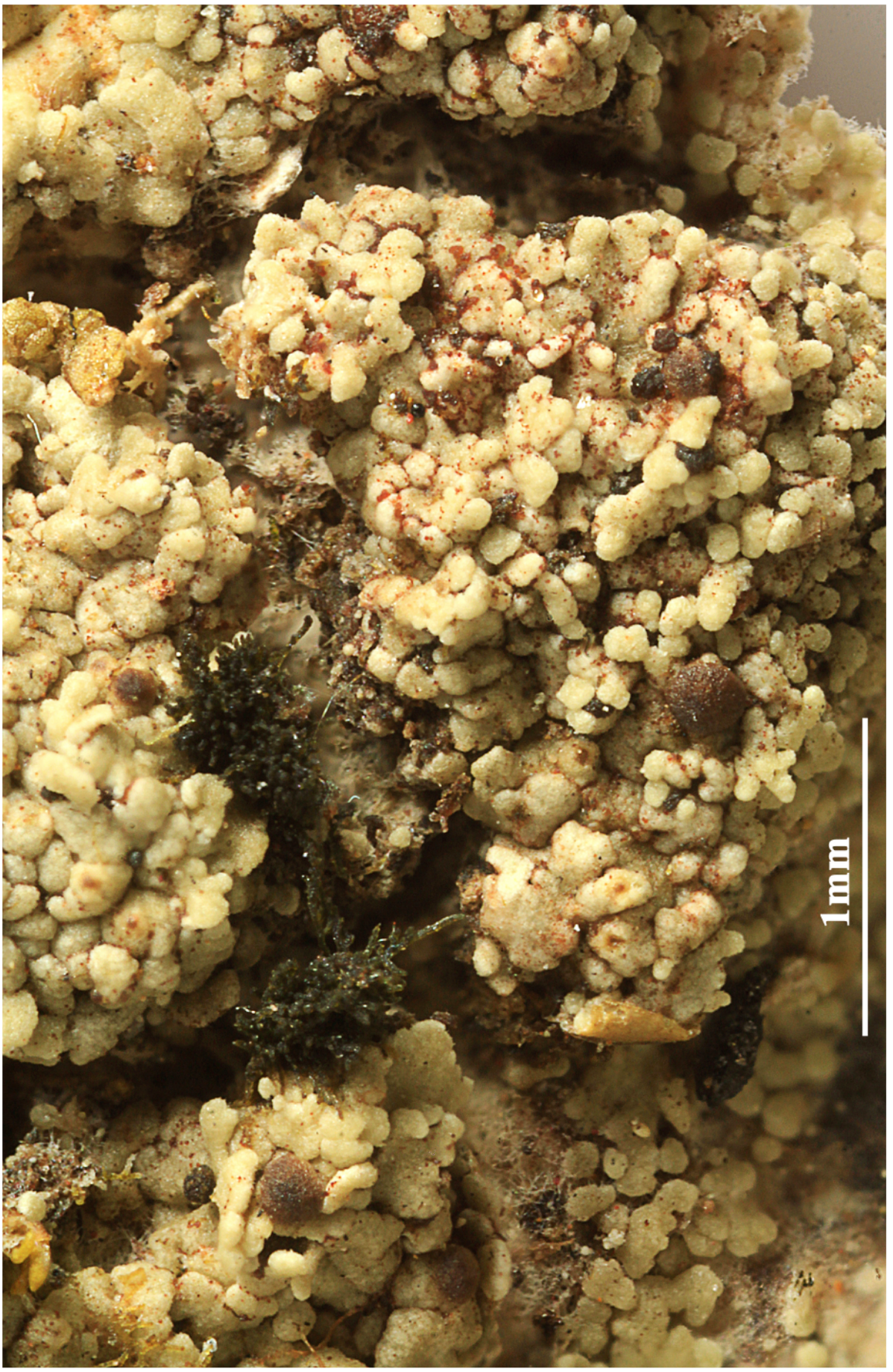


Phyllopsora breviuscula

Phyllopsora chodatinica Elix, Australas. Lichenol. 59: 23 (2006)

[ABL27616], Brazil, Amapá, Macapá, Fazendhina Ecotel garden. On tree bark in garden. 0°03' N, 51°07 W, 5 m. Leg. M. Cáceres & A. Aptroot (no 27616), 22 August 2015, det. A. Aptroot 2015. - Thallus effuse, squamulose. Prothallus usually well developed, pale red-brown. Squamules 0.3–0.5 mm wide, ascending or not, elongate, 1.0–1.5 mm long, often imbricate, incised to deeply divided, plane to weakly convex; upper side pale green to ±intense yellow-green or orange-yellow, glabrous, epruinose; margin concolorous with the upper side, sometimes finely pubescent, lacking isidia. Lacinules common, developed from the lobe tips, 0.05–0.15 mm wide. Lower surface pigmented yellow in part. Upper cortex of type 1 (Swinscow & Krog 1981), 25–60 µm thick. Apothecia rare, 0.8–1.5 mm wide, rounded or somewhat irregular at the margins, simple to slightly conglomerate, weakly to moderately convex, reddish brown, with an indistinct, darker margin. Exciple reddish brown; hypothecium red brown to dark red brown; hymenium pale yellow-brown; epithecium deep golden yellow. Ascospores narrowly ellipsoid, simple, 7–11 x 2.0–3.0 µm. Pycnidia not seen. Chemistry: Cortex K+ yellow; medulla K+ yellow, C+ faint orange, KC–, P+ yellow; containing chodatin (major), 5,7-dichloro-3-O-methynorlichexanthone (minor), 2,5,7-trichloro-3-O-methylnorlichexanthone (minor), di-O-methylthiophanic acid (minor), 3-O-methylthiophanic acid (trace), isoarthothelin (trace), ±demethylchodatin (trace).



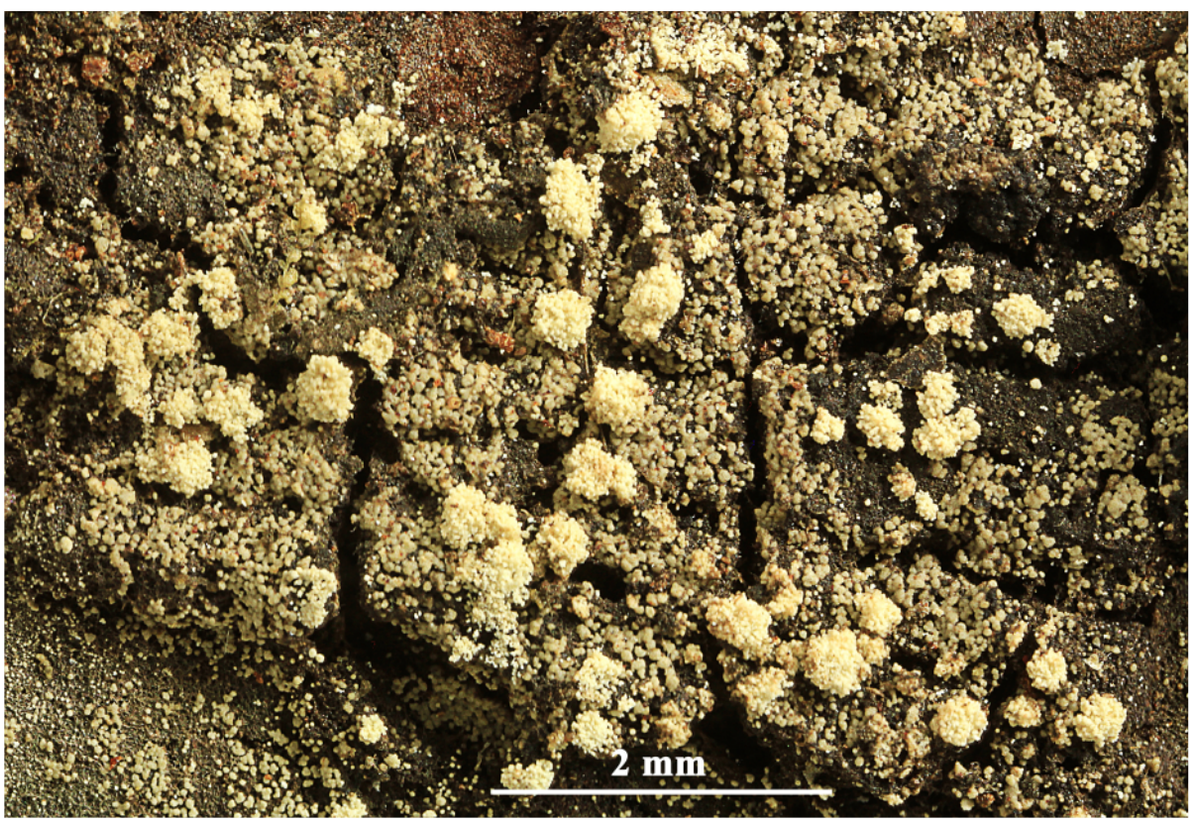


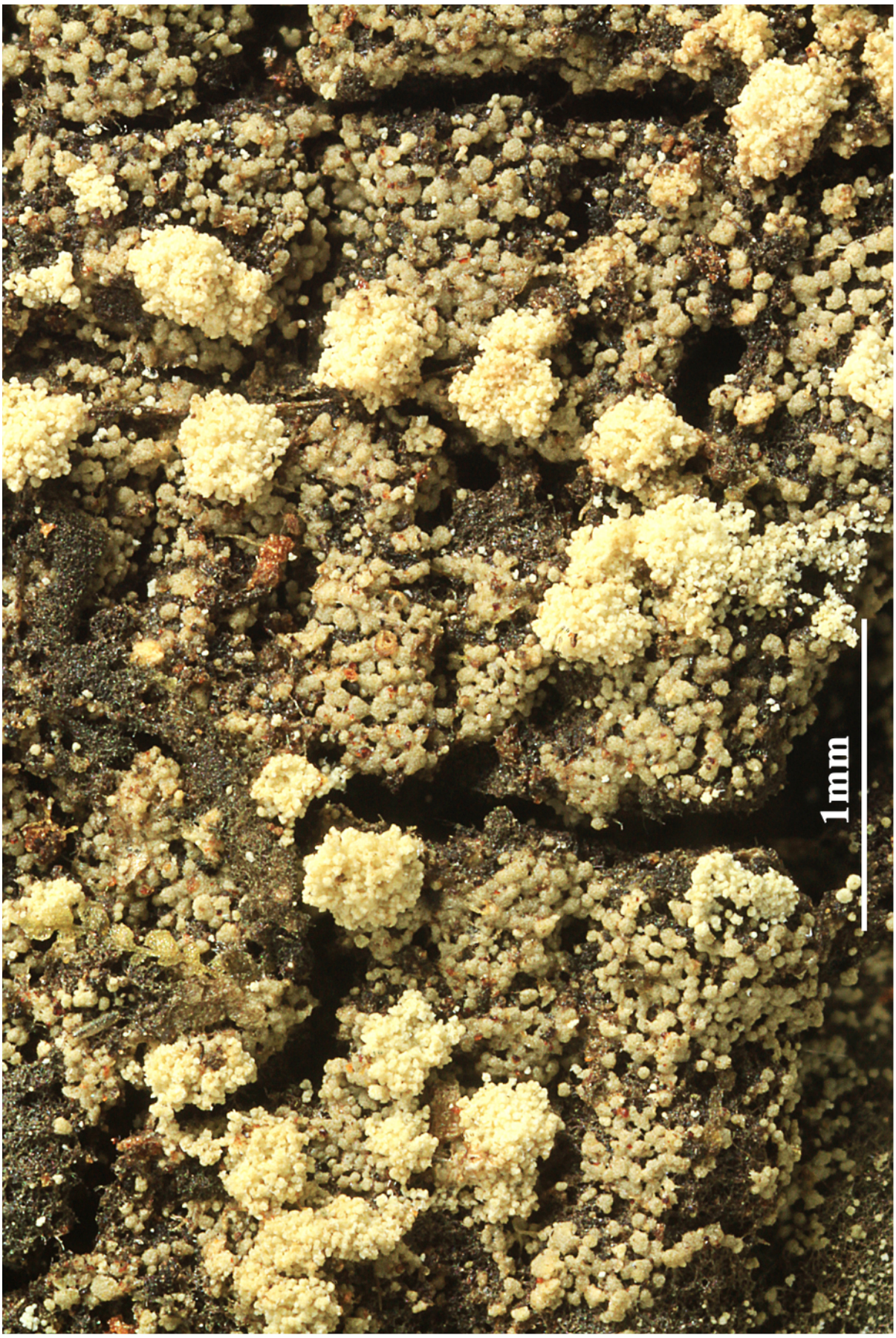
Phyllopsora chodatinica

Phyllopsora sorediata (Aptroot & Sparrius) Timdal, Lichenologist 40(4): 341 (2008)

= *Triclinum sorediatum* Aptroot & Sparrius, in Aptroot, Saipunkaew, Sipman, Sparrius & Wolseley, (2007

[ABL27373], Brazil, Amapá, Flona, Floresta Nacional do Amapá, up stream of station. 0°58' N, 51°36' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27373), 20 August 2015, det. A. Aptroot 2015. - Thallus corticolous, corticate, composed of squamules on a continuous layer of black, felty hypothallus that extends beyond the thallus for c. 0.4 mm, covering an area of up to 3 cm diam. Squamules greyish green, mostly convex, partly ascending, rounded to elongate, entire or branched, c. 0.2–0.5 mm diam., originating singly and hardly overlapping or fusing, attached with hyaline, branched rhizoids of c. 5 µm diam. to the hypothallus. Soralia regularly dispersed but largest in the central part of the thallus, covering entire squamules, round, yellowish-white, c. 0.4-0.8 mm diam., with farinose soredia. Thallus c. 60–90 µm thick, filled with algae except for the cortex; upper cortex c. 10 µm thick. Algae chlorococcoid, cells mostly globose, c. 5-7 µm diam. Apothecia sessile, orange-brown, marginate, in section hyaline. Excipulum consisting of conglutinated cells. Ascospores needle-shaped, indistinctly (1-)3-septate, 30-25 × 0.8-1.2 µm. Pycnidia unknown. Chemistry: atranorin, divaricatic acid and zeorin (in e.g. the type) or protocetraric acid only (tlc); thallus and soredia KOH+ yellow, UV-.



