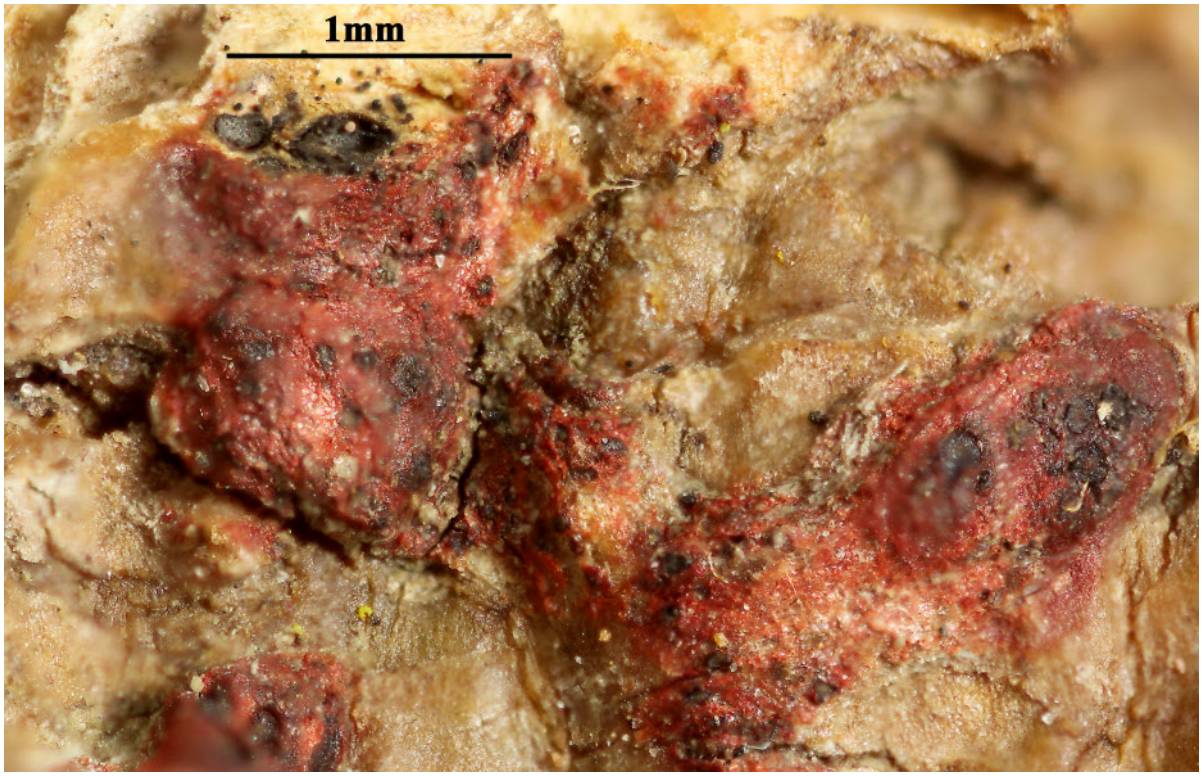
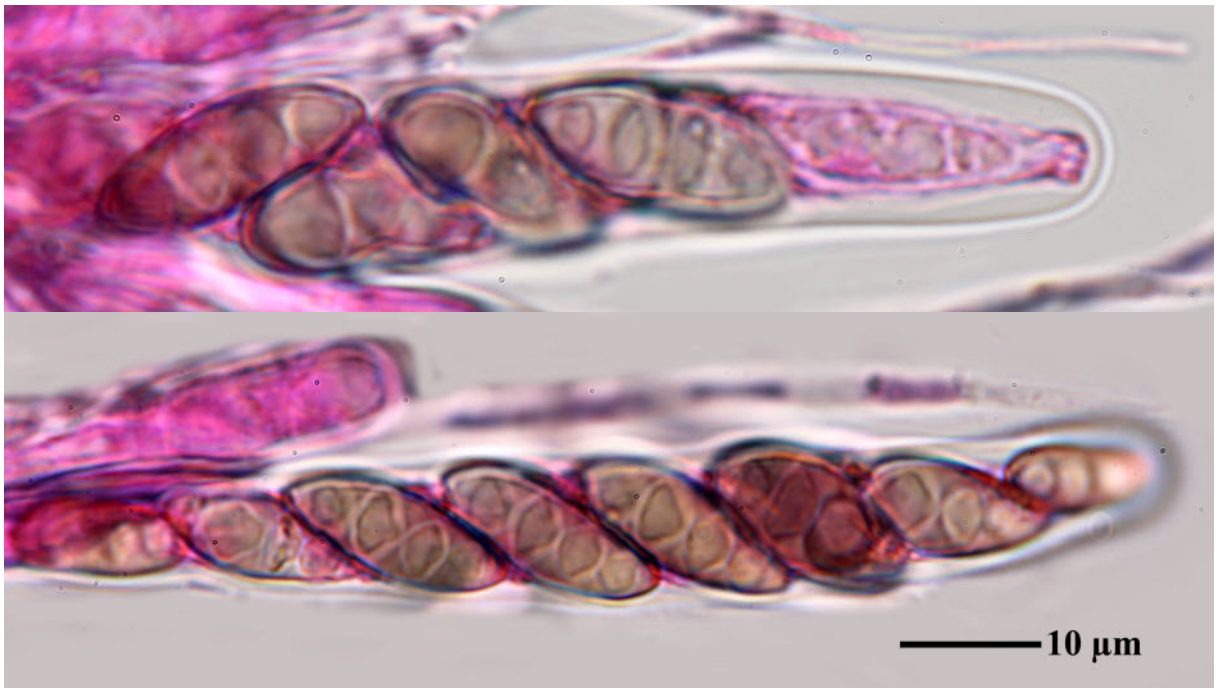


Felix Schumm & André Aptroot

Atlas of Pyrenulaceae and Trypetheliaceae
(Lichenized Ascomycota)

VOLUME 4



Felix Schumm & André Aptroot

Atlas of Pyrenulaceae and Trypetheliaceae
(Lichenized Ascomycota)

Volume 4

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Index with synonymes.....2048-2081

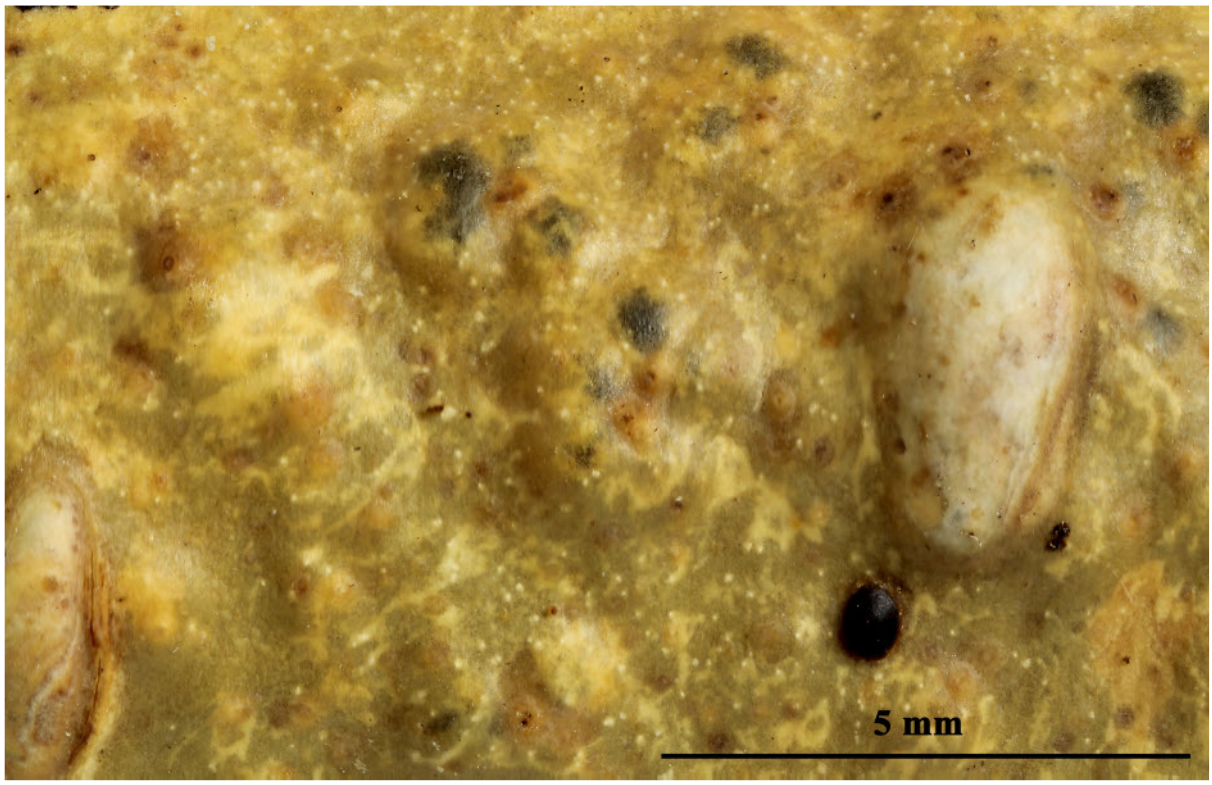
new combinations

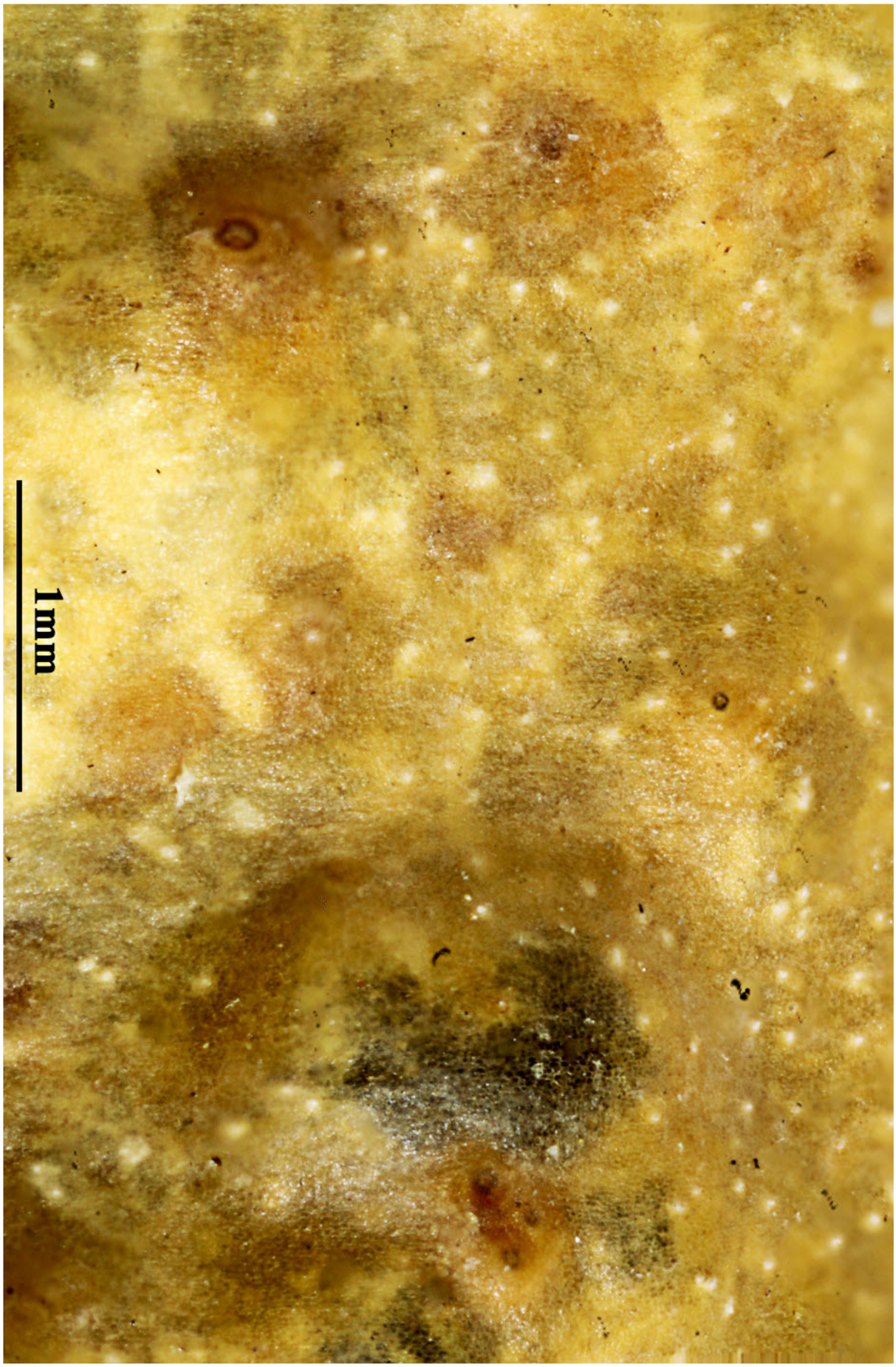
Astrothelium himalayense (Upreti & Aptroot) Aptroot & Schumm
Bogoriella oleosa (Aptroot) Aptroot & Schumm
Pseudopyrenula kantvilasii (P.M. McCarthy) Aptroot

Pyrenula hibernica (Nyl.) Aptroot & Etayo, in Etayo & Aptroot, Lichenologist 35(3): 235 (2003)
= *Anthracothecium hibernicum* (Nyl.) A.L. Sm., Monogr. Brit. Lich. 2: 342 (1911)
= *Polyblastia hibernica* (Nyl.) Arnold, Flora, Regensburg 53: 21 (1870)
= *Verrucaria hibernica* Nyl., Flora, Regensburg 51: 163 (1868)
= *Verrucaria pyrenuloides* var. *hibernica* (Nyl.) Carroll, J. Bot., Lond. 6: 163 (1868)

Thallus immersed. pale olive-green or yellow-buff, sometimes with white dots, smooth, continuous, with age becoming rougher and rarely cracked. Ascomata 1–2 m diam., black, arising 1–1.5 mm below the surface; only the pale ostiolum visible at surface, or ascomata visible through translucent surface of thallus; occuring singly, or radially arranged in groups of 2 to 5; ostioles lateral, often joined, visible as a pale yellow- or orange-brown depression, or level with surface of thallus. Asci 4- to 8-spored. Ascospores muriform, brown when mature, (57–)70–135(–140) × (24–) × 26–47(–55) µm, oblong to fusiform-ellipsoid. Pycnidia c. 2 mm diam., divided into chambers; conidia 24–27 × 1 µm. Chemistry: Thallus C-, K-, KC-, P-, UV+ pale yellow.

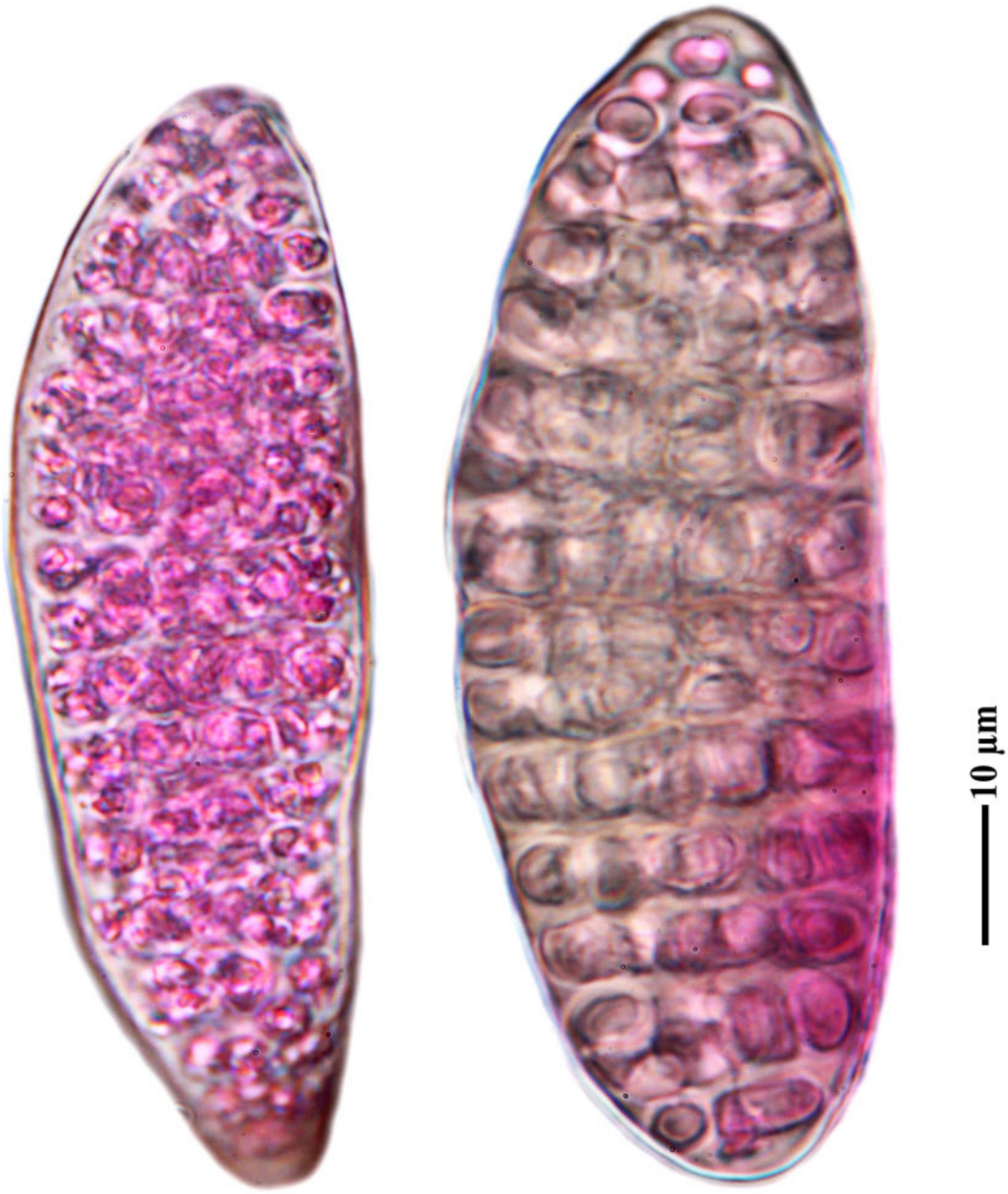
[ABL61955], Scotland, Argyll, Sunart, Resipole, near Allt Mhic Chiarain river, on Corylus. 0-50 m. Leg. A. Aptroot (no 61955), 18-30.07.2004, det. A. Aptroot, 2004.





Pyrenula hibernica





Pyrenula hibernica



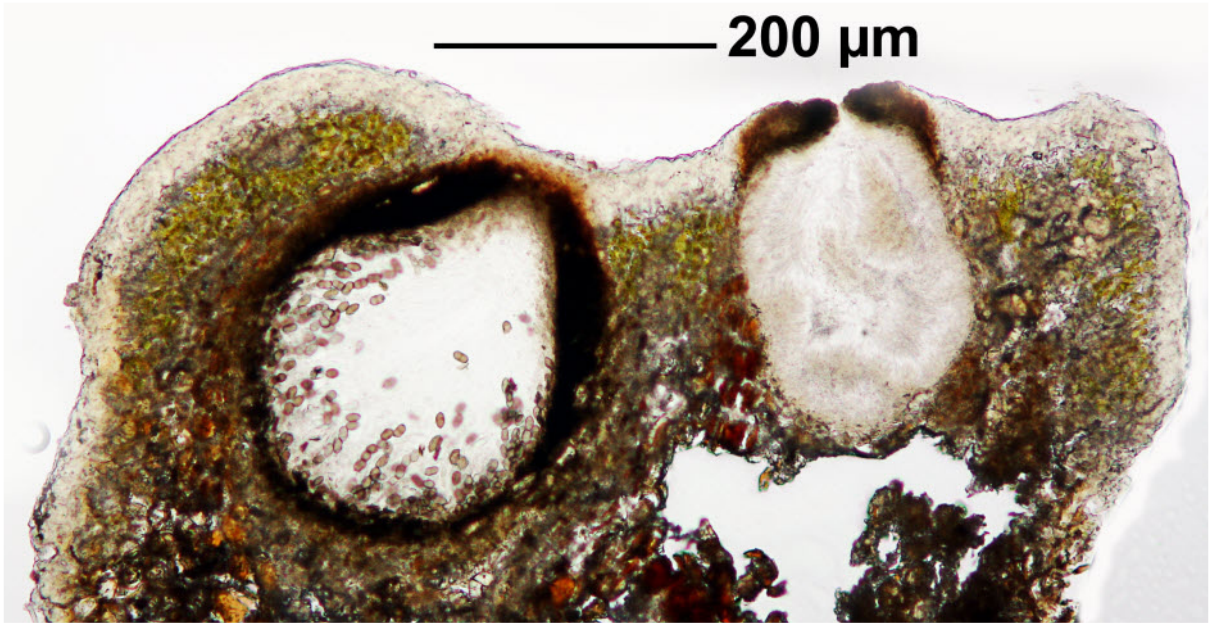
Pyrenula hibernica

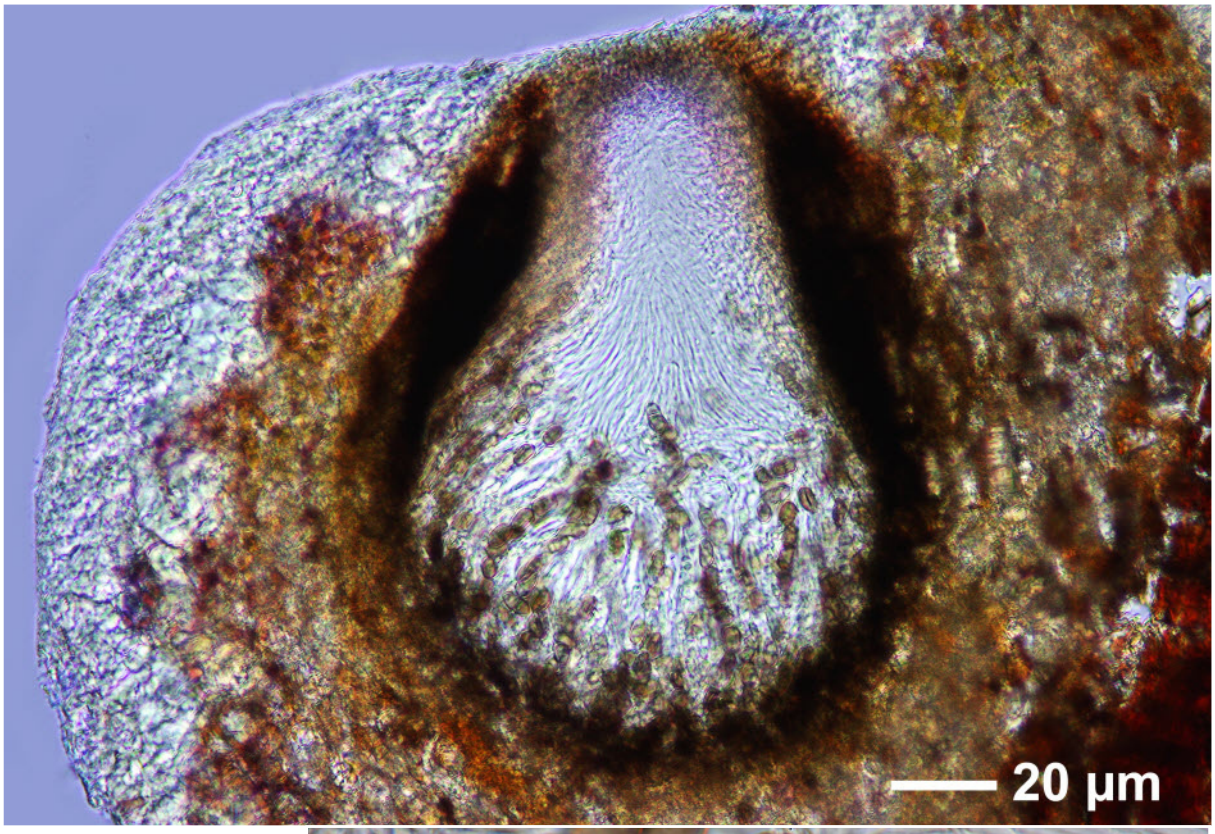
Pyrenula infracongruens Aptroot & Schumm, in Schumm & Aptroot, Seychelles Lichen Guide (Wangen): 280 (2010)

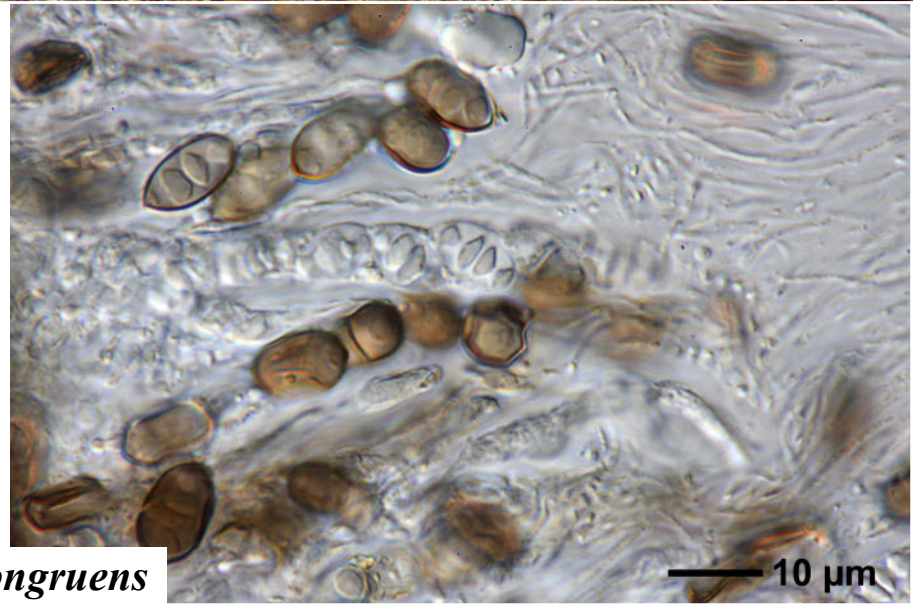
Thallus yellowish grey, smooth, up to 0.4 mm thick, with a 20–40 µm thick hyaline cortical layer, UV- negative. Ascomata only visible by the grey ostiole, immersed in the thallus, globose to pyriform, c. 0.2–0.4 mm diam, surrounded by a thin carbonized wall which is thicker at the upper half and especially around the ostiole, suggesting a clypear origin. Hamathecium not inspersed. Ascospores 11–13 × 6–7 µm, 3-septate, rather variably coloured grey to brown, ellipsoid with parallel sides, mostly sharply pointed, end lumina in spore tips, central lumina often irregularly placed, rounded to angular.
This is a species with ascospores of the *pseudobufonia*-type (with the end lumina in the ascospore tips) differing from *Pyrenula nitidula* by the much smaller spores, and from *Pyrenula fetivica* also by the absence of inspersion, and from both species by the thick, corticate thallus which hides most of the ascomata.

[14552], Seychelles, La Digue, La Retraite, Straße nach Grand Anse, 4°21.996' S, 55°50.170' E, ca. 40 m. Leg. F. Schumm 05.10.2008, det. A. Aptroot 2008. HOLOTYPUS.

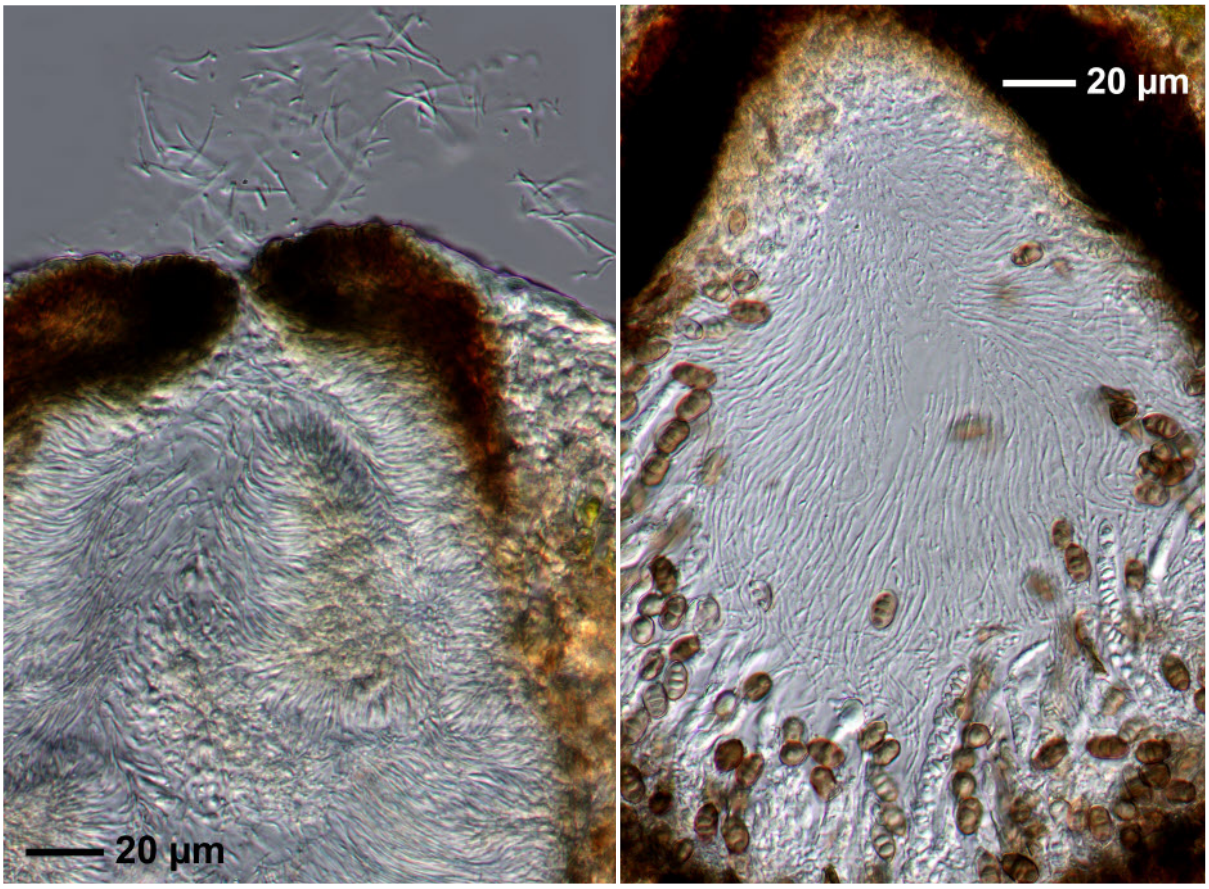








Pyrenula infracongruens



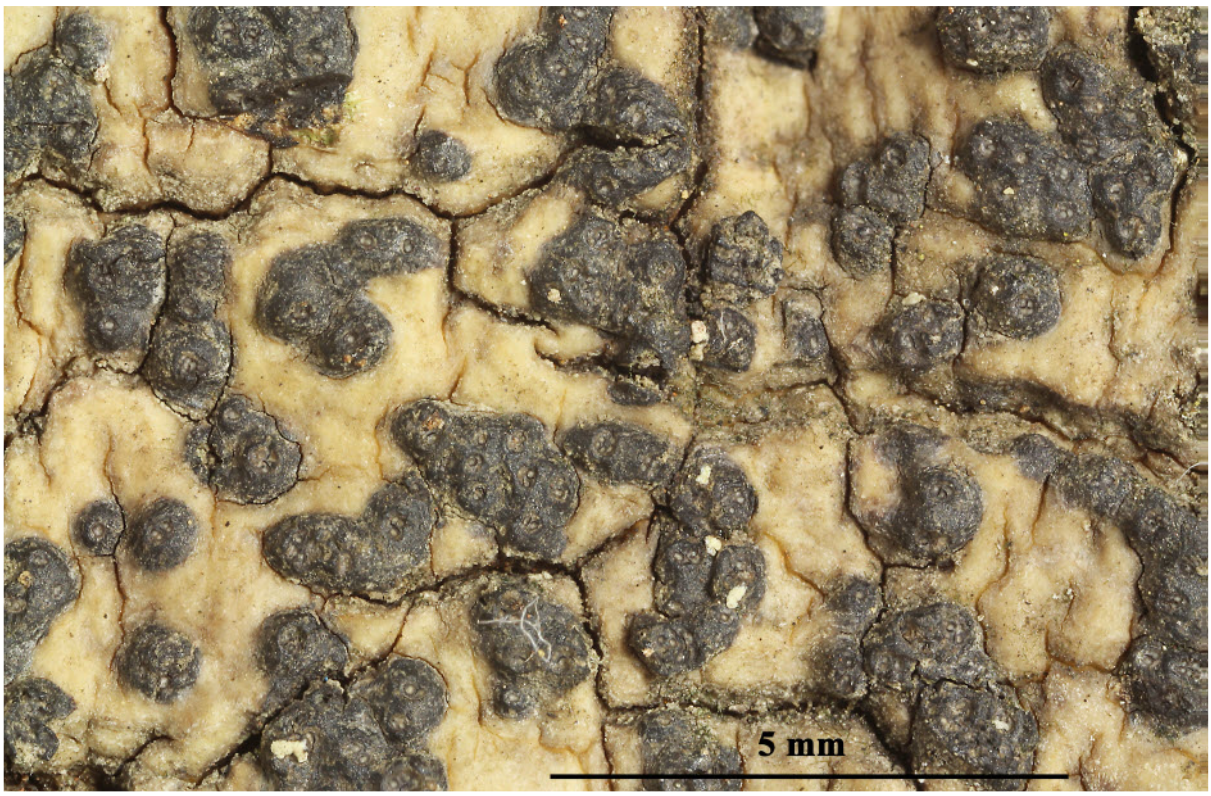


Pyrenula infracongruens

Pyrenula infraleucotrypa Aptroot & M. Cáceres, Lichenologist 45(2): 175 (2013)

Thallus thin, oily, yellowish brown to olivegreen or olive-brown, glossy, widely spreading, without pseudocyphellae, without a prothallus. Ascomata superficial, conical, 0.4–0.7mm diam., mostly in groups of 3–40 and partly to completely fused laterally with only partly fused walls and separate ostioles. Resulting stromata superficial, black, often strongly contrasting in colour with the pale thallus. Ostiole apical, black or with whitish pruinose ring. Hamathecium not inspersed. Ascospores 8 per ascus, irregularly biseriate, 3-septate, 15–18(–22) × 5–7(–9) µm, ends often pointed, lumina angular to rounded, often wider than long, with a thick layer of endospore in the spore tips. Pycnidia not observed. Chemistry: No substances detected.

[ABL11468], Brazil, Rondônia, Porto Velho, Parque Circuito, 8°43’54” S, 63°54’04” W, 100 m, in plantation, on Hevea brasiliensis bark. Leg. M. Cáceres & A. Aptroot (no 11468), 11.03.2012, det. A. Aptroot, 2012. ISOTYPE.





Pyrenula infraleucotrypa



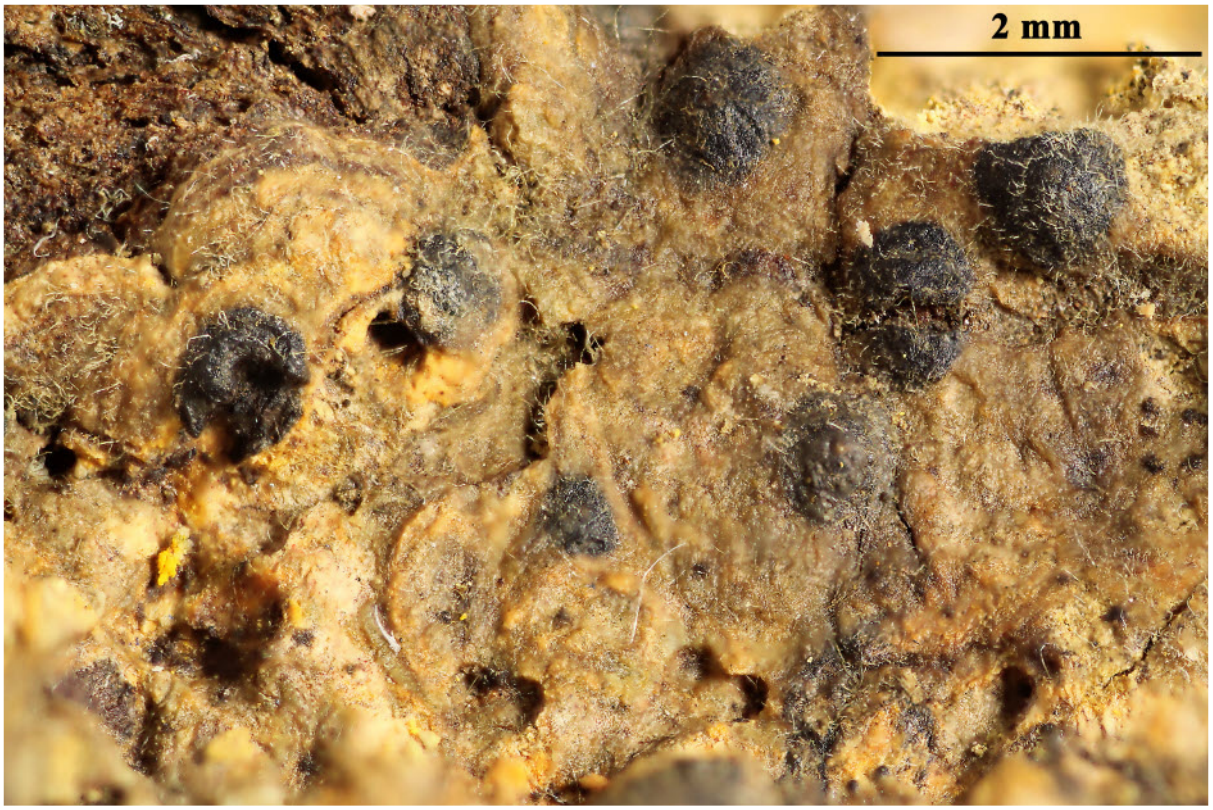
Pyrenula infraleucotrypa

Pyrenula inframamillana Aptroot & M. Cáceres, Lichenologist 45(2): 177 (2013)

Thallus thin, olive-green to olive-brown, smooth but not glossy, widely spreading, often occupying a large area (dm2), without pseudocyphellae, without prothallus. Ascomata superficial, conical, 0.4–0.9(–1.2) mm diam., solitary. Ostiole apical, brown to black. Hamathecium inspersed with hyaline oil globules. Ascospores 8 per ascus, uniseriate, 3-septate, 10–15 × 3.5–4.0 µm, lumina rounded to angular, not longer than wide, with a thick layer of endospore in the spore tips. Pycnidia not observed. Chemistry: No substances detected.

[ABL11290], Rondônia, Porto Velho, Parque Natural Municipal, 8°41’10” S, 63°52’05” W, 100 m, in primary rainforest, on tree bark. Leg. M. Cáceres & A. Aptroot (no 11290), 9–12.03.2012, det. A. Aptroot, 2012. ISOTYPE.







Pyrenula inframamillana

Pyrenula inspersicollaris Aptroot & M. Cáceres, in Aptroot, Andrade, Mendonça, Lima & Cáceres, Phytotaxa 197(3): 203 (2014)

Thallus thin, corticate, dark brown, somewhat glossy, without pseudocyphellae, without prothallus. Ascomata emergent from the bark but fully covered by thallus, pyriform, 0.3–0.5 mm diam., usually 2– fused, without clearly fused walls but with fused ostioles. Wall carbonized all around. Ostiole lateral. Hamathecium inspersed with hyaline oil droplets. Ascospores 8/ascus, brown, irregularly biseriate, 3-septate, 17–20 × 5.5–6.5 µm, lumina mostly rounded, separated from the wall by a thick layer of endospore. Pycnidia not observed. Chemistry: Thallus UV– no substances detected with TLC.

[ABL21754], Brazil. Sergipe, Areia Branca, Parque Nacional Serra de Itabaiana, S slope, 10°44'35" S, 37°20'25" W, 400 m, on tree bark in Atlantic rainforst. Leg. M. Cáceres & A. Aptroot (no 21754), 10.05.2014, det. A. Aptroot, 2014. ISOTYPE.







20 µm

Pyrenula inspersicollaris

Pyrenula inspersoleucotrypa Aptroot, L.I. Ferraro & M. Cáceres, Lichenologist 46(1): 97 (2014)

Thallus corticate, smooth, continuous, rather thin, olivaceous brown, without pseudocyphellae, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata perithecioid, erumpent, 0.4–1.2 mm diam., black, conical with flattened tips, mostly aggregated in groups or lines of 2–8, with partly fused walls but separate ostioles. Wall carbonized all around, up to c. 100 mm thick. Ostioles pale brown, apical, flat. Hamathecium hyaline, inspersed with hyaline oil droplets. Asci cylindrico-clavate, with 8 ascospores. Ascospores brown, 3-septate, fusiform, without constrictions, 17–20 × 6.5–8.0 µm, ends obtuse but rather pointed, middle lumina broadly diamond-shaped, end lumina triangular, separated from the wall by thick endospore layer. Pycnidia not observed. Chemistry. Thallus UV-, C-, K-, KC-, P-. No substances detected by TLC.

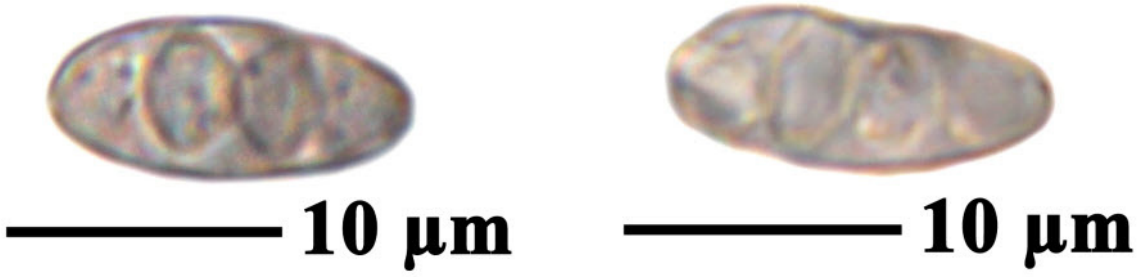
[ABL11468], Brazil, Rondônia, Porto Velho, Parque Circuito, on *Hevea brasiliensis* bark in plantation. 8°43'54" S, 63°54'04" W, 100 m. Leg. M. Cáceres & A. Aptroot (no 11468), 11.03.2012, det. A.Aptroot, 2012. ISOTYPE.

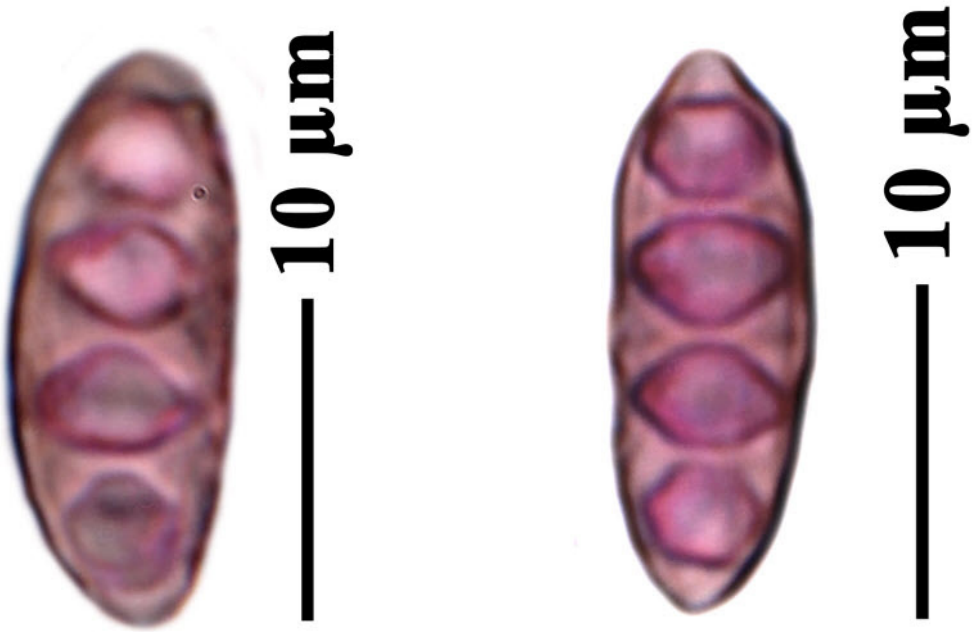




Pyrenula inspersoleucotrypa







Pyrenula inspersoleucotrypa

Pyrenula inspersoleucotrypa Aptroot, L.I. Ferraro & M. Cáceres, Lichenologist 46(1): 97 (2014)

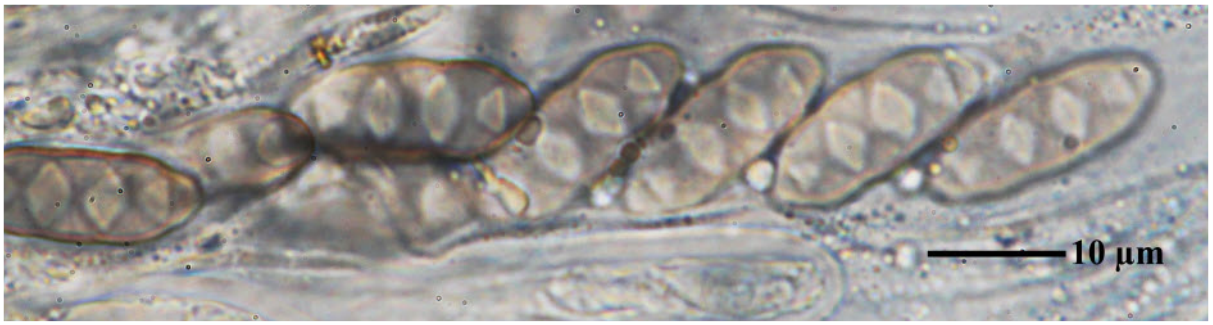
Thallus corticate, smooth, continuous, rather thin, olivaceous brown, without pseudocyphellae, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata perithecioid, erumpent, 0.4–1.2 mm diam., black, conical with flattened tips, mostly aggregated in groups or lines of 2–8, with partly fused walls but separate ostioles. Wall carbonized all around, up to c. 100 mm thick. Ostioles pale brown, apical, flat. Hamathecium hyaline, inspersed with hyaline oil droplets. Asci cylindrico-clavate, with 8 ascospores. Ascospores brown, 3-septate, fusiform, without constrictions, 17–20 × 6.5–8.0 µm, ends obtuse but rather pointed, middle lumina broadly diamond-shaped, end lumina triangular, separated from the wall by thick endospore layer. Pycnidia not observed. Chemistry. Thallus UV-, C-, K-, KC-, P-. No substances detected by TLC.

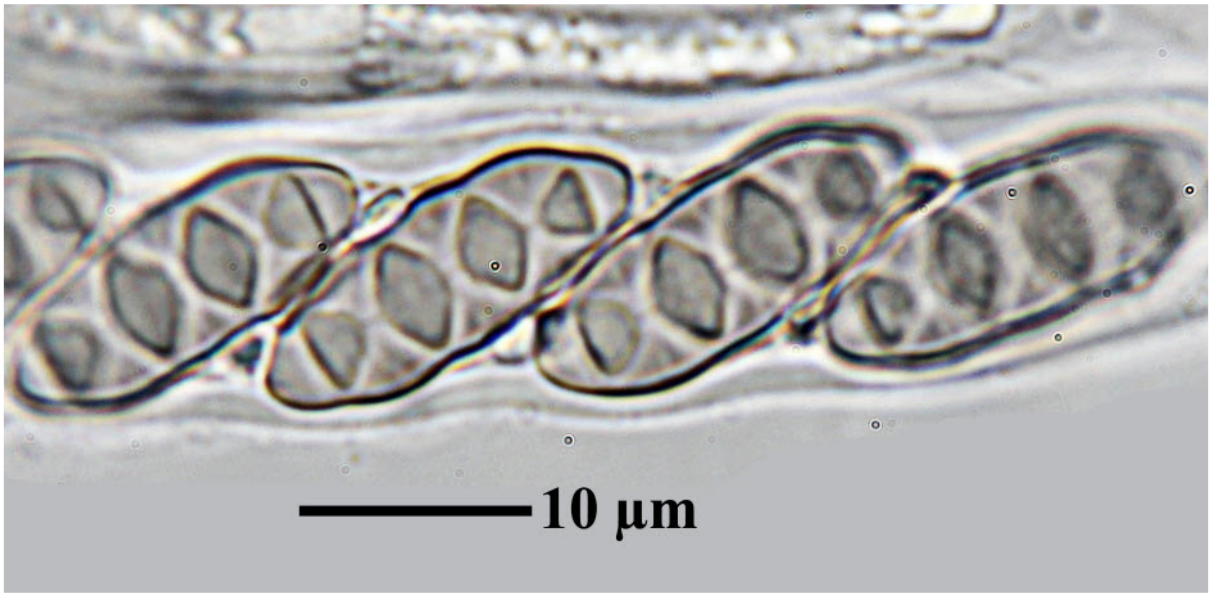
[Ferraro10533], Brazil, Prov. Missiones, Puerto Iguazú, near Hotel Selvático Don Horacio, 230 m, 25°36’20” S, 54°33’33” W. On tree bark in evergreen tropical rainforest. Leg. L.I. Ferraro (no 10533), A. Aptroot & M. Cáceres, 22.02.2013, det. A. Aptroot, 2013. ISOTYPE.

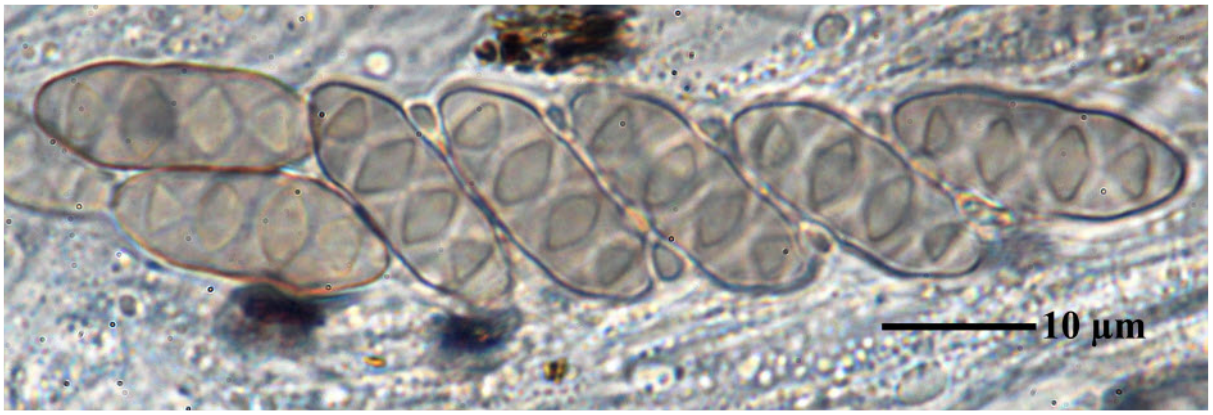


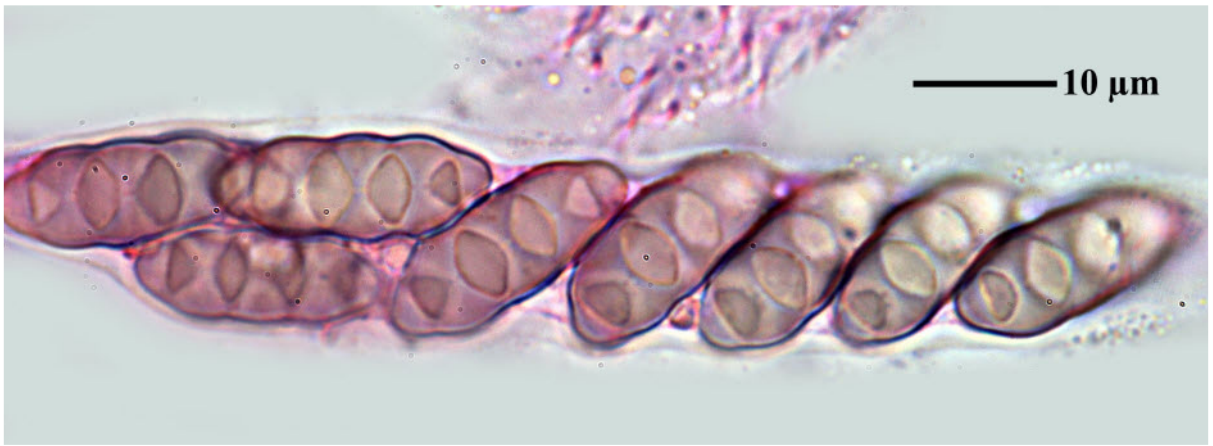


Pyrenula inspersoleucotrypa







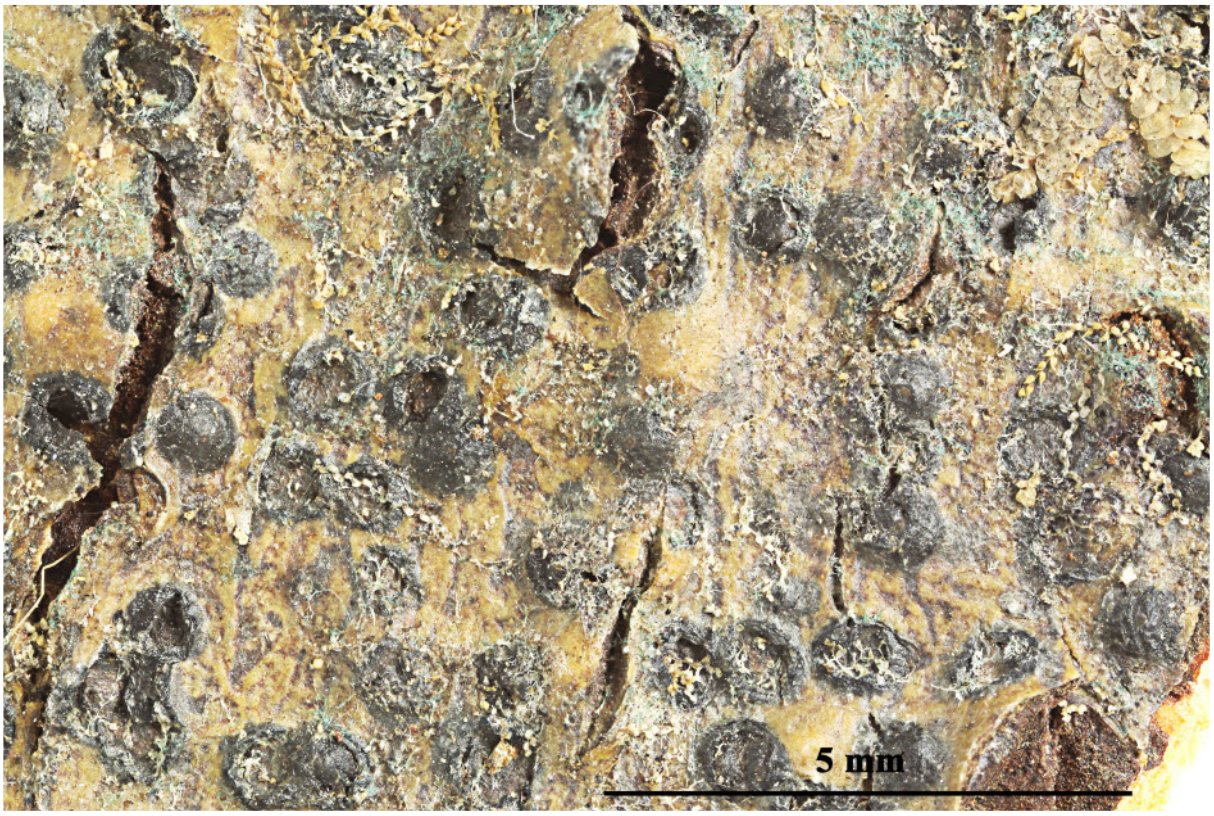


Pyrenula inspersoleucotrypa

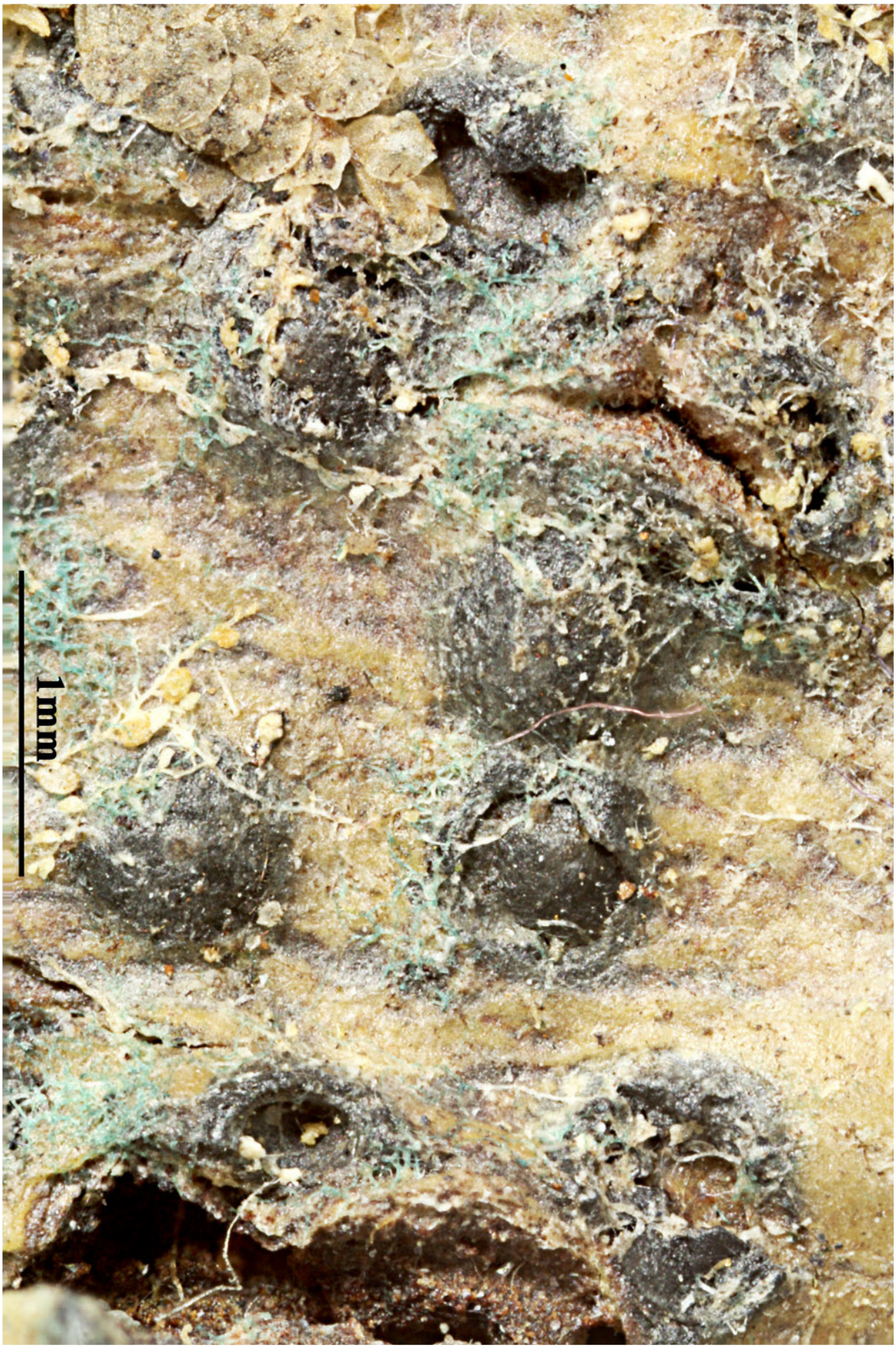
Pyrenula interducta (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 433 (1922)
= *Arthonia interducta* Nyl. 1866

Ascomata conical-depressed to semi-globose, 0.5–1 mm diam., with thallus cover. Ostioles indistinct. Hamathecium inspersed with colourless oil globules. Ascospores 4-loculate, 30–42 × 10–18 µm.

[Hill9253], Solomon Islands, Guadalcanal island, central part, Sutakiki river on ridge, on S side near confluence with Balasuna river, c. 500 m. Leg. D. J. Hill (no 9253), 27.10.1965, det. A. Aptroot, 2013.







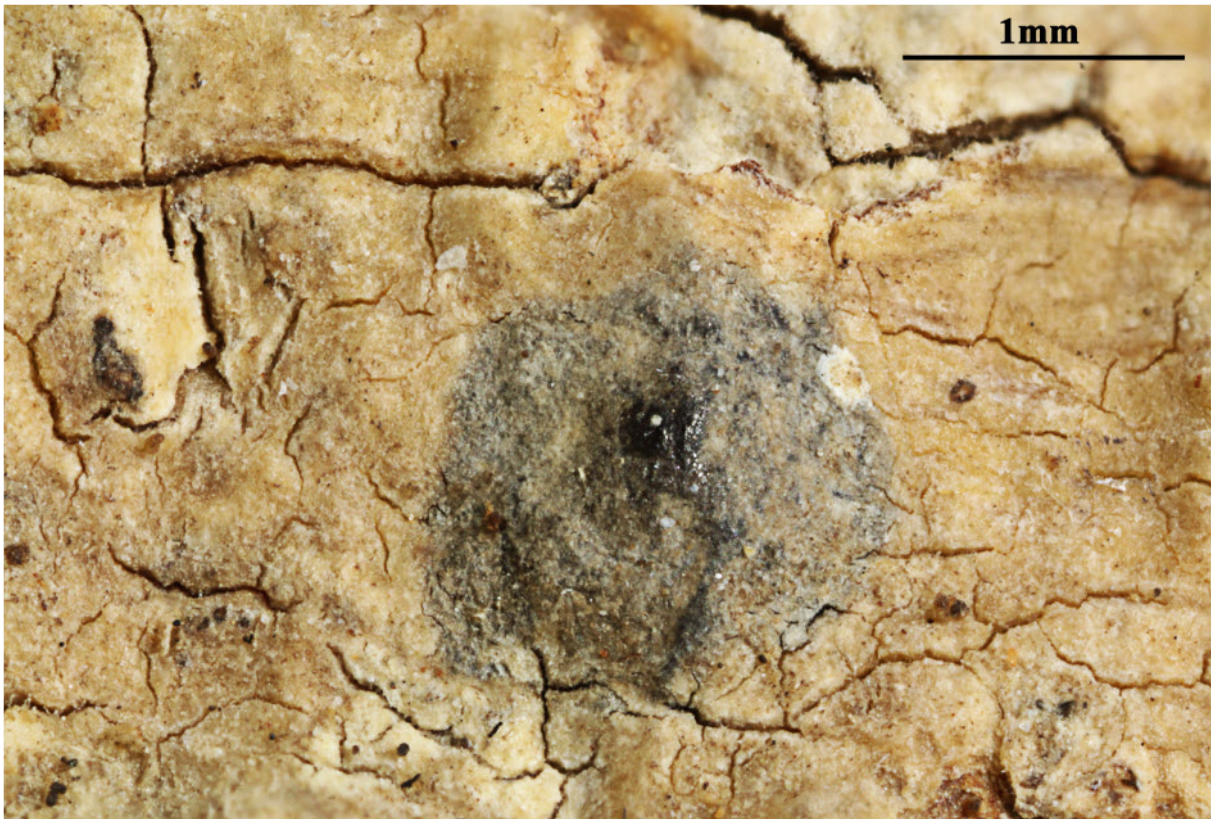
Pyrenula interducta

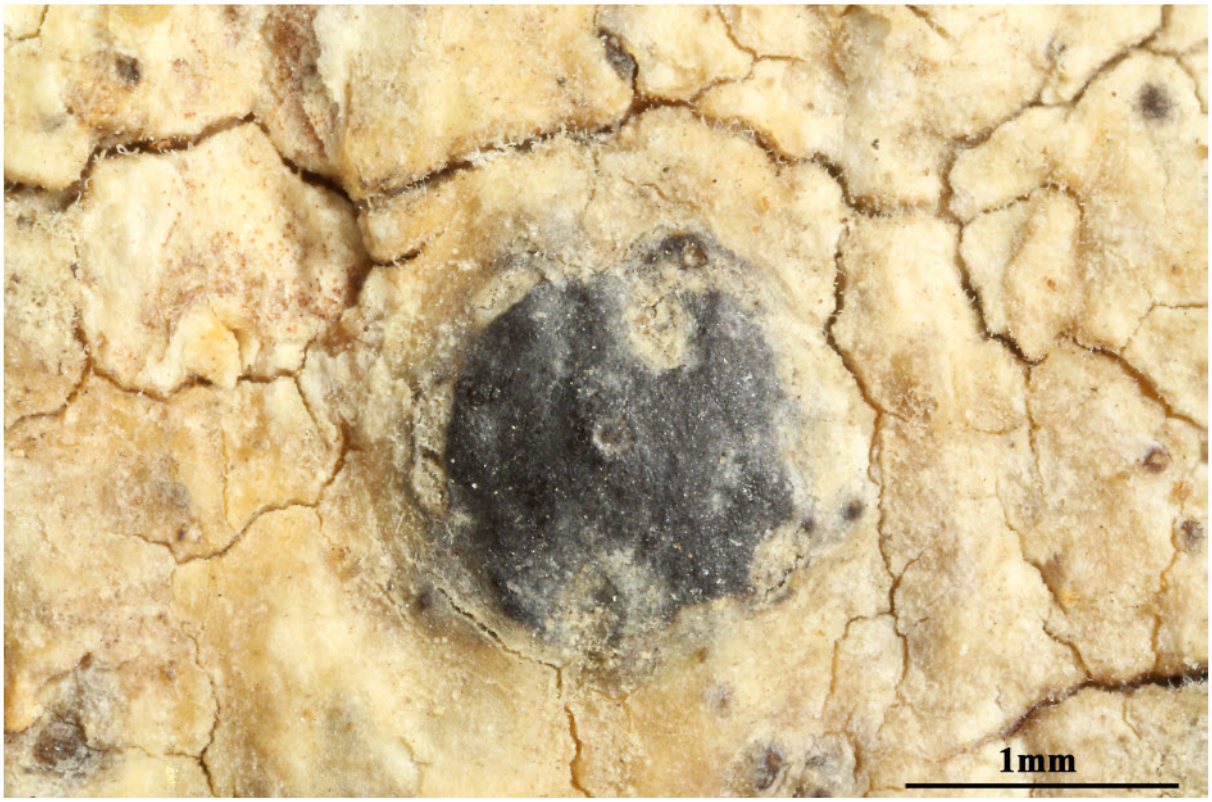
Pyrenula irosina Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 337 (1921)

Ascomata flattened hemispherical, finally exposed, c. 1.5–2.5 mm diam. Hamathecium lightly inspersed with colourless oil globules. Ascospores uniseriate, 4-loculate, 16–24 × 5–9 μm, oblong-cylindrical with obtuse or acute apices.

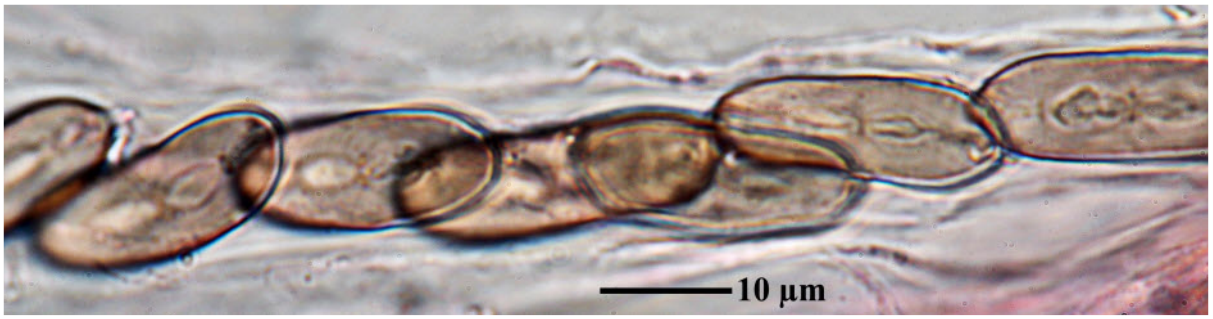
[Elmer14928], Philippines,Luzon island, prov. Sorsogon, Irosin, 1250 m. On the stem of a big liana. Leg. A. D. E. Elmer (no 14928), 12.1915. ISOTYPUS.

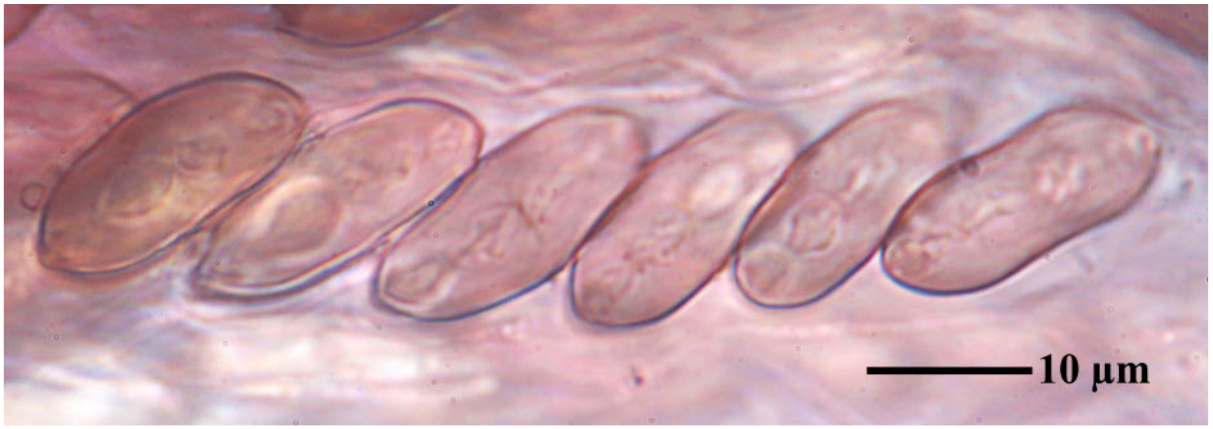


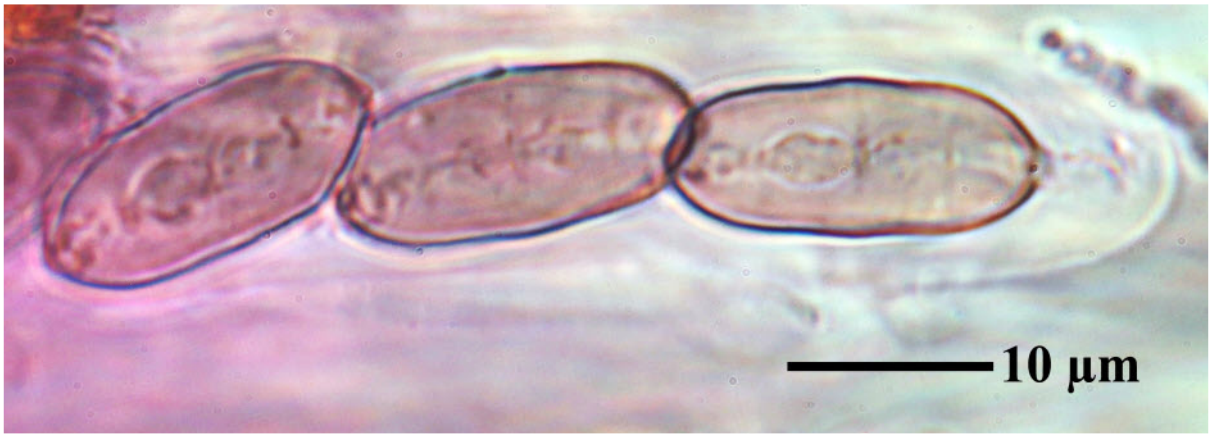




Pyrenula irosina

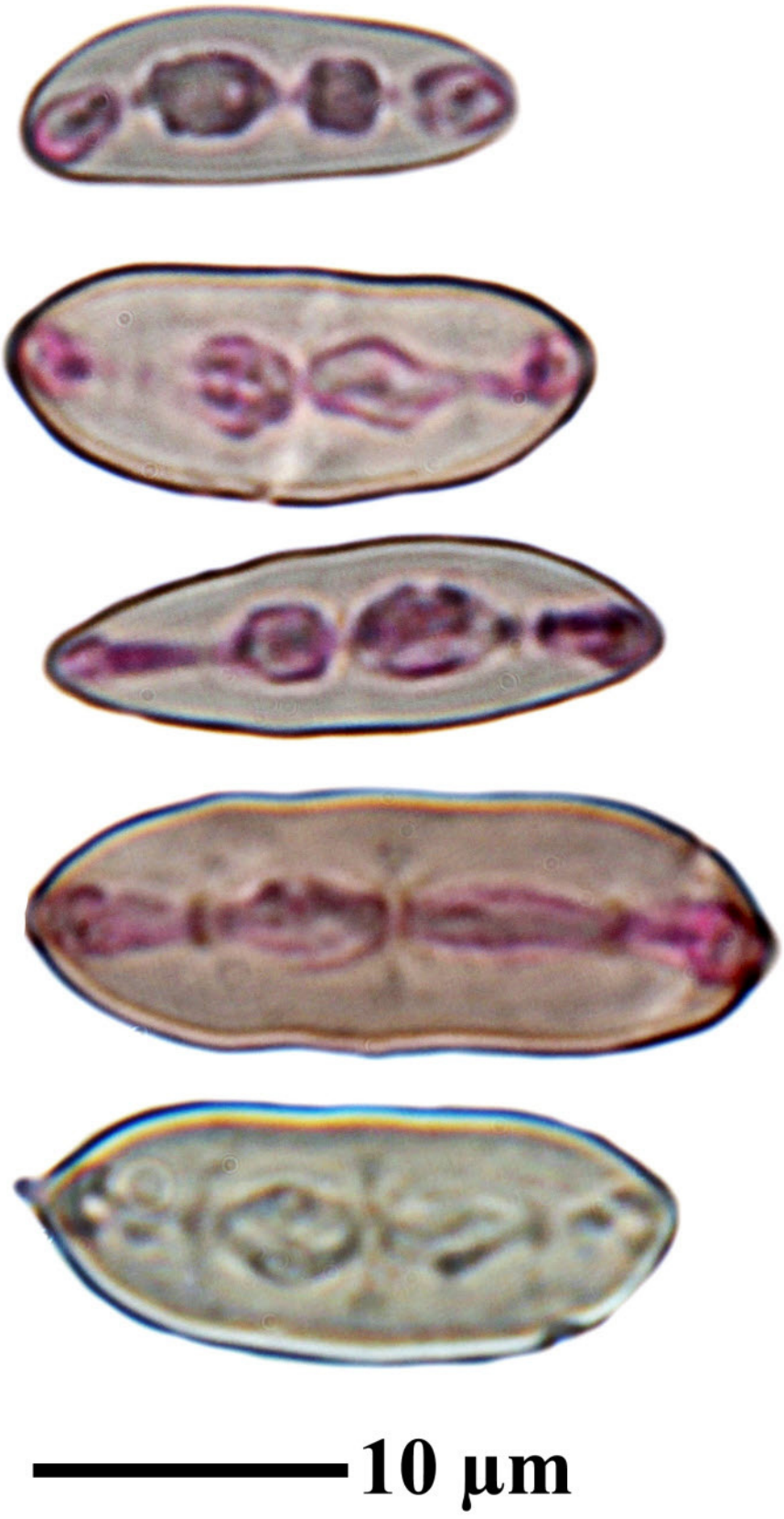








Pyrenula irosina



Pyrenula irosina

Pyrenula kermesina R.C. Harris, Moscosoa 6: 214 (1990)

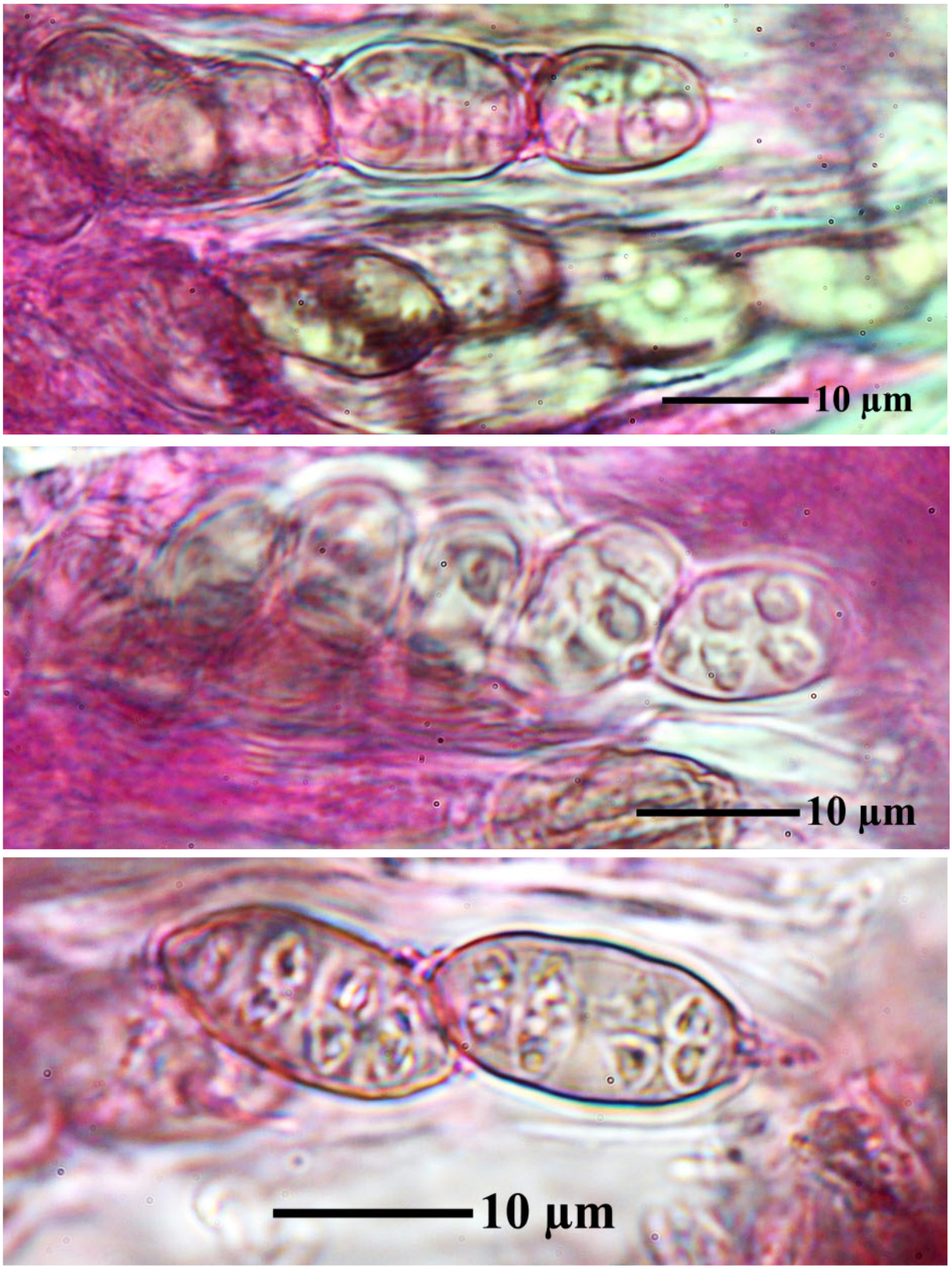
Thallus not corticate, entirely red or pigmented mainly over ascomata in weathered portions, not pseudocyphellate, KOH+ purple, UV-. Ascomata mostly immersed, visible as slightly raised wart elongated with the grain of wood, up to 5 mm by 1–2 mm, usually more strongly pigmented than the surrounding thallus, consistimg mainly of bark, containing 3–6 chambres; ostioles remaining distinct but emerging, usually in a single row, in a common gelatinized plug; crystals lacking. Hamathecium not inspersed; hymenial gelatin IKI+ initially blue-green then rapidly bright red-orange. Ascospores uniseriate to irregularly biseriate, ellipsoidal, with locelli in four rows, middle rows with four locelli each, terminal rows mostly with two locelli but rarely four, 17–22 × 10–12 µm.

[Harris19512], Dominican Republic, El Morro de Monte Cristi, 237 m. Leg. R. C. Harris, 8.01.1982. ISOTYPE.

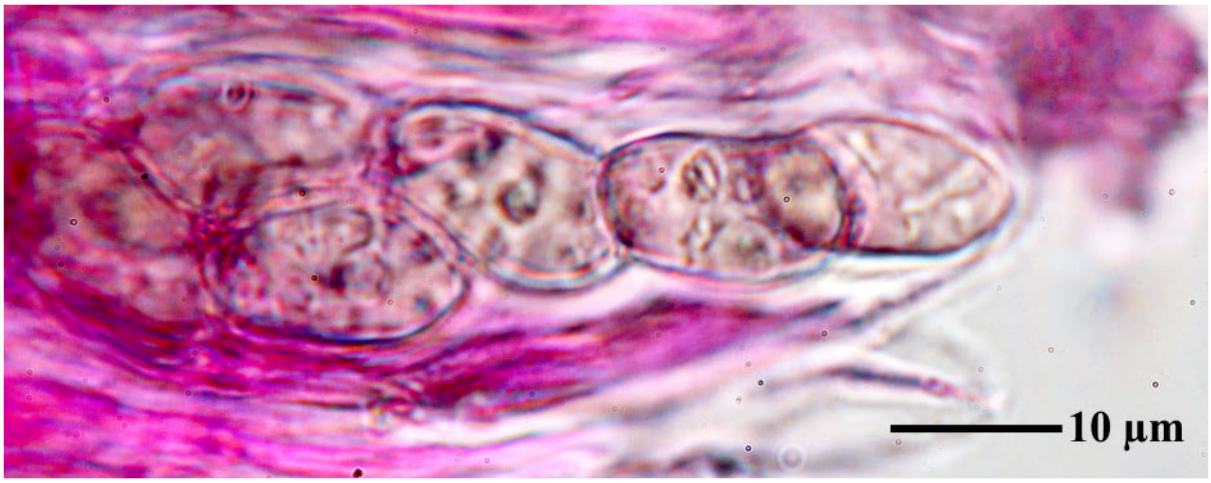


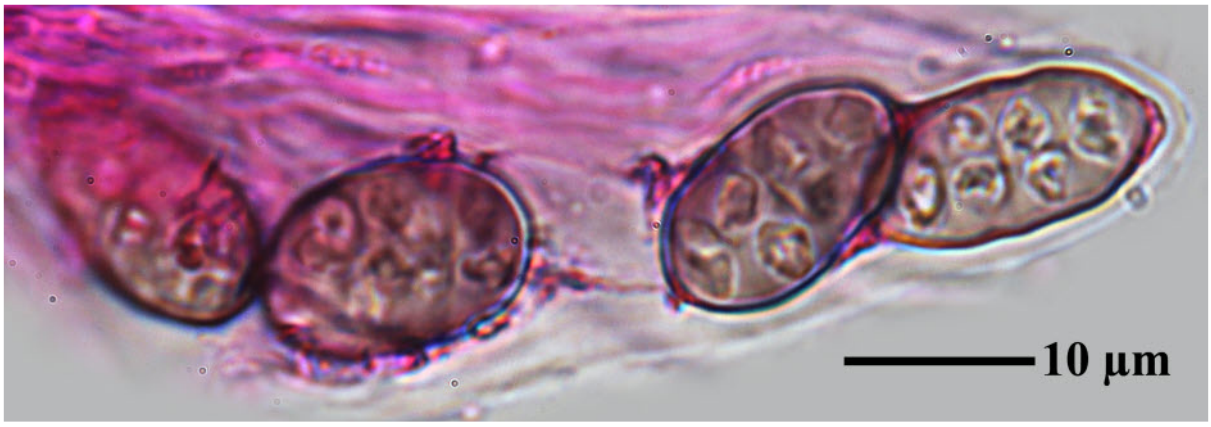


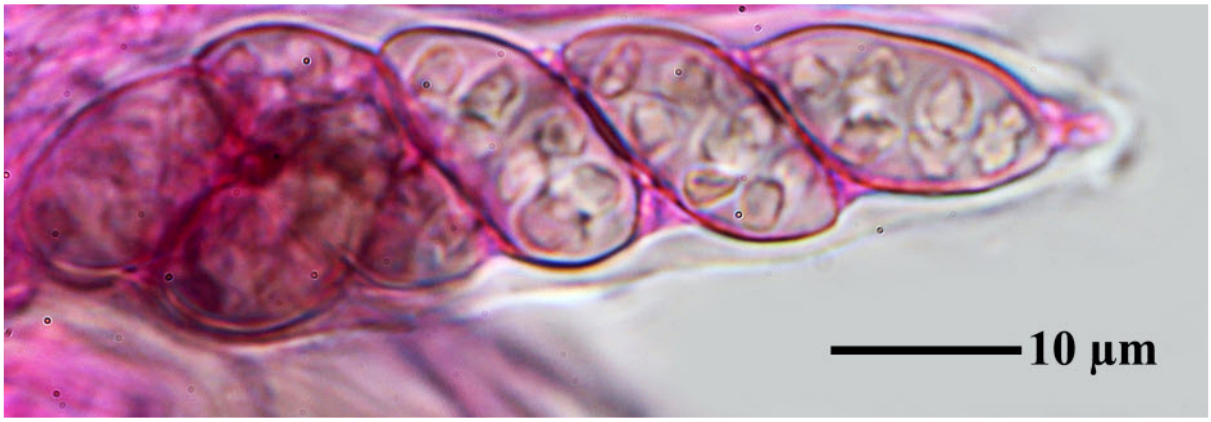
Pyrenula kermesina

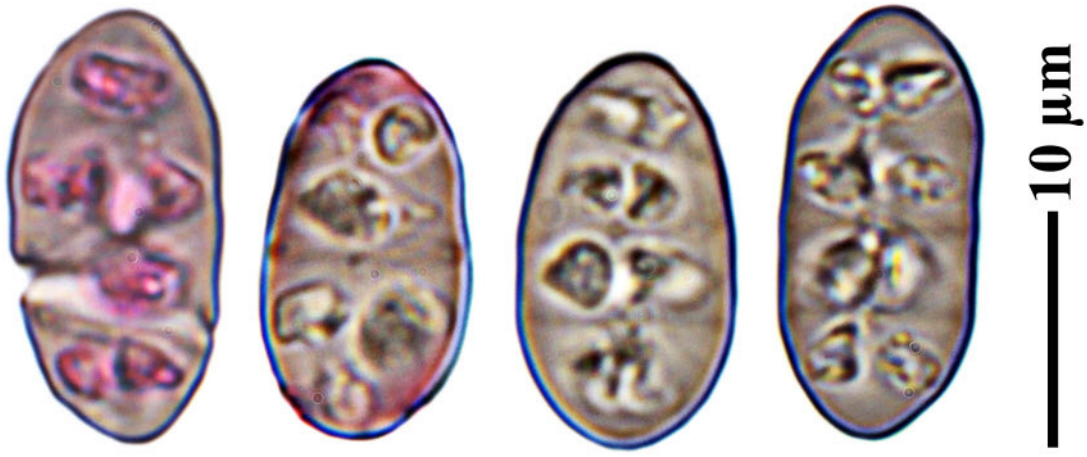


Pyrenula kermesina









Pyrenula kermesina

Pyrenula kurzii Ajay Singh & Upreti, Geophytology 17(1): 81 (1987)

Keine Diagnose außer der Kurzdiagnose im key gefunden
Thallus shiny; ascomata globose-hemispherical, thallus-covered, 0.6–1.0 mm diam.; ostioles indistinct to slightly umbonate; hamathecium densely inspersed with colorless oil globules; ascospores 4-loculate, 35–50 × 13–18 µm, *approximans*-type (dies müßte in eine Einleitung zum Buch noch erklärt werden)

[Hill11129], Solomon Islands, Santa Isabel Island, betweem Tatamba and Rego, 0 m. Leg. D. J. Hill (no 11129), 2.10.1965, det. A. Aptroot, 2013.





Pyrenula kurzii



Pyrenula kurzii

Pyrenula laetior Müll. Arg., Bot. Jb. 6: 413 (1885)
= *Pyrenula gregantula* Müll. Arg.

Ascomata flattened to conical, erumpent, c. 0.4–0.7 mm diam. Ostioles apical, reddish. Hamathecium inspersed with colourless oil globules. Ascospores 4-loculate, 11–15(–18) × 4.5–6(–7) µm, fusiform with rounded ends, with thick apical walls.

[AlstrupTZ2562], Tanzania, Kissarawa district, Pugu Hills, 300 m, 6°54’ S, 39°05’ E. Leg. V. Alstrup (no TZ2562), 6.10.1999, det. A. Aptroot.





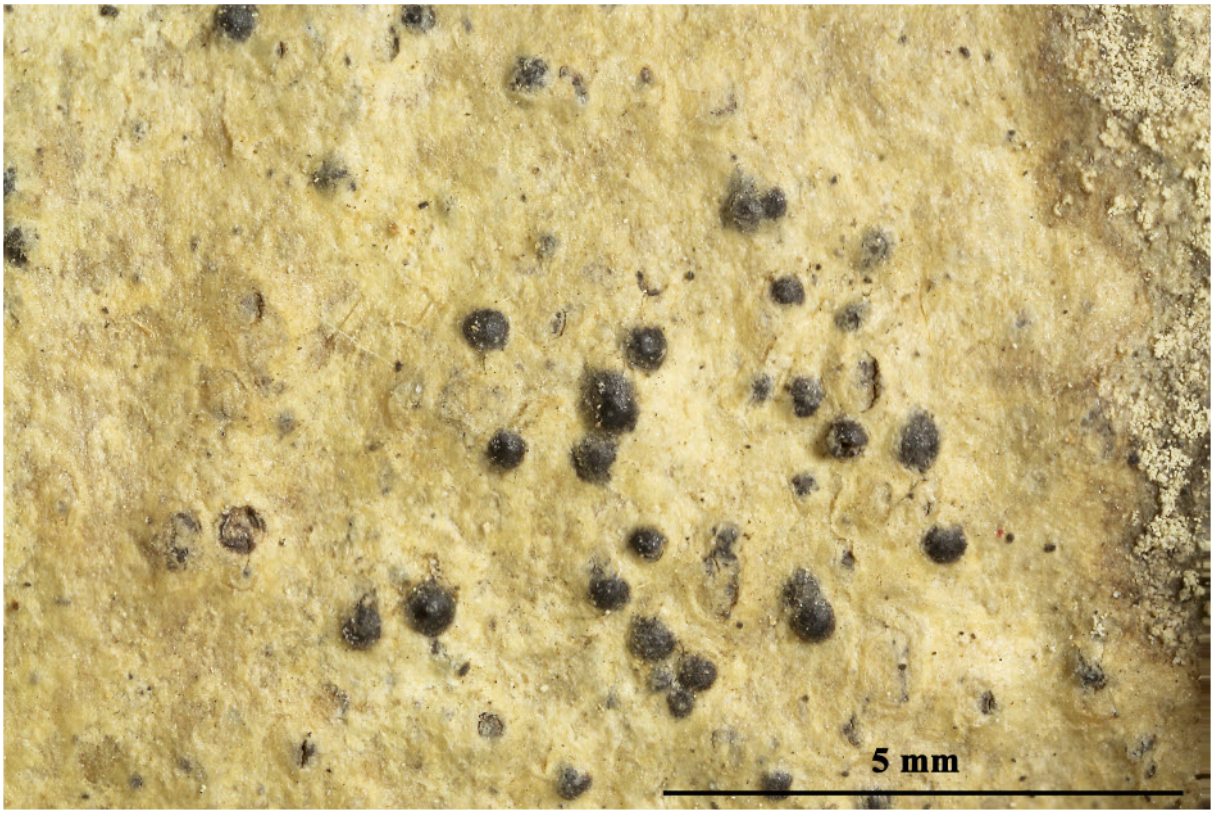


Pyrenula laetior

Pyrenula laevigata (Pers.) Arnold, Flora, Regensburg 68: 158 (1885)
= *Pyrenula alba* var. *laevigata* (Pers.) Trevis., Conspect. Verruc.: 12 (1860)
= *Verrucaria laevigata* Pers., Ann. Wetter. Gesellsch. Ges. Naturk. 2: 11 (1811) [1810]

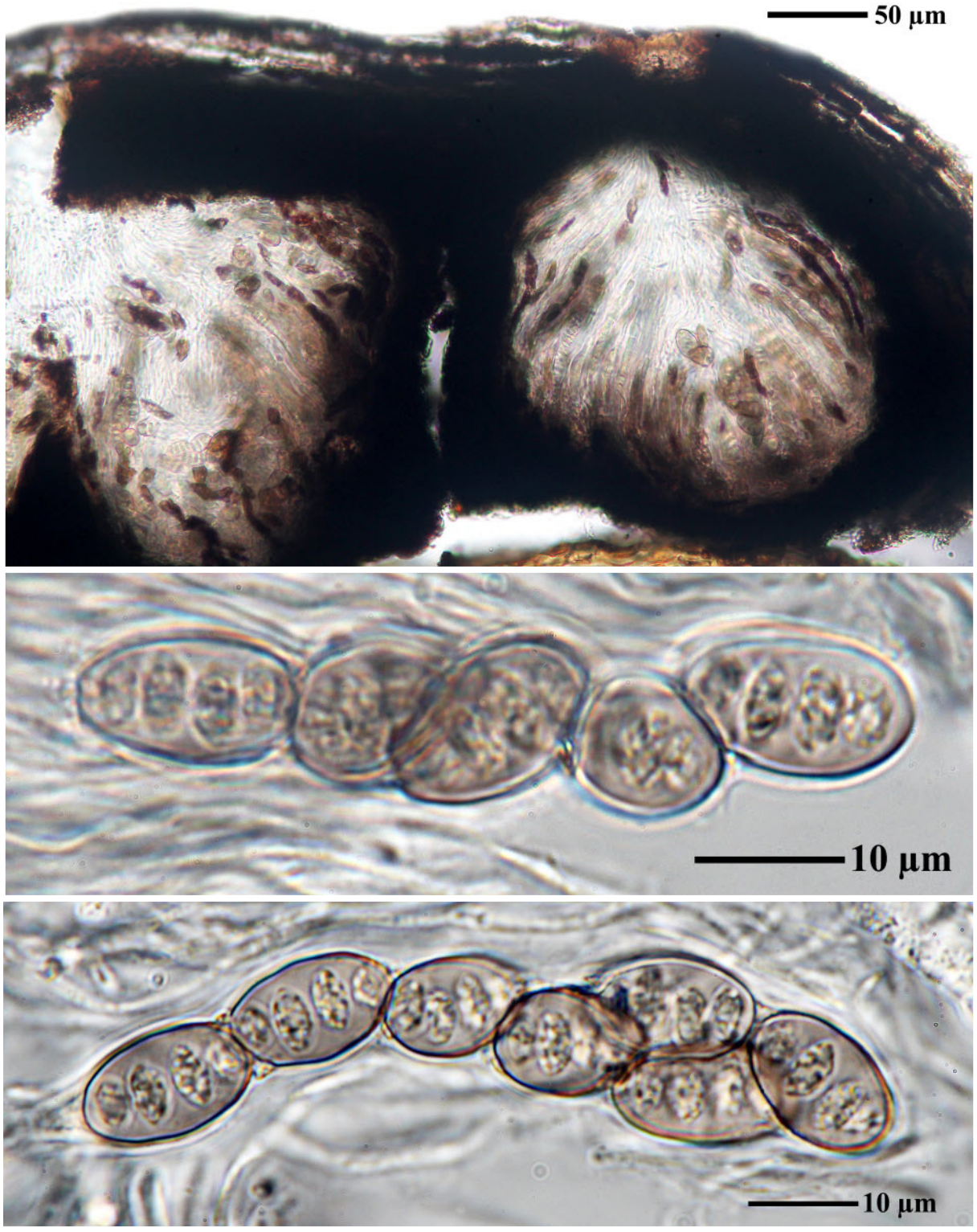
Thallus immersed, silvery or cream to pale yellow- brown; pseudocyphellae absent. Perithecia 0.45–0.66 mm diam., forming projections in the thallus, somewhat flattened in section, with an involucrellum separable from the exciple and spreading somewhat; hymenium not containing anthraquinones, K-. Ascospores (14–)17–22(–26) × (7–)8—9(–11) µm, 3-septate Pycnidia black, up to c. 100 µm diam., scattered or in lines; conidia 10–19 × 0.5 µm, curved. Thallus C-, K+ yellow, KC-, P-, UV-.

[1412], Germany, Baden-Württemberg, Rems-Murr-Kreis, Baach bei Schnait, an *Carpinus* im Schlierbachtal. Leg. E. Putzler, 16.08.1950, det. O. Klement.





Pyrenula laevigata



Pyrenula laevigata

Pyrenula laii Aptroot, J. Hattori bot. Lab. 93: 166 (2003)
= *Pyrenula immissa* (Stirt.) Zahlbr.
= *Verrucaria immissa* Stirt.
= *Pyrenula cuprescens* A. Zahlbr.

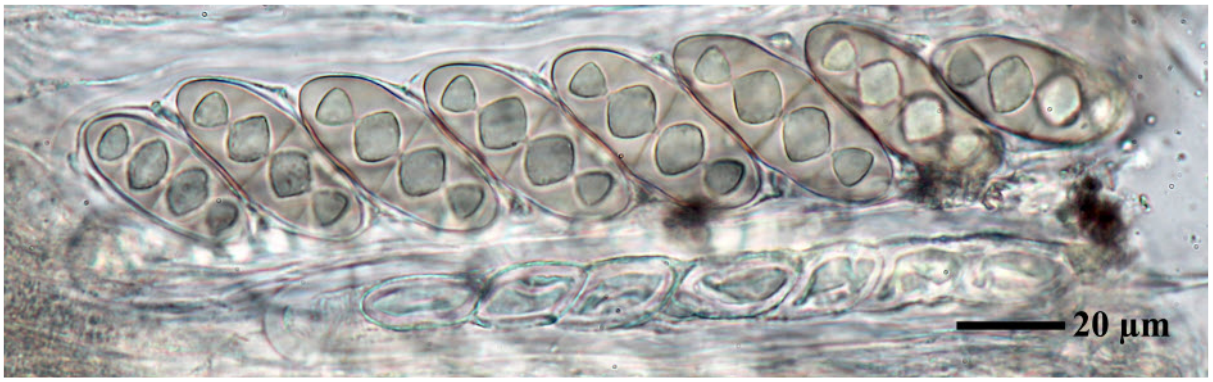
Thallus with pseudocyphellae, without papillae; ascomata subglobose, immersed to erumpent, often partly or mostly covered by substrate, c. 0.4–0.7 mm diam.; ostioles apical, pale to brown; ascospores 3-septate, 48–60 × 20–25 µm, fusiform, with thick apical walls.

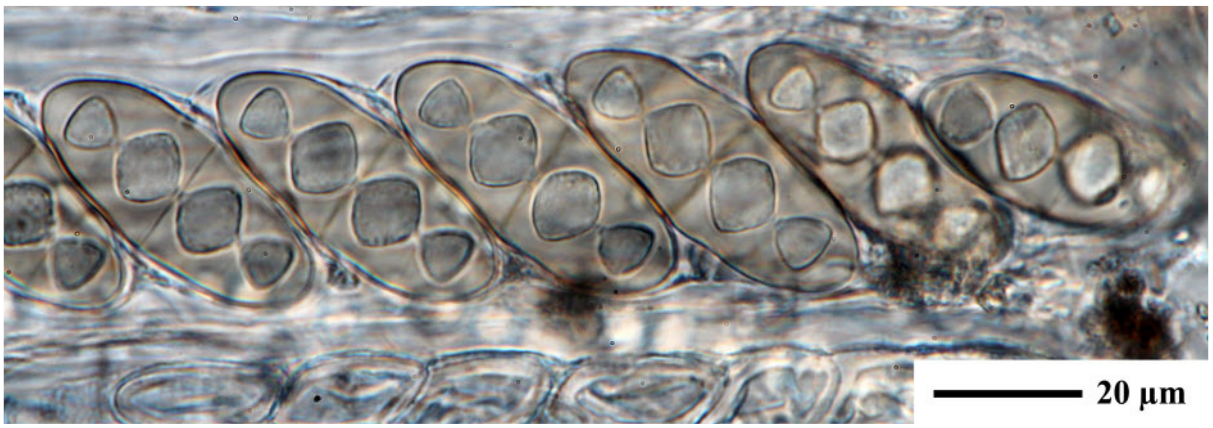
[ABL52296], Taiwan, Nantou County, 44 km WNW of Hualien, Meifeng, broadleaf forest remnant in valley, on *Machilus thunbergii*. 2050 m, 24°05'30" N, 121°10'34" E. Leg. A. Aptroot (no 52296), 10.10.2001, det. A. Aptroot, 2002. ISOTYPE.

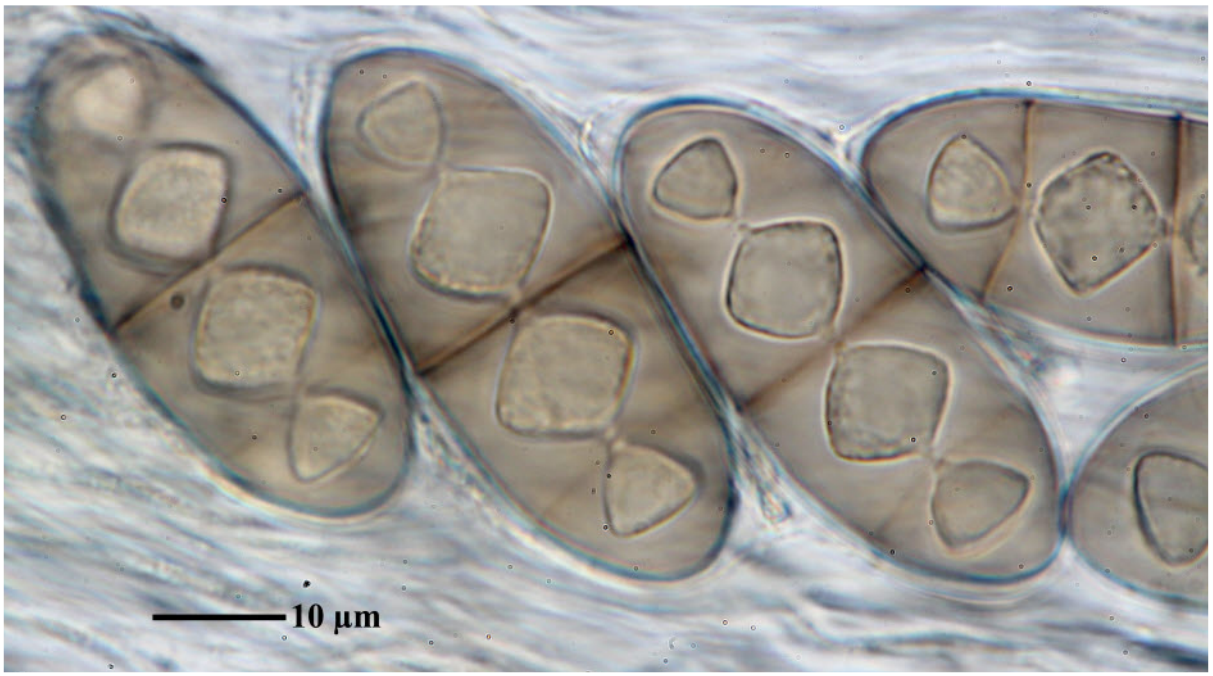


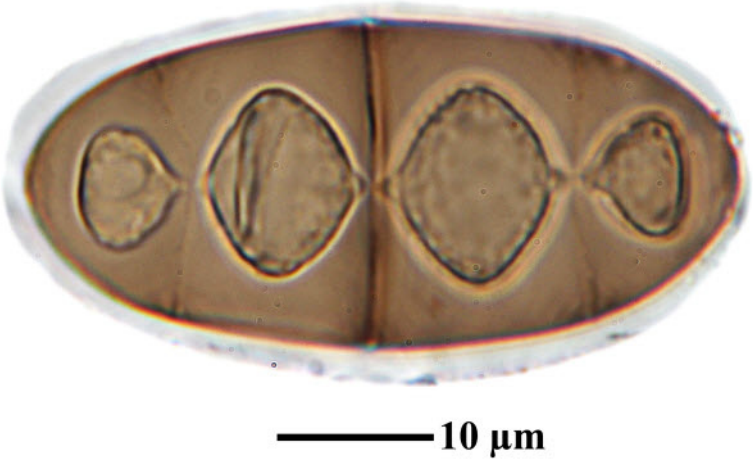


Pyrenula laii







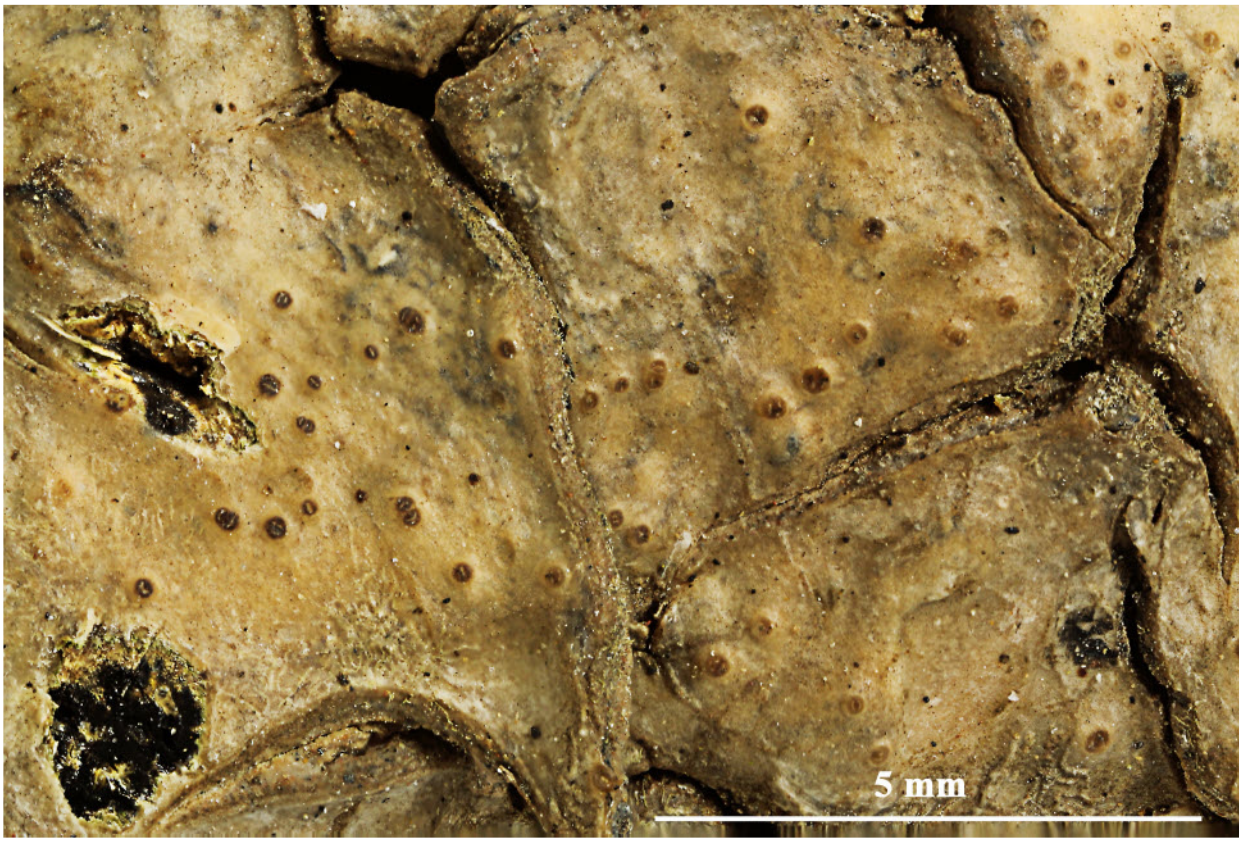


Pyrenula laii

Pyrenula leptaleoides Aptroot & M. Cáceres, Lichenologist 45(6): 773 (2013)

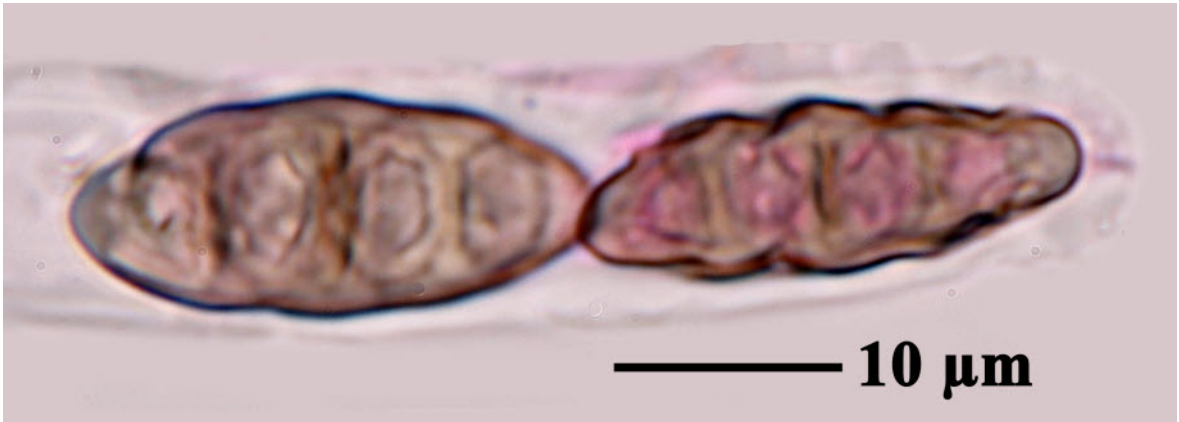
Thallus corticate, smooth, continuous, thin, green to pale brown, with whitish pseudocyphellae, surrounded by a black prothallus line; algae trentepohlioid. Ascomata perithecioid, deeply immersed in the bark, 0.4–0.6 mm diam., black (visible only in sections through the bark), with long necks that are fused with those of 3–8 neighbouring ascomata in joint ostioles which are visible as brown dots on the surface. Wall carbonized all around, and often much carbonization also present along the necks where it fuses with carbonization of neighbouring ascomata, up to c. 100 µm thick. Ostioles brown, lateral and fused. Hamathecium hyaline, not inspersed. Asci cylindrico-clavate, with 8 uniseriate ascospores. Ascospores brown, 3-septate, clavate-rhomboidal, without constrictions, 23–27 × 8–11 m, ends obtuse but rather pointed, middle lumina broadly diamond-shaped, end lumina triangular, separated from the wall by a thick endospore layer. Pycnidia not observed. Chemistry: No reactions with K or UV; no secondary substances detected.

[ABL15352], Brazil, Rondônia, Sítio Ecólogico Buriti on Lago Cujubim E of Porto Velho, on tree bark in disturbed rain forest. 8°35'17" S, 63°40'40" W, 100 m. Leg. M. Cáceres & A. Aproot (no 15352), 18.11.2012, det. A. Aptroot, 2012. ISOTYPE.

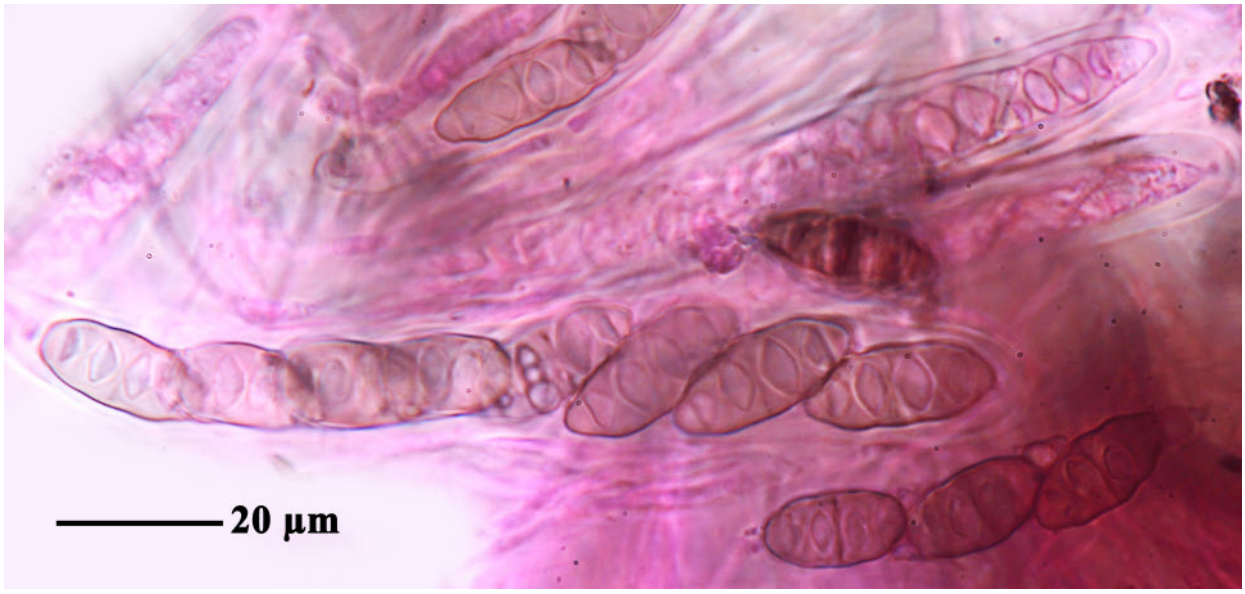




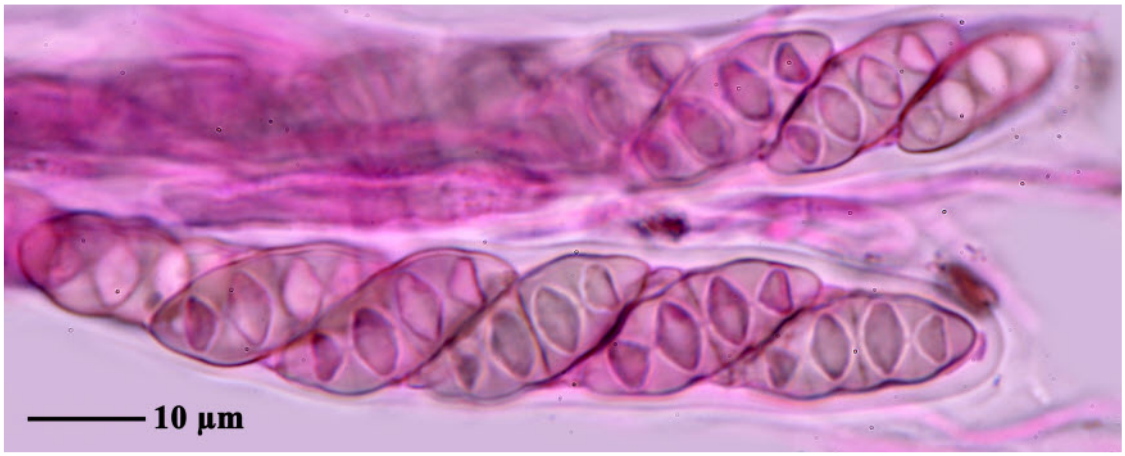




Pyrenula leptaleoides





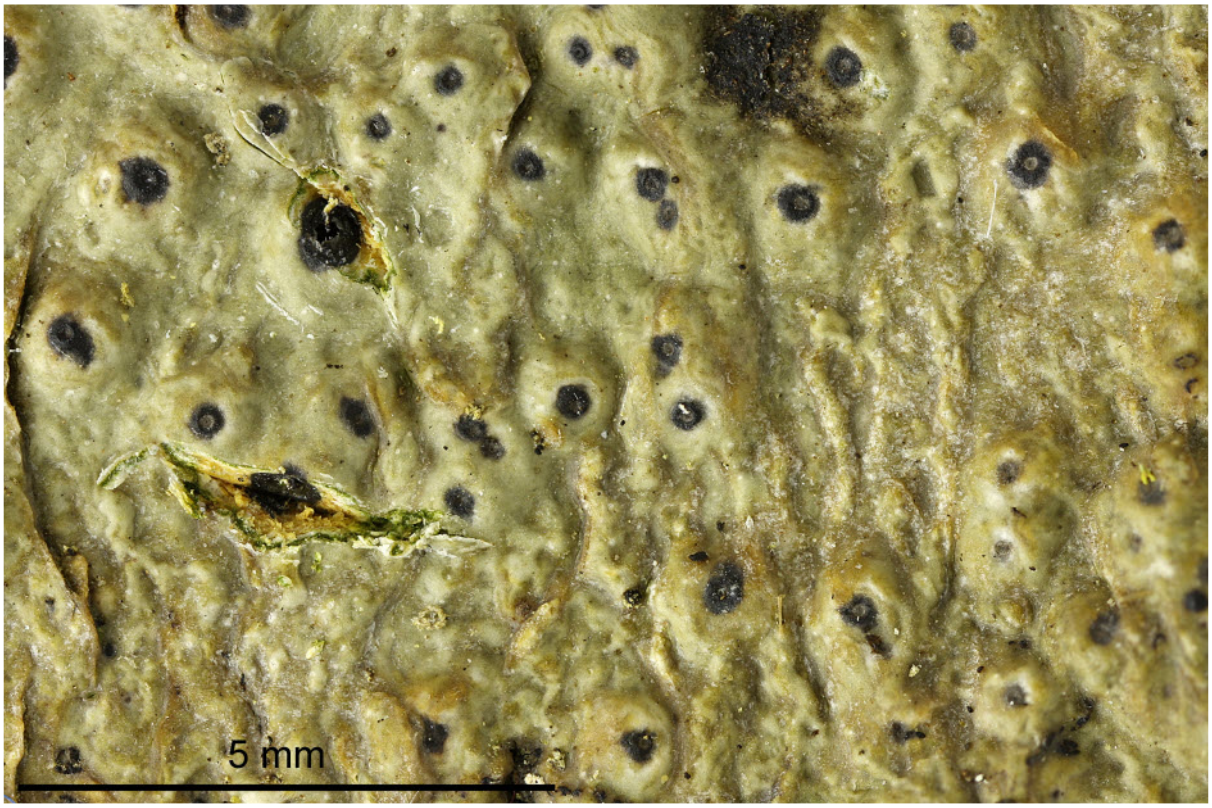


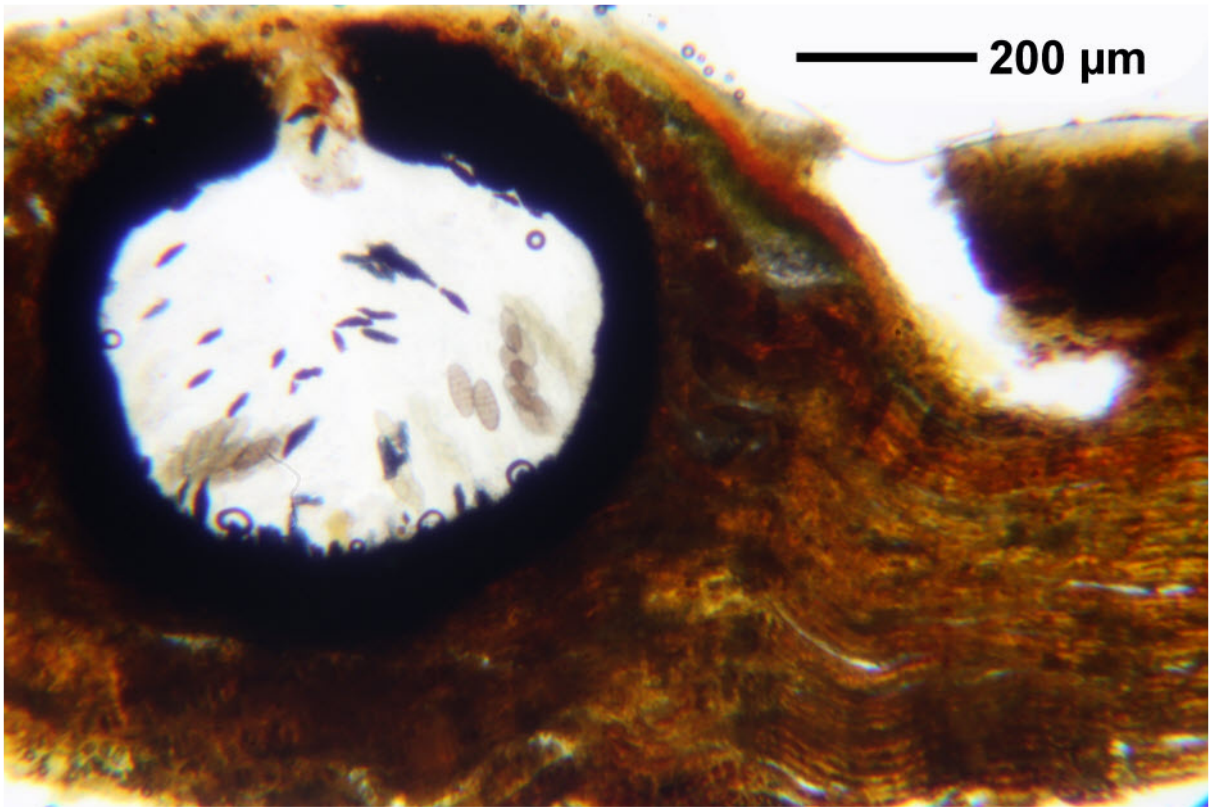
Pyrenula leptaleoides

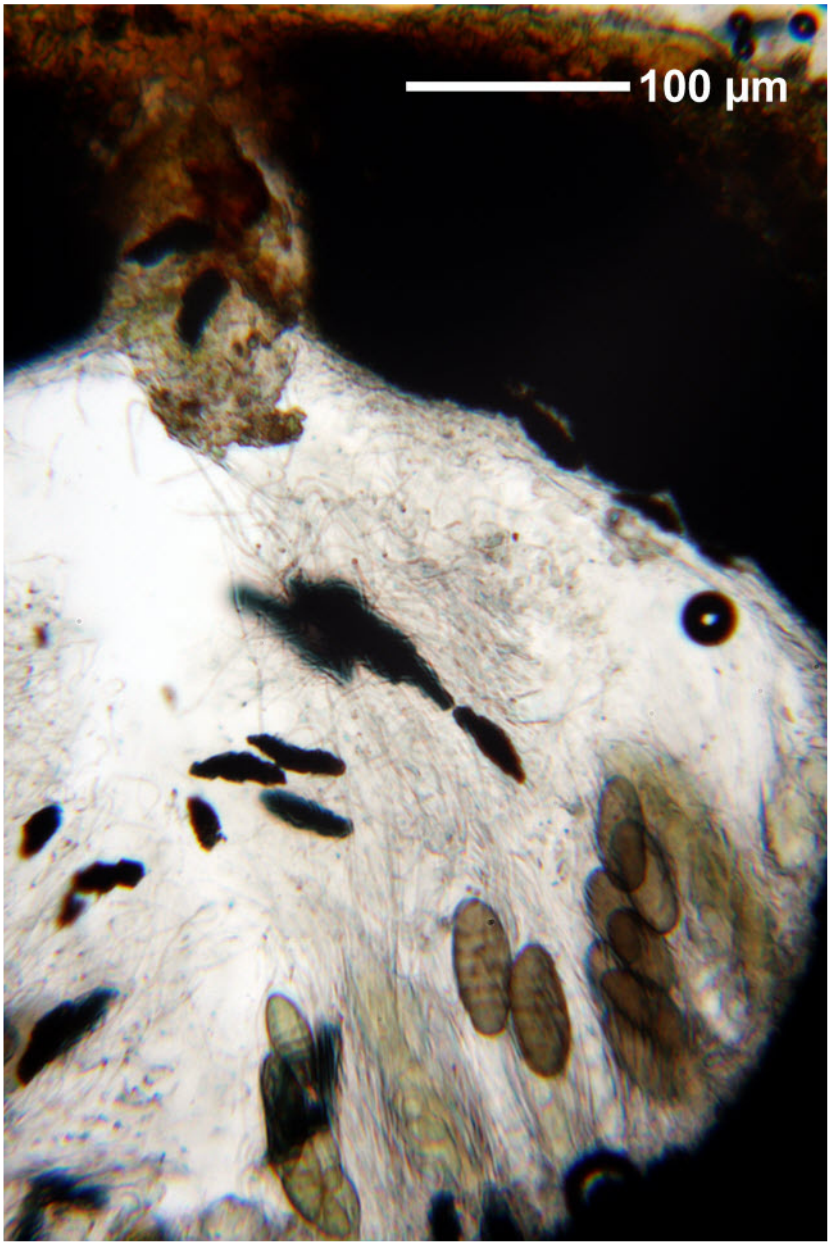
Pyrenula leucostoma Ach., Syn. meth. lich. (Lund): 124 (1814)
= *Anthracothecium leucostomum* (Ach.) Malme, Ark. Bot. 22A(no. 11): 32 (1929)
= *Anthracothecium libricola* (Fée) Müll. Arg. [as 'libricolum'], Linnaea 43: 44 (1880)
= *Bottaria libricola* (Fée) Vain., J. Bot., Lond. 34: 265 (1896)
= *Pyrenula libricola* Fée, Essai Crypt. Exot., Suppl. Révis. (Paris): 82 (1837)
= *Sporodictyon feei* var. *leucostoma* (Ach.) Trevis. [as 'leucostomum'], Conspect. Verruc.: 13 (1860)
= *Verrucaria leucostoma* (Ach.) Mont., Annls Sci. Nat., Bot., sér. 2 19: 60 (1843)
= *Verrucaria libricola* (Fée) Nyl., Bull. Soc. linn. Normandie, sér. 2 2: 126 (1868)

Thallus corticate, usually with pseudocyphellae, UV- (often seeming pale greenish). Ascospores brown, muriform, 6–8/ascus, 40–60 × 17–22 μm, without reddish oil.

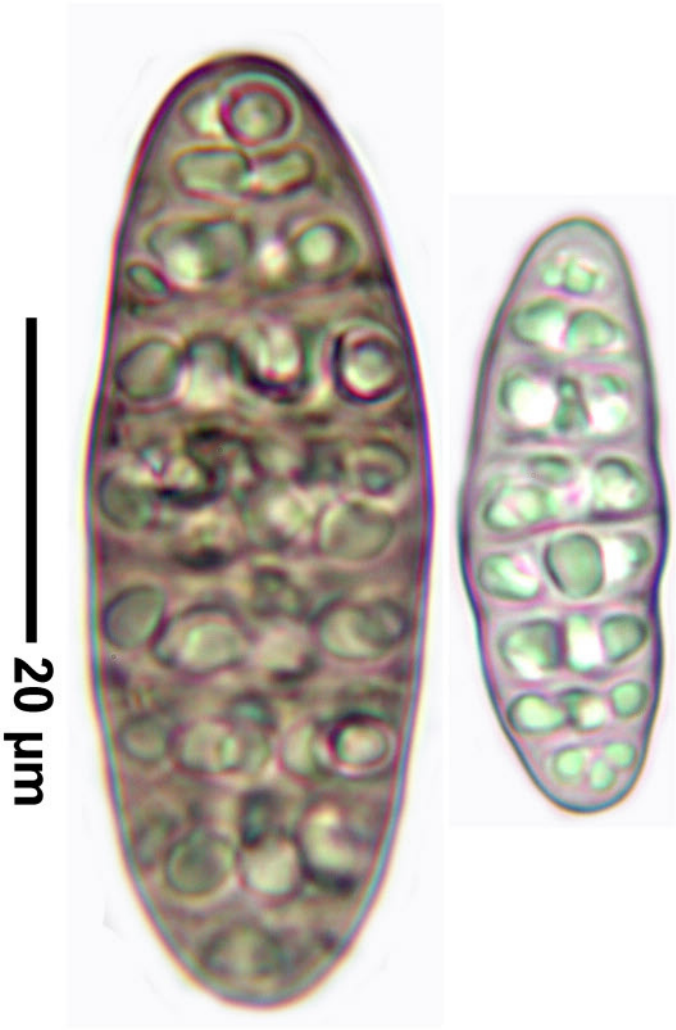
[14354], Seychelles, Praslin, Anse La Blague, beim Hotel La Vanilla, 4°19.793' S, 55°47.019' E, 17 m. Leg. F. Schumm 27.09.2008, det. A. Aptroot 2008.



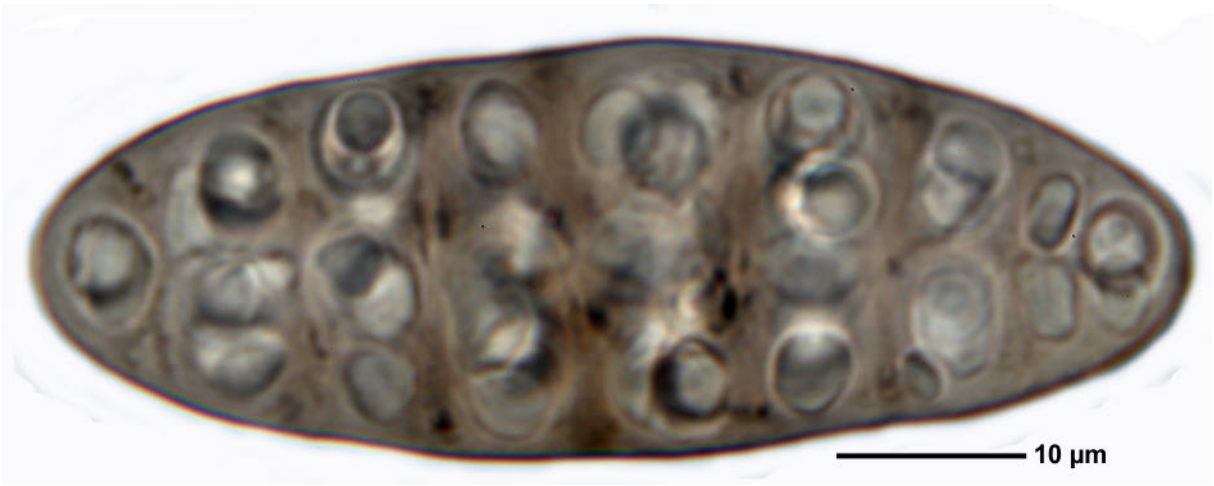




Pyrenula leucostoma







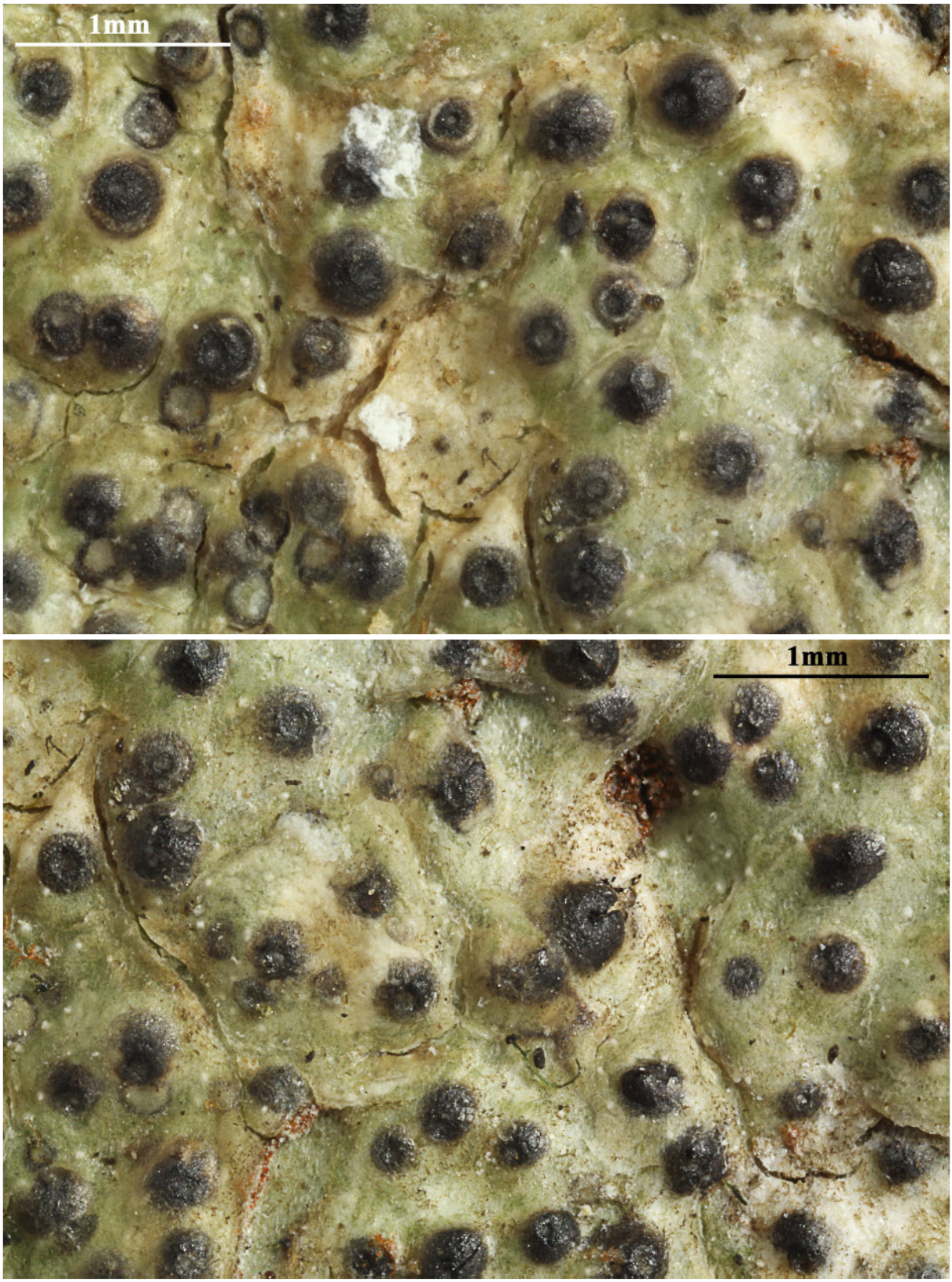
Pyrenula leucostoma

Pyrenula leucostoma Ach., Syn. meth. lich. (Lund): 124 (1814)
= *Anthracothecium leucostomum* (Ach.) Malme, Ark. Bot. 22A(no. 11): 32 (1929)
= *Anthracothecium libricola* (Fée) Müll. Arg. [as 'libricolum'], Linnaea 43: 44 (1880)
= *Bottaria libricola* (Fée) Vain., J. Bot., Lond. 34: 265 (1896)
= *Pyrenula libricola* Fée, Essai Crypt. Exot., Suppl. Révis. (Paris): 82 (1837)
= *Sporodictyon feei* var. *leucostoma* (Ach.) Trevis. [as 'leucostomum'], Conspect. Verruc.: 13 (1860)
= *Verrucaria leucostoma* (Ach.) Mont., Annls Sci. Nat., Bot., sér. 2 19: 60 (1843)
= *Verrucaria libricola* (Fée) Nyl., Bull. Soc. linn. Normandie, sér. 2 2: 126 (1868)

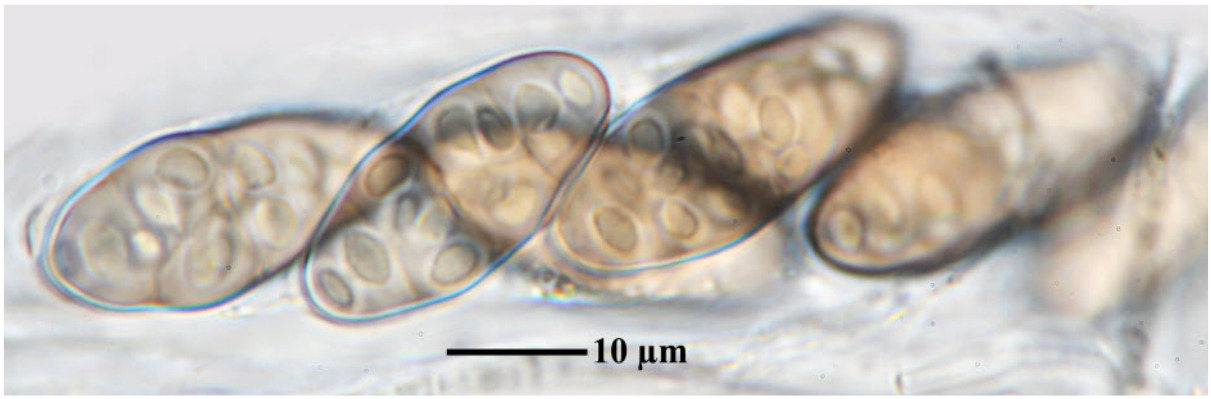
Thallus corticate, usually with pseudocyphellae, UV- (often seeming pale greenish). Ascospores brown, muriform, 6–8/ascus, 40–60 × 17–22 μm, without reddish oil.

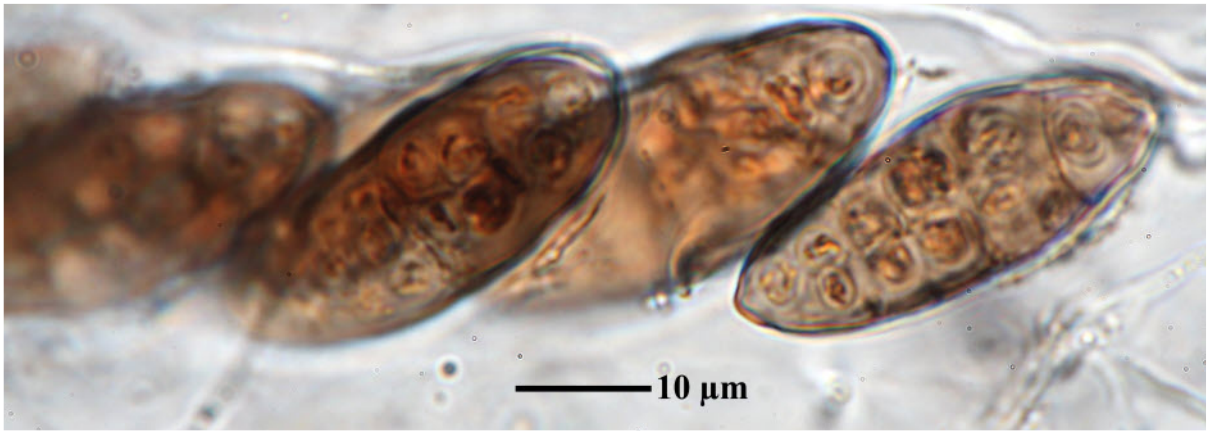
[19693], Indonesien, Bali, Sanur, Puri Santrian Hotel, 8.70890° S, 115.25916° E, 34 m. Leg. F. Schumm, 15.10.2017, det. F. Schumm.

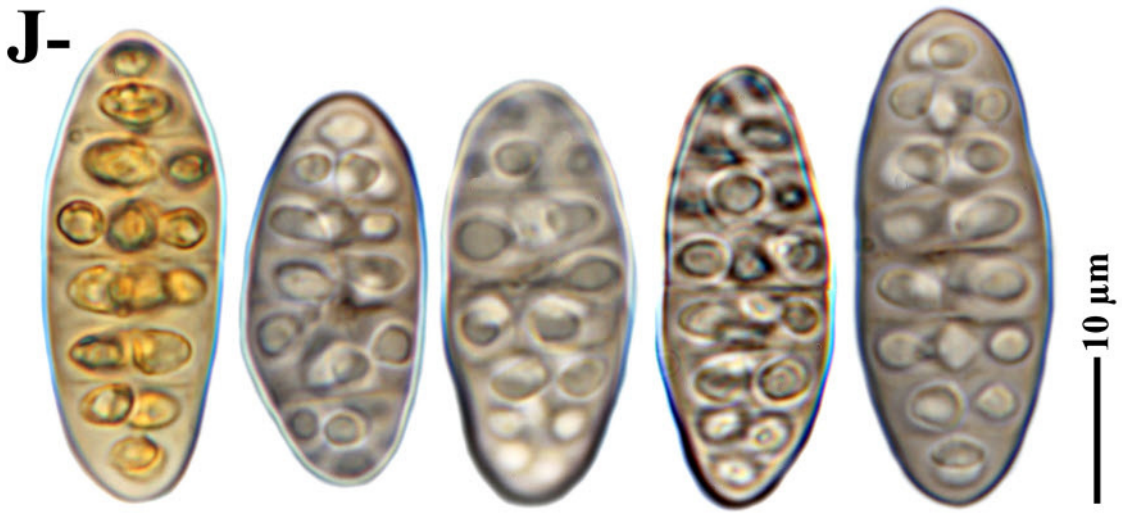




Pyrenula leucostoma







Pyrenula leucostoma

Pyrenula lilacina C.O. Mendonça, Aptroot & M. Cáceres, Phytotaxa 286(3): 174 (2016)

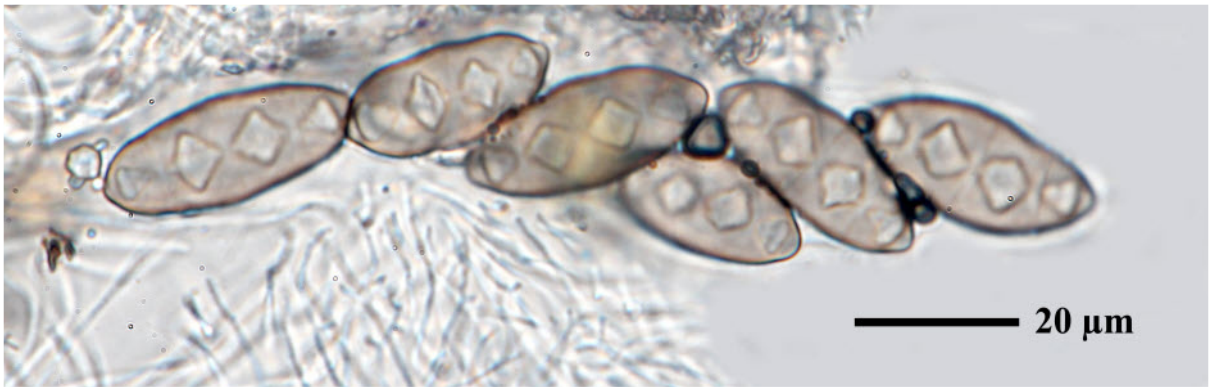
Thallus crustose, thin, lilac, corticate, somewhat shiny, without pseudocyphellae, without a prothallus. Algae trentepohlioid. Ascomata erumpent, subglobose to globose, 0.3–0.5 mm diam., simple. Ostiole apical, pale brown. Hamathecium not inspersed. Asci with 8 biseriate ascospores. Ascospores brown, not curved, 3-septate, 31–37 × 11–14 µm, distoseptate, lumina diamond shaped, terminal lumina not directly against the outer wall, without gelatinous layer, upper and lower end rounded, without ornamentation. Pycnidia absent. Chemistry: KOH+ reddish, UV–. TLC: unidentified anthraquinone with low Rf value.

[ISE3100], Brazil. Bahia, Povoado Ouro Verde, Catolé, Chapada Diamantina, 13°17’49’ S, 41°54’02’ W, 1636 m, in primary Brejo de Altitude on tree bark. Leg. C. Mendonça (no ISE 31000), 10.01.2015, det. A. Aptroot, 2015. ISOTYPE.





Pyrenula lilacina







Pyrenula lilacina

Pyrenula lineatostroma Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 64: 160 (1997)

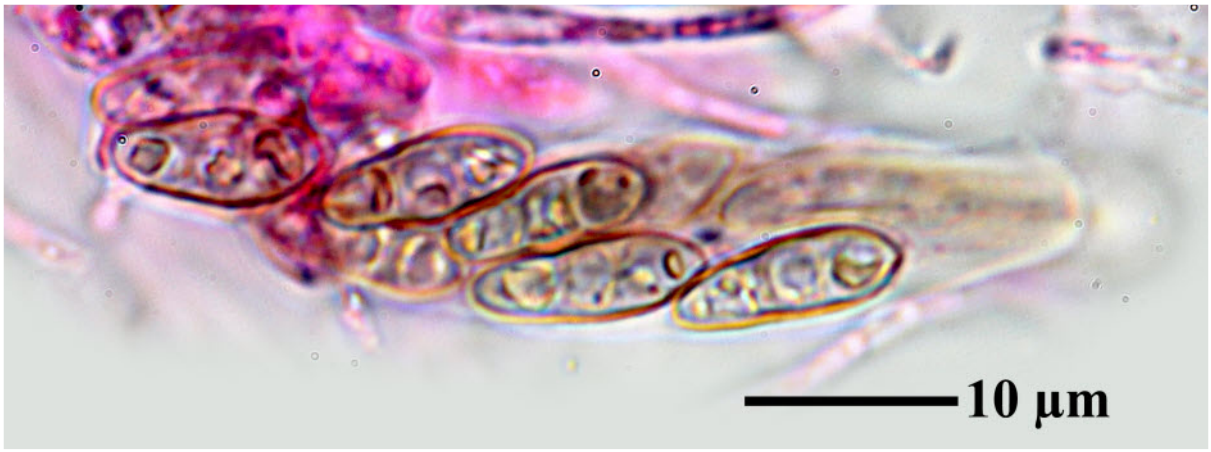
Thallus up to 5 cm wide, pale brownish to whitish, continuous, smooth, corticate, without pseudocyphellae, UV-, surrounded by a black prothallus. Ascomata immersed, black, spherical, 50–80 µm wide, with 10–100 together in convex, black, 0.5–1 × 1–5 mm large, elongate pseudostromata. Wall entire, carbonized, without clypeus, up to 30 µm thick. Ostiole apical, forming an inconspicuous, punctiform depression. Hamathecium IKI-, not inspersed. Ascospores brown, 8/ascus, irregularly arranged in the ascus, lacrymiform-pyriform, 2-septate, distoseptate, with rounded lumina, 8–10 × 4–5 µm.

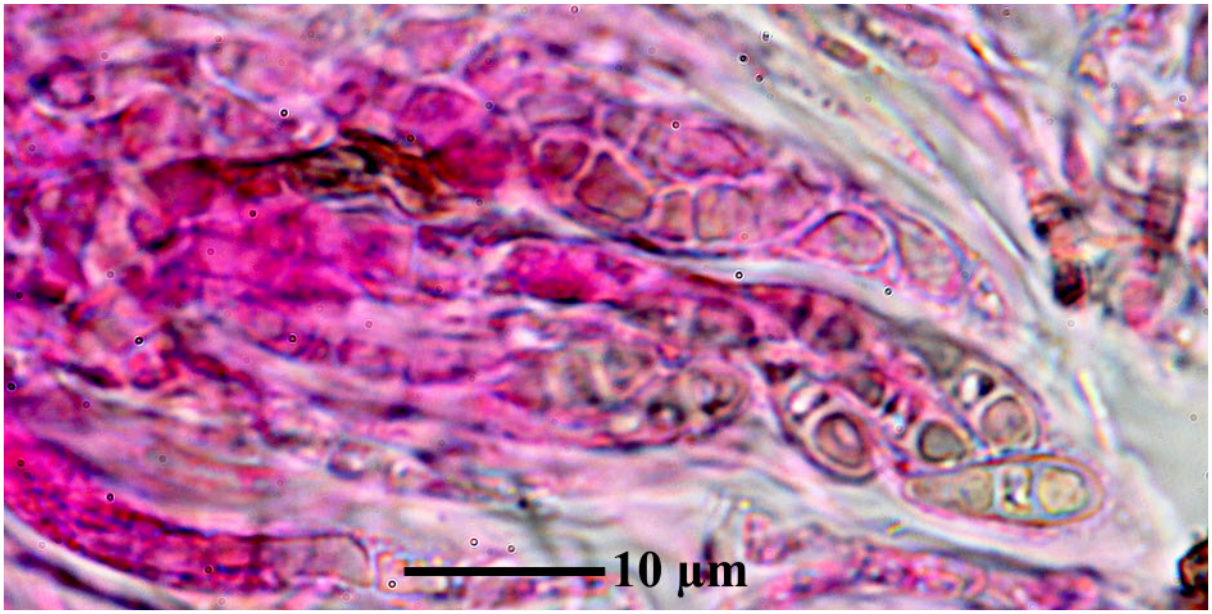
[ABL19106], Papua New Guinea, Central prov., Varirata National Park, 20 km E of Port Moresby, on tree in secodary tropical forest. 147°22' E, 9°27' S, 800 m. Leg. A. Aptroot (no 19106), March 1987, det. A. Aptroot, 1987. ISOTYPE.

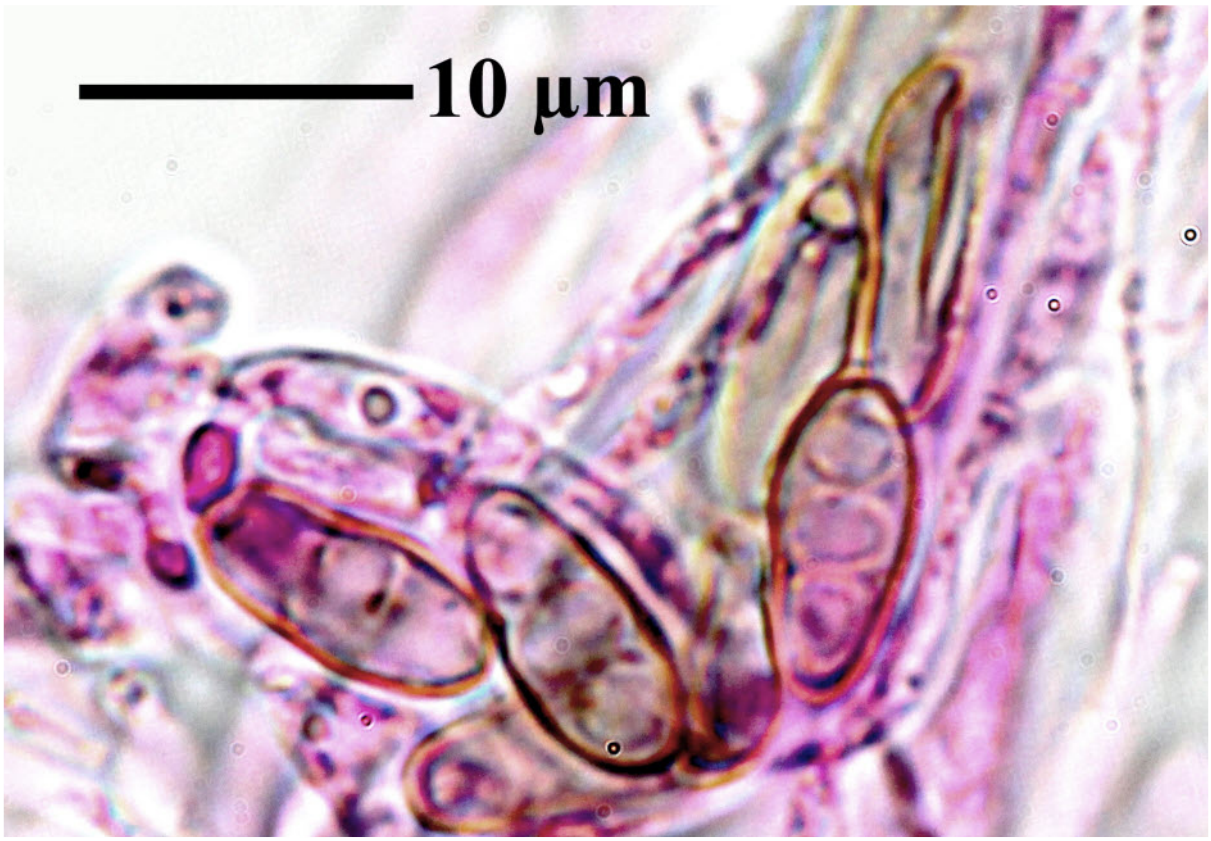




Pyrenula lineatostroma

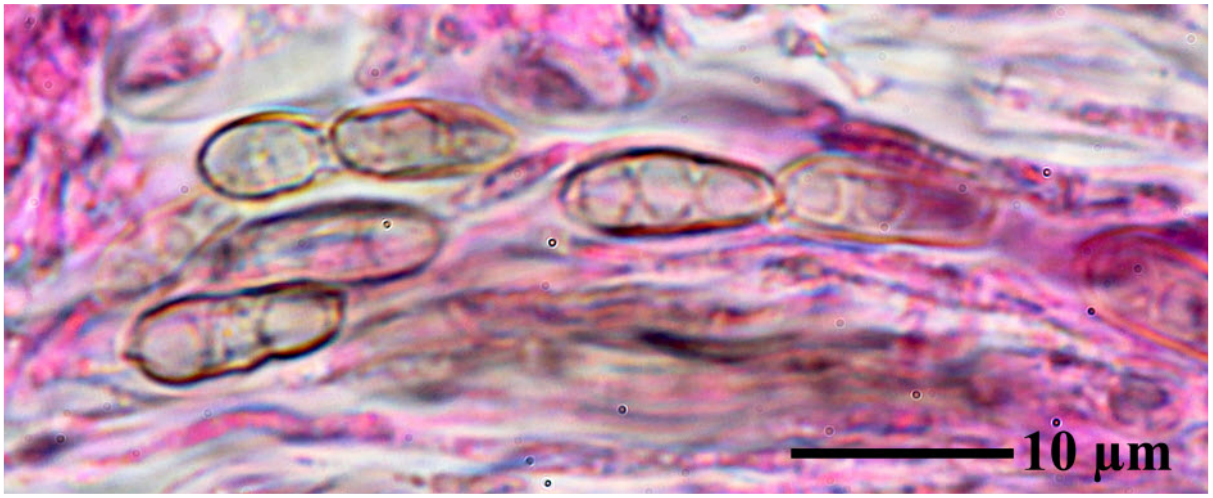


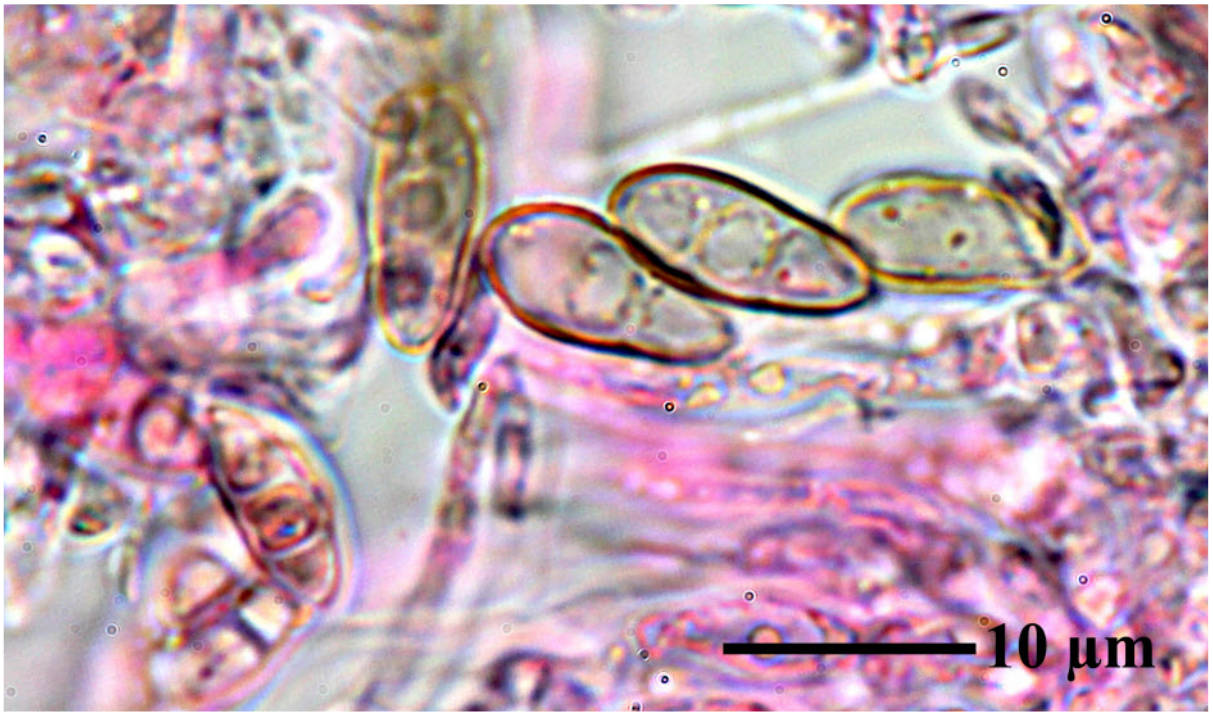




Pyrenula lineatostroma







Pyrenula lineatostroma

Pyrenula macounii R.C. Harris, The Michigan Botanist 12 (1): 45 (1973).

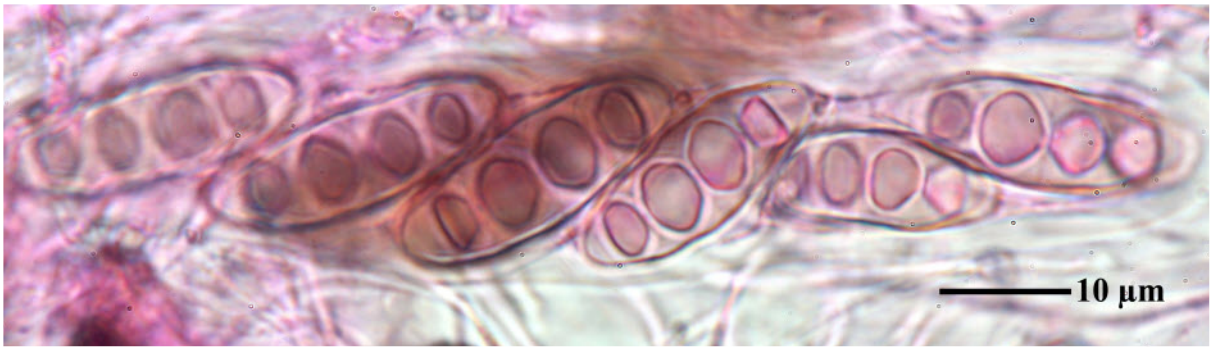
Thallus olivaceous, UV-, shiny, without pseudocyphellae, translucent in section, composed of compacted hyphae and remnants of bark cells, c. 75 µm thick. Ascomata quite crowded, brown-black, globose or subglobose, occasionally somewhat flattened at the base, immersed, 0.5–0.7 mm in diam.,0.35–0.5 mm in height. Involucrellum entire, brown-black, including bark cells, colorless crystals absent, 40–100 µm thick, thinner below. Exciple brownish, not distinct. Hamathecium IKI-, not inspersed. Interthecial hyphae c. 1–2 µm, septate, not branched and anastomosed. Asci cylindrical, not much thickened at the tip, c. 110–115 × 15–18 µm. Spores eight in the ascus, uniseriate, light brown, fusiform-elliptical, 3-septate, commonly with true septa continuous with the outer wall, terminal lumina separated from outer spore wall by a layer of endospore, 22–30 × 8-12 µm.

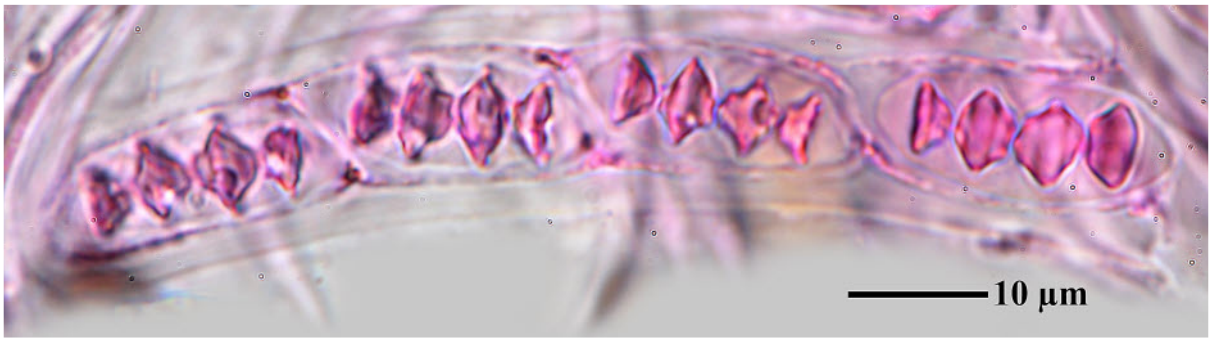
[Shibuichi10048], Japan, Honshu, Prov. Etchu, Buna-zaka, Tateyama Mts., Naka-Niikawa-gun, on bark of *Fagus crenata*, 1100 m. Leg. H. Shibuichi (no 10048) & K. Yoshida, 12.11.1998, det. A. Aptroot.

