

Felix Schumm und André Aptroot

Atlas of Pyrenulaceae and Trypetheliaceae
(Lichenized Ascomycota)

VOLUME 3



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(Lichenized Ascomycota)

Volume 3

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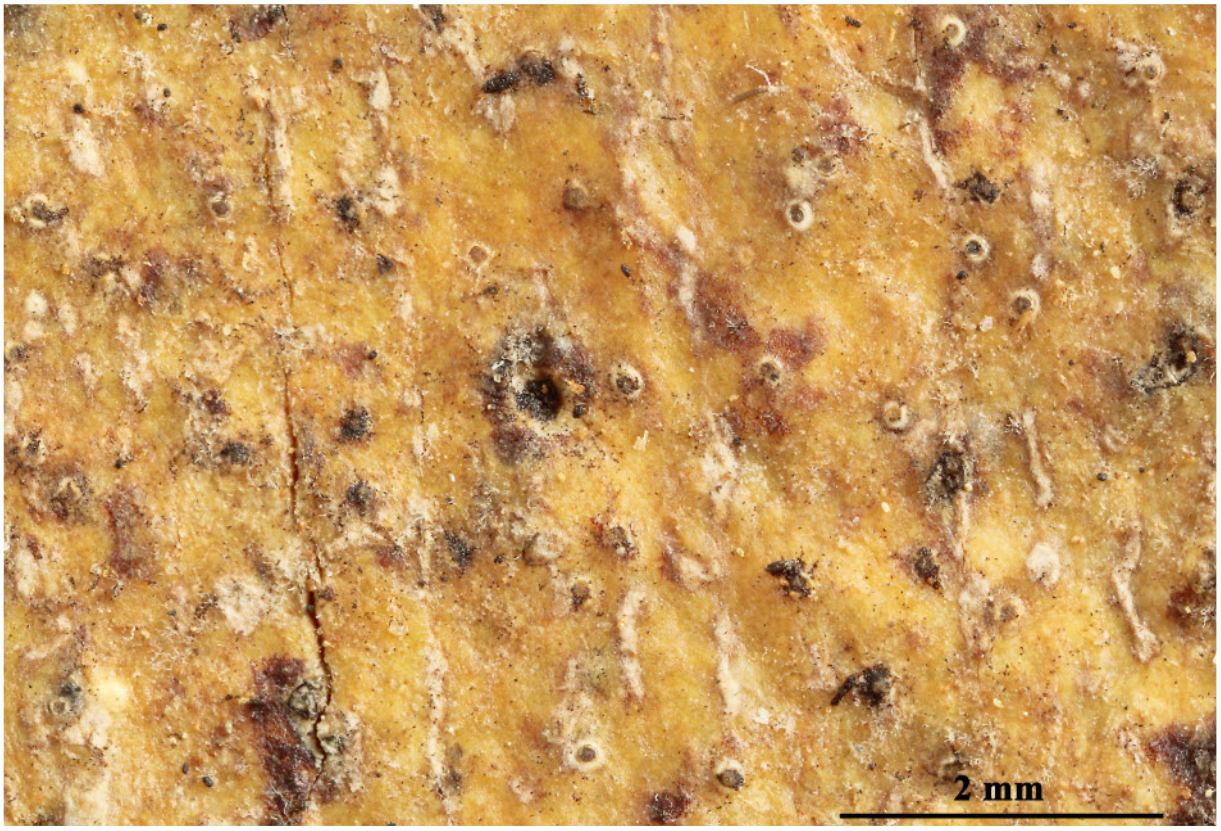
new combinations

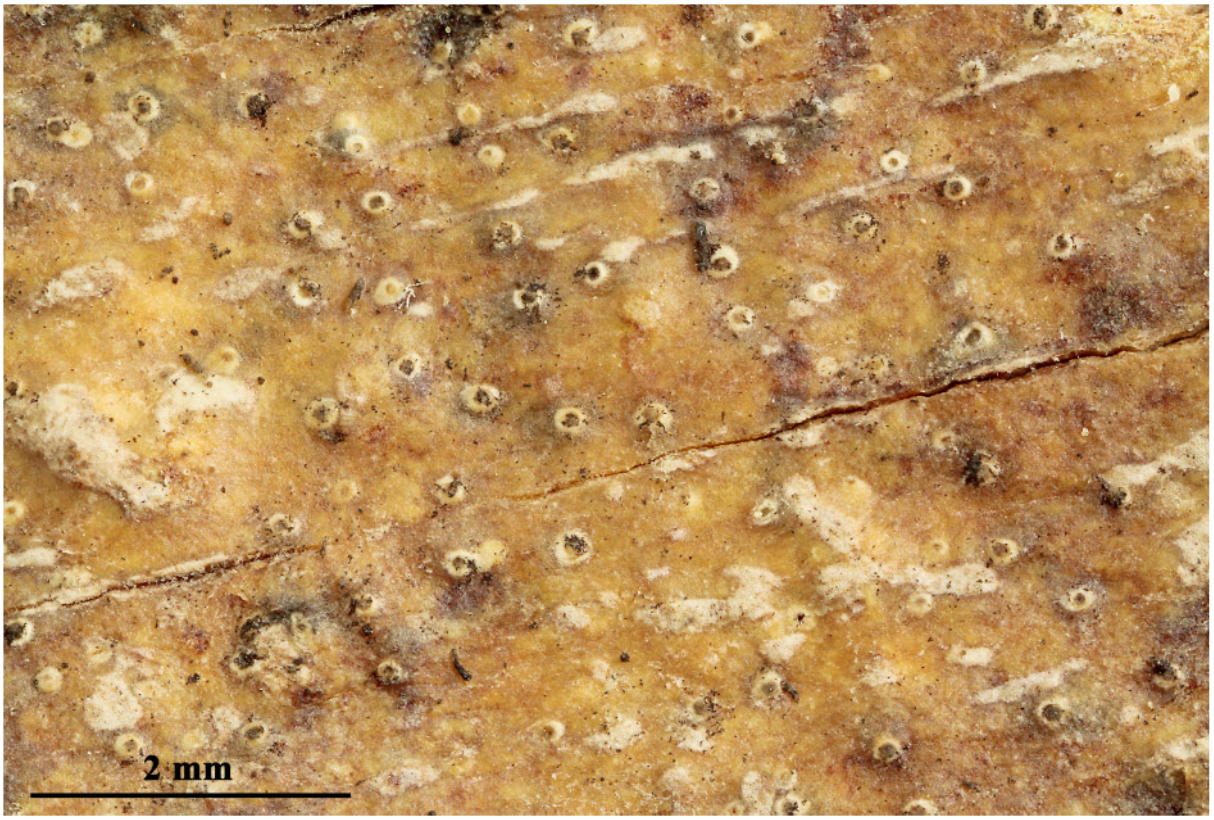
Astrothelium himalayense (Upreti & Aptroot) Aptroot & Schumm
Bogoriella oleosa (Aptroot) Aptroot & Schumm
Pseudopyrenula kantvilasii (P.M. McCarthy) Aptroot

Lithothelium immersum Aptroot & M. Cáceres, in Gueidan, Aptroot, Cáceres & Binh, Mycol. Progr. 15(1/7): 18 (2015)

Thallus thin, brown, without pseudocyphellae, without prothallus. Ascomata fully immersed in the bark below the thallus, pyriform, 0.3–0.5 mm diam., mostly 1–5 fused sideways with fused ostioles. Ostiole lateral, black, punctiform, usually surrouned by a rounded pale area of c. 0.1 mm. Hamathecium not inspersed with oil droplets. Ascospores 8/ascus, dark brown, irregularly biseriate, 3-septate, 22–26 × 6.5–8.5 µm, lumina slightly rounded, lumina wider than long, without much endospore, surrounded by a 1 µm thick gelatinous gel. Pycnidia not observed. Chemistry: No substances detected.

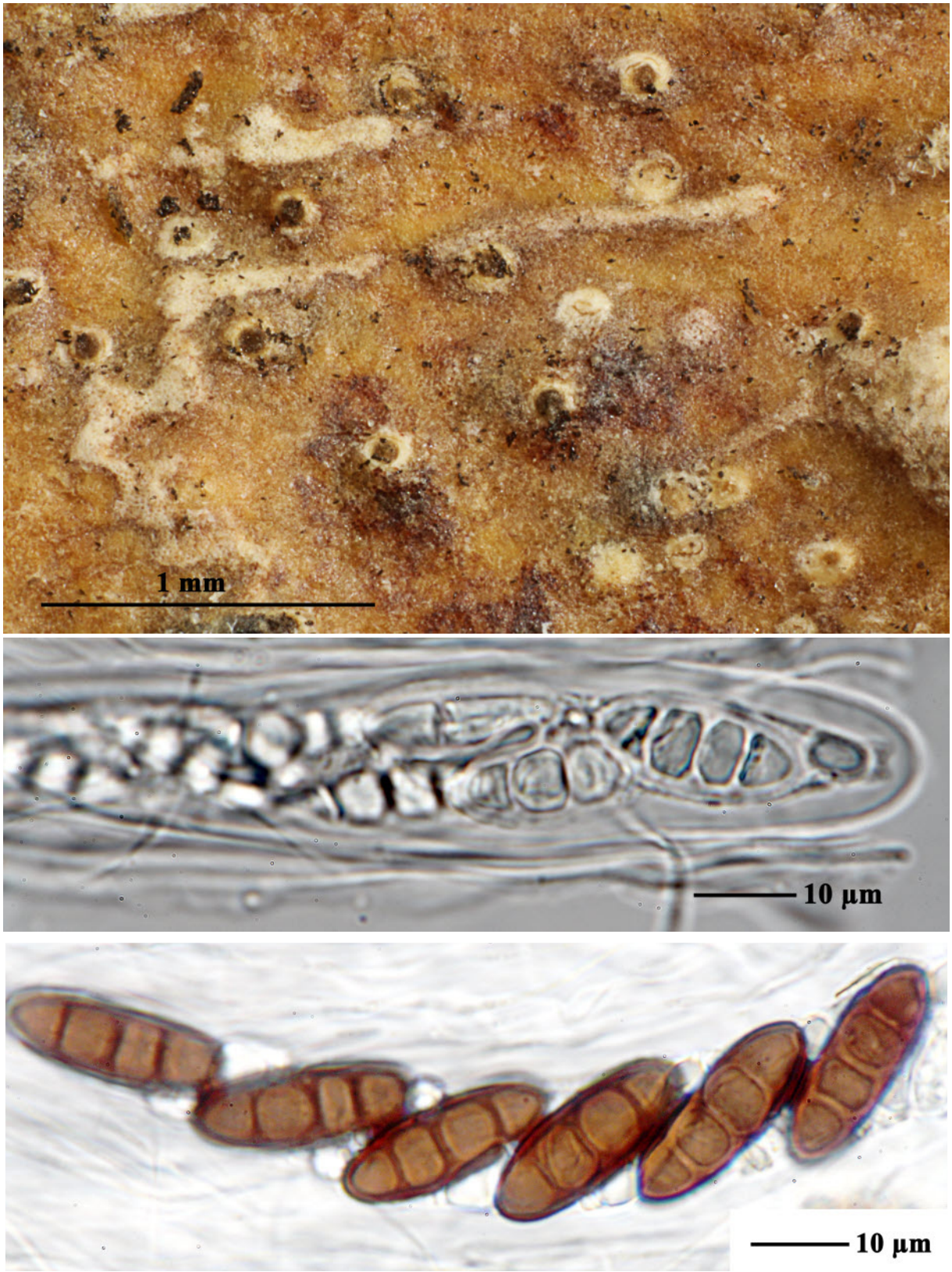
[ABL11919], Brazil, Amazonia, Fazenda São Francisco off BR319, 30 km N of Porto Velho, on tree bark. 8°24'33'' S, 63°58'56'' W, 100 m. Leg. M. Cáceres & A. Aptroot (no 11919), 15.03.1919, det. A. Aptroot 2012. ISOTYPE.







Lithothelium immersum



Lithothelium immersum



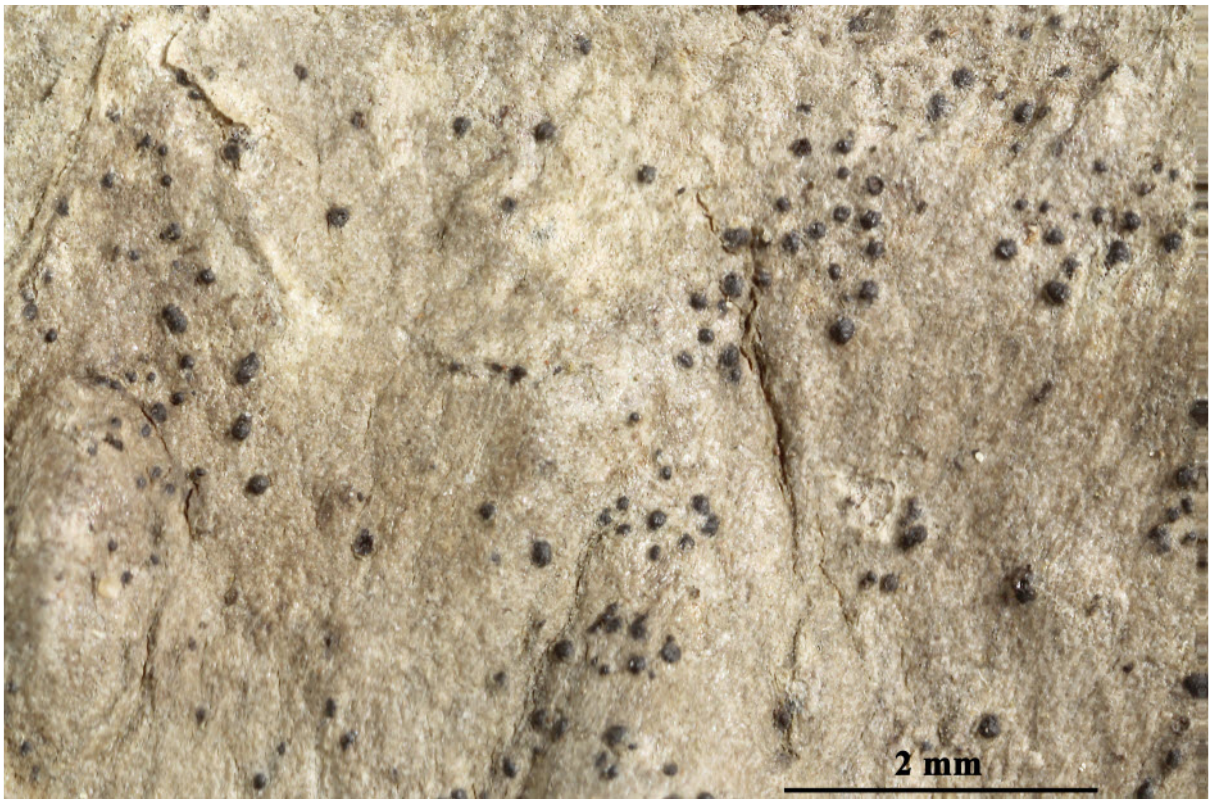


Lithothelium immersum

Lithothelium japonicum H. Harada, Bryologist 100(2): 204 (1997)

Thallus brownish green, continuous, smooth, dull. Perithecia simple, ovate to (? widely) elliptic, elevated (sometimes almost hemispherical), not constricted at base, blackish, 0.2–0.4 mm wide, 0.3–0.7 mm long, with thin thallus covering, with blackish lateral ostiole. Thallus endophloeodic, with Trentepohlia as phycobiont. Involucrellum strongly developed above, also around ostiole, lacking below, with remnants of substratal bark, carbonized for the most part, lacking crystals, 30-50µm thick above; exciple dark brown to almost black above and near ostiole, hyaline or partly blackish in the remaining parts, lacking crystals, 10–20 µm thick. Hymenium with oil droplets, I- and KI- (including asci and spores); paraphyses not gelatinized, simple; periphyses prominent, branched and anastomosing, 50–70 µm long. Asci cylindric, 75–90 × 10 µm, with sagittiform ocular chamber. Spores 8 in each ascus, uniseriate, hyaline, usually oval, sometimes fusiform with subacute ends or ellipsoidal, (9–)10–14(–17) × (3–)4–5 µm, with 3 distosepta; endosporium up to 2–3 µm thick; walls smooth, lacking gelatinous sheath.

[ABL67267], Korea, Jeju-do, Sogwipo-shi, Jungbang-dong, around Jungbang falls, 1–5 m, on Cinnamomum japonicum. Leg. A. Aptroot (no 67267), 12.05.2007, det. A. Aptroot, 2007.





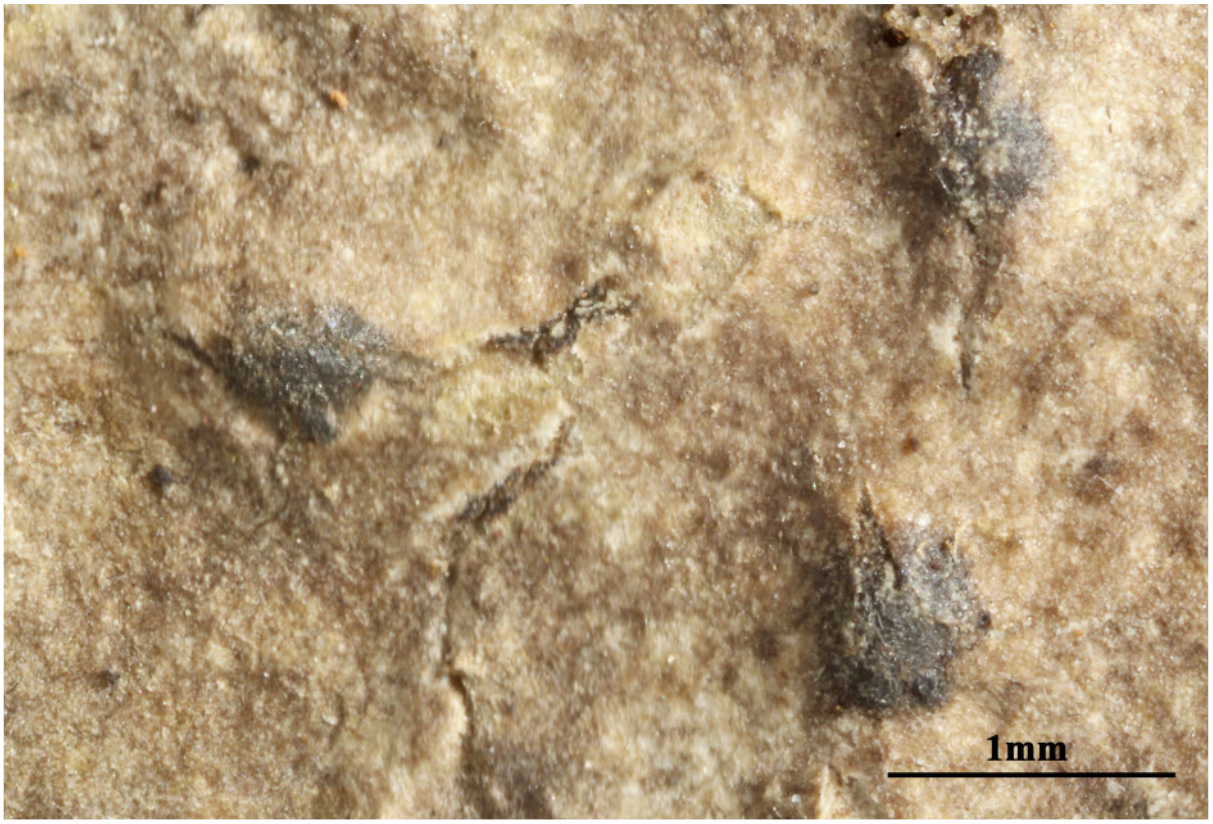
Lithothelium japonicum

Lithothelium obtectum (Müll. Arg.) Aptroot, Biblthca Lichenol. 44: 62 (1991)
= *Arthopyrenia obtecta* (Müll. Arg.) Müll. Arg., Flora, Regensburg 66(20): 318 (1883)
= *Sagedia obtecta* Müll. Arg., Linnaea 43: 42 (1880)
= *Verrucaria obtecta* (Müll. Arg.) Stizenb., (1891) [1889-1890]

Thallus brownish to green, not blackened around the ascocarps, dull, superficial on the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with Trentepohlia algae. Ascocarps with 1–5 fused ostioles, simple to parmentarioid, which gives a varied appearance, without pseudostromatic tissues, without crystals, hemispherical, not distinctly flattened, erumpent from the substratum, exposed, 0.6–0.8 mm diam, 0.2–0.4 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 100 µm thick. Ostiole brown, conical, lateral, 50–120 µm diam. Hamathecium colourless, not inspersed with oil droplets, gelatinized, IKI+ blue. Interthecial hyphae true paraphyses, only branched at the tips, 0.7–1 µm thick. Periphyses absent. Asci with rounded ocular chamber, 50–70 × 10–12 µm. Ascospores 8 in the ascus, irregularly placed, colourless, fusiform with subacute ends, symmetrically septate, not constricted at the septa, 12–15(–18) × 4–6 µm; with 3 distosepta, 1 µm thick. Endosporium up to 2 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC.

[ABL70307], Thailand, Prov. Trat, Ban-Dan-Kao, 12°14’06” N. 102°33’44” E. In mangrove forest on Xylocarpus. Leg., A. Aptroot (no70307, RAML 17265), 15.01.2912, det. A. Aptroot, 2012.





Lithothelium obtectum

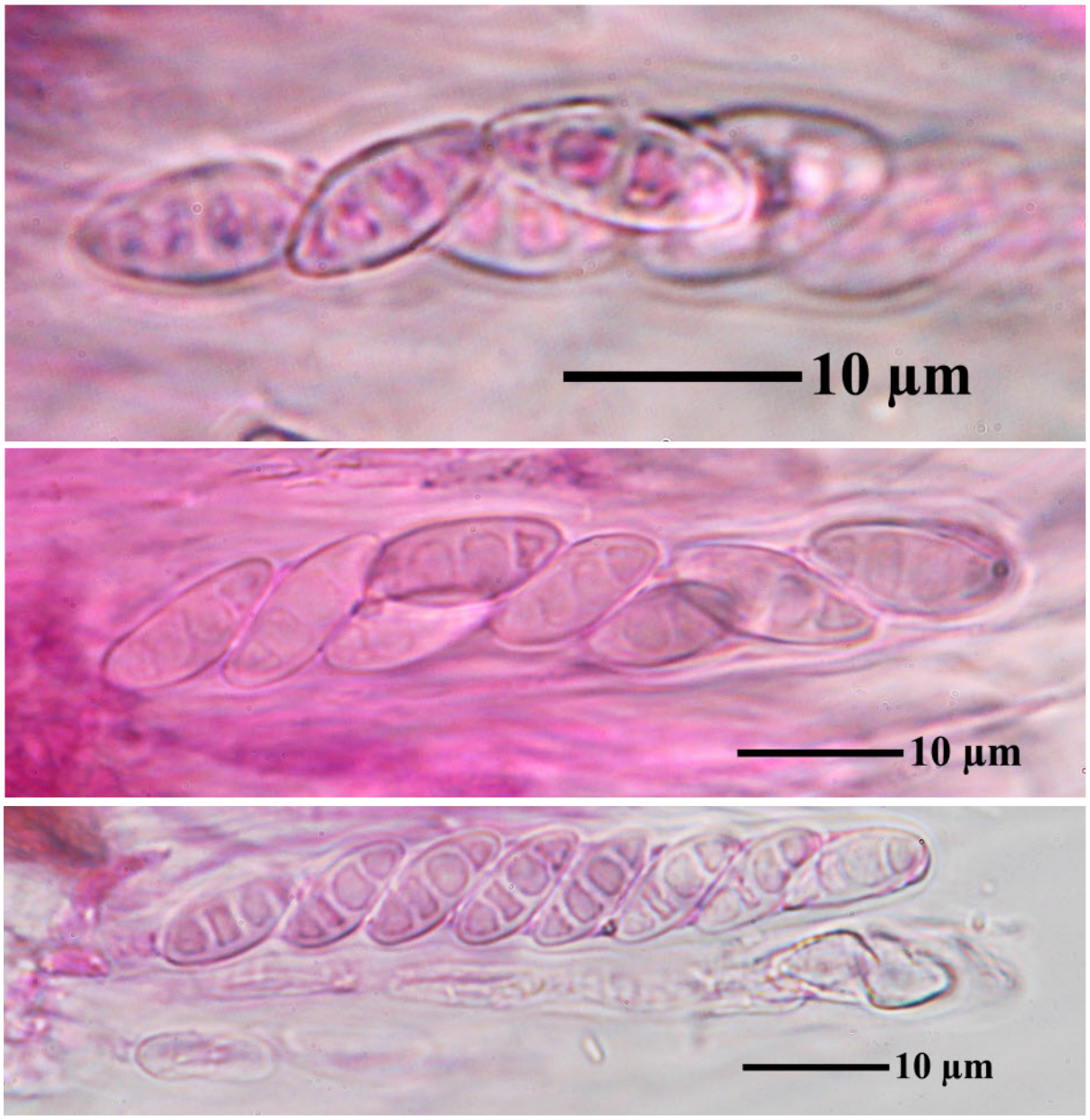
Lithothelium obtectum (Müll. Arg.) Aptroot, Biblthca Lichenol. 44: 62 (1991)
= *Arthopyrenia obtecta* (Müll. Arg.) Müll. Arg., Flora, Regensburg 66(20): 318 (1883)
= *Sagedia obtecta* Müll. Arg., Linnaea 43: 42 (1880)
= *Verrucaria obtecta* (Müll. Arg.) Stizenb., (1891) [1889-1890]

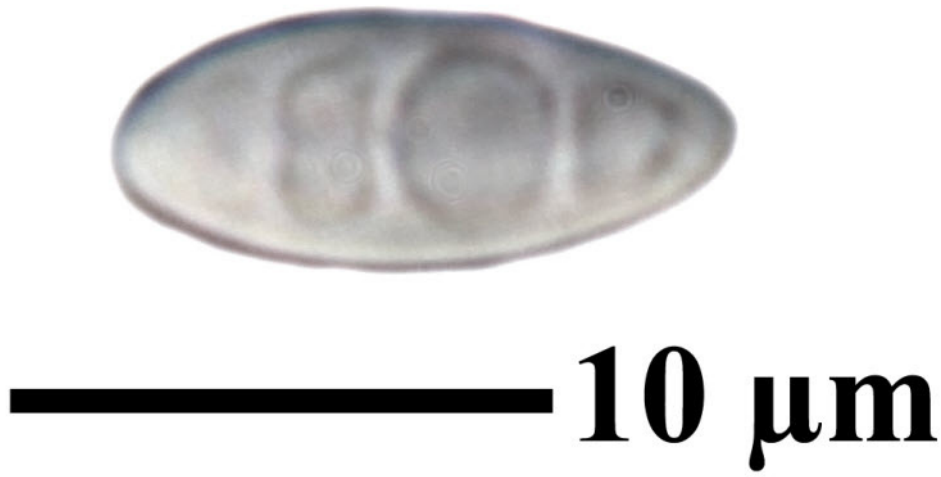
Thallus brownish to green, not blackened around the ascocarps, dull, superficial on the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with Trentepohlia algae. Ascocarps with 1–5 fused ostioles, simple to parmentarioid, which gives a varied appearance, without pseudostromatic tissues, without crystals, hemispherical, not distinctly flattened, erumpent from the substratum, exposed, 0.6–0.8 mm diam, 0.2–0.4 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 100 µm thick. Ostiole brown, conical, lateral, 50–120 µm diam. Hamathecium colourless, not inspersed with oil droplets, gelatinized, IKI+ blue. Interthecial hyphae true paraphyses, only branched at the tips, 0.7–1 µm thick. Periphyses absent. Asci with rounded ocular chamber, 50–70 × 10–12 µm. Ascospores 8 in the ascus, irregularly placed, colourless, fusiform with subacute ends, symmetrically septate, not constricted at the septa, 12–15(–18) × 4–6 µm; with 3 distosepta, 1 µm thick. Endosporium up to 2 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC.

[Ferraro10544], Argentina, 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 10544), A. Aptroot & M. Cáceres, 22.02.2013, det. A. Aptroot, 2013.



Lithothelium obtectum



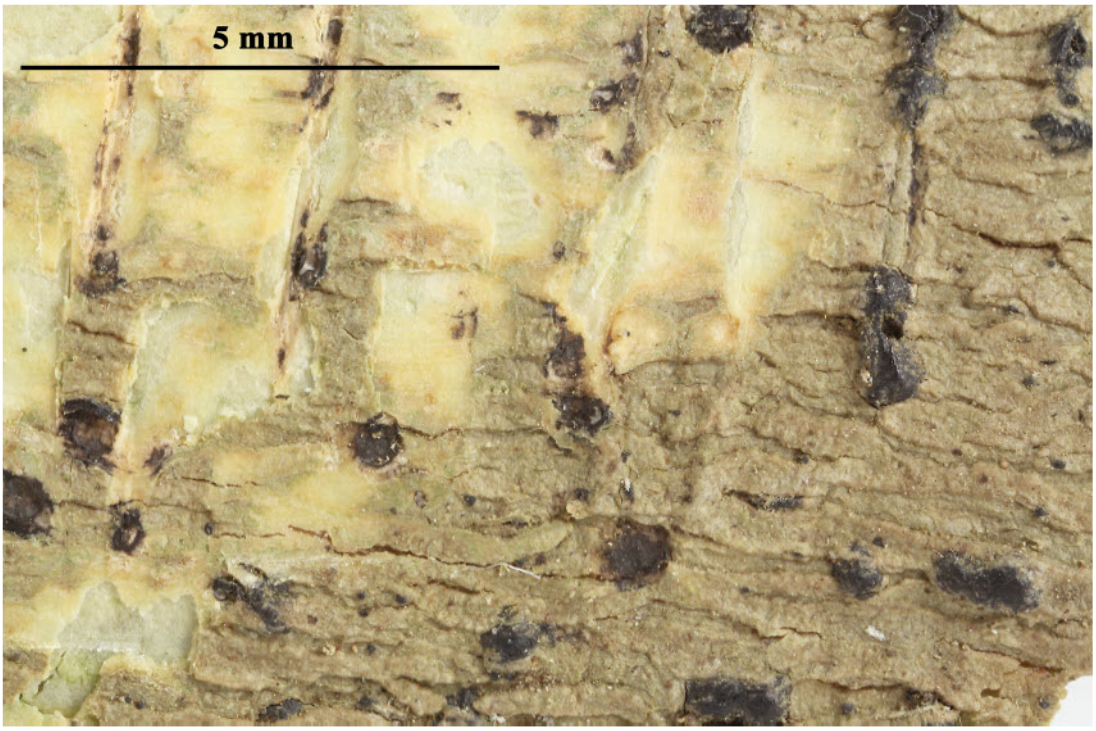


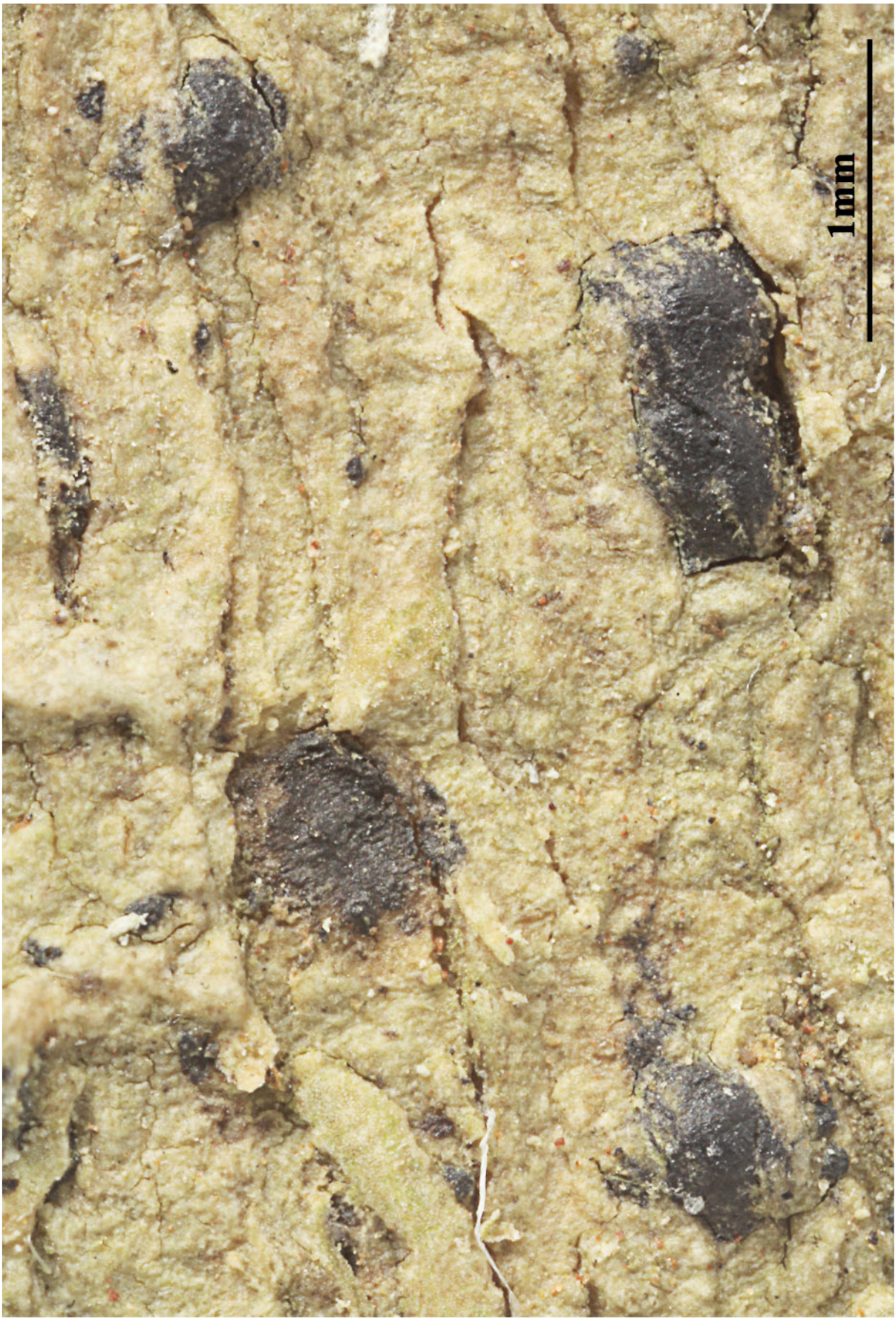
Lithothelium obtectum

Lithothelium paraguayense Müll. Arg. [as 'paraguaense'], Revue mycol., Toulouse 10(no. 40): 180 (1888)

Thallus brownish to green, not blackened around the ascocarps, smooth, superficial on the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with Trentepohlia algae. Ascocarps with fused ostioles and fused walls (astrothelioid), with non-carbonized pseudostromatic tissues, without crystals, conical, not distinctly flattened, erumpent from the substratum, exposed, 1–1.7 mm diam, 0.5–1 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 300 µm thick. Ostiole black, obconical, skewed, 50–100 µm diam. Hamathecium not inspersed with oil droplets, gelatinized, IKI+ blue. Interthecial hyphae true paraphyses, simple, not branched at the tips, 1 µm thick. Periphyses present, anastomosing, 0.5 µm thick. Asci with rounded ocular chamber, 100–120 × 15–20 µm. Ascospores 8 in the ascus, uniseriate, colourless, fusiform with subacute ends, symmetrically septate, not constricted at the septa, 18–23 × (6–)8–11 µm; with 3 distosepta, 1 µm thick. Endosporium up to 2 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph black pycnidia, 150–200 µm diam, wall completely carbonized, up to 40 µm thick. Conidia acrogenous, filiform, 8–11 × 0.3–0.5 µm. Chemistry: UV negative, no substances detected with TLC.