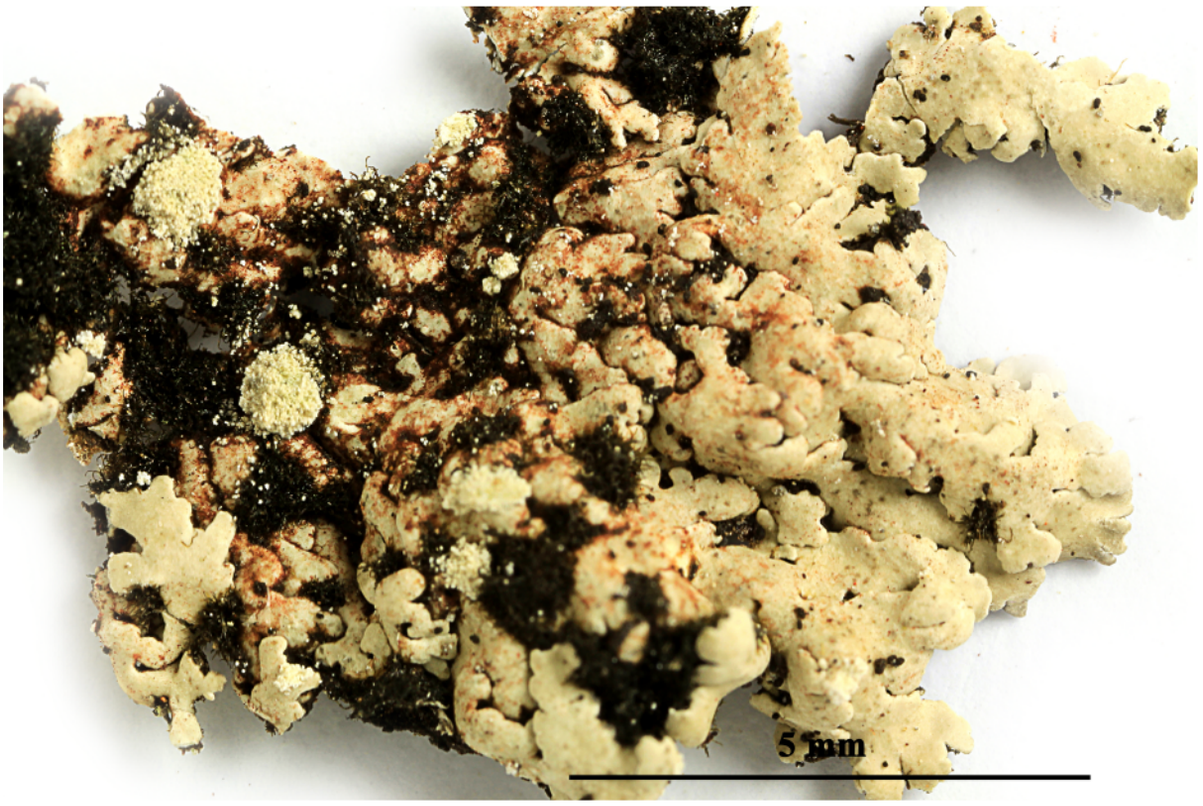


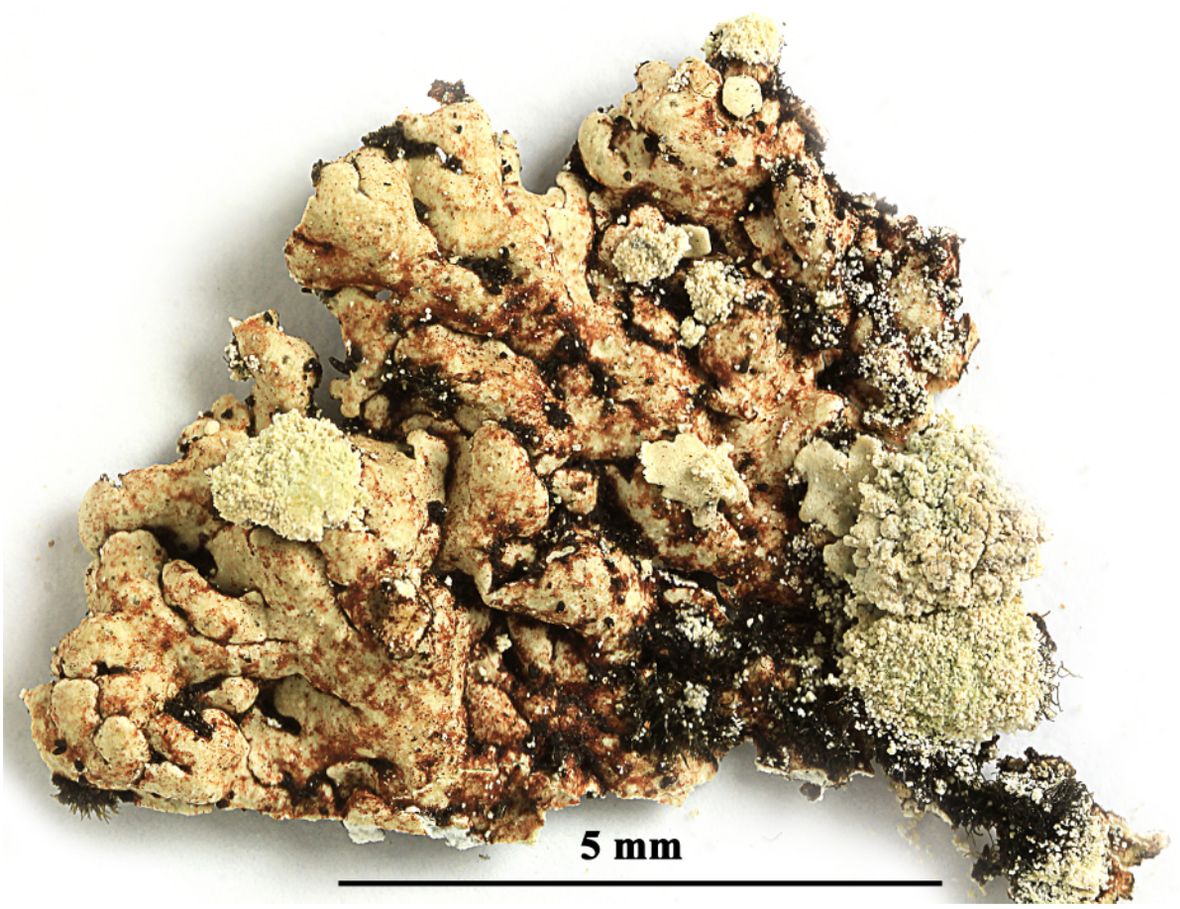
Phyllopsora sorediata

Physcia erumpens Moberg, Nordic Jl Bot. 6(6): 856 (1986)

[ABL27212], Brazil, Amapá, Macapá, Fazendinha, Ecotel Garden, on tree bark in garden. 0°03' N, 51°07' W, 5m. Leg. M. Cáceres & A. Aptroot (no 27212), 18 August 2015, det. A. Aptroot 2015. - Thallus: orbicular to irregular, up to 3 cm across, usually firmly adnate also at the lobe tips lobes: overlapping to separate, up to 1 mm wide, ± truncate, eciliate upper surface: shining to dull, whitish gray to pale brownish gray, occasionally with a white pruina, sorediate soredia: in laminal, crateriform soralia that sometimes are ± capitate, starting as cracks in the upper cortex upper cortex: paraplectenchymatous medulla: white lower cortex: paraplectenchymatous, the lower part dark brown to black lower surface: black except for the paler tips, with black rhizines Apothecia rare, sessile; margin: often sorediate ascospores: brown, 1-septate, Pachysporaria-type, 21-27 x 9-12 µm Pycnidia: rare, immersed conidia: subcylindrical, 4-6 x 1 µm Spot tests: upper cortex and medulla K+ yellow, C-, KC-, P+ yellow Chemistry: upper cortex with atranorin; medulla with atranorin and zeorin. Notes: The black lower surface, the crateriform to capitate soralia and the convex lobes makes *P. erumpens* easily separated from other *Physcia* species. From its close relative, *P. sorediosa*, it is separated by the type of soralia as P. sorediosa has marginal, small and delimited soralia.



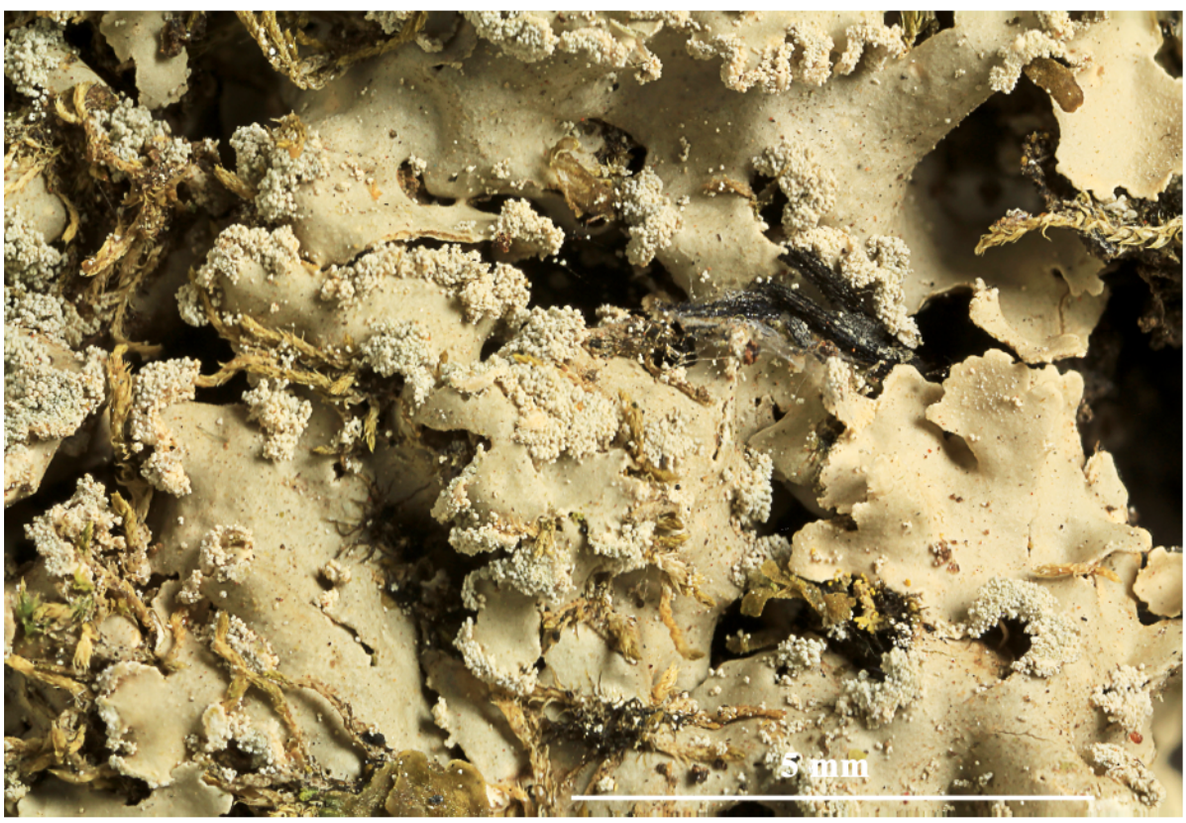




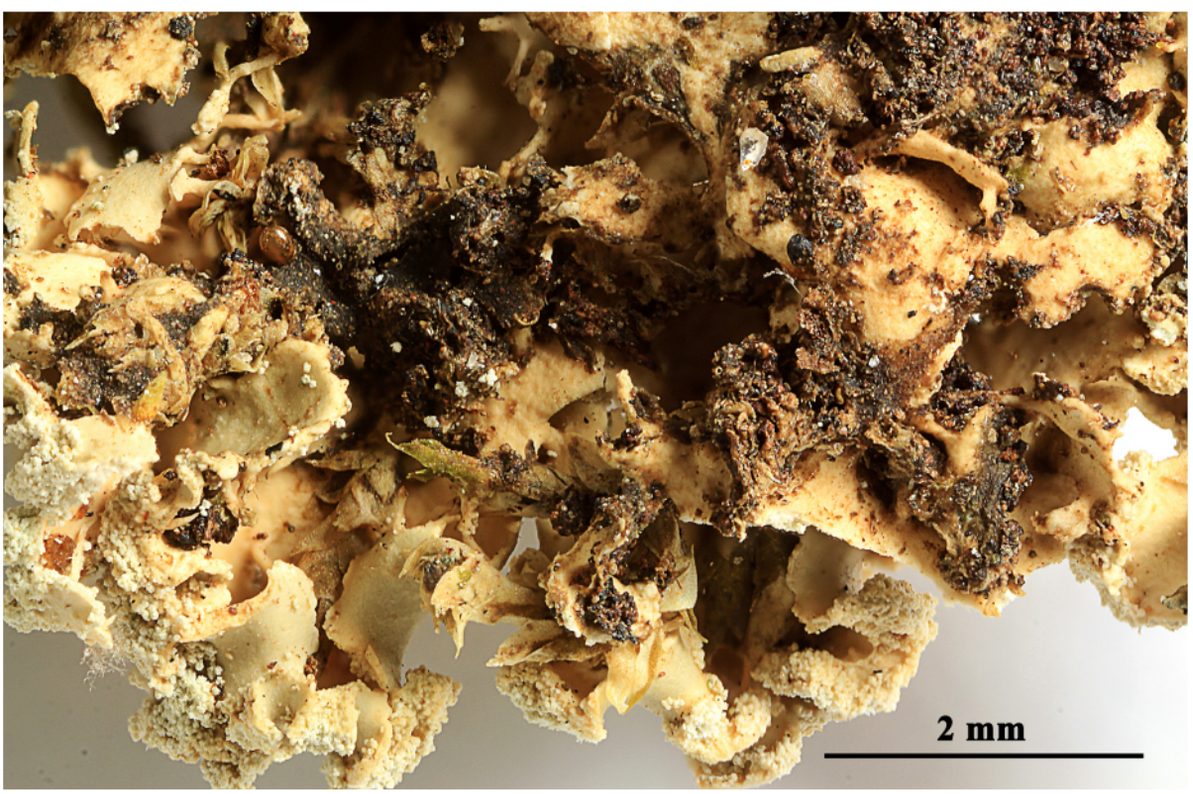
Physcia erumpens

Physcia undulata Moberg, Nordic Jl Bot. 6(6): 861 (1986)

[ABL13441], Brazil, São Paulo, Botucatu, Bioscience building on on campus. On Bauhinia bark in park. 22°53'35" S, 48°29'40" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13441), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus: foliose, irregular to orbicular, up to 4 cm diam., usually loosely adnate. Lobes thin, usually less than 150 µm thick, loosely adnate to ascending, up to 2 mm wide; tips rounded, eciliate. Upper surface gray to dark gray and 'frosted', sorediate. Soredia in marginal soralia that give the margins an undulate appearance, usually not reaching the outermost parts of the lobe tips, sometimes eroded. Upper cortex paraplectenchymatous. Medulla white. Lower cortex indistinct proso- to paraplectenchymatous. Lower surface whitish gray to brownish, with concolorous or darker rhizines. Apothecia uncommon, up to 2 mm wide; Margin sorediate. Ascospores brown, 1-septate, intermediate between Physcia- and Pachysporaria-type, (15-) 18-27 (-33) x (7-) 8-11 (-13) µm. Pycnidia uncommon. Spot tests: cortex and medulla K+ yellow, C-, KC-, P+ yellow Secondary metabolites: upper cortex with atranorin; medulla with atranorin, zeorin and additional triterpenes. Notes: The species is extremely variable in lobe size but easily recognized by the 'frosted' upper surface, the marginal, ± undulate soralia, and the pale lower surface.