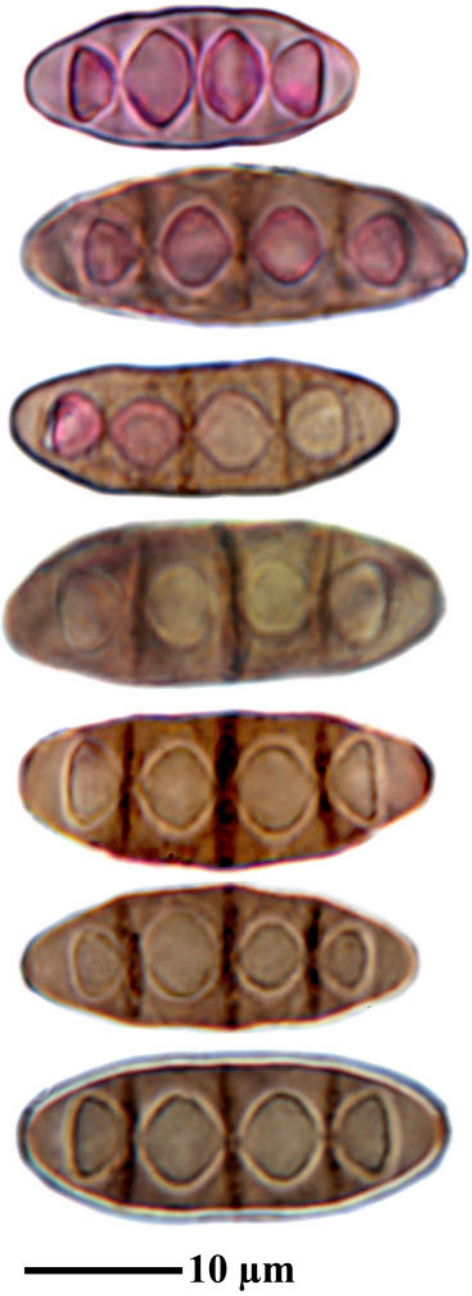




Pyrenula macounii





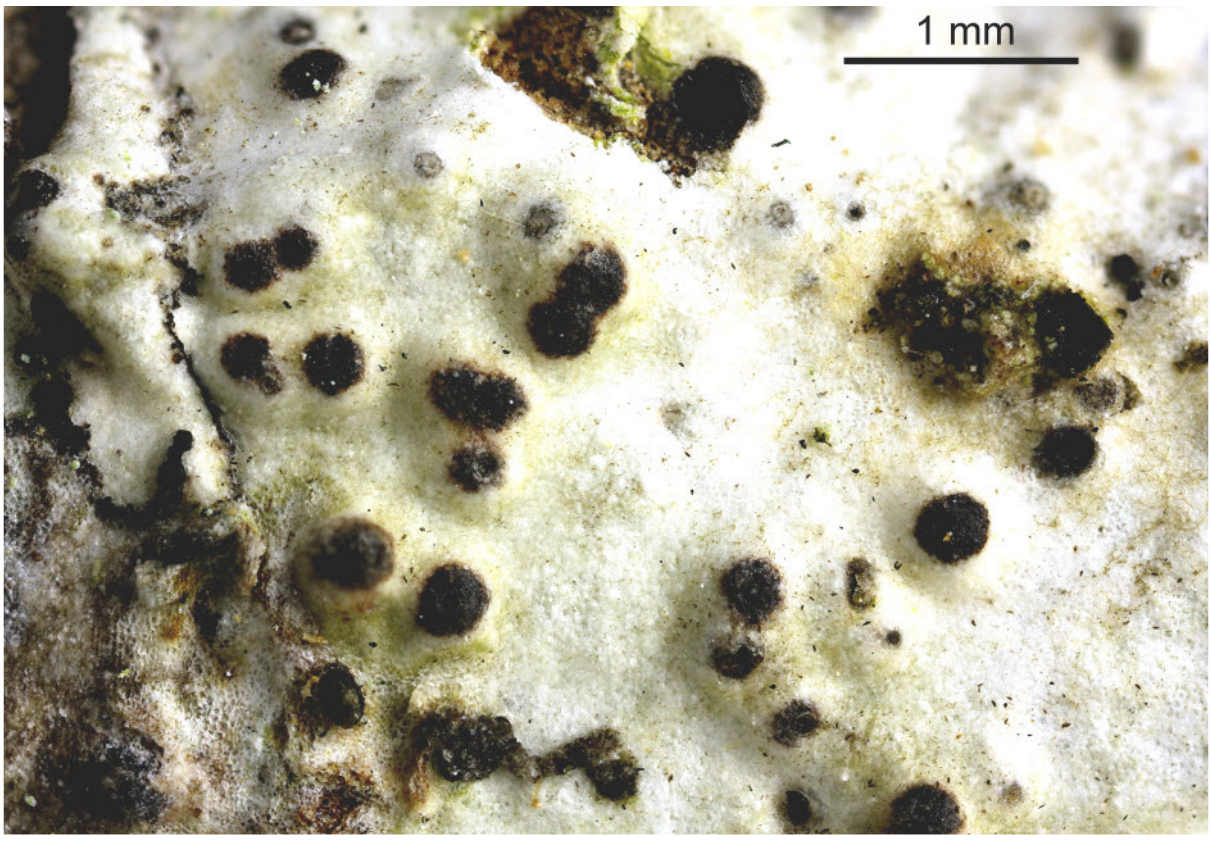


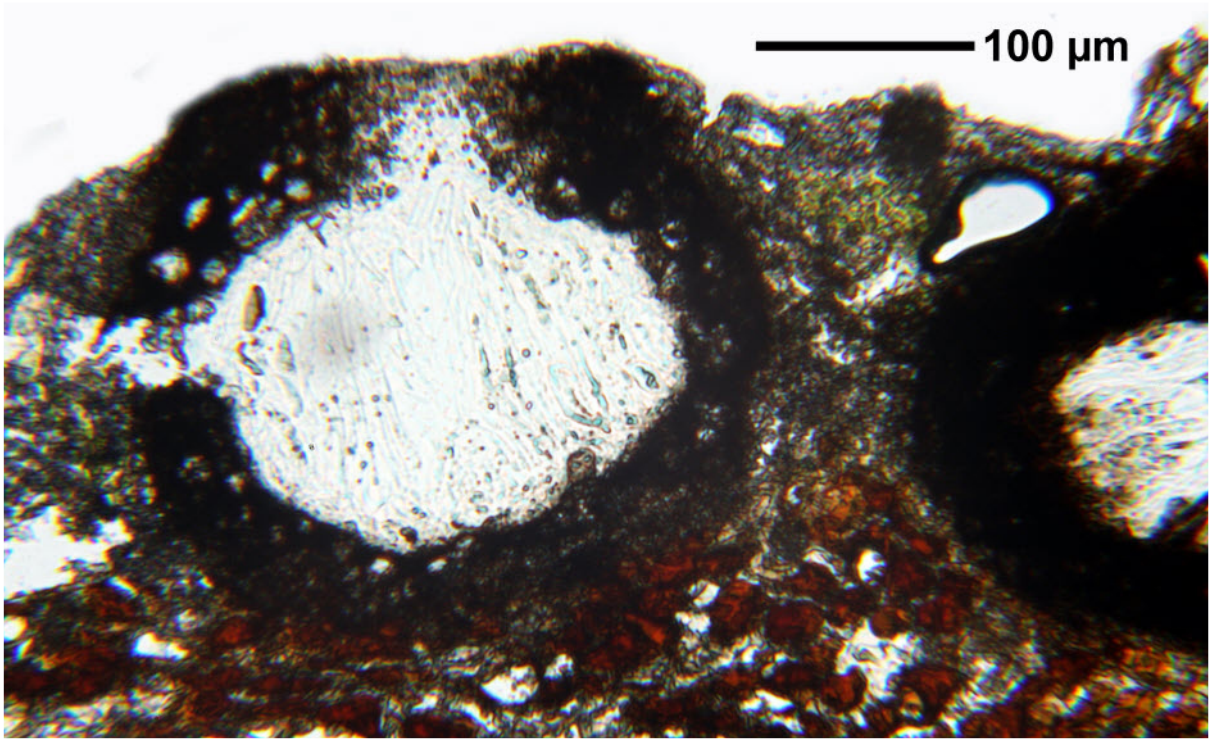
Pyrenula macounii

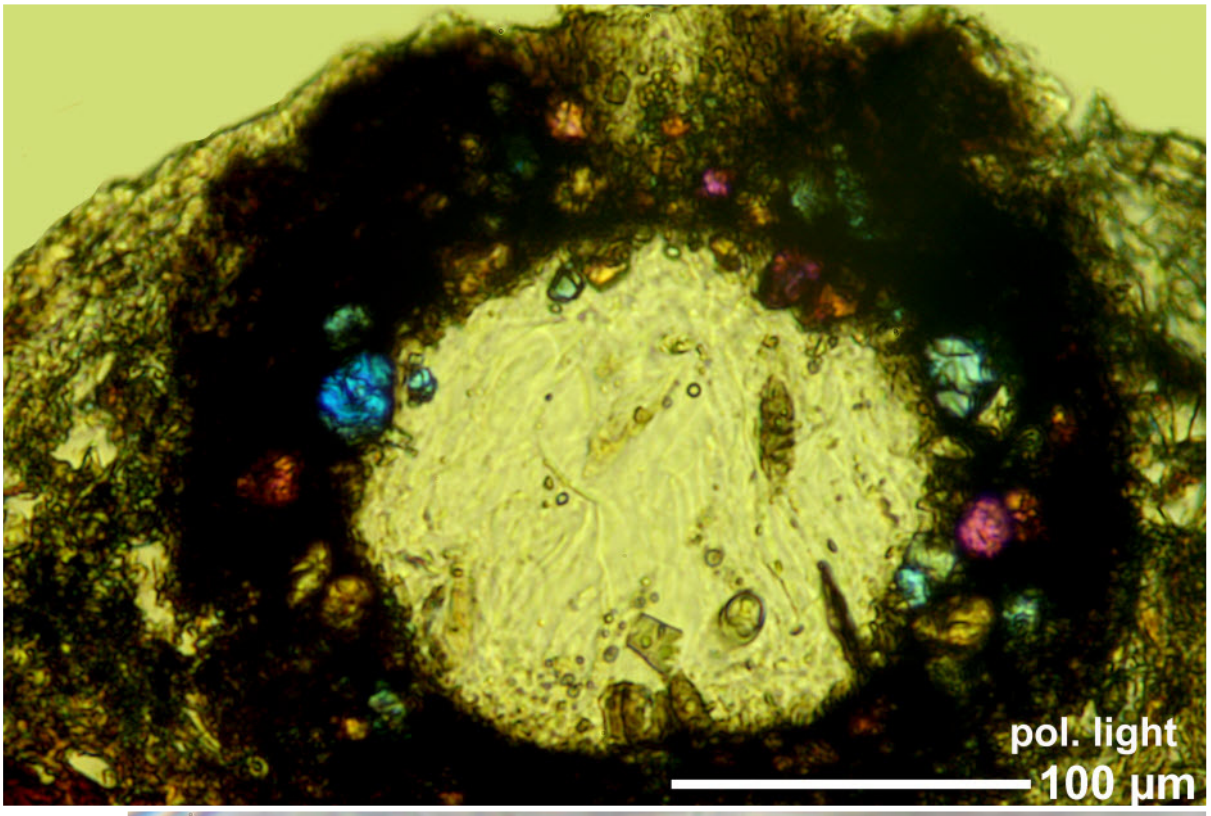
Pyrenula macularis (Zahlbr.) R.C. Harris, Mem. N. Y. bot. Gdn 49: 94 (1989)
= *Anthracothecium maculare* Zahlbr., Mycologia 22(2): 70 (1930)

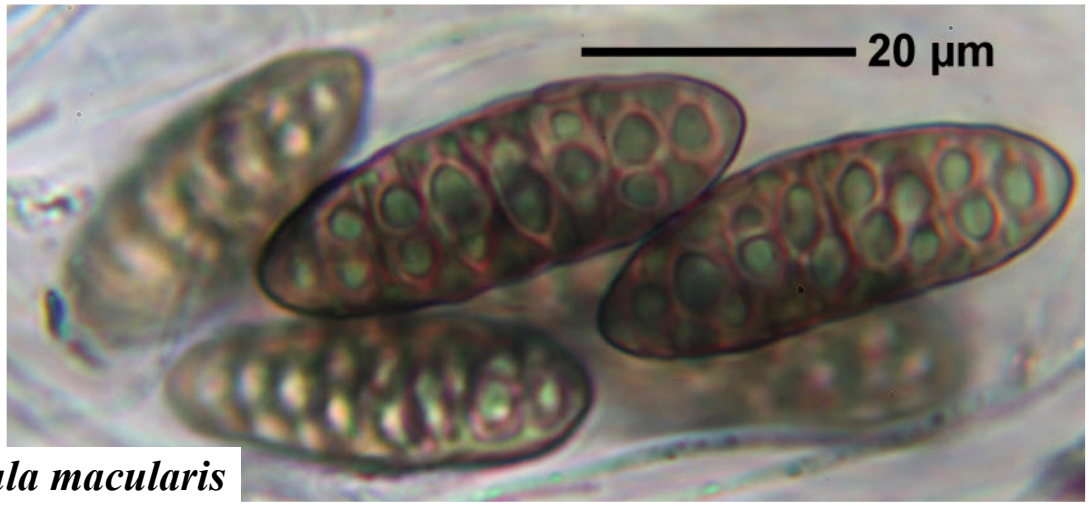
Thallus corticate, brownish to olive green, with pseudocyphellae. Perithecia solitary, subglobose, erumpent from the substratum, sides often partly or mostly covered by thallus, c. 0.3–0.5 mm diam. Perithecial wall with crystals, up to 100 µm thick. Ostiole pale, apical. Hamathecium not inspersed, IKI+ orange, filaments unbranched. Ascospores 8/ascus, grey brown, irregularly biseriate, muriform with c. 8 rows of c. 3–8 locelli, fusiform with rounded ends, 38–50 × 15–20 µm, lumina rounded, old spores with orange oil. Chemistry: No substances detected.

[14678], Seychelles, Mahe, W-Küste, Barbarons Estate, 4°43.214' S, 55°28.839' E, 17 m. Leg. F. Schumm, 11.10.2008, det. A. Aptroot, 2008.

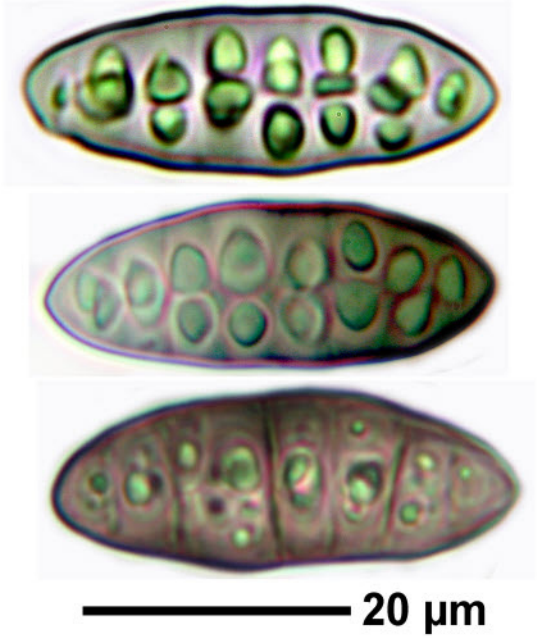


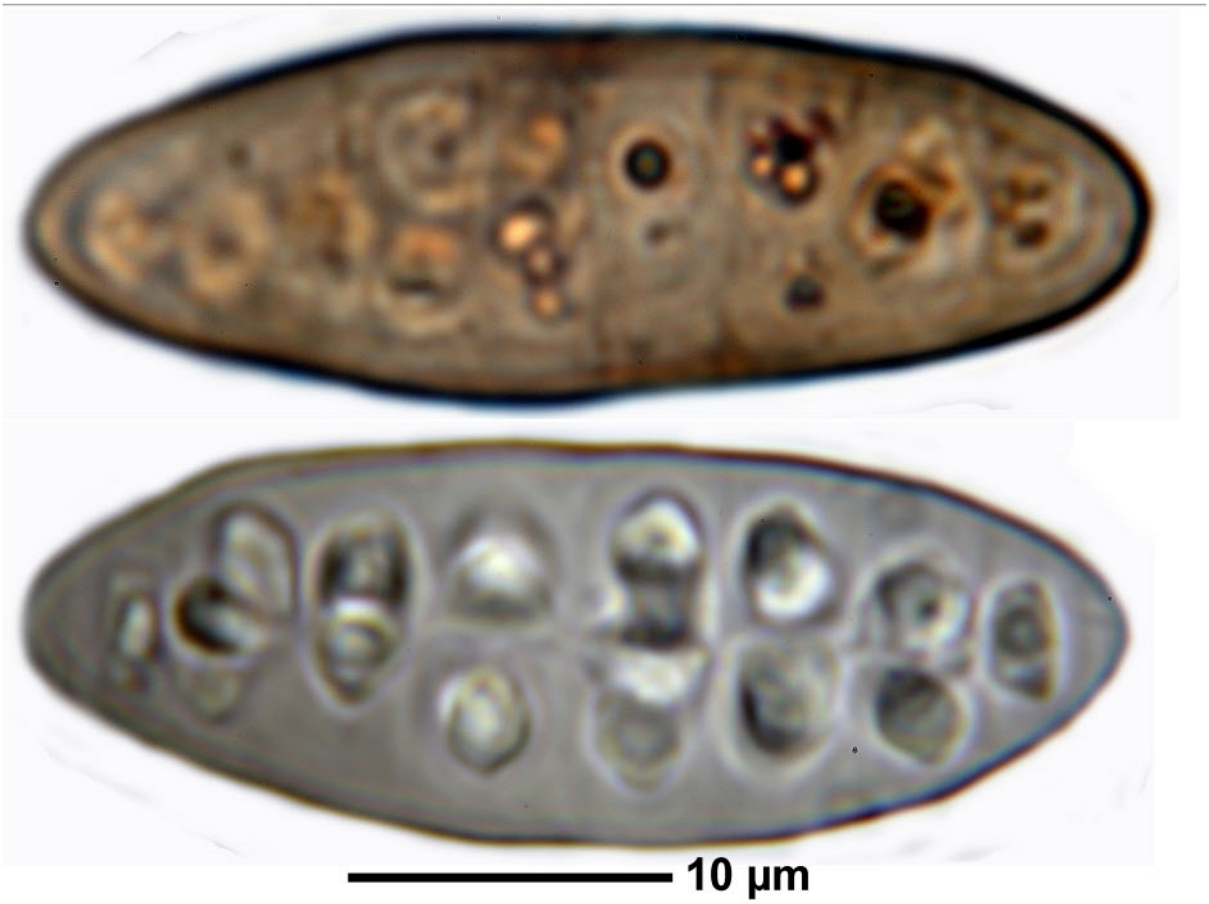






Pyrenula macularis



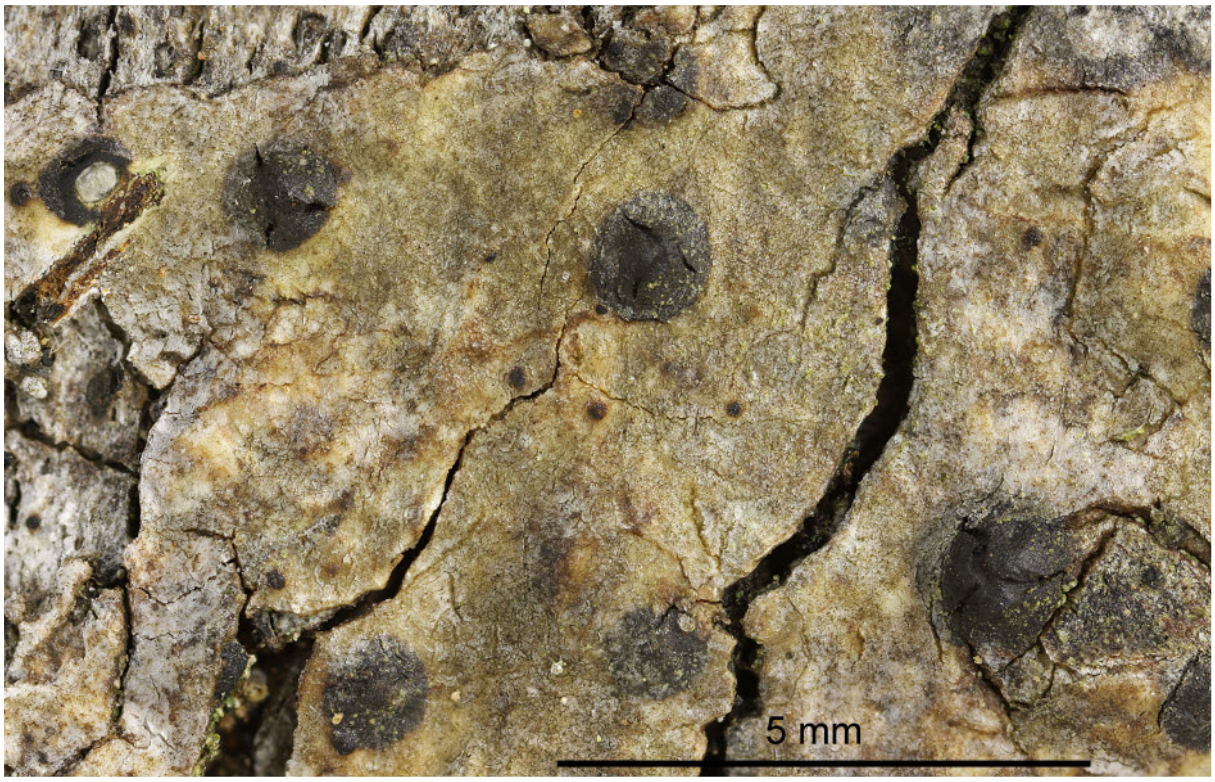


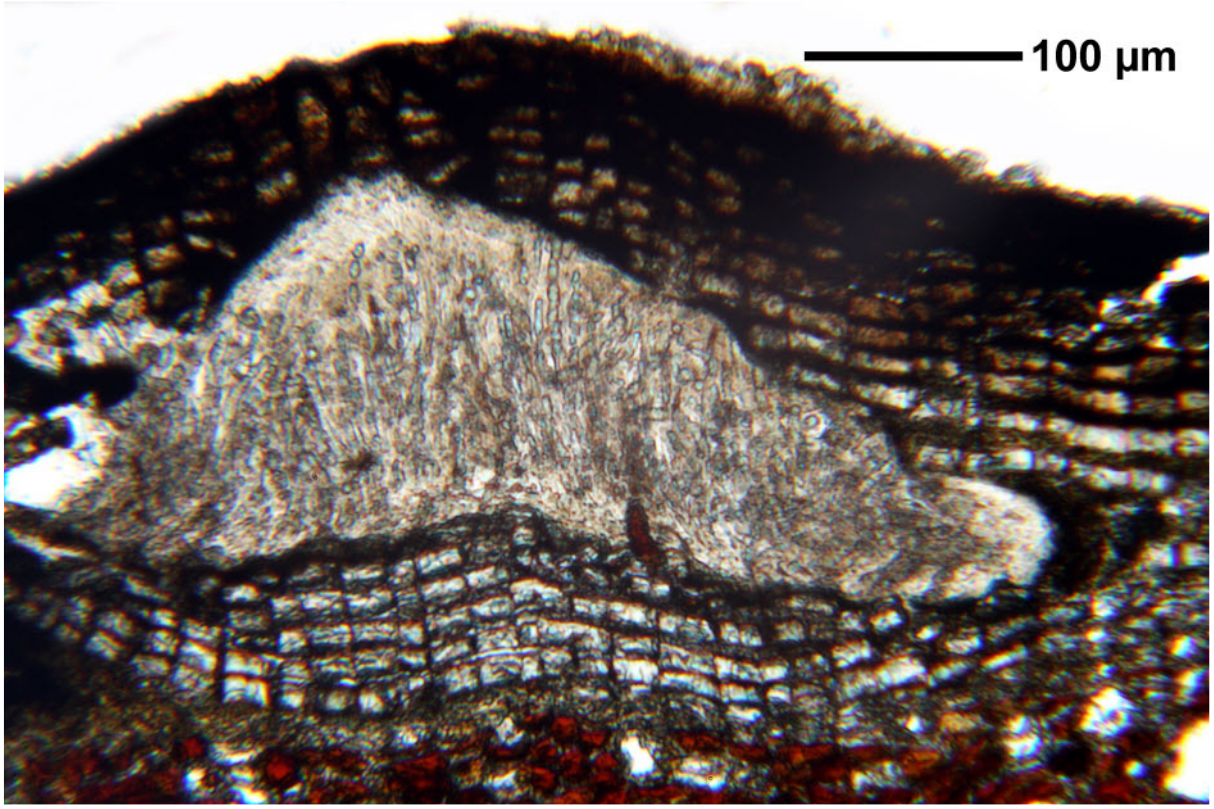
Pyrenula macularis

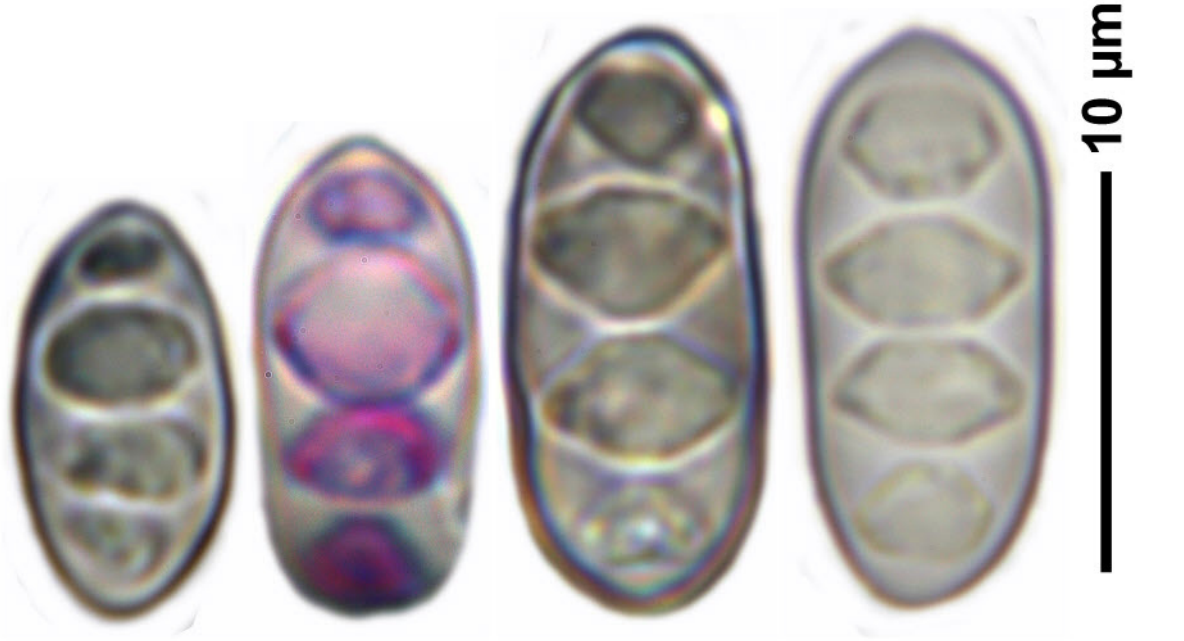
Pyrenula mamillana (Ach.) Trevis., Conspect. Verruc.: 13 (1860)
= *Pyrenula kunthii* (Fée) Fée, Essai Crypt. Exot., Suppl. Révis. (Paris): 80 (1837)
= *Pyrenula marginata* Hook., in Kunth, Syn. pl. (Paris) 1: 20 (1822)
= *Verrucaria kunthii* Fée, Essai Crypt. Exot. (Paris): 88 (1825)
= *Verrucaria mamillana* Ach., Methodus, Sectio prior (Stockholmiæ): 120 (1803)
= *Verrucaria marginata* (Hook.) Hepp, in Zollinger, Syst. Verz.: 5 (1854)

Thallus corticate, brownish to olive green, without pseudocyphellae. Perithecia solitary or a few accidentally fused, conical, erumpent from the substratum, exposed, rarely sides covered by thallus, c. 0.7–1.5 mm diam. Perithecial wall without crystals, up to 300 µm thick. Ostiole pale, apical. Hamathecium inspersed, IKI+ blue, filaments unbranched. Ascospores 8/ascus, grey brown, regularly uniseriate, often pale brown, 3-septate, fusiform with rounded to pointed ends, 15–20 × 4.5–7.5 µm, lumina angular, terminal lumina separated from the exospore by an endospore layer, old spores constricted at the septa. Chemistry: No substances detected, UV-.

[14554], Seychelles, La Digue, La Retraite, Straße nach Grand Anse, 4°21.996' S, 55°50.170' E, ca. 40 m. Leg. F. Schumm, 05.10.2008, det. A. Aptroot, 2008.





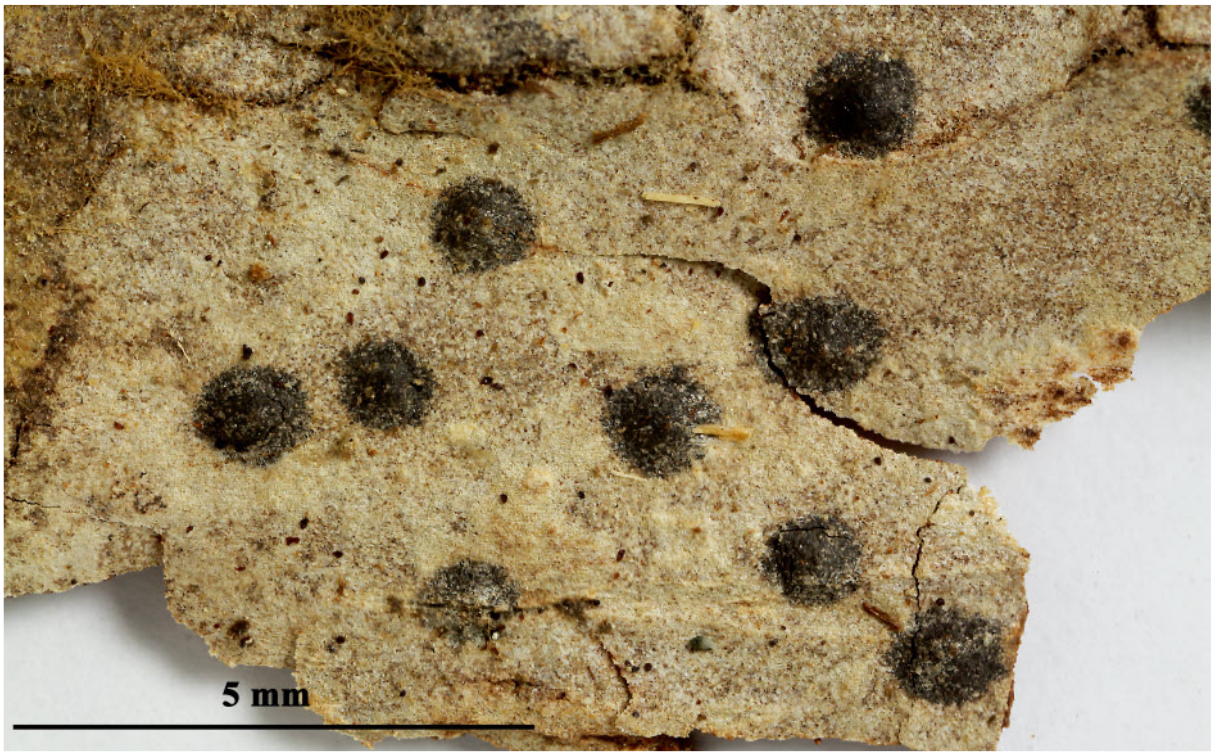


Pyrenula mamillana

Pyrenula mastigophora Aptroot, Bryologist 117(3): 288 (2014)

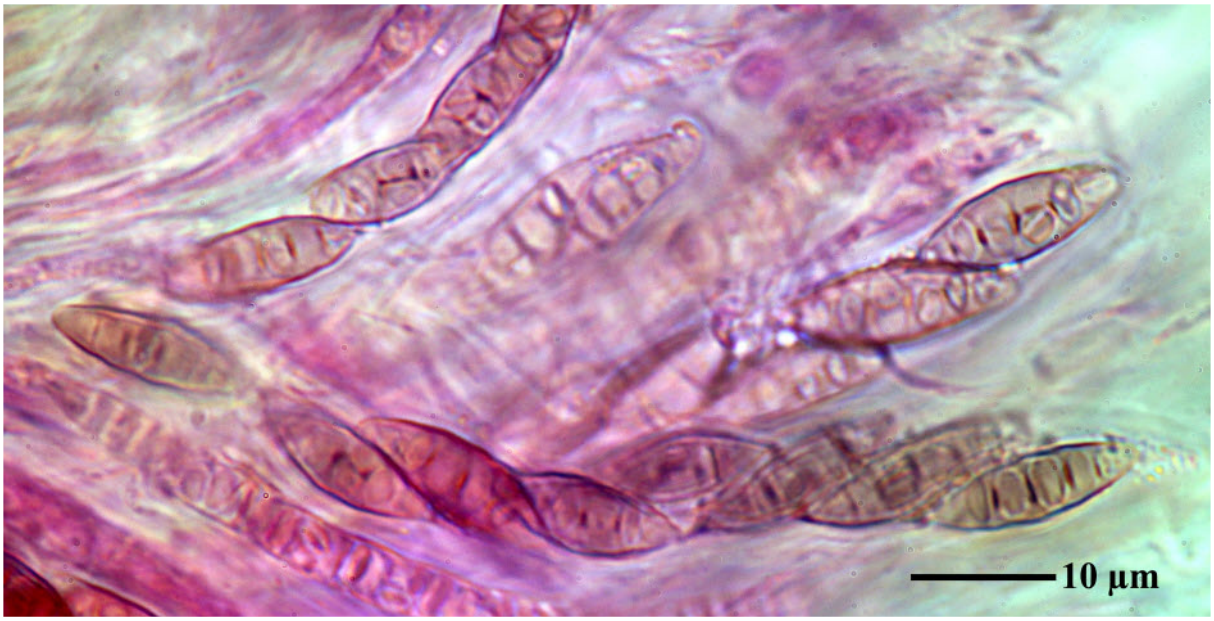
Thallus corticate, smooth, continuous, rather thin, olivaceous brown, without pseudocyphellae, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata perithecioid, erumpent, 0.7–1.5 mm diam., black, not aggregated, conical with pointed or rounded tip and basis flattened in the thallus level. Wall carbonized all around, up to ca.100 mm thick. Ostioles indistinct, black, apical. Hamathecium hyaline, not inspersed with oil droplets. Paraphyses simple, ca. 1 µm wide. Asci cylindrico-clavate, with 8 ascospores. Ascospores brown, 5-septate, clavate, without constrictions, 17–20 × 5.5–6.5 µm, ends rather pointed; lower end with an up to 25 µm long tail; lumina rather rounded, separated from the wall by a thick endospore layer. Pycnidia present, black, c. 0.1 mm diam. Conidia not observed. Chemistry. Thallus UV–; no secondary metabolites detected.

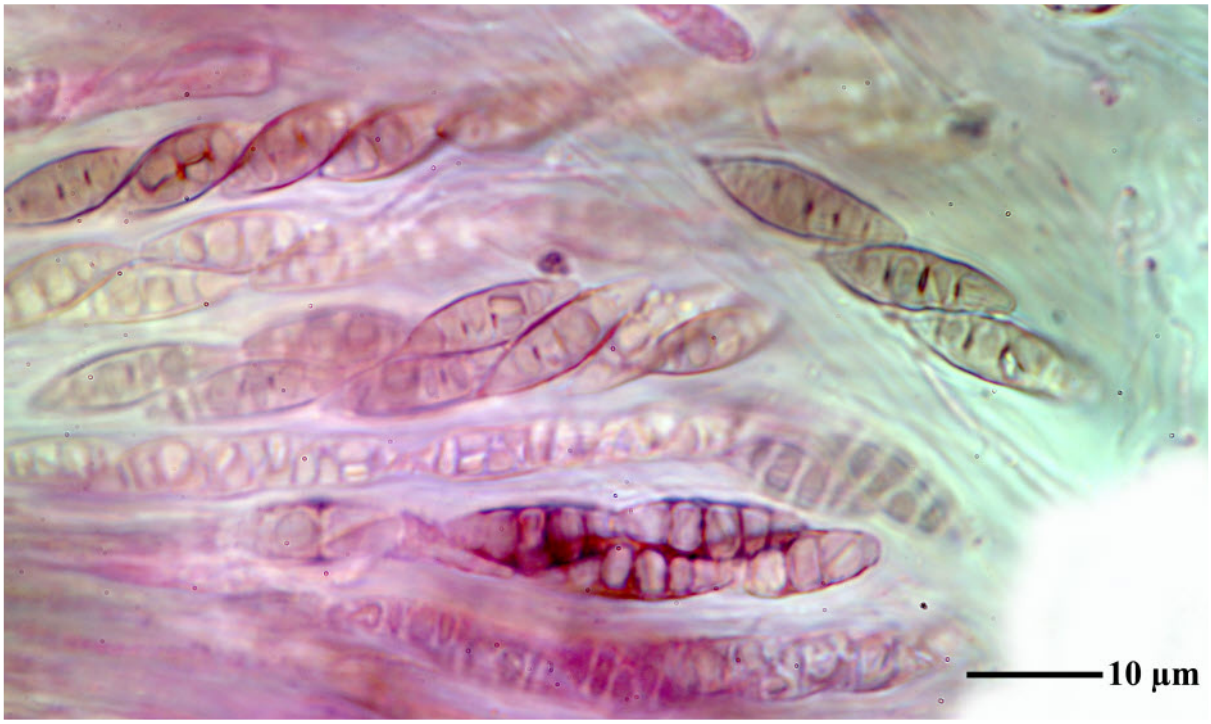
[Hill8740], Solomon Islands, San Cristobal Island, North of Ugi Island, near Pawa school, ca. 20 m, disturbed forest. Leg. D.J. Hill (no 8740), 12.08.1965, det. A. Aptroot, 2013. ISOTYPE.





Pyrenula mastigophora







Pyrenula mastigophora



Pyrenula mastigophora

Pyrenula mastophoriza (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 439 (1922)
= *Verrucaria mastophoriza* Nyl. 1873
= *Anthracothecium peltophorum* Müll. Arg.
= *Pyrenula neopeltophora* Ajay Singh
= *Pyrenula glabrescens* Vain.

Thallus corticate, without pseudocyphellae. Ascomata subglobose or hemispherical, erumpent, the sides often partly thallus-covered, c. 0.4–0.7 mm diam. Ostioles apical, pale, rather wide. Ascospores 3-septate, 12–16 × 7–8 µm, elongate-ellipsoidal, apical locules thin-walled at the tips.This species is similar to *P. mastophora*, but with smaller ascospores.

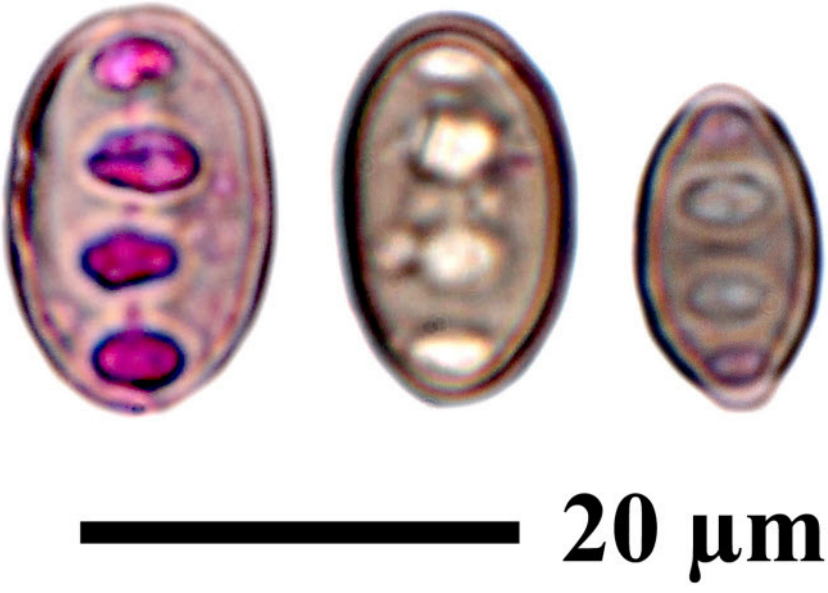
[Hill8402], Solomon Islands, New Georgia Group, Marovo Lagoon, Paleki island, 0 m, shore. Leg. D. J. Hill (no 8402), 3.8.1965, det. A. Aptroot, 2013.





Pyrenula mastophoriza



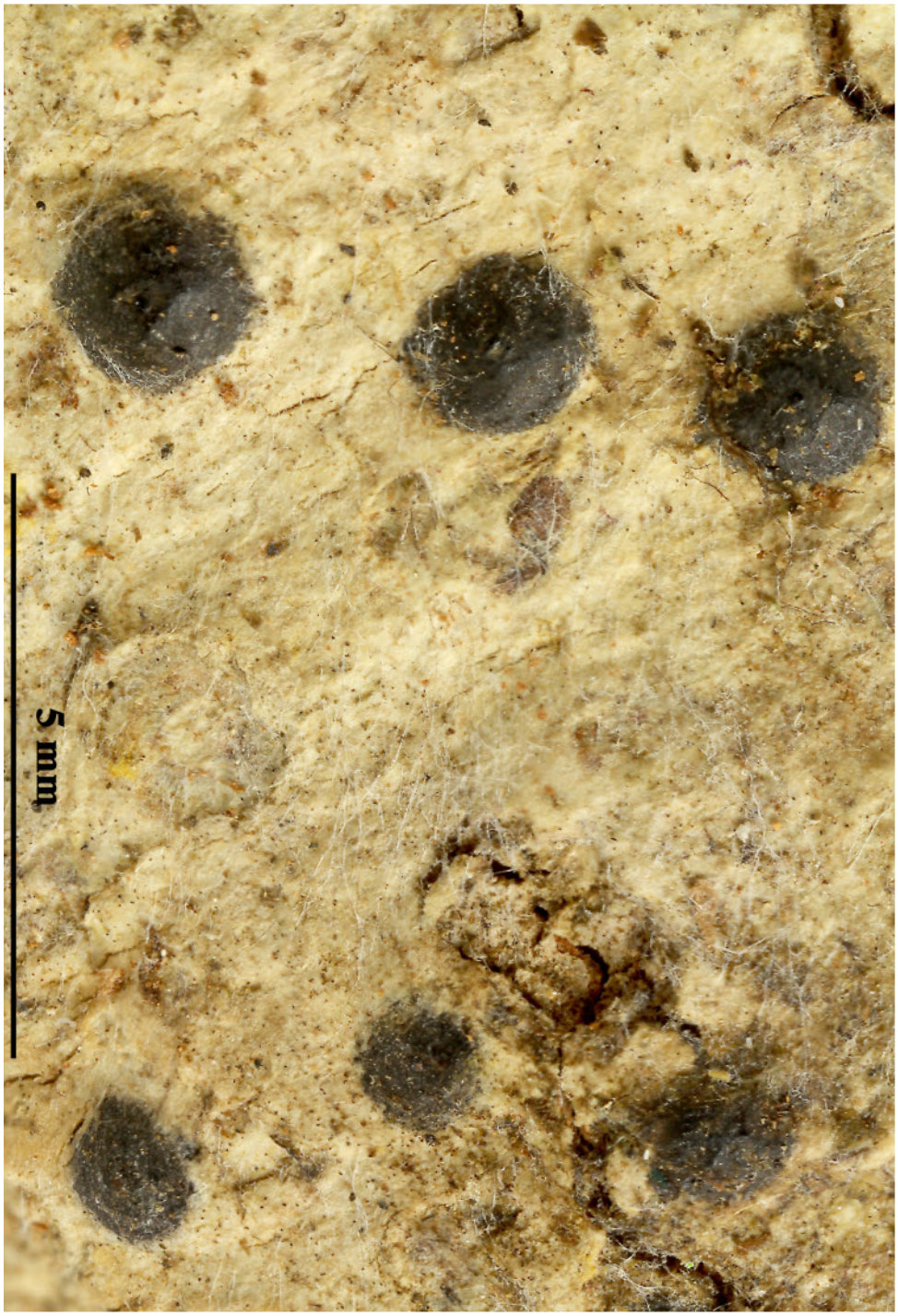


Pyrenula mastophoriza

Pyrenula mastophoroides (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 439 (1922)
= *Verrucaria mastophoroides* Nyl. 1863

Thallus corticate, without pseudocyphellae. Ascomata subglobose to conical, erumpent, sides often partly covered by thallus, c. 0.7–1.4 mm diam. Ostioles apical, pale. Hamathecium inspersed with colorless oil globules. Ascospores 3-septate, 30–40 x 15–22 µm, fusiform with pointed ends, with thick apical walls.

[ABL10449], Ecuador, pr. Morona-Santiago, Los Encuentros, km 12 East Cordillera del Condor, primary tropical rainforest, 1200 m. Leg. A. Aptroot (no 10449), 26.07.1082, det. A. Aptoot.







Pyrenula mastophoroides

Pyrenula mattickiana Sipman & Aptroot, Lichenologist 45(2): 180 (2013)

Thallus growing on bark, several cm in diam., c. 50–100 mm thick, smooth, yellowish brown, UV-, without white spots, endophloeodic except for the outer part of the c. 25 mm thick prosoplectenchymatous cortical layer. Ascomata exposed on the thallus, scattered or aggregated in small groups, dark brown, rather conical, c. 0.7–1.0 mm wide, with heavily carbonized wall, c. 300 µm thick laterally, much thinner on the bottom, without red, K+ violet crystals. Ostiole impressed, apical, pale brown. Hamathecium clear; filaments c. 1 µm wide, unbranched; asci c. 80 × 10 µm. Ascospores 8 per ascus, mostly uniseriate, 3-septate, 17–18 × 6.5–7.5 µm, pale reddish brown, with thin septa and rounded or triangular terminal and elongated central lumina, with a thick layer of endospore in the spore tips. Pycnidia not observed. Chemistry: No lichen substance detected.

[Mattick93a], Brazil, Rio de Janeiro, Parque Nacional da Serra dos Orgãos, 1600–2000 m, 43°03’ W, 22°30’’ S, along track from Abrigo 2 upward, on tree bark. Leg. F. Mattick (no 93a), 1.10.1952, det. H. Sipman, 2011. ISOTYPE.



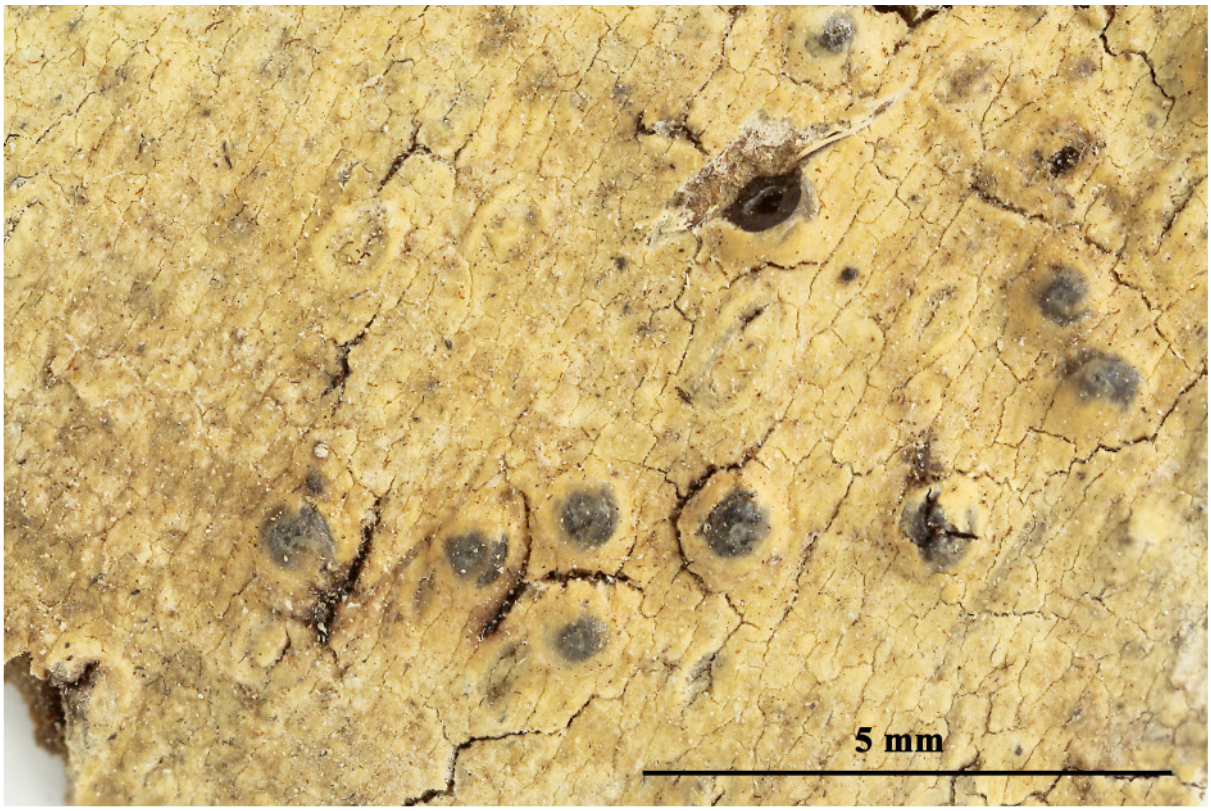


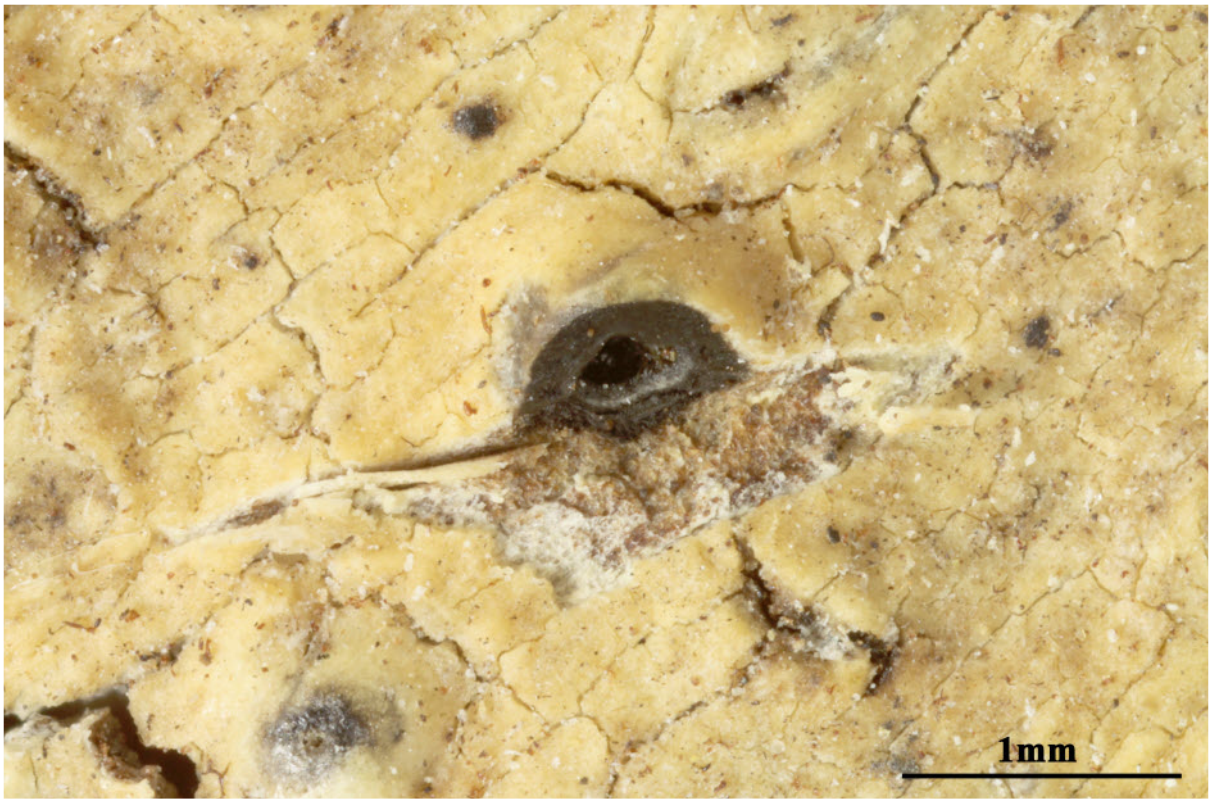
Pyrenula mattickiana

Pyrenula media Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Bibliotheca Lichenol. 64: 161 (1997)

Thallus up to 10 cm wide, yellowish-brown, continuous to irregularly cracked, smooth, corticate, without pseudocyphellae, UV-, surrounded by a black prothallus or without prothallus. Perithecia immersed in the thallus and bark, becoming exposed, black, dull, hemispherical, 0.6–1.3 mm wide, at least partly covered by the thallus; ascoma wall entire, carbonized, with clypeus up to 250 µm thick, c. 20 µm under the asci; ostiole apical, inconspicuous; hymenium I-, not inspersed; ascospores 8/ascus, irregularly arranged in the ascus, 3-septate, distoseptate, without eusepta, citriform, with pointed ends, constricted at the lumina, with angular lumina, 24–29 × 9–11 µm.

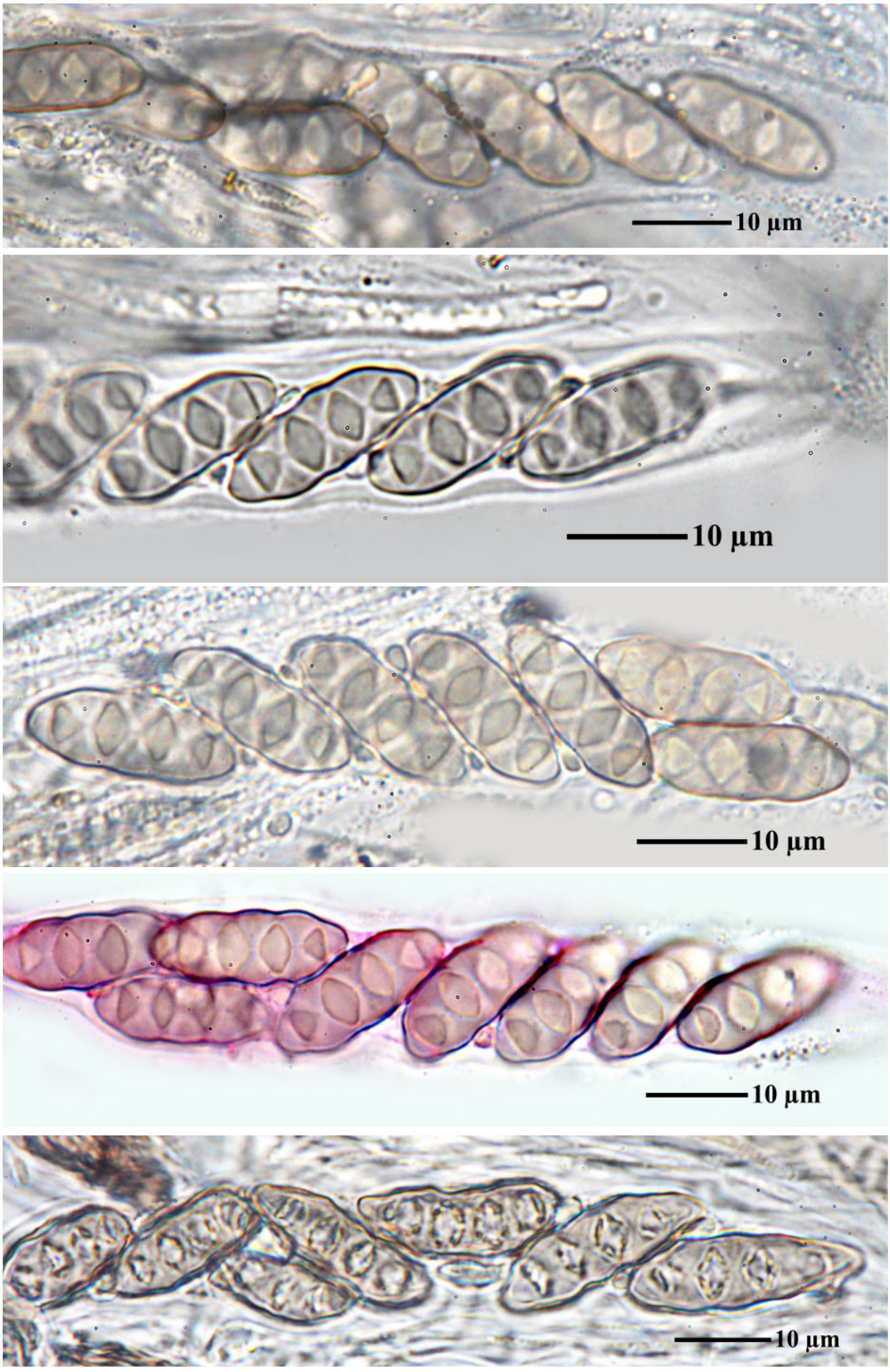
[ABL31969], Papua New Guinea, Madang prov., Huon Peninsula, Finisterre range, Yupna valley, Teptep village, deep valley in N direction, 2300-2750 m, 146°33’ E, 5°57’ S, in mossy mountain forest, on gravel slopes along stream. Leg. A. Aptroot (no 31969), 30-31.07.1992, det. A. Aptroot, 1993. ISOTYPE.



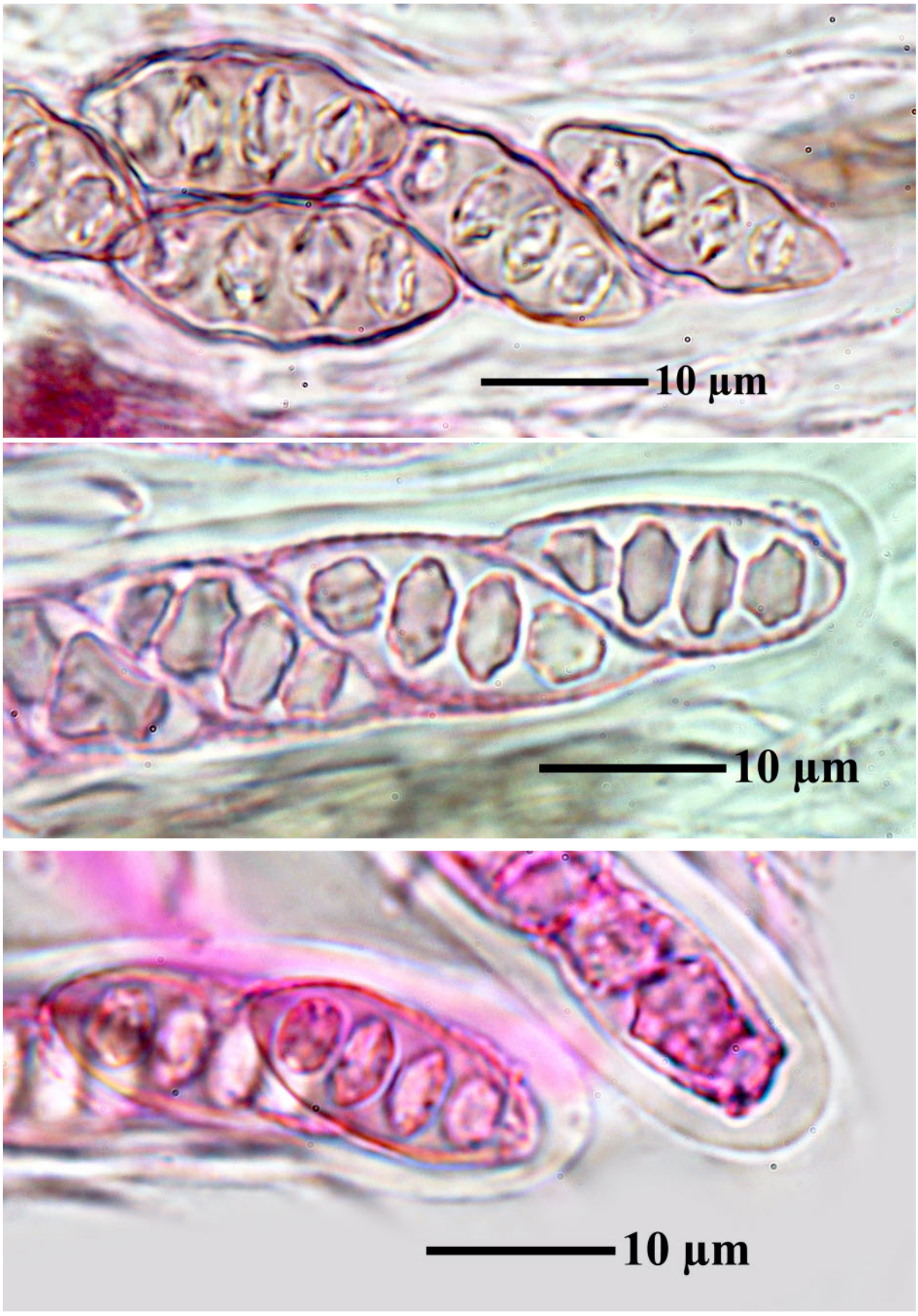




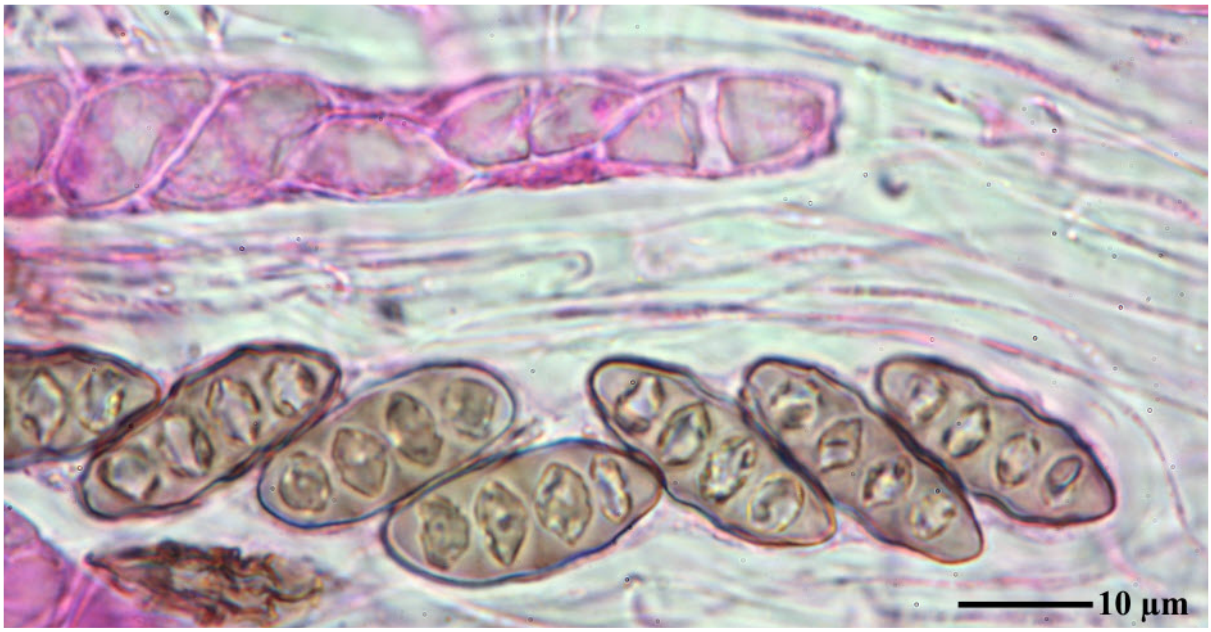
Pyrenula media



Pyrenula media



Pyrenula media



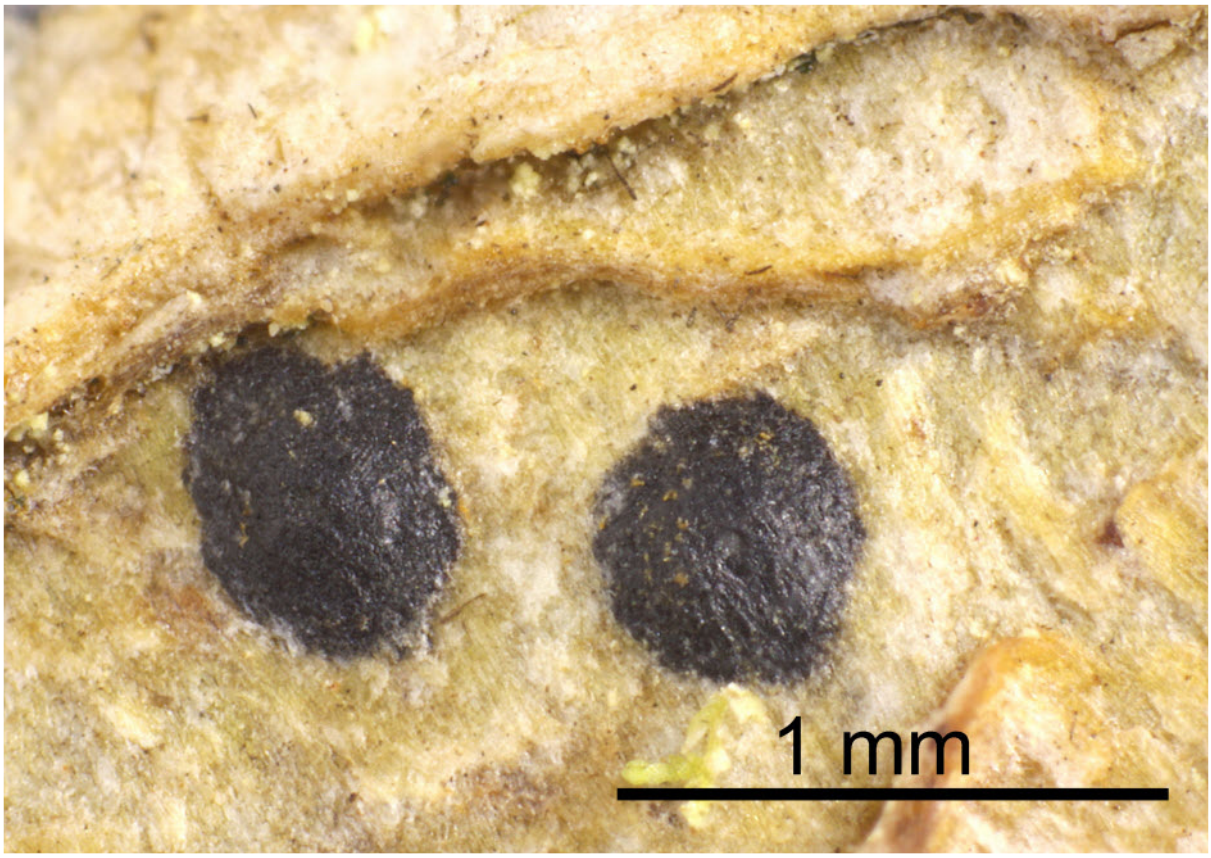


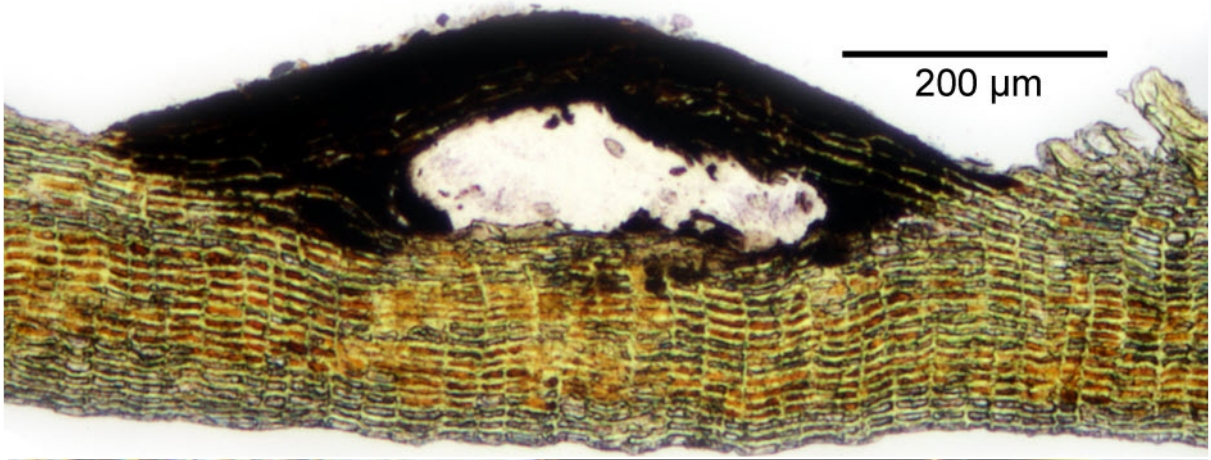
Pyrenula media

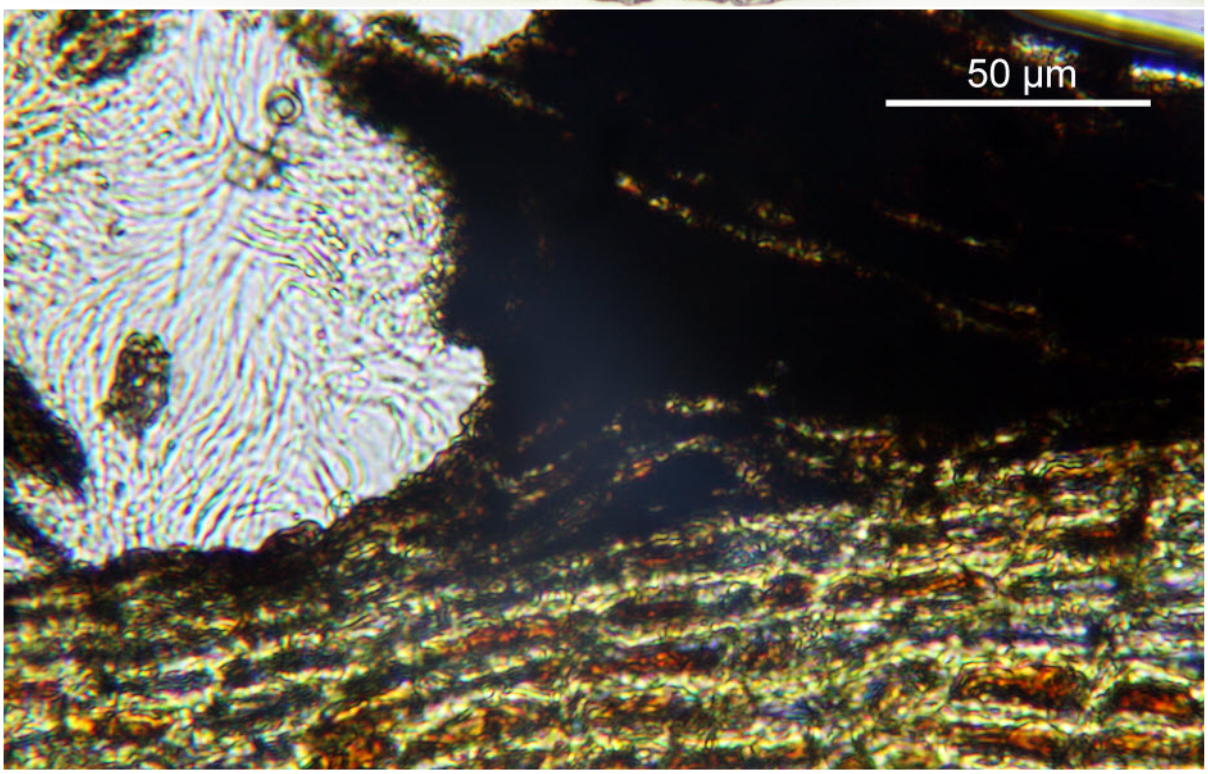
Pyrenula microcarpa Müll. Arg., Bot. Jb. 6: 412 (1885)
= *Pyrenula cinerea* Zahlbr.

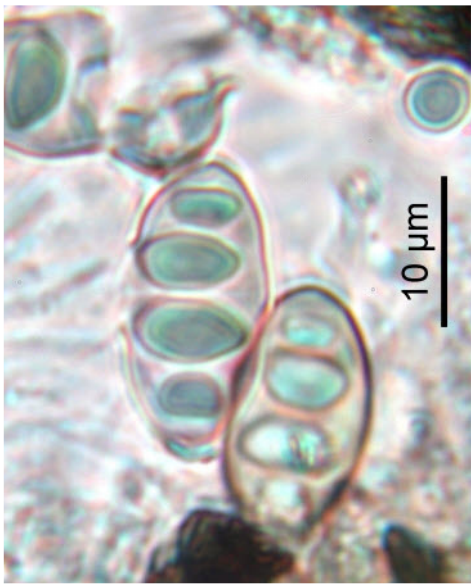
Thallus ecorticate, white to greyish, without pseudocyphellae. Perithecia solitary, subglobose, erumpent from the substratum, sides often partly covered by thallus, c. 0.3–0.4 mm diam. Perithecial wall without crystals, up to 100 µm thick. Ostiole pale, apical. Hamathecium not inspersed, IKI–, filaments unbranched. Ascospores 8/ascus, grey brown, irregularly biseriate, long hyaline, greyish brown, 3-septate, fusiform with pointed ends, 17–25 × 7–11 µm, lumina angular, terminal lumina separated from the exospore by an endospore layer. Chemistry: No substances detected, thallus UV- (often seeming greenish).

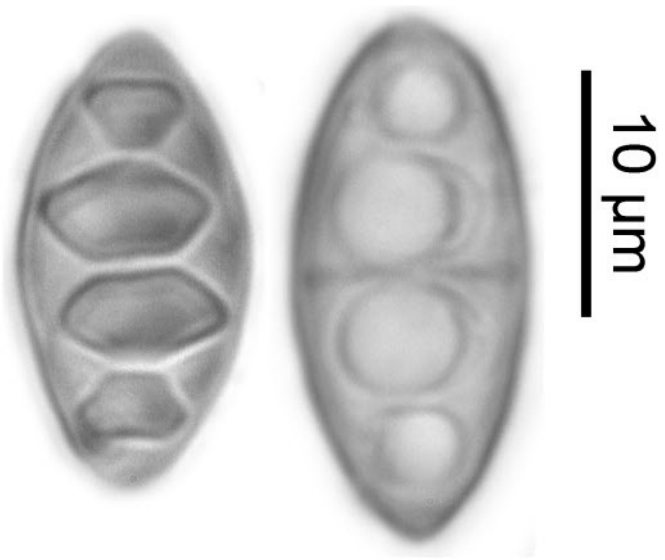
[14454], Seychelles, Praslin, Nationalpark Sentier Glacier Noire, 4°19.916' S, 55°44.465' E, ca. 200-320 m. Leg. F. Schumm & J.-P. Frahm, 30.09.2008, det. A. Aptroot, 2008.









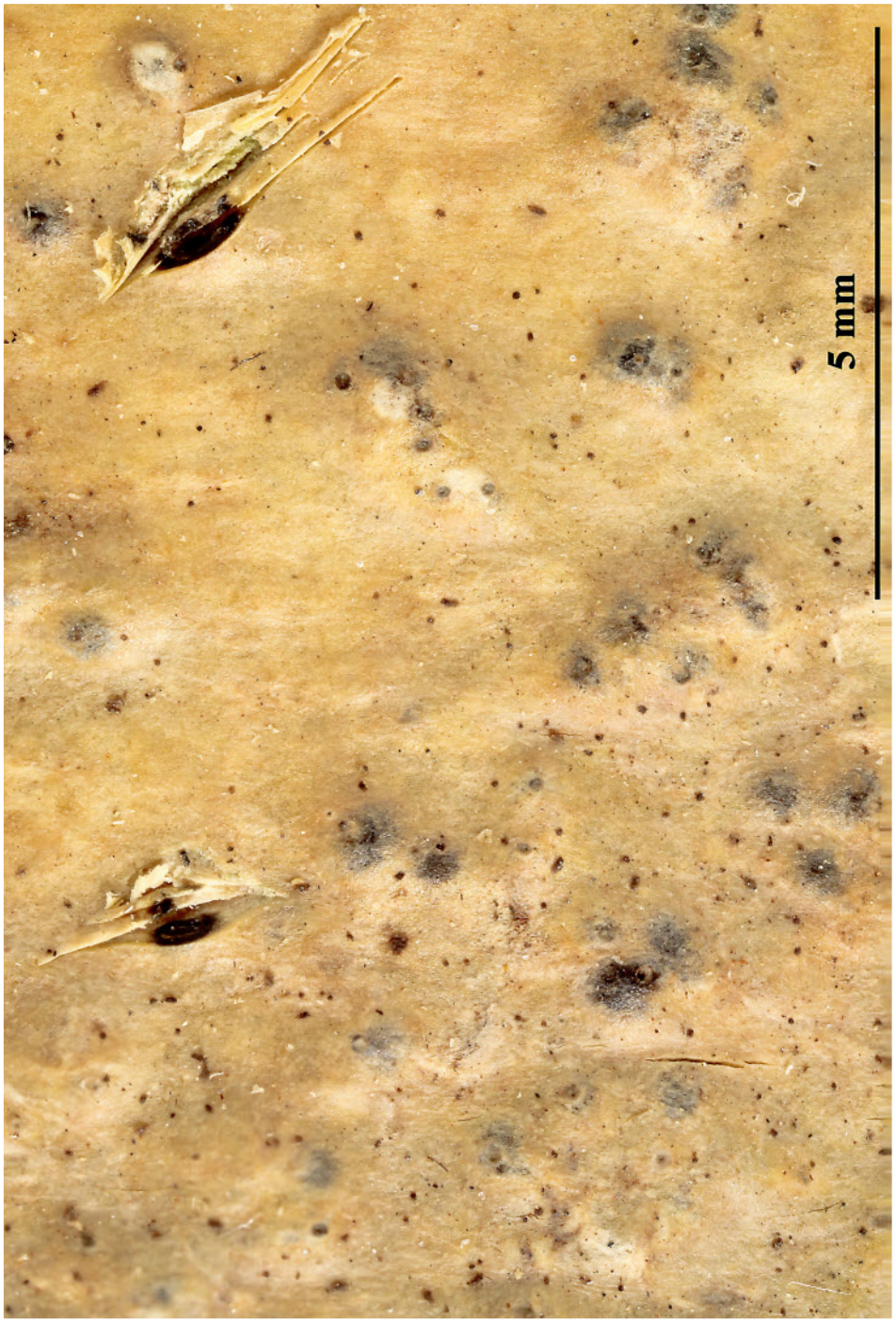


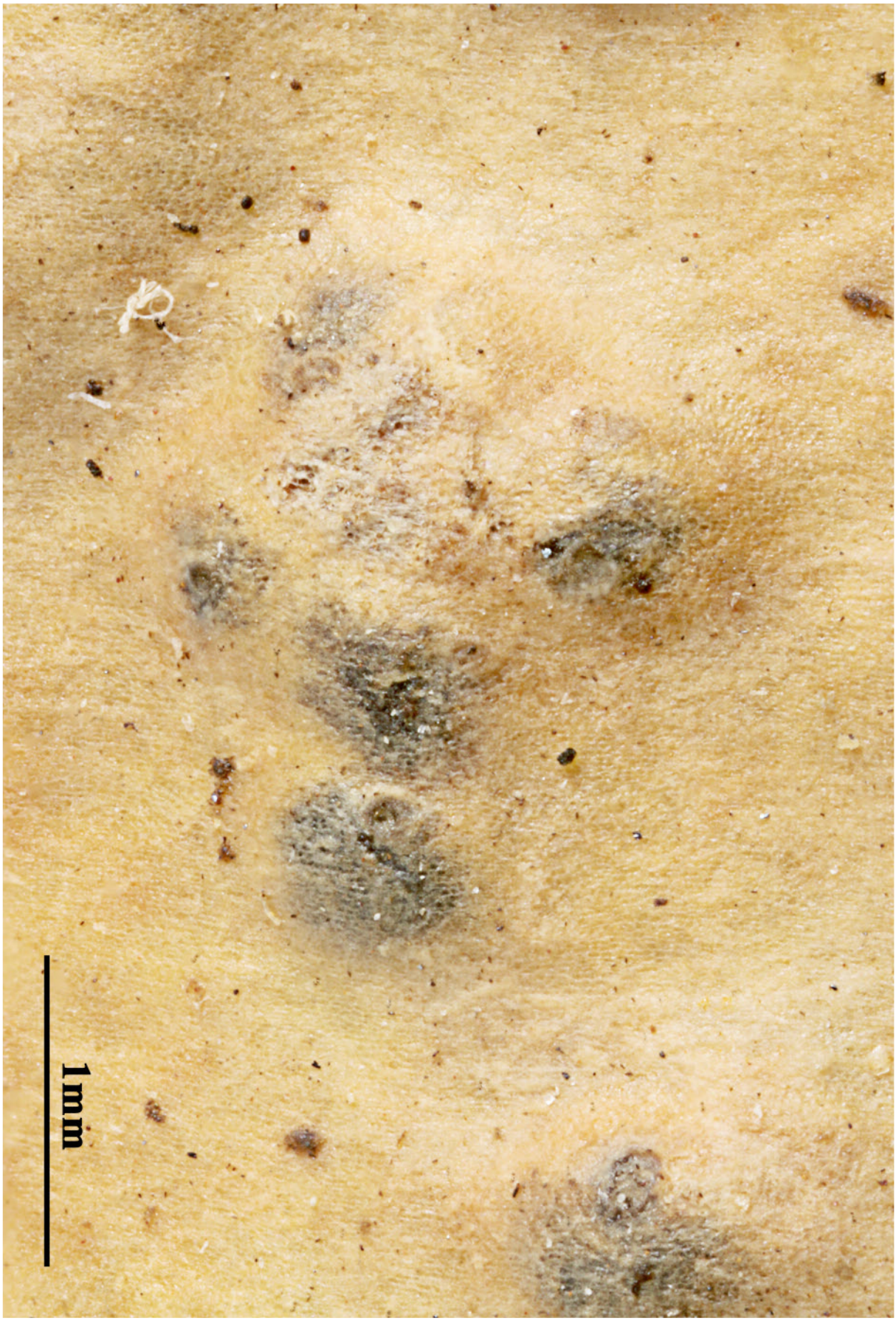
Pyrenula microcarpa

Pyrenula microtheca R.C. Harris, Mem. N. Y. bot. Gdn 49: 96 (1989)
= *Parathelium microcarpum* Riddle, in Britton & Millspaugh, The Bahama Flora (New York): 531 (1920)

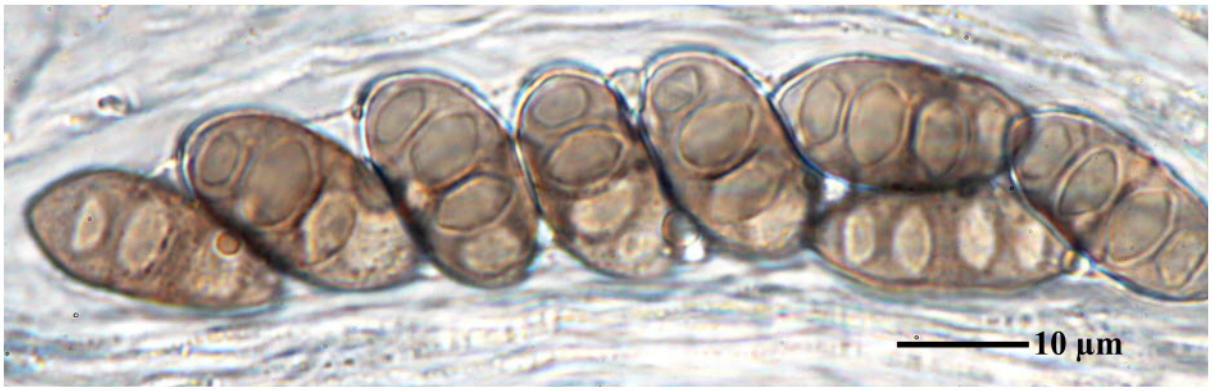
Thallus corticate, not pseudocyphellate, UV-. Ascomata flask-shaped, 0.5–0.9 mm long; ostiole lateral; crystals absent. Hamathecium not inspersed, hymenial gel IKI+ blue-green or less commonly IKI-. Ascospores uniseriate to biseriate, 4-celled, 18–25 × 7.5–10 µm.

[ABL41504], Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque Natural do Caraça, near Tanque Grande, in rain forest remnant on tree, 1270 m, 20°06’ S, 43°29’ W. Leg. A. Aptroot (no 41504), 19-20.09.1997, det. A. Aptroot, 1998.



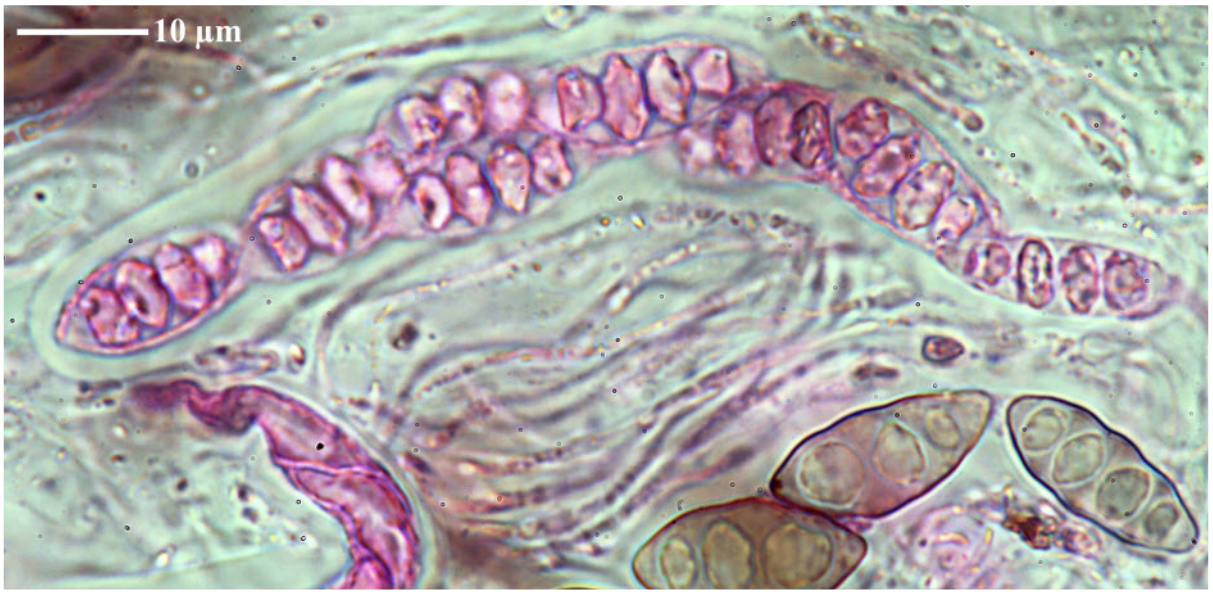


Pyrenula microtheca

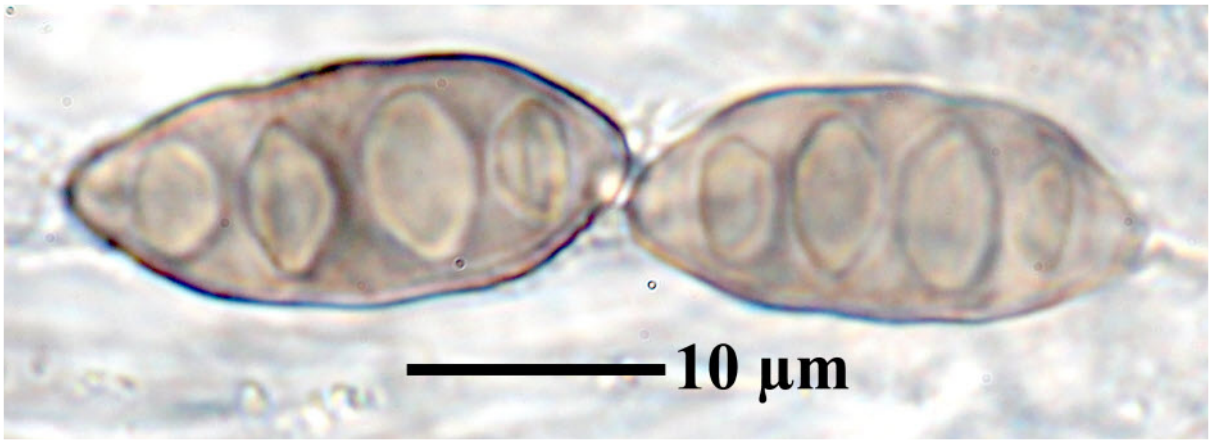




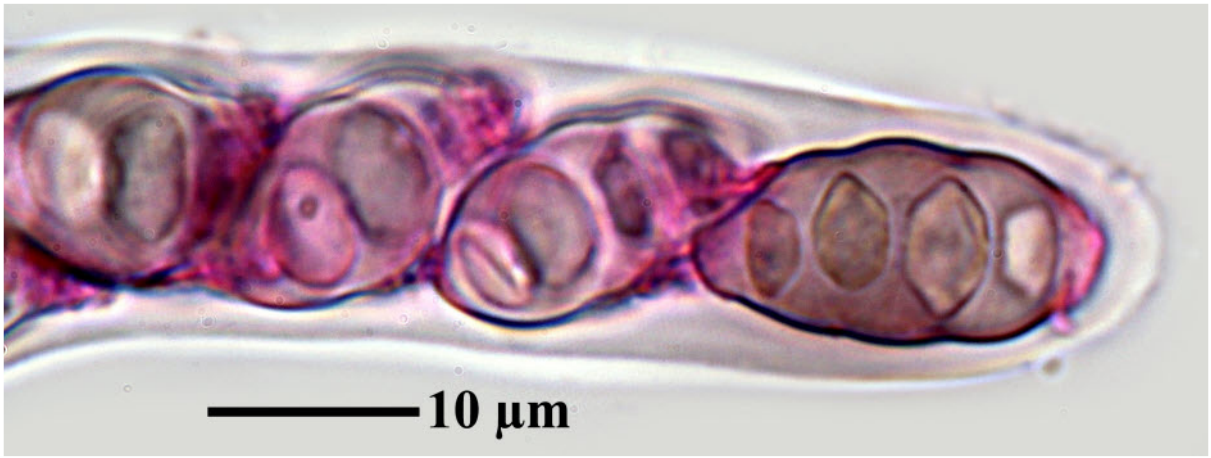




Pyrenula microtheca







Pyrenula microtheca

Pyrenula minoides Aptroot & Sipman, Lichenologist 45(2): 183 (2013)

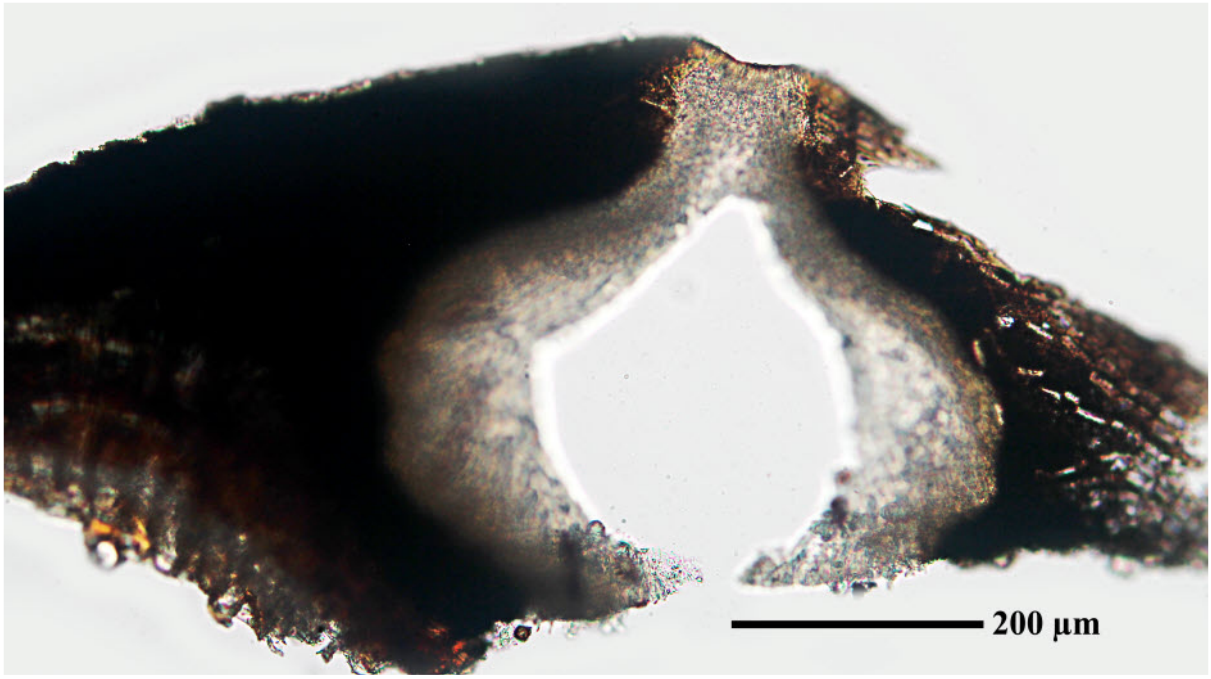
Thallus thin, medium to dark brown, smooth but not glossy, widely spreading, occupying a large area (several dm^2), without pseudocyphellae, without prothallus. Ascomata superficial, low conical, flattened, 1.0–2.5 mm diam., solitary and widely separate. Ostiole apical, brown to black. Hamathecium not inspersed. Ascospores 4 per ascus, uniseriate, 3-septate, 27–32 × 12–16 µm, dark brown, constricted at the central septum, ends rounded, lumina much wider than long, without endospore in the spore tips. Pycnidia not observed. Chemistry: No substances detected.

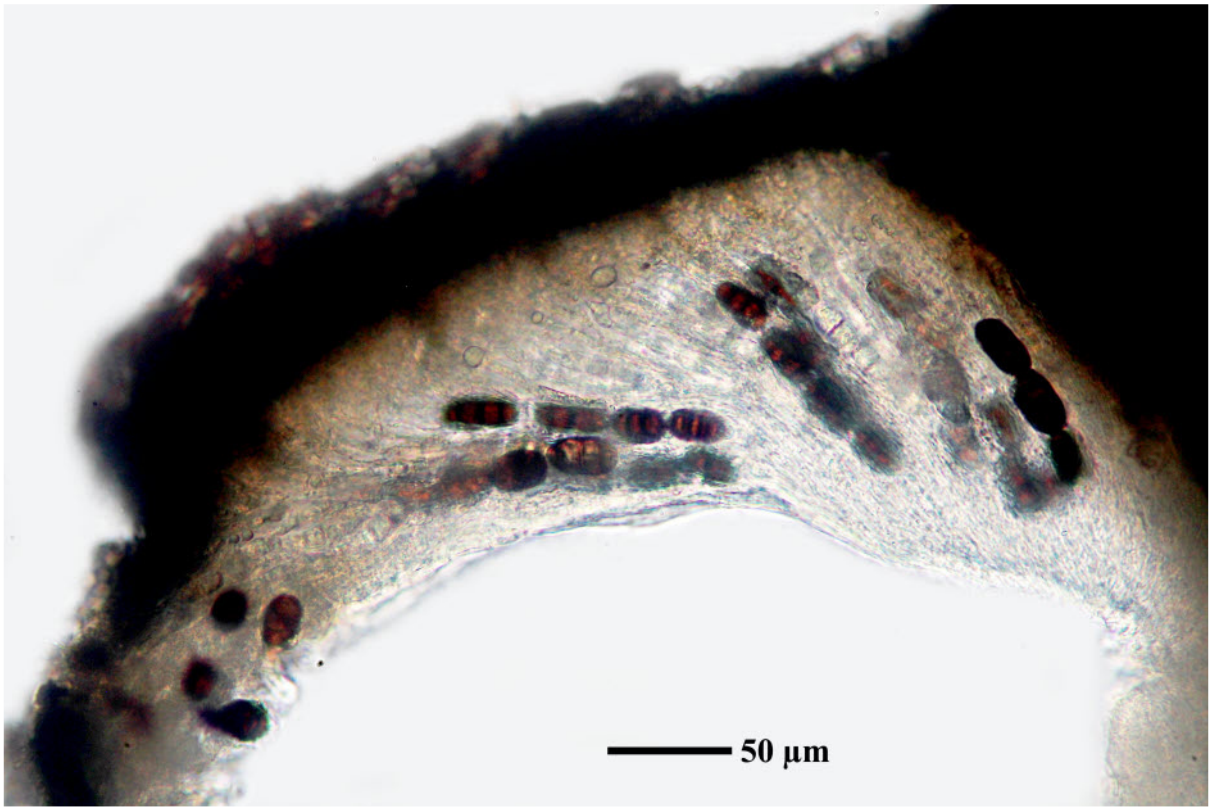
[Sip18837], Guyana, Upper Mazaruni district, N-slope of mount Roraima (campsite 6), 1400 m, 5°17' N, 60°43' W, in c. 25 m tall virgin humid mossy forest on steep N-facing slope, 1 m high on 30 cm diam. treetrunk. Leg. H. Sipman (no 18837) & A. Aptroot, 14–18.02.1985. ISOTYPE.





Pyrenula minoides







Pyrenula minoides

Pyrenula minor Fée, Essai Crypt. Exot., Suppl. Révis. (Paris): 79 (1837)

Thallus corticate, UV-, thinner than 0.3 mm, without external pigments. Ascomata < 0.4 mm diam, mostly simple. Hamathecium not inspersed. Ascospores 14.5–17 × 5.5–7 µm, brownish, 3-septate, without dark bands, lumina in a straight line, without extra endospores layers, terminal lumina mostly separated from the exospore wall by endospore thickening, old without orange oil.

[ABL13516], Sergipe, Parque National Serra da Itabaiana, on bark in transitional forest, 400 m, 10°44’35’’ S, 37°20’25’’ W. Leg. M. Cáceres & A. Aptroot (no 13516), 6.9.2012, det. A. Aptroot, 2012.



Pyrenula minor Fée, Essai Crypt. Exot., Suppl. Révis. (Paris): 79 (1837)

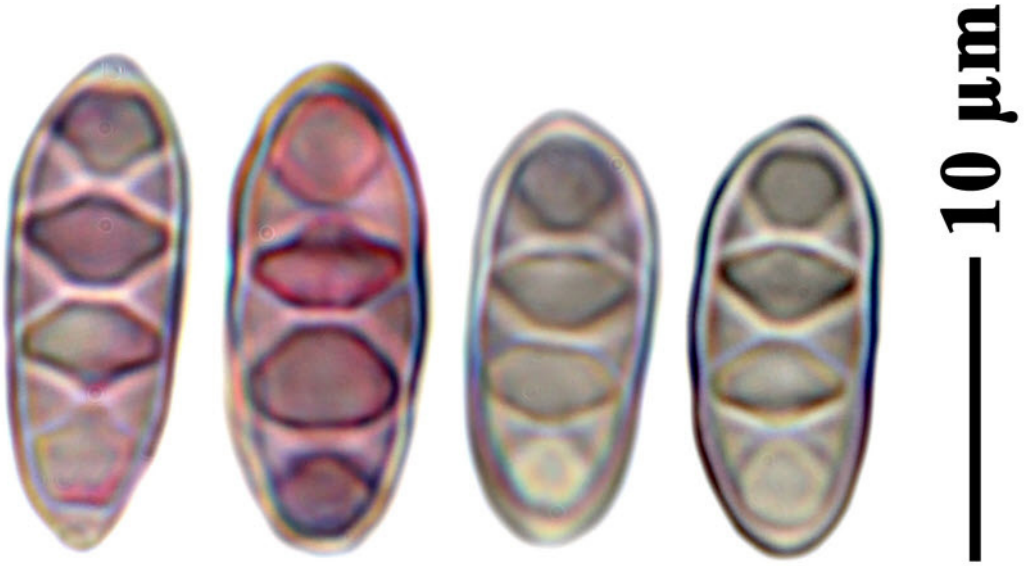
Ascomata dense, hemispherical to globose, exposed or sometimes covered by cortex only, 0.2–0.4 mm diam.; hamathecium gel IKI+ blue-green transient into reddish; ascospores pale grey, uniseriate, 4-loculate, 12–8 × 5–6 µm, oblong to ellipsoidal-oblong, mastophora-type.

[ABL27308], Brazil, Amapá, Flona, Floresta Nacional do Amapá, nbear station, on tree bark in disturbed forest, 30 n, 0°55’ N, 51°36’ W. Leg. M. Cáceres & A. Aptroot (no 27308), 19.08.2015, det. A. Aptroot, 2015.





Pyrenula minor





Pyrenula minor

Pyrenula minutispora Aptroot & M. Cáceres, in Gueidan, Aptroot, Cáceres & Binh, Mycol. Progr. 15(1/7): 19 (2015)

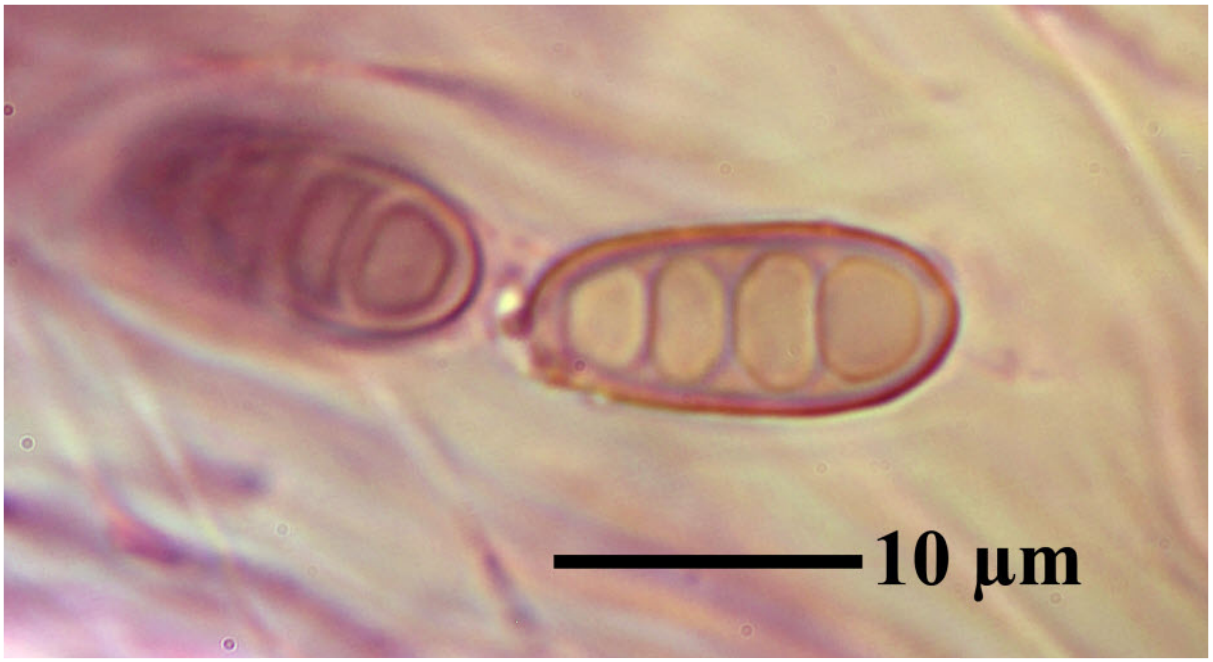
Thallus thin, dark brown, at least 10 cm diam., without pseudocyphellae, without prothallus. Ascomata immersed to emergent, conical, 0.2–0.3 mm diam., mostly single, sometimes a few fused sideways, but without clearly fused walls and with separate ostioles. Ostiole apical, pale brown. Hamathecium not inspersed. Ascospores 8/ascus, overlapping uniseriate, 3-septate, 11–13× 5–6 µm, lumina mostly rounded but becoming angular with age, wider than long, lumina separated from the wall by a thick layer of endospore. Pycnidia not observed. Chemistry: no substances detected.

[ABL11877], Brazil, Amazonia, Fazenda São Francisco off BR319, 30 km N of Porto Velho, on tree bark in primary rain forest, 8°24’33” S, 63°58’56” W, 100m. Leg. M. Cáceres & A. Aptroot (no 11877), 15.03.2012, det. A. Aptroot, 2012. ISOTYPE.





Pyrenula minutispora





Pyrenula minutispora

Pyrenula montagnei Müll. Arg., Flora, Regensburg 68: 337 (1885)

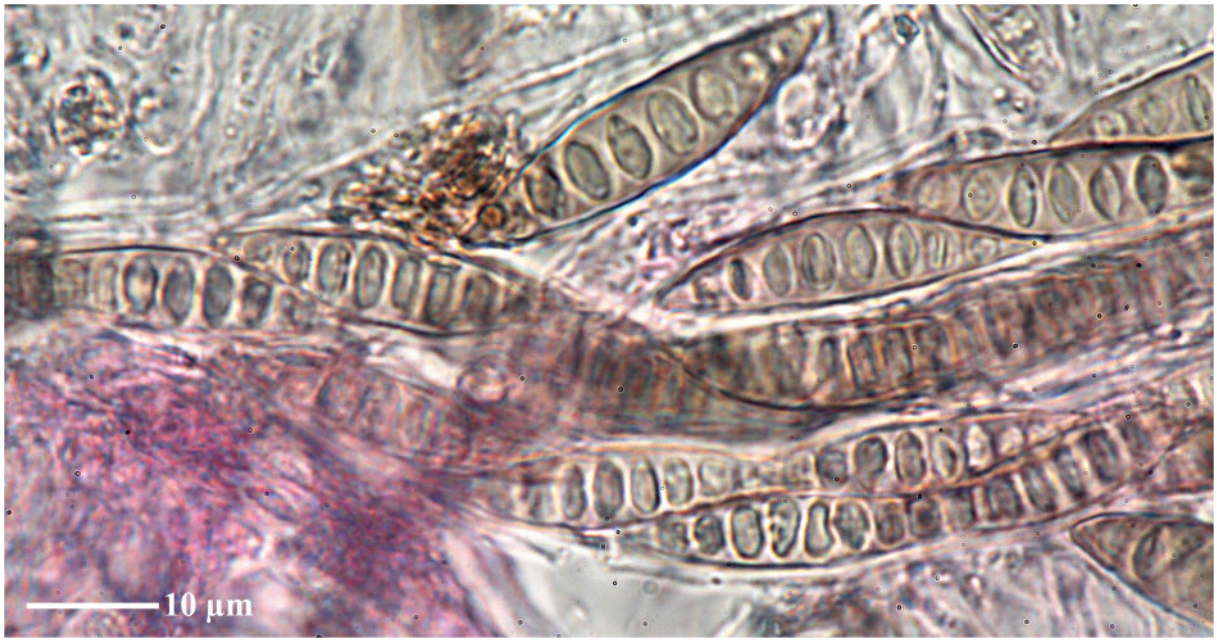
Ascomata semiglobose, (finally) exposed, 0.4–0.6 mm diam.; ostioles tiny, often pale; hamathecium not or inspersed with colourless oil globules; ascospores usually 6–8-loculate, 25–38 × 5–7 µm, grey-brown, narrowly fusiform, mostly curved, with elongate to ovoid locules, somewhat acute at the tips.

[Groenhart2111], Indonesia, Java, Salak, 200 m. Leg. P. Groenhart (no 2111), 08.09.1940, det. A. Aptroot, 2011.





Pyrenula montagnei





Pyrenula montagnei

Pyrenula montana Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 64: 163 (1997)

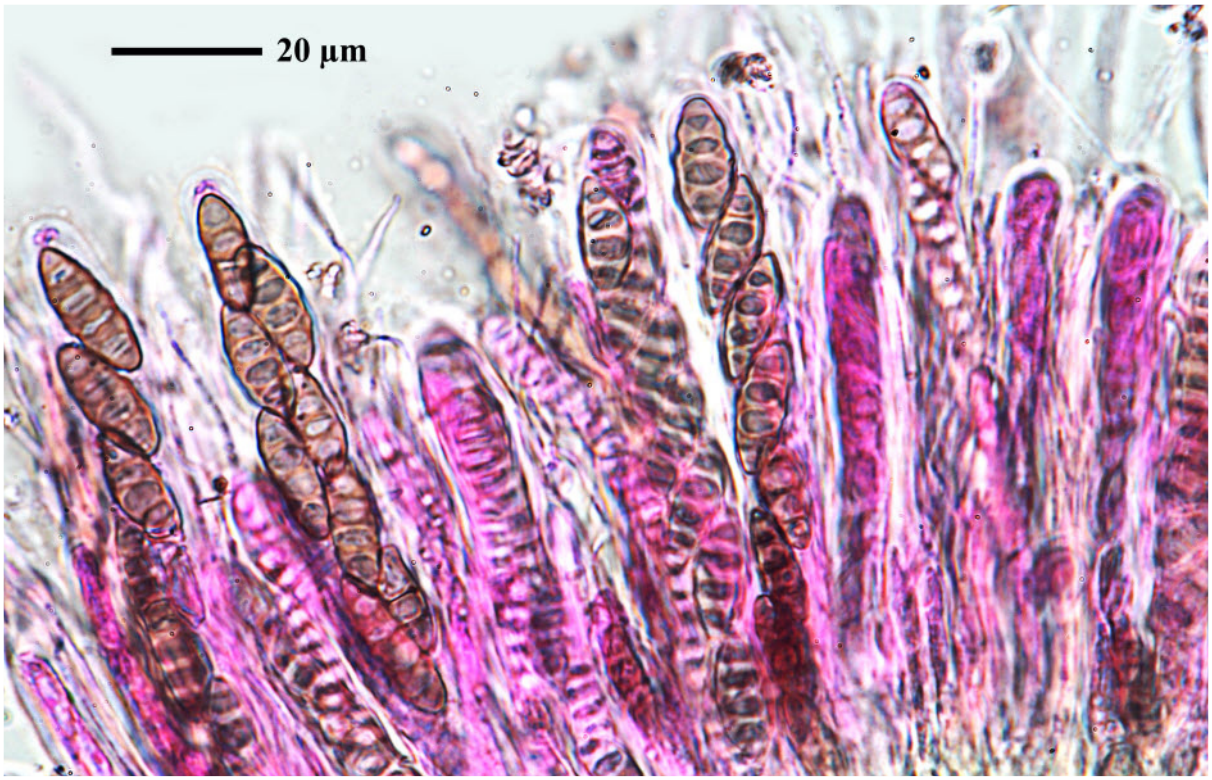
Thallus up to 10 cm wide, yellowish-brown, continuous to irregularly cracked, smooth, corticate, without pseudocyphellae, UV-, surrounded by a black prothallus or without prothallus. Perithecia immersed in the thallus and the bark, becoming exposed, black, dull, hemispherical, 0.6–1.3 mm wide, at least partly covered by the thallus; ascoma wall entire, carbonized, with clypeus up to 150 µm thick, c. 20 µm under the asci; ostiole apical, inconspicuous; hymenium I-, inspersed; ascospores 8/ascus, irregularly arranged in the ascus, 3-septate, distoseptate, without or with 1 median euseptum, wide-fusiform, not pointed, constricted at the lumina, with angular lumina, 16–19 × 7–9 µm.

[ABL18214], Papua New Guinea, Chimbu prov., Mount Wilhelm Area, 3 km NW of Keglsugl, 30 km N of Kundiawa, on tree in tropical moutain forest. 145°05’ E, 5°48’ S, 2800 m. Leg. A. Aptroot (no 18214), 03.1987, det. A. Aptroot, 1987.





Pyrenula montana





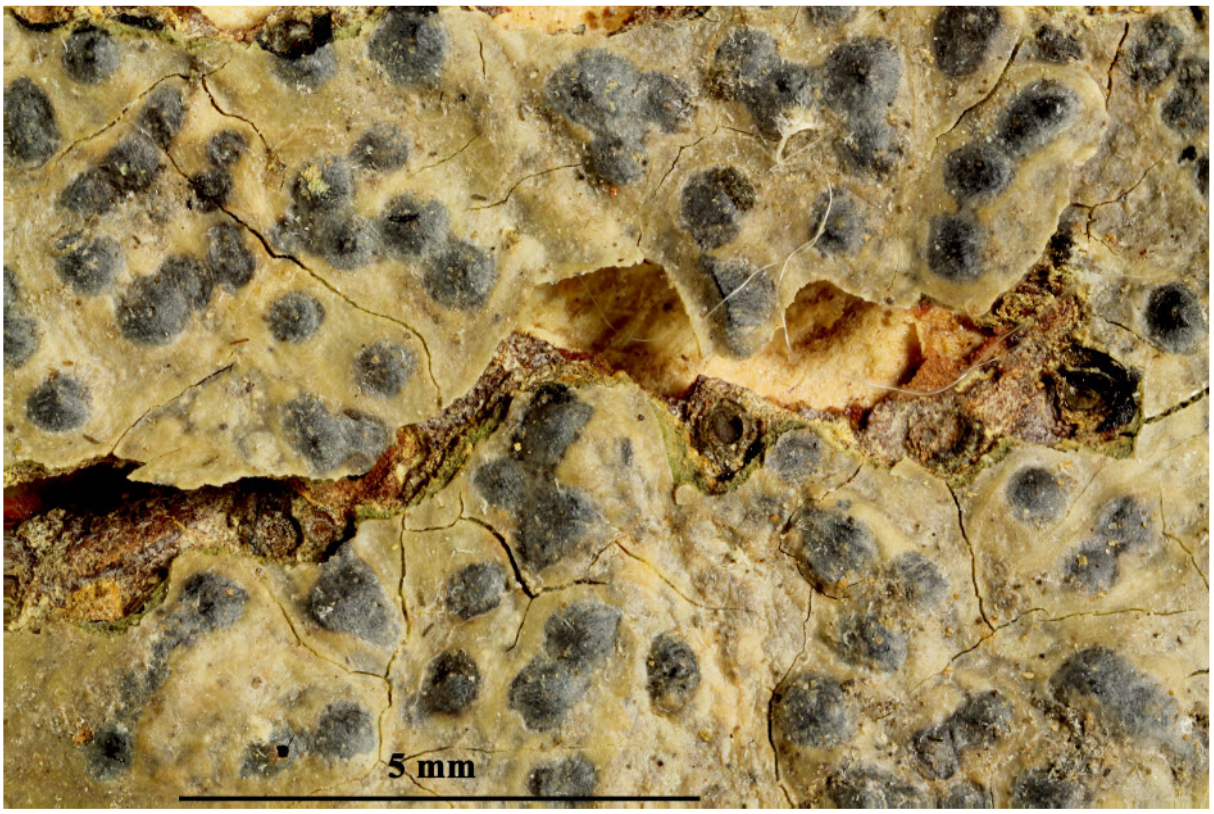


Pyrenula montana

Pyrenula multicolorata Weerakoon & Aptroot, Phytotaxa 280(2): 158 (2016)

Thallus oily, olive green, quite thick, without pseudocyphellae, covering an area up to 5 cm diam., surrounded by a thin black hypothallus line. Ascomata almost superficial, low conical, simple or occasionally a few fused sideways, black, not covered by thallus, 0.5–0.7 mm in diam. Ostiole apical, brown to black. Hamathecium inspersed with many orange, KOH-negative crystals that are colouring the hamathecium red close to the wall and yellow in the centre. Ascospores 8/ascus, pale brown (dark brown only when postmature), irregularly biseriate, 3-septate, 12–13.5 × 4.5–5.5 µm, lumina becoming diamond-shaped, wall relatively thick, with a thick layer of endospore in the spore tips. Pycnidia not observed. Chemistry. Thallus UV–, K–. Hamathecium with orange to red or yellow (depending on dilution), KOH -; no substances detected with TLC

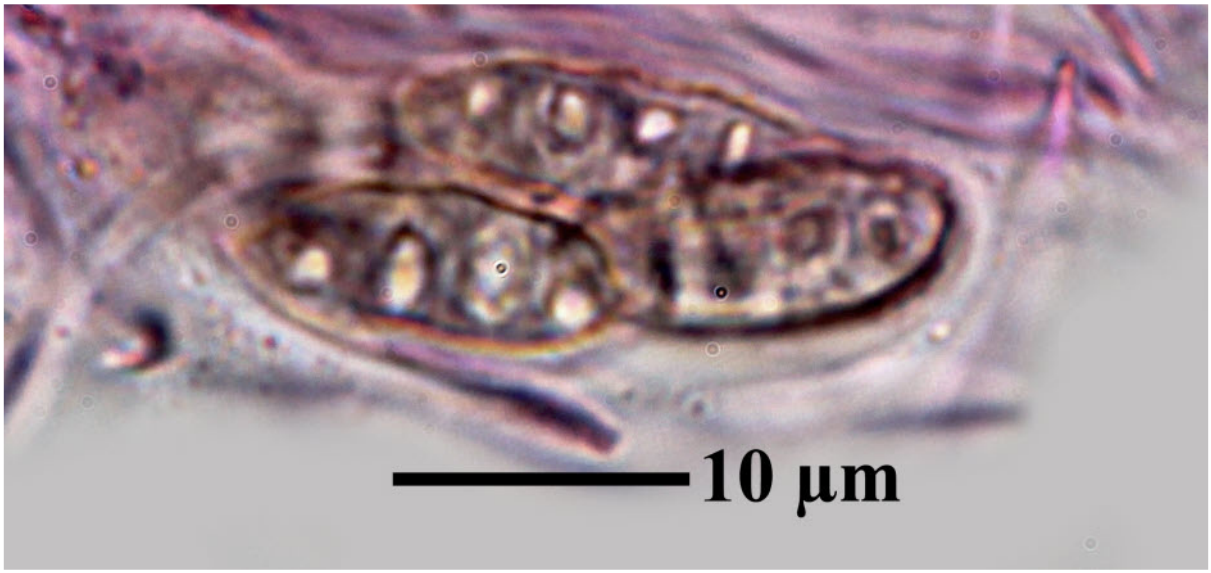
[WeerakoonKi05], Sri Lanka, Kitulgala-Makandawa, on bark of tree. Leg. G. Weerakoon (no Ki 05), 29.03.2015, det. A. Aptroot, 2016. ISOTYPE.





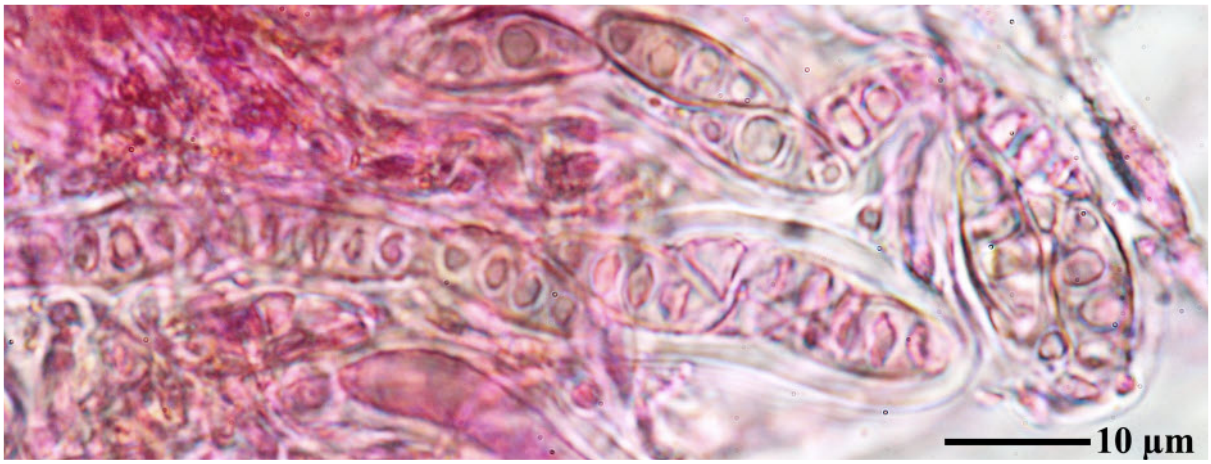
Pyrenula multicolorata

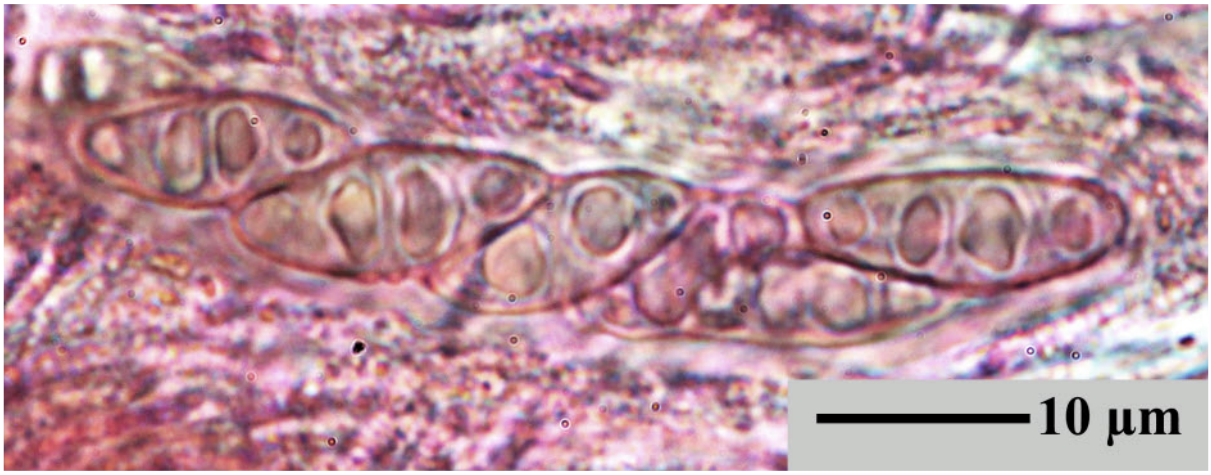


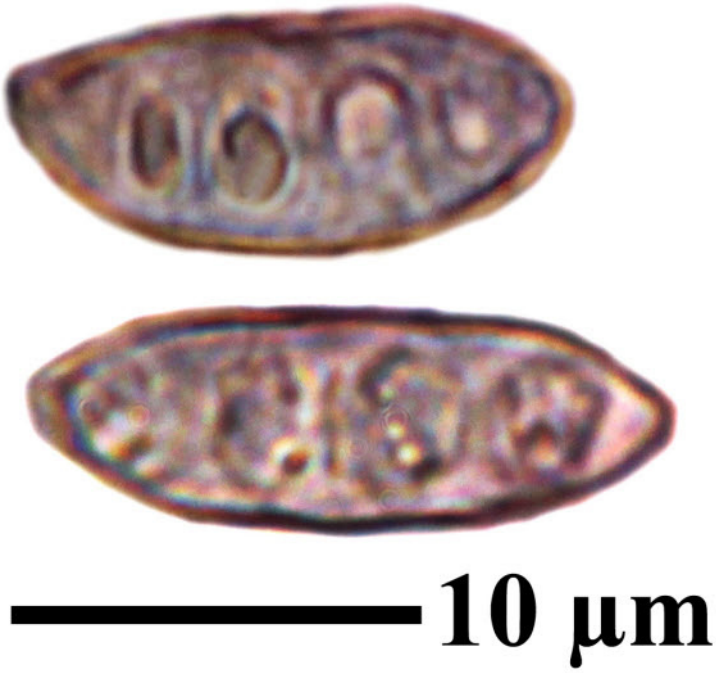




Pyrenula multicolorata







Pyrenula multicolorata

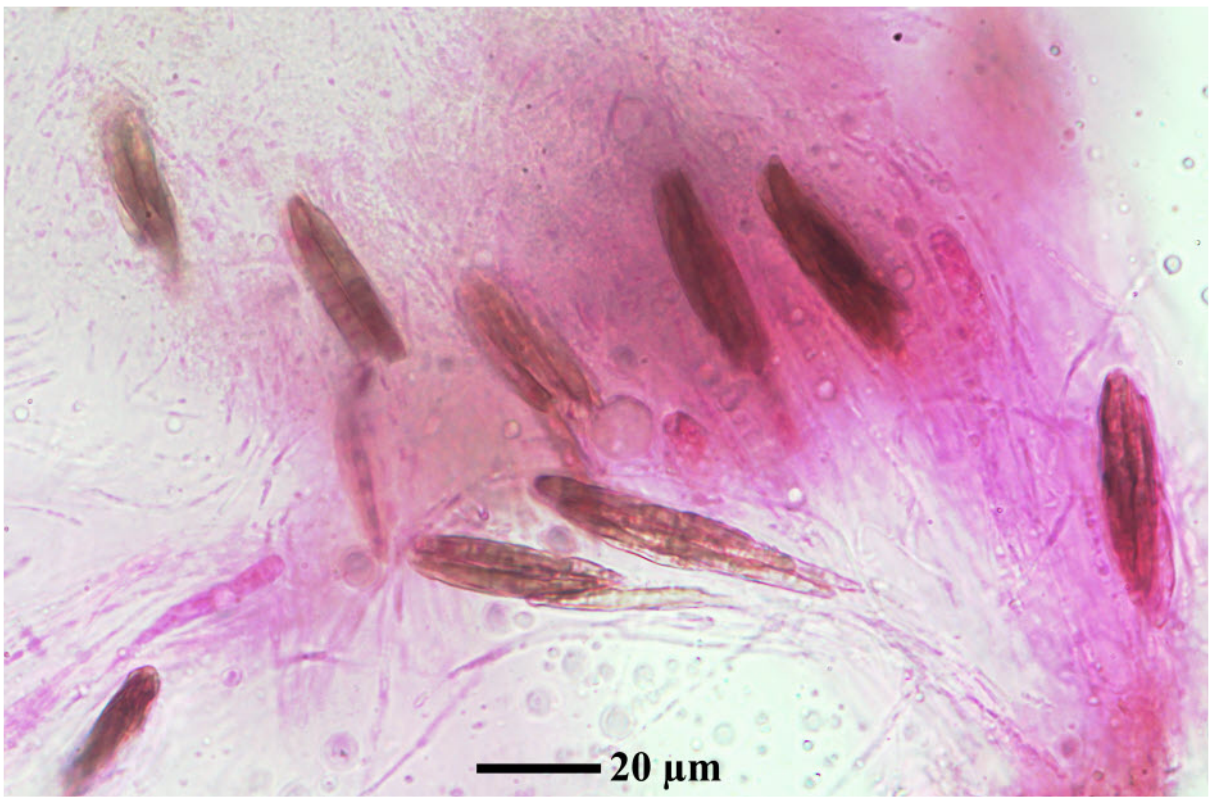
Pyrenula musaespora Aptroot & M. Cáceres, in Aptroot, Andrade, Mendonça, Lima & Cáceres, Phytotaxa 197(3): 203 (2014)

Thallus thin, corticate, pale ochraceous, without pseudocyphellae, surrounded by a c. 0.5 mm wide black prothallus line. Ascomata superficial on the bark, conical, 0.4–0.65 mm diam., single, mostly covered by thallus that is revealing the black ascomata in a rather irregular area around the ostiole. Wall carbonized all around. Ostiole apical, black. Hamathecium inspersed with hyaline oil droplets. Ascospores 8/ascus, brown, in one bundle (all mostly overlapping), filiform, 3–5-septate, 30–37 × 3–4 µm, lumina long elongated, separated from the wall by a relatively thick layer of endospore, ends pointed. Pycnidia not observed. Chemistry: Thallus UV+ yellow; TLC: lichexanthone.

[ABL18759], Brazil, Sergipe, Santa Luzia do Itanhy, Mata do Crasto, 11°22' S, 37°25' W. 10 m, on bark of tree in Atlantic rainforest. Leg. M. Cáceres & A. Aptroot (no 18759), 26.03.2014, det. A. Aptroot, 2014. ISOTYPE.



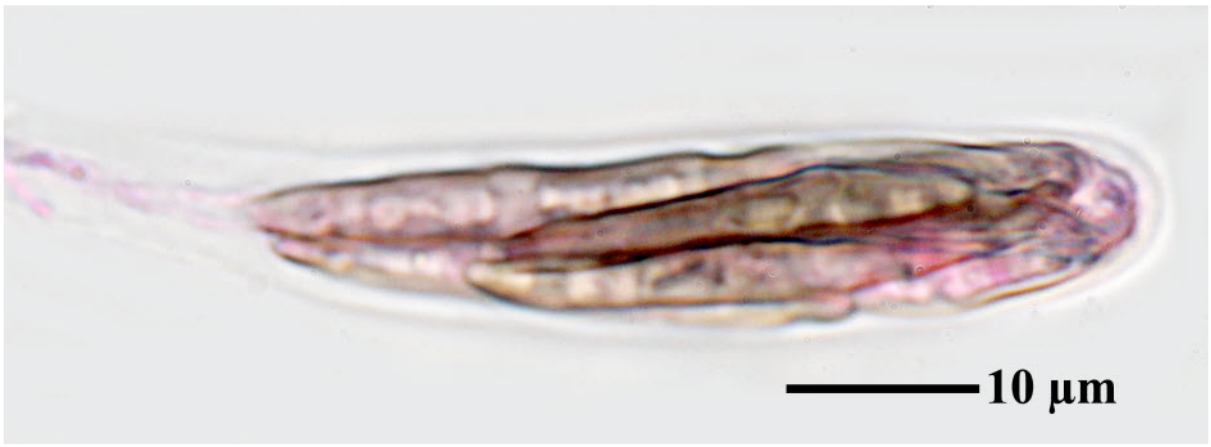




Pyrenula musaespora









Pyrenula musaespora

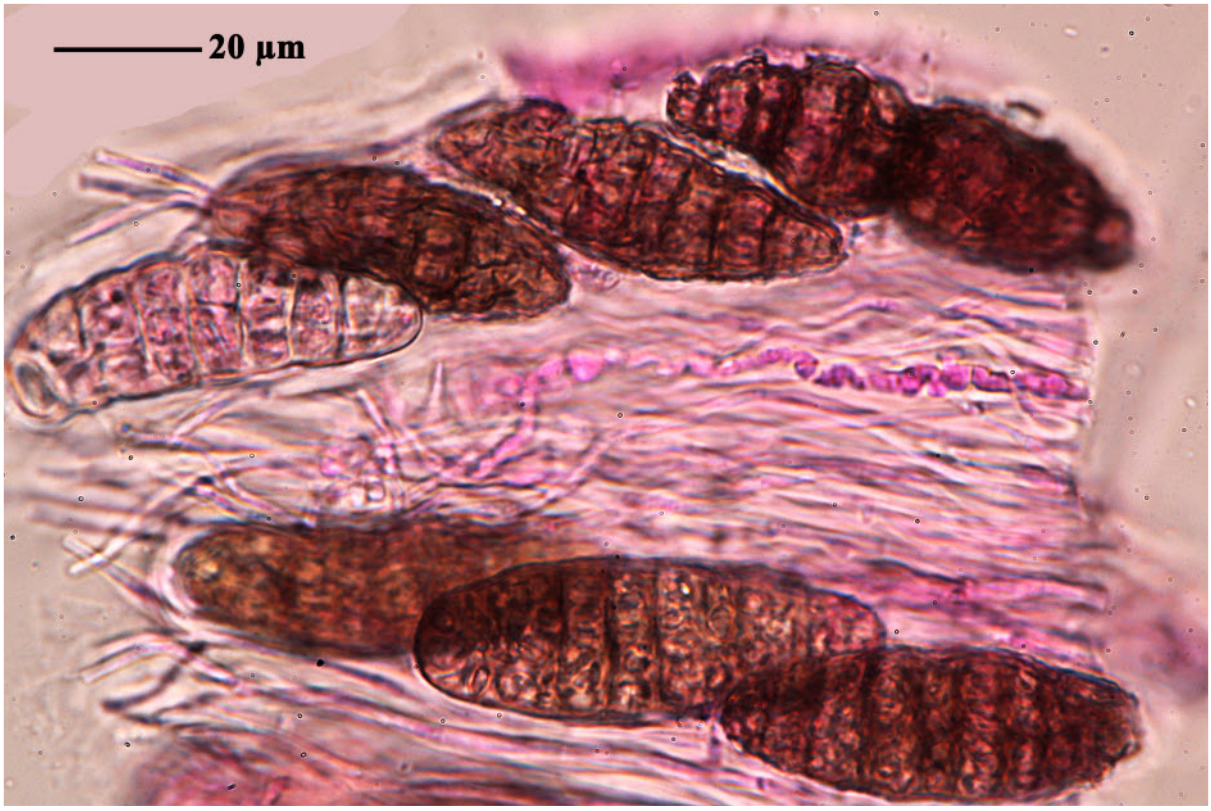
Pyrenula neosandwicensis Aptroot, Lichenologist 44(1): 36 (2011) [2012]
= *Anthracothecium sandwicense* Zahlbr., Annls mycol. 10(4): 361 (1912)

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.

[ABL13475], Brazil, São Paulo, Botucatu, Fazenda Lageado museum, on bark in park. 750 m, 22°50'39" S, 48°25'36" W. Leg. M. Cáceres & A. Aptroot (no 13475), 14.9.2012, det. A. Aptroot, 2012.







Pyrenula neosandwicensis





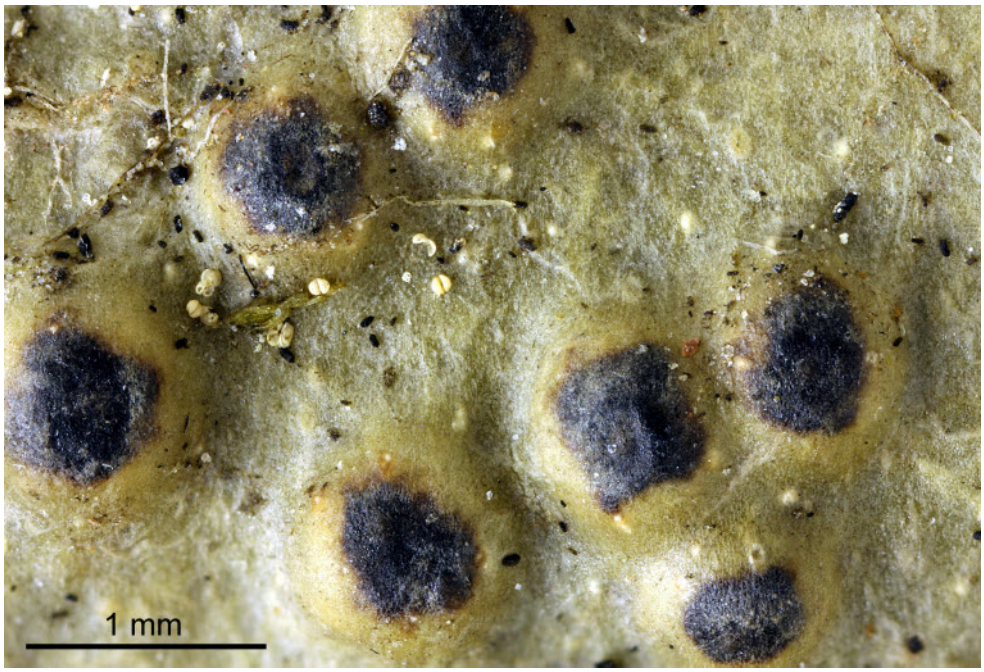


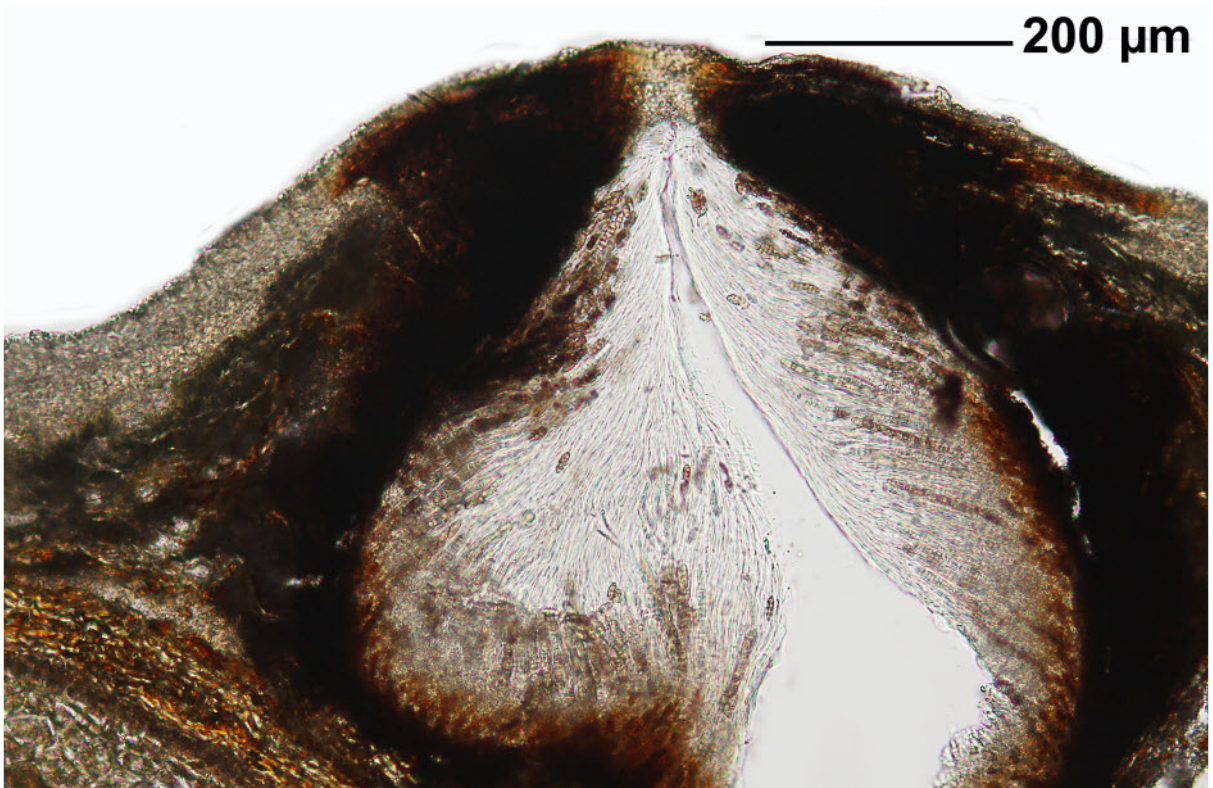
Pyrenula neosandwicensis

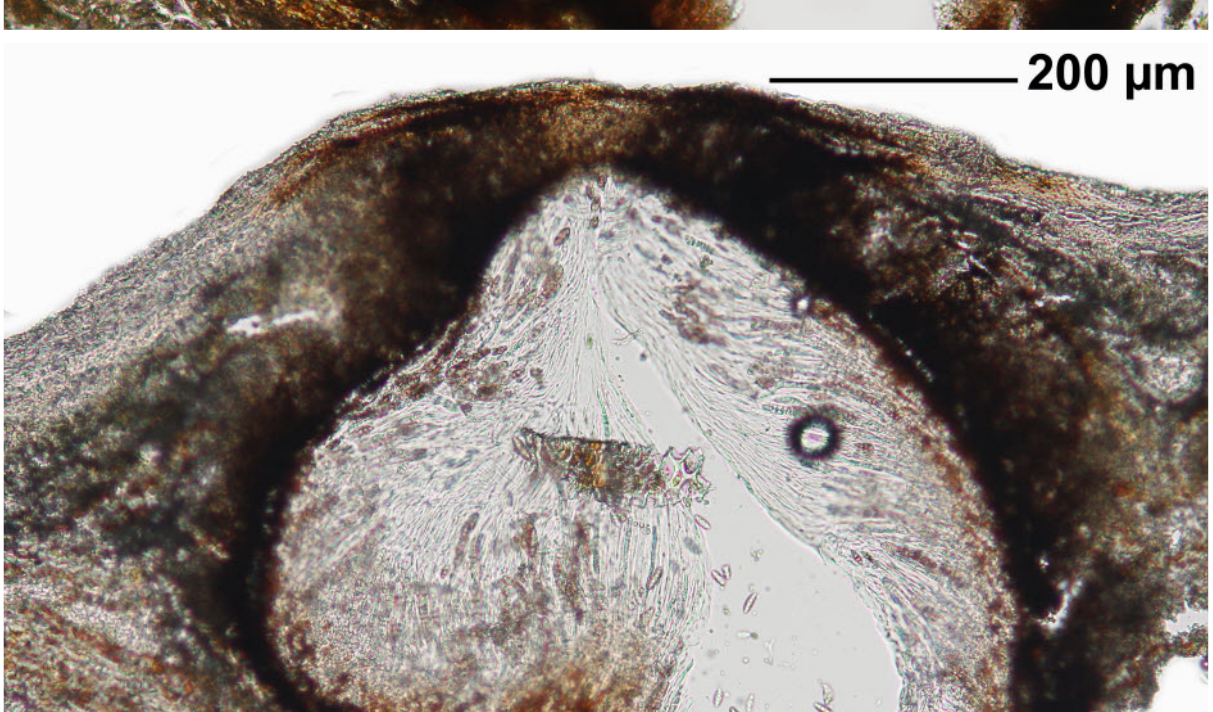
Pyrenula nitida (Weigel) Ach., Mag. Gesell. naturf. Freunde, Berlin 6(1): 21 (1814)
= *Arthopyrenia nitida* (Weigel) H. Olivier, Flora Lich. Orne 2: 271 (1884)
= *Bunodea nitida* (Weigel) Beltr., Lich. Bassan.: 252 (1858)
= *Bunodea nitida* var. *major* Arnold, Flora, Regensburg 41(34): 556 (1858)
= *Lichen nitidus* (Weigel) Ach., Lich. suec. prodr. (Linköping): 18 (1799)
= *Pyrenula nitida* var. *major* Schaer., Enum. critic. lich. europ. (Bern): 212, tab. VIII, fig. 2 (1850)
= *Sphaeria nitida* Weigel, Observ. Bot.: 45 (1772)
= *Sphaeria suffusa* Rebent., Prodr. fl. neomarch. (Berolini): 325 (1804)
=*Verrucaria nitida* (Weigel) Schrad., J. Bot. (Schrader) 1: 79 (1801)
= *Verrucaria nitida* var. *major* Schaer., Lich. helv. spicil. 2: 57 (1826)

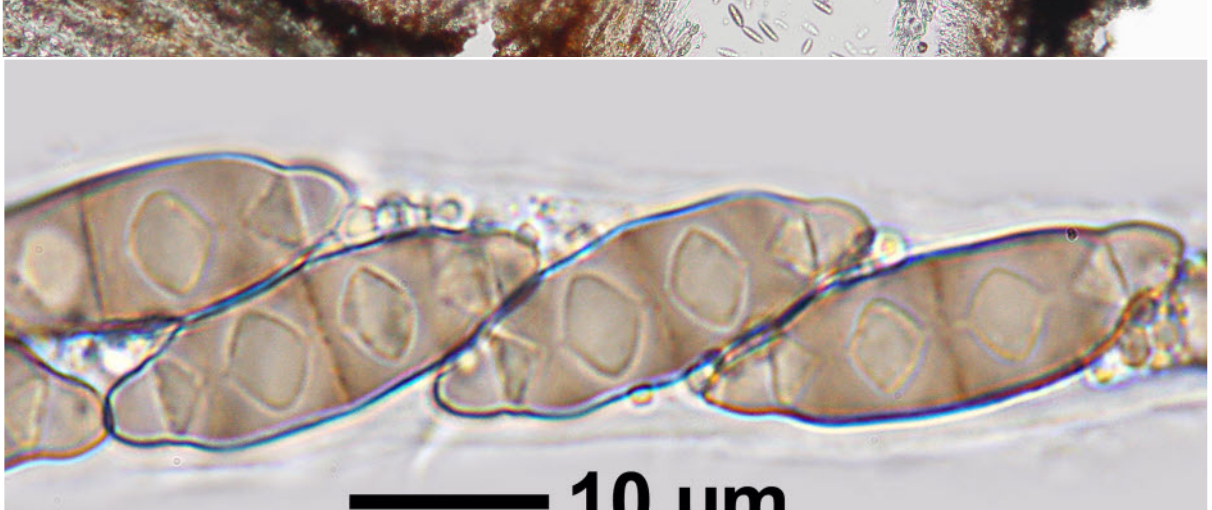
Thallus olive- to yellow- or dark brown. Pseudocyphellae often absent, but sometimes frequent, 50–75 μm diam., whitish. Perithecia black, 0.6–0.8(–1) mm diam.; exciple containing colourless crystals; outer part of hymenium adjacent to exciple with orange-brown (by transmitted light) masses mof anthraquinone, K+ purple-red goining into solution; hymenium with or without sparse oil droplets. Ascospores brown, 3-septate, (17–)19–24(–26) × 6–8(–9) µm, 3-septate. Conidia c.16.5–19 × 0.8 µm, curved. Chemistry: Thallus C-, K+ orange-red, KC+ reddish, P-, UV-, unidentified anthraquinones.

[1998], Germany, Baden-Württemberg, Südschwarzwald, Tälchen nördlich von Hauingen beim Wirtshaus, ca. 350 m, TK 8312. Leg. et det. F. Schumm, 07.09.1971.

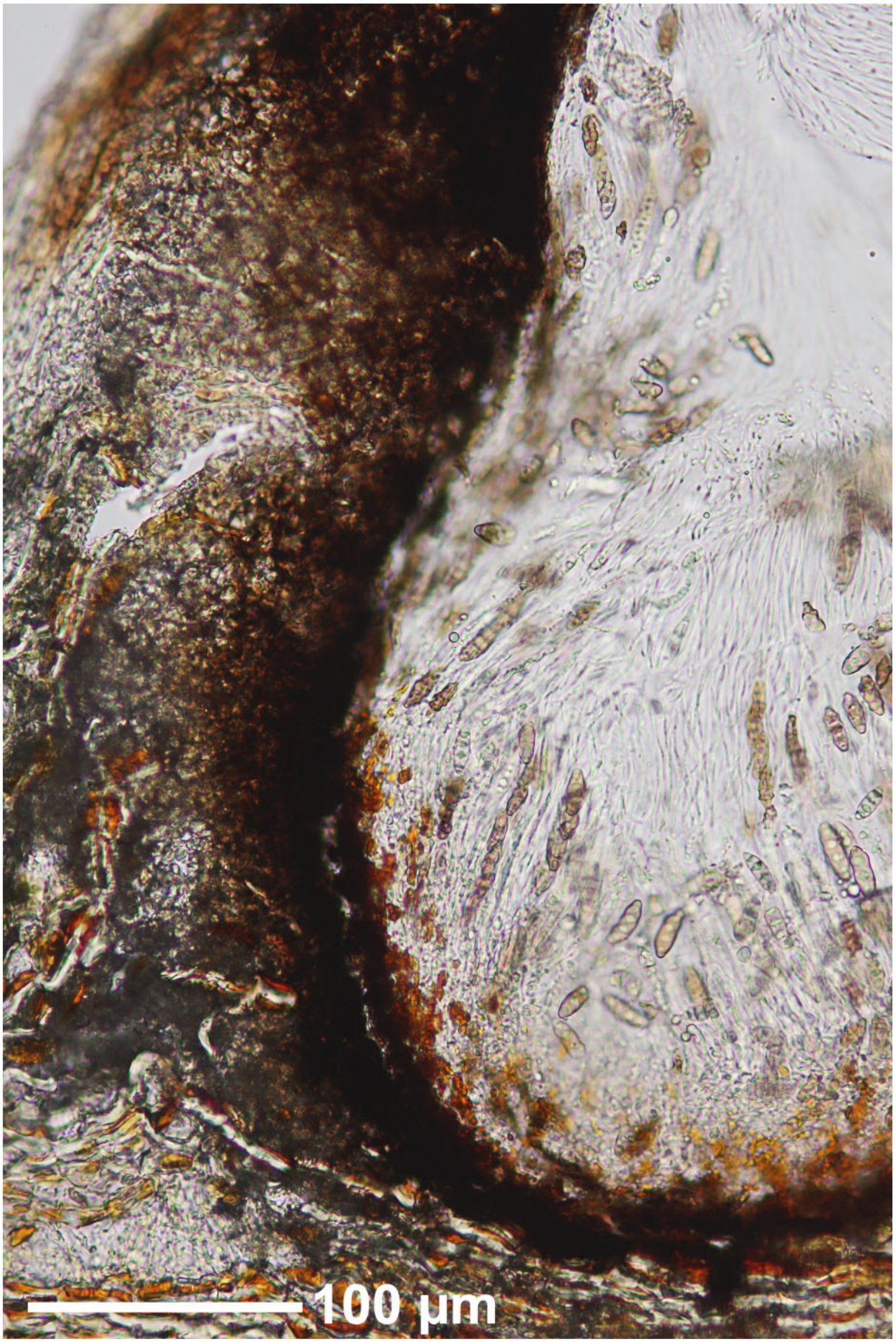




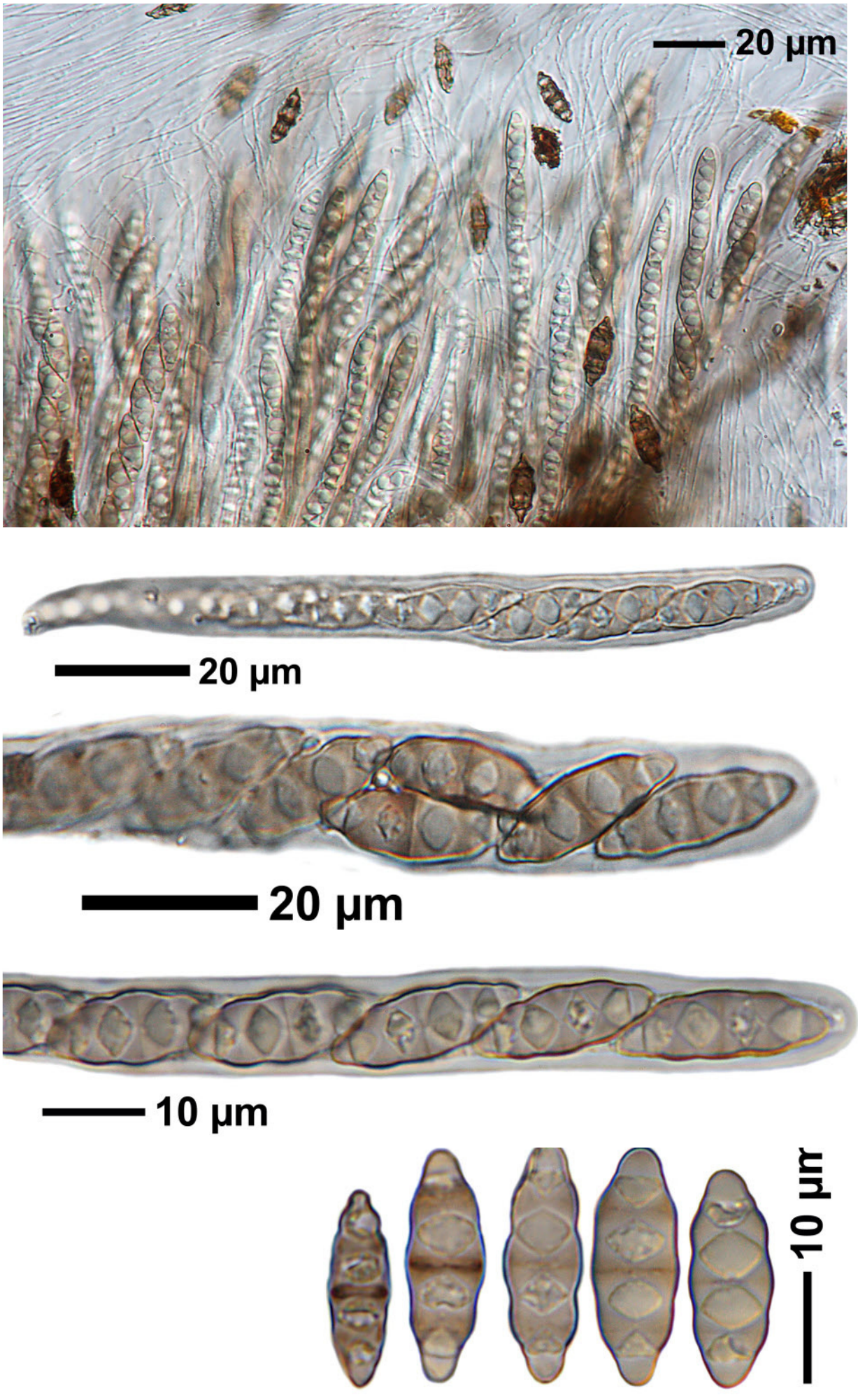




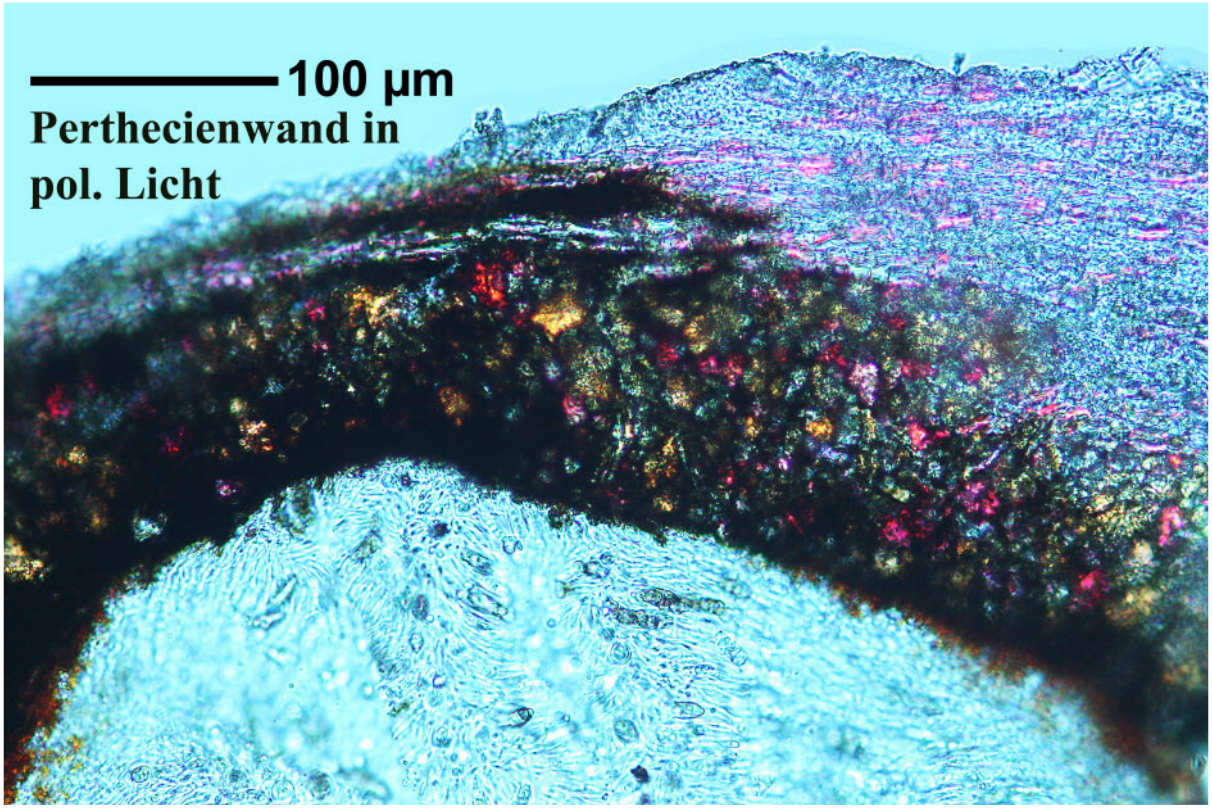
Pyrenula nitida



Pyrenula nitida



Pyrenula nitida



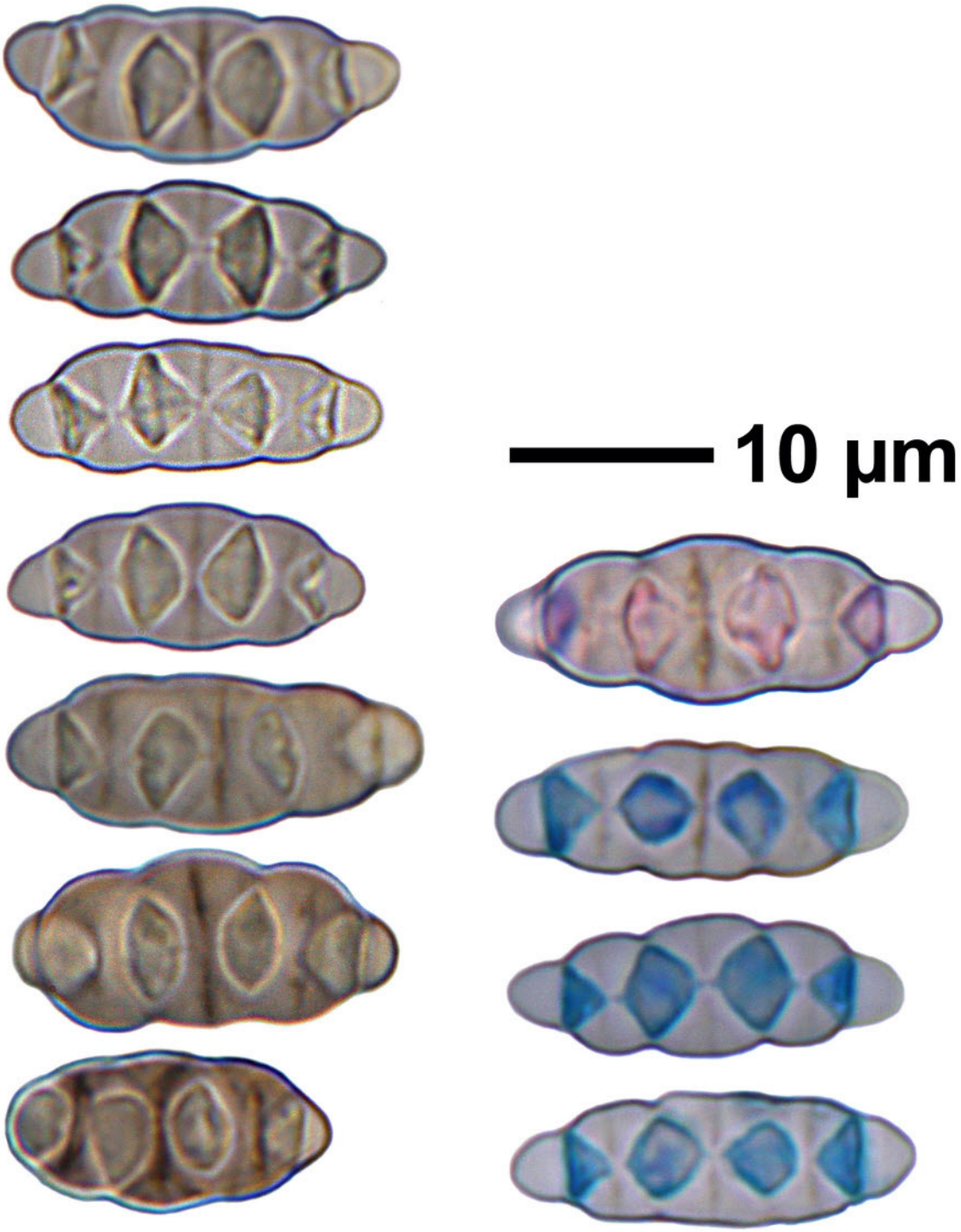
Pyrenula nitida

Pyrenula nitidella (Flörke ex Schaer.) Müll. Arg., Bot. Jb. 6: 414 (1885)
= *Arthopyrenia nitida var. nitidella* (Flörke ex Schaer.) H. Olivier, Flora Lich. Orne 2: 271 (1884)
= *Bunodea nitida var. nitidella* (Flörke ex Schaer.) Beltr., Lich. Bassan.: 253 (1858)
= *Pyrenula nitida f. nitidella* (Flörke) Körb., Syst. lich. germ. (Breslau): 360 (1855)
= *Pyrenula nitida var. nitidella* (Flörke ex Schaer.) Schaer., Enum. critic. lich. europ. (Bern): 212 (1850)
= *Verrucaria nitida subsp. nitidella* (Flörke) Nyl. ex Lamy, Bull. Soc. bot. Fr. 25(5): 500 (1880)
= *Verrucaria nitida var. nitidella* Flörke, Deutsche Lich. 2: 9 (no. 10) (1815)
= *Verrucaria nitidella* (Flörke ex Schaer.) Nyl., Lich. Nov. Zeland. (Paris): 130 (1888)

Thallus olive-brown to fawn; pseudocyphellae 50–75 µm diam., often sparse, whitish. Perithecia 0.2–0.3(–0.35) mm diam.; hymenium not inspersed with oil droplets, at sides with K+ purple-red material. Ascospores (20–)22–26(–28) × 8–12 µm, 3-septate, brown. Chemistry: thallus K+ yellow(–orange), C-, P-, KC-, UV-.

[4223], Germany, Baden-Württemberg, Kreis Schwäbisch Gmünd, im Beutenbachtal bei der Beutenmühle ca. 3 km südöstlich von Lorch, ca 310 m, an Fraxinus, TK 7224. Leg. et det. F. Schumm, 29.05.1995.





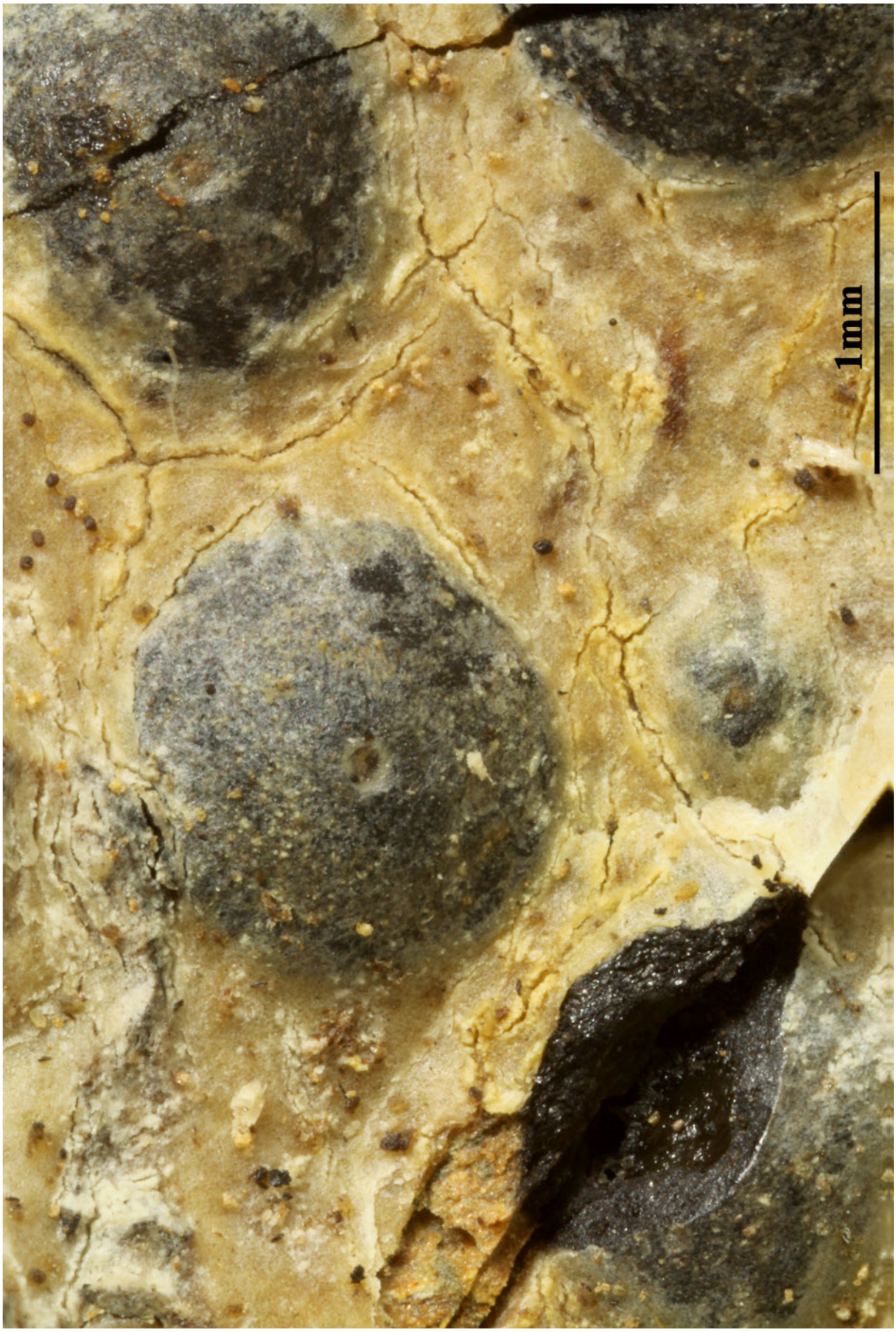
Pyrenula nitidella

Pyrenula novemseptata Vain., Proc. Amer. Acad. Arts & Sci. 58(3): 145 (1923)
= *Anthracothecium novemseptatum* (Vain.) R.C. Harris
= *Anthracothecium varians* R.C. Harris

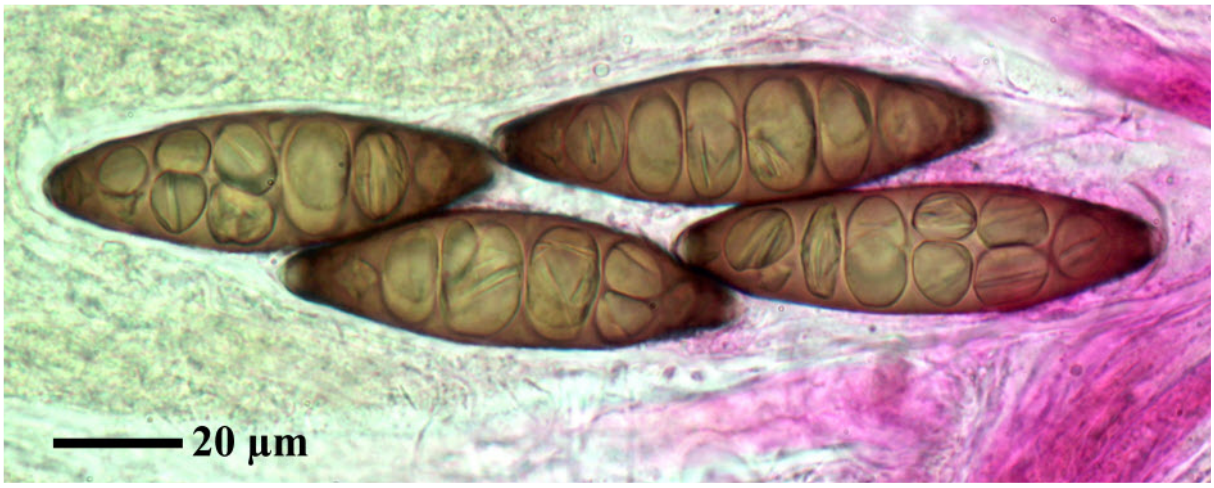
Ascomata conical to flattened conical, 1.0–1.5 mm diam.; hamathecium heavily inspersed with colourless oil globules, gel IKI+ orangish; ascospores 6–8-loculate, with rounded ends, (45–)50–65(–74) × (17–)20–29(–33) µm.