[Ferraro10645], Argentina, Prov. Misiones, Iguazú national Park, along railroad, on tree bark in evergreen tropical rainforest. 200 m, 25°41’50” S, 54°26’50” W. Leg. L.I. Ferraro (no 10645), A. Aptroot & M. Cáceres, 24.02.2013, det. A. Aptroot, 2013.





Lithothelium paraguayense



Lithothelium paraguayense

Lithothelium phaeosporum (R.C. Harris) Aptroot, Biblthca Lichenol. 44: 65 (1991)
= *Plagiocarpa phaeospora* R.C. Harris, Michigan Bot. 12(1): 36 (1973)

Thallus whitish-grey, not blackened around the ascocarps, dull, immersed in the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with *Trentepohlia* algae. Ascocarps simple, without pseudostromatic tissues, without crystals, conical, not distinctly flattened, erumpent from the substratum, exposed, 0.5–0.7 mm diam, 0.3–0.5 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 120 µm thick. Ostiole black, conical, skewed, 80–110 µm diam. Hamathecium not inspersed with oil droplets, gelatinized, IKI+ blue. Interthecial hyphae true paraphyses, simple, not branched at the tips, 2–3 µm thick. Periphyses absent. Asci with sagittiform ocular chamber, 100–140 × 20–25 µm. Ascospores 8 in the ascus, irregularly arranged, red-brown, fusiform with rounded ends, symmetrically septate, not constricted at the septa, 28–34(–40) × 10–14(–16) µm; with 3 distosepta, 1 µm thick. Endosporium up to 3 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC.

[Berger6844], Austria, Mühlviertel, Rannatal, 340 m, auf Ulmus glabra unter der Ruine Falkenstein. Leg. F. Berger (no 6844), 03.10.1993, det. A. Aptroot.



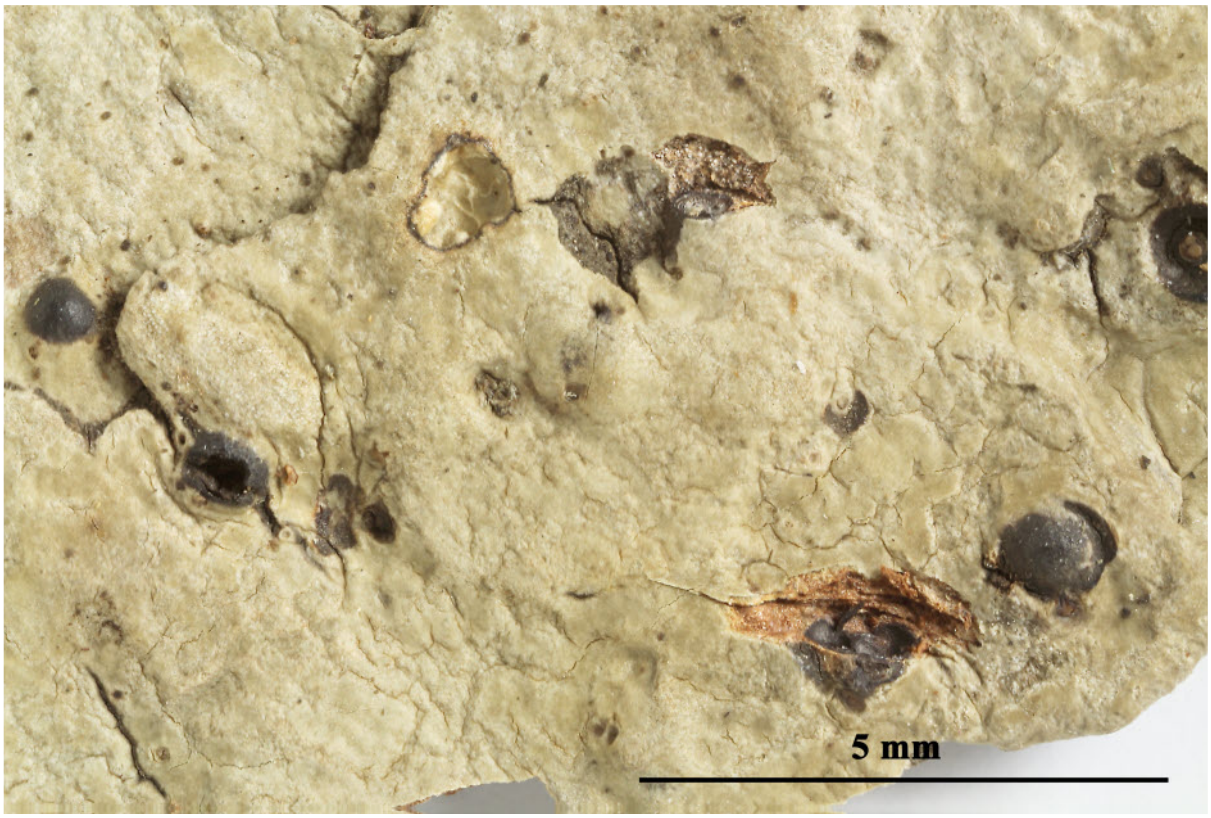


Lithothelium phaeosporum

Lithothelium quadrisporum Aptroot, Lichenologist 38(6): 543 (2006)

Thallus epiphloeodic, pale green to brownish, thin (c. 50–100 µm), a bit shiny but not corticate, uneven and irregularly rimose, up to 5 cm diam., surrounded by a 0.1–0.2 mm wide black prothallus line. Alga trentepohlioid, cells c. 4–6 µm diam. Ascomata solitary or 2 with fused ostioles (not walls), closed, ovoid, semi-immersed, leaving black pits, black, 0.6–0.9 mm diam. Walls of exciple and involucrellum fully integrated; combined wall c. 100 µm thick above and at the sides, c. 30 µm thick below the asci. Ostiole lateral. Hymenium not inspersed, initially gel IKI+ blue in most part and IKI+ orange in lower part; after some minutes all hymenium IKI+ orange. Paraphyses unbranched, c. 1–1.5 µm wide. Asci cylindrical, with a rounded ocular chamber, containing 4 ascospores. Ascospores hyaline, with 3 distosepta, endospore c. 3–5 µm thick, lumina rounded, 37–50 × 12–19 µm, perispore gelatinous, c. 1 µm thick, not ornamented. Pycnidia not seen.

[Allen497], Thailand, Chiang Mai Prov., Doi Chiang Dao, 1600 m, on tree trunk. Leg. D. Allen (no 497), 29.01.1996, det. A. Aptroot. ISOTYPUS.





Lithothelium quadrisporum

Lithothelium septemseptatum (R.C. Harris) Aptroot, Biblthca Lichenol. 44: 68 (1991)
= *Plagiocarpa septemseptata* R.C. Harris Michigan Bot. 12(1): 37 (1973)

Thallus whitish grey, not blackened around the ascocarps, dull, immersed in the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with Trentepohlia algae. Ascocarps simple, without pseudostromatic tissues, without crystals, conical, not distinctly flattened, erumpent from the substratum, exposed, 0.3–0.6 mm diam, 0.1–0.3 mm high. Ascocarp wall only in the upper part carbonized, without distinct clypeus, up to 200 µm thick. Ostiole black, conical, skewed, 50–100 µm diam. Hamathecium not inspersed with oil droplets, gelatinized, IKI + blue. Interthecial hyphae true paraphyses, simple, not branched at the tips, 1–1.5 µm thick. Periphyses absent. Asci with sagittiform ocular chamber, 80–100 × 15–25 µm. Ascospores 8 in the ascus, irregularly arranged, red-brown, fusiform with rounded ends, symmetrically septate, not constricted at the septa, 30–35(–40) × 10–13(–15) µm; with 7 distosepta, 1 µm thick. Endosporium up to 2 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph black pycnidia, 80–110 µm diam, wall completely carbonized, up to 30 µm thick. Conidia acrogenous, filiform, 12–18 × 0.7–1 µm. Chemistry: UV negative, no substances detected with TLC.

[Berger7318], Austria, Oberösterreich, Donautal, Schlögener Schlinge, Steiner Felsen, 300–400 m, auf Stammbasis von Quercus petraea. Leg. F. Berger (no 7318), 5.01.1994, det. A. Aptroot.





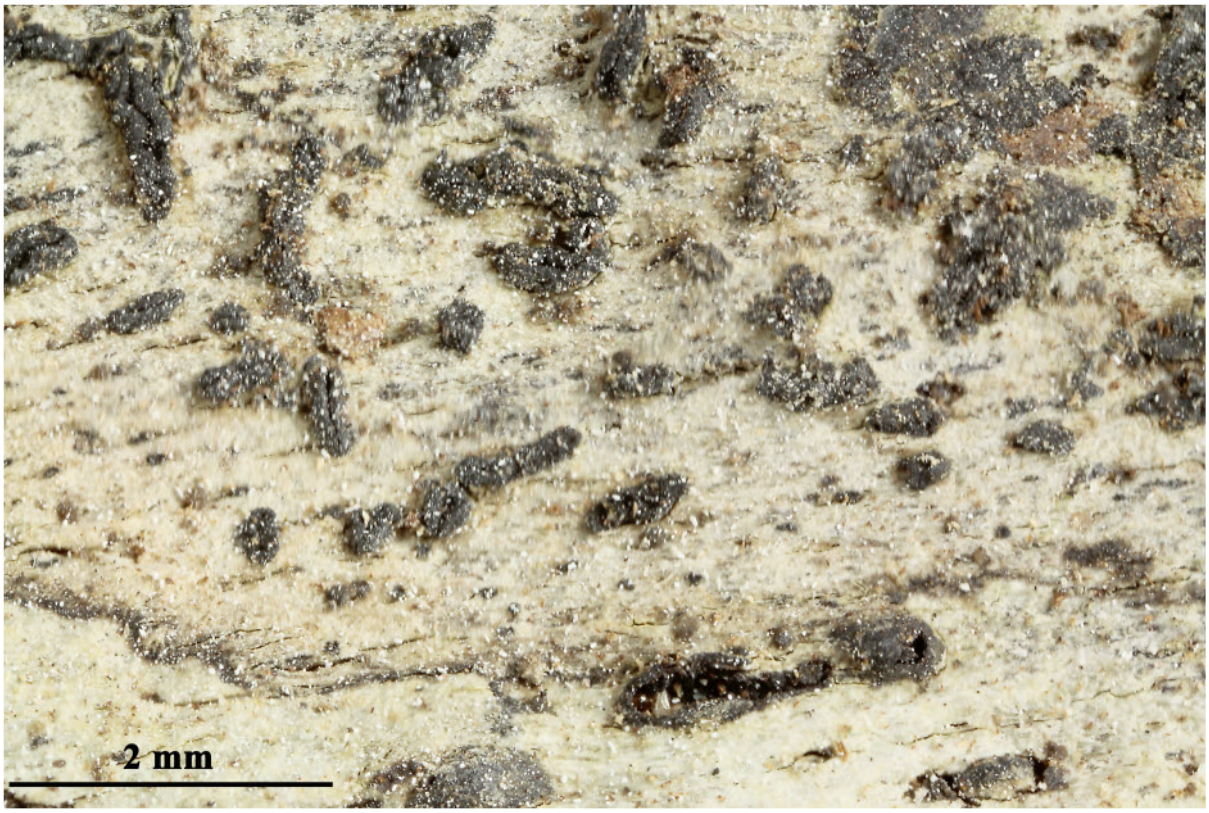


Lithothelium septemseptatum

Lithothelium submuriforme R.C. Harris & Aptroot, Biblthca Lichenol. 44: 69 (1991)

Thallus brownish to green, not blackened around the ascocarps, smooth, superficial on the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with Trentepohlia algae. Ascocarps simple or often with fused ostioles only (parmentarioid), without pseudostromatic tissues, without crystals, hemispherical, not distinctly flattened, erumpent from the substratum, extensively covered by the thallus, 0.5–0.8 mm diam, 0.2–0.4 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 200 μm thick. Ostiole black, conical, lateral, 60–100 μm diam. Hamathecium not inspersed with oil droplets, gelatinized, IKI+ blue. Interthecial hyphae true paraphyses, only branched at the tips, 0.7–1 μm thick. Periphyses absent. Asci with sagittiform ocular chamber, 100–120 × 10–13 μm. Ascospores 8 in the ascus, uniseriate, brown, fusiform with subacute ends, symmetrically septate to irregularly submuriform, not constricted at the septa, 20–25 × 8–10 μm; with 3–5 distosepta, 1 μm thick. Endosporium up to 3 μm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 μm thick. Anamorph black pycnidia, 80–120 μm diam, wall carbonized in the upper part only, up to 20 μm thick. Conidia acrogenous, filiform, 16–20 × 0.3–0.6 μm. Chemistry: UV negative, no substances detected with TLC.

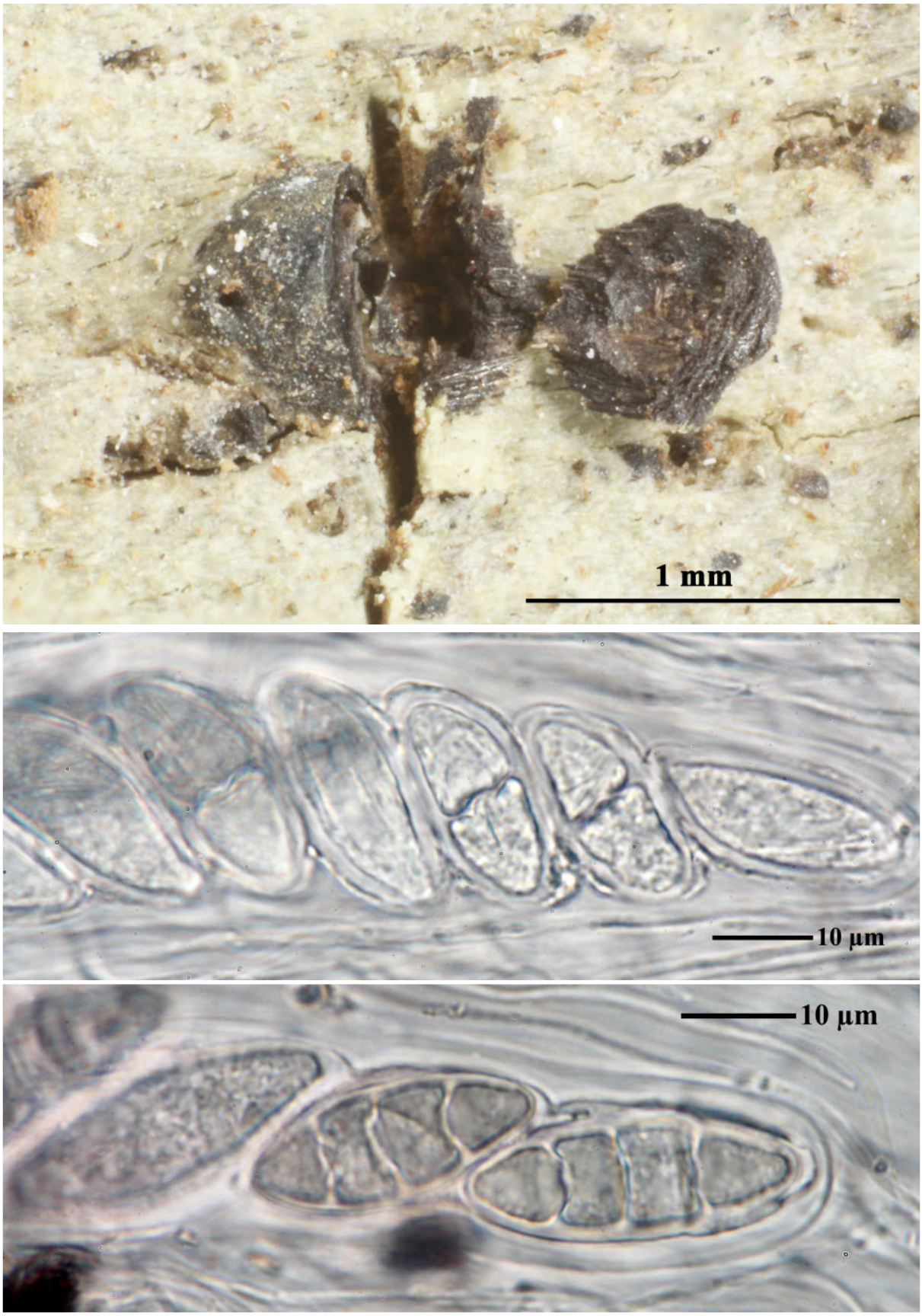
[ABL38353], Papua New Guinea, Madang Province, c. 10 km W of Bogia, Laing Island in Hansa Bay, coastal primary forest. 4°10.4’ S, 144°52.5’ E, 1 m. Leg. A. Aptroot (no 38353), 25-27.10.1995, det. A. Aptroot, 1996.



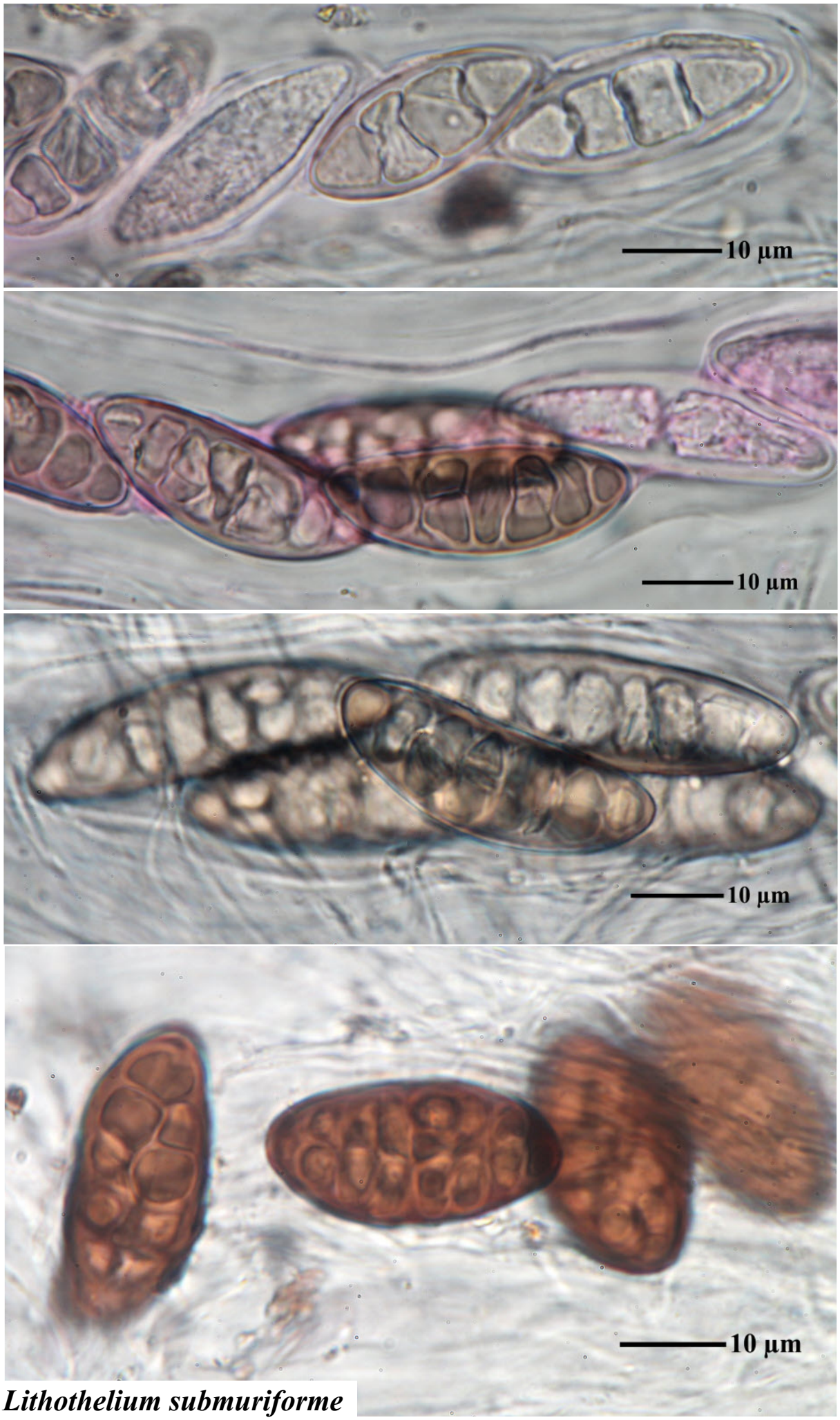




Lithothelium submuriforme



Lithothelium submuriforme

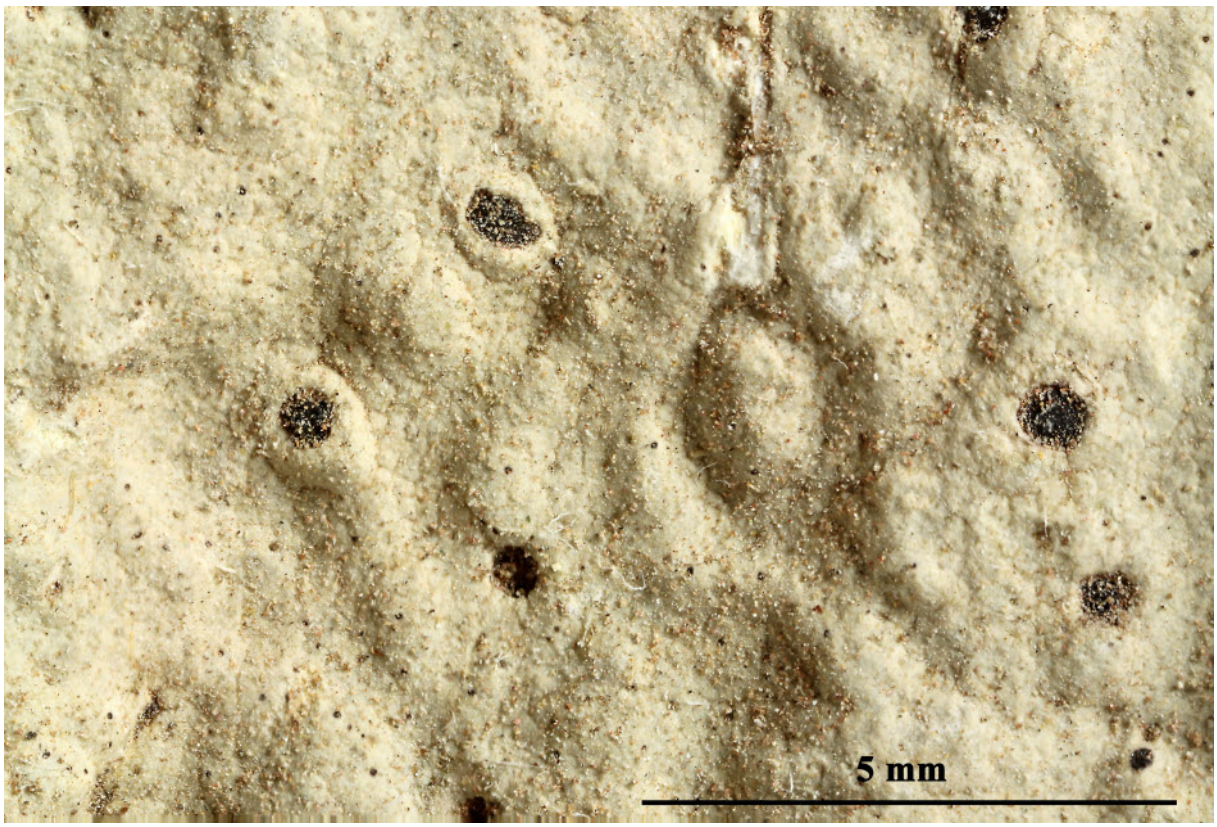


Lithothelium submuriforme

Lithothelium triseptatum (Nyl.) Aptroot, Biblthca Lichenol. 44: 70 (1991)
= *Verrucaria conoidea* var. *triseptata* Nyl. 1857

Thallus violet-grey, not blackened around the ascocarps, dull, superficial on the substratum, cracked-areolate around the ascomata, without crystals, without hypothallus. Lichenized, probably with Trentepohlia algae. Ascocarps simple, with non-carbonized pseudostromatic tissues, without crystals, hemispherical, not distinctly flattened, immersed in the substratum, exposed, 0.4–0.7 mm diam, 0.4–0.7 mm high. Ascocarp wall in the upper part carbonized, without distinct clypeus, up to 120 µm thick. Ostiole brown, obconical, apical, 100–120 µm diam. Hamathecium not inspersed with oil droplets, gelatinized, IKI+ blue or partly blue, partly orange. Interthecial hyphae true paraphyses, simple, not branched at the tips, 1–2 µm thick. Periphyses absent. Asci without ocular chamber, 60–70 × 10–13 µm. Ascospores 6–8 in the ascus, uniseriate, colourless, fusiform with subacute ends, symmetrically septate, not constricted at the septa, 17–21 × 6–8 µm; with 3 distosepta, 1 µm thick. Endosporium up to 3 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC.

[ABL57387], China, Yunnan Prov., Xishuangbanna, 2 km SE of Menglun, Green Stone Park, 600 m, 21°54’37” N, 101°16’51” E, on limestone. Leg. A. Aptroot (no 57387), 1.11.2002, det A. Aptroot, 2003.





Lithothelium triseptatum

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

= *Constrictolumina majuscula* (Nyl.) Lücking, M.P. Nelsen & Aptroot, in Aptroot & Lücking, Lichenologist 48(6): 921 (2016)

= *Arthopyrenia majuscula* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 332 (1922)

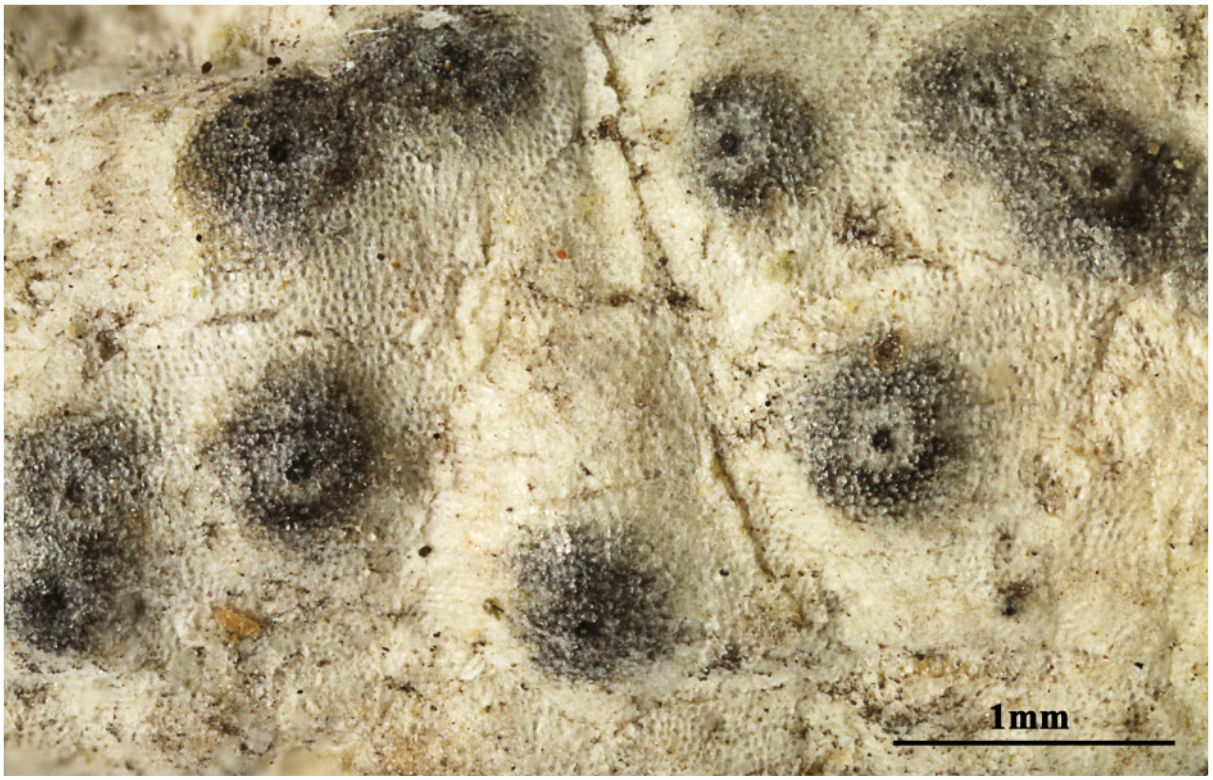
= *Ciferriolichen majusculus* (Nyl.) R.C. Harris, Moscosoa 6: 215 (1990)

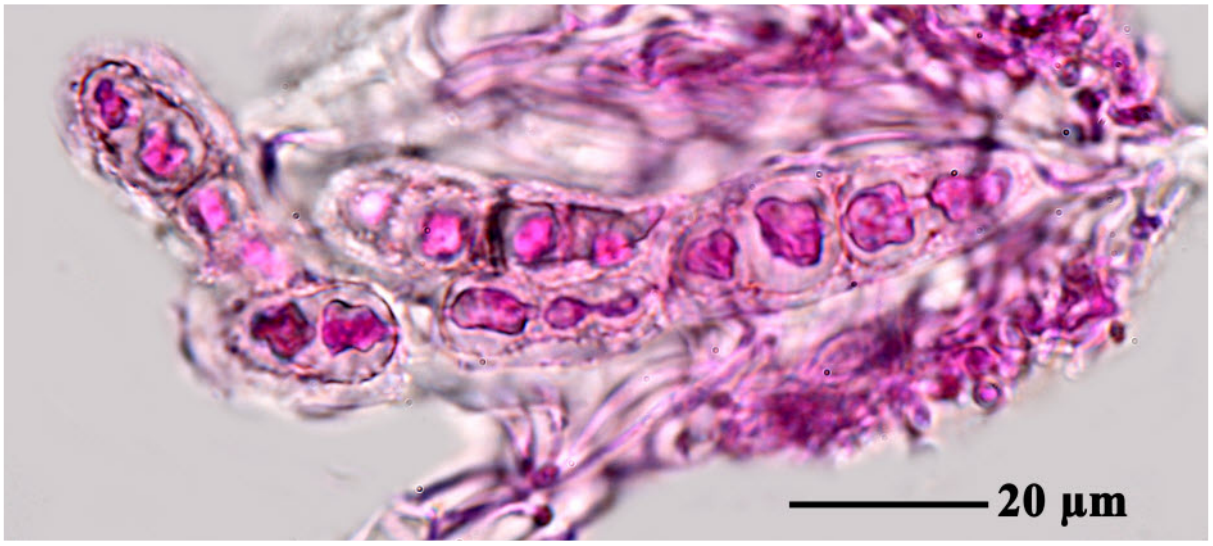
= *Verrucaria majuscula* Nyl., Annls Sci. Nat., Bot., sér. 4 20: 253 (1863)

Thallus thin, whitish. Ascomata with apical ostioles, solitary, 0.4–0.9 mm diam., erumpent; Hymenium flattened hemispherical. Ostioles surrounded by a broad, thin hyphal ring. Wall thin, lacking below. Asci narrowly obovate, (80–)105–125 × 25–30 µm. Ascospores 4–8/ascus, irregularly arranged, 1-septate, each cell partially subdivided by a flat-topped ring-like thickening of the wall, becoming 3-septate; wall strongly granular ornamented, perispore thick, up to 2 µm, 27–37 × 10–12 µm. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[ABL107336], Chagos Expedition, S. Brother, Indian Ocean, on Serevola. Leg. M.R.D. Seaward, 13.3.1996.