Physcia undulata

Platythecium sphaerosporellum (Nyl.) Staiger, Biblthca Lichenol. 85: 391 (2002)

= *Graphina sphaerosporella* (Nyl.) Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 29(no. 8): 47 (1887)

= *Graphis sphaerosporella* Nyl., Flora, Regensburg 52: 124 (1869)

= *Medusulina sphaerosporella* (Nyl.) Müll. Arg., Bull. Herb. Boissier 2(app. 1): 93 (1894)

[ABL40307], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40307), 29 October 2016, det. A. Aptroot 2016 - Ascocarps densely branched, more or les stromatoid, immersed, ca. 0.2 mm wide, at the tips narrower and fissurine; margins forming a low thalloid rim around the immersed, brownish grey disc; hymenium ca. 40 µm, not inspersed; ascospores 8/ascus, submuriform, I+ blue-violet, ca. 9 x 7 µm, 2 x 2 celled.





Platythecium sphaerosporellum

Platythecium suberythrellum (M. Wirth & Hale) Staiger & Kalb, in Kalb, Staiger & Elix, Symb. bot. upsal. 34(no. 1): 178 (2004)

= *Graphina suberythrella* M. Wirth & Hale, Smithson. Contr. bot. 40: 42 (1978)

[ABL28908], Brazil, Tocantins, near Itaguatins. 5°45'22" S, 47°33'53" W, 150 m. In cerrado along river bark of tree. Leg. M. Cáceres & A. Aptroot (no 28908), 23 October 2016, det. A. Aptroot 2016. - Thallus K+ red (norstictic acid). Lirellae entire, not in pseudostromatic clusters. Hymenium not inspersed. Ascospores remaining hyaline, muriforme, 5-7/1-3 locular, 17-28 x 10-14 µm.





Platythecium suberythrellum

Polymeridium albidoreagens Aptroot, A.A. Menezes & M. Cáceres, Nova Hedwigia 98(1-2): 7 (2013) [2014]

[ABL40181], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40181), 29 October 2016, det. A. Aptroot 2016 - Thallus ecorticate, whitish grey, UV+ yellow. Ascomata 0.2–0.4 mm diam., centrum globose, erumpent, solitary. Ostiole apical. Hamathecium not inspersed. Ascospores 8/ascus, IKI–, 3-septate, 20–23 × 6–8 µm, not ornamented. Chemistry: lichexanthone.





Polymeridium albidoreagens

Polymeridium costaricense Aptroot, Nova Hedwigia 98(1-2): 14 (2013) [2014]

[ABL28767], Brazil, Tocantins, near Itaguatins. 5°44'58" S, 47°32'24" W, 150 m. In cerrado on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28787), 22 October 2016, det. A. Aptroot 2016. - Thallus ecorticate, whitish grey, UV–. Ascomata 0.4–0.6 mm diam., centrum globose, erumpent, solitary. Ostiole apical. Hamathecium inspersed, filaments profusely anastomosing. Ascospores 8/ascus, hyaline, IKI–, 8–12-septate, 40–50 × 9–11 µm, not ornamented, wall not thickened. Chemistry: No substances.





Polymeridium costaricense

Polymeridium siamense (Vain.) Aptroot, Nova Hedwigia 98(1-2): 24 (2013) [2014]

= *Arthopyrenia siamensis* Vain., Ann. bot. Soc. Zool.-Bot. fenn. Vanamo 1(no. 3): 55 (1921)

[ABL27569], Brazil, Amapá, Mazagão, Reserva extrativista Moracá, along BR 156. 0°02' S, 51°45' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27569), 21 August 2015, det. A. Aptroot 2025. - Thallus ecorticate, white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.4 mm diam., erumpent, exposed and black. Hamathecium inspersed. Ascospores 8/ascus, 3-septate, fusiform, 20–23 × 6–8 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: No substances detected.





Polymeridium siamense

Porina coralloidea P. James, Lichenologist 5(1-2): 142 (1971)
= *Zamenhofia coralloidea* (P. James) Clauzade & Cl. Roux, Bull. Soc. bot. Centre-Ouest, Nouv. sér., num. spec. 7: 824 (1985)

[ABL28940], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28940), 23 October 2016, det. A. Aptroot 2016. - Thallus epiphloeodal, rarely penetrating the substratum, effuse, when fresh bluebrown, becoming black-grey-brown when wet. In the herbarium soon becoming dark purplish brown-olive, ± smooth or becoming ± coralloid isidiate, isidia at first scattered sometimes becoming closely packed, simple or coralloid, up to 1-5 mm tall. Frequently sterile. In section thallus 10-170 µm thick (including isidia), up to 600 µm (including perithecia), cortex ill-defined, isidia composed of contorted chains of *Trentepohlia* surrounded by closely compacted hyphae. Phycobiont *Trentepohlia* sp., cells 8-15 x 6-9 µm, pale orange-red to dark orangebrown, soon becoming colourless in the herbarium, walls 2-3 µm thick. Perithecia compound, spherical or rarely broadly pyriform, 300-400 µm wide, 400-600 µm high; involucrellum very closely appressed, only very little spreading at the base, well-developed, reaching about halfway down the outer wall of the perithecium, cells very small with dark brown walls and contents (seen in thin section), appearing black and opaque in thick sections, 50-80 (-110) µm thick at widest part. Perithecial wall distinct, c. 30-45 µm thick, distinctly continued beneath and fused to the lower side of the involucrellum, pale brown to dark brownblack, usually darker towards the outer-edge, cells isodiametric, 5-10 x 5-7 µm, cells narrower, ± rectangular-elongate in transverse section towards the inner side. Periphyses numerous, persistent, well developed, 10-25 µm long, 0.5-0.7 (-1.0) um thick. Paraphyses very numerous, persistent, distinct, separating in water squash, simple, very rarely furcate-branched, up to 350 um long, 0.7-1.0 µm thick, individual cells 5-7 µm long, indistinct. Hypothecium 50-80 um thick, of closely compacted, unorientated cells, ± clouded with included oil droplets. Asci thinwalled, only slightly thickened at apices, 125-150 x 18-22 µm, elongate-ellipsoid, eight-spored; spores elongate, two- to three-seriate in asci, ellipsoid or more rarely clavate-fusiform, ends obtuse, sometimes ± attenuated, (5-)9-ll(-12)-septate, (35-)40-57(-63) x (8-)9-13(-15) µm, lateral wall 2-2-5 µm thick. Pycnidia, pycnoconidia and macroconidia not seen.



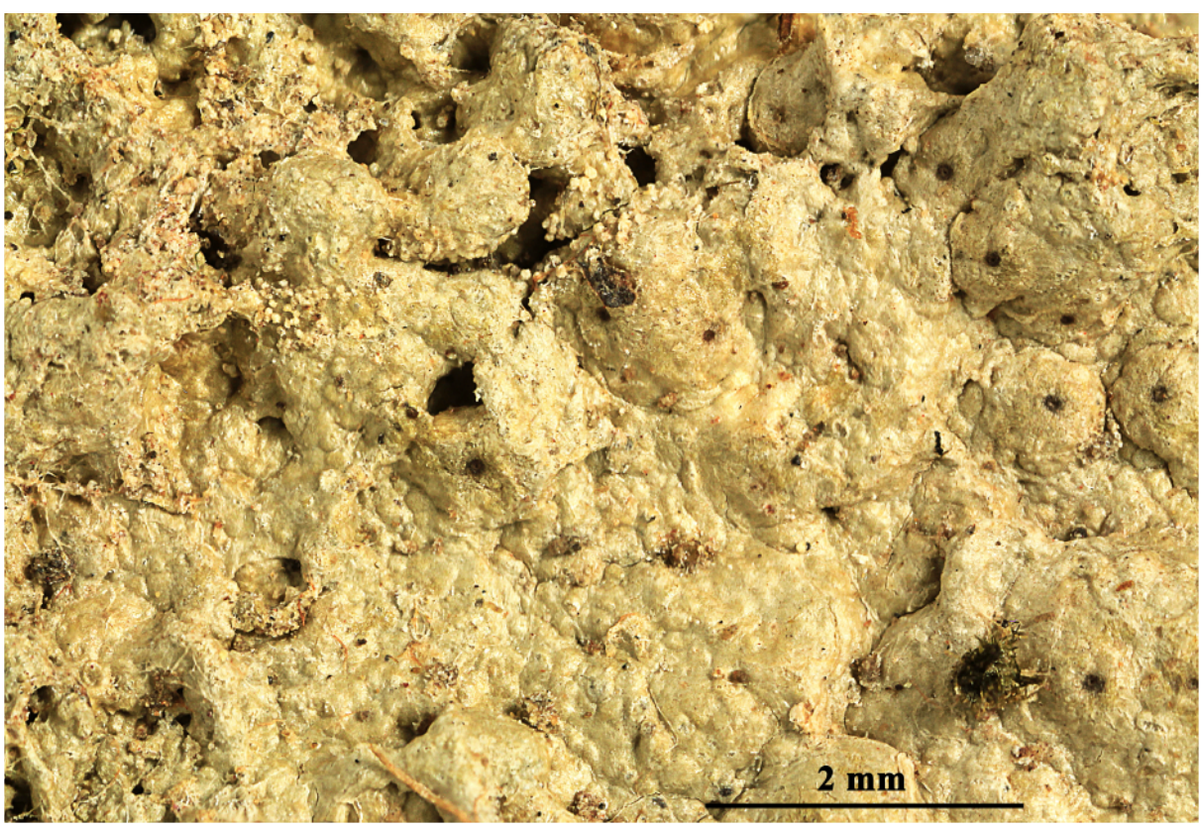
Porina coralloidea



Porina coralloidea

Porina farinosa C. Knight, in Bailey, Syn. Queensl. Fl. 1(Suppl.): 73 (1886)
= *Clathroporina farinosa* (C. Knight) Zahlbr., Cat. Lich. Univers. 1: 417 (1922)
= *Clathroporina tomentella* Müll. Arg., Flora, Regensburg 70: 428 (1887)

[ABL27191], Brazil, Amapá, Macapá, Fazendinha, Ecotel Garden, on tree bark in garden. 0°03' N, 51°07' W, 5m. Leg. M. Cáceres & A. Aptroot (no 27191), 18 August 2015, det. A. Aptroot 2015. - Thallus epiphloeodal, pale yellowish green, grey-green or pale grey-brown, 40–150 µm thick, continuous to rimose, smooth, minutely rugulose, verruculose or coarsely verrucose, corticate; prothallus pale grey, dark grey-brown or not apparent. Algae *Trentepohlia*; cells 5–12 × 5–9 µm. Perithecial verrucae convex, hemispherical or subglobose, 0.5–1 mm diam.; wall containing a layer of colourless crystals; apex slightly concave, plane or rounded; ostiole inconspicuous; periostiolar area concolorous with the thallus or pinkish brown. Involucrellum pale yellowish brown to orange-brown, forming a ±globose shell that often encloses the exciple. Exciple 20–30 µm thick, hyaline to pale brown. Centrum 0.35–0.67 mm wide. Periphyses 20–40 µm long. Asci broadly fusiform to oblong, 210–410 × 35–65 µm. Ascospores narrowly to broadly ellipsoidal or fusiform, muriform, with 17–30 transverse septa, each loculus with (1–) 2–4 (–6) longitudinal or diagonal septa, 58–148 × 18–41 µm; perispore 1–4 (–5) µm thick. Pycnidia immersed in 0.1–0.2 mm diam. verrucae. Conidia fusiform, 2–4 × c. 1 µm.