[Sip18314], Guyana, Upper Mazaruni District, Jawalla village, at the confluence of Kukul river and Mazaruni river. Cultivated, well-lit area near the village, on Persea. 5°40’ N, 60°29’ W. Leg. H. Sipman (no 18314) & A. Aptroot, 6.02.1985, det A. Aptroot, 1990.





Pyrenula novemseptata







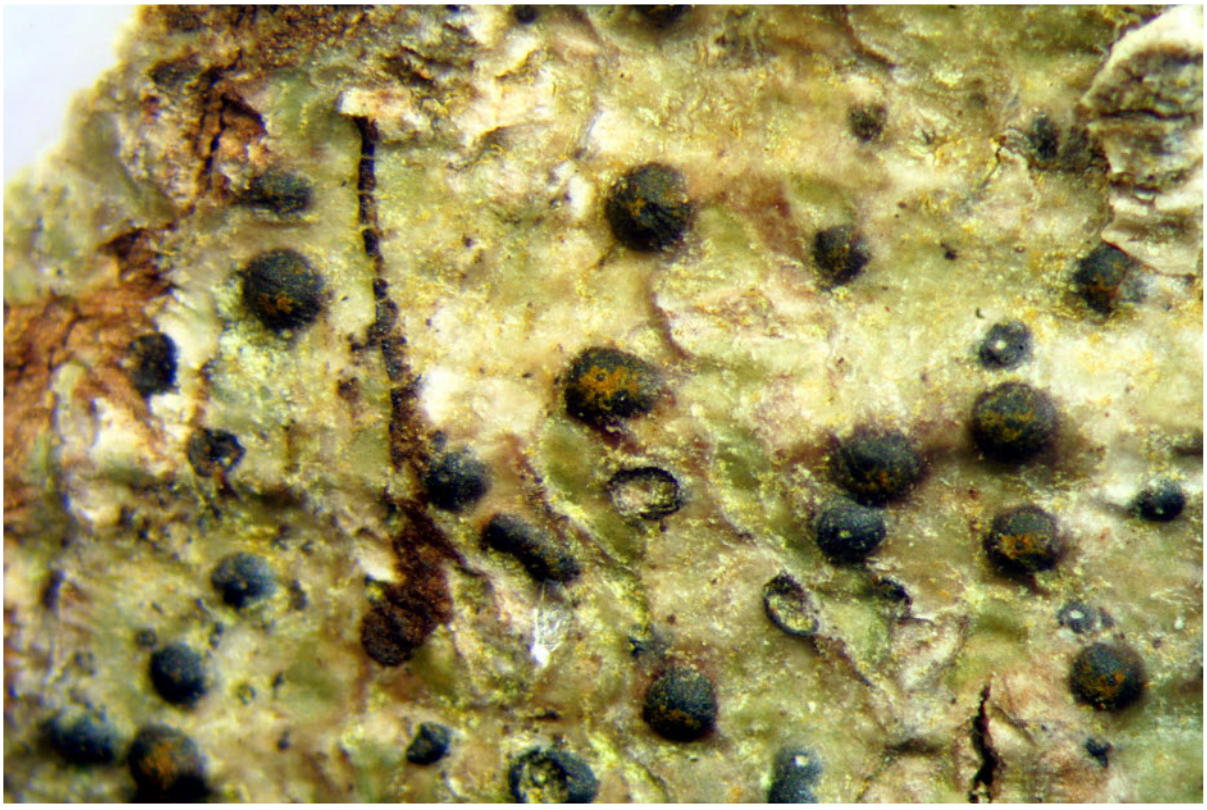


Pyrenula novemseptata

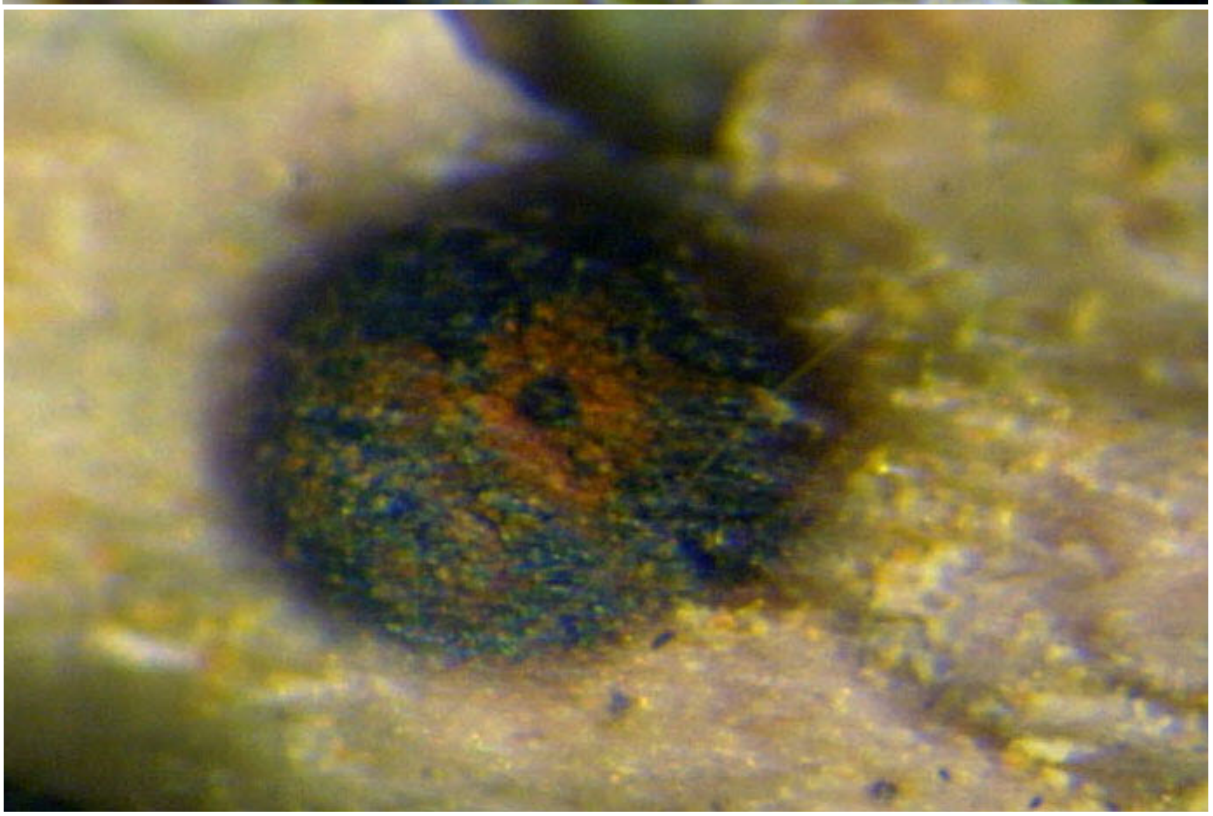
Pyrenula occidentalis (R.C. Harris) R.C. Harris, in Ahti, Brodo & Noble, Mycotaxon 28(1): 96 (1987)
= *Pyrenula harrisii* Hafellner & Kalb, Herzogia 9(1-2): 85 (1992)
= *Pyrenula neglecta subsp. occidentalis* R.C. Harris, Michigan Bot. 12(1): 51 (1973)

Thallus whitish to greenish grey, lacking pseudocyphellae. Ascomata hemispherical to subglobose, usually finally one half to two thirds exposed, 0.4–0.8 mm diam, with brown (K+ violet) pigment; ostioles usually evident, flush or in papilla; hamathecium I+ greenish blue at base, heavily inspersed with colorless oil globules; ascospores mostly uniseriate, brown. 3-septate, 13–22(–24) x (7–)8–11(–12) µm, terminal locules smaller and pressed against the outer wall, often projecting and forming a small apical papilla. Chemistry: Thallus UV+ yellow, lichexanthone.

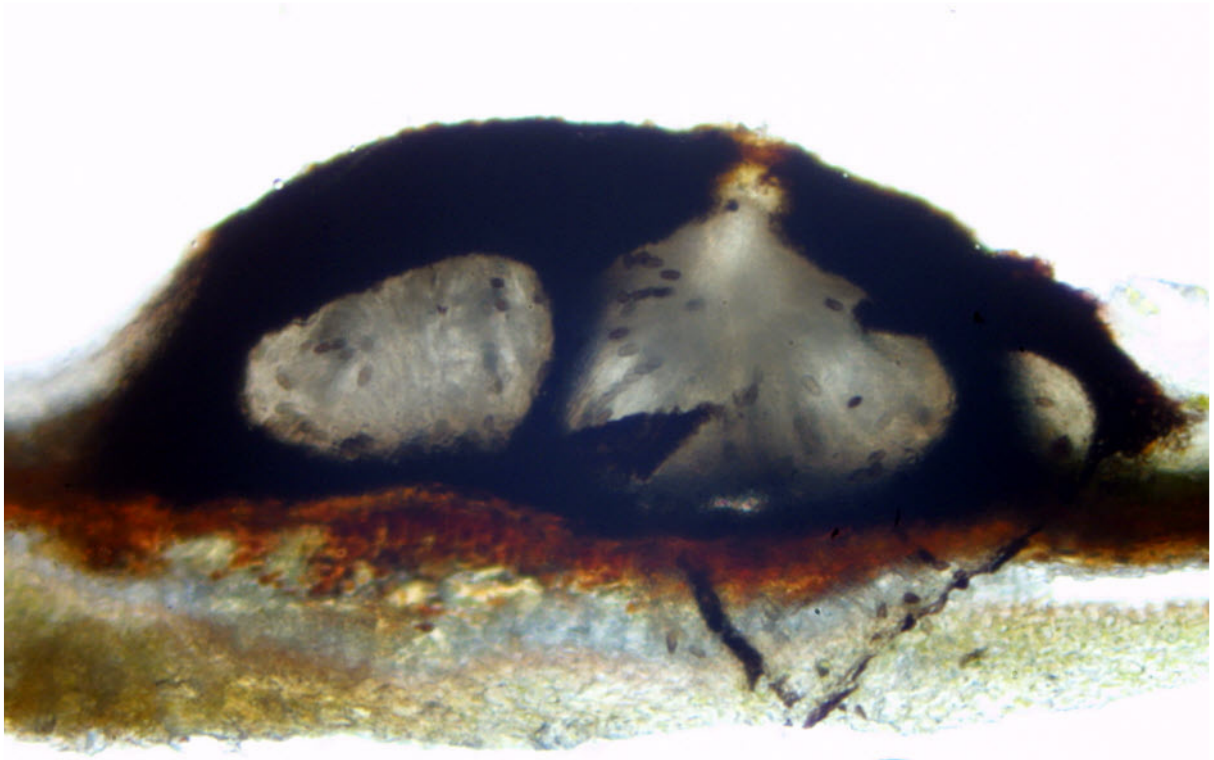
[11513], Portugal, Madeira, südlich von Porto da Cruz bei Portela, im Lorbeerwald am Anfang der Levada zwischen Portela und Laceimeiros; 32°45' N, 16°50' W, 630 m. Leg. et det. F. Schumm, 28.12.2003.

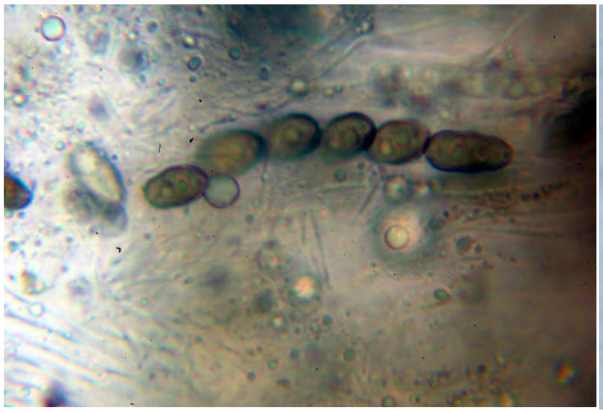




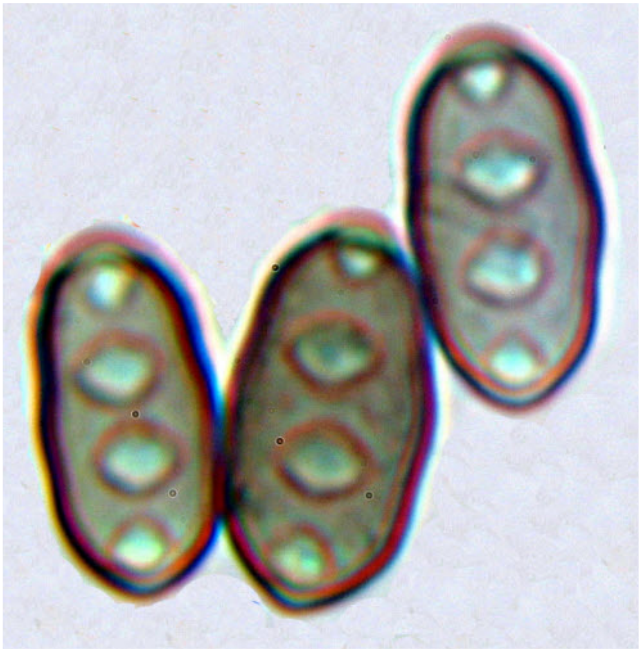


Pyrenula occidentalis







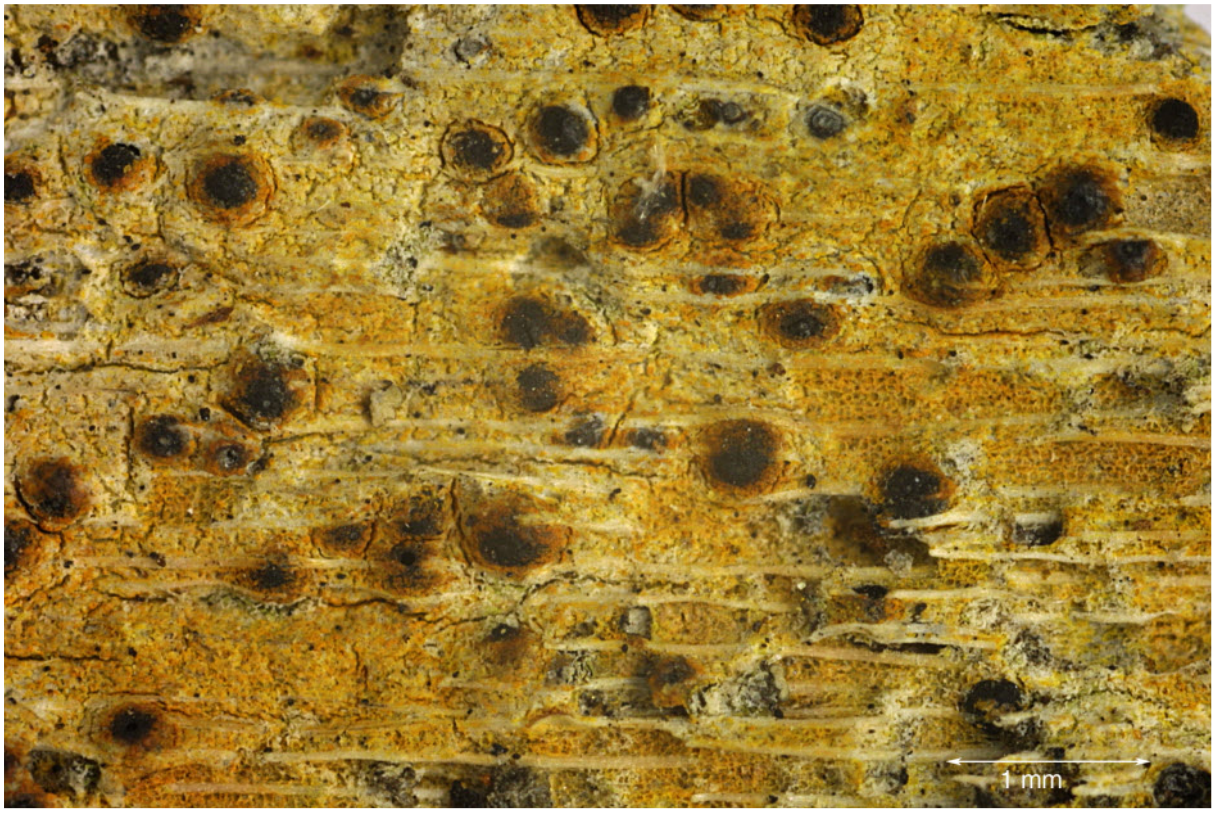


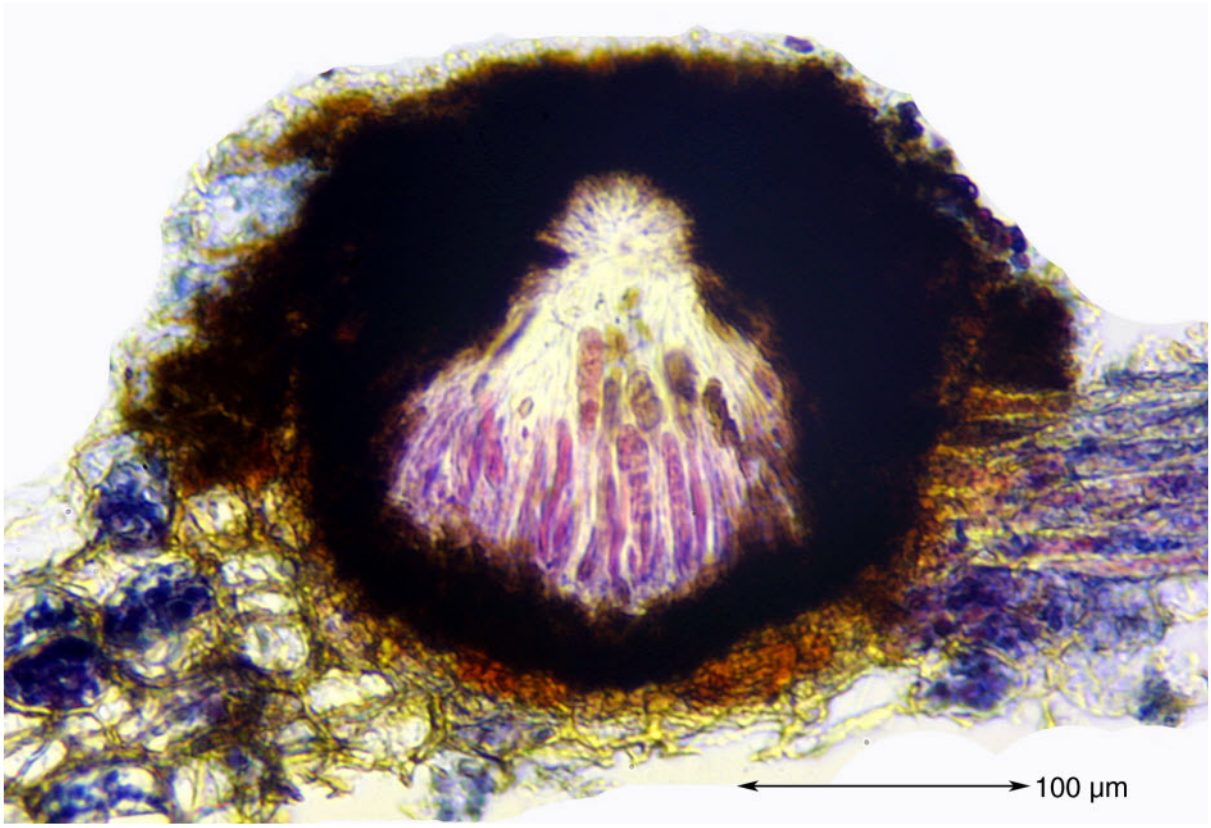
Pyrenula occidentalis

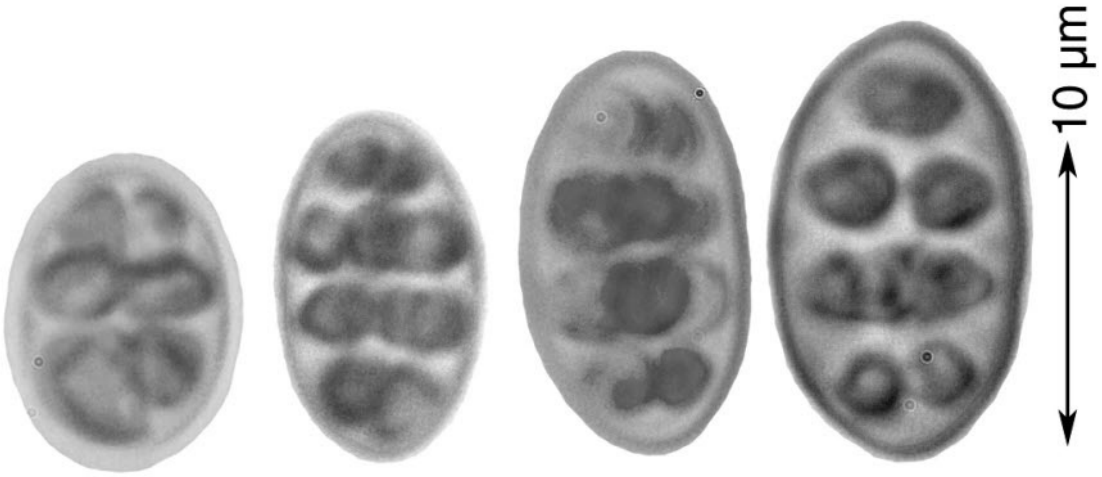
Pyrenula ochraceoflava (Nyl.) R.C. Harris, Mem. N. Y. bot. Gdn 49: 96 (1989)
= *Pyrenula ochraceoflava* var. *pacifica* P.M. McCarthy, Lichenologist 32(1): 32 (2000)
= *Sporodictyon ochraceoflavum* (Nyl.) Trevis. [as 'ochraceo-flavum'], Conspect. Verruc.: 13 (1860)
= *Verrucaria ochraceoflava* Nyl., Expos. Synopt. Pyrenocarp.: 50 (1858)

Thallus yellow to orange or whitish with rusty brownish patches, lacking pseudocyphellae, corticate. Ascomata simple, subglobose, erumpent from the substratum, often partly or almost completely covered by the thallus, c. 0.4–0.6 mm diam. Ascomatal wall lacking crystals, to 100 µm thick, ostiole apical, pale to brown, Hamathecium not inspersed with oil droplets, IKI+ orange. Ascospores 8/ascus, irregularly biseriate, submuriform, with c. 4 rows of 2–4 locules, ellipsoidal, with rounded ends, grey to brownish, 21–25 × 8-13 µm; lumina mostly rounded to slightly angular. Chemistry: Thallus and, frequently, apothecia with yellow to orange, UV+ red and K+ violet anthraquinone.

[4015], Madagascar, Nosy Be, Andilana Beach. An *Cocos nucifera v. aurantiaca*. Ca. 0 m NN. Leg. F. Schumm, 09.01.1993, teste H. Sipman, 05.1999.







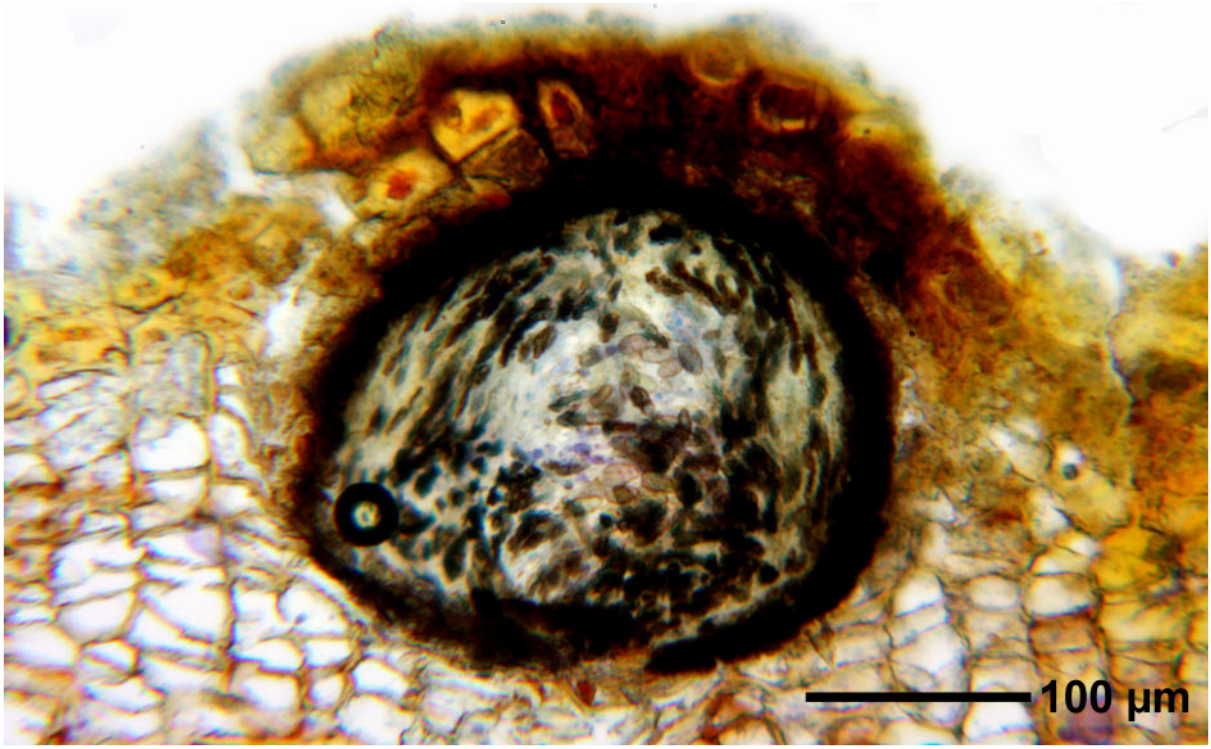
Pyrenula ochraceoflava

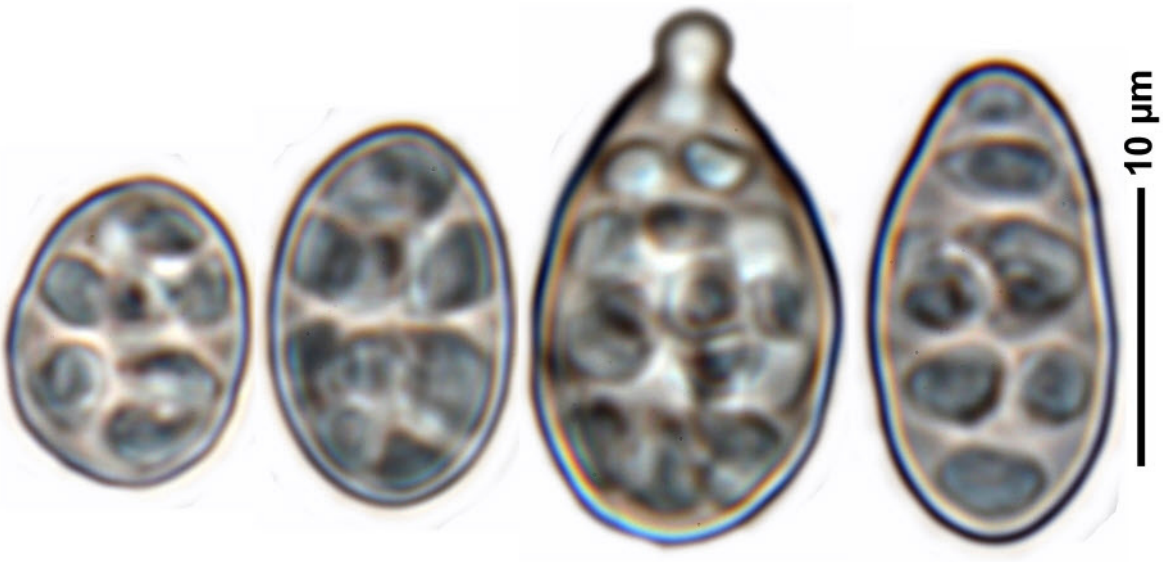
Pyrenula ochraceoflava (Nyl.) R.C. Harris, Mem. N. Y. bot. Gdn 49: 96 (1989)
= *Pyrenula ochraceoflava* var. *pacifica* P.M. McCarthy, Lichenologist 32(1): 32 (2000)
= *Sporodictyon ochraceoflavum* (Nyl.) Trevis. [as 'ochraceo-flavum'], Conspect. Verruc.: 13 (1860)
= *Verrucaria ochraceoflava* Nyl., Expos. Synopt. Pyrenocarp.: 50 (1858)

Thallus yellow to orange or whitish with rusty brownish patches, lacking pseudocyphellae, corticate. Ascomata simple, subglobose, erumpent from the substratum, often partly or almost completely covered by the thallus, c. 0.4–0.6 mm diam. Ascomatal wall lacking crystals, to 100 µm thick, ostiole apical, pale to brown, Hamathecium not inspersed with oil droplets, IKI+ orange. Ascospores 8/ascus, irregularly biseriate, submuriform, with c. 4 rows of 2–4 locules, ellipsoidal, with rounded ends, grey to brownish, 21–25 × 8-13 µm; lumina mostly rounded to slightly angular. Chemistry: Thallus and, frequently, apothecia with yellow to orange, UV+ red and K+ violet anthraquinone.

[14396], Seychelles, Praslin, Mündung des Cote Or River, östlich von Anse Volbert Village, 4°18.996' S, 55°44.780' E, 2 m; auf Cocos. Leg. et det. F. Schumm, 29.09.2008, teste A. Aptroot, 2008.







Pyrenula ochraceoflava

Pyrenula ochraceoflava (Nyl.) R.C. Harris, Mem. N. Y. bot. Gdn 49: 96 (1989)

= *Pyrenula ochraceoflava* var. *pacifica* P.M. McCarthy, Lichenologist 32(1): 32 (2000)

= *Sporodictyon ochraceoflavum* (Nyl.) Trevis. [as 'ochraceo-flavum'], Conspect. Verruc.: 13 (1860)

= *Verrucaria ochraceoflava* Nyl., Expos. Synopt. Pyrenocarp.: 50 (1858)

Thallus yellow to orange or whitish with rusty brownish patches, lacking pseudoscyphellae, corticate. Ascomata simple, subglobose, erumpent from the substratum, often partly or almost completely covered by the thallus, c. 0.4–0.6 mm diam. Ascomatal wall lacking crystals, to 100 µm thick, ostiole apical, pale to brown, Hamathecium not inspersed with oil droplets, IKI+ orange. Ascospores 8/ascus, irregularly biseriate, submuriform, with c. 4 rows of 2–4 locules, ellipsoidal, with rounded ends, grey to brownish, 21–25 × 8-13 µm; lumina mostly rounded to slightly angular. Chemistry: Thallus and, frequently, apothecia with yellow to orange, UV+ red and K+ violet anthraquinone.

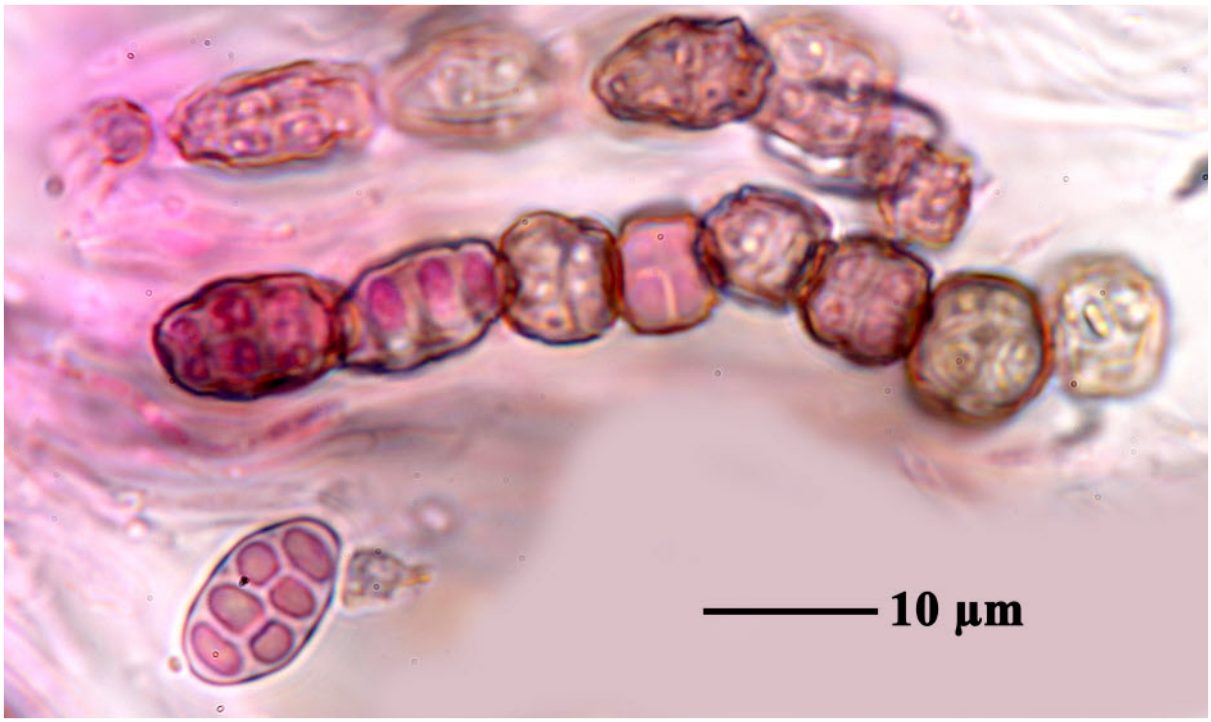
[Cavalcante], Brazil, Rio Grande do Norte, Jenipabu, Rn2, on tree bark in mangove, 1 m. Leg. J.G. Cavalcante, 13.12.2018, det. A.Aptroot, 2019.

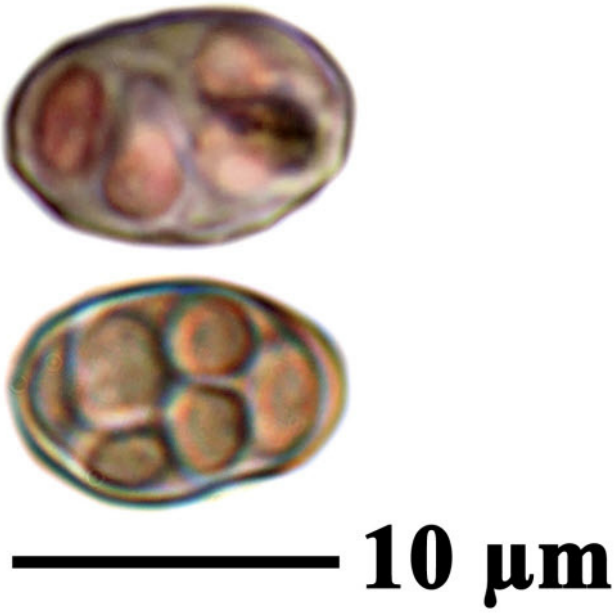




Pyrenula ochraceoflava







Pyrenula ochraceoflava

Pyrenula oculata Ajay Singh & Upreti, Geophytology 17(1): 84 (1987)

Thallus without pseudocyphellae. Ascomata globose, immersed in thallus warts, 0.3–0.5 mm diam. Ostioles black, apical: Hamathecium inspersed with colorless oil globules. Ascospores 4-loculate, 27–50 × 15–18 µm, subducta-type.

[Kashiwadani50353], Cambodia, Prov. Siam Reap, around Ta Nei temple, Angkor Wats complex, Siem Reap. 13°17‘ N, 103°52‘ E, 30 m. On bark of Ficus sp. Leg. H. Kashiwadani (no 50353) & K. H. Moon, 06.12.2011, det. H. Kashiwadani.







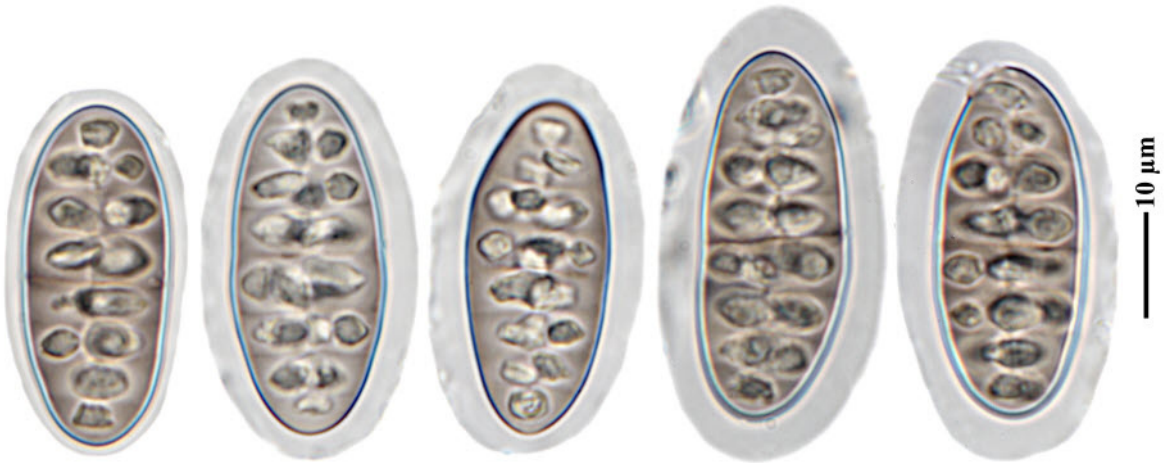
Pyrenula oculata

Pyrenula oleosa R.C. Harris, Mem. N. Y. bot. Gdn 49: 97 (1989)

Thallus corticate, pseudocyphellate, with pockets of white crystrals, UV-. Ascomata initially immersed, subglobose, 3.5–0.5 mm diam,.; crystals abundant. Hamathecium not inspersed, hymenial gel IKI-. Ascospores mostly biseriate, with 8 rows of up to 6 locelli, 37–51 × 14–19 µm. Postmature spores containing a colourless oily substance.

[ABL60135], Costa Rica, Prov. Limón, Hitoy Cerere Reserve, near Pandora, 40 km S of Limón, on tree in secondary forest near Rio Estrella. 83°02’ W, 9°40’ N, 150 m. Leg. A. Aptroot (no 60135 2004.), 0.03.2004, det. A. Aptroot.







Pyrenula oleosa

Pyrenula papillifera (Nyl.) Aptroot, Lichenologist 44(1): 36 (2011) [2012]
= *Verrucaria papillifera* Nyl., Expos. Synopt. Pyrenocarp.: 42 (1858)
= *Sporodictyon papilliferum* (Nyl.) Trevis.
= *Verrucaria thwaitesii* Leight.
= *Anthracothecium thwaitesii* (Leight.) Müll. Arg.
= *Bottaria thwaitesii* (Leight.) Vain.
= *Bottaria mucosa* Vain.
= *Anthracothecium mucosum* (Vain.) Zahlbr.
= *Pyrenula mucosa* (Vain.) R.C. Harris
= *Bottaria albidopallens* Vain.
= *Anthracothecium albidopallens* (Vain.) Zahlbr.
= *Anthracothecium chrysophorum* Zahlbr.
= *Anthracothecium badioatrum* Ajay Singh.

Thallus with pseudocyphellae. Ascomata subglobose, erumpent, mostly covered by thallus, c. 0.3–0.6 mm diam. Ostioles apical, pale. Ascospores muriform, c. 8–10 × 3–8-loculate, 40–65 × 15–25 µm, fusiform with pointed ends.

[Ferraro10944], Argentina, Prov. Chaco, Selvas del Ró de Oro, on tree bark in open subtropical forest. 26°49’34” S, 58°58’26” W, 75 m. Leg. L. I. Ferraro (no 10944) & A. Aptroot & M. Cáceres, 27.02.2013, det. A. Aptroot, 2013.





Pyrenula papillifera

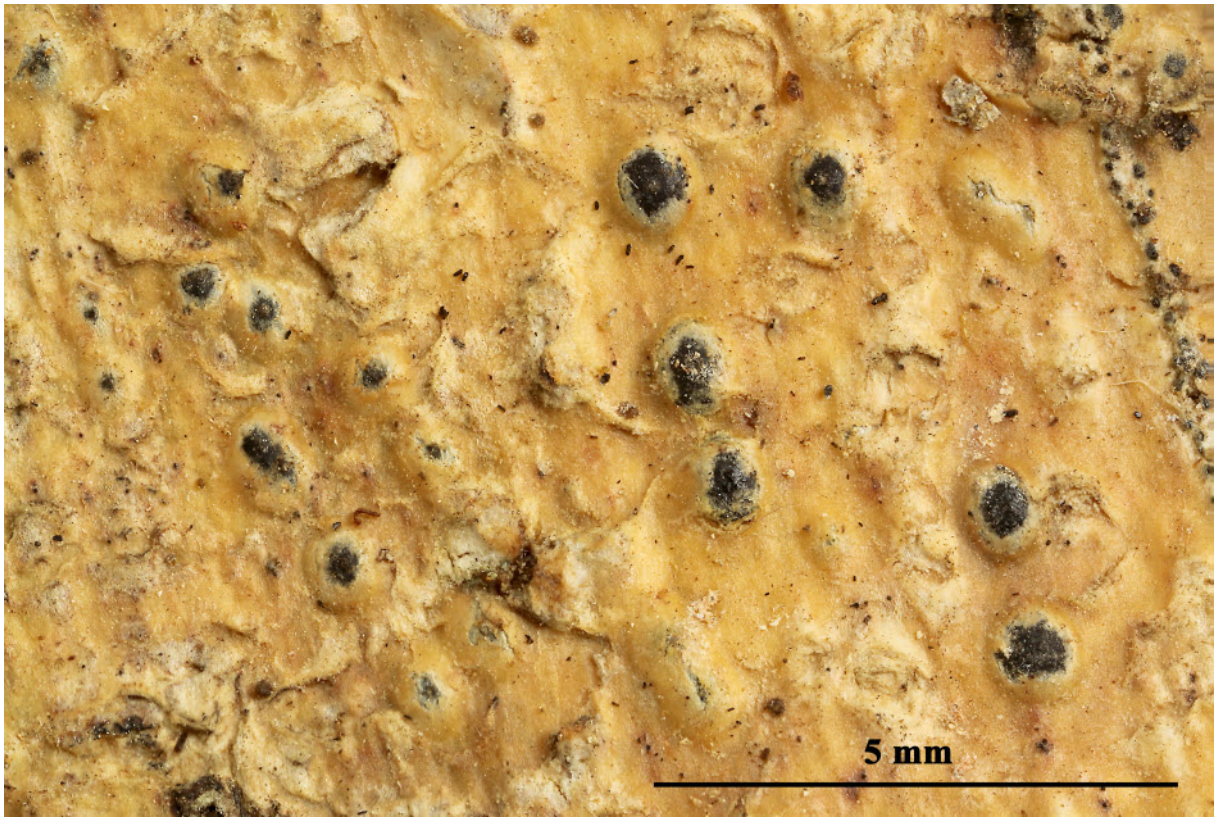


Pyrenula papillifera

Pyrenula papilligera (Leight.) Müll. Arg., Flora, Regensburg 68: 335 (1885)
= *Verrucaria papilligera* Leight. 1866
= *Pyrenula neofulva* A. Singh

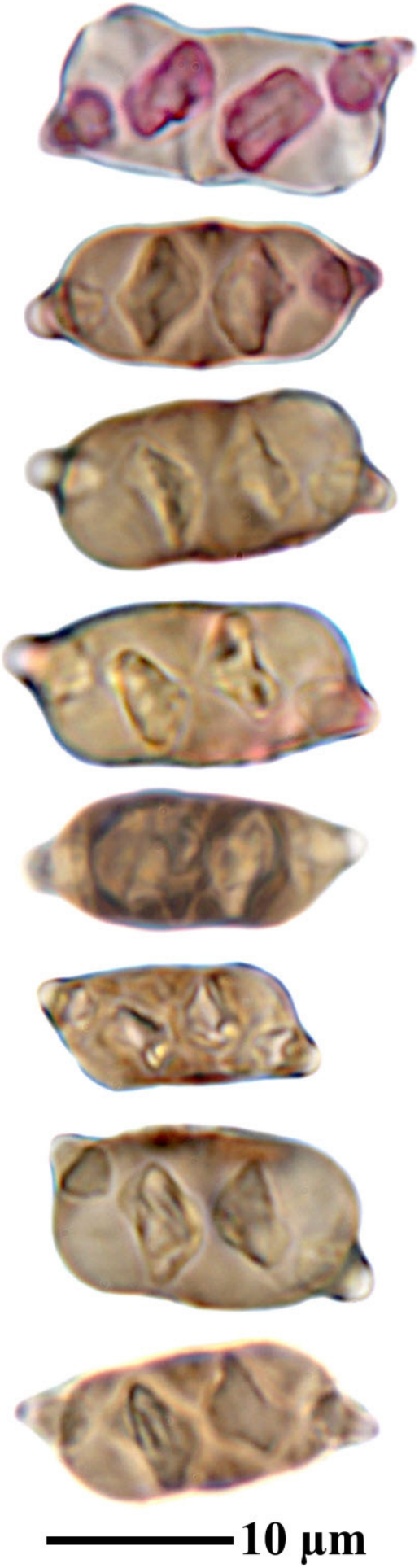
Thallus corticate, brownish to olive green, without pseudocyphellae. Perithecia solitary, subglobose, erumpent from the substratum, sides covered by thallus, c. 0.3–0.5 mm diam. Perithecial wall without crystals, up to 100 µm thick. Ostiole black, apical. Hamathecium inspersed, IKI–, filaments unbranched. Ascospores 8/ascus, grey brown, irregularly biseriate, 3-septate, citriform with pointed ends, 13–15 × 9–11 µm, lumina angular, mostly not in one row but nearly cruciate, terminal lumina not separated from the exospore by an endospore layer. Chemistry: No substances detected.

[ABL10848], Ecuador, pr. Zam-Chin, Zamora along Rio Bombuscara, 1100 m, prim. tropical rainforest. Leg. A. Aptroot (no 10848) & R. Hensen, 24.07.1982, det. A. Aptroot.





Pyrenula papilligera



Pyrenula papilligera

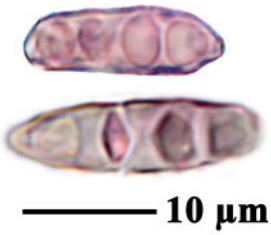
Pyrenula paraminarum Aptroot & M. Cáceres, Lichenologist 45(2): 183 (2013)

Thallus oily, olive-brown, smooth but not glossy, without pseudocyphellae, without prothallus. Ascomata erumpent to superficial, hemispherical, 0.3–0.5 mm diam., mostly 2–8 grouped but only partly fused sideways and with only partly fused walls and separate ostioles. Ostiole apical, impressed, black but often surrounded by a thin ring of whitish pruina. Hamathecium inspersed with hyaline oil globules. Ascospores 8/ascus, irregularly biseriate, 3-septate, 16–18 × 5–6 µm, lumina rounded to somewhat angular, not wider than long, with a thick layer of endospore in the spore tips. Pycnidia abundant, in groups dispersed on the thallus. Conidia filiform, curved, 17–22 × 0.5 µm. Chemistry: No substances detected.

[ABL11471], Brazil, Rondônia, Porto Velho, Parque Circuito, 8°43’54” S, 63°53’04” W, c. 100 m, in plantation, on *Hevea brasiliensis* bark. Leg. M. Cáceres & A. Aptroot (no 11471), 11.03.2012, det. A. Aptroot, 2012. ISOTYPE.

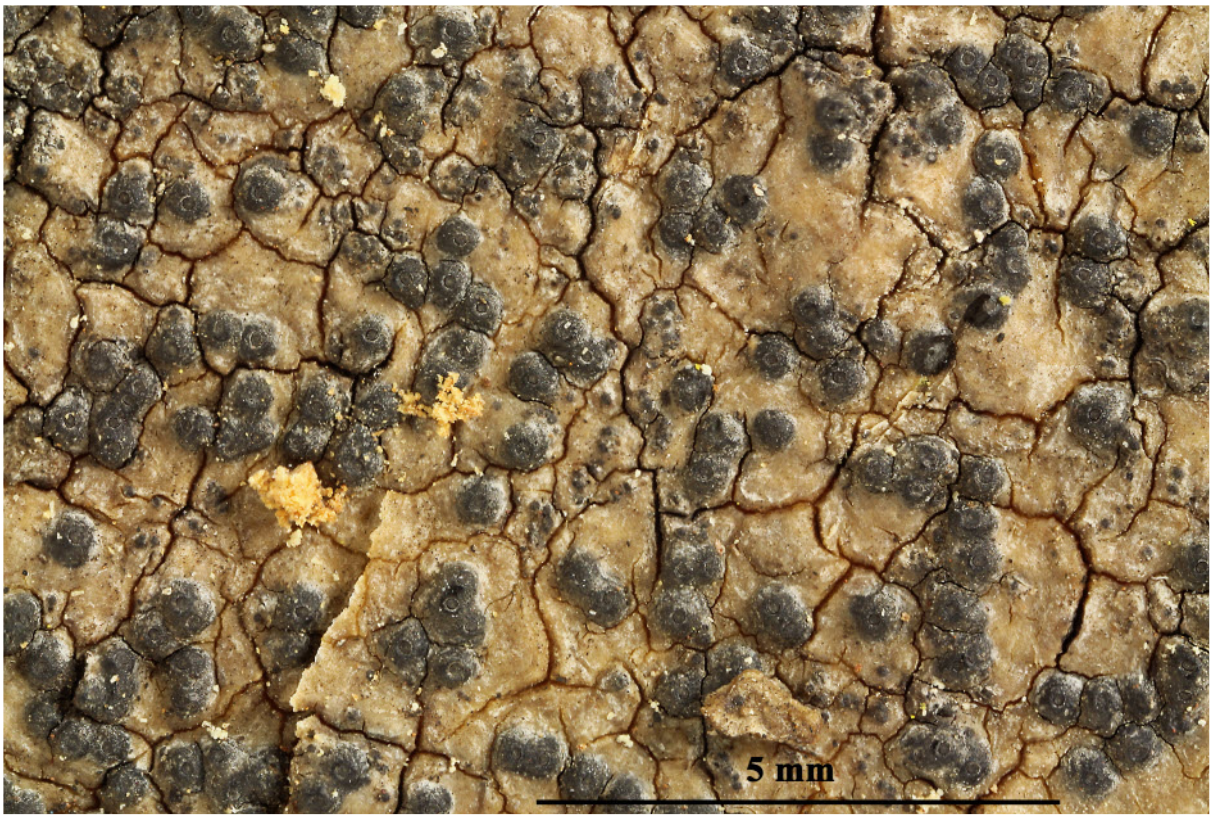


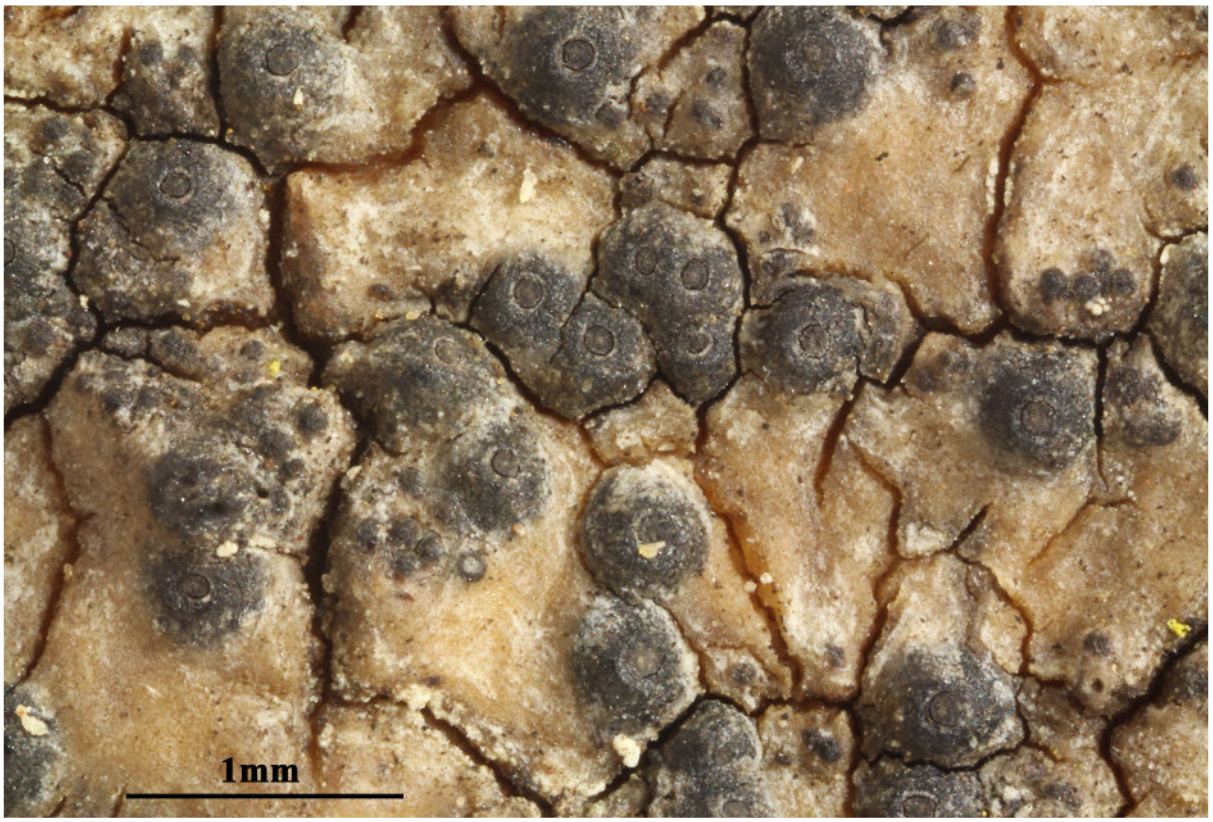






Pyrenula paraminarum





Pyrenula paraminarum

Pyrenula parvinuclea (Meyen & Flot.) Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 64: 165 (1997)

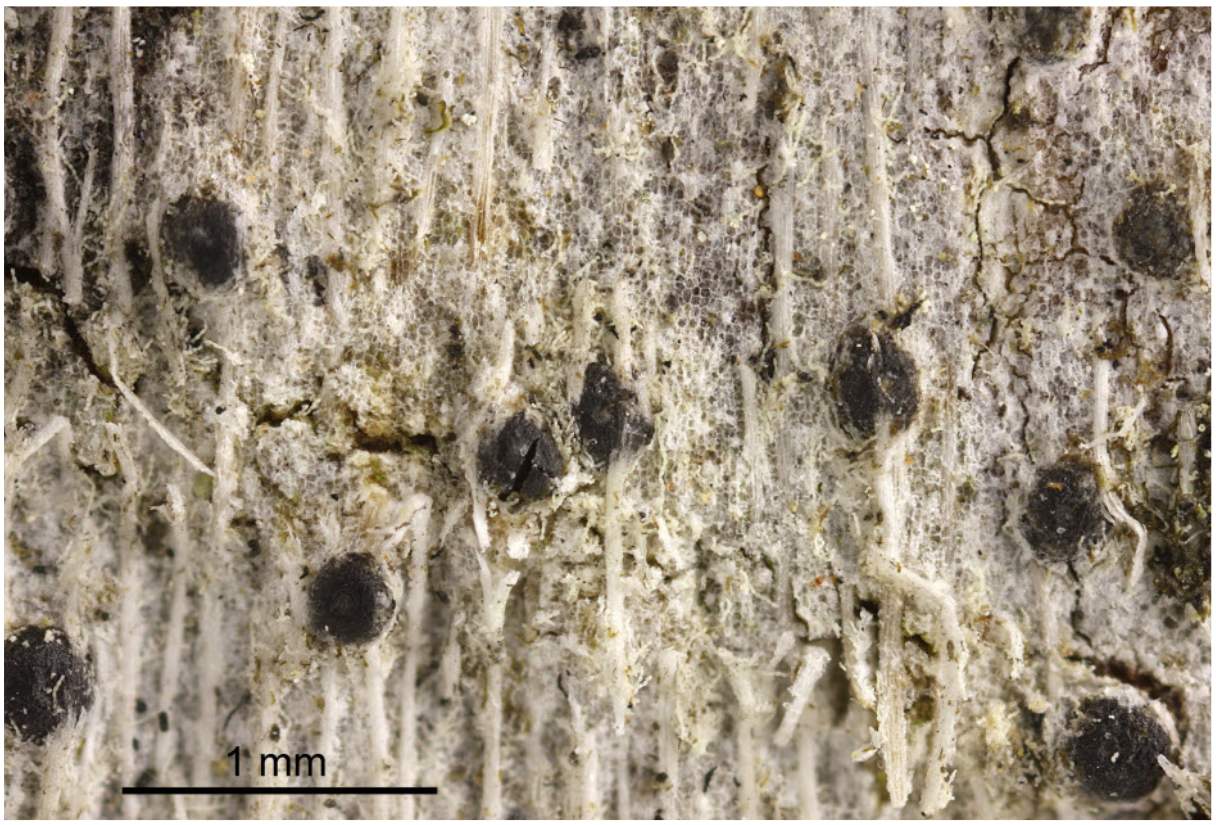
= *Anthracothecium parvinucleum* (Meyen & Flot.) Zahlbr., Cat. Lich. Univers. 1: 466 (1922)

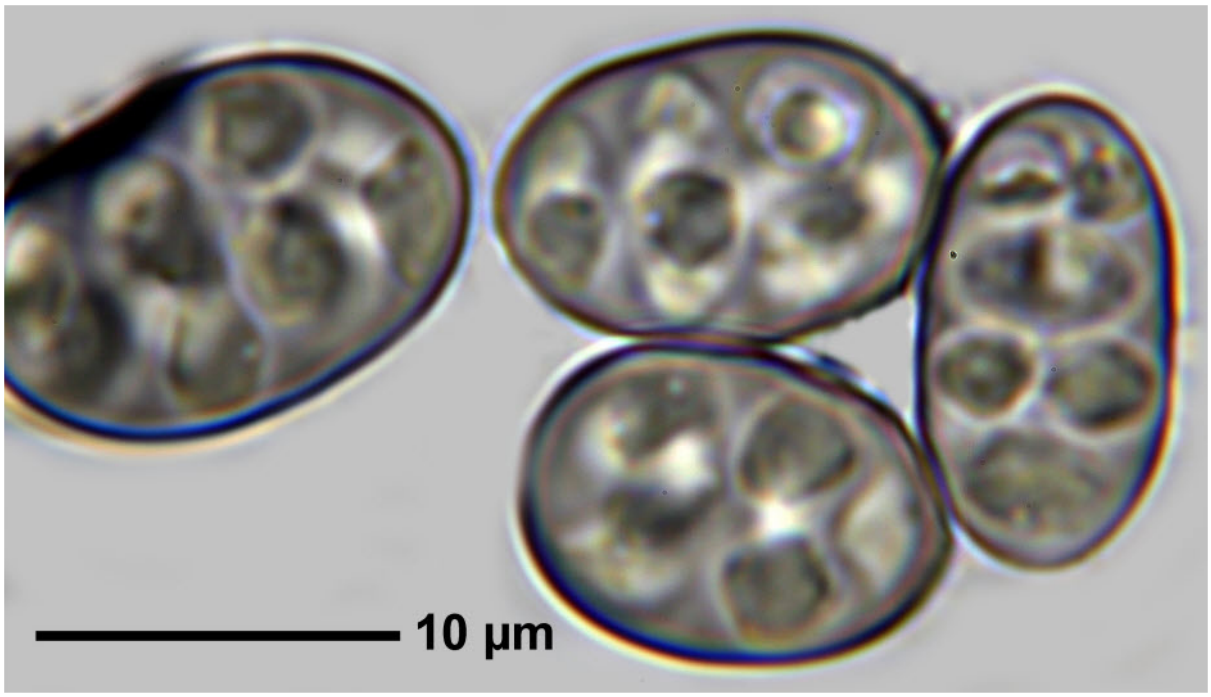
= *Bottaria parvinuclea* (Meyen & Flot.) Vain., Bolm Soc. broteriana, Coimbra, sér. 2 6: 33 (1930)

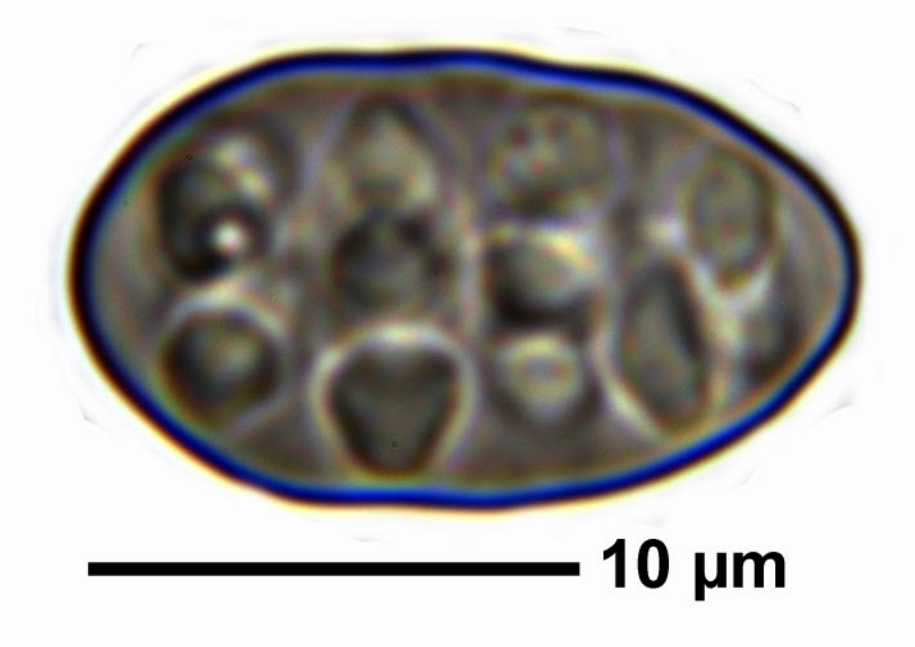
= *Verrucaria parvinuclea* Meyen & Flot., Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur., Suppl. 1 19: 231 (1843)

Thallus corticate, whitish to grey, without pseudocyphellae. Perithecia solitary, subglobose, erumpent from the substratum, sides often partly covered by thallus, c. 0.4–0.6 mm diam. Perithecial wall without crystals, up to 100 µm thick. Ostiole pale, apical. Hamathecium not inspersed, IKI+ orange, filaments unbranched. Ascospores 8/ascus, grey brown, irregularly biseriate, muriform with c. 4 rows of 2–4 locelli, ellipsoid with rounded ends, 12–23 × 8–12 µm, lumina rounded. Chemistry: No substances detected.

[14412], Seychelles, Praslin, Curieuse Bay, Mündung des Pasquiere River Nr. 1; 4°18.712' S, 55°43.276' E, 2 m. Leg. F. Schumm & J.P. Frahm, 29.09.2008, det. A. Aproot, 2008.





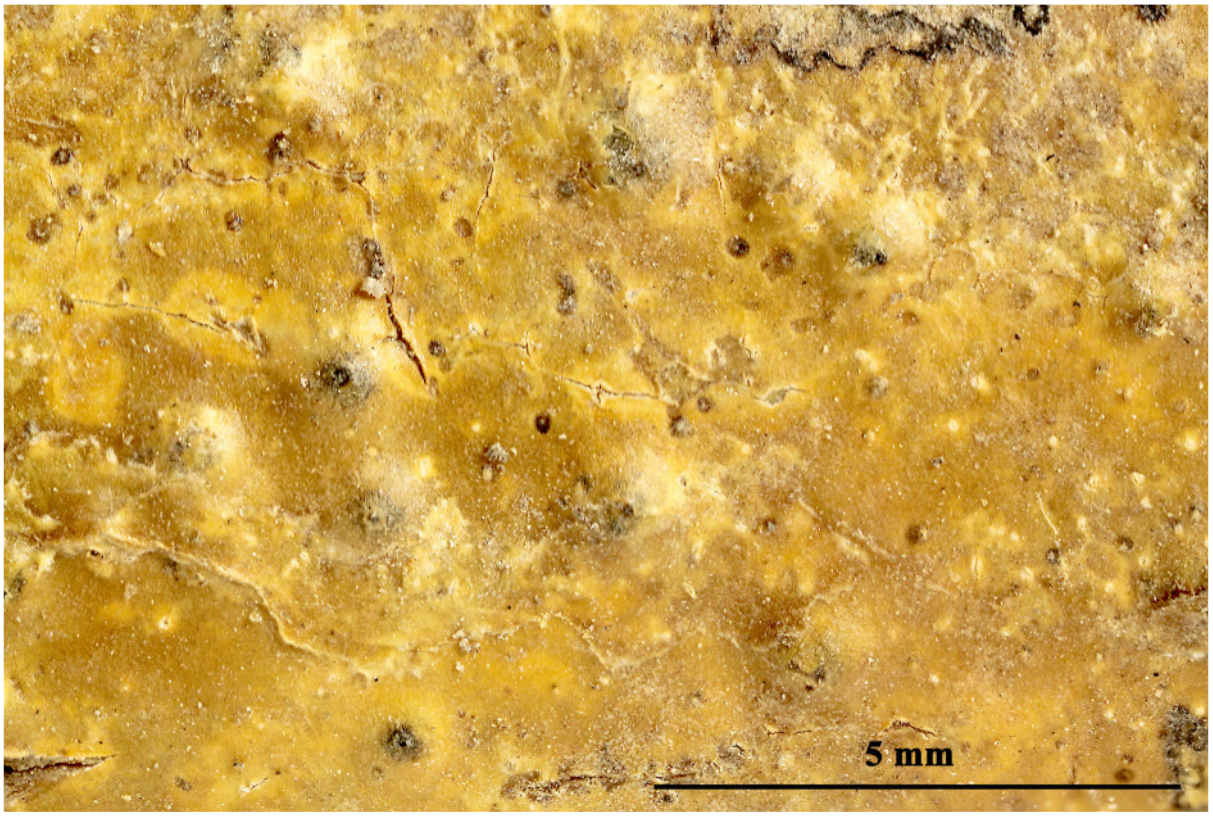


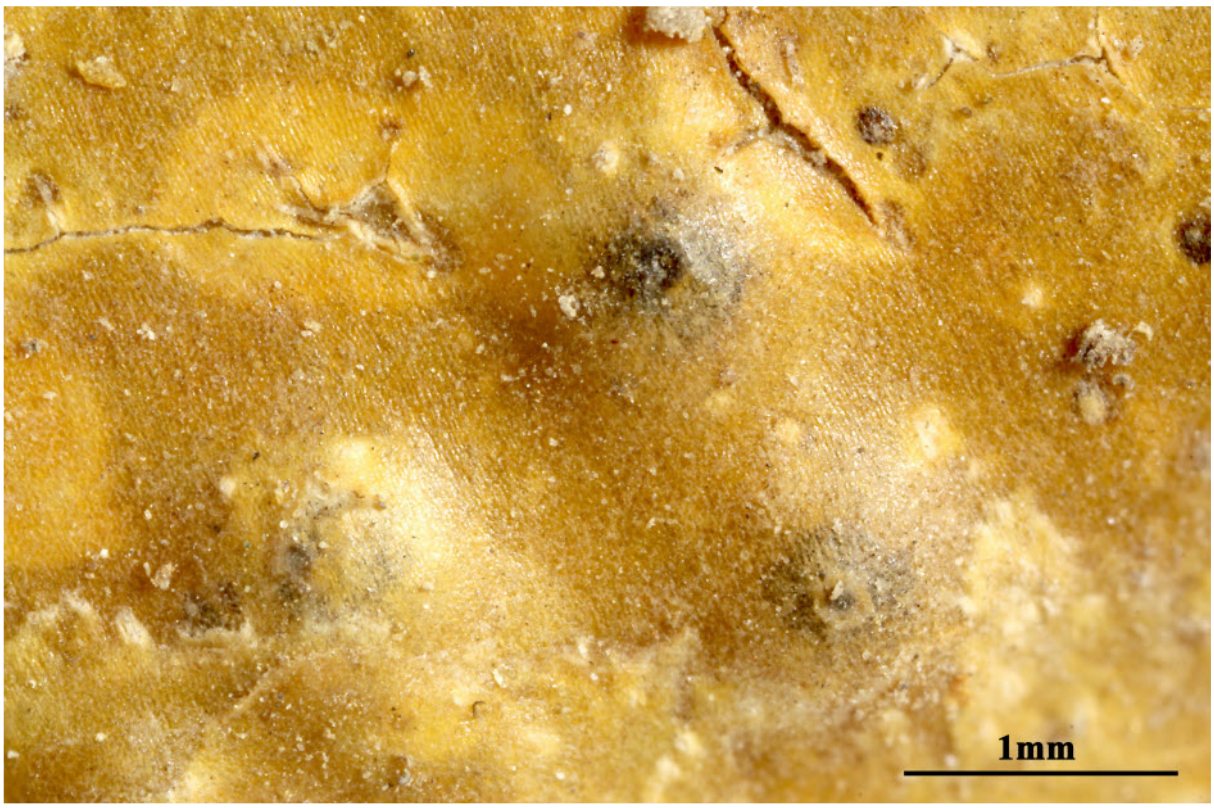
Pyrenula parvinuclea

Pyrenula platystoma (Müll. Arg.) Aptroot, Lichenologist 44(1): 36 (2011) [2012]
= *Anthracothecium platystomum* Müll. Arg., Revue mycol., Toulouse 10(no. 40): 184 (1888)
= *Anthracothecium oculatum* Müll. Arg.
= *Pyrenula neoculata* Aptroot
= *Bottaria impressa* Vain.
= *Anthracothecium impressum* (Vain.) Zahlbr.
= *Anthracothecium biferum* Zahlbr.
= *Bottaria himalayensis* Räsänen
= *Anthracothecium himalayense* (Räsänen) D.D. Awasthi
= *Anthracothecium vermiculare* Kashiw. & Kurok.
= *Pyrenula vermicularis* (Kashiw. & Kurok.) H. Harada
= *Anthracothecium pseudohimalayense* Ajay Singh
= *Anthracothecium himalayense* var. *pseudohimalayense* (Ajay Singh) Ajay Singh
= *Anthracothecium mulleri* Patw. & Makhija
= *Polyblastiopsis muelleri* Upreti & Ajay Singh
= *Anthracothecium lifuense* Upreti & Ajay Singh
= *Anthracothecium bengalense* Ajay Singh

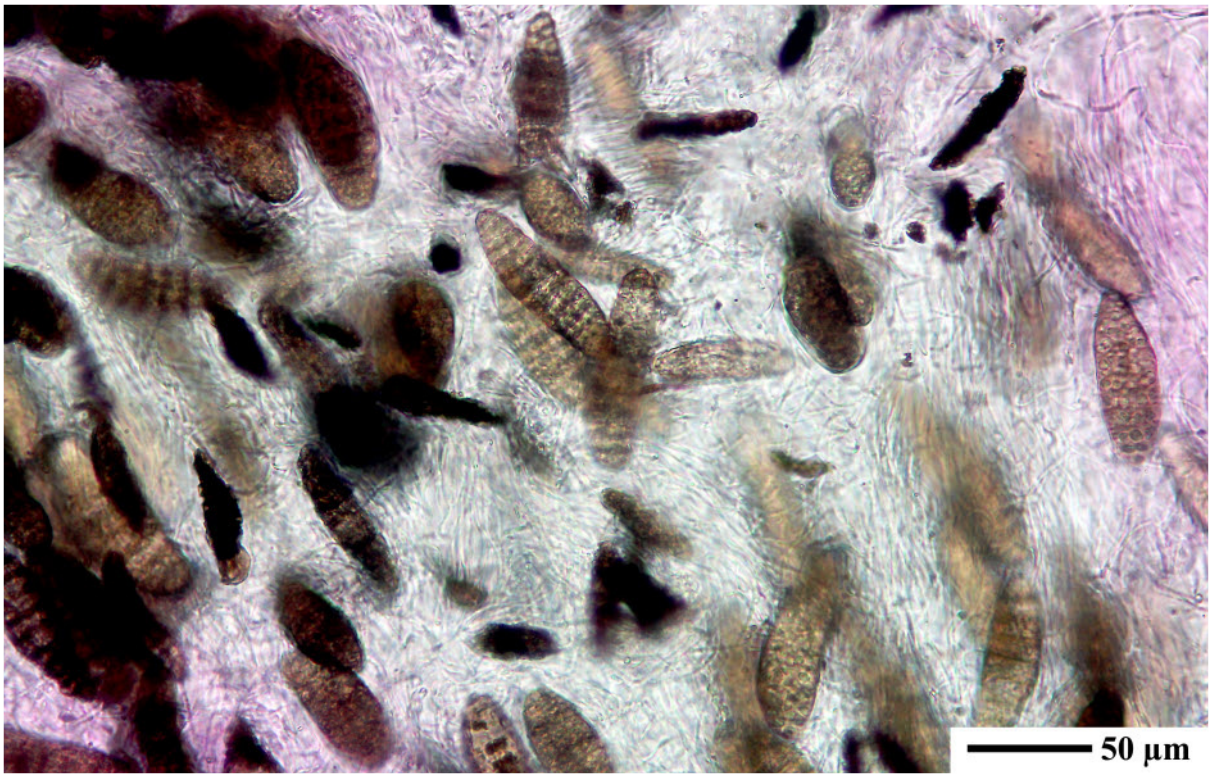
Thallus corticate, with pseudocyphellae. Ascomata conical, exposed, c. 0.4–0.7 mm diam. Ostioles apical, black. Hamathecium inspersed with colorless oil globules. Ascospores brown, 2–4/ascus, densely muriform, 80–150 x 25–40 µm, locules round to oval.

[ABL41207], Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque Natural do Caraça, 0.5-1 km NW of monastery Santuário do Caraça, 1250 m, on tree in gallery forest. 20°06’ S, 43°29’ W. Leg. A. Aptroot (no 41207), 18.9.1997, det. A. Aptroot, 1998.





Pyrenula platystoma





Pyrenula platystoma



Pyrenula platystoma

Pyrenula plicata Sipman & Aptroot, Lichenologist 45(2): 186 (2013)

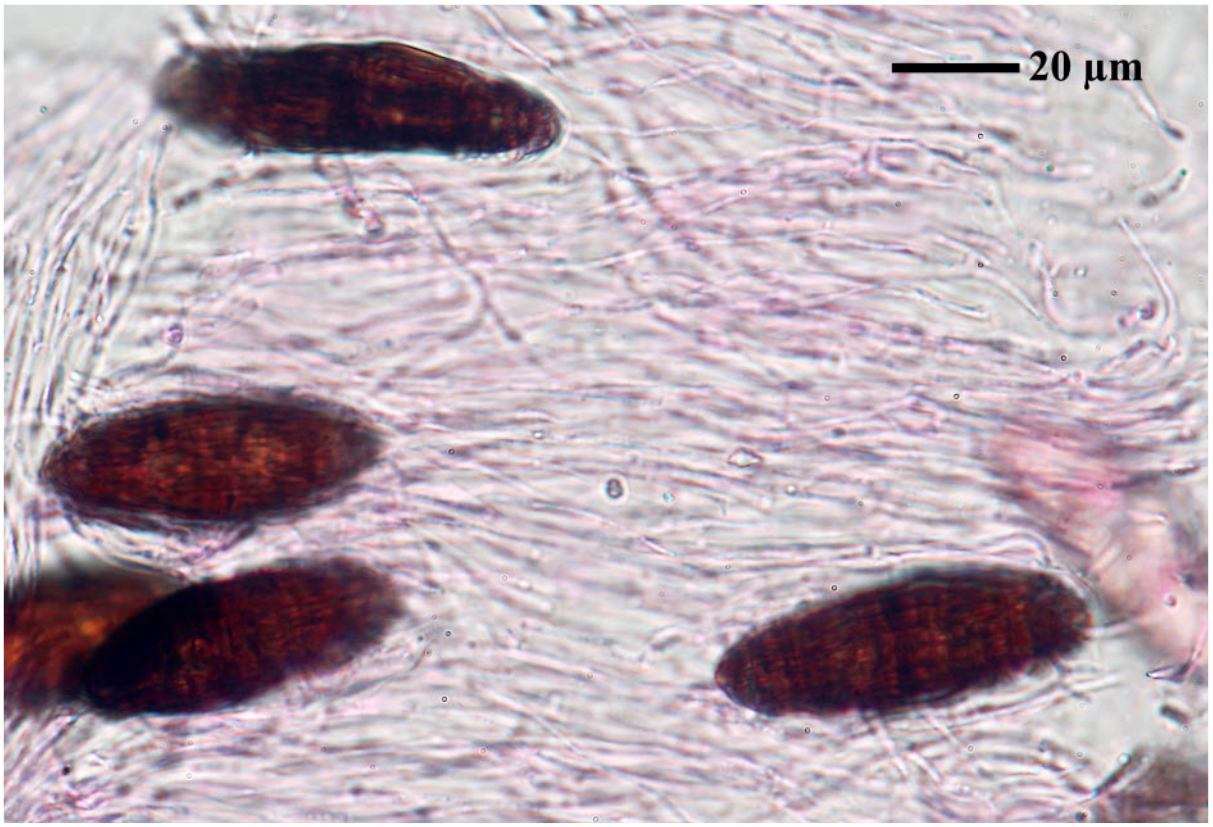
Thallus growing on dead branchlets, several cm in diam., c. 150 mm thick, smooth, orange in full light, pale brownish in shade, K+ purplish red where pigmented, UV– (weakly reddish), distinctly white-spotted (pseudocyphellate), occasionally bordered by a black prothallus line, endophloeodic except for the uppermost c. 50 µm, covered by a prosoplectenchymatous cortex, c. 10 µm thick, and a layer of tiny yellow crystals just below it, with trentepohlioid photobiont cells c. 4 × 4–8 µm, with scattered large crystal aggregates showing in polarized light. Ascomata immersed in smooth thallus, globose, c. 0.5(0.3–0.8) mm diam., with carbonized, c. 50 µm thick, equally thickened wall. Ostioles apical, black. Hamathecium clear; filaments 1.0–1.5 µm wide, unbranched between the asci, branched and anastomosing above. Asci c. 200 × 40 µm, with small ocular chamber. Ascospores 8 per ascus, biseriate, 3-septate, c. 55–63 × 19–22 µm, pale greyish brown, with lenticular lumina, with a thick layer of endospore in the spore tips, longitudinally plicate with c. 20 folds. Pycnidia not seen. Chemistry: Parietin present

[Ferraro2161], Chile, Coquimbo Province, Parque Nacional Fray Jorge, Altos de Talinay, Caleta Ramadita, on dead branchlets. 30°39’ S, 71°42’ W. Leg. L. Ferraro (no 2161) & J. Redón, 16.05.1980, det. A. Aptroot. ISOTYPE.





Pyrenula plicata



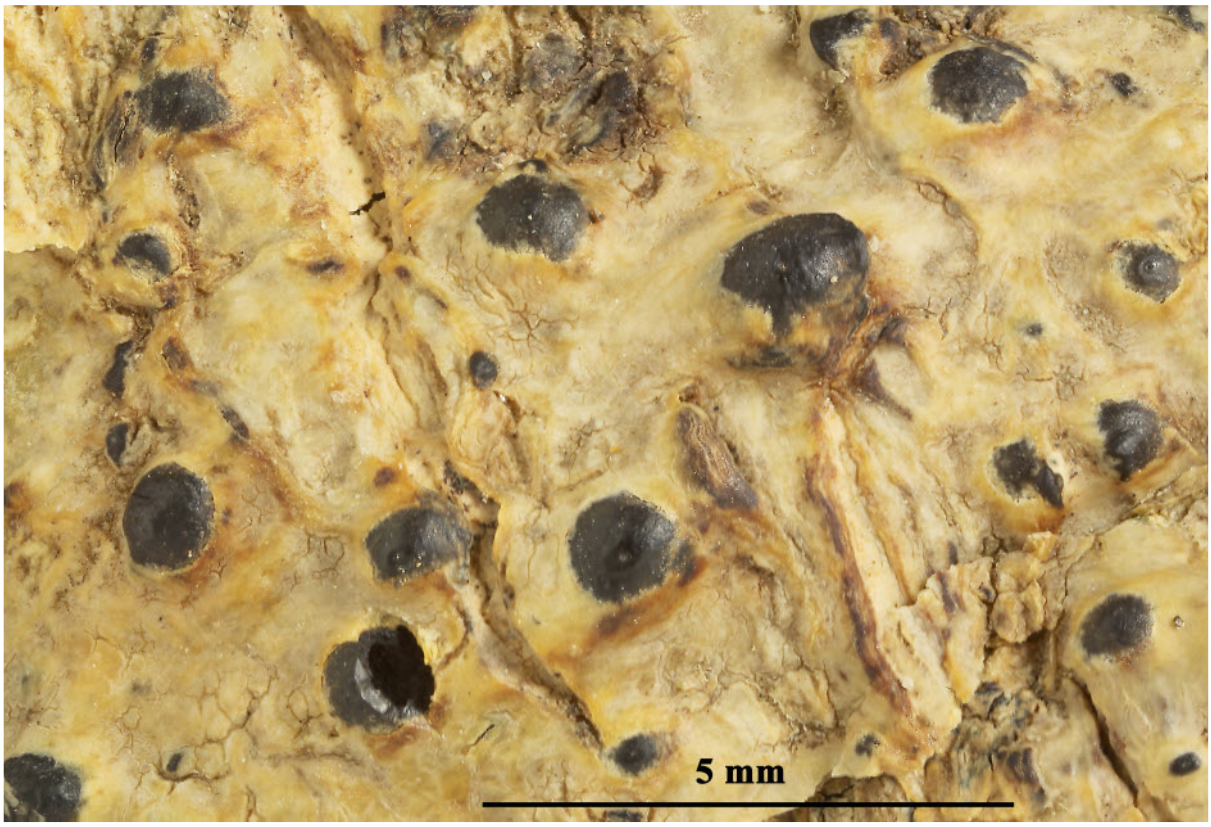


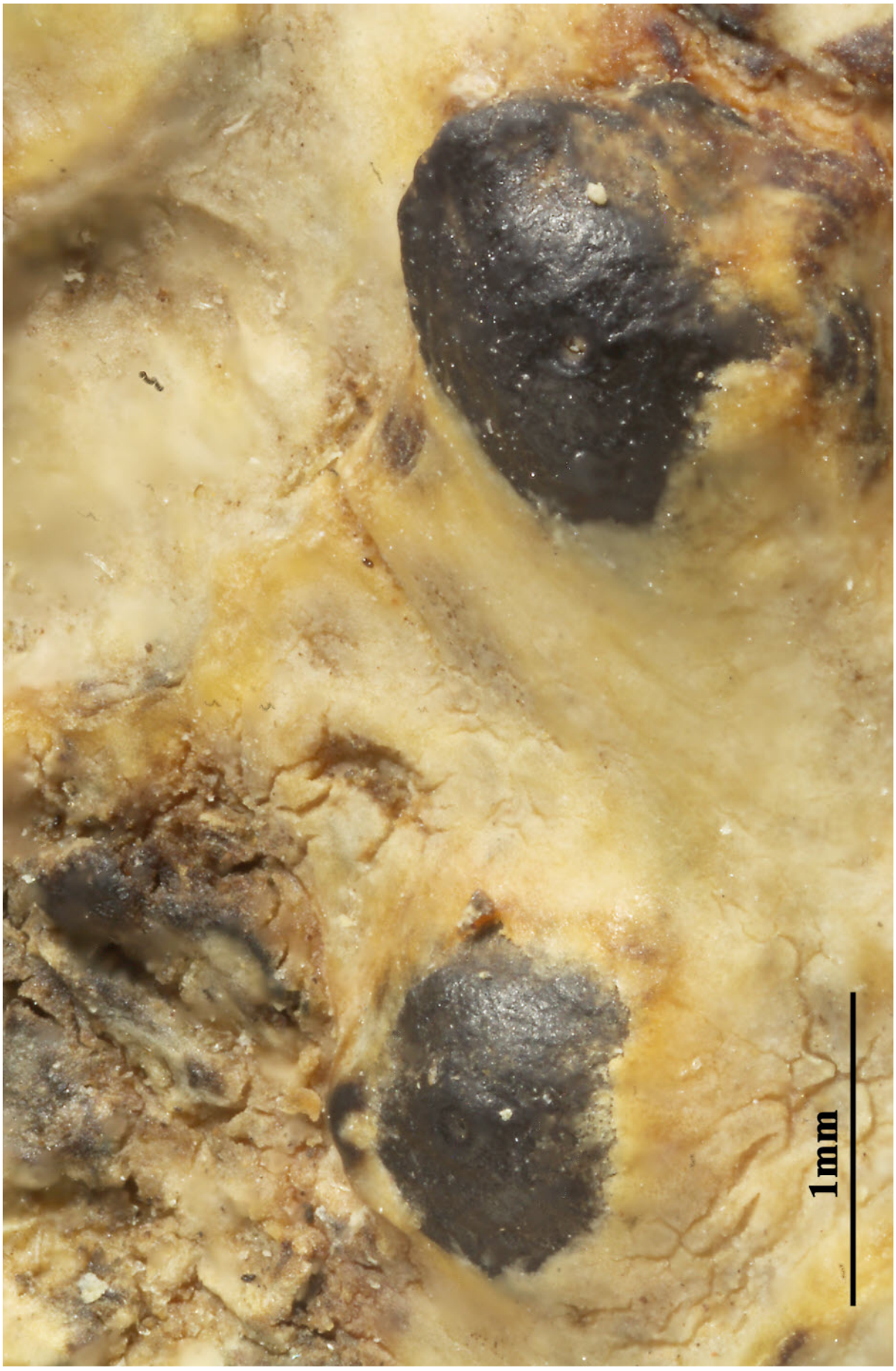
Pyrenula plicata

Pyrenula praelucida (Mont.) Trevis., Spighe Paglie: 17 (1853)
= *Verrucaria praelucida* Mont. 1851

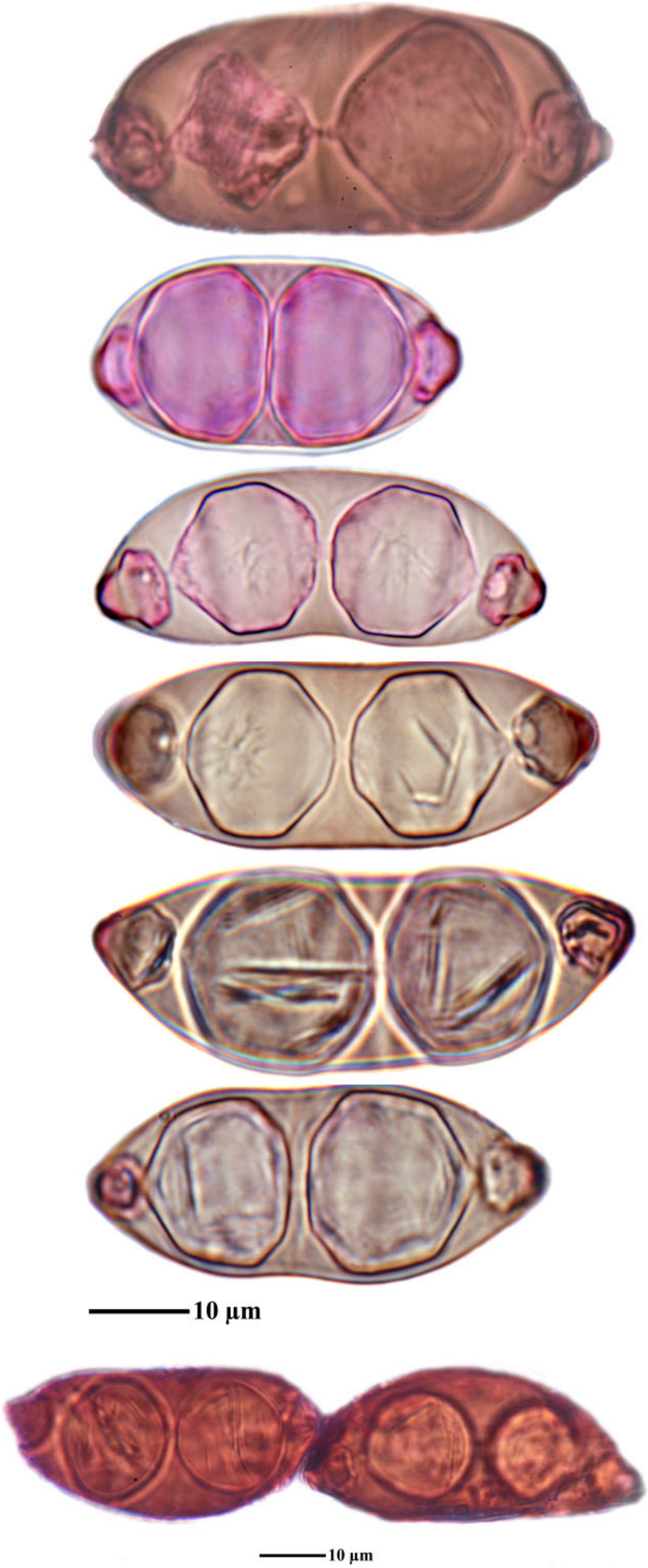
Thallus corticate, brownish to olive green, without pseudocyphellae. Perithecia solitary, subglobose, erumpent from the substratum, often mostly covered by thallus, c. 0.8–1.5 mm diam. Perithecial wall without crystals, up to 300 μm thick. Ostiole pale, apical. Hamathecium not inspersed, IKI+ blue, filaments unbranched. Ascospores 4/ascus, grey brown, uniseriate, 3-septate, broadly fusiform with pointed ends, 50–75 x 20–30 μm, often curved, lumina rounded, terminal lumina not separated from the exospore and much smaller than central lumina. Chemistry: Thallus UV+ yellow; lichexanthone.

[Hensen], Costa Rica, Prov. Jan José, Monteverde, 1400 m. 84°50' E, 10°20' N. Leg. R.V. Hensen, 01.1997, det. A. Aptroot, 1997.





Pyrenula praelucida

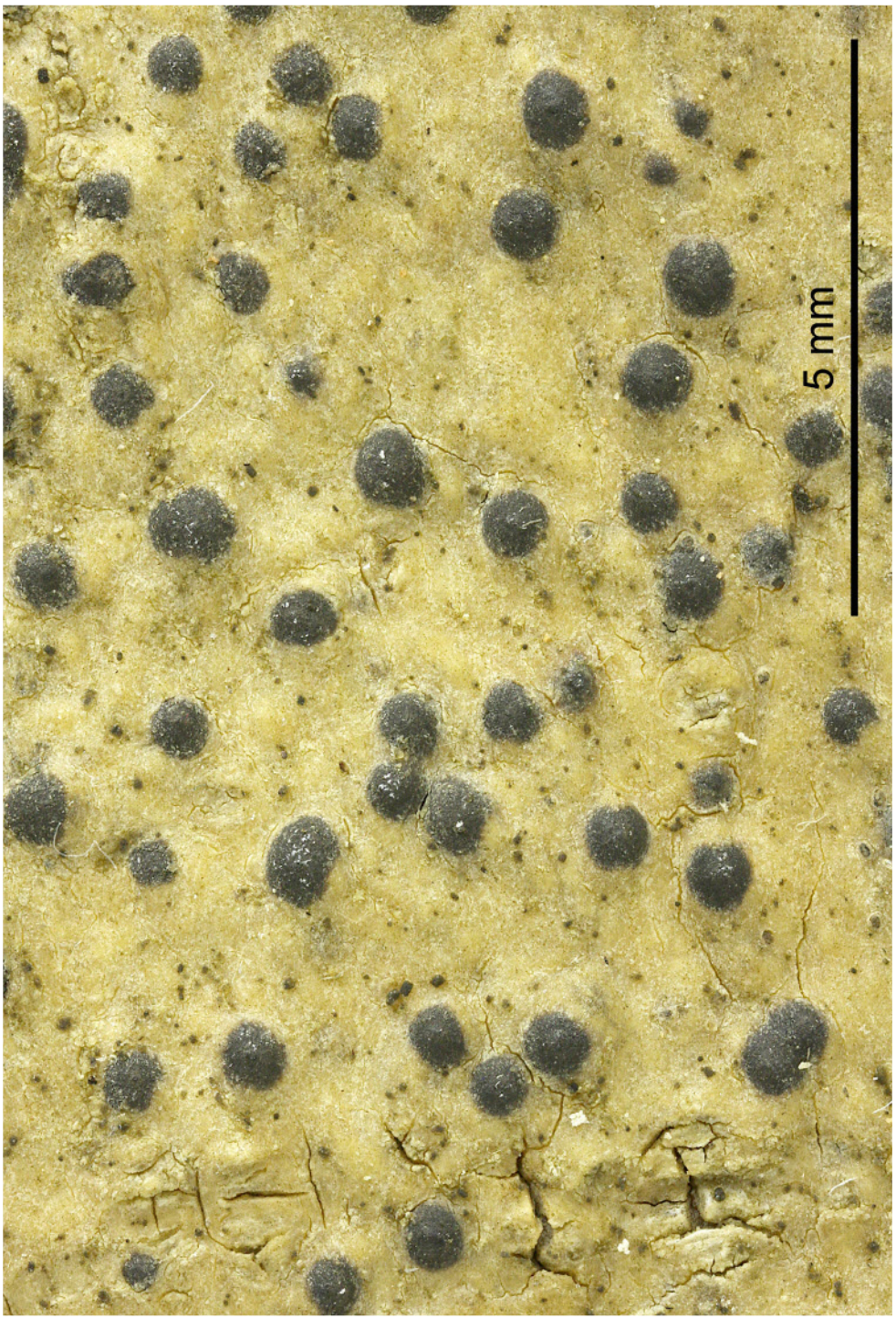


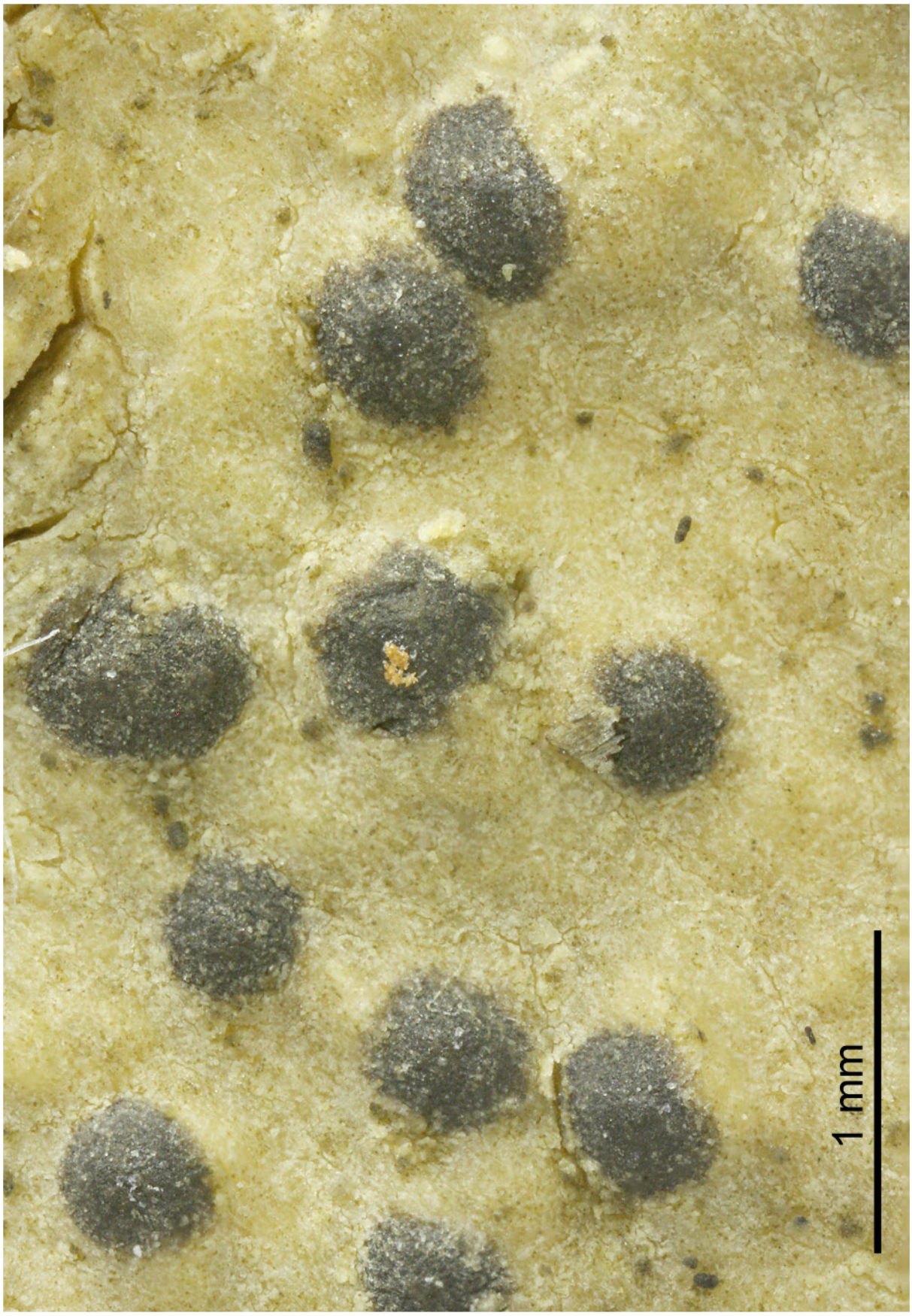
Pyrenula praelucida

Pyrenula pseudobufonia (Rehm) R.C. Harris, Evansia 2(3): 46 (1985)
= *Clypeosphaeria pseudobufonia* Rehm 1904

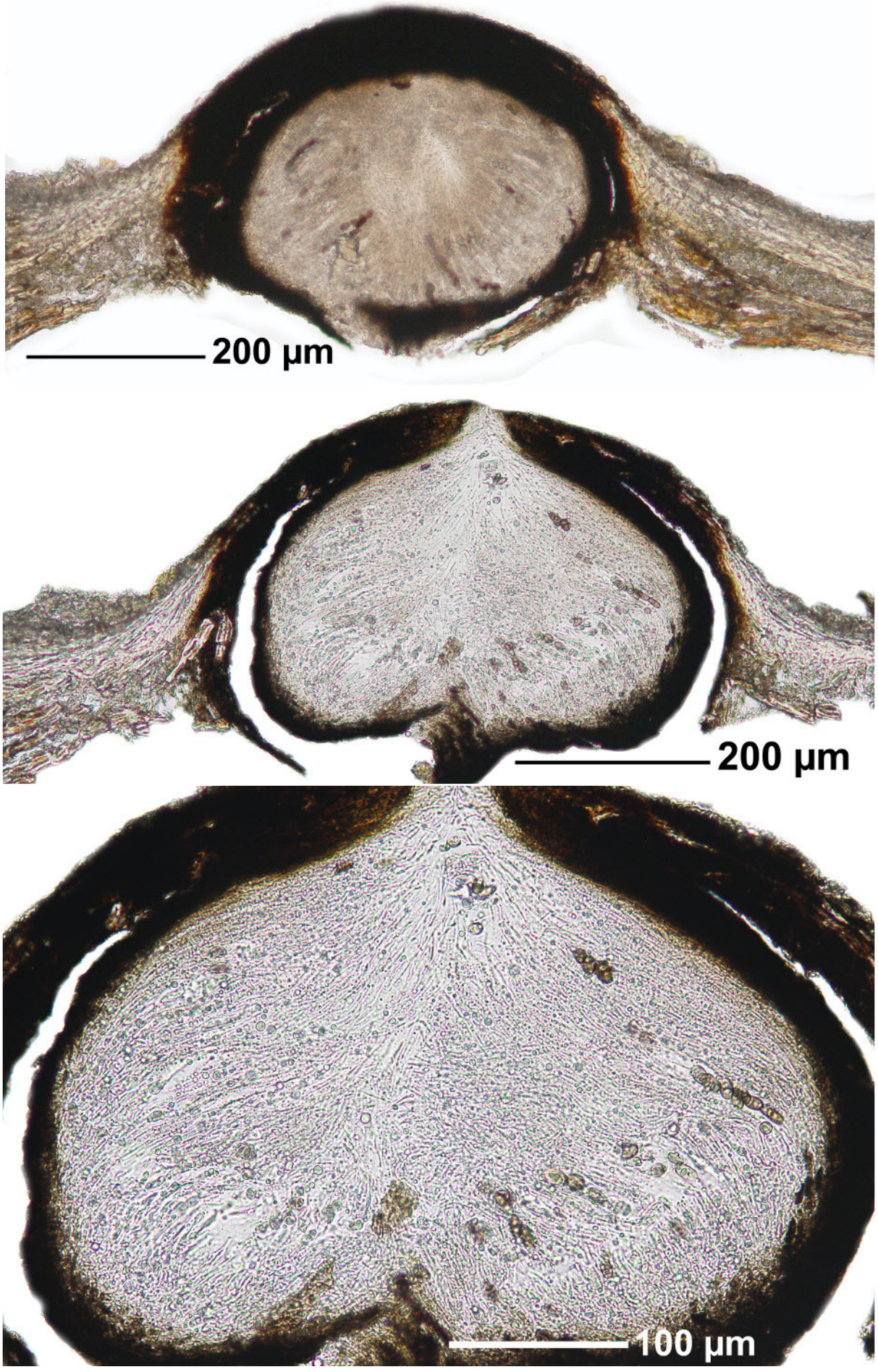
Thallus UV+ yellow; ascomata initially immersed, mostly subglobose, 0.5–0.7 mm diam.; hamathecium heavily inspersed with colorless oil globules, gel IKI+ blue-green; ascospores 8/ascus, mostly uniseriate, brown, 4-loculate, 13–22(–24) x (7–)8–11(–12) µm, with thin apical walls.

[8956], USA, Maine, Washington Co.: Buchenwäldchen an der Straße Nr. 182 zwischen Franklin und Cherryfield, 44°36.560’ N, 68.01.146’ W, 60 m. Leg. F. Schumm, 23.08.2001, det. A. Aptroot, 2011.

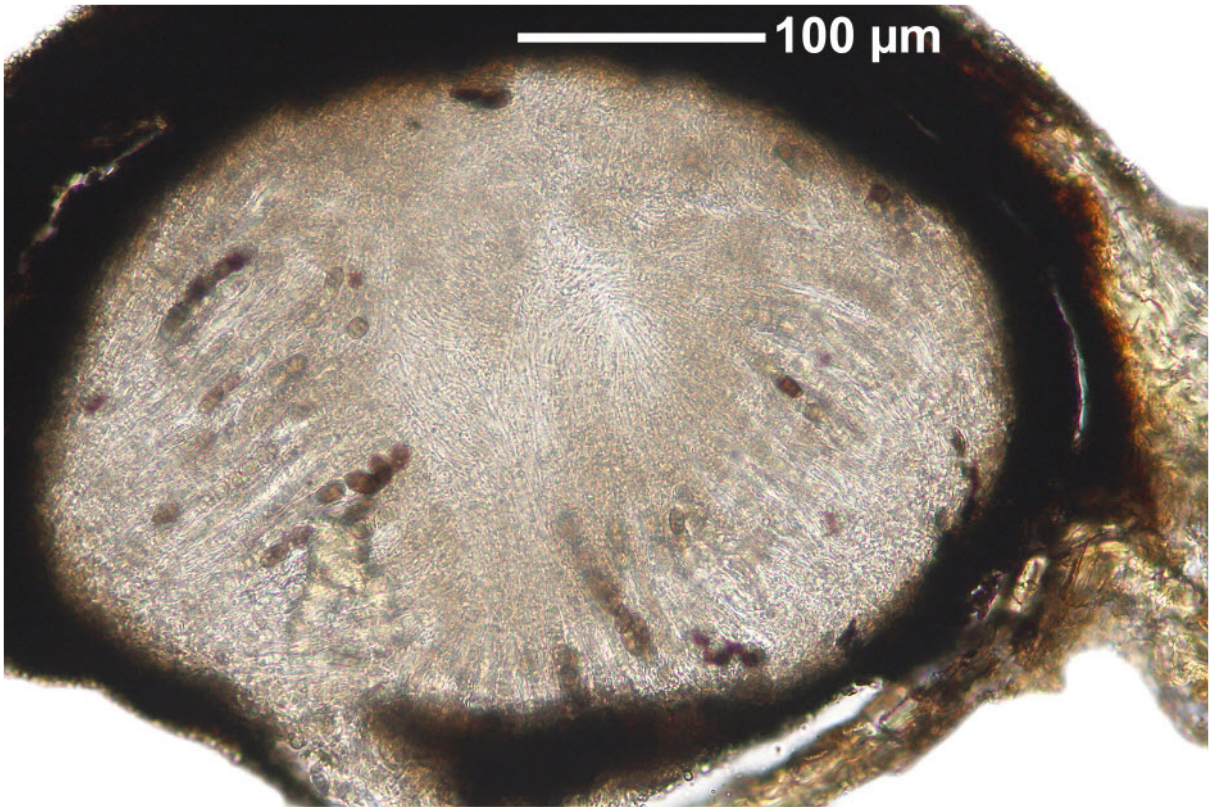


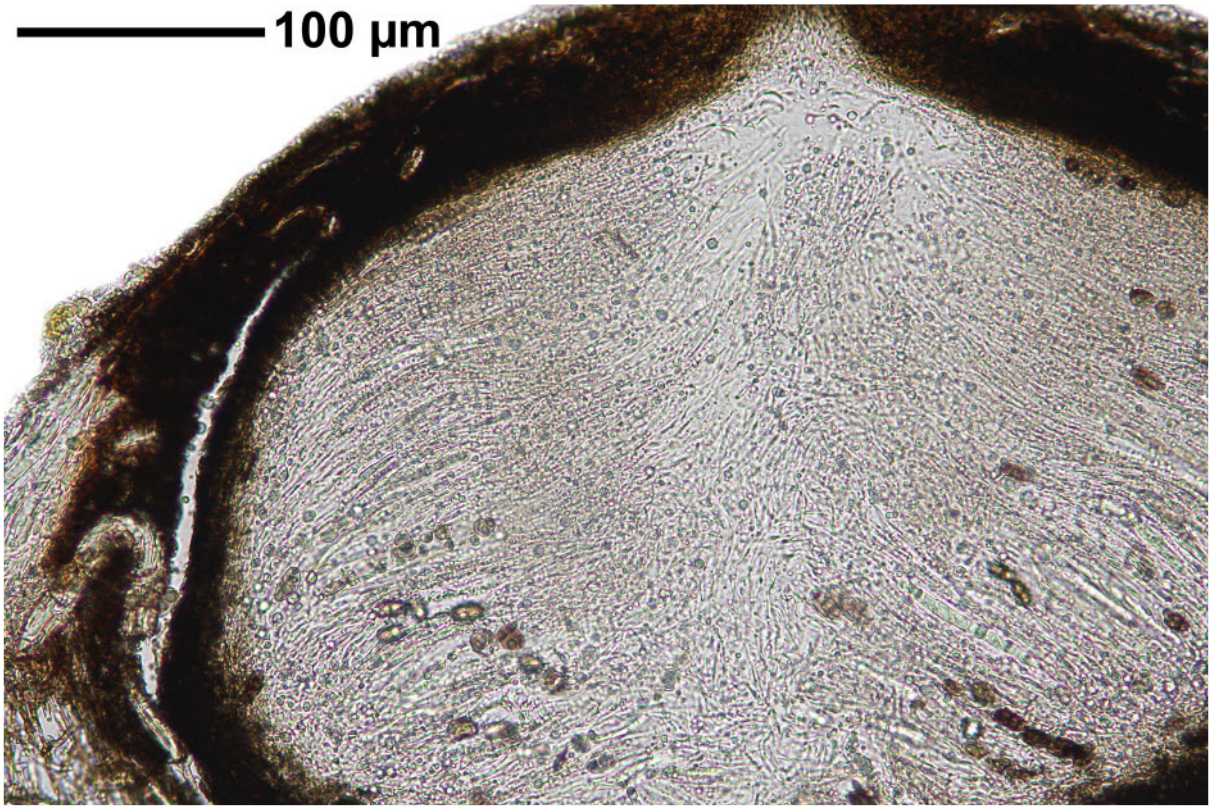


Pyrenula pseudobufonia



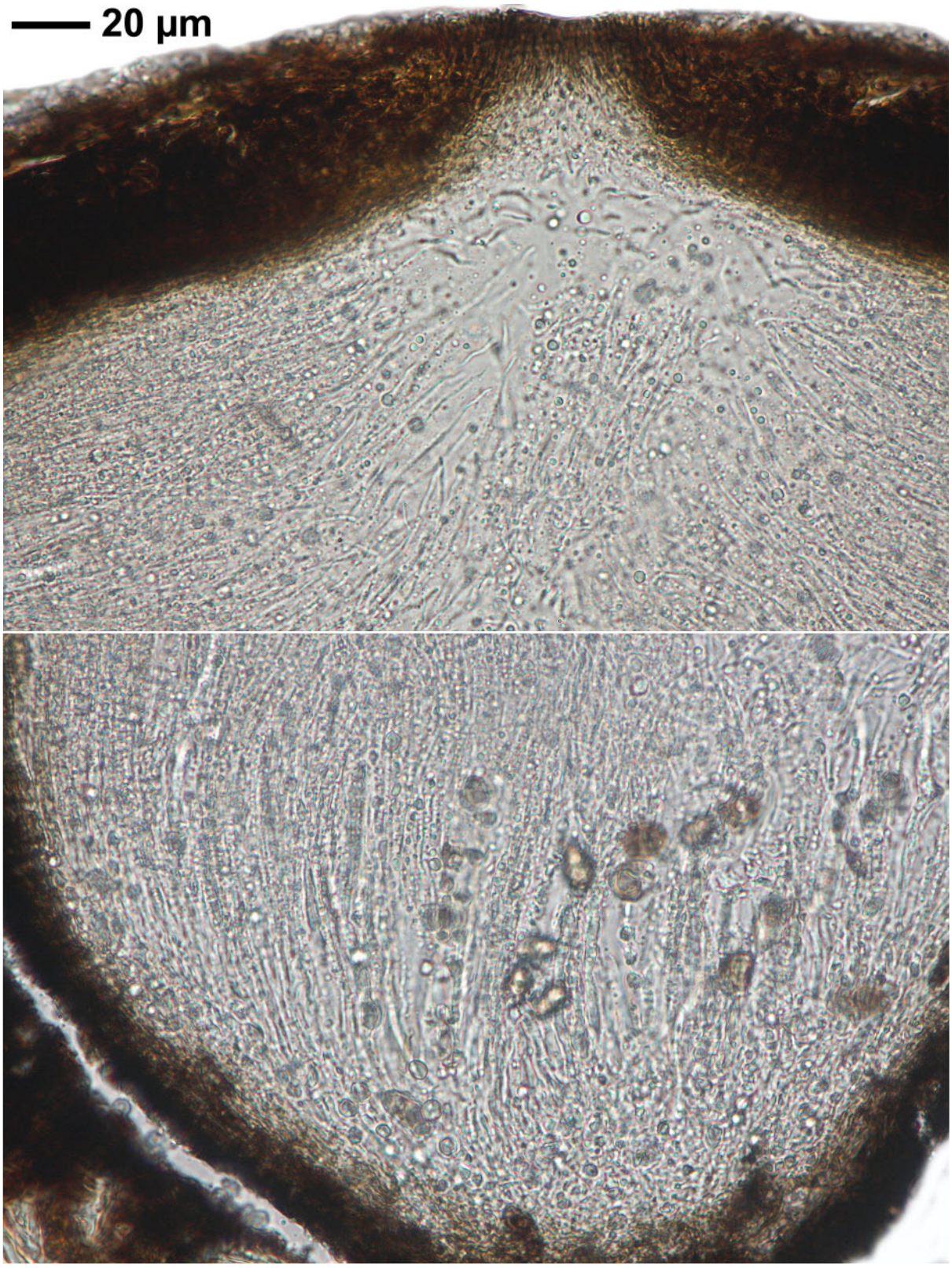
Pyrenula pseudobufonia



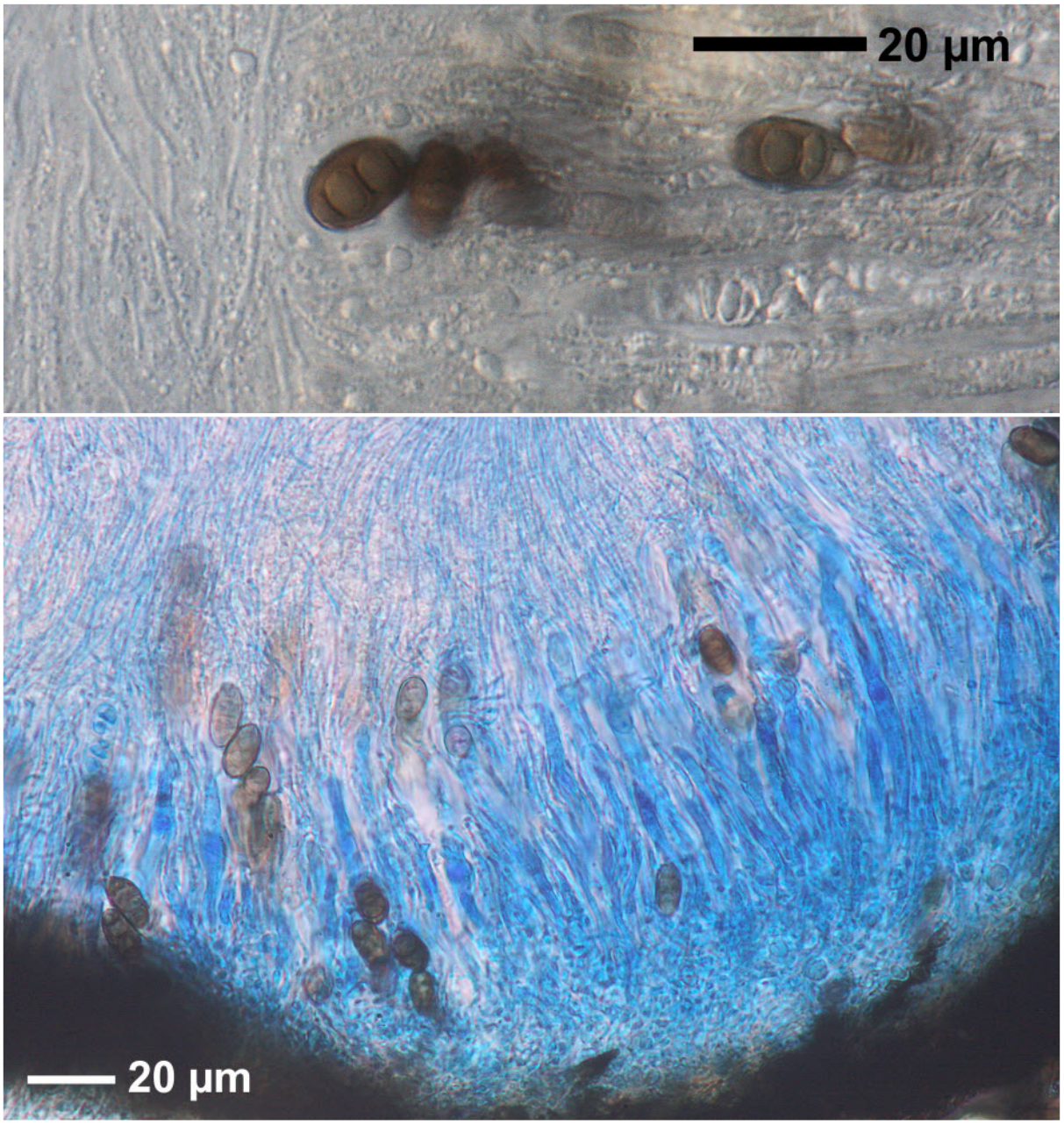




Pyrenula pseudobufonia



Pyrenula pseudobufonia



Pyrenula pseudobufonia

Pyrenula psoriformis Zahlbr., Mycologia 22(2): 70 (1930)

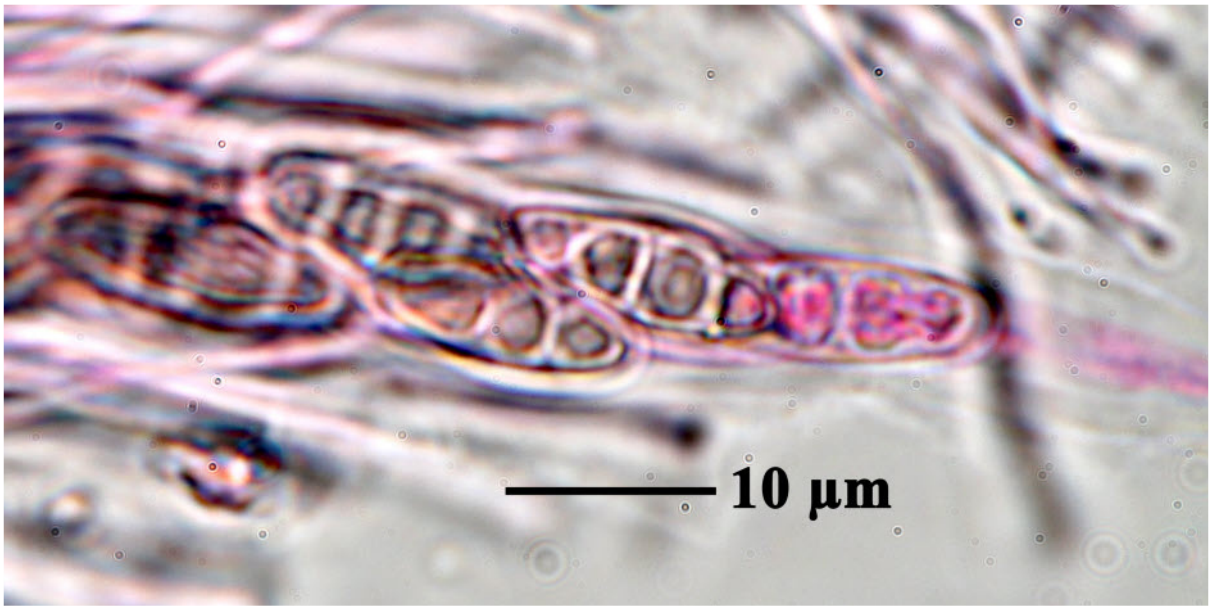
Thallus thick to subsquamulose, at least partly 0.3 mm thick; ascomata sessile, convex, black, c. 1 mm diam; ostioles apical, inconspicuous; ascospores brownish, uniseriate, 4-loculate, 12–16 × 5–6 µm, oblong-ellipsoidal, locules wide-lentiform, almost equal,

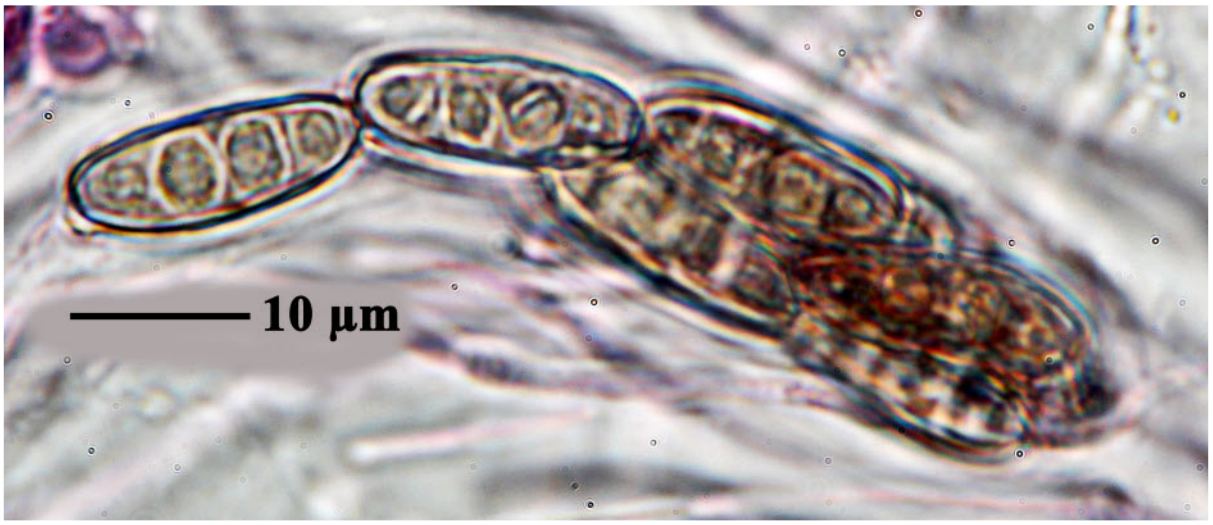
[ABL15591], Brazil, Rondonia, Porto Velho, Parque Natural Municipal, on twig in primary rain forest. 100 m, 8°41’10”S, 63°52’05” W, Leg. M. Cáceres & A. Aptroot (no15591), 19.11.2012, det. A. Aptroot, 2012.



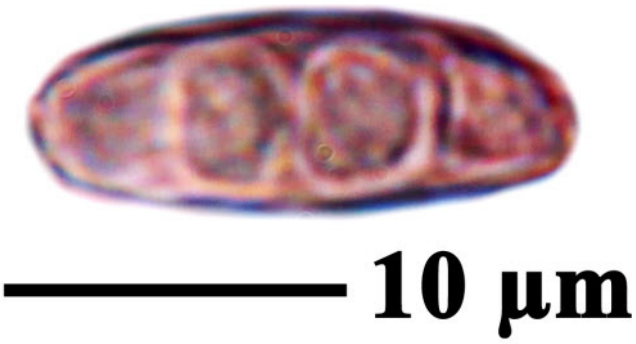


Pyrenula psoriformis







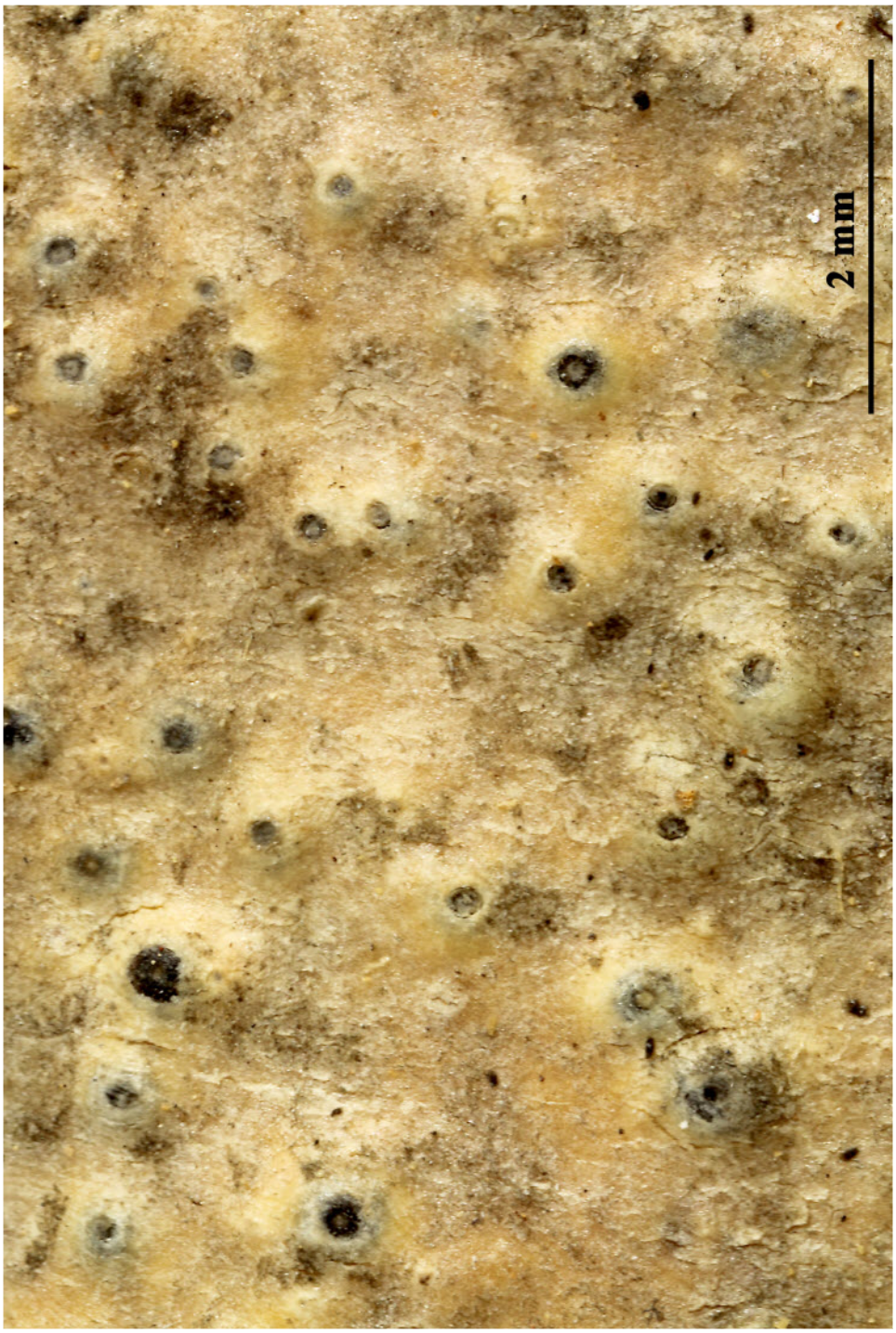


Pyrenula psoriformis

Pyrenula punctella (Nyl.) Trevis., Conspect. Verruc.: 13 (1860)
= *Verrucaria punctella* Nyl., Expos. syn. pyrenocarp. 46 (1858)
= *Pyrenula ferax* Müll. Arg., Bot. Jahrb. Syst. 6: 414. (1885)

Thallus corticate, thick, without pseudocypellae. Ascomata initially immersed, mostly subglobose, 0.5–0.7 mm diam. Wall with abundant hyaline crystals. Hamathecium not inspersed, hymenial gel IKI+ orangish. Ascospores uniseriate to subbiseriate, 3-septate, 32–42 × 13–17 µm. Chemistry: No substances detected.

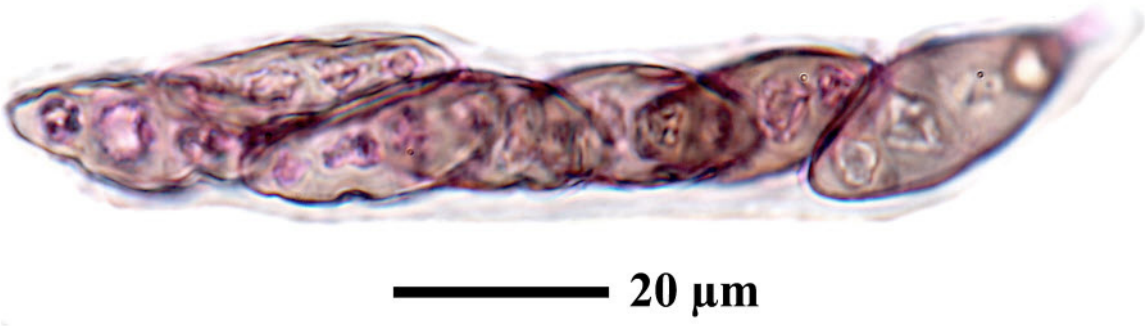
[Johnson1166], U.S.A., Mississippi, Clarke County, one mile S of Quitman. Leg. G. T. Johnson (no 1166), 08.04.1953.





Pyrenula punctella







Pyrenula punctella

Pyrenula punctoleucotrypa Aptroot, L.I. Ferraro & M. Cáceres, Lichenologist 46(1): 97 (2014)

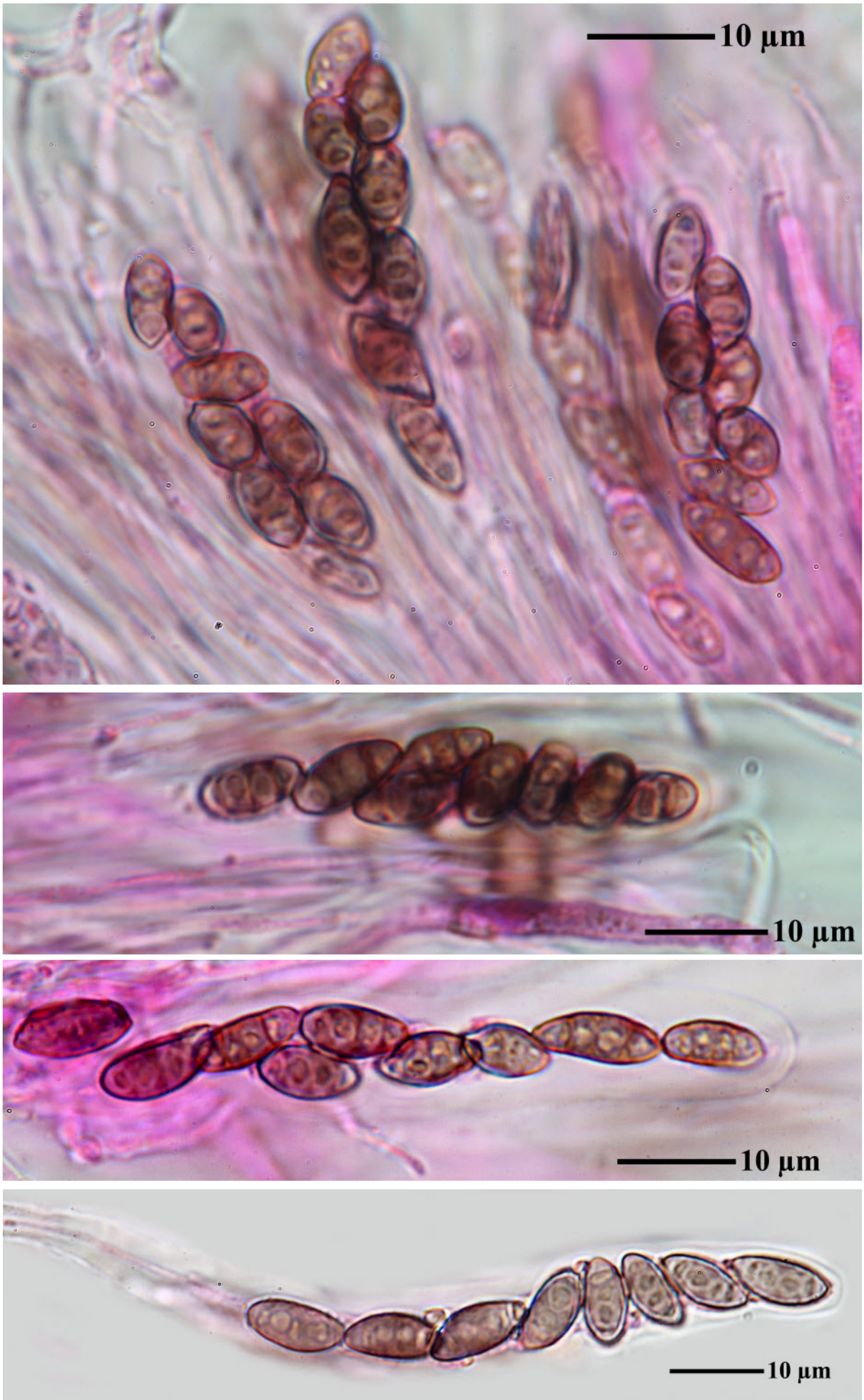
Thallus corticate, smooth, continuous, rather thin, olivaceous green, with numerous pale pseudocyphellae, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata perithecioid, pyriform, c. 0.2–0.4 mm diam., immersed in erumpent, 0.4–1.2 mm diam., black, conical pseudostromata with flattened tips, which are formed by the fused walls of 2–6 ascomata with mostly fused ostioles. Wall carbonized mostly above and fusing to form an up to c.100 µm thick pseudostroma. Ostioles pale brown, lateral, but central in the conical pseudostroma, often concave and angular. Hamathecium hyaline, not inspersed. Asci cylindricoclavate, with 8 ascospores. Ascospores brown, 3-septate, fusiform, without constrictions, 10–12 × 4–5 µm, ends obtuse, lumina rounded, separated from the wall by thick endospore layer. Chemistry: No substances detected.

[Ferraro10530], Argentina, Misiones Province, Puerto Iguazú, near Hotel Selvático Don Horacio, c. 230 m, on tree bark in evergreen tropical rainforest. 25°36'20''S, 54°33'33'' W. Leg. L. I. Ferraro (no 10530), A. Aptroot & M. Cáceres, 22.02.2013, det. A. Aptroot, 2013. ISOTYPE.





Pyrenula punctoleucotrypa



Pyrenula punctoleucotrypa

Pyrenula pyrenastrospora Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 64: 165 (1997)

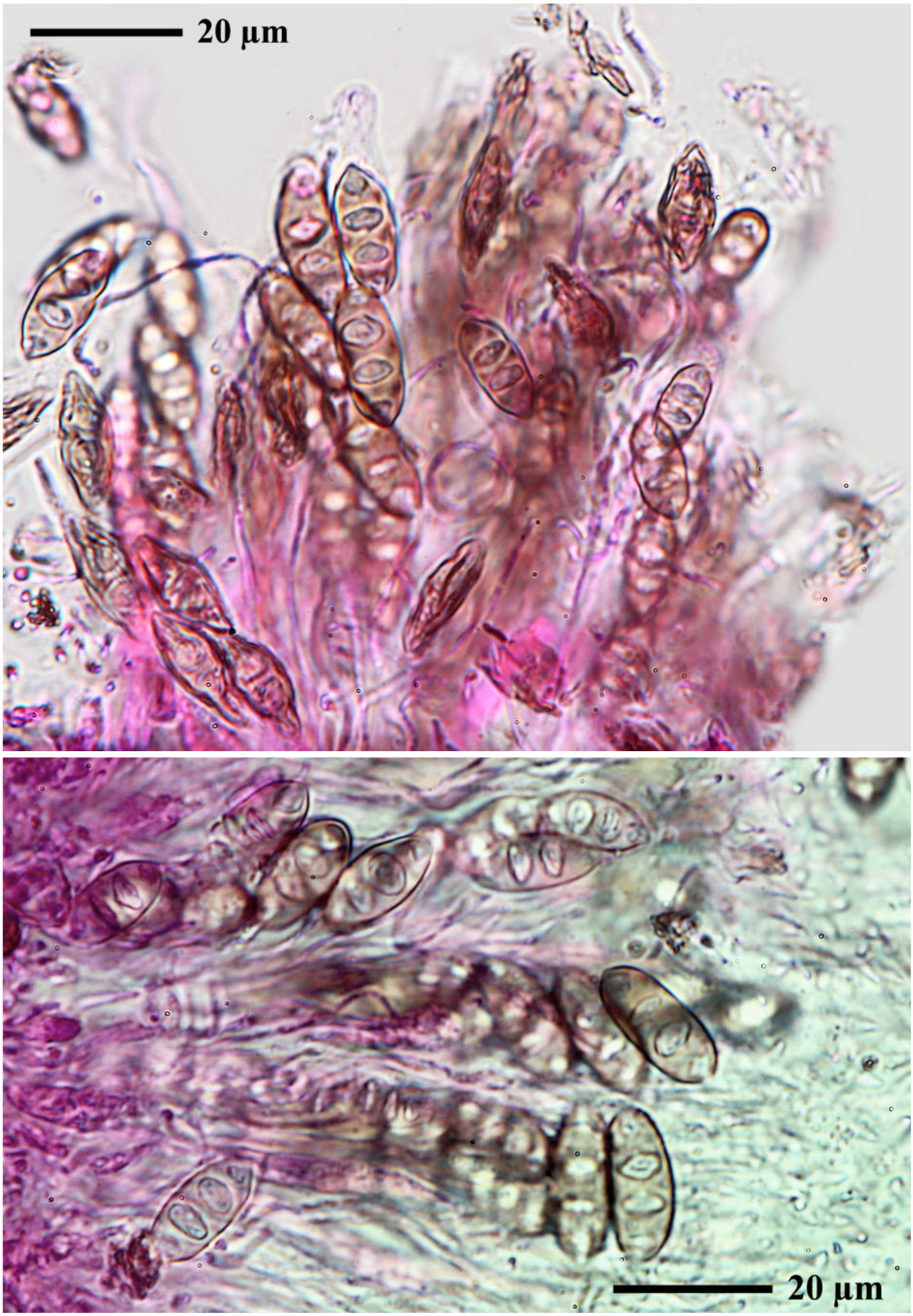
Thallus up to 2 cm wide, brown to dark brown, continuous, smooth, corticate, dull, without pseudocyphellae, without prothallus. Ascomata superficial, flattened, lens-shaped, 0.4–0.6 mm wide, not covered by the thallus. Wall entire, carbonized, with clypeus up to 200 µm thick. Ostiole apical, inconspicuous, c. 70 µm wide. Hamathecium IKI-, not inspersed. Ascospores 8/ascus, irregularly arranged in the ascus, fusiform, 3-septate, distoseptate, with 3 eusepta, not pointed, not constricted at the lumina, with angular lumina, with end locules elongated longitudinally and nearly adjacent to the outer wall, 18–20 × 5.5–7.5 µm. Chemistry: No substances detected.

[ABL30149], Papua New Guinea, Madang prov., Madang, in park in the city, on tree, 1m. 145°45’ E, 5°15’ S. Leg. A. Aptroot (no 30149), 18.07.1992. det. A. Aptroot, 1993.

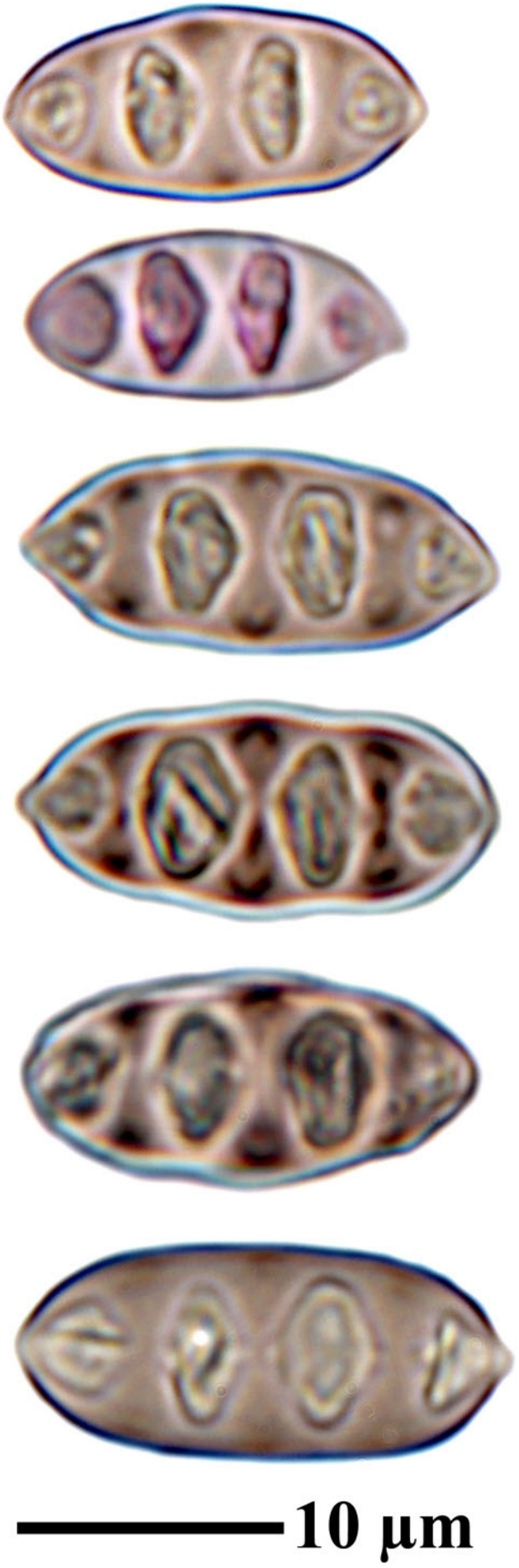




Pyrenula pyrenastrospora



Pyrenula pyrenastrospora



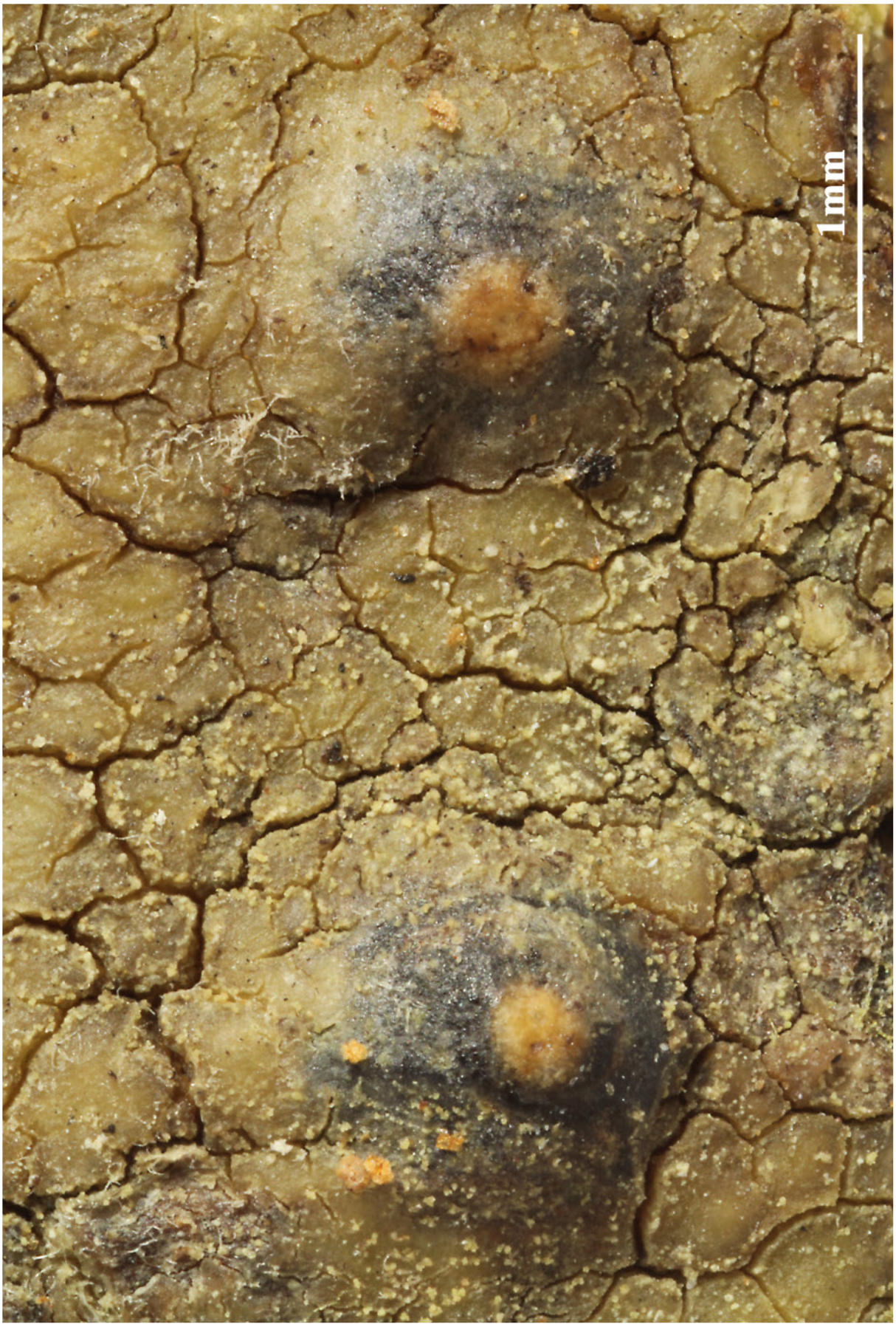
Pyrenula pyrenastrospora

Pyrenula pyrenuloides (Mont.) R.C. Harris, Mem. N. Y. bot. Gdn 49: 99 (1989)
= *Anthracothecium pyrenuloides* (Mont.) Müll. Arg., Linnaea 43: 44 (1880)
= *Bathelium pyrenuloides* (Mont.) Trevis., Spighe Paglie: 20 (1853)
= *Bottaria pyrenuloides* (Mont.) Trevis., Flora, Regensburg 44: 21 (1861)
= *Pyrenastrum pyrenuloides* (Mont.) Nyl., Acta Soc. Sci. fenn. 7(2): 488 (1863)
= *Trypethelium pyrenuloides* Mont., Annls Sci. Nat., Bot., sér. 2 19: 69 (1843)
= *Verrucaria pyrenuloides* (Mont.) Nyl., Mém. Soc. Imp. Sci. Nat. Cherbourg 5: 138 (1857)

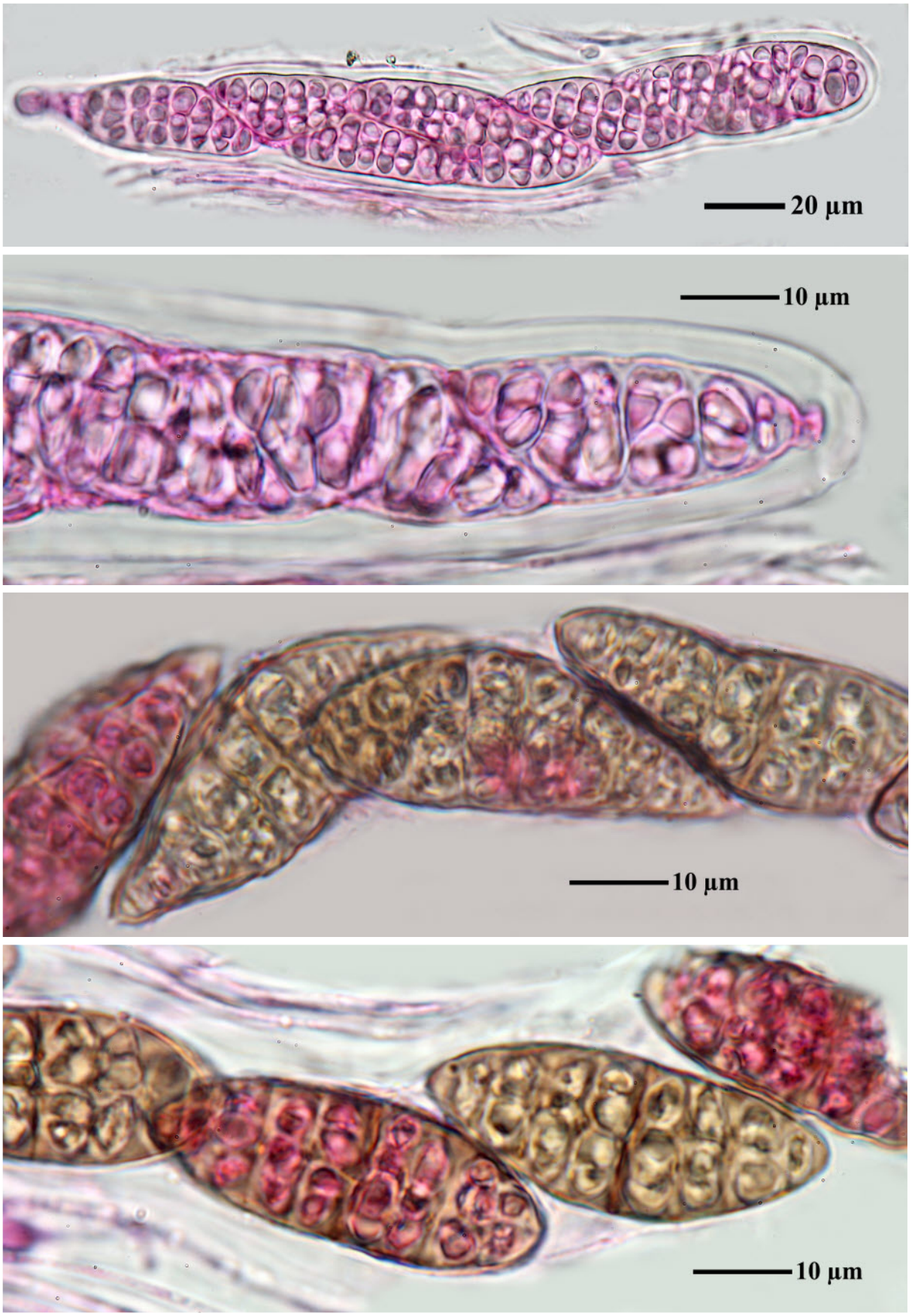
Thallus corticate, with or without pseudocyphellae. Ascomata immersed, subglobose, 0.5–1 mm diam., crystals present. Hamathecium not inspersed, hymenial gel IKI+ orangish.Ascospores brown, biseriate, with 8–10 rows of up to 10 locelli, 50–62 × 18–24 µm. Chemistry: No substances detected.

[ABL31778], Papua New Guinea, Madang Prov., foothills of Finisterre Range, along toad Madang-Lae, km 39. Virgin lowland rainforest, on tree, 320 m. 145°34’ E, 5°25’ S. Leg. A. Aptroot (no 31778), 14.08.1992, det. A. Aptroot, 1993.





Pyrenula pyrenuloides



Pyrenula pyrenuloides



Pyrenula pyrenuloides

Pyrenula pyrgillospora Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 64: 166 (1997)

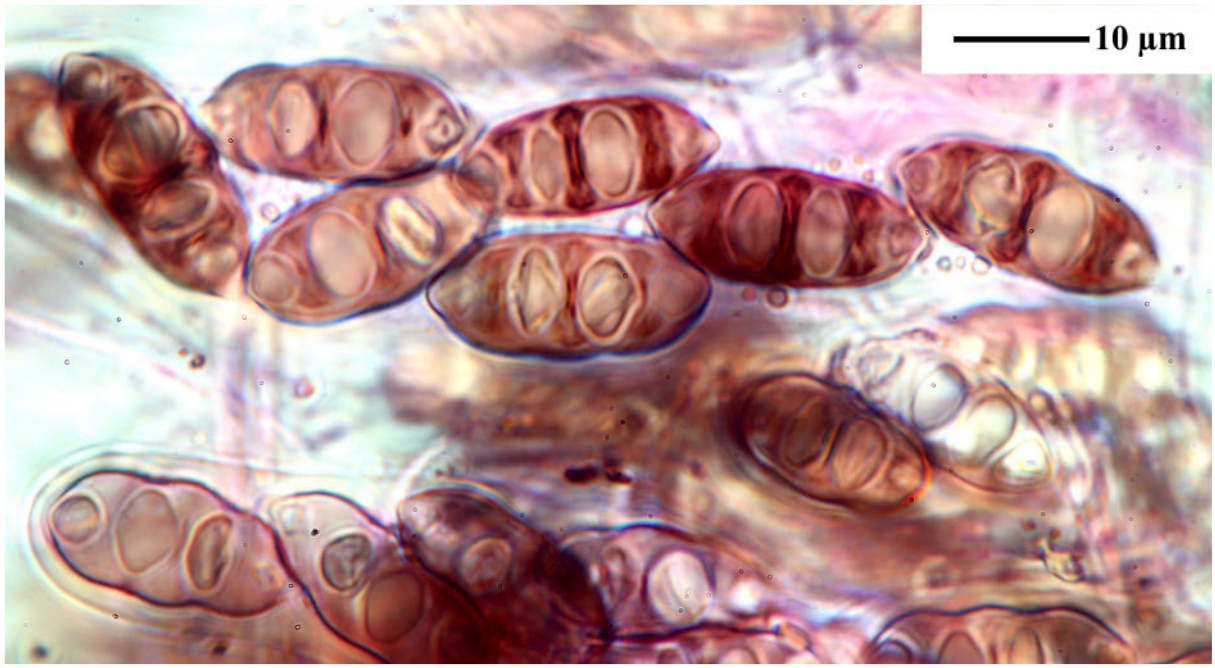
Thallus up to 5 cm wide, brown, continuous, smooth, not corticate, shiny, without pseudocyphellae, surrounded by a black prothallus. Ascomata superficial, flattened, lens-shaped, 0.8–1.3 mm wide, not covered by the thallus. Wall entire, carbonized, with clypeus up to 200 µm thick. Ostiole apical, depressed, pale brown, c. 100 µm wide. Hamathecium IKI-, not inspersed. Ascospores 8/ascus, brown, uniseriate, 3-septate, distoseptate, with 3 very thick and darkened eusepta (resembling and probably homologous to *Pyrgillus*), pointed, constricted at the lumina, with angular lumina, (17–)19–22 × 7–9 µm. Chemistry: No substances detected.

[ABL19168], Papua New Guinea, Cental prov., Varirata National Park, 20 km E of Port Moresby, on tree in secondary tropical forest, 800 m. 147°22' E, 9°27' S. Leg. A. Aptroot (no 19168), 03.1987, det. A. Aptroot, 1987.



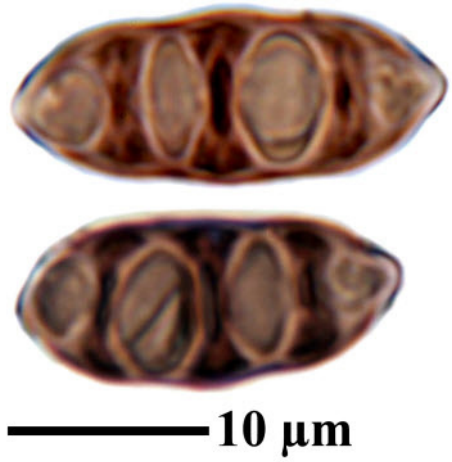


Pyrenula pyrgillospora









Pyrenula pyrgillospora

Pyrenula quartzitica Aptroot [as 'quarzitica'], Fungal Diversity 9: 23 (2002)

Thallus crustose, up to 10 cm diam., yellowish-brown, superficial, corticate, without pseudocyphellae, somewhat glossy, without hypothallus. Algae Trentepohlia-like, sparse. Perithecia mostly half covered by the thallus, hemispherical, brown, 0.6–1 mm diam. Ascomal wall entire, 100–250 µm thick, with angular, 30–80 µm wide hyaline crystals, IKI–, KOH+ reddish. Ostiole conical, reddish-brown, 0.1–0.2 mm wide. Hymenium not interspersed, hyaline, IKI–. Asci cylindrical to clavate, c. 100–150 × 15–20 µm, without ocular chamber. Paraphyses simple, a few anastomosing above the asci, up to 0.8 µm wide. Ascospores 8 in one ascus, uniseriate, very dark chocolate brown, distoseptate only, with darker pigmentation in bands around the septa, with 4 lumina (the middle ones about twice as broad as the end ones), ellipsoid, often the ends pointed, (22–)25–30 × (12–)14–17 µm, without gelatinous sheath. Pycnidia not observed. Chemistry: No substances observed.

[ABL41329], Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque Natural do Caraça, near Funil, 1.5 km NW of monastery Santuário do Caraça, in secondry rainforest on shaded to somewhat exposed sandston, 1300 m. 20°06’ S, 43°29’ W. Leg. A. Aptroot (no 41329), 18–21.09.1997, det. A. Aptroot, 1998.





Pyrenula quartzitica

Pyrenula reginae E.L. Lima, Aptroot & M. Cáceres, Lichenologist 45(2): 199 (2013)

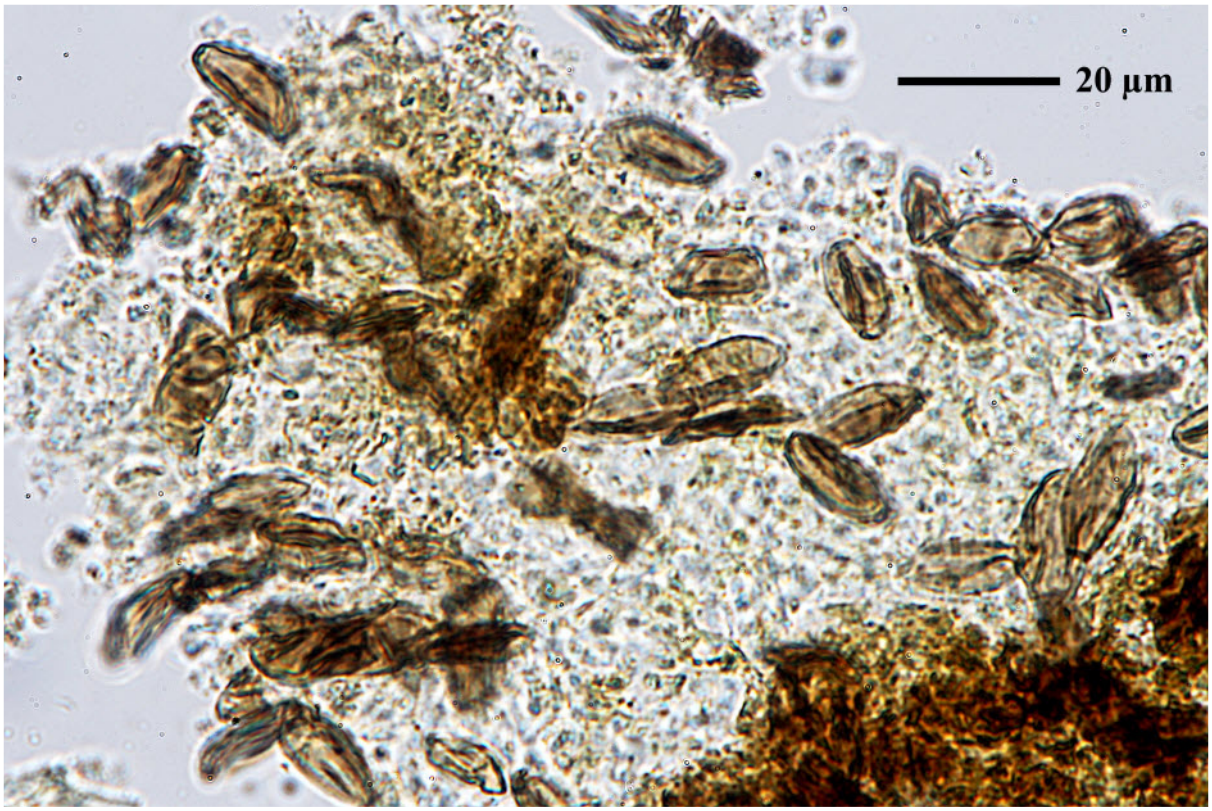
Thallus corticate, dull, rough, continuous, thin, dark carmine red, without pseudocyphellae, without prothallus. Algae trentepohlioid. Ascomata perithecioid, associated in groups of 2–20 with partly fused walls but with separate ostioles, hemispherical, emergent, 0.2–0.4 mm diam., tops glossy black, edges with thallus covering; often only the ostioles black. Wall only carbonized above, extending sideways as a clypeus, without crystals, KOH–, c. 70 µm thick. Ostioles black, apical. Hamathecium hyaline, densely inspersed with oil droplets. Asci cylindrico-clavate, IKI–, with 8 biseriate ascospores. Ascospores brown, IKI–, 3-septate, fusiform, without constrictions at the septa, 12–15 × 6–8 µm, ends rounded, middle lumina broadly diamond-shaped, end lumina triangular, separated from the wall by thick endospore layer. Pycnidia not observed. Chemistry: Thallus UV–, KOH+ purple. TLC: anthraquinone.

[Lima10], Brazil, Pernambuco, Buíque, Vale do Catimbau National Park, on bark of tree, c. 885 m. Leg. E. L. Lima (no 10), 7.8.2011. TOPOTYPE.