Macroconstrictolumina majuscula

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

= *Verrucaria malaccitula* Nyl., J. Linn. Soc., Bot. 20: 61 (1883)

= *Arthopyrenia malaccitula* (Nyl.) Zahlbr., Cat. Lich. Univ. 1: 284 (1921)

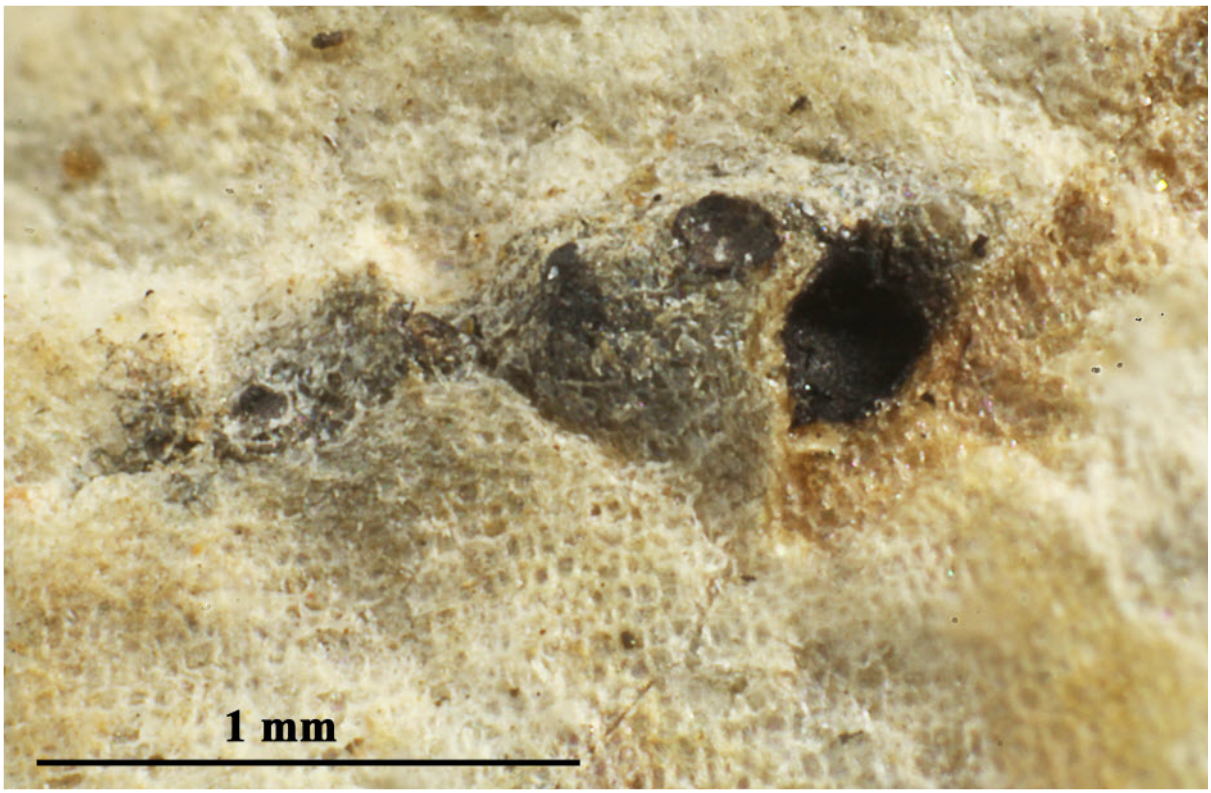
= *Arthopyrenia bifera* Zahlbr., Ann. Mycol. 33: 34 (1935)

= *Didymella gigantea* Räsänen, Arch. Soc. Zool. Bot. Fenn. "Vanamo" 3: 89 (1949)

= *Constrictolumina malaccitula* (Nyl.) Lücking, M.P. Nelsen & Aptroot, in Aptroot & Lücking, Lichenologist 48(6): 921 (2016)

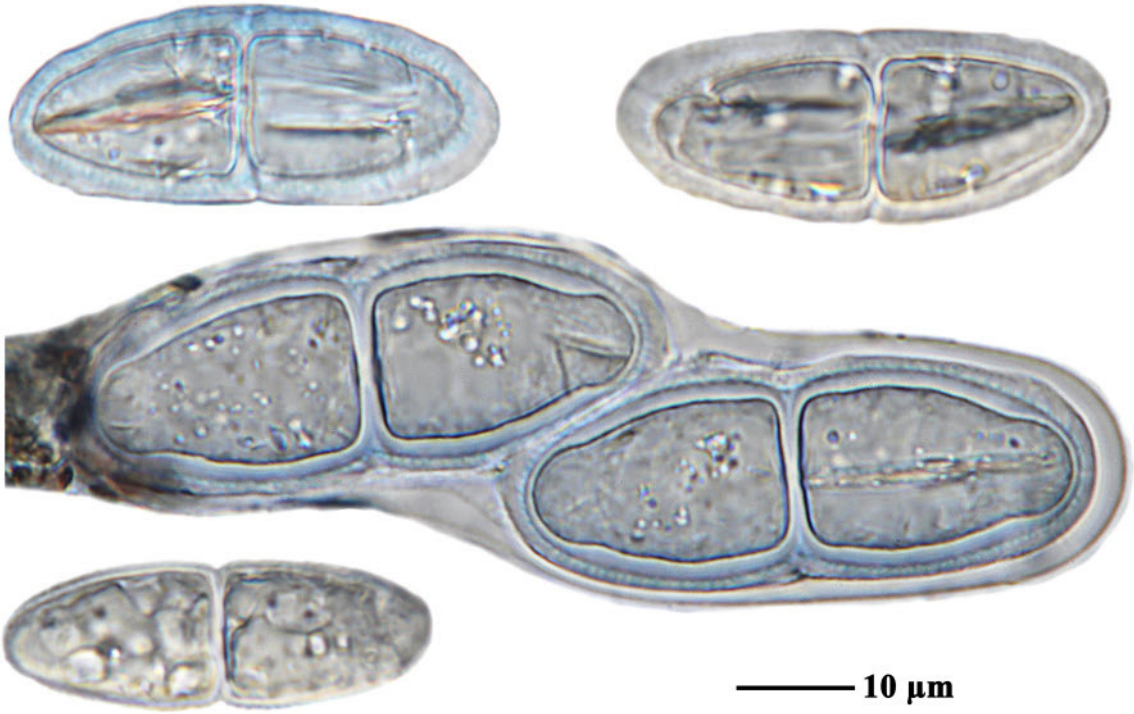
Thallus thin, whitish. Ascomata with mostly eccentric ostioles, solitary, 0.2–0.4 mm diam., subglobose to hemispherical. Wall thinner or lacking below. Asci narrowly elliptical, 75–105(–120) × (20–)25–35 µm. Ascospores 2/ascus, narrowly elliptical, 1-septate, with a slightly thickened area of the wall outlining a smaller subchamber, ultimately becoming 3-septate; wall strongly granular ornamented, perispore well developed, 37–48 × 15–16 µm (excluding perispore). Pycnidia often present. Conidia rod-like to linear, 5-10 x 1 µm. Chemistry: Thallus and ascomata UV-, K-. TLC: no substances detected.

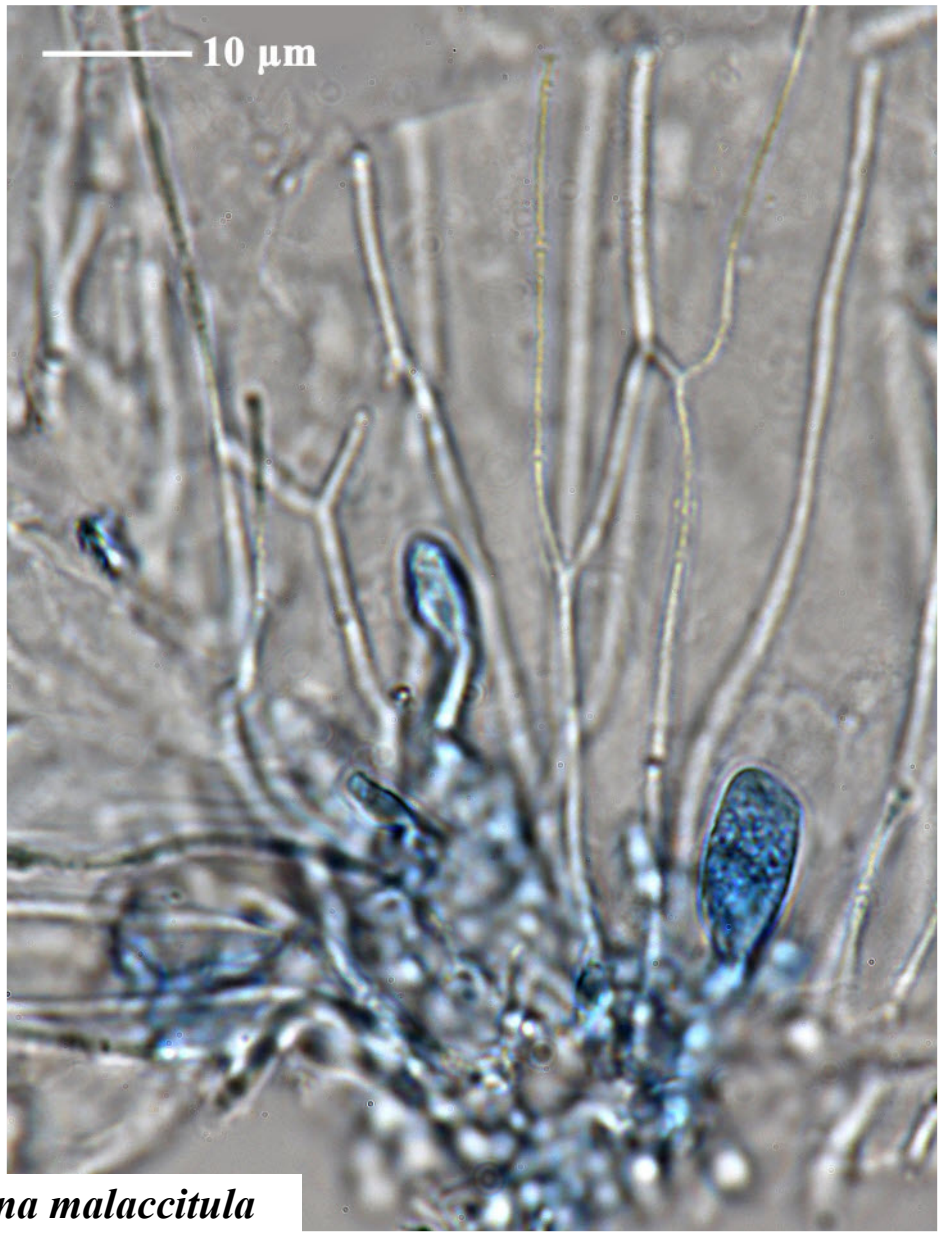
[ABL19093], Papua New Guinea, Central Prov., Varirata National Park, 20 km E of Port Moresby, 147°22’ E, 9°27’ S, 800 m, on tree in secondary tropical forest. Leg. A. Aptroot (no 19093), 03.1987, det. A. Aptroot 1987.





Constrictolumina malaccitula





Constrictolumina malaccitula

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

= *Constrictolumina malaccitula* (Nyl.) Lücking, M.P. Nelsen & Aptroot, in Aptroot & Lücking, Lichenologist 48(6): 921 (2016)

= *Arthopyrenia malaccitula* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 284 (1921) [1922]

= *Verrucaria malaccitula* Nyl., in Nylander & Crombie, J. Linn. Soc., Bot. 20: 61 (1883)

Thallus thin, whitish. Ascomata with mostly eccentric ostioles, solitary, 0.2–0.4 mm diam., subglobose to hemispherical. Wall thinner or lacking below. Asci narrowly elliptical to elliptical, 75–105(–120) × (20–)25–35 µm. Ascospores 2/ascus, narrowly elliptical, 1-septate, with a slightly thickened area of the wall outlining a smaller subchamber, ultimately becoming 3-septate; wall strongly granular ornamented, perispore well developed, 37–48 × 15–16 µm (excluding perispore). Pycnidia often present. Conidia rod-like to linear, 5-10 x 1 µm. Chemistry: Thallus and ascomata UV-, K-. TLC: no substances detected.

[Cavalcante], Brazil, Bahia, Jaguaripé, Ba2, on tree bark in mangrove, alt. 1m. Leg. J.G. Cavalcante, 8.06.2019, det. A. Aptroot, 2019.



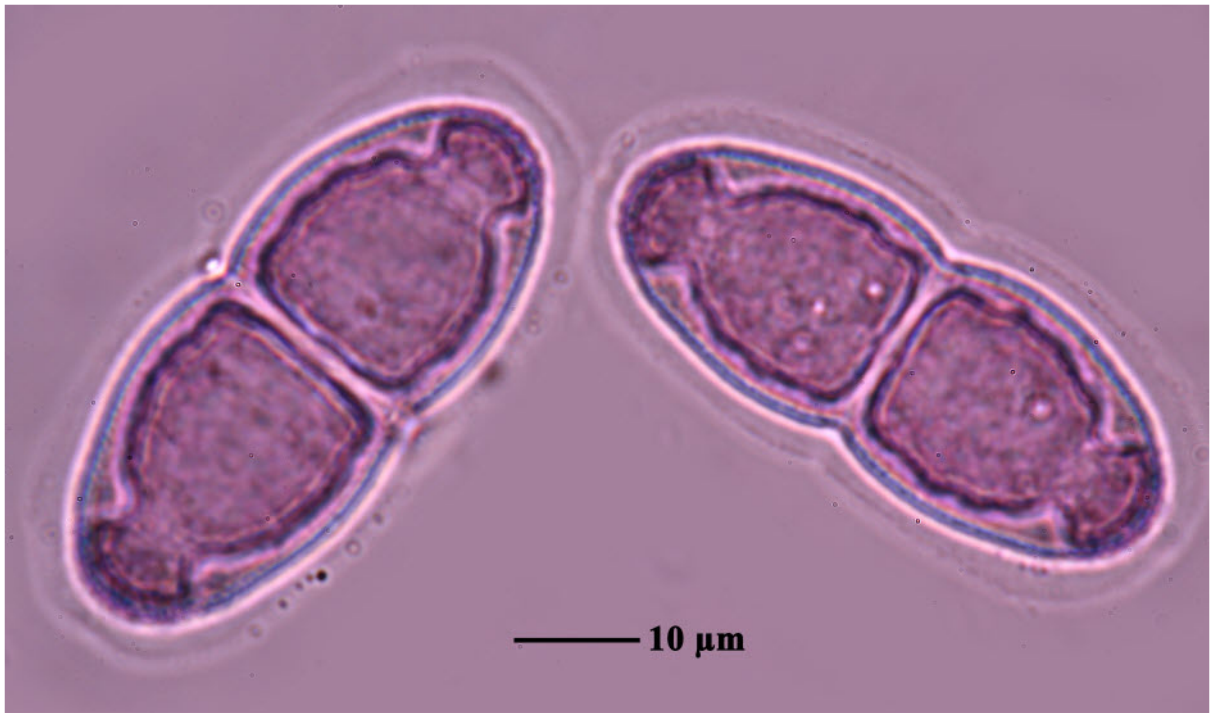


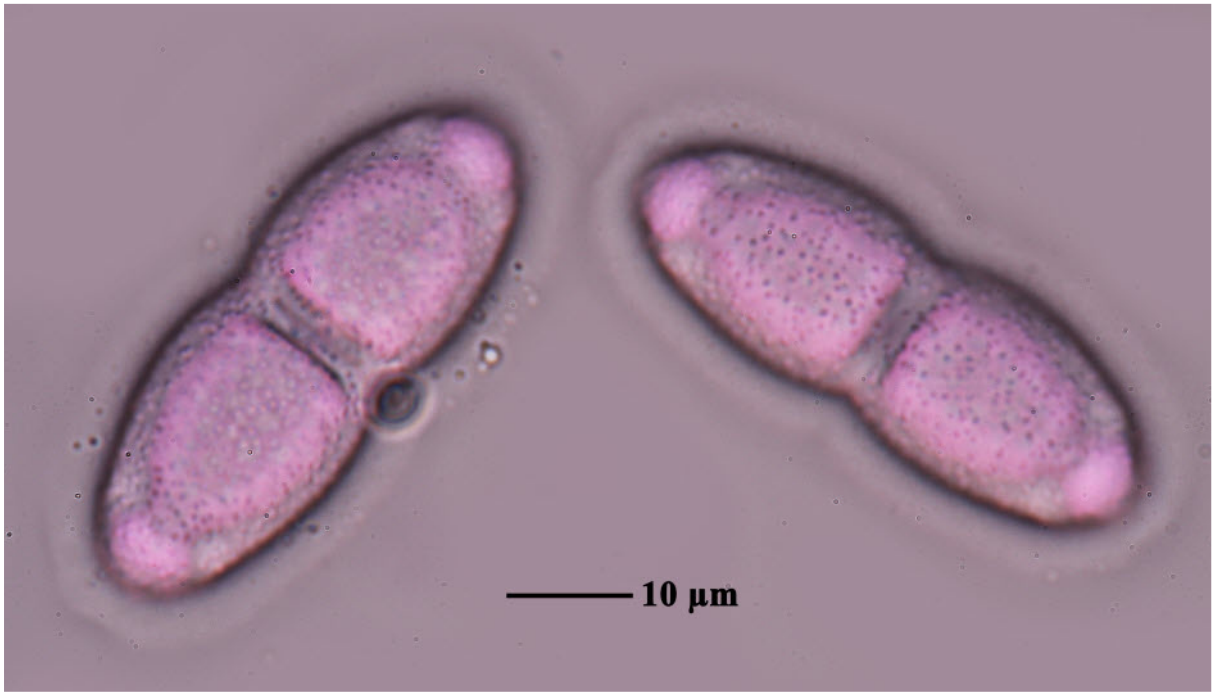
Macroconstrictolumina malaccitula





Macroconstrictolumina malaccitula





Macroconstrictolumina malaccitula

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

= *Constrictolumina malaccitula* (Nyl.) Lücking, Nelsen & Aptroot

= *Verrucaria malaccitula* Nyl., J. Linn. Soc., Bot. 20: 61 (1883)

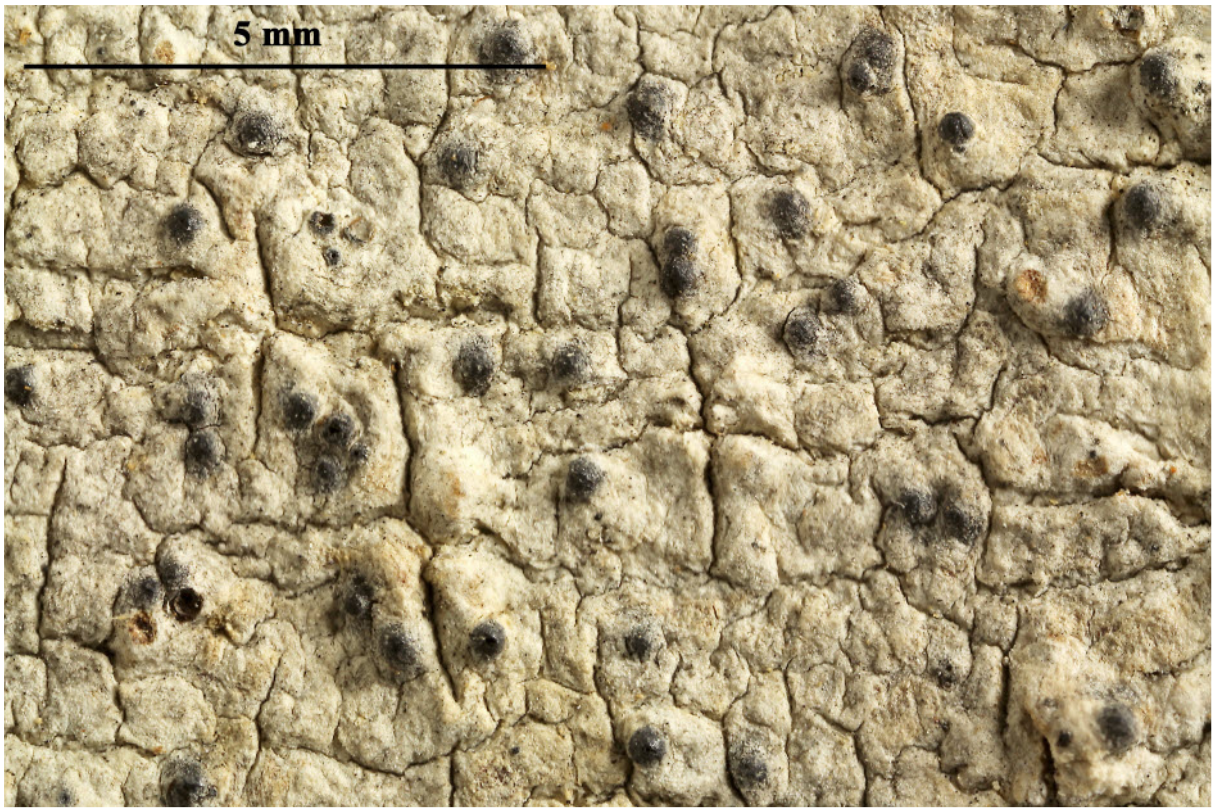
= *Arthopyrenia malaccitula* (Nyl.) Zahlbr., Cat. Lich. Univ. 1: 284

= *Arthopyrenia bifera* Zahlbr., Ann. Mycol. 33: 34 (1935)

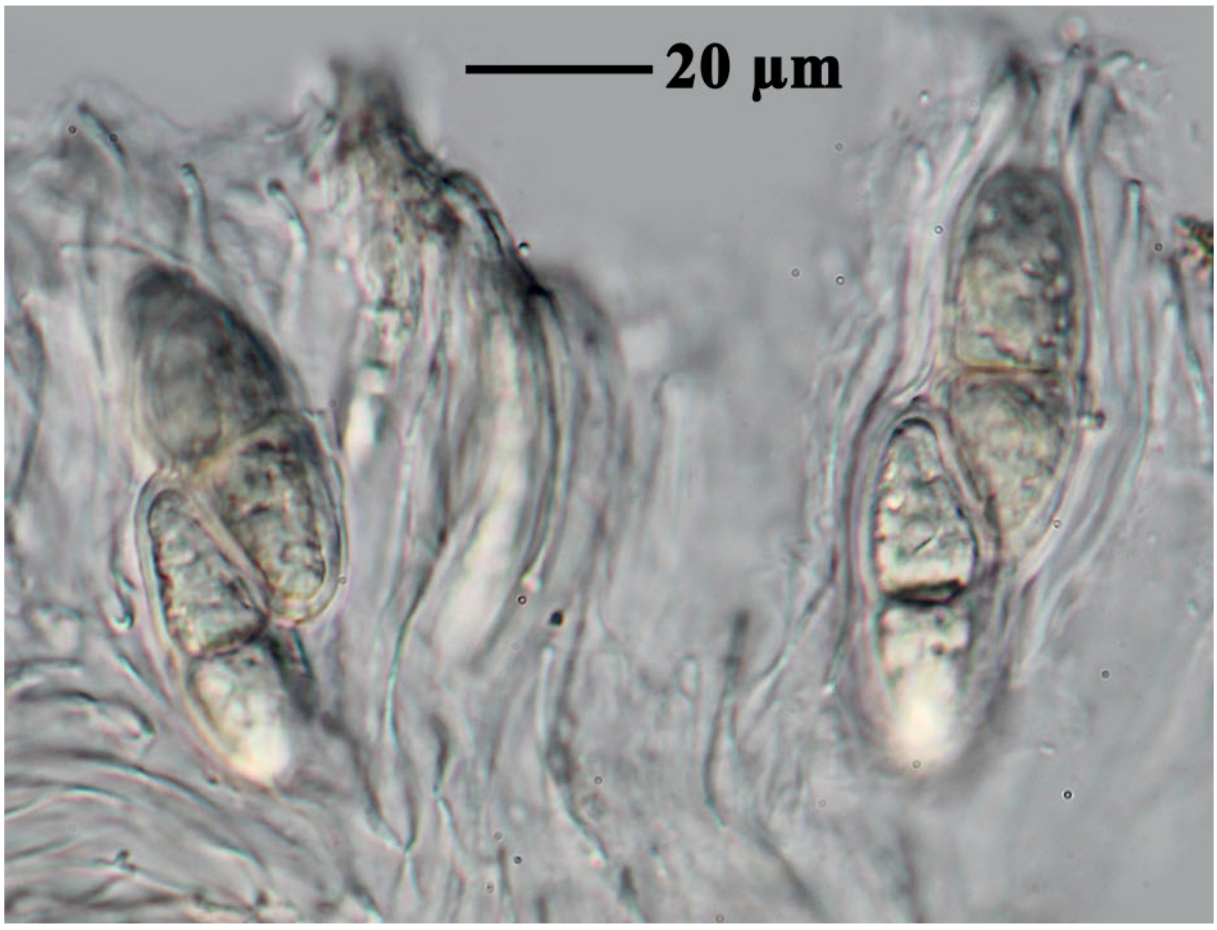
= *Didymella gigantea* Räsänen, Arch. Soc. Zool. Bot. Fenn. "Vanamo" 3: 89 (1949)

Thallus thin, whitish. Ascomata mostly immersed, subglobose to hemispherical, 0.2–0.4 mm diam. Wall thinner or lacking below. Ostioles often rather eccentric. Asci narrowly elliptical to elliptical, 75–105(–120) × (20–)25–35 µm. Ascospores 2/ascus, narrowly elliptical, 1-septate, with a slightly thickened area of the wall outlining a smaller subchamber, ultimately becoming 3-septate; wall strongly granular ornamented; perispore well developed; 37–48 × 15–16 µm (excluding perispore). Pycnidia often present. Microconidia rod-like to linear, 5–10 × 1 µm.

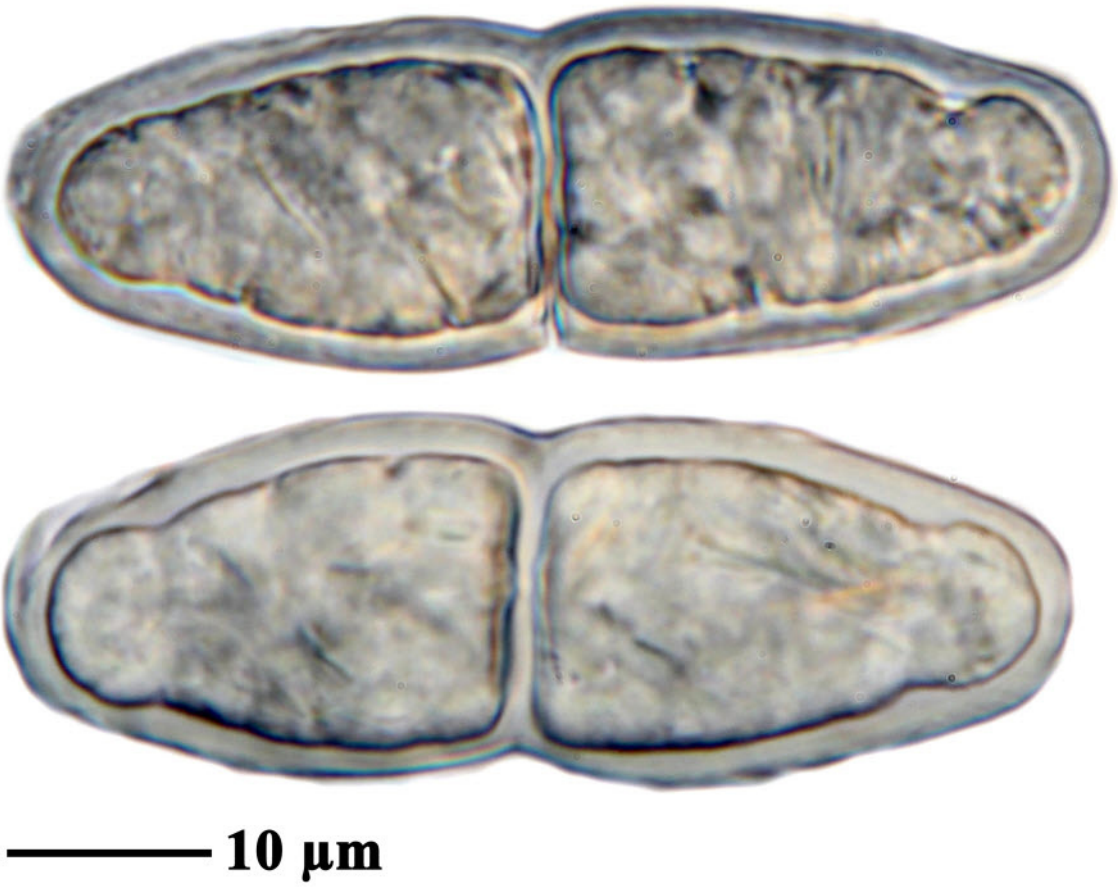
[Johnson2535], USA, Pearl River County, 10 mi E of Popularville, on *Fagus*. Leg. G.T. Johnson (no 2535), 14.6.1939, det. A. Aptroot.

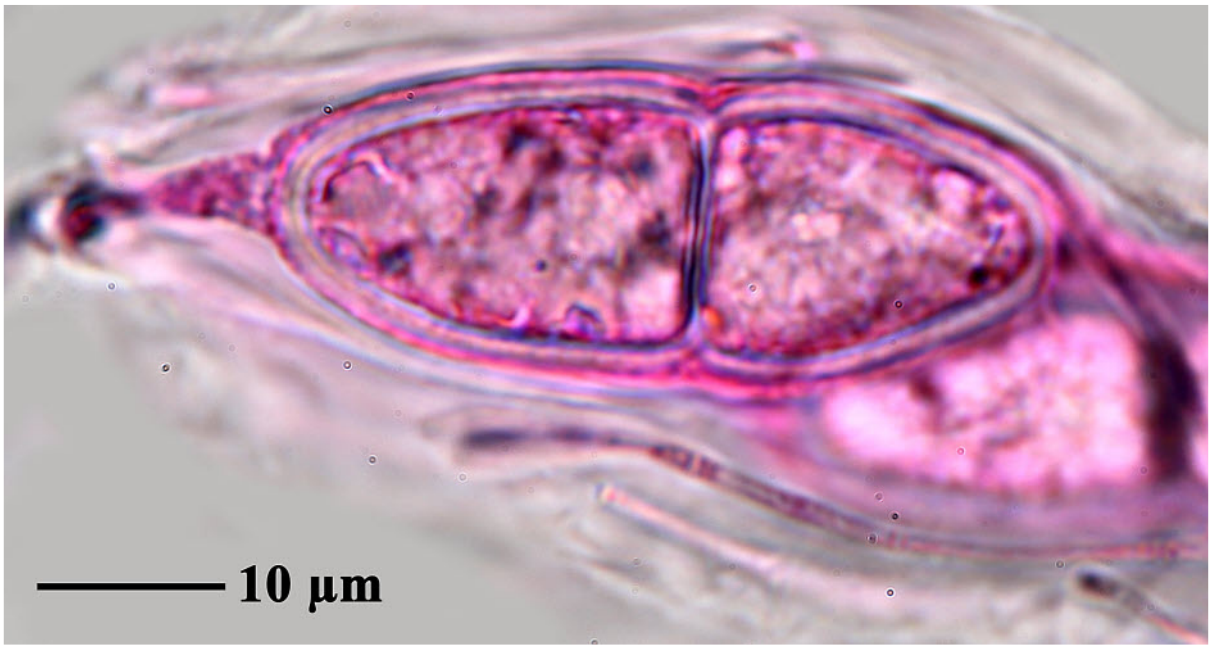






Macroconstrictolumina malaccitula





Macroconstrictolumina malaccitula

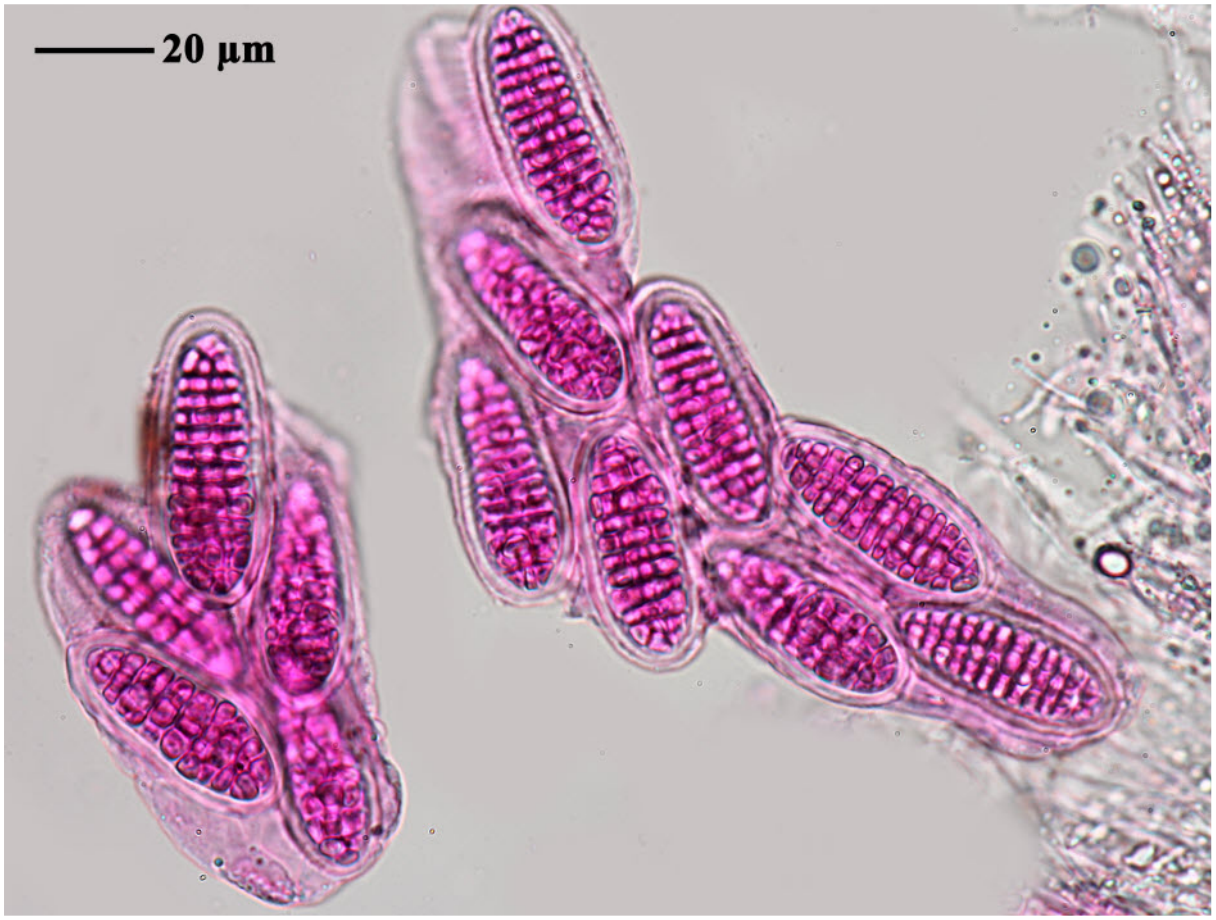
Marcelaria cumingii (Mont.) Aptroot, Nelsen & Parnmen, Glalia 5(2): 6 (2013)
= *Bathelium cumingii* (Mont.) Trevis., Flora, Regensburg 44: 21 (1861)
= *Laurera cumingii* (Mont.) Zahlbr., Cat. Lich. Univers. 1: 503 (1922)
= *Trypethelium cumingii* Mont., J. Bot. (Hooker) 4: 5 (1845)

Thallus corticate, olive-green to yellowish, smooth to uneven. Ascomata sessile with flattened top, solitary to irregularly grouped and confluent, covered with (orange-) yellow pigment except for blackish ostiole, 0.5–0.8 mm diam., with groups up to 3 mm diam. Hamathecium densely and heavily inspersed. Ascospores 2-8/ascus, muriform, fusiform-ellipsoid, 50–70 × 14–22 µm, hyaline, IKI-, surrounded by a gelatinous sheath, 3–9 µm thick. Chemistry: Thallus UV+ yellow, K+ purple. TLC: Three anthraquinones (parietin, emodin) plus lichexanthone.

[ABL20052], Philippines, island of Luzon, prov. Laguna, 60 km SE of Manila, Los Baños, College, University Campus, on tree,121°15 E, 14°12’ E, 50 m. Leg. A. Aptroot (no 20052), 02.1987, det. A. Aptroot 1987.