Porina farinosa

Porina hibernica P. James & Swinscow, Lichenologist 2: 35 (1962)
= *Zamenhofia hibernica* (P. James & Swinscow) Clauzade & Cl. Roux , Bull. Soc. bot. Centre-Ouest, Nouv. sér., num. spec. 7: 830 (1985)

[ABL28938], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28938), 23 October 2016, det. A. Aptroot 2016. - Thallus effuse, indeterminate, directly on bark or spreading over mosses and bryophytes, epiphloeodal and endophloeodal, consisting of more or less scattered, minute granules (0.1-0.3 mm) which may become confluent to form a thin, continuous, scurfy, matt, non-areolate film ; when encrusting mosses the granules may become branched, coralloid-isidioid; orangebrown, orange or greenish orange when dry and fresh, rapidly fading to pallid brown or cervine in the herbarium. Perithecia prominent, compound, black more or less globular, up to 0.7 mm. diam., 1/2-3/4 immersed in the thallus and substratum, surface matt or slightly shining, simple and 1-2 cm. apart but occasionally 2-6 aggregated, and then forming contorted clusters with individual ostioles; ostiole more or less in a shallow apical depression, occasionally eccentric, not conspicuous. Thallus 50-150 µm thick (up to 500 µm including perithecia), distinctly epiphloeodal but penetrating the substratum up to 40 µm deep (up to 400 µm under the perithecia), very irregular in thickness ; cortex ill-defined and often absent, when present of 1-2 layers of rounded cells 5-8 µm diam., pale brown or colourless; phycobiont zone not differentiated in medulla, hyphae more or less irregularly compacted, unorientated, c. 1.5 µm thick with thickened walls; algae *Trentepohlia*, in well-developed filaments which, with the hyphae, often penetrate the substratum, cells 8-15 x 6-9 µm, orange. Perithecia compound, round or broadly pyriform, 400-600 (-700) x 300-500 (-600) µm; involucrellum appressed, often small and vestigial, reaching about halfway down the wall of the perithecium, cells very small with darkened walls and contents; perithecial wall well developed when mature, 60-80 µm, thick, outer 30 µm black, of small cells like the involucrellum, inner part of colourless or pale brown closely appressed cells; periphyses numerous and persistent, well developed, 20-50 µm long and 0.6-0.8 µm thick, branched below, simple above; paraphyses numerous and persistent, distinct and separating in water, simple, rarely 1-2 branched, c. 1 µm, thick, up to 260 µm long, individual cells 8-12 µm long; base of paraphyses and asci (hypothecium) up to 250 µm thick, of closely compacted, unorientated cells, more or less clouded with small oil droplets ; asci thin-walled, 150-200 x 15-25

(-30) µm elongate-clavate, 8-spored ; spores elongate, with fusiform ends, thin-walled, (7-) 12-16 (-17)-septate, 2-3-seriate in ascus, (55-) 60-90 (-95) x 5-7 (-8) µm, colourless. Pycnidia not observed. Hymenial gelatine I -; perithecia I + reddish-purple, K-, KC- , C- , N- or decolourised, P- .



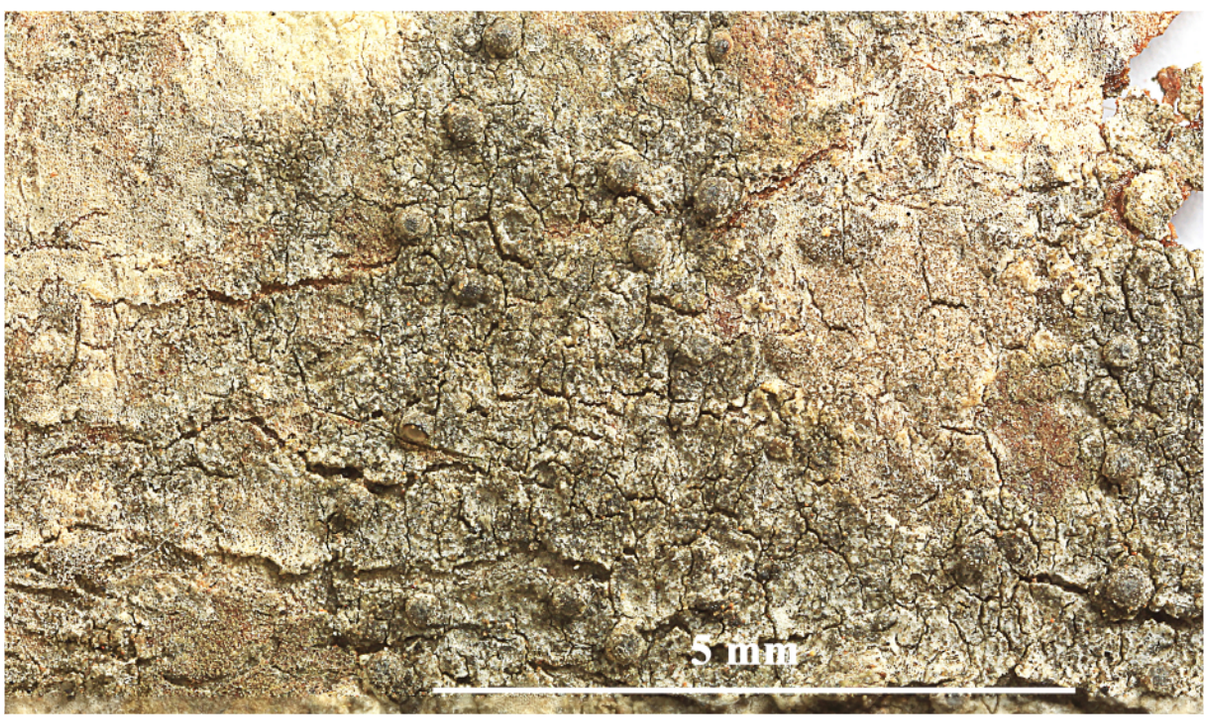
Porina hibernica



Porina hibernica

Porina rhaphidosperma Müll. Arg., Hedwigia 34: 35 (1895)
= *Pseudosagedia rhaphidosperma* (Müll. Arg.) R.C. Harris, Opuscula Philolichenum 2: 15 (2005)
= *Trichothelium rhaphidospermum* (Müll. Arg.) R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 180 (1995)

[ABL13563], Brazil, São Paulo, Botucatu, Pousada Mandala on SP-254, on bark in gallery forest. 22°52'47" S, 48°29'06" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13563), 9 Sept. 2012, det. A. Aptroot 2012. - Thallus crustose, grayish white to olive, continuous. Photobiont *Trentepohlia*. Ascomata perithecia, black, ~0.3 mm diam., subglobose, subimmersed; ostiole apical. Perithecial wall carbonized, not entire below the hymenium; hymenium hyaline; paraphyses subconglutinate. Asci thin, fusiform, 8-spored; ascospores hyaline, filiform, 60-70 x 1.5 – 2.5 µm (Müller 1895), 14-21-celled, 100-140 × 3-5 µm (Harris 1995). Conidiomata not reported.



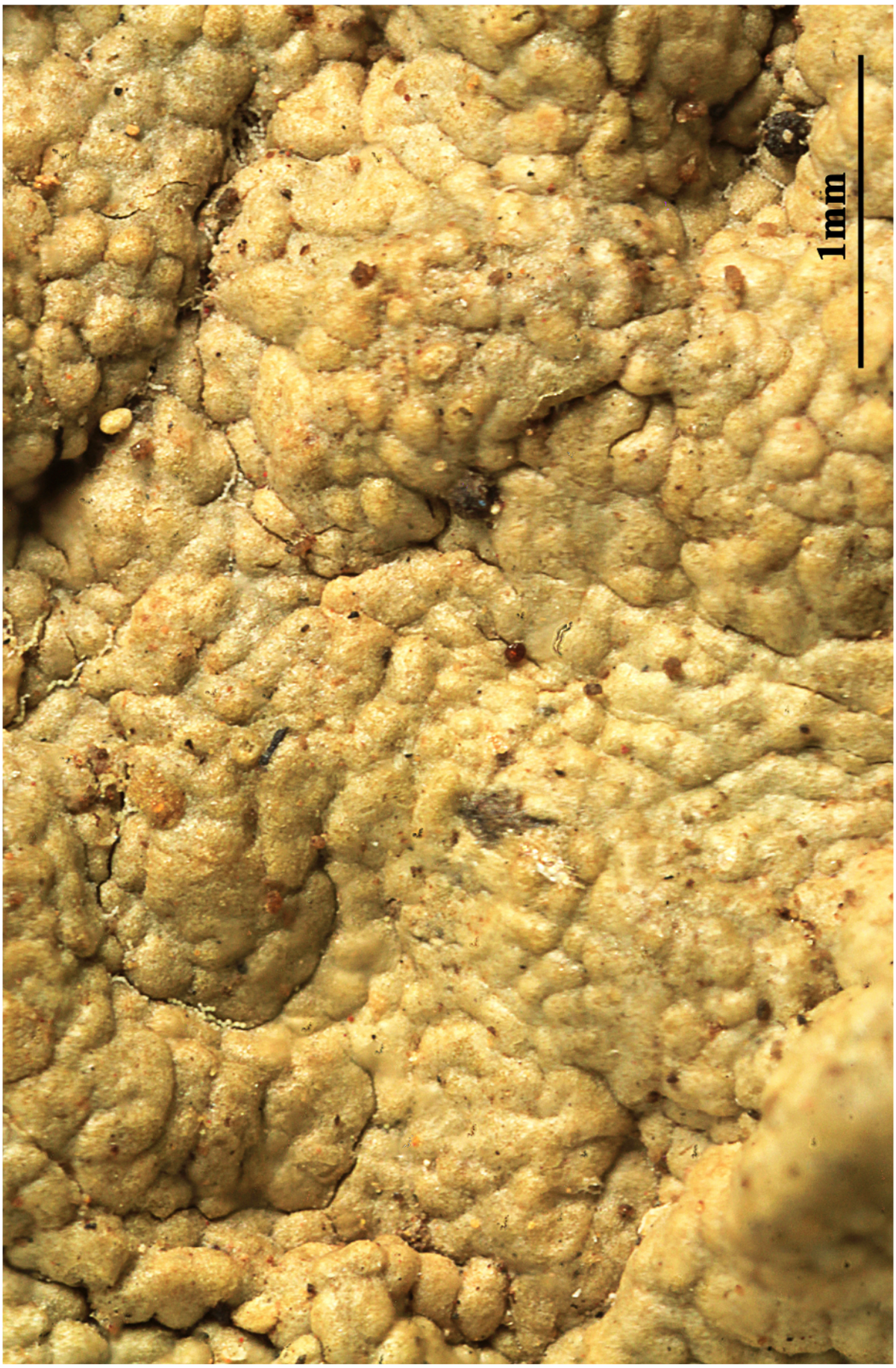


Porina rhaphidosperma

Porina rudiuscula (Nyl.) Müll. Arg., Hedwigia 31: 287 (1892)
= *Verrucaria rudiuscula* Nyl., Bull. Soc. linn. Normandie, sér. 2 2: 124 (1868)

[ABL27607], Brazil, Amapá, Macapá, Fazendhina Ecotel garden. On tree bark in garden. 0°03' N, 51°07 W, 5 m. Leg. M. Cáceres & A. Aptroot (no 27607), 22 August 2015, det. A. Aptroot 2015. - Thallus yellowish green, rugulose, often surrounded by a black prothallus line. Perithecia thallus-covered, 0.3-0.5 mm diam. Ostiole pale, surrounded by a red brown area. Ascospores 8/ascus, (7-)9-11-septate, 38-75 x 12-16 µm.





Porina rudiuscula

Porina subnucula Lumbsch, Lücking & Vězda, in Lücking & Vězda, Willdenowia 28(1/2): 217 (1998)

[ABL28854], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28854), 23 October 2016, det. A. Aptroot 2016. - Thallus epiphyllous, forming small colonies, irregularly verruculose, pale yellowish grey; prothallus not apparent. Algae *Phycopeltis*; cells somewhat rounded, angular or irregular, not forming radiating plates. Perithecial verrucae hemispherical or wart-shaped to ±subglobose, 0.25–0.42 mm diam., smooth to uneven; wall containing a layer of colourless crystals; apex plane to rounded; ostiole inconspicuous; peri-ostiolar area concolorous or pinkish brown to (rarely) blackish and up to 0.15 mm diam. Involucrellum apical and ±vestigial. Exciple c. 15–20 µm thick, pale yellowish brown. Asci narrowly obclavate to elongate-cylindrical, c. 115 × 15 µm. Ascospores fusiform, 7-septate, 30–40 × 5–6 µm; perispore thin or not apparent. Pycnidia not seen.





Porina subnucula

[ABL27315], Brazil, Amapá, Flona, Floresta Nacional do Amapá, near station. 0°55' N, 51°36' W, 30 m. On tree bark in disturbed forest. Leg. M. Cáceres & A. Aptroot (no 27315), 19 August 2015, det. A. Aptroot 2015. - ISOTYPE -Thallus up to 4 cm diam., corticate, smooth, dull, continuous, thin, olive grey, surrounded by an up to 1 mm wide whitish hyphal prothallus. Algae trentepohlioid. Ascomata not observed. Sporodochia abundant in the central part of the thallus, absent in a marginal zone of 1–2 mm wide, whitish grey, irregular to rounded, ca. 0.1–0.3 mm diam., only ca. 15 µm high. Conidia hyaline, palmate, with 3–6 arms, each of which are 4–7-celled, ca. 20–25 µm diam., consisting of cells of ca. 2.5–3.0 µm. Chemistry: Thallus UV–, C–, P–, K–. TLC: No substances detected.





Psammina tropica

Pseudopyrenula cubana (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 955 (2016)
= *Plagiotrema cubanum* Müll. Arg., Bot. Jb. 6: 387 (1885)

[ABL28800], Brazil, Tocantins, near Itaguatins. 5°44'58" S, 47°32'24" W, 150 m. In cerrado on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28800), 22 October 2016, det. A. Aptroot 2016. - Thallus ecorticate, whitish to pale brownish, smooth to uneven. Ascomata with eccentric ostioles, solitary, 0.3–0.5 mm diam., erumpent, pear-shaped, exposed and black. Hamathecium inspersed, hyaline. Ascospores 8 per ascus, 3-septate, fusiform-ellipsoid, 21–25 × 6–9 µm, hyaline but sometimes lumina filled with yellow oil, IKI−. Chemistry: Thallus and ascomata UV−, K−. TLC: no substances detected.