Pyrenula reginae



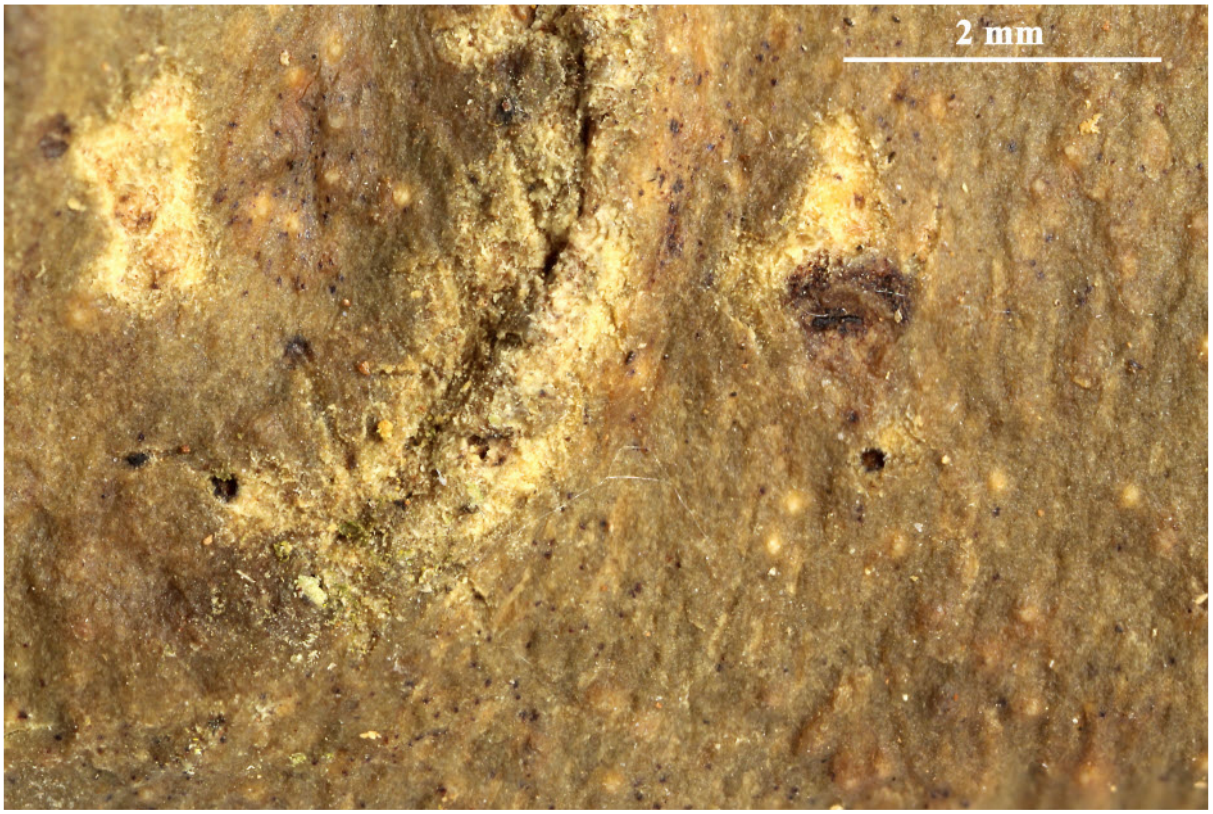


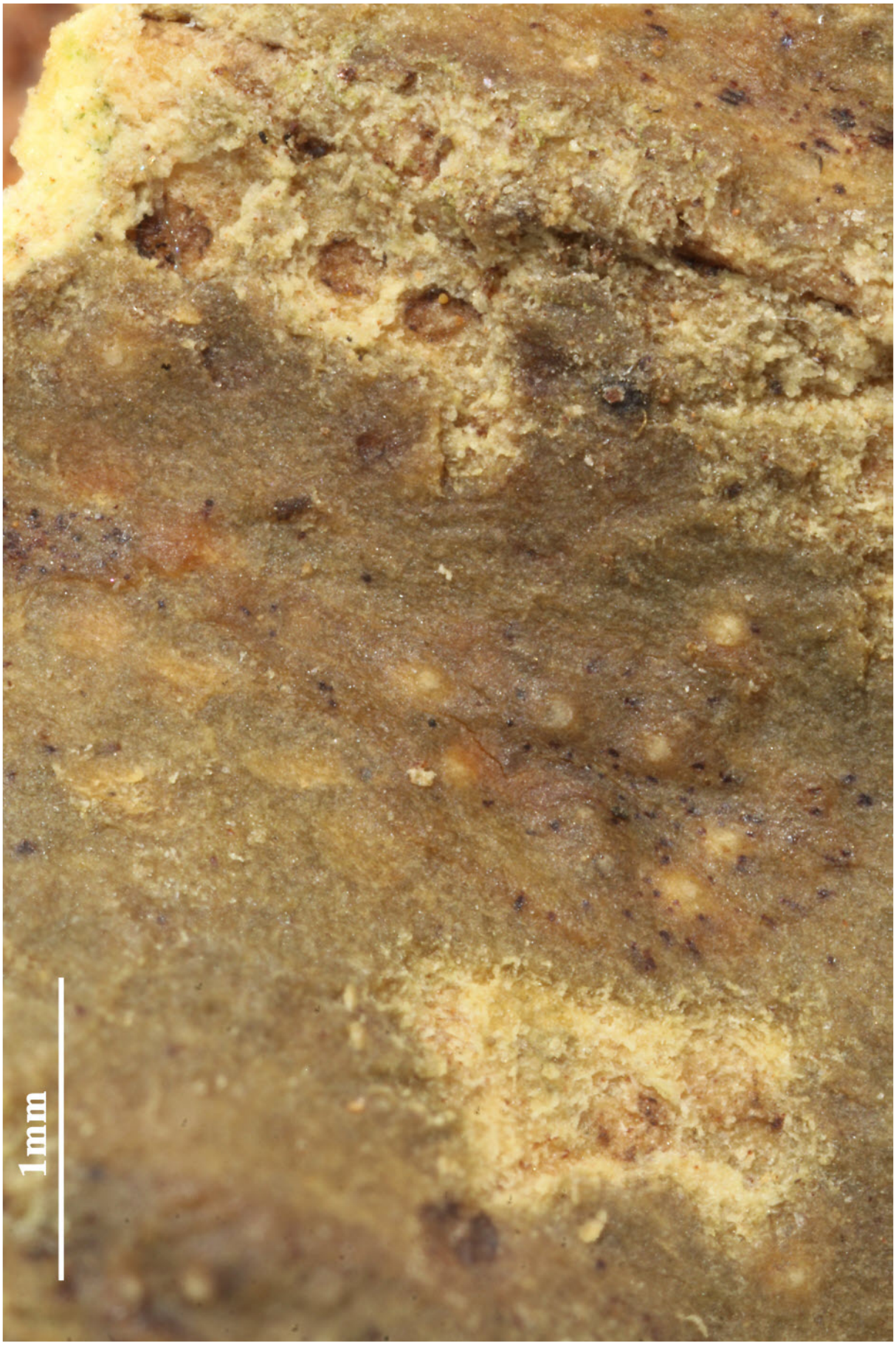
Pyrenula reginae

Pyrenula rhomboidea Aptroot & M. Cáceres, Lichenologist 45(6): 775 (2013)

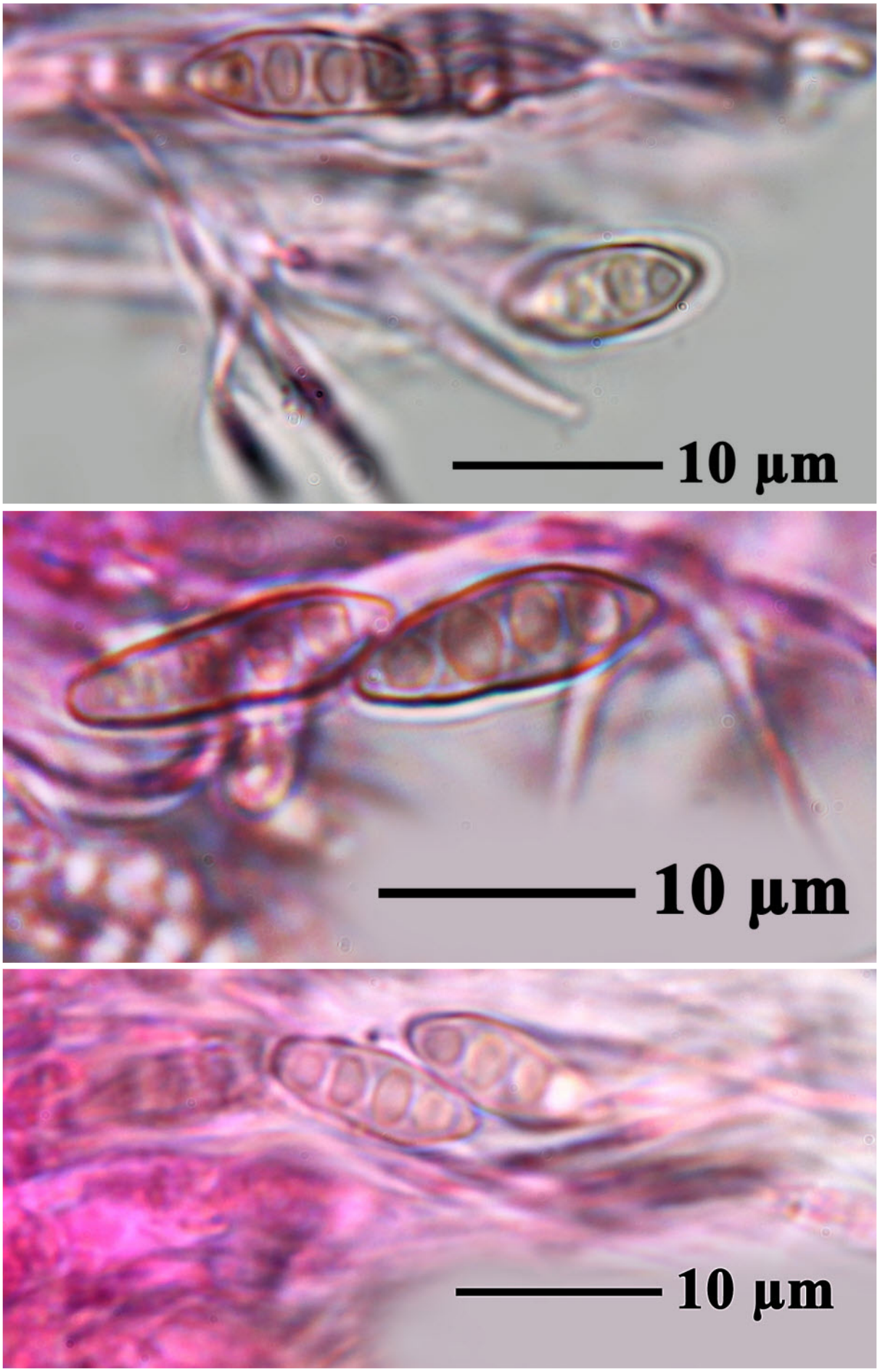
Thallus corticate, smooth, continuous, thin, olive-brown, without pseudocyphellae, not surrounded by prothallus; algae trentepohlioid. Ascomata perithecioid, simple, fully immersed in the bark, only visible from above by the ostioles, lenticular, 0.1–0.2 mm diam., black. Wall completely carbonized, without crystals, up to c. 50 µm thick. Ostioles pale brown, apical, somewhat raised above the thallus surface. Hamathecium hyaline, not inspersed. Asci cylindrico-clavate. Ascospores 8/ascus, irregularly uniseriate, 3 septate, brown, clavate rhomboidal, not constricted at the septa, 11–13 × 3.5–4.0 µm, ends rounded, lumina rounded to diamond shaped, separated from the wall by a thick endospore layer. Chemistry. K-, UV-. TLC: no secondary substances detected.

[ABL15338], Brazil, Rondônia, Porto Velho, Parque Natural Municipal, on tree bark in primary rain forest. 100 m, 8°41’10” S, 63°52’05” W. Leg. M. Cáceres & A. Aptroot (no 15338), 17.11.2012, det. A. Aptroot, 2012. ISOTYPE.

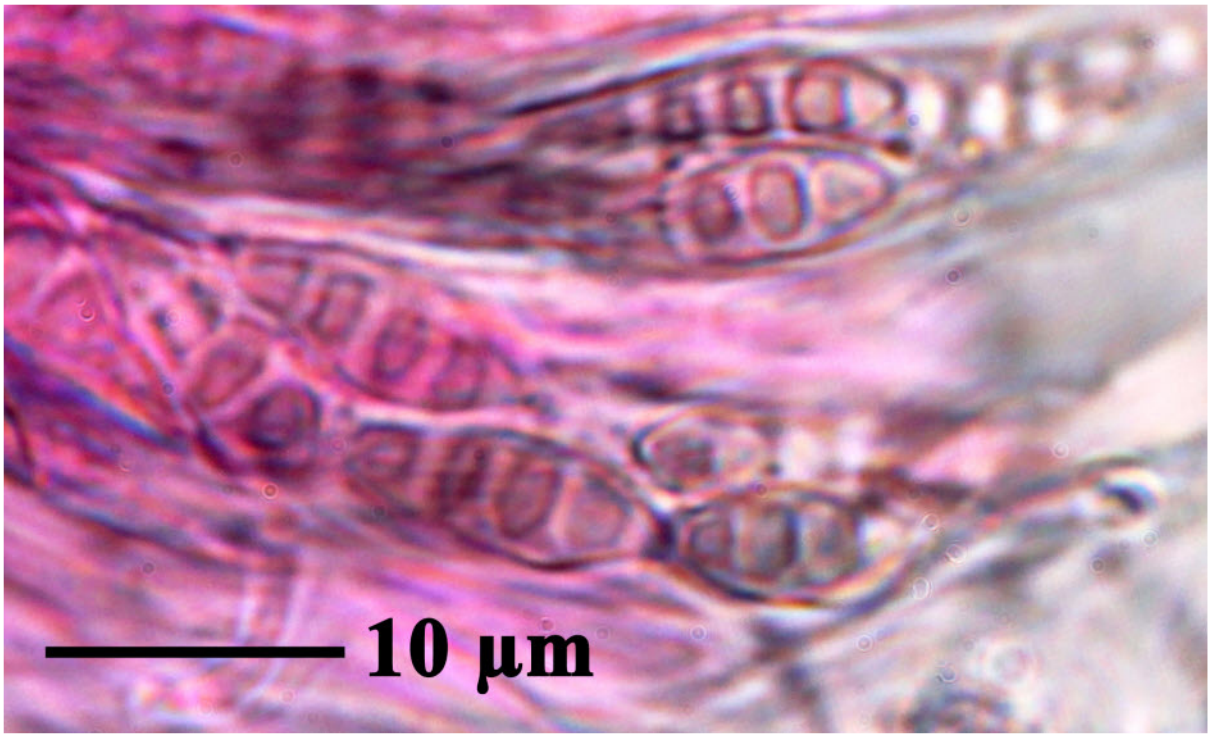


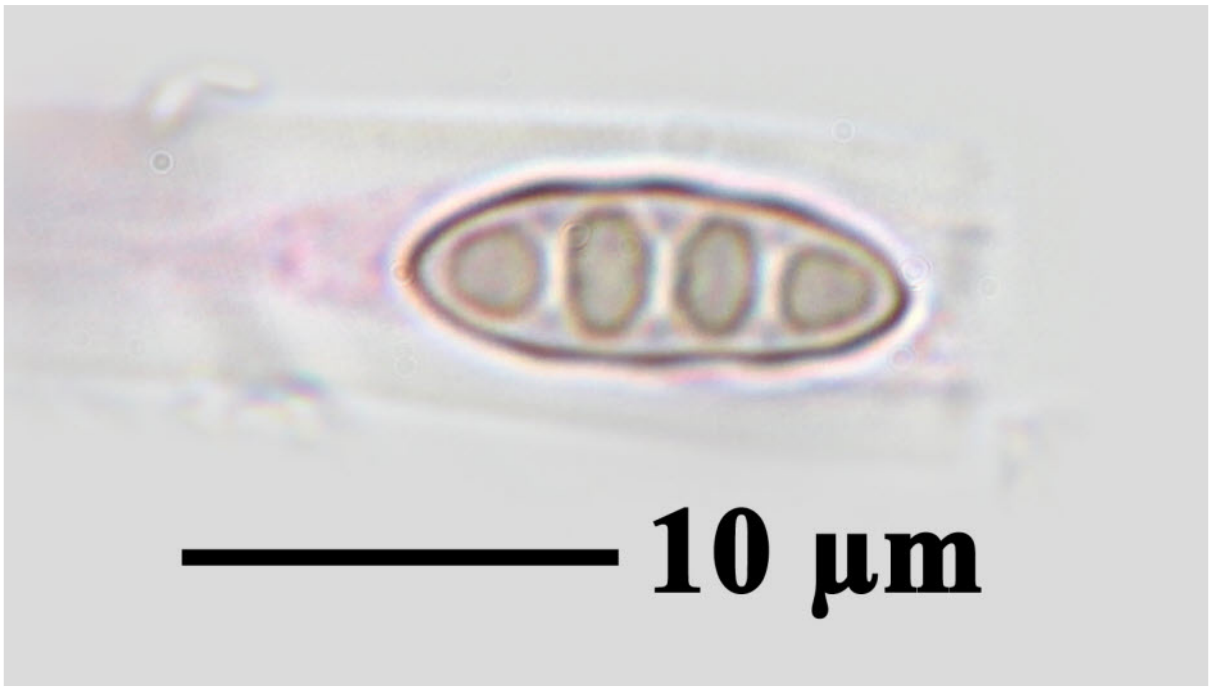


Pyrenula rhomboidea



Pyrenula rhomboidea





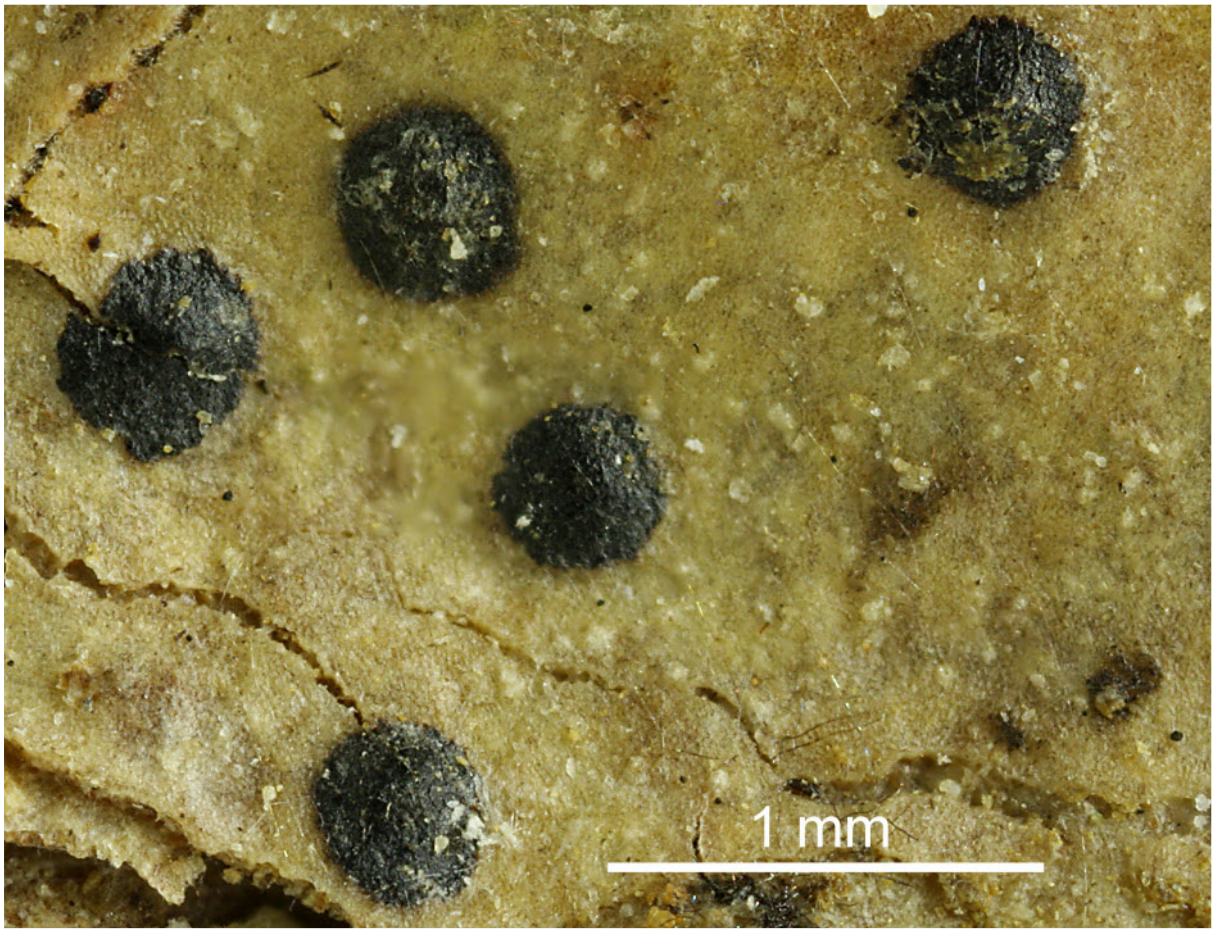
Pyrenula rhomboidea

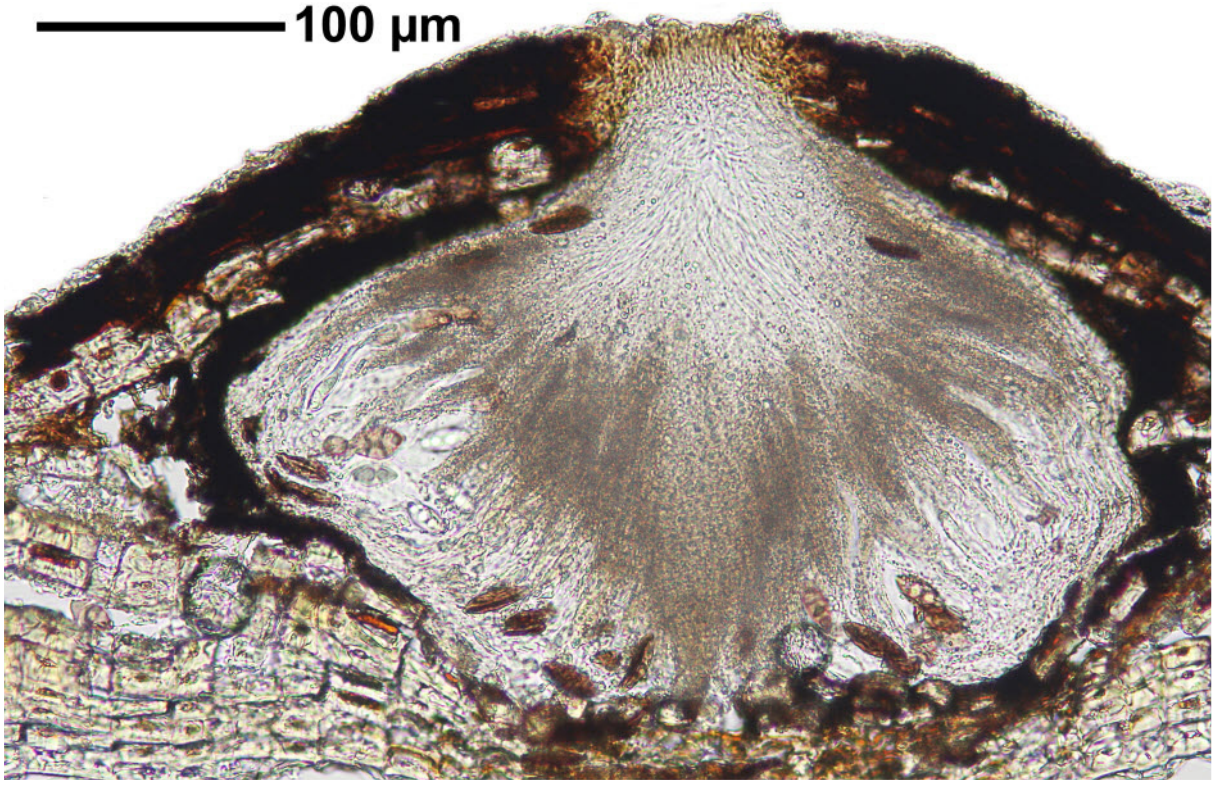
Pyrenula rinodinospora Aptroot, Lichenologist 44(5): 615 (2012)

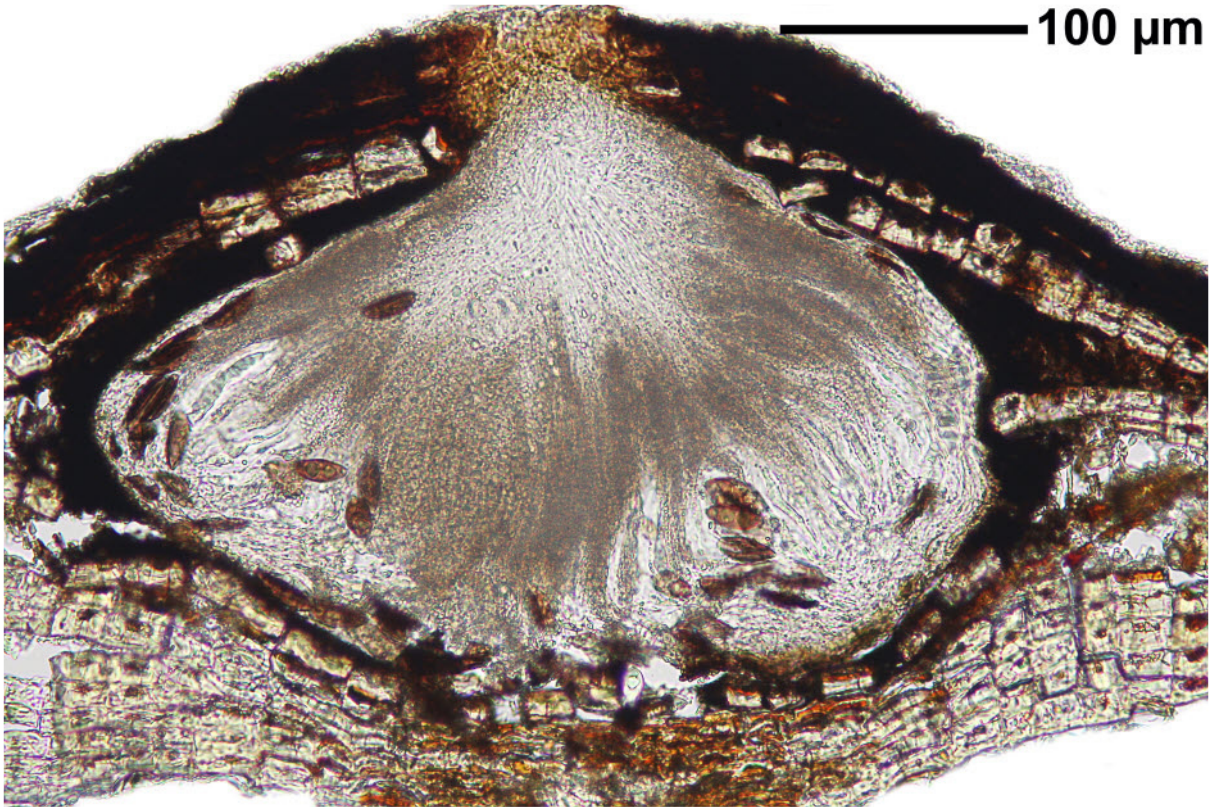
Thallus corticate, smooth, continuous, thin, brownish, without pseudocyphellae or pockets of crystals; algae trentepohlioid. Ascomata perithecioid, simple, dispersed, conical, emergent, 0.3–0.5 mm diam., black, edges without thallus covering. Wall more or less equally carbonized, but with a sideways extension (clypeus), without crystals, but with bark cells between the wall and the clypeus, KOH-, c. 25 mm thick. Ostioles black, KOH-, apical. Hamathecium hyaline, densely inspersed with oil droplets. Asci cylindrico-clavate, IKI-, with 8 irregularly arranged ascospores. Ascospores rather dark brown, IKI-, 3-septate, fusiform, without constrictions, (20–)26–30 × 11.0–12.5 µm, ends mostly pointed, lumina mostly quadrangular, angles blunt, terminal lumina elongated and not separated from the end wall by an endospore layer. Pycnidia not observed. Chemistry. No substances detected.

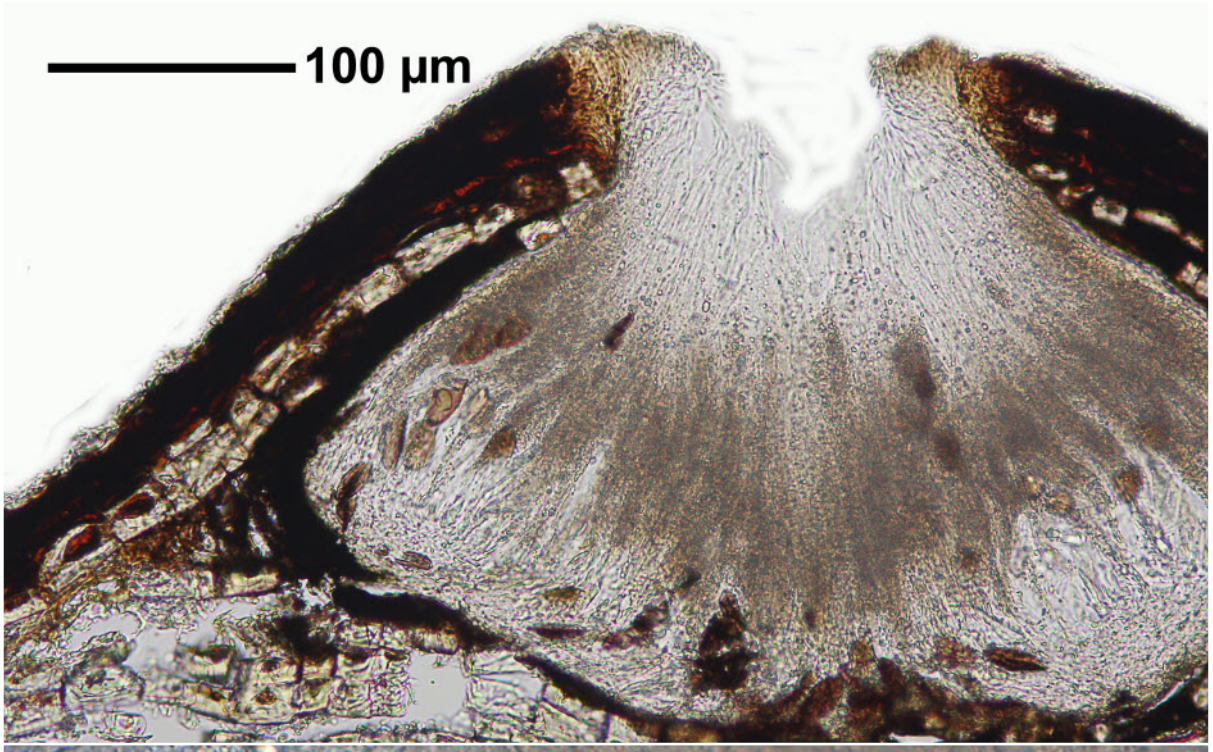
[ABL-367471], Papua New Guinea, Madang Province, Budub village, Ari logging site, c. 20 km NW of Madang. 5°02.6’ S, 145°44.5’ E, 150 m. On tree trunks in primary forest. Leg. A. Aptroot (no 367471), 1. Nov. 1996, det. A. Aptroot. HOLOTYPUS.

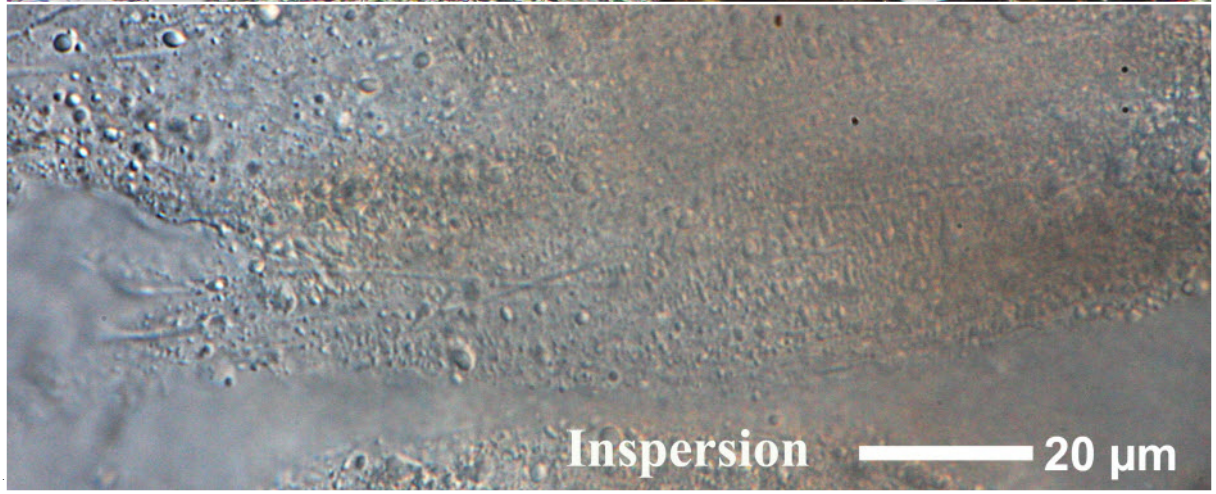


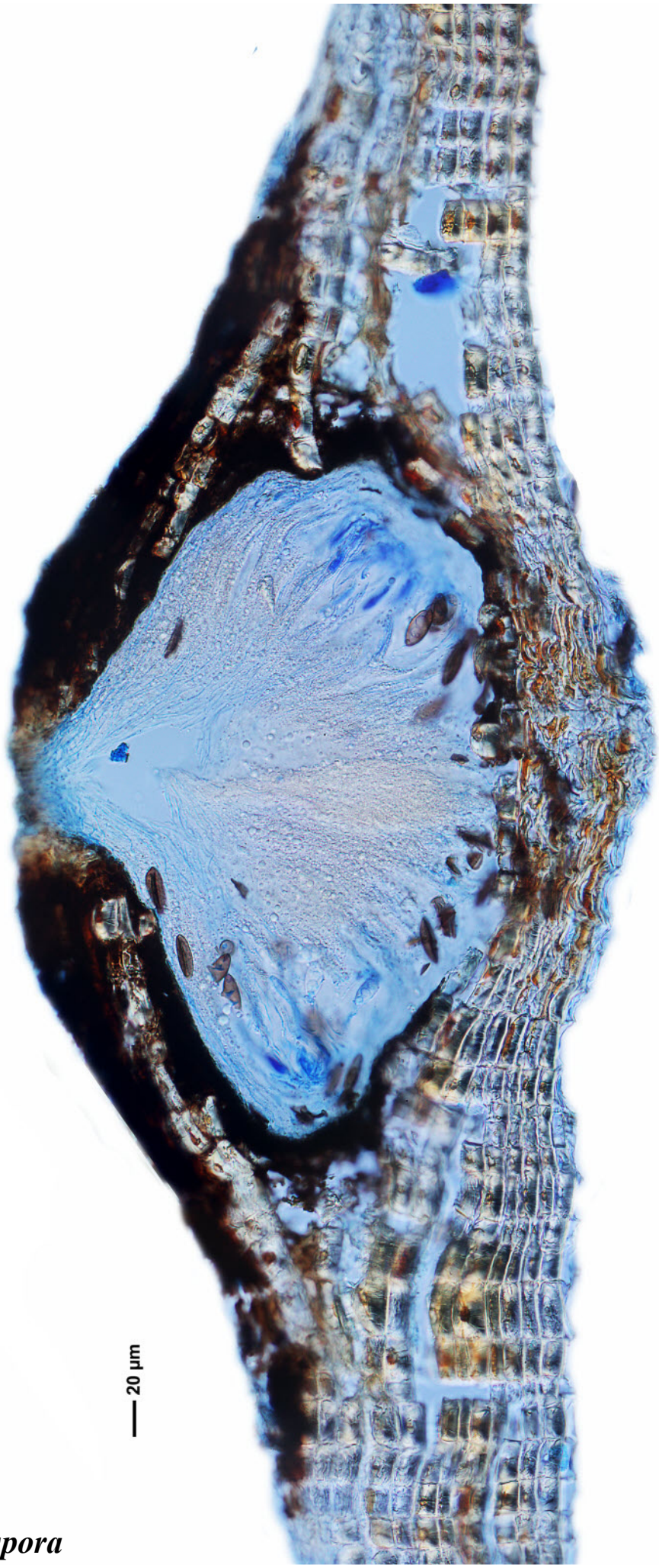

1 mm


100 µm

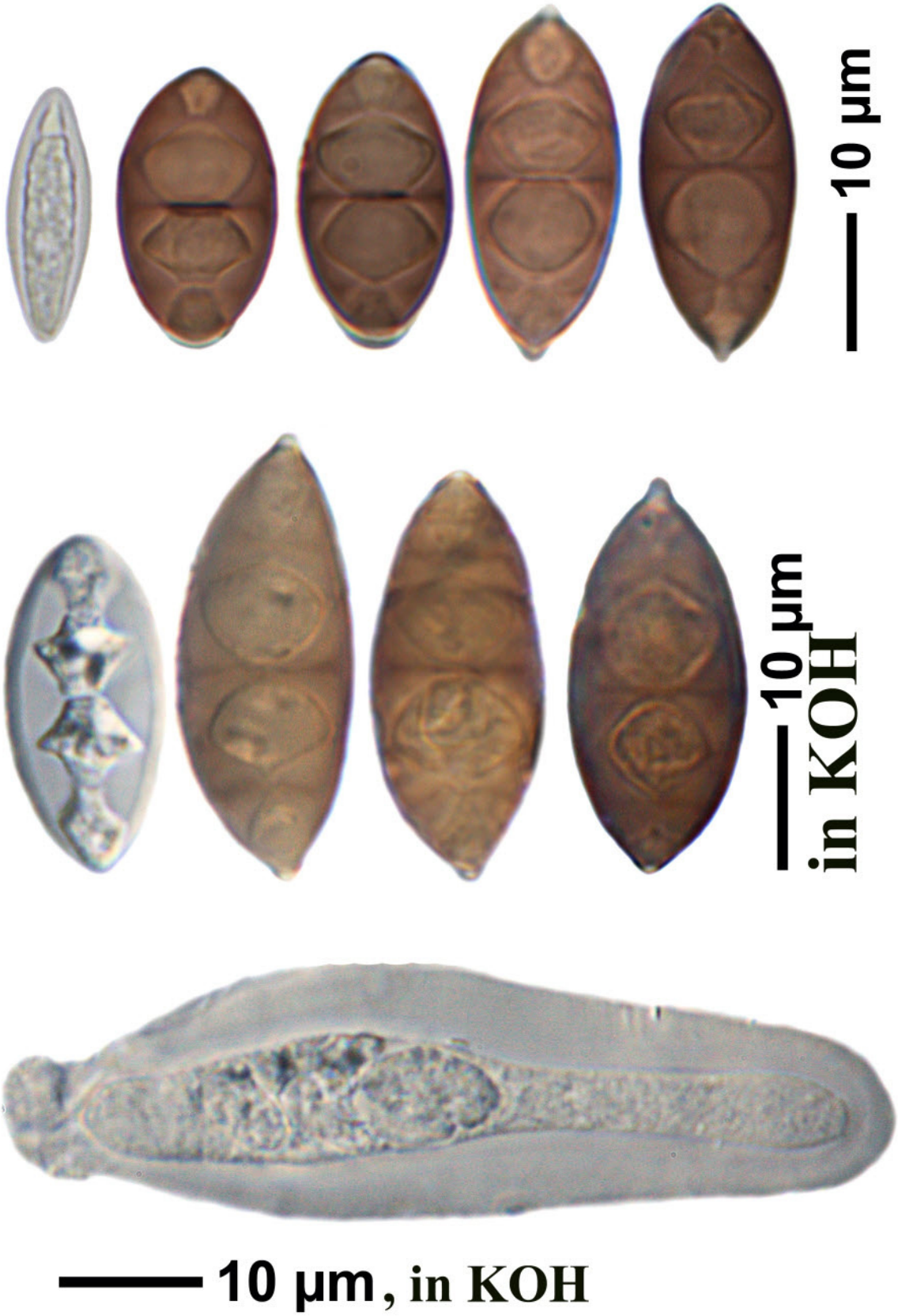

100 µm


100 µm


Inspersion
20 µm



Pyrenula rinodinospora



Pyrenula rinodinospora

Pyrenula rockii Zahlbr., Annls mycol. 30(5/6): 428 (1932)

Ascomata subglobose, erumpent, mostly thallus-covered, c. 0.8–1.5 mm diam.; ostioles apical, pale. Hamathecium not inspersed. Ascospores 4/ascus, 4-loculate, 50–75 × 20–30 µm, broadly fusiform with pointed ends, apical locules small, with thin wall, protruding. Thallus UV-.

[ABL12440], Madagascar, Ambohimanga, prov. Antananarive, mountain forest with *Ficus* and *Weinmannia*, on bark, mainly *Ficus*. 47°38' E, 18°45' S, 1550 m. Leg. A. Aptroot (no 12440) & R. Hensen, 17.04.1984, det. A. Aptroot.





Pyrenula rockii

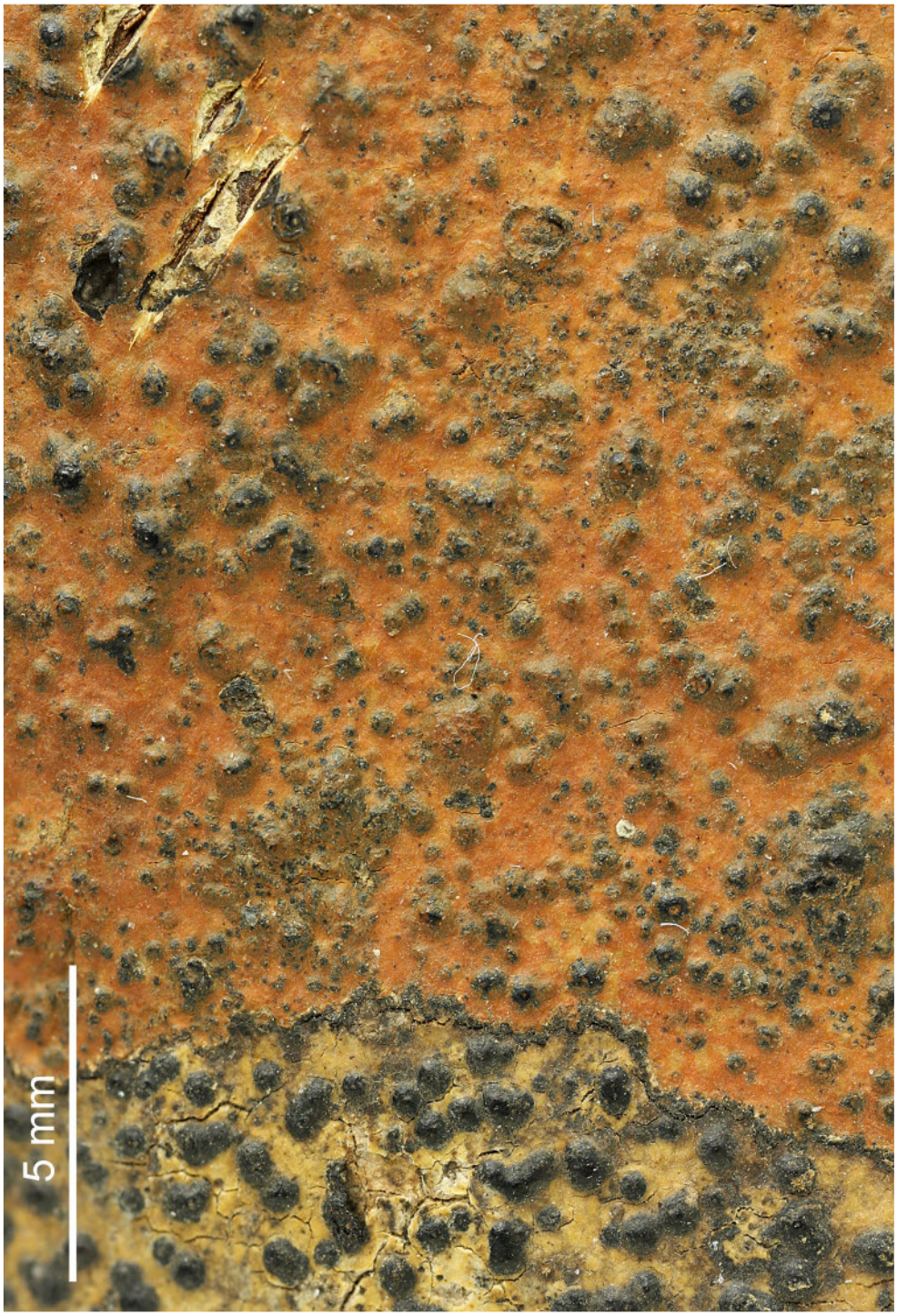


Pyrenula rockii

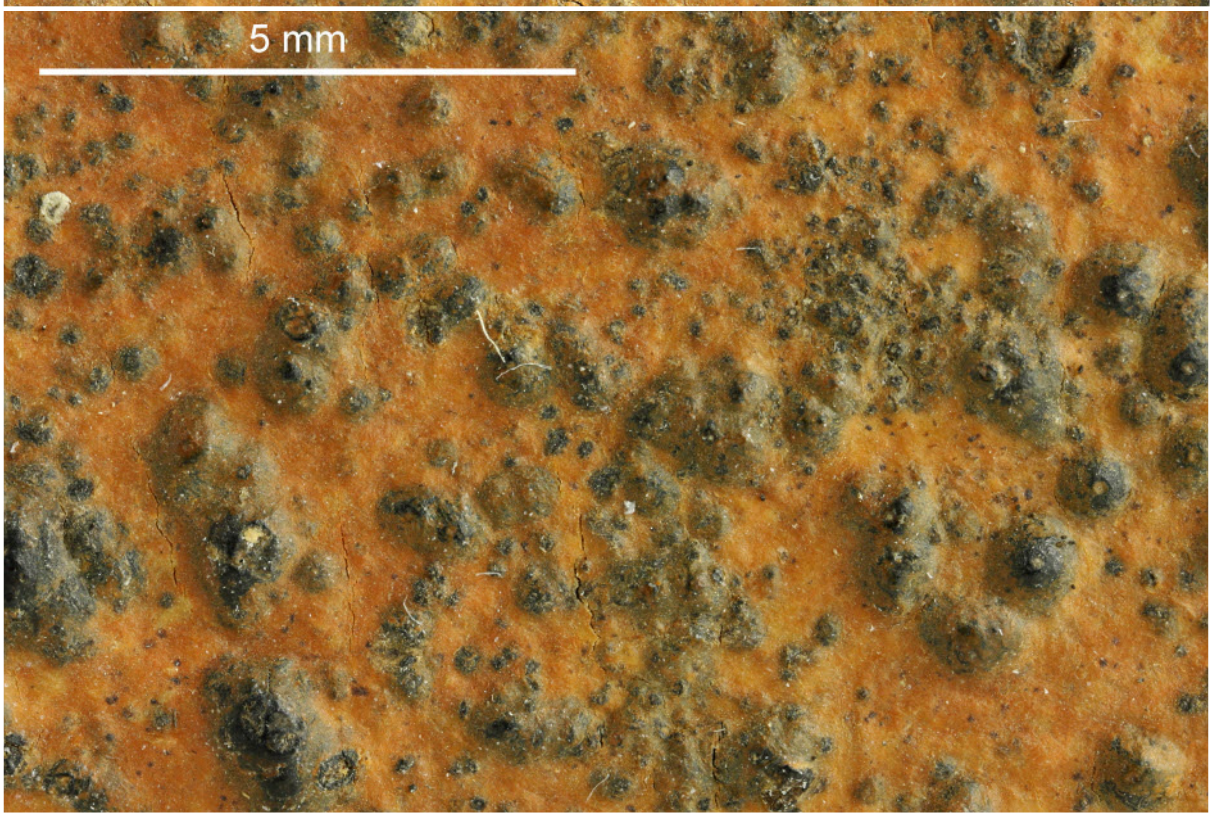
Pyrenula rubrojavanica Aptroot, Lichenologist 44(5): 615 (2012)

Thallus red-brown. Perithecia semi-immersed, c. 0.7 mm wide, laterally mostly covered by the thallus, black free part at the top c. 0.3–0.4 mm wide. Hamathecium partly inspersed with very fine droplets. Ascospores brown, 3-septate, lumina in water irregular diamond-shaped, in K all lumina rounded, 8/ascus, 16–20 × 7.5–8.5 µm.

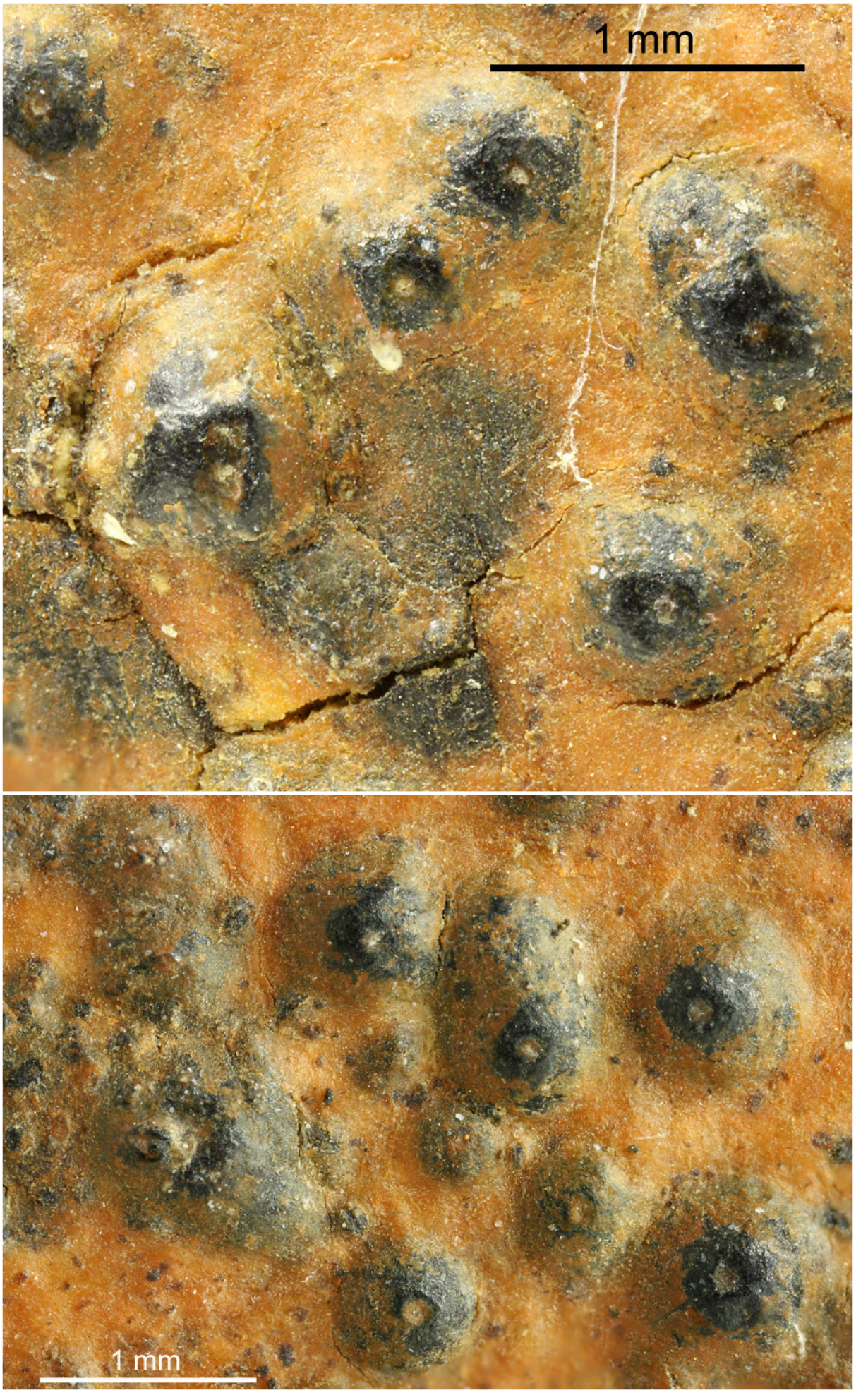
[ABL-PG7892], West Java, on teawood from an unknown estate in the neighbourhood of Bogor and brought into Camp Kedung Badak for firewood. Alt. ca. 1700 m. Leg. P. Groenhart Nr. 7892, det. Aptroot. ISOTYPUS.



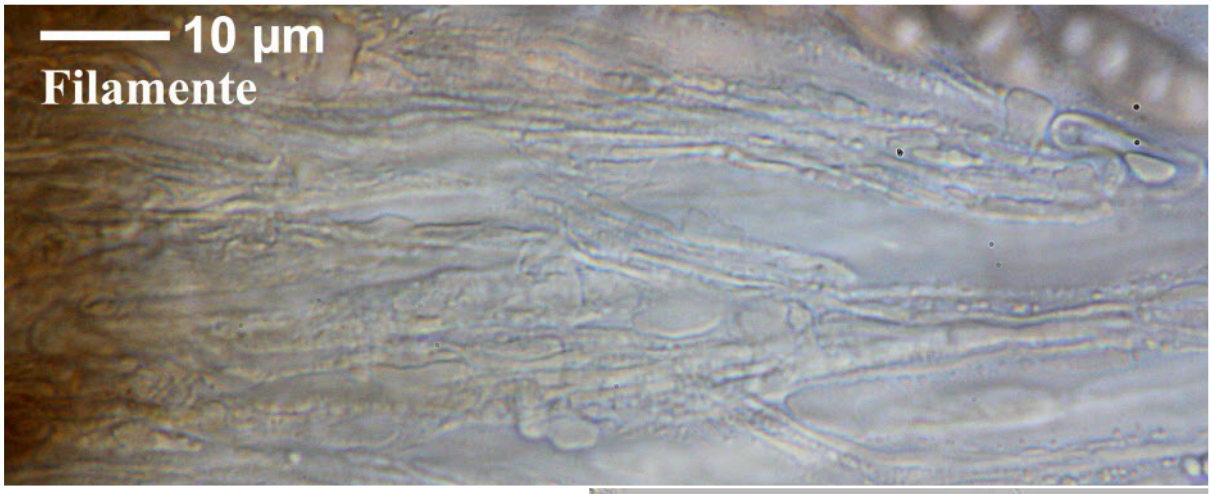


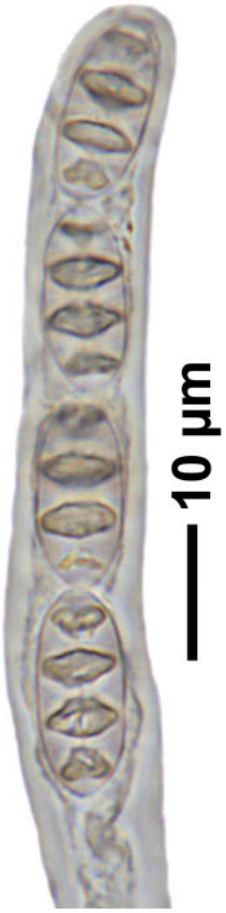


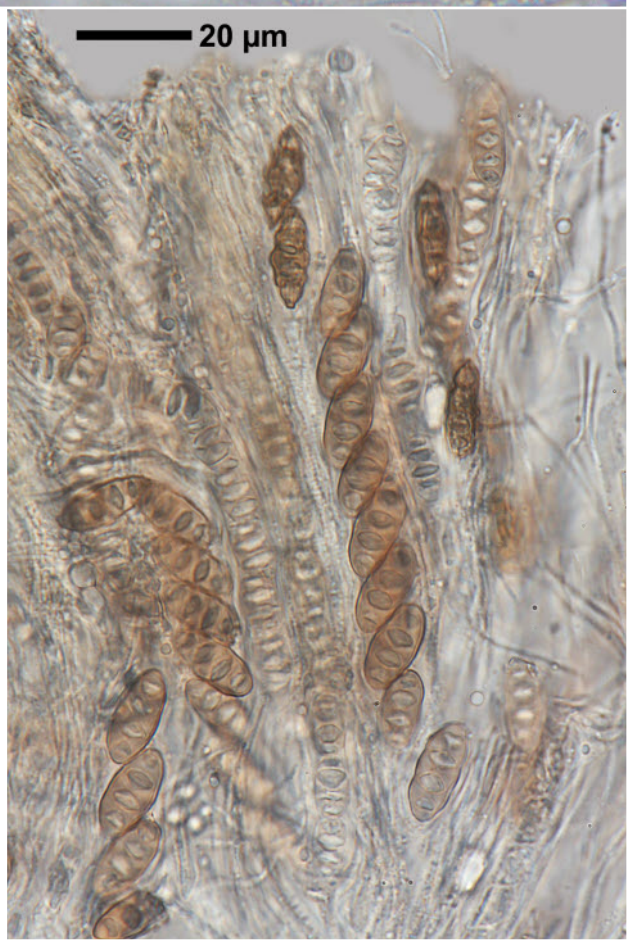
Pyrenula rubrojavanica



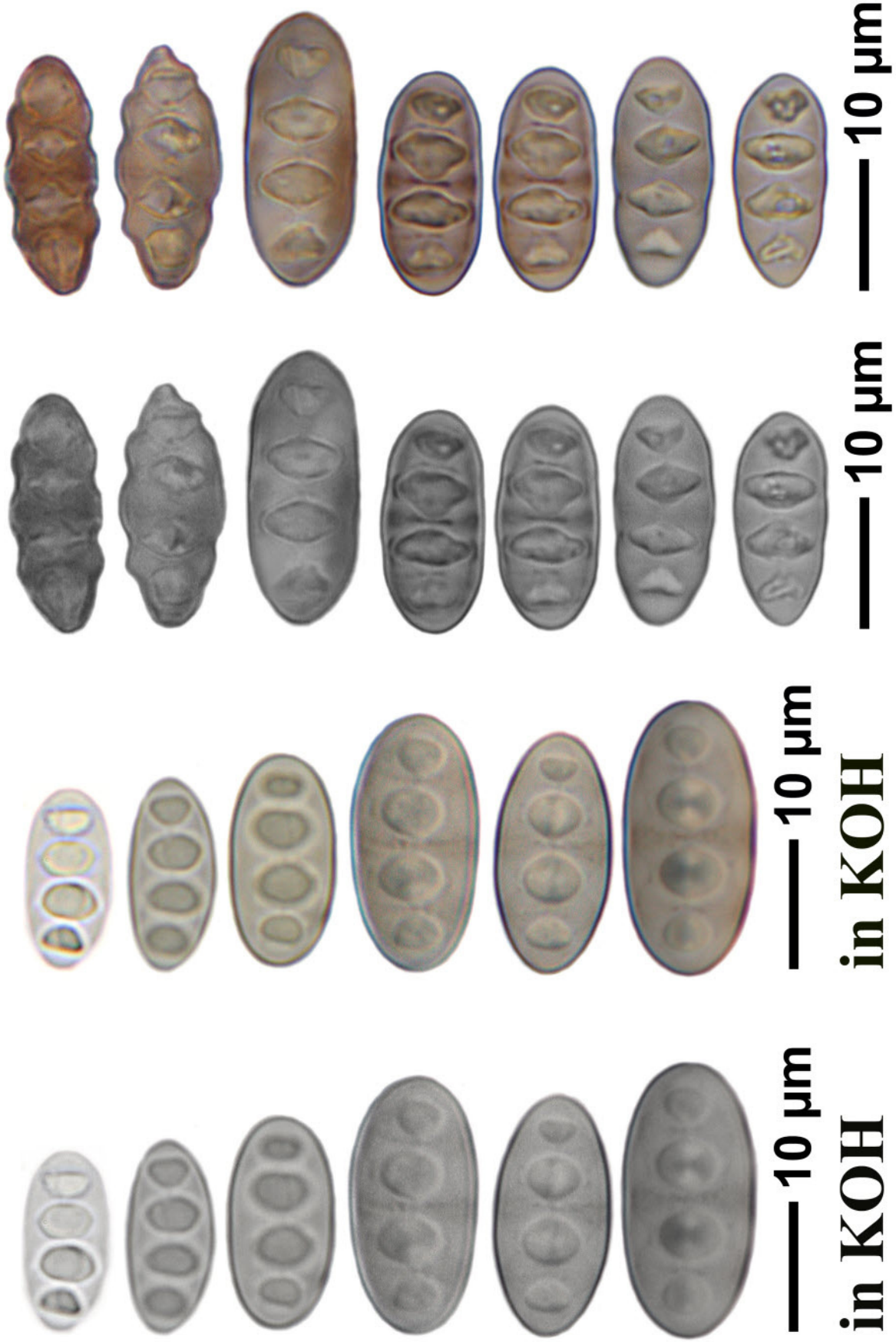
Pyrenula rubrojavanica



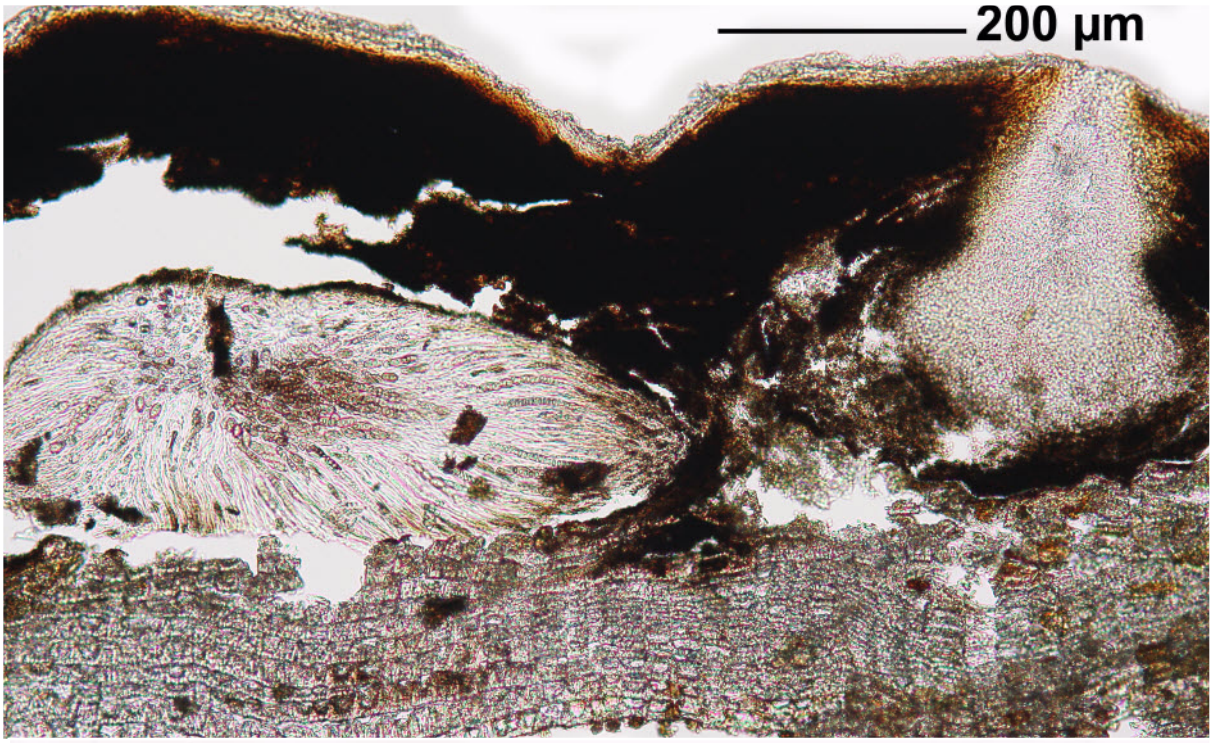


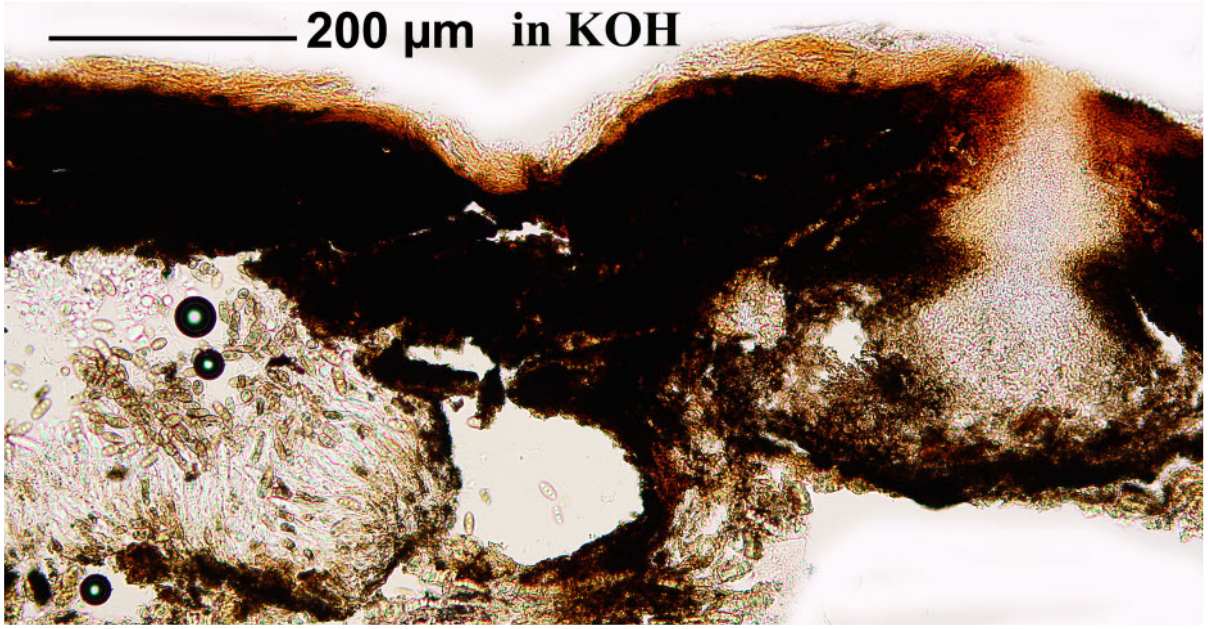


Pyrenula rubrojavanica

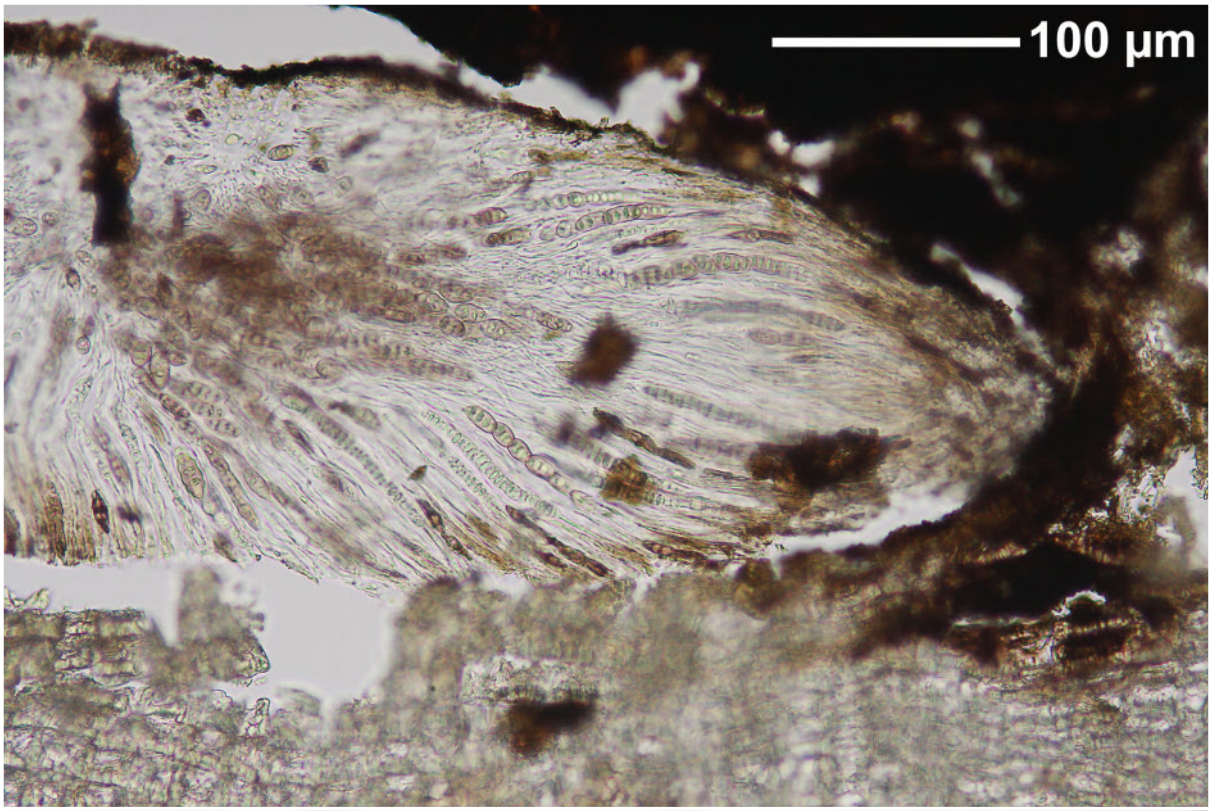


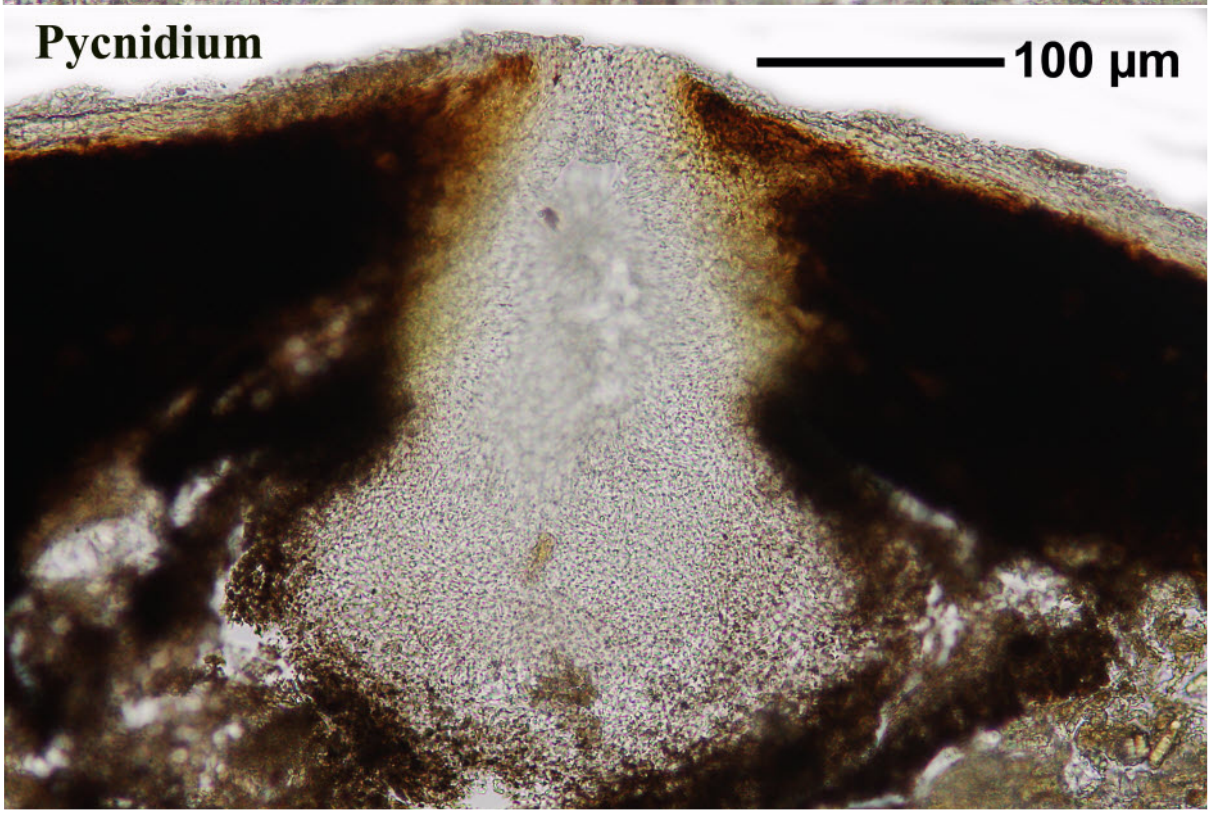
Pyrenula rubrojavanica



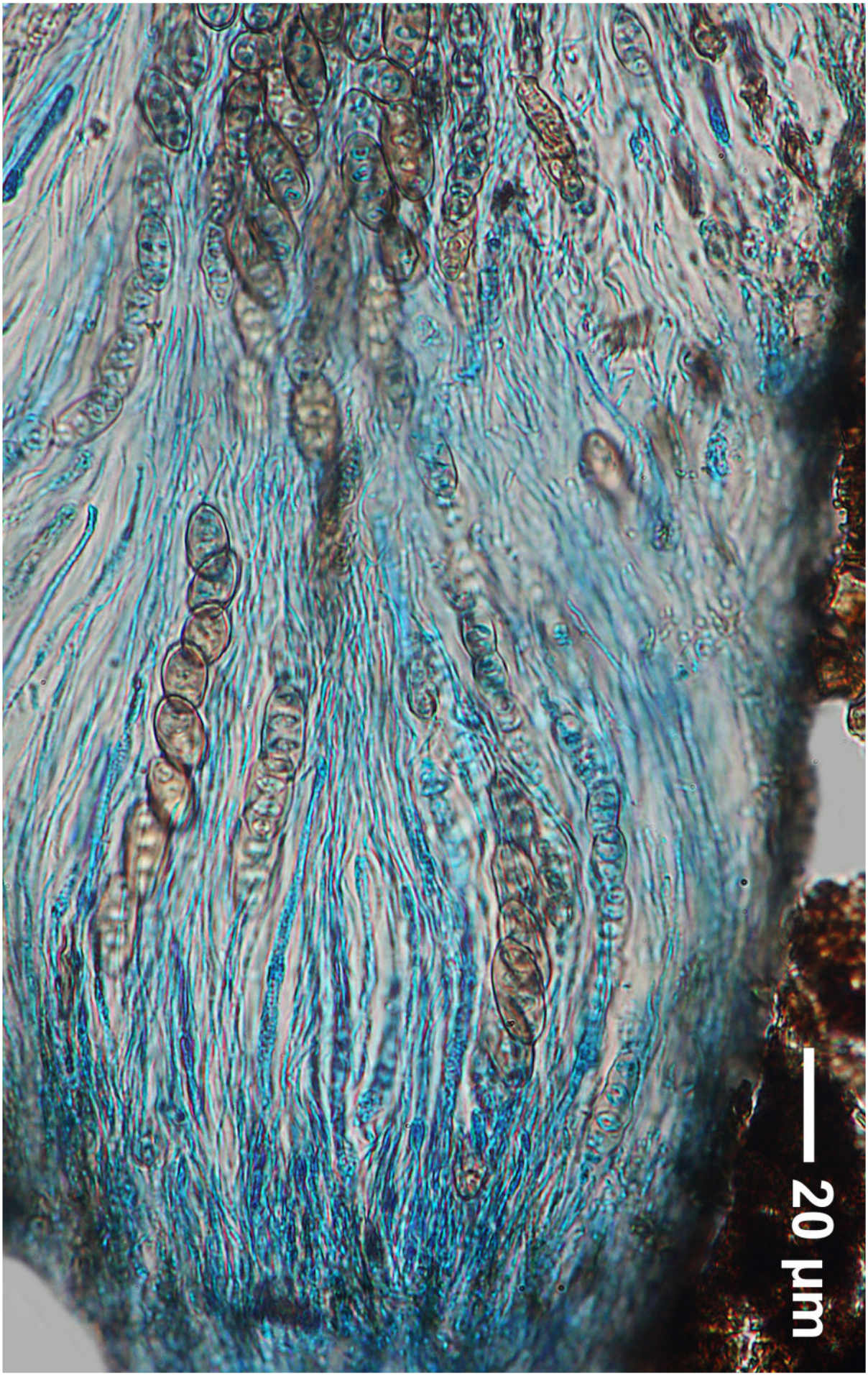


Pyrenula rubrojavanica

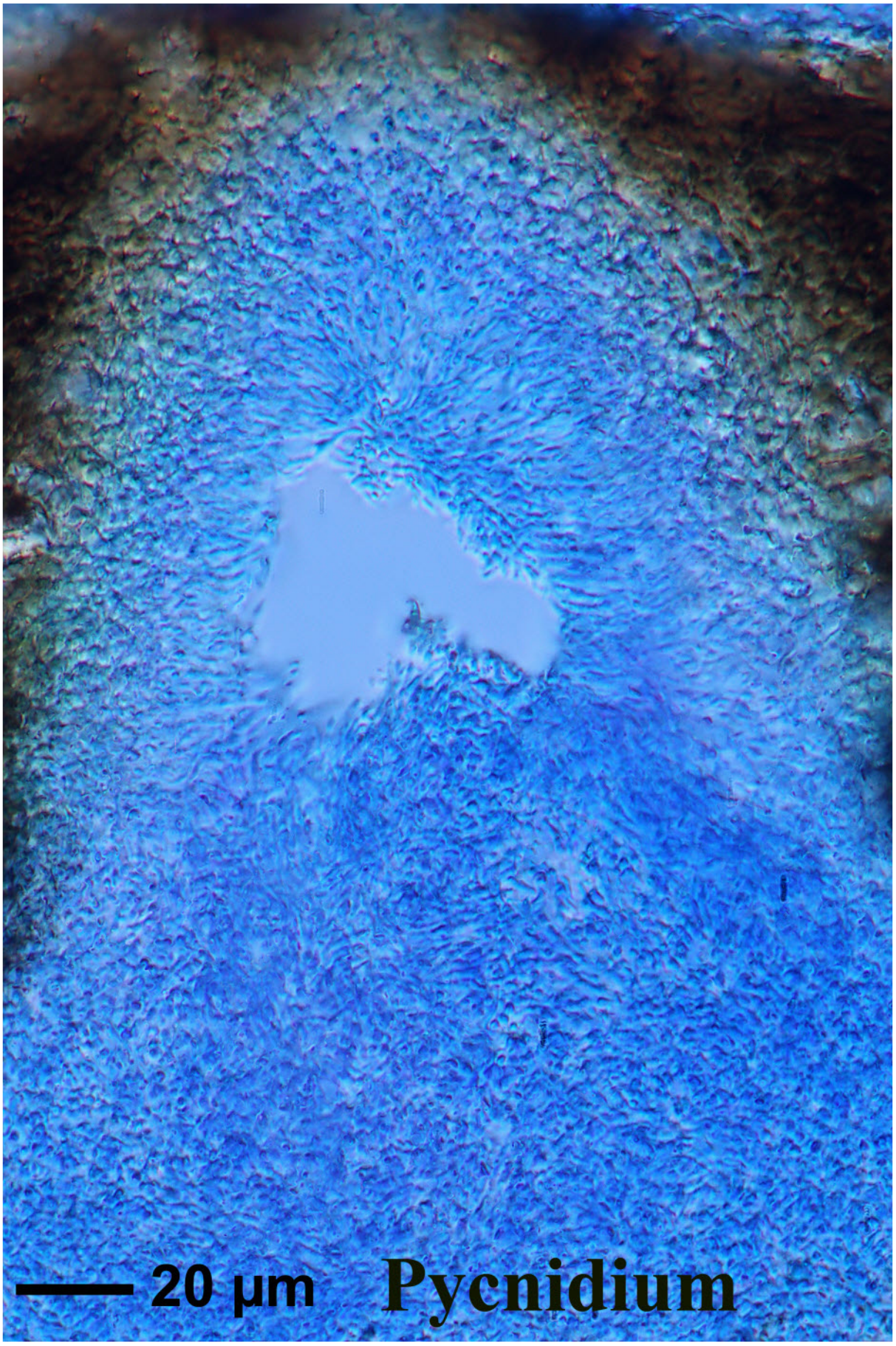




Pyrenula rubrojavanica



Pyrenula rubrojavanica



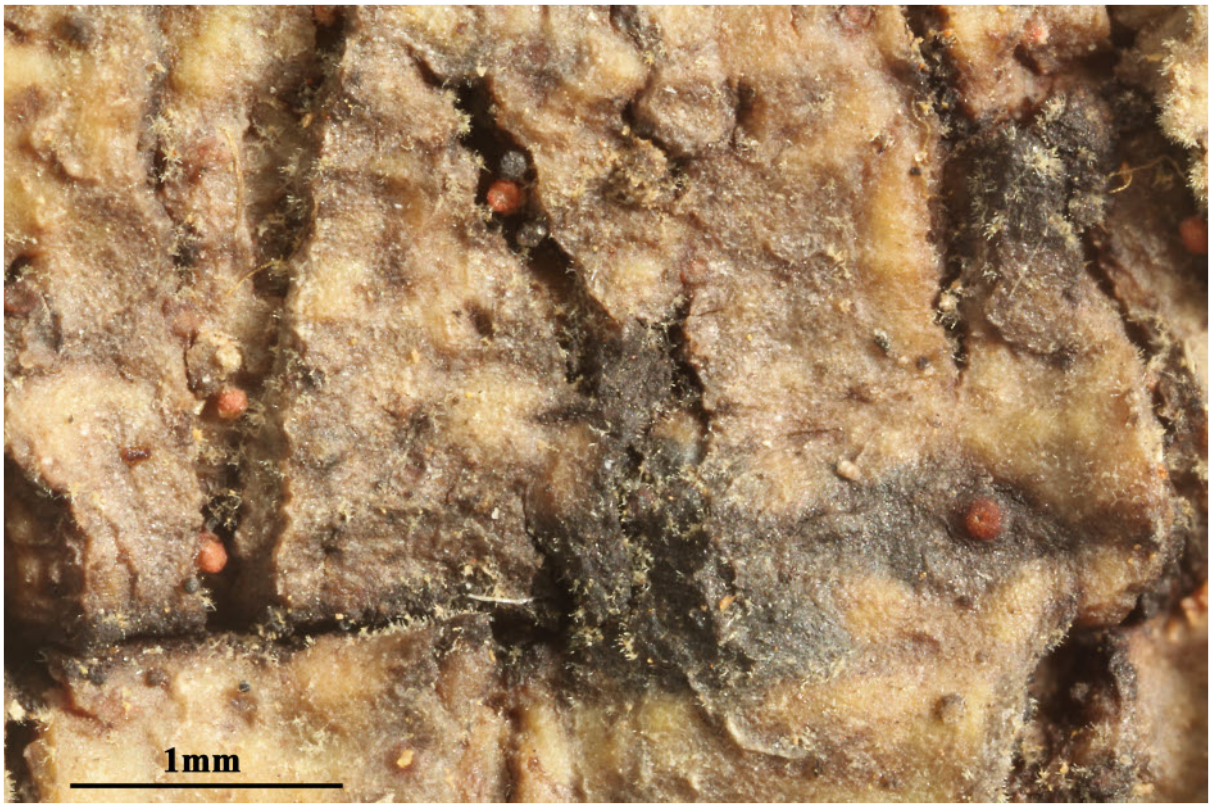
Pyrenula rubrojavanica

Pyrenula rubrolateralis Aptroot & M. Cáceres, in Aptroot, Andrade, Mendonça, Lima & Cáceres, Phytotaxa 197(3): 205 (2014)

Thallus rather thin (up to 0.1 mm thick), rather irregular in thickness, corticate, olive green, closely following the cracks and fissures in the bark, without pseudocyphellae, surrounded by a *c.* 1 mm wide black prothallus line. Ascomata immersed in raised areas of the bark, almost completely covered by the thallus, pyriform, 0.6–0.9 mm diam., single. Wall carbonized all around. Ostiole eccentric, red brown to bright red, flush to distinctly convex. Hamathecium not inspersed with oil droplets. Ascospores 8/ascus, irregularly biseriate, brown, 3-septate, 20–24 × 8–10 µm, lumina mostly rounded to somewhat diamond-shaped, separated from the wall by a thick layer of endospore, ends pointed. Pycnidia not observed. Chemistry: Ostiole K–, thallus UV–, no substances detected with TLC.

[ABL18783], Brazil. Sergipe, Santa Luzia do Itanhy, Mata do Crasto, 11˚22' S, 37˚25' W, *c*. 10 m, on tree bark in Atlantic rainforest. Leg. M. Cáceres & A. Aptroot (no 18783), 26.03.2014, det. A. Aptroot, 2014. ISOTYPE.

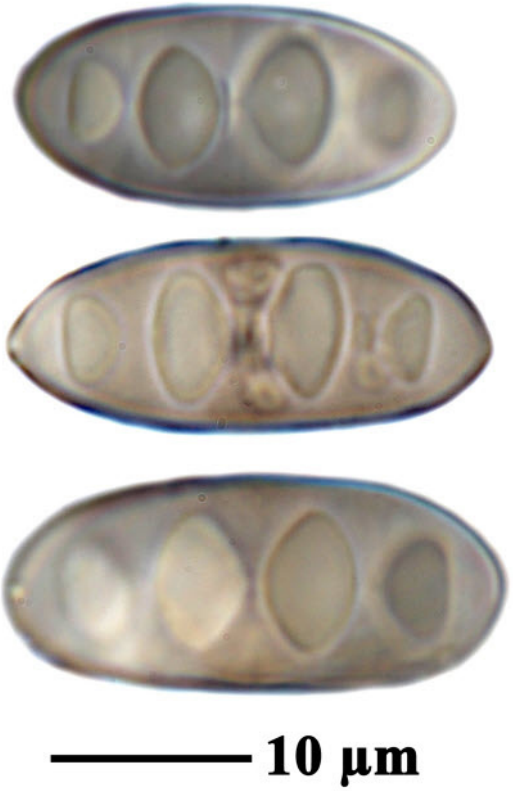






Pyrenula rubrolateralis





Pyrenula rubrolateralis

Pyrenula rubronitidula Aptroot & M. Cáceres, Lichenologist 45(2): 190 (2013)

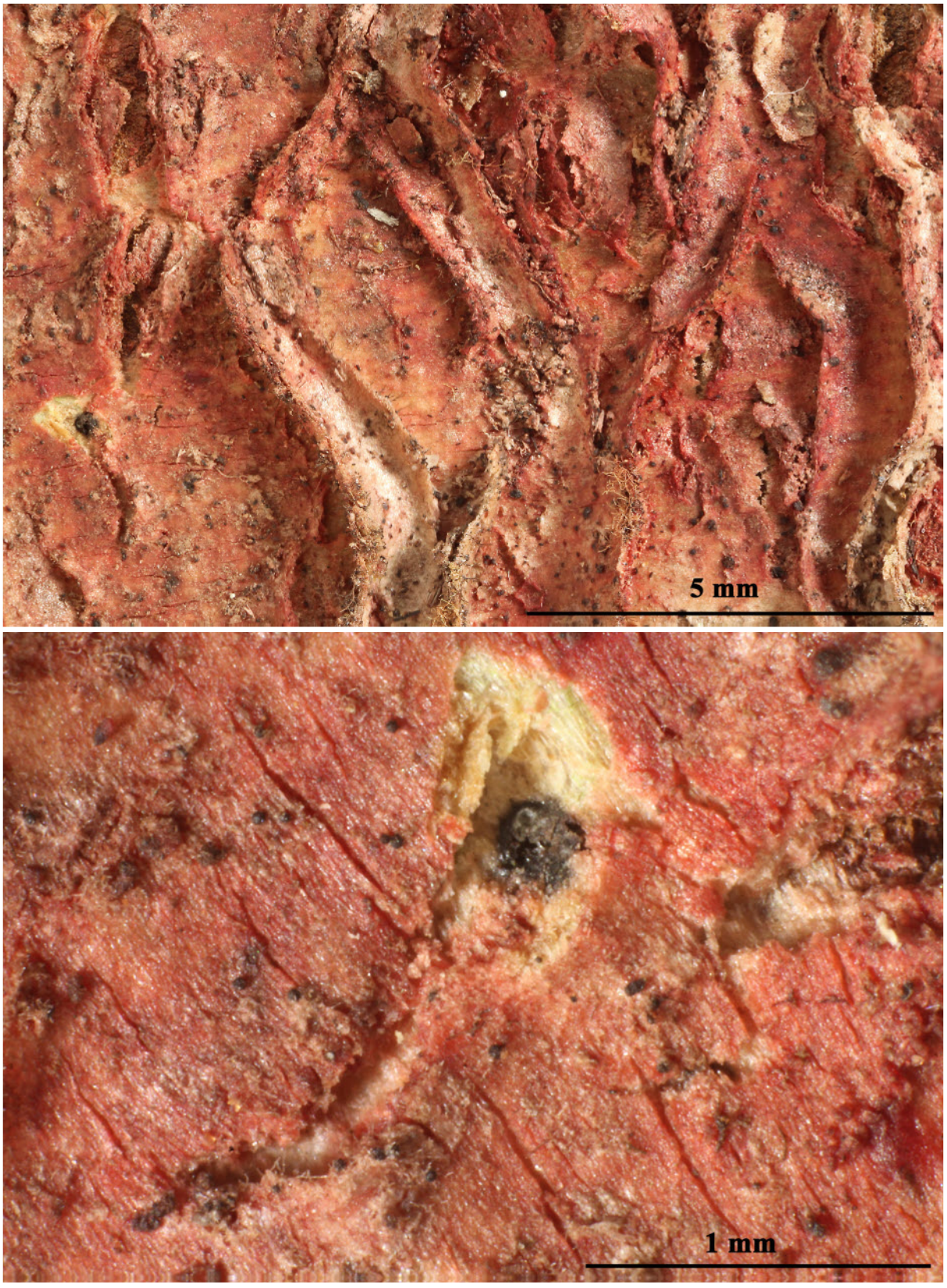
Thallus thin, dark carmine red, smooth and partly glossy, without pseudocyphellae, without prothallus. Ascomata immersed in the bark, more or less pyriform to globose, 0.2–0.4 mm diam., solitary and widely separate. Ostiole apical, tiny, black, the only part of the ascoma that is visible from outside. Hamathecium not inspersed. Ascospores 8/ascus, irregularly biseriate, 3-septate, 16–9 × 6–7 µm, ends rounded, lumina rounded to angular, not wider than long, with a thick layer of endospore in the spore tips. Pycnidia immersed in the bark, dispersed on the thallus, c. 0.1 mm diam. Conidia filiform, curved, c. 10–14 × 0.5 mm. Chemistry: Thallus with a red, KOH+ purple anthraquinone.

[ABL11332], Brazil, Rondônia, Porto Velho, Parque Natural Municipal, 8°41'10'' S, 63°52'05'' W, 100 m, in primary rainforest, on tree bark. Leg. M. Cáceres & A. Aptroot (no 11332), 9-12.03.2012. det. A. Aptroot, 2012. ISOTYPE.





Pyrenula rubronitidula

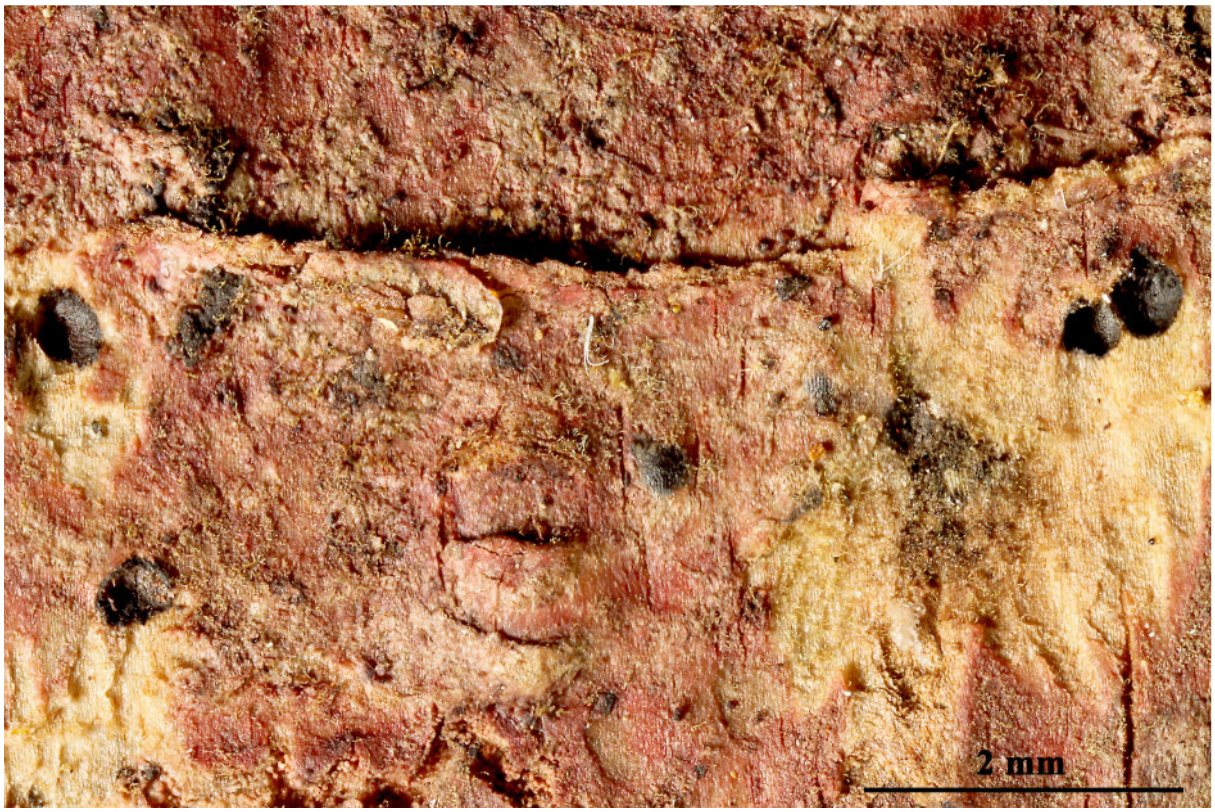


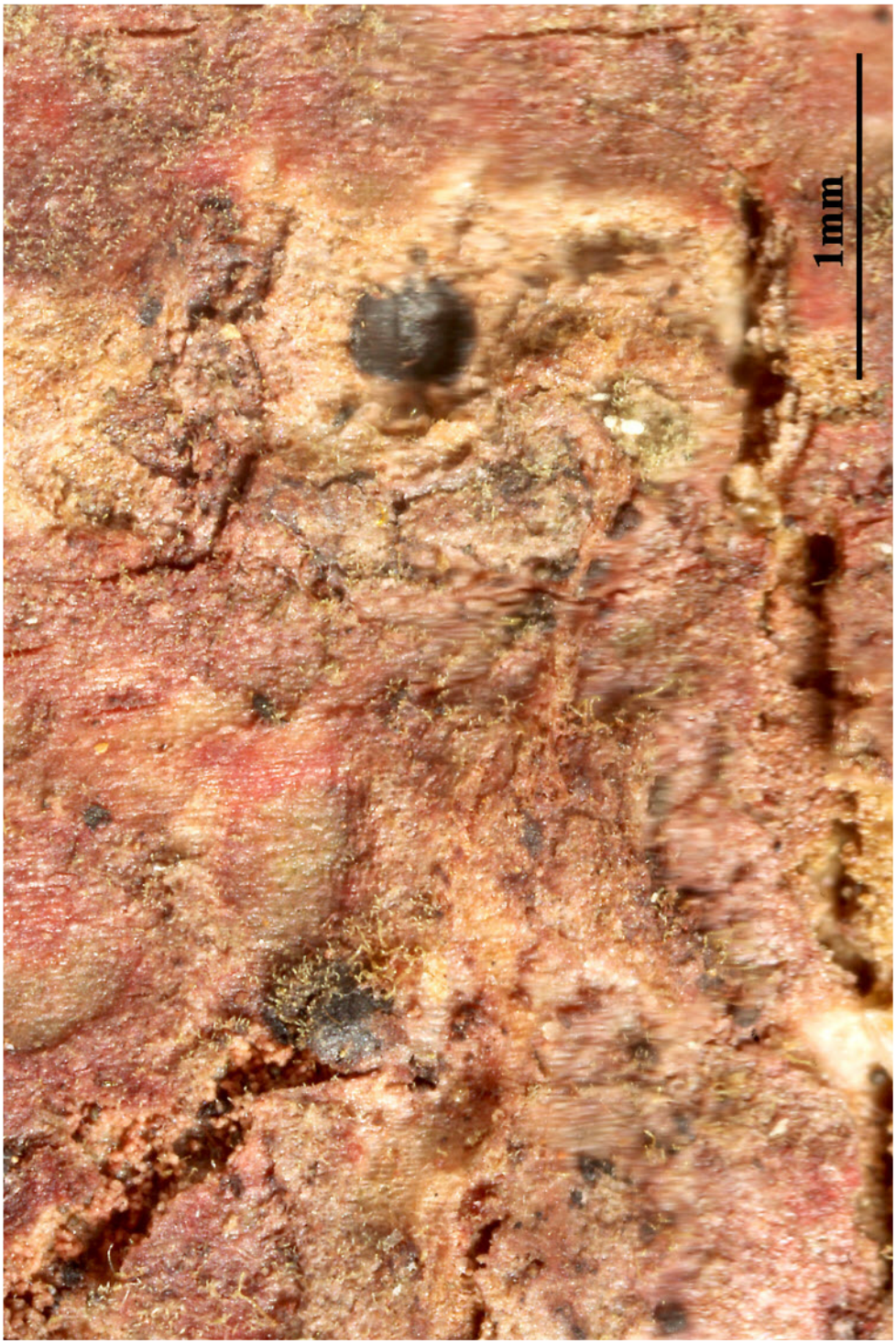
Pyrenula rubronitidula

Pyrenula rubronitidula Aptroot & M. Cáceres, Lichenologist 45(2): 190 (2013)

Thallus thin, dark carmine red, smooth and partly glossy, without pseudocyphellae, without prothallus. Ascomata immersed in the bark, more or less pyriform to globose, 0.2–0.4 mm diam., solitary and widely separate. Ostiole apical, tiny, black, the only part of the ascoma that is visible from outside. Hamathecium not inspersed. Ascospores 8/ascus, irregularly biseriate, (1)-3-septate, 16–9 × 6–7 µm, ends rounded, lumina rounded to angular, not wider than long, with a thick layer of endospore in the spore tips. Pycnidia immersed in the bark, dispersed on the thallus, c. 0.1 mm diam. Conidia filiform, curved, c. 10–14 × 0.5 µm. Chemistry: Thallus with a red, KOH+ purple anthraquinone.

[ABL15603], Brazil, Rondônia, Porto Velho, Parque Natural Municipal, in primary rainforest, on tree bark, 100 m. 8°41'10'' S, 63°52'05'' W. Leg. M. Cáceres & A. Aptroot (no 15603), 19.11.2012, det. A. Aptroot, 2012. TOPOTYPE.





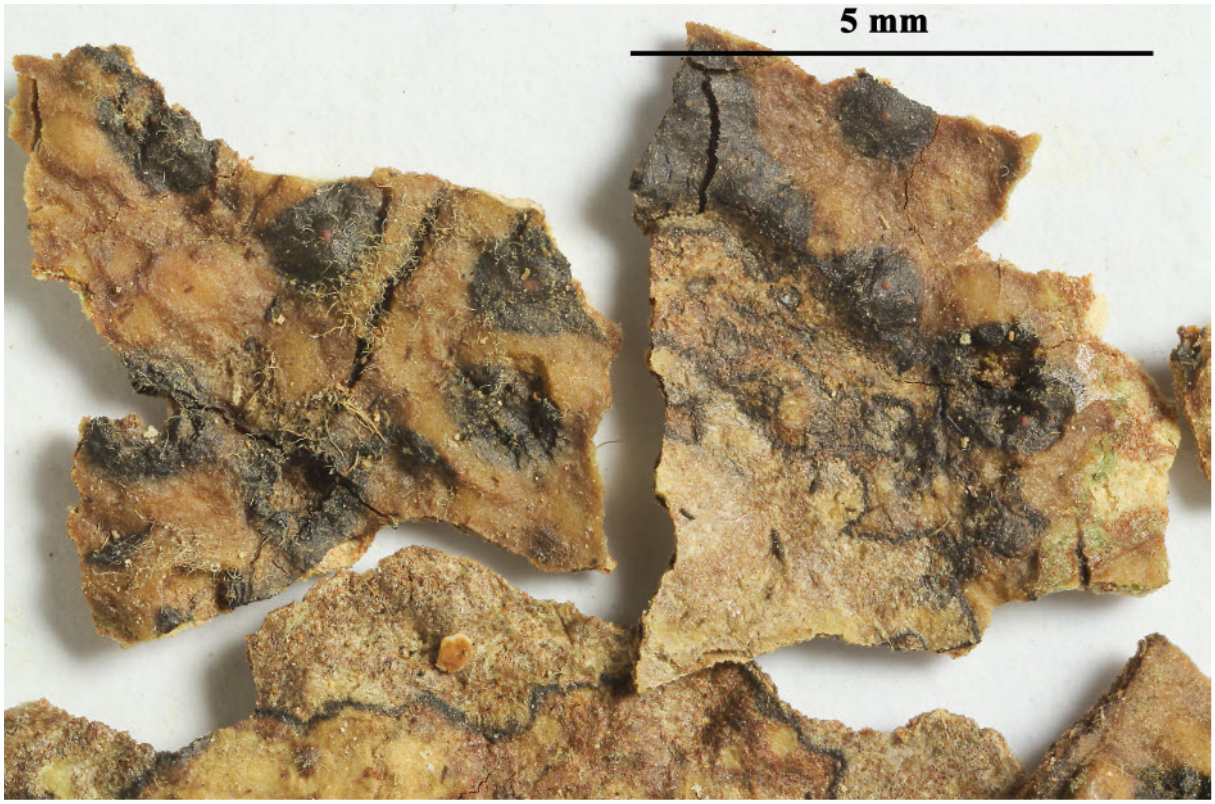


Pyrenula rubronitidula

Pyrenula rubrostigma Aptroot & M. Cáceres, Lichenologist 45(2): 190 (2013)

Thallus thin, olive-brown, smooth but not glossy, without pseudocyphellae, surrounded by a thin black prothallus line. Ascomata superficial, conical, somewhat flattened, 0.6–1.2 mm diam., solitary. Ostiole apical, red. Hamathecium inspersed with hyaline oil globules. Ascospores 8/ascus, irregularly biseriate, 3-septate, 15–18 × 6–7 µm, ends rounded, lumina rounded to angular, often somewhat wider than long, with a thick layer of endospore in the spore tips, sometimes with distinct eusepta between the lumina. Pycnidia not observed. Chemistry: Ostiole with a red, KOH+ purple anthraquinone.

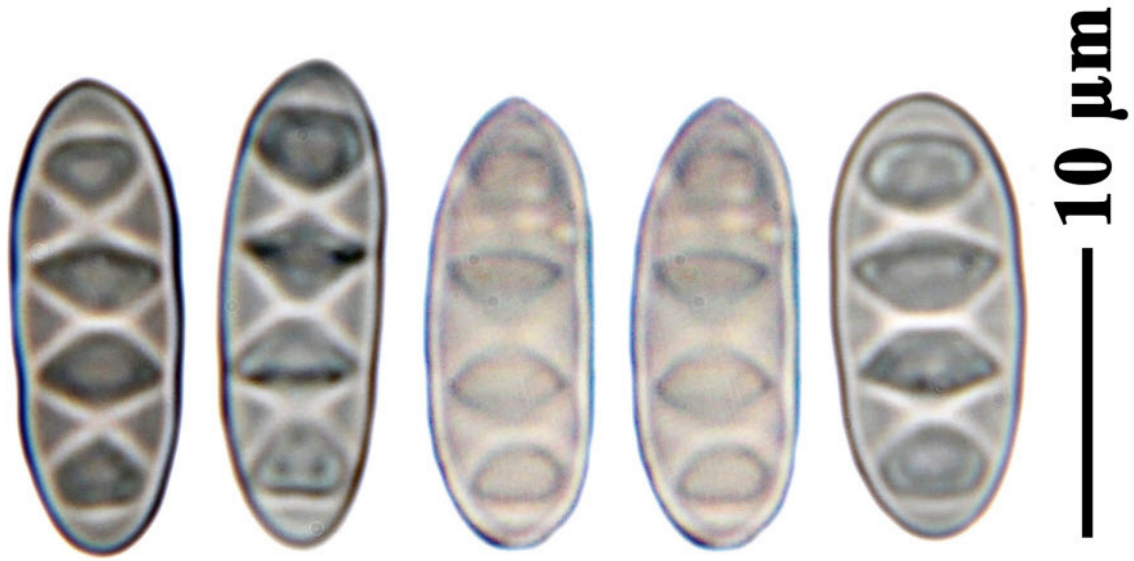
[ABL11697], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 N of Porto Velho, 8°o2'44" S, 63°29'11" W, 100 m, on tree bark in primary rainforest. Leg. M. Cáceres & A. Aptroot (no 11697), 13.03.2012, det. A. Aptroot 2012. ISOTYPE.

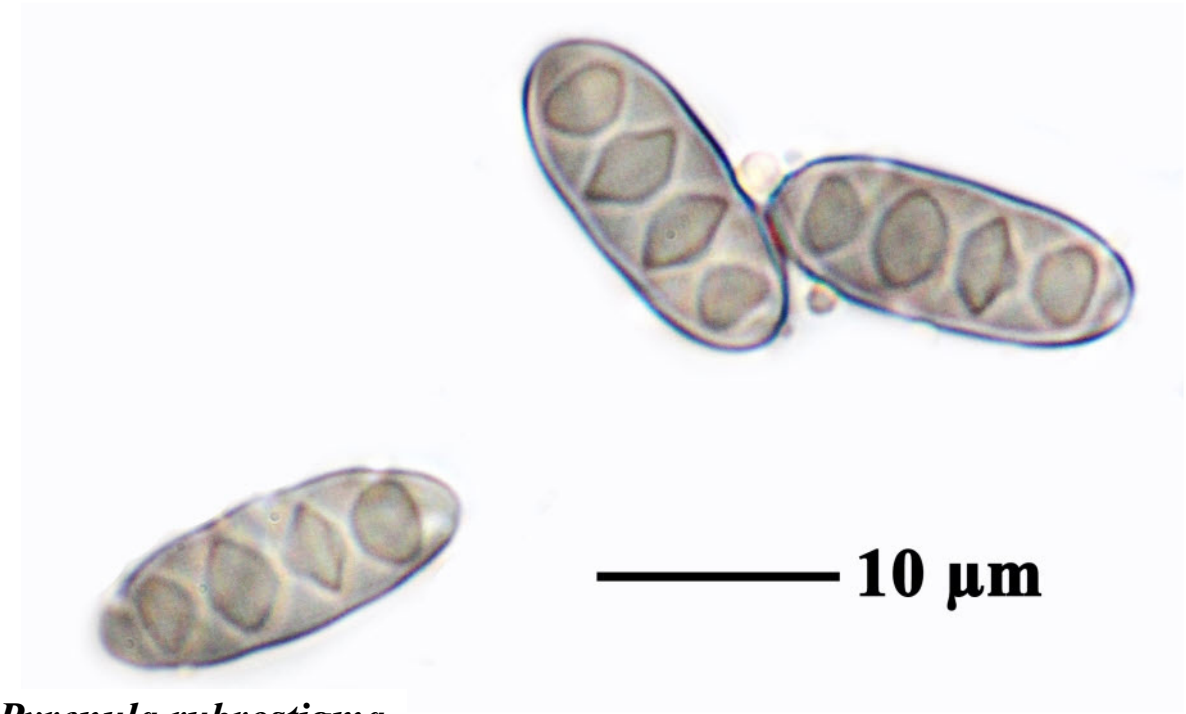




Pyrenula rubrostigma







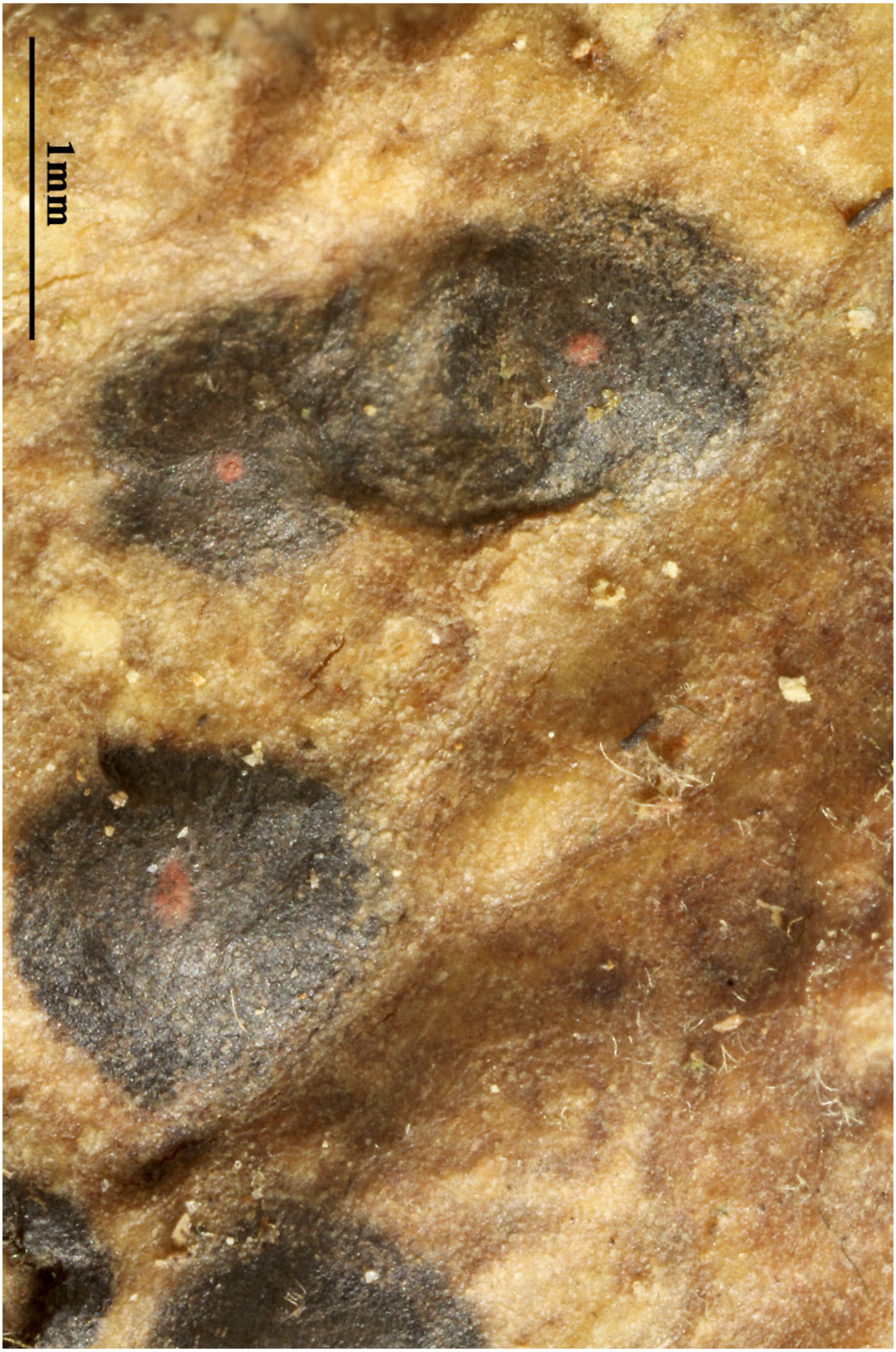
Pyrenula rubrostigma

Pyrenula rubrostigma Aptroot & M. Cáceres, Lichenologist 45(2): 190 (2013)

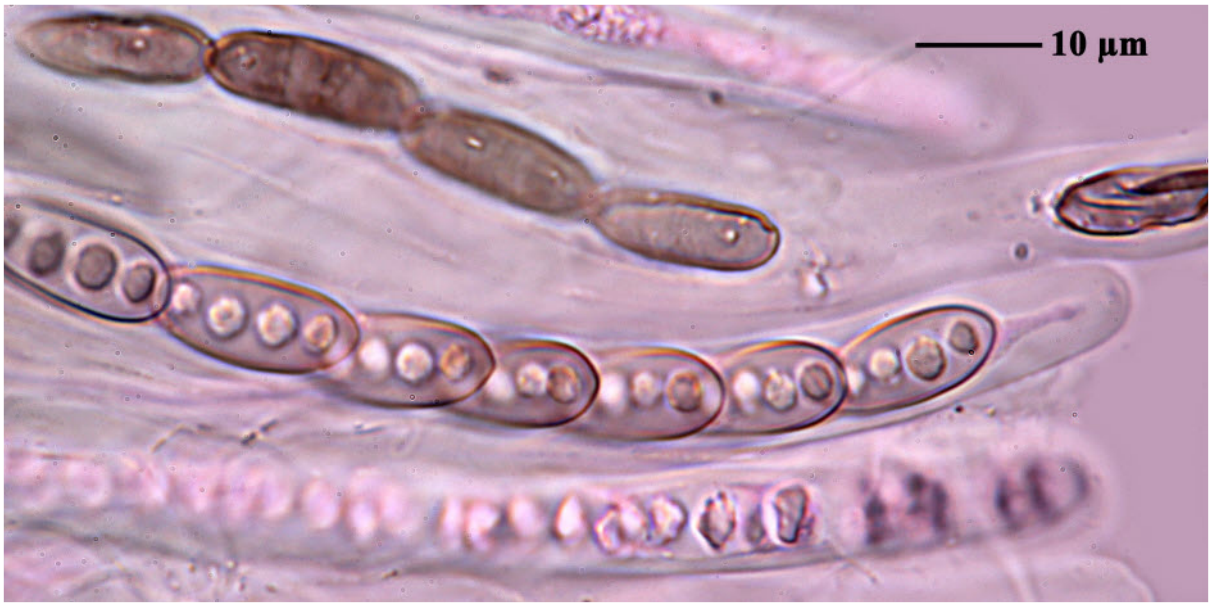
Thallus thin, olive-brown, smooth but not glossy, without pseudocyphellae, surrounded by a thin black prothallus line. Ascomata superficial, conical, somewhat flattened, 0.6–1.2 mm diam., solitary. Ostiole apical, red. Hamathecium inspersed with hyaline oil globules. Ascospores 8 per ascus, irregularly biseriate, 3-septate, 15–18 × 6–7 mm, ends rounded, lumina rounded to angular, often somewhat wider than long, with a thick layer of endospore in the spore tips, sometimes with distinct eusepta between the lumina. Pycnidia not observed. Chemistry: Ostiole with a red, KOH+ purple anthraquinone.
There is the only species known with red ostioles containing an anthraquinone, and hamathecium inspersion.

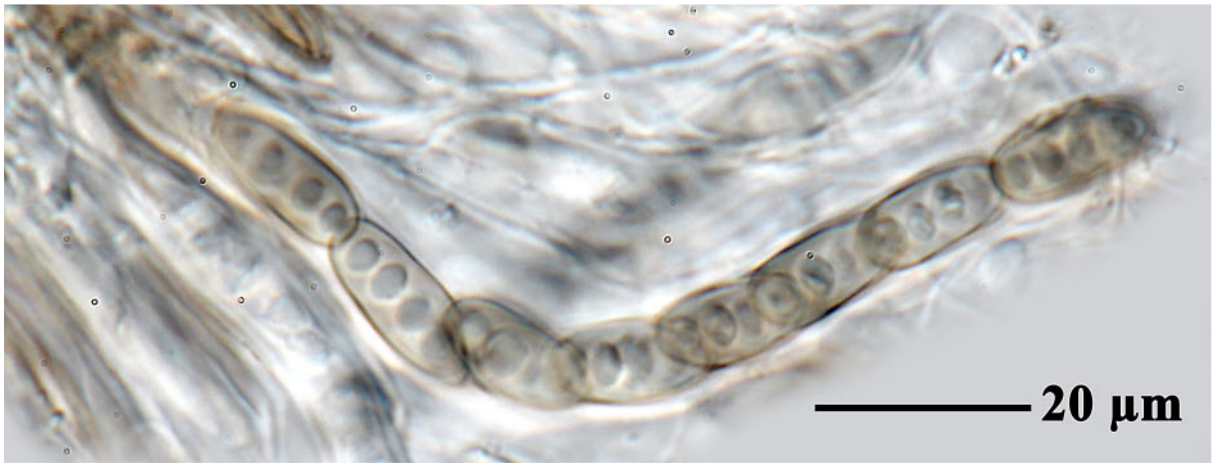
[ABL11697b], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 N of Porto Velho, 8°02'44" S, 63°29'11" W, 100 m, on tree bark in primary rainforest. Leg. M. Cáceres & A. Aptroot (no11697b), 13.03.2012, det. A. Aptroot, 2012. ISOTYPE.





Pyrenula rubrostigma







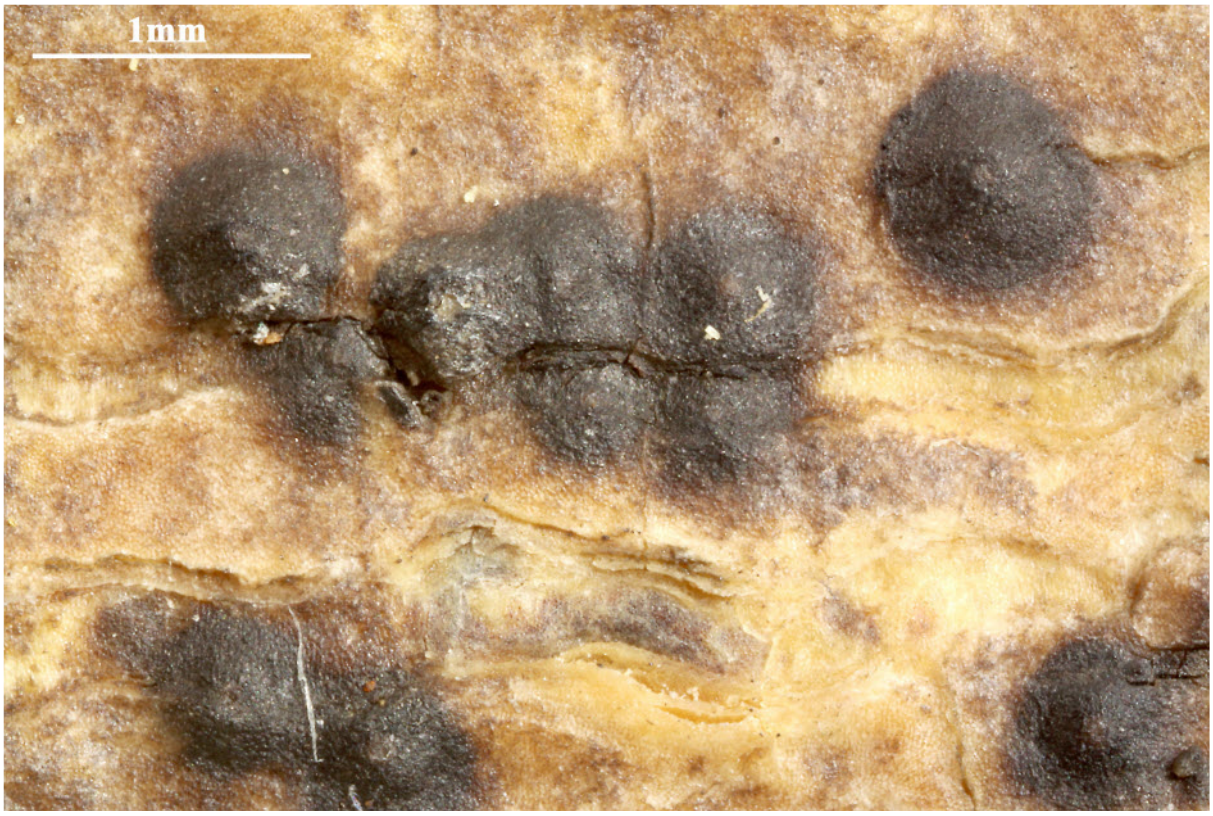
Pyrenula rubrostigma

Pyrenula rubrostoma R.C. Harris, in Tucker & Harris, Bryologist 83(1): 16 (1980)

Thallus thin, without pseudocyphellae. Ascomata flattened conical or hemispherical, 0.5–0.6 mm diam. Ostioles usually with tiny, red, K+ bluish plug. ln KOH, the pigment turns lavender. then bright blue. The red ostiole is sometimes detectable with a dissecting microscope but often a cross section is necessary. Hamathecium gel IKI+ orangish; ascospores 3-septate, 17–19 × 7.5–9 µm, with predominantly lateral endospore with differentiated inner lay. ln those specimens lacking the red pigment, the ascospores are sufficiently characteristic for identification. The inner spore wall is distinct from the other spore wall layers and gives the spore a very peculiar appearance. Chemistry: an anthraquinone.

[Sip57678a], Guyana, Upper Takutu district, southern Rupununi savannah, Kusad mountain, SE-side, sheltered, little disturbed forest in valley at foot of the mountain, on tree. 150-250 m, 59°50’ W, 2°47’ N. Leg. H. Sipman (no 5767a), 26–27.09.1992, det. A. Aptroot, 2012.







Pyrenula rubrostoma

Pyrenula sanguinea Aptroot, M. Cáceres & Lücking, Bryologist 116(4): 352 (2013)

Thallus crustose, corticate, somewhat shiny, pale yellowish brown, patchily tinged red to partly completely red, without pseudocyphellae, without a prothallus line. Algae trentepohlioid. Ascomata pyriform, 0.15–0.25 mm diam, with 2–20 together immersed in a pseudostromata, with partly fused outer walls but separate, apical ostioles, only visible from above by a black punctiform ostiole of c. 0.05–0.1 mm diam. Pseudostromata prominent to sessile, generally constricted, round to lobate, 0.3–1.8 mm diam., bright red outside, black inside, without thalline tissue. Ascoma wall carbonized all around, 50–120 µm thick, generally thinnest below the hamathecium, only visible from above by a black ostiole. Ostiole apical. Hamathecium consisting of paraphyses, not inspersed with hyaline oil droplets, IKI-negative. Paraphyses unbranched, septate, ca. 2 µm wide, tips not differentiated. Asci long pyriform, with 8 ascospores. Ascospores initially hyaline, soon brown, 3-septate, with distosepta but endospore formation not pronounced, long ellipsoid, 20–24 × 10–12 µm, ends rounded, bearing 7–13 µm long, horn-like, young straight, when mature curled, gelatinous appendages at both tips, which dissolve in 10% KOH. Pycnidia not observed. Chemistry. Thallus and (mostly) pseudostromata UV–, C–, P–, red parts K+ purple (dissolving but not evanescent). TLC: Six anthraquinone pigments, viz. haematommone (major), two unknown yellow pigments (major), and one yellow, orange, and violet pigment each (trace).

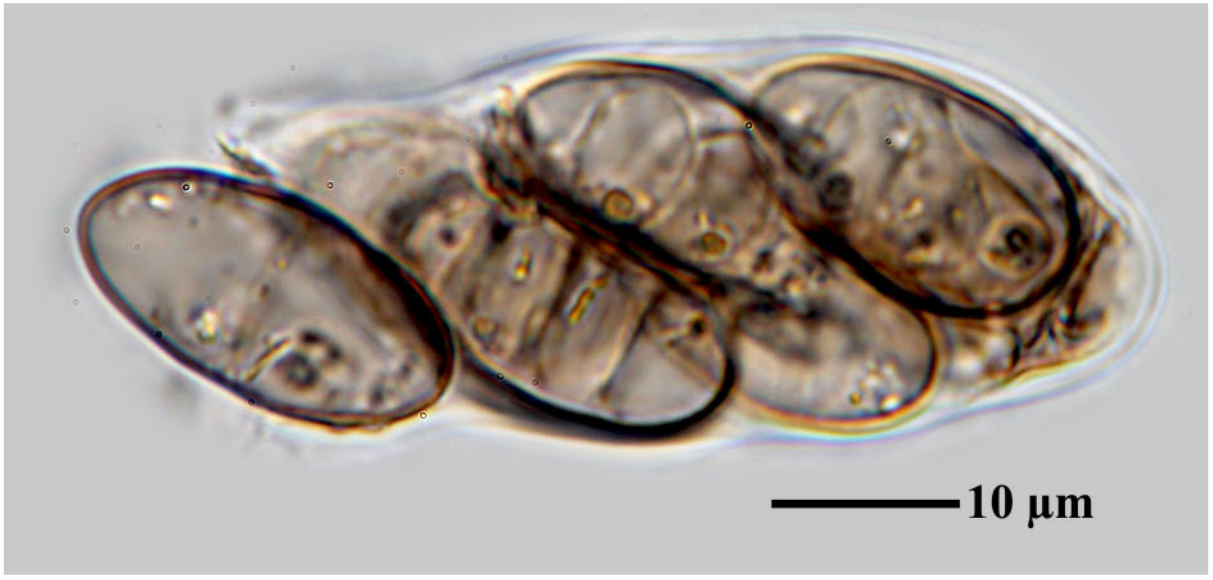
[ABL15707], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 N of Porto Velho, on tree bark in primary rain forest, 8°02’44” S, 63°29’11” W, 100 m. Leg. M Cáceres & A. Aptroot (no 15707), 20.11.2012, det. A. Aptroot, 2012. ISOTYPE.





Pyrenula sanguinea





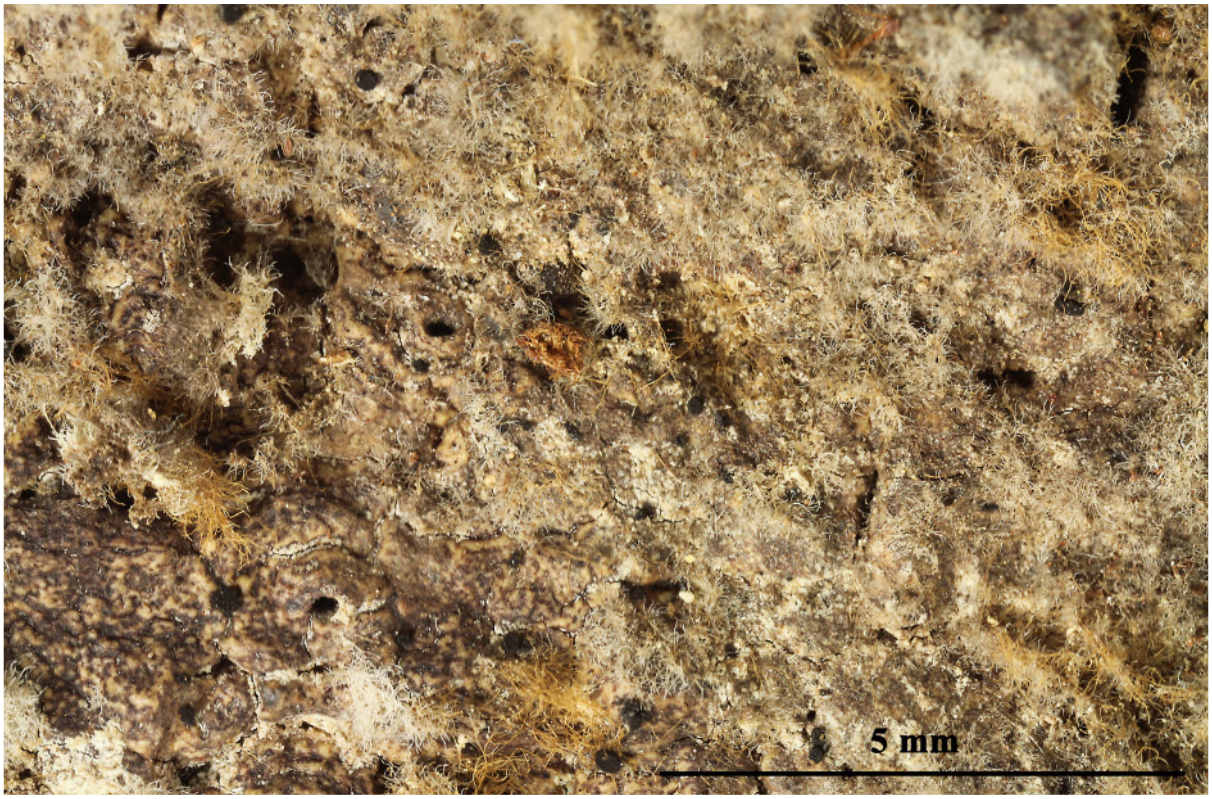


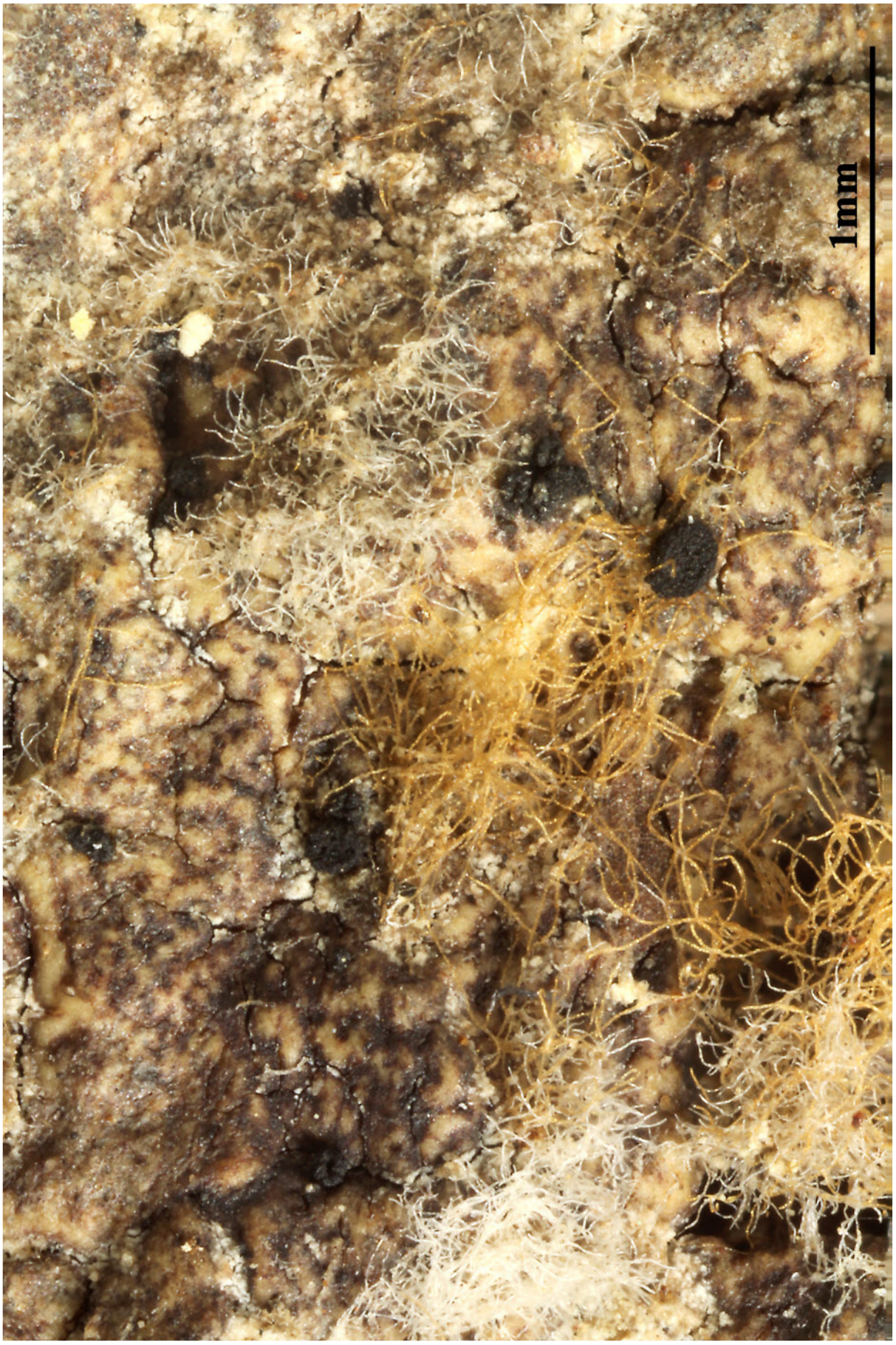
Pyrenula sanguinea

Pyrenula sanguineomeandrata Aptroot & Mercado Diaz, in Aptroot, Sipman, Mercado Diaz, Mendonça, Feuerstein, Cunga-Dias, Pereira & Cáceres, Lichenologist 50(1): 79 (2018)

Thallus corticate, smooth, continuous, up to 0.1 mm thick, ochraceous, with lines or a reticulum of dark red pigmentation, without pseudocyphellae or pockets of crystals. Algae trentepohlioid. Ascomata perithecioid, simple, dispersed, pyriform, deeply immersed in the bark and only visible from above by the ostiole, 0.2–0.4mm diam., black. Wall more or less equally carbonized, without crystals, c. 30 µm thick. Ostiole apical, dark to reddish brown. Hamathecium inspersed with dark red oil droplets. Asci cylindrico-clavate, with 8 irregularly arranged ascospores. Ascospores dark brown, 3-septate, broadly fusiform, without constrictions, 25–29 × 10–12 µm, ends rather pointed; lumina mostly diamond-shaped, terminal lumina separated from the end wall by an endospore layer. Pycnidia not observed. Chemistry: Red anthraquinone on thallus reacting UV+ red and KOH+ purple; dark red hamathecium inspersion (anthraquinone?) reacting KOH+ orange.

[ABL72206], Puerto Rico, Maricao, Bosque Estatal de Maricao, Vereda Los Viveros, submontane evergreen wet forest on serpentinite, sclerophyllous, disturbed primary forest on slope, on bark of tree, 850 m. 18°09' N, 66°59' W. Leg. A. Aptroot (no 72206), 18.02.2014, det. A. Aptroot, 2014. ISOTYPE.

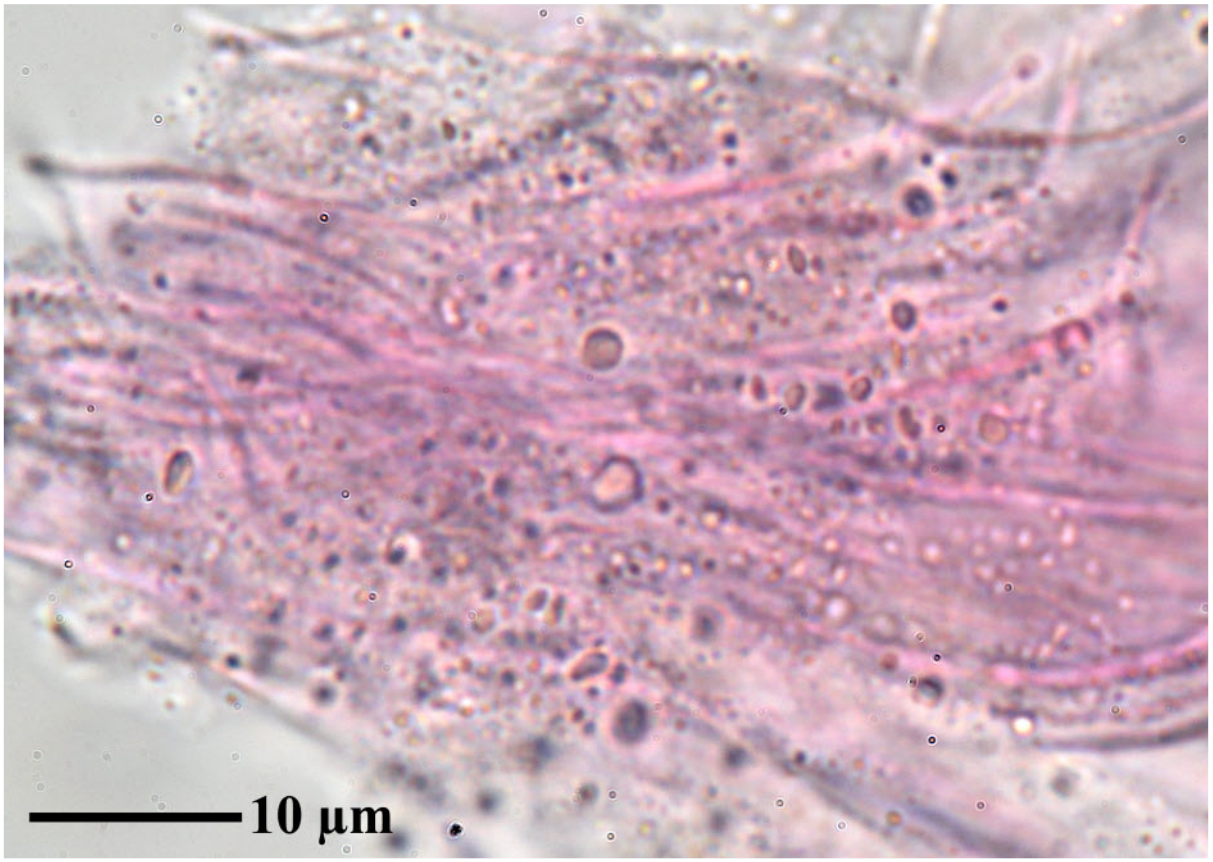




Pyrenula sanguineomeandrata







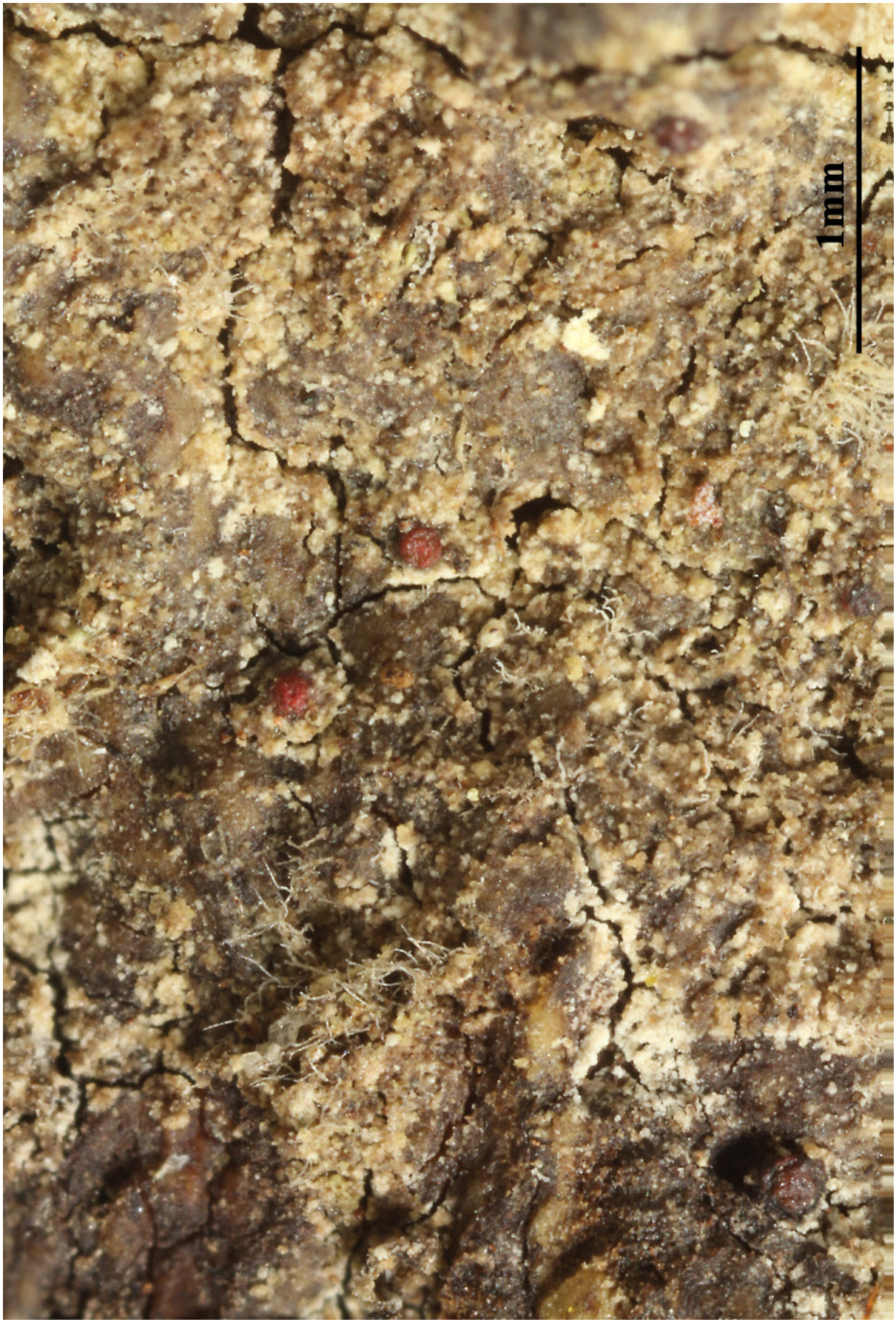
Pyrenula sanguineomeandrata

Pyrenula sanguineostiolata Aptroot & Mercado Diaz, in Aptroot, Sipman, Mercado Diaz, Mendonça, Feuerstein, Cunga-Dias, Pereira & Cáceres, Lichenologist 50(1): 80 (2018)

Thallus corticate, smooth, continuous, up to 0.1mm thick, olivaceous green, without pseudocyphellae or pockets of crystals; algal cells trentepohlioid. Ascomata perithecioid, simple, dispersed, pyriform, deeply immersed in the bark and only visible from above by the ostiole, 0.3–0.5mm diam., black. Wall more or less equally carbonized, without crystals, c. 40 µm thick. Ostioles apical, superficial, c. 0.1mm diam., bright red. Hamathecium hyaline, not inspersed with oil droplets. Asci cylindrico-clavate, with 8 irregularly arranged ascospores. Ascospores brown, 3-septate, broadly fusiform, without constrictions, 25–28 × 9–12 µm, ends rather pointed; lumina mostly rounded to diamond-shaped, somewhat irregularly aligned, terminal lumina separated from the end wall by an endospore layer. Pycnidia not observed. Chemistry: Red anthraquinone of ostiole reacting UV+ red and KOH+ dark purple (almost black).

[ABL72180], Puerto Rico, Maricao, Bosque Estatal de Maricao, Vereda Los Viveros, 18°09' N, 66°59' W, c. 850 m. Submontane evergreen wet forest on serpentinite, sclerophyllous, disturbed primary forest on slope. On tree bark. Leg. A. Aptroot (no 27180), 18.02.2014, det. A. Aptroot, 2014. ISOTYPE.





Pyrenula sanguineostiolata



Pyrenula sanguineostiolata

Pyrenula schiffneri (Zahlbr.) Aptroot, Lichenologist 44(1): 36 (2011) [2012]
= *Parmentaria schiffneri* Zahlbr., Denkschr. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 83: 95 (1909)
= *Anthracothecium falsarium* Zahlbr.
= *Pyrenula falsaria* (Zahlbr.) R.C. Harris
= *Pyrenula verruculosa* Upreti & Ajay Singh.

Anthraquinones absent, Ascomata non flattened, circular in transverse section. Ostioles lateral, mostly 2 or more fused. Hamathecium filaments mostly unbranched. Ascospore 4–8 per ascus, muriform, 100–135 µm long, septation only or mostly distseptate, with notably thickened endospore.

[Harris3052], USA, Florida, Columbia County, Osceola National Forest, wet forest along Fla. Hwy. 250 m, ME of Lake City, on Ilex. Leg. R. C. Harris (no 3052), 20.05.1967, det. A. Aptroot





Pyrenula schiffneri



Pyrenula schiffneri

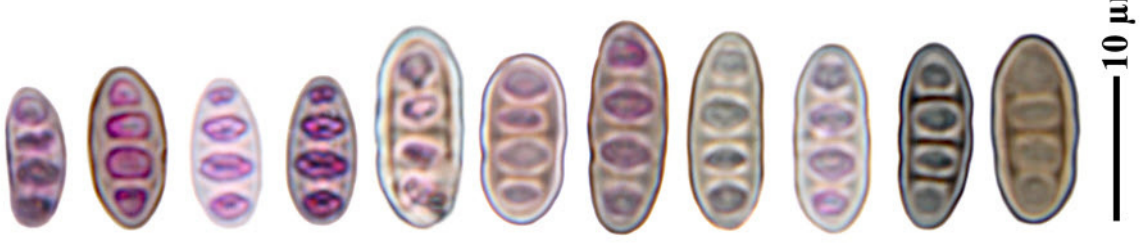
Pyrenula scutata (Stirt.) Zahlbr., Cat. Lich. Univers. 1: 452 (1922)
= *Verrucaria scutata* Stirt. 1881

Ascomata conical, emergent, 0.4–1 mm diam. Ostioles sometimes with white spot. Ascospores 4-loculate, 18–22 × 6-8 µm, *brunnea*-type.

[CG1635], Vietnam, Tuyen Quang Province, Na Hang District, Na Hang Natura Reserve. Leg. C. Gueidan (no CG 1635), 4.03.2011, det. A. Aptroot.





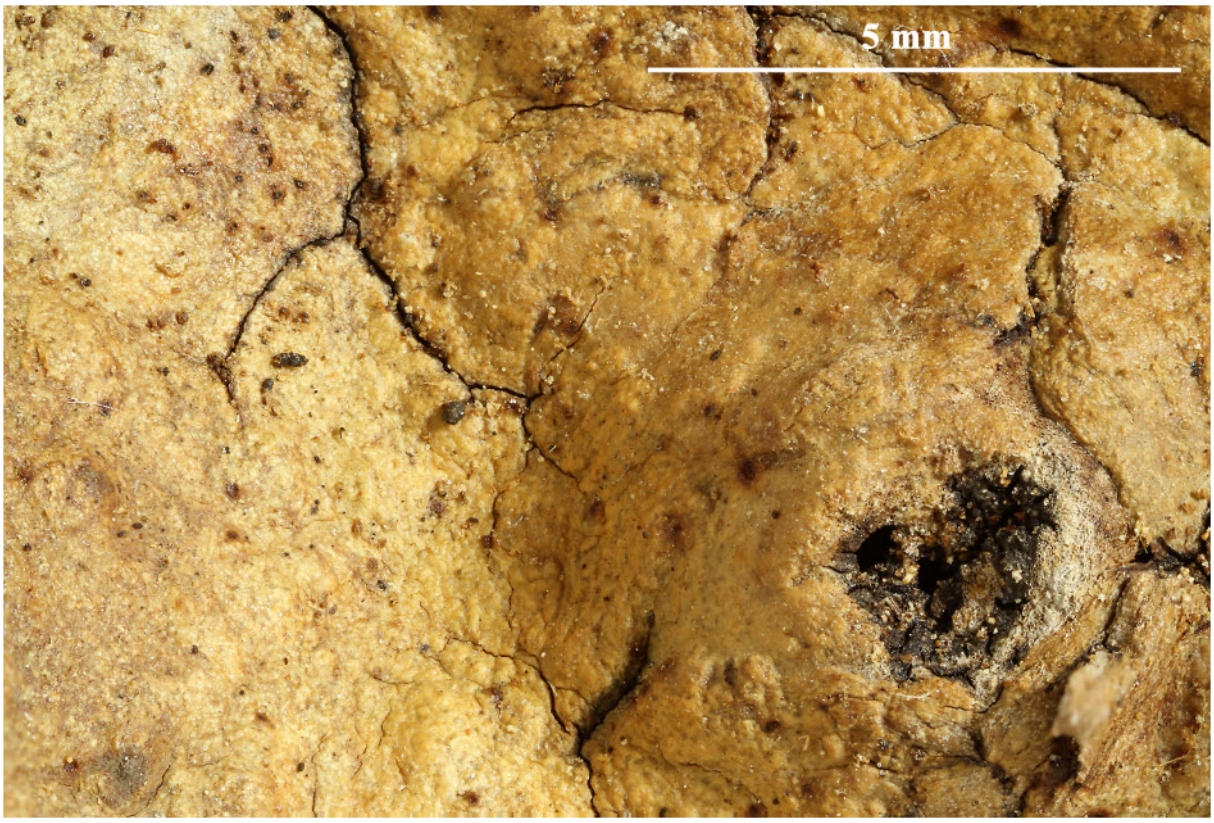


Pyrenula scutata

Pyrenula septicollaris (Eschw.) R.C. Harris, Mem. N. Y. bot. Gdn 49: 101 (1989)
= *Pyrenastrum septicollare* Eschw. 1824

Ascomata with 1–6 flask-shaped, c. 0.4–0.6 mm diam. chambers with a joint, pale ostiole, aggregation 1.5–2 mm wide; ascospores uniseriate, 4-loculate, 12–21 × 4.5–8 µm, ellipsoidal with rounded ends, terminal locules separated from the exospore by an endospore layer.

[Montfoort82], French Guiana, 2 km SW of the village „sentier Limonade“, 180-210 m, 03°32’ N, 53°12’ W. Mixed forest on lateritic sil, epiphytic on lower trunk of Hura crepitans. Leg. D. Montfoort (no 82) & R.C. Ek, 29.8.1986, det. A. Aptroot.







Pyrenula septicollaris

Pyrenula sexlocularis (Nyl.) Müll. Arg., Flora, Regensburg 60: 475 (1877)
= *Verrucaria sexlocularis* Nyl., Annls Sci. Nat., Bot., sér. 4 20: 249 (1863)

Thallus often with pseudocyphellae; ascomata subglobose, immersed to erumpent, more or less thallus-covered, c. 0.3–0.5 mm diam.; ostioles apical, pale to black; hamathecium gel IKI+ orangish; ascospores 6-loculate, 24–34 × 10–15 µm, fusiform, with permanently thin septa and thick apical walls, postmature the content dissolving in reddish mases.

[Hill8422], Solomon Islands, New Georgia Group, Marovo Lagfoon,Paleki island, shore, 0 m. Leg. D.J. Hill (no 8422), 3.8.1965, det. A. Aptroot, 2013.





Pyrenula sexlocularis

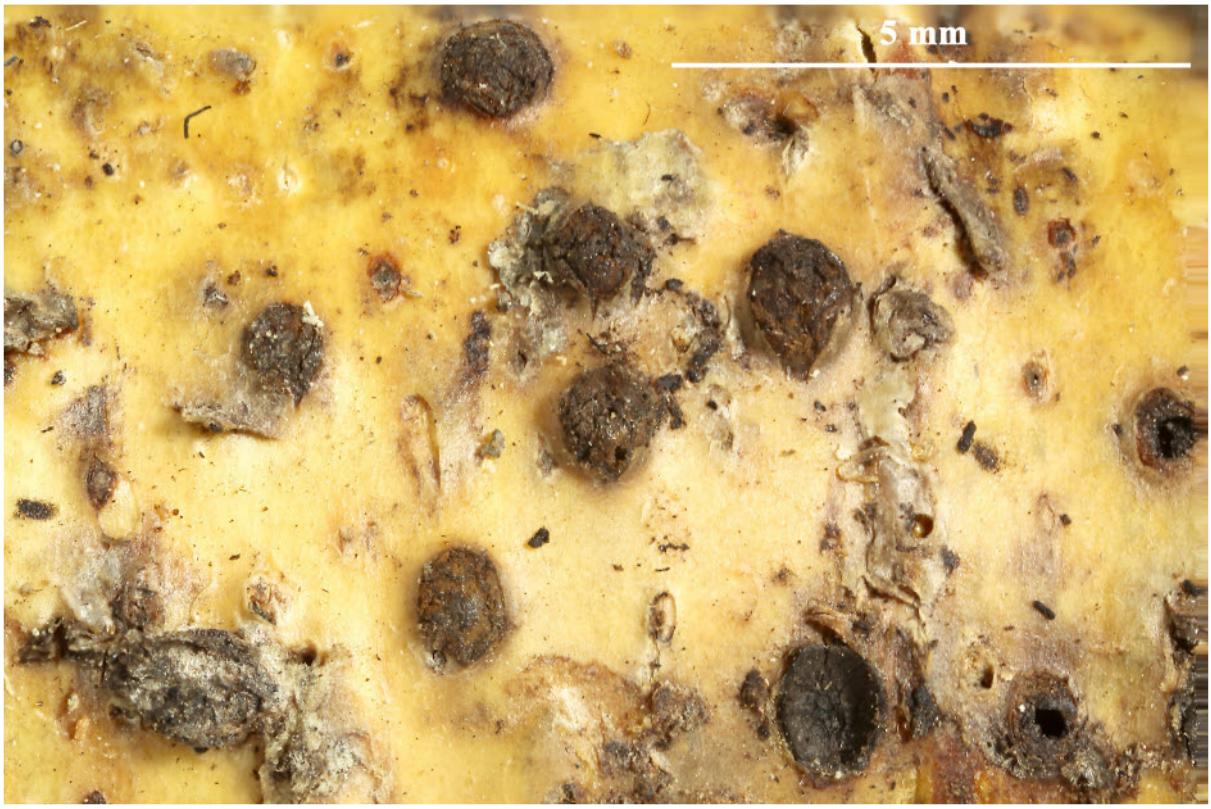


Pyrenula sexlocularis

Pyrenula sexluminata Aptroot, Lichenologist 44(1): 36 (2011) [2012]
= *Pyrenula quinqueseptata* Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 64: 167 (1997)

Thallus yellowish-brown, continuous, corticate, without pseudocyphellae, UV-, surrounded by a black prothallus. Ascocarp erumpent through the bark, becoming exposed, dark brown, dull, hemispherical, 0.8–1.3 mm diam., partly covered by the thallus; ascoma wall entire, carbonized; ostiole apical, yellowish brown, up to 200 µm; hymenium IKI+ blue, inspersed; ascospores 8/ascus, brown, irregularly fusiform, 5-septate, distoseptate, without eusepta, with angular lumina, with elongated distal lumina, 28–35 × 10–15 µm.

[Sipman35408], Papua New Guinea, Madang Province, Huon Peninsula, Finisterre range, Ypna valley, Zeptep village, deep valley in N direction. Mossy mountain forest along stream. 2600 m, 146°33’ E, 5°57’ S. Leg. H. Sipman (no 35408), 30.7.1992, det. A. Aptroot. ISOTYPE.





Pyrenula sexluminata

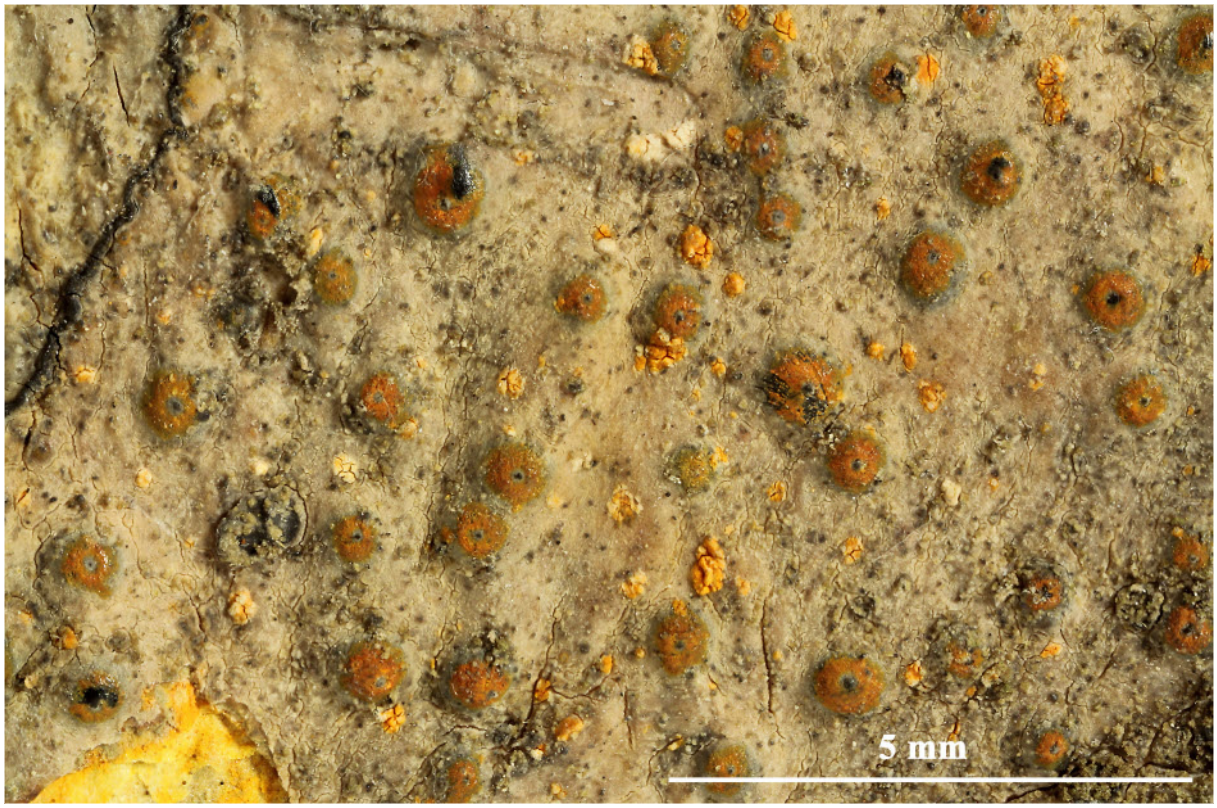


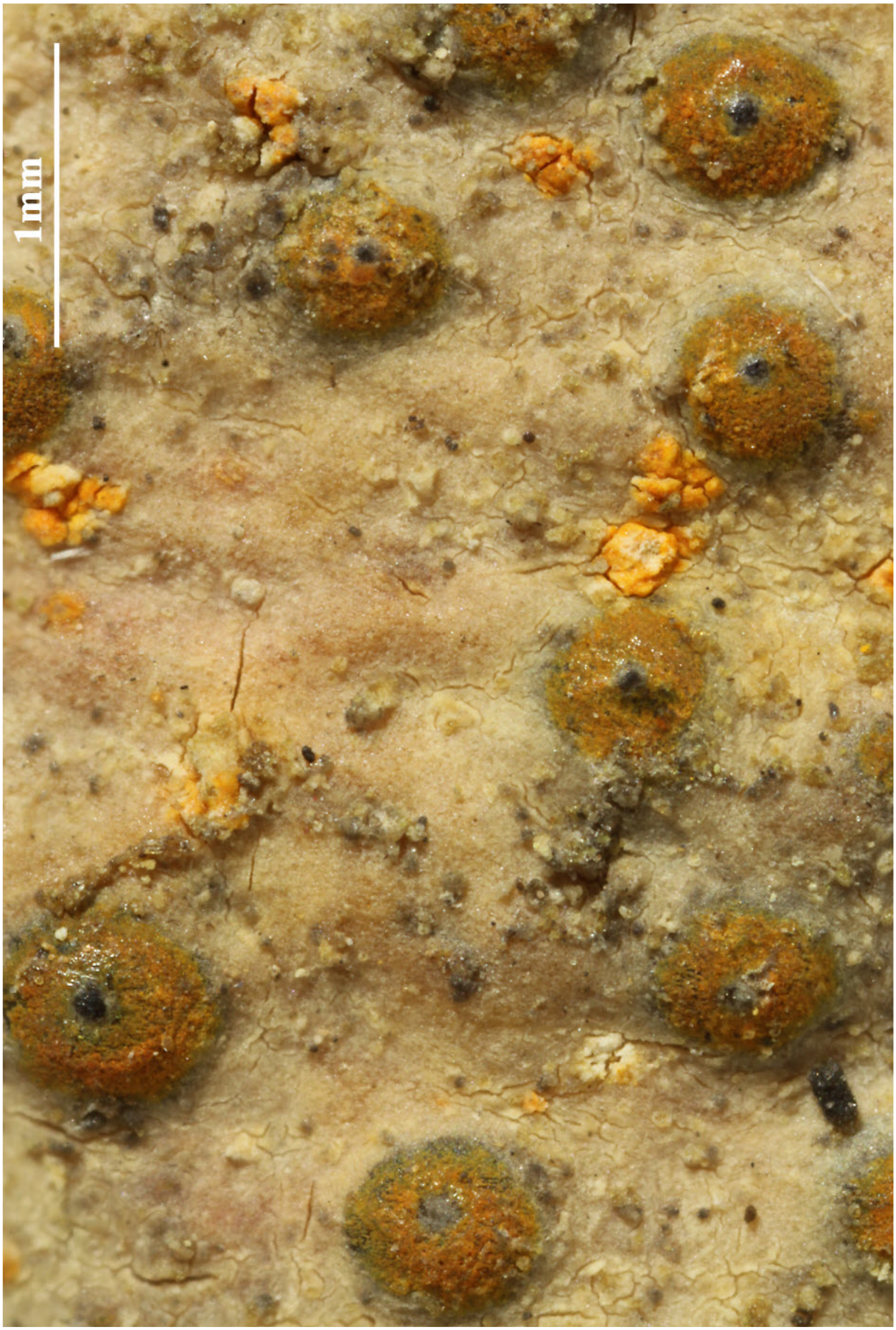
Pyrenula sexluminata

Pyrenula sipmanii Aptroot & K.H. Moon, in Moon & Aptroot, Biblthca Lichenol. 99: 307 (2009)

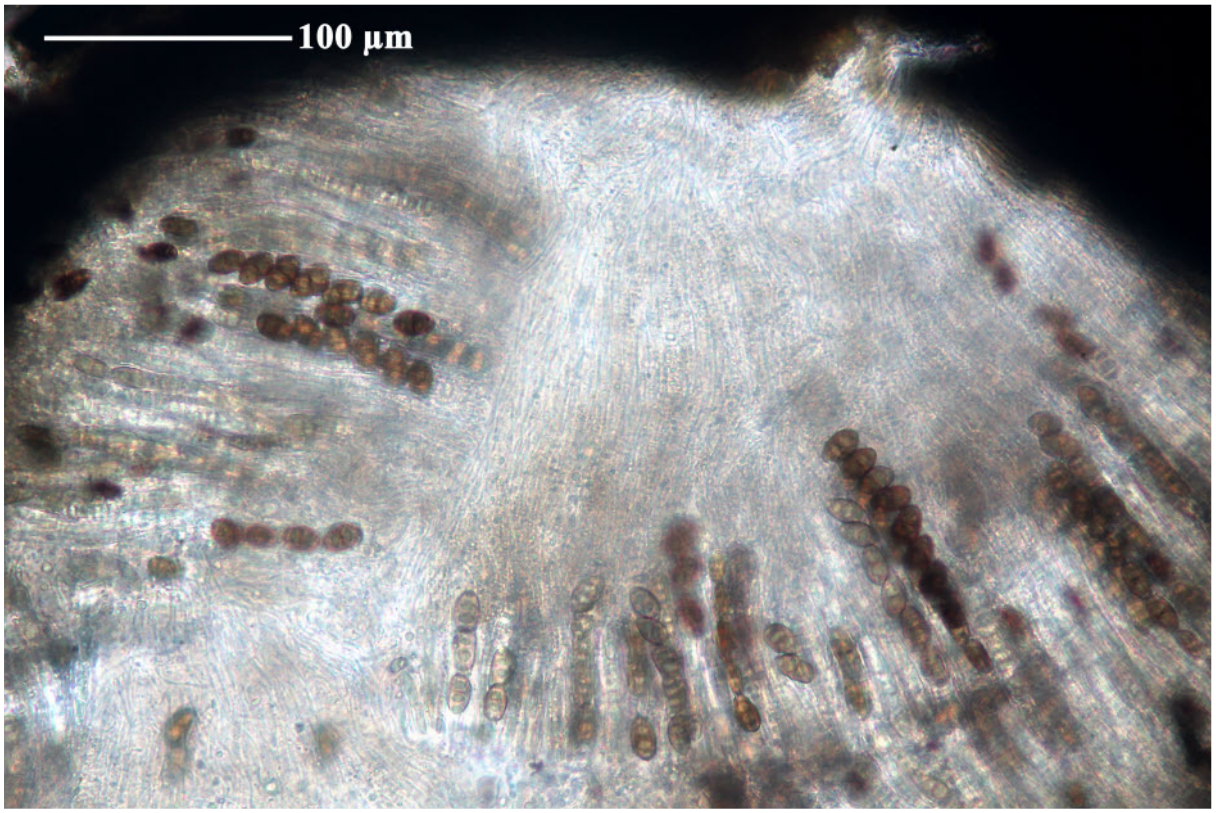
Thallus corticate, cream, without pseudocyphellae. Ascomata simple, conical, erumpent from the substratum, totally covered with orange pruina, sideways often partly covered by thallus, c. 0.5–1 mm diam.; ascomal wall without crystals, up to 100 µm thick. Ostiole black, apical. Hamathecium inspersed with oil droplets, IKI-. Ascospores becoming rather dark brown, 8/ascus, irregularly biseriate, 3-septate, ellipsoid with truncate ends, 17–20 × 8–10 µm, lumina rather rounded, with incomplete eusepta between them, terminal lumina not separated from the exospore. Pycnidia absent. Chemistry: Apothecia with orange, UV+ orange, K+ violet anthraquinone. Thallus UV+ yellow, with lichexanthone.

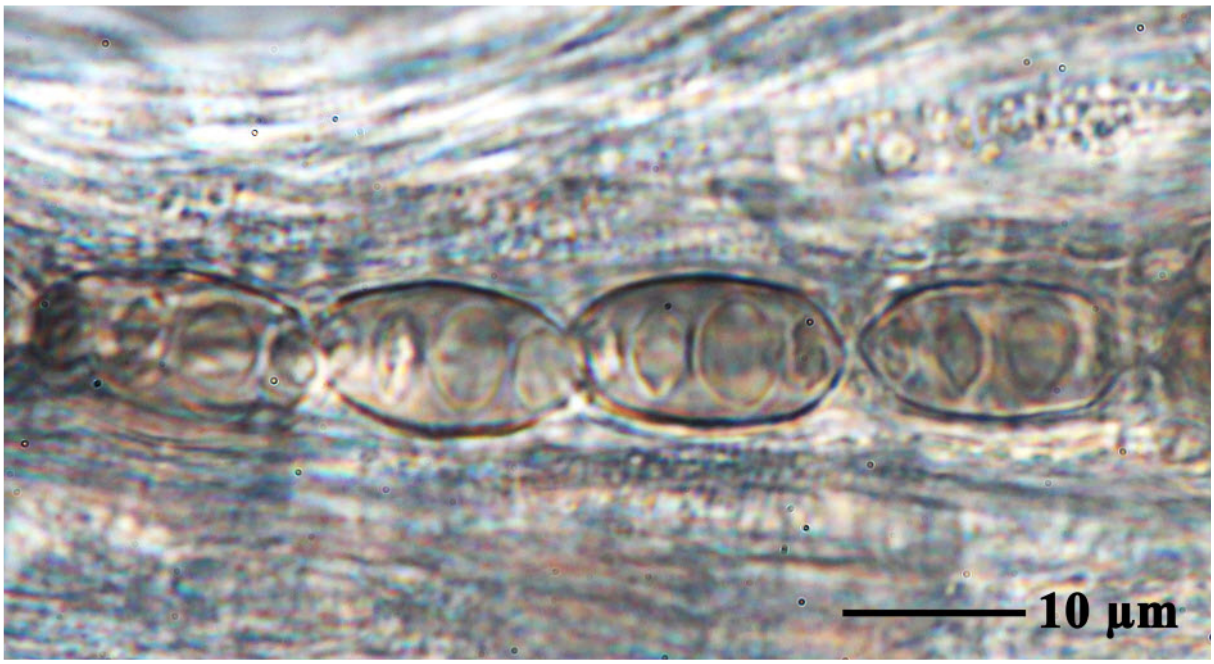
[ABL67520], Korea, Jeju-do, Jeju-shi, Ara 1 dong, around Kwanum-sa temple, on tree, 560 m, 33°25’29.8”, 126°33’30.0”, leg. A. Aptroot (no 67520), 15.5.2007, det. A. Aptroot, 2007. ISOTYPE.