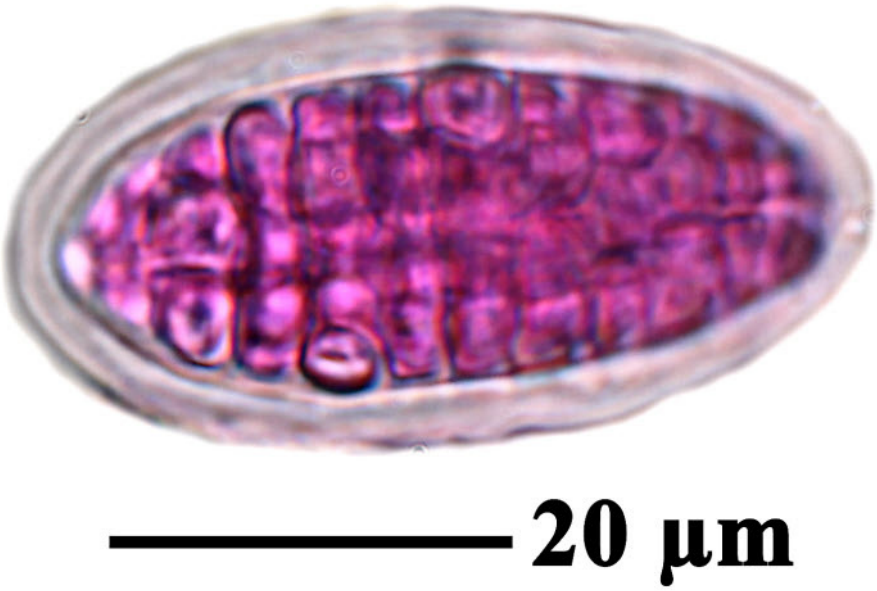




Marcelaria cumingii







Marcelaria cumingii

Marcelaria purpurina (Nyl.) Aptroot, Nelsen & Parnmen, Glalia 5(2): 9 (2013)
= *Bathelium purpurinum* (Nyl.) Müll. Arg., Linnaea 43: 45 (1880)
= *Laurera purpurina* (Nyl.) Zahlbr., Denkschr. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 83: 93 (1927)
= *Trypethelium purpurinum* Nyl., in Leighton, Trans. Linn. Soc. London 25: 459 (1866)
= *Tremotylium sprucei* Müll. Arg., J. Linn. Soc., London 30: 454 (1895)

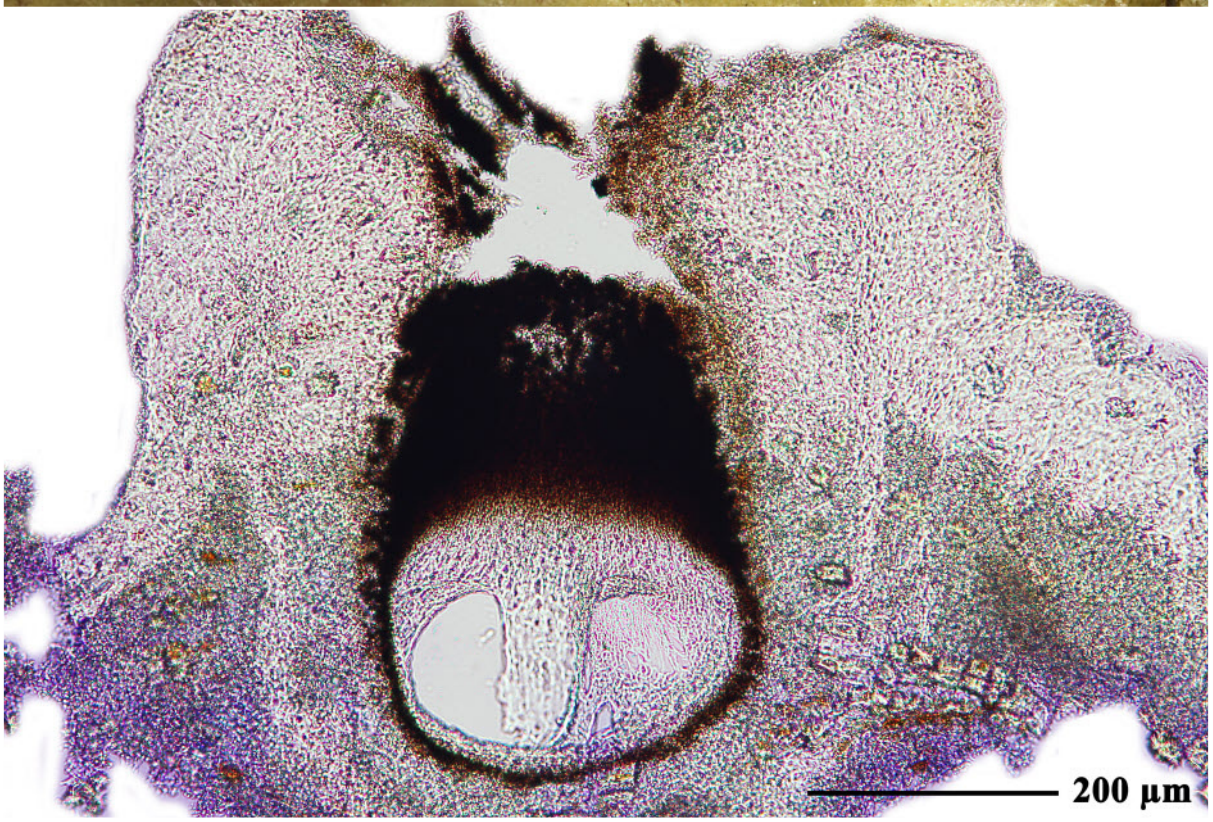
Thallus olive green but sometimes with patches of bright red pruina. Ascomata warts 0.7–1.2 mm diam. and up to 0.7 mm high, clusters of 2–10 warts up to 4 mm diam., bright red, surface rough by the often thick pruina, in section with 5–8 µm thick, prosoplectenchymatous upper cortex and 100–200 µm thick, gelatinous main cortex filled with yellow-olive to orange-brown pigment granules. Wall (excipulum) 50–80 µm thick, becoming thicker towards the ostiole, brown-black, carbonized, nucleus 0.5–0.7 mm diam. and 0.4–0.5 mm high. Hamathecium clear. Ascospores 8 per ascus, their wall IKI+ violet, densely muriform with 29–49 transverse septa and 5–9 longitudinal septa per segment, 110–170 × 14–26 µm, surrounded by a 5–10 µm thick gelatinous sheath. Conidia not observed. Chemistry: Thallus UV–, K+ purple, ascomata warts UV–, K+ purple. TLC: Five anthraquinones (xanthorin = lauropurpurone, parietin = physcione, and three other orange anthraquinones, possibly secalonic acid derivates).

[ABL11440], Brazil, Rondônia, Porto Velho, Parque Circuito, 8°43’54” S, 63°54’04” W, c. 100 m, on *Hevea brasiliensis* bark in plantation. Leg. M. Cáceres & A. Aptroot (no 11440), 11.3.2012, det. A. Aptroot 2012.

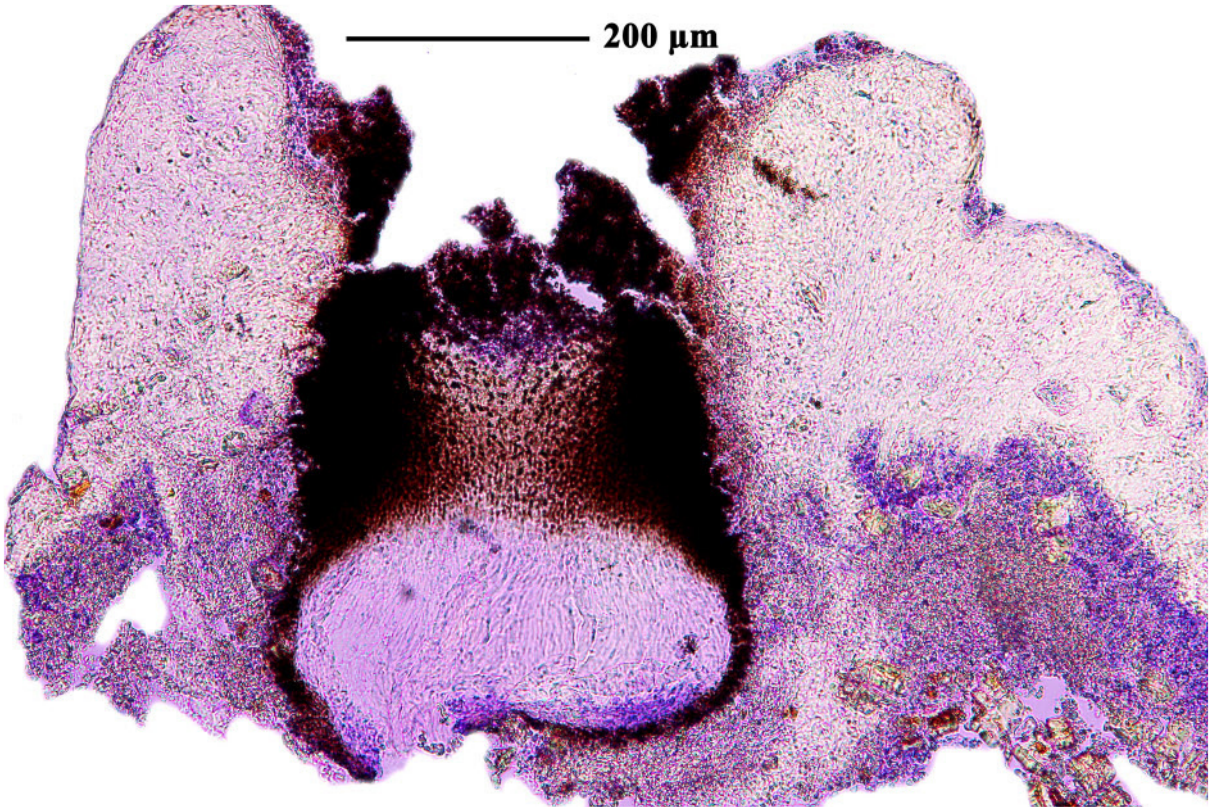


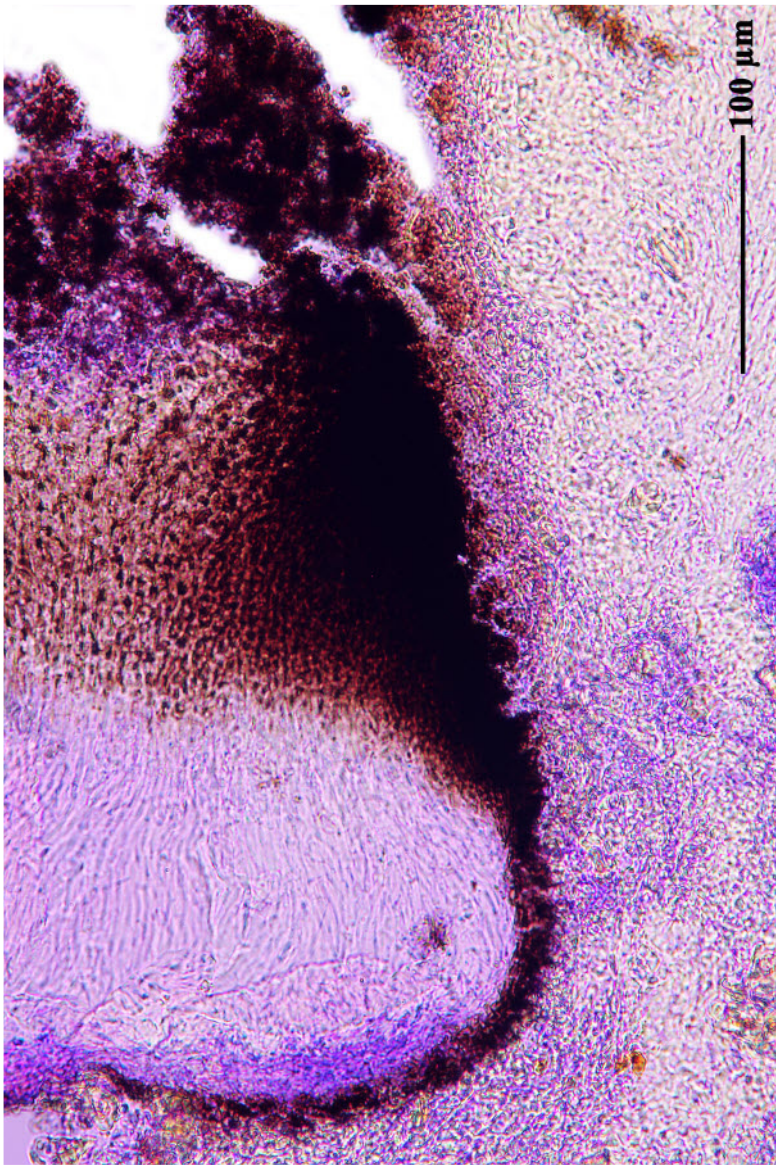
Marcelaria purpurina



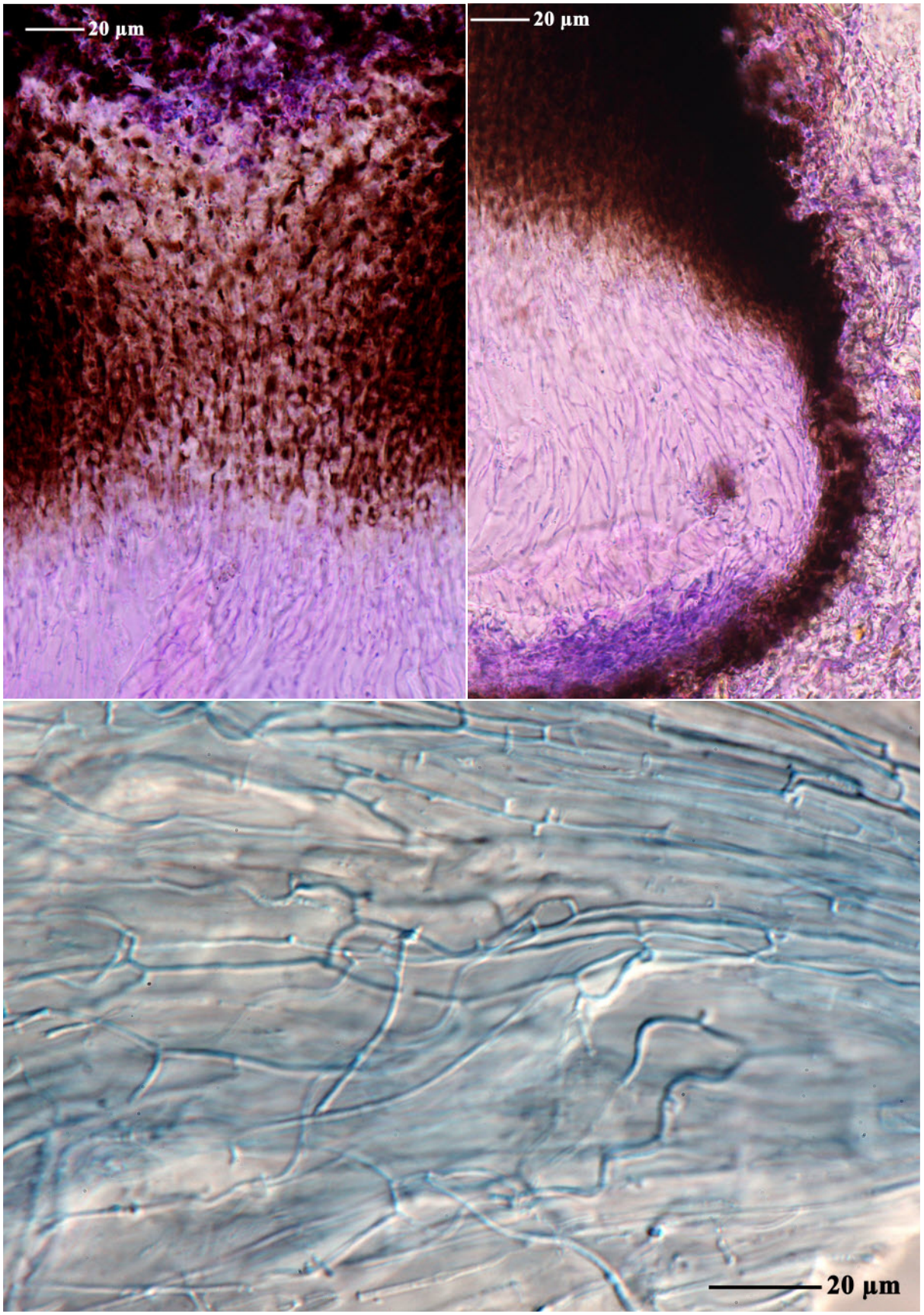


Marcelaria purpurina



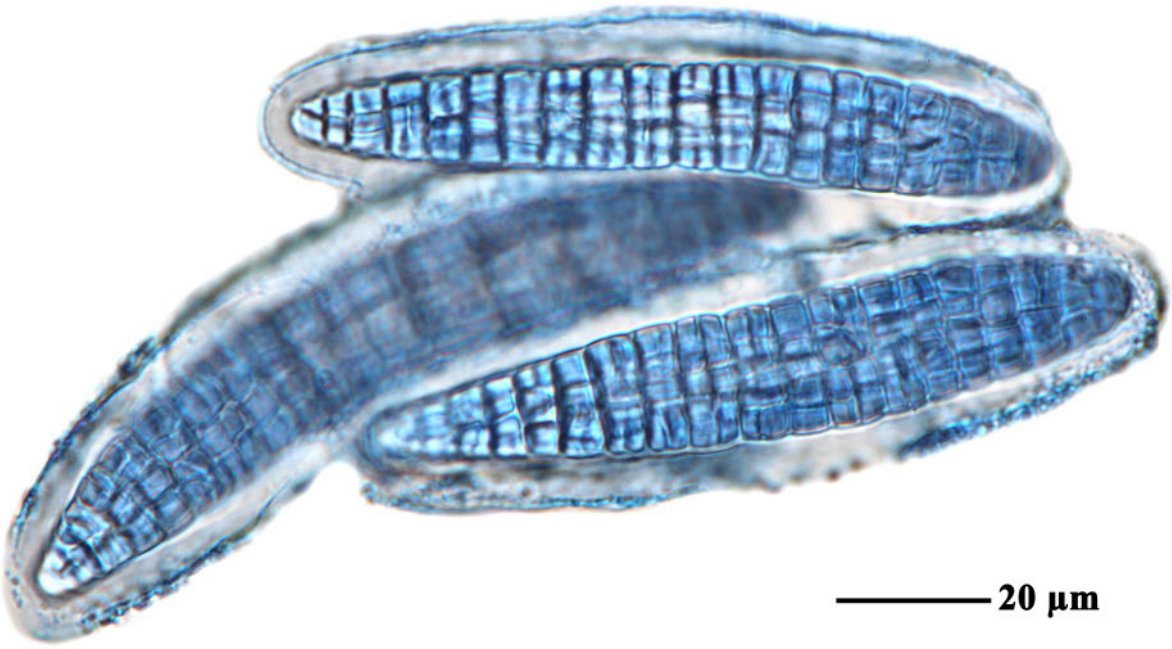


Marcelaria purpurina



Marcelaria purpurina







Marcelaria purpurina

Mazaediothecium album Aptroot, Biblthca Lichenol. 44: 73 (1991)

Thallus yellowish-grey, not blackened around the ascocarps, dull, superficial on the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with *Trentepohlia* algae. Ascocarps black, mazaedioid, without pseudostromatic tissues, without crystals, conical, not distinctly flattened, erumpent from the substratum, extensively covered by the thallus, 0.2–0.4 mm diam, 0.2–0.6 mm high. Ascocarp wall not carbonized, without distinct clypeus, up to 100 µm thick. Ostiole black, obconical, apical, 30–60 µm diam. Hamathecium not inspersed with oil droplets, not gelatinized, IKI negative. Interthecial hyphae true paraphyses, simple, not branched at the tips, 0.7–1.0 µm thick. Periphyses absent. Asci without ocular chamber, 40–50 × 5–8 µm. Ascospores 8 in the ascus, uniseriate, blackish, ellipsoidal with rounded ends, symmetrically septate, cruciately submuriform, not constricted at the septa, 7–10 × 6–7 µm; with 3 distosepta, 1–2 µm thick. Endosporium up to 2 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: thallus UV + yellow, lichexanthone detected with TLC.

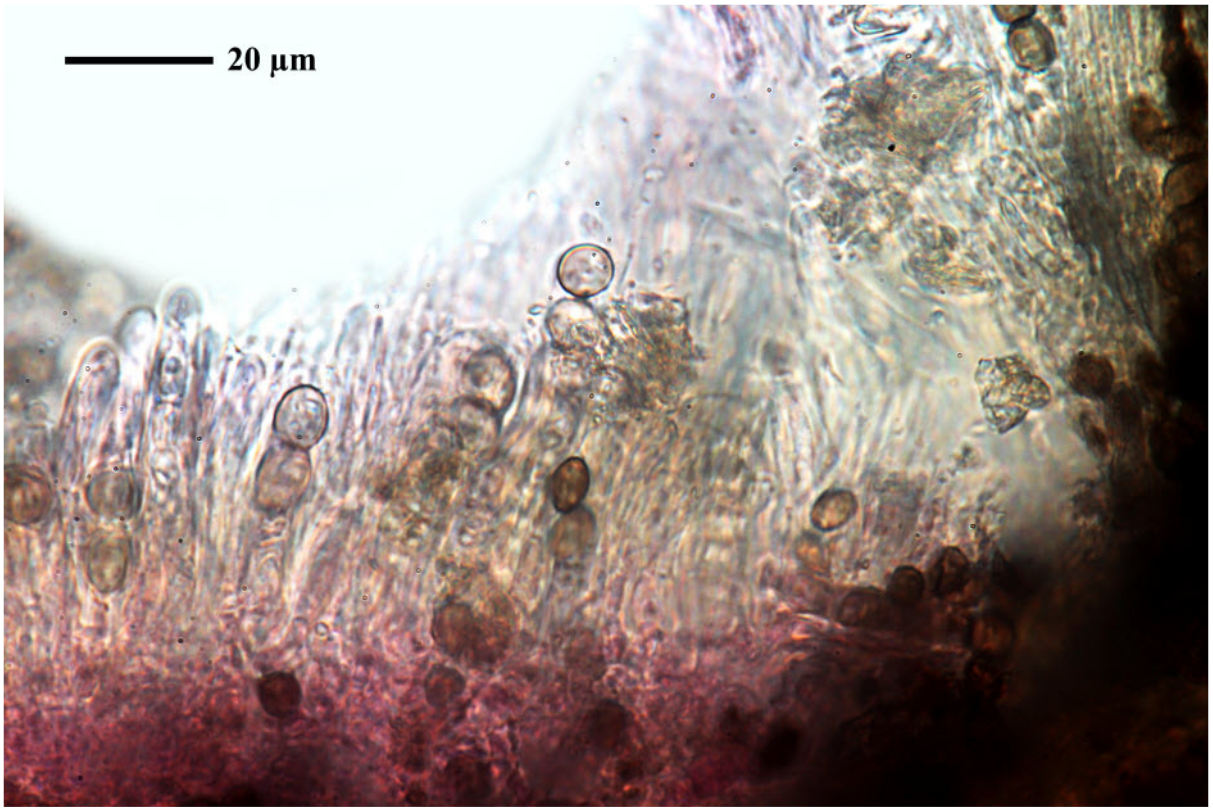
[Sip12246], Costa Rica, prov. Limon, Caribbean coast S of Cahuita, 0 m, on Cocos treetrunks in orchard immediately S of town. Leg. H. Sipman (no 12246), 7.01.1979. ISOTYPE.

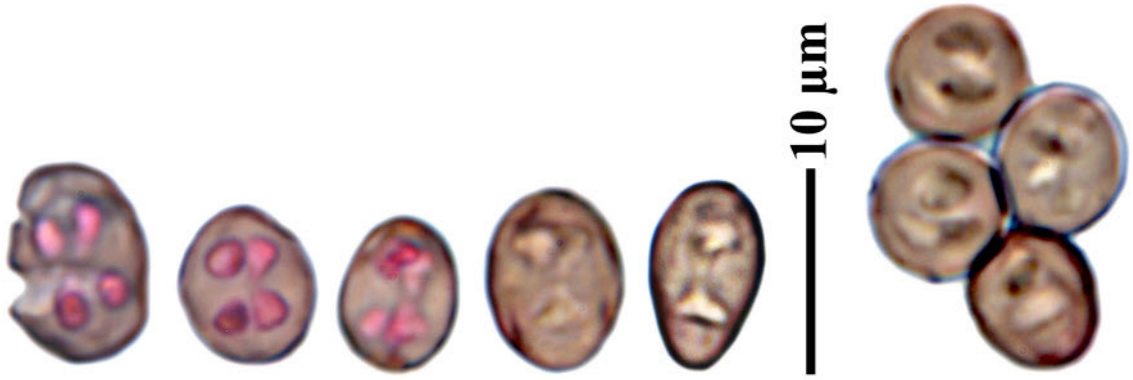






Mazaediothecium album





Mazaediothecium album

Mazaediothecium rubiginosum Aptroot, Biblthca Lichenol. 44: 74 (1991)

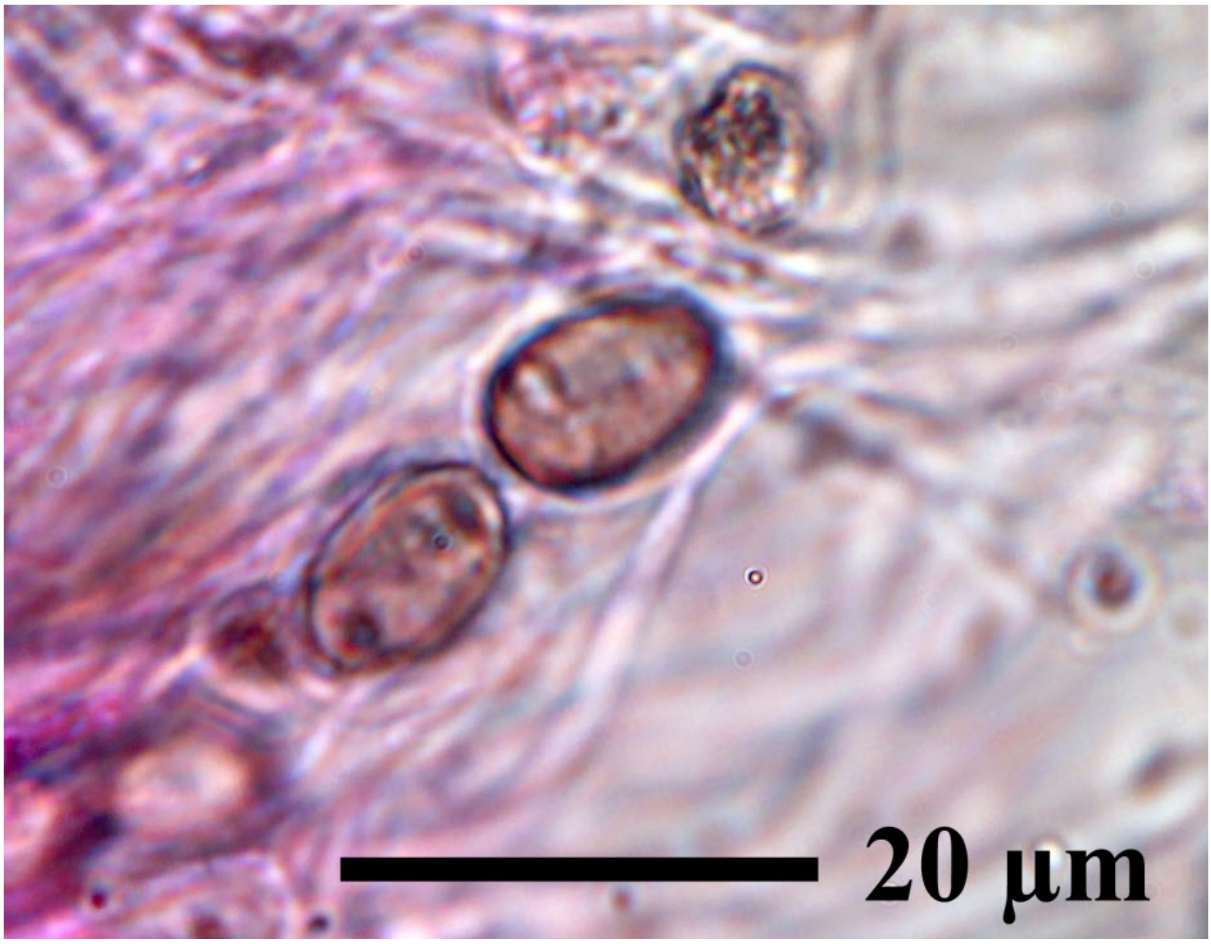
Thallus greenish-grey, not blackened around the ascocarps, smooth, immersed in the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with *Trentepohlia* algae. Ascocarps red, mazaedioid, without pseudostromatic tissues, without crystals, conical, not distinctly flattened, erumpent from the substratum, exposed, 0.3–0.5 mm diam, 0.3–0.6 mm high. Ascocarp wall not carbonized, without distinct clypeus, up to 100 µm thick. Ostiole whitish, obconical, apical, 40–70 µm diam. Hamathecium not inspersed with oil droplets, not gelatinized, IKI negative. Interthecial hyphae true paraphyses, only branched at the tips, 1 µm thick. Periphyses absent. Asci without ocular chamber, 40–60 × 6–10 µm. Ascospores 8 in the ascus, uniseriate, blackish, ellipsoidal with rounded ends, symmetrically septate, submuriform, not constricted at the septa, 6–9 × 4–5 µm; with 3 distosepta, 1 µm thick. Endosporium up to 2 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: no thallus reactions, but ascocarp pigment UV+ red, KOH+ rose, KOH-soluble; a red anthraquinone detected with TLC.

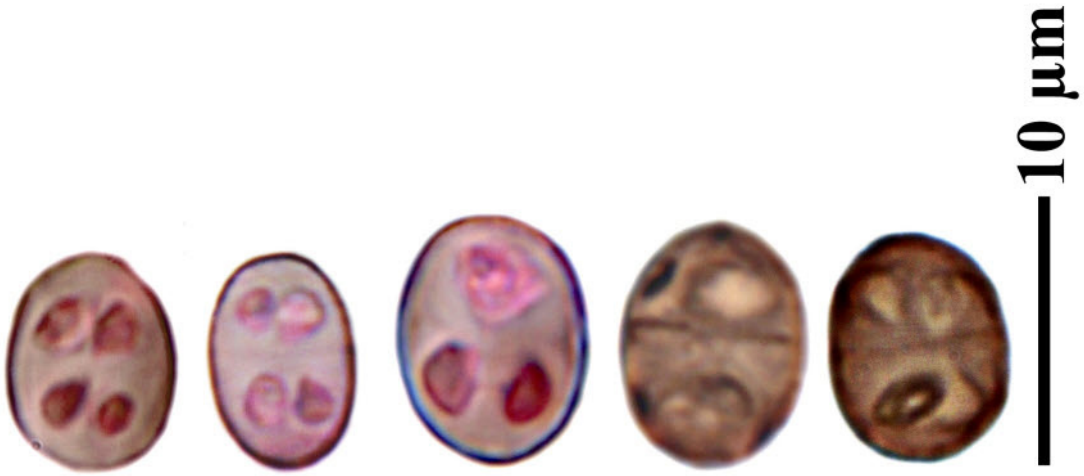
[ABL17464], Papua New Guinea, Madang prov., Wasabamal logging area, 30 km N of Madang, tropical lowland rainforest, 25 m, 145°40’ E, 4°50’ S. Leg. A. Aptroot (no 17464), 021.1987, det. A. Aptroot, 1987. HOLOTYPE.





Mazaediothecium rubiginosum





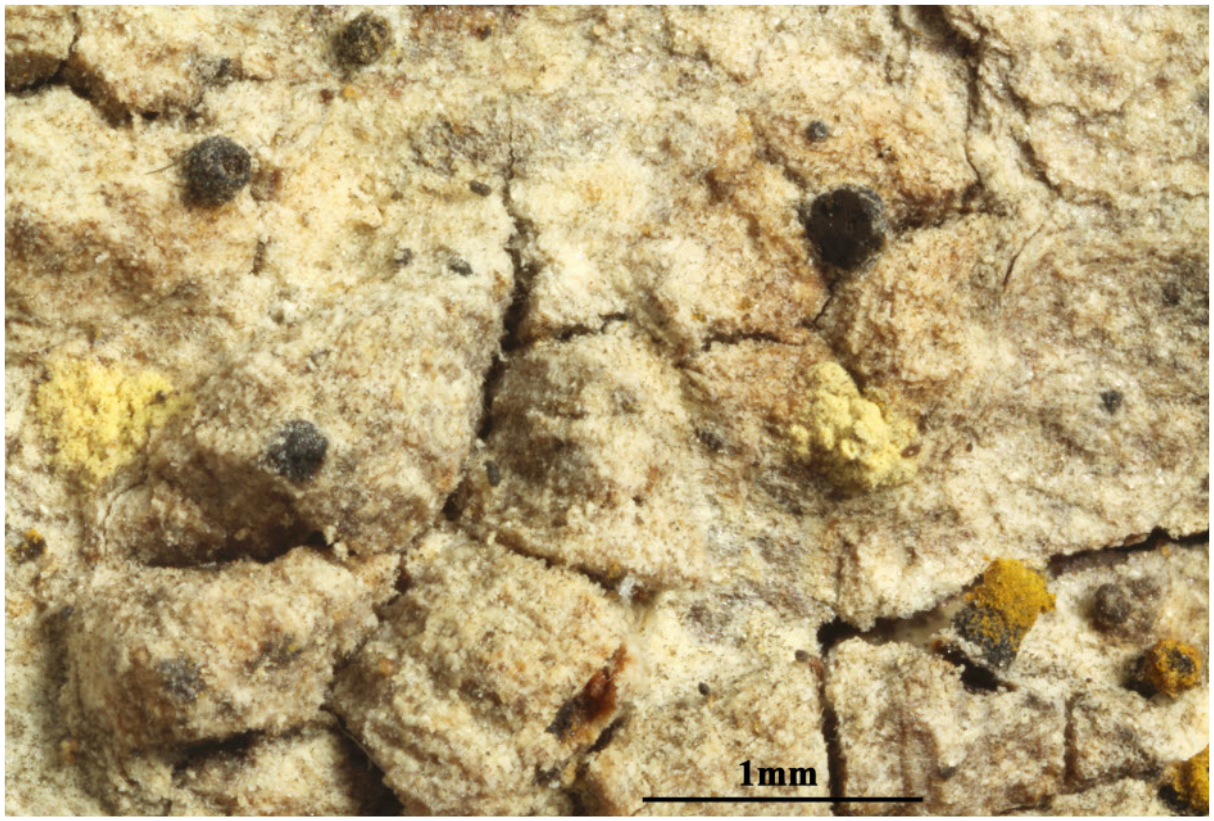
Mazaediothecium rubiginosum

Mazaediothecium uniseptatum Aptroot, in Aptroot, MotaJunior, Santos & Cáceres, Lichenologist 48(2): 136 (2015)

Thallus greyish white, not corticate, dull and almost hyphal, surrounded by a dark brown hyphal prothallus line. Associated algae trentepohlioid. Apothecia numerous, sessile, black, dull, with golden yellow pruina in upper half, c. 0.2 mm diam. and up to 0.6 mm high, cylindrical; margin not clearly visible. Excipulum black. Hamathecium not inspersed with oil droplets, covered by a thick mazaedium layer. Hamathecium filaments simple. Asci soon disintegrating (no mature intact asci observed); immature asci clavate-cylindrical, up to c. 60 × 8 µm. Ascospores pale grey, ellipsoid to broadly fusiform, 1-septate, distoseptate, a thin median euseptum also sometimes present, 7.0–12.0 × 5.0–7.5 µm, lumina angular, 1.5–2.0 µm diam. Pycnidia unknown. Chemistry. Pruina on apothecium a K+ violet anthraquinone.