Pseudopyrenula cubana

Psoroglaena costaricensis Henssen, Biblthca Lichenol. 57: 201 (1995)

[ABL13693], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13693), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus filamentous or in part granular. Perithecia very rare, pale , flesh coloured with brown ostiolum, 0.2-0.3 mm wide. Ascospores colourless, muriform, 59-72 x 15.5-22.5 µm, with 18-22 transverse and 3-6 longitudinal septa





Psoroglaena costaricensis

Pyrenula albothallina Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 334 (1921)

[ABL27298], Brazil, Amapá, Flona, Floresta Nacional do Amapá, near station. 0°55' N, 51°36' W, 30 m. On tree bark in disturbed forest. Leg. M. Cáceres & A. Aptroot (no 27298), 19 August 2015, det. A. Aptroot 2015. - Thallus ecorticate, whitish, UV-. Perithecia 0.5-0.7 mm diam., wall balck. Hamathecium inspersed. Ascospores 3-septate, 10-13 x 4.5-6 µm, lumina rather irregular, wall apically thickened.





Pyrenula albothallina

Pyrenula aurantiacorubra Aptroot & M. Cáceres, in Aptroot, Andrade, Mendonça, Lima & Cáceres, Phytotaxa 197(3): 201 (2014)

[ABL27568], Brazil, Amapá, Mazagão, Reserva extrativista Moracá, along BR 156. 0°02' S, 51°45' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27568), 21 August 2015, det. A. Aptroot 2025. - Thallus thin, somewhat granular, orange red mottled with some grey, without pseudocyphellae, without prothallus. Ascomata superficial, globose, 0.2–0.35 mm diam., single, distinctly brown, generally with orange with red pruina. Wall barely carbonized. Ostiole apical, black. Hamathecium not inspersed. Ascospores 8/ascus, brown, irregularly biseriate, muriform, 3(–5) × 1–2-septate, 9–18 × 5–10 µm, lumina mostly rounded. Pycnidia not observed. Chemistry: Pigment K+ deep crimson, UV+ orange. TLC revealed several anthraquinones including 7-chloroemodin as major compound, and one or more derivatives of it as minor compounds; the lower part of the TLC plate is streaked with purple until as high as Rf 4.





Pyrenula aurantiacorubra

Pyrenula brunnea Fée, Essai Crypt. Exot., Suppl. Révis. (Paris): 81 (1837)

[ABL28910], Brazil, Tocantins, near Itaguatins. 5°45'22" S, 47°33'53" W, 150 m. In cerrado along river bark of tree. Leg. M. Cáceres & A. Aptroot (no 28910), 23 October 2016, det. A. Aptroot 2016. - Thallus endophloeodal, buff-yellowish brown, smooth, not pseudocyphellate, hypothallus like a black border line, Ascocarps solitary or 2–3 aggregated, depressed- conical-semiglobose, with corticiform layer of thallus, dull black, ostioles indistinct or sometimes slightly papillate, peridium conical, very thick at sides, base thin, laterally spreading, centrum IKI-, without oil globules. Asci cylindrical, 80–100 × 10–13 µm. Ascospores 8/ascus, uniseriate, 3-septate, brown, oblong-ellipsoid, 12–17 × 5–7 µm.





Pyrenula brunnea

Pyrenula neosandwicensis Aptroot, Lichenologist 44(1): 36 (2011) [2012]
= *Anthracothecium sandwicense* Zahlbr., Annls mycol. 10(4): 361 (1912)

[ABL13678], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13678), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus with indistinct pseudocyphellae; ascomata exposed, c. 0.6 mm diam.; ostioles apical; hamathecium gel I+ weakly copper-colored; ascospores 2–8/ascus, uniseriate, densely muriform, 10–24 × 4–8-loculate, 45–90 × 17–27 µm, subglobose, without halo.





Pyrenula neosandwicensis

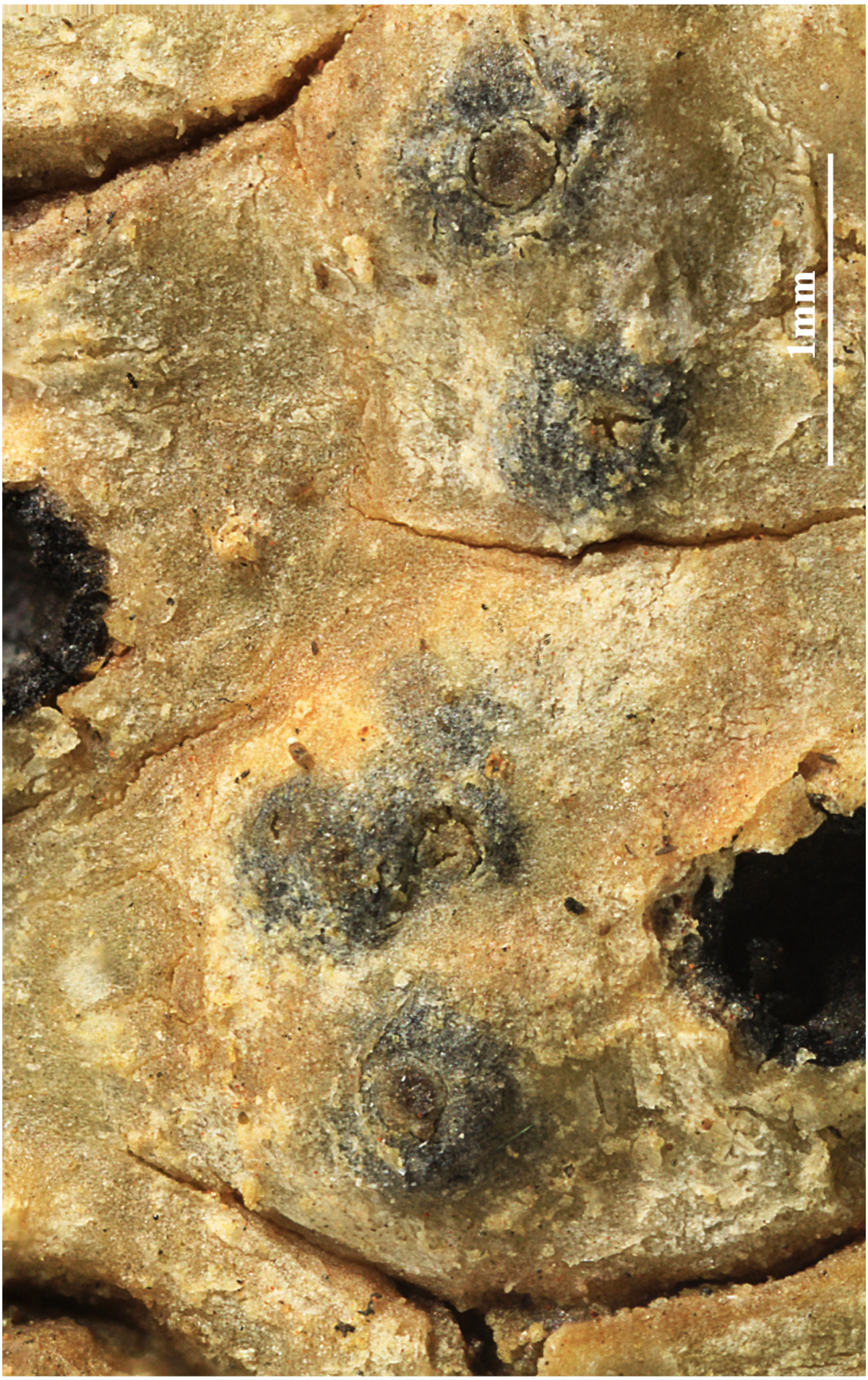
Pyrenula platystoma (Müll. Arg.) Aptroot, Lichenologist 44(1): 36 (2011) [2012]

= *Anthracothecium platystomum* Müll. Arg., Revue mycol., Toulouse 10(no. 40): 184 (1888)

= *Anthracothecium platystomum var. papillatum* A. Singh & Upreti, in Upreti & Hayaka, Recent Trends in Botanical Research (Allahabad): 28 (1999)

[ABL13691], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13591), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus corticate, with pseudocyphellae. Ascomata conical, exposed, c. 0.4–0.7 mm diam. Ostioles apical, black. Hamathecium inspersed with colorless oil globules. Ascospores brown, 2–4/ascus, densely muriform, 80–150 x 25–40 µm, locules round to oval.





Pyrenula platystoma

Pyrenula subpraelucida Müll. Arg., Bot. Jb. 6: 411 (1885)

[ABL27626], Brazil, Amapá, Macapá, Fazendhina Ecotel garden. On tree bark in garden. 0°03' N, 51°07 W, 5 m. Leg. M. Cáceres & A. Aptroot (no 27626), 22 August 2015, det. A. Aptroot 2015. - Thallus corticate, brownish to olive green, without pseudocyphellae. Perithecia solitary, subglobose, erumpent from the substratum, often mostly covered by thallus, c. 0.8–1.5 mm diam. Perithecial wall without crystals, up to 300 µm thick. Ostiole pale, apical. Hamathecium not inspersed, IKI+ blue, filaments unbranched. Ascospores 4/ascus, brown, uniseriate, 3-septate, broadly fusiform with pointed ends, 50–75 × 20–30 µm, often curved, lumina rounded, terminal lumina not separated from the exospore and much smaller than central lumina. Chemistry: No substances detected.





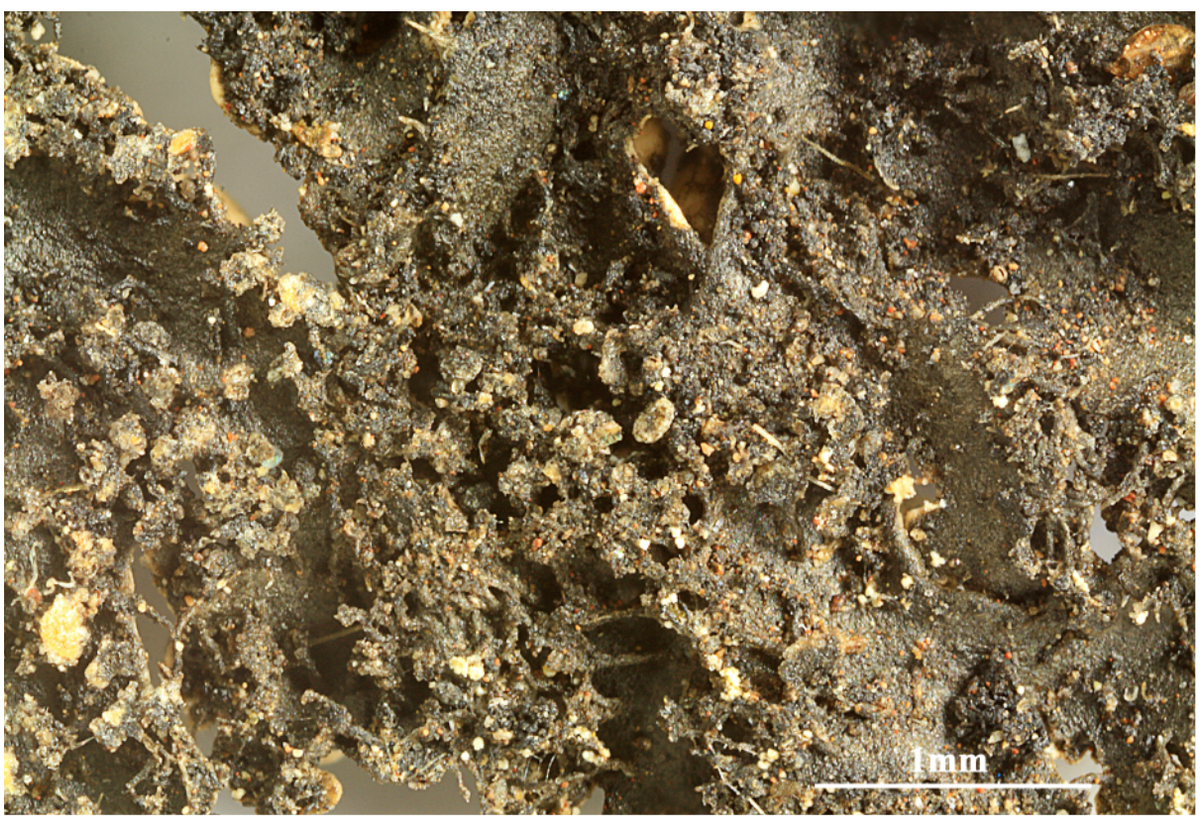
Pyrenula subpraelucida

Pyxine astridiana Kalb, Biblthca Lichenol. 24: 33 (1987)

[ABL13432], Brazil, São Paulo, Botucatu, Bioscience building on on campus. On Pandanus bark in park. 22°53'35" S, 48°29'40" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13432), 13 Sept. 2012, det. A. Aptroot 2012. - Thallus corticolous, c. 2.5 cm diam., grey. Lobes 0.2-0.7 mm wide, without soredia or isidia. Medulla white, K-, P-, C-, KC-. Apothecia 0.5-1.3 mm diam., disc black (young pruinose), stipes white. Spores 15-20 x 6-8 µm. Chemistry: lichexanthone, triterpenoids.







Pyxine astridiana

Pyxine pustulata Aptroot & Jungbluth, in Aptroot, Jungbluth & Cáceres, Lichenologist 46(5): 671 (2014)

[ABL13638], Brazil, São Paulo, Botucatu, Botanical garden on campus. On bark in park. 22°53'09" S, 48°29'56" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13638), 13 Sept. 2012, det. A. Aptroot 2012. - ISOTYPE -Thallus appressed foliose, corticate, shiny, pale grey. Lobes irregularly linear, much dissected and not confluent or overlapping, quite regularly c. 0.7–1.2 mm wide throughout. Lobe tips mostly rounded, with few, irregular, linear, white maculae, without pruina. Lobes convex, in older parts with laminal, thallus-coloured pustules c. 0.1–0.3 mm wide and c. 0.2–0.6 mm high. Polysidiangia clustered in generally large groups c. 0.3–1.5 mm wide, corticate when young and at the sides, becoming ecorticate above, when old inside with few granular soredia, occasionally exposing the yellow medulla. Medulla bright yellow to ochraceous above, white below. Lower surface black, shiny, with regularly dispersed, simple, black rhizines. Ascomata and pycnidia not observed. Chemistry: Thallus cortex UV+ yellow, K-. Thallus medulla (both layers) UV-, P-, K-. TLC: lichexanthone, terpenoids and pigment. This species is close to *P. caesiopruinosa* (Nyl.) Imshaug and *P. physciiformis* (Malme) Imshaug. However, the upper medulla of *Pyxine physciiformis* is K+ faint reddish orange, while *P. caesiopruinosa* has a K+ purple upper medulla.