Pyrenula sipmanii





Pyrenula sipmanii

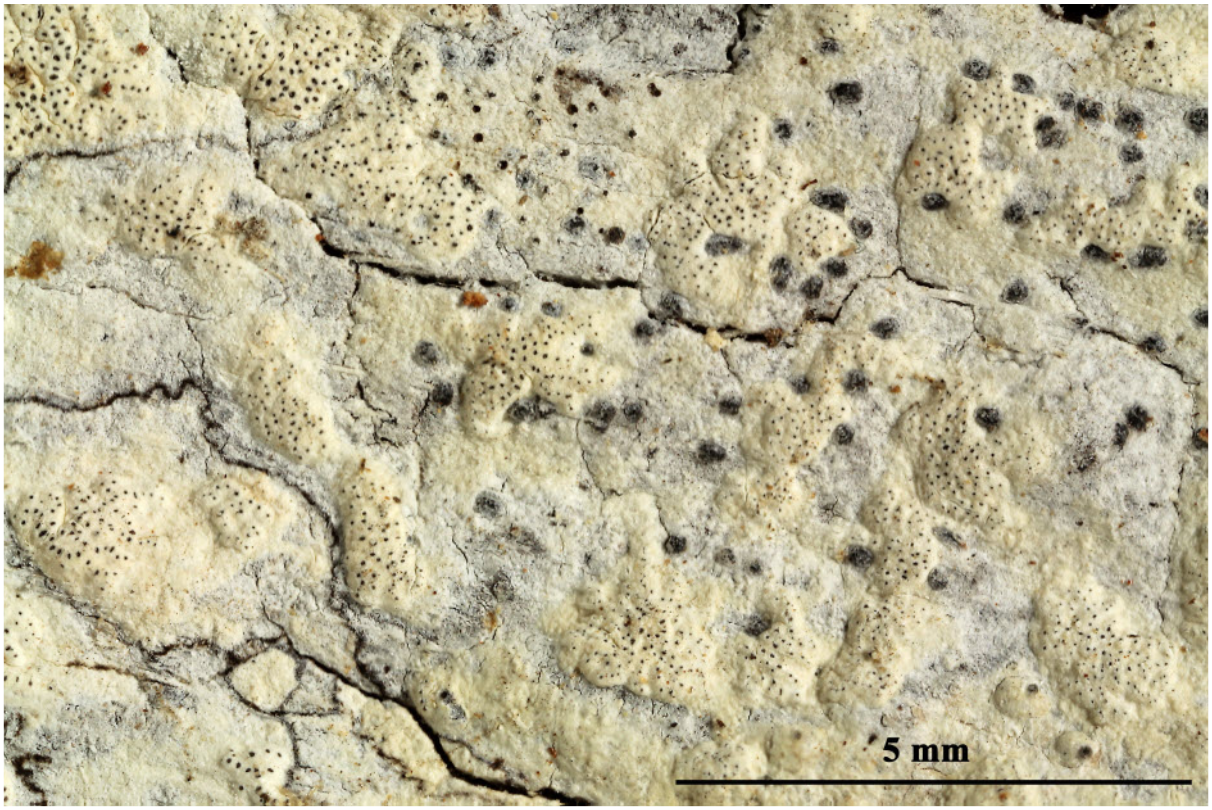


Pyrenula sipmanii

Pyrenula spissitunicata Aptroot, The Bryologist 117(3): 288 (2014)

Thallus corticate, smooth, continuous, rather thick, ochraceous to cream, without pseudocyphellae, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata perithecioid, erumpent, 0.2–0.5 mm diam., 0.3–0.5 mm high, black, but totally covered by thallus, obpyriform to conical, mostly aggregated in 0.5–0.8 mm wide, also conical groups of 2–8 with partly fused walls and one common ostiole. Wall carbonized all around, up to ca.100 mm thick. Ostioles black, not covered by thallus, skewed (not apical). Hamathecium hyaline, not inspersed with oil droplets. Paraphyses simple, ca. 1 µm wide. Asci cylindrico-clavate, with 8 ascospores. Ascospores brown, 3-septate, long ellipsoid, without constrictions, 10–12 × 4–5.5 µm; ends rounded; lumina rounded, separated from the wall by a thick endospore layer; with dark eusepta when overmature. Pycnidia not observed. Chemistry: Thallus UV+ yellow, containing lichexanthone (TLC).

[Hill8923], Solomon islands, San Cristobal island, Wainoni Region, near mouth of Huni River, 0 m, on tree near beach. Leg. D.J. Hill (no 8923), 15.8.1965, det. A. Aptroot, 2913. ISOTYPE.

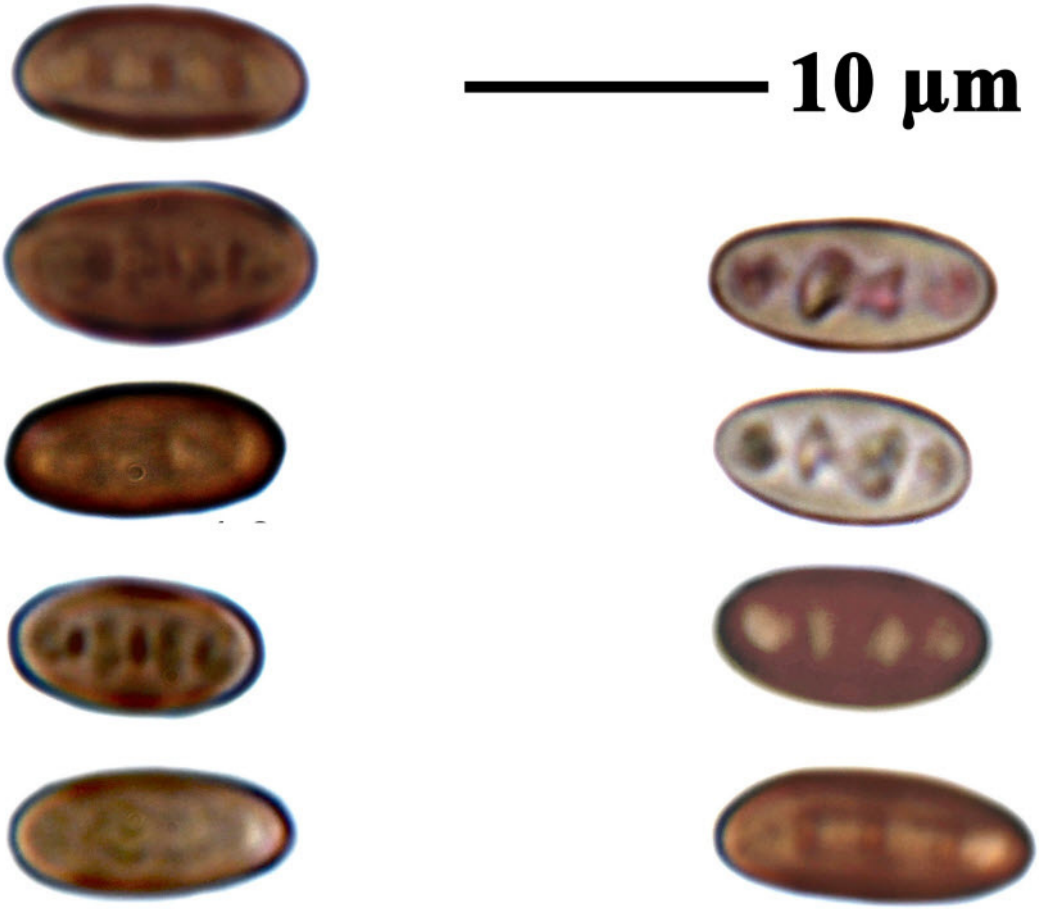






Pyrenula spissitunicata





Pyrenula spissitunicata

Pyrenula subcamptospora Upreti, Acta Botanica Gallica 140(5): 519 (1993)

Thallus epiphloeodal, smooth-slightly verruculose, shining, hypothallus indistinct. Ascocarps solitary, 1–3 mm diam., 500–800 µm high, depressed semiglobose-globose, mostly naked, lack or sometimes covered with corticiform layers of thallus, rough dull black, ostioles indistinct or appearing as a whitish depression; peridium black, carbonaceous, laterally spreading, 200–300 µm thick at top, 450–559 µm thick at sides, centrally columellate at bottom; centrum I-, with abundant oil globules. Asci cylindrical, 180–220 × 20–30 µm. Ascospores 8/ascus, uniseriately arranged in ascus, brown, 4-locular, oblong-ellipsoid to bean-shaped, curved at middle, 35–55 × 18–28 µm. Thallus UV-.

[UpretiL87121], India, Kerala, Idukki district, Myladumpara, Govt. Cardamum Farm, 1050 m, on bark. Leg. D.K. Upreti (no 87121), 1.3.1984. ISOTYPE.





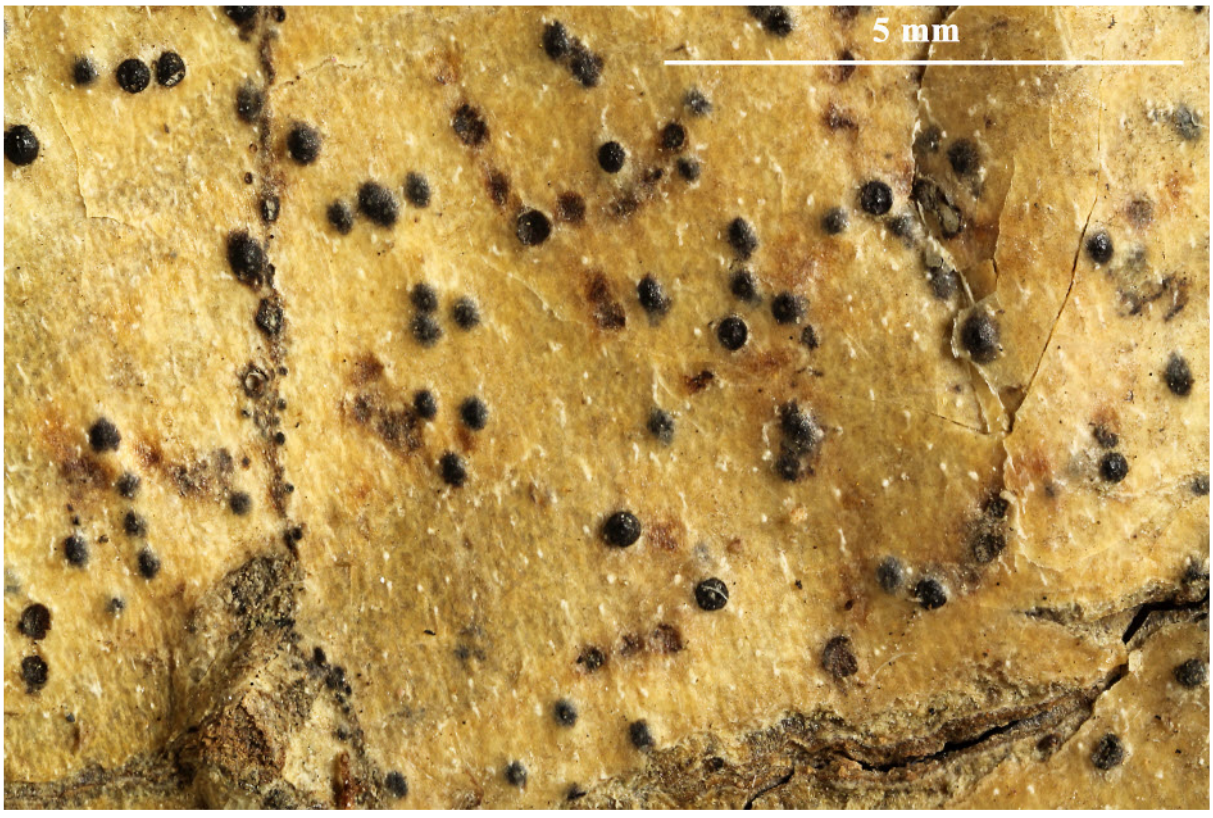


Pyrenula subcamptospora

Pyrenula subcylindrica Jagad. Ram & Upreti, Lichenologist 37(2): 109 (2005)

Thallus crustose, corticolous, yellowish brown, epiphloeodal, smooth, corticated, pseudocyphellate; prothallus a black line; cortex hyaline, 40–90 µm thick; photobiont layer not continuous, 12–18 µm thick, photobiont *Trentepohlia*; medulla white, immersed to partly superficial on the substratum. *Ascomata* hemispherical, 0.3–0.45 mm diam., semi-immersed, partly covered by thalline layer; ascocarp wall carbonized, dark brown to black, with distinct clypeus at middle, clypeus 50–70 µm thick, thin at the base; ostiole apical, black, plane; centrum not inspersed with oil globules. *Hymenium* with colourless crystals, I-, K-; paraphyses simple, 1.0–1.5 µm thick. Asci cylindrical, 80–110 × 14–20 µm, 8-spored. Ascospores irregularly arranged, colourless when immature, dark brown at maturity, fusiform with subacute ends, middle locules rounded to polygonal, 7–11-septate, 42–67(–72) × 4.5–6.5 µm; spore wall smooth, constricted at the septa, without granules. *Pycnidia* black, hemispherical, 80–200 x 75–150 µm; Conidia colourless, filiform, curved, 18–35 x 1 µm. *Chemistry.* Thallus K-, C-, KC-, P-, UV-9.

[Ram13805], India, West Bengal, Sundarbans Biosphere reserve, Lothian Island Wildlife Sanctuary, on bark of *Avicennia alba*. Leg. T.A.M. Jagasesh Ram, 7.3.2003. ISOTYPE.





Pyrenula subcylindrica



Pyrenula subcylindrica

Pyrenula subelliptica (Tuck.) R.C. Harris, in Egan, Bryologist 90(2): 164 (1987)
= *Verrucaria subelliptica* Tuck., in Lea, Cat. Pl. Cincinnati: 47 (1849)

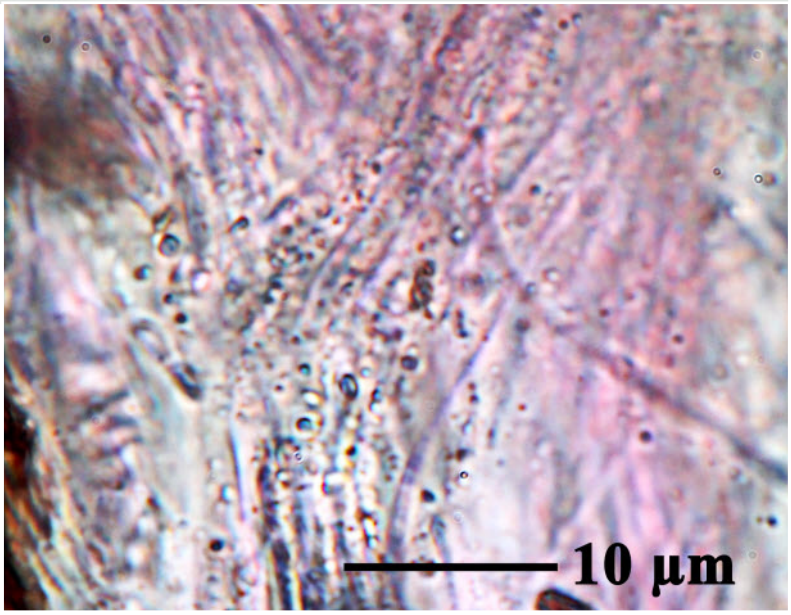
Thallus often with pseudocyphellae; ascomata globose or occasionally somewhat flattened, almost completely immersed, 0.4–0.8 mm diam.; ostioles usually flush, rarely in papilla; hamathecium inspersed with small colorless oil globules, gel IKI+ orangish; ascospores 4-loculate, 24–35(–46) × 10–15(–17) µm, broadly elliptical, no septa continuous with outer wall, terminal locules shorter and broader than elongate median locules, with thick apical walls.

[Harris20910], USA, North Carolina, Graham County, Trail to Slickrock Creek along Lake Caulderwood, Slickrock Wilderness Area, Natahala National forest, mixed hardwood, on Liriodendron. Leg.& det. R.C. Harris, 3.10.1987.









Pyrenula subelliptica



Pyrenula subelliptica

Pyrenula subglabrata (Nyl.) Müll. Arg., Bot. Jb. 6: 410 (1885)
= *Verrucaria subglabrata* Nyl., in Nylander & Crombie, J. Linn. Soc., Bot. 20: 60 (1883)

Ascomata depressed-hemispherical, finally incopletely exposed, 0.6–0.8 mm diam., with thallus cover; ostioles indistinct; hamathecium inspersed with colorless oil globules; ascospores uniseriate, 4-loculate, 16–22 × 8–10.5 µm, apical locules much smaller then median locules.

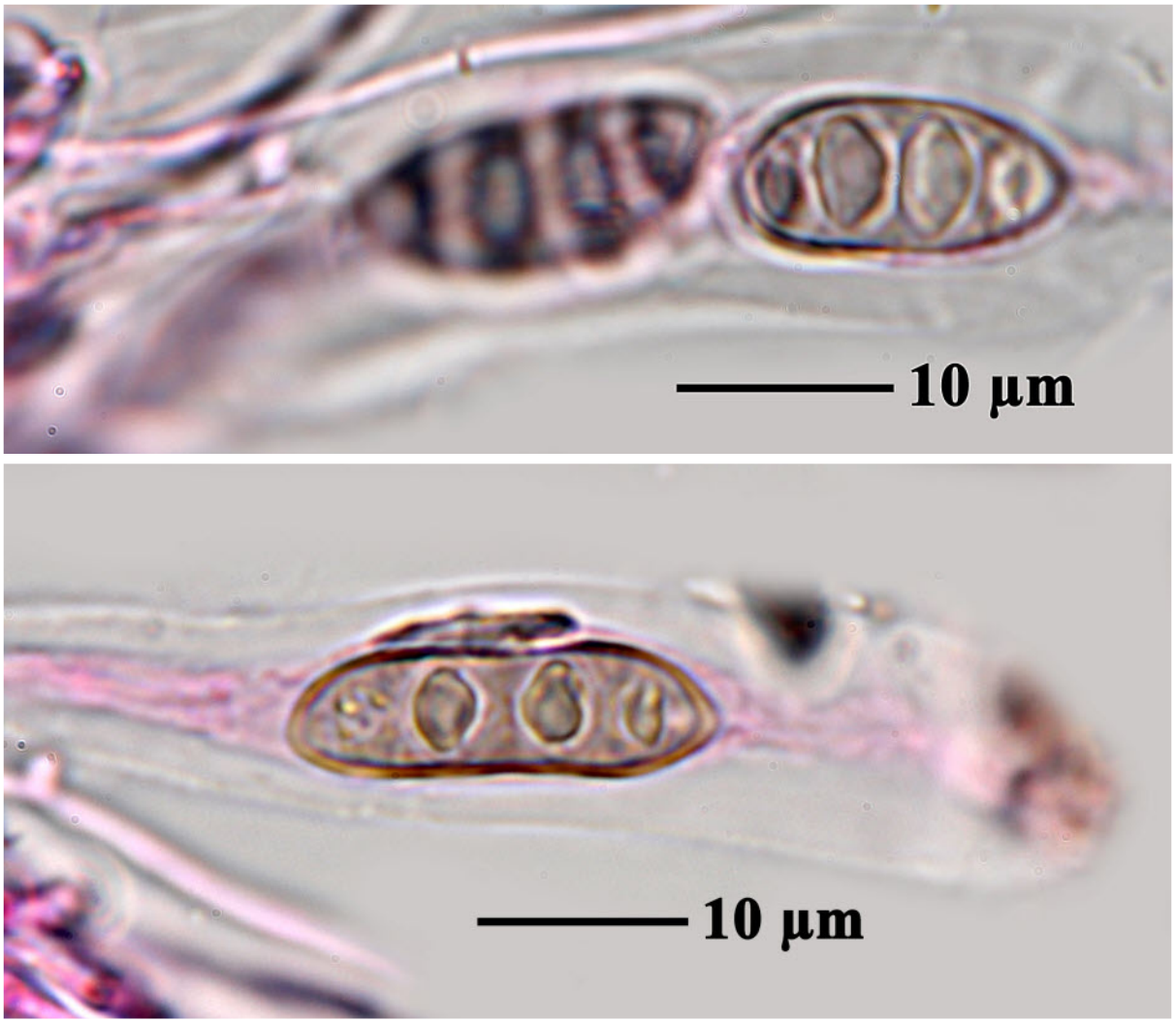
[CG3069], Vietnam, Dong Nai province, Cát Tiên National Park, near the minority village 10 km South of the accommodation area, on a tree in a plantation along the road. Leg. C. Gueidan (no 3069), 16.2.2012, det. A. Aptroot.







Pyrenula subglabrata

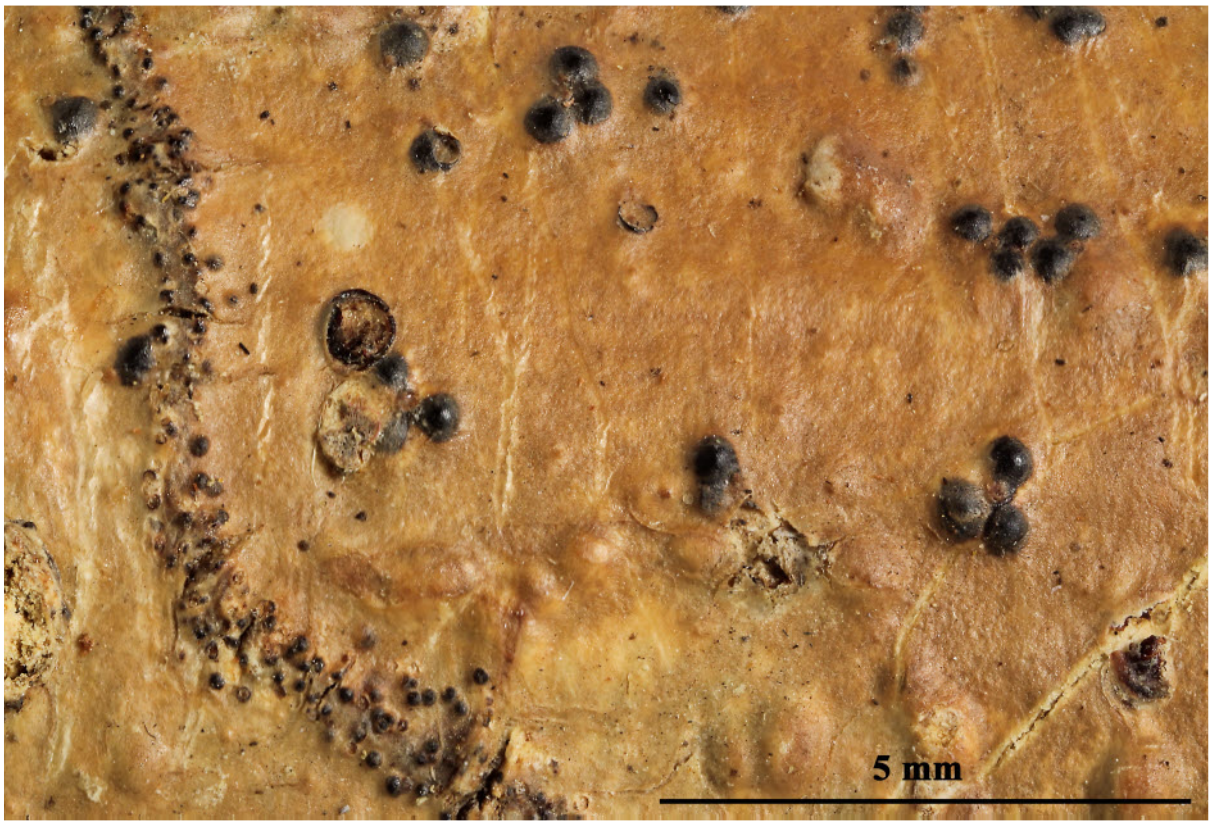


Pyrenula subglabrata

Pyrenula subgregantula Müll. Arg., Bull. Soc. R. Bot. Belg. 30(no. 1): 94 (1891)
= *Pyrenula personata* (Malme) R.C. Harris
= *Pyrenula fulvella* R.C. Harris
= *Pyrenastrum fulvum* Malme

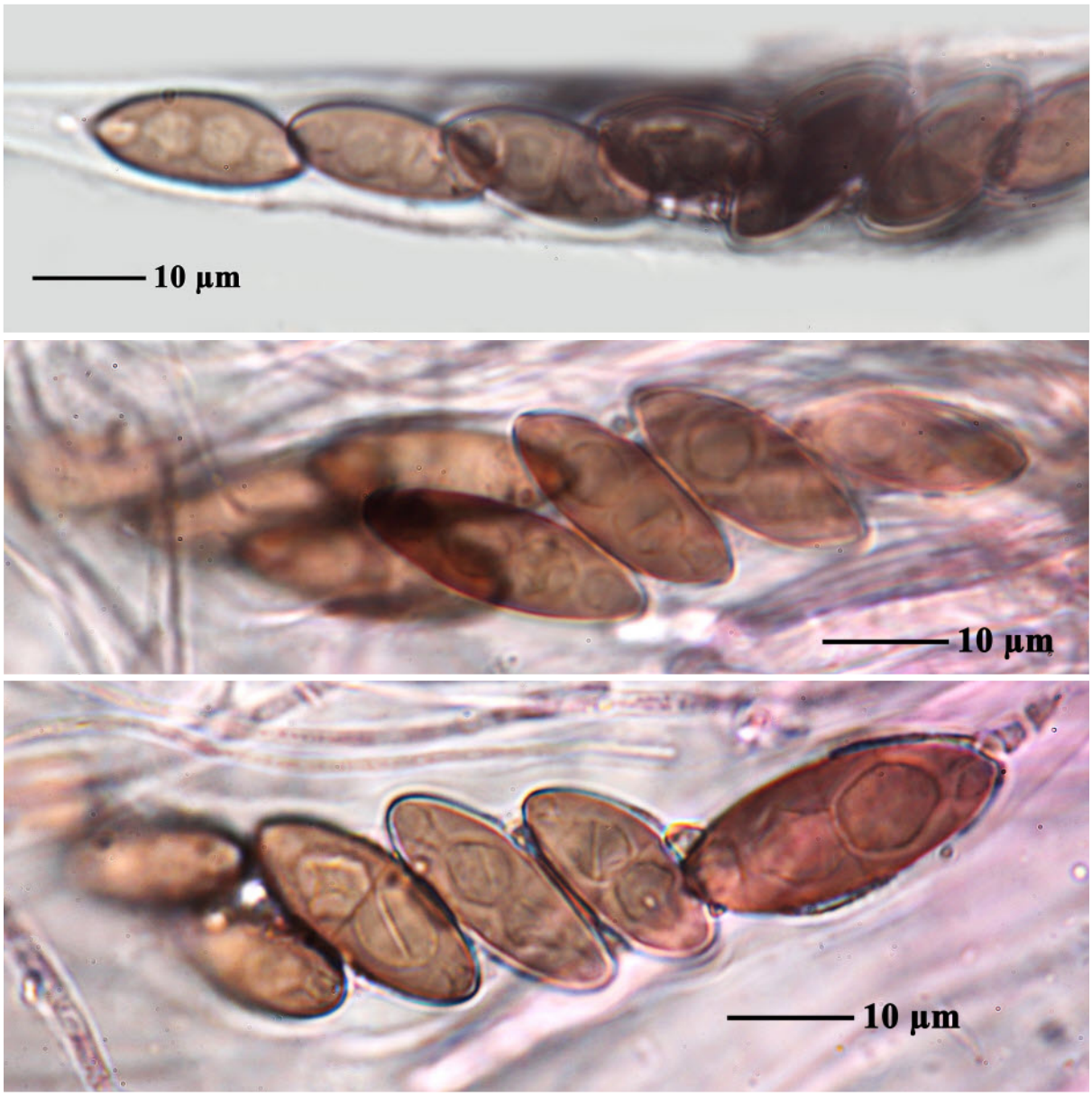
Thallus corticate, brownish to olive green, with pseudocyphellae. Perithecia usually 2–7 with joined ostioles, flask-shaped, erumpent from the substratum, mostly covered by thallus, c. 0.4–0.6 mm diam. Perithecial wall without crystals, up to 100 µm thick. Ostiole pale, lateral. Hamathecium not inspersed, IKI+ blue, filaments unbranched. Ascospores 8/ascus, brown, uniseriate, 3-septate, fusiform with rather pointed ends, 17–21 × 7–8 µm, lumina angular, end lumina elongated, not separated from the exospore by an endospore layer. Chemistry: No substances detected.

[ABL60827], Costa Rica, Prov. Guanacaste, Barra Honda National Park, 10 Km ENE of Nicoya, on tree in open semideciduous forest along trail to Terciopelo cave. 450-500 m, 85°21' W, 10°10' N. leg. A. Aptroot (no 60827), 22.03.2004, det. A. Aptroot, 2004.

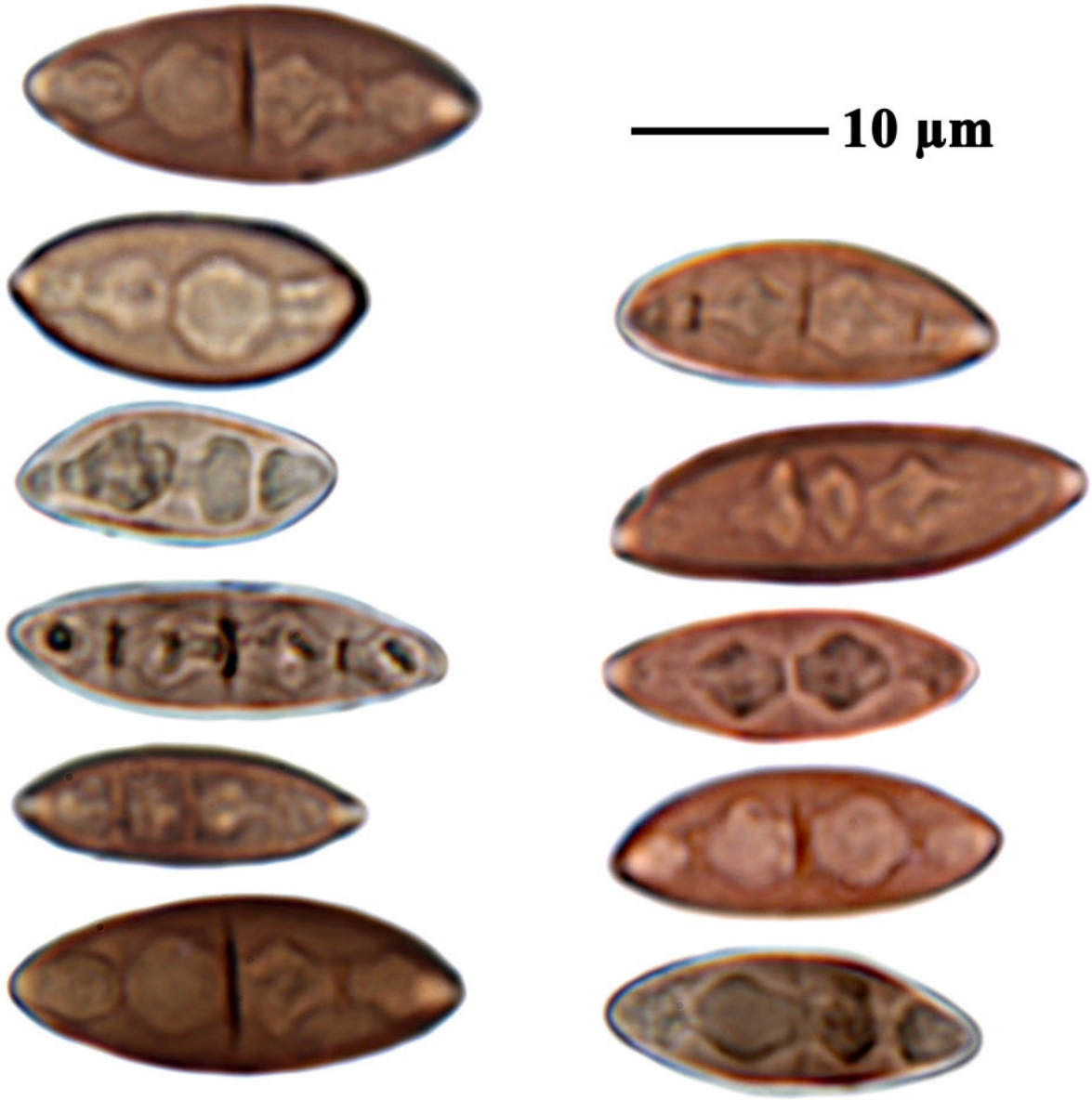




Pyrenula subgregantula



Pyrenula subgregantula



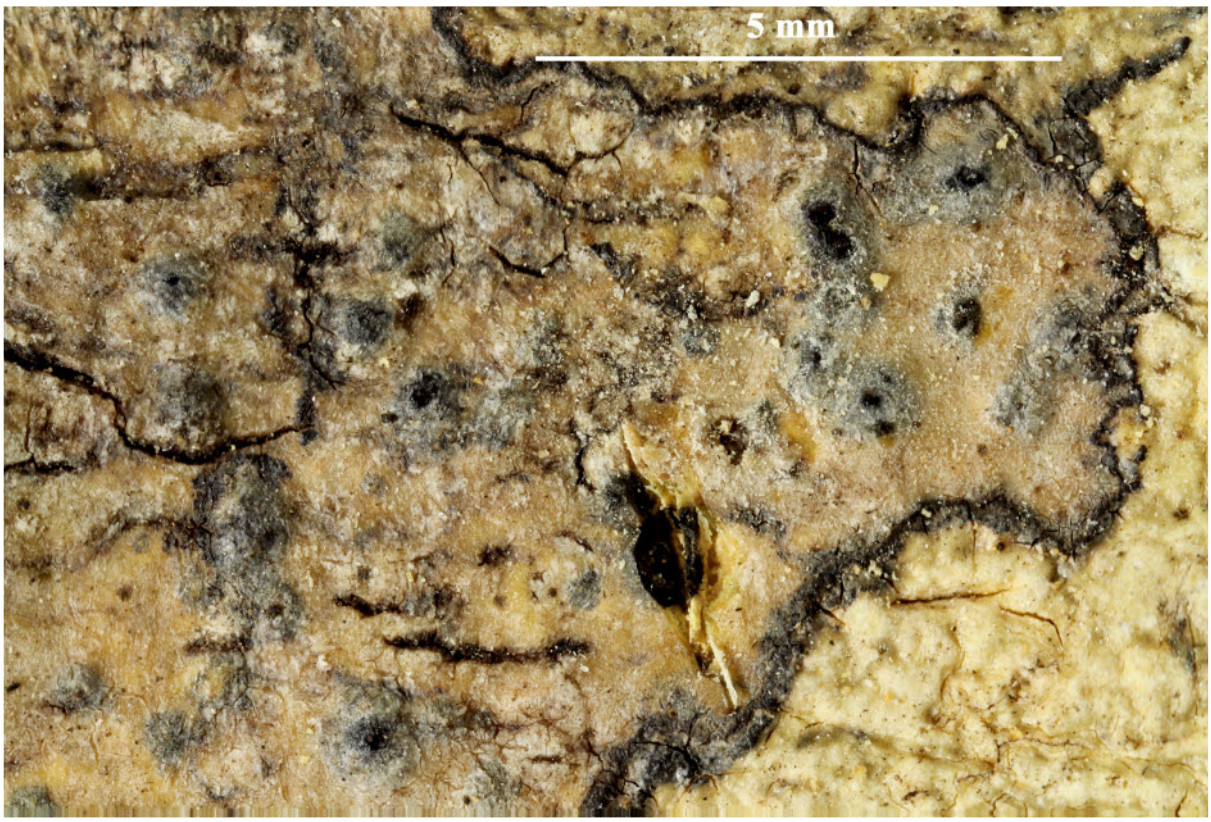
Pyrenula subgregantula

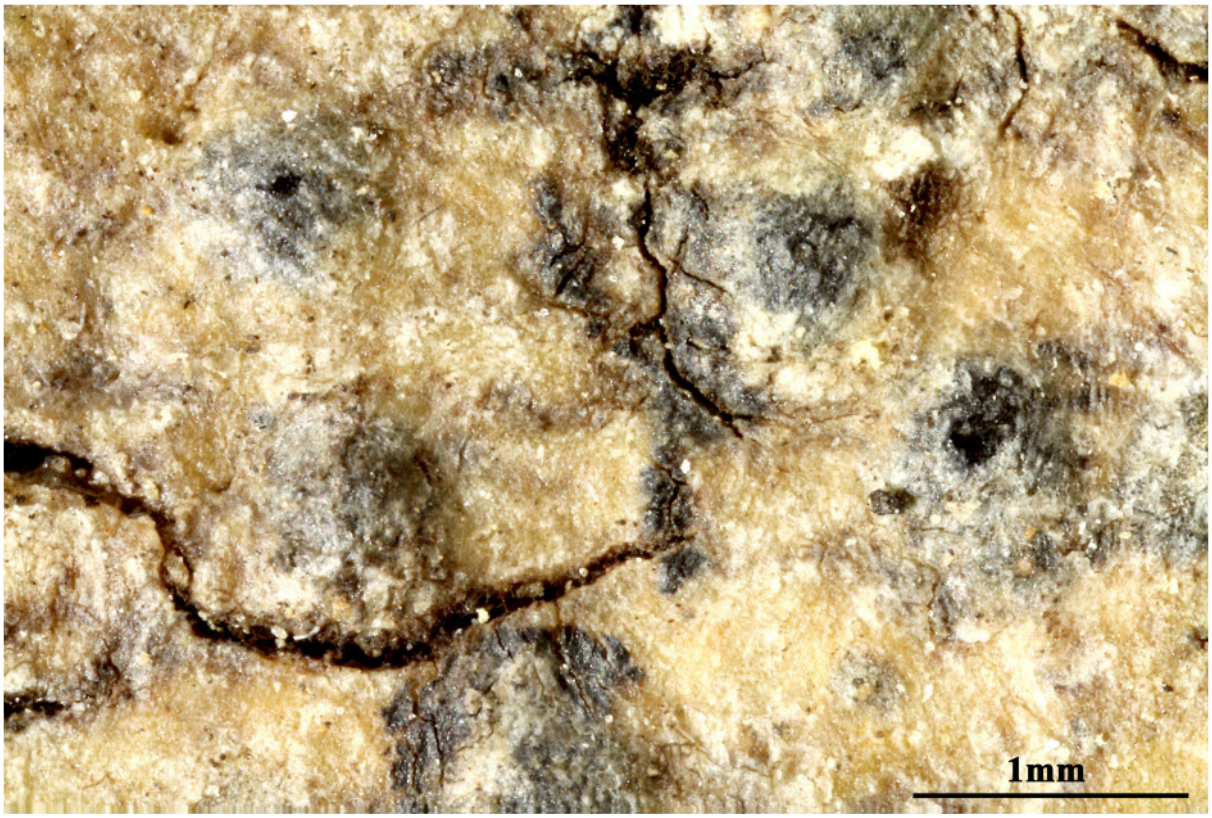
Pyrenula sublaevigata (Patw. & Makhija) Upreti, Nova Hedwigia 66(3-4): 574 (1998)

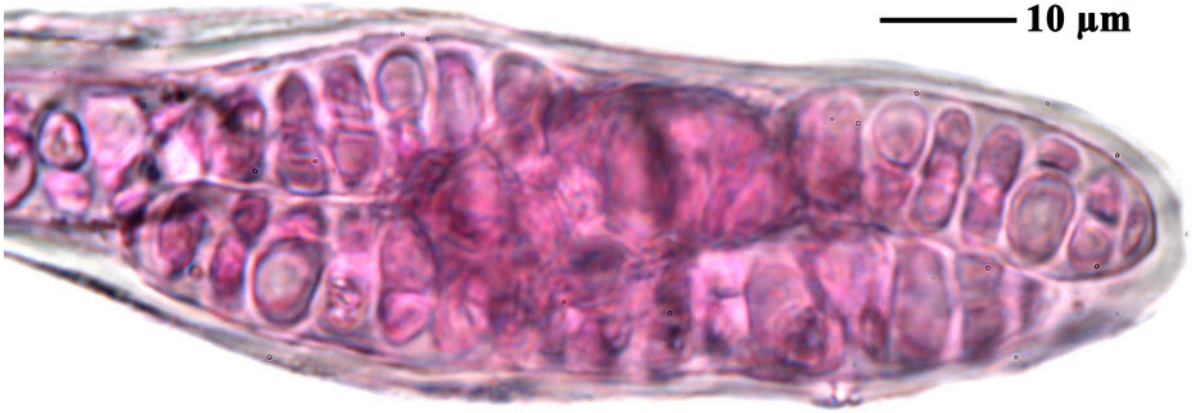
= *Anthracothecium sublaevigatum* Patw. & Makhija, Kavaka 8: 25 (1981) [1980]

Ascomata immersed, c. 0.4 mm diam.; ostioles apical, dark brown to black; hamathecium inspersed, ascospores muriform, 4–8/ascus, 6–8 × 2-loculate, 25–26 × 13–22 µm, ovoid or ellipsoidal, often slightly constricted at the middle septum.

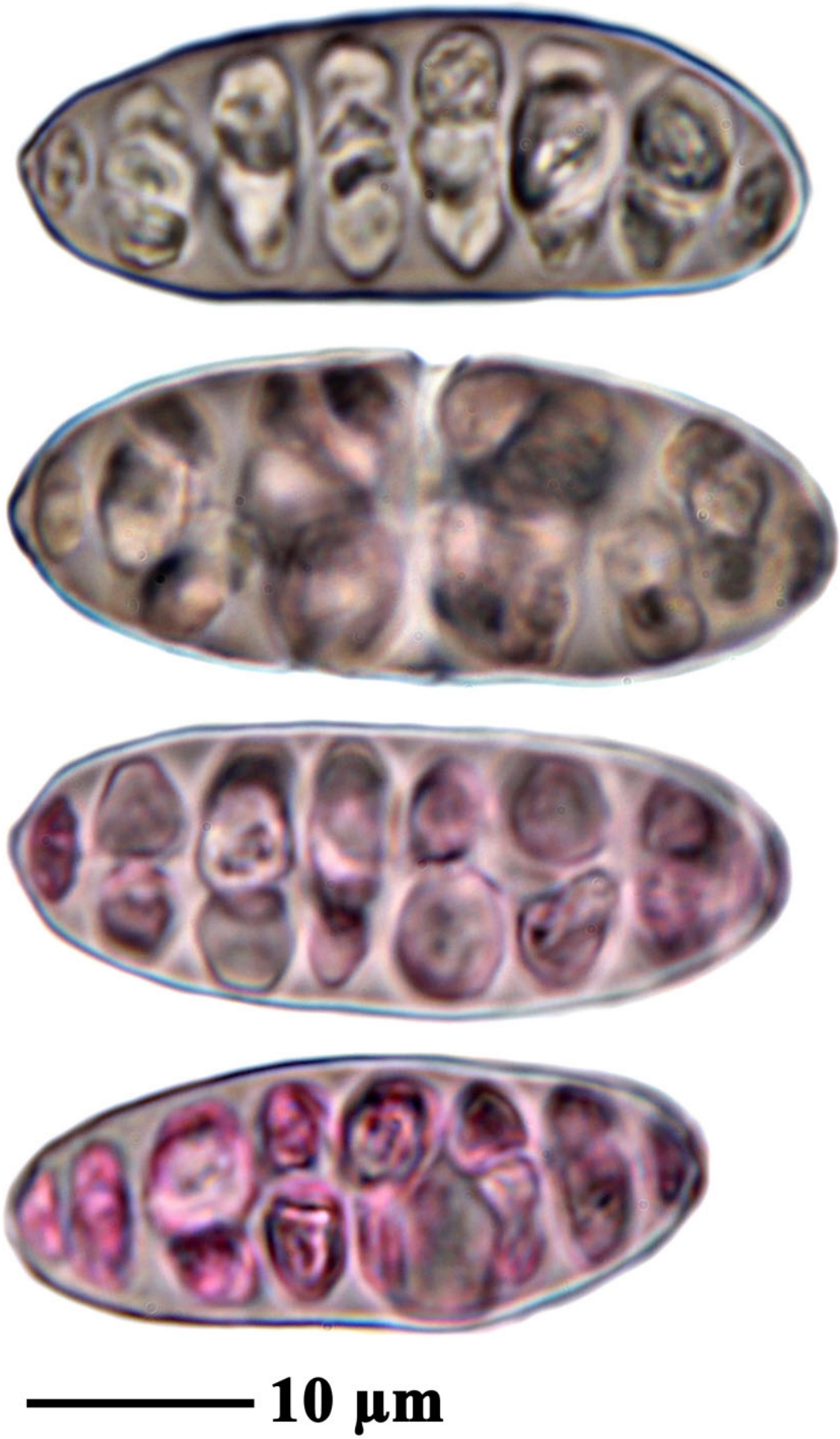
[ABL31751], Papua New Guinea, Madang Prov., Ramu valley, Brahman, along road to Bundi. Virgin lowland rainforest, on Dipterocarp tree. 200 m, 145°21' E, 5°46' S. Leg. A. Aptroot (no31751), 12.8.1992, det. A.Aptroot, 1993.







Pyrenula sublaevigata



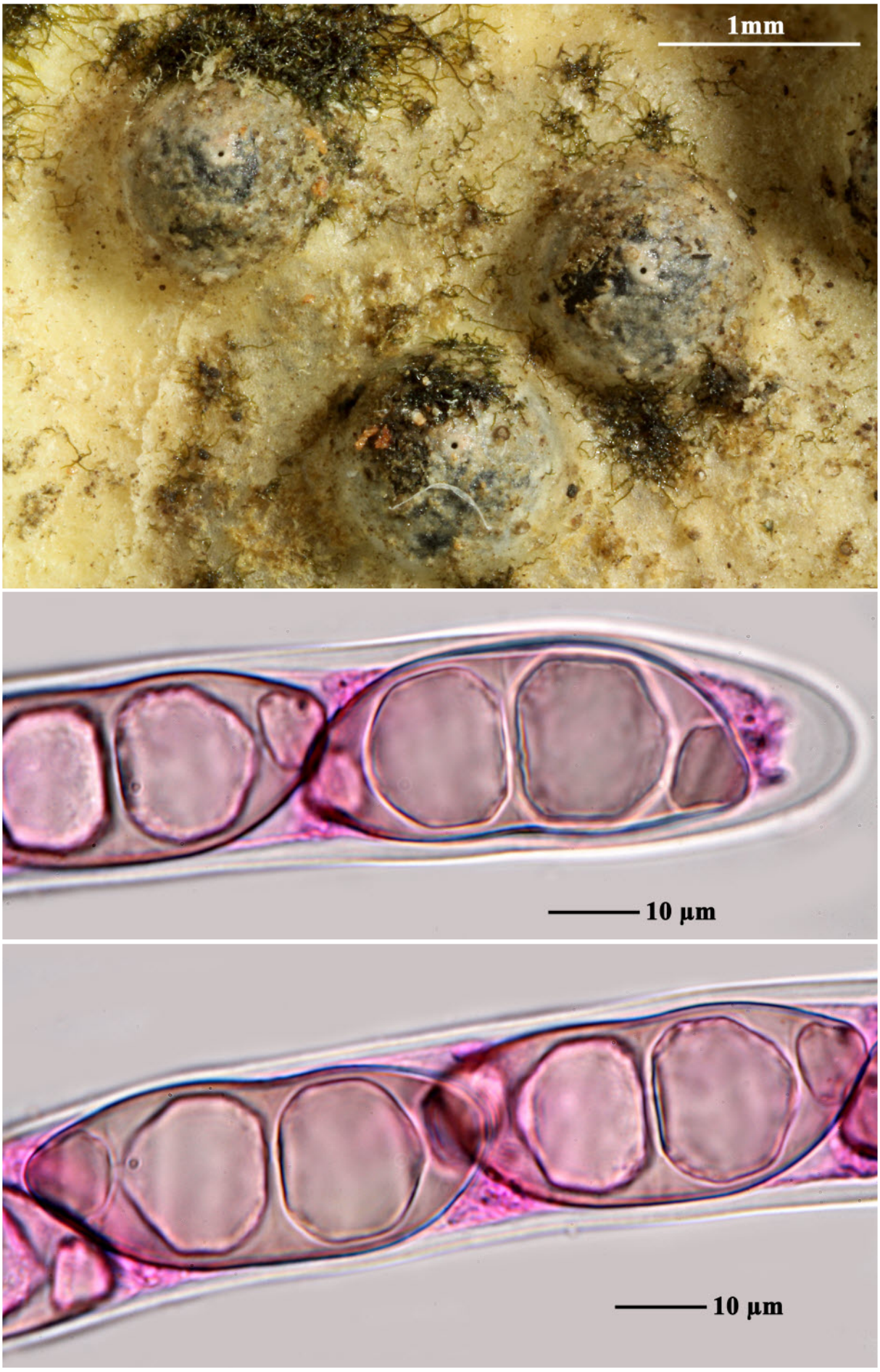
Pyrenula sublaevigata

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

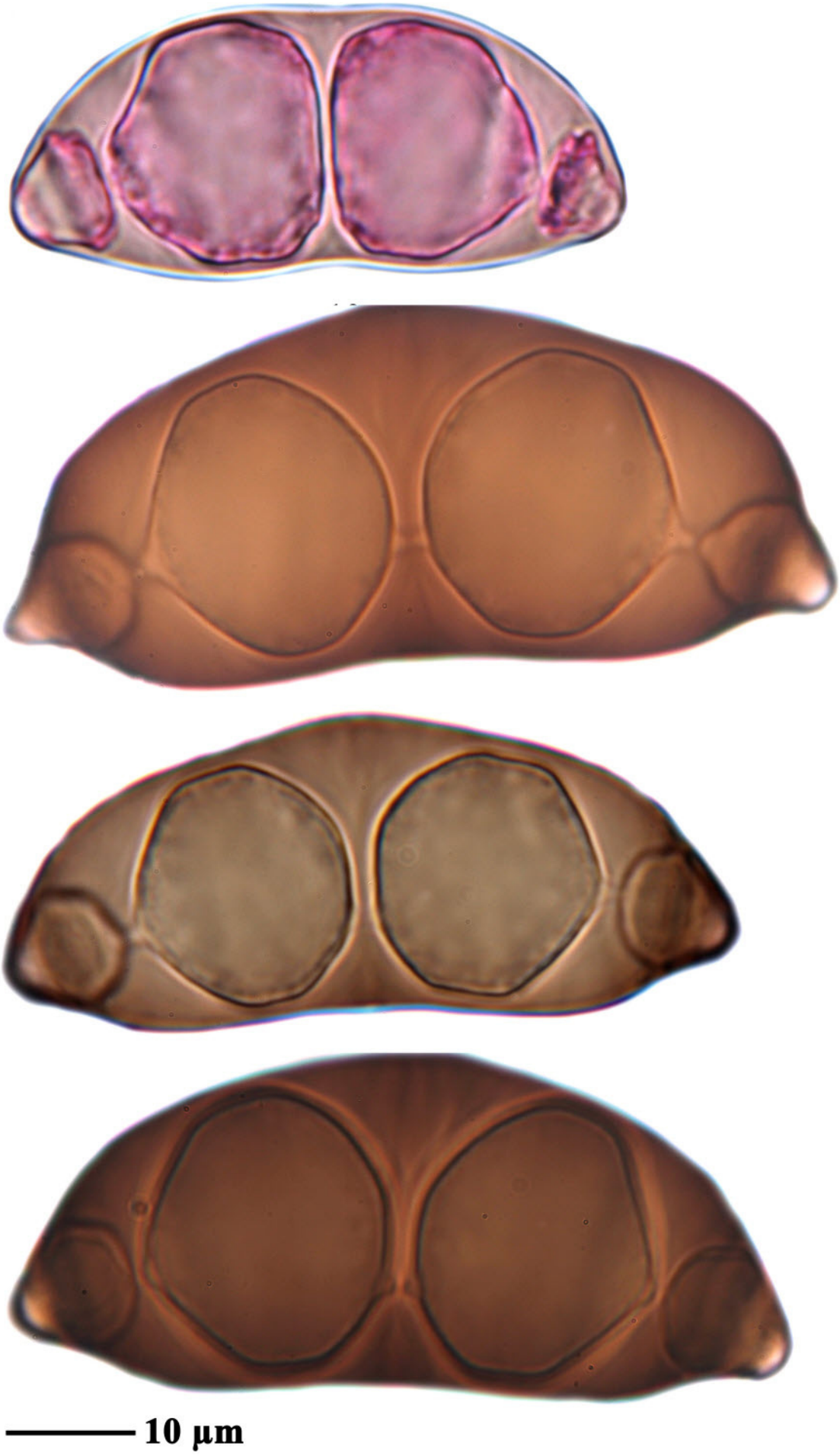
Thallus corticate, brownish to olive green, without pseudocyphellae. Perithecia solitary, subglobose, erumpent from the substratum, often mostely covered by thallus, c. 0.8–1.5 mm diam. Perithecial wall without crystals, up to 300 µm thick. Ostiole pale, apical. Hamathecium not inspersed, IKI+ blue, 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.

[ABL60946], Costa Rica, Prov. Guanacaste, Proyecto Eólico Novasa near Tierras Morenas. 15 km NNW of Tilarán, on exposed trees along road. 85°01’ W, 10°35’ N, 750 m. Leg. A. Aptroot (no 60946), 23.3.2004, det. A. Aptroot, 2004.





Pyrenula subpraelucida

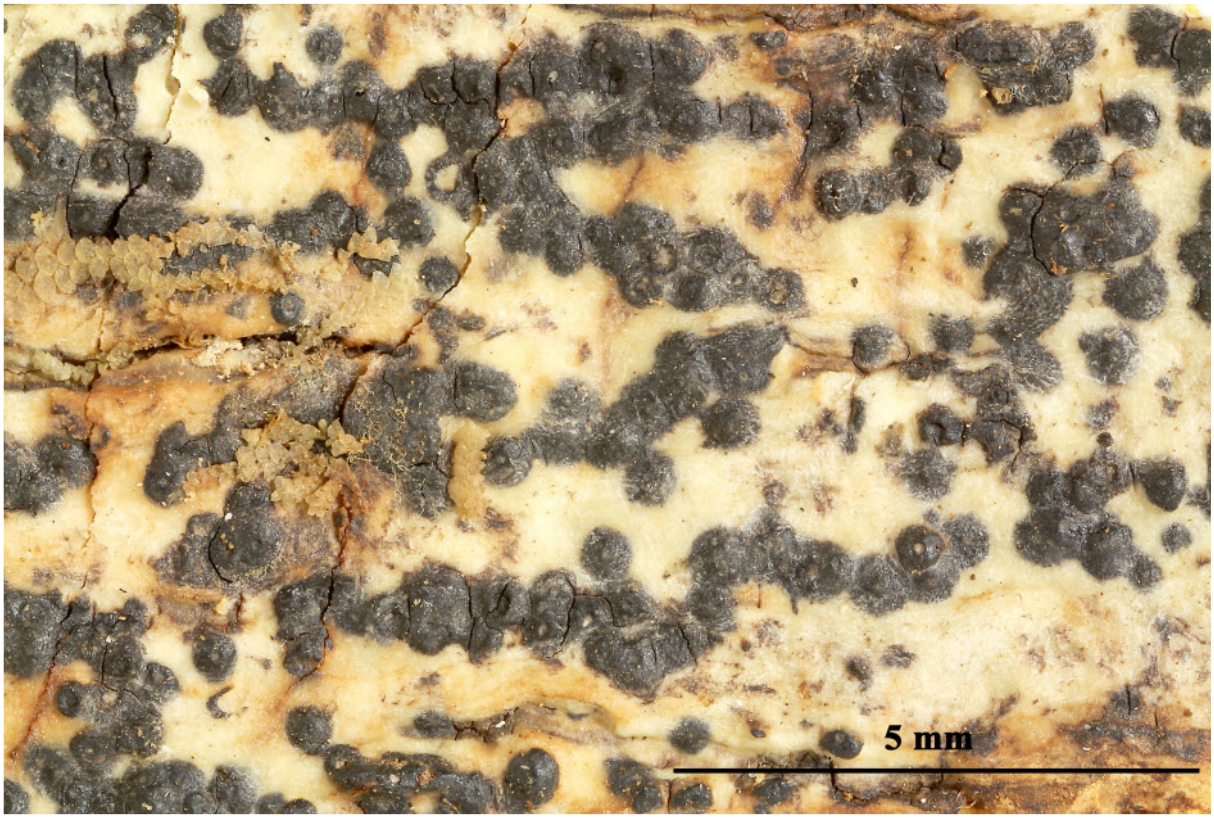


Pyrenula subpraelucida

Pyrenula subsoluta (Müll. Arg.) Aptroot, in Aptroot, Lücking, Sipman, Umaña & Chaves, Biblthca Lichenol. 97: 127 (2008)
= *Melanotheca subsoluta* Müll. Arg., Bull. Soc. R. Bot. Belg. 30(no. 1): 89 (1891)

Thallus olivaceous brown, thinly corticate, without hypothallus. Perithecia sessile, conical-hemispherical, 0.5–0.8 mm diam., centrum 0.15–0.3 mm diam., usually 2–10 laterally fused to form linear to irregular rounded melanothecoid stromata of 0.5–2 mm diam. Ostioles vertical. pale brown, 0.1–0.2 mm diam., slightly raised. Perithecial wall clypeate, 70–120 µm thick, not below the hamathecium. Hamathecium not inspersed. IKI-, filaments unbranched. Ascospores 8/ascus, grey brown, grey. 3-distoseptate, 21–25 × 7–8 µm, lumina diamond-shaped, not directly against the outside wall at the ends, outer lumina more elongated than inner lumina. Chemistry: No substances detected.

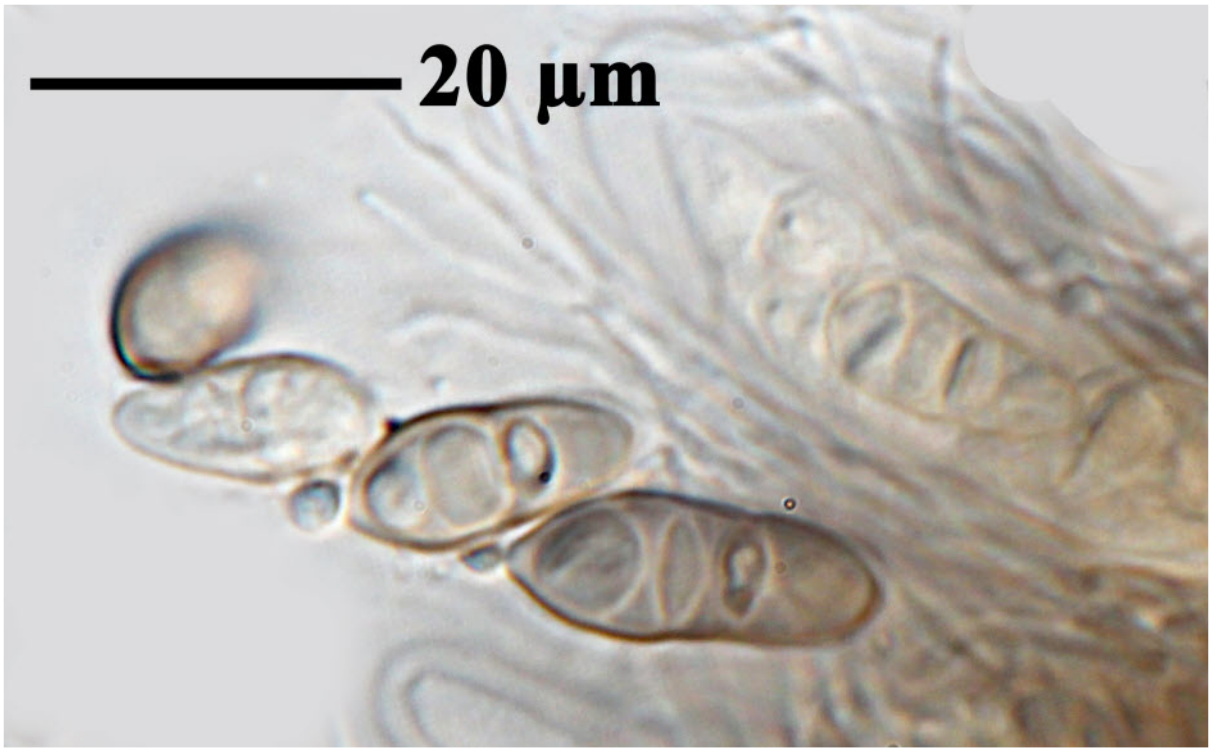
[Vivant], Antilles, Guadeloupe, La Desirade Plateau calcaire. Sentier de la ravine de „Grande Riviera“. 150 m. Leg. J. Vivant, 8.1.1993, det A. Aptroot.





Pyrenula subsoluta

1839





Pyrenula subsoluta

Pyrenula subumbilicata (C. Knight) Aptroot, Australas. Lichenol. 60: 39 (2007)

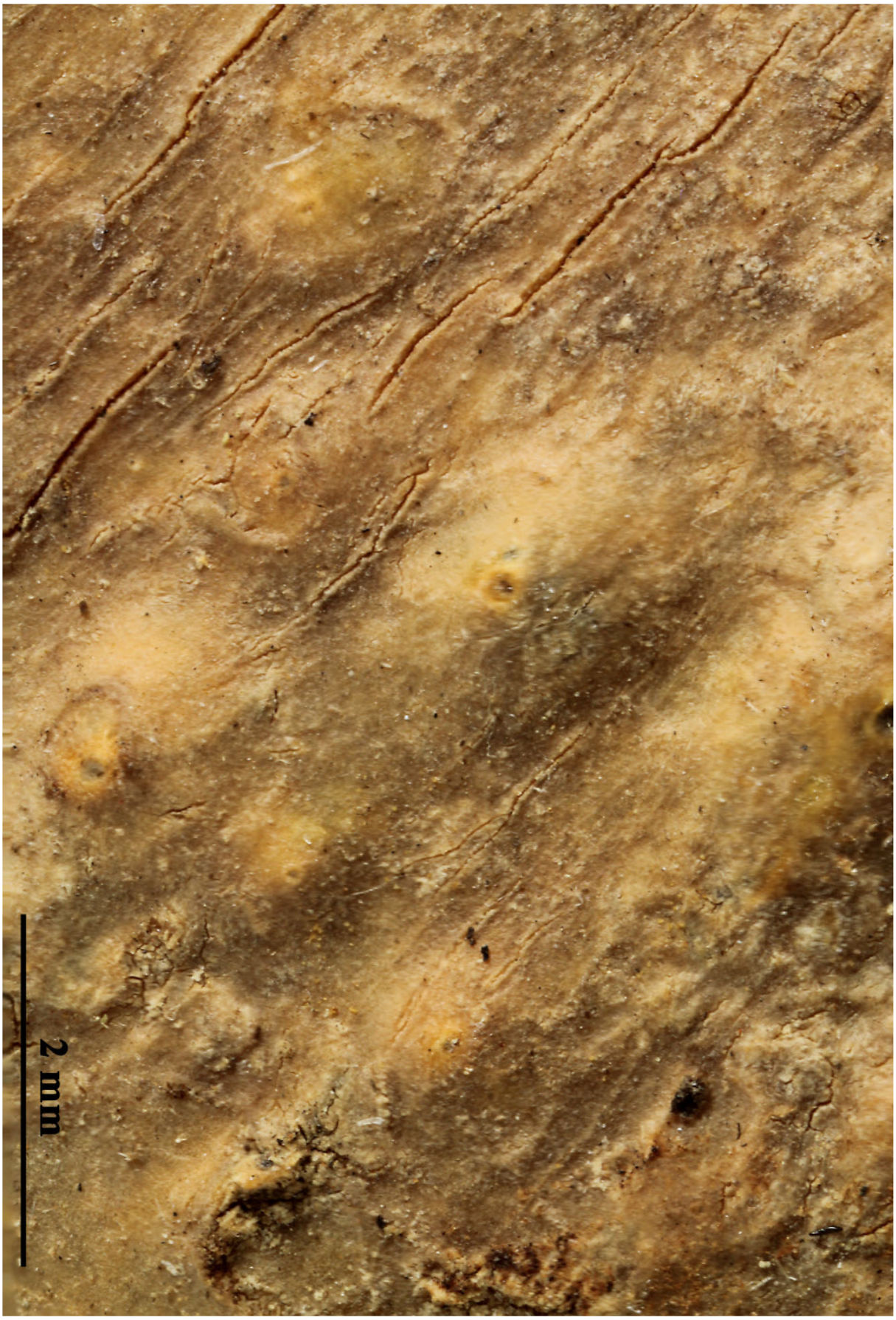
= *Trypethelium subumbilicatum* C. Knight, in Bailey, Syn. Queensl. Fl. 1(Suppl.): 76 (1886)

= *Parmentaria subumbilicata* (C. Knight) Müll. Arg., Flora, Regensburg 70: 426 (1887)

Thallus yellowish to olive green, lacking pseudocyphellae, corticate. Ascomata occasionally solitary, but usually in groups of 2–6 bwith fused ostioles, flask-shaped, immersed to erumpent from the substratum, usually partly covered by the thallus, c. 0.4–0.6 mm diam. Ascomatal wall without crystals, to 200 µm thick; ostiole lateral, pale. Hamathecium not inspersed with oil droplets, IKI-. Ascospores 8/ascus, irregularly biseriate, submuriform, with c. 5 traverse septa, the end locules simple, only a few medial locules longitudinally septate, fusiform, with pointed ends, grey to brown, 24–32 × 10–13 µm; lumina angular. Chemistry: No substances detected.

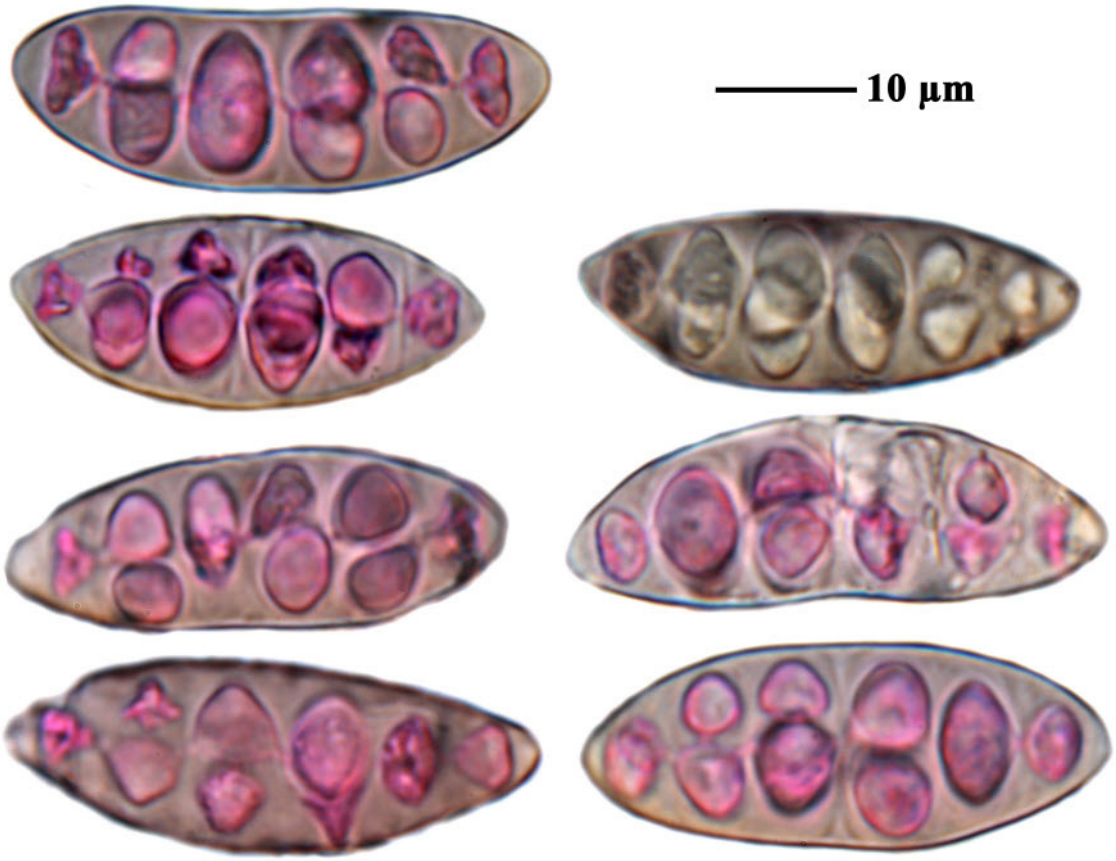
[Haf16381], Australia, Queensland, Great Dividing Range, Gambubal State Forest, Cons Plain (Bald Mtn.) E of Emu Vale, 1100-1200 m, 28°14’ S, 152°23’ E. Subtropical rainforest. Leg. J. Hafellner (no 16381) & N. Stevens, 7.9.1986, det. A. Aptroot, 2007.





Pyrenula subumbilicata





Pyrenula subumbilicata

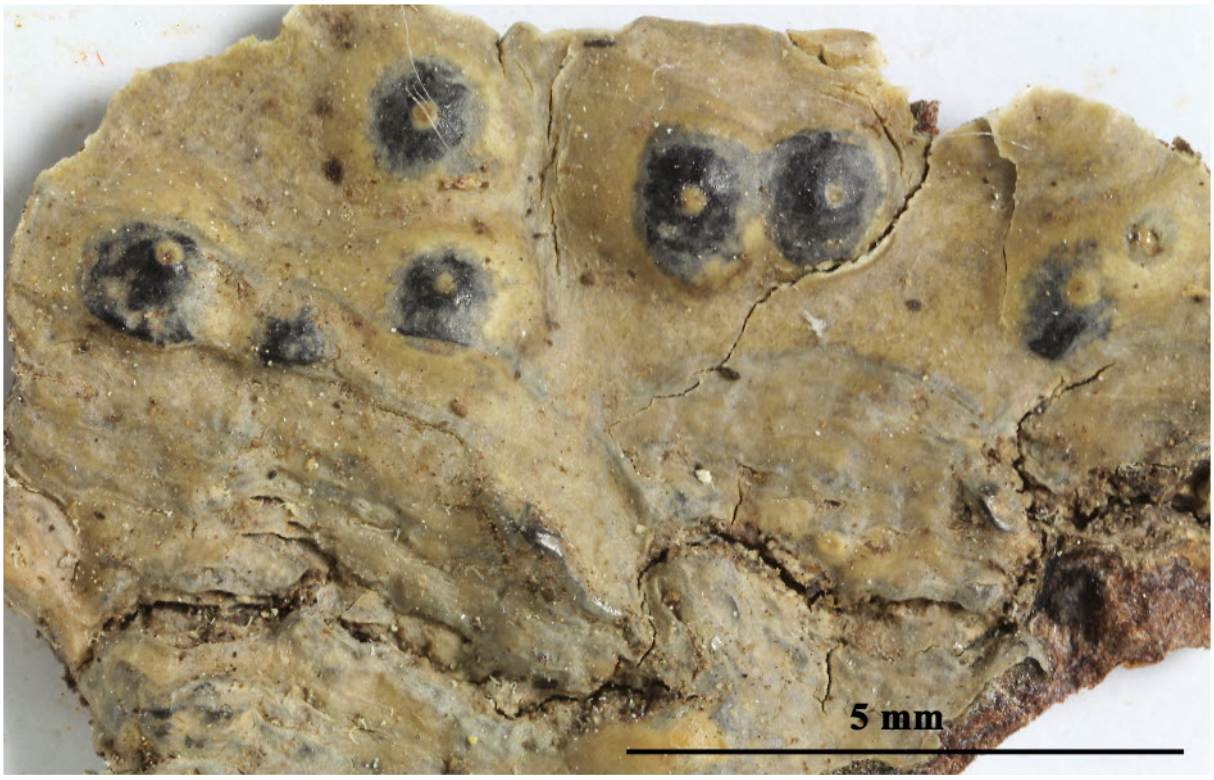
Pyrenula subvariolosa (C. Knight) Aptroot, Australas. Lichenol. 60: 40 (2007)

= *Anthracothecium subvariolosum* C. Knight, in J. Shirley, Lich. Fl. Queensland 4, 182 (1889)

= *Verrucaria subvariolosa* C. Knight, in F.M. Bailey, Syn. Queensland Fl., Suppl. 1, 78 (1886).

Thallus yellowish to olive green, lacking pseudocyphellae, corticate. Ascomata solitary, subglobose, immersed to erumpent from the substratum, usually partly covered by the thallus, 0.4–0.7 mm diam. Ascomatal wall without crystals, to 200 µm thick; ostiole apical, plane. Hamathecium not inspersed with oil droplets. IKI-. Ascospores 8/ascus, irregularly biseriate, submuriform, with c. 5 traverse septa, the end locules simple, with only a few medial locules longitudinally septate, fusiform, with pointed ends, grey to brown, 34–72 × 15–33 µm, lumina angular. Chemistry: No substances detected.

[Haf16261], Australia, Queensland, Cunninghams Gap National Park, lowe slopes of Mt. Cordeaux exposed to the south, subtropical rainforest, 800 m, 28°02’ S, 152°23’ E. Leg. J. Hafellner (no 16261) & R. Rogers, 17.9.1986, det. A. Aptroot, 2007.





Pyrenula subvariolosa



Pyrenula subvariolosa

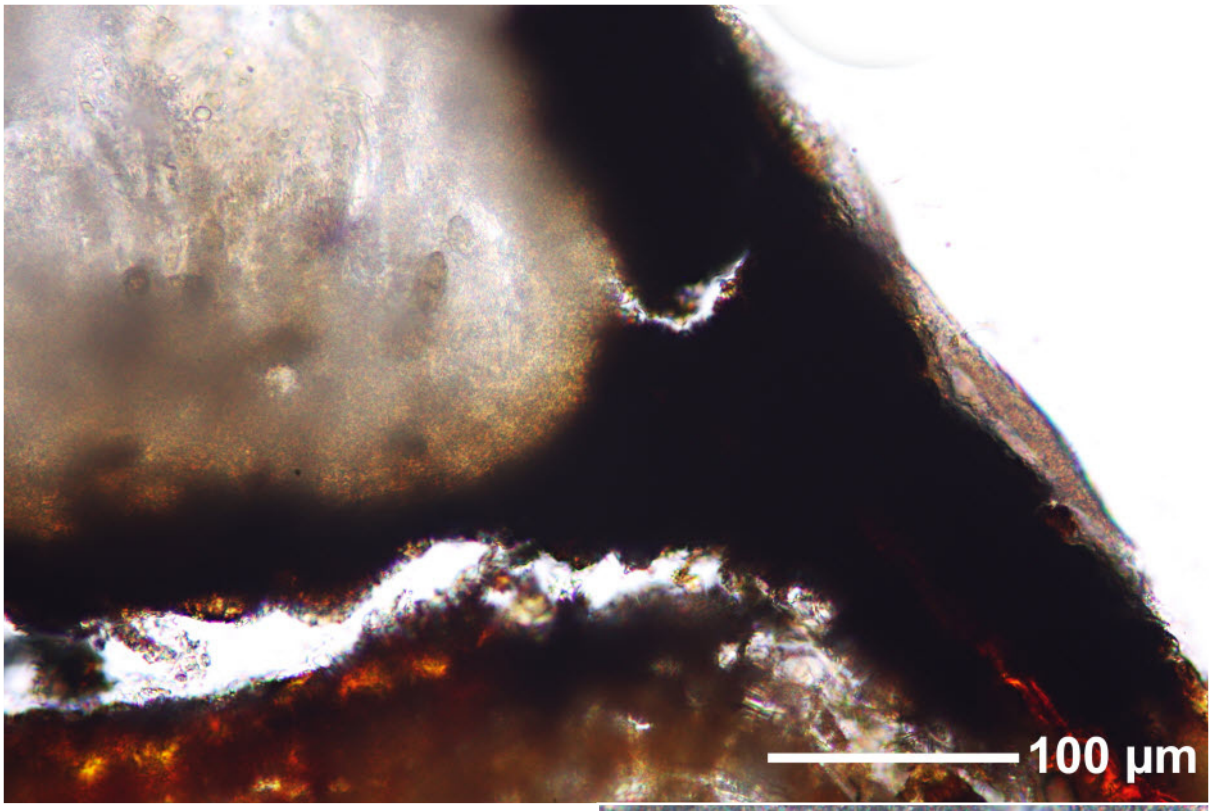
Pyrenula supracongruens Aptroot & Schumm, in Schumm & Aptroot, Seychelles Lichen Guide (Wangen): 288 (2010)

Thallus greenish brown, smooth, corticate, very thin, UV-negative. Ascomata conical, black, exposed, c. 0.5–1.2 mm diam. Excipulum carbonized throughout, c. 30 µm thick; involucrellum up to ca. 250 µm laterally extending beyond the ascomata. Hamathecium heavily inspersed. Ascospores 30–35 × 11–13 µm, 3-septate, brown, fusiform, pointed, lumina rounded, end lumina bulging out into the spore tips, but still separated by a thick endospore layer from the wall.

[14636], Seychelles, Mahe, Morne Blanc (rechts der Straße von Victoria nach Port Glaud), 4°39.593' S, 55°26.248' E, 480 m, auf Cinnamomum verum. Leg. F. Schumm & J.-P. Frahm, 09.10.2008, det. A. Aptroot, 2008. HOLOTYPE.







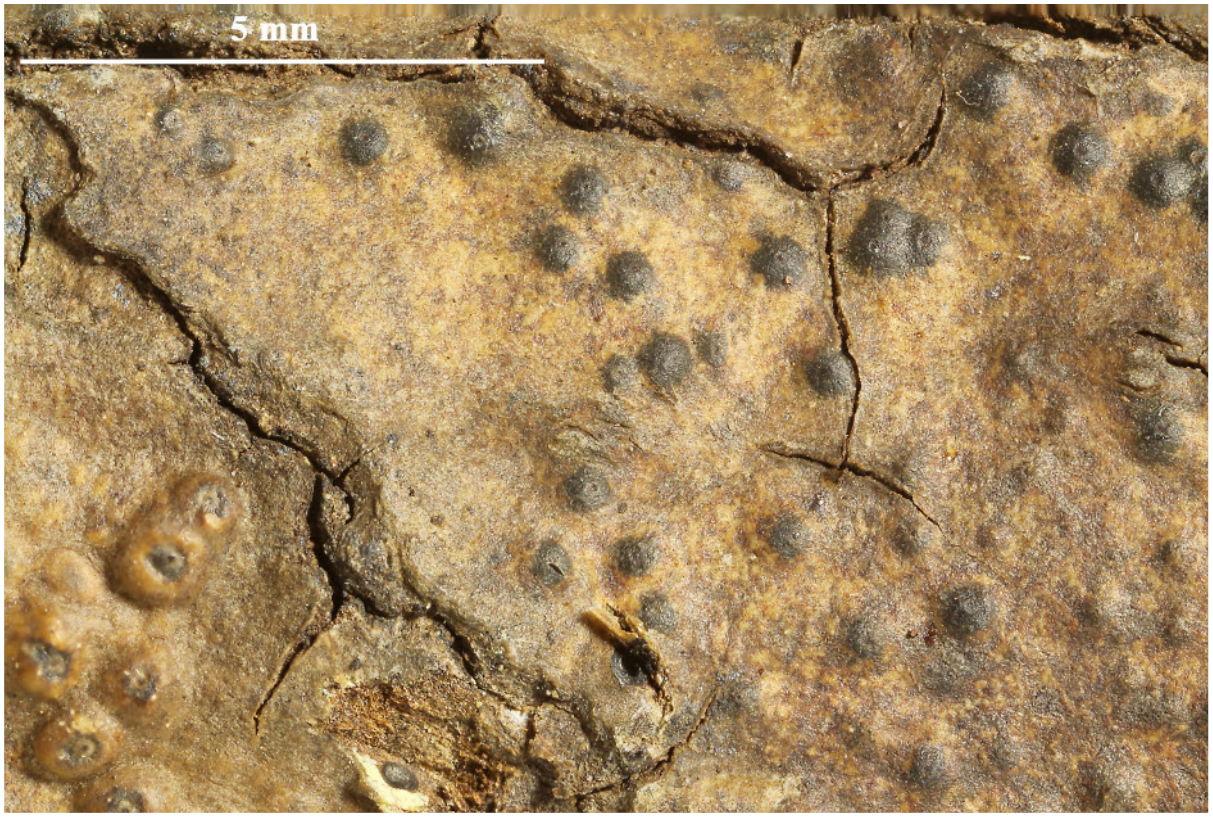


Pyrenula supracongruens

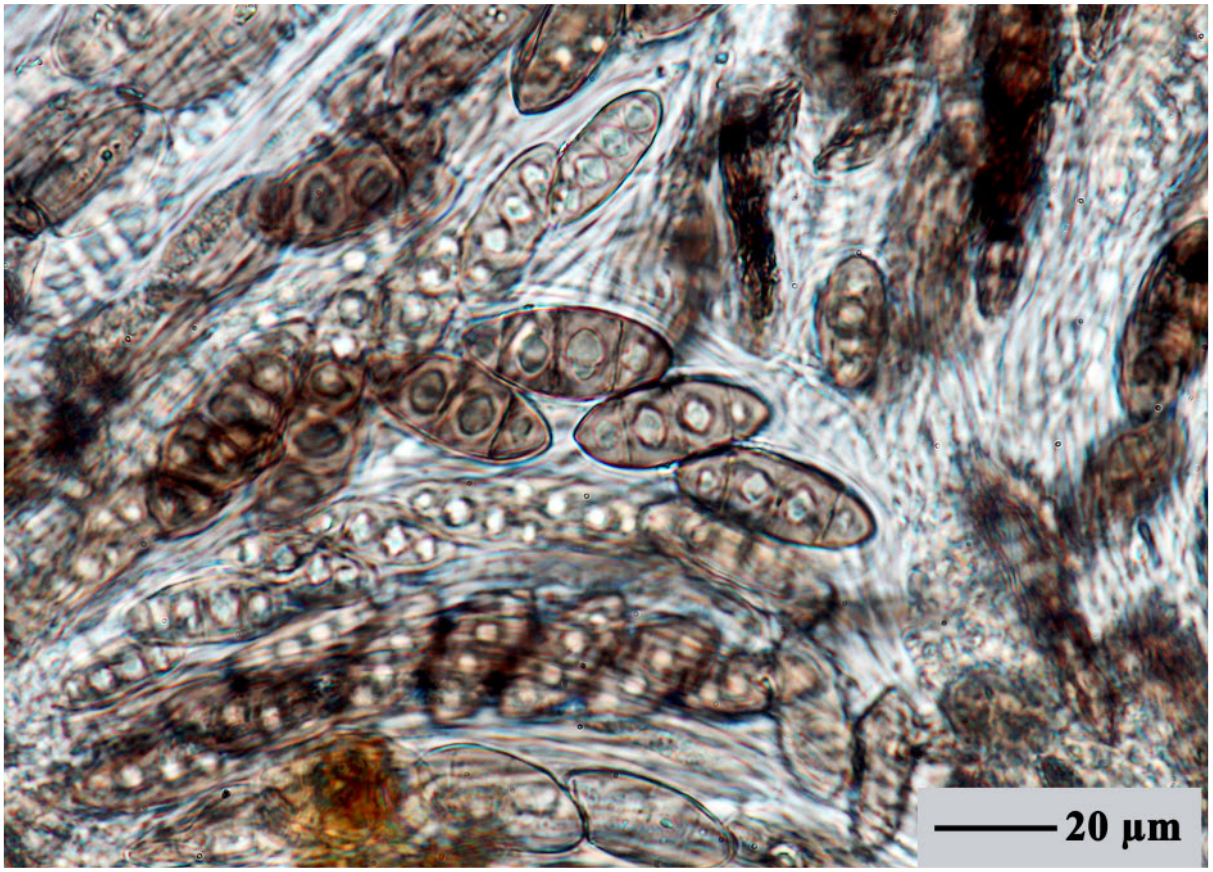
Pyrenula supralaetior C.O. Mendonça, Aptroot & M. Cáceres, Phytotaxa 286(3): 174 (2016)

Thallus thin, yellowish brown, a bit mottled, without red pruina, corticated, shiny, with pseudocyphellae, without prothallus. Algae trentepohlioid. Ascomata erumpent to prominent, subglobose to conical with rounded tip, 0.4–0.6 mm diam, simple, not covered by thallus, without red pruina. Ostioles apical, flat to slightly depressed, black, without pruina in the canal ostiolar. Hamathecium inspersed with oil droplets. Asci with 8 uniseriate ascospores. Ascospores brown, not curved, 3-septate, 25–31 × 11–13 µm, lumina rounded to diamond-shape, distoseptate, terminal lumina not directly against the outer wall, without gelatinous sheath, upper and lower end rounded, without ornamentation. Pycnidia not observed. Chemistry: Thallus KOH–, UV–; TLC: nil.

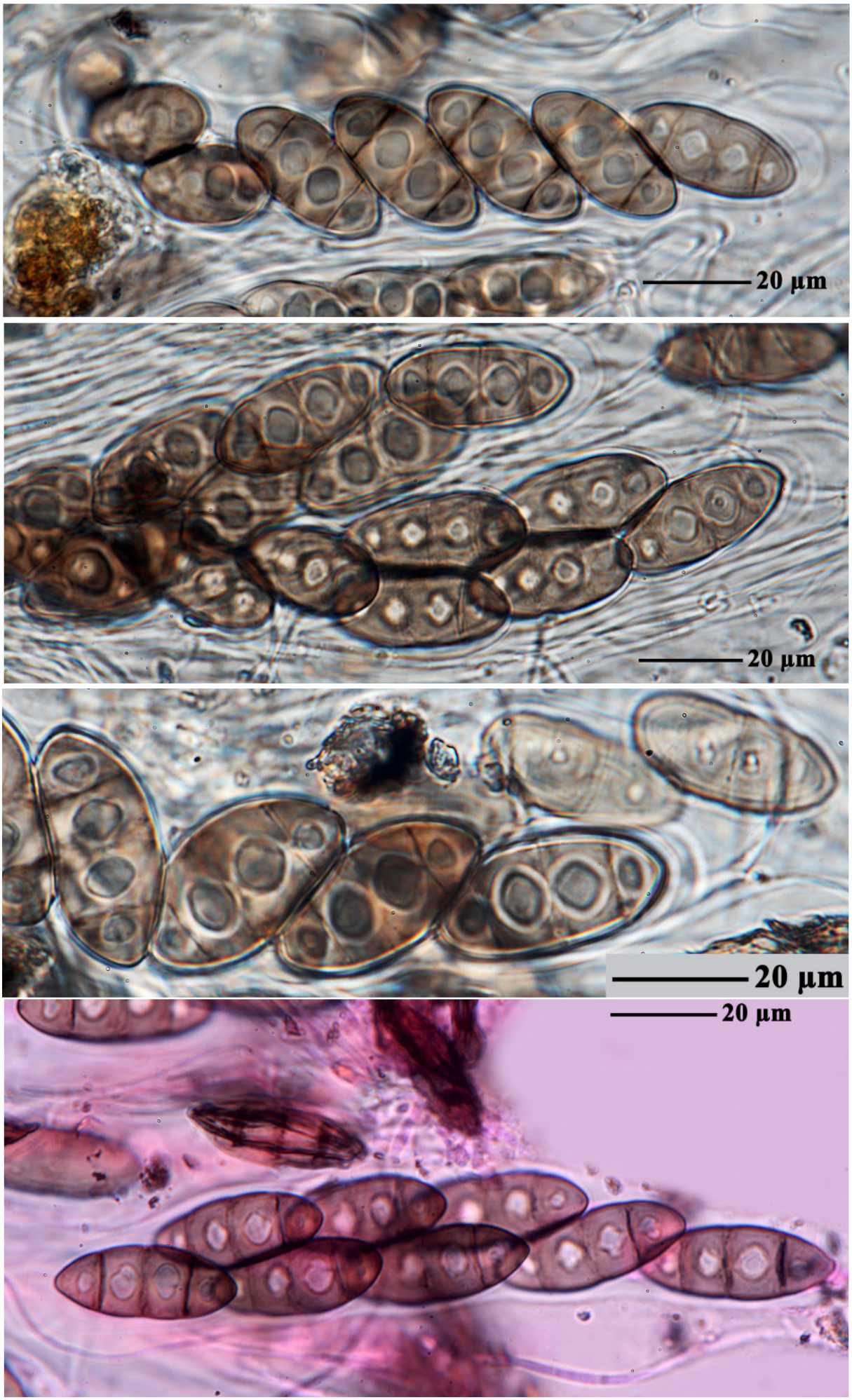
[ISE23836]**,** Brazil, Bahia, Mata dos Coqueiros, Abaira, Chapada da Diamantina, 13°16’ S, 41°44’ W, 1000 m. Leg. C. Mendonca (23836), 11.1.2015, det. A. Aptroot, 2015. ISOTYPE.







Pyrenula supralaetior



Pyrenula supralaetior

Pyrenula tenuisepta R.C. Harris, Mem. N. Y. bot. Gdn 49: 101 (1989)

Thallus corticate, not pseudocyphellate, Ascomata flattened conical to subglobose, 0.5–0.7 mm diam., often immersed with only the flattened top showing, crystals lacking. Hamathecioum not inspersed, hymenial gel IKI–. Ascospores uniseriate, yellow brown with very little endospore, septa and wall thin, 14–17 × 5–7 µm. Pyrenula tenuisepta is unique among the knpwn species in its sore type with very little endospore. Chemistry: Thallus UV–.

[Knight61800], New Zealand, Otaga, Tuapeka West, Knights Bush, 45°54'-51' N, 169°29'-31' W, 78 m. On Coprosma linariifola in mixed podocarp/broadleaf/ Kunzea ericoides forest on N-facing slope above stream. Leg. A. Knight (no 61800), 1.10.2011, det. A. Aptroot.

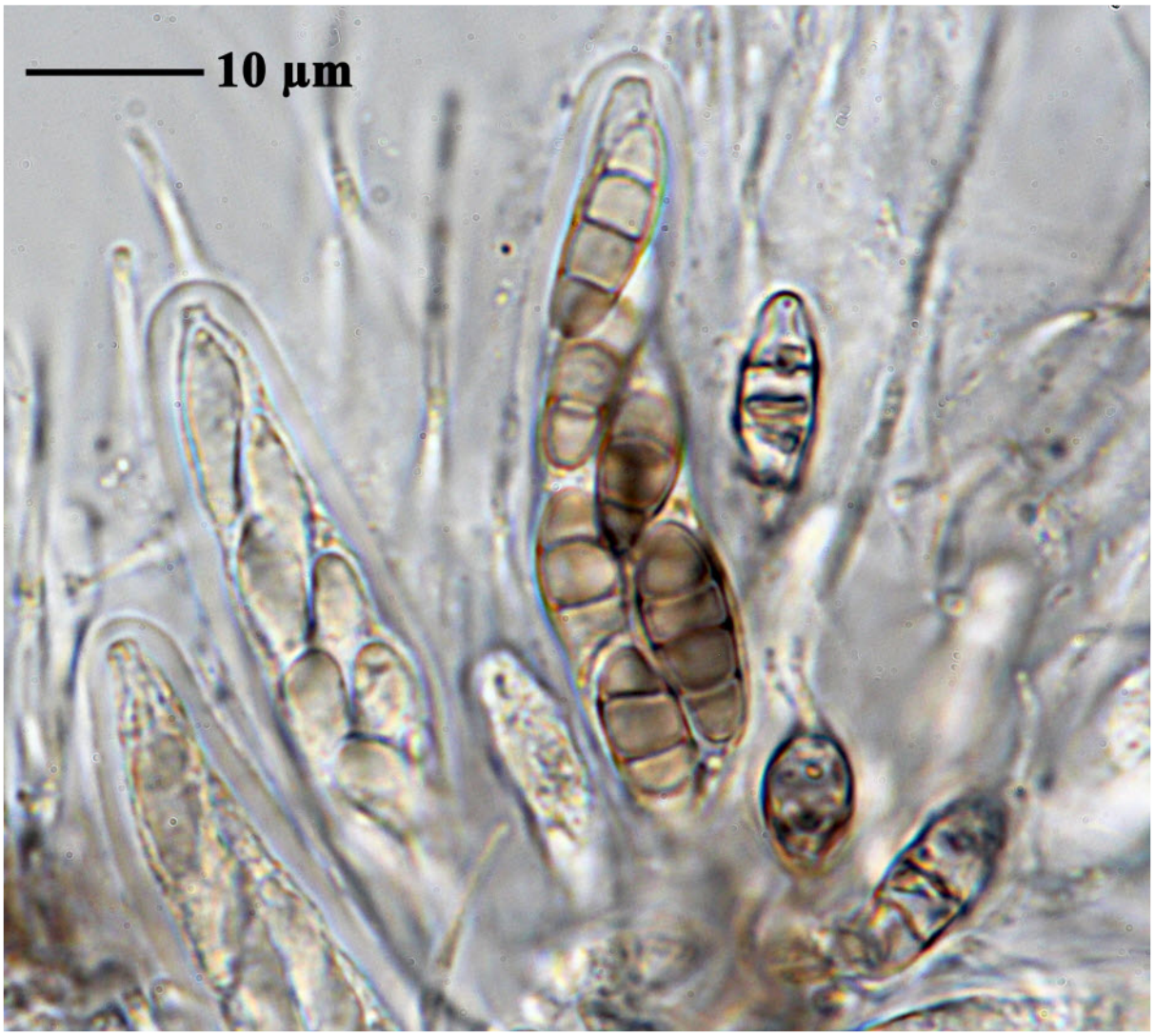




Pyrenula tenuisepta

1853





Pyrenula tenuisepta

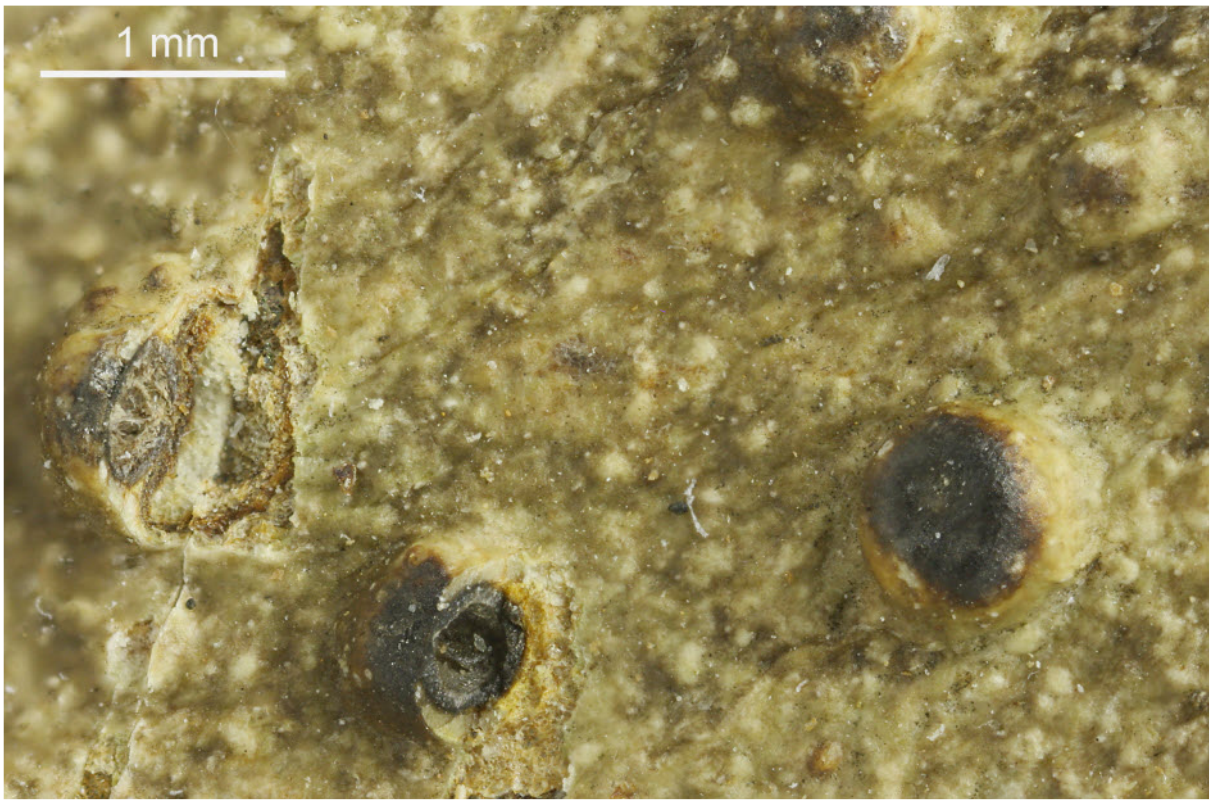


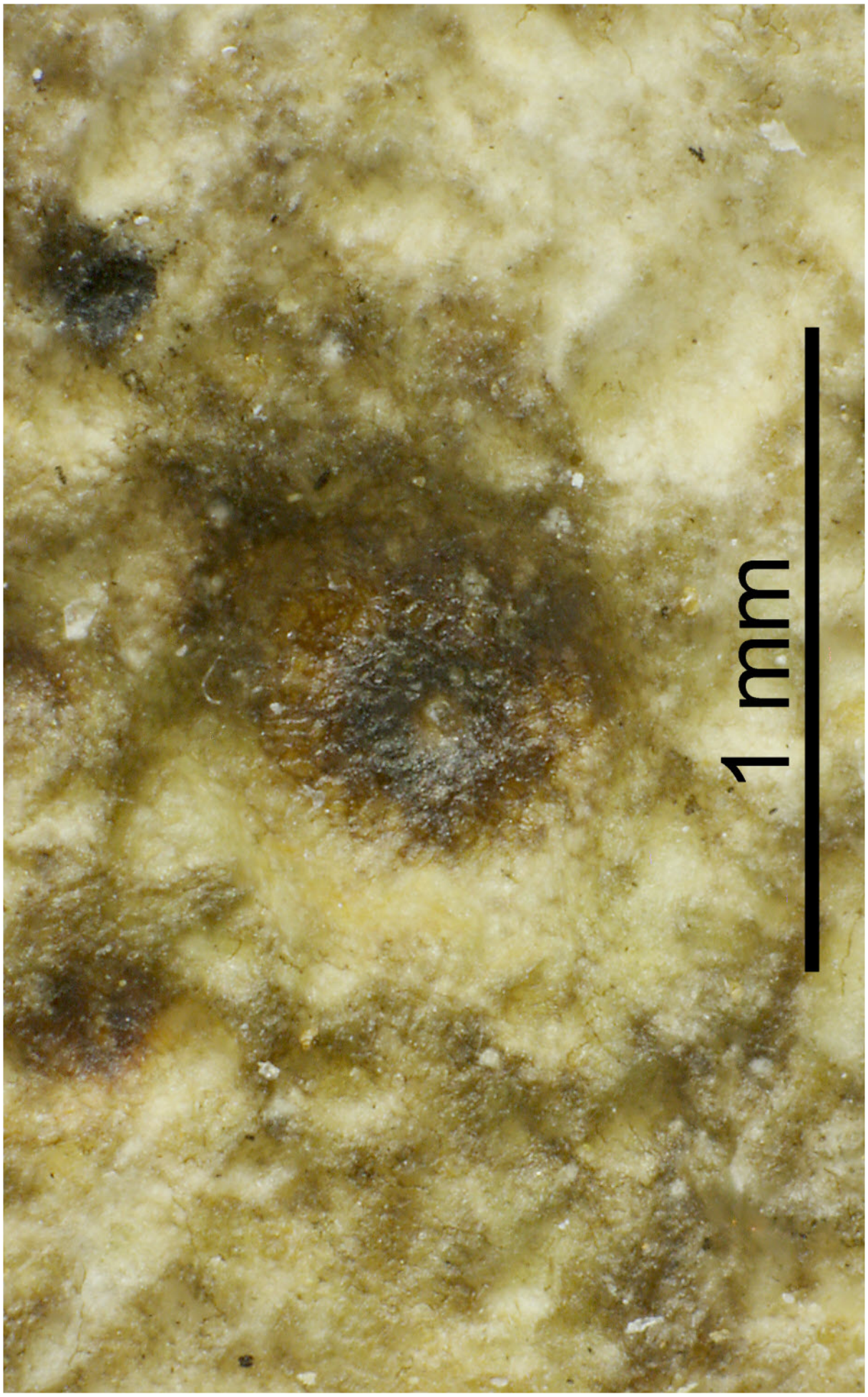
Pyrenula tenuisepta

Pyrenula thailandica Aptroot, Lichenologist 44(5): 617 (2012)

Thallus corticate, smooth, continuous, rather thick, brownish, generally with rather sparse, pale dots formed by pockets of crystals; algae trentepohlioid. Ascomata perithecioid, simple, dispersed, globose, immersed to emergent, 0.6–1.1 mm diam., black, largely covered with thallus. Wall more or less equally carbonized, with crystals, KOH-, c. 75 µm thick, thinner below. Ostioles brown, KOH-, apical. Hamathecium hyaline, not inspersed with oil droplets. Asci cylindrico-clavate, IKI-, with 8 irregularly arranged ascospores. Ascospores brown, IKI-, 3-septate, fusiform, without or with slight constrictions, (30–)35–51 × (10–)14–20 µm, ends rounded, lumina mostly quadrangular, angles blunt, terminal lumina separated from the end wall by an endospore layer; postmature ascospores with red oil inside. Pycnidia not observed. Chemistry: No substances detected.

[ABL-AH5718], Thailand, Province Chiang Mai. Site: Doi Suthep, transsect Wat Palad. Dry evergreen, on Xylia xylocarpa. 99°56’ E, 18°48’ N, 680 m. Leg. P. Wolseley & B. Aguirre-Hudson (no. 5718), 26.11.1991. ISOTYPE.

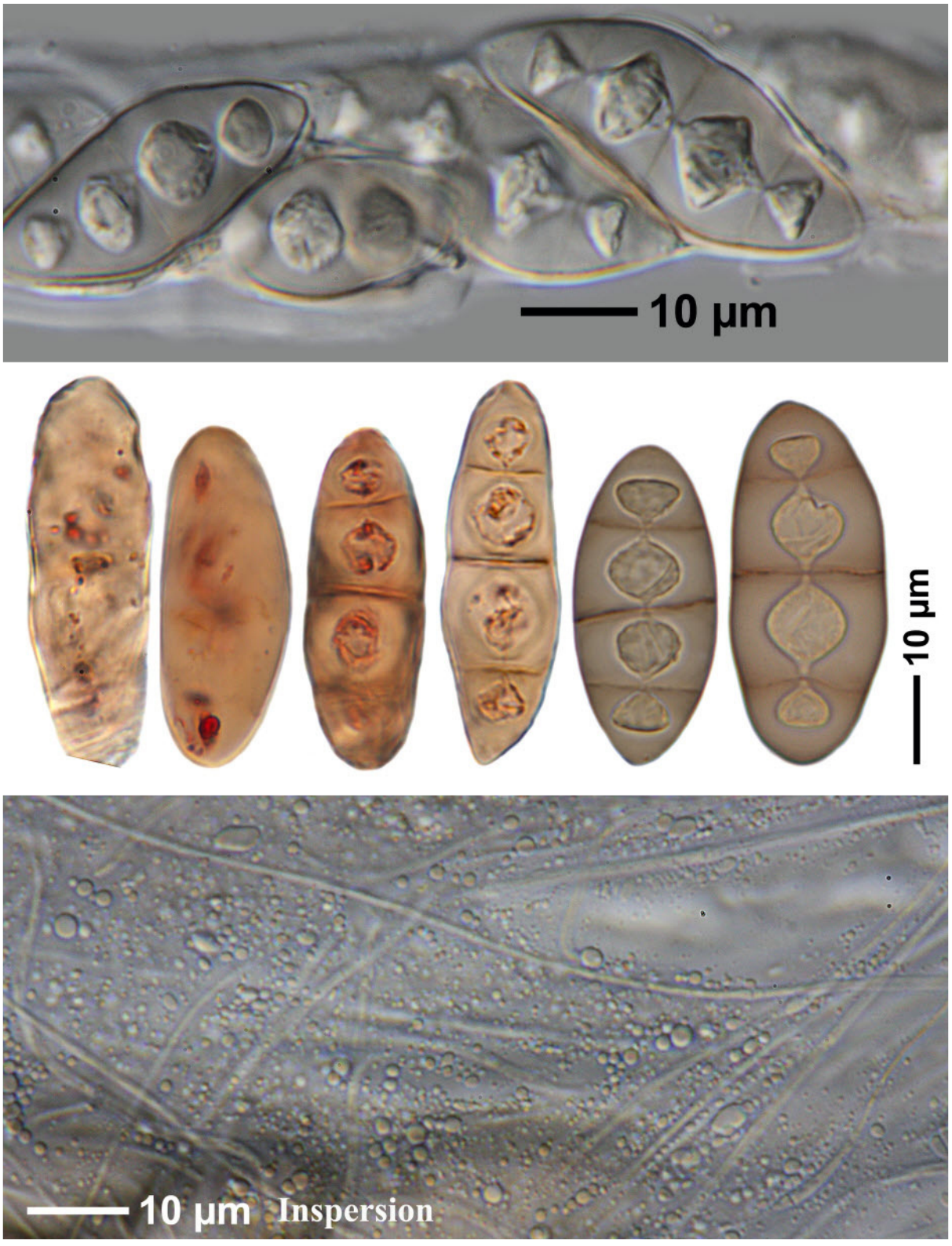




Pyrenula thailandica

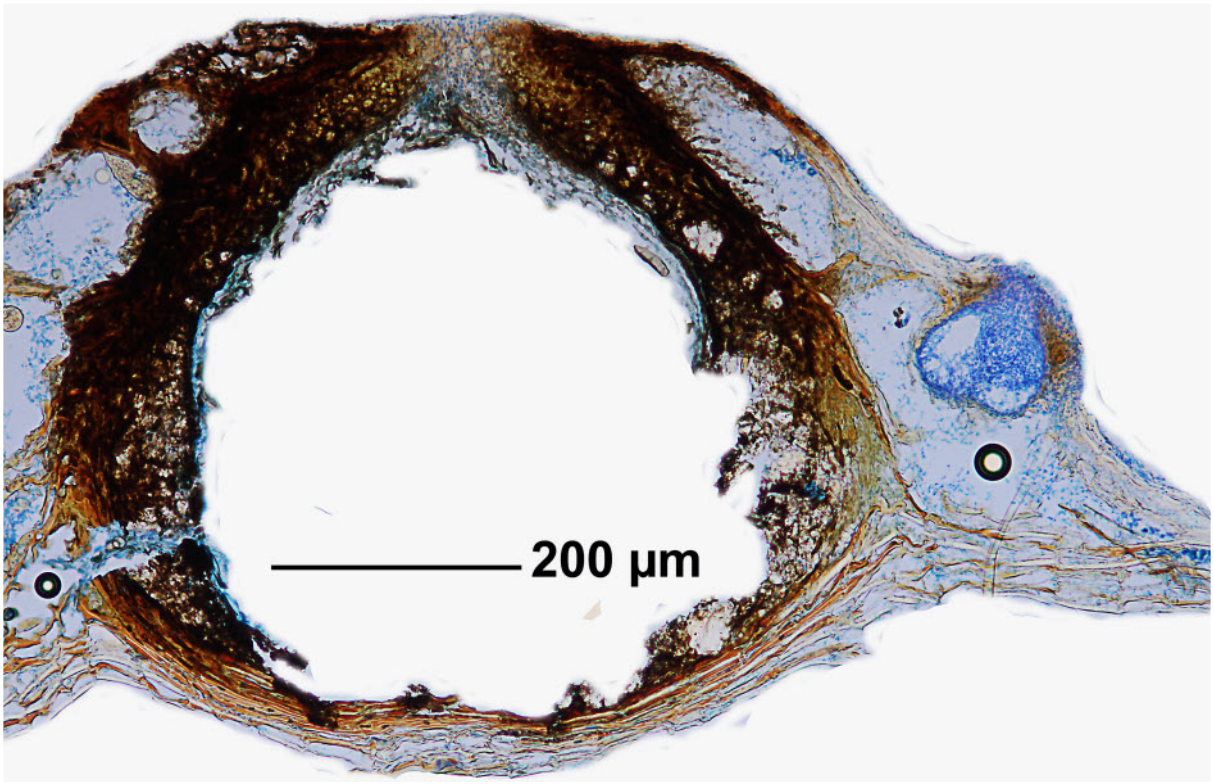


Pyrenula thailandica

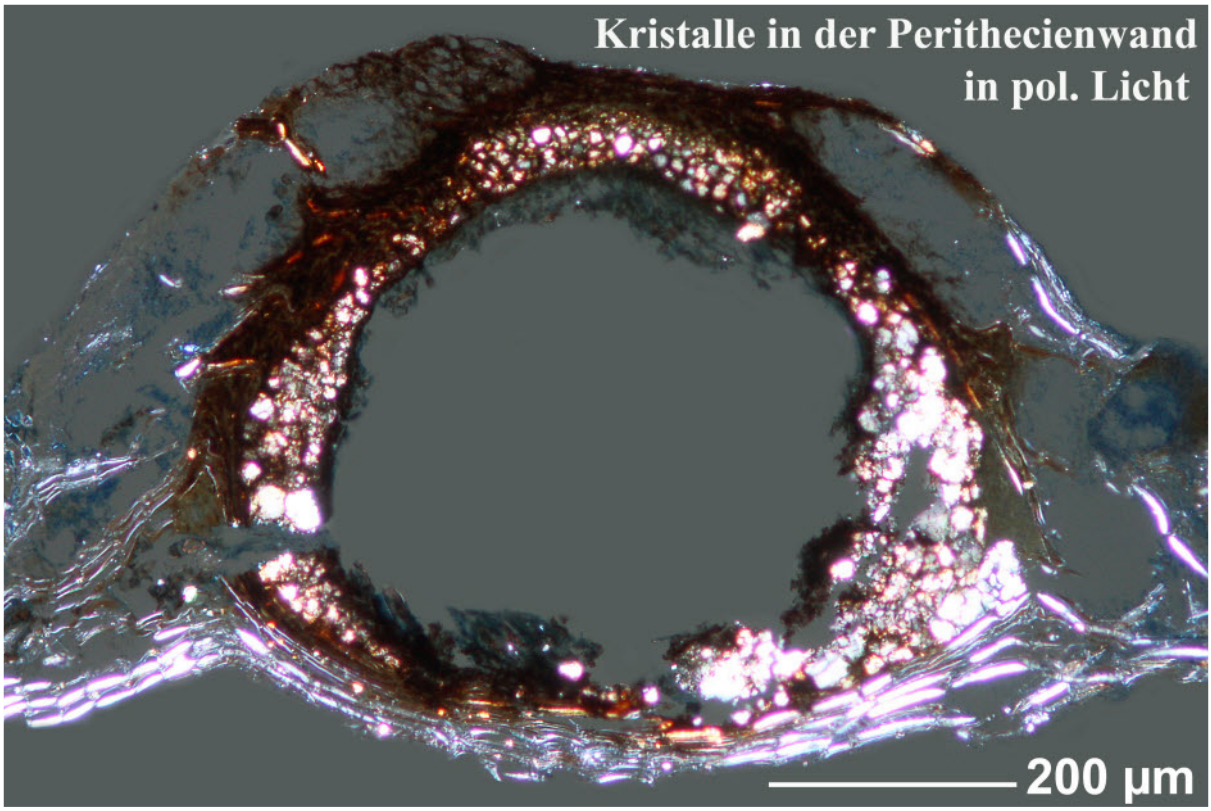


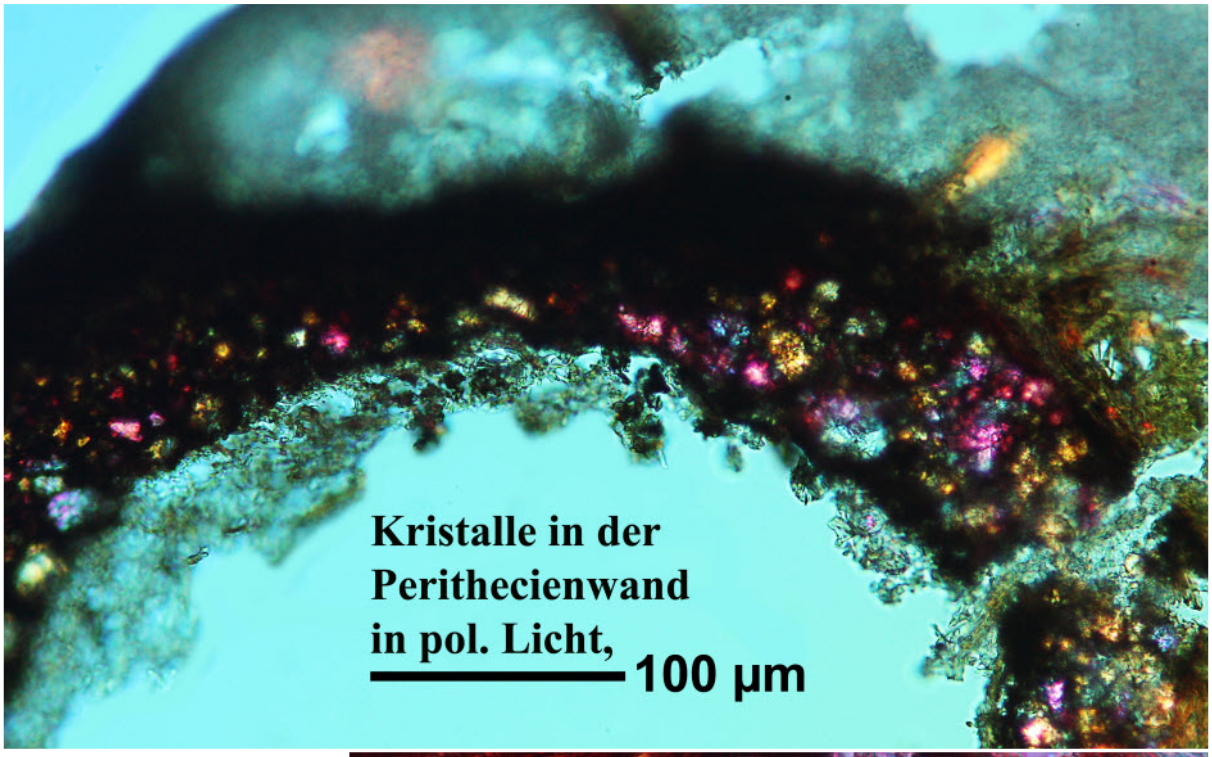
Pyrenula thailandica

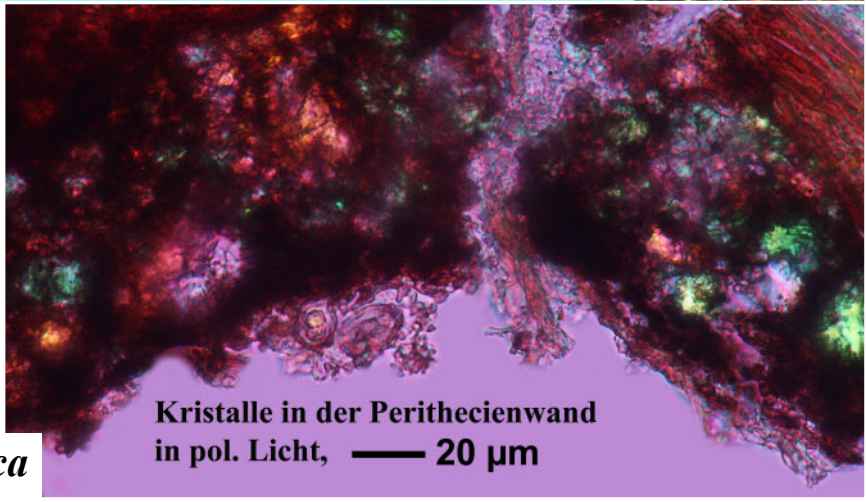




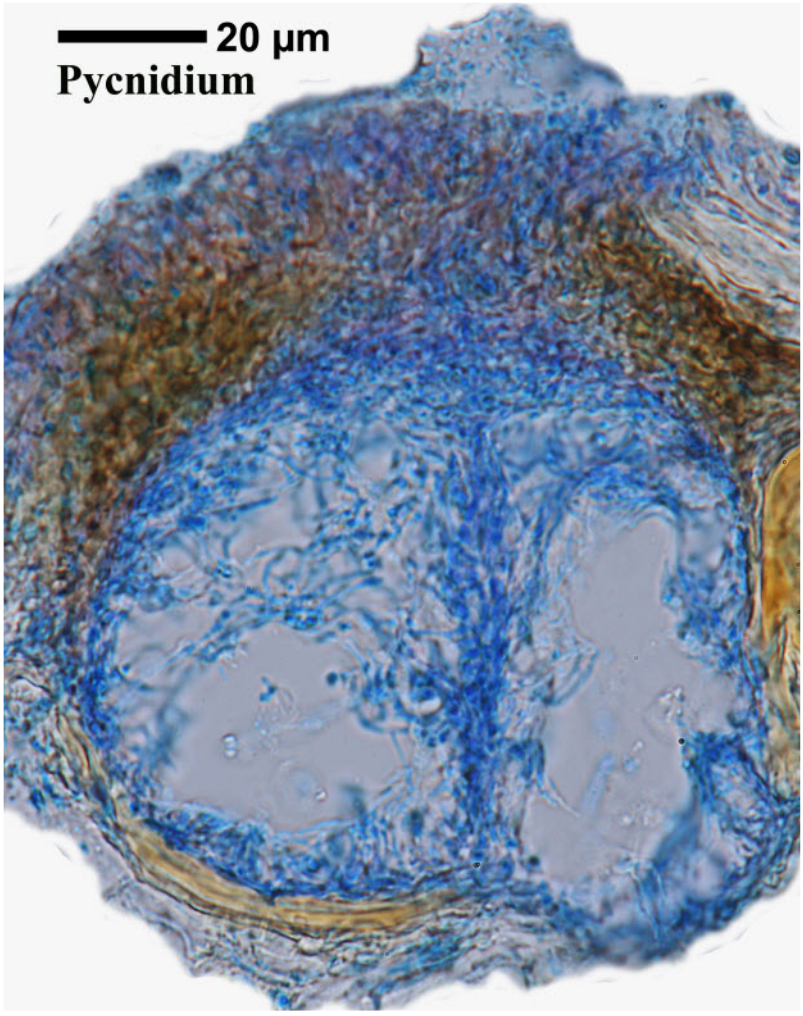
Pyrenula thailandica

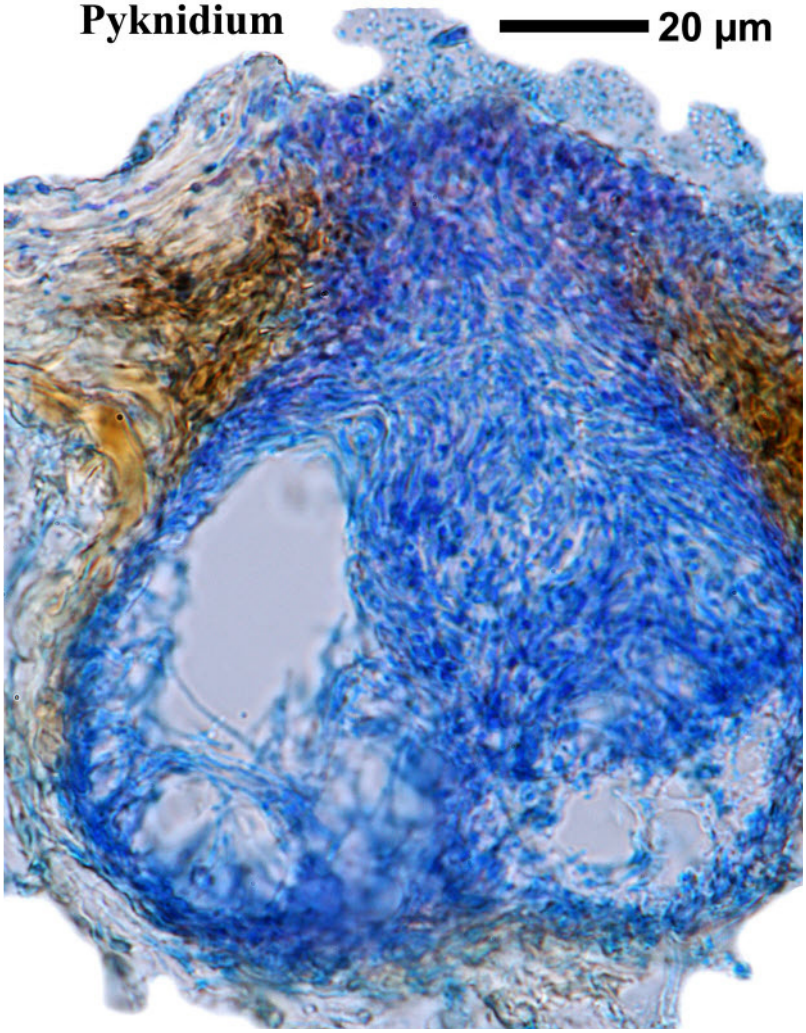






Pyrenula thailandica





Pyrenula thailandica

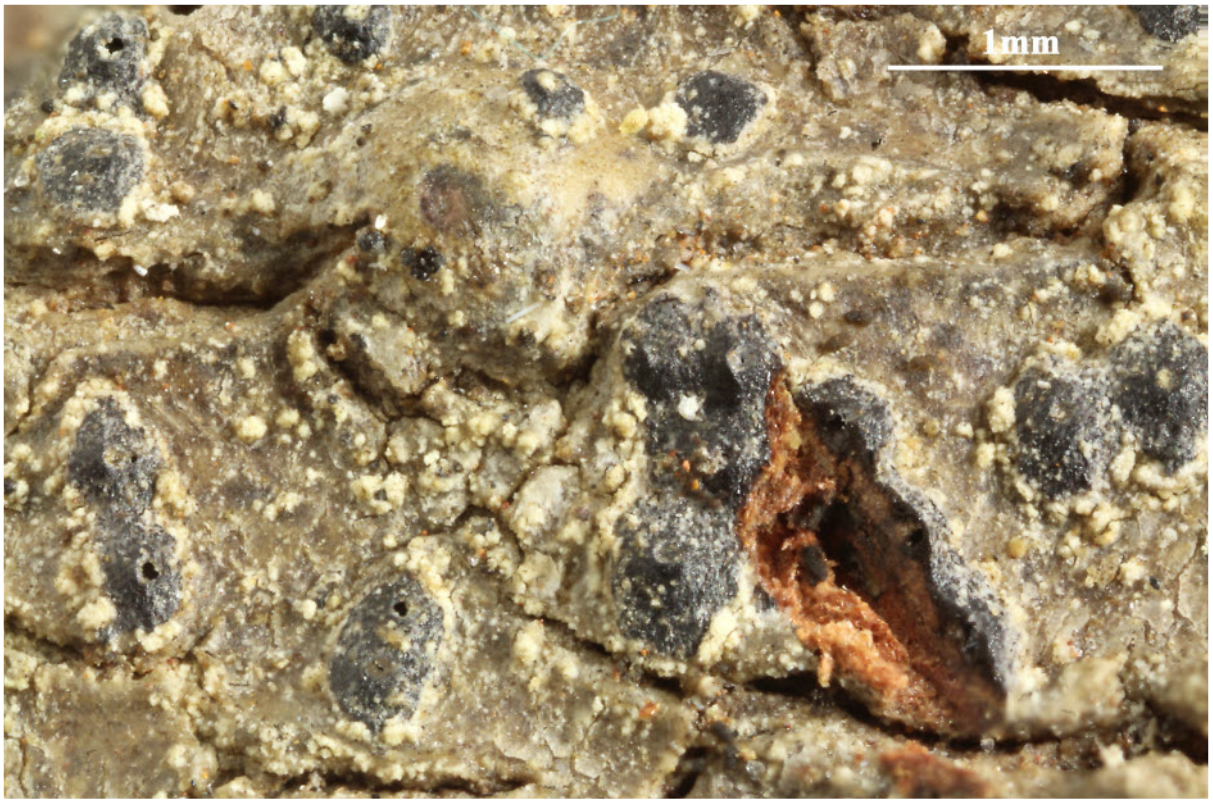
Pyrenula tristissima Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 345 (1921)

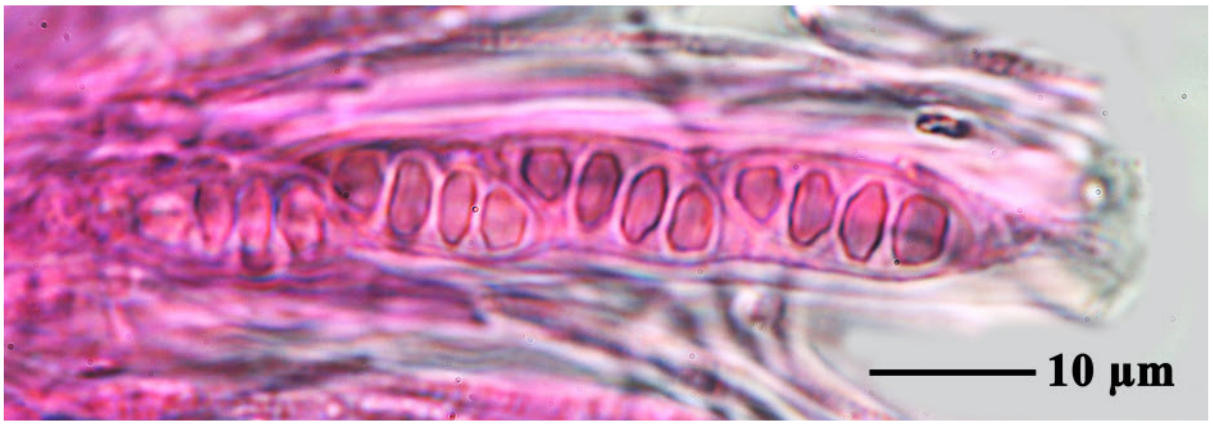
Ascomata depressed-hemispherical, immersed or slightly emersed to exposed, 0.5–0.7 mm diam.; ascospores 4-loculate, 19–20 × 11 µm, apical locules smaller, ellipsoid with rounded apices with apical verruc-ule.

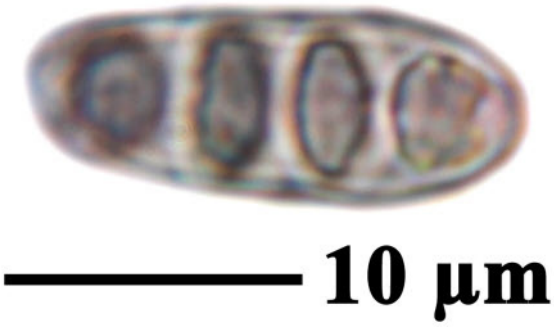
-

[ABL13508], Brazil, Sergipe, Parque Nacional Serra da Itabaiana, on bark in transitional forest. 400 m, 10°44’35’’ S, 37°20’25’’ W. Leg. M. Cáceres & A. Aptroot (no 13508), 6.9.2012, det. A. Aptroot, 2012.

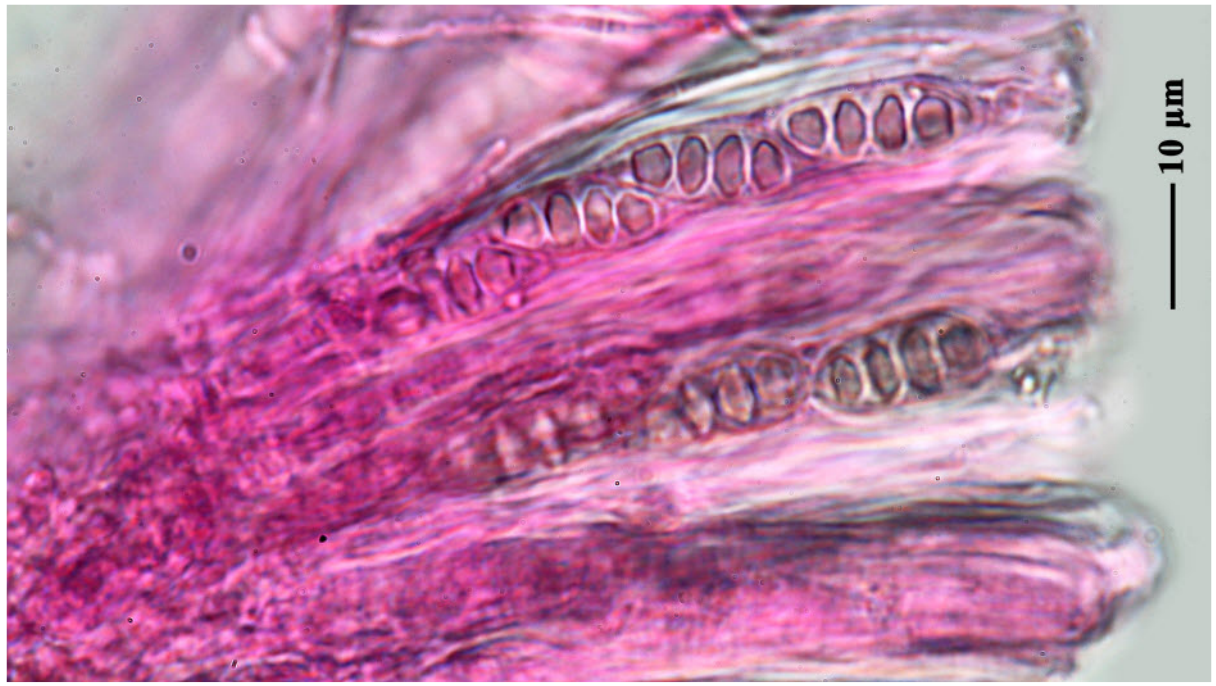








Pyrenula tristissima





Pyrenula tristissima

Pyrenula vernicosa (Kremp.) Müll. Arg., Flora, Regensburg 72: 68 (1889)
= *Verrucaria vernicosa* Kremp., Flora Regensburg 61: 522 (1878)

Thallus corticate, pale olive-green, without pseudocyphellae. Ascomata simple, initially globose, immersed, later conical and emergent, c. 0.7–0.9 mm diam. Ostiole apical. Hamathecium not inspersed. Ascospores 4-loculate, 28–40 × 13–18 ìm, fusiform-ellipsoidal, apical locules direct against the outer cell wall, much smaller then mediane locules. Chemistry: Thallus UV–.

[Hill8579], Solomon Islands, New Georgia Group, Marovo Lagoon, Matui island, West end, 0 m, trees along beach. Leg. D.J. Hill (no 8579), 6.8.1965, det. A. Aptroot, 2013.







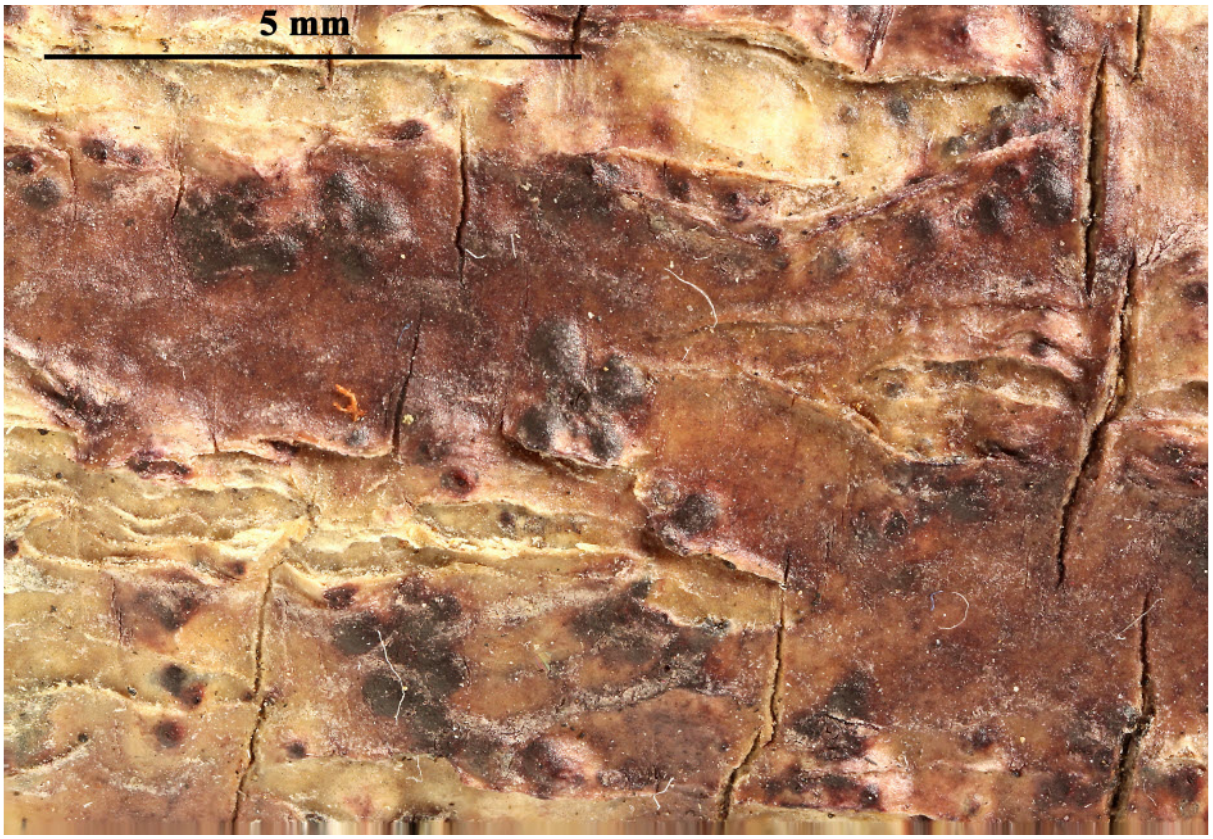
Pyrenula vernicosa

1867

Pyrenula violaceastroidea C.O. Mendonça, Aptroot & M. Cáceres, Phytotaxa 286(3): 174 (2016)

Thallus thin, partly pale brown, but mostly wine red to purplish streaked, corticated, shiny, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata immersed to erumpent, 0.3–0.5 mm diam., pyriform, aggregated by 3–6 perithecia with a shared ostiole but without joint walls (parmentarioid), mostly covered by a thin layer of thallus. Ostiole lateral, black with red pruina that extends over part of the ascomata and parts of the thallus. Hamathecium not inspersed. Asci with 8 uniseriate ascospores. Ascospores brown, not curved, 3-septate, 16–21 × 6–7 µm, somewhat clavate, lumina rounded to diamond-shaped, distoseptate, terminal lumina not directly against the outer wall, upper and lower end rounded, without ornamentation. Pycnidia not observed. Chemistry: pigment KOH+ purple, UV–, TLC: unidentified anthraquinone.

[Mendonca], Brazil, Paraíba, Reserva Biológica Guaribas, Mamanguape, 06°44’32” S, 35°08’26” W, 207 m, in primary Restinga forest, on tree bark. Leg. C. Mendonça (no 56), 30 05.2015, det. A. Aptroot, 2015. ISOTYPE.







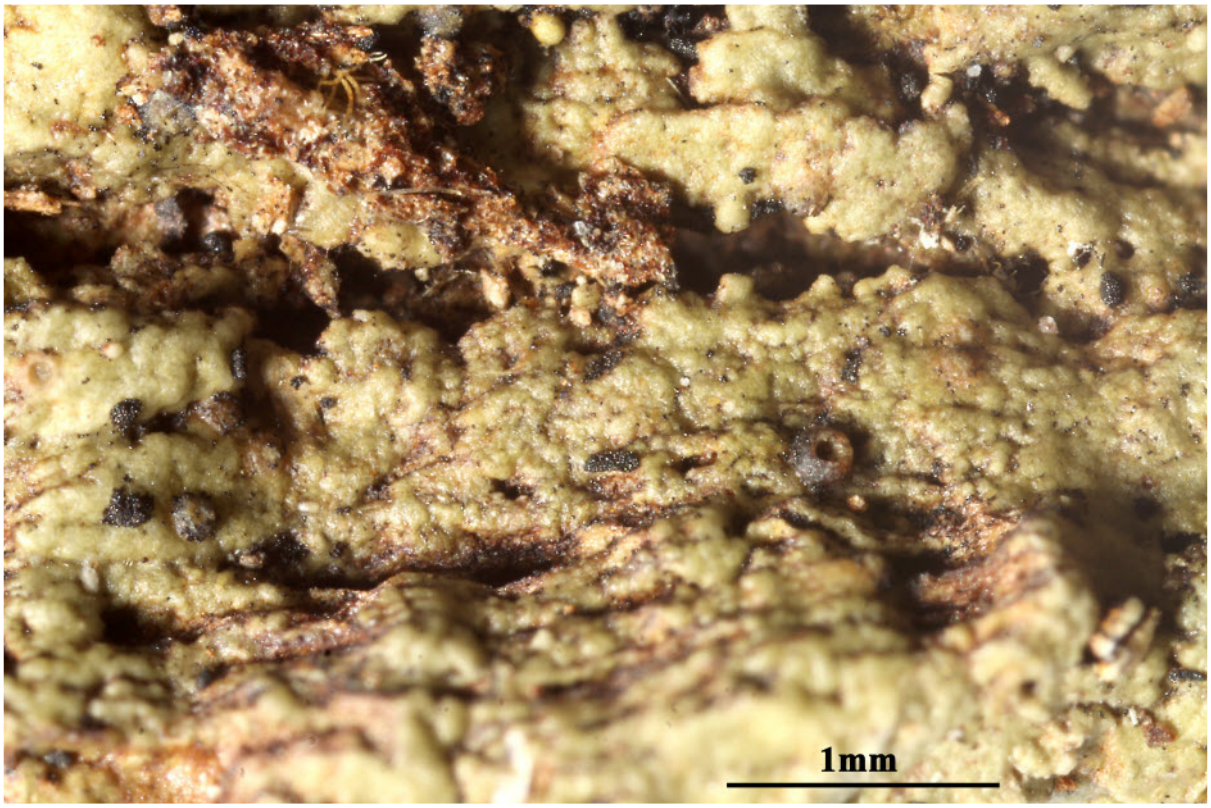


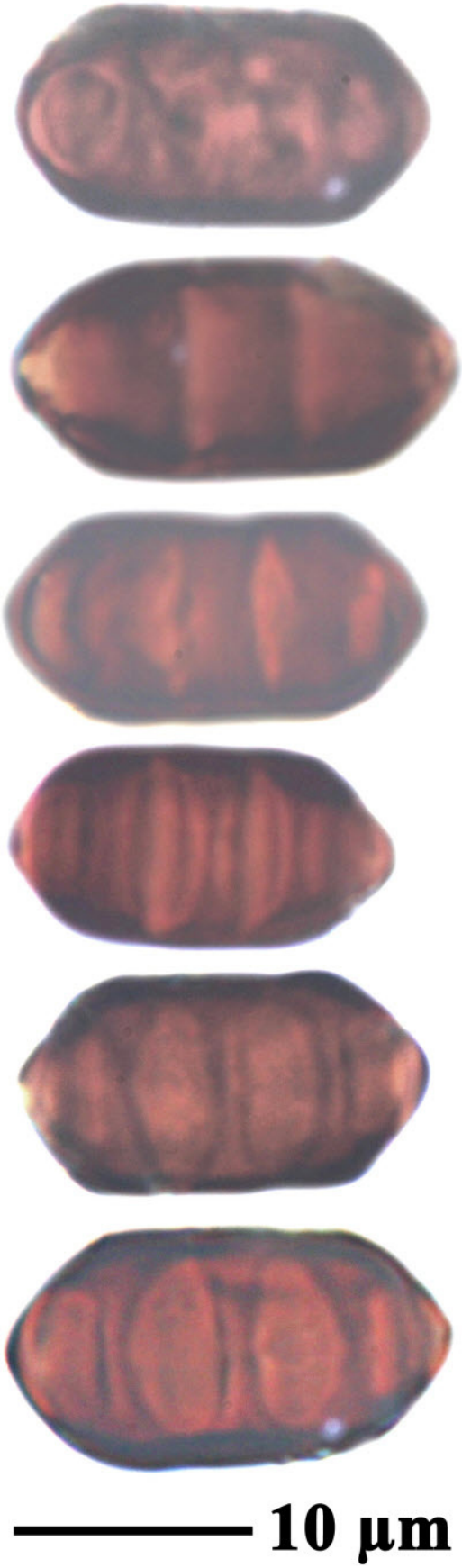
Pyrenula violaceastroi-

Pyrenula viridipyrgilla Aptroot & M. Cáceres, Lichenologist 45(2): 195 (2013)

Thallus thin, olive-green, smooth, glossy, widely spreading, without pseudocyphellae, without prothallus. Ascomata deeply immersed in the bark, pyriform, 0.4–0.7 mm diam., solitary. Ostiole eccentric, pale yellowish, waxy, hemispherical with a depression in the centre, c. 0.2 mm diam. Hamathecium not inspersed. Ascospores 8/ascus, irregularly biseriate, 3-septate, 19–22 × 9.0–10.5 µm, dark brown, constricted at the central septum, ends rounded, lumina much wider than long, without endospore in the spore tips, with dark bands of granular eusep-tum material between lumina. Pycnidia not observed. Chemistry: No substances detected.

[ABL11864], Brazil, Amazonsa, Fazenda São Francisco off BR319, 30 km N of Porto Velho. 100 m, 8°24’33” S, 63°58’56” W. On trree bark in primary rain forest. Leg. M. Cáceres & A. Aptroot (no11864), 15.03.2012, det. A. Aptroot, 2012. ISOTYPE.



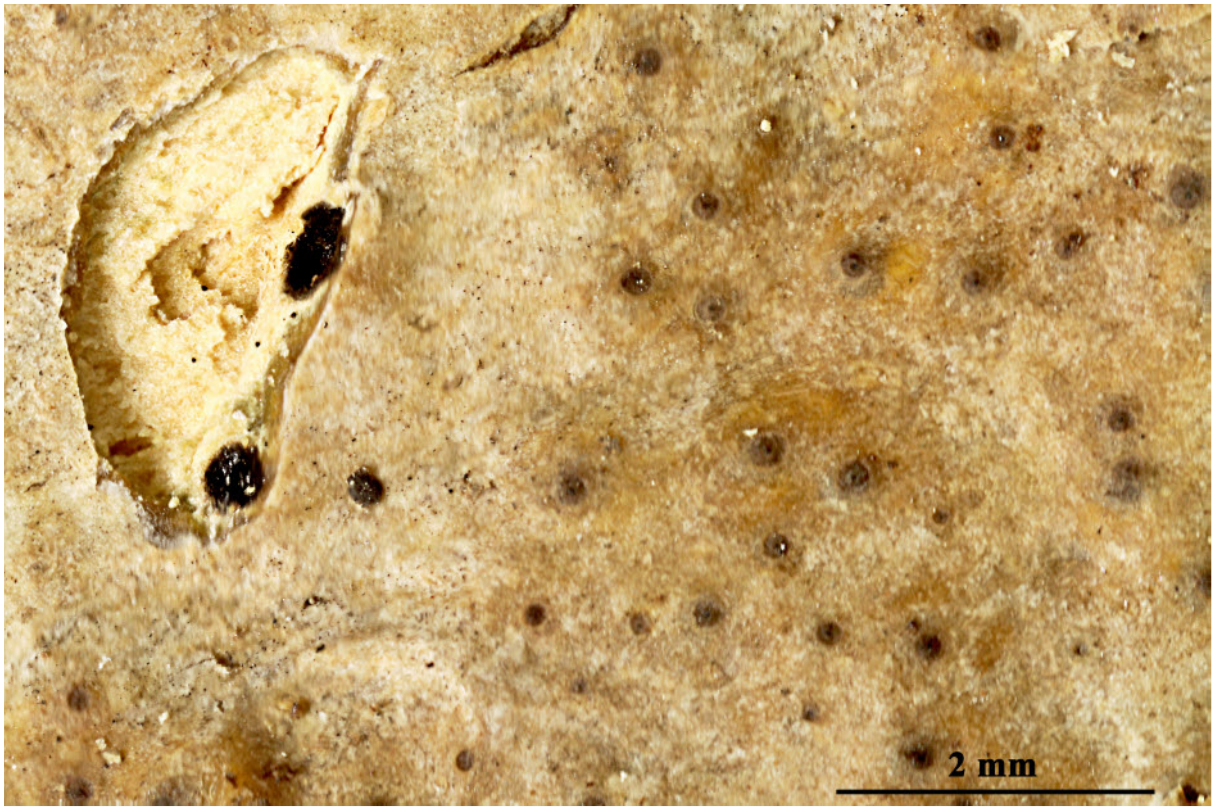


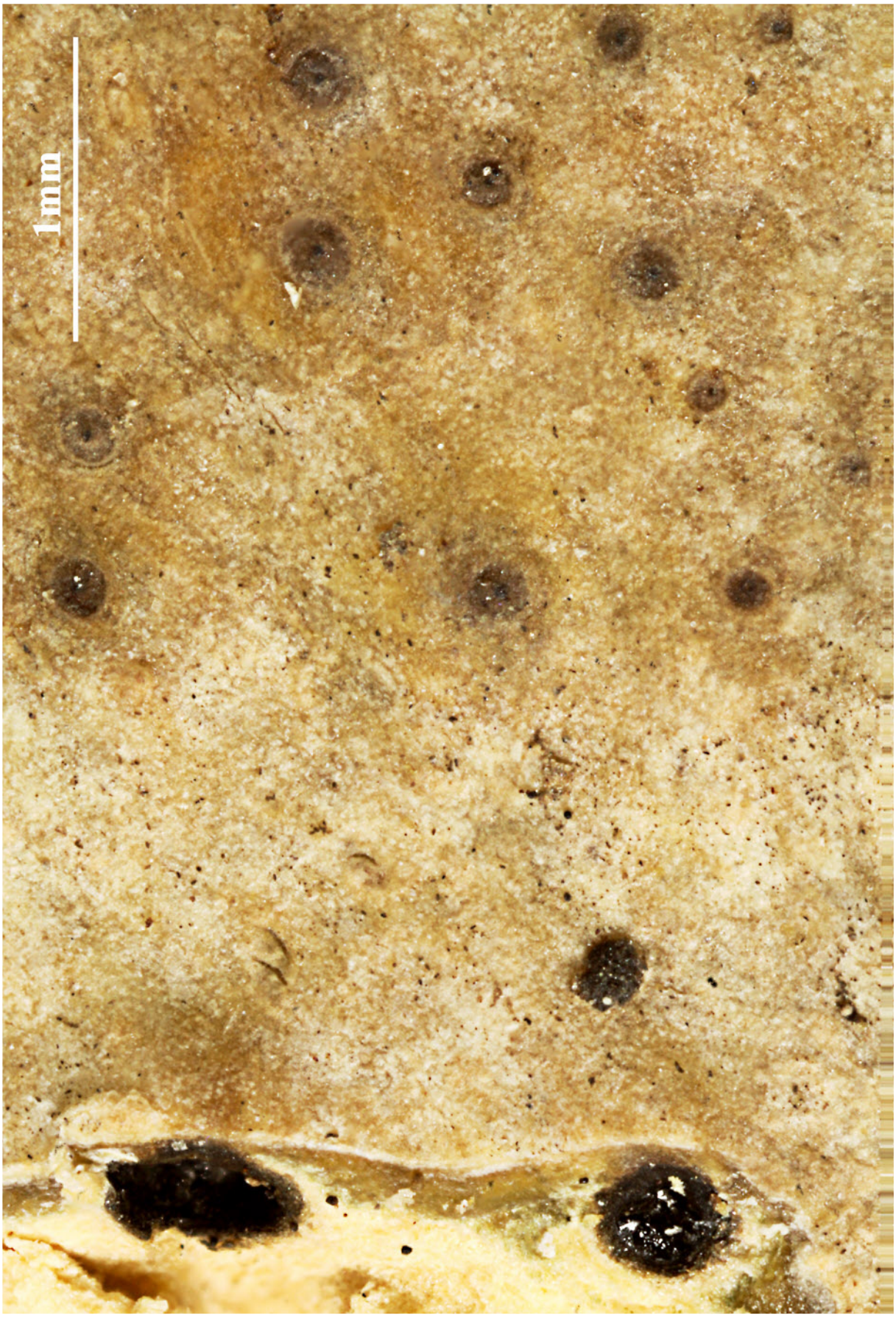
Pyrenula viridipyrgilla

Pyrenula welwitschii (Upreti & Ajay Singh) Aptroot, Lichenologist 36 (2012).
= *Anthracothecium welwitschii* Upreti & Ajay Singh, Feddes Repert. Spec. Nov. Regni. Veg. 99: 151 (1988).
= *Pyrenula himalayana* Utpreti, Nova Hedwigia 66: 568 (1998)

Thallus corticate, brownish to olive green, with pseudocyphellae, Perthecia solitary, subglobose, erumpent from the substratum, sides often partly covered by thallus, c. 0.4–0.8 mm diam. Perithecial wall with crystalls, up to 100 µm thick. Ostiole pale, apical. Hamathecium not inspersed, IKI+ orange, filaments unbranched. Ascospores 8/ascus, grey brown, irregularly biseriate, muriform with c. 8 rows of c. 8 loculi, fusiform with rouded ends, 25–35 × 10–16 µm, lumina rounded. Chemistry: No substancesd detected.

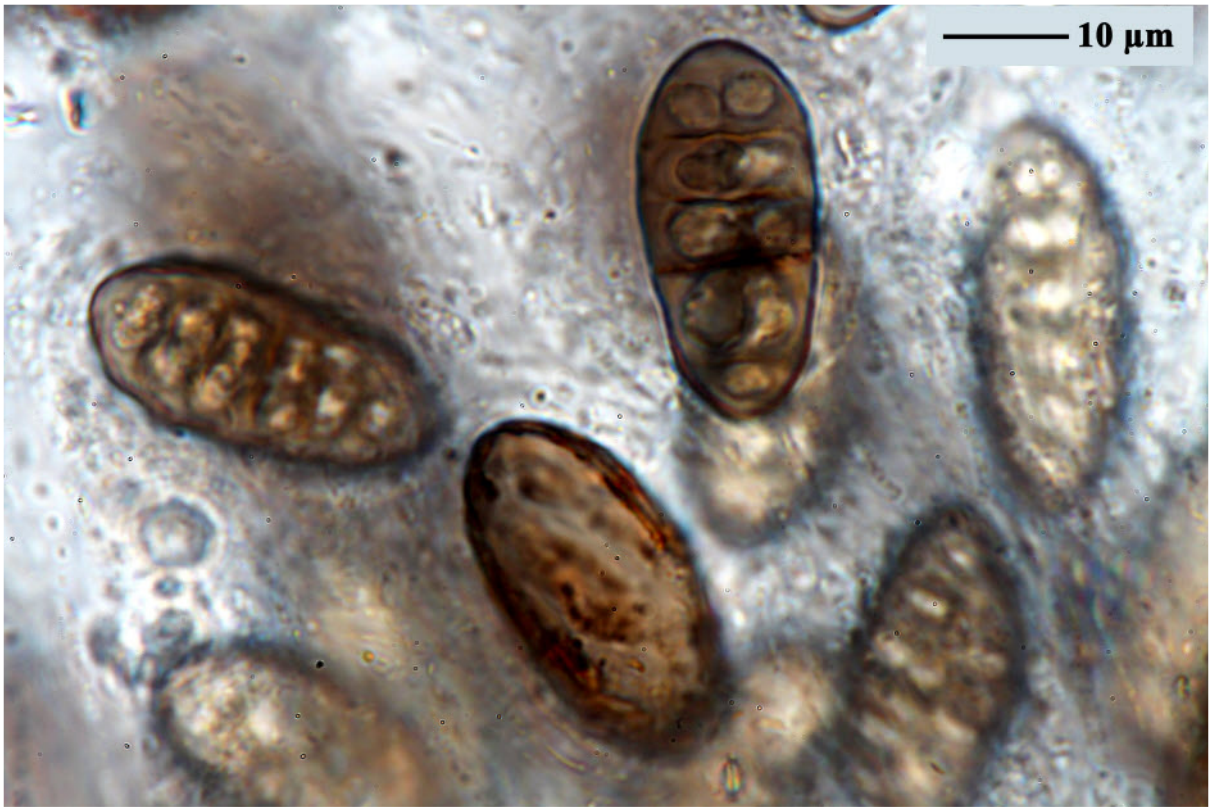
[Upreti212879], India, Uttar Pradesh. Pithoragarh district, on way toThalkedar Temple, 1900-2400 m. Leg. D.K. Upreti (no 212879), 27.06.1993, det. Upreti. ISOTYPE of *Pyrenula himalayana* Upreti.





Pyrenula welwitschii

1873



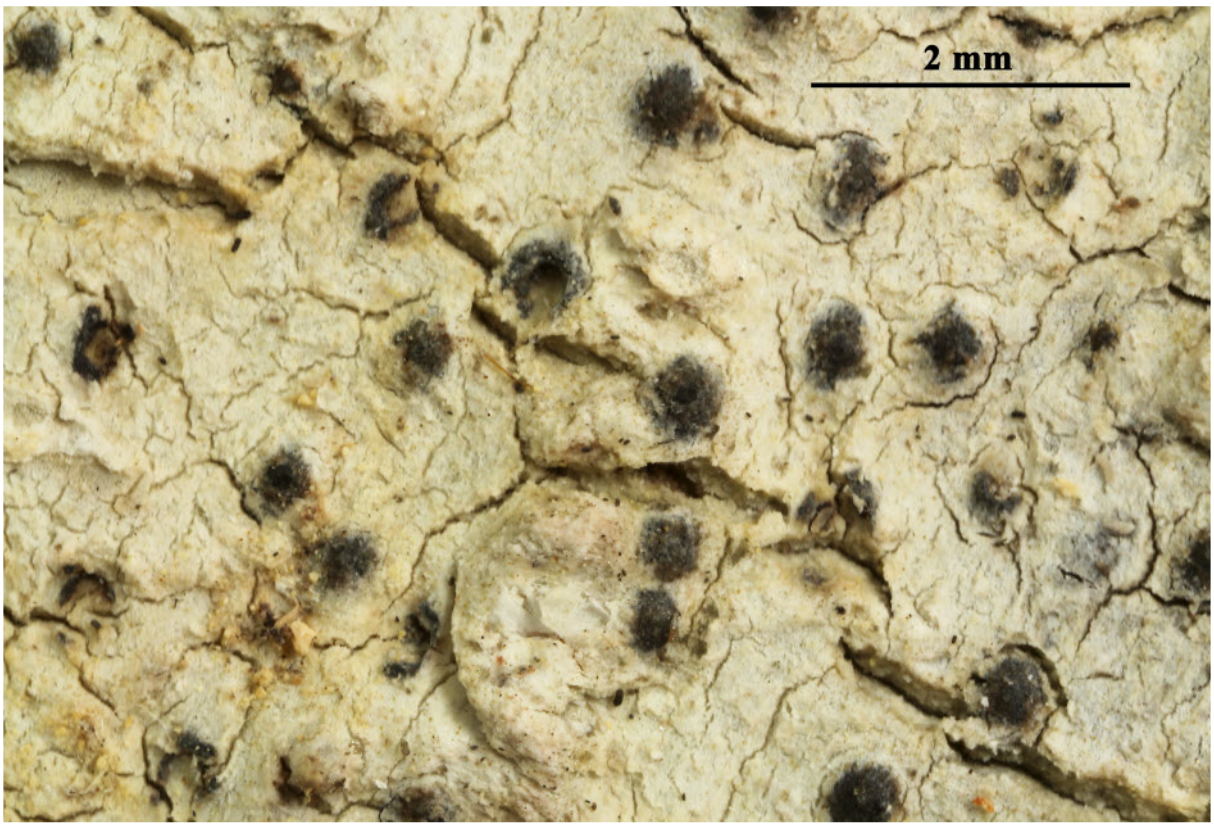


Pyrenula welwitschii

Pyrenula xanthinspersa Aptroot & M. Cáceres, in Aptroot, Sipman, Mercado Diaz, Mendonça, Feuerstein, Cunga-Dias, Pereira & Cáceres, Lichenologist 50(1): 82 (2018)

Thallus not corticate, dull, continuous, thin, pale creamish, without pseudocyphellae or pockets of crystals; algae trentepohlioid. Ascomata perithecioid, simple, dispersed, low hemispherical, emergent to superficial, 0.3–0.5mm diam., black, without thallus covering. Wall more or less equally carbonized, without crystals, c. 40 µm thick. Ostioles apical, black. Hamathecium hyaline, not inspersed with oil droplets. Asci cylindrico-clavate, with 8 irregularly arranged ascospores. Ascospores brown, 3-septate, broadly fusiform, without constrictions, 14–17 × 6.0–7.5 µm, ends rather pointed; lumina often diamond-shaped, terminal lumina separated from the end wall by an endospore layer. Pycnidia not observed. Chemistry: Thallus UV+ yellow, with lichexanthone.

[ISE28435], Brazil, Amazonas, Manaus, Reserva Florestal Ducke, along trails in vicinity of field station, 80 m, 2°56' S, 59°57' W, on tree bark in primary rainforest. Leg. M. Cáceres & A. Aptroot (no 28435), 3–8.06.2016, det. A. Aptroot, 2016. ISOTYPE.



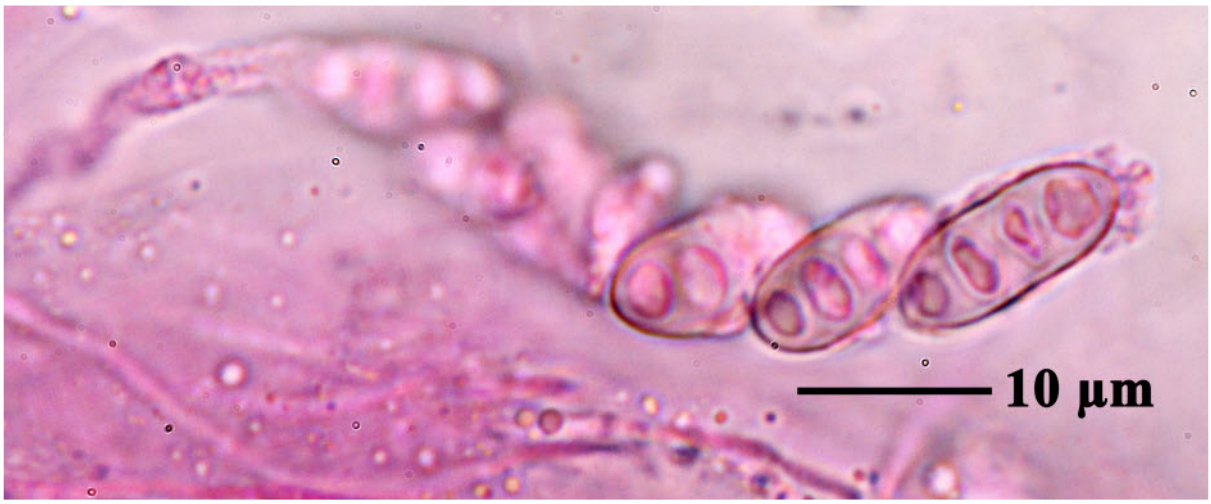


Pyrenula xanthinspersa

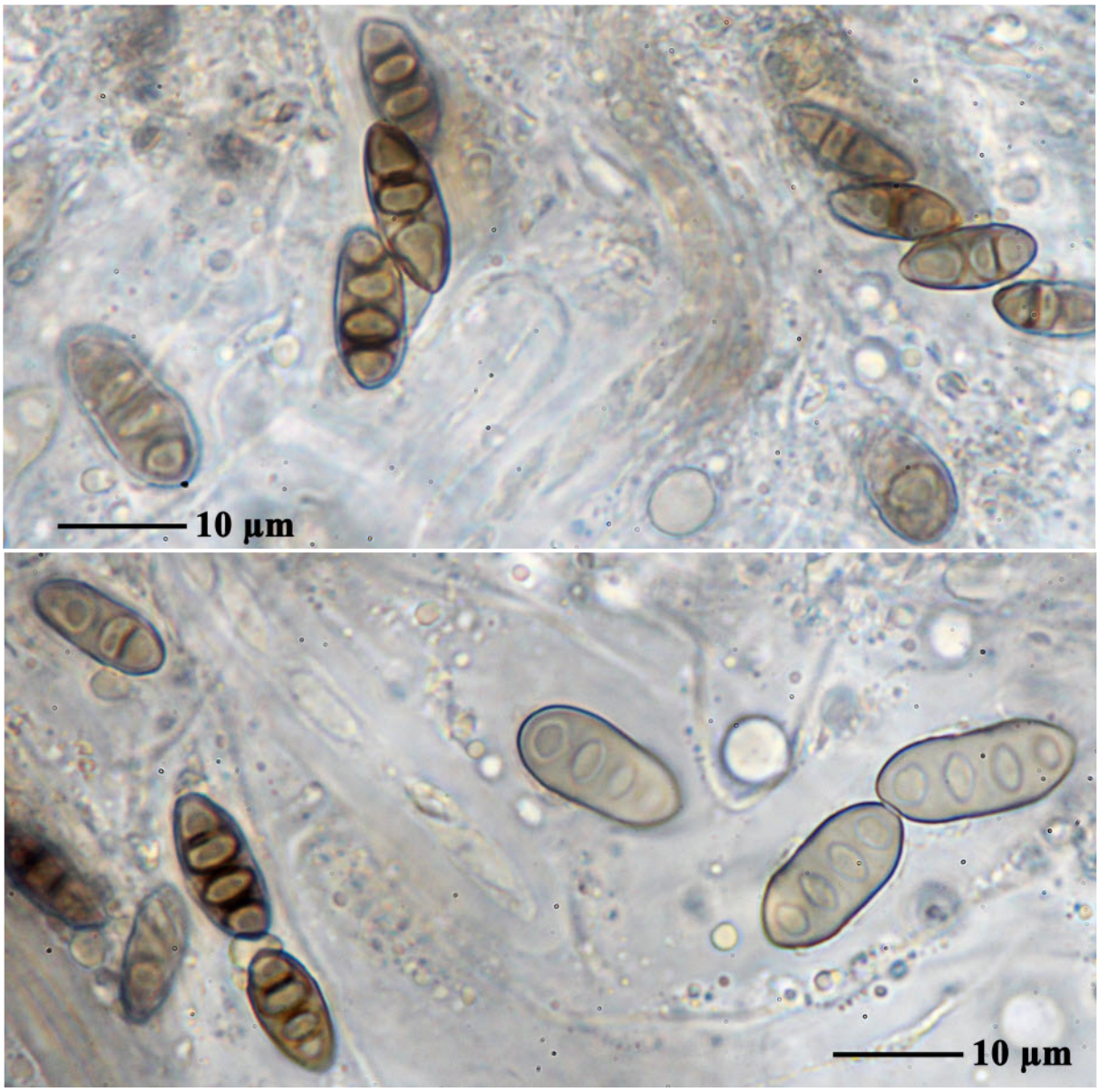
1876







Pyrenula xanthinspersa



Pyrenula xanthinspersa

Pyrenula xanthominuta Aptroot, Australas. Lichenol. 60: 40 (2007)

Thallus corticate, brownish to olive-green, with many colourless crystals and some minute pseudocyphellae. Ascomata simple, subglobose, erumpent from the substratum, totally or mostly covered by thallus, *c.* 0.3–0.5 mm diam. Ascomatal wall with crystals, up to 60 µm thick. Ostiole pale to brown, apical. Hamathecium not inspersed with oil droplets, IKI–. Ascospores 8 per ascus, uni- to irregularly biseriate, 3-septate, fusiform with rounded ends, 9–11 × 6.5–8 µm; lumina angular, wider than long, sometimes not aligned; terminal lumina separated from the exospore by an endospore layer. Pycnidia unknown. *Chemistry*: Thallus UV+ yellow or negative, lichexanthone detected with TLC. This species is chiefly characterized by the short but relatively wide ascospores. It is known only from coastal areas of northern Australia.