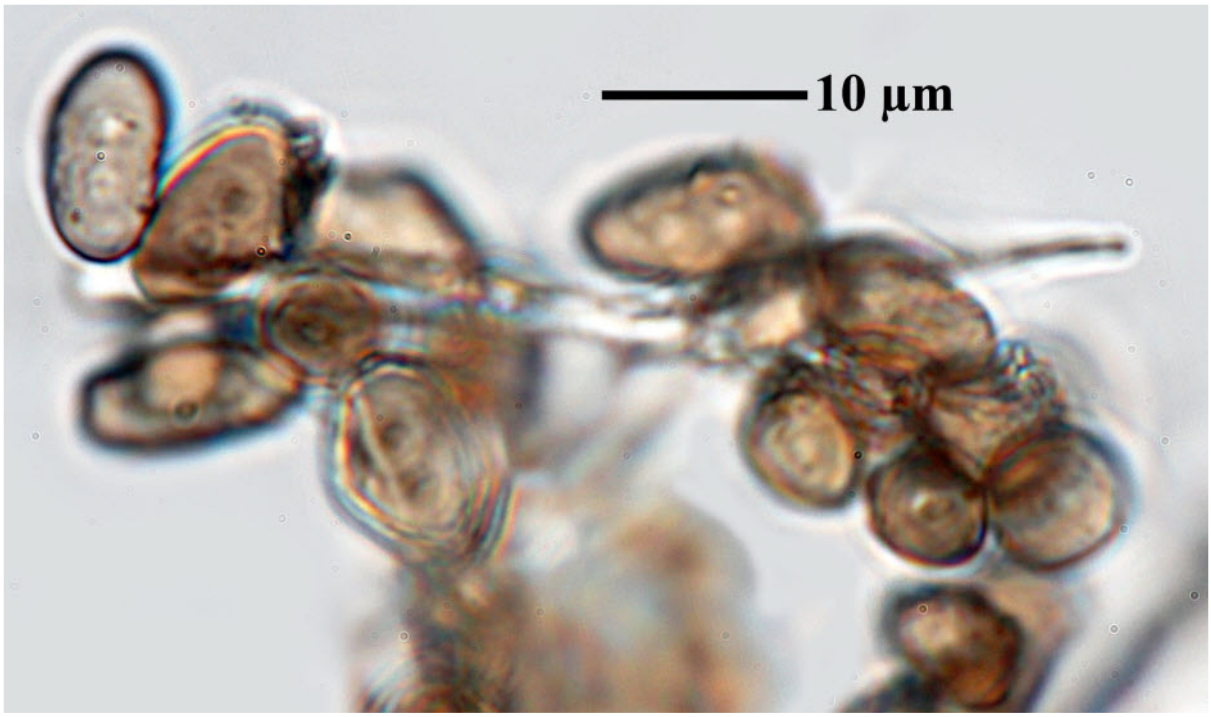
[Montfort383], French Guiana, Saül, 2 km SW of the village, „sentier limonade“, on higher trunk of *Protium* sp. in mixed forest on lateritic soil, c. 200 m, 3°32’ N, 53°12’ W, Leg. D. Montfoort (nr. 383) & R.C. Ek, 24.11.1986, det. A. Aptroot, 1990. ISOTYPE.

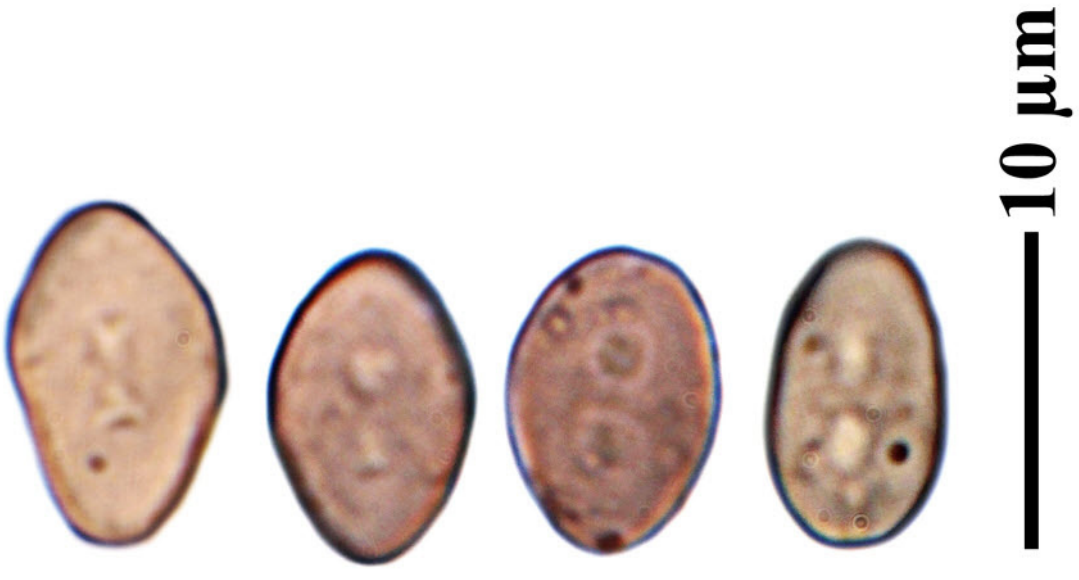






Mazaediothecium uniseptatum





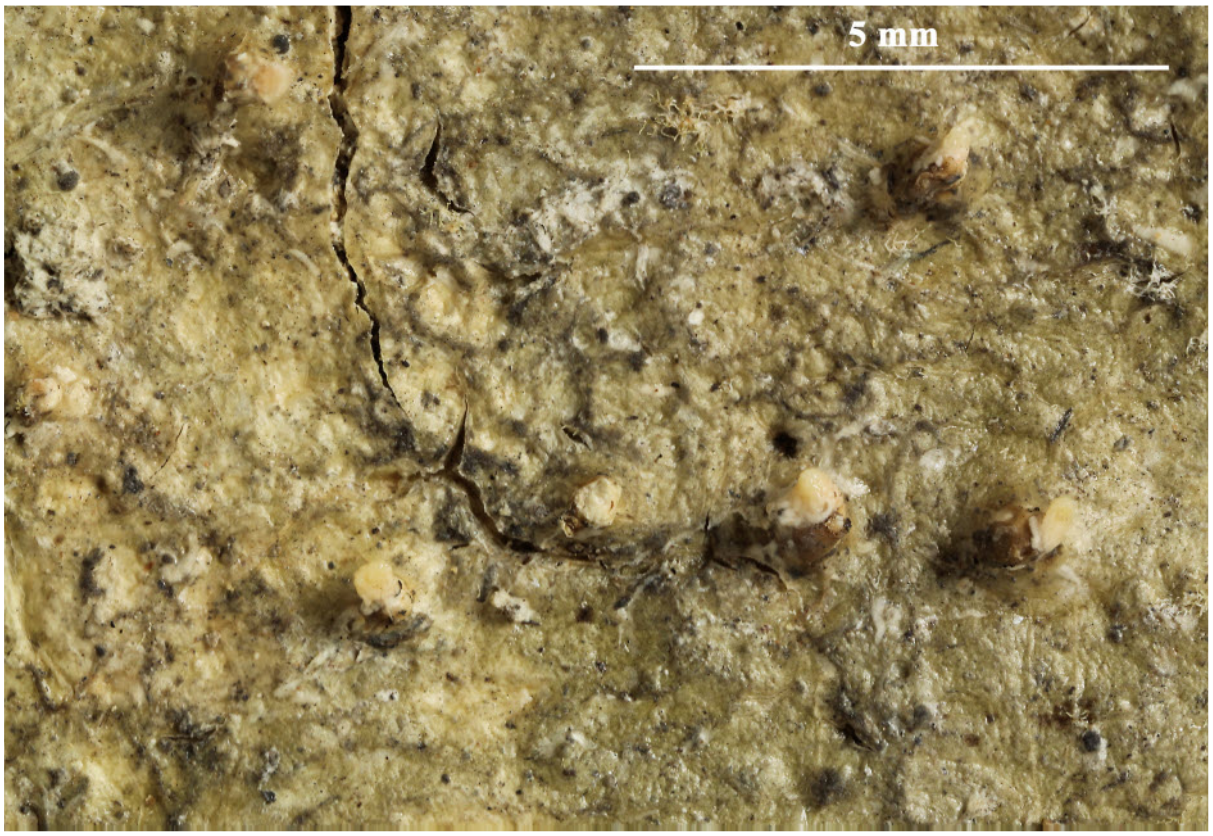
Mazaediothecium uniseptatum

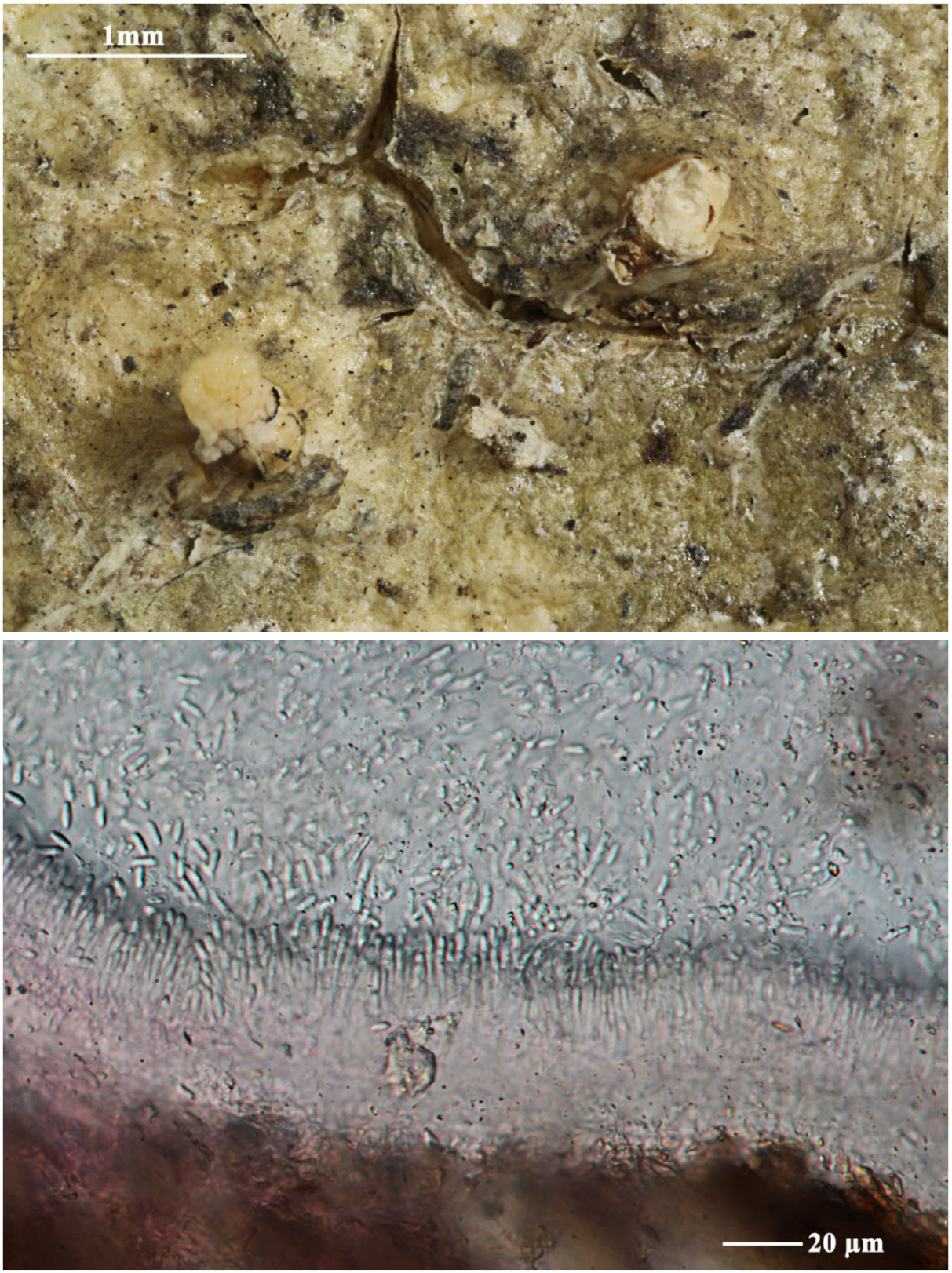
Megalotremis flavovulcana (Komposch) Aptroot [as 'flavovulcanus'], in Aptroot, Lücking, Sipman, Umaña & Chaves, Biblthca Lichenol. 97: 69 (2008)

= *Anisomeridium flavovulcanum,* Komposch [as 'flavovulcanus'], Lichenologist 37(6): 520 (2005)

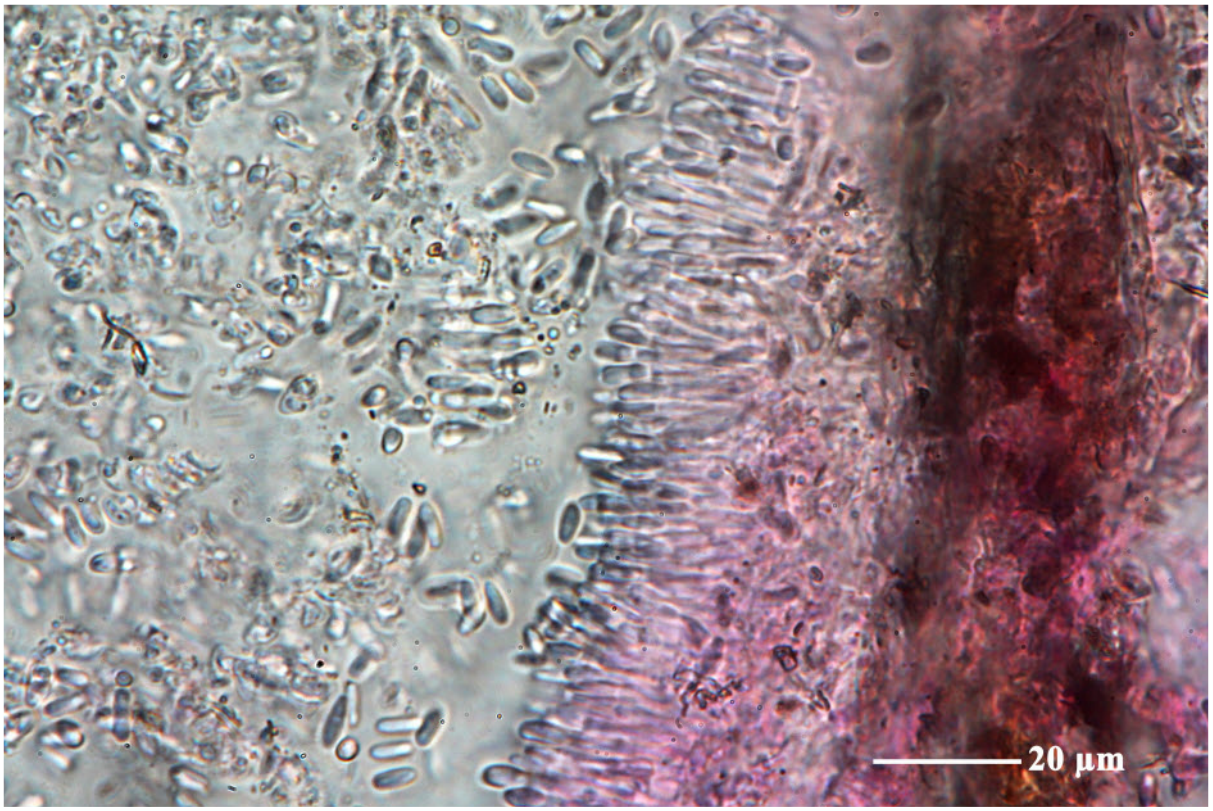
Thallus greenish grey, corticate, smooth, superficial on the substratum, continuous. UV-. Perithecia solitary or in groups, black, globose, superficial on the substratum, immersed in conical thallus warts, 0.5–0.9 mm diam. Perithecial wall up to 100 µm thick. Ostiole black, obconical, apical. Hamathecium hyaline, not inspersed, IKI-, filaments profusely anastomosing. Asci with sagittiform ocular chamber, 250–350 × 25–30 µm. Ascospores 8/ascus, mostly uniseriate, ellipsoid with rounded ends, 1-septate, constricted at the septa, 35–55 × 15–23 µm, endospore thickenings 1–2 µm wide, wall 1–2 µm thick. Conidiomata immersed pycnidia, often aggregated with joined ostioles within conical thallus warts. Conidia of two types, extruding in yellow mass, microconidia ellipsoid, 1-septate, 5–7 × 2.5–4 µm, macroconidia globose, 10–15 µm diam.

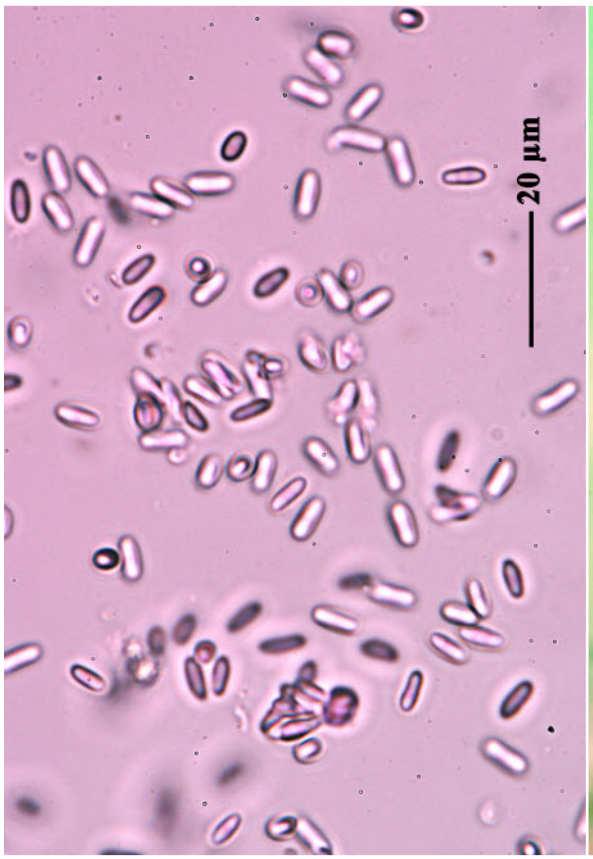
[ABL21793], Brazil, Sergipe, Parque Nacional Serra de Itabaiana, S slope, 400 m, 10°44’35” S, 37°20’25” W. Leg. M. Cáceres & A. Aptroot (no 21793), 10.05.2014, det. A. Aptroot, 2014.





Megalotremis flavovulcana





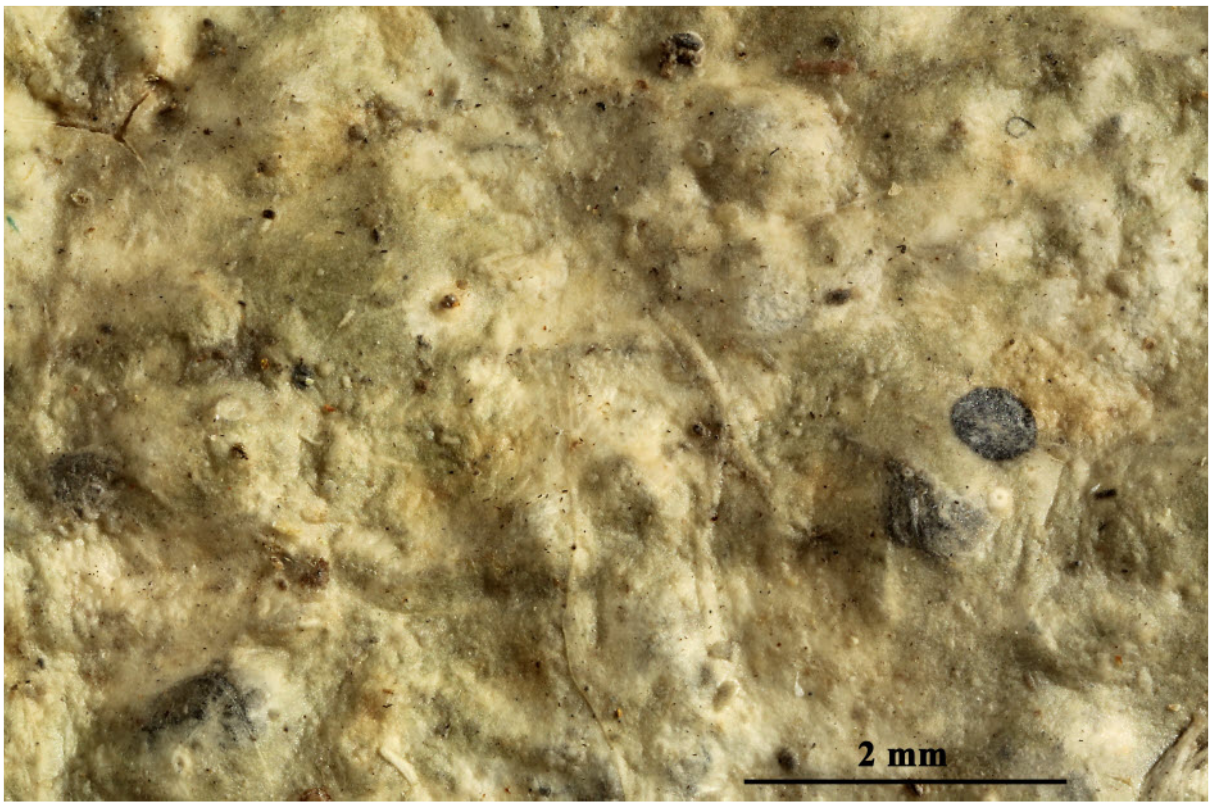


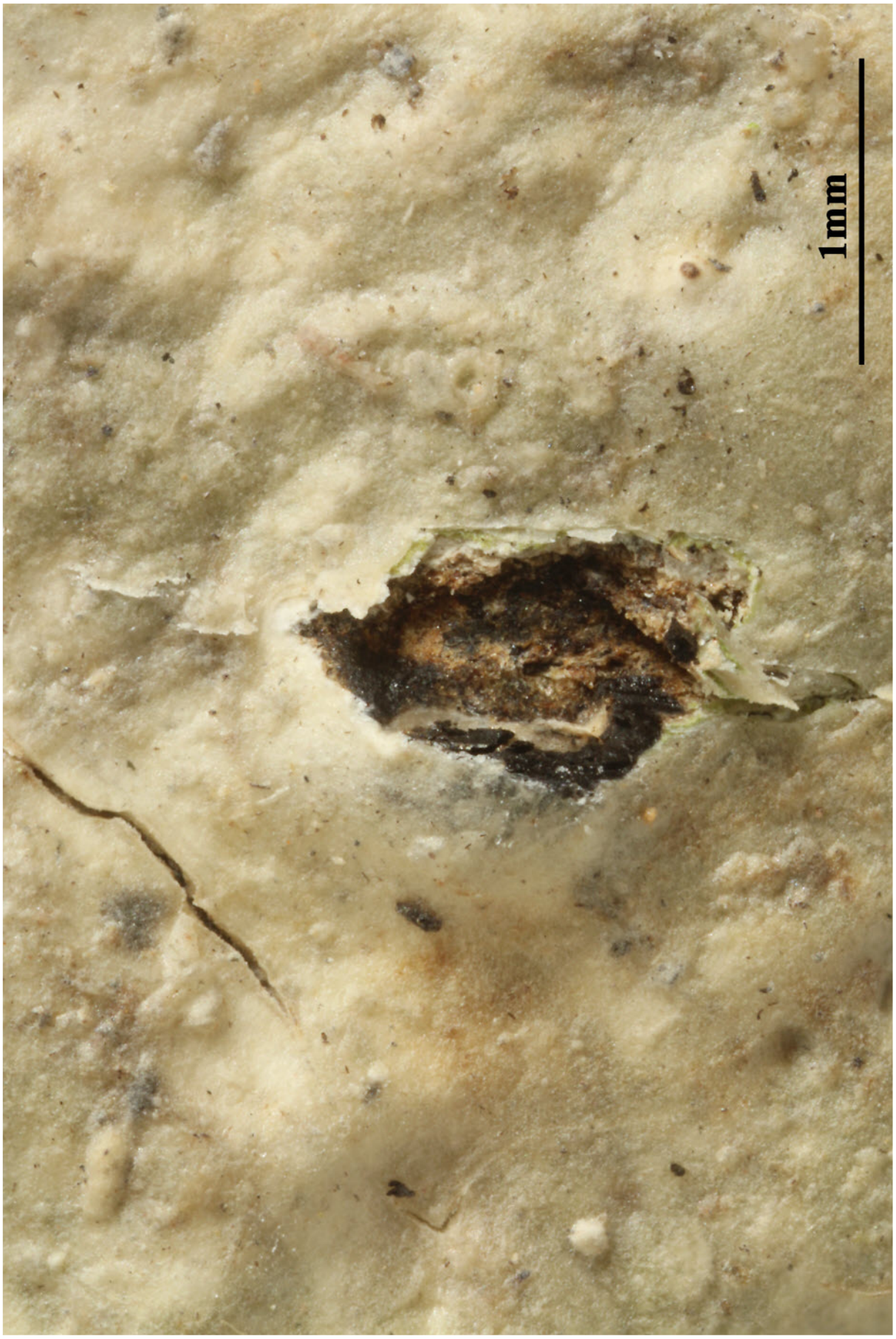
Megalotremis flavovulcana

Megalotremis nemorosa (R.C. Harris) Aptroot, in Aptroot, Lücking, Sipman, Umaña & Chaves, Biblthca Lichenol. 97: 71 (2008)
= *Anisomeridium nemorosum* R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 148 (1995)

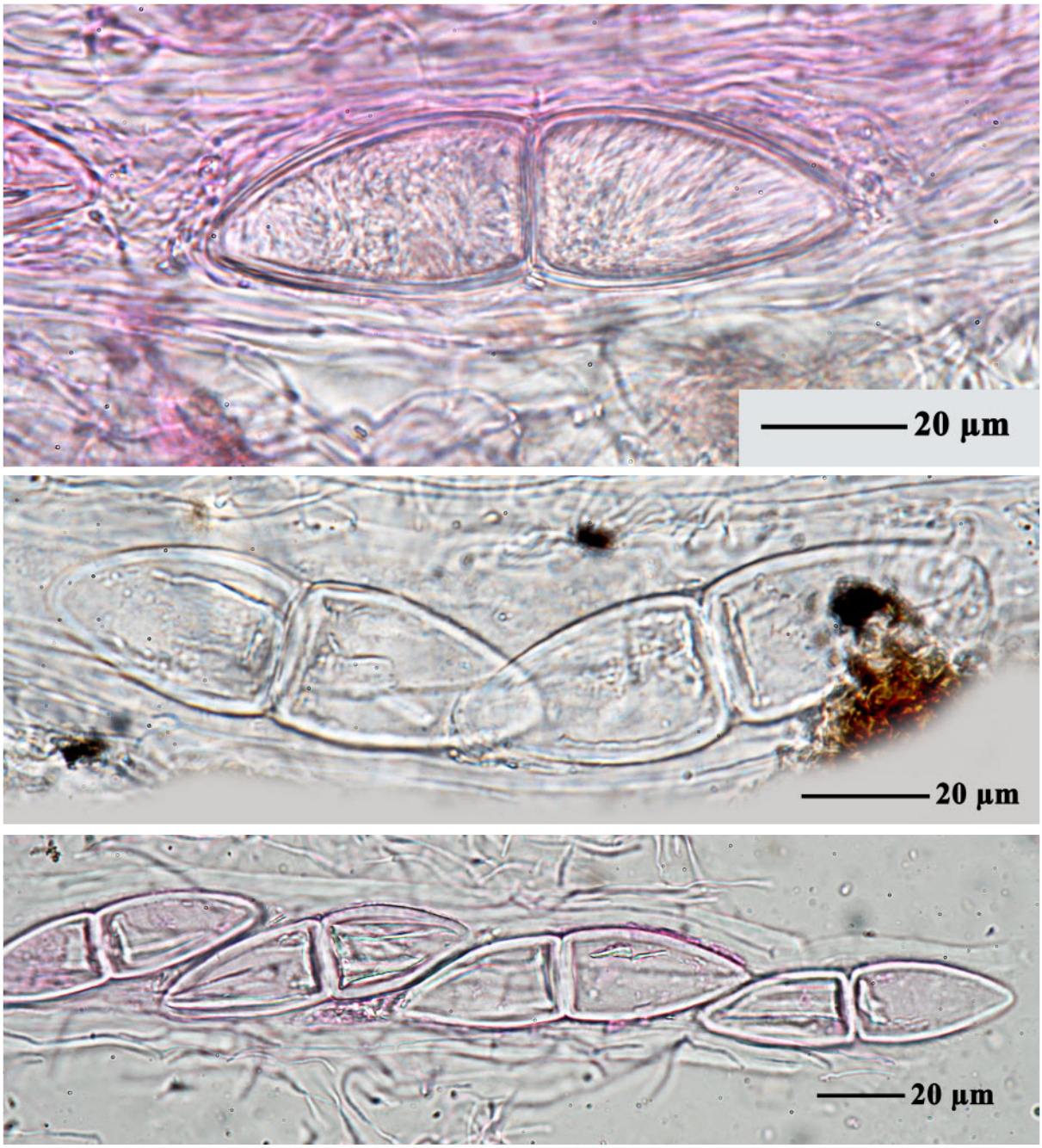
Thallus greenish grey, corticate, smooth, superficial on the substratum, continuous, UV-. Perithecia solitary, black, globose, immersed in the thallus, 0.5–0.7 mm diam. Ostiole pale, obconical, eccentric. Hamathecium hyaline, not inspersed, IKI-, filaments profusely anastomosing. Asci without ocular chambre. Ascospores 8/ascus, uniseriate, fusiform with rounded ends, 1-septate, constricted at the septum, 80–120 × 22–28 µm, septum median, wall 1–2 µm thick. Conidiomata not observed.

[ABL27433], Brazil, Amapá, Floresta Nacional do Amapá, up stream of the station. On tree bark in primary forest. 0°58' N, 51°36' W, 30 m. Leg. M. Cáceres & A. Aptroot (no 27433), 20.08.2015, det. A. Aptroot,





Megalotremis nemorosa



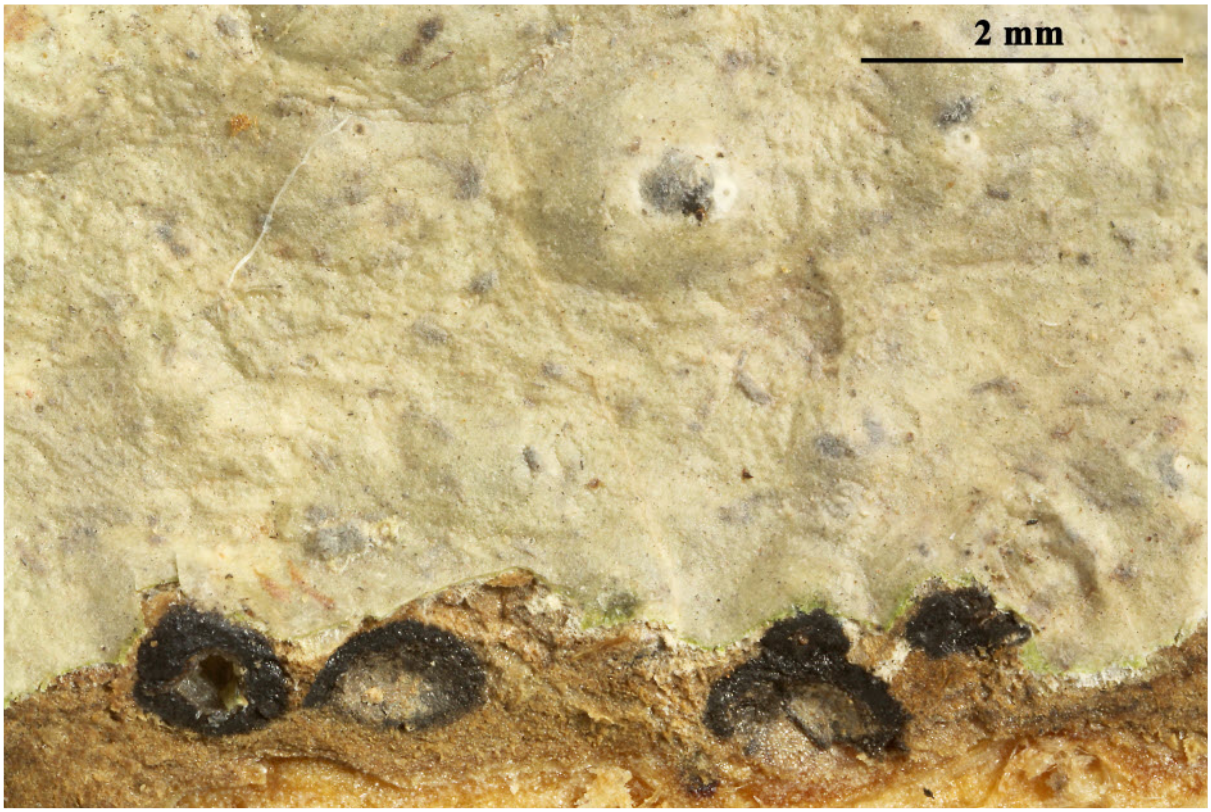
Megalotremis nemorosa

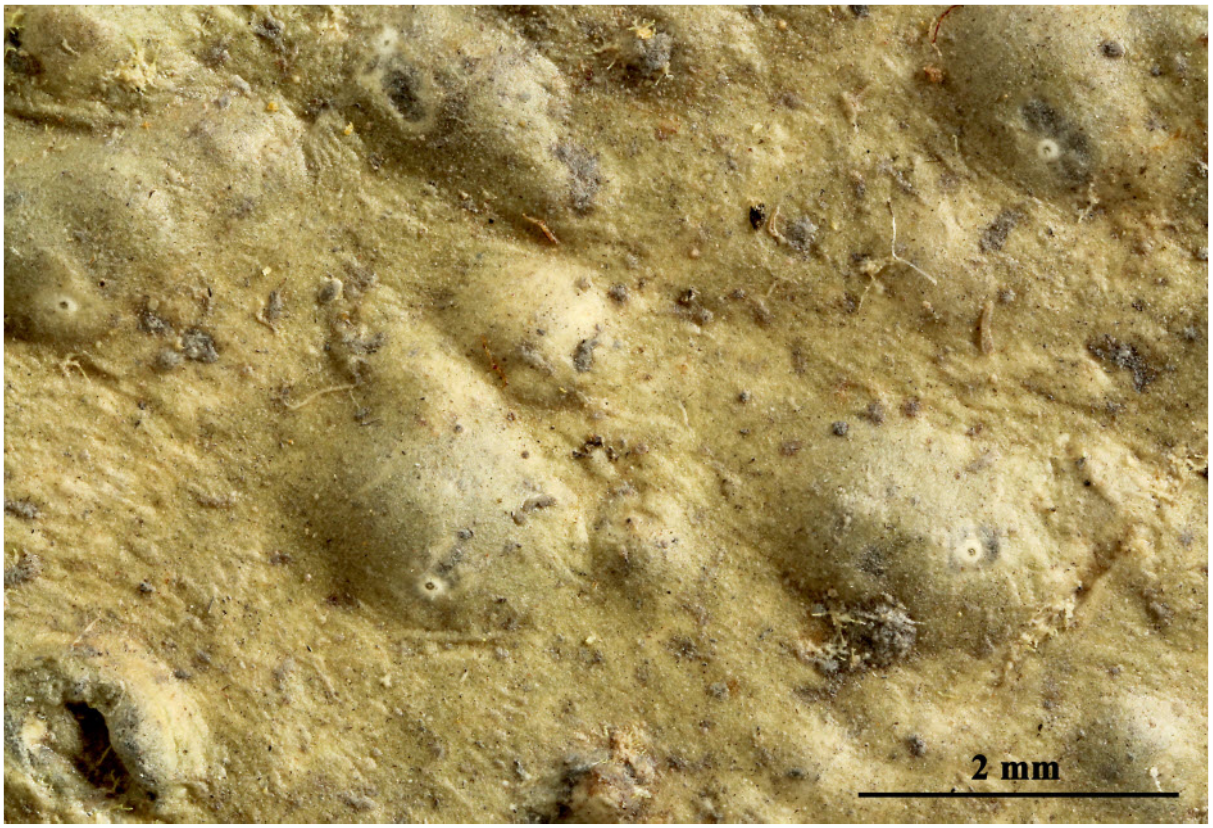
Megalotremis nemorosa (R.C. Harris) Aptroot, in Aptroot, Lücking, Sipman, Umaña & Chaves, Biblthca Lichenol. 97: 71 (2008)

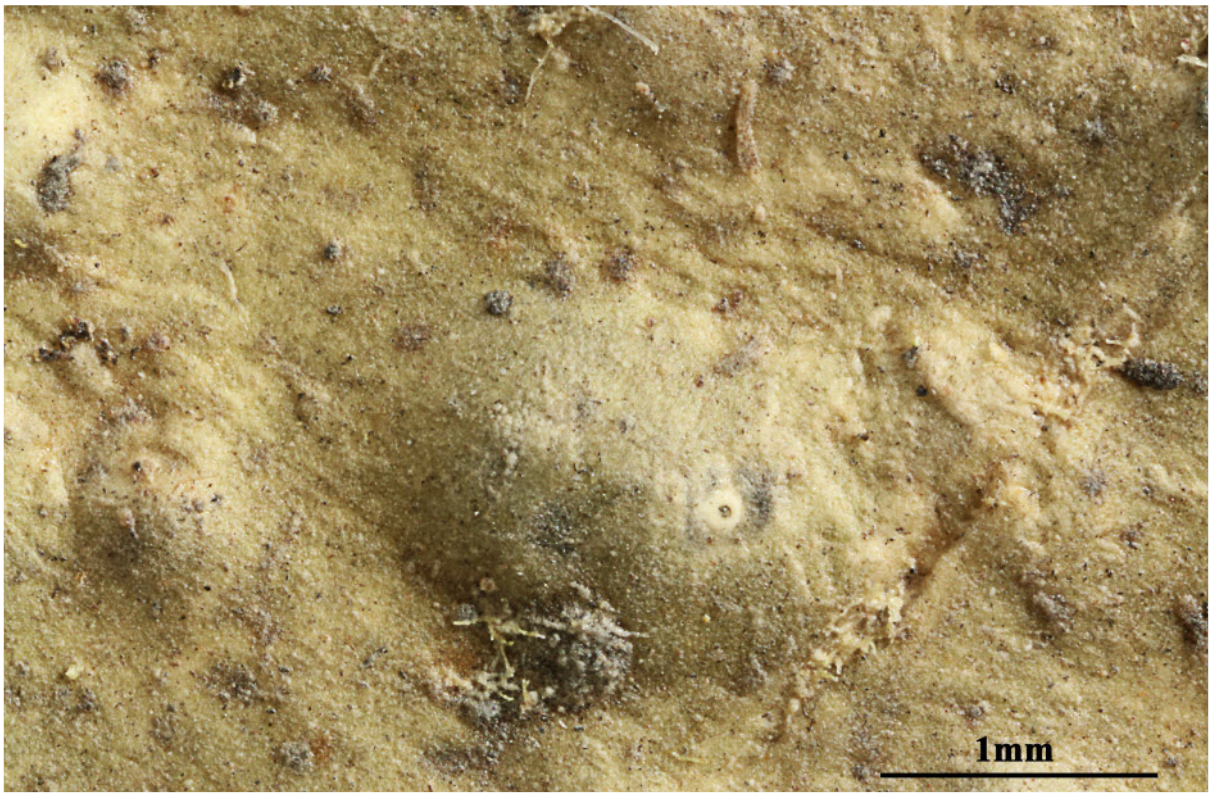
= *Anisomeridium nemorosum* R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 148 (1995)

Thallus greenish grey, corticate, smooth, superficial on the substratum, continuous, UV-. Perithecia solitary, black, globose, immersed in the thallus, 0.5–0.7 mm diam. Ostiole pale, obconical, ecentric. Hamathecium hyaline, not inspersed, IKI-, filaments profusely anastomosing. Asci without ocular cchambre. Ascospores 8/ascus, uniseriate, fusiform with rounded ends, 1-septate, constricted at the septum, 80–120 × 22–28 µm, septum median, wall 1–2 µm thick. Conidiomata not observed.