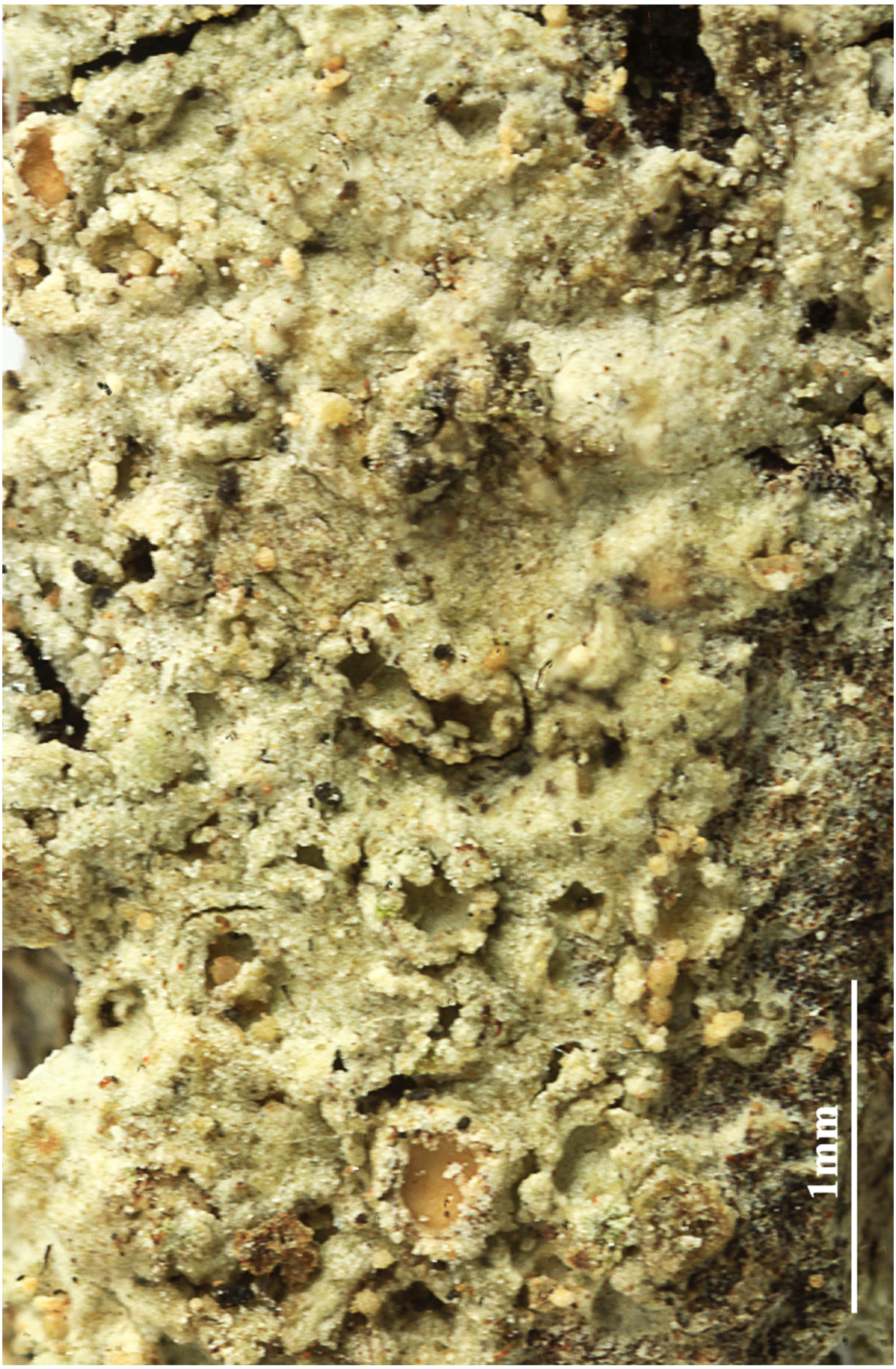




Pyxine pustulata

Ramonia variespora Sobreira, Aptroot & M. Cáceres [as 'variospora'], in Aptroot, Sobreira & Cáceres, Lichenologist 47(1): 22 (2015)

[ABL28945a], Brazil, Tocantins, near Itaguatins. 5°44'48" S, 47°33'46" W, 150 m. In cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28945a), 23 October 2016, det. A. Aptroot 2016. - Thallus crustose, corticate, slightly shiny, grey, cracked into angular areoles of c. 0.1–0.3 mm diam. which soon become irregular hemispherical warts, at least towards the centre of the thallus where the thallus is c. 0.2 mm thick, not surrounded by prothallus; cortical cells almost globose, c. 3–6 µm diam. Photobiont trentepohlioid, cells c. 10–16 x 8–12 µm. Apothecia numerous, dispersed, sessile, lentiform, on the outside covered with several thallus warts, round, 0.3–0.5 mm diam.; disc concave, pinkish, margin covered by thalline warts, c. 0.1 mm wide, almost closing inward over the disc leaving a hollow space over the hymenium. Wall almost surrounding the whole ascoma, reddish brown on the outside, hyaline inside; lumina elongated, in the central part c. 6–10 x 1.5–2.5 µm; near the ostiole almost globose. Ostiole almost closed when apothecia young, reddish brown when viewed from above and where not covered by thallus, granular. Excipulum a thin brown cupular layer, c. 50 µm thick. Hymenium not inspersed, after pretreatment with KOH with Lugol + blue, 120–170 µm high. Paraphyses unbranched, 2.0–2.5 µm wide, apices not swollen but filaments toward the tip slightly moniliform and up to 3.5 µm wide. Periphyses unbranched, numerous, hyaline, 13–29(–58) x 4.5–5.5 µm, the longer ones visible from the outside as glassy hairs in the empty chamber below the ostiole. Asci soon disintegrating (no mature ascus tips observed), 90–129 x 10–35 µm, containing either 8 or c. 32–64 ascospores, variable within a hymenium; 8-spored asci cylindrical and slender; multispored asci fusiform and wide. Ascospores hyaline, young simple, 1-septate when mature; when 8 per ascus ellipsoid and (16–)16.4–18.3–20.2(–22) x (6–)6.8–7.4–8.0(–10) µm (n ¼ 15); when c. 32–64 per ascus broadly ellipsoid and (10–)11.8–*12.7*–13.6–(14) x (6–)6.7–*7.2*–7.7(–8) mm (n =14), smooth, but surrounded by a 3–5 µm thick gelatinous sheath. Pycnidia not observed. Chemistry: TLC no substances.



Ramonia variespora



Ramonia variespora

Redingeria glaucoglyphica (Sipman) Frisch, in Frisch & Kalb, Biblthca Lichenol. 92: 409 (2006)
= *Ocellularia glaucoglyphica* Sipman, Trop. Bryol. 6: 9 (1992)

[ABL27541], Brazil, Amapá, Mazagão, Reserva extrativista Moracá, along BR 156. 0°02' S, 51°45' W, 30 m. On tree bark in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27541), 21 August 2015, det. A. Aptroot 2025. - Thallus corticolous, dark velvety olive to yellowish-olive and covered by extensive patches of a thin white pruina, rimose to fissured with the substrate, 0.05-0.15 mm thick, with a smooth, matt surface; some specimens densely dotted by white apothecia initials; a thin white to pale yellow medullary layer present. Prothallus line thin, brownish. Phenocortex absent. Photobiont layer 30-100 µm thick, with dense photobiont cells and few inclusions of large calcium oxalate crystals. Medulla up to 80 µm thick, largely epiphloeodal. Pycnidia immersed in the thallus, c. 0.1-0.15 mm in diam., with a white, slightly elevated pore area and a single tiny pore. Nucleus obovate to broadly truncated conical in section, c. 100-180 µm wide and 85-95 µm high, with an undulating inner surface. Pycnidial wall c. 3-8 µm wide, comprising a hyaline conglutinated prosoplectenchyma, widening to 25 µm in the pore area. Conidiophores of Vobis type II(-IV). Conidiogenous cells bottle-shaped, 6-8 × 1.5-2 µm. Conidia formed acrogenously, bacilliform, 5-6 × 1-1.2 µm. Apothecia dispersed, immersed in the thallus, angular to usually elongated or long lirelliform, 0.5-0.6 mm wide and up to 4 mm long. Margin level with the thallus or low and rim-like, usually indistinct; occasionally jagged to shallowly lobed and the lobes then upright to recurved. Columella massive, filling the exposed disc, ± lobate to indistinctly reticulate marginally and with a few connections to the apothecial margin; the flat tip typically level with the surface of the thallus and often covered by a thin layer of thallus; the apothecia then visible as two parallel, ± sinuous strands of hymenium immersed in the thallus. Disc pale brown, covered by thin white pruina. Phenocortex absent. Photobiont layer up to 130 µm thick. Periderm layer 50-110 µm thick, comprising a moderately dense, brown conglutinated prosoplectenchyma with distinct rows of periderm cells. Proper exciple cupular, up to 70 µm deep and brown at the base, 60-110 µm wide laterally, carbonised unto the base, with a thick apical layer of pale brownish to hyaline hyphae including a few small calcium oxalate crystals, or a thin layer of thallus. Columella simple, flat, usually broader than high, carbonised, usually with a thin apical layer of thallus. Subhymenium c. 12-15 µm high. Hymenium 100-125 µm

high, clear. Ascospores 8/ascus, 1 seriate, dark brown, transversely septate, 4 loculate, 14-17 × 6-8 µm, with rounded ends and distinct ornamentation by undulating ridges, I+ purplishblue when young. Asci cylindrical, 90-100 × 9-11 µm. Paraphyses simple, straight, 2-2.5 µm wide; tips with a single thickened cell, adspersed with fine greyish to brownish granules. Epihymenium unpigmented, c. 10 µm high. - Remarks: *R. glaucoglyphica* is a characteristic species that is readily identified by its velvety-olive thallus and the lirelliform apothecia which are almost completely immersed in the thallus. The top of the columella is usually covered by a thin layer of thallus. From the other *Redingeria* species in South America, *R. glaucoglyphica* differs additionally by the ecorticate thallus without lichen compounds.



Redingeria glaucoglyphica



Redingeria glaucoglyphica

Relicina subabstrusa (Gyeln.) Hale, Phytologia 28(5): 485 (1974)
= *Parmelia endococcinea* (Müll. Arg.) Gyeln., Feddes Repert. Spec. Nov. Regni veg. 29: 288 (1931)
= *Parmelia limbata* f. *endococcinea* Müll. Arg., Flora, Regensburg 70: 318 (1887)
= *Parmelia subabstrusa* Gyeln., Feddes Repert. Spec. Nov. Regni veg. 29: 288 (1931)

[ABL28810], Brazil, Tocantins, near Itaguatins. 5°44'58" S, 47°32'24" W, 150 m. In cerrado on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28810), 22 October 2016, det. A. Aptroot 2016. - Thallus foliose, adnate, to 4–8 cm wide. Lobes contiguous centrally to separate at periphery, not imbricate, linear-elongate, dichotomously to subdichotomously branched, 0.5–2 mm wide, without lobules; cilia dense, conspicuous, strongly inflated, to 1 mm long. Upper surface yellow-green, flat, smooth, shiny at lobe apices, emaculate, without isidia. Lower surface black; rhizines dense, simple, black. Apothecia common, 1–3 mm wide; disc ±flat or shallowly concave, cinnamon-brown; thalline exciple strongly coronate. Ascospores ellipsoidal, 7–8 × 4–5 µm. Pycnidia common, flat to slightly emergent, punctiform, to 0.1 mm wide. Conidia bifusiform, 6–8 µm. Chemistry: cortex K-, UV-; medulla K+ yellow then dark red, C-, P+ orange; containing usnic acid, norstictic acid (major), connorstictic acid (trace) and ±hyposalazinic acid (trace).