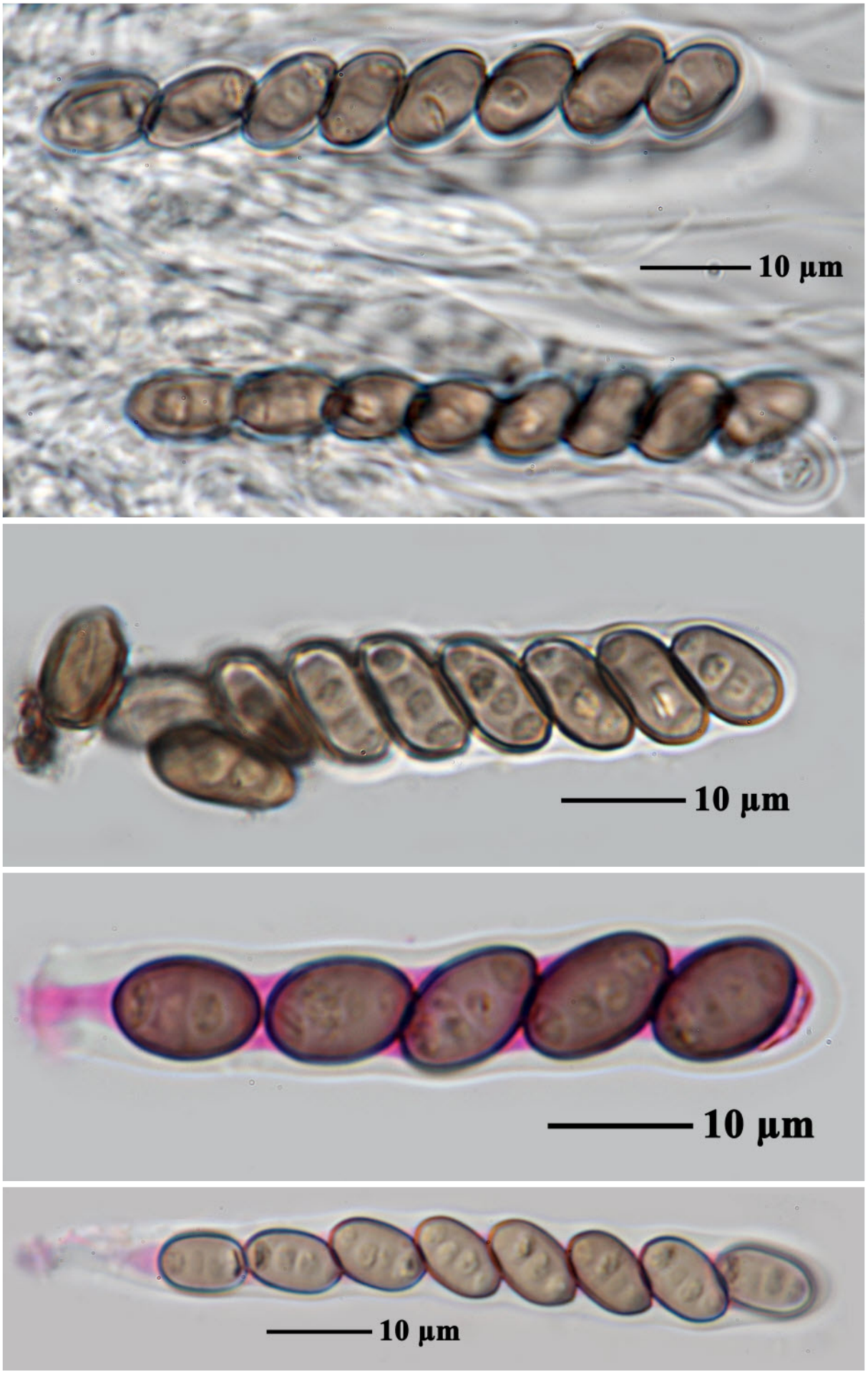
[Hale69172], Australia, Queensland, Edmund Kennedy National Park, on Clift Road, NW of Cardwell, 0 m, mangrove and stand forest. Leg. M.E. Hale (no 69172), 17.07.1983, det. A. Aptroot.





Pyrenula xanthominuta

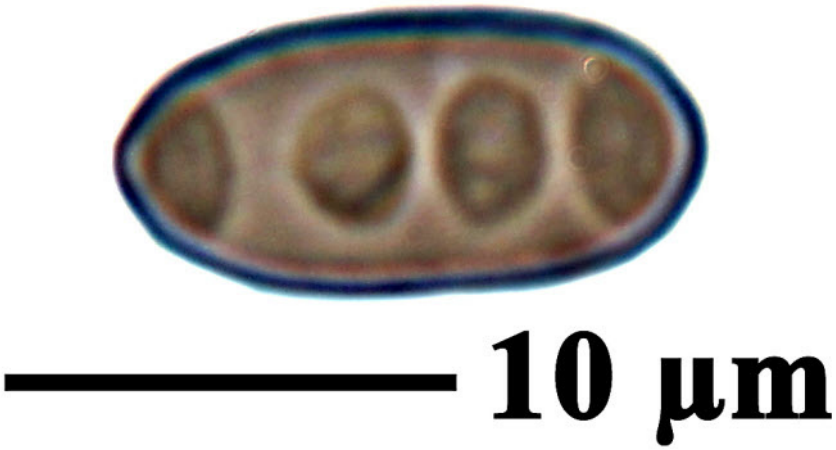
1880



Pyrenula xanthominuta







Pyrenula xanthominuta

Pyrgillus aurantiacus Aptroot & M. Cáceres, in Aptroot, Sipman, Mercado Diaz, Mendonça, Feuerstein, Cunga-Dias, Pereira & Cáceres, Lichenologist 50(1): 82 (2018)

Thallus corticate, fissured, rather smooth and flat, c. 0.1mm thick, olivaceous green, without pseudocyphellae or pockets of crystals; algal cells trentepohlioid. Ascomata mazaedioid, sessile, simple or a few together, dispersed, cylindrico-pyriform, 0.5–0.8 mm diam., 0.5–1.2 mm high, black, lower half mostly with thallus covering. Wall more or less equally carbonized, without crystals, c. 100 µm thick. Ostioles apical, covered with black mazaedium which is mostly covered by a bright orange pruina. Hamathecium not observed. Ascospores dark brown, 3-septate, long ellipsoid, usually with faint median constriction, 13–16 × 6.0–7.5 µm, c. 2 times as long as wide, ends rounded; lumina mostly rounded, septa thickened and darkened, terminal lumina not separated from the end wall by an endospore layer. Pycnidia not observed. Chemistry: Thallus UV+ yellow, with lichexanthone; orange anthraquinone pruina on ascomata reacting UV+ red and KOH+ violet.

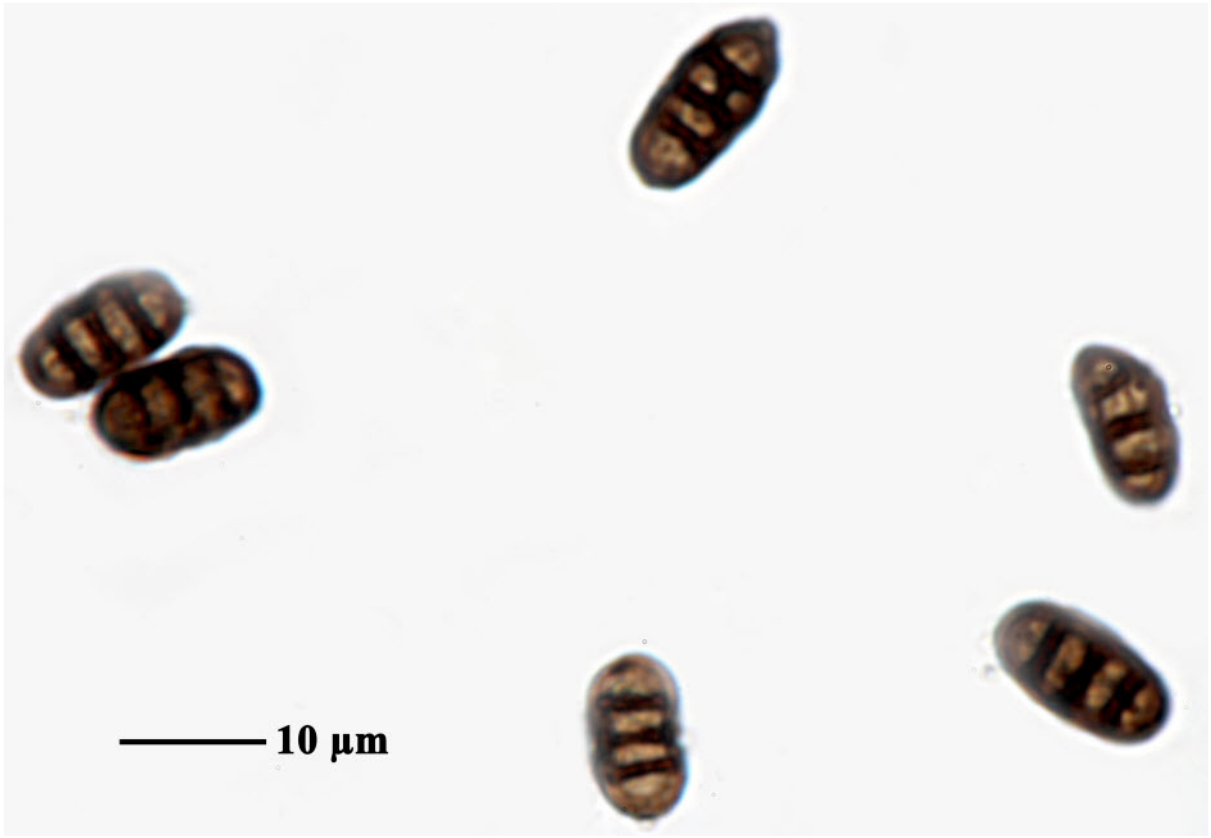
[ISE28857], Brazil, Tocantins, near Itaguatins, 150 m, 5°44'48" S, 47°33'46" W, on tree bark in cerrado remnant on farm. Leg. M. Cáceres & A. Aptroot (no 28857), 23.10.2016, det. A. Aptroot, 2016. ISOTYPE.

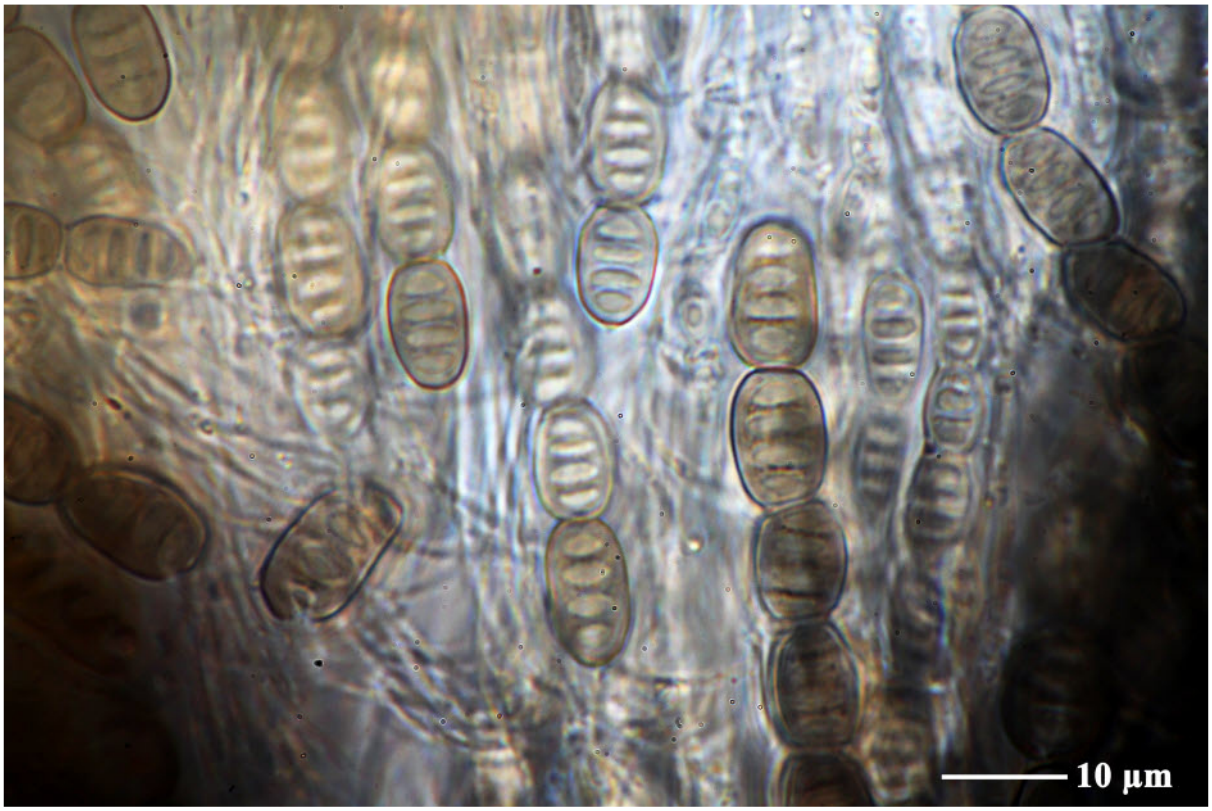




Pyrgillus aurantiacus

1884





Pyrgillus aurantiacus



Pyrgillus aurantiacus

Pyrgillus cambodiensis Kashiw., K.H. Moon & Aptroot, in Kashiwadani, Aptroot, Futagami & Moon, J. Jap. Bot. 87(4): 282 (2012)

Thallus crustose, pale brown to yellowish brown, dull, coarsely rimose; thallus uneven in thickness, lacking cortex, medulla composed of a mass of conglutinate hyphae, *Trentepohlia* gonidia and crystals of calcium oxalate, 30–80 µm thick. Ascocarps dispersed, erumpent, conical and terminally truncated, black, almost naked on the upper half, immersed in the thallus at base, 0.6–0.8 mm in diameter at basal portion, 0.4–0.5 mm in diameter at apex, 1.5–2 mm high. Ascocarps mazaedioid; mazaedia blackish brown, composed of ascospores and orange-yellow fractions of hyphae; ostioles orange-red (K+ purple) at margin; exciple black, well developed, completely carbonized, 250–350 µm thick, thickened in the middle; hamathecium colourless, clear and not inspersed, IKI– connecting above to the mazaedia; asci cylindrical, 65 × 5–6 µm, 8-spored, uniseriate; ascospores dark brown, 4-celled with distosepta, broadly ellipsoid, 10–12 × 5–7µm. Chemistry: Orange-red pigments of anthraquinone series.

[Kashiwadani47894], Cambodia, Prov. Siem Reap, Ta Nei temple, Angkor Wats complex, Siem Reap, 13°27’ N, 103°53 E, 30 m. On bark of *Tetrameles nudiflora*. Leg. H. Kashiwadani (no 47894), 18.07.2006. ISOTYPE.





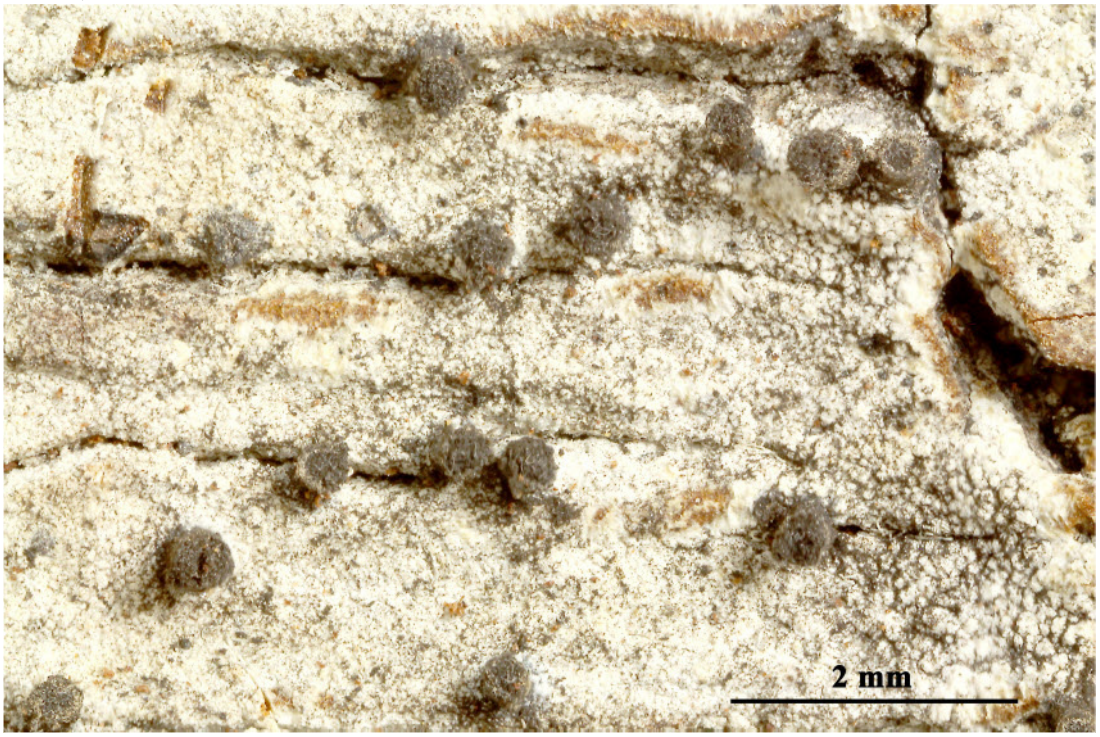


Pyrgillus cambodiensis

= ***Pyrgillus cubanus*** Nyl., Flora, Regensburg 59: 519 (1876)
= *Pyrgillocarpon cubanum* (Nyl.) Nádv. ex Tibell, Beih. Nova Hedwigia 79: 676 (1984)
= *Pyrgillocarpon cubanum* (Nyl.) Nádv., Stud. Bot. Čechoslov. 5: 125 (1942)

Thallus grey, not blackened around the ascocarps, dull, superficial on the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with *Trentepohlia* algae. Ascocarps mazaedioid, without pseudostromatic tissues, without crystals, conical, not distinctly flattened, erumpent from the substratum, exposed, 0.4–0.6 mm diam, 0.5–0.8 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 200 µm thick. Ostiole whitish, obconical, apical, 150–200 µm diam. Hamathecium not inspersed with oil droplets, not gelatinized, IKI negative. Interthecial hyphae true paraphyses, simple, not branched at the tips, 1 µm thick. Periphyses absent. Asci not seen. Ascospore arrangement not observed, spores brown, median area dark, ellipsoidal with rounded ends, symmetrically septate, not constricted at the septa, 7–10 × 5–7 µm; with 1 distoseptum with darker centre indicating an euseptum, 2 µm thick. Endosporium up to 2 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: UV + yellow, lichexanthone detected with TLC.

[Sip15698b], Papua New Guinea, prov. Morobe, Wau area, SW-slope of Mt. Missim, Poverty Creek valley, steep slope with *Castanopsis acutissima* forest, on thick tree trunk, 1350 m. Leg. H. Sipman (no 15691b), 6.08.1981, det. Tibell, 1989.





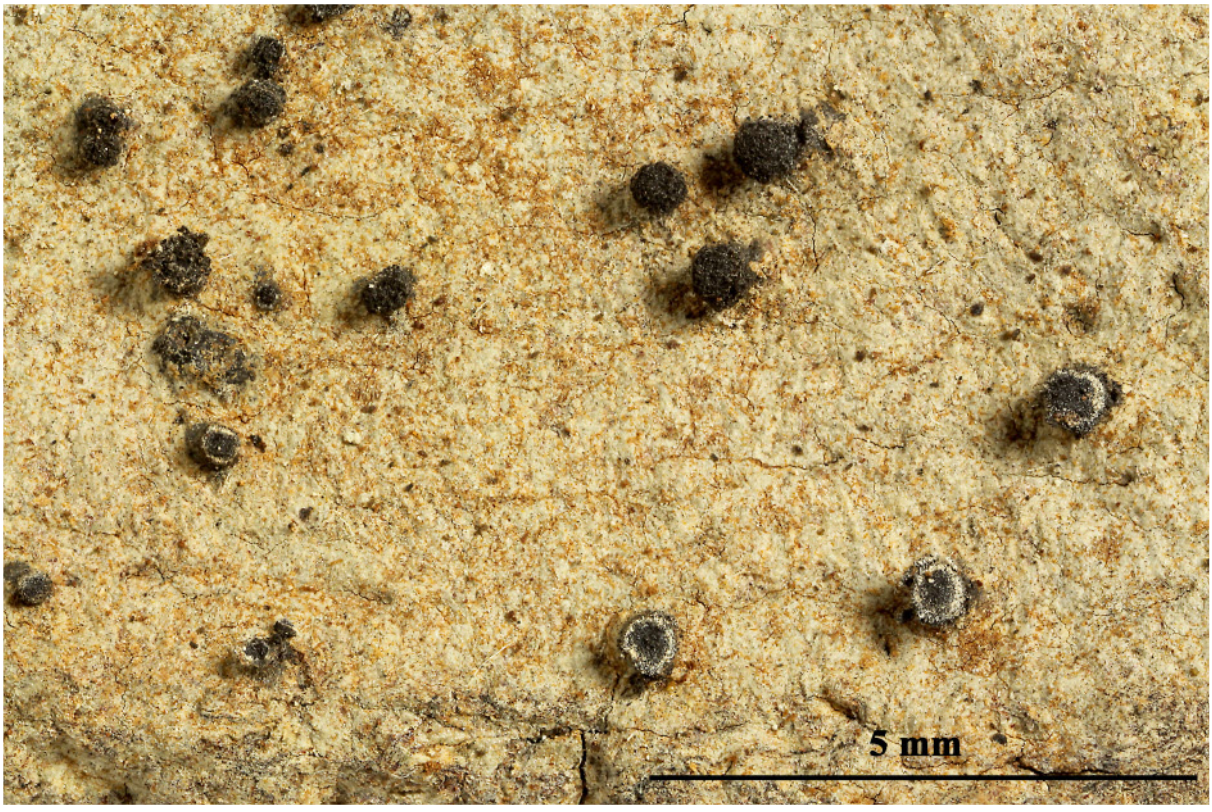


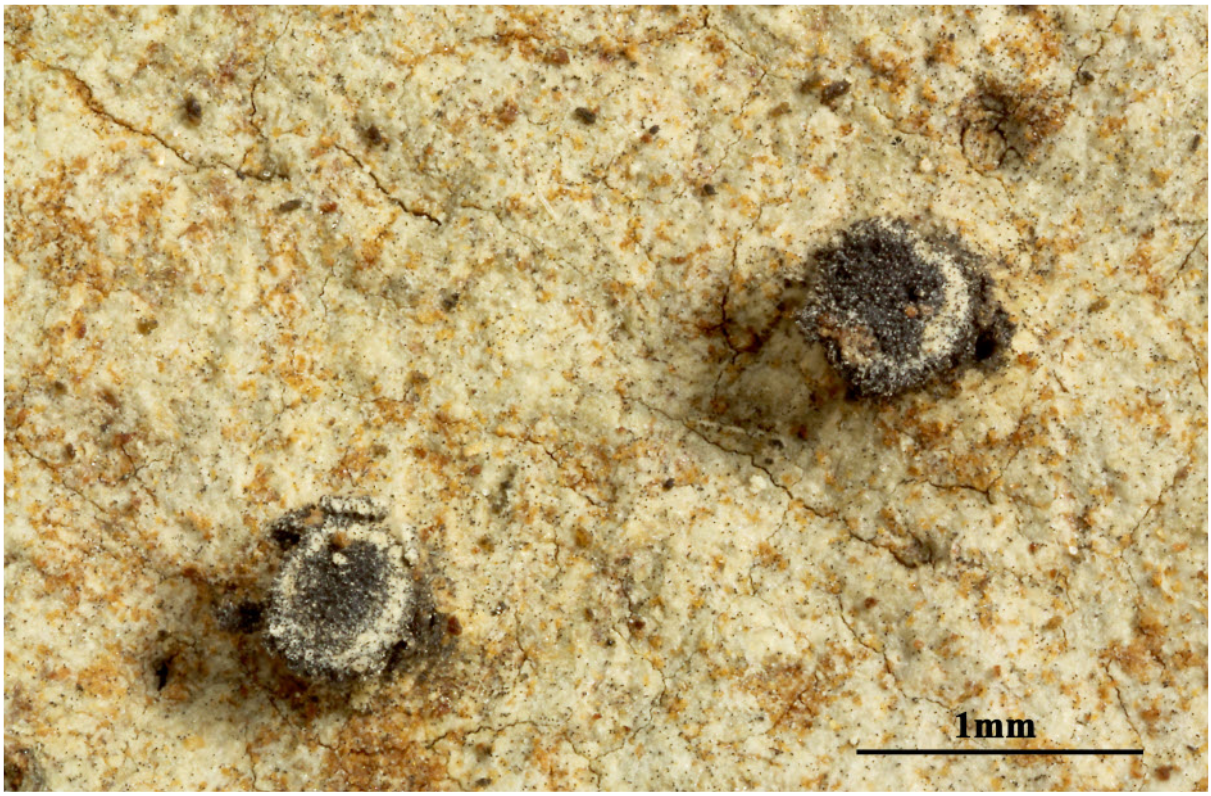
Pyrgillocarpon cubanum

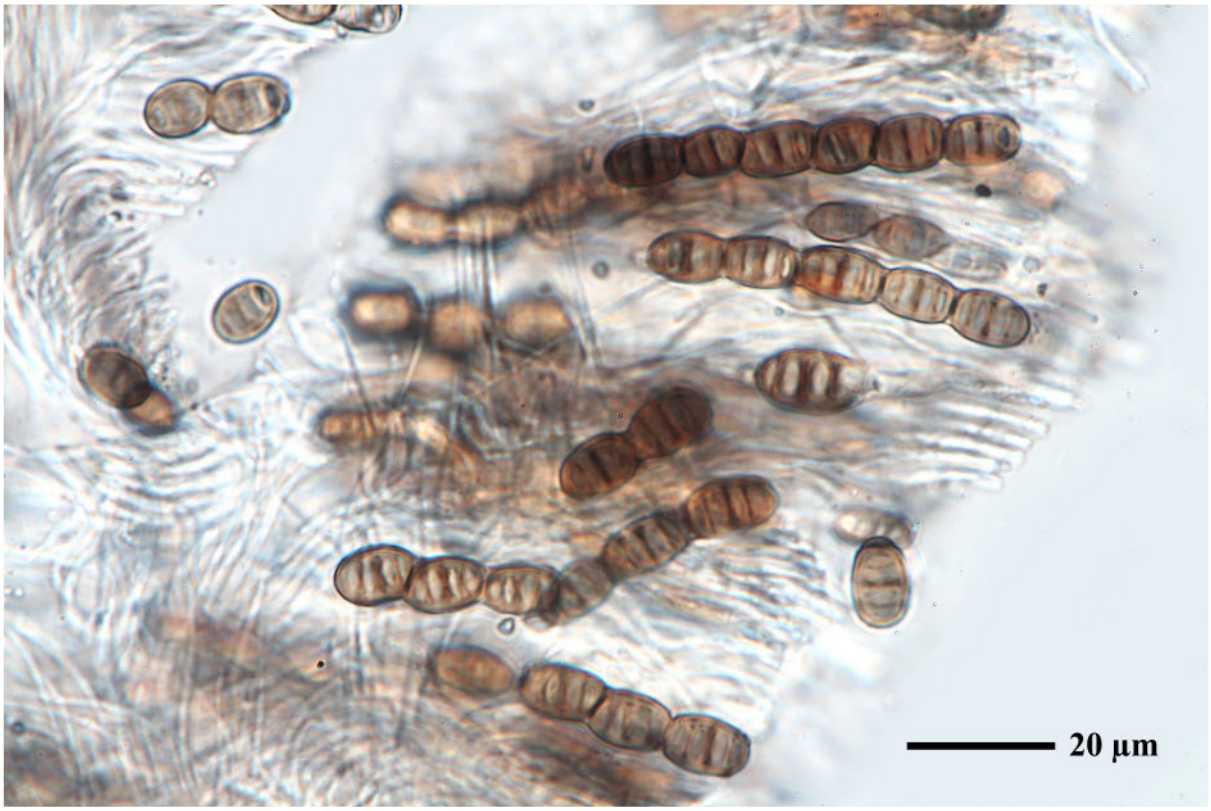
Pyrgillus javanicus (Mont. & Bosch) Nyl., Mém. Soc. Imp. Sci. Nat. Cherbourg 5: 334 (1858)
= *Acolium javanicum* (Mont. & Bosch) Stizenb., Ber. Tät. St Gall. naturw. Ges.: 148 (1862) [1861-62]
= *Calicium javanicum* Mont. & Bosch, Pl. Jungh. 4: 480 (1856)
= *Pyrgillus australiensis* F. Wilson, in Bailey, Bot. Bull. Dept. Agric., Queensland 7: 31 (1891)
= *Trachylia javanica* (Mont. & Bosch) Nyl., Monogr. Calic.: 33 (1857)

Thallus yellowish grey. Ascomata 0.4–0.6 mm diam., 0.4–0.9 mm tall. Ascomatal wall to 200 µm thick, ostiole whitish, 250–400 µm diam. Ascospore bicolorous, fusiform, with subacute ends, (10–)13–16 × 5–6 µm, with 3 very dark distosepta 1–2 µm thick. Chemistry: Thallus UV+ yellow or UV-; lichexanthone detected with TLC in most specimens.

[ABL21836], Australia, Queensland, Lamington National Park, 100 km S of Brisbane, near lost world on tree in subtropical rainforest, 300 m, 153°07’ E, 28°18’ S, leg. A. & M. Aptroot (no 12836), 02.1988, det. A. Aptroot, 1988.





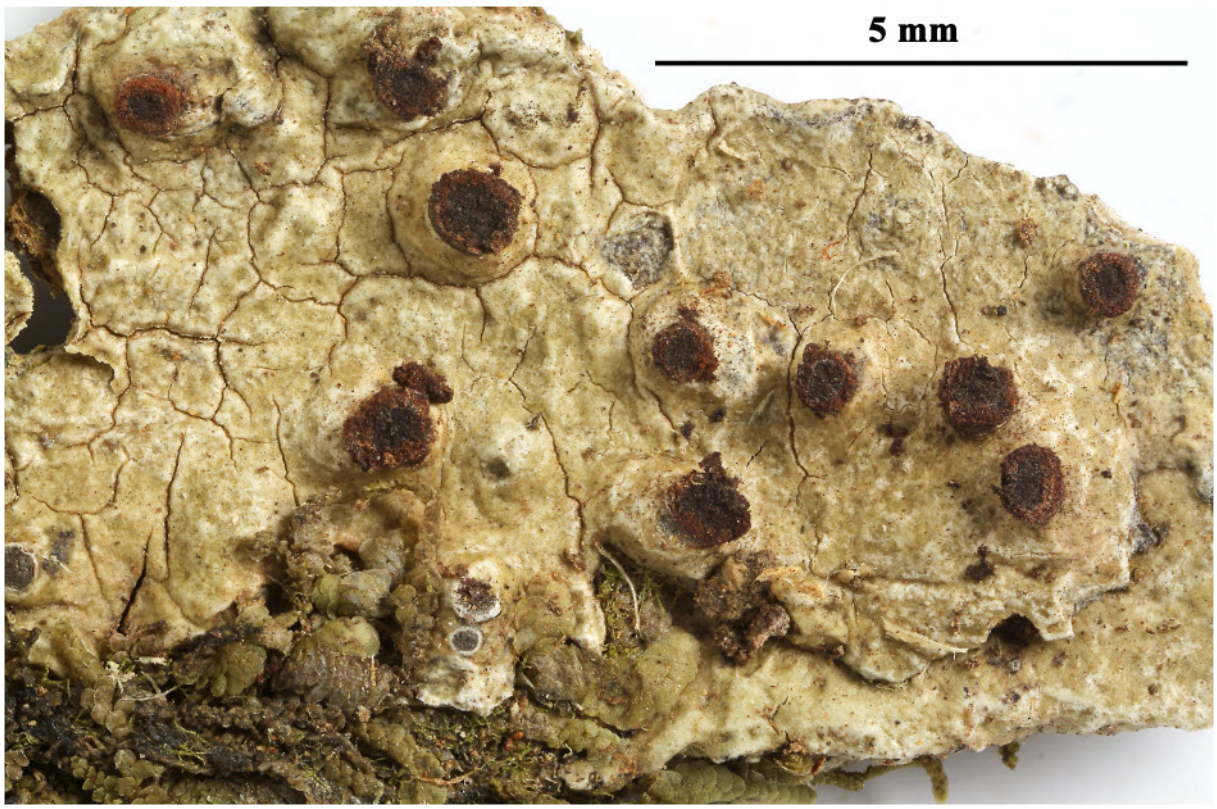


Pyrgillus javanicus

Pyrgillus rufus Aptroot & M. Cáceres, in Aptroot, Sipman, Mercado Diaz, Mendonça, Feuerstein, Cunga-Dias, Pereira & Cáceres, Lichenologist 50(1): 84 (2018)

Thallus corticate, fissured, rather uneven, c. 0.1mm thick, olivaceous green, without pseudocyphellae or pockets of crystals; algae trentepohlioid. Ascomata mazaedioid, erumpent to sessile, simple, dispersed, cylindrico-pyriform, 0.5–0.8 mm diam., 0.5–0.8 mm high, black, sides almost completely with thallus covering. Wall more or less equally carbonized, without crystals, c. 100 µm thick. Ostioles apical, covered with black mazaedium which is mostly covered by a dark red pruina. Hamathecium not observed. Ascospores dark brown, 3-septate, long ellipsoid, usually with faint median constriction, 15.0–17.5 × 5.0–6.5 µm, c. 2.5–3 times as long as wide, ends rounded; lumina mostly rounded, septa thickened and darkened, terminal lumina not separated from the end wall by an endospore layer. Pycnidia not observed. Chemistry: Thallus UV+ yellow, with lichexanthone; red pigment (anthraquinone?) pruina on ascomata reacting UV+ red and KOH+ orange.

[ISE40256], Brazil, Pará, Villa Nazaré, 85 km N of Dom Eliseu, in primary tropical lowland rain forest on bark of tree, 3°53'56" S, 48°05'44" W, 120m. Leg. M. Cáceres & A. Aptroot (no 40256), 29.10.2016, det. A. Aptroot, 2016. ISOTYPE.





Pyrgillus rufus

1894



Pyrgillus rufus

Requienella fraxini Jaklitsch & Voglmayr, Persoonia 37: 95 (2016)

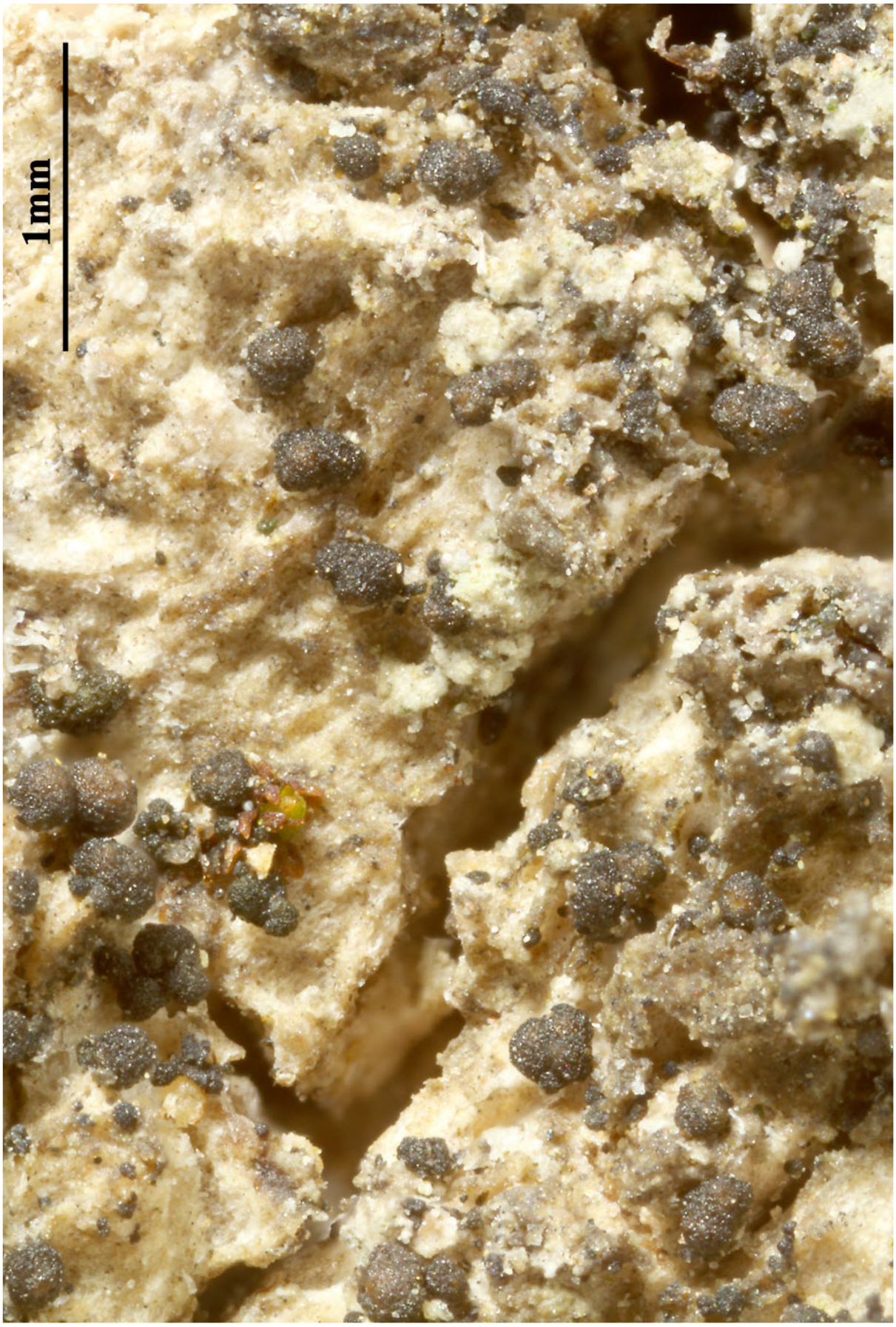
Ascomata perithecioid, immersed, with the ostiolum, often including an upper part of the ascoma, erumpent to 0.2–0.9 mm above the host surface, solitary or aggregated in small numbers, 0.5–1.1 mm high, 0.45–1 mm diam., conical with rounded base or more or less globose with a prominent, conical, more or less acute, shiny black, apically 26–160 µm wide papilla, circular in transverse section, black; often surrounded by white amorphous tissue containing some hyaline 2–6 µm wide hyphae; tissue sometimes turning black by ejected ascospores. Peridium 15–30 µm wide at the base, thickened to 150 µm and hard in upper regions, dark brown, consisting of small pseudoparenchymatous cells. Hamathecium complex, consisting of 2–5 µm wide, apically free paraphyses containing oil drops when vital, and similarly long as the asci, superposed by masses of long, sparcely branched, 1–2.5 wide, apically free 'pseudotrabeculae' nearly reaching the ostiolum and variously curved periphyses of same width in the ostiolum, all immersed in a gel matrix. Asci 153–206 × 20–30(–33) µm (n = 10), bitunicate, fissitunicate, oblong to narrowly clavate, with thick-walled apex, wide ocular chamber comprising a slightly refractive, inversely funnel-shaped dome 9–11 µm long, 6.5–9.5 µm wide at the base, turning reddish in Congo Red, demarcated by a basal plate, with short simple stipe, containing 8 uni- to biseriately arranged ascospores. Ascospores (23.3–)26.7–31.5(–36) × (8.0–)9.5–12(–14.5) µm, l/w (2.1–)2.4–3.1(–3.9) (n = 100), ellipsoid, oblong to fusiform, first hyaline, 1-celled, with narrow sheath, becoming septate and yellow, finally brown with lighter ends, 3(–5)-distoseptate, with large lumina and faintly punctate perispore.

[Etayo30205], Portugal, Tras-os-Montes, Bragança, Parque Natural Monteshino, entre Rabal y Franca, ladera orient. W con castaños y encinas, 635 m, 41°52'20'' N, 6°44'41''E. on *Fraxinus*. Leg. J. Etayo (no 30205) & E. Ros, 25.07.2016, det. A. Aptroot



Requienella fraxini

1897



Requienella fraxini

1898



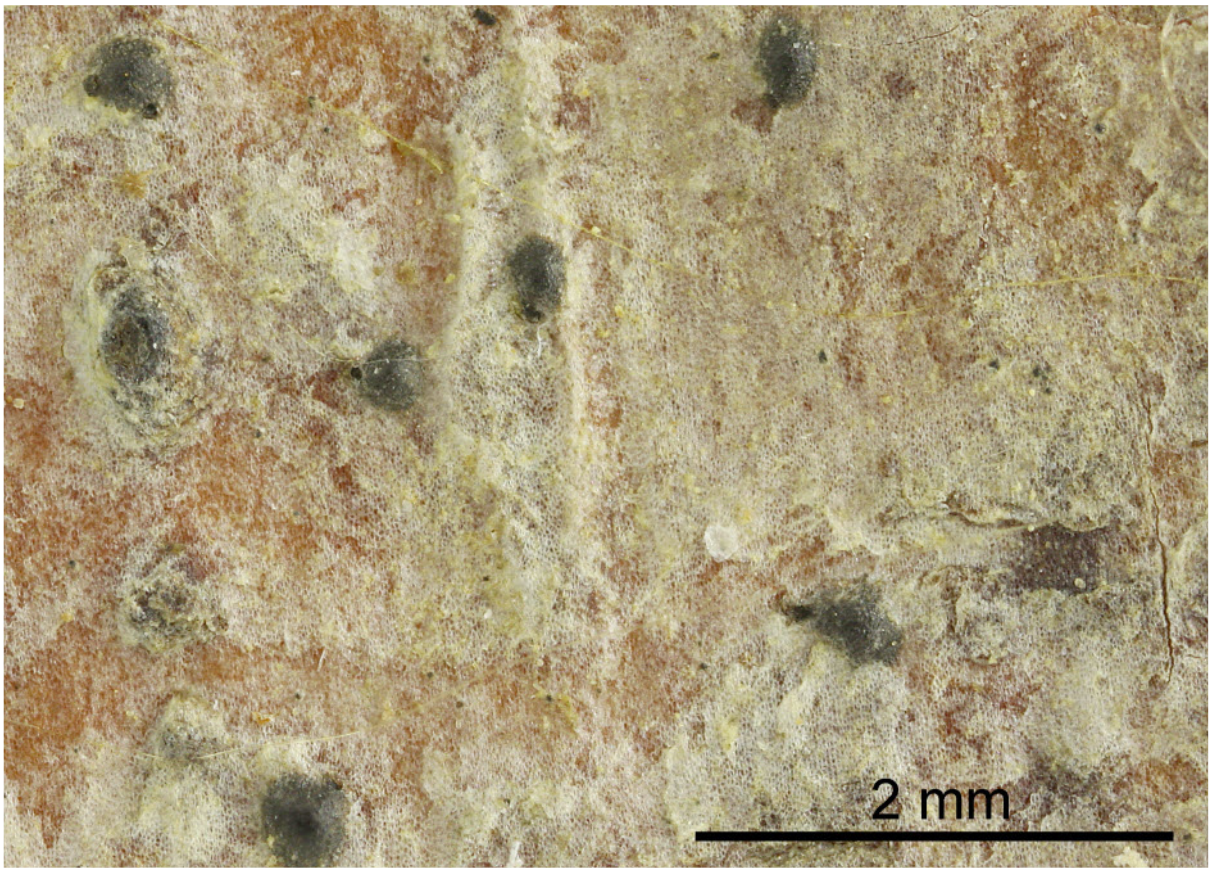
Requienella fraxini

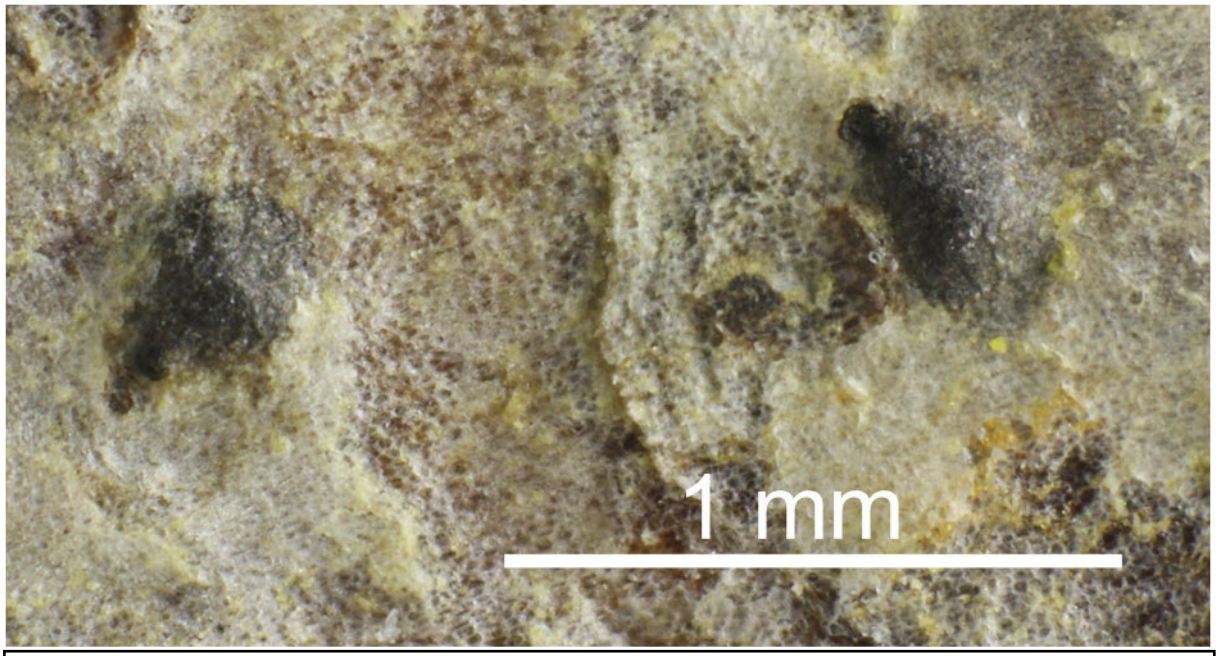
Schummia angulata (Aptroot & Schumm) Lücking, R. Miranda & Aptroot, in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [174] (2020)

= *Distothelia angulata* Aptroot & Schumm, Flechten Madeiras, der Kanaren und Azoren (Wangen) 2: 200 (2013)

Thallus only causing a bleaching of the bark; algae only loosely associated with the thallus, chlorococcoid, c. 1.5 µm diam. Ascomata perithecioid, emergent, 0.25-0.45 mm diam., black with grey covering. Ostioles black, strongly lateral. Hamathecium hyaline, IKI-; filaments not or only little branched, c. 1.5 µm wide. Asci cylindrical, IKI-, with 5–8 ascospores, ascus tips with long ocular chamber. Ascospores young hyaline, soon pale brown, IKI-negative, essentially 1-septate, asymmetrically sole-shaped with the upper end widest, with a submedian constriction, 14–21 × 5.7–9.2 µm, wall extremely thickened so as to leave two small reniform lumina near the central septum, old seemingly 3-septate. Pycnidia not observed.

[14061], Portugal, Azoren, Terceira, nördlich von Matela an einem Paralleträßchen zur EN3-1; 38°41.461' N, 27°14.999' W, 430 m. leg. Schumm 18.07.2008. HOLOTYPE.



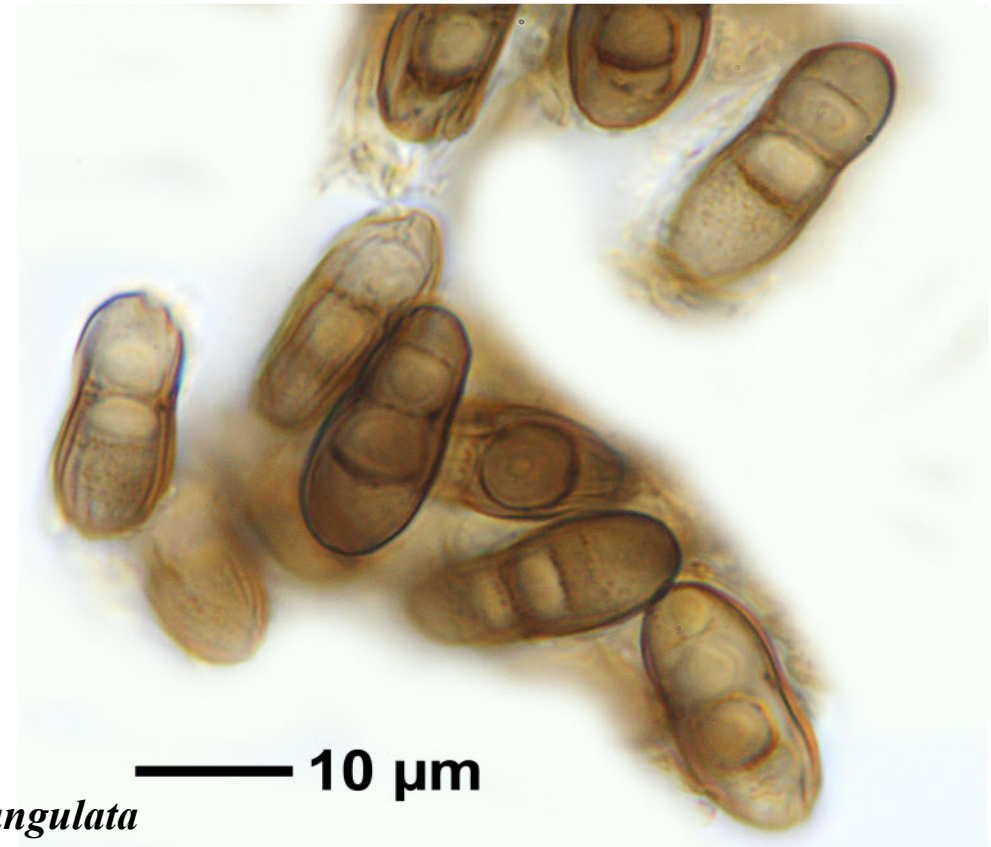




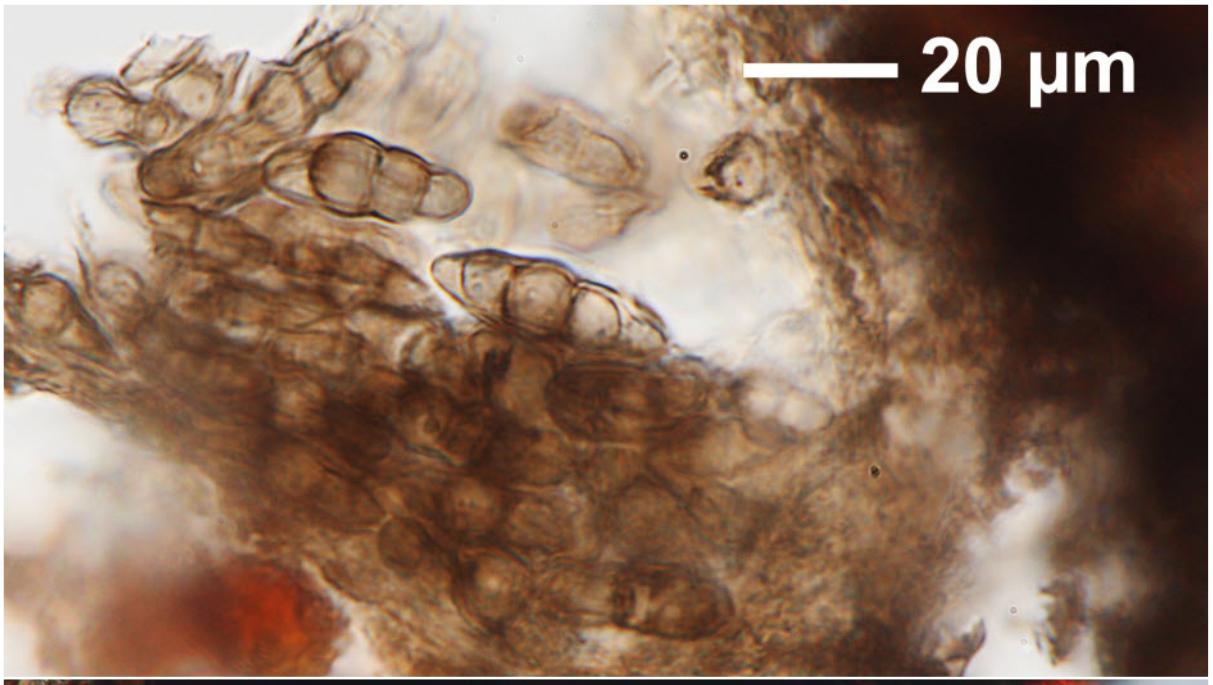


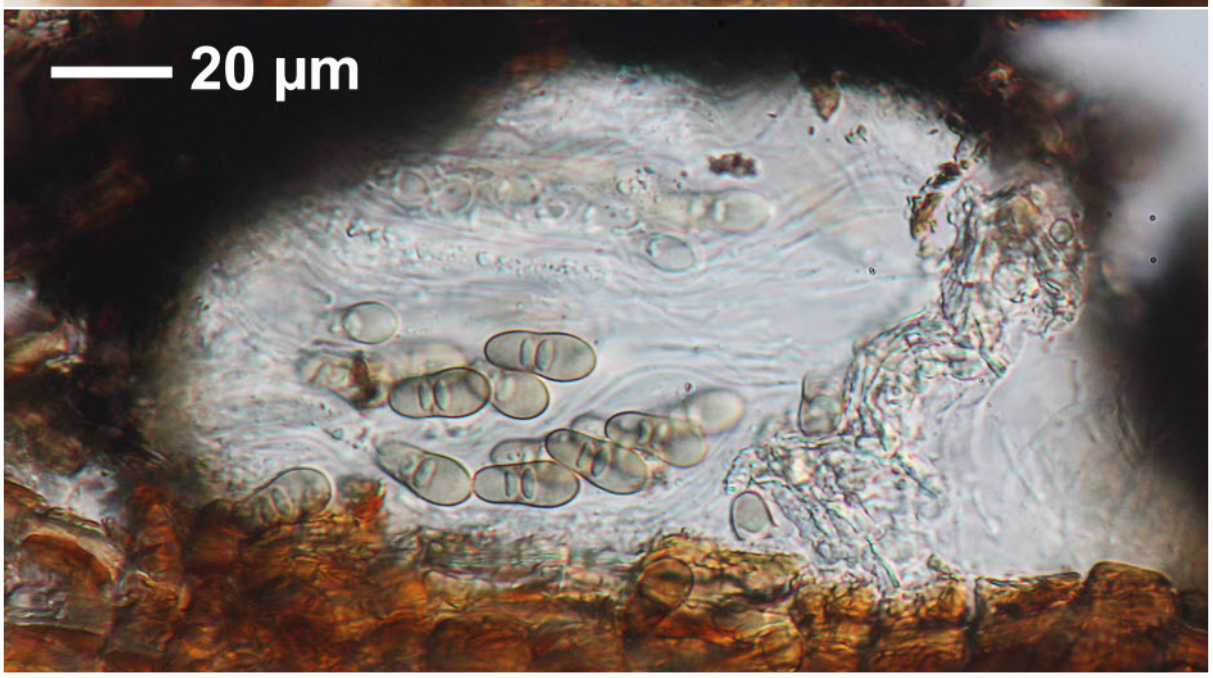
Schummia angulata

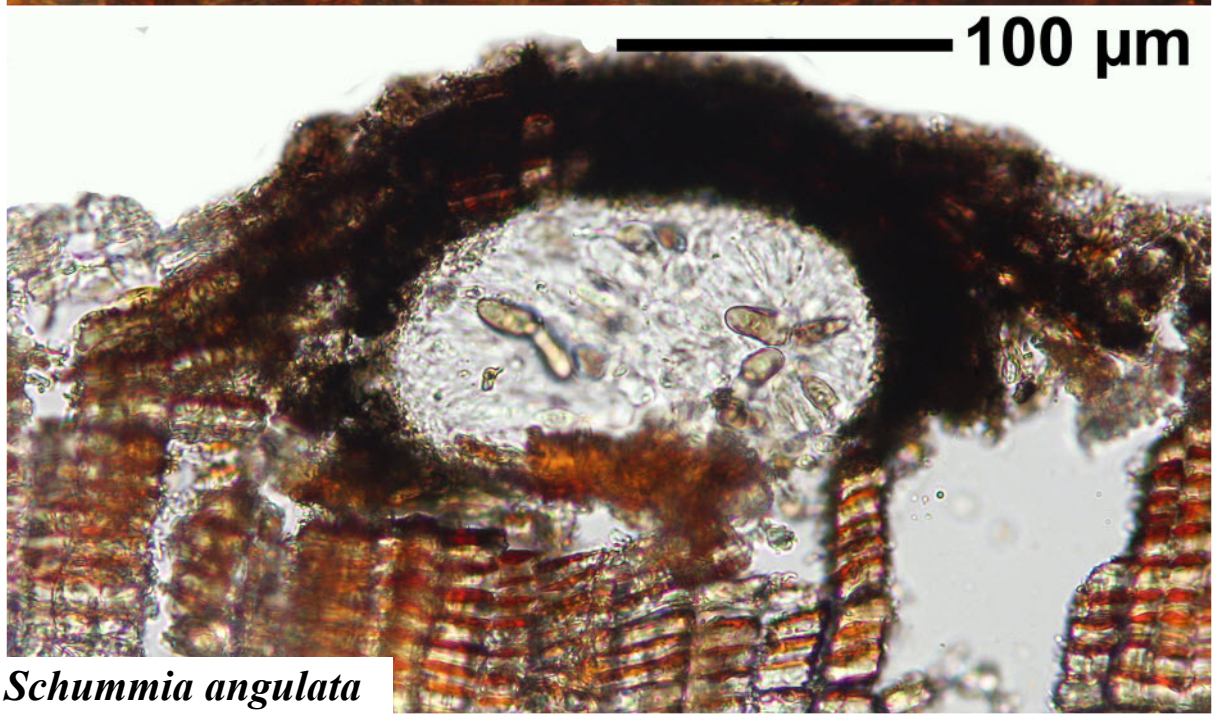




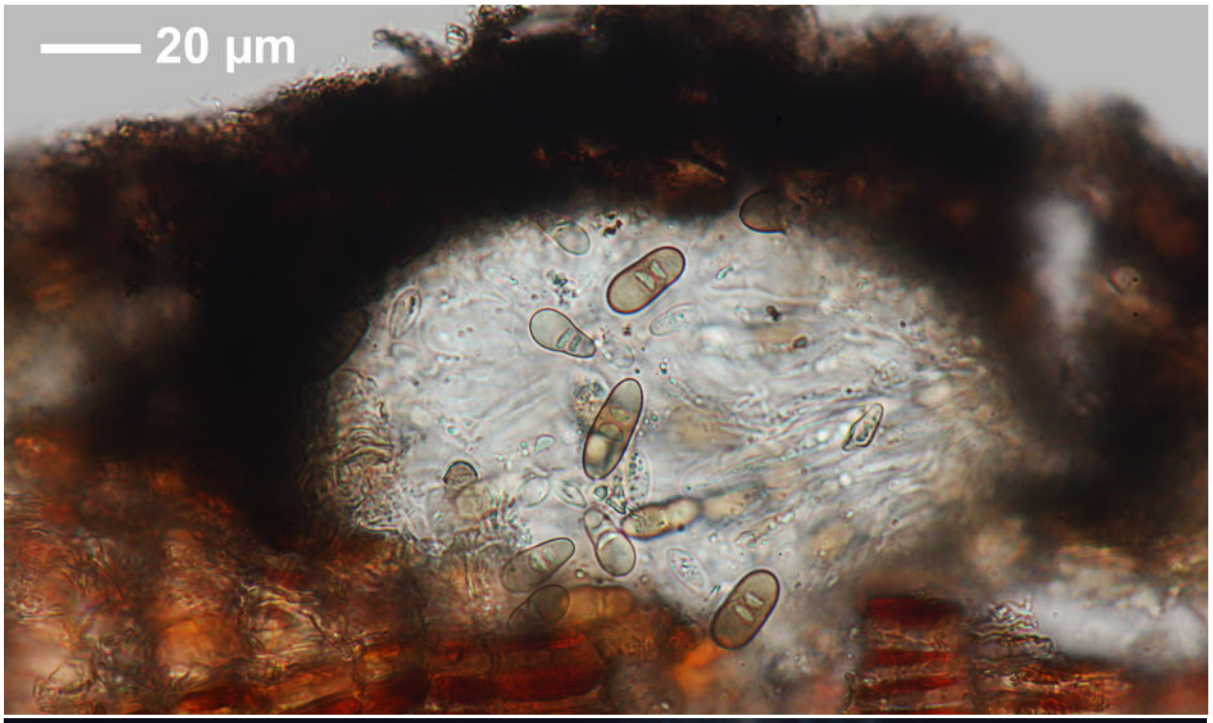
Schummia angulata

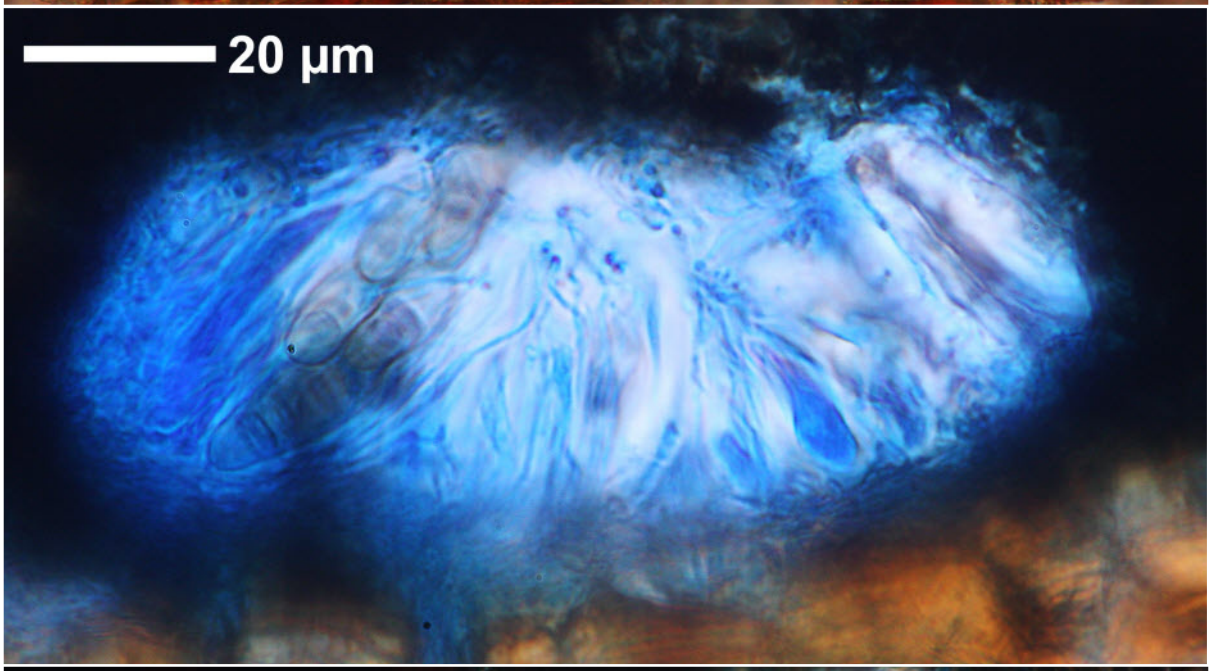


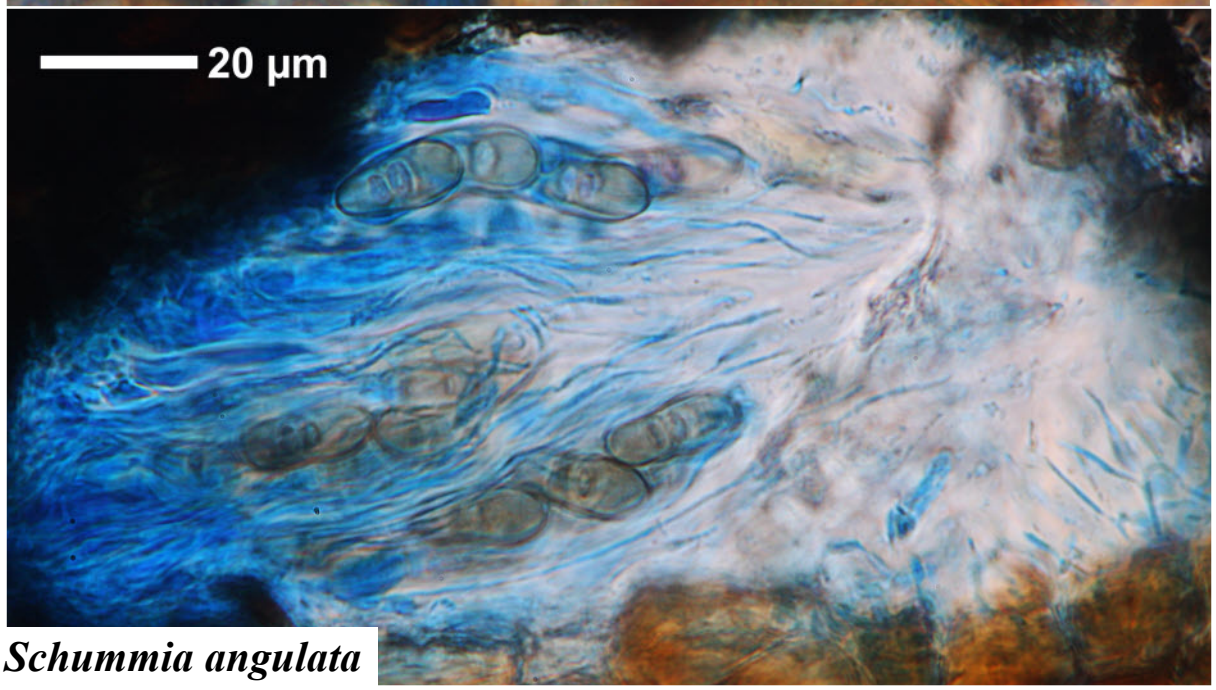




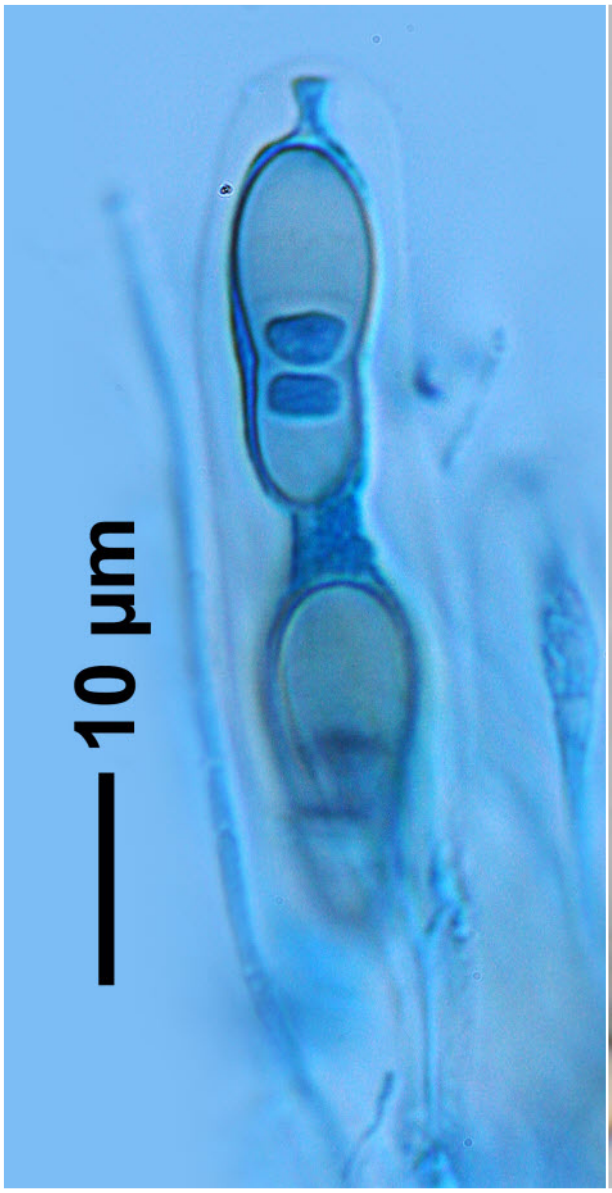
Schummia angulata







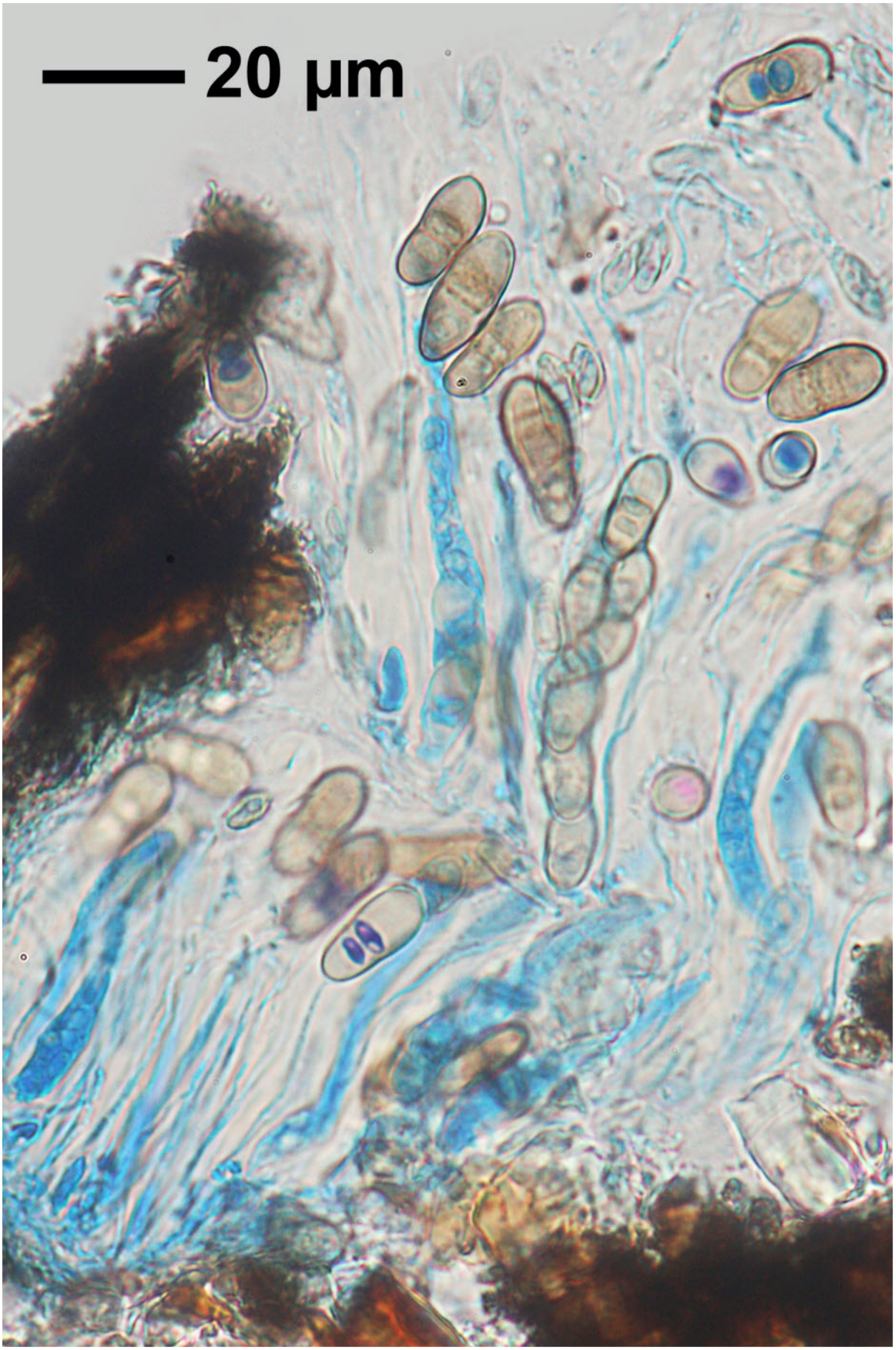
Schummia angulata





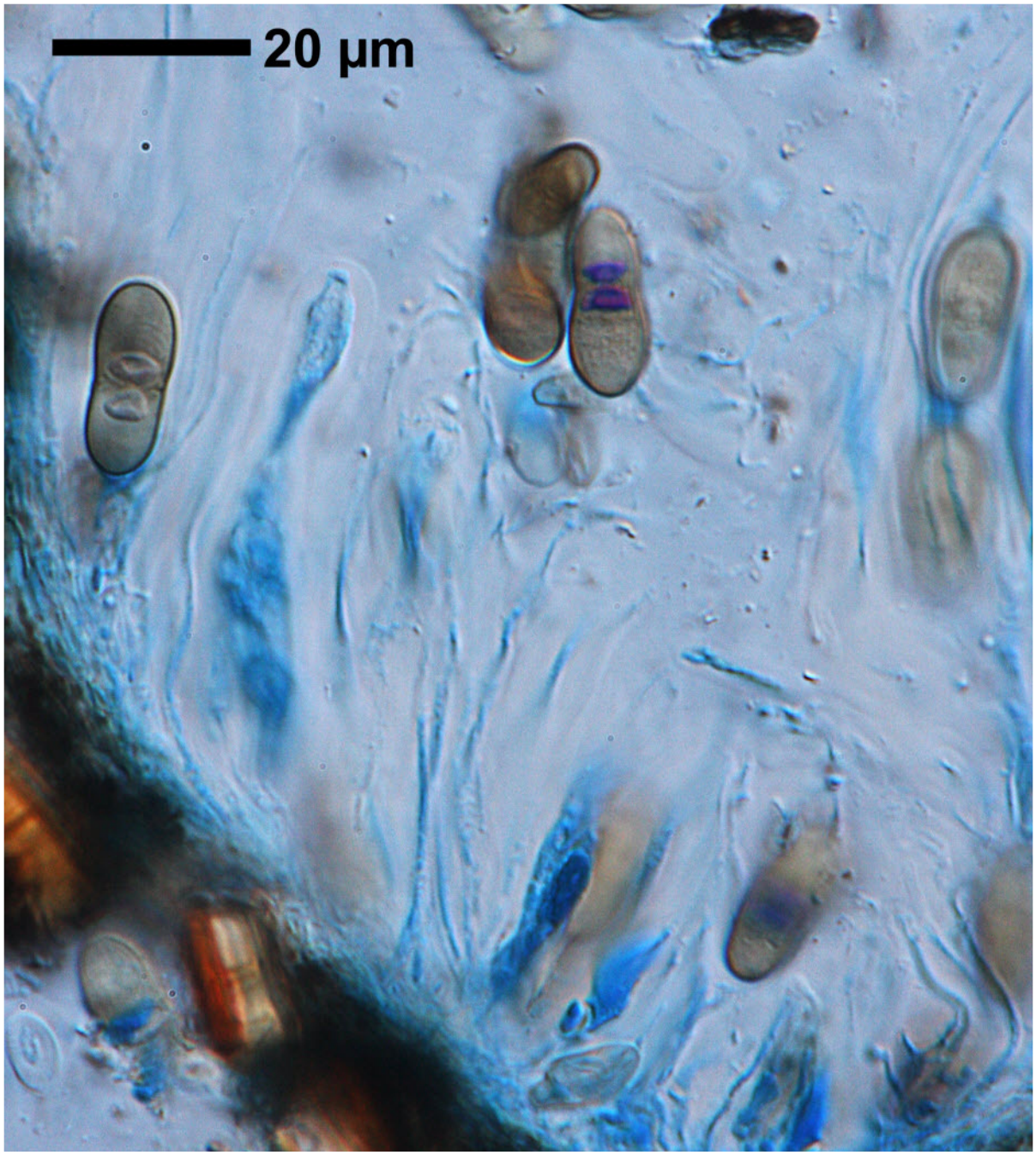


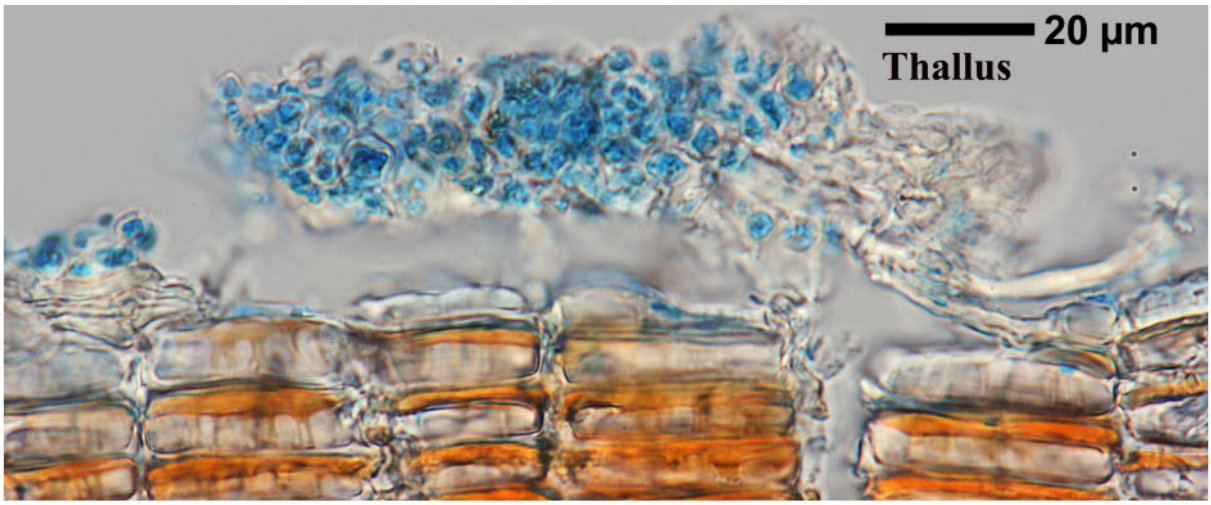
Schummia angulata



Schummia angulata

1906





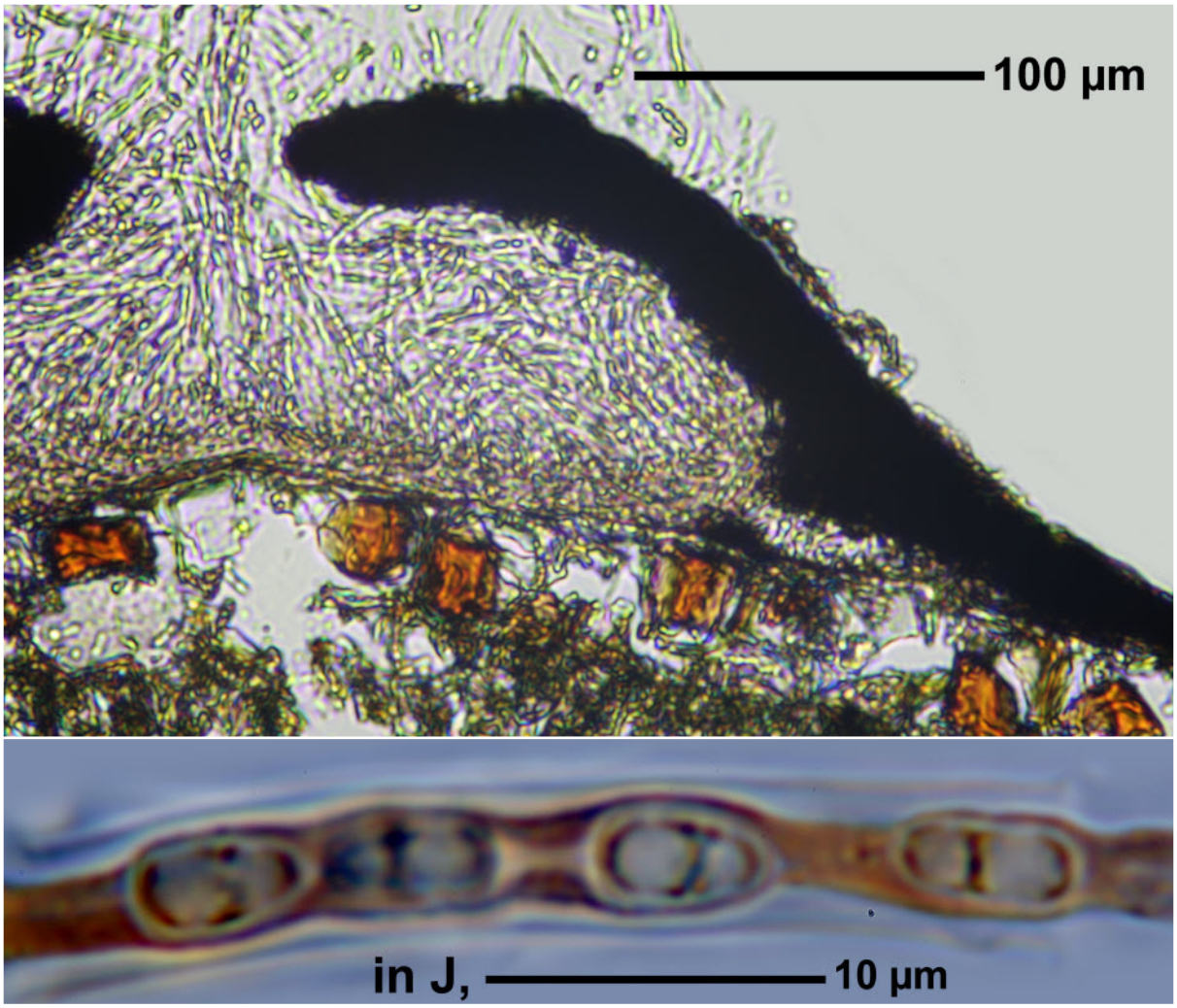
Schummia angulata

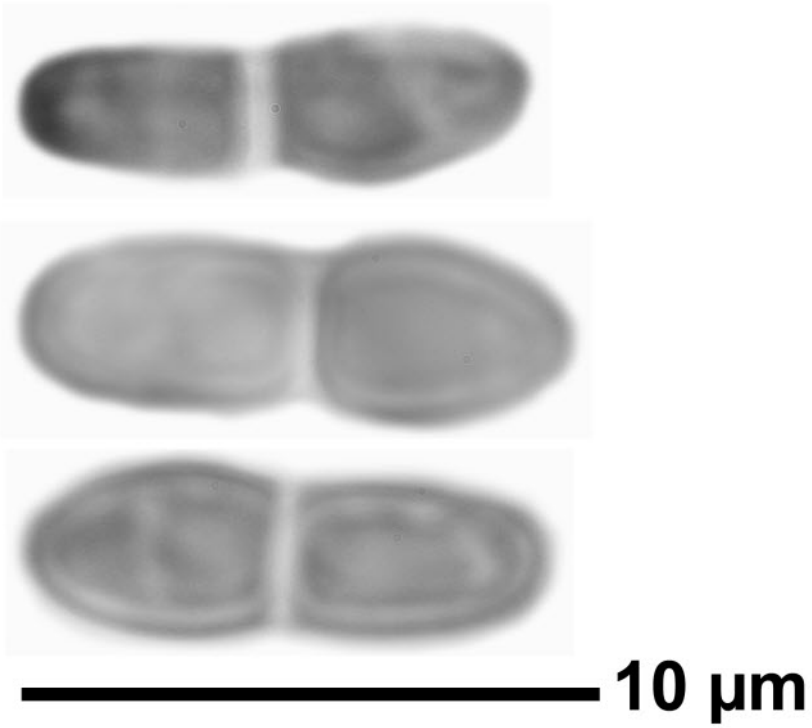
Strigula nitidula Mont., in Sagra, Histoire física, politica y naturál de la islea de Cuba 9: 93 (1845)
= *Haploblastia nitidula* (Mont.) Trevis., Conspect. Verruc.: 16 (1860)

Thallus green. Spores uniseriate, 1-septate, hyaline, 9–10 × 2.5–3.5 µm, often breaking into 2 part-spores.

[14520], Seychelles, La Digue, zwischen Belle Vue (Nid d' Aigles) und Fond Piment, 4°22' S, 55°50' E, ca. 350 m. Leg. F. Schumm & J.-P. Frahm, 03.10.2008, det. A. Aptroot, 2008.







Strigula nitidula

Strigula nitidula Mont., in Sagra, Histoire física, politica y naturál de la islea de Cuba 9: 93 (1845)
= *Haploblastia nitidula* (Mont.) Trevis., Conspect. Verruc.: 16 (1860)

Thallus usually folicolous, subcuticular, no hypothallus. Perithecia 0.4–0.6 mm diam., conical, totally exposed, black, nitidous. Ascospores 8/ascus, uniseriate, 1-septate, cells often broken apart (sometimes within the mature asci), 8–10(–12) × (2–)2.5–3 µm

[ABL11690], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 N of Porto Velho. On tree bark in primary rain forest. 8°02'44" S, 63°29'11" W, 100 m. Leg. M. Cáceres & A. Aptroot (no 11690), 12.03.2012, det. A. Aptroot, 2012.

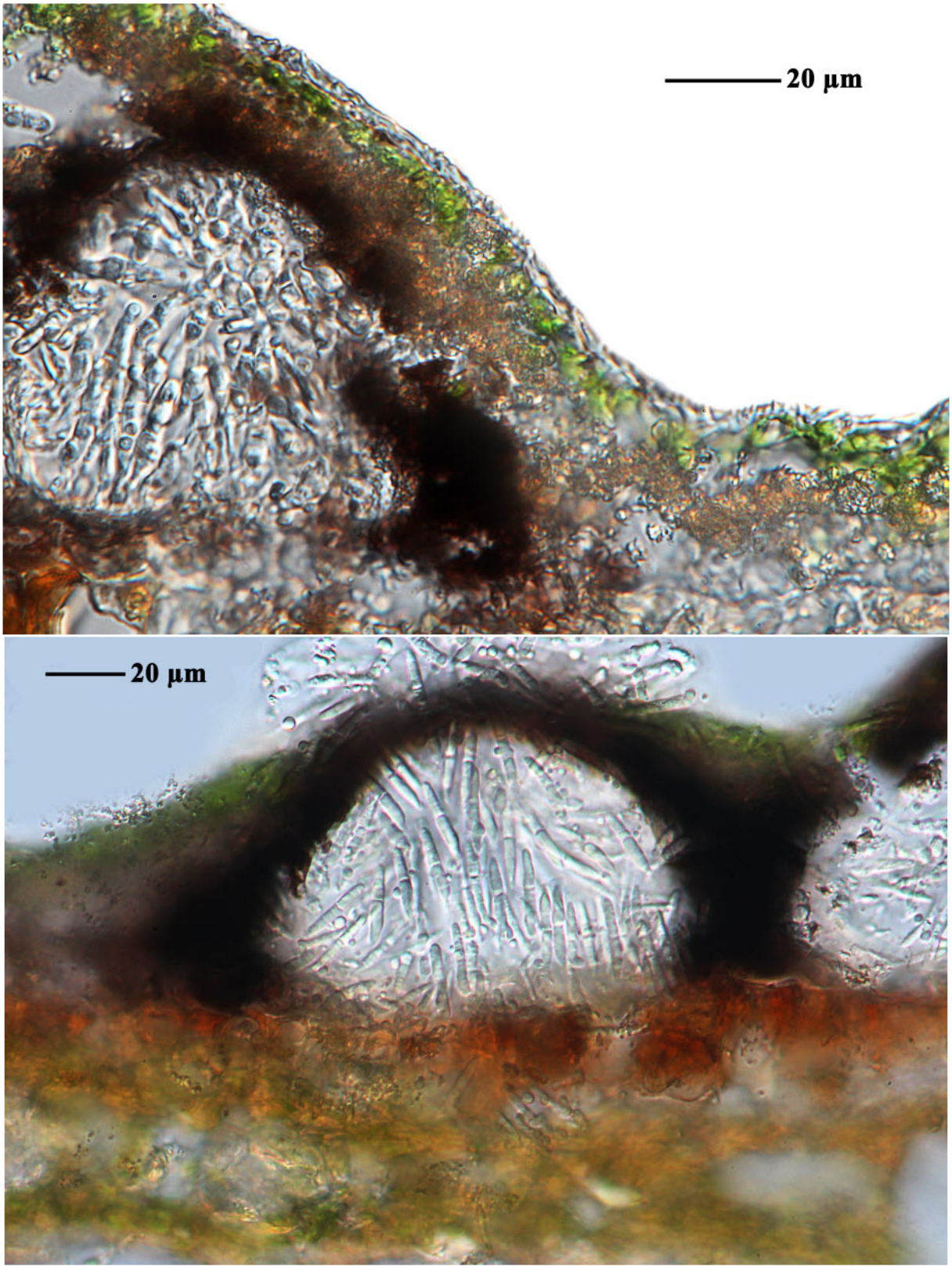


Strigula smaragdula Fr., Linnaea 5: 550 (1830)
= *Phyllocharis elegans* Fée, Essai Crypt. Exot. (Paris): xciv, c (1825)
= *Stigmatidium elegans* (Fée) Spreng., Syst. veg., Edn 16 4(1): 243 (1827)
= *Strigula elatior* Stirt., Trans. & Proc. Roy. Soc. Victoria 17: 75 (1881)
= *Strigula elegans* (Fée) Müll. Arg., Flora, Regensburg 63(3): 41 (1880)
= *Strigula elegans* var. *elatior* (Stirt.) Zahlbr., Cat. Lich. Univers. 1: 539 (1922)
= *Strigula elegans* var. *eumorpha* Müll. Arg., Flora, Regensburg 68(18): 342 (1885)

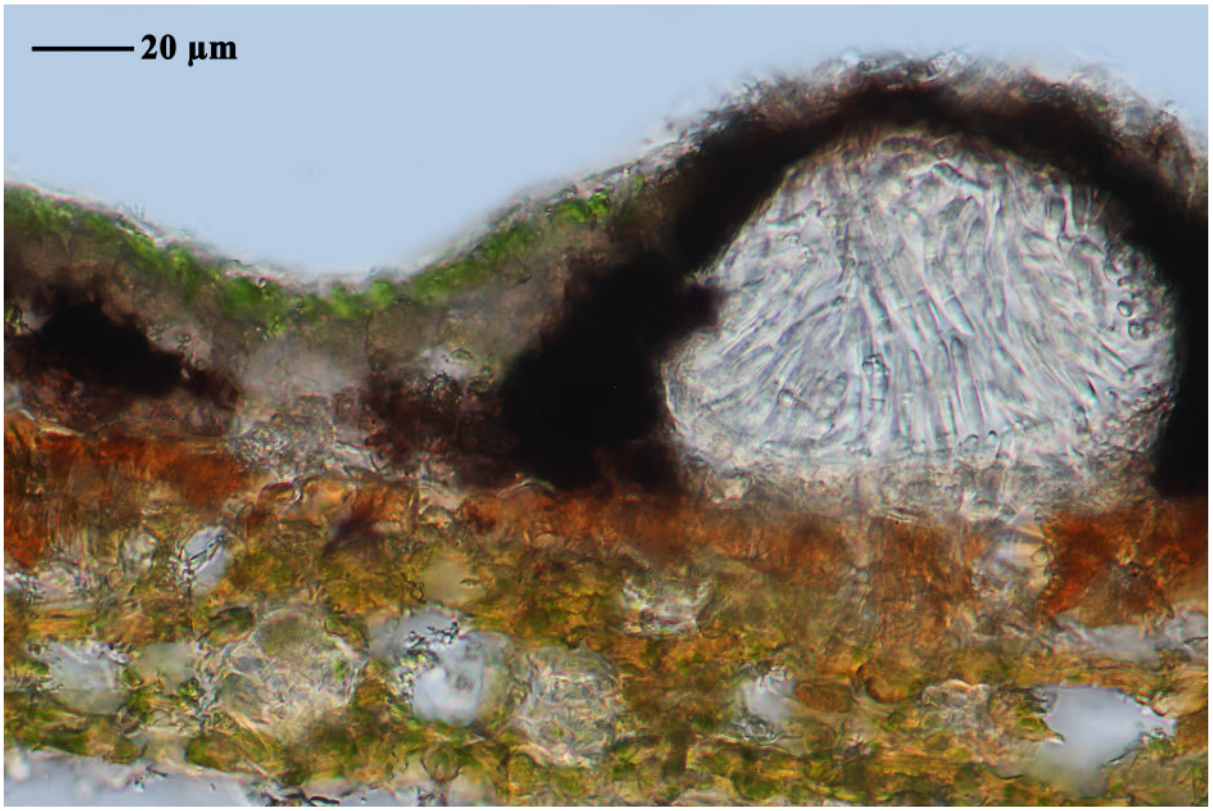
Thallus bright green, subcuticular, continuous or dispersed into rounded, partly confluent patches, 5–25 mm across. Perithecia 0.3–0.5 mm, half immersed, covered by thallus tissue, only uppermost part black. Excipulum black. Ascospores hyaline, 1-septate but with additional pseudoseptae, 14–24 × 4–6 µm.

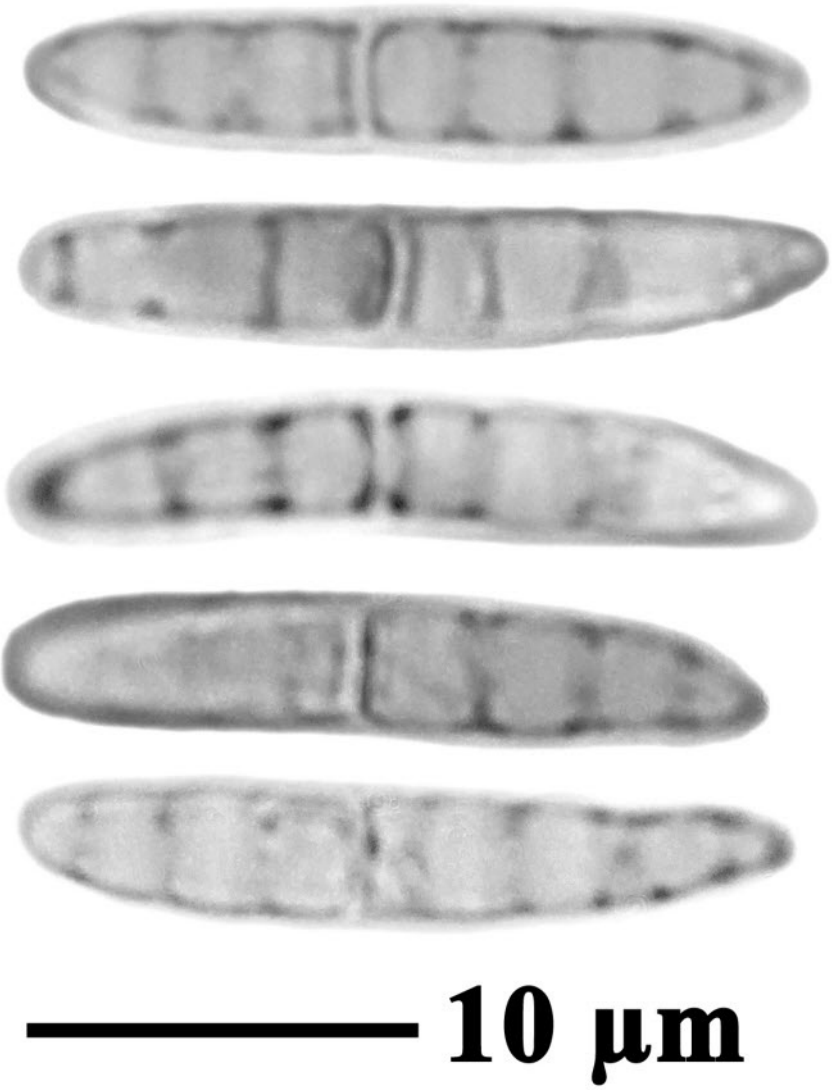
[19277], Australia, Northern Territory, Channell Point, 23 north-northwest of Daly River, 13°07' S, 130°31' E, 10 m, growing on leaves in monsoon forest on seasonal and spring-fed flats with palms, *Acacia*, *Corallia* and *Canorium*. Leg. J.A. Elix (27686), H.T. Lumbsch & H. Streimann 05.07.1991, det. H.T. Lumbsch. Chemistry: no lichen substances detected by TLC, anal. J.A. Elix. LICHENES AUSTRALASICI EXSICCATI NO. 247.





Strigula smaragdula





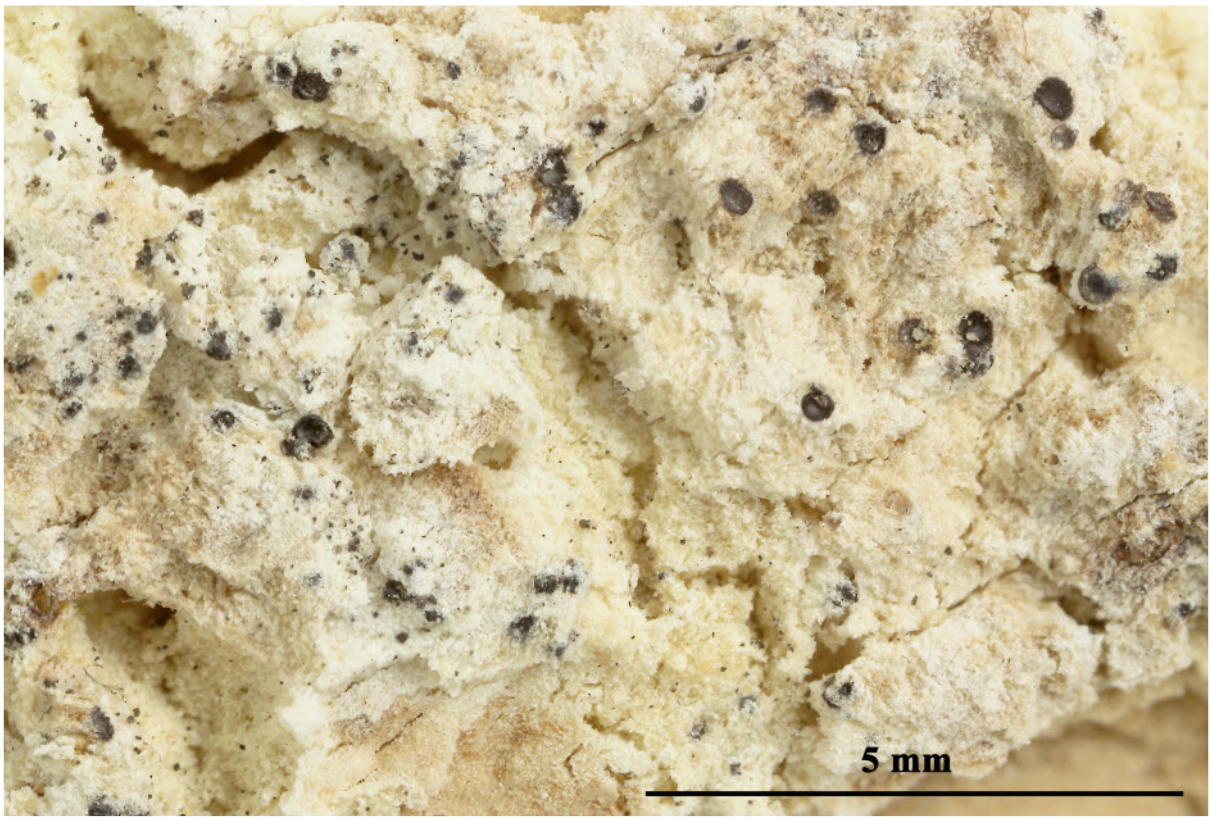
Strigula smaragdula

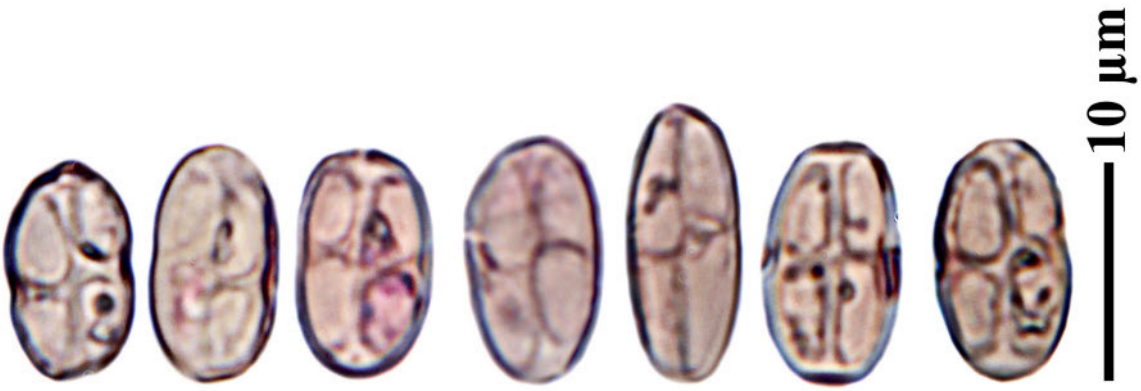
1913

Sulcopyrenula cruciata Aptroot, Fungal Diversity 9: 23 (2002)

Thallus crustose, greenish grey. Soredia and isidia absent. Photobiont trentepohlioid. Perithecia globose, black, without clypeus, solitary, with wide apical ostiole. Paraphyses unbranched. Ascospores brown, cruciate submuriform with 3–5 cells, lumina walls distinctly thickened, lumina usually rounded. Thallus UV+ yellow.

[ABL41633], Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque Natrural do Caraça, near rapids Cachoeira da Canjerans near Tanque Grande, on tree, 1300 m, 20°06’ S, 43°29’ W. Leg. A. Aptroot (no 41633), 20.09.1997, det. A. Aptroot, 1998. HOLOTYPE.







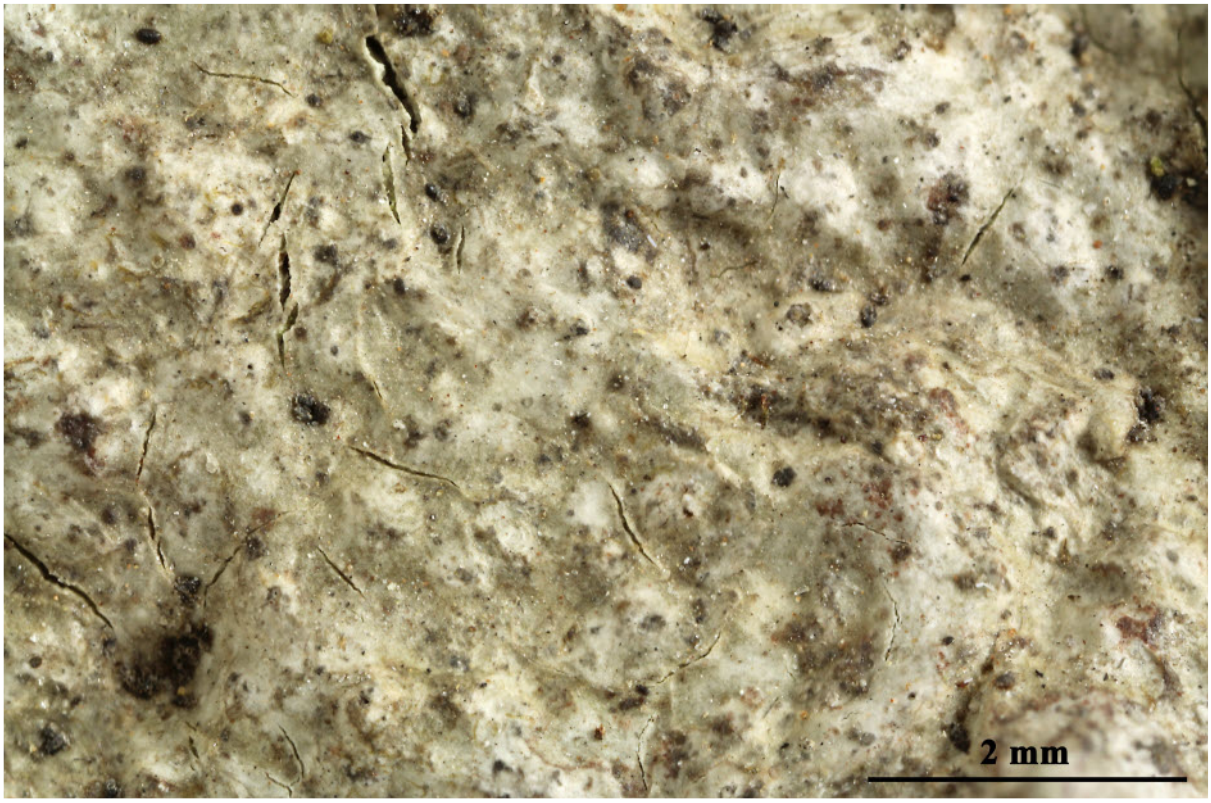
Sulcopyrenula cruciata

Swinscowia griseonitens (R.C. Harris) S.H. Jiang, Lücking & Sérus., in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [139] (2020)

= *Strigula griseonitens* R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 156 (1995)

Thallus corticolous, grey, ±shiny, with prosoplectenchymateous cortex, 10–30 µm thick. Ascomata immersed, subglobose, 0.3–0.4 mm diam., wall colourless below, expanded and streaked with pale brown around ostiole. Asci cylindrical, 100–130 × 15–20 µm. Ascospores 8/ascus, biseriate, submuriform, 7(–8)-septate with 3–4 cells longitudinally 1–2-septate, 26–33 × 8–10 µm.

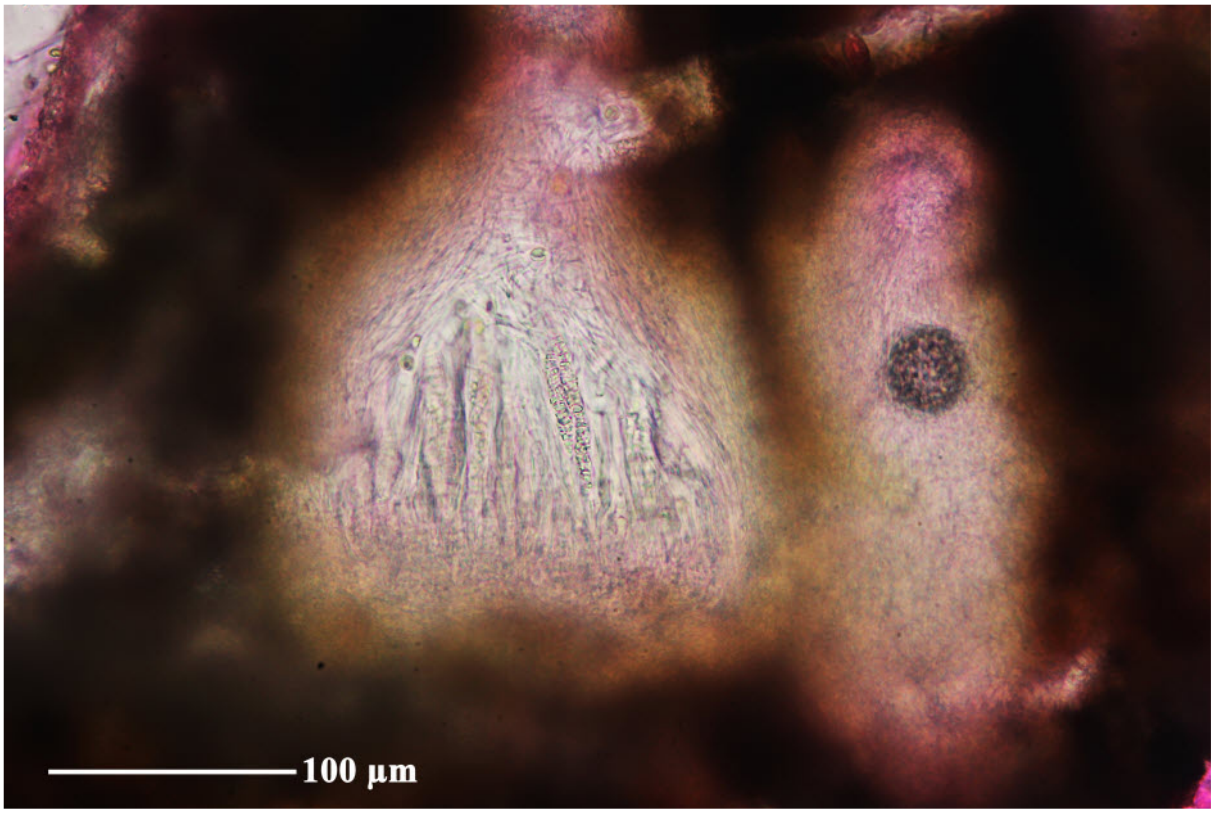
[ABL15071], Brazil, Sergipe, Parque dos Falcões, just E of Itabaiana, on tree bark in transitional forest, 400 m, 10°4450'' S, 37°22'38'' W. Leg. M. Cáceres & A. Aptroot (no 15071),11.11.2012, det. A. Aptroot 2012.





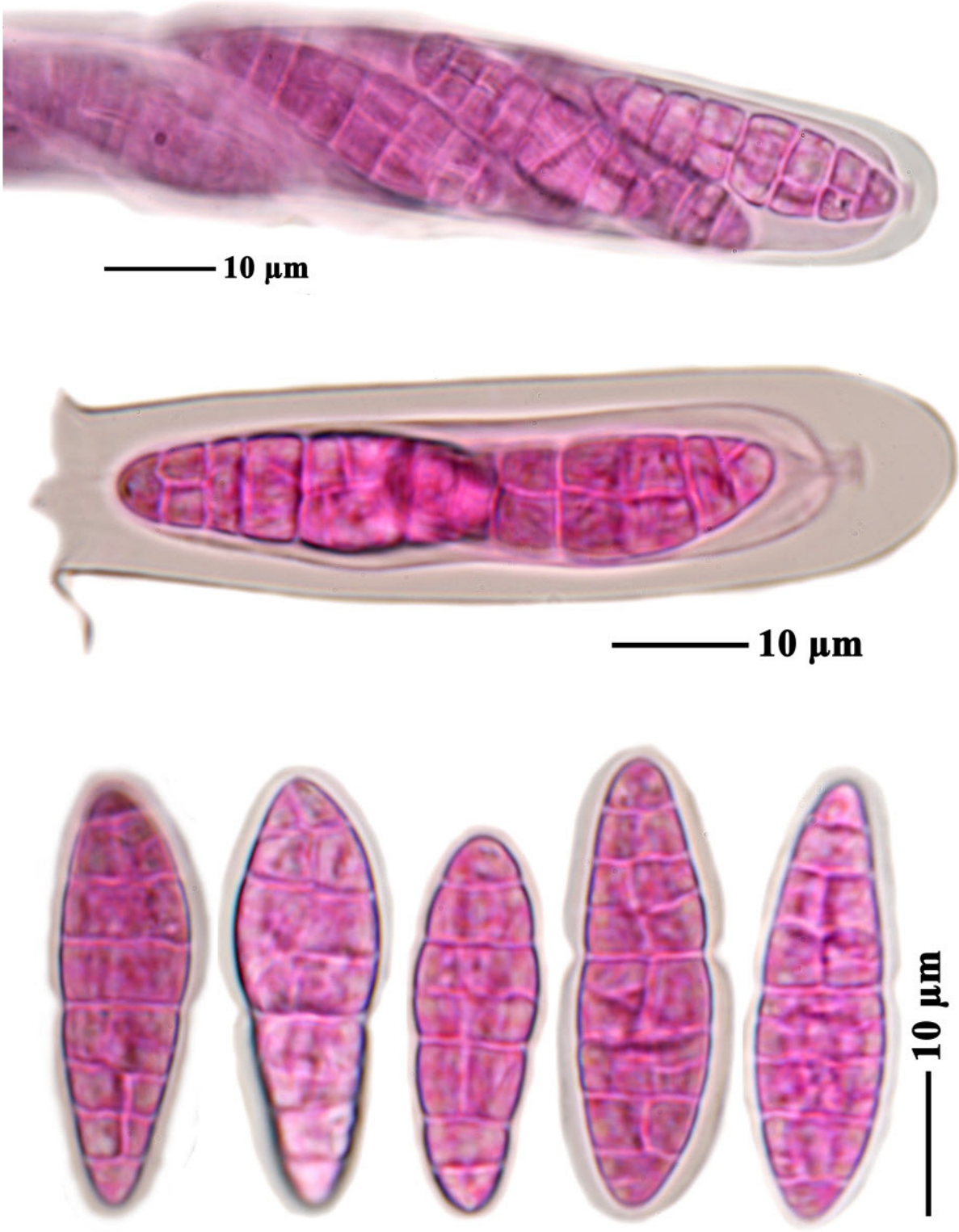
Swinscowia griseonitens

1917





Swinscowia griseonitens



Swinscowia griseonitens

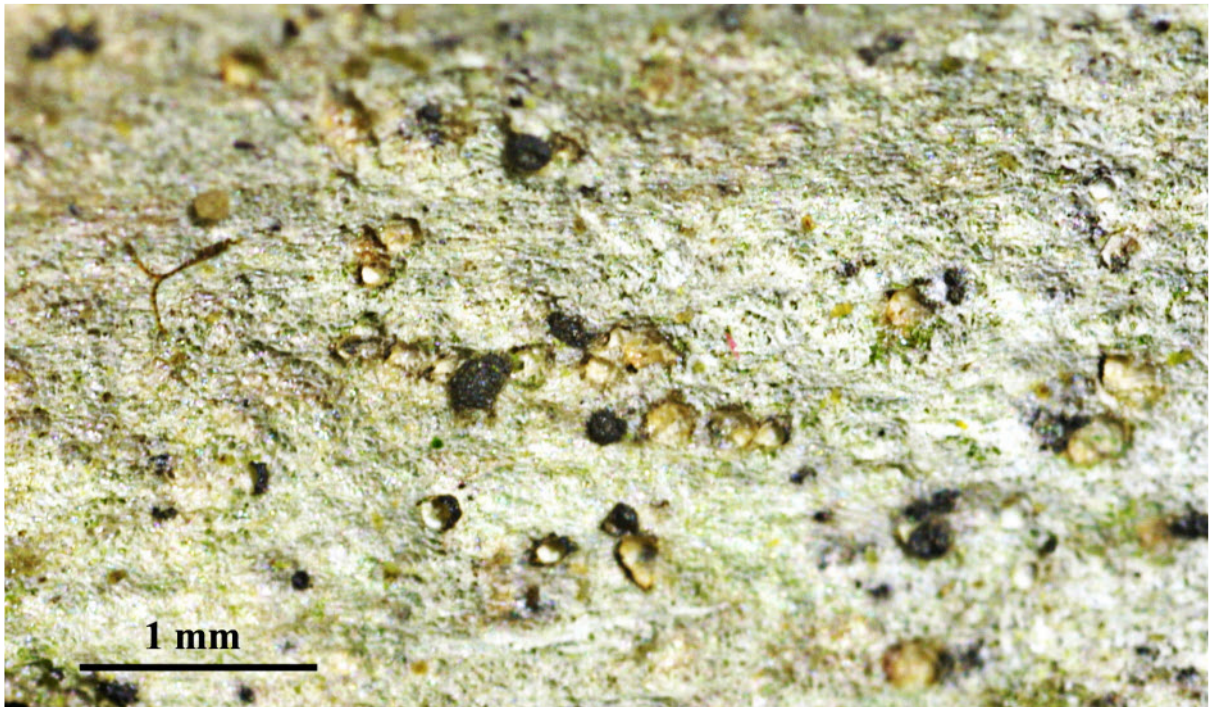
Swinscowia jamesii (Swinscow) S.H. Jiang, Lücking & Sérus., in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [139] (2020)

= *Strigula jamesii* (Swinscow) R.C. Harris, in Hawksworth, James & Coppins, Lichenologist 12(1): 107 (1980)

= *Geisleria jamesii* Swinscow, Lichenologist 3: 420 (1967)

Thallus whitish or pale grey, very thin, largely immersed. Ascomata 0.1–0.2 mm diam., half immersed in the substrate, upper part rounded or flattened, rarely conical; involucrellum confined to the apical part of the exciple. Asci narrowly clavate. Ascospores 8/ascus, 13.5–16(–17.5) × 4–5(–5.5) µm, subfusiform, 3-septate, lightly constricted at the septa, the two upper cells usually wider than the lower two, perispore 0.2–2.5 µm thick. Macropycnidia 0.05–0.1 mm diam., larghely immersed, involucrellum present in upper part; macroconidia (13–)13.5–16.5(–18) × (2–)2.5(–3) µm; microconidia 2.5–4 × 1–1.5 µm.

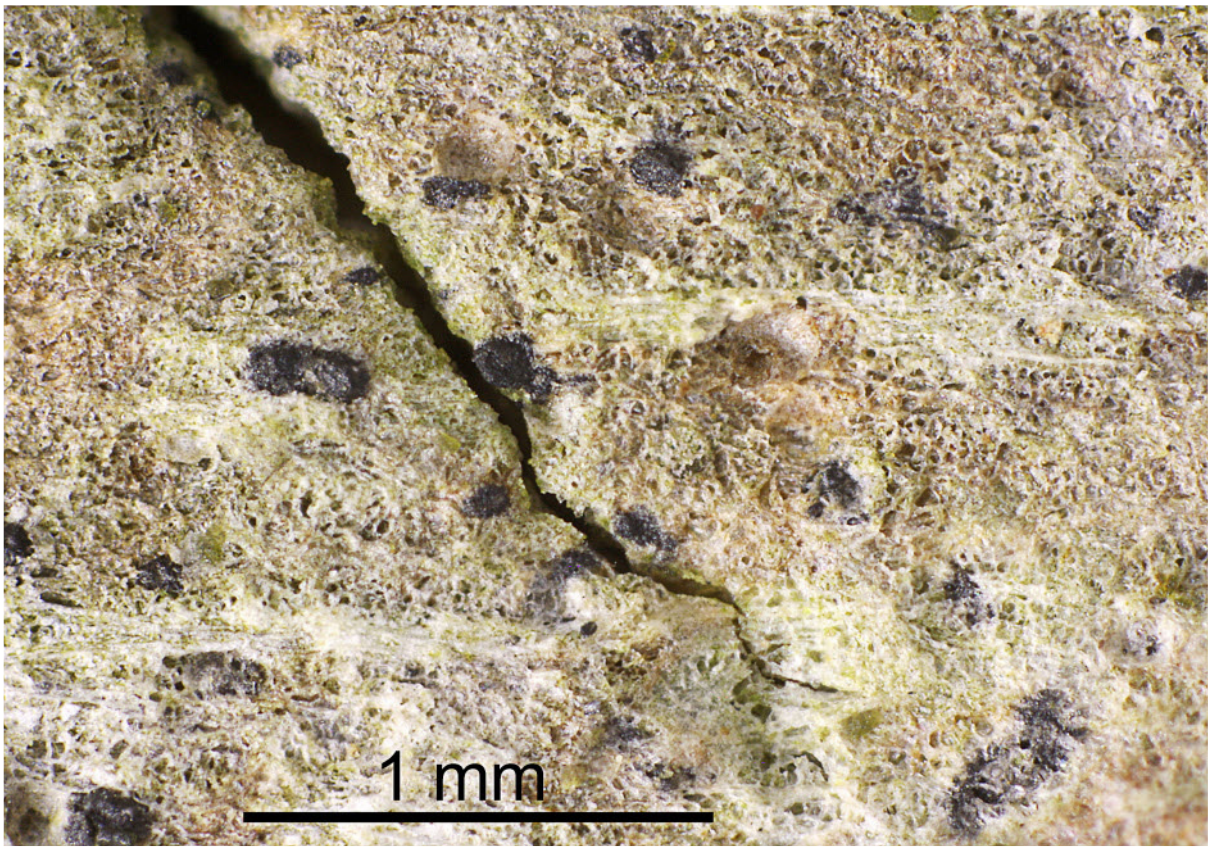
[12248], Germany, Baden-Württemberg, Alb-Donau Kreis, nördlich von Urspring bei der Bahnunterführung an der Straße nach Amstetten, auf Esche, sonnig, windoffen; 48°33.296' N, 9°53.442' E, 570 m, TK: 7435. Leg et det. F. Schumm 29.10.2005.

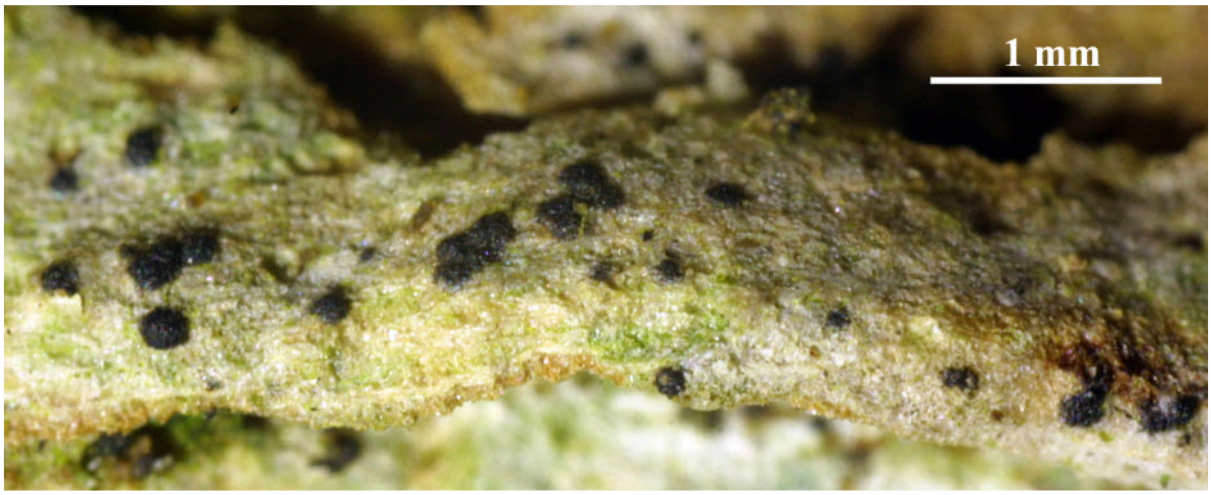


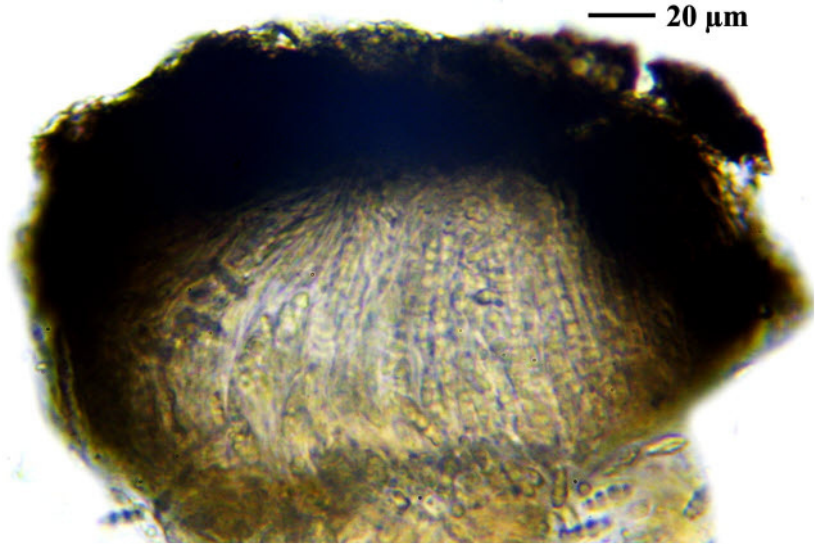


Swinscowia jamesii

1921

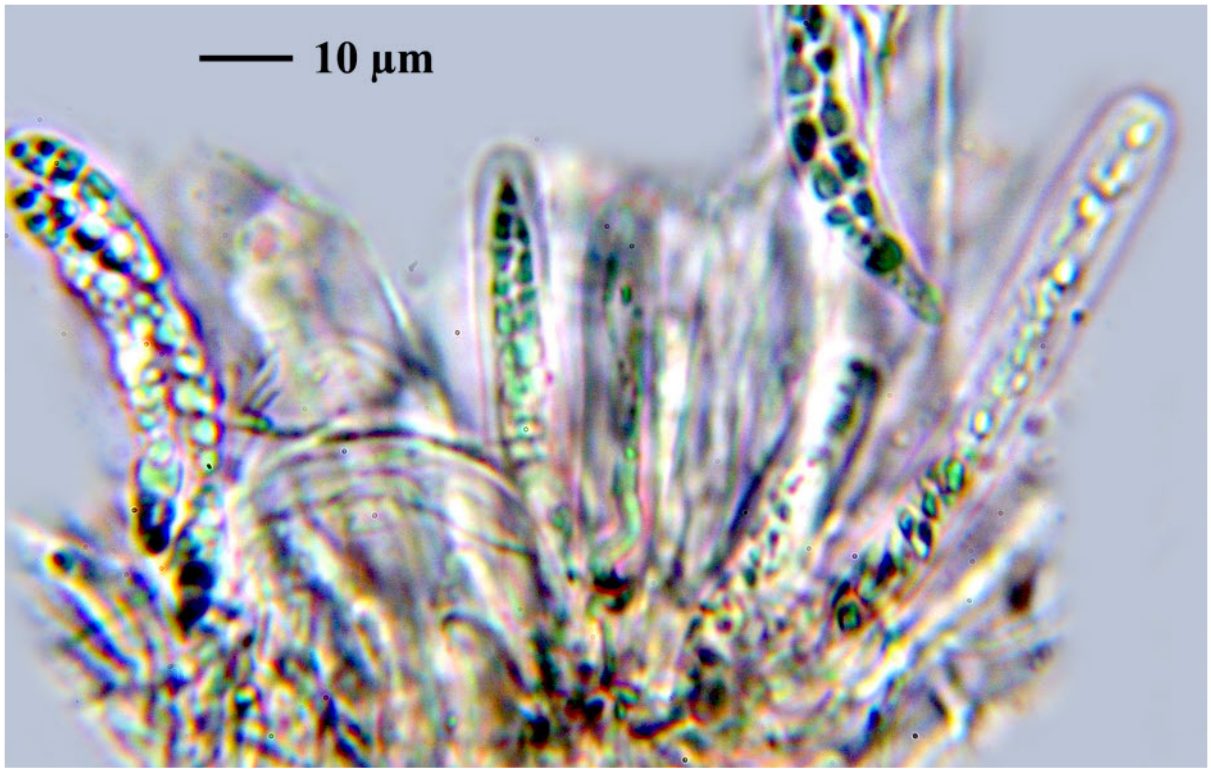


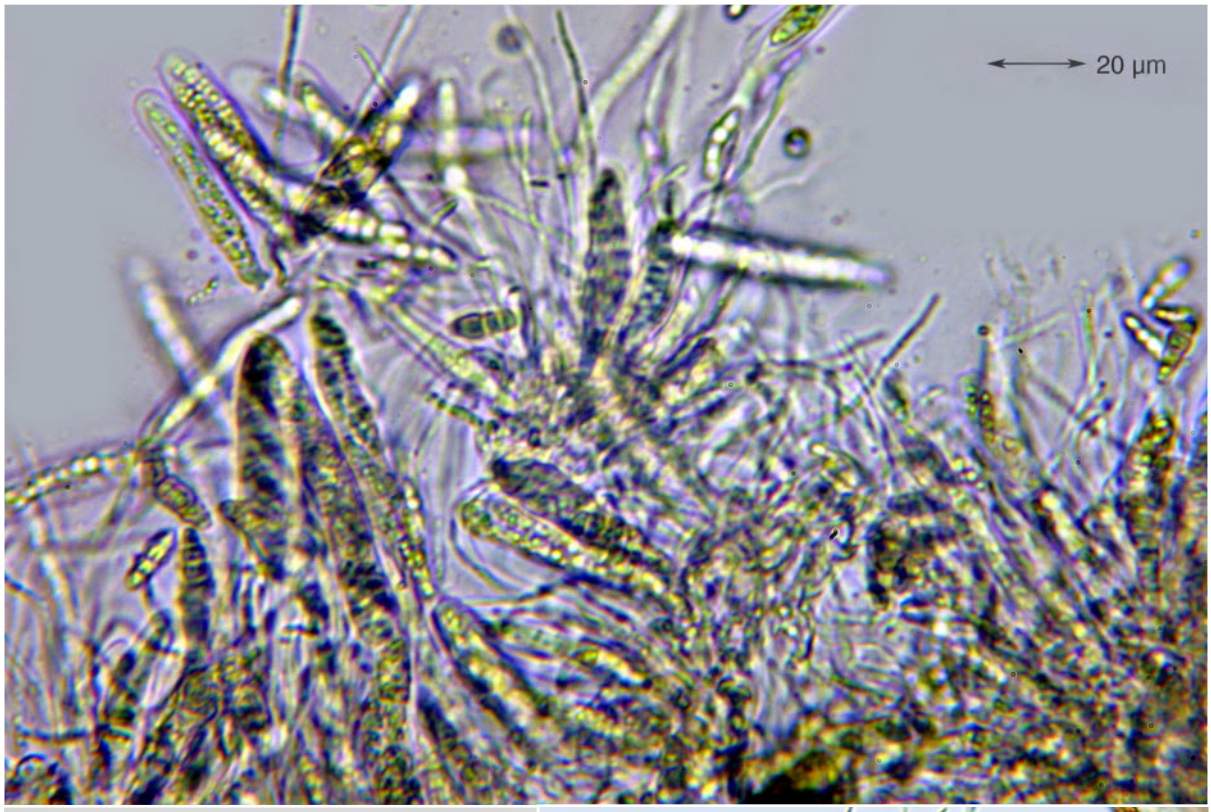


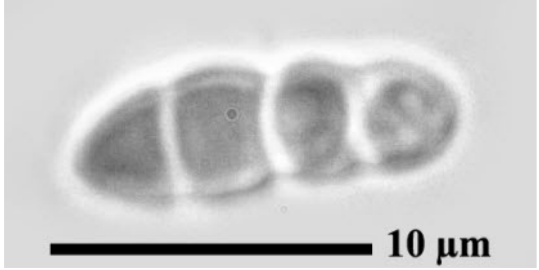


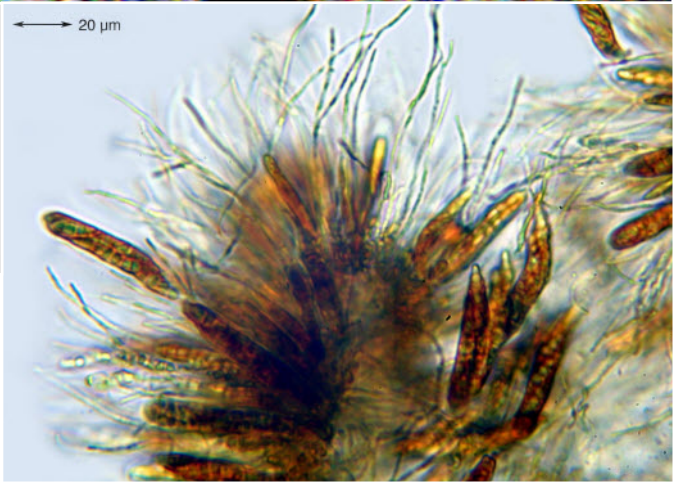
Swinscowia jamesii

1922



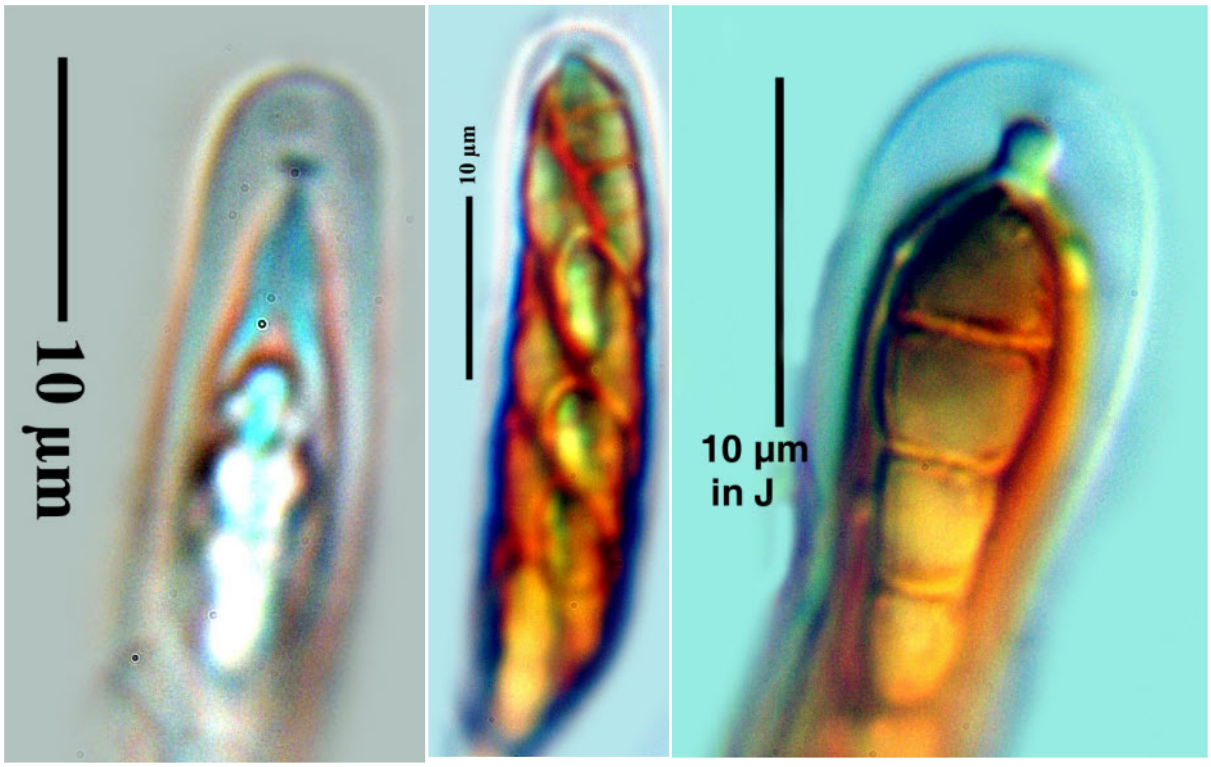






Swinscowia jamesii

1923

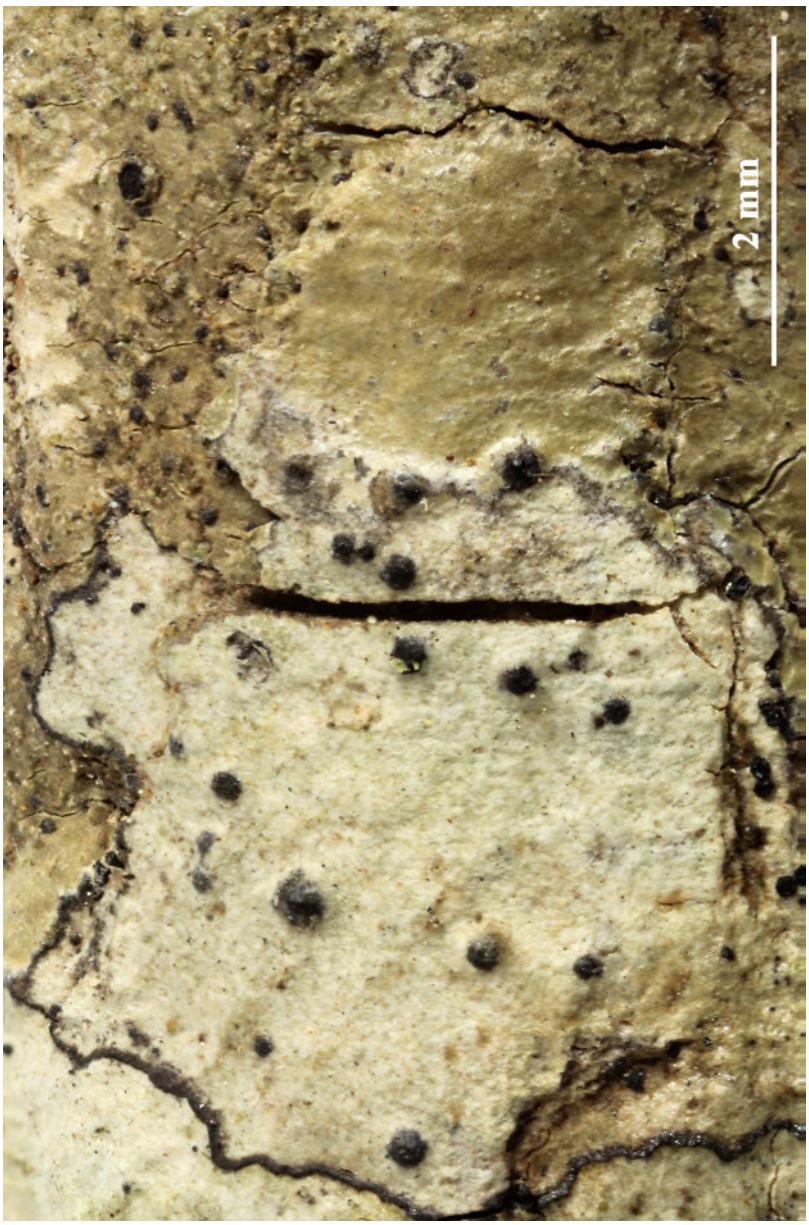


Swinscowia jamesii

Swinscowia obtecta (Vain.) S.H. Jiang, Lücking & Sérus., in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [140] (2020)
= *Strigula obtecta* (Vain.) R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 158 (1995)
= *Phyllobathelium obtectum* (Vain.) H. Mayrhofer, Biblthca Lichenol. 26: 82 (1987)
= *Polyblastiopsis obtecta* (Vain.) Zahlbr., Cat. Lich. Univers. 1: 351 (1922)
= *Thelenella obtecta* Vain., Acta Soc. Fauna Flora fenn. 7(no. 2): 218 (1890)

Thallus endophloeodic to thin epiphloeodic, whitish to pale yellowish, thin, indistinct, mat. Ascocarp 0.5–1 mm diam., globose, immersed in the thallus or substratum, dispersed. Ostiole brownish. Ascospores muriform, fusiform, 4–6/ascus, 60–85 × 18–26 µm.

[ABL22228]. Brazil, Rio Grande do Sul, Viamão, near Parque Itapua, on tree bark. 100 m, 30°05’ S, 51°00’ W. Leg. M. Cáceres & A. Aptroot (no 22228), 26.9.2014, det. A. Aptroot, 2014.





Swinscowia obtecta

1926



Swinscowia obtecta

1927

Thelenella brasiliensis (Müll. Arg.) Vain., J. Bot., Lond. 34: 293 (1896)
= *Microglaena brasiliensis* Müll. Arg., Flora, Regensburg 71: 547 (1888)

Thallus epilithic, pale brown, or olive brown to olive green, thin, rimose, matt to somewhat glossy. Ascocarps 0.2–0.4 mm, dispersed, in the thallus immersed. Areolae with Ascocarps somewhat semiglobose emergent. Ostiolar area dark brown. Ascospores muriform, with 6-7 transverse and 2 parallel longitudinal septae, long ellipsoid to subcylindrical, usually (4-)-8/ascus, 20–32 × 9–13 µm

[ABL21410], Brazil, Ceará, Quixadá, Açude Cedró, trilha da Galinha, on gneiss in Caatinga. 250 m, 04°58’ S, 39°03’ W. Leg. M. Cáceres & A. Aptroot (no 21410), 31.03.2014, det. A. Aptroot, 2014.





Thelenella brasiliensis

1929





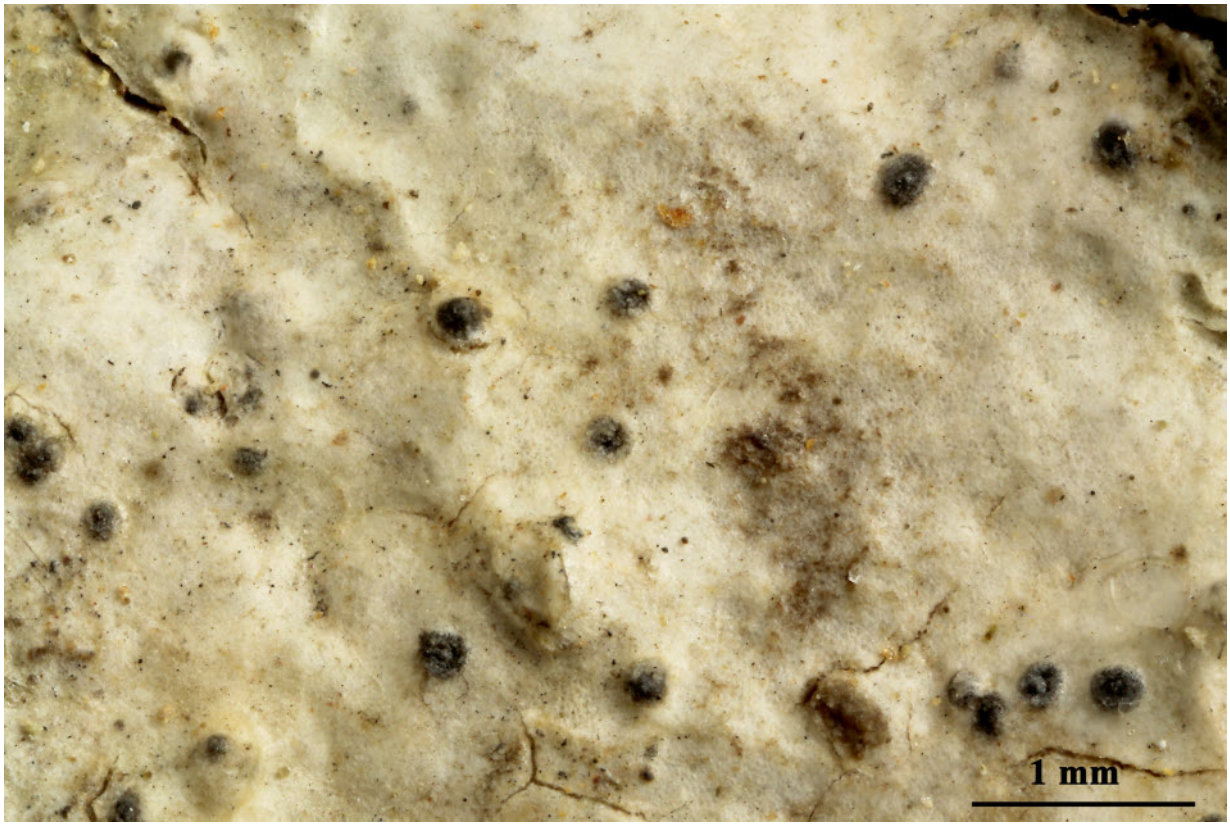
Thelenella brasiliensis

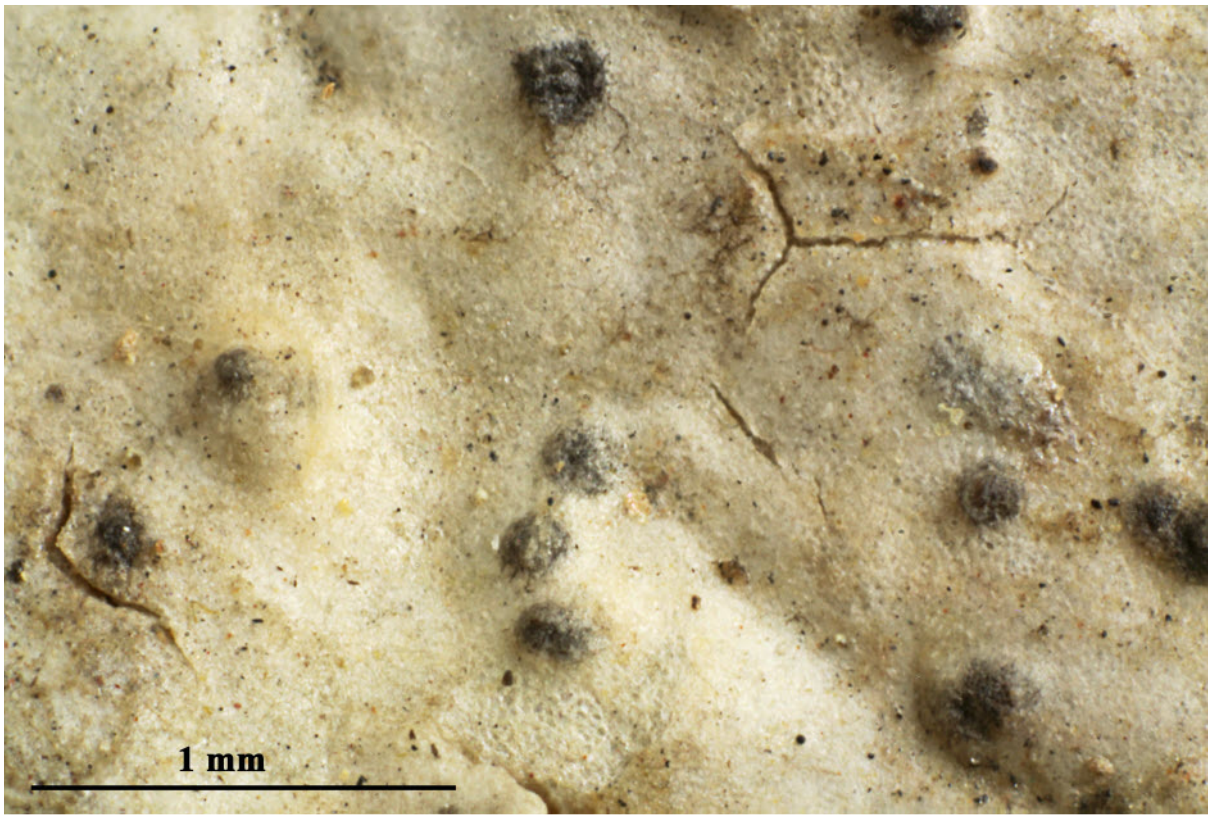
1930

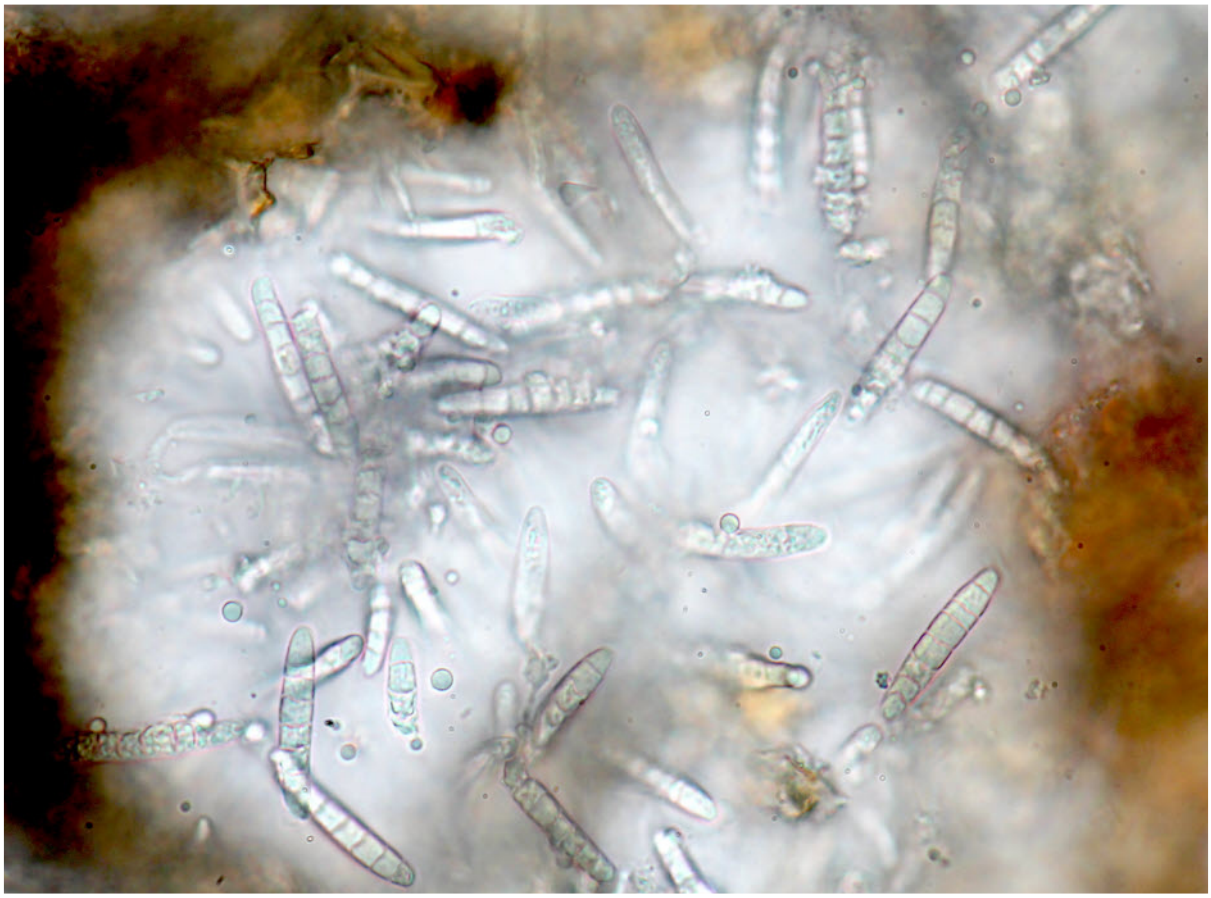
Thelenella lateralis Aptroot & M. Cáceres, in Aptroot, Andrade, Mendonça, Lima & Cáceres, Phytotaxa 197(3): 205 (2014)

Thallus thin, corticate, metallic grey, without pseudocyphellae, without prothallus. Ascomata immersed in the bark, pyriform, 0.4–0.55 mm diam., single. Wall only carbonized above. Ostiole eccentric, dark grey. Hamathecium not inspersed with oil droplets, filaments anastomosing. Ascus with ocular chamber. Ascospores 8/ascus, long ellipsoid-fusiform, hyaline, irregularly biseriate, irregularly muriform, 7–9 × 0–2-septate, 27 × 9–10.5 µm, ends rounded or lower end pointed. Pycnidia not observed. Chemistry: No substances detected.

[ABL18215]**,** Brazil, Sergipe, Aracaju, Parque da Cidade; in park with atlantic forest remnant, on tree bark. 10°52’57’’ S, 37°03’10’’ W, 75 m. Leg. M. Cáceres & A. Aptroot (no 18215), 15.9.2013, det A. Aptroot, 2013.

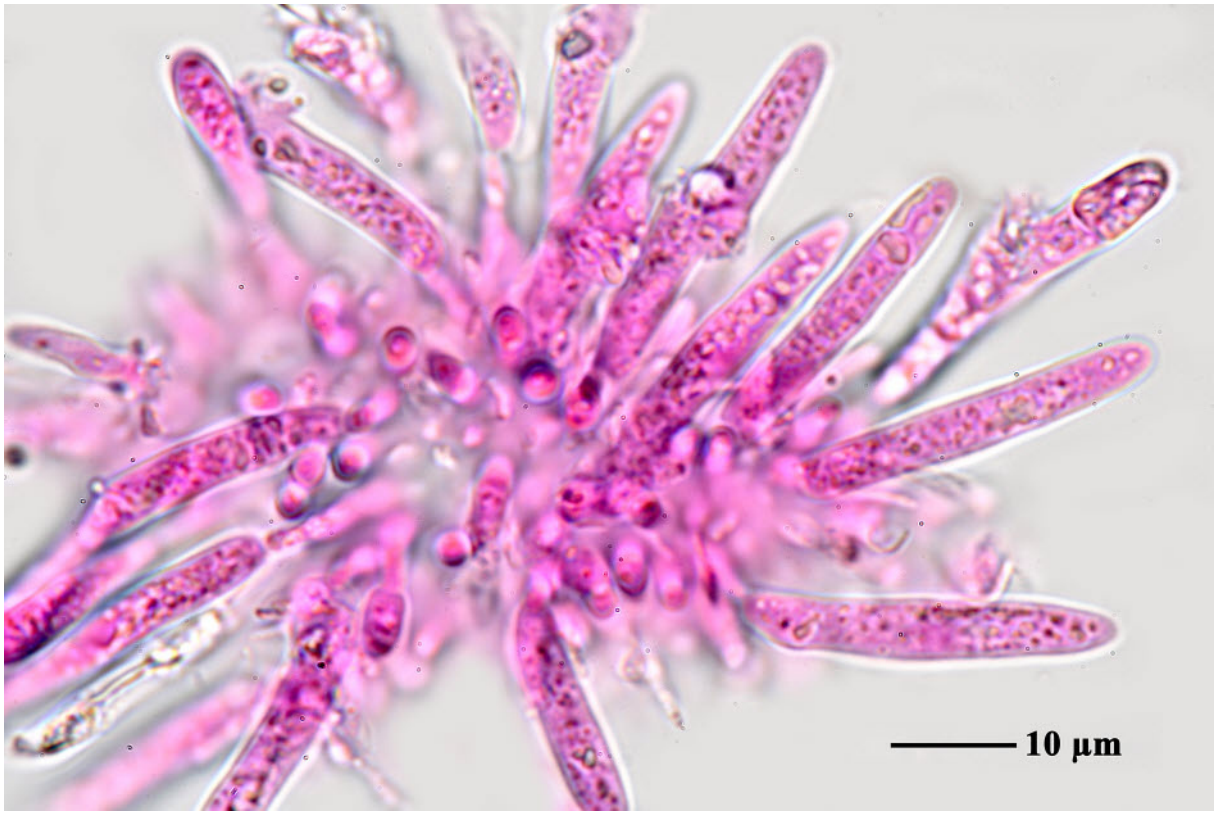






Thelenella lateralis

1932





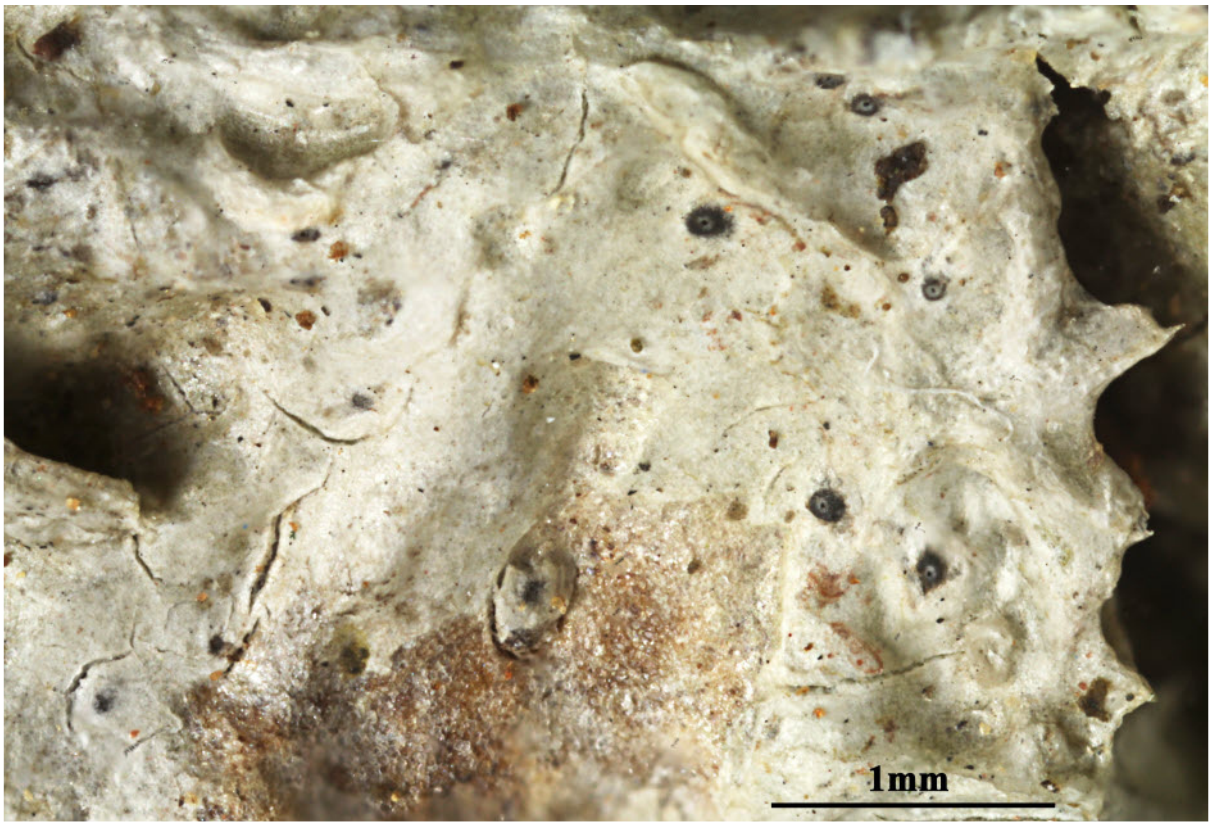
Thelenella lateralis

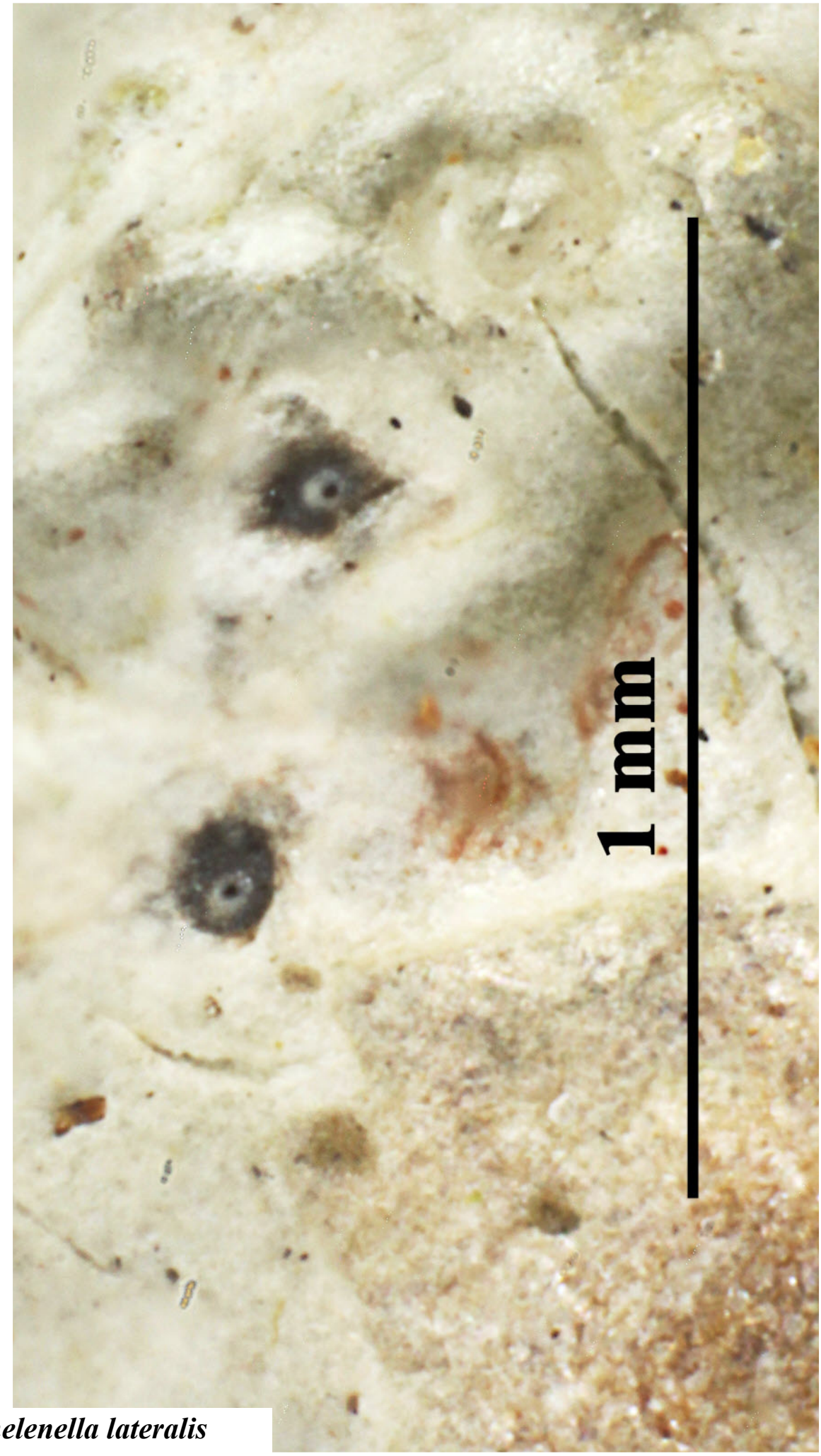
1933

Thelenella lateralis Aptroot & M. Cáceres, in Aptroot, Andrade, Mendonça, Lima & Cáceres, Phytotaxa 197(3): 205 (2014)

Thallus thin, corticate, metallic grey, without pseudocyphellae, without prothallus. Ascomata immersed in the bark, pyriform, 0.4-0.55 mm diam., single. Wall only carbonized above. Ostiole eccentric, dark grey. Hamathecium not inspersed with oil droplets, filaments anastomosing.Ascus with ocular chamber. Ascospores 8/ascus, long ellipsoid-fusiform, hyaline, irregularly biseriate, irregularly muriform, 7–9 × 0–2 septate, 27–32 × 9–10.5 µm, ends rounded or lower end pointed. Pycnidia not observed. Chemistry: No substances detected.

[ABL18217], Brazil, Sergipe, Aracaju, Parque da Cidade, in park with Atlantic forest remnant, on tree bark. 75 m, 10°52’57’’ S, 37°03’10’’ W. Leg. M. Cáceres & A. Aptroot (no 18217), 15.09.2013, det. A. Aptroot, 2013.