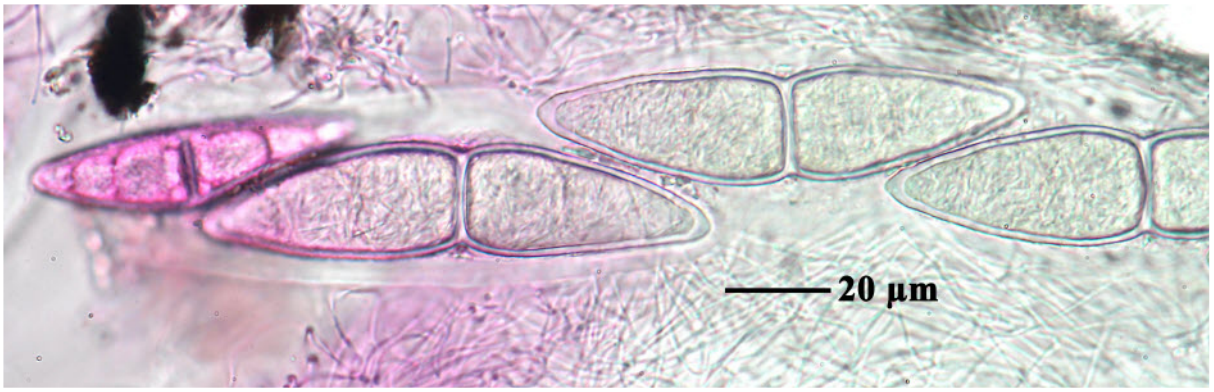
[ABL27553], Brazil, Amapá, Mazagão, Reserva extrativista Moracá, along BR 156. 0°02' S, 51°45' W, 30 m. Leg. M. Cáceres & A. Aptroot (no 27553), 21.08.2015, det. A. Aptroot 2015.







Megalotremis nemorosa









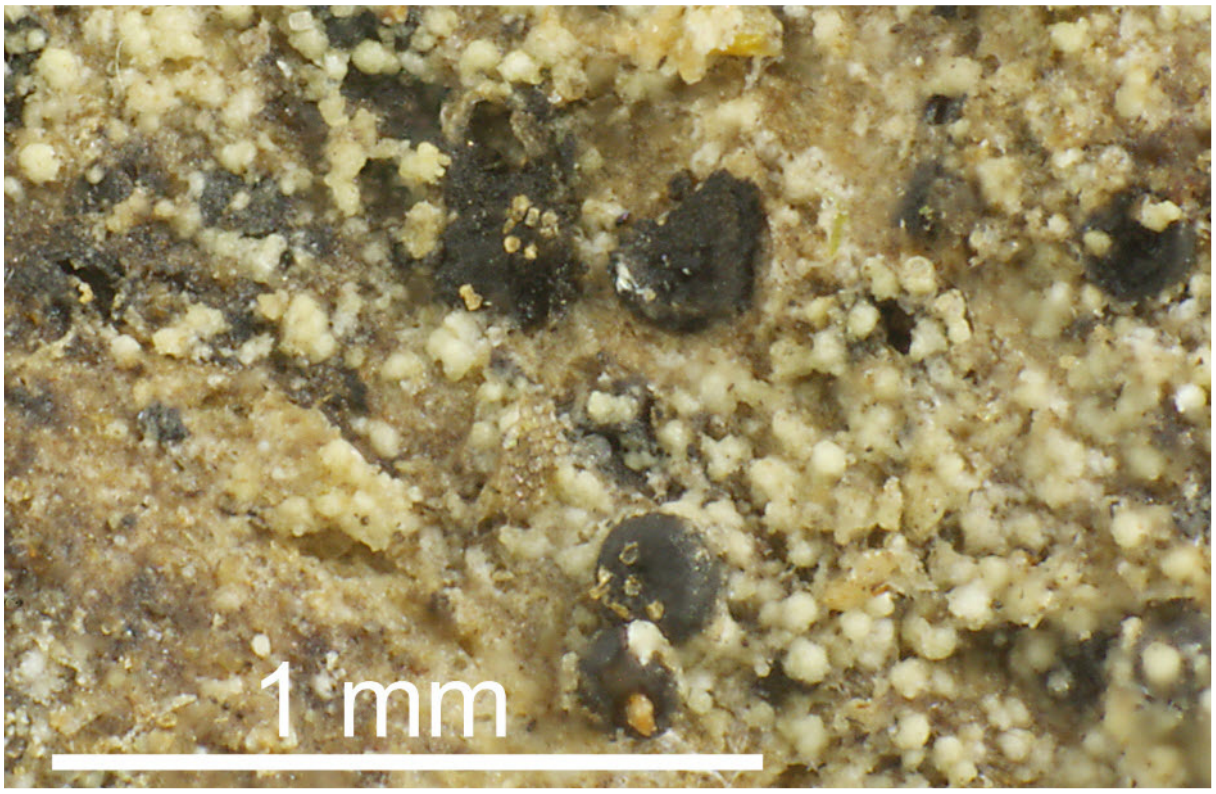


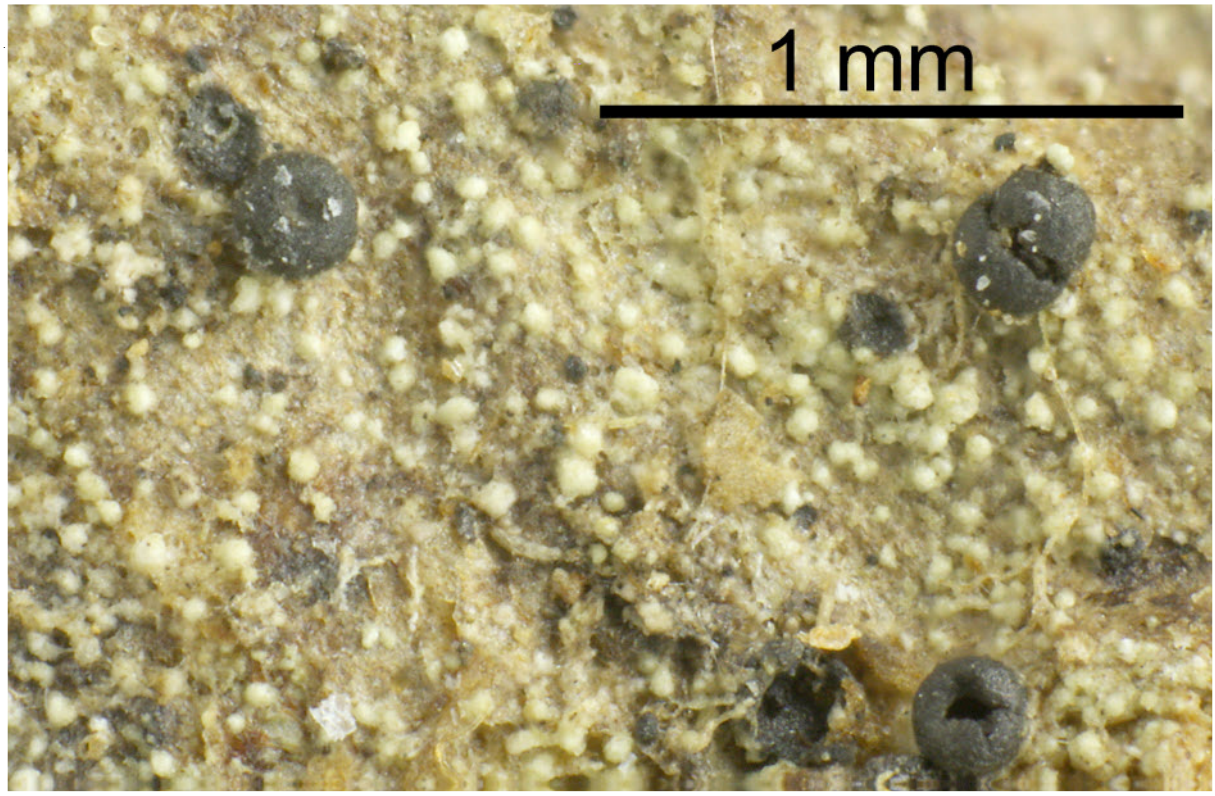
Megalotremis nemoro-

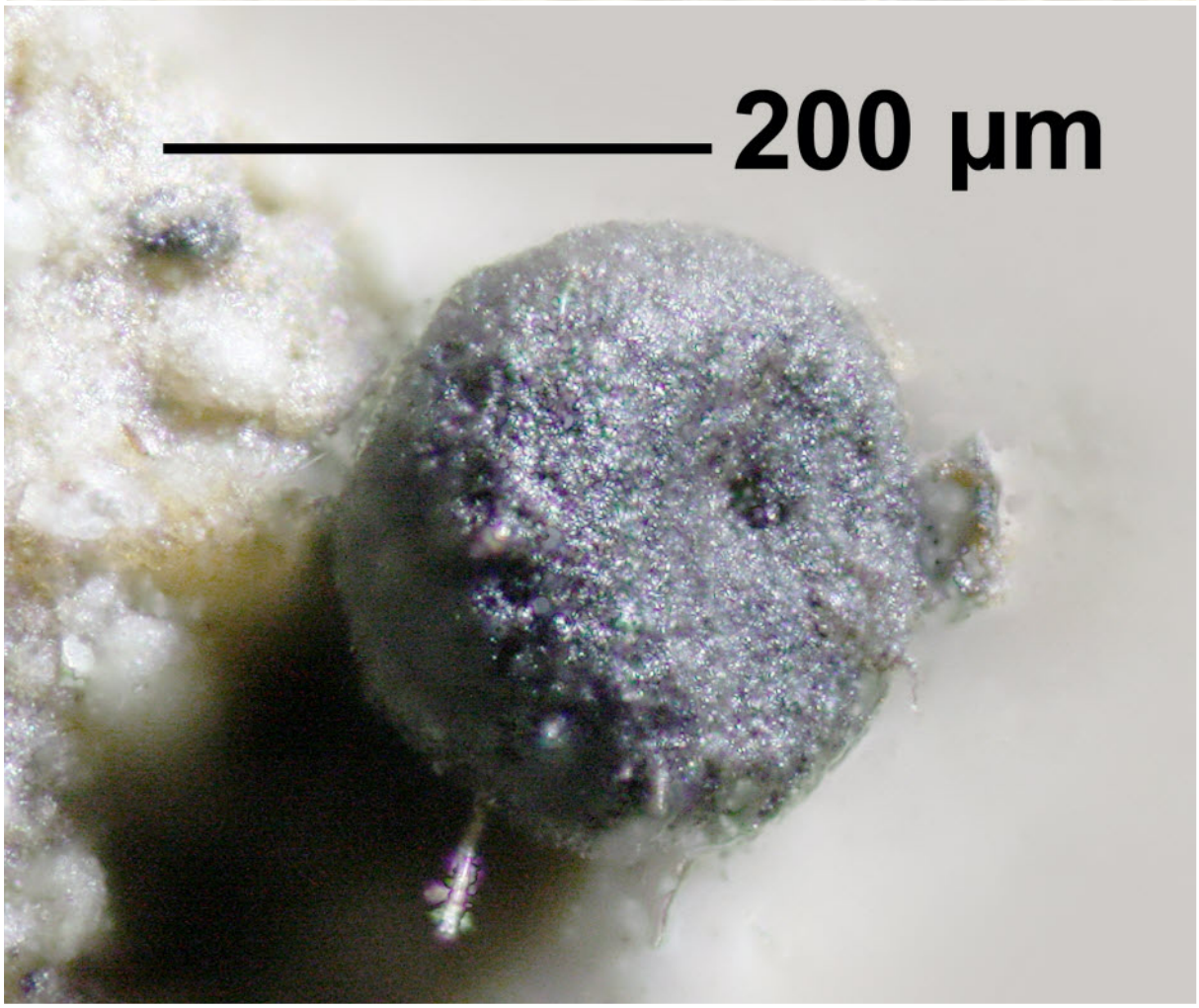
Melanophloea pacifica P. James & Vězda, Lichenologist 5(1-2): 90 (1971)

Thallus smooth, dispersed, whitish to green 0.04–0.09 mm granules. Algae chlorococcoid, globose, 4.8–6.5 µm diam, 1 paritale chloroplast. Ascomata pyrenocarpous, black, constricted at the base, 0.15–0.2 mm diam., nearly globose but flattened at the top with preformed somewhat depressed ostiole. Exciple closed, brown to black, 33–44 µm diam., in the upper part full with crystals (polarized light!). Inside a stratum, hyline, small cellular, 26 µm diam. before the filaments. Periphyses absent. Filaments c. 0.83 µm thick, strongly branched with many anastomoses., without discernible septa, tips unchanged, not forming an epithecium but ending in the ostiole. Asci uniformly thick-walled with wall c. 2 µm wide, at the tip the wall c. 3 µm, tip when young with flat and wide ocular chamber, bitunicate, in J+ faint bluish. Ascospores hyaline, globose, 2.7–3 µm, >500/ascus.

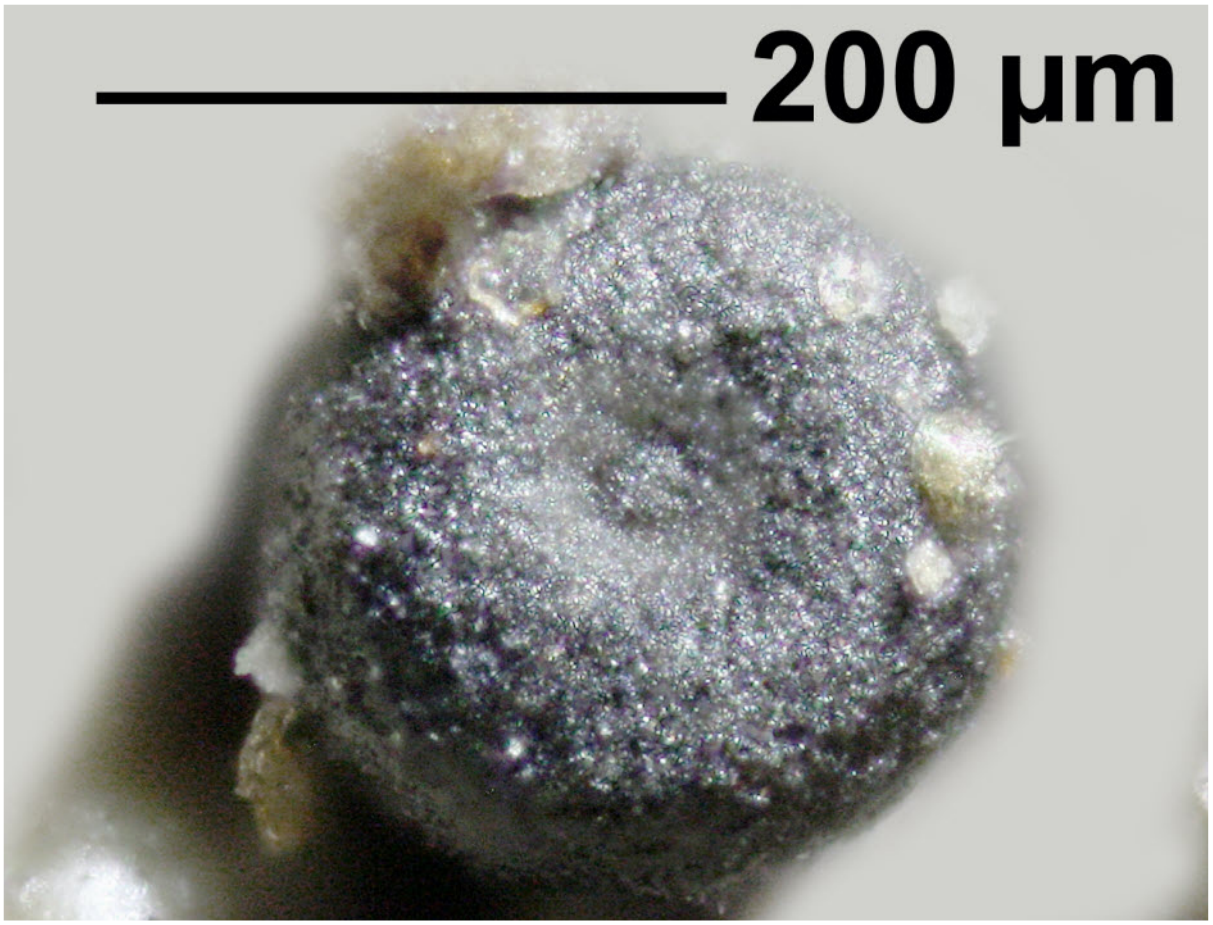
[ABL36520], Papua New Guinea, Madang Province, foothills of Finisterre range, 40.8 km along road Madang-Lae. 5°26’ S, 145°34’ E, 200 m, primary forest. Leg. A. Aptroot (no 36520), 2. Nov. 1995, det. A. Aptroot 1996.