Relicina subabstrusa

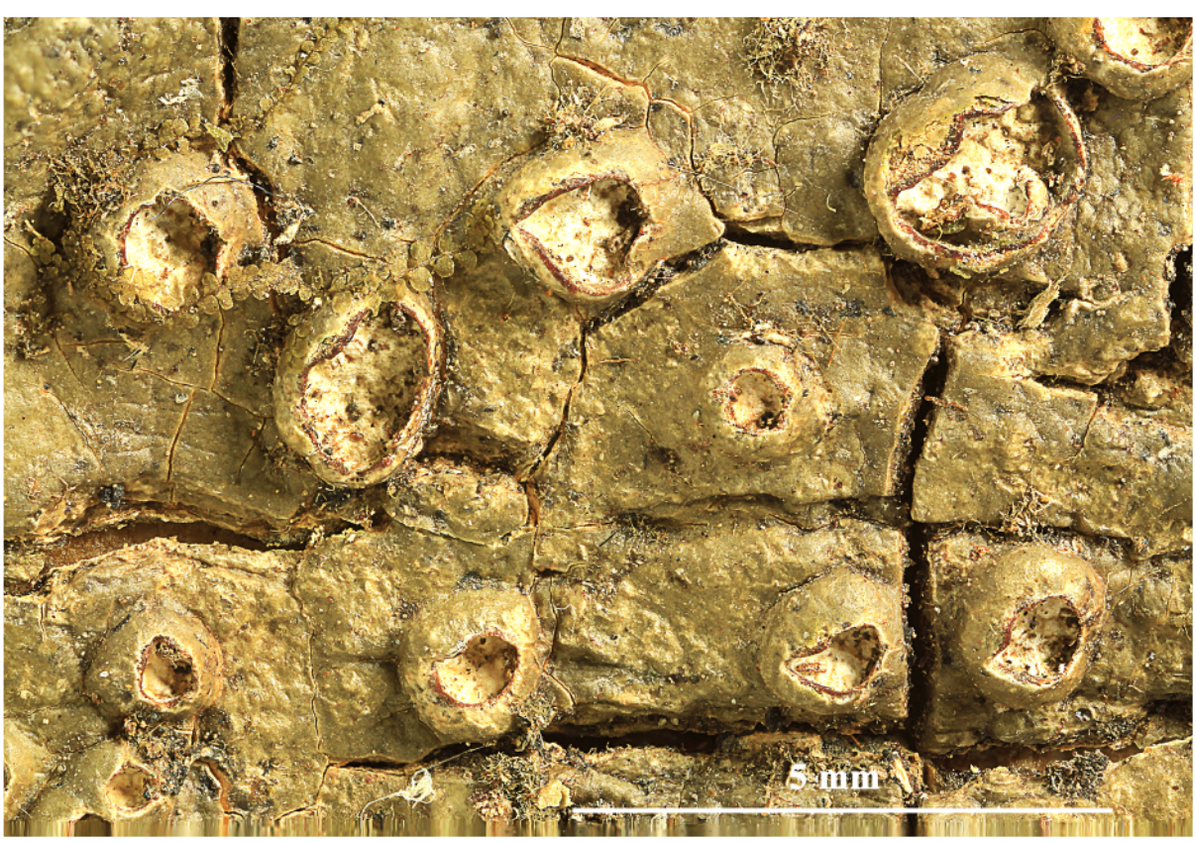
Rhabdodiscus anamorphoides (Nyl.) Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 184 (1921)

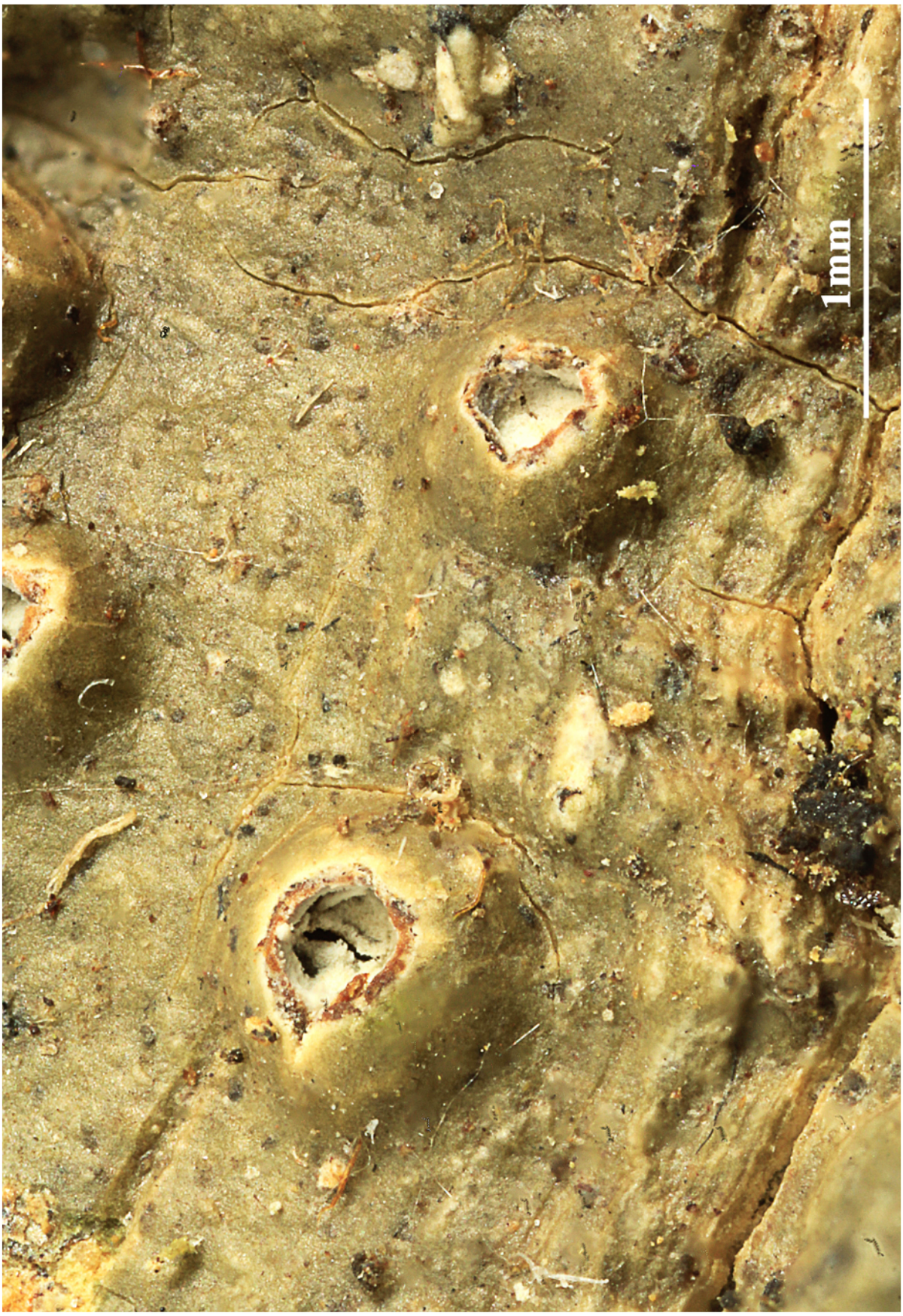
= *Stegobolus anamorphoides* (Nyl.) Lücking, in Sipman, Lücking, Aptroot, Chaves, Kalb & Umaña Tenorio, Phytotaxa 55: 168 (2012)

= *Phaeotrema anamorphoides* (Nyl.) Müll. Arg., J. Linn. Soc., Bot. 30: 451 (1895)

= *Thelotrema anamorphoides* Nyl., Flora, Regensburg 52: 120 (1869)

[ABL40303], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40303), 29 October 2016, det. A. Aptroot 2016 - Thallus grey-olive, smooth to uneven, with dense, prosoplectenchymatous cortex with internal splitting; photobiont layer and medulla with clusters of calcium oxalate crystals. Apothecia sessile, angular-rounded, 1–3 mm diam.; disc partially covered by 0.5–2 mm wide pore, partly filled by brown-black, white-pruinose columella; margin fissured to lobulate, brown-black, felty white-pruinose. Columella present, lobatereticulate, carbonized. Excipulum prosoplectenchymatous, carbonized; periphysoids absent. Hymenium 80–100 µm high, clear; paraphyses unbranched. Ascospores 4–8/ascus, 3–5-septate, 10–15 x 6–8 µm, ellipsoid, with thick septa and lens-shaped lumina, brown, young I+ violet-blue (amyloid). Secondary chemistry: psoromic, subpsoromic and 2'-O-demethylpsoromic acids.

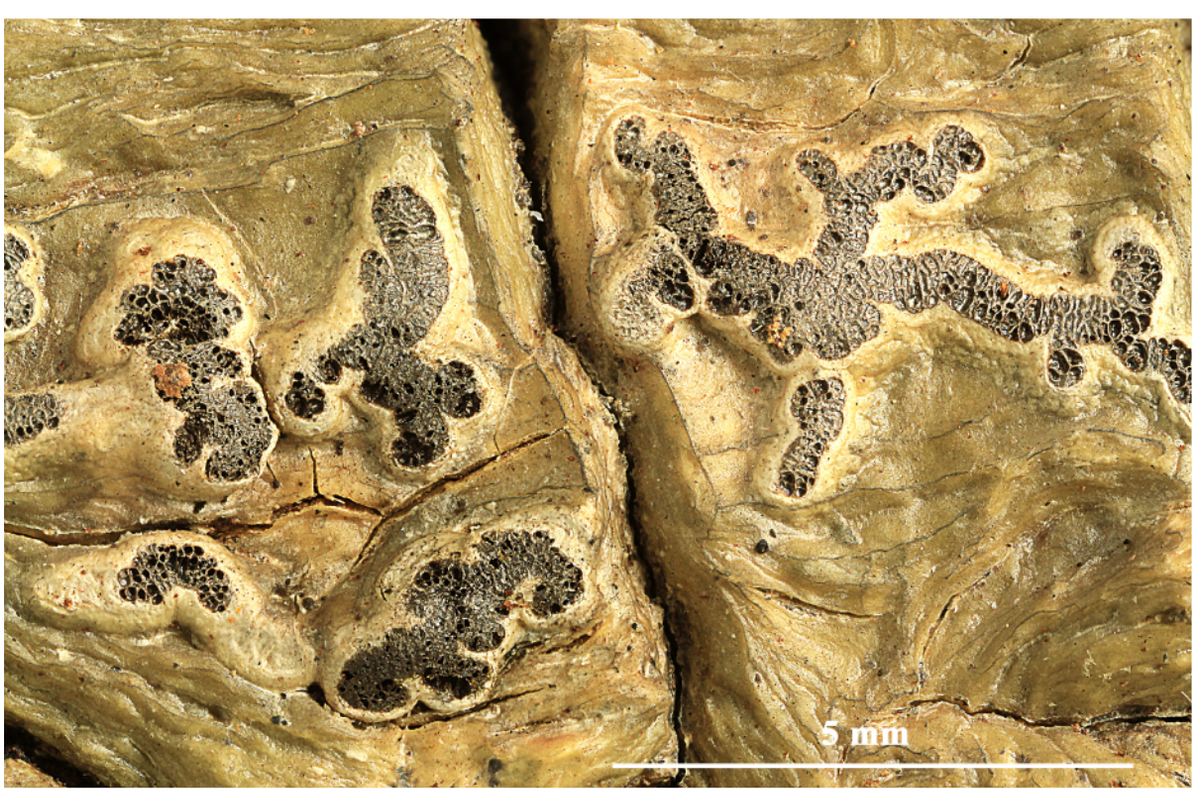




Rhabdodiscus anamorphoides

Sarcographa heteroclita (Mont.) Zahlbr., in Rechinger, Denkschr. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 88: 19 (1911)
= *Actinoglyphis heteroclita* (Mont.) Kremp., Nuovo G. bot. ital. 7(1): 44 (1875)
= *Actinoglyphis leprieurii* Mont., Syll. gen. sp. crypt. (Paris): 355 (1856)
= *Flegographa leprieurii* A. Massal., Atti Inst. Veneto Sci. lett., ed Arti, Sér. 3 5: 314 (1860) [1859-1860]
= *Glyphis heteroclita* Mont., Annls Sci. Nat., Bot., sér. 2 19: 83 (1843)
= *Graphis heteroclita* (Mont.) Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 234 (1921)
= *Graphis leprieurii* Nyl., Mém. Soc. Imp. Sci. Nat. Cherbourg 5: 130 (1858)
= *Phaeographis leprieurii* Staiger, Biblthca Lichenol. 85: 338 (2002)
= *Sarcographa leprieurii* Müll. Arg., Flora, Regensburg 70(5): 77 (1887)

[ABL27124], Brazil, Amapá, near Provoado Abacate da Pedreina, km 34 on AP 070. 0°15' N, 50°55' W, 30 m, On tree bark in cerrado. Leg. M. Cáceres & A. Aptroot (no 27124), 18 August 2015, det. A. Aptroot 2015. - Ascocarps elongate and branched, finally strongly raised, 0.5-1,0 mm wide; margins forming a low thalloid rim around the exposed, grey, flat, transversely, and in wider lirellae also longitudinally, fissured disc; hymenium 80-120 µm, inspersed; ascospores 8/ascus, transversely septate, ca. 16-23 x 6-8 µm, 6 celled.





Sarcographa heteroclita

Sclerophyton stigmaticum (Kremp.) Sparrius, Biblthca Lichenol. 89: 78 (2004)
= *Chiodecton stigmaticum* (Kremp.) Zahlbr., Cat. Lich. Univers. 2: 482 (1923) [1924]
= *Platygrapha stigmatica* Kremp., Flora, Regensburg 50: 6 (1867)

[ABL13569], Brazil, São Paulo, Botucatu, Pousada Mandala on SP-254, on bark in cerrado forest. 22°52'47" S, 48°29'06" W, 850 m. Leg. M. Cáceres & A. Aptroot (no 13569), 9 Sept. 2012, det. A. Aptroot 2012. - Thallus 1-3 cm in diam., smooth to verrucose, white to grey, water-repellent, 100-200 µm thick. Photobiont Trentepohlia. Prothallus thin, black. Upper algaefree medulla 15-20 µm thick. Medulla cream-coloured, with crystals of c. 20 µm diam. Ascomata open, lirelliform, often shortly branched, 0.1-0.15 x 0.2-0.6 mm, in slightly raised and paler coloured pseudostromata, disc dark brown to black, not pruinose. Thalline margin 0.1-0.2 mm wide. Excipulum very thin, 10-15 µm wide, hyline in section, orange-brown above. Hypothecium hyaline to pale orange, 50-60 µm tall, K-. Hymenium hyaline, 70-80 µm tall. Paraphysoids 1.0-1.5 µm wide, apices 1.5-2.0 µm wide, branched and anastomosed especially in the upper parts, apices orange, K-. Epithecium c. 10 µm tall, with crystals of c. 2.5 µm daim, unchanged in K. Asci 40-50 x 10-15 µm, clavate-cylindrical, 8-spored. Ascospores ellipsoid, upper cell not or slightly enlargted, 10-17 x 2.7-4.5 µm, 3-septate, sometimes slightly curved, perispore to 0.5 µm wide. Condiomata punctiform. immersed, 0.1 mm diam., brown-black, wall orange-brown in section, conidia rod-shaped, 4.0-6.0 x 0.8 µm. Chemistry: Thallus C-, K+ weakly yellowish, P-, UV-; TLC: no substances detected- Amyloidy: asci I+ red. KI+ blue, epithecium, hymenium, hypothecium and excipulum I+ and KI+ dark blue. The species is characterized by its small, 3-septate ascospores with rounded ends.