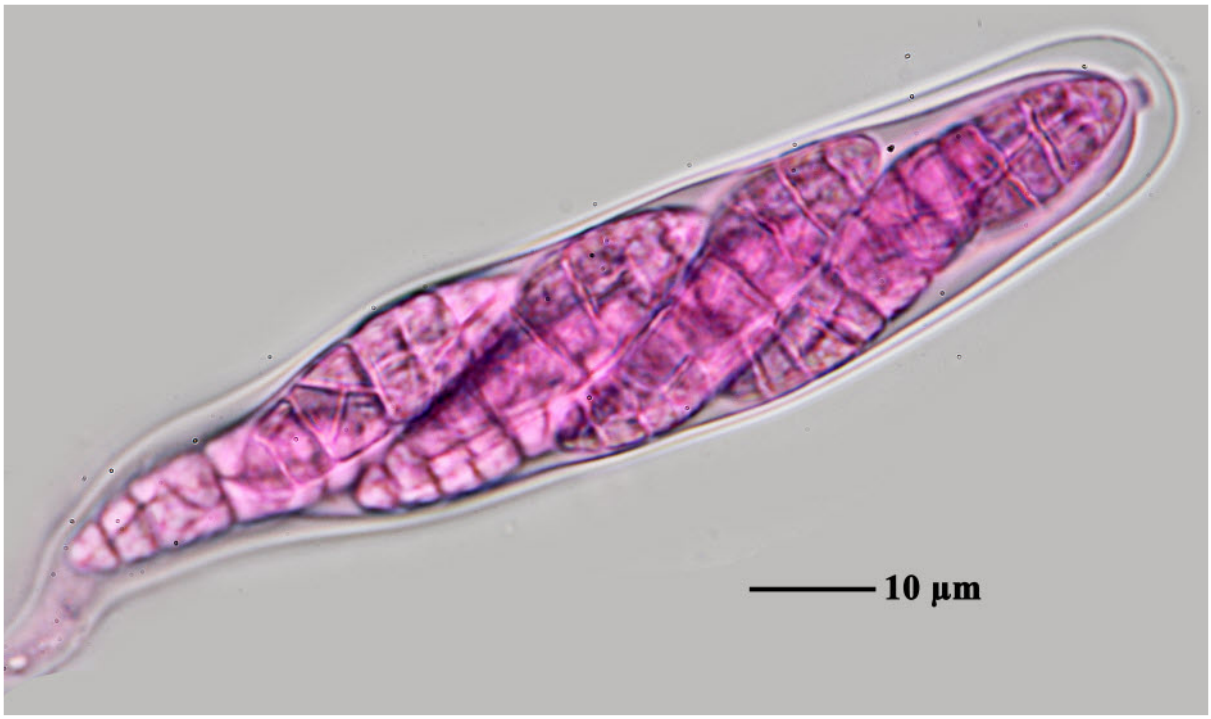


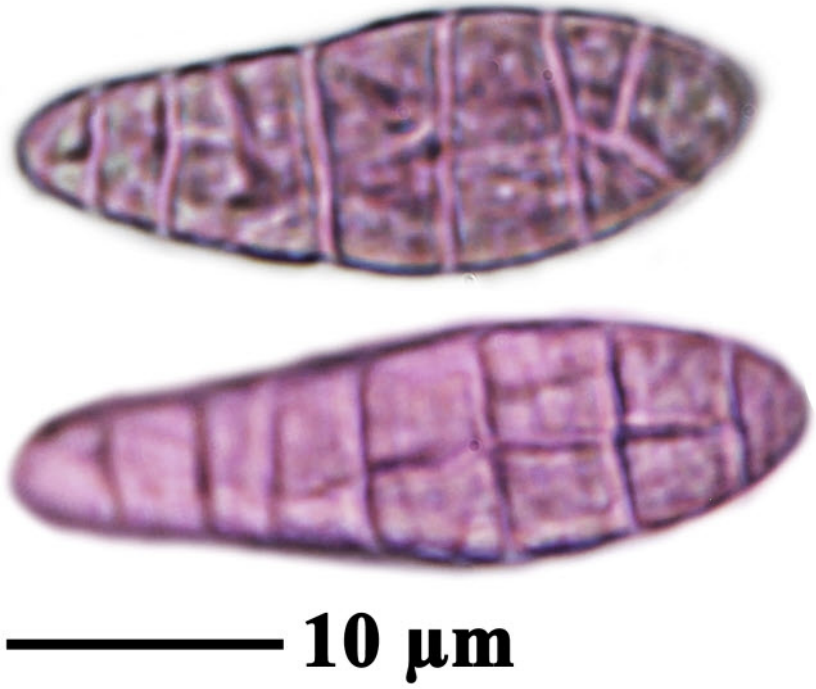
Thelenella lateralis

1935



Thelenella lateralis





Thelenella lateralis

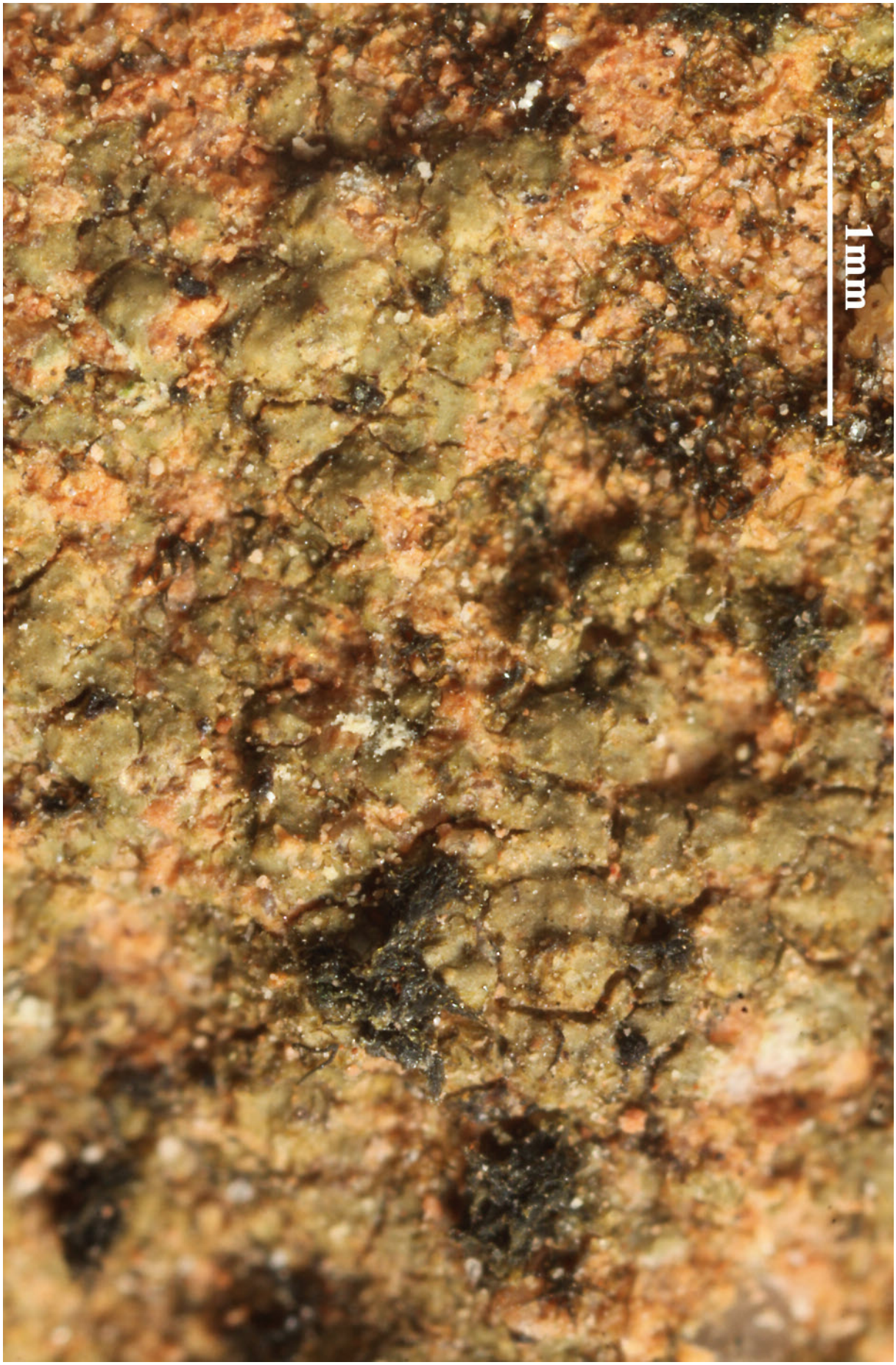
1937

Thelenella luridella (Nyl.) H. Mayrhofer, Biblthca Lichenol. 26: 45 (1987)
= *Luykenia luridella* (Nyl.) Luyk.
= *Microglaena luridella* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 192 (1921) [1922]
= *Verrucaria luridella* Nyl., Expos. Synopt. Pyrenocarp.: 41 (1858)

Thallus epilithic, ochre, yellowish grey, greyish brown to olive brown, thin, membranous fissured to areolate-fissured, matt to weakly glossy. Ascocarps 0.2–0.6 mm diam., dispersed. Ostiolar area dark brown. Ascospores muriform, with 7–9 transversal septa and 3 longitudinal septa, 4–6–8/ascus, hyalin, ellipsoid, 30–45 × 12–19 µm

[ABL13471], Brazil, Sao Paulo,Botucatu, near Santo Antonio church, on soft rock in degraded cerrado forest. 850 m, 22°53’59” S, 48°29’21” W. Leg. M. Cáceres & A. Aptroot (no 13471), 14.9.2912, det. A. Aptroot, 2012.





Thelenella luridella

1939







Thelenella luridella





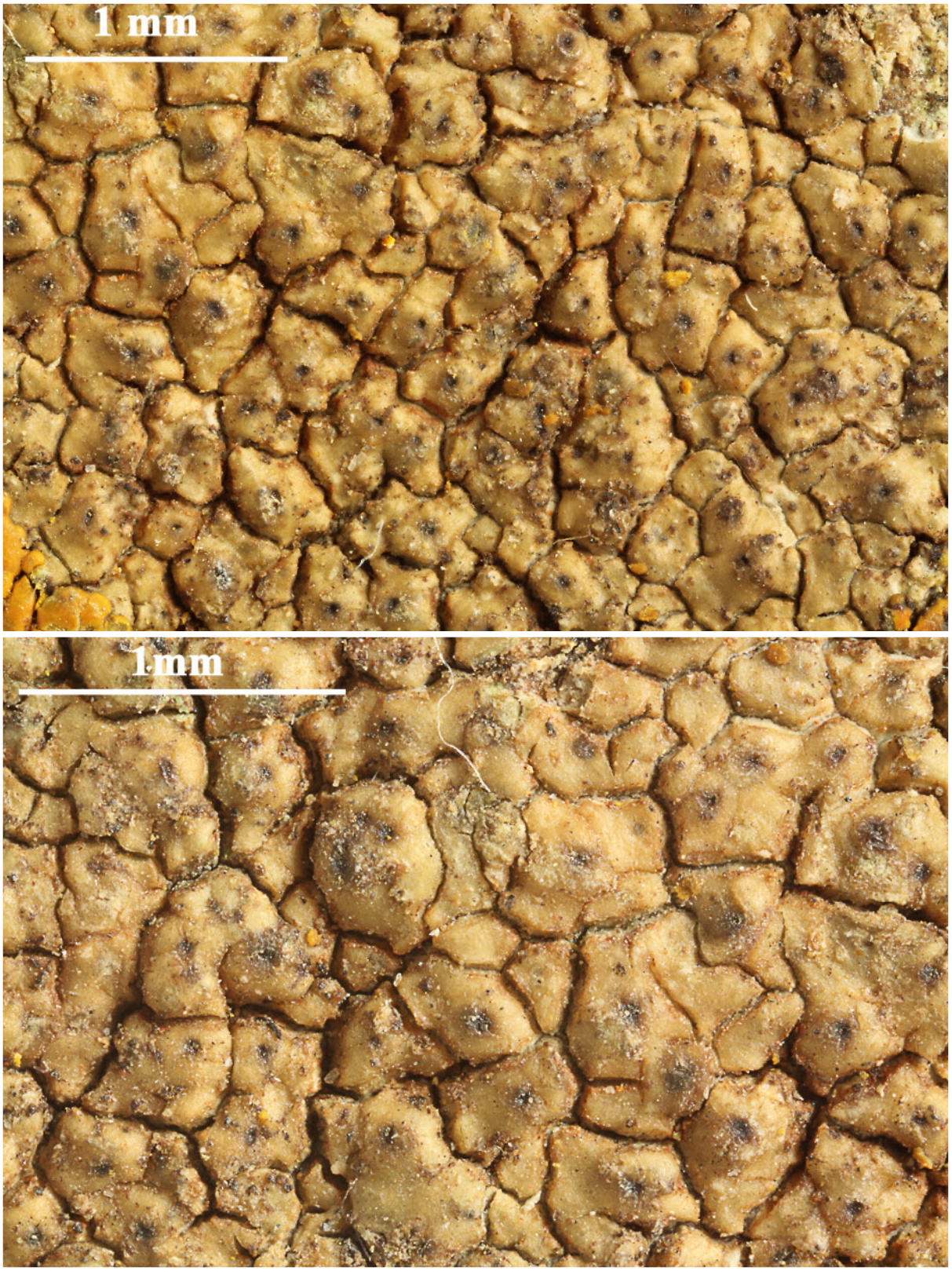
Thelenella luridella

Thelenella luridella (Nyl.) H. Mayrhofer, Biblthca Lichenol. 26: 45 (1987)
= *Luykenia luridella* (Nyl.) Trevis., Conspect. Verruc.: 20 (1860)
= *Microglaena luridella* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 192 (1921)
= *Verrucaria luridella* Nyl., Expos. Synopt. Pyrenocarp.: 41 (1858)

Thallus brownish, thin, inconspicuous, saxicolous. Ascomata inconspicuous, with little carbonization. Ascospores 8/ascus, hyaline, muriform, 30–45 × 12–19 µm, 7–9 × 1–3-septate.

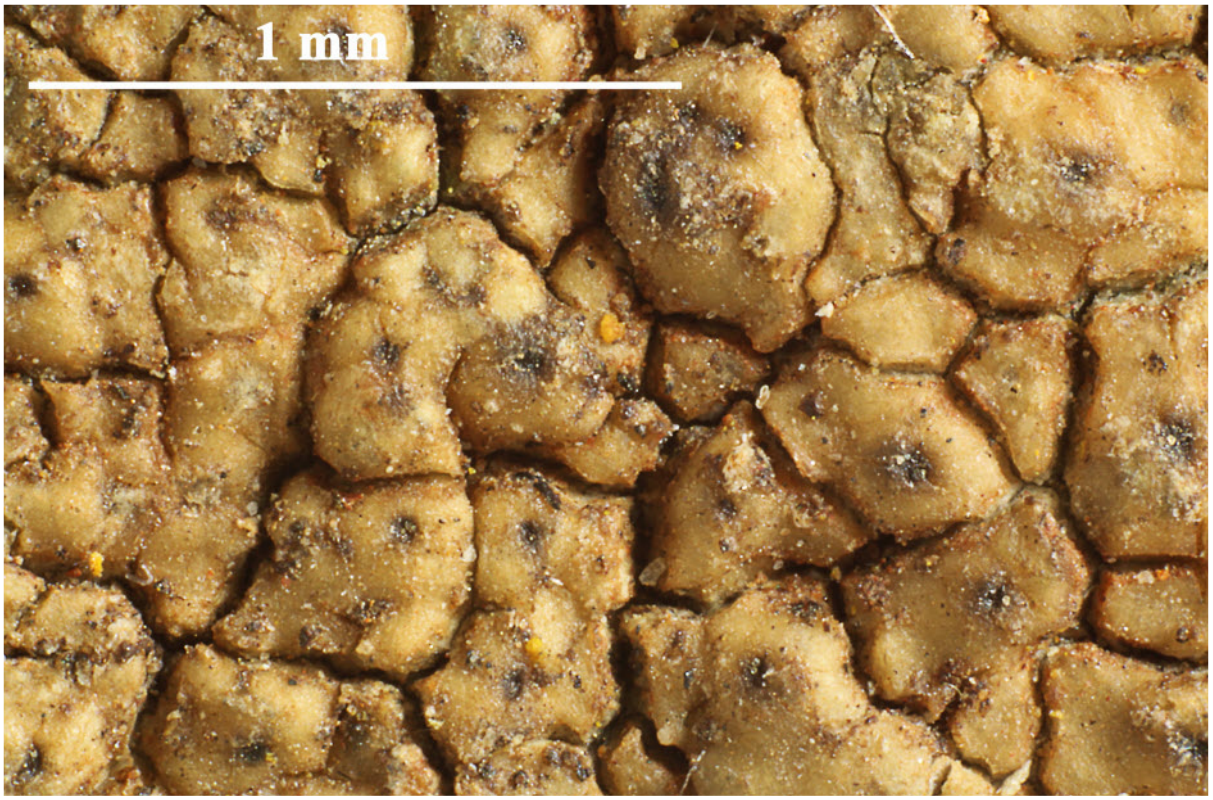
[TSB-16706], Argentina, Misiones, Iguazù, Parque National de Iguazù, Garganta del Diablo, on basalt. Leg. M. Codogno & M. Tretiach, XII.1987, det. H. Mayrhorfer, 1992.

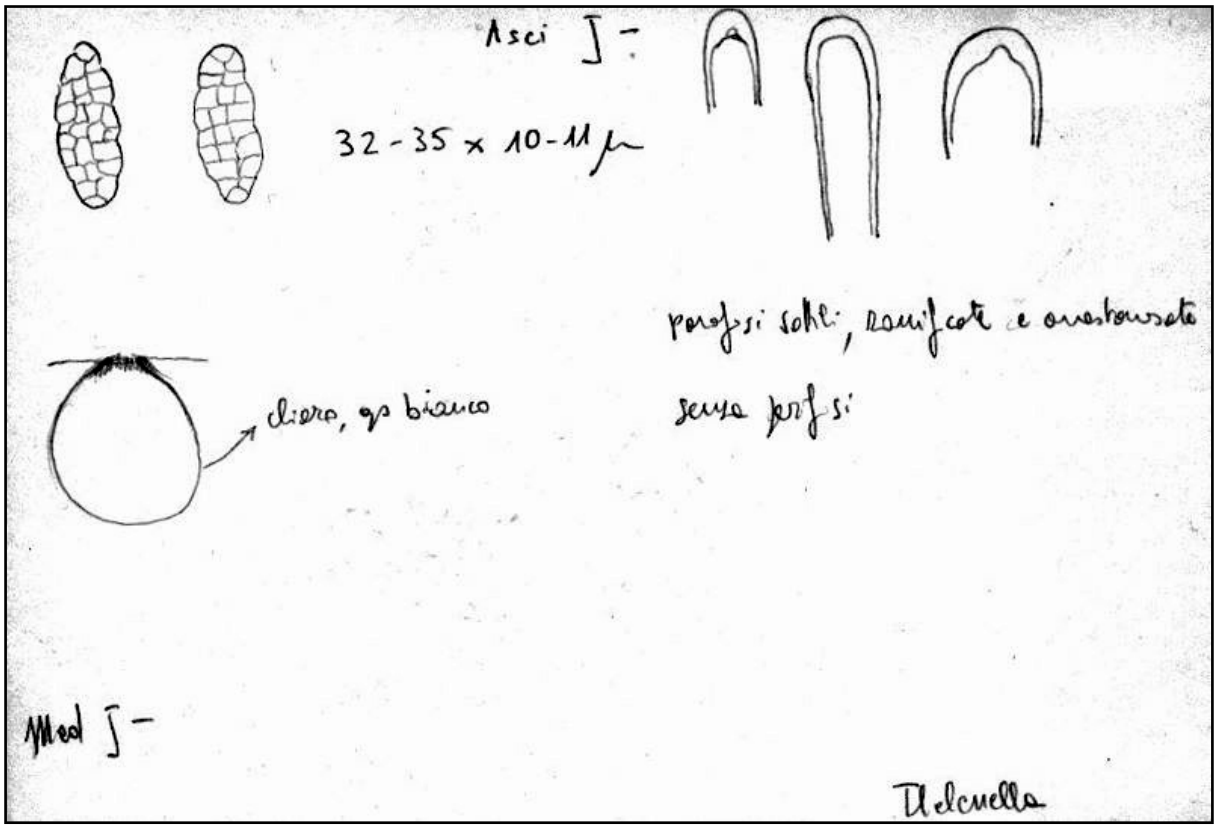




Thelenella luridella

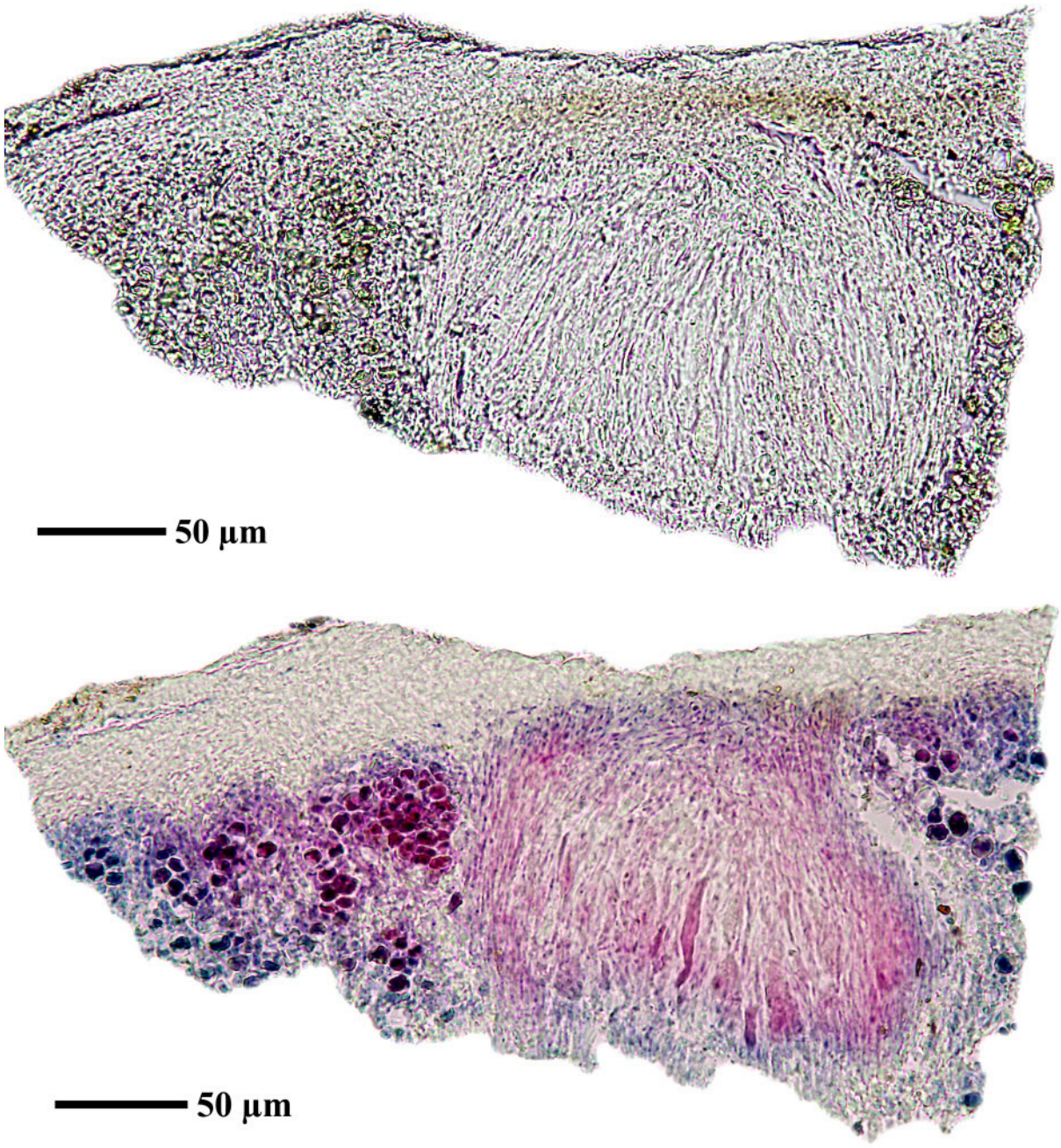
1943





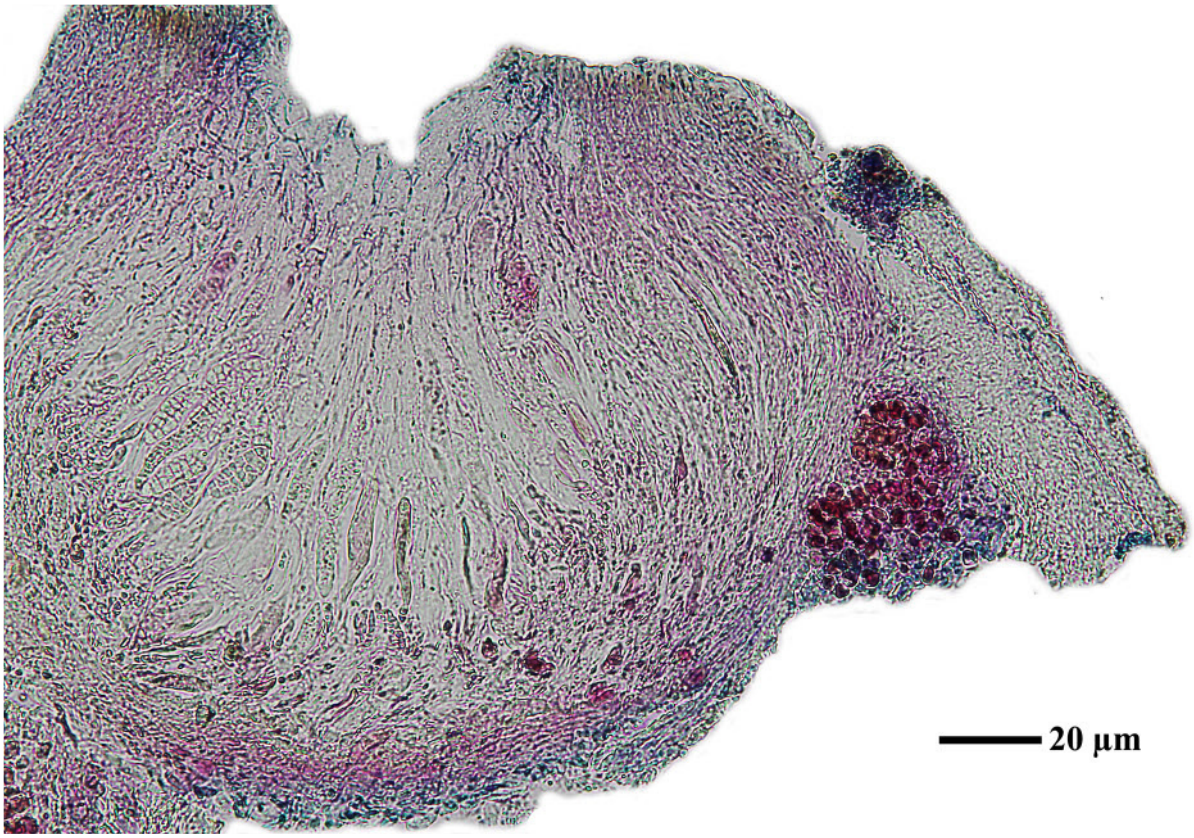
Thelenella luridella

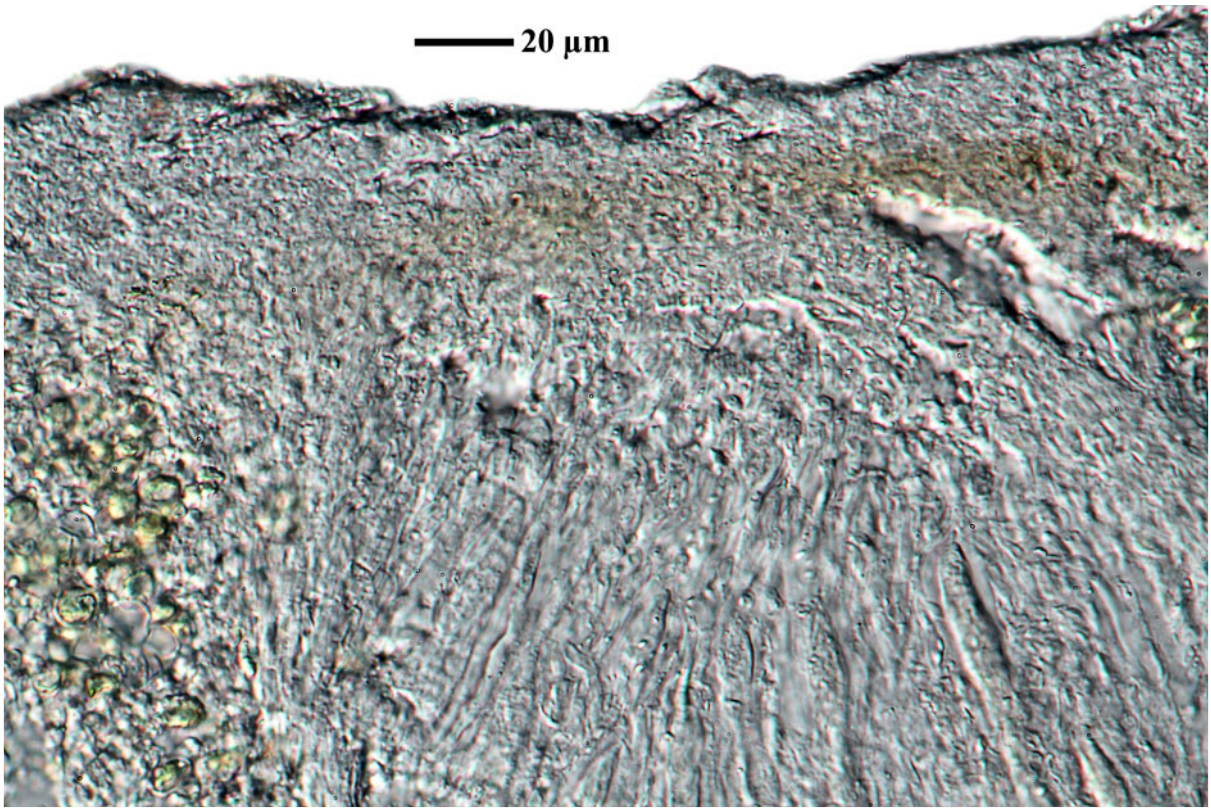
1944



Thelenella luridella

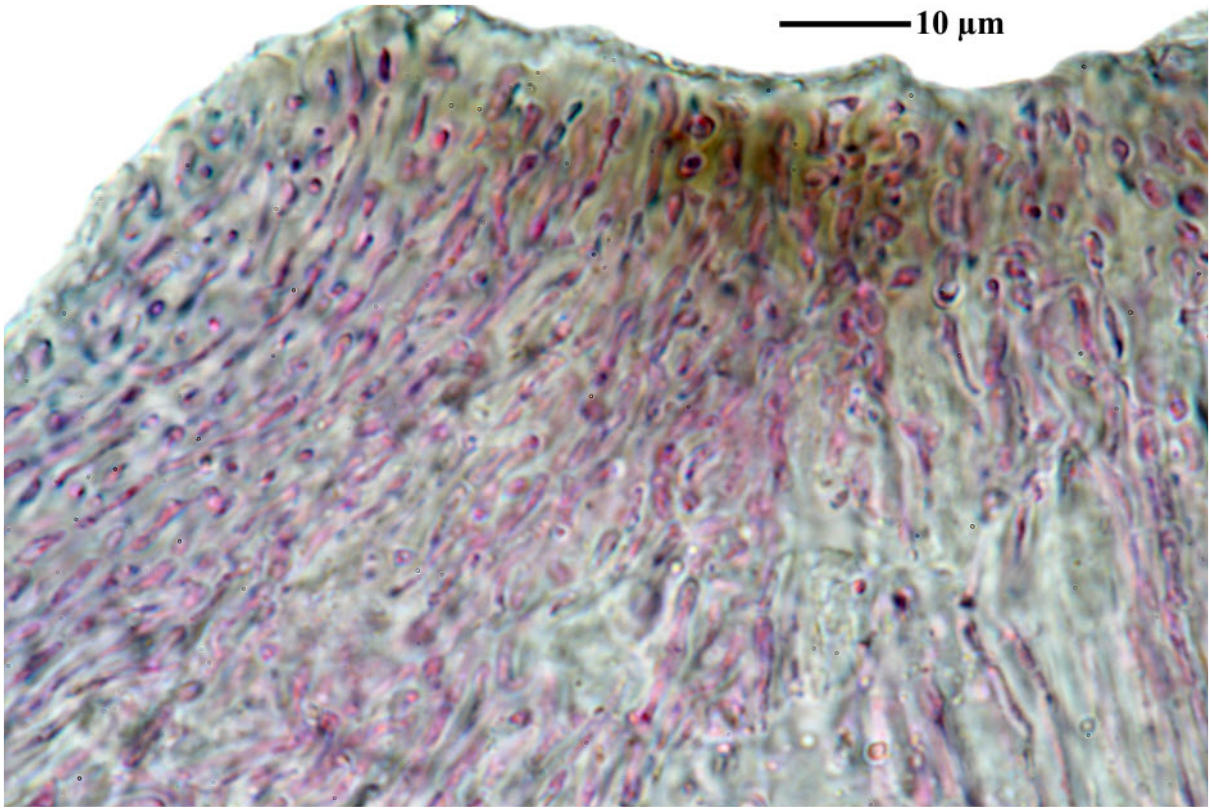
1945

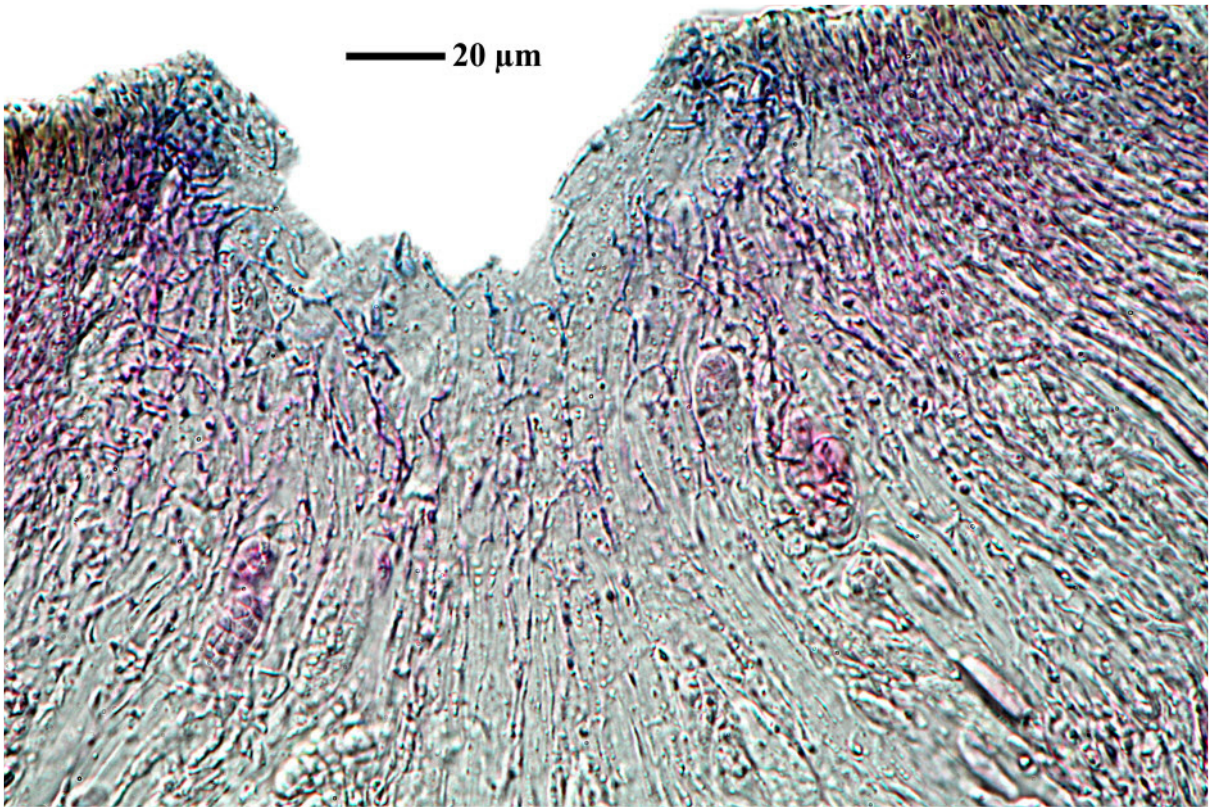




Thelenella luridella

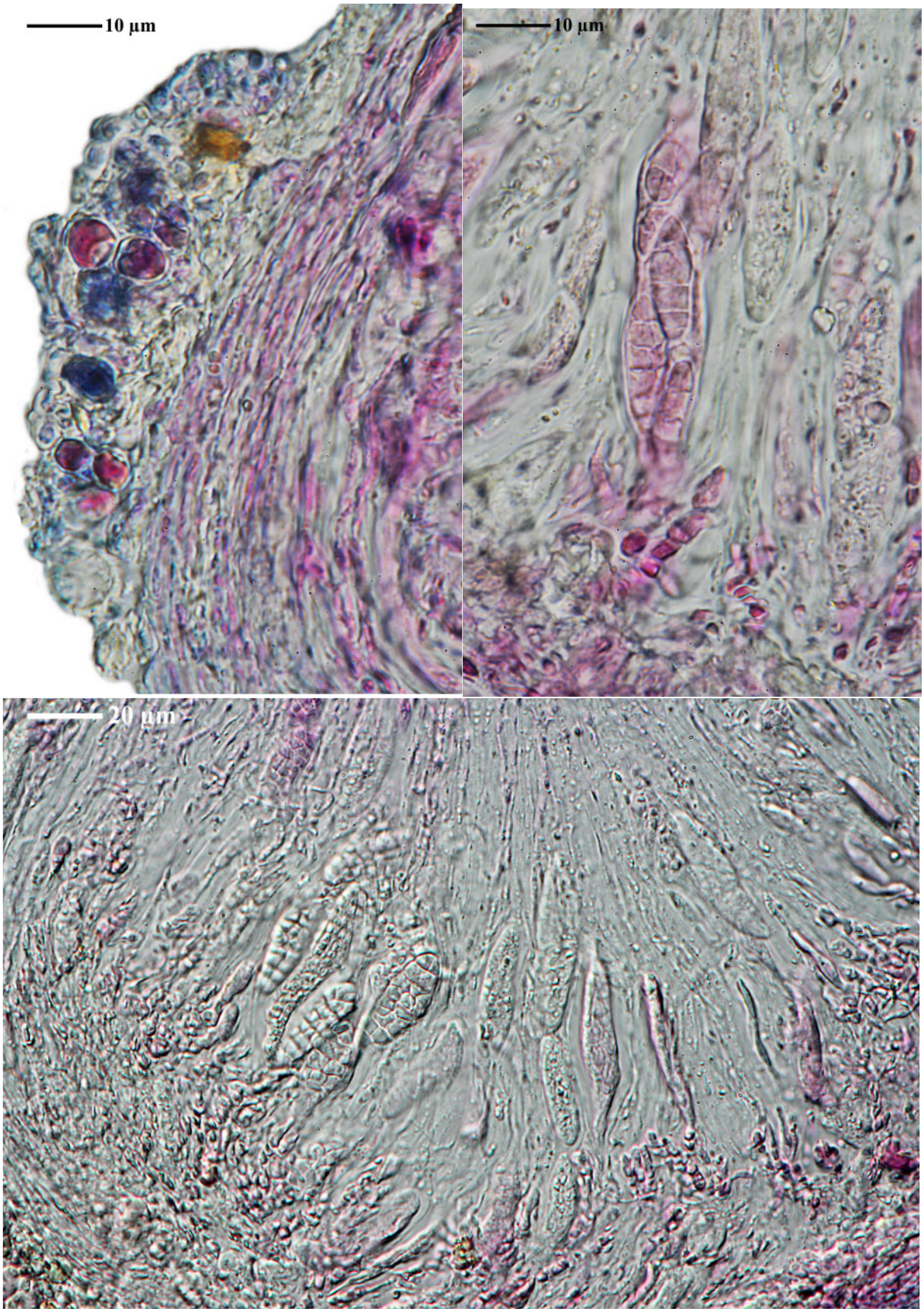
1946





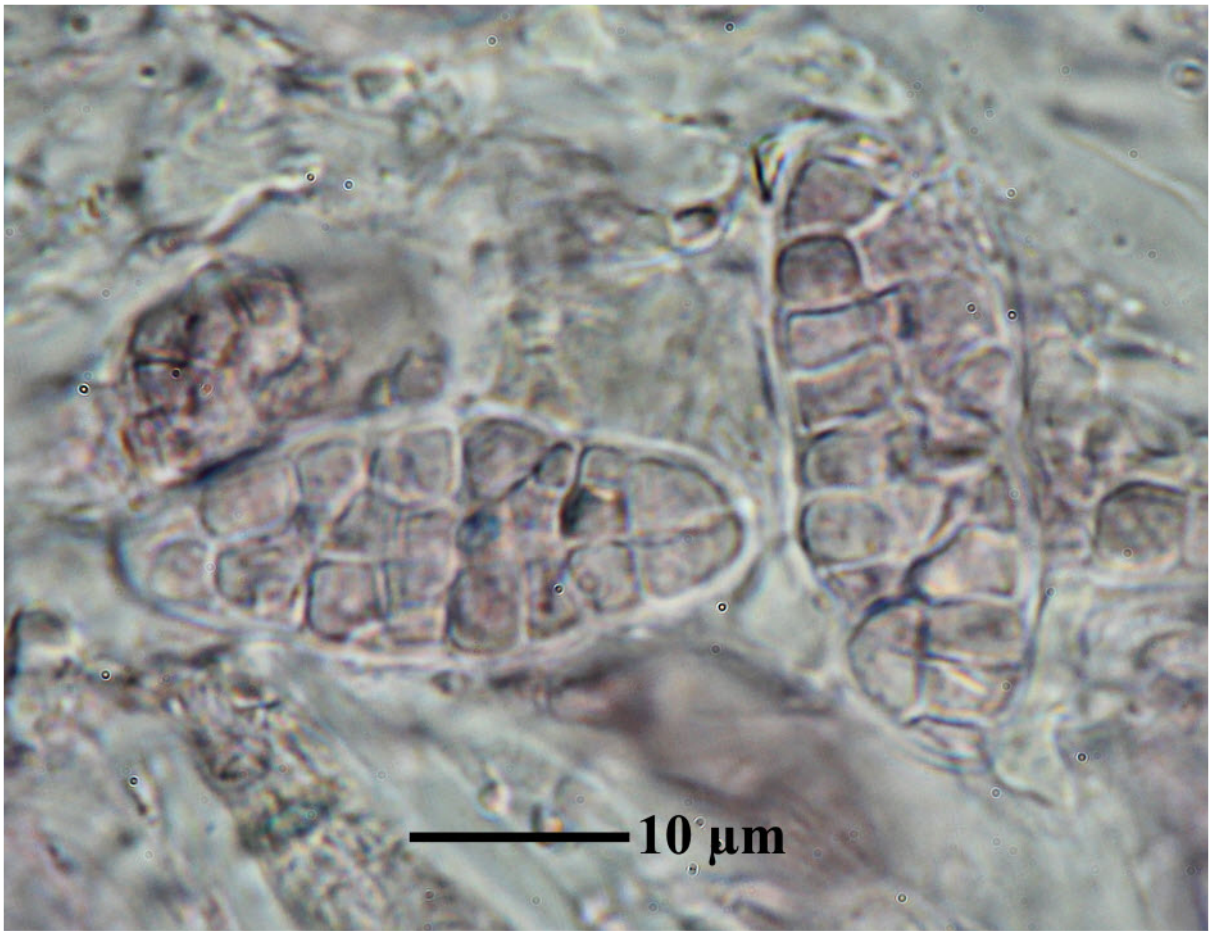
Thelenella luridella

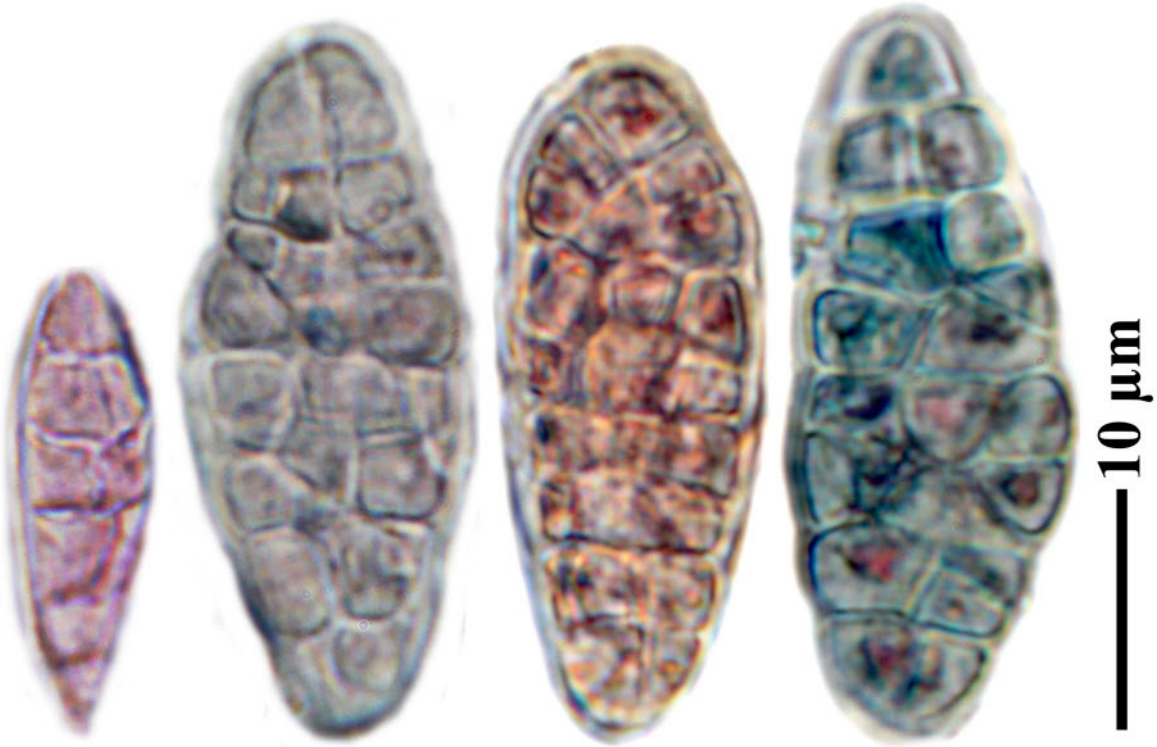
1947



Thelenella luridella

1948





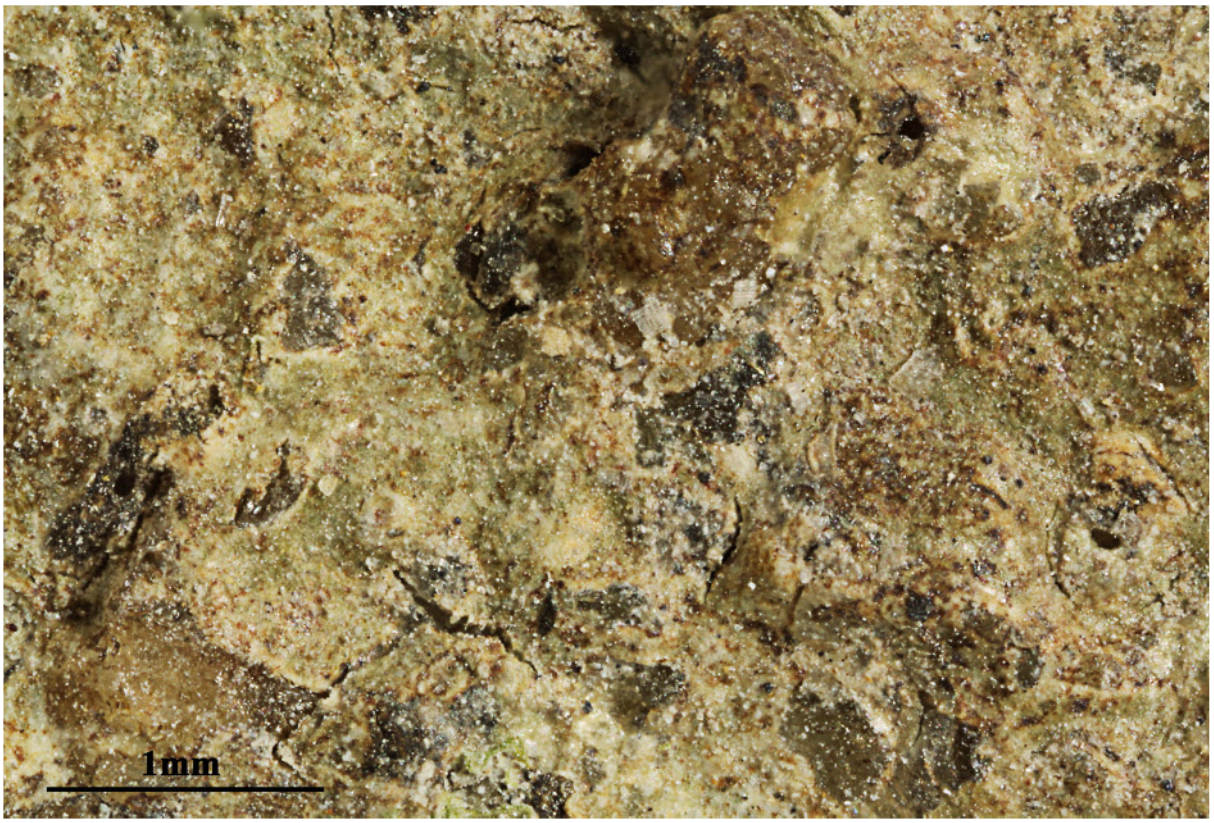
Thelenella luridella

1949

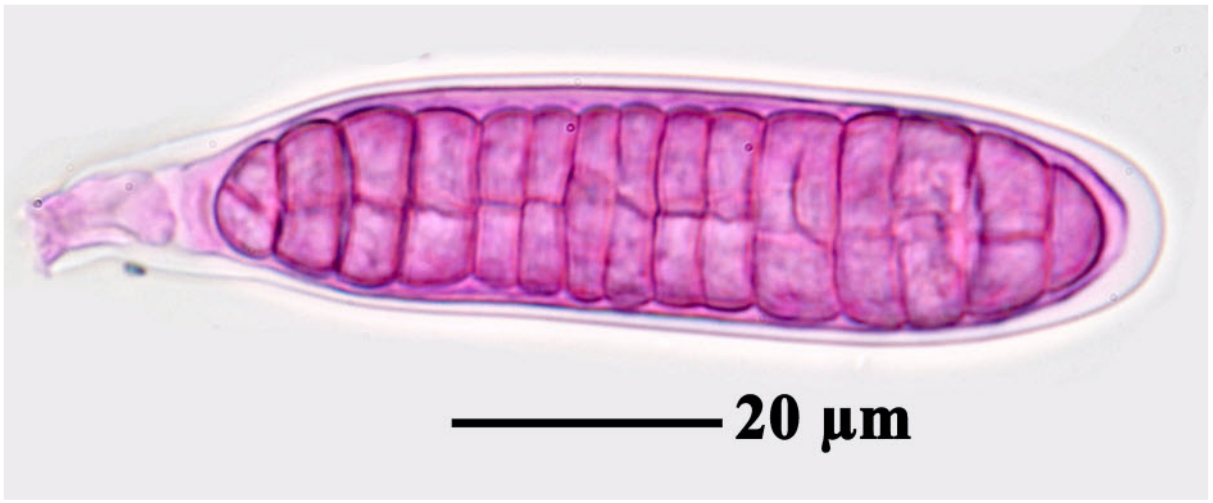
Thelenella monospora Aptroot & M. Cáceres, Bryologist 119(3): 262 (2016)

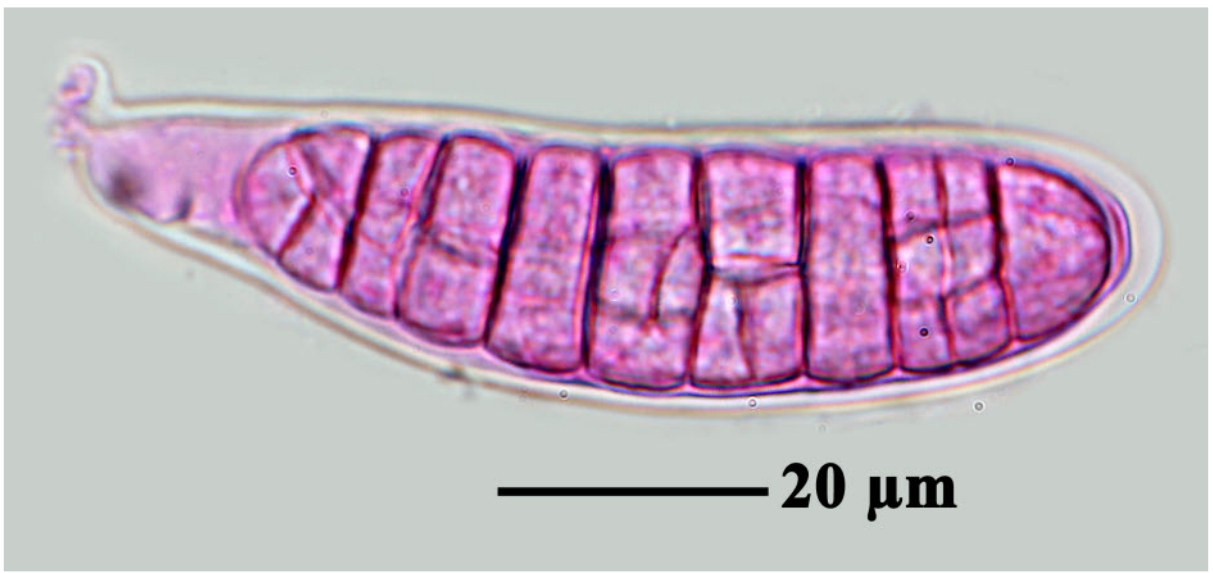
Thallus corticate, smooth, shiny, continuous, thin, bluish grey, surrounded by a ca. 0.3 mm wide shiny white prothallus. Ascomata perithecioid, low conical, c. 0.5–0.7 mm diam., fully covered by thallus except for a brown c. 0.1 mm wide ostiole, which is generally surrounded by a whitish ring. Wall hyaline, except for a broad darkened zone around the ostiole. Ascospores 1/ascus, hyaline, ellipsoid, irregularly muriform, 75–90 × 25–28 µm, surrounded by a c. 5 µm wide gelatinous sheath. Pycnidia not observed. Chemistry: Thallus UV–, C–, P–, K–. TLC: No substances detected.

[ABL27406], Brazil, Amapá, Floresta Nacional do Amapá, upstream of the station, c. 30 m, 0°58' N, 51°36' W, on siliceous rock in primary tall forest. Leg. M. Cáceres & A. Aptroot (no 27406), 20.08.2015, det. A. Aptroot, 2015. ISOTYPE.

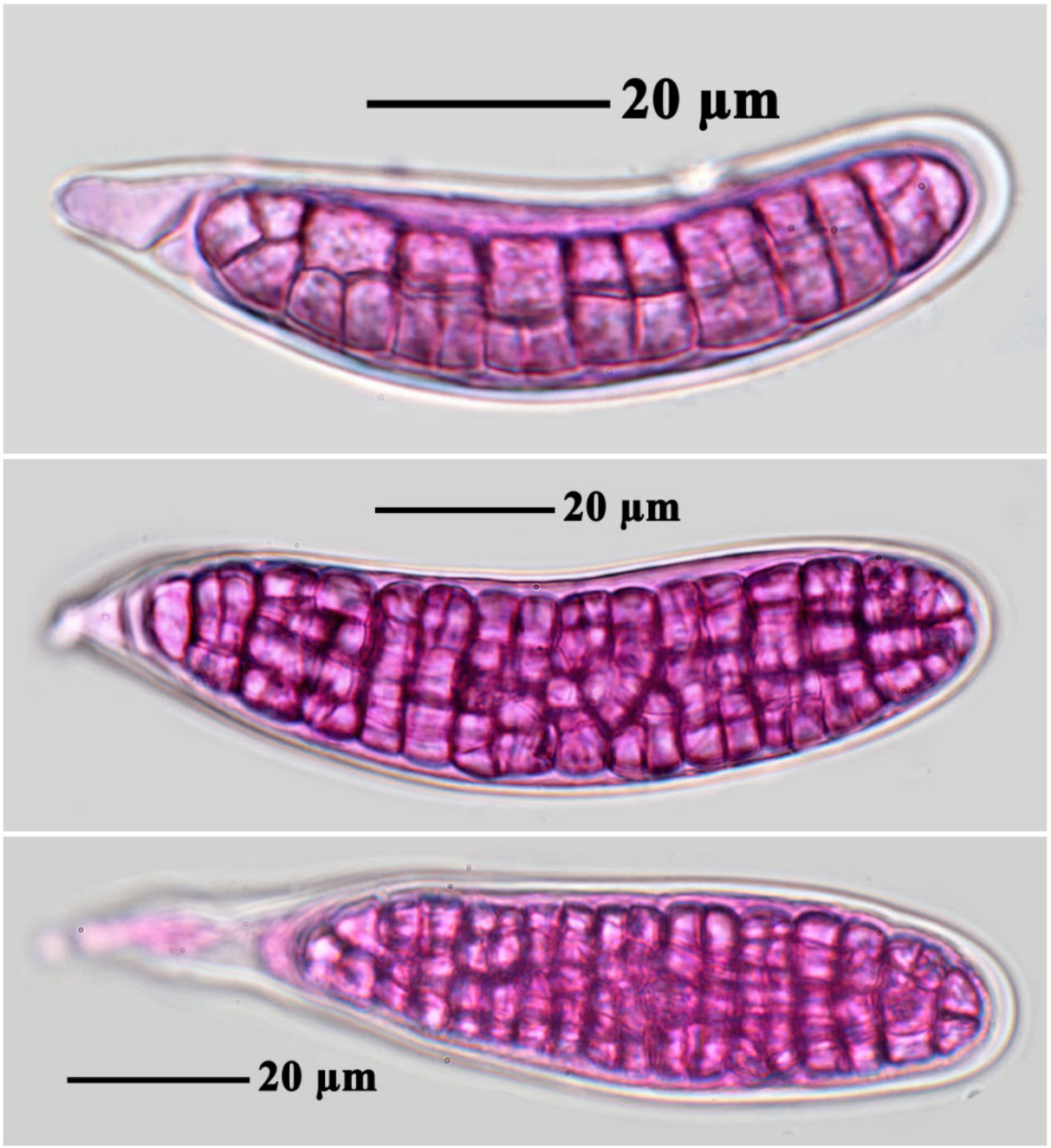








Thelenella monospora



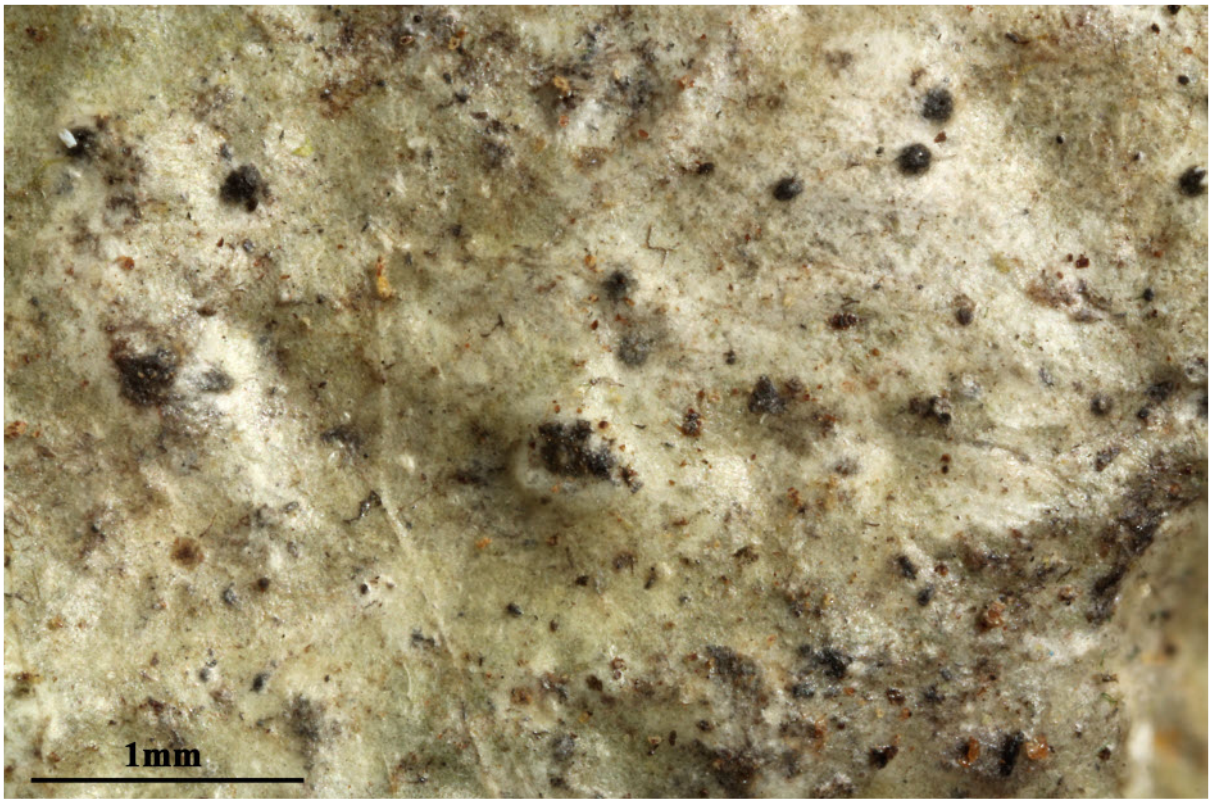
Thelenella monospora

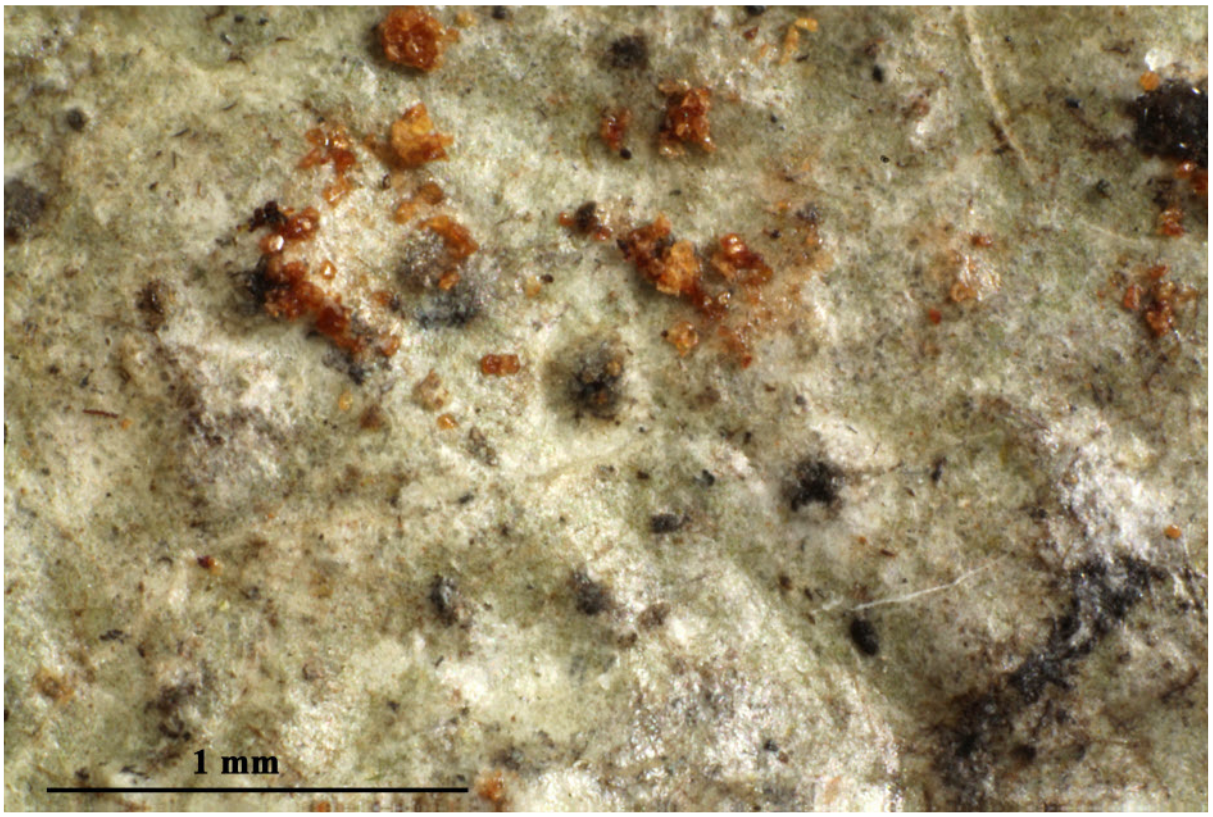
Thelenella paraguayensis Malme, Ark. Bot. 22A(no. 1): 5 (1928)

Thallus epiphloeodic, pale mineral grey. Perithecia hemispherical, immersed in thallus warts, 0.2–0.4 mm diam., pale cream to grey, glossy, towards the top with brownish grey areas and with a depressed black ostiole, which is visible in cross section as a black cap somewhat below the top of the perithecia. Hamathecium not inspersed, filaments branched to anastomosing. Ascospores 4/ascus, hyaline, densely muriform, 7–9 × 1–3-septate with partly oblique septa, c. 40–50 × 12–15 µm, ends rounded.

[ABL18022], Brazil, Sergipe, Parque National Serra de Itabaiana, on bark in transitional forest to caatinga. 400 m, 10°44’35” S, 37°20’25” W. Leg. M. Cáceres & A. Aptroot (no 18022), 27.07.2013, det. A. Aptroot, 2013.

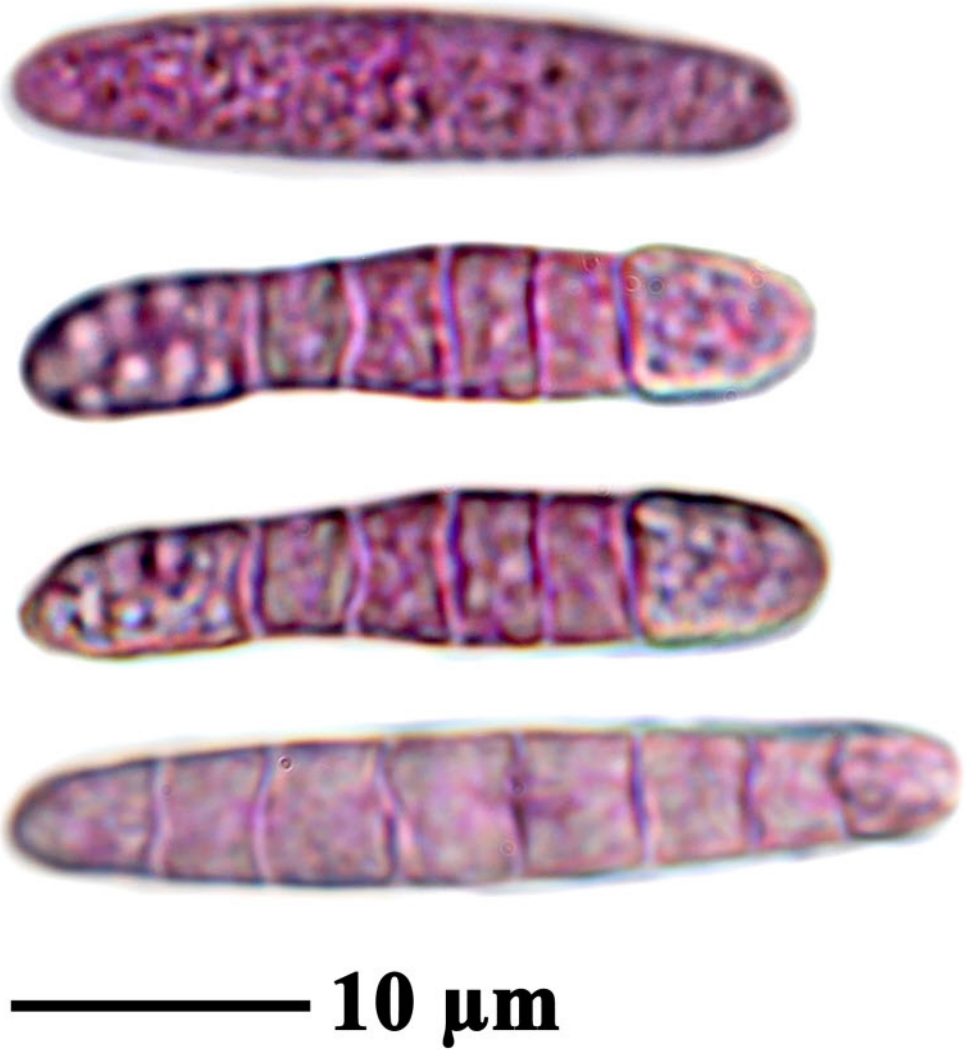






Thelenella paraguayensis

1954



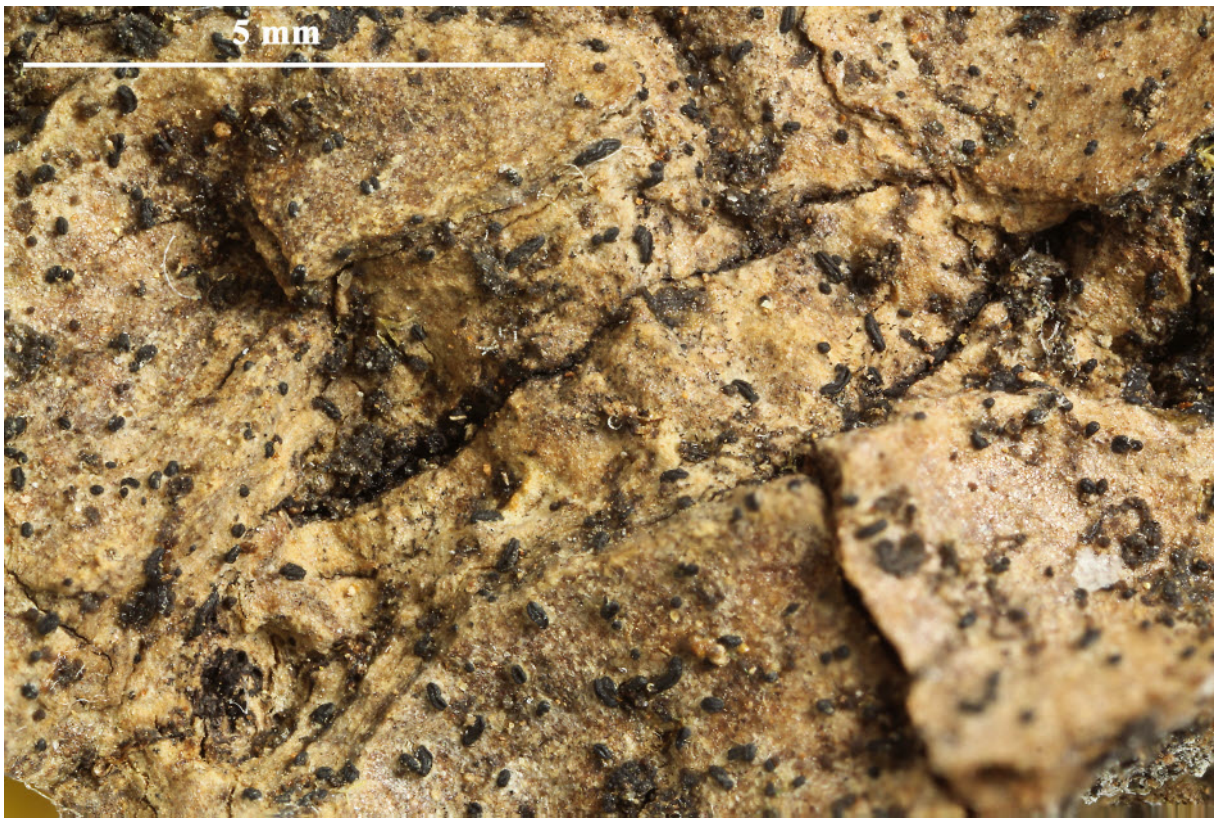
Thelenella paraguayensis

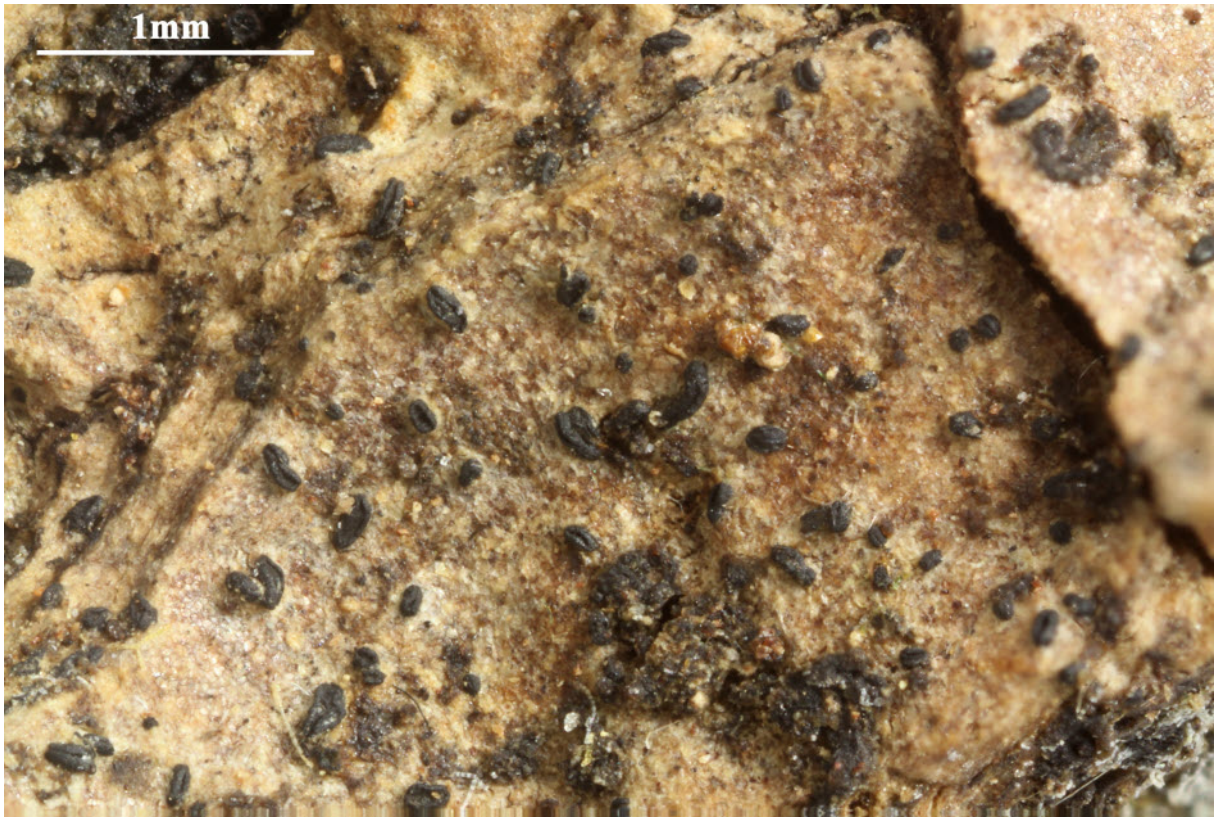
1955

Thelopsis cruciata Aptroot & M. Cáceres, in Aptroot, Mendonça, Ferraro & Cáceres, Lichenologist 46(6): 802 (2015) [2014]

Thallus crustose, corticate, dull or slightly shiny, olive-green to olive-brown, smooth to somewhat granular, not surrounded by prothallus. Perithecia numerous, dispersed, mostly immersed in the thallus or partly in the bark, globose, 0.25–0.35 mm diam., mostly covered by thallus, only a small area around the ostiole visible from above as a red-brown dot. Ostiole inconspicuous. Wall mostly hyaline, brownish around the ostiole, c. 50 µm thick. Hymenium not inspersed, IKI+ pale blue; paraphyses unbranched, sparse, apices not swollen; periphyses unbranched, numerous. Asci containing c. 50–100 ascospores, 80–95 × 19–25 µm. Ascospores hyaline, cruciate septate with generally 4 locules, globose to ellipsoid, 7–10 × 4–7 µm. Pycnidia not observed. Chemistry. No spot reactions. TLC: no substances.

[ABL18225b], Brazil, Sergipe, Aracaju, Parque da Cidade, in park with Atlantic forest remnant, on tree bark, 75 m, 10°52’57” S, 37°03’10” W. Leg. M. Cáceres & A. Aptroot (no 18225b), 15.09.2013, det. A. Aptroot, 2013.







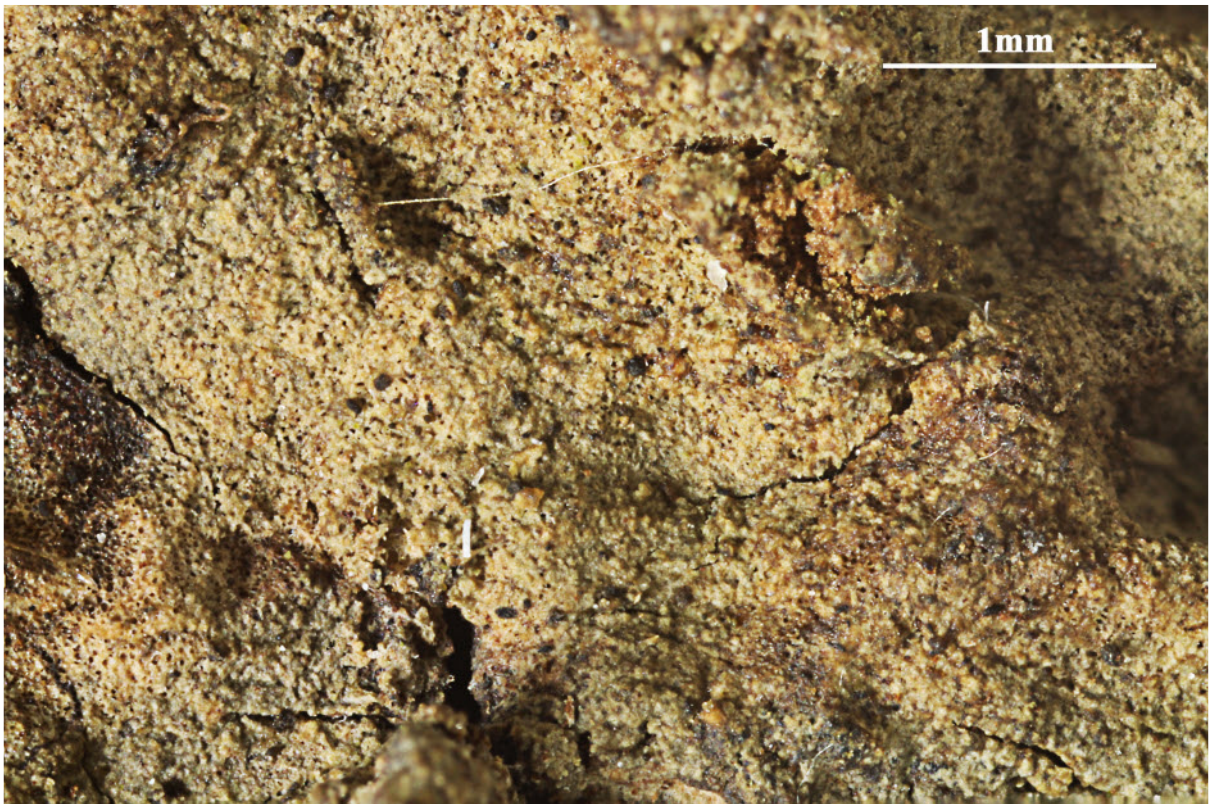
Thelopsis cruciata

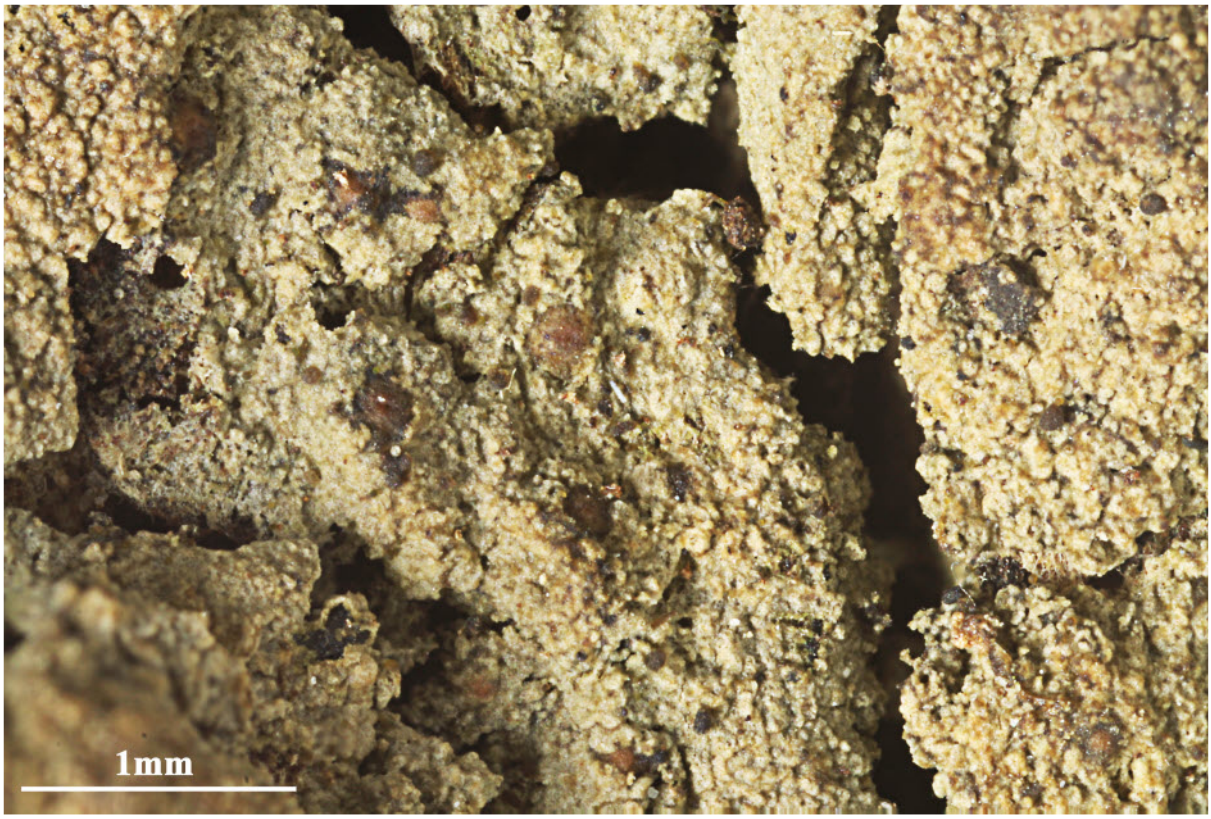
1957

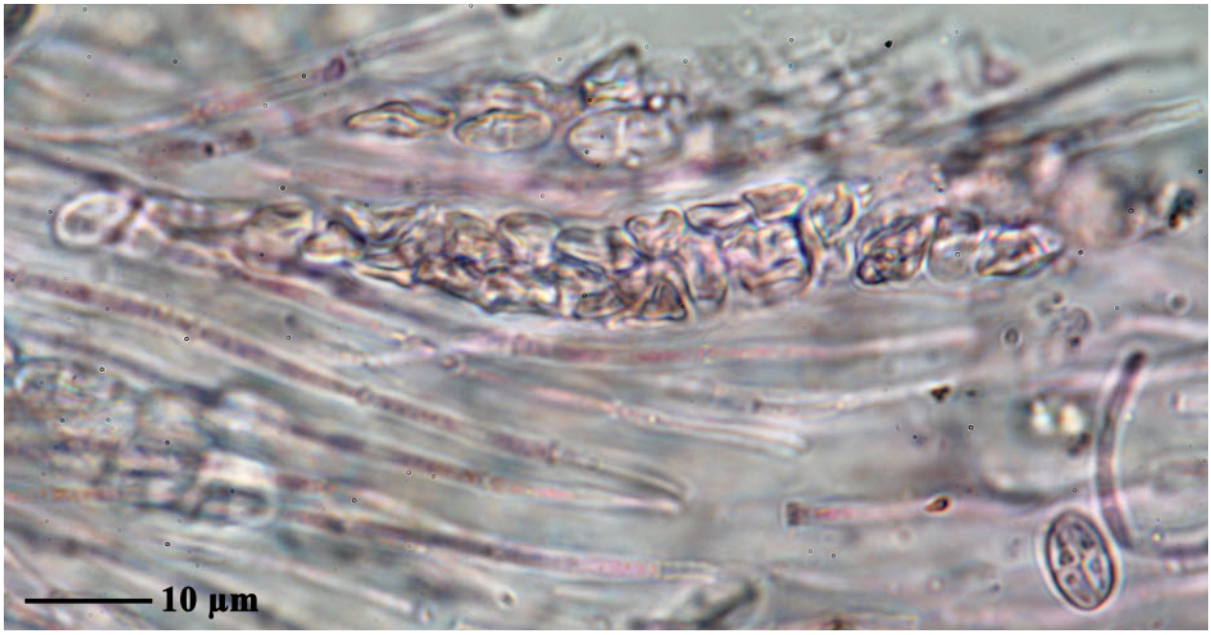
Thelopsis cruciata Aptroot & M. Cáceres, in Aptroot, Mendonça, Ferraro & Cáceres, Lichenologist 46(6): 802 (2015) [2014]

Thallus crustose, corticate, dull or slightly shiny, olive-green to olive-brown, smooth to somewhat granular, not surrounded by prothallus. Perithecia numerous, dispersed, mostly immersed in the thallus or partly in the bark, globose, 0.25–0.35 mm diam., mostly covered by thallus, only a small area around the ostiole visible from above as a red-brown dot. Ostiole inconspicuous. Wall mostly hyaline, brownish around the ostiole, c. 50 µm thick. Hymenium not inspersed, IKI+ pale blue; paraphyses unbranched, sparse, apices not swollen; periphyses unbranched, numerous. Asci containing c. 50–100 ascospores, 80–95 × 19–25 µm. Ascospores hyaline, cruciate septate with generally 4 locules, globose to ellipsoid, 7–10 × 4–7 µm. Pycnidia not observed. Chemistry. No spot reactions. TLC: no substances.

[ABL18253], Brazil, Sergipe, Parque national Serra de Itabaiana, NW foot, 250 m, 10°45’37” S, 37°22’15” W, in transitional forest to caatinga, on tree bark. Leg. M. Cáceres & A. Aptroot (no 18253), 17.09.2013, det. A. Aptroot, 2013.

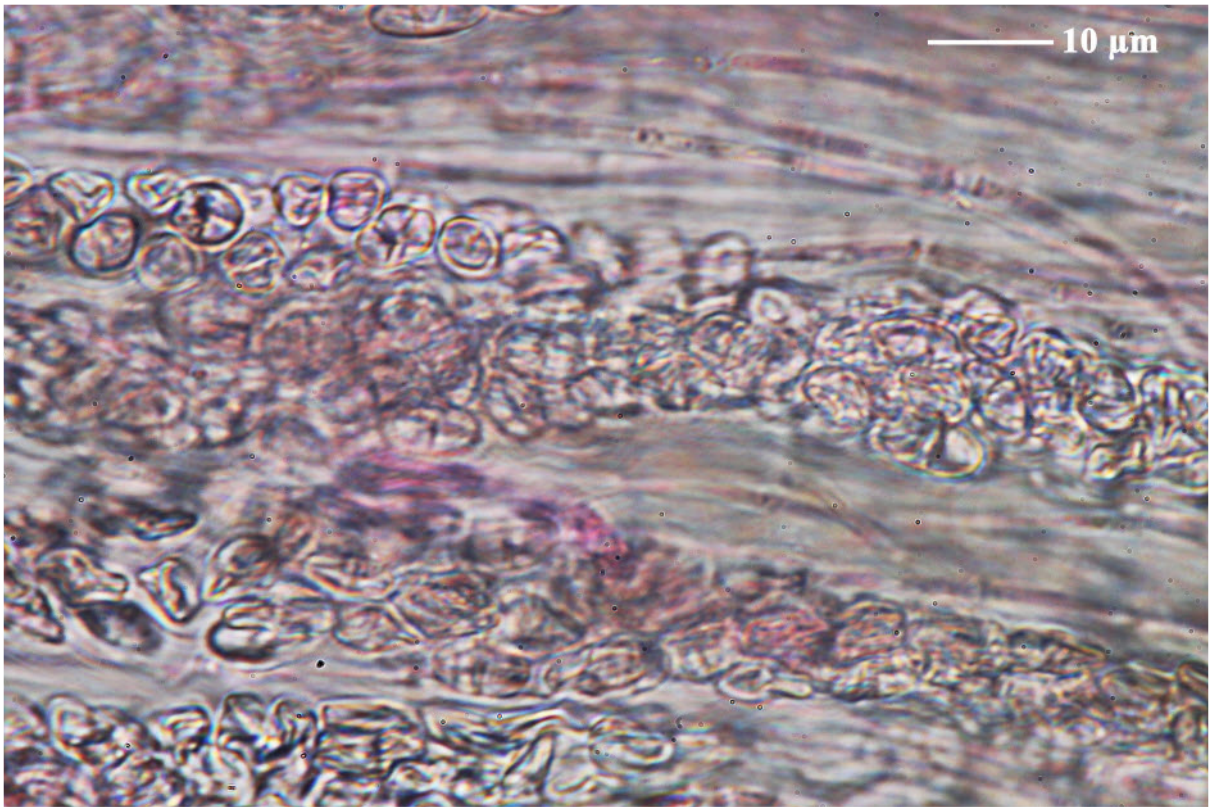






Thelopsis cruciata

1959





Thelopsis cruciata

1960

Topelia nimisiana Tretiach & Vězda, Lichenologist 24(2): 107 (1992)

Thallus corticolous, grey or green. Perithecia immersed in the substratum or the thallus. Ascospores hyaline, muriform, 20–30 × 8–13.5 µm.

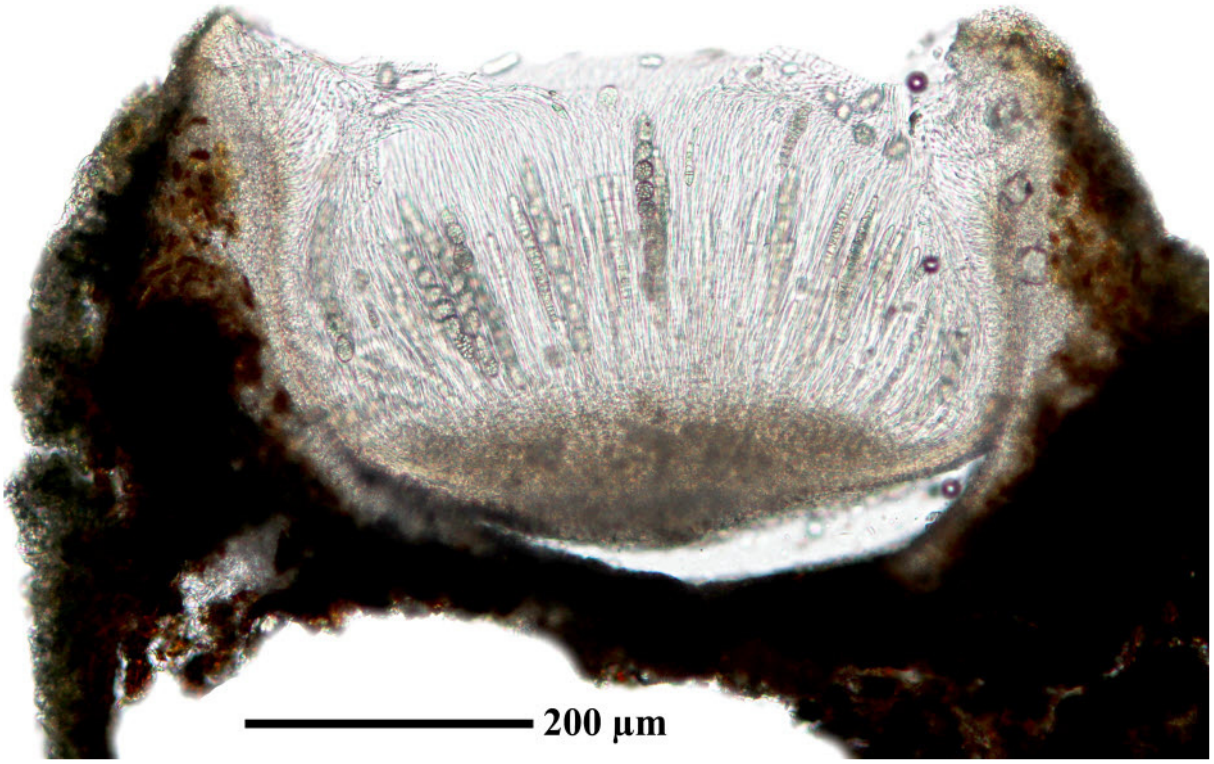
[TSB-15110], Italy, Lazio, Tenuta Presidenziale di Castelporziano (Roma), on *Quercus robur*, bosco su vecchie dune interne in sito umido e ombroso, c. 10 m. Leg. M. Tretiach, 18.02.1991. HOLOTYPE.

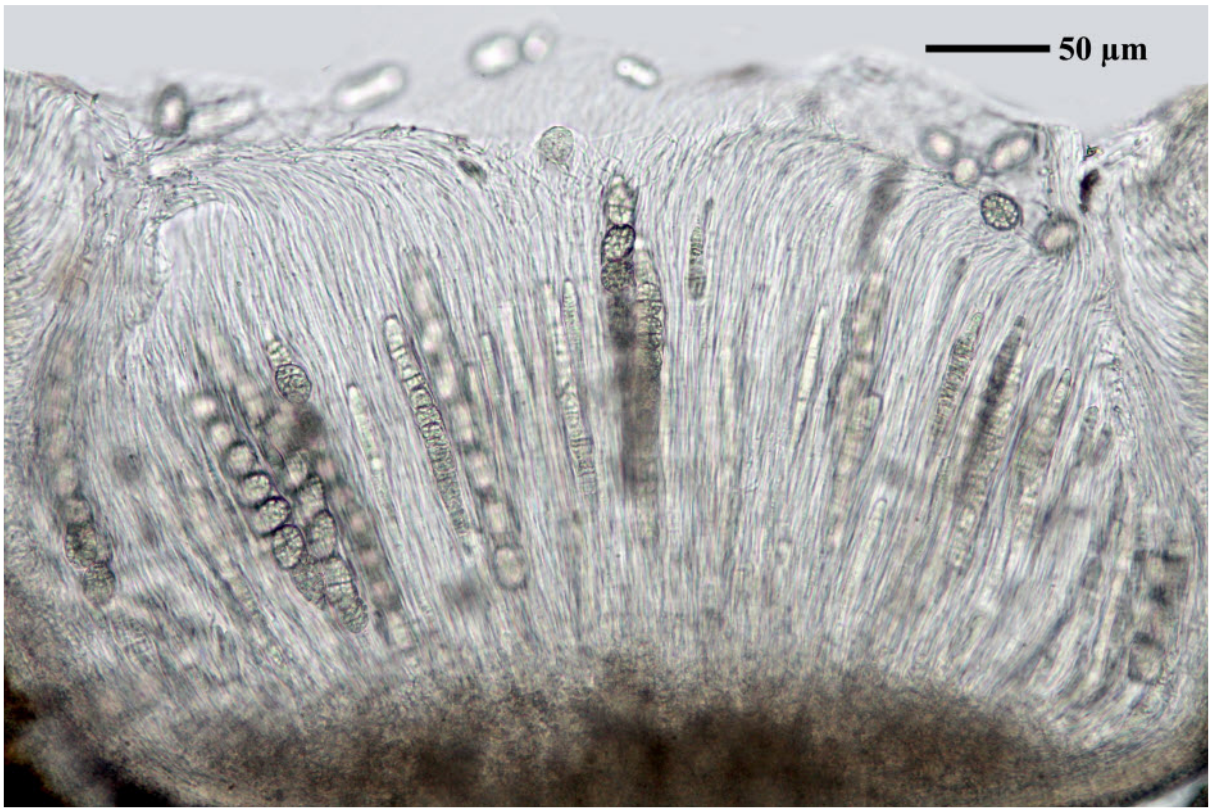




Topelia nimisiana

1962





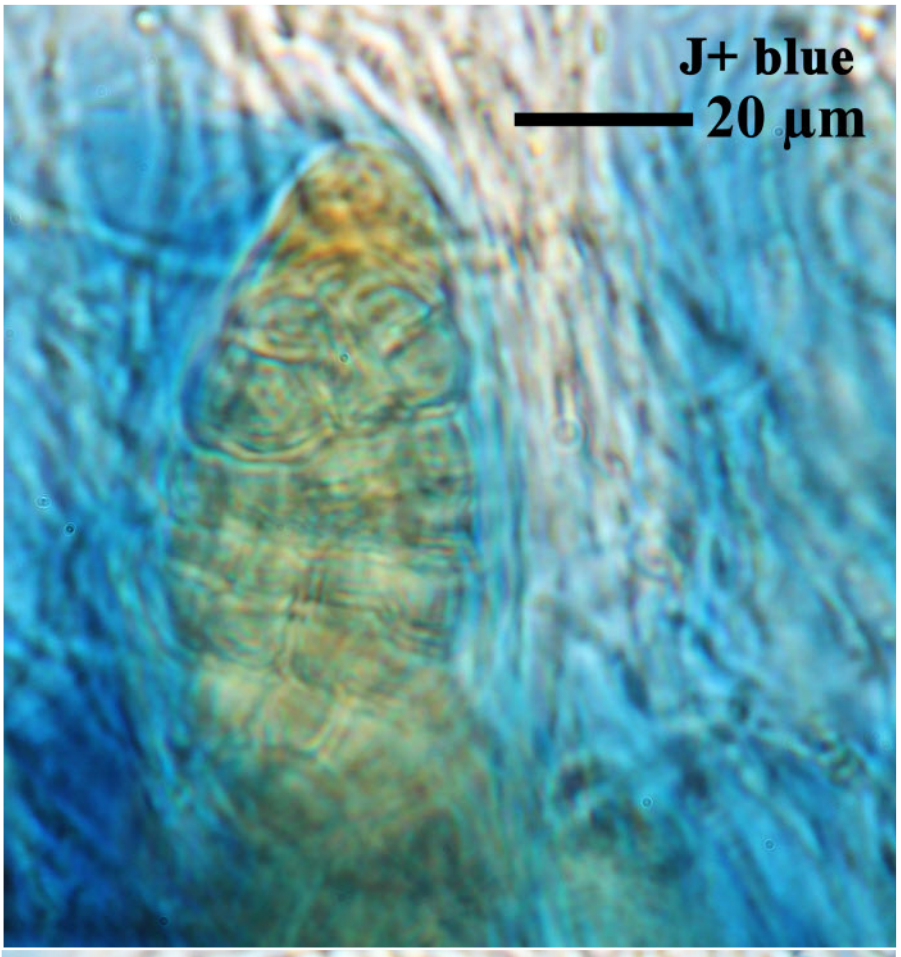
Topelia nimisiana

1963



Topelia nimisiana

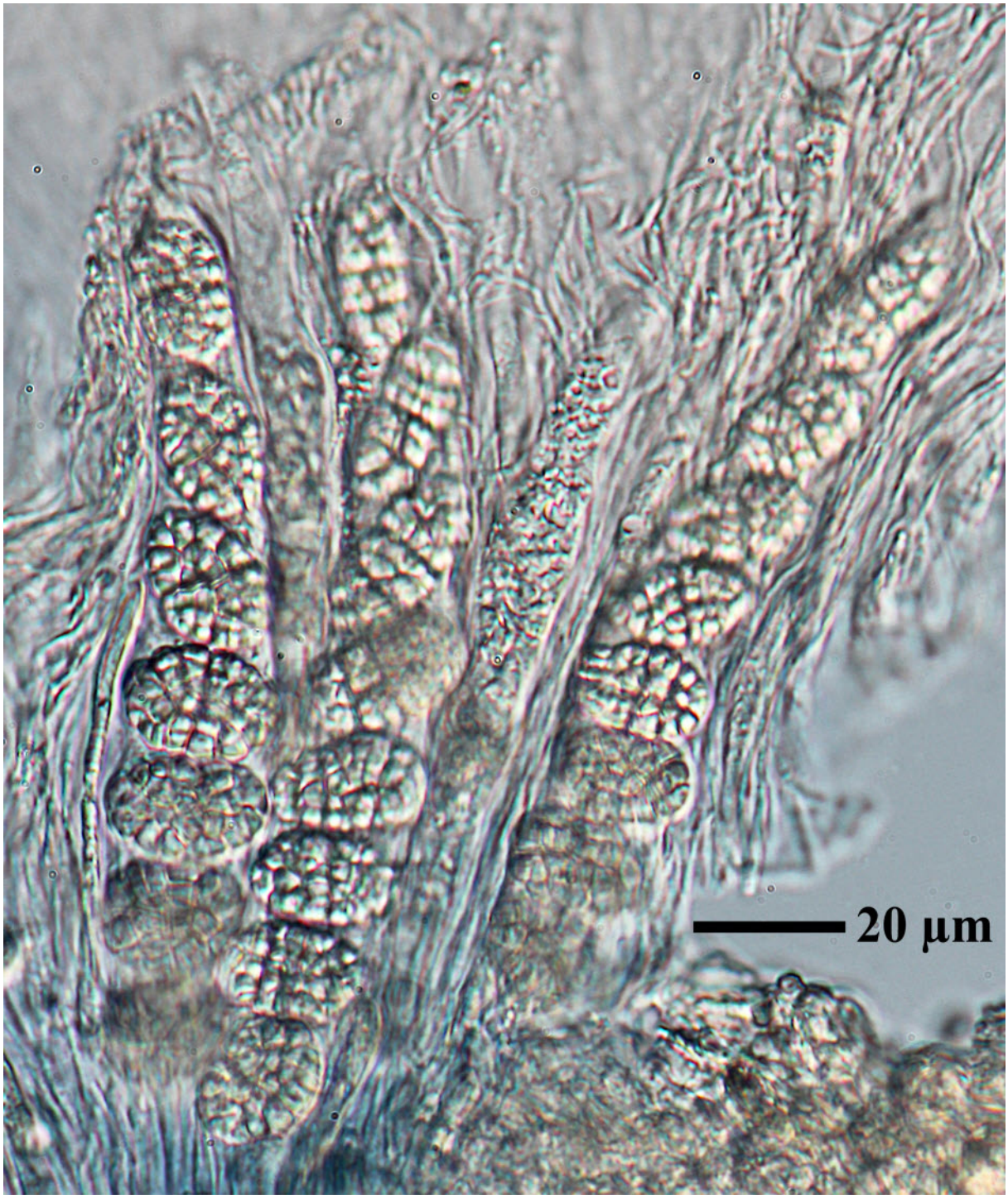
1964





Topelia nimisiana

1965



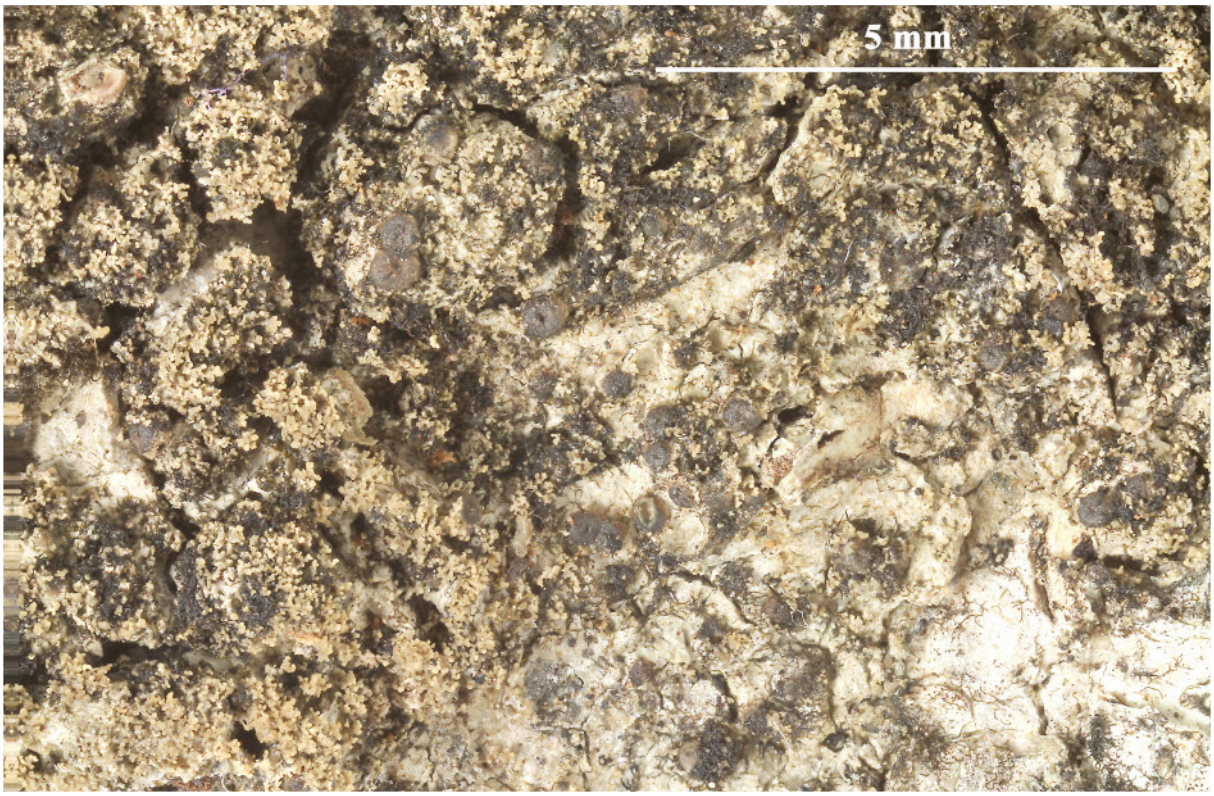
Topelia nimisiana

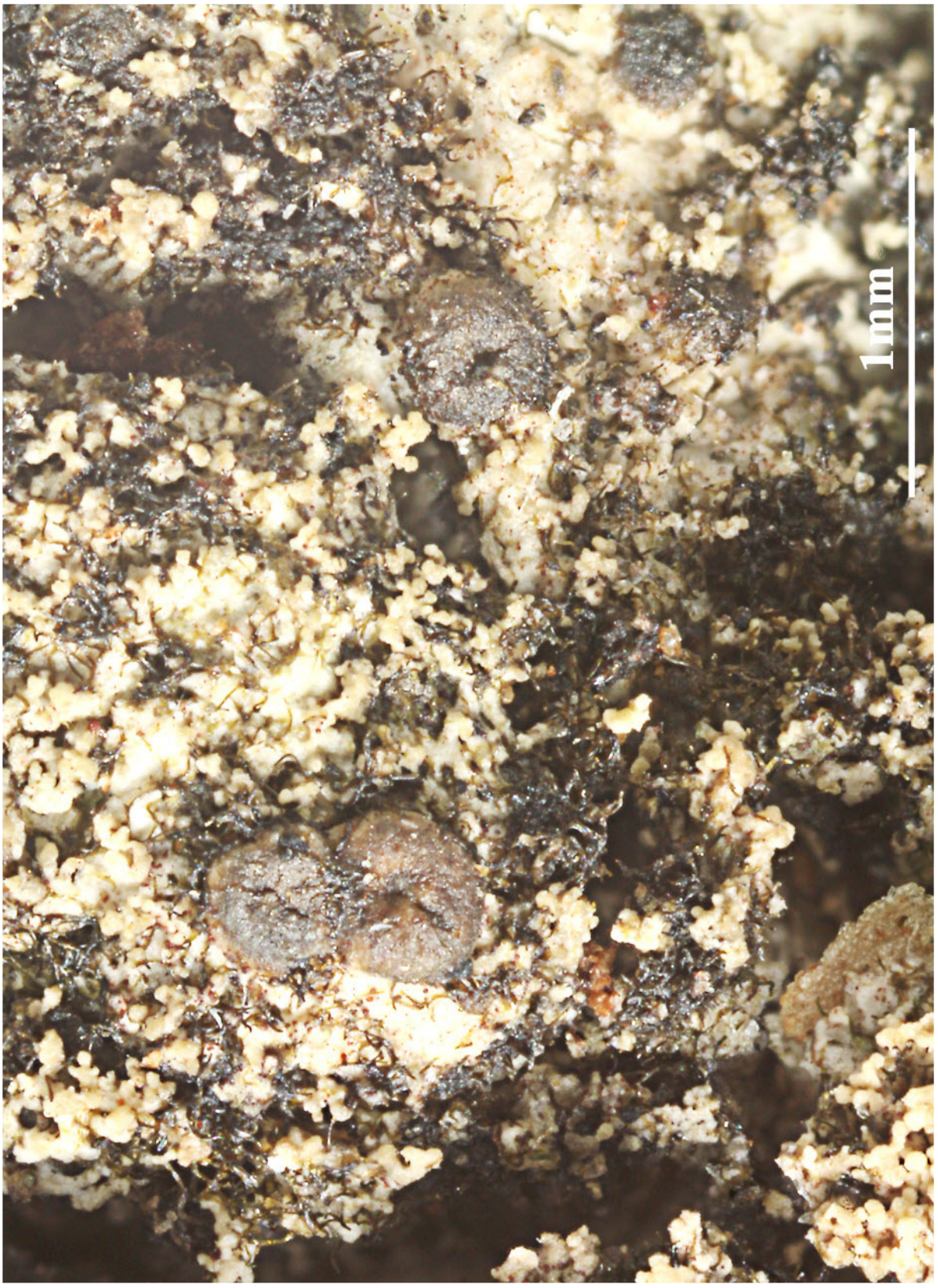
1966

Topelia tetraspora Aptroot & M. Cáceres, in Aptroot, Mendonça, Ferraro & Cáceres, Lichenologist 46(6): 804 (2015) [2014]

Thallus crustose, corticate, dull or slightly shiny, mineral grey, mostly covered with a c. 0.1–0.6 mm thick layer of coralloid to usually flattened, irregularly palmately branched isidia c. 0.05 mm diam., not surrounded by prothallus. Perithecia sparse, not equally dispersed, superficial on the thallus, mostly between but also emergent from the isidia, globose, 0.25–0.50 mm diam., not covered by thallus, dark brown to nearly black, often in various shades on one perithecium. Ostiole inconspicuous. Wall in section mostly brown on the outside, c. 50 µm thick. Hymenium not inspersed, IKI-; paraphyses unbranched, numerous, apices not swollen; periphyses unbranched, numerous. Asci initially containing 8 irregularly biseriate ascospores, but only up to 4 maturing (often only 2), 95–125 x 19–29 µm. Ascospores hyaline, muriform, 15–19 × 2–6-septate, ellipsoid, 39–50 × 11–16 µm. Pycnidia not observed. Chemistry. No spot reactions. TLC: no substances.

[ABL18228b], Brazil, Sergipe, Aracaju, Parque da Cidade, in park with Atlantic forest remnant, om tree bark, 75 m, 10°52'57" S, 37°03'10" W. Leg. M. Cáceres & A. Aptroot (no 18228b), 15.09.2013, det. A. Aptroot, 2013. ISOTYPE.





Topelia tetraspora

1968





Topelia tetraspora

1969

Trypethelium astroideum Flakus & Aptroot, in Flakus, Kukwa & Aptroot, Lichenologist 48(6): 685 (2016)

Thallus corticate, with corticiform layer c. 40–80 µm thick, smooth to somewhat bullate, inducing swellings of the host bark, somewhat shiny, continuous, covering areas ≤ 7 cm diam., c. 0.5 mm thick, olive-green, not surrounded by a black prothallus. Pseudostromata with a surface similar to the thallus or slightly paler, distinctly raised above the thallus surface, irregular in outline (star-like), with sloping sides, c. 1.0–1.5 × 1–3 mm and 0.8 mm high, olive-green with paler border and black ostiolar area with rust red pigment, inside with an additional orange granular pigment and bark tissue. Ascomata pyriform, 0.3–0.6 mm diam., aggregated, immersed in pseudostromata. Wall fully carbonized, not differentiated into excipulum and involucrellum, ≤c. 100 µm wide. Ostioles eccentric to apical, fused to simple, convex, black, surrounded by a rust red pigmented spot, usually forming a black star-shaped pattern. Hamathecium clear. Asci 8-spored. Ascospores hyaline, IKI-, 12–22-septate, fusiform, 65–100 × 11–14 µm, ends rounded, lumina rounded, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus surface UV−, K−, thallus medulla K−; pseudostromata surface UV−, rust red pigment near ostioles, UV−, K+ purple (not dissolving), granular orange pigment inside of pseudostromata K+ carmine red (dissolving). TLC: parietin (minor) and additional unidentified anthraquinone (trace) detected.

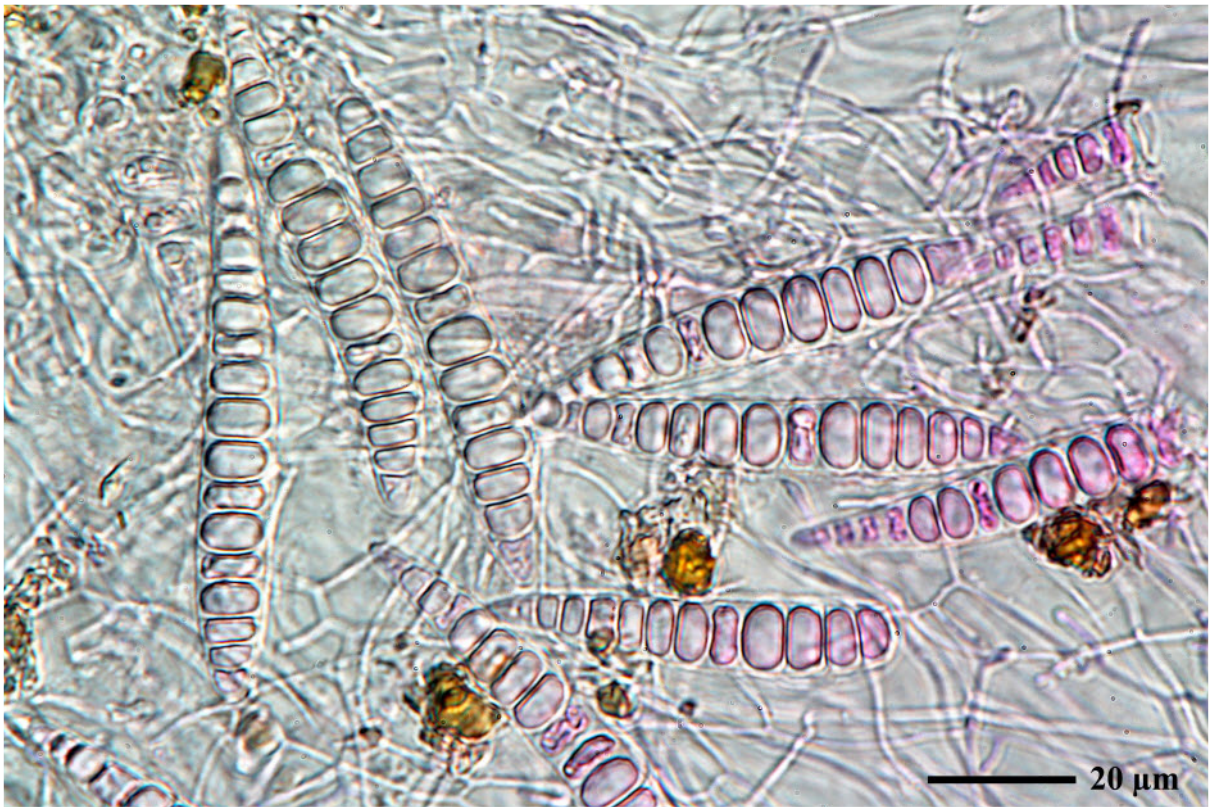
[ISE48587], Brazil, Bahia, Itamarajú, Monte Pascual, on tree bark in cerrado forest, 16°51’55” S, 39°24’ 54” W, 130 m. Leg. M. Cáceres & A. Aptroot (no ISE48587), 18.02.2019, det. A. Aptroot, 2019.





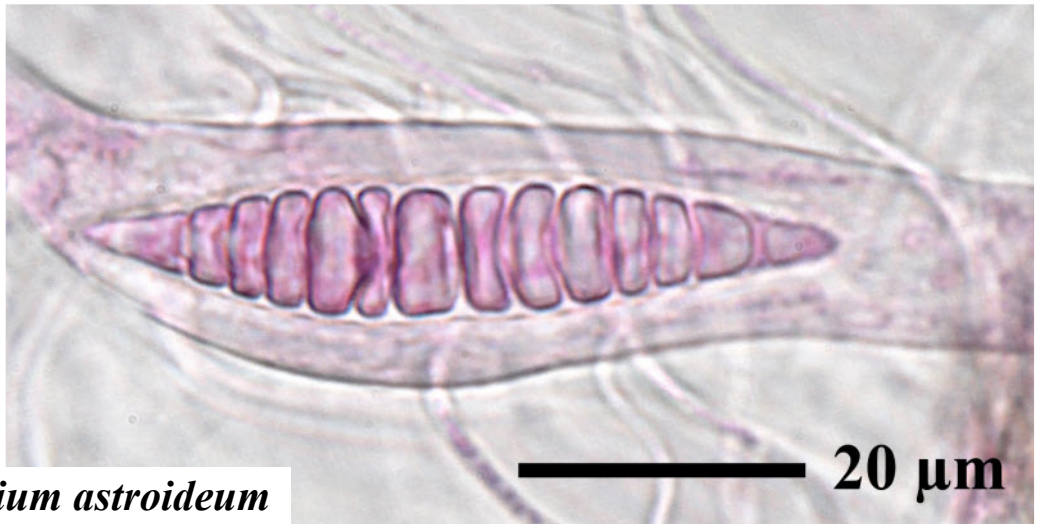
Trypethelium astroideum

1971









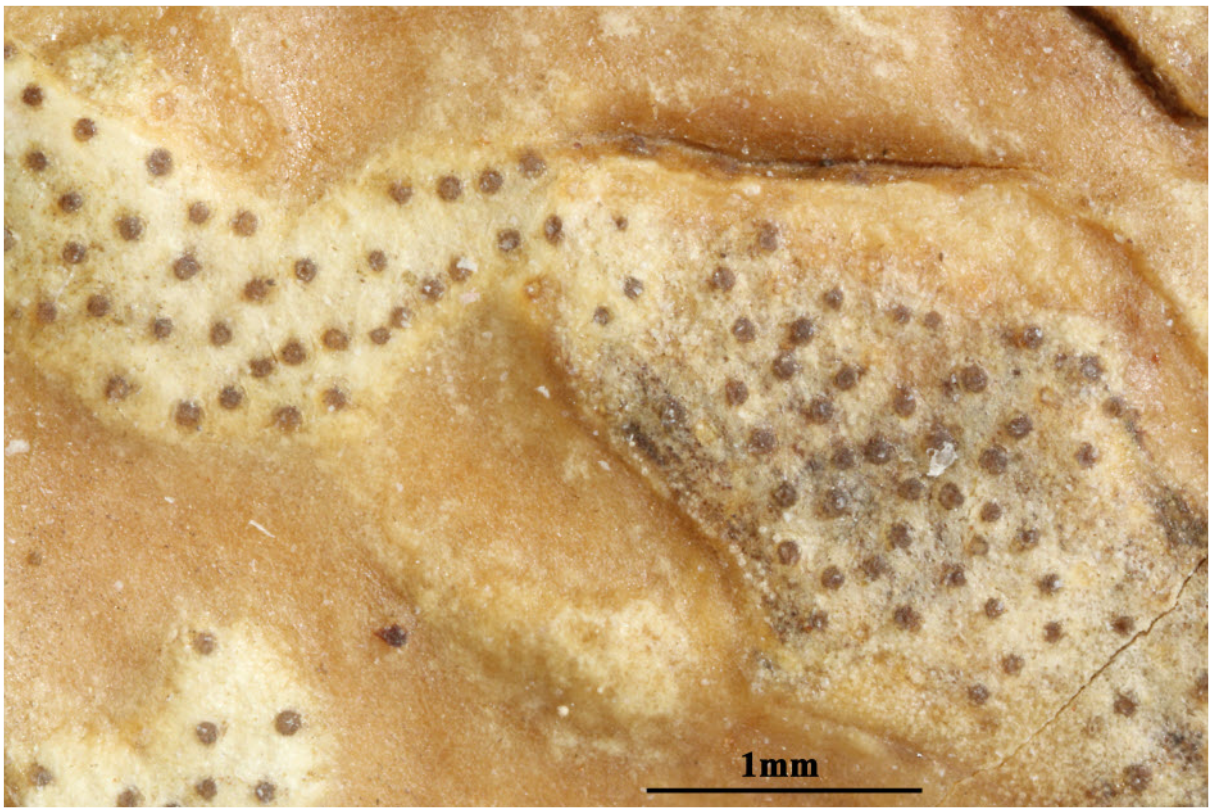
Trypethelium astroideum

1972

Trypethelium epileucodes Nyl., Lich. Japon.: 116 (1890)
= *Trypethelium virgineum* Müll. Arg., Rep. Meetings Australs. Assoc. Advancem. Sci.: 461 (1895)
= *Bathelium sundaicum* Müll. Arg., Nuovo Giorn. Botan. Ital. 23: 277 (1891)
= *Laurera sundaica* (Müll. Arg.) Zahlbr., Catal. Lich.Univ. 1: 507 (1922)
= *Trypethelium virginicum* Müll. Arg., Rep. Australas. Assoc. Advancem. Sci. 1895: 461 (1895)
= *Trypethelium subnitidiusculum* Makhija & Patw., J. Hattori Bot. Lab. 73: 207 (1993)
= *Trypethelium andamanicum* Makhija& Patw., J. Hattori Bot. Lab. 73: 193 (1993)

Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, distinctly pseudostromatic; pseudostromata containing few to numerous ascomata, 0.5–1.5 mm broad, erumpent, whitish with dark ostioles. Hamathecium clear. Ascospores 8 per ascus, 5–9(–13)-septate, fusiform, 30–60 × (5–)8–13 µm, hyaline, IKI−. Chemistry. Thallus and pseudostromata UV−, K−. TLC: no substances detected.

[AMH85273], India, Andaman Islands, South Andaman, Baratang. Leg. Nagarkar & Sethy (no AMH85471 et AMH85273), 1985, det. A. Aptroot. ISOTYPE of *Trypethelium andamanicum*.



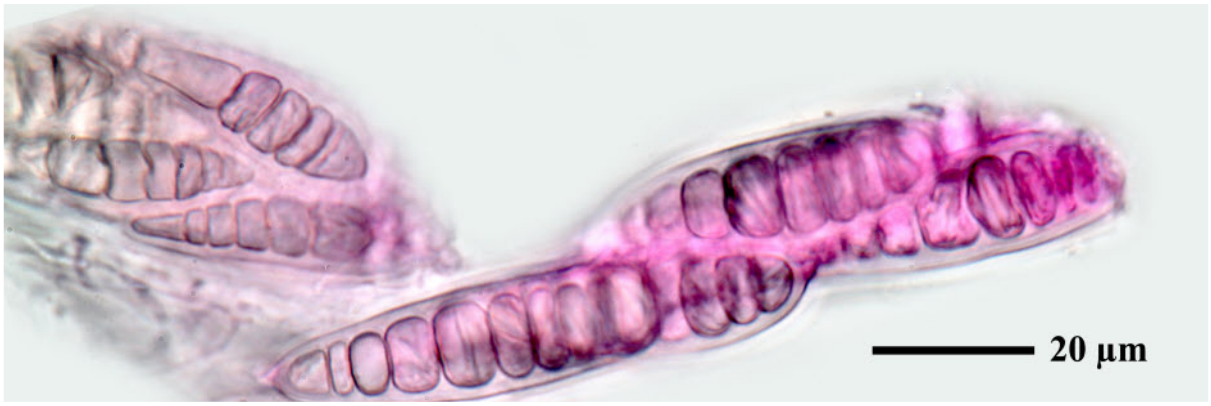


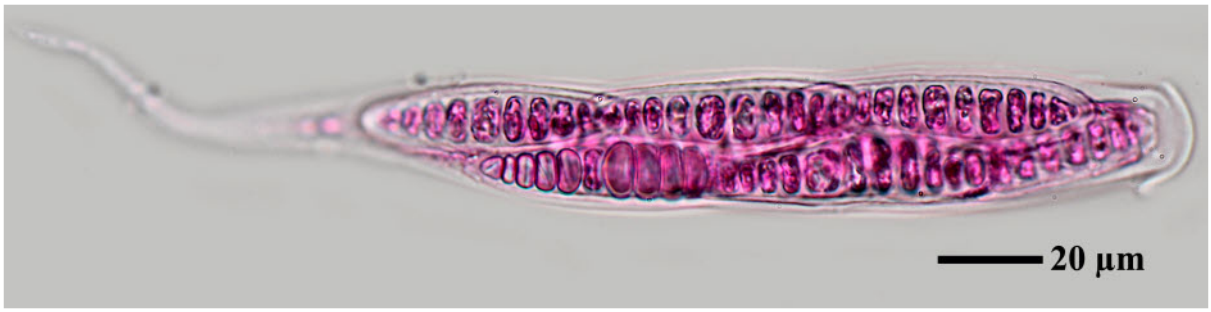


Trypethelium epileucodes

1974







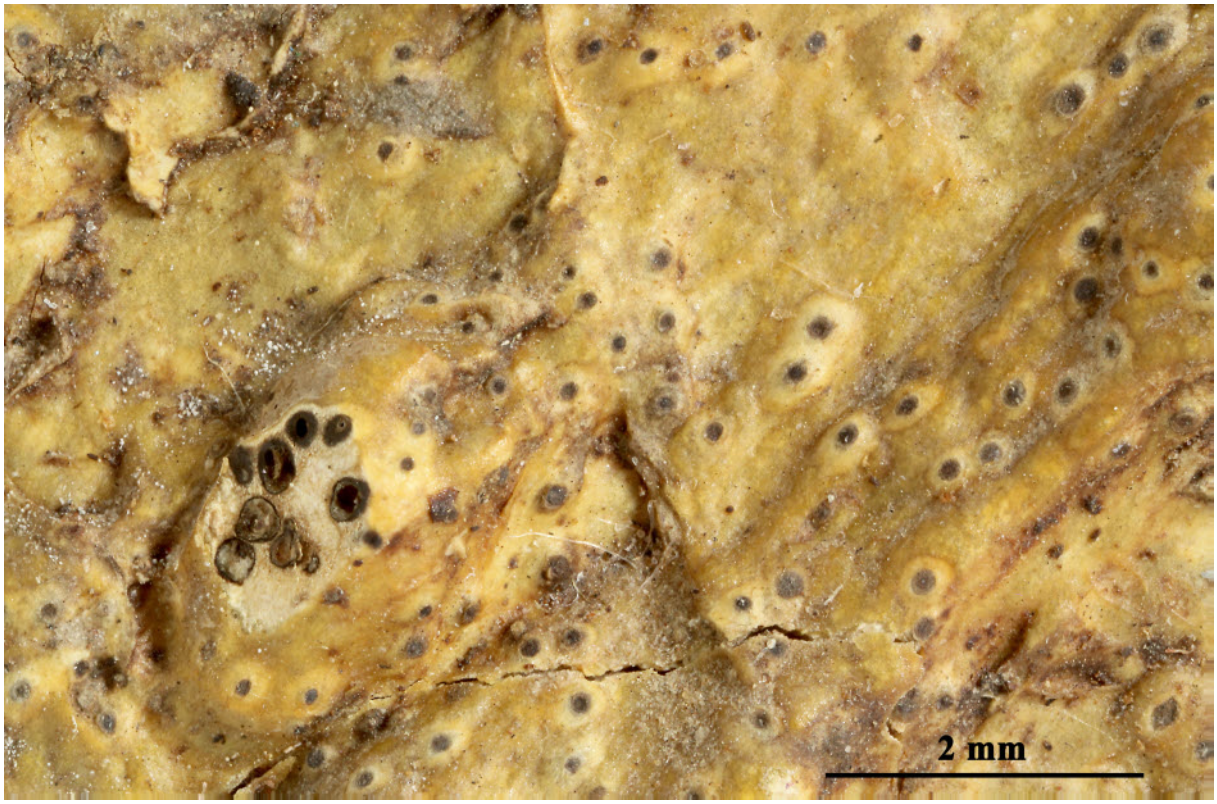
Trypethelium epileucodes

1975

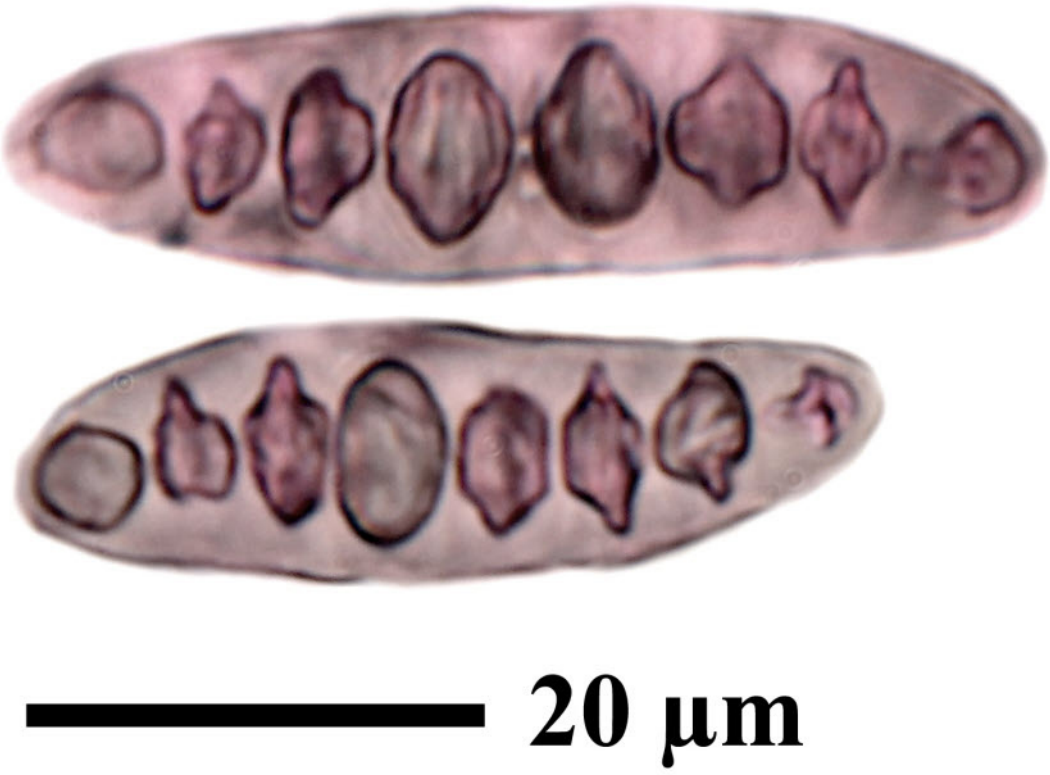
Trypethelium epileucodes Nyl., Lich. Japon.: 116 (1890)
= *Trypethelium virgineum* Müll. Arg., Rep. Meetings Australs. Assoc. Advancem. Sci.: 461 (1895)
= *Bathelium sundaicum* Müll. Arg., Nuovo Giorn. Botan. Ital. 23: 277 (1891)
= *Laurera sundaica* (Müll. Arg.) Zahlbr., Catal. Lich.Univ. 1: 507 (1922)
= *Trypethelium virginicum* Müll. Arg., Rep. Australas. Assoc. Advancem. Sci. 1895: 461 (1895)
= *Trypethelium subnitidiusculum* Makhija & Patw., J. Hattori Bot. Lab. 73: 207 (1993)
= *Trypethelium andamanicum* Makhija& Patw., J. Hattori Bot. Lab. 73: 193 (1993)

Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, distinctly pseudostromatic; pseudostromata containing few to numerous ascomata, 0.5–1.5 mm broad, erumpent, whitish with dark ostioles. Hamathecium clear. Ascospores 8 per ascus, 5–9(–13)-septate, fusiform, 30–60 × (5–)8–13 µm, hyaline, IKI−. Chemistry. Thallus and pseudostromata UV−, K−. TLC: no substances detected.

[AMH743368], India, Karnataka, Coorg, Talcauvery. Leg. Patwrdhan & Prabha (no AMH 743368), 1993, det. A. Aptroot. ISOTYPE of *Trypethelium subnitiusculum* Makhija & Patw.

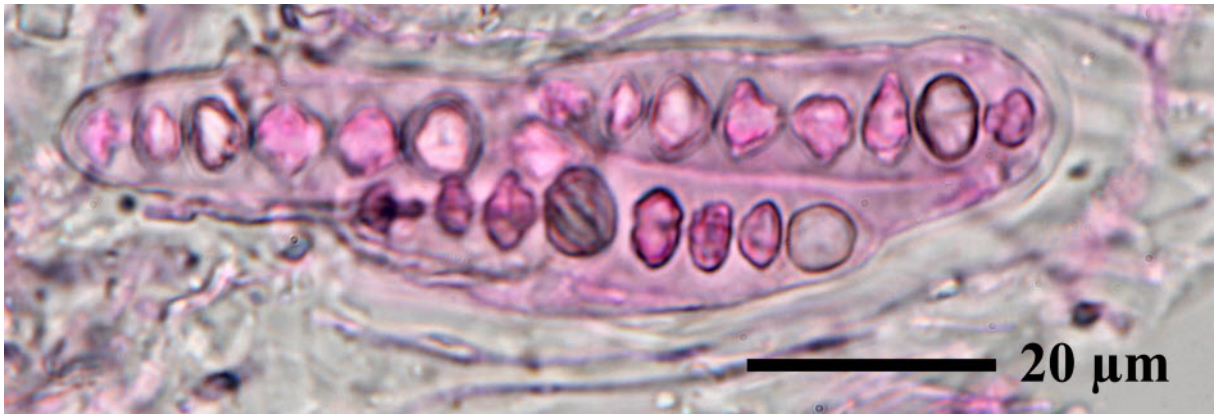


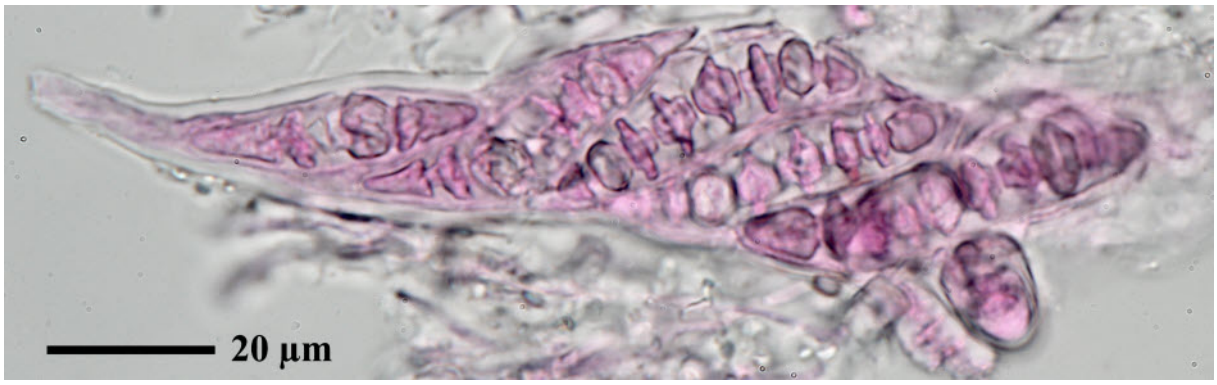




Trypethelium epileucodes

1977





Trypethelium epileucodes

1978

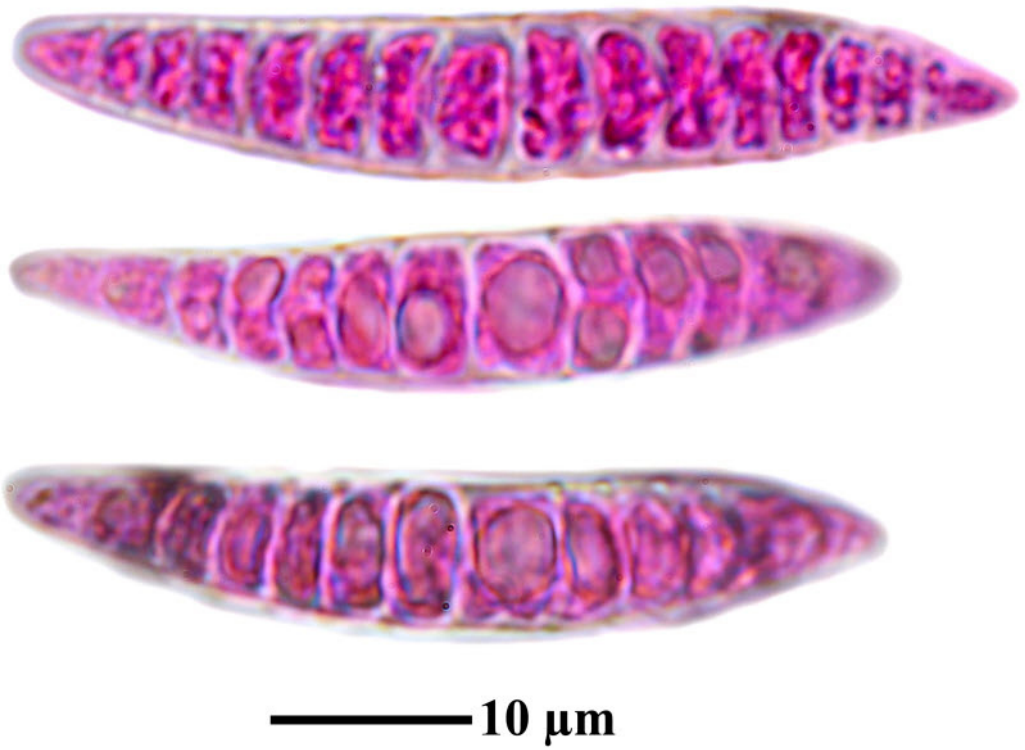
Trypethelium foveolatum Müll. Arg., Flora, Regensburg 68(12): 255 (1885)

Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, distinctly pseudostromatic; pseudostromata usually containing few ascomata, 0.7–1.5(–2.0) mm diam., prominent, laterally covered by thallus but upper part cream-coloured, with relatively broad, dark, often confluent ostiolar spots. Hamathecium clear. Ascospores 8 per ascus, 9–15-septate, fusiform, 58–78 × 10–13 µm, hyaline, IKI−. Chemistry: thallus and pseudostromata UV−, K−. TLC: no substances detected.

[ABL78380], Brazil, Mato Grosso do Sul, Campo Grande, Avenida Mato Grosso, Parque dos Poderes, in park on tree bark, 20°26’41” S, 54°33’40” W, 640 m. Leg. A. Aptroot (no 78380), 26.03.2019, det. A. Aptroot, 2019.







Trypethelium foveolatum

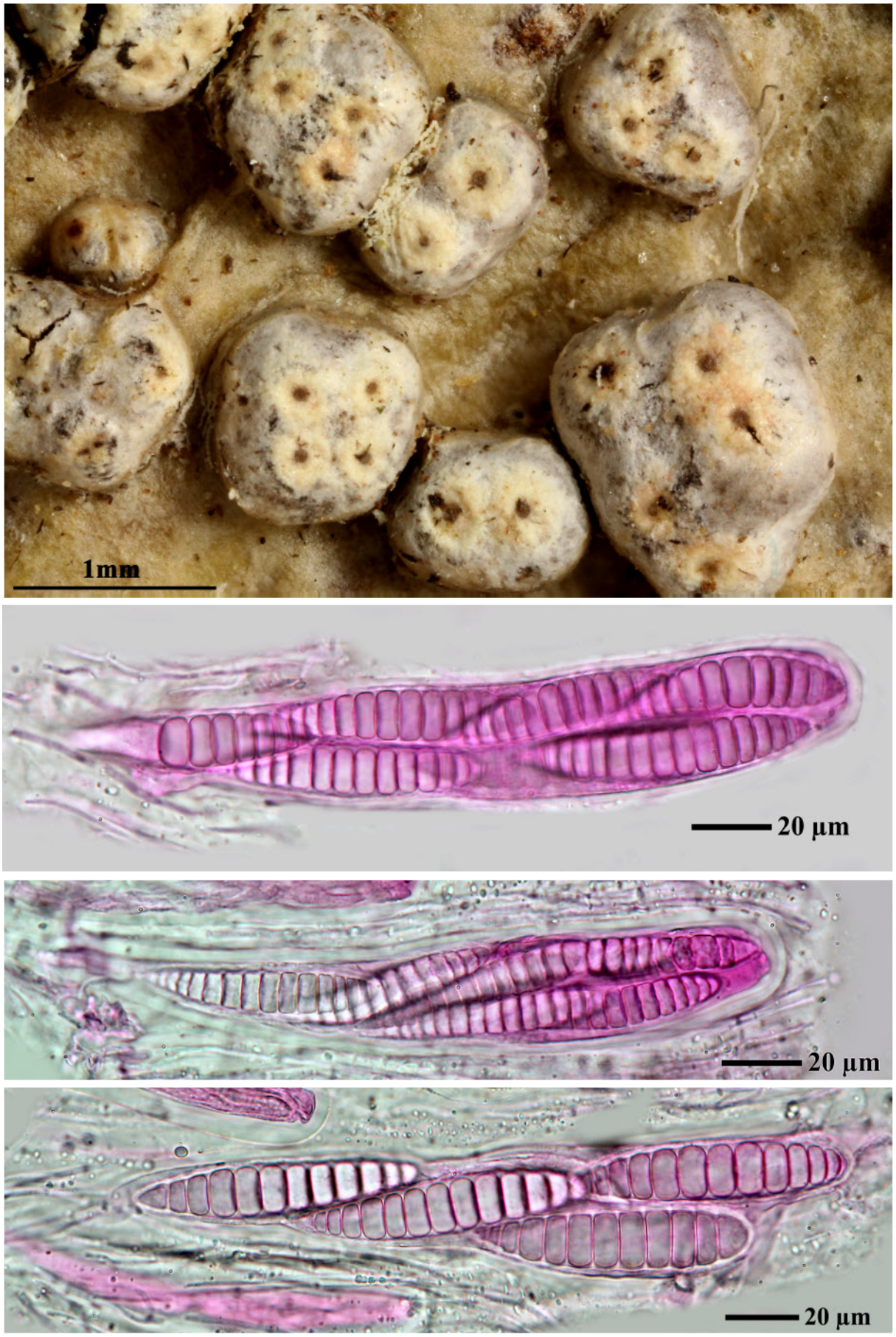
1980

Trypethelium globolucidum Aptroot, L.I. Ferraro & M. Cáceres, Lichenologist 46(1): 100 (2014)

Thallus corticate, smooth, somewhat shiny, continuous, covering areas up to 10 cm long and encircling twigs, thin, olivaceous green to olivaceous brown, without pseudocyphellae, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata perithecioid, sessile, 0.4–0.8 mm diam., black, mostly aggregated with 2–12(–25) in pseudostromata. Wall carbonized all around, up to c. 100 µm thick. Ostioles apical, flat to usually papillate, red-brown to black. Pseudostromata lobate in outline, up to c. 3 mm diam. and 1.5 mm high, sessile with nearly vertical sides, partly or completely covered with whitish to cream tissue. Hamathecium hyaline, inspersed with hyaline oil globules. Asci cylindrico-clavate, with 8 ascospores. Ascospores hyaline, 13–19-septate, fusiform, with a slight constriction at the median septum, (65–)83–97 × 11.5–14.5 µm, ends rather pointed, lumina rounded to lentiform, surrounded by a gelatinous layer of up to 7 mm thick. Pycnidia not observed. Chemistry: thallus UV–, C–, K–, KC–, P–, whitish parts of pseudostromata UV+ yellow. TLC: lichexanthone.

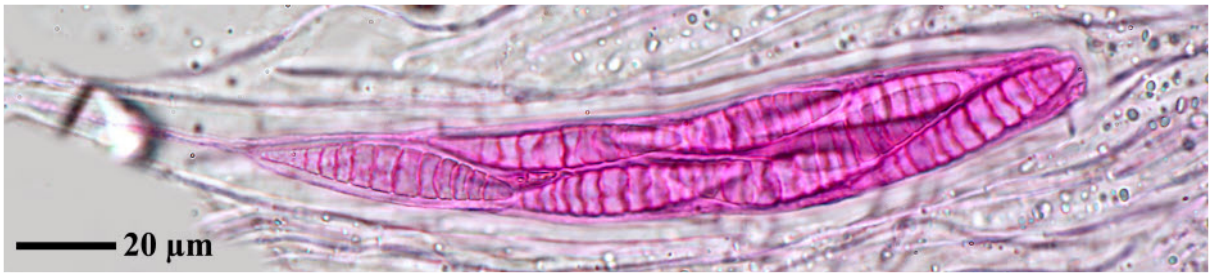
[Ferraro10630], Argentina, Misiones Province, Iguazú National Park, along railroad, 200 m, 25°41’50’’ S, 54°26’60’’ W, on twig bark along path near evergreen tropical rainforest. Leg. L. I. Ferraro (no 10630), A. Aptroot & M. Cáceres, 24.02.2013, det. A. Aptroot, 2013. ISOTYPE.

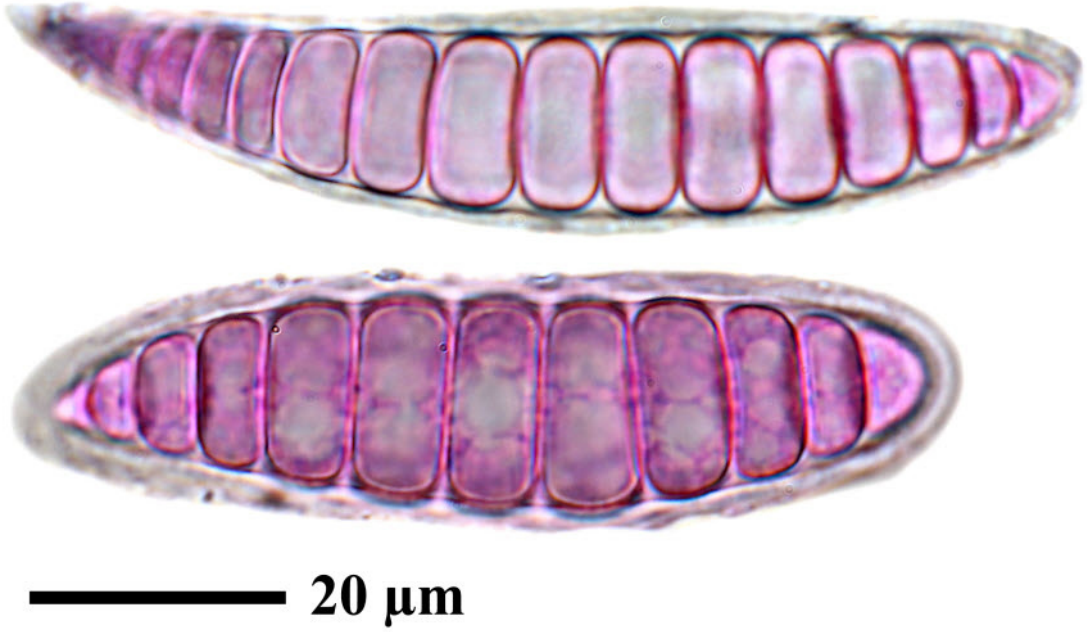




Trypethelium globolucidum

1982





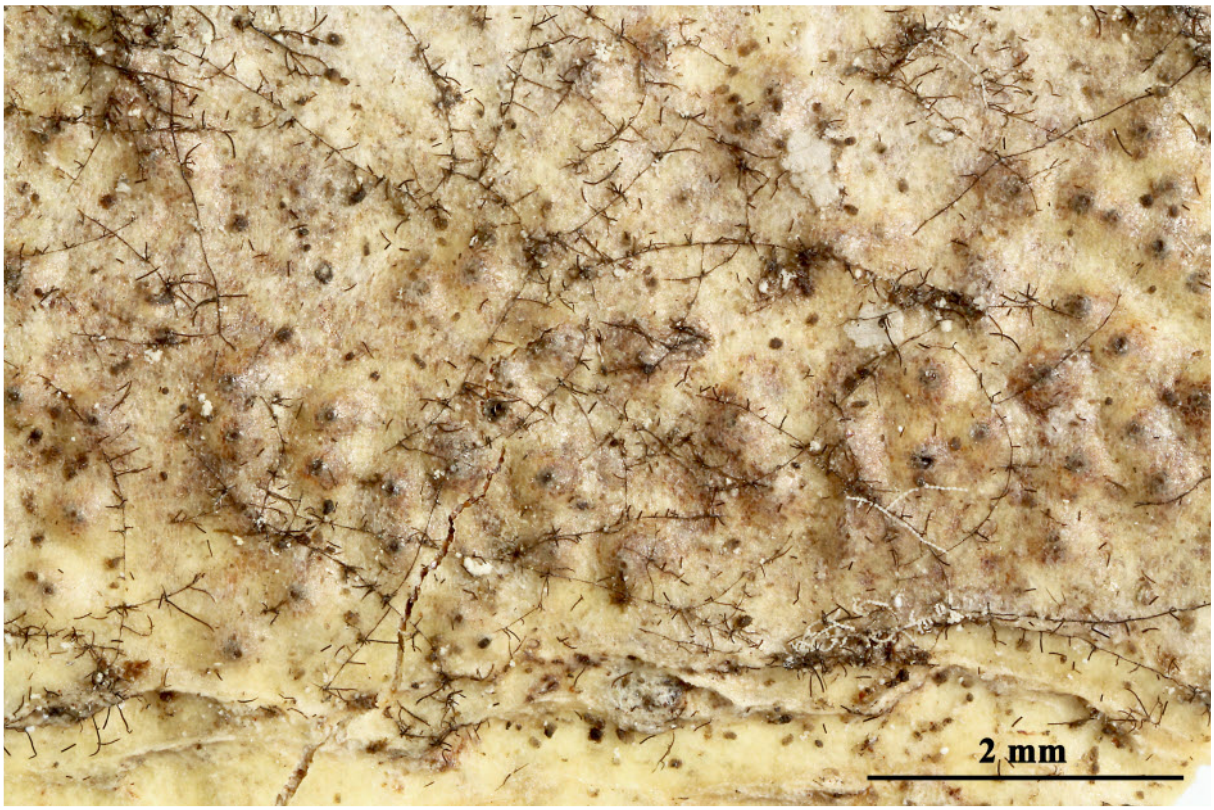
Trypethelium globolucidum

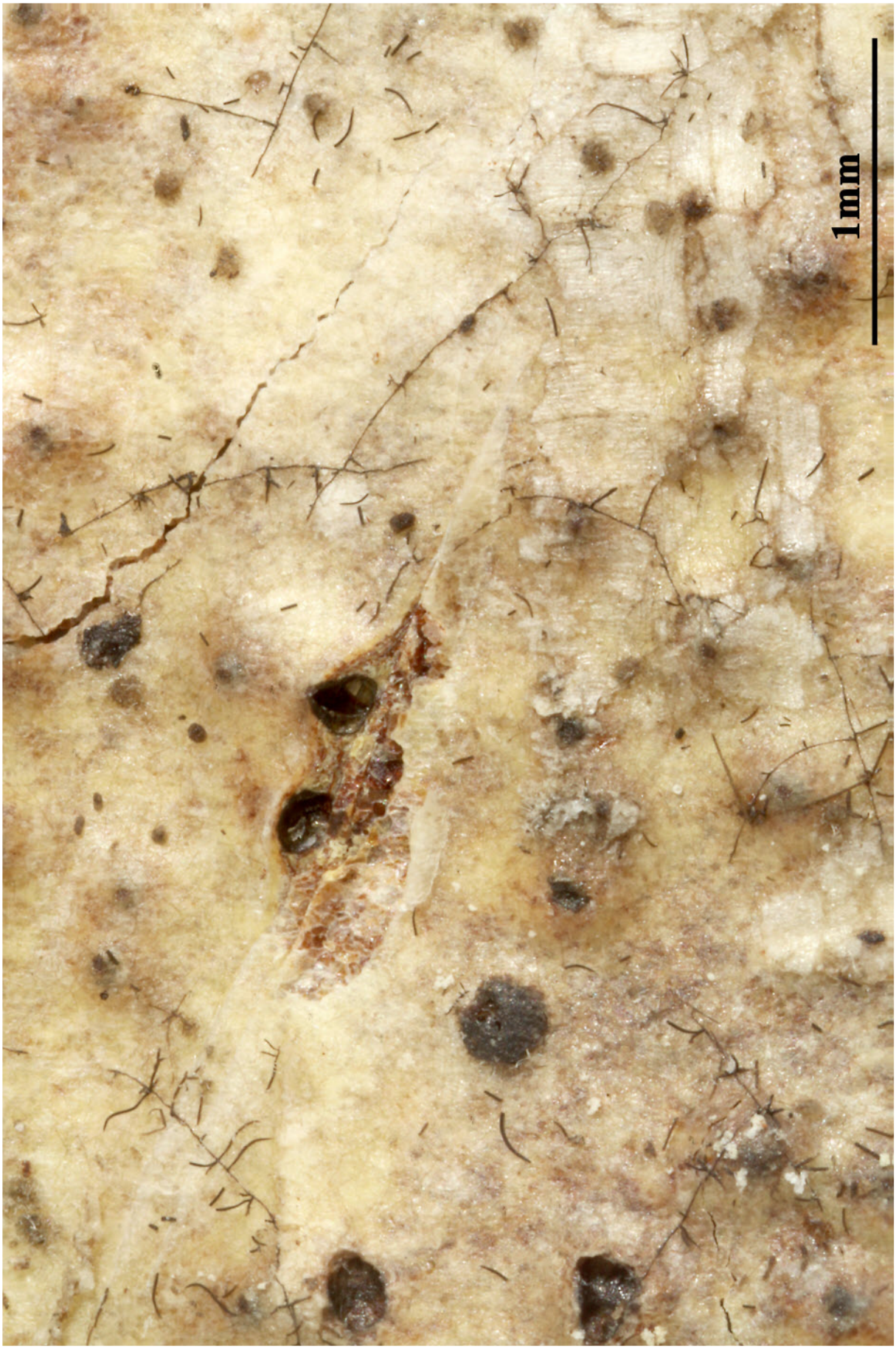
1983

Trypethelium inaequale Fée, Annls Sci. Nat., sér. 1 23: 439 (1831)
= *Trypethelium sprengelii f. inaequale* (Fée) Nyl., Mém. Soc. Acad. Maine-et-Loire 4: 77 (1858)
= *Trypethelium eluteriae var. inaequale* (Fée) Müll. Arg., Bot. Jahrb. Syst. 6: 393 (1885)
= *Trypethelium inamoenum* Müll. Arg., J. Linn. Soc. London, Bot. 29: 230 (1892)

Thallus corticate, olive-green to yellowish or brownish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, diffusely to distinctly pseudostromatic; pseudostromata with numerous ascomata, 0.5–1.0 mm broad, immersed to erumpent, often linear, with individual ascomata largely exposed and blackish brown. Hamathecium clear. Ascospores 8 per ascus, 5–11-septate, fusiform, 21–45 × 9–15 µm, hyaline, IKI−. Chemistry: Thallus and pseudostromata UV−, K−. TLC: no substances detected.

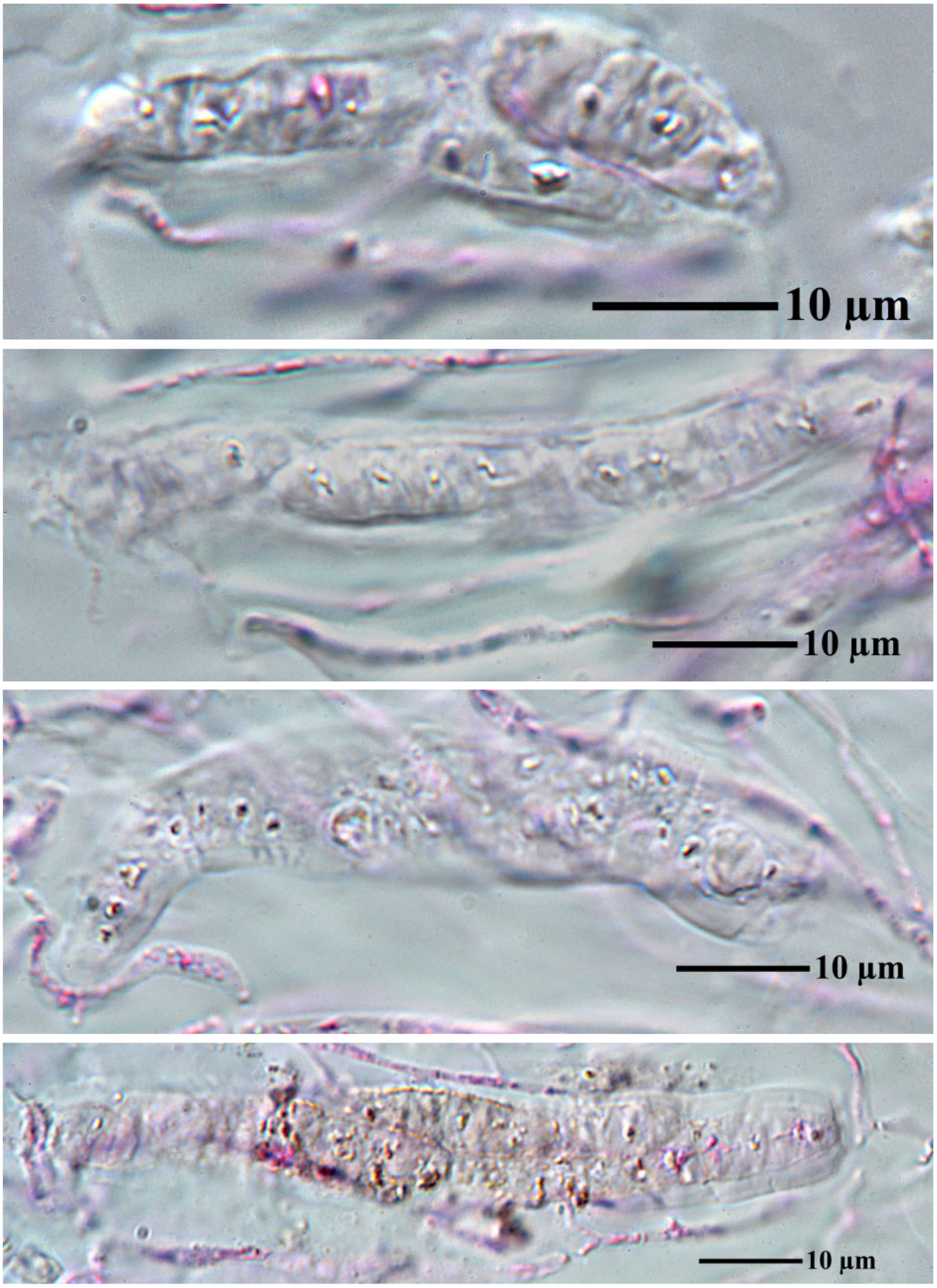
[ABL8259], Guyana, Upper Mazaruni district, Pakaraima mountains, c. 2 km NW of Kamarang, on thin stemlet in c. 10 m tall, well-lit savannah-forest on ridge. 5°53' N, 60°38' W, 500 m. Leg. H. Sipman & A. Aptroot (no ABL8259), 4.02.1985, det. A. Aptroot, 1990.





Trypethelium inaequale

1985



Trypethelium inaequale

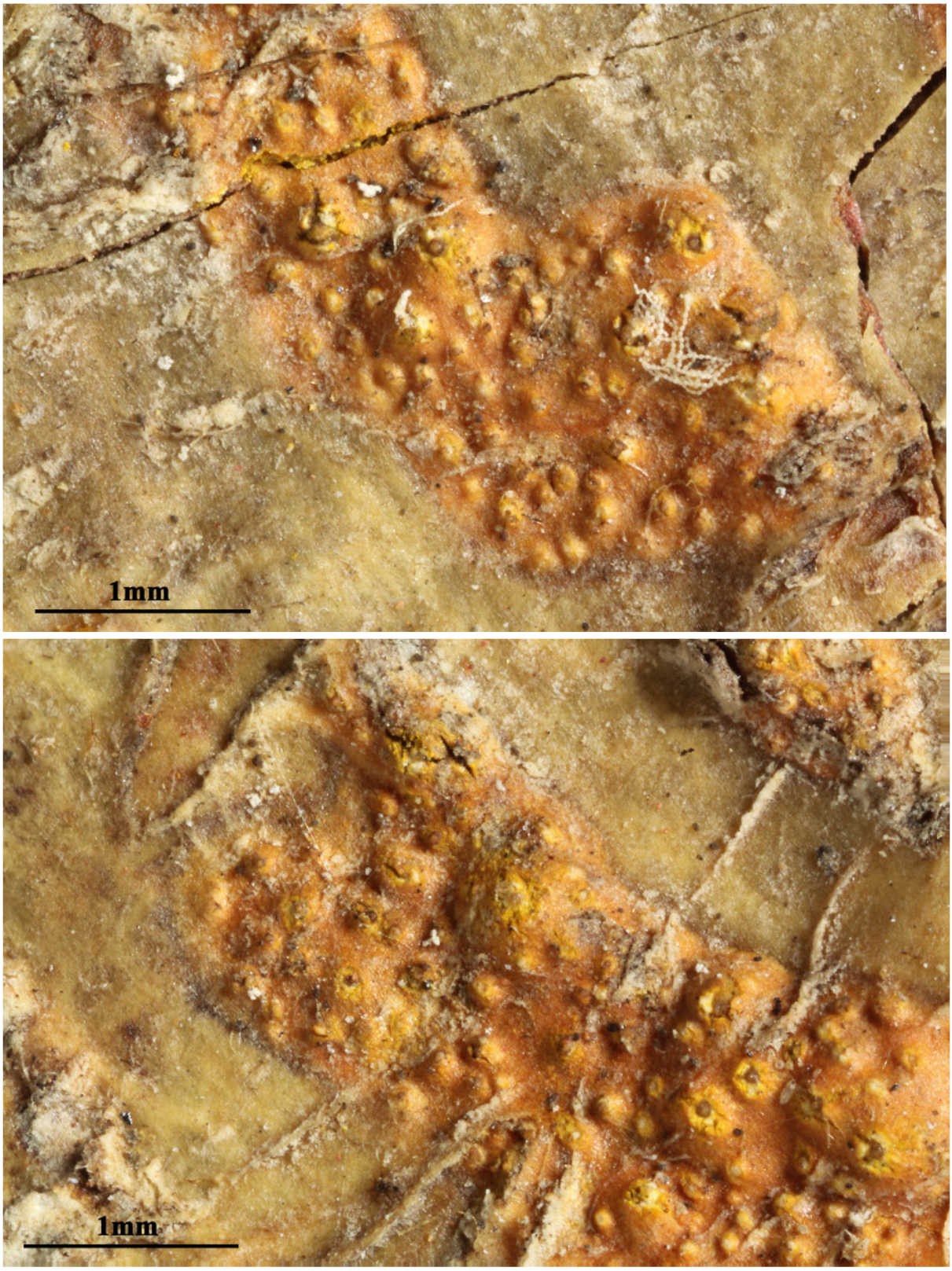
1986

Trypethelium infraeluteriae Aptroot & Gueidan, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 636 (2016)

Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤ at least 5 cm diam., c. 0.1 mm thick, olive-greenish grey, prothallus not observed, not inducing gall formation of the host bark. Ascomata globose, 0.3–0.5 mm diam., immersed in groups of 6–15 in pseudostromata with surfaces different from the thallus, which are slightly raised above the thallus, irregular to often linear in outline, ≤ 8 mm long and 2 mm wide, occasionally forming a net, orange. Wall dark brown all around, ≤ c. 50 µm thick. Ostioles apical, not fused, flat to concave, grey. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, fusiform, 7–9-septate, 37–42 × 9–11 µm, ends pointed, lumina ellipsoid, not surrounded by a gelatinous layer. Chemistry. Thallus UV-, K-; pseudostroma exterior K+ red, inside K+ red. TLC: parietin, emodin and two derivatives.