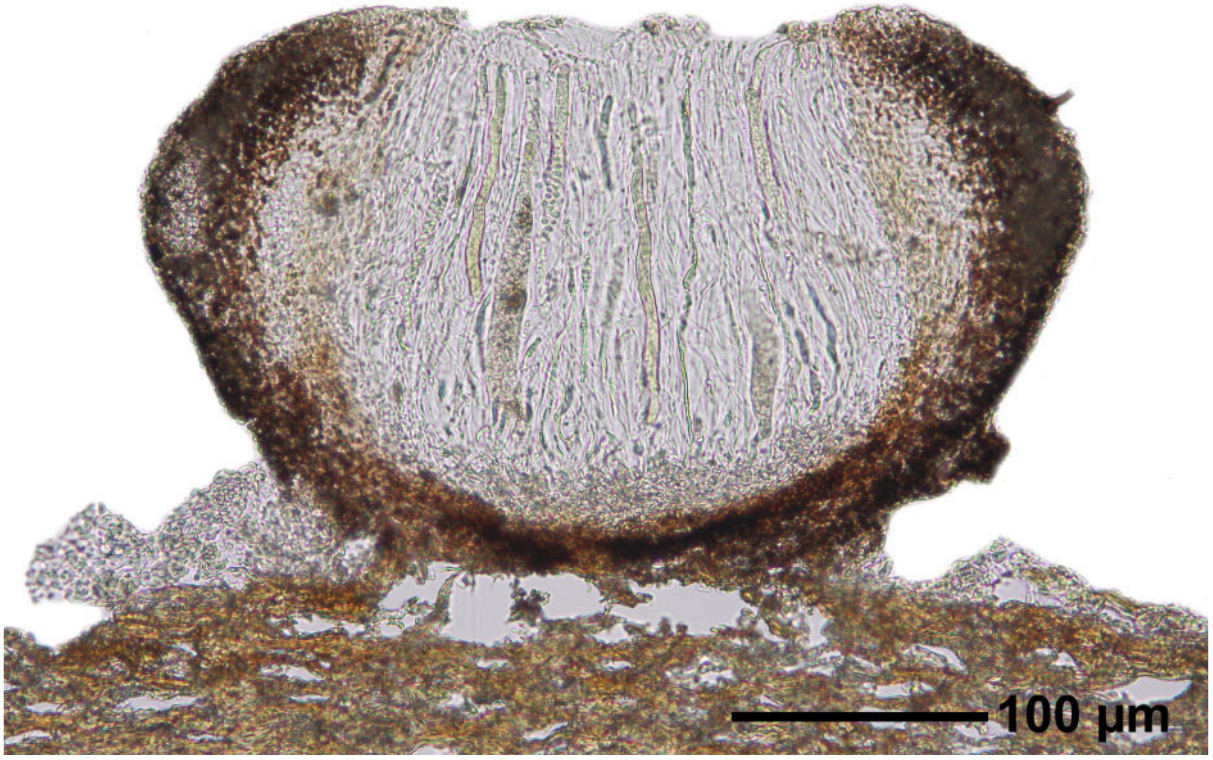




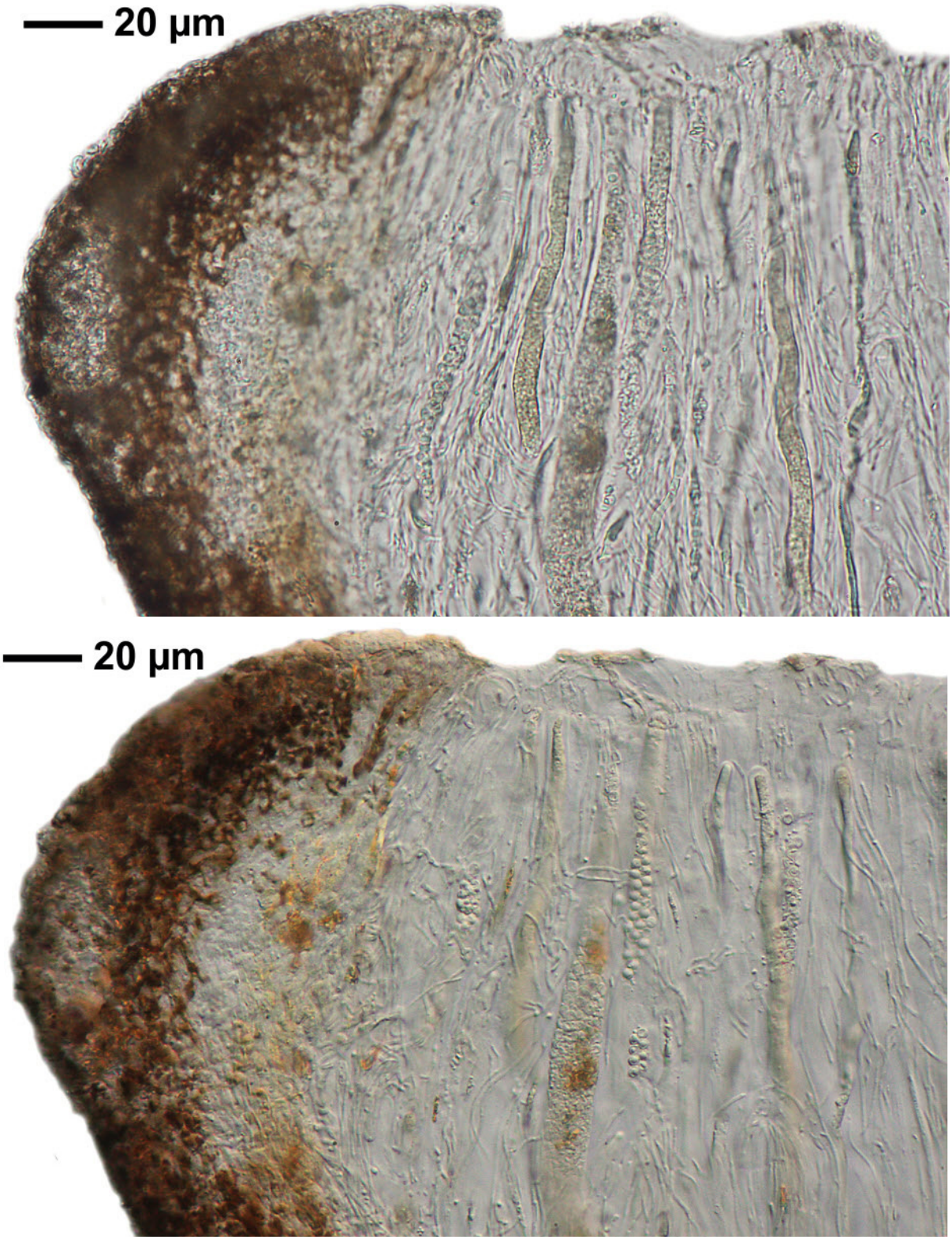


Melanophloea pacifica

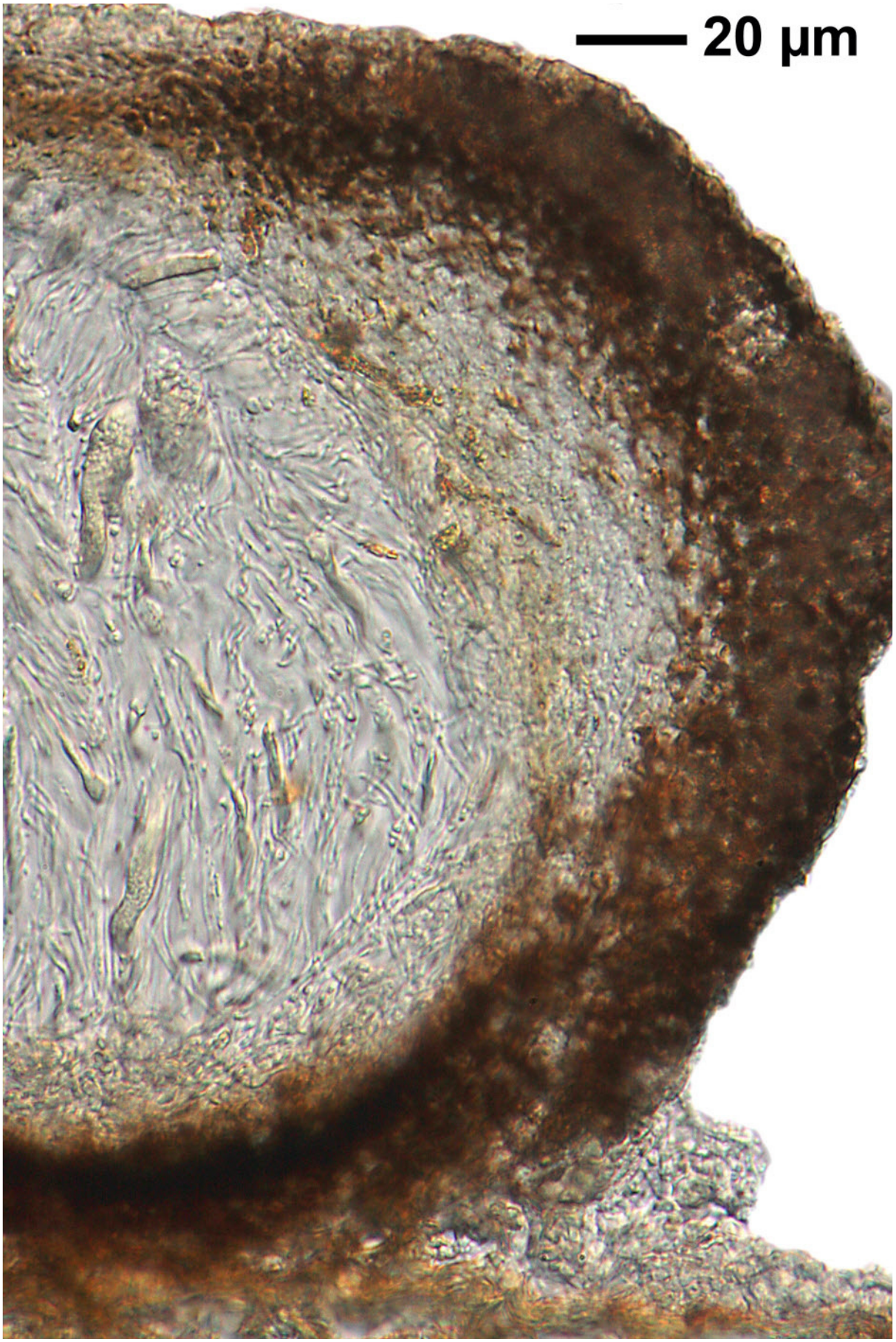




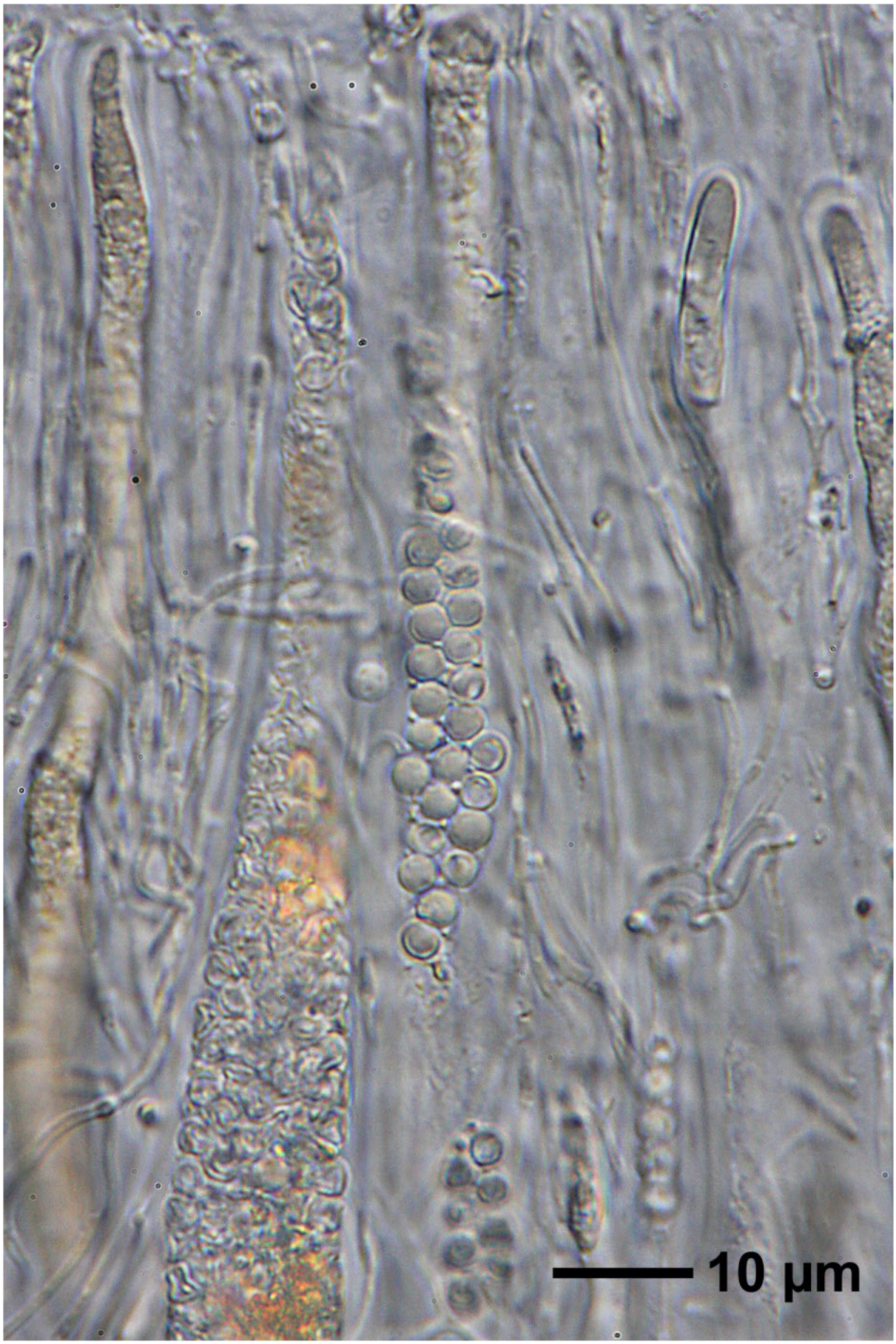
Melanophloea pacifica



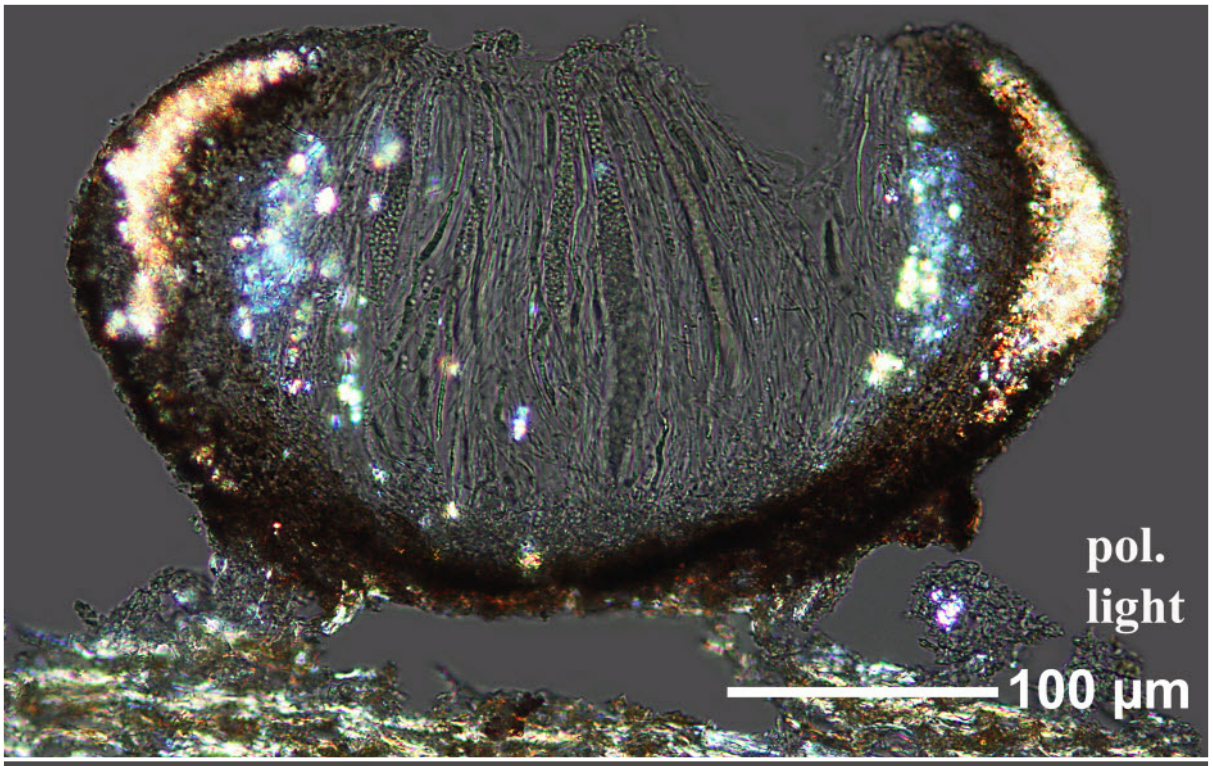
Melanophloea pacifica

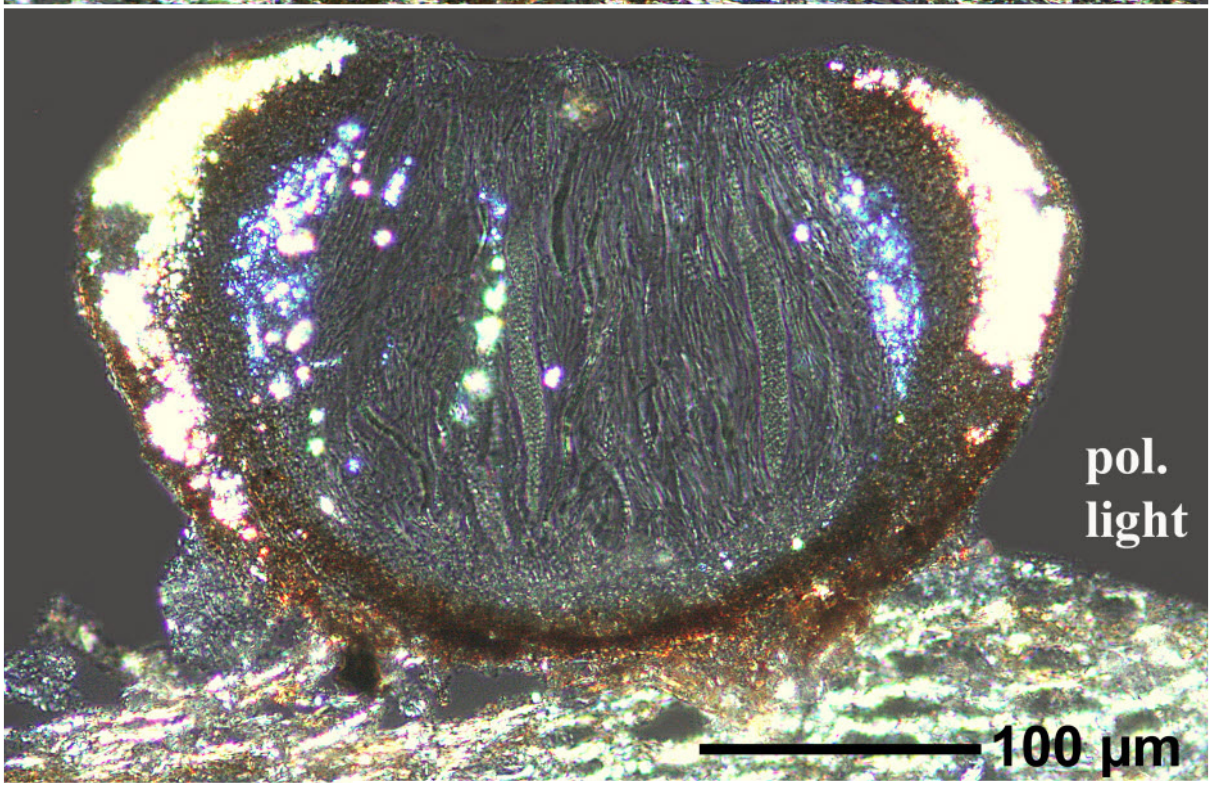


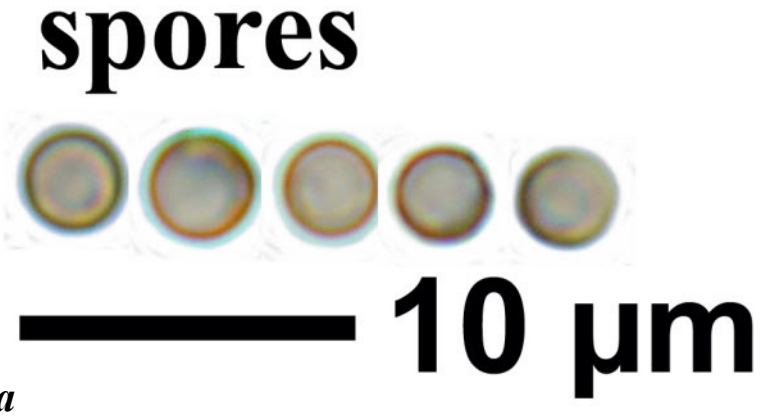
Melanophloea pacifica



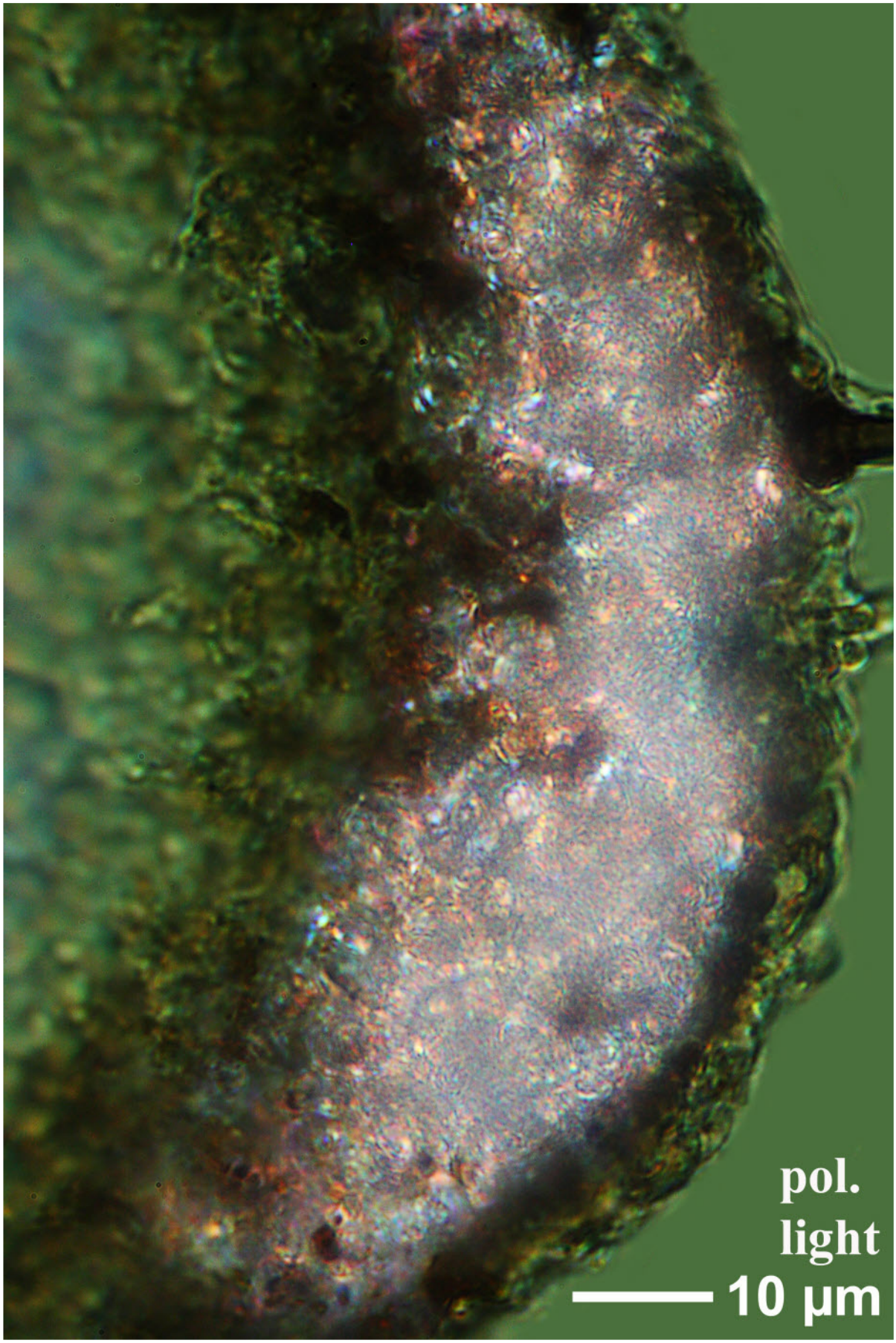
Melanophloea pacifica



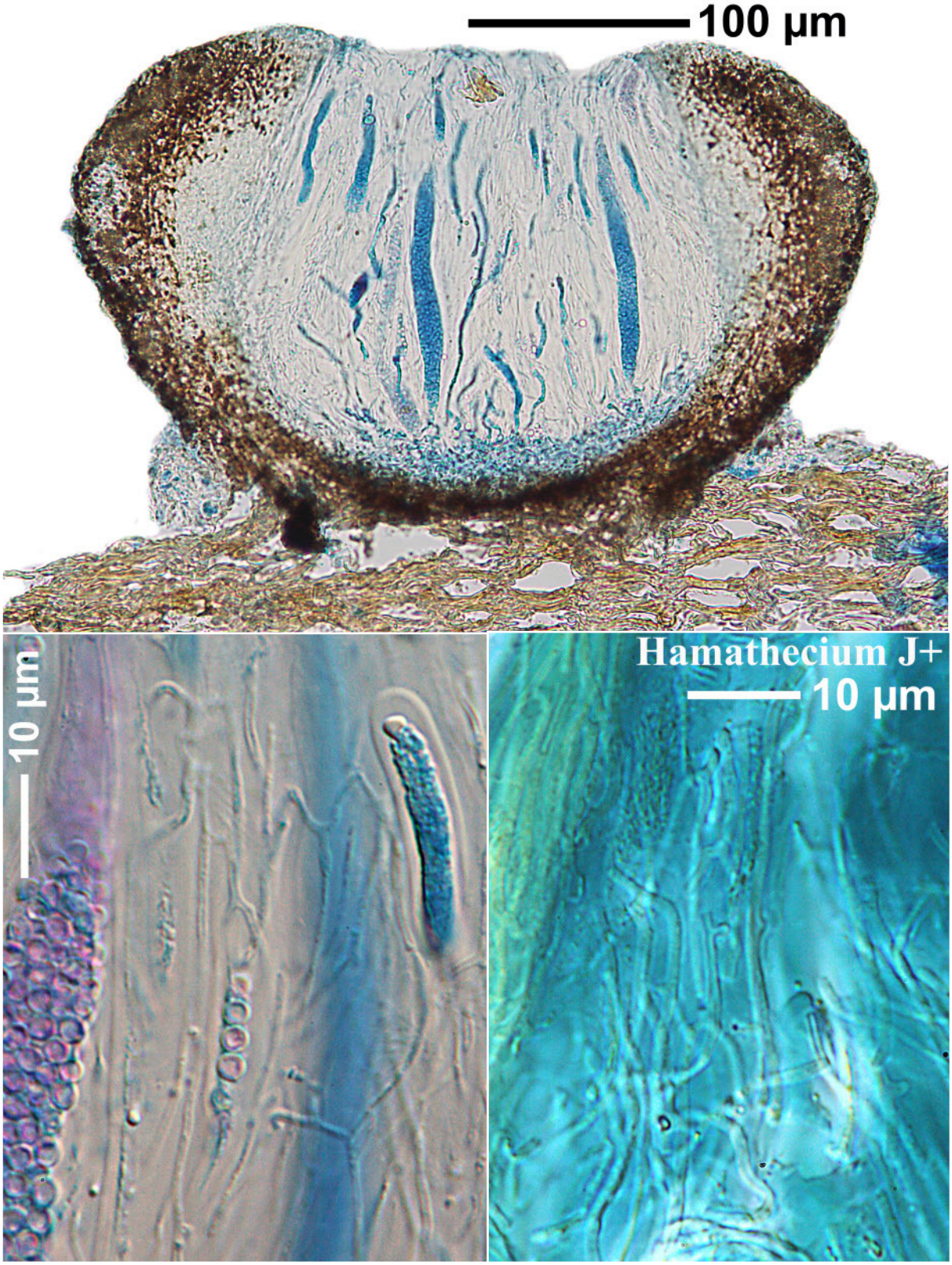




Melanophloea pacifica



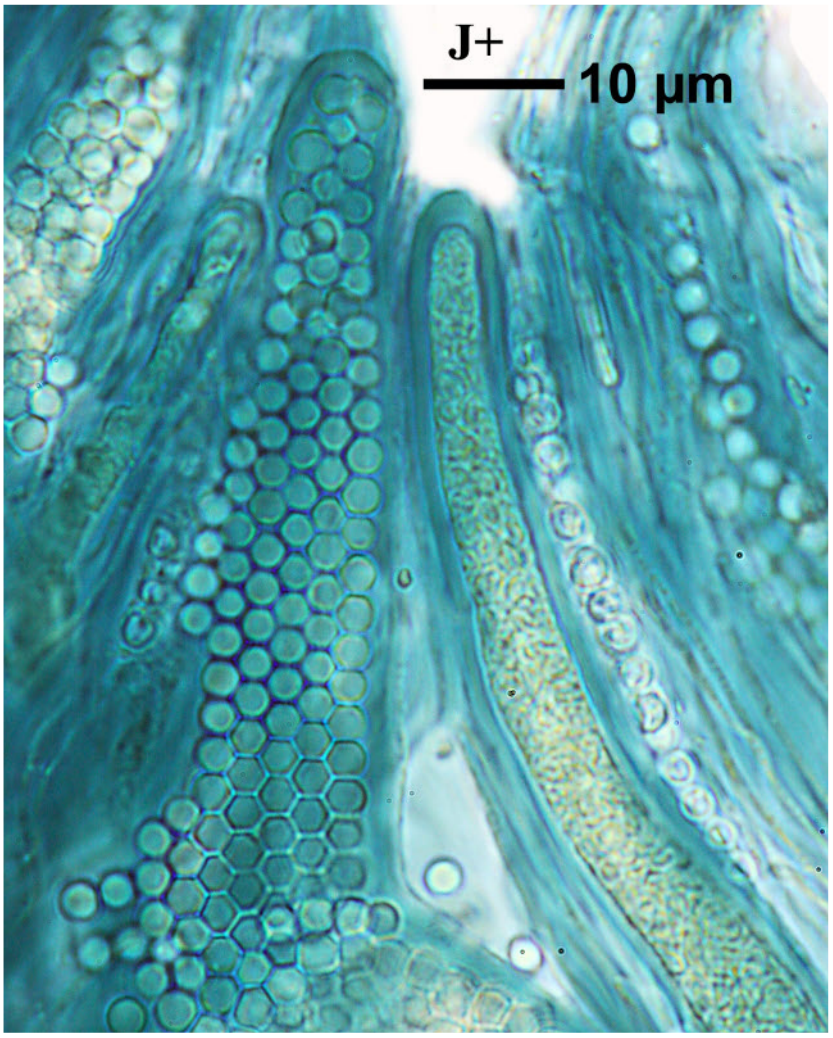
Melanophloea pacifica

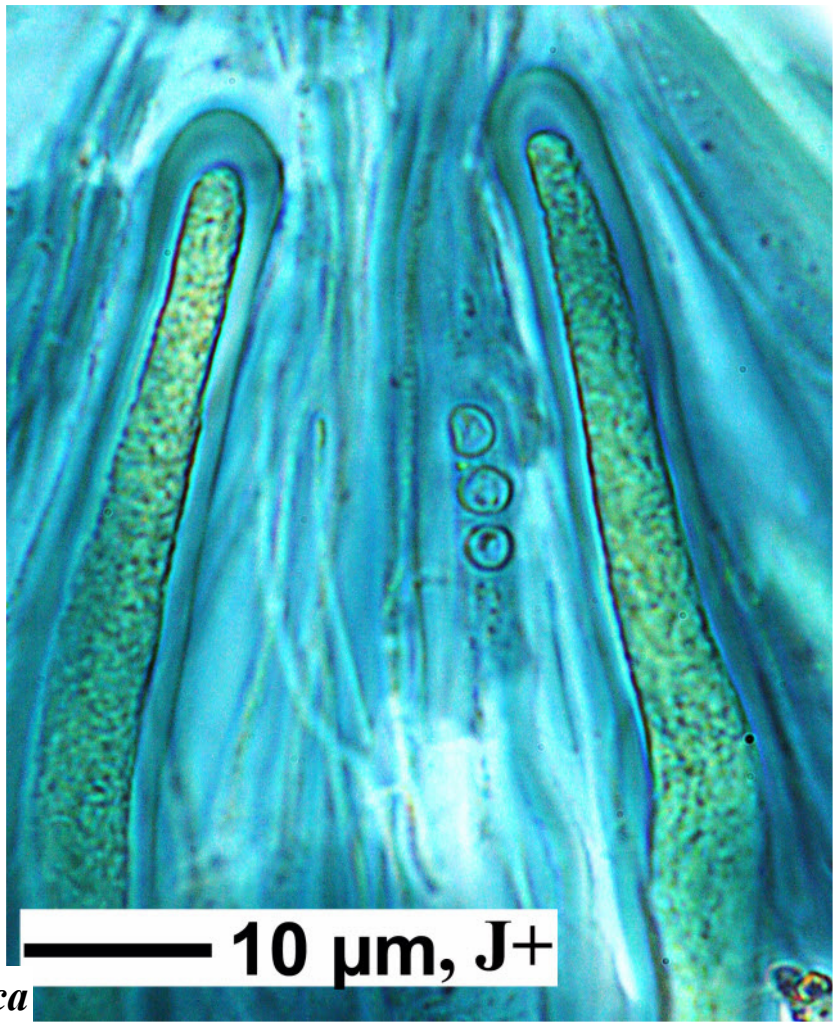


Melanophloea pacifica

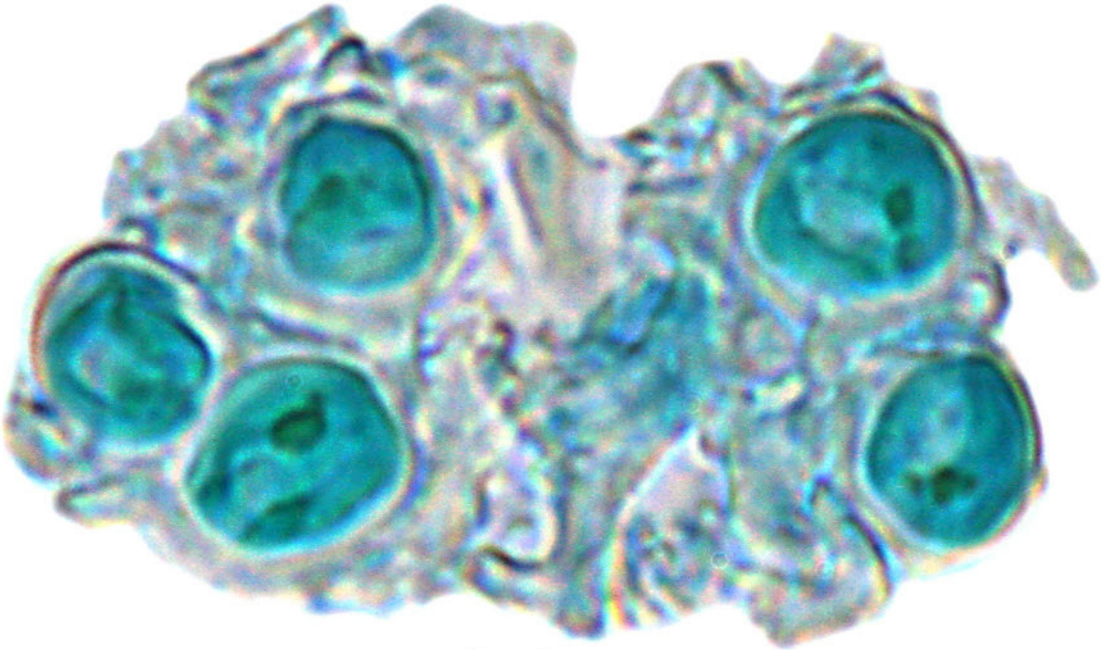


Melanophloea pacifica



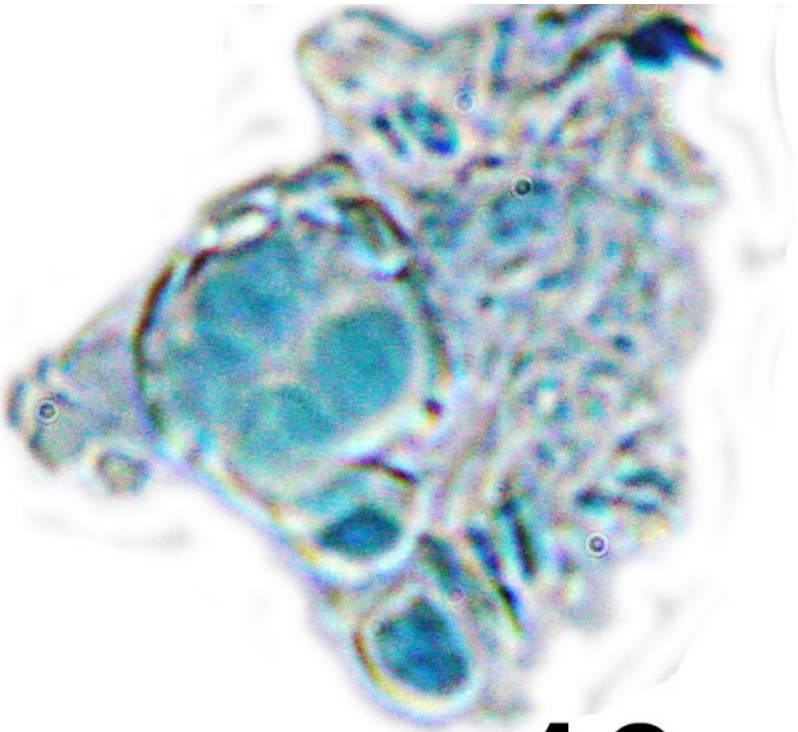


Melanophloea pacifica



10 µm

Photobiont



10 µm

Photobiont

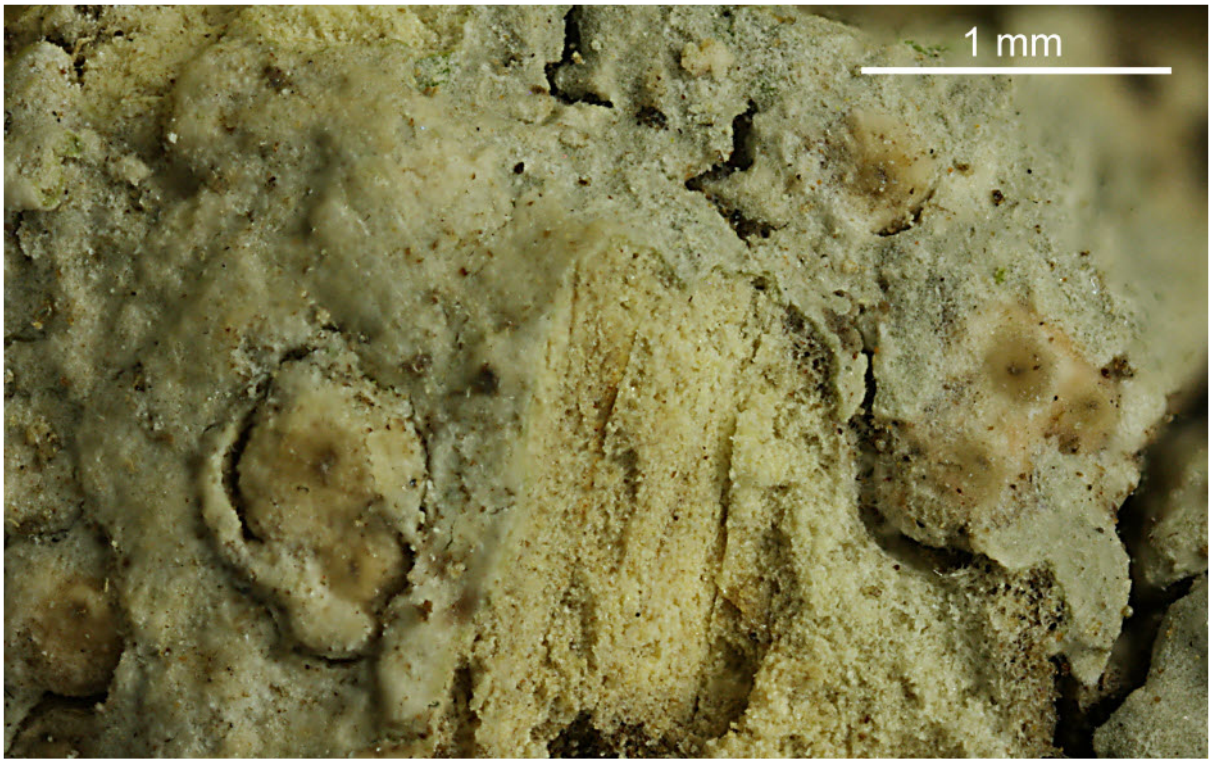
Monoblastia pellucida Aptroot, Bryologist 94(4): 404 (1991)

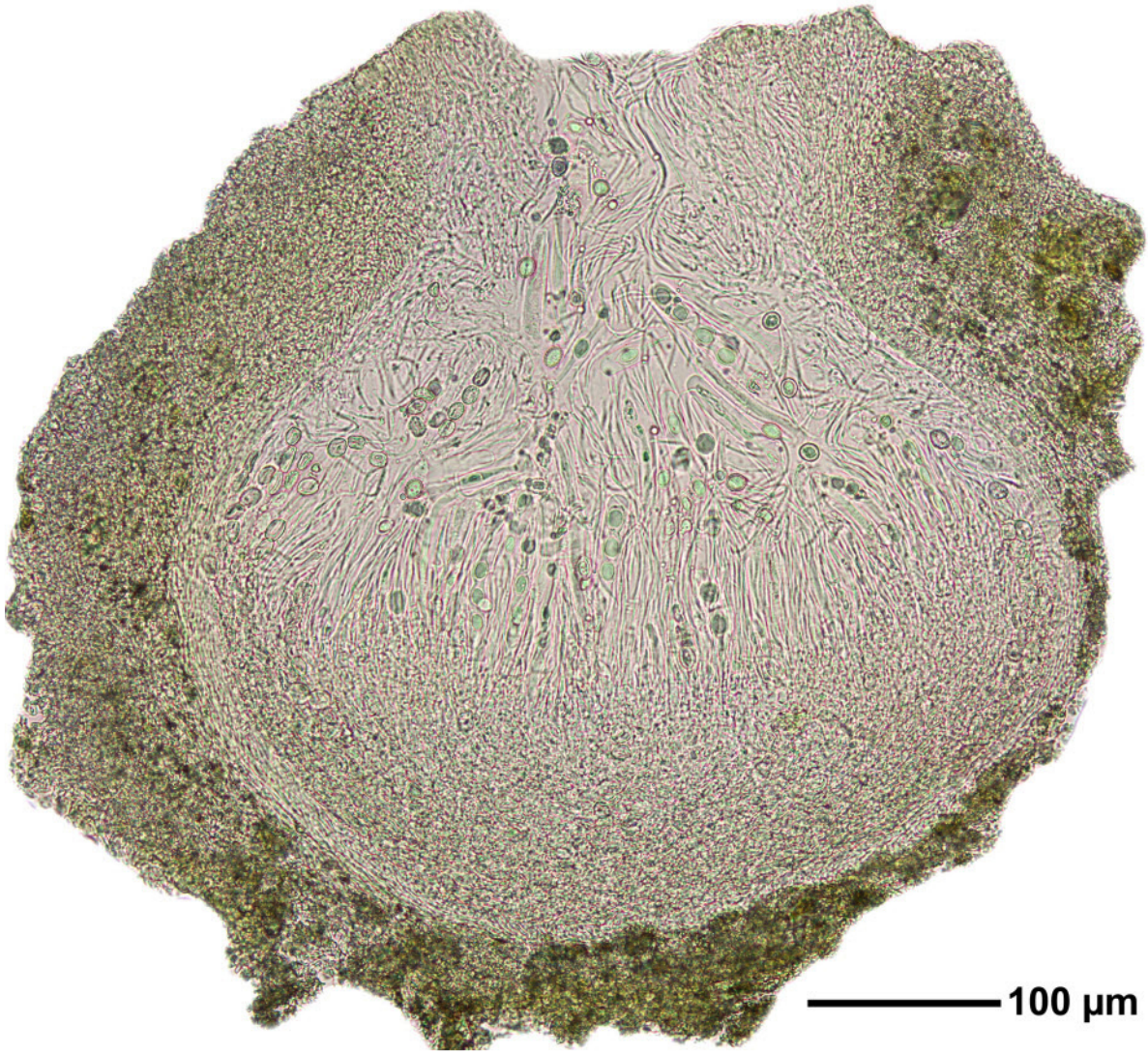
Thallus following substrate or a little squamulose, bluish-grey, epiphloeodal, smooth, without hypothallus or with a tiny white fringe, lichenized, probably with Trentepohlia. No chemistry detected, thallus UV negative. Ascocarps simple, pale ochraceous, hemispherical, 0.4–0.6 mm diam., 0.2–0.4 mm tall, unevenly dispersed, often absent on several square cm, semi-immersed in substrate. Ascomal wall closed, 60–80 μm thick, not carbonized, without bark particles, inner 10–20 μm consisting of a prosoplect-enchymatous tissue of 1 μm thick gelatinized hyphae, outer part of wall consisting of irregularly arranged 2 μm-thick hyphae. Ostiole obconical, medium-brown, apical, 50–80 μm wide. Hymenium colourless, IKI negative, not inspersed. Interthecial hyphae 1.5–2 μm thick, filamentous, only branched and anastomosing at the tips. Asci cylindric, contents dextrinoid, 80–100 × 10–15 μm, tholus ca. 8 μm wide, originating on a dense, 40–60 μm thick layer of hyphae inside ascomal wall. Ascospores 6–8 per ascus, uniseriate, subglobose to ellipsoid, colourless, not septate, ornamented with a reticulum of 1–1.5 μm-tall cristae (1,000 ×, at lower magnifications visible as spines), without a conspicuous gelatinous layer, 9–13 × 7–9 μm. Conidia not observed. Note: the rare occurrence of non-carbonized specimens in groups with usually carbonized perithecia allows for the observation of the internal structure of the ascomata.

[ABL-15095], French Guyana, Cayenne, botanical garden, 4°56’ N, 52°20’ W, alt. 0 m, on Lecythidaceae. Leg. et det. A. Aptroot (no 15095), March 1985. ISOTYPUS

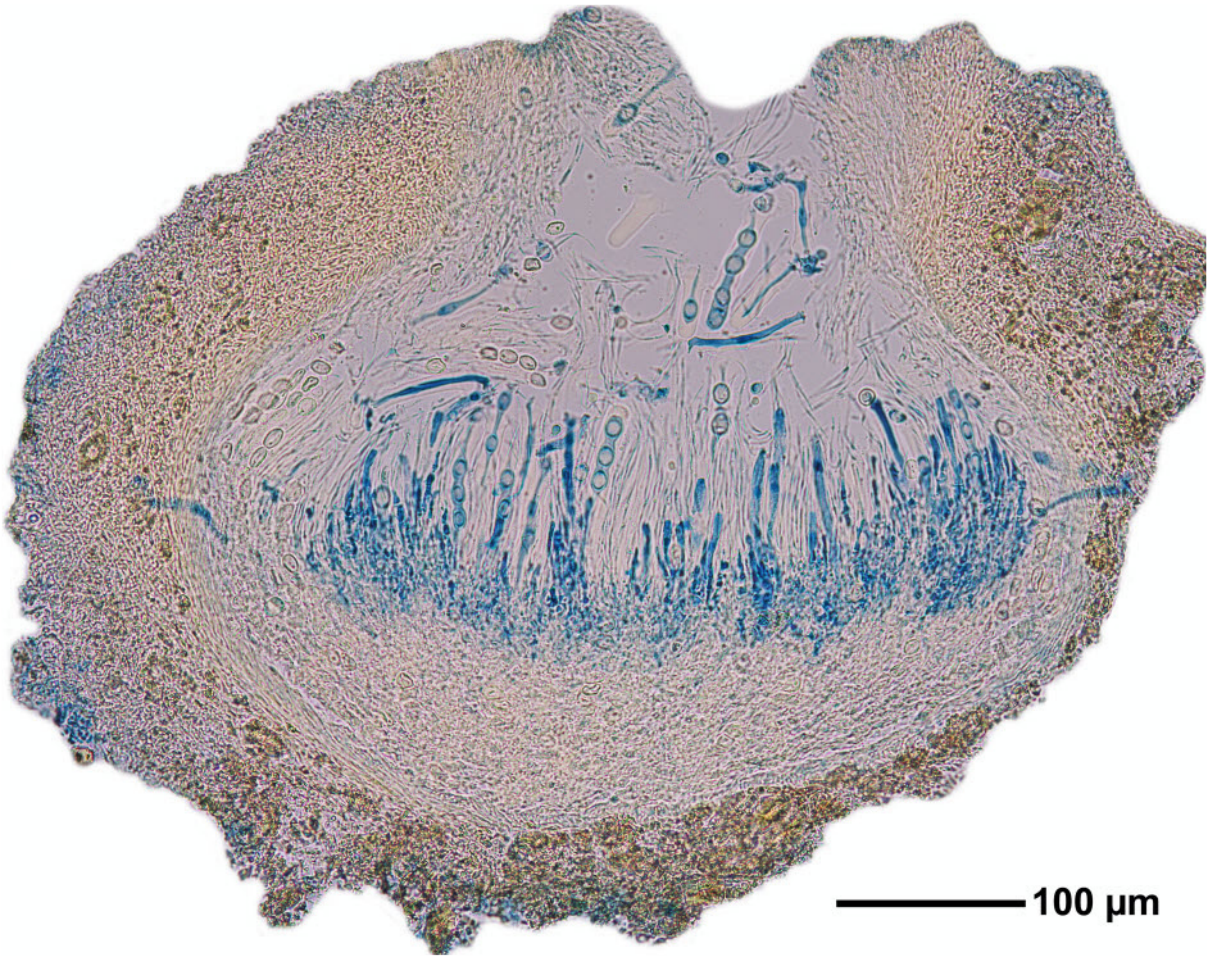


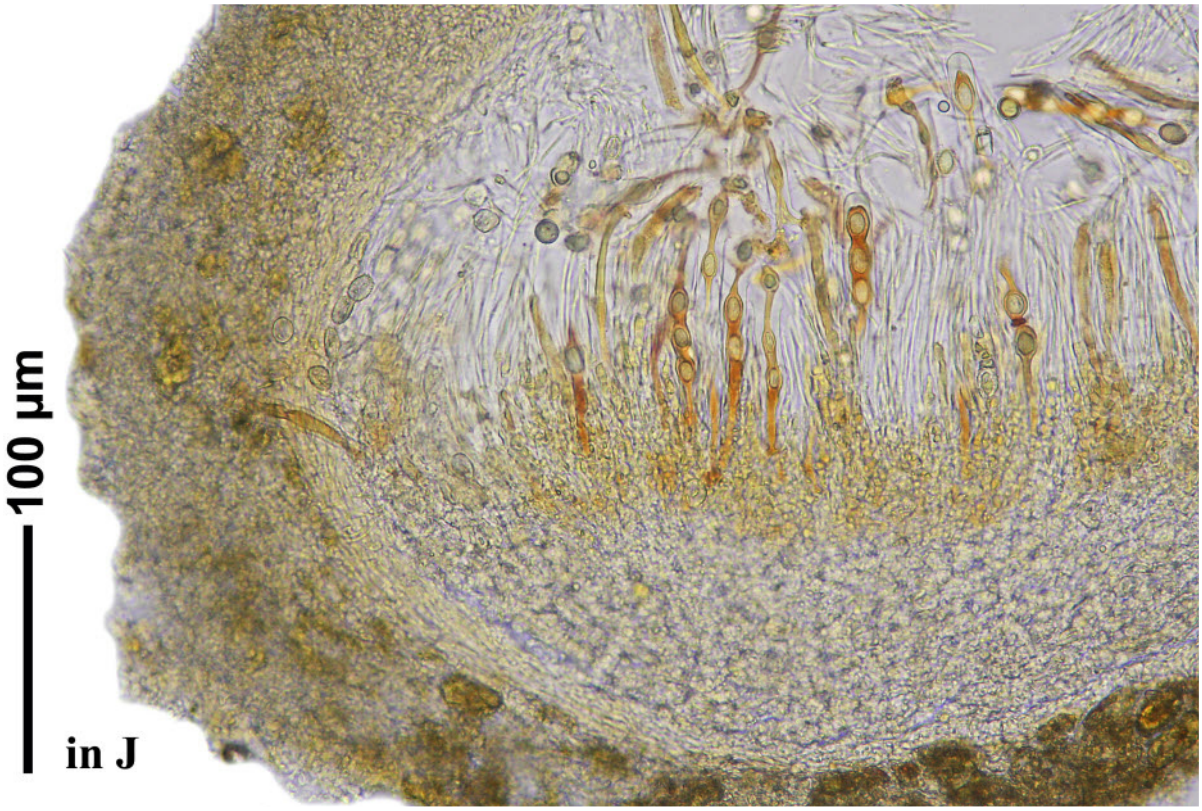
Monoblastia pellucida



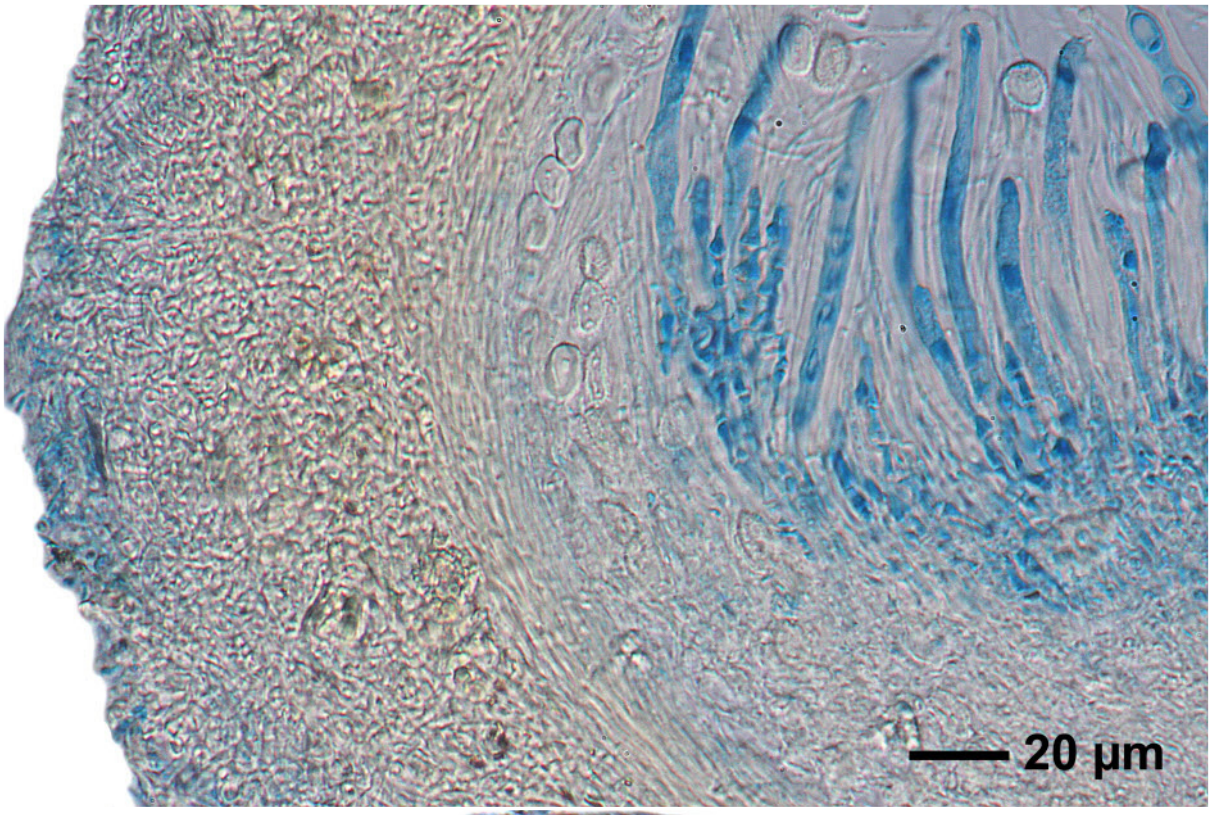


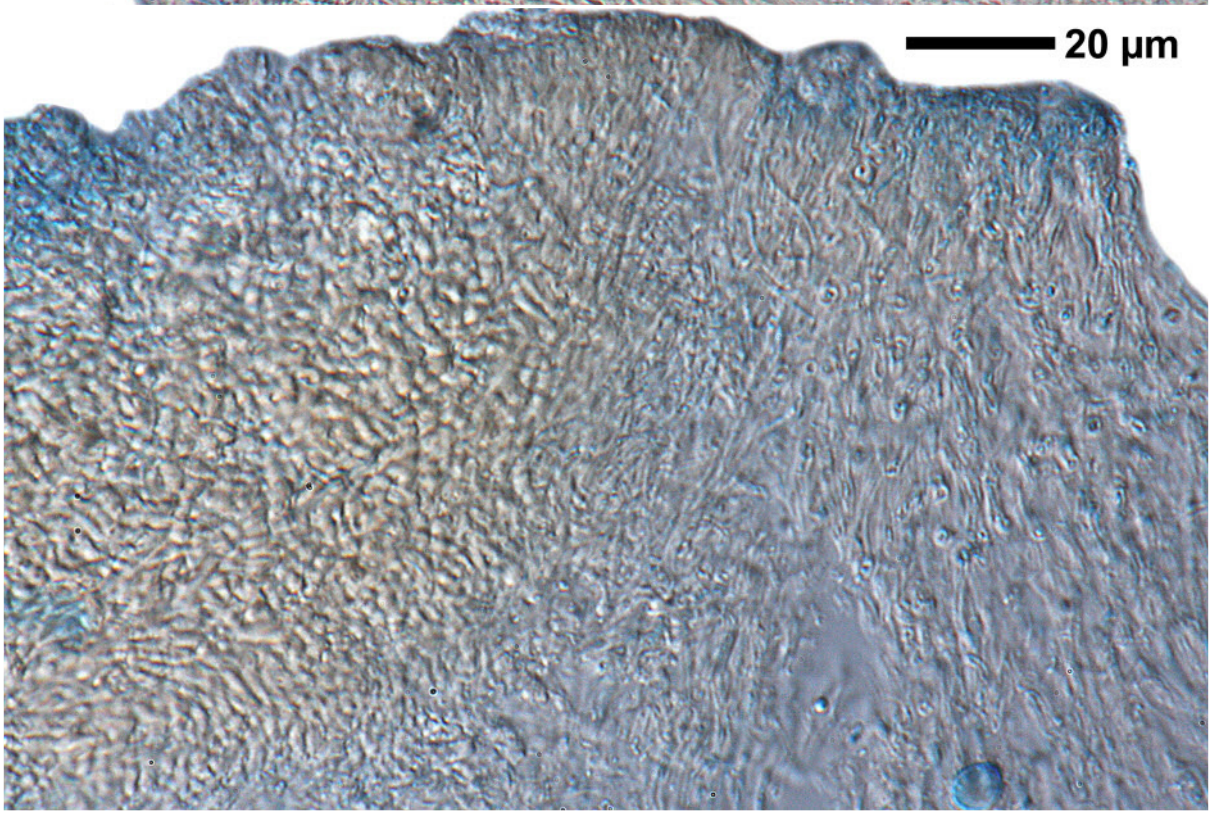
Monoblastia pellucida



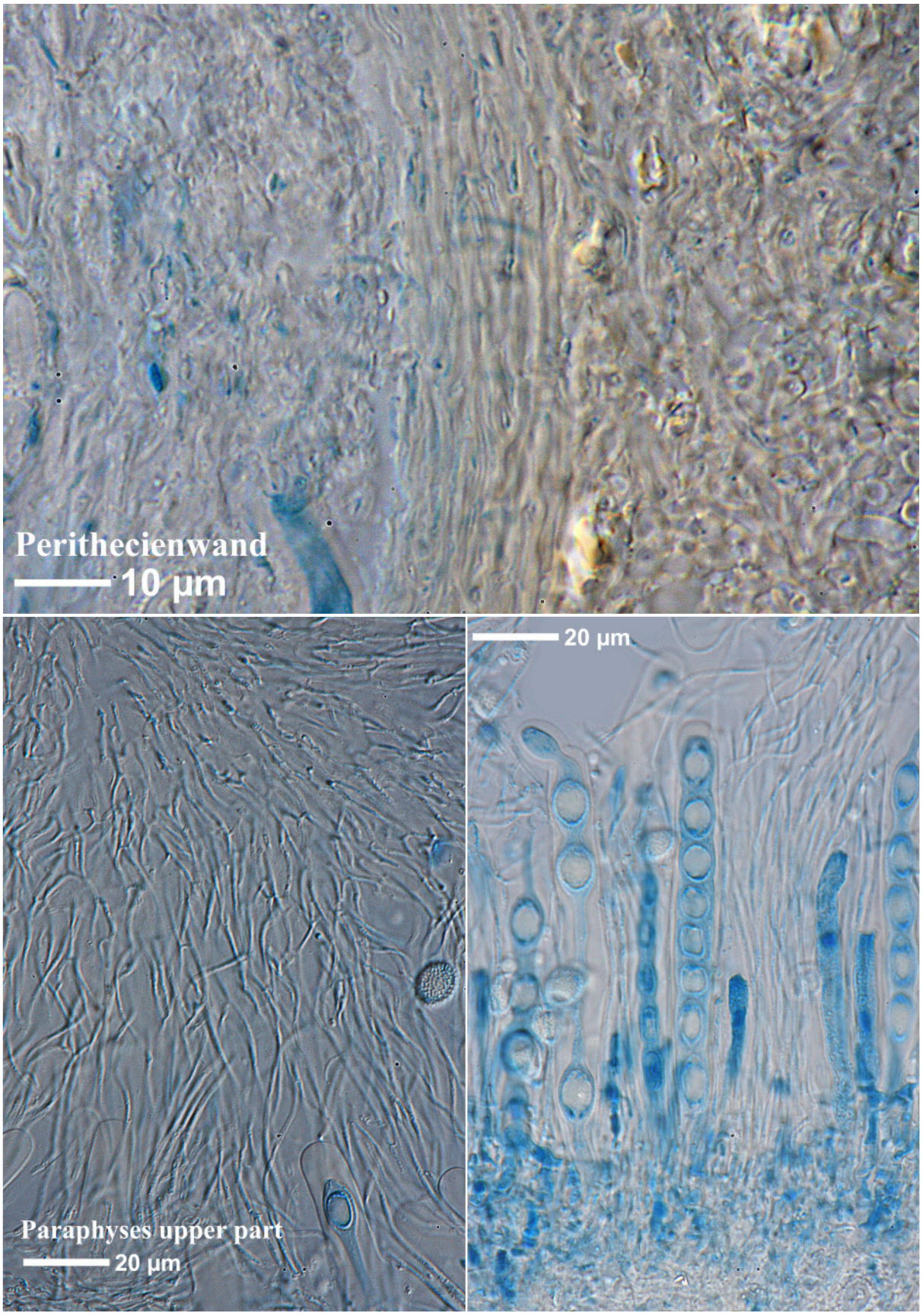


Monoblastia pellucida

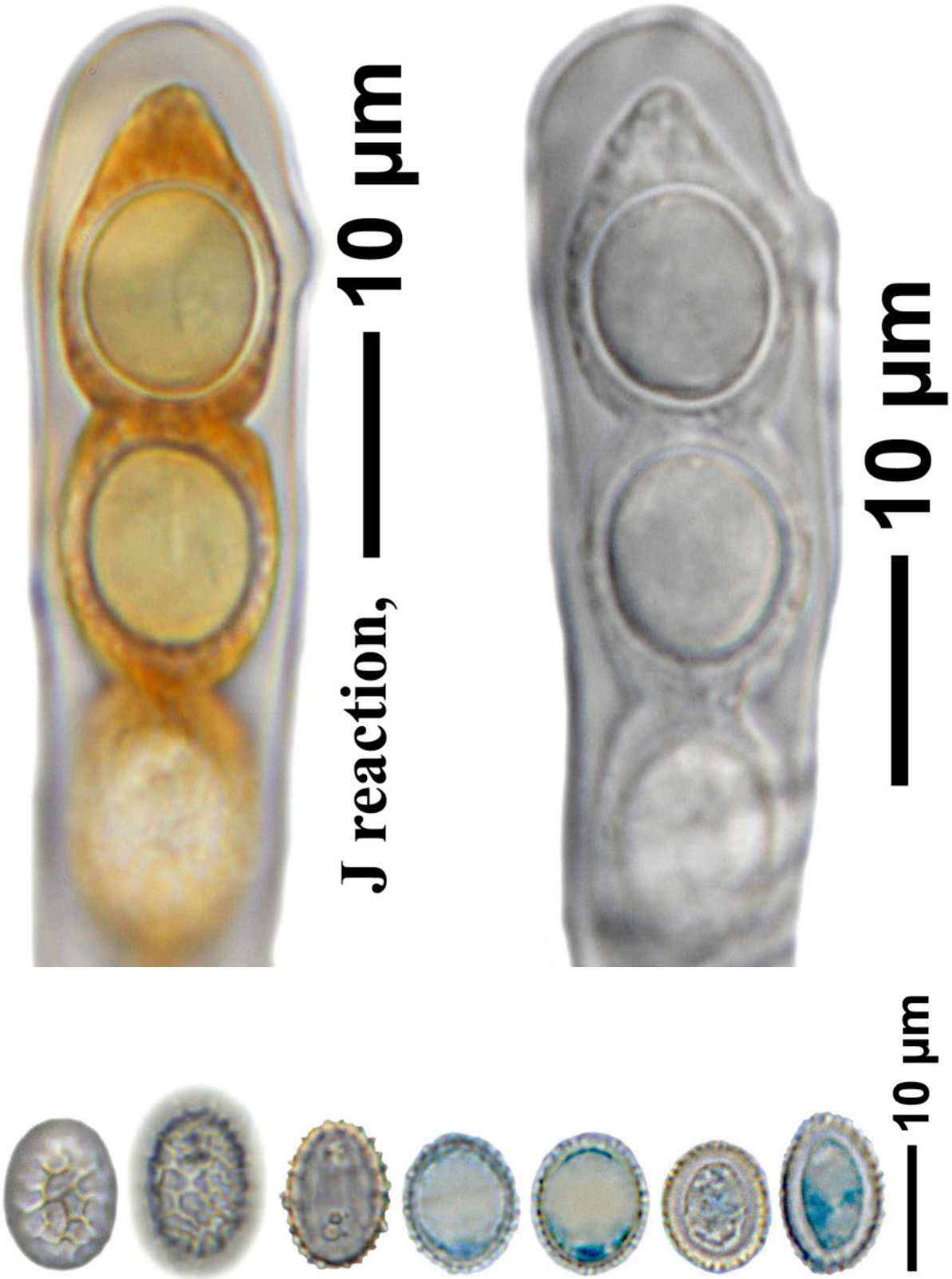




Monoblastia pellucida



Monoblastia pellucida



Monoblastia pellucida

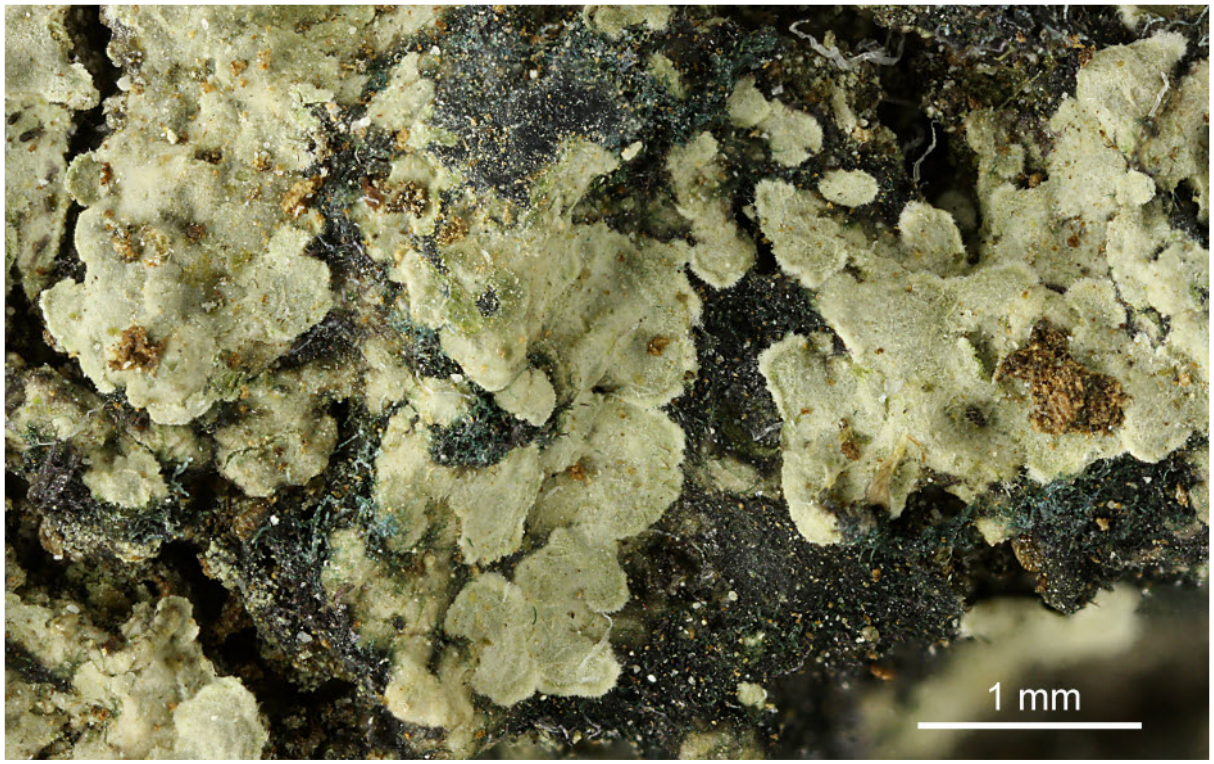
Monoblastia pellucida Aptroot, Bryologist 94(4): 404 (1991)

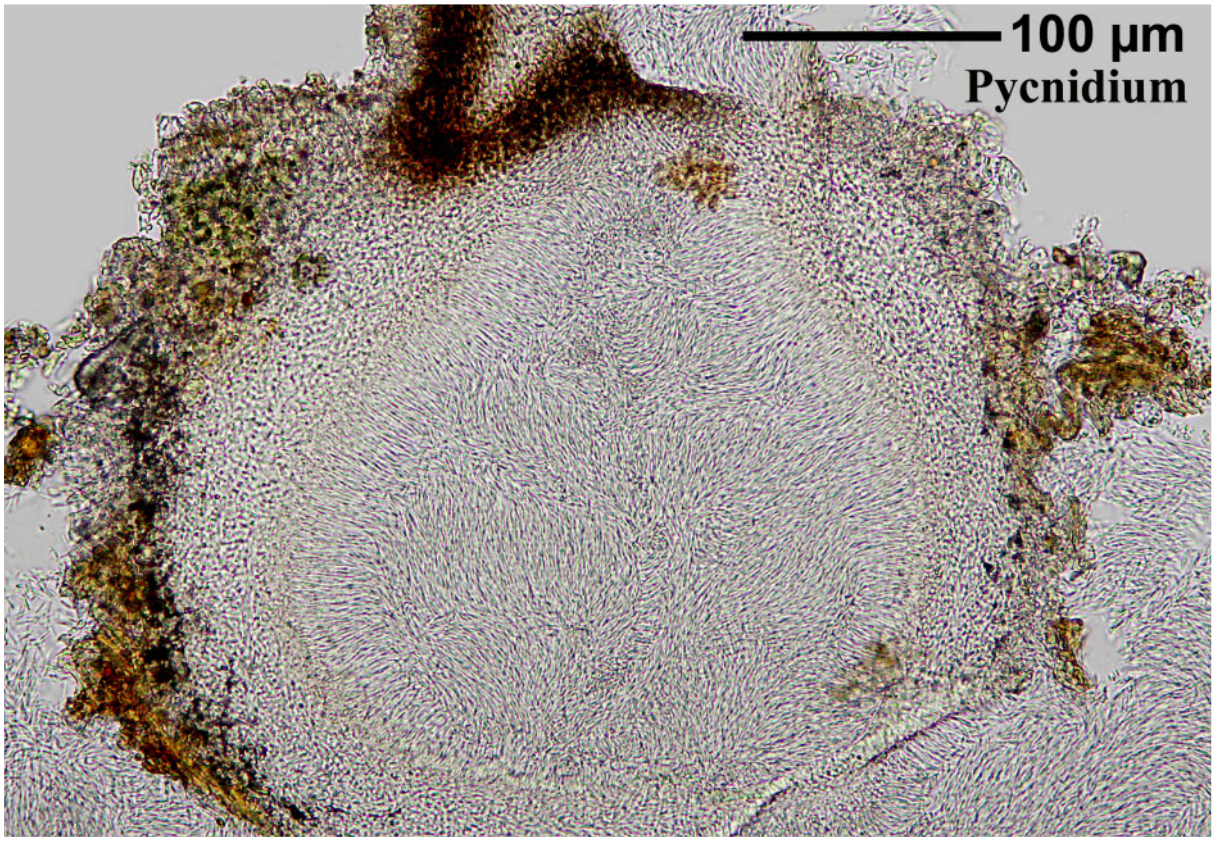
Thallus following substrate or a little squamulose, bluish-grey, epiphloeodal, smooth, without hypothallus or with a tiny white fringe, lichenized, probably with Trentepohlia. No chemistry detected, thallus UV negative. Ascocarps simple, pale ochraceous, hemispherical, 0.4–0.6 mm diam., 0.2–0.4 mm tall, unevenly dispersed, often absent on several square cm, semi-immersed in substrate. Ascomal wall closed, 60–80 μm thick, not carbonized, without bark particles, inner 10–20 μm consisting of a prosoplect-enchymatous tissue of 1 μm thick gelatinized hyphae, outer part of wall consisting of irregularly arranged 2 μm-thick hyphae. Ostiole obconical, medium-brown, apical, 50–80 μm wide. Hymenium colourless, IKI negative, not inspersed. Interthecial hyphae 1.5–2 μm thick, filamentous, only branched and anastomosing at the tips. Asci cylindric, contents dextrinoid, 80–100 × 10–15 μm, tholus ca. 8 μm wide, originating on a dense, 40–60 μm thick layer of hyphae inside ascomal wall. Ascospores 6–8 per ascus, uniseriate, subglobose to ellipsoid, colourless, not septate, ornamented with a reticulum of 1–1.5 μm-tall cristae (1,000 ×, at lower magnifications visible as spines), without a conspicuous gelatinous layer, 9–13 × 7–9 μm. Conidia not observed. Note: the rare occurrence of non-carbonized specimens in groups with usually carbonized perithecia allows for the observation of the internal structure of the ascomata.

[ABL-17507], Papua New Guinea, Madang prov., Madang city, parks and gardens near the coast, on tree. 5°15’ S, 145°45’ E, 0-5 m. Leg. A. Aptroot (no 17507), 26.02.1987. PARATYPUS.

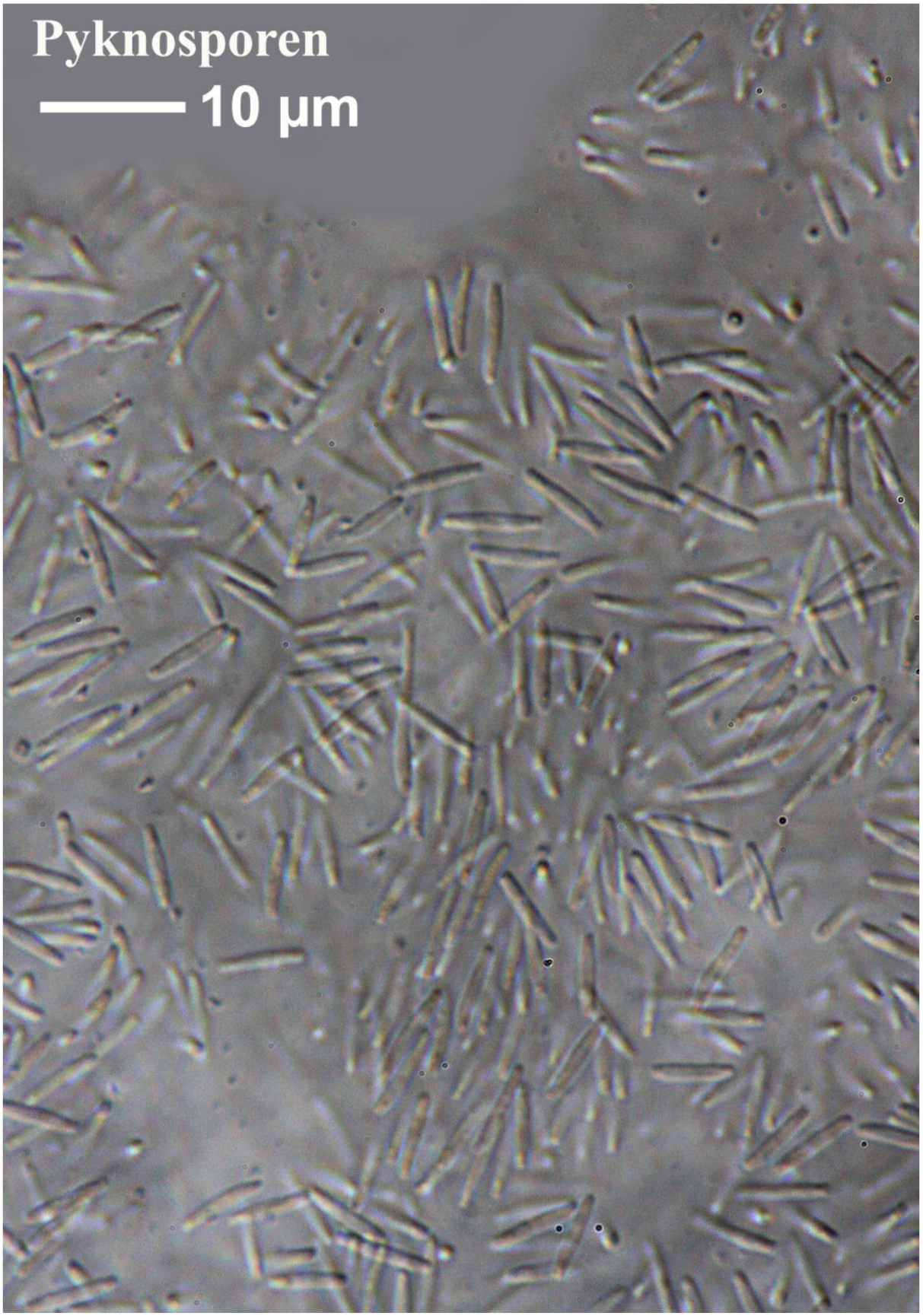


Monoblastia pellucida

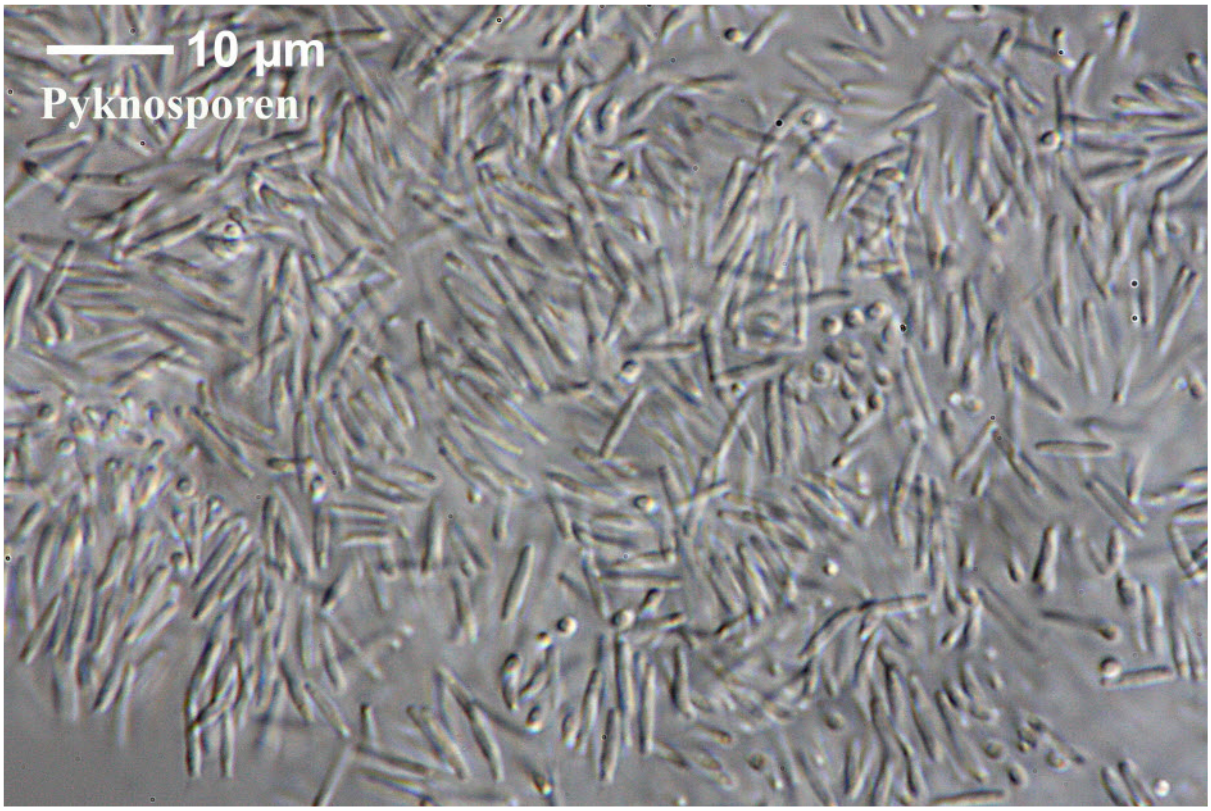