Sclerophyton stigmaticum



Sclerophyton stigmaticum

Thalloloma rhodastrum (Redinger) Staiger, Biblthca Lichenol. 85: 442 (2002)

= *Graphis rhodastra* Redinger, Ark. Bot. 27A(no. 3): 10, 67, tab. V, fig. 57 (1935)

[ABL27527], Brazil, Amapá, Mazagão, Reserva extrativista Moracá, along BR 156. 0°02' S, 51°45' W, 30 m. On tree bark in disturbed forest. Leg. M. Cáceres & A. Aptroot (no 27527), 21 August 2015, det. A. Aptroot 2025. - Ascocarps only weakly reddish brown to red-coloured, no greenish colour-reaction can be observed when K is added to ascocarp sections; exciple poorly developed at the base and laterally, pale (not brownish); proper margins absent; lirellae embedded in the thallus; thallus pale grey or ± greenish, powdery, no cortex developed; ascospores transverse 8-11-locular, 22-26 × 6-7 µm, I+ dark blue (even young spores).

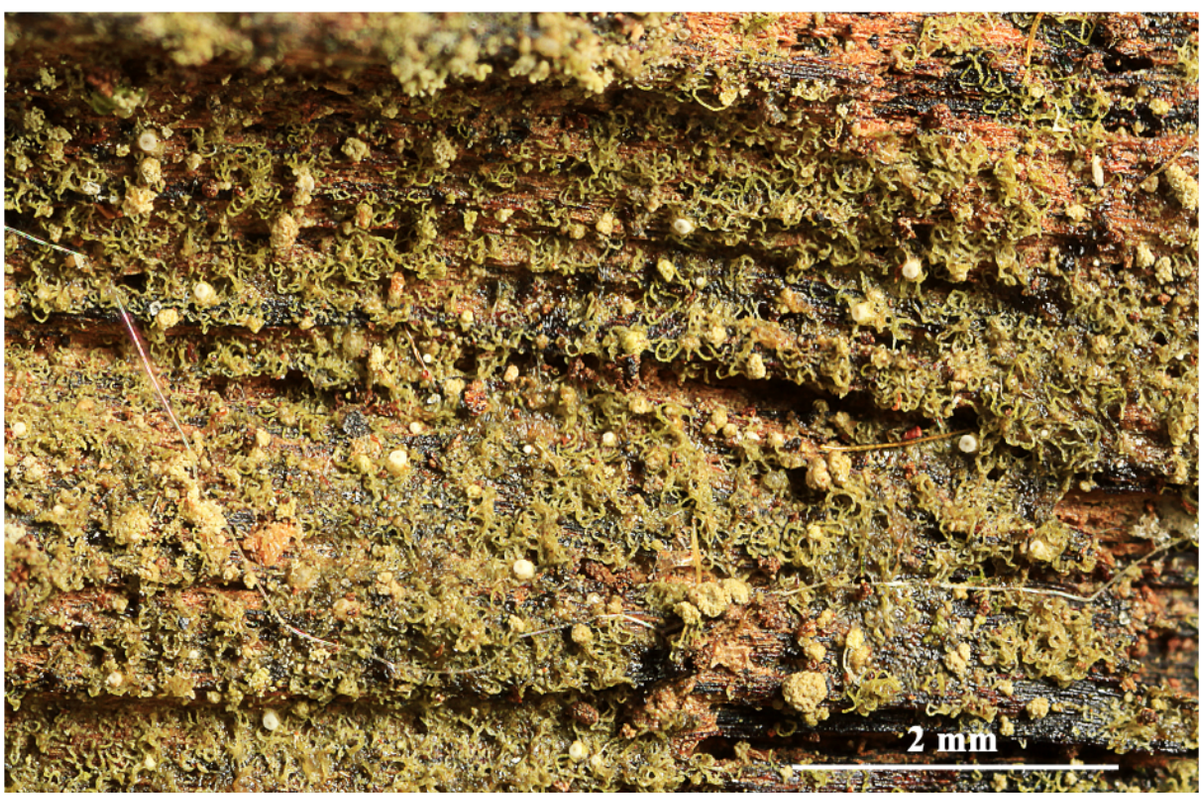




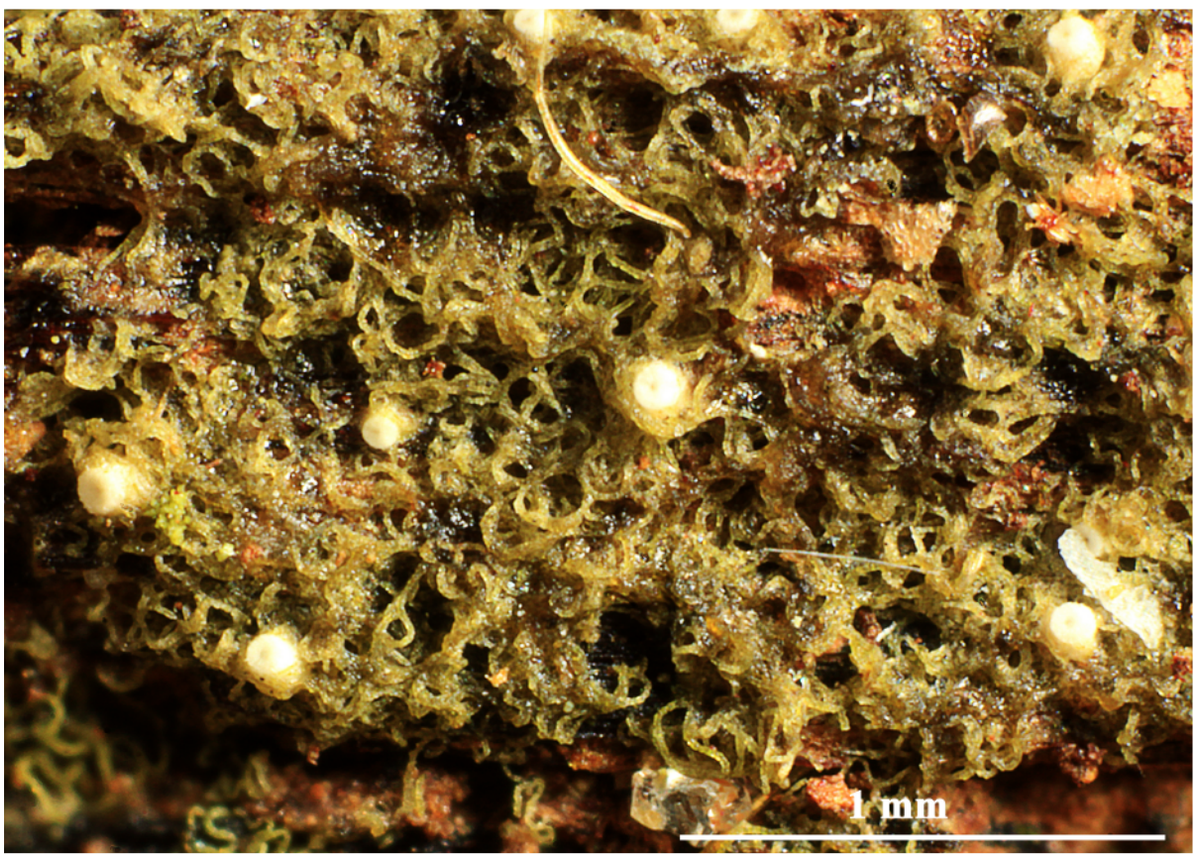
Thalloloma rhodastrum

Thelocarpon triseptatum Aptroot & M. Cáceres, Bryologist 119(3): 262 (2016)

[ABL27092], Brazil, Amapá, near Provoado Abacate da Pedreina, km 34 on AP 070. 0°15' N, 50°55' W, 30 m, On wood in cerrado. Leg. M. Cáceres & A. Aptroot (no 27092), 18 August 2015, det. A. Aptroot 2015. - ISOTYPE - Thallus absent; ascomata in close contact with algal colonies (not occurring directly on the wood); algal colonies mostly belonging to *Klebsormidium* and *Gloeocystis*. Ascomata perithecioid, sessile, superficial, 0.2–0.3 mm diam., 0.2–0.3 mm high, tops flat, off white. Wall almost hyaline, regularly 15–20 µm thick all around, consisting of hyphae with small lumina of ca. 1 µm, but wall much thickened, to ca. 75 µm, at the flat tops around the ostiole and there in surface view white. Hamathecium hyaline, ca. 200–250 µm high, consisting of sparsely anastomosing paraphysoids of ca. 1 µm thick, without differentiated tips, in IKI– gel. Asci IKI–, cylindrical with pointed tip, 95–160 x 5–7 µm, with 8 mostly uniseriate ascospores. Ascospores hyaline, IKI–, fusiform, 3-septate, 12–16 x 3.5–4.5 µm, ends somewhat pointed but not thickened. Pycnidia not observed. Chemistry: Not applicable.







Thelocarpon triseptatum

Zwackhia bonplandii (Fée) Ertz, in Diederich, Ertz, Eichler, Cezanne, van den Boom, Fischer, Killmann, Van den Broeck & Sérusiaux, Bull. Soc. Nat. luxemb. 113: 106 (2012)

= *Graphis abbreviata* Spreng., Syst. veg., Edn 16 4(1): 249 (1827)

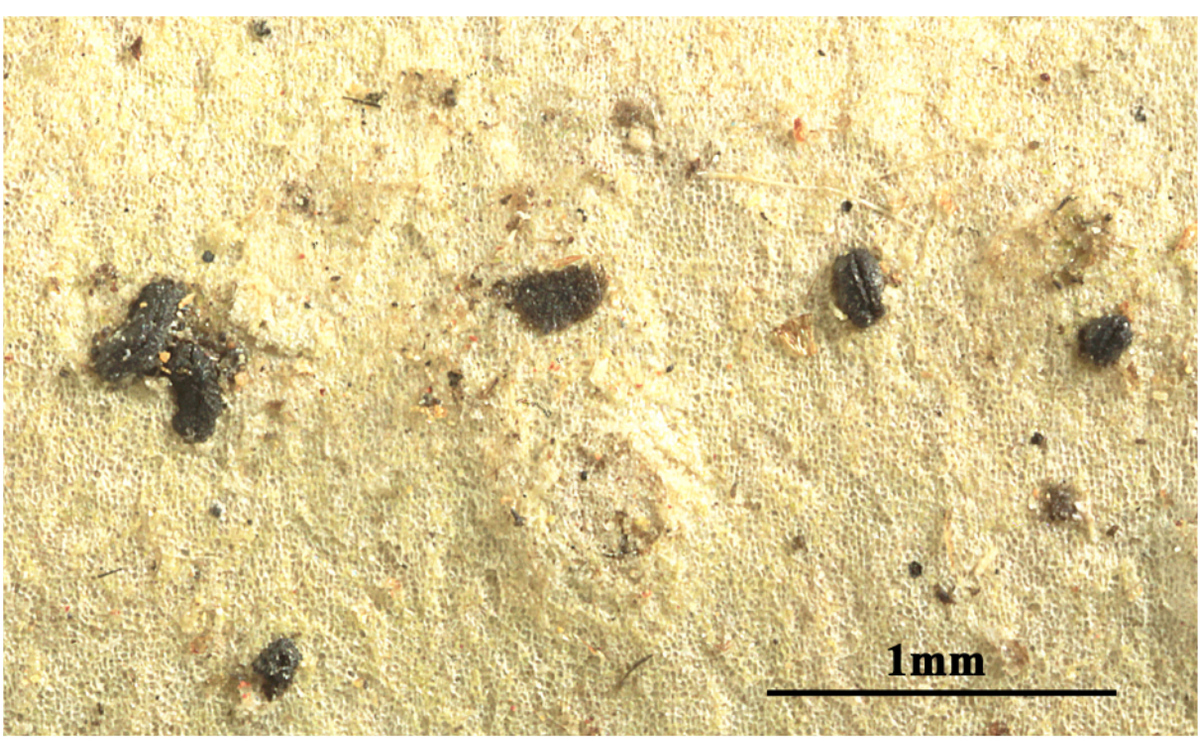
= *Opegrapha abbreviata* Fée, Essai Crypt. Exot. (Paris): 25 (1825) [1824]

= *Opegrapha bonplandii* Fée [as 'bonplandi'], Essai Crypt. Exot. (Paris): 25 (1825) [1824]

= *Opegrapha bonplandii f. abbreviata* (Müll. Arg.) Redinger, Ark. Bot. 29A(no. 19): 28 (1940)

= *Opegrapha bonplandii var. abbreviata* Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 29(no. 8): 17 (1887) [1887]

[ABL40442], Brazil, Pará, Vila Nazaré. 80 km N of Dom Eliseu. 3°53'56" S, 48°05'44" W, 120 m. In primary tropical lowland rain forest on bark of tree. Leg. M. Cáceres & A. Aptroot (no 40442), 29 October 2016, det. A. Aptroot 2016 - Thallus crustose, thin, brownish, continuous; surface smooth; prothallus dark. Vegetative diaspores absent. Photobiont trentepohlioid alga. Ascomata lirellate, abundant, scattered, sessile, rarely branched, straight to curved, epruinose; disk slitlike to exposed, concave. Exciple carbonized, entire below the hypothecium; hymenium hyaline, clear; paraphysoids branched, anastomosing. Asci 8-spored, clavate; ascospores hyaline, fusiform, 9-12-septate, 40.0-60.5 × 4.5-6.0 µm with perispore ~1 µm thick. Conidiomata not reported. Chemistry: Spot tests negative; no substances detected by TLC.





Zwackhia bonplandii

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In this book, lichens collected in 2015 and 2016 in the Brazilian states Amapá, Tocantins and some from Pará and São Paulo are treated, including several species that were not illustrated before. Pará is one of the largest states in the Amazon. Some specimens are illustrated here from near the border of this state with Manahão. Amapá and Tocantins are tropical states in Northern Brazil. Amapá is the only Brazilian state that lies largely in the Northern Hemisphere. For many tropical species that were described from Brazil, it is their only known occurence on the Northern Hemisphere. The natural vegetation of Amapá is tropical rainforest; in Tocantins it is partly tropical rainforest, partly Cerrado with gallery forests.