[CG3054], Vietnam, Western Highlands, Dong Nai province, Cát Tiên National Park, near the minority village 10 km South West of the accommodation area, along the road near a road gate (13), on trees in a tree plantation. Leg. C. Gueidan (no 3054), 16.02.2012, det. A. Aptroot (dubl. ex BM00098011 in ABL), 2012.





Trypethelium infraeluteriae

1988







Trypethelium infraeluteriae

1989





Trypethelium infraeluteriae

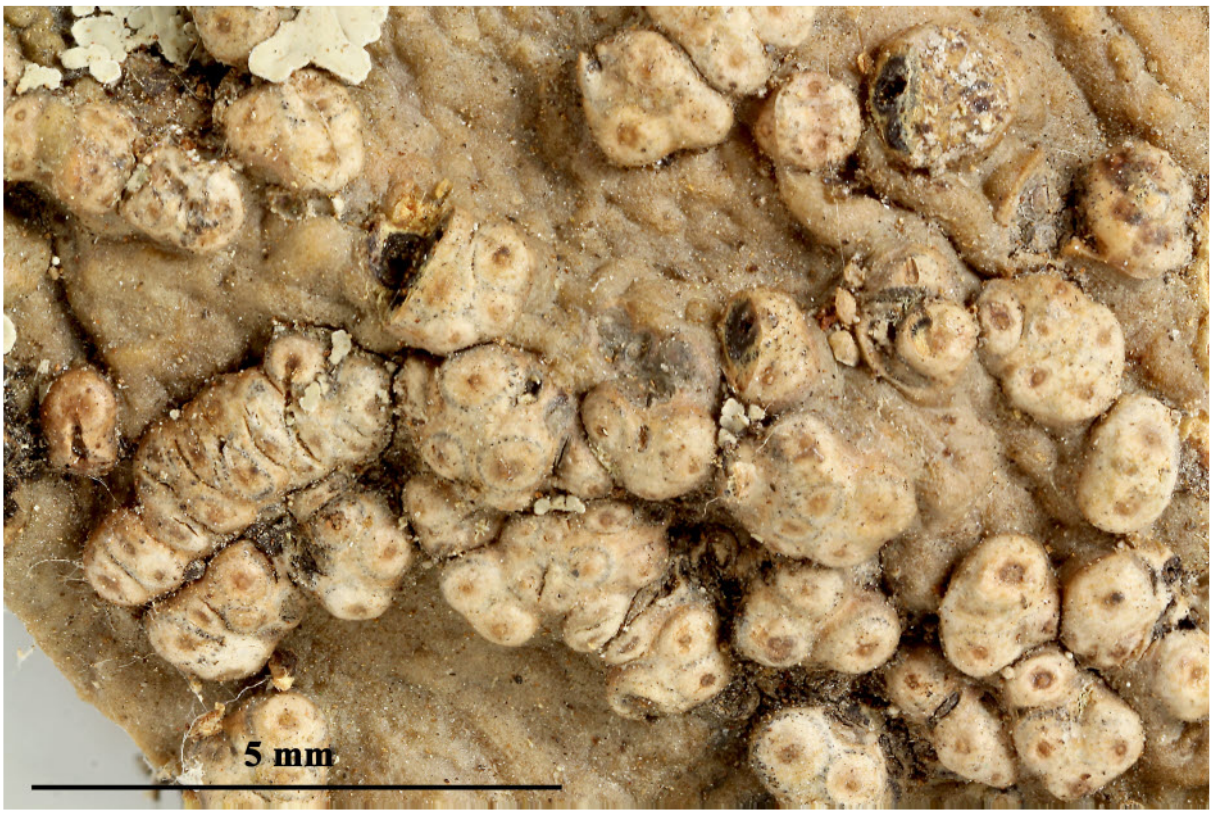
1990

Trypethelium krempelhuberi Makhija & Patw. [as 'krempelhuberii'], Int. J. Mycol. Lichenol. 5(3): 241 (1992)

= *Trypethelium platystomum* var. *denudatum* Malme, Ark. Bot. 19(1): 27 (1924)

Thallus corticate, olive-green to brownish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, distinctly pseudostromatic; pseudostromata with few ascomata, 0.5–1.2 mmdiam., erumpent to prominent, laterally covered by thallus but upper portion of individual ascomata exposed and blackish brown, conspicuously flattened, disc-shaped and margins of 'discs' with numerous small, black papillae arranged in circular fashion, around the ostioles thinly furnished with orange pigment. Hamathecium clear. Ascospores 8 per ascus, 13–15-septate, fusiform, 59–72 × 13–15 µm, hyaline, IKI−. Chemistry: Thallus UV−, K−; pseudostromata apically UV+ red, K+ purple, with thin, orange anthraquinone.

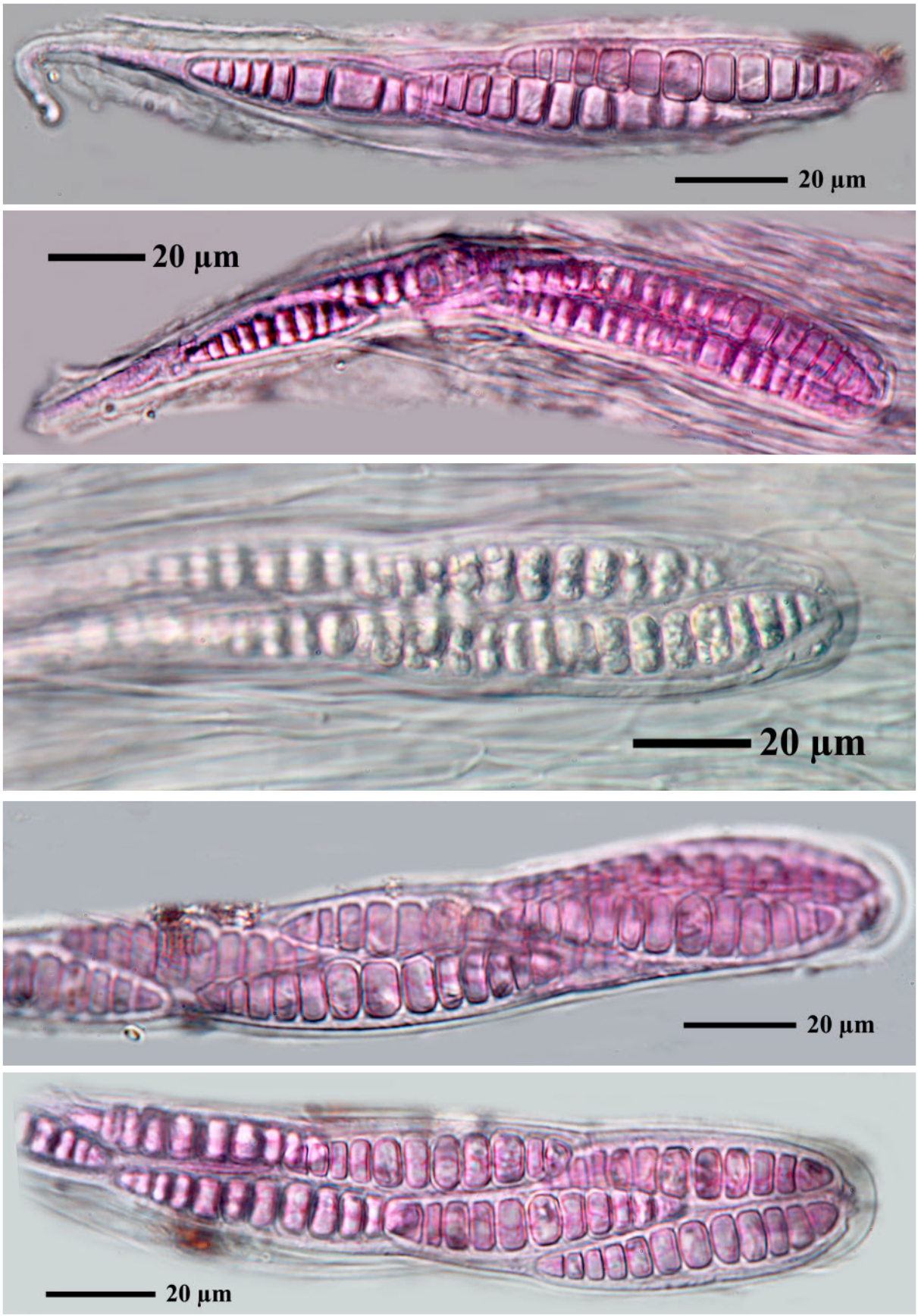
[ABL22229], Australia, Queensland, Cairns, in the city near the Centenary Lakes at the Botanical Garden on cultivated tree. 145°44' E, 16°54' S. Leg. A. & M. Aptroot (no ABL22229), 03.1988, det. A. Aptroot, 1988.





Trypethelium krempelhuberi

1992



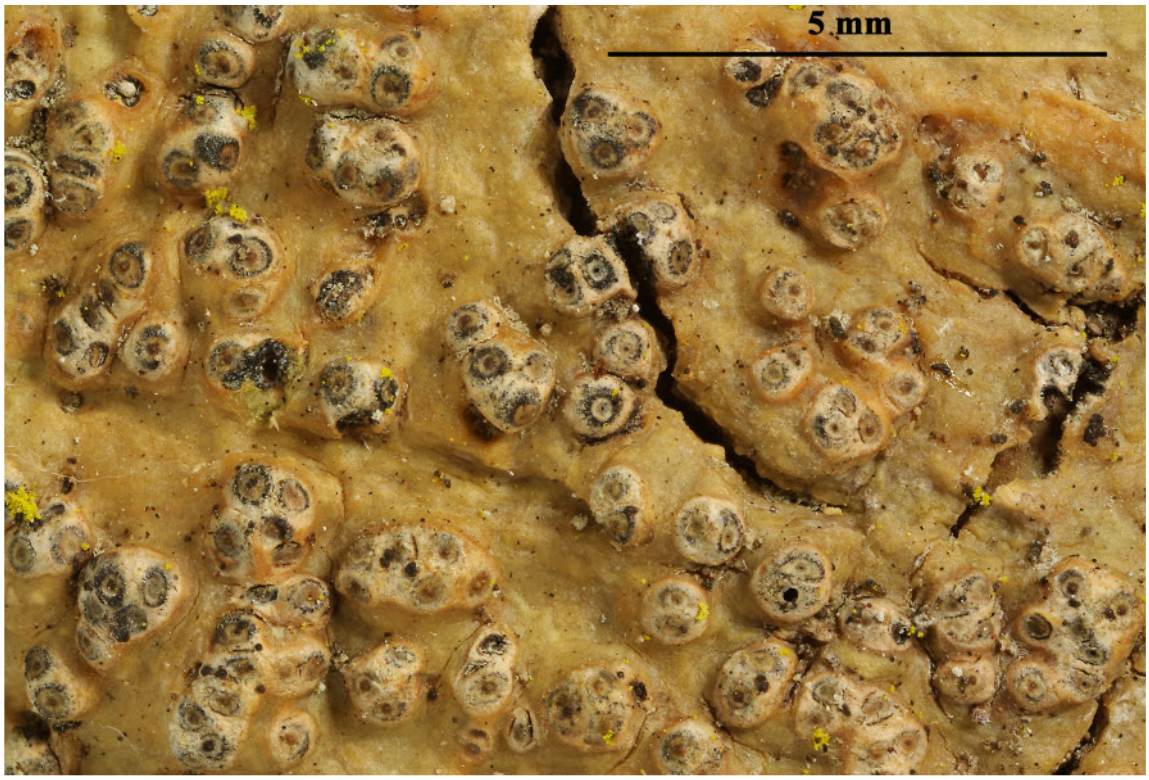
Trypethelium krempelhuberi

1993

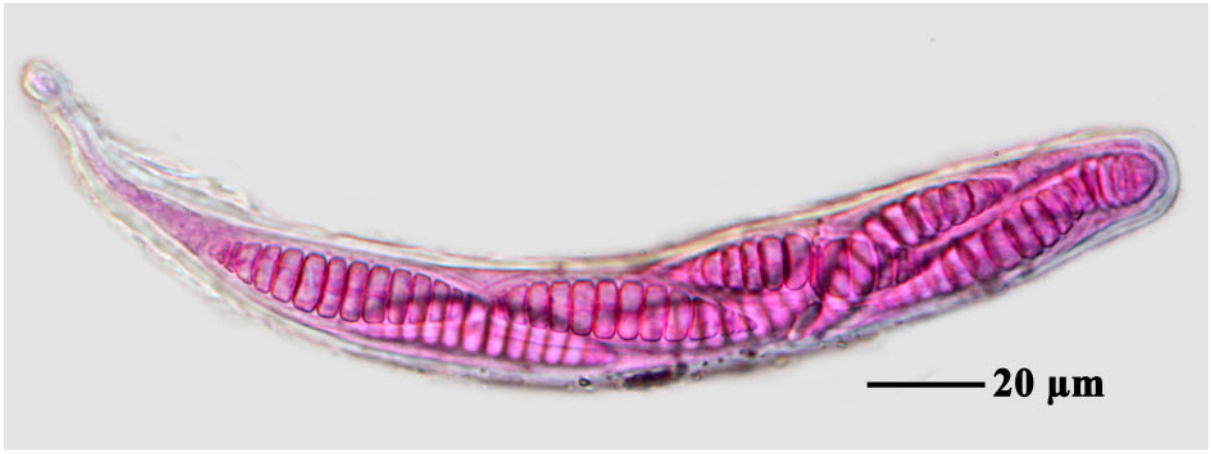
Trypethelium luteolucidum Aptroot, C. Mendonça & M. Cáceres, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 724 (2016)

Thallus corticate, smooth to somewhat bullate, somewhat shiny, continuous, covering areas ≤ 10 cm diam., c. 0.2 mm thick, ochraceous, not surrounded by a prothallus, not inducing gall formation of the host bark. Ascomata globose, 0.4–0.7 mm diam., mostly 2–7 aggregated, emergent from the thallus in pseudostromata with a decorticated upper surface different from the thallus; pseudostromata distinctly raised above the thallus, irregular in outline, sides almost vertical, ≤ c. 5 mm diam. and 1 mm high, sides concolorous with thallus; upper surface whitish pruinose or grey to blackish due to the emergent ascomata, inside with crystals. Wall carbonized, ≤ c. 60 µm thick. Ostioles apical, not fused, flat, brown. Hamathecium inspersed with hyaline oil globules. Asci with 8 ascospores. Ascospores hyaline, 11–21-septate, long fusiform, 60–110 × 12–15 µm, ends rounded, lumina diamond-shaped, surrounded by a gelatinous layer ≤ 2 µm thick. Pycnidia not observed. Chemistry: Thallus surface mostly UV+ yellow, K−, pseudostroma UV+ yellow, crystals K+ yellow to red. TLC: lichexanthone and an anthraquinone.

[ABL11446], Brazil, Rondônia, Porto Velho, Parque Circuito, c. 100 m, 8°43’54” S, 63°54’04” W, on bark of *Hevea brasiliensis* in plantation. Leg. M. Cáceres & A. Aptroot (no 11446), 11.03.2012, det. A. Aptroot, 2012. ISOTYPE.



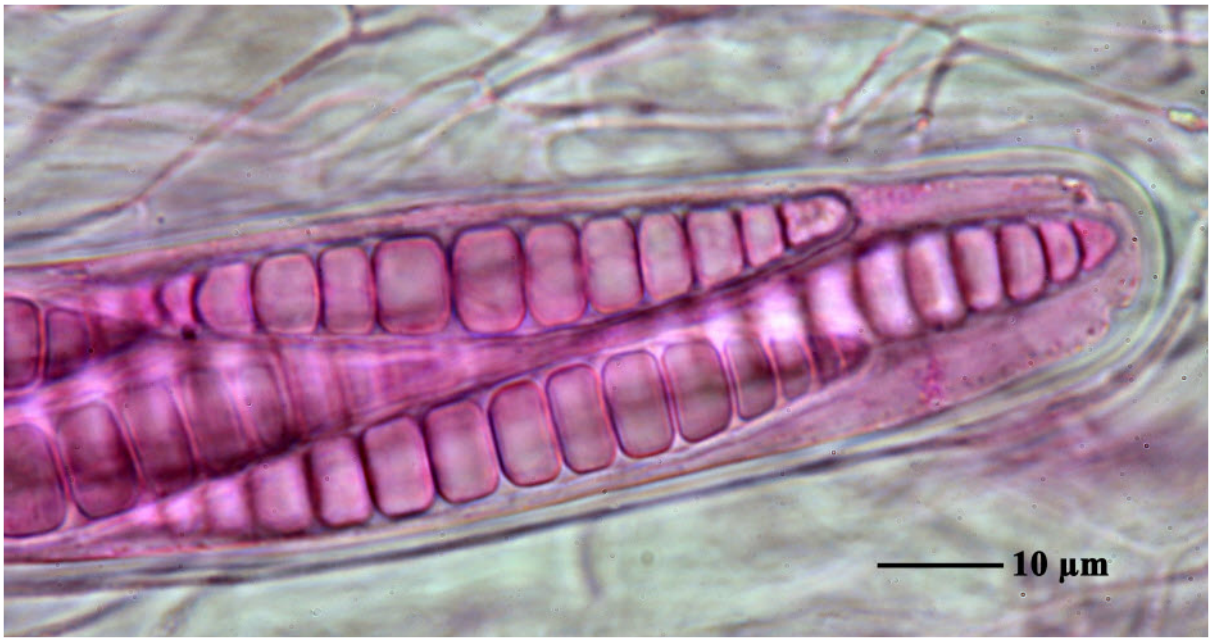


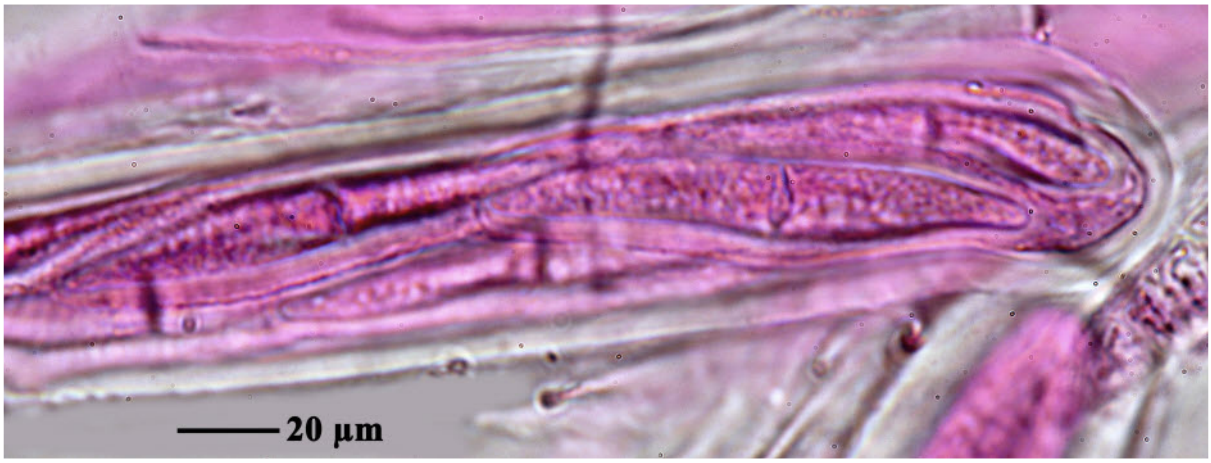




Trypethelium luteolucidum

1995







Trypethelium luteolucidum

1996





Trypethelium luteolucidum

1997

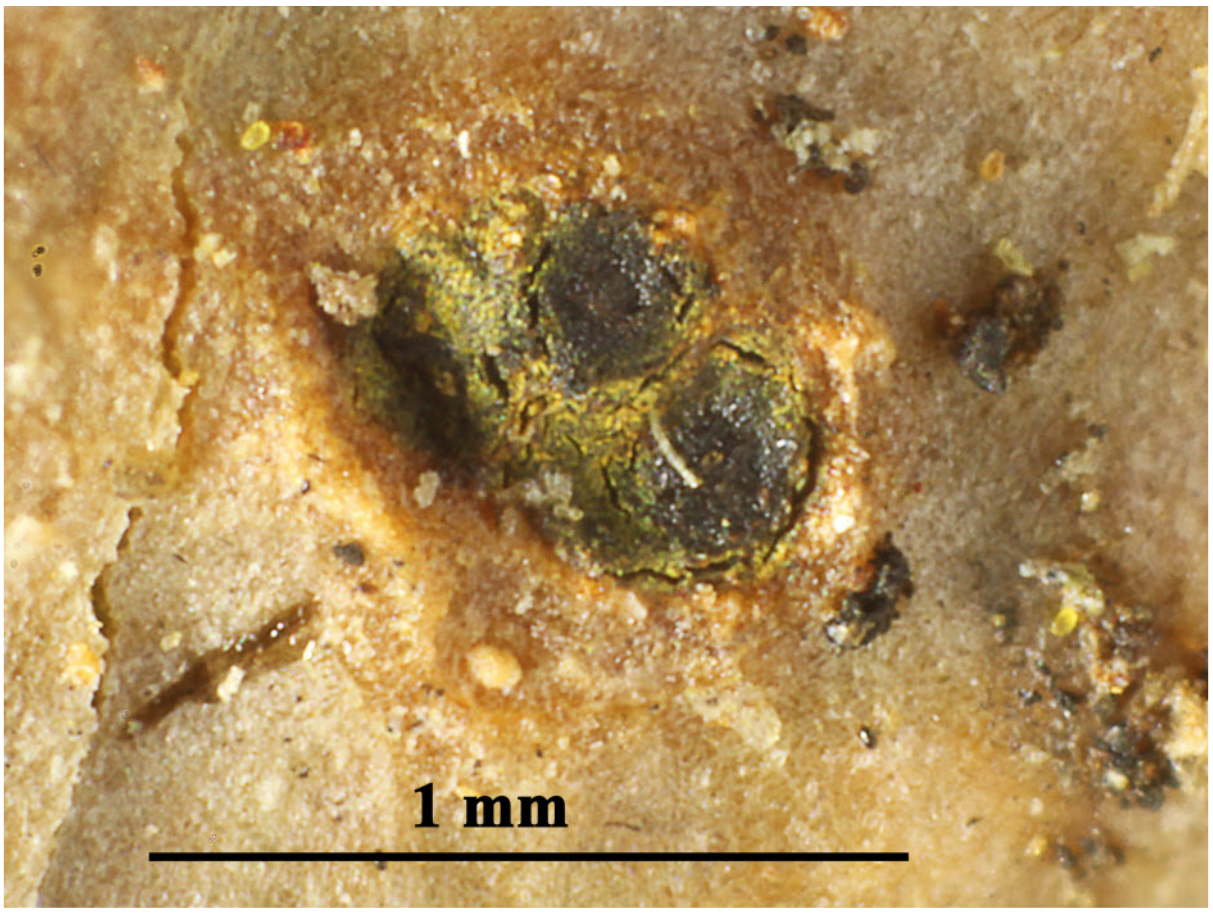
Trypethelium platystomum Mont., Annls Sci. Nat., Bot., sér. 2 19: 72 (1843)
= *Trypethelium platystomum f. leucostomum* Nyl. (1886)
= *Trypethelium platystomum var. denudatum* Malme (1924)
= *Trypethelium platystomum var. leucostomum* Nyl. (1886)

Thallus olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, distinctly pseudostromatic; pseudostromata with few ascomata, 0.8–1.5 mm diam., prominent, cream-coloured and usually paler than the thallus, but ostiolar spots dark and usually confluent in lobate pattern, surround by thin layer of orange pigment. Hamathecium clear. Ascospores 8 per ascus, 12–18-septate, fusiform, 55–75 × 8–15 µm, hyaline, IKI−. Chemistry: thallus UV−, K−; pseudostromata apically UV+ red, K+ purple, with orange anthraquinone.

[ABL11861], Brazil, Amazonia, Fazenda Sao Francisco off BR319 30 km N of Porto Velho, 8°24‘33“ S, 63°58‘56“ W, c. 100 m, on tree bark in primary rain forest. Leg. M. Cáceres & A. Aptroot (no 11861), 15.03.2012, det. A. Aptroot 2012.

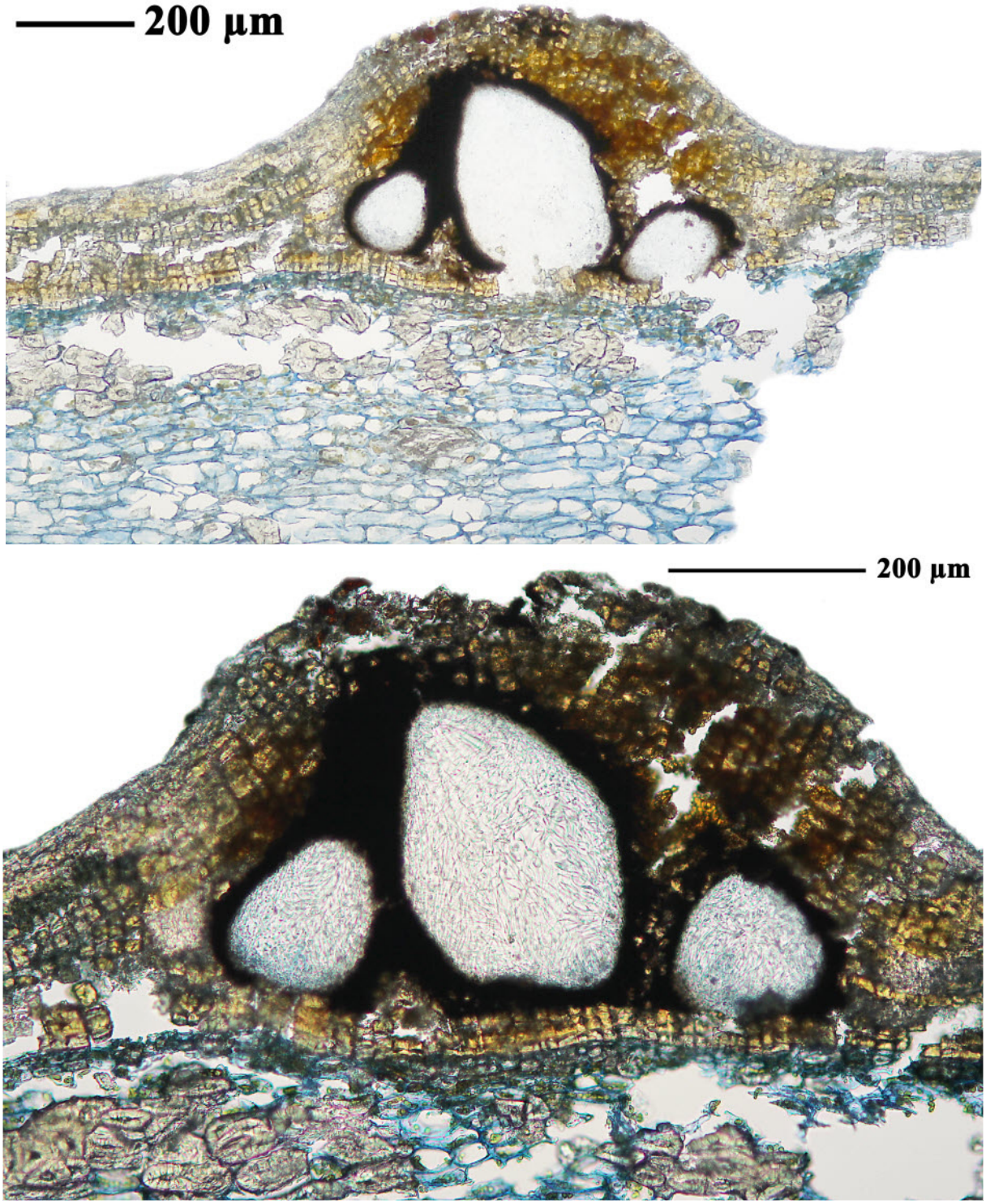






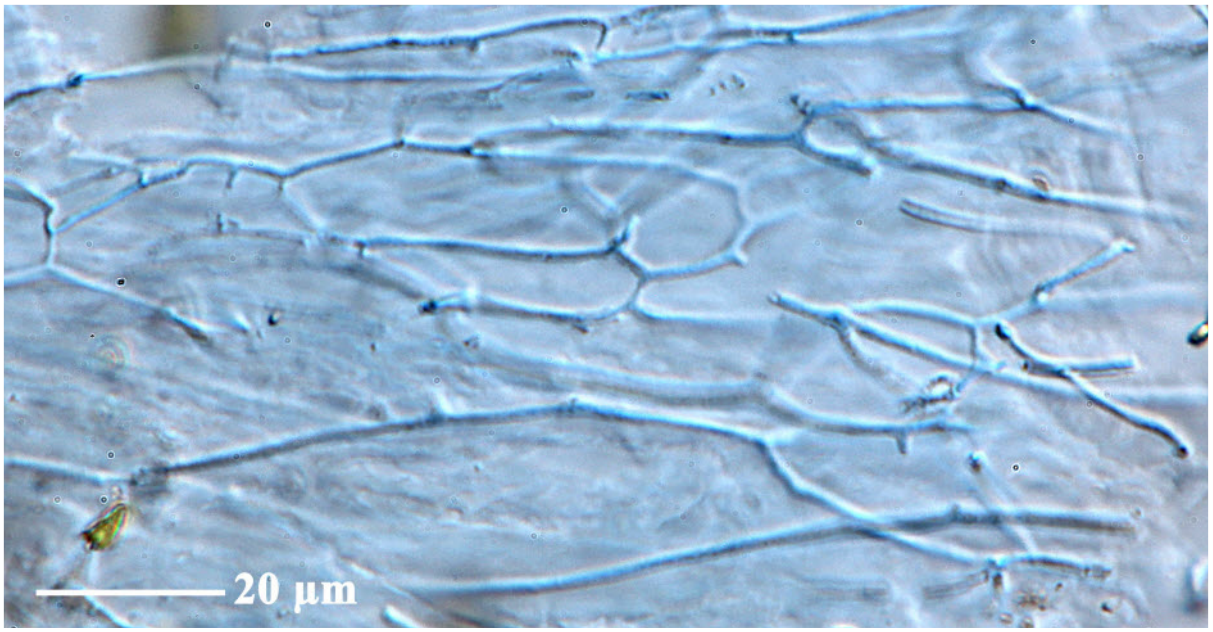
Trypethelium platystomum

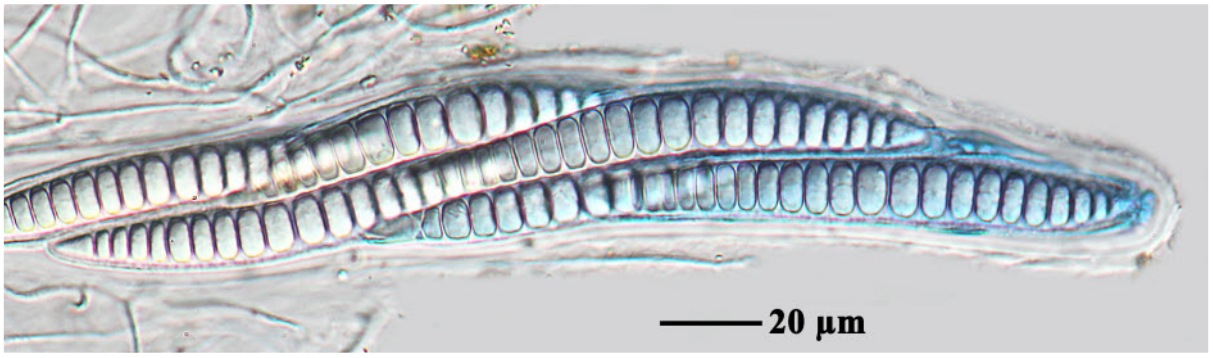
1999

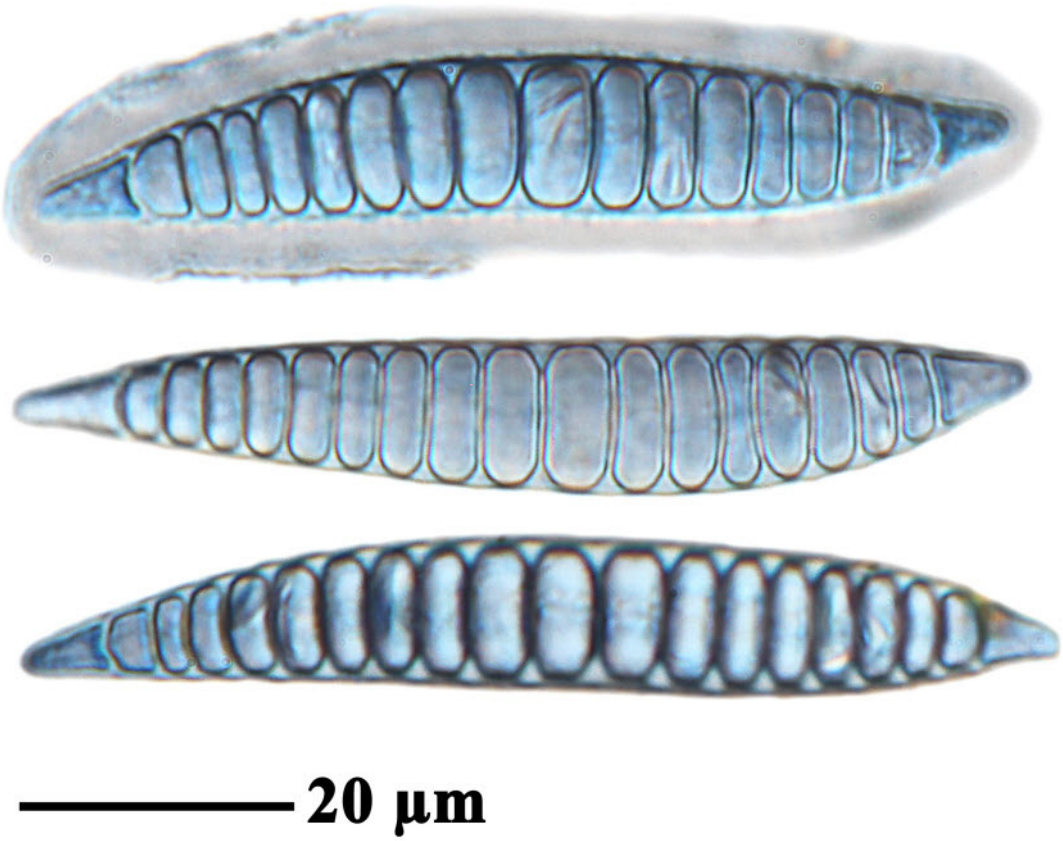


Trypethelium platystomum

2000

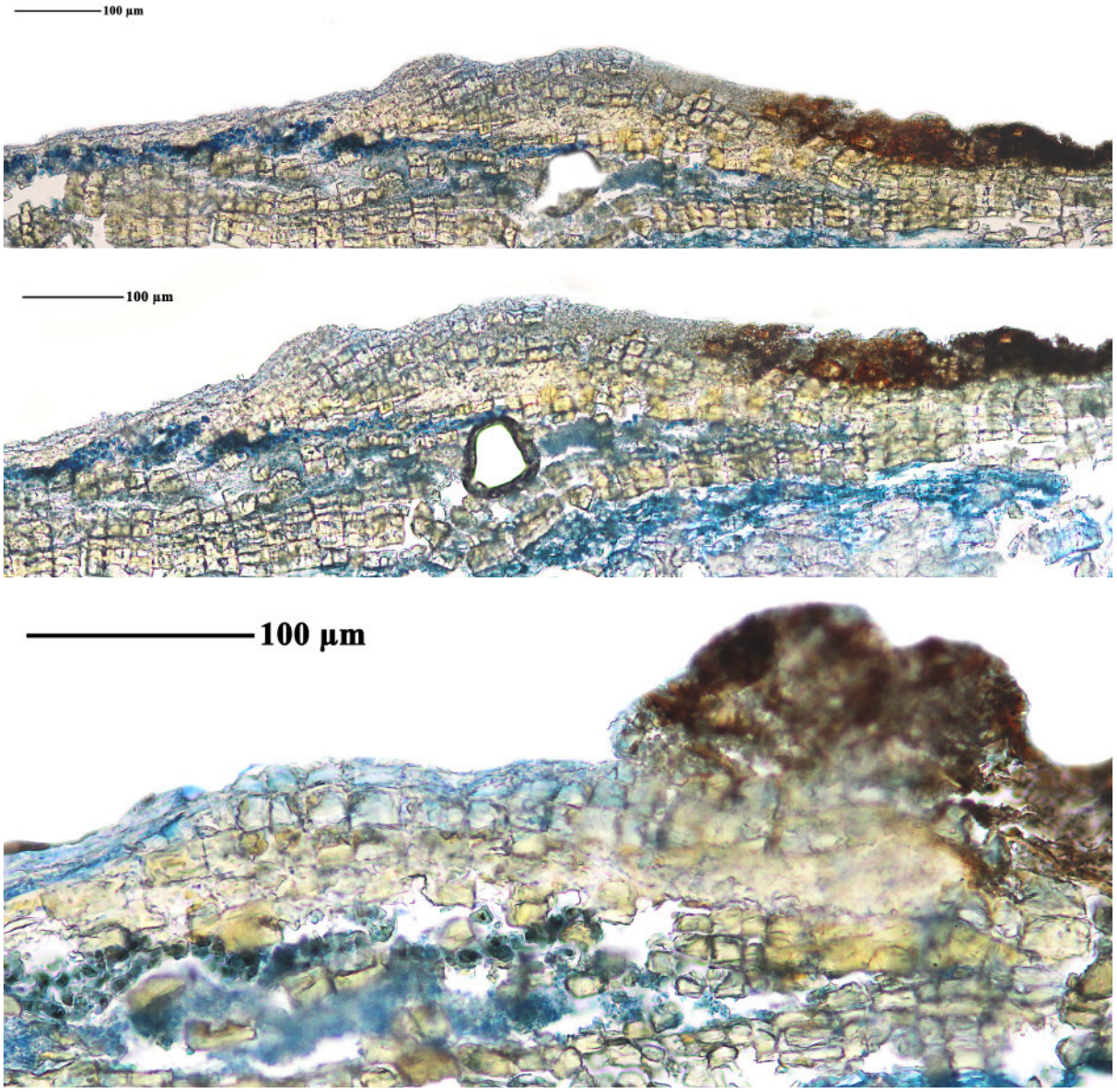






Trypethelium platystomum

2001



thallus to prothallus

Trypethelium platystomum

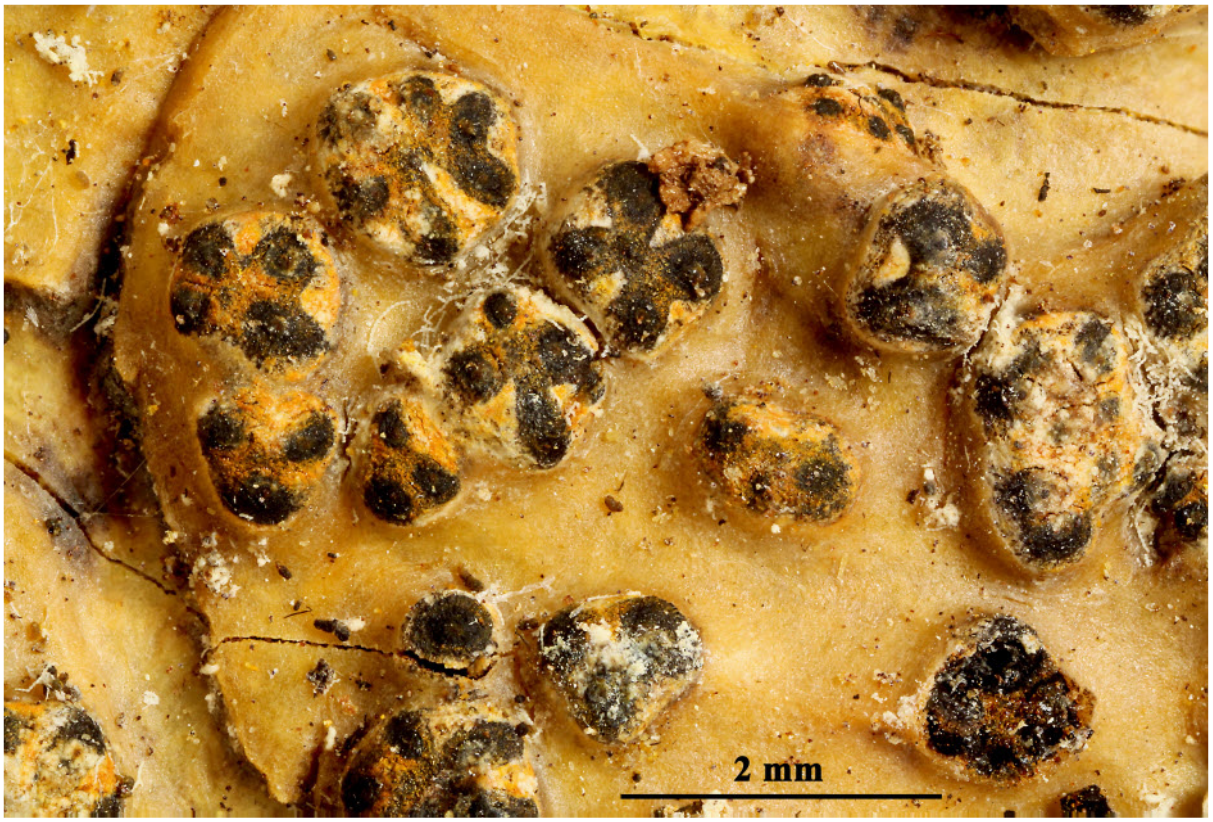
2002

Trypethelium platystomum Mont., Annls Sci. Nat., Bot., sér. 2 19: 72 (1843)
= *Trypethelium platystomum f. leucostomum* Nyl. (1886).
= *Trypethelium platystomum var. denudatum* Malme (1924).
= *Trypethelium platystomum var. leucostomum* Nyl. (1886).

Thallus olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, distinctly pseudostromatic; pseudostromata with few ascomata, 0.8–1.5 mm diam., prominent, cream-coloured and usually paler than the thallus, but ostiolar spots dark and usually confluent in lobate pattern, surround by thin layer of orange pigment. Hamathecium clear. Ascospores 8 per ascus, 12–18-septate, fusiform, 55–75 × 8–15 µm, hyaline, IKI−. Chemistry: thallus UV−, K−; pseudostromata apically UV+ red, K+ purple, with orange anthraquinone.

[Sip19441], Guyana, upper Mazaruni district, trail from Kamarang river to PwiPwi mountain, N of Waramadan, rocky savannah, ca. 10 km N of Waramadan. 5°57’ N, 60°45’ W, ca. 800 m. Leg. H. Sipman (no 19441) & A. Aptroot, 28.02.1985, det. A. Aptroot, 1990, rev. R. Harris, 1991.







Trypethelium platystomum

2004



Trypethelium platystomum

2005





Trypethelium platystomum

2006

Trypethelium plicatorimosum Makhija & Patw. [as 'plicato-rimosum'], J. Hattori bot. Lab. 73: 205 (1993)

= *Trypethelium rubrocinctum* Makhija & Patw., J. Hattori Bot. Lab. 73: 206 (1993)

Thallus corticate, olive-green to yellowish, verrucose-rugulose. Ascomata trypethelioid, with apical ostioles, diffusely pseudostromatic; pseudostromata with few ascomata, 0.5–1.0 mm broad, erumpent, basally covered by thallus but upper part exposed, brown-black, flattened and disc-shaped. Hamathecium clear. Ascospores 8 per ascus, 12–17-septate, fusiform, 45–55 × 6–8 µm, hyaline, IKI−. Chemistry: thallus and pseudostromata UV−, K−. TLC: no substances detected.

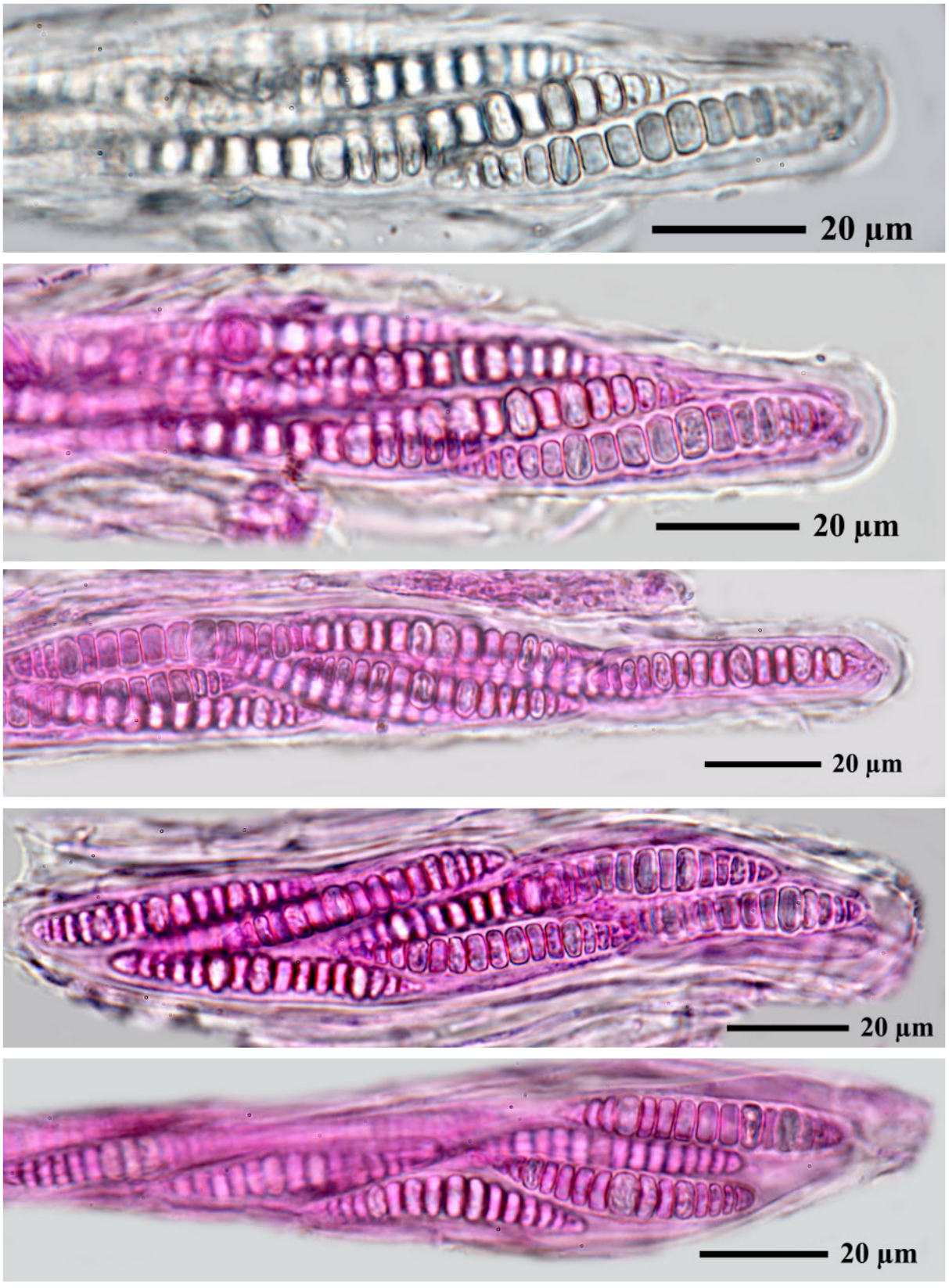
[AMH75528], India, Maharashtra, Amboli. Leg. Patwardhan (no AMH 75528) & Prabhu. Part of the HOLOTYPE.





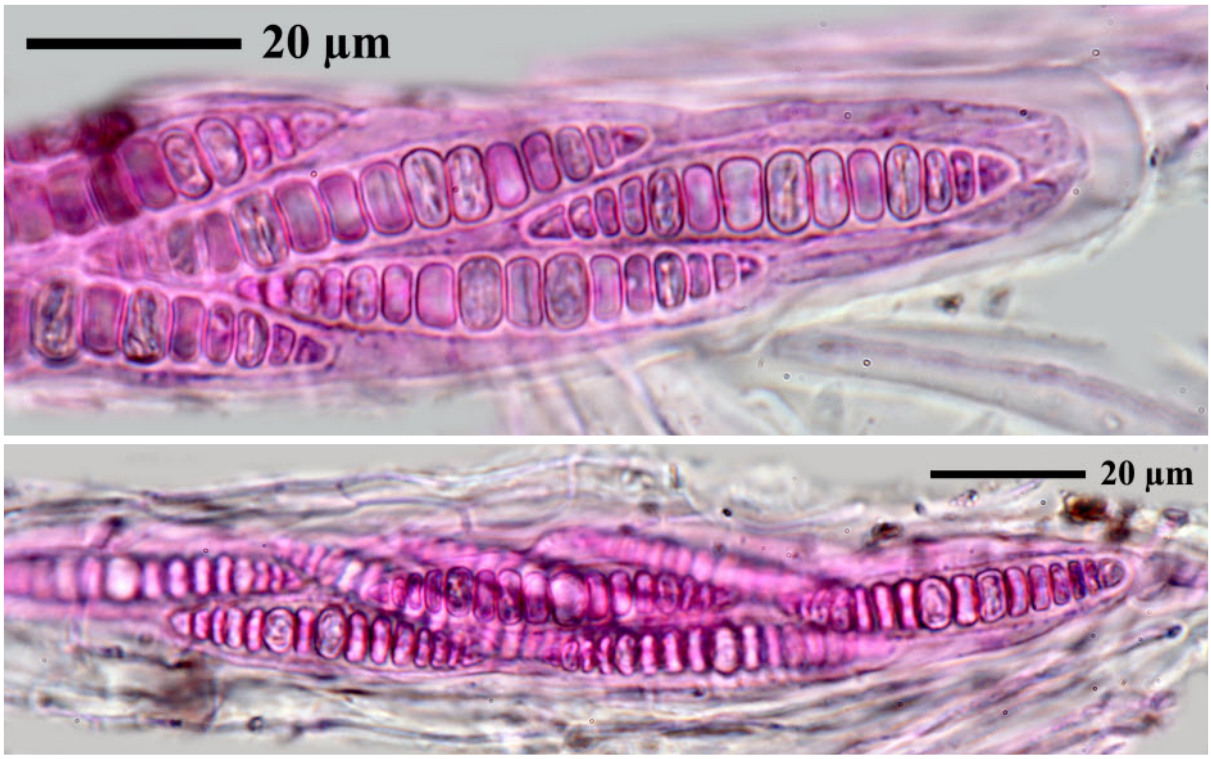
Trypethelium plicatorimosum

2008



Trypethelium plicatorimosum

2009



Trypethelium plicatorimosum

2010

Trypethelium subeluteriae Makhija & Patw., Int. J. Mycol. Lichenol. 5(3): 245 (1992)

Thallus olive-green to yellowish brown, smooth to uneven. Ascomata with apical ostioles, distinctly pseudostromatic; pseudostromata with numerous ascomata, 1–2 mm diam., prominent to sessile, browenish but covered by orange pigment except for dark ostioles. Hamathecium clear. Ascospores 8/ascus, 11–19-septate, fusiform, hyaline, 55–75 × 11–12 µm, IKI-. Chemistry: thallus UV-, K-; pseudostromata UV+ red, K+ purple, with orange anthraquinone.

[ABLISE48597], Brazil, Bahia, Itamajarú, Monte Pascual, on tree in cerrado forest, 16°51’55” S, 39°24’54” W, 130 m. Leg. M. Cáceres & A. Aptroot, (no ISE 48597), 18.02.2019.

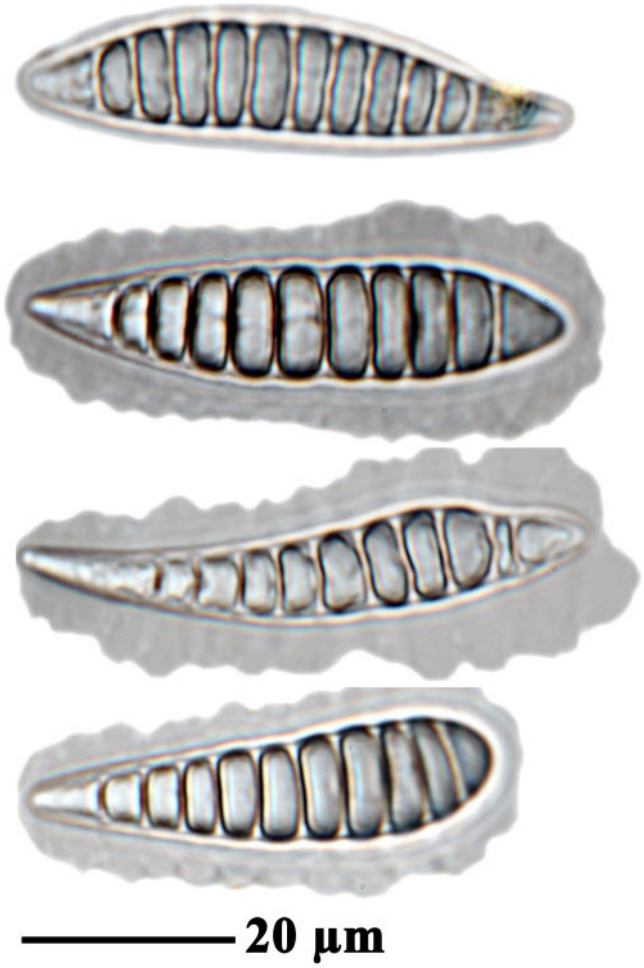




Trypethelium subeluteriae

2012





Trypethelium subeluteriae

2013

Trypethelium subeluteriae Makhija & Patw., Int. J. Mycol. Lichenol. 5(3): 245 (1992)

Thallus olive-green to yellowish brown, smooth to uneven. Ascomata with apical ostioles, distinctly pseudostromatic; pseudostromata with numerous ascomata, 1–2 mm diam., prominent to sessile, browenish but covered by orange pigment except for dark ostioles. Hamathecium clear. Ascospores 8/ascus, 11–19-septate, fusiform, hyaline, 55–75 × 11–12 µm, IKI-. Chemistry: thallus UV-, K-; pseudostromata UV+ red, K+ purple, with orange anthraquinone.

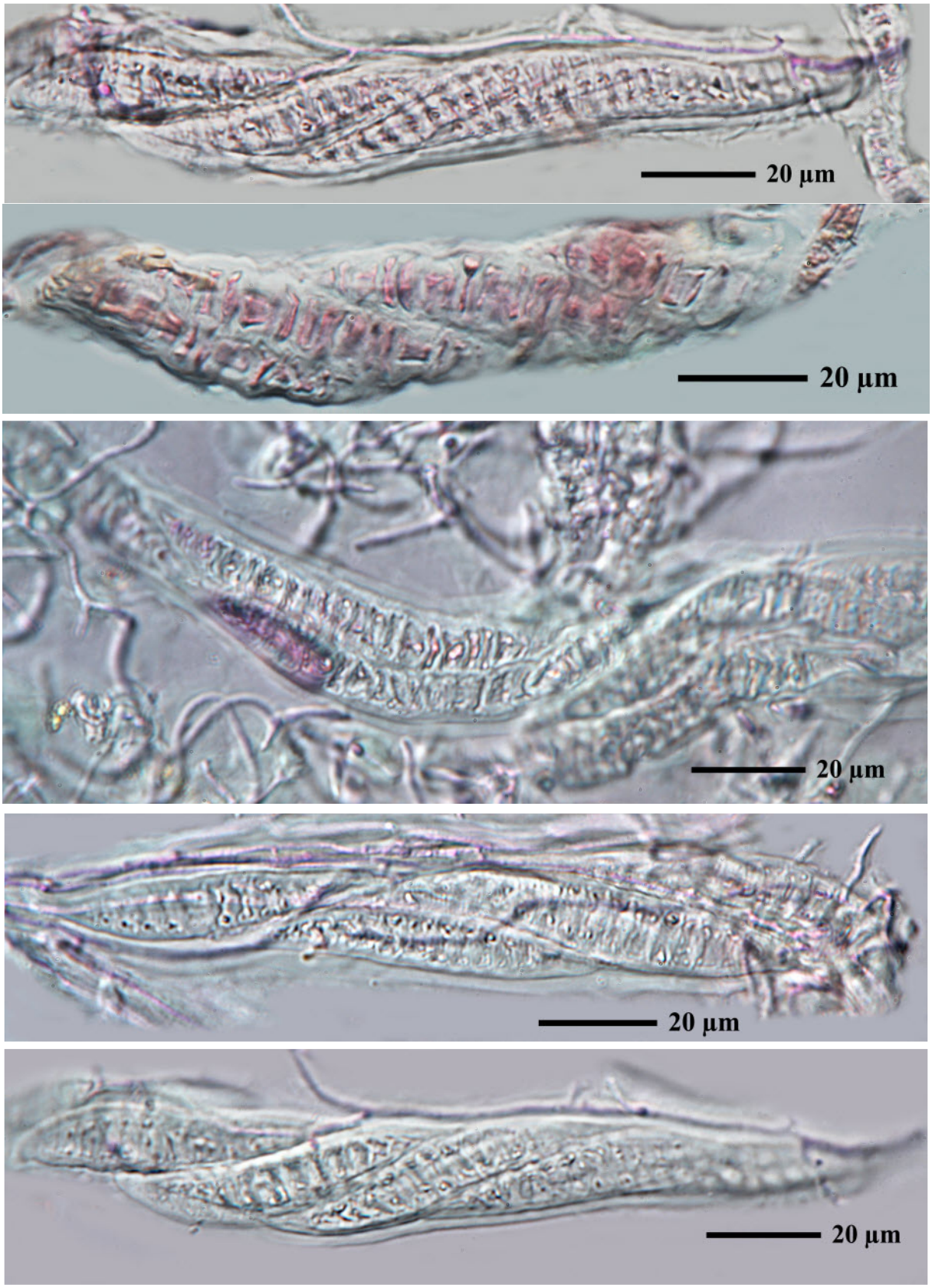
[ISE48601], Brazil, Bahia, Itamarajú, Monte Pascual, on tree in cerrado forest, 16°51’55” S, 39°24’54” W, 130 m. Leg. M. Cáceres & A. Aptroot, (no ISE 48601), 18.02.2019, det A. Aptroot, 2019.





Trypethelium subeluteriae

2015



Trypethelium subeluteriae

2016

Viridothelium cinereoglaucescens (Vain.) Lücking, M.P. Nelsen & Aptroot, in Aptroot & Lücking, Lichenologist 48(6): 973 (2016)

= *Pseudopyrenula cinereoglaucescens* Vain., Bot. Mag., Tokyo 35: 76 (1921)

= *Trypethelium cinereoglaucescens* (Vain.) R.C. Harris, Lichenogr. Thomsoniana, North American Lichenology in Honor of John W. Thomson (Ithaca): 141 (1998)

Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary to irregularly confluent, 0.4–0.6 mm diam., immersed-erumpent, completely covered by thallus. Hamathecium clear. Ascospores 8 per ascus, (5–)7–11-septate, fusiform, 50–80 × 8–15 µm, with rather thin septa, hyaline, IKI+ weakly violet. Chemistry: Thallus and pseudostromata UV−, K−. TLC: no substances detected.

[Kashiwadani19705], Japan, Shikoku, Prov. Oyo, Sotodomari, Nishiumi-cho, Minamiuwa-gun, on bark of Rapamaea meriifolia. Leg. H. Kashiwadani (no 19705), 24.03.1983.



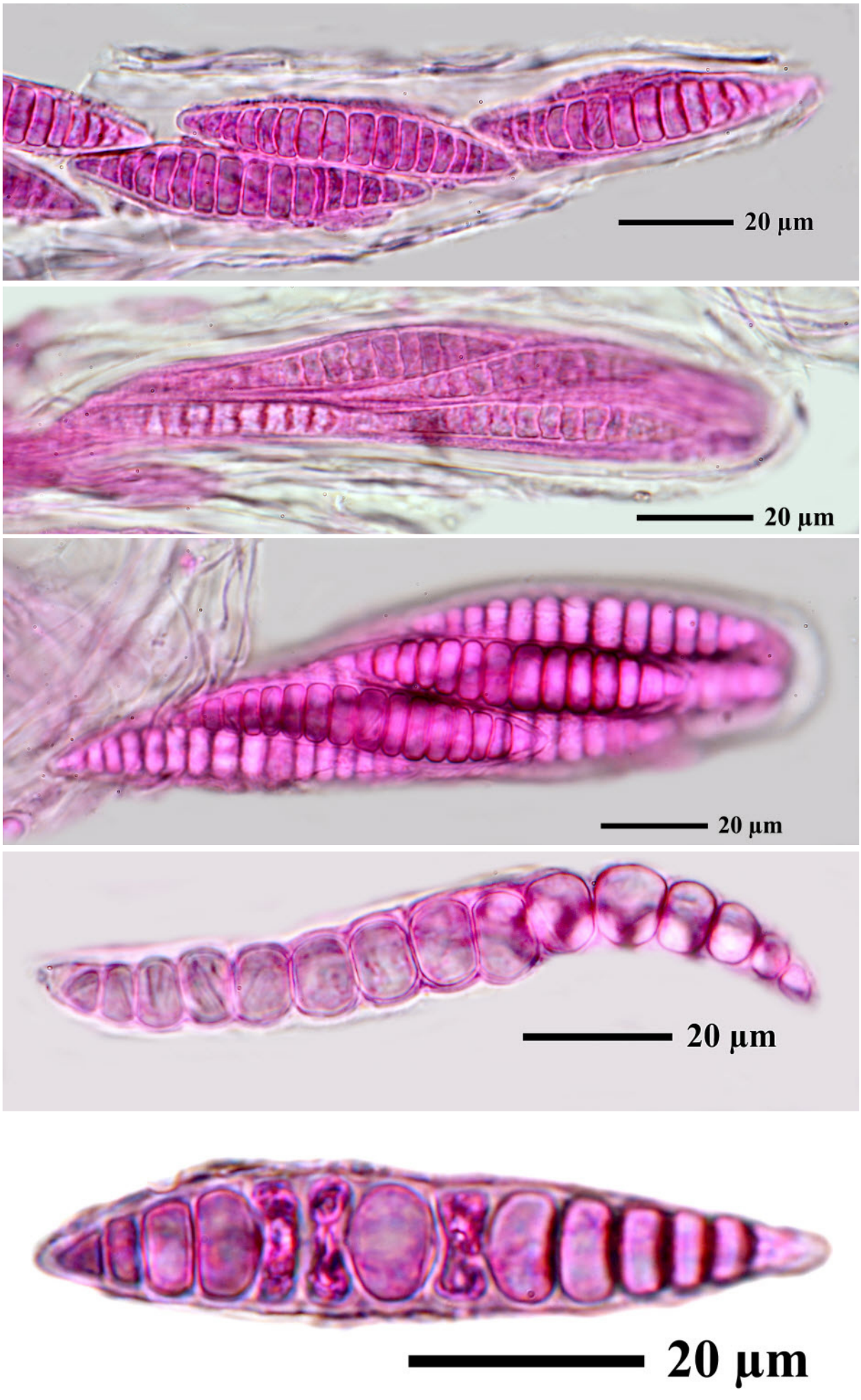






Viridothelium cinereoglaucescens

2018



Viridothelium cinereoglaucescens

2019

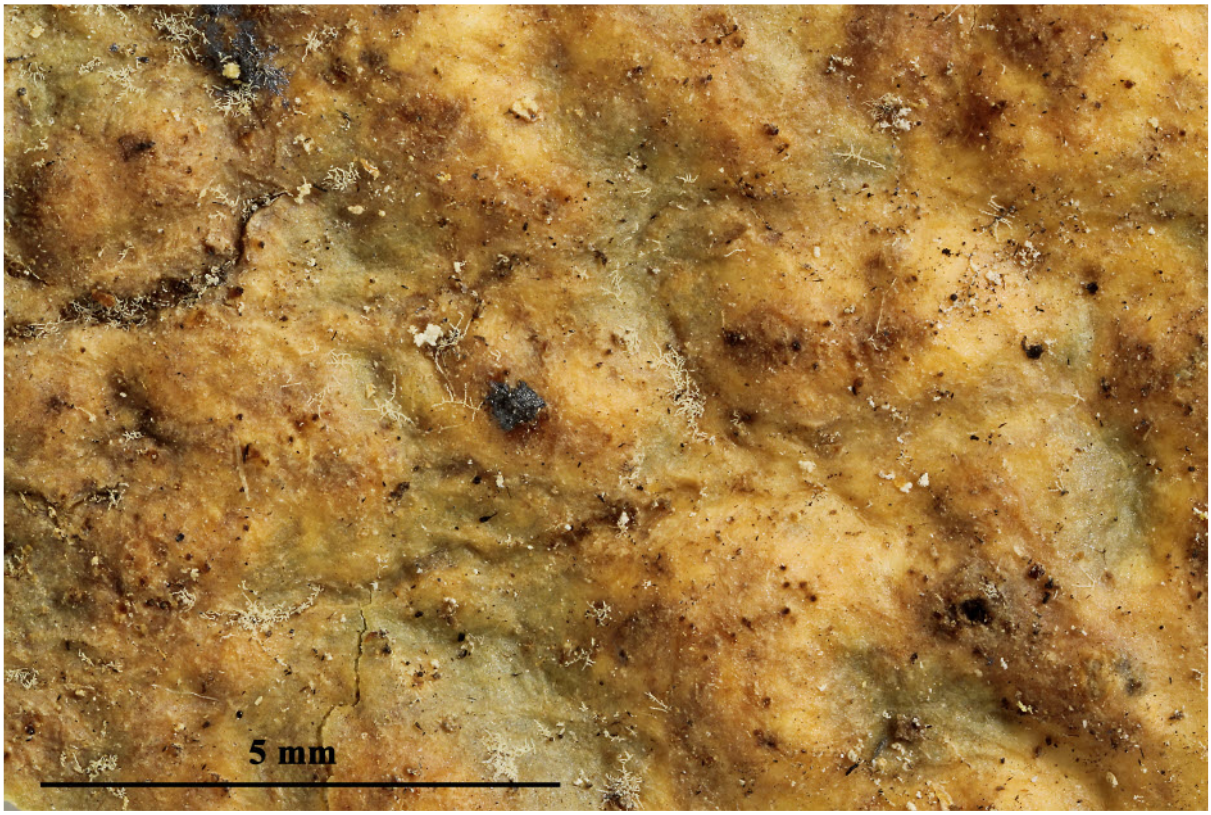
Viridothelium indutum (Stirt.) Aptroot & Lücking, Lichenologist 48(6): 975 (2016)

= *Trypethelium indutum* Stirt., Proc. Roy. phil. Soc. Glasgow 13: 193 (1881) [1880]

= *Trypethelium deforme* Makhija & Patw., Int. J. Mycol. Lichenol. 5: 240 (1992) non Fée [as deformis]; type: Singapore, Maingay 165 (BM!—holotype).

Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary to irregularly confluent, 0.2–0.4 mm diam., erumpent, laterally covered by thallus but upper part exposed, brownblack. Hamathecium clear. Ascospores 8 per ascus, (9–)13–17-septate, fusiform, 90–105 × 12–16 µm, hyaline, IKI−. Chemistry. Thallus and ascomata UV−, K−. TLC: no substances detected.

[ABL19140], Papua New Guinea, Central Prov., Varirata National Park, 20 km E of Port Moresby, on tree in secondary tropical forest, 147°22’ E, 9°27’ S. 800 m. Leg. A. Aptroot (no 19140), 03.1987, det. A. Aptroot, 1987.

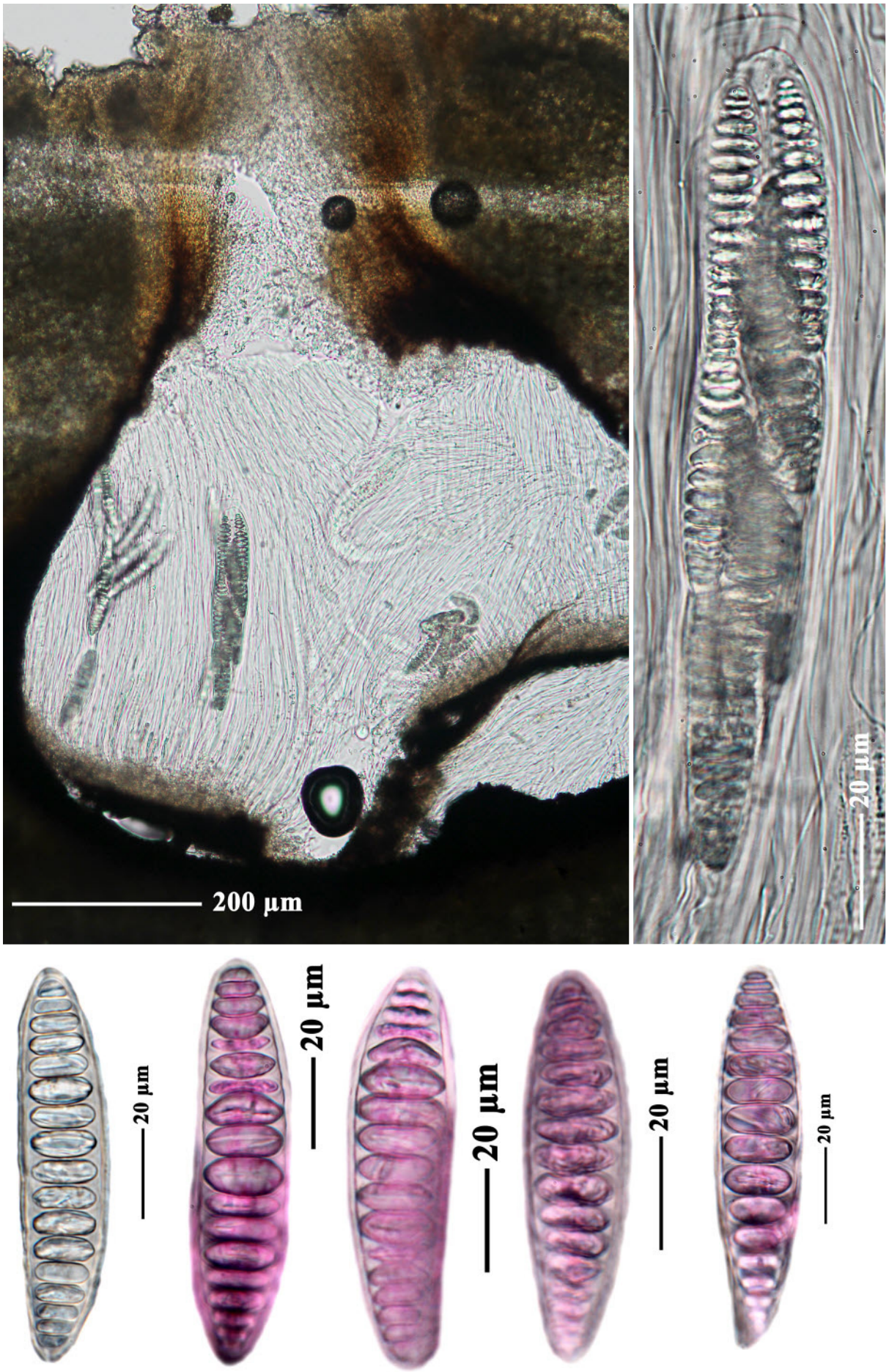






Viridothelium indutum

2021



Viridothelium indutum

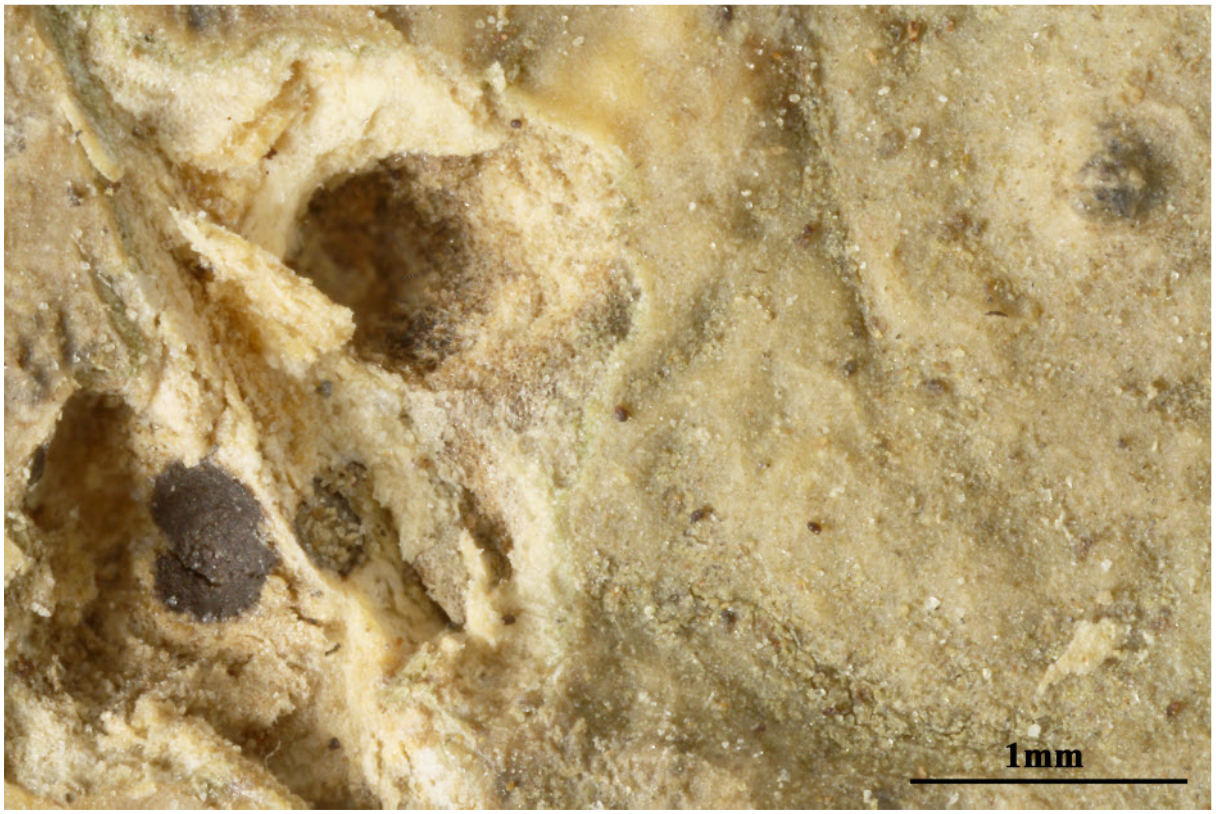
2022

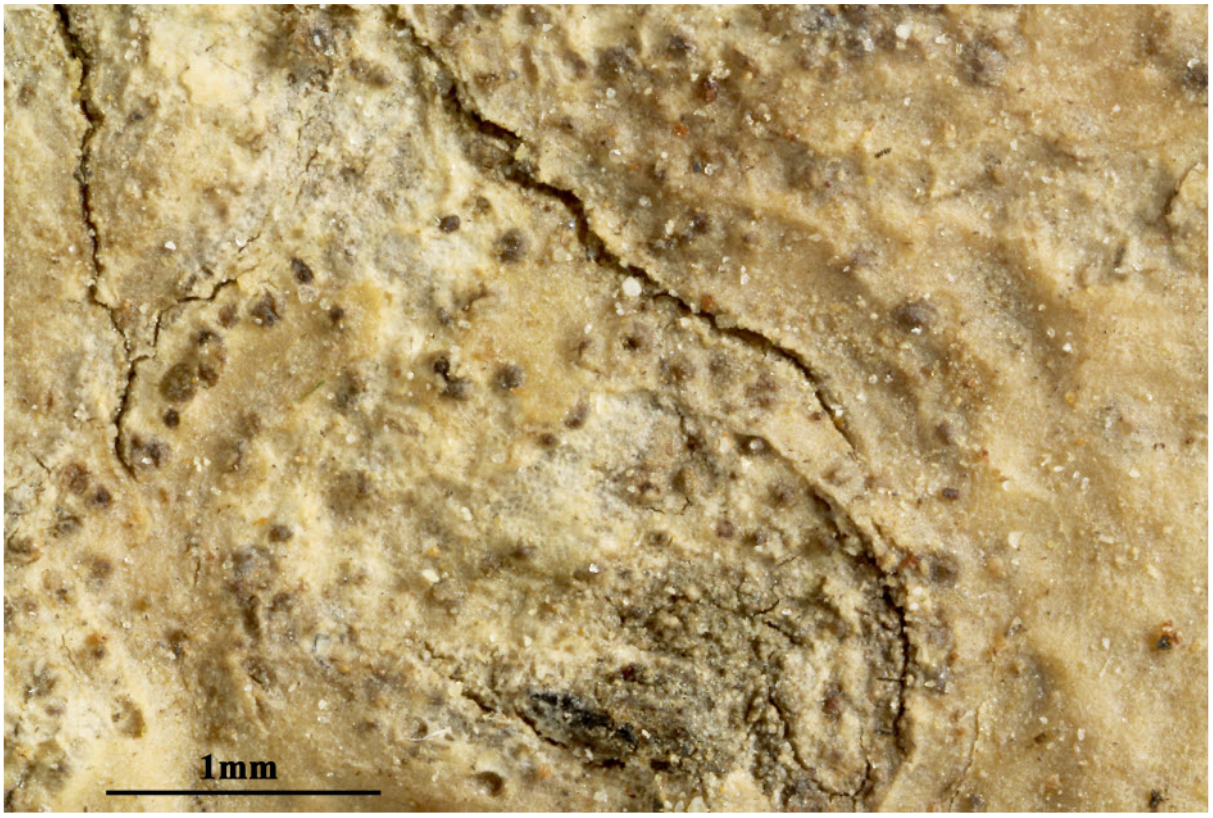
Viridothelium inspersum Aptroot, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 636 (2016)

Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤ at least 7 cm diam., c. 0.1 mm thick, olive-green, prothallus not observed, not inducing gall formation of the host bark. Ascomata globose, 0.5–0.8 mm diam., single, deeply immersed in the bark below the thallus, without discernible pseudostromata. Wall brown, not always all around, ≤ c. 50 µm thick. Ostioles apical, convex, brownish grey. Hamathecium inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, fusiform, 12–14-septate, 60–75 × 12–17 µm, ends pointed, lumina ellipsoid, not surrounded by a gelatinous layer. Chemistry: Thallus and pseudostromata UV−, K−. TLC: no secondary substances detected.

[ABL17317]. Papua New Guinea, Central Prov., along Hiritano Highway, 50 km NW of Port Moresby,5 km NW of Brown River, 147°11’ E,9°10’ S, 25 m. Leg. A. Aptroot (no 17317), 02.1987, det. A. Aptroot 1987. HOLOTYPE.

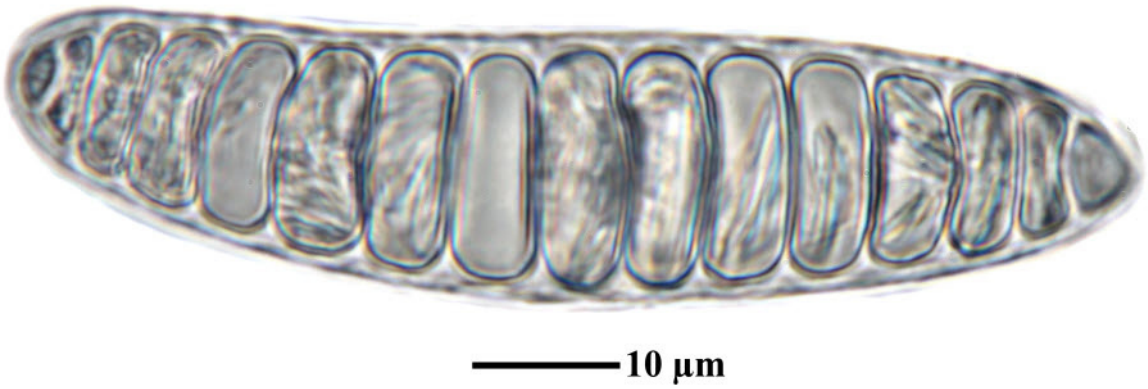






Viridothelium inspersum

2024



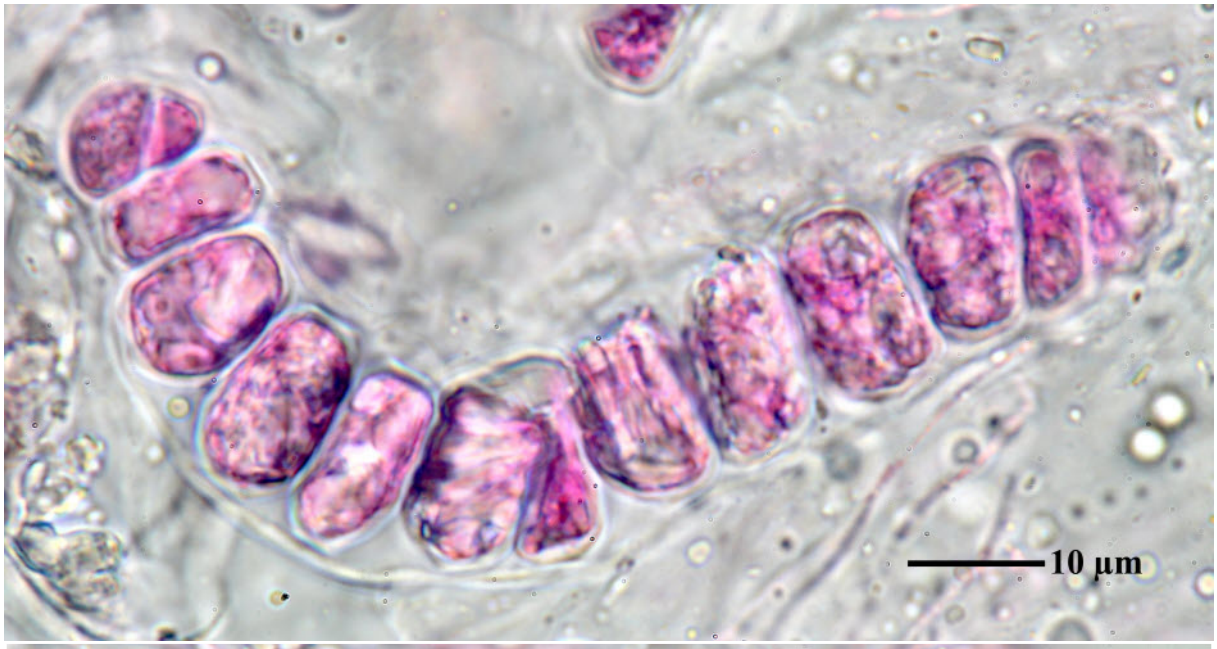






Viridothelium inspersum

2025





Viridothelium inspersum

2026

Viridothelium leptoseptatum Aptroot & M. Cáceres, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 724 (2016)

Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤5 cm diam., c. 0.2 mm thick, pale olive-green, surrounded by a black prothallus c. 1 mm wide, not inducing gall formation of the host bark. Ascomata globose, 0.3–0.5 mm diam., mostly aggregated 3–20, emergent from the thallus, not forming distinct pseudostromata, surface not different from the thallus, covered by thallus or not and fully or partly free with the carbonization visible from above, always at least partly covered by yellow pigment. Wall black, ≤ c. 50 µm thick. Ostioles apical, not fused, flat, white. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 23–25 × 7–8 µm, ends rounded, lumina of similar shape to the ascospore cell walls, septa thin, constricted at the septa, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus surface UV−, thallus medulla K−; pseudostroma surface UV+ pink to orange, pigmented parts of pseudostroma K+ blood red. TLC: an anthraquinone, probably parietin.

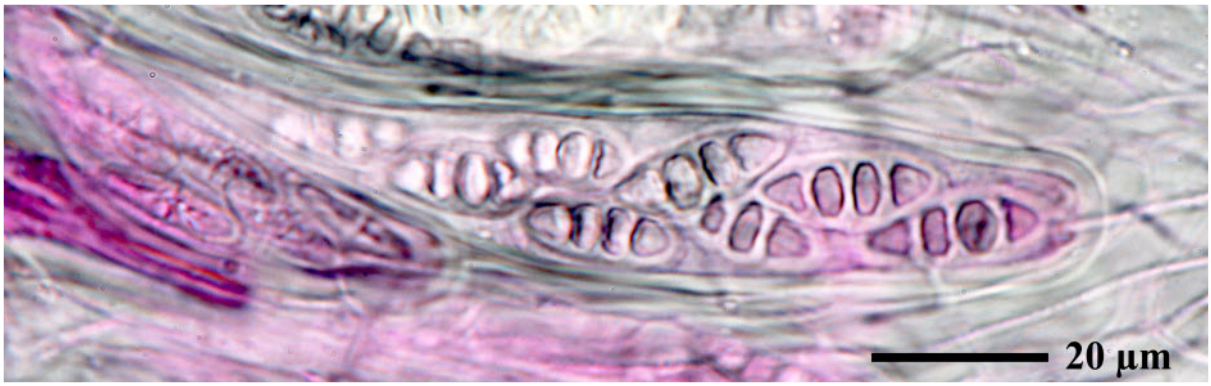
[ABL18588], Brazil, Sergipe, Parque Nacional Serra de Itabaiana, in transitional forest to caatinga, on tree bark, 10°45’37” S, 37°22’15” W, 250 m. Leg. M. Cáceres & A. Aptroot (no 18588), 18.09.2013, det. A. Aptroot, 2013. ISOTYPE.

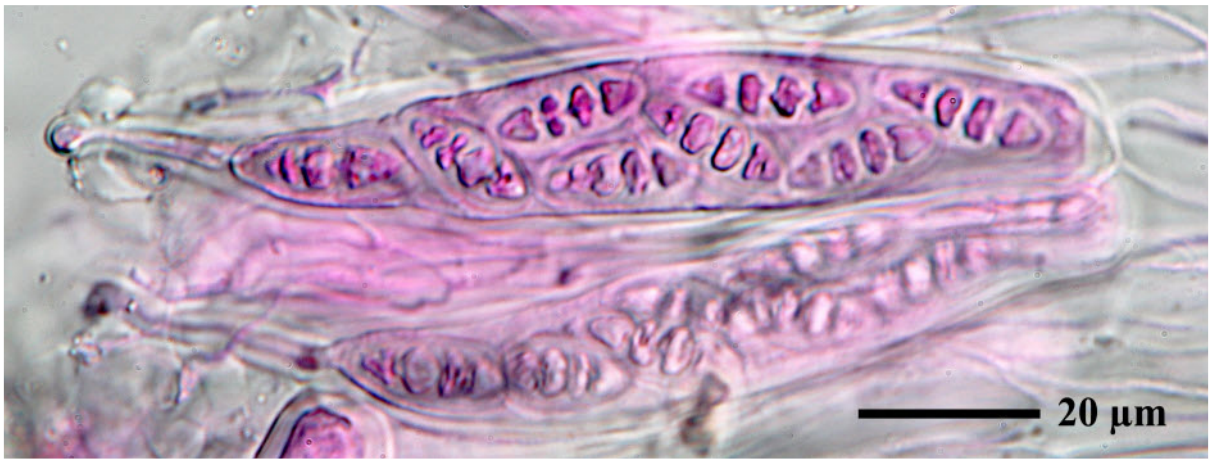


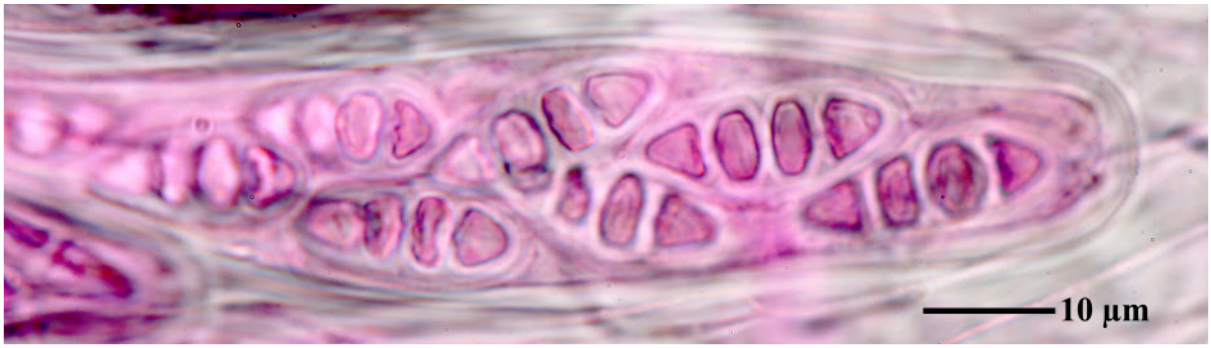


Viridothelium leptoseptatum

2028









Viridothelium leptoseptatum

2029

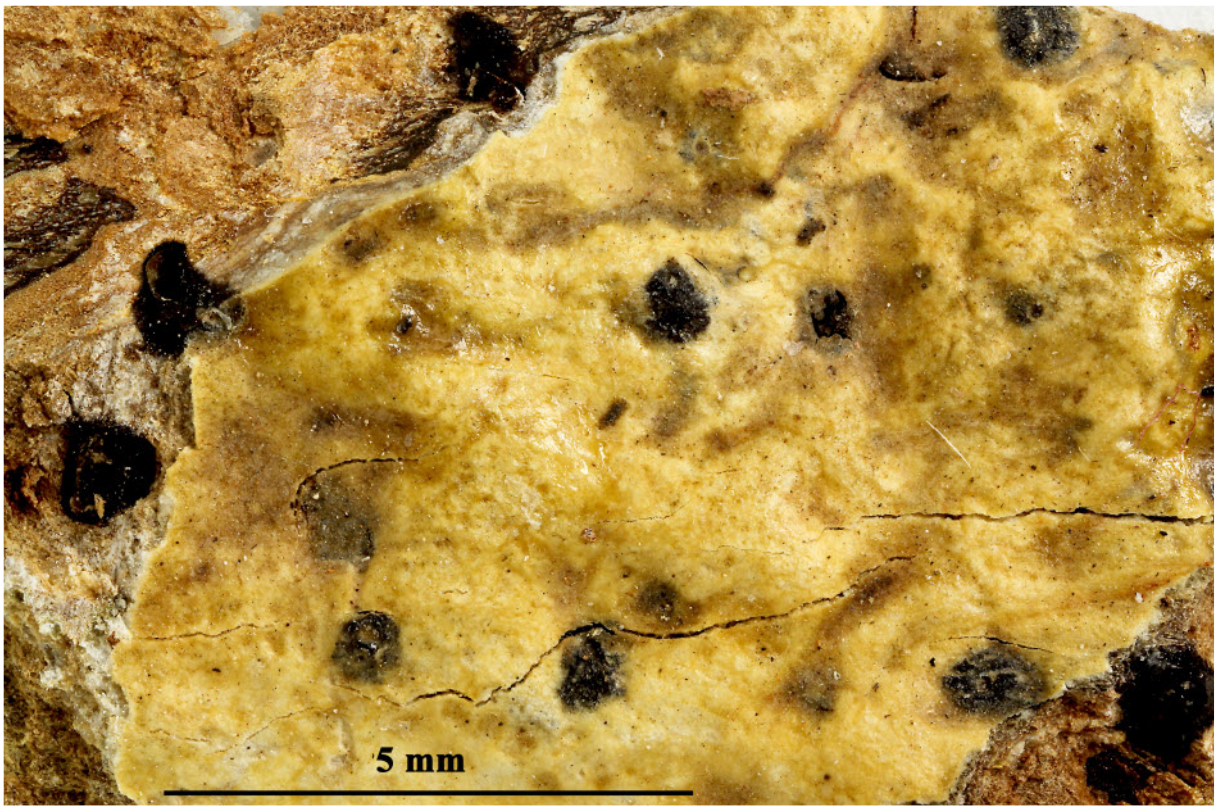
Viridothelium megaspermum (Makhija & Patw.) Aptroot & Lücking, Lichenologist 48(6): 975 (2016)

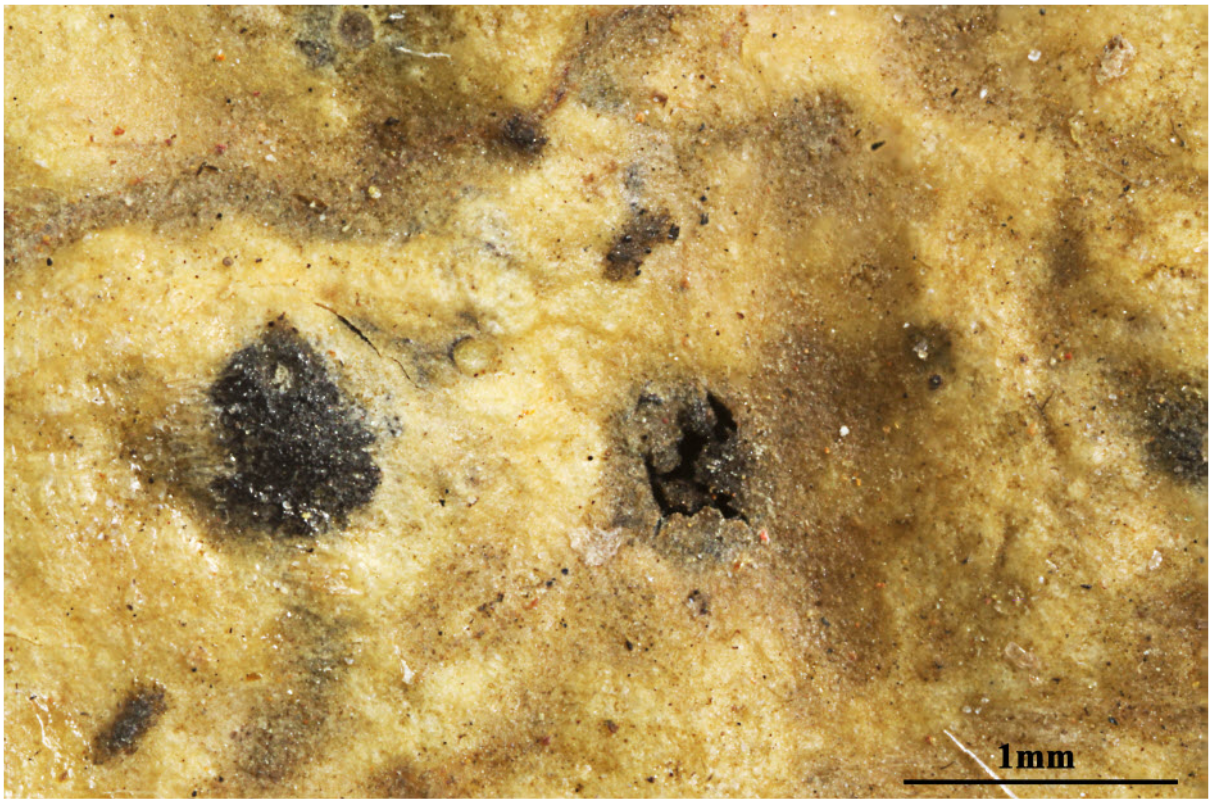
= *Pleurotrema megaspermum* Makhija & Patw., Biovigyanam 16(1): 24 (1990)

= *Trypethelium karnatakense* R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 147 (1995)

Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with mostly eccentric ostioles, solitary, 0.4–0.6 mm diam., deeply (c. 2 mm) immersed in the bark, covered by thallus except for black ostioles. Hamathecium clear. Ascospores 4/ascus, (9–)15–17-septate, fusiform, 99–152 × 26–33 µm, hyaline, IKI−. Chemistry. Thallus and ascomata UV−, K−; reported to be K+ orange, but no substances detected.

[AMH242991], India, Karnataka, Agumbe, 1974, leg. Kulkarni. ISOTYPE

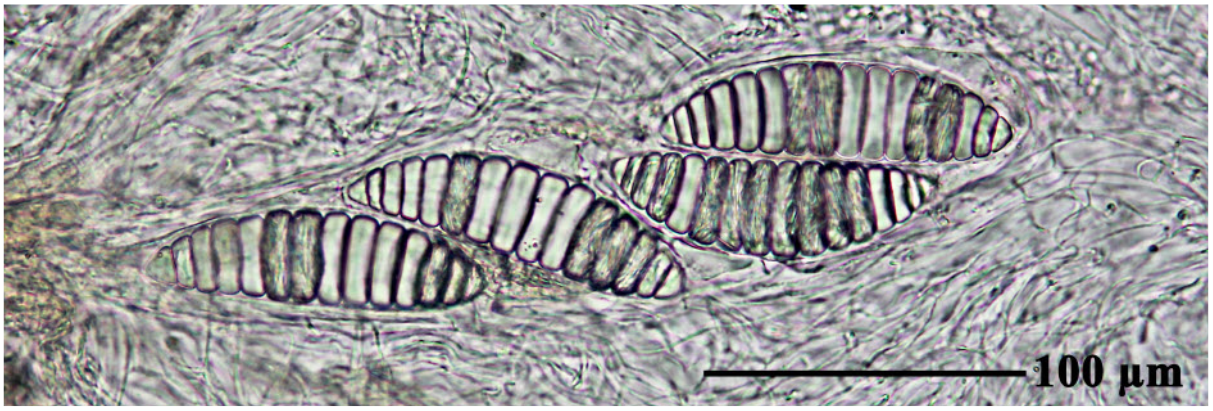




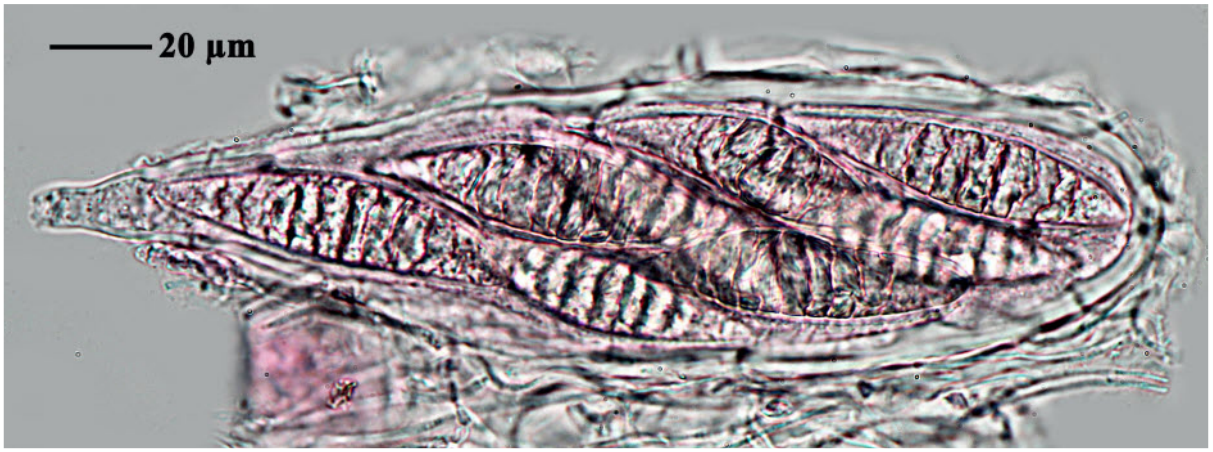


Viridothelium megaspermum

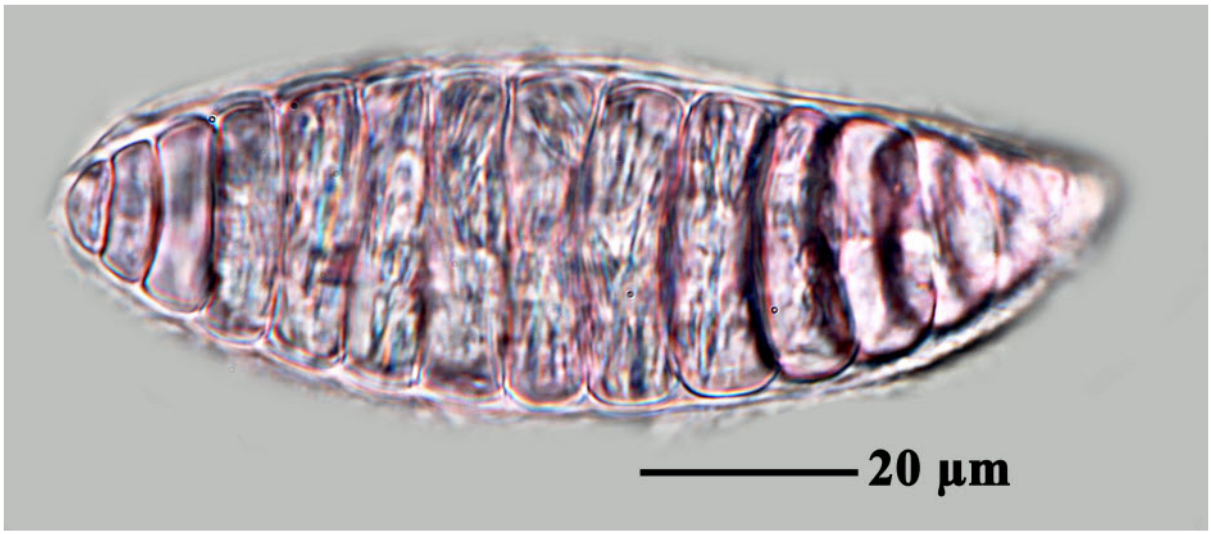


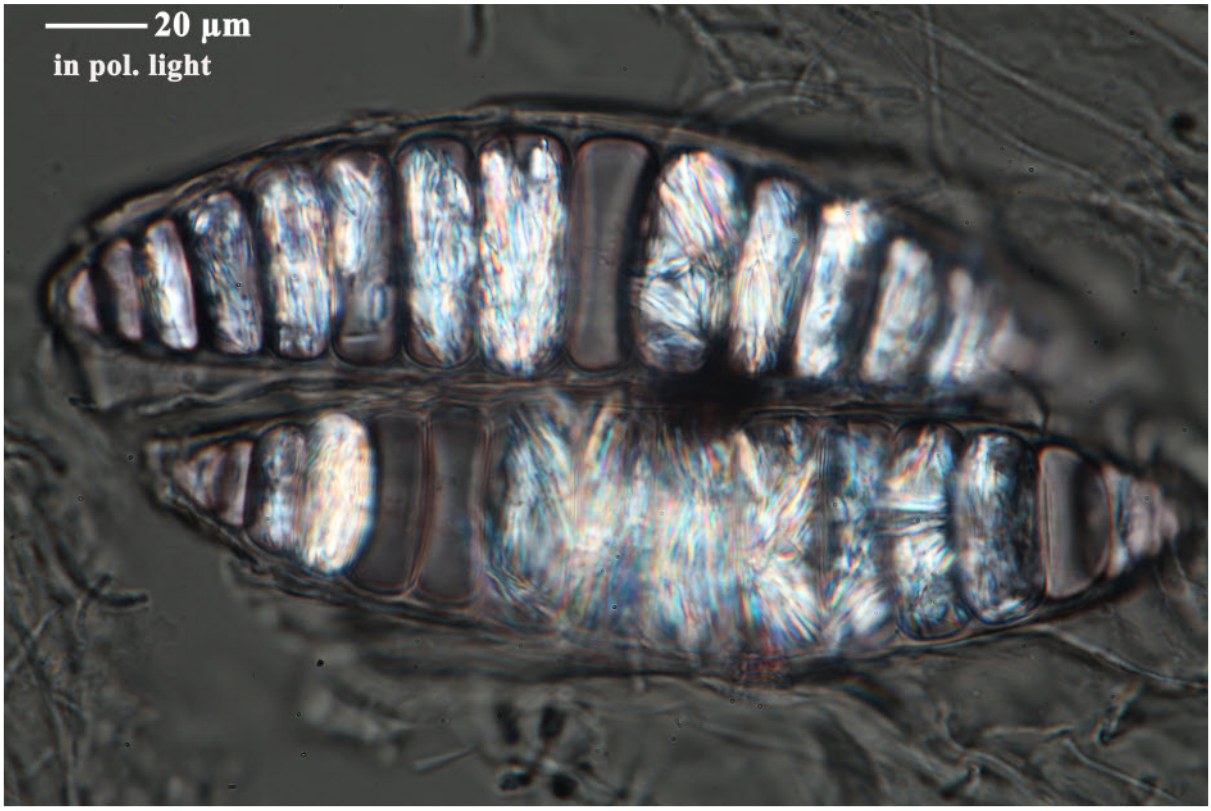






Viridothelium megaspermum





Viridothelium megaspermum

Viridothelium solomonense Aptroot, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 637 (2016)

Thallus yellowish brown, smooth, thin, absent (probably abraded by the harsh sea winds) over large stretches. Ascomata mostly simple, a few aggregated with fused ostioles, emergent from the bark and the thallus, becoming fully exposed. Pseudostromata in the normal sense absent, but a carbonized clypeus is present. Wall black, ≤ 80 µm thick. Ostioles lateral. Hamathecium not inspersed with oil droplets. Ascospores hyaline, fusiform, 15–19-septate, 75–98 × 17–20 µm, ends pointed, with ellipsoid lumina. Chemistry. Thallus UV−, K−. TLC: no secondary substances detected.

[Hill 11040], Solomon Islands, Santa Isabel Island, Tanabuli Island, near Tatamba. Leg. D. J. Hill (no 11040), det. A. Aptroot. ISOTYPE.







20 µm



Viridothelium solomonense



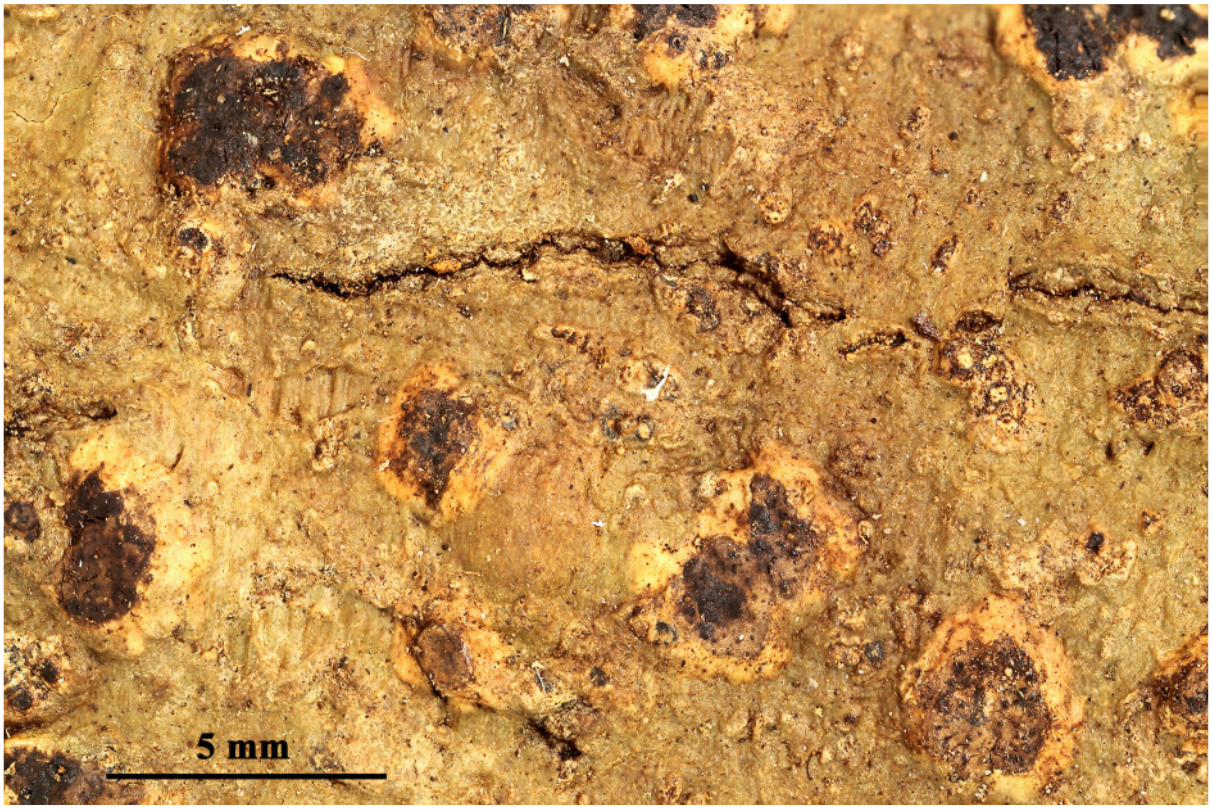


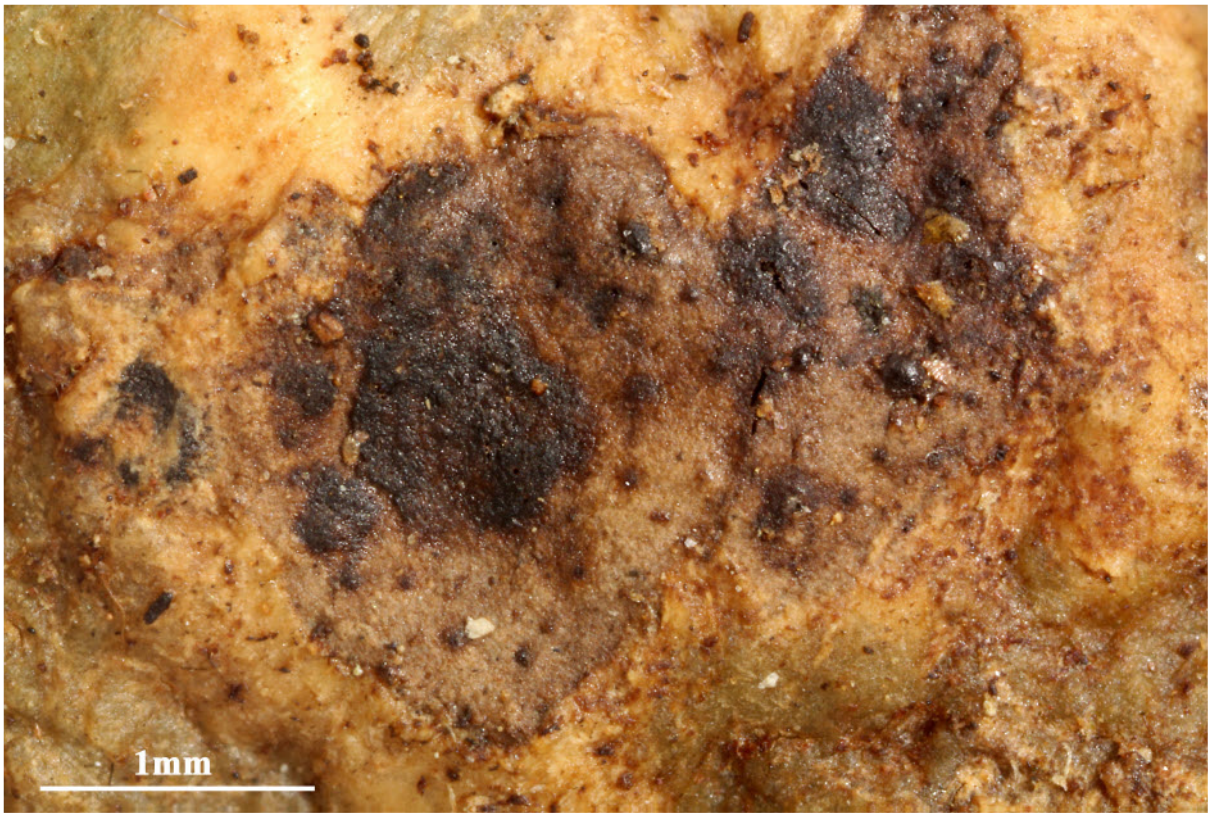


Viridothelium solomonense

Thallus dull, olivaceous green, not surrounded by a prothallus. Ascomata globose to pyriform, 0.4–0.7 mm diam., immersed in pseudostromata, in groups of 9–25. Pseudostroma distinctly raised with steep sides and flat tops, c. 2–6 mm diam., roundish to ellipsoid, ochraceous, not pigmented, margin often somewhat crenate. Ostioles eccentric, fused, conical, black, surrounded by a c. 0.1 mm wide black ring. Hamathecium not inspersed, IKI–. Ascospores 8/ascus, hyaline, 3-septate, 17–20 × 6.5–7.5 µm, long-ellipsoid, not surrounded by a gelatinous sheath. Pycnidia not observed. Chemistry: thallus and pseudostroma UV–, C–, K–, KC–, P–. No lichen substances detected with TLC.

[ISE28212], Brazil, Amazonas, Manaus, Reserva Florestal Ducke, along trails in vicinity of field station, on tree bark in primary rain forest, 80 m, 59°57'W, 2°56' S. Leg. M. Cáceres & A. Aptroot (no ISE 28212), 3-8.06.2016. det. A. Aptroot, 2016. ISOTYPE.







Viridothelium ustulatum

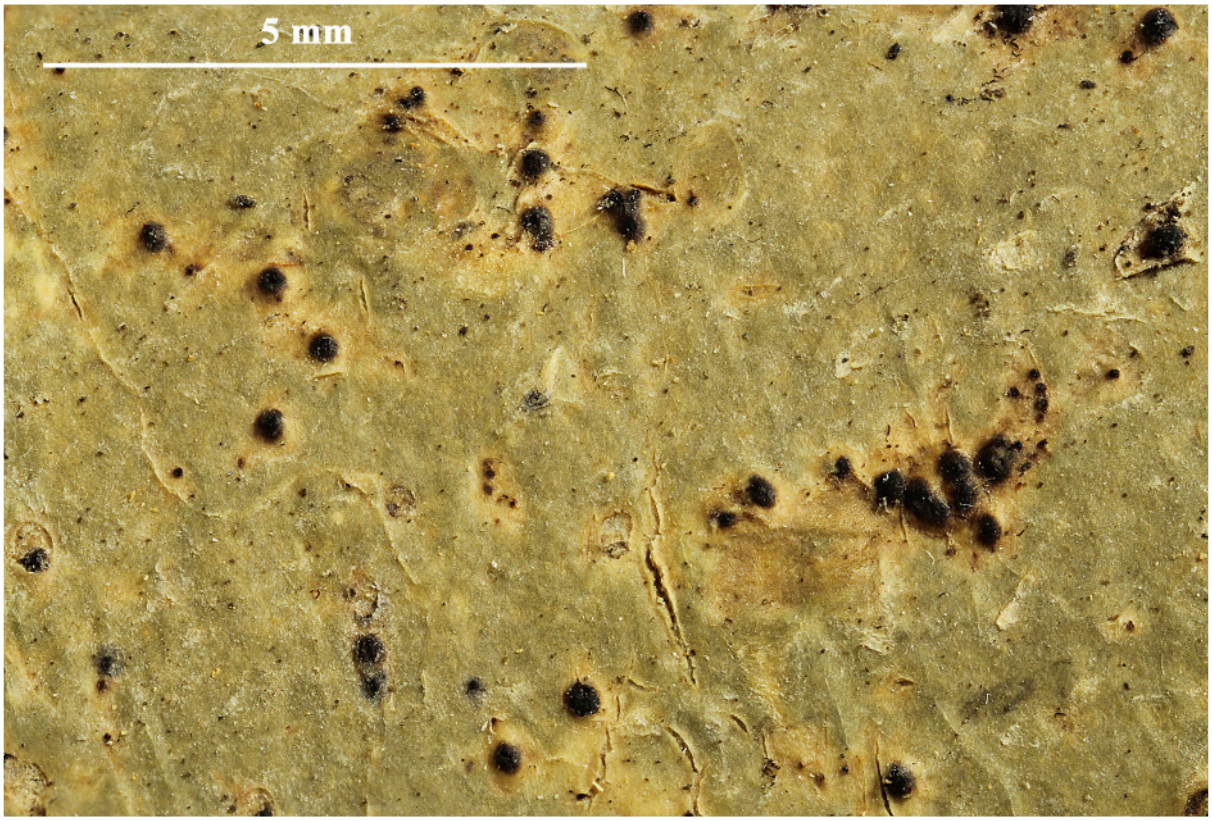
Viridothelium virens (Tuck. ex Michener) Lücking, M.P. Nelsen & Aptroot, in Lücking et al., Lichenologist 48(6): 759 (2016)

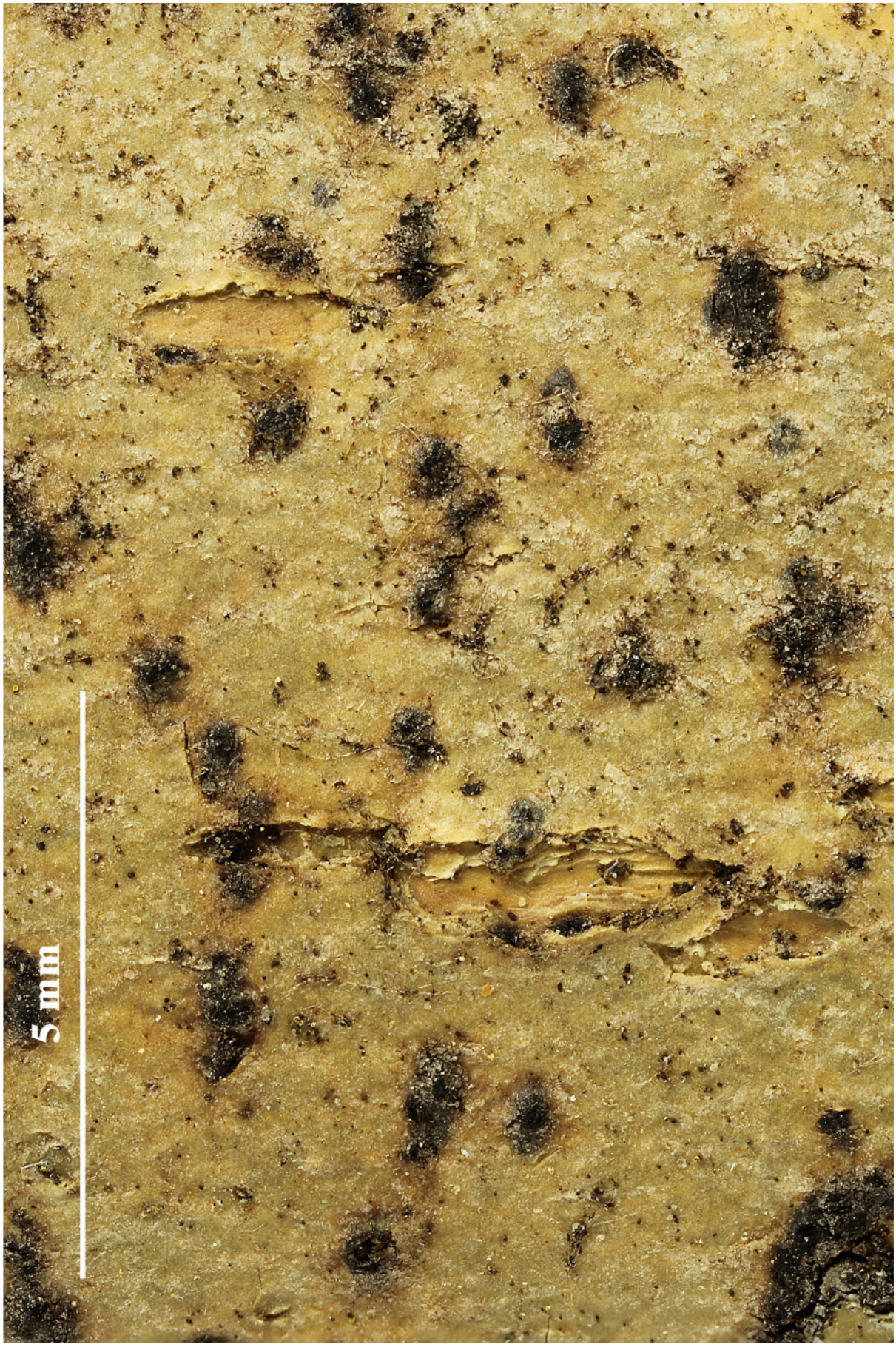
= *Trypethelium eluteriae* var. *virens* (Tuck.) Trevis., Flora, Regensburg 44: 20 (1861)

= *Trypethelium virens* Tuck. ex E. Michener, in Darlington, Fl. Cestrica, Edn 3 (Philadelphia): 453 (1853)

Thallus corticate, olive-green to yellowish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, pseudostromatic; pseudostromata 0.6–1.5 mm diam., immersed-erumpent, with the upper parts of individual ascomata exposed and dark brown. Hamathecium clear. Ascospores 8/ascus, 7–11-septate, fusiform, 38–52 × 7–10 µm, with rather thin septa, hyaline, IKI+ weakly violet. Chemistry: Thallus and pseudostromata UV−, K−. TLC: no substances detected.

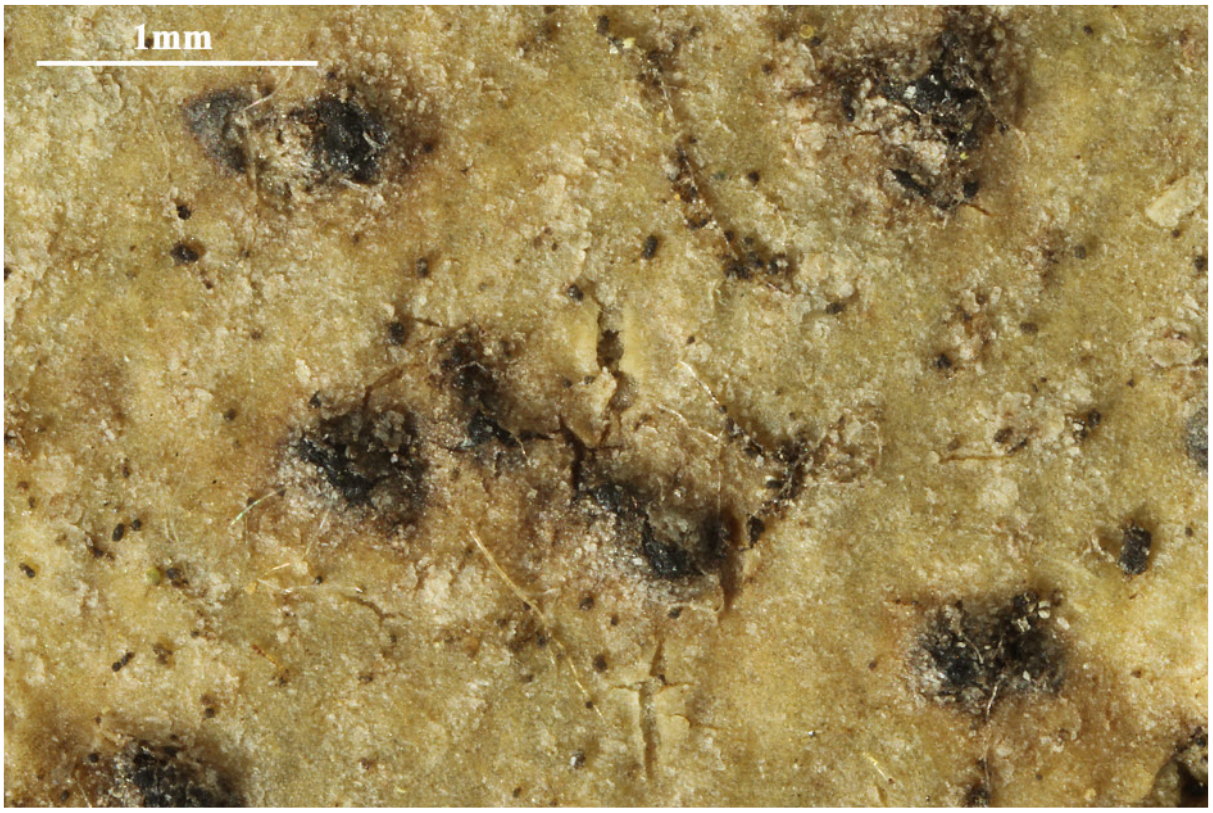
[ABL Harris 19352], USA, Hamilton County, Long Point, Raquette Lake, upland hardwoods, on Fagus. Leg. et det. R.C. Harris 6.9.1986





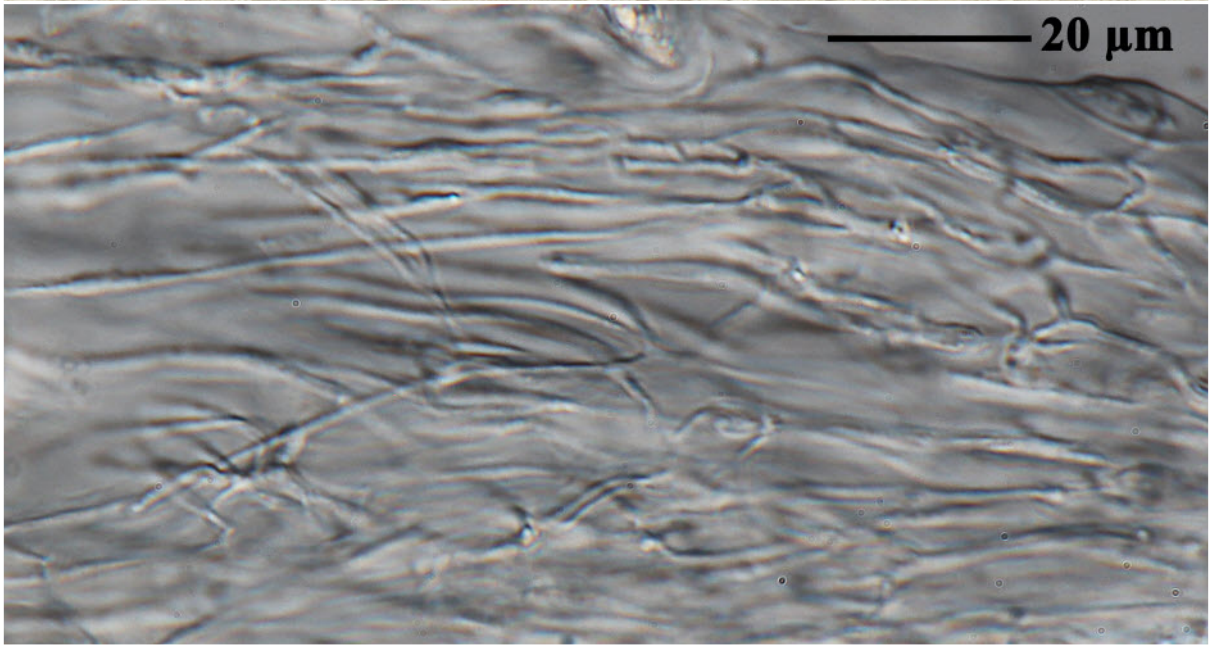
Viridothelium virens

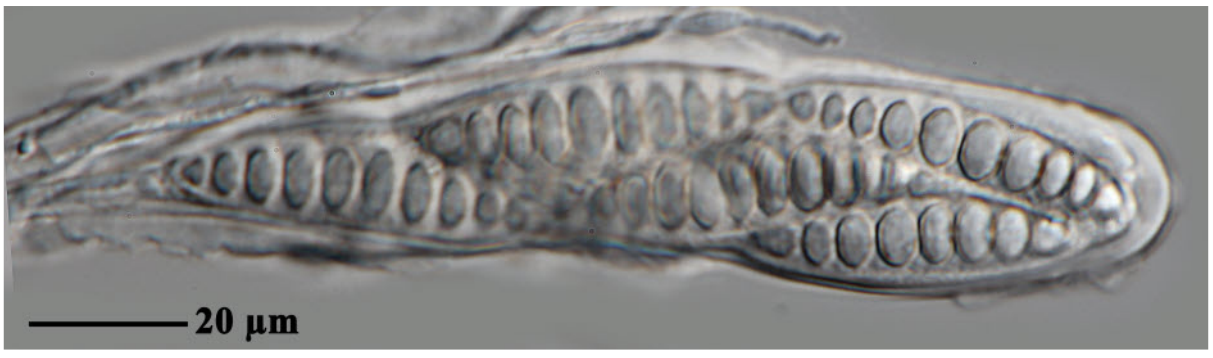




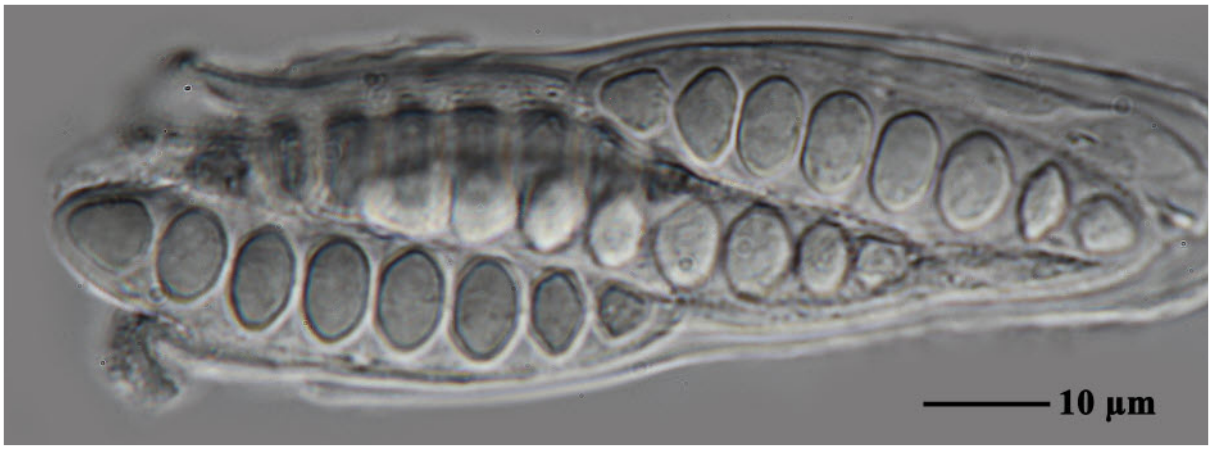
Viridothelium virens



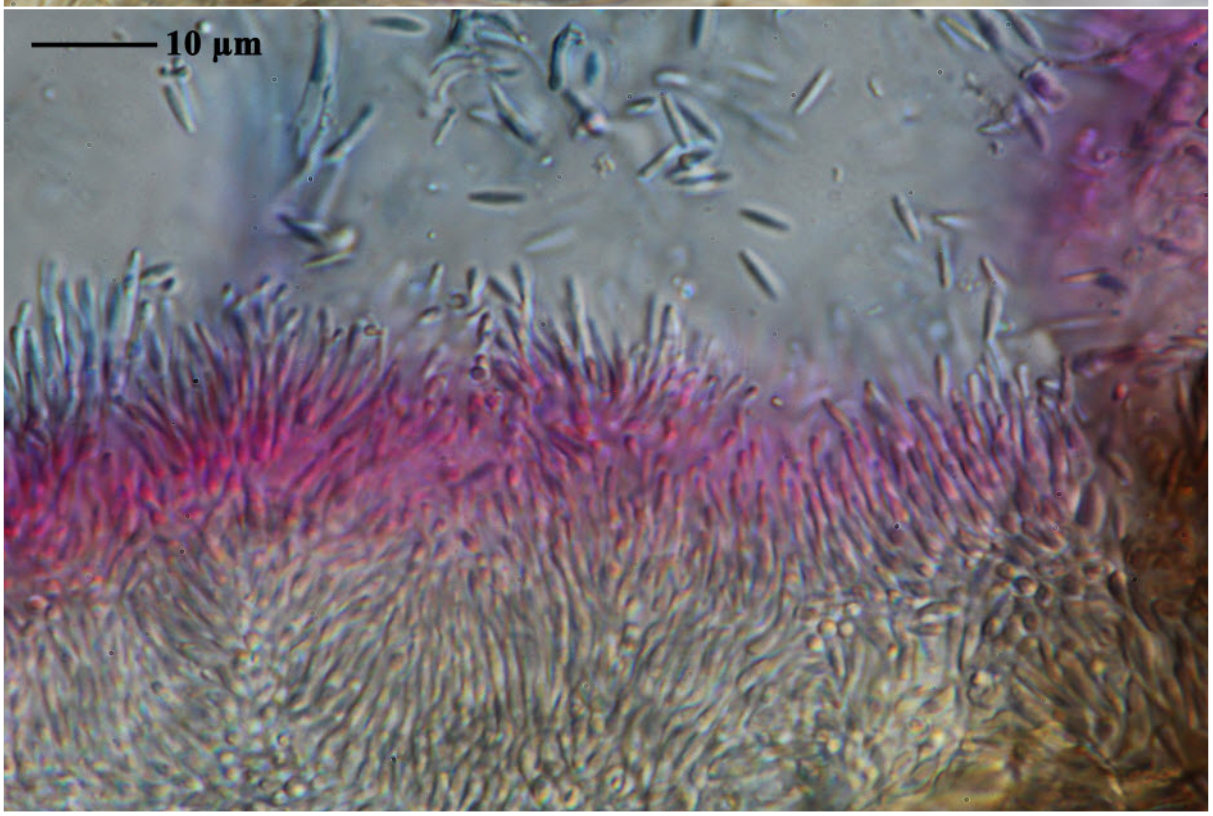




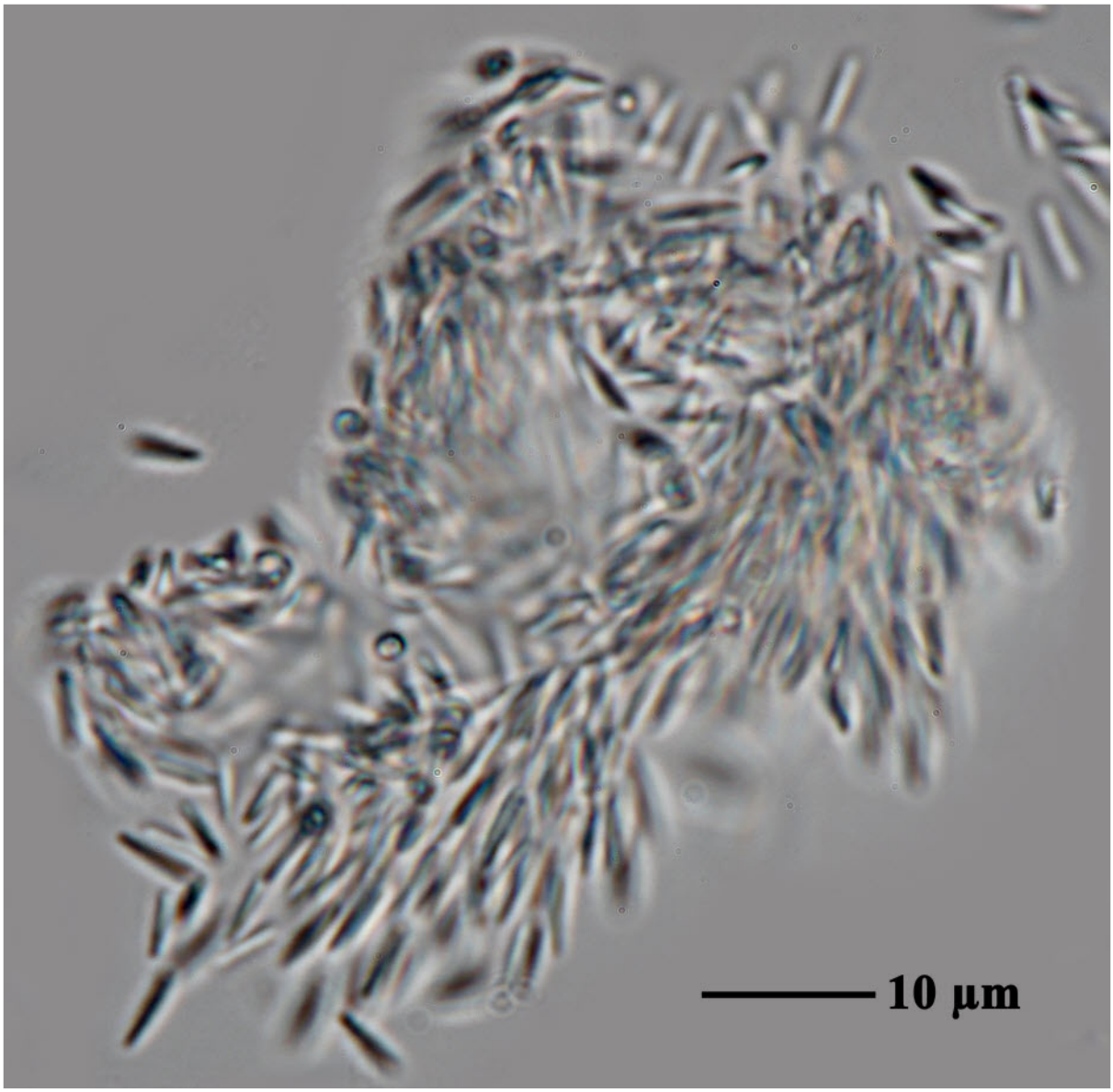
Viridothelium virens







Viridothelium virens



Viridothelium virens

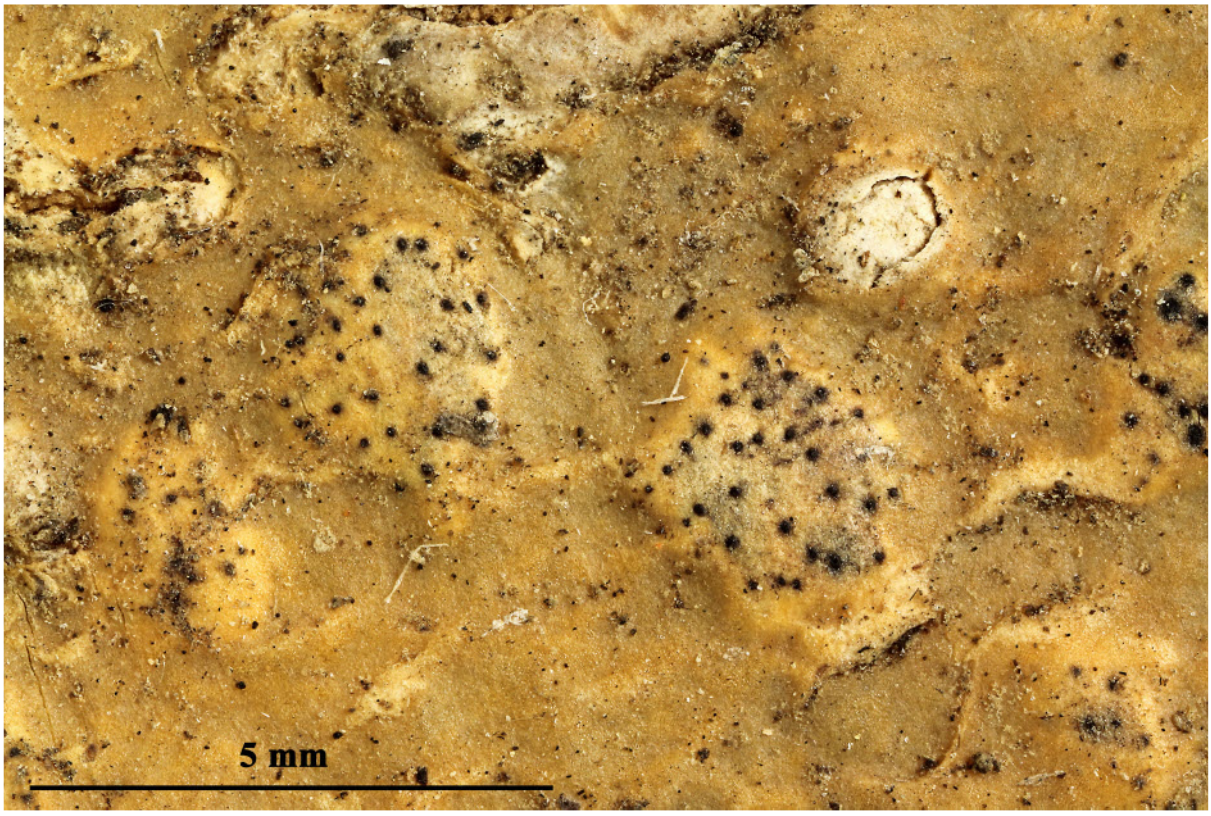
Viridothelium virens (Tuck. ex Michener) Lücking, M.P. Nelsen & Aptroot, in Lücking et al., Lichenologist 48(6): 759 (2016)

= *Trypethelium eluteriae* var. *virens* (Tuck.) Trevis., Flora, Regensburg 44: 20 (1861)

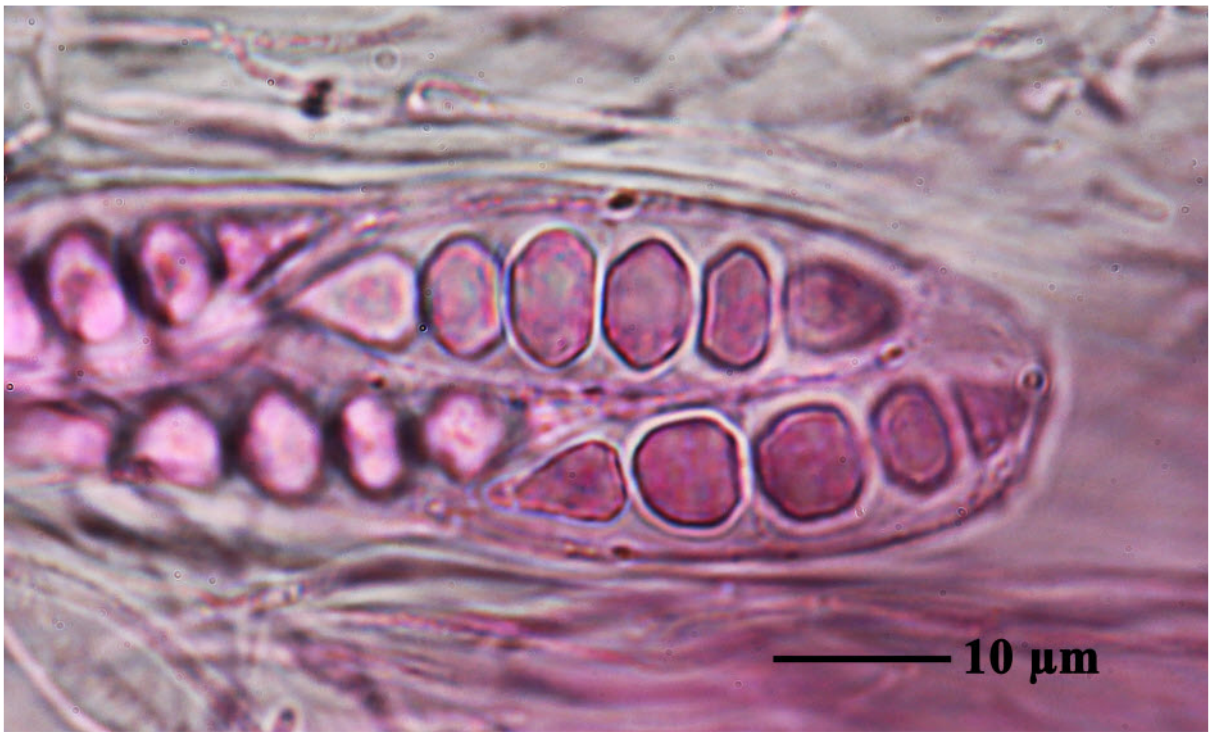
= *Trypethelium virens* Tuck. ex E. Michener, in Darlington, Fl. Cestrica, Edn 3 (Philadelphia): 453 (1853)

Thallus corticate, olive-green to yellowish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, pseudostromatic; pseudostromata 0.6–1.5 mm diam., immersed-erumpent, with the upper parts of individual ascomata exposed and dark brown. Hamathecium clear. Ascospores 8/ascus, 7–11-septate, fusiform, 38–52 × 7–10 µm, with rather thin septa, hyaline, IKI+ weakly violet. Chemistry: Thallus and pseudostromata UV−, K−. TLC: no substances detected.

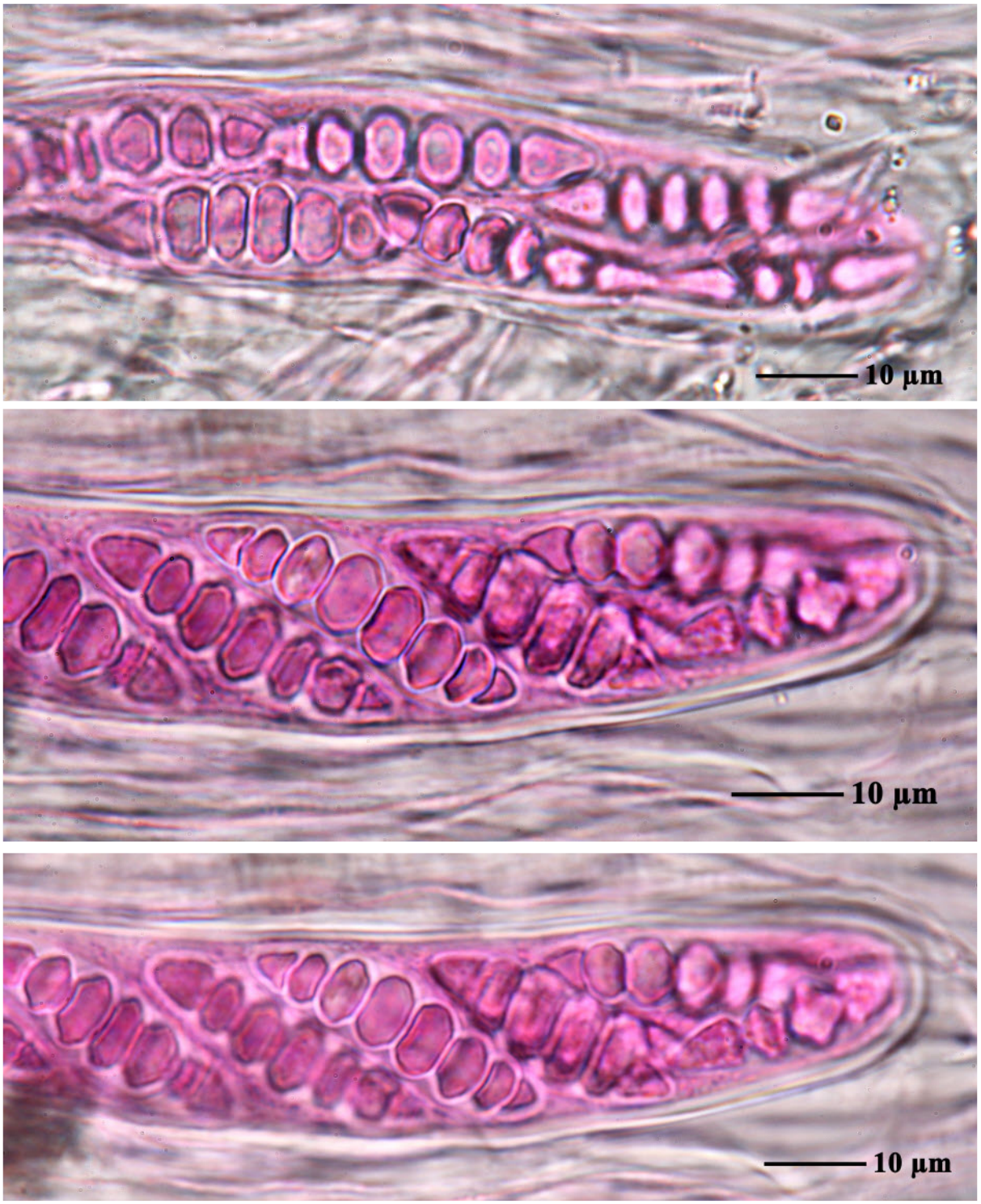
[Johnson7514], USA, South Carolina, Sumpter County, near Stateburg. Leg. G.T. Johnson (no 7514), 28.01.1967, det. G.T. Johnson.







Viridothelium virens



Viridothelium virens

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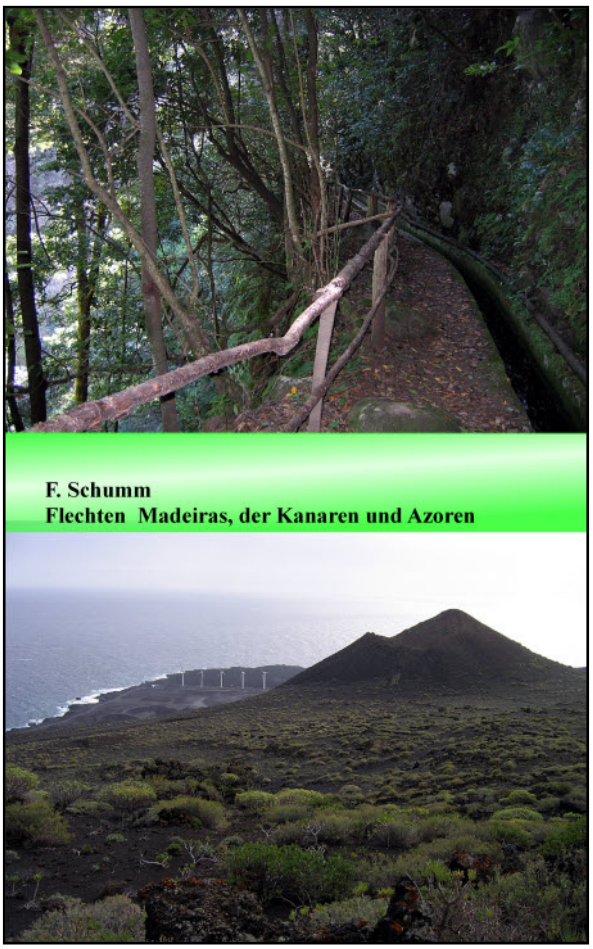
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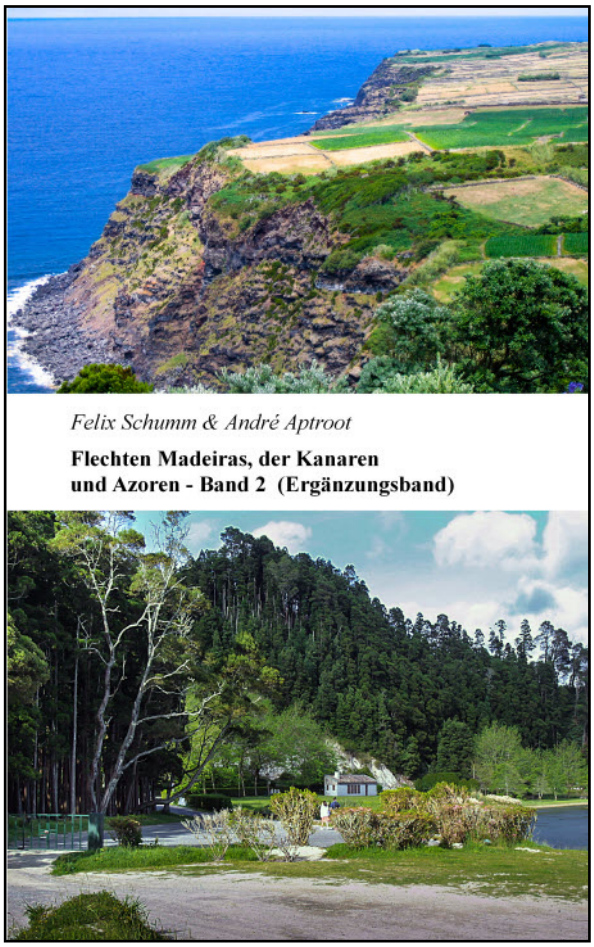
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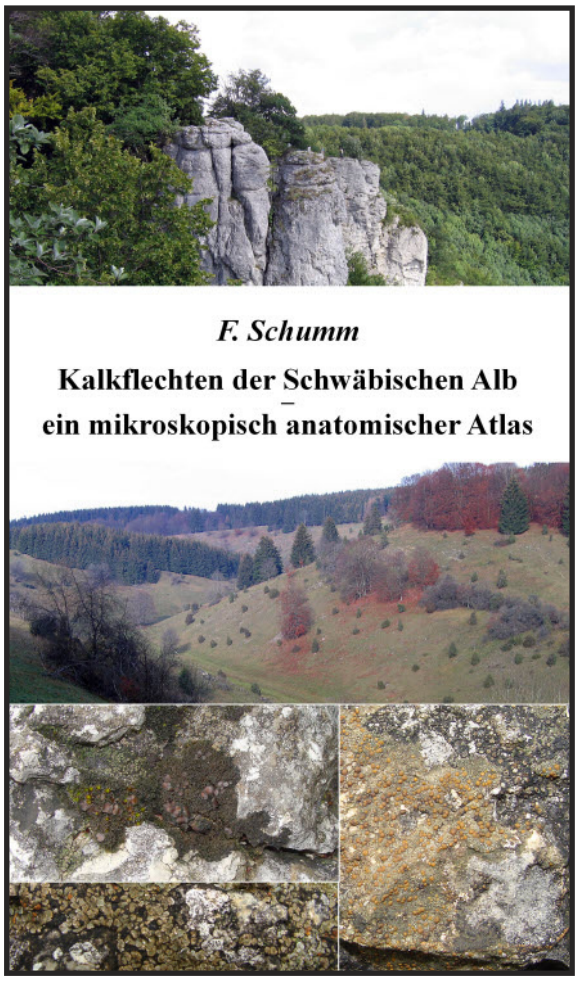
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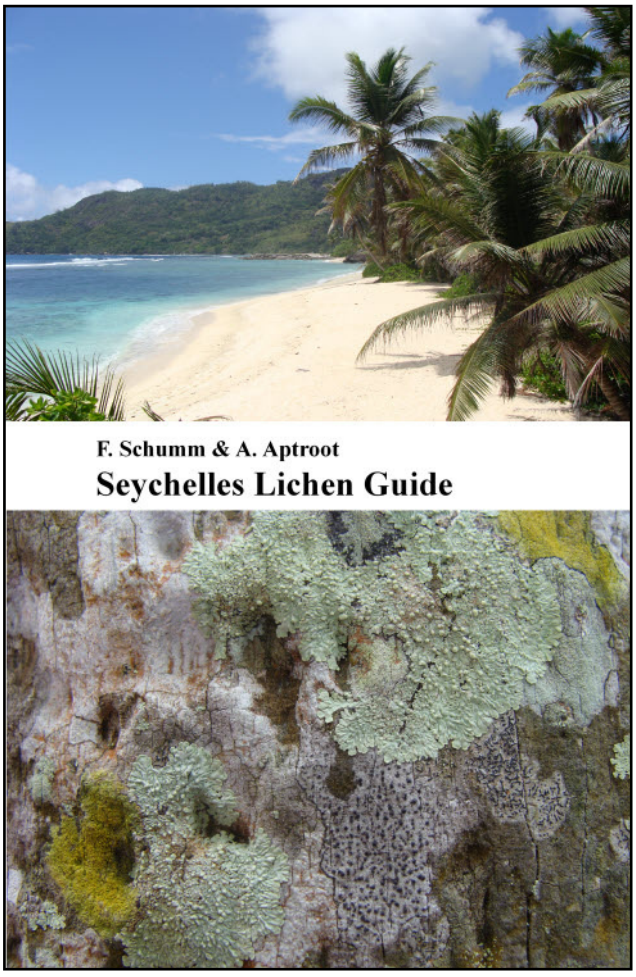
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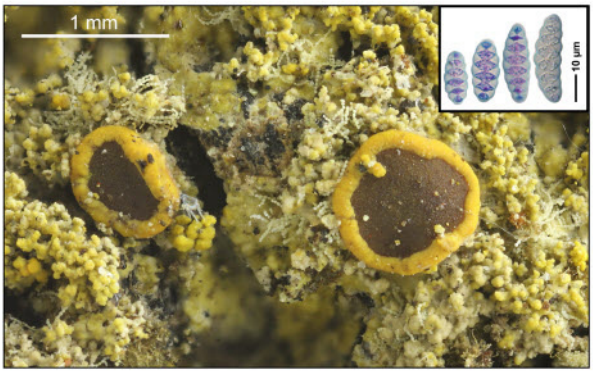


F. Schumm & A. Aptroot

A microscopical Atlas of some tropical Lichens from SE-Asia

(Thailand, Cambodia, Philippines,Vietnam)

VOLUME ONE



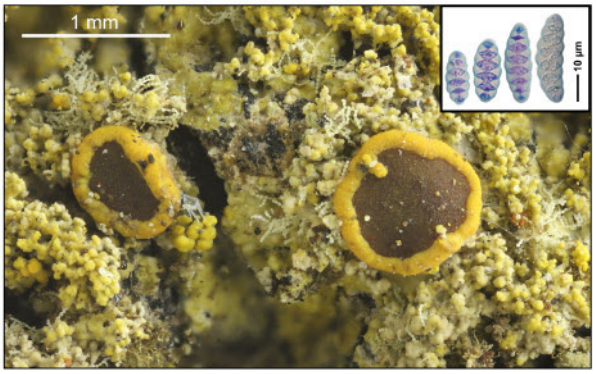


F. Schumm & A. Aptroot

A microscopical Atlas of some tropical Lichens from SE-Asia

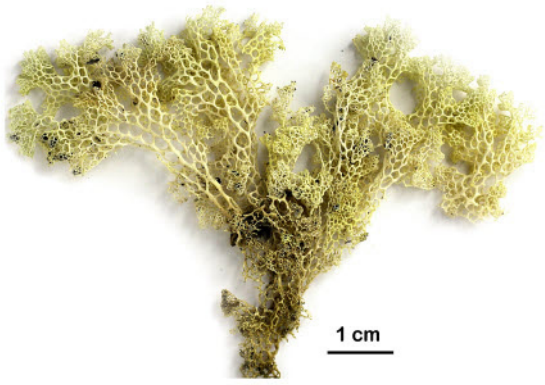
(Thailand, Cambodia, Philippines,Vietnam)

VOLUME TWO



Felix Schumm & John A. Elix

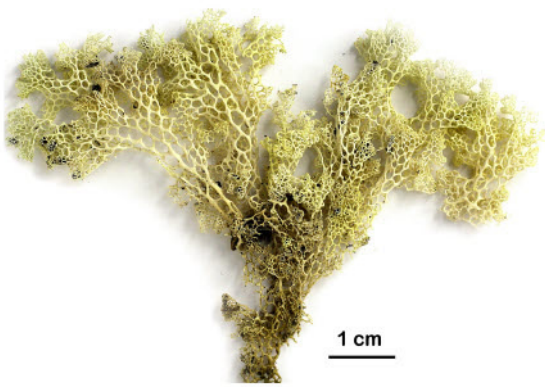
Images from Lichenes Australasici Exsiccati and of other characteristic Australasian Lichens



VOLUME ONE

Felix Schumm & John A. Elix

Images from Lichenes Australasici Exsiccati and of other characteristic Australasian Lichens



VOLUME TWO

A. Aptroot & F. Schumm

Fruticose Roccellaceae

-

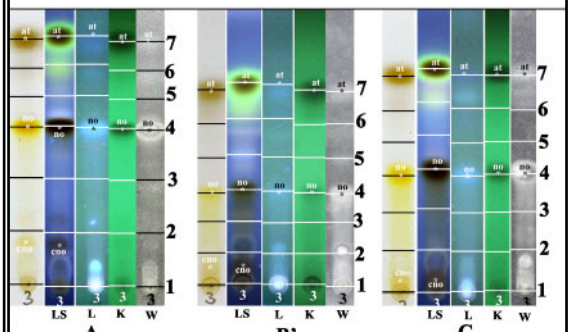
an anatomical-microscopical Atlas and Guide with a worldwide Key and further Notes on some crustose Roccellaceae or similar Lichens



F. Schumm & J.A. Elix

Atlas of Images of Thin Layer Chromatograms of Lichen Substances

Bilderatlas von Dünnschicht-chromatogrammen von Flechten-Inhaltsstoffen



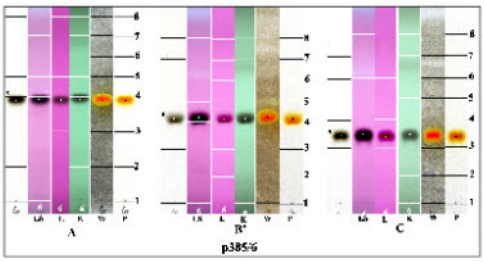
Platismatia glauca [3030] und Cladonia symphycarpa [4698]

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F. Schumm

Atlas of Images of Thin Layer Chromatograms of Lichen Substances. Supplement

Bilderatlas von Dünnschicht-chromatogrammen von Flechten-Inhaltsstoffen. Ergänzungsband

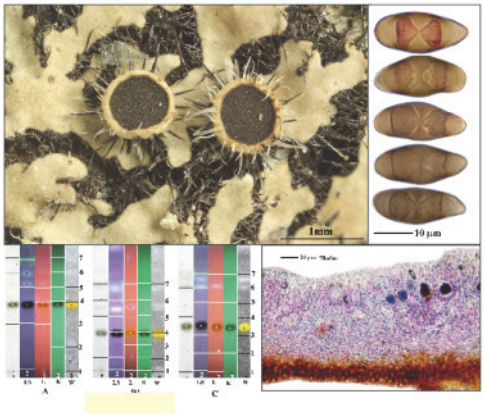


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Felix Schumm,
André Aptroot

Virtuelles Herbarium der Flechtengattungen

Hyperphyscia, Phaeophyscia, Physcia und *Physconia*

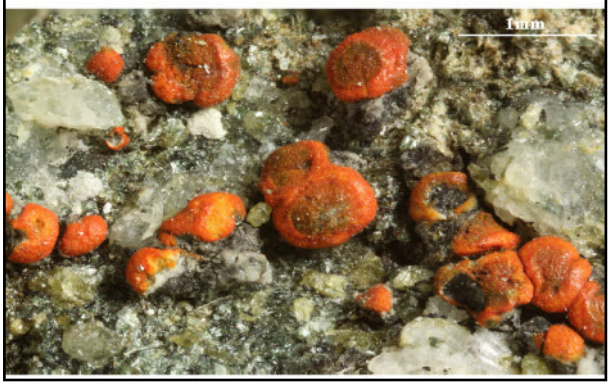


F. Schumm & A. Aptroot

Images of the Lichen Genus Caloplaca

Volume 1

Caloplaca adelphoparasitica
|
Caloplaca crenularia



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Images of the Lichen Genus Caloplaca

Volume 2

Caloplaca crenularia
|
Caloplaca holocarpa



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Images of the Lichen Genus Caloplaca

Volume 3

Caloplaca holocarpa
|
Caloplaca pulicarioides



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Images of the Lichen Genus Caloplaca

Volume 4

Caloplaca pyracea
|
Caloplaca xerica



This book focuses on two families of lichenized ascomycetes: Pyrenulaceae and Trypetheliaceae. It illustrated the majority of the accepted species in these families, which are most diverse on bark in tropical regions, most especially the Amazon. Fully updated dichotomous identification keys are given to all species in these families and to some similar groups and species, especially those in the same habitat, several of which are also illustrated in full. The illustrations are made from relatively recent material which still shows all characters, including gelatinous ascopore sheaths. For relatively recently described species, often type material is illustrated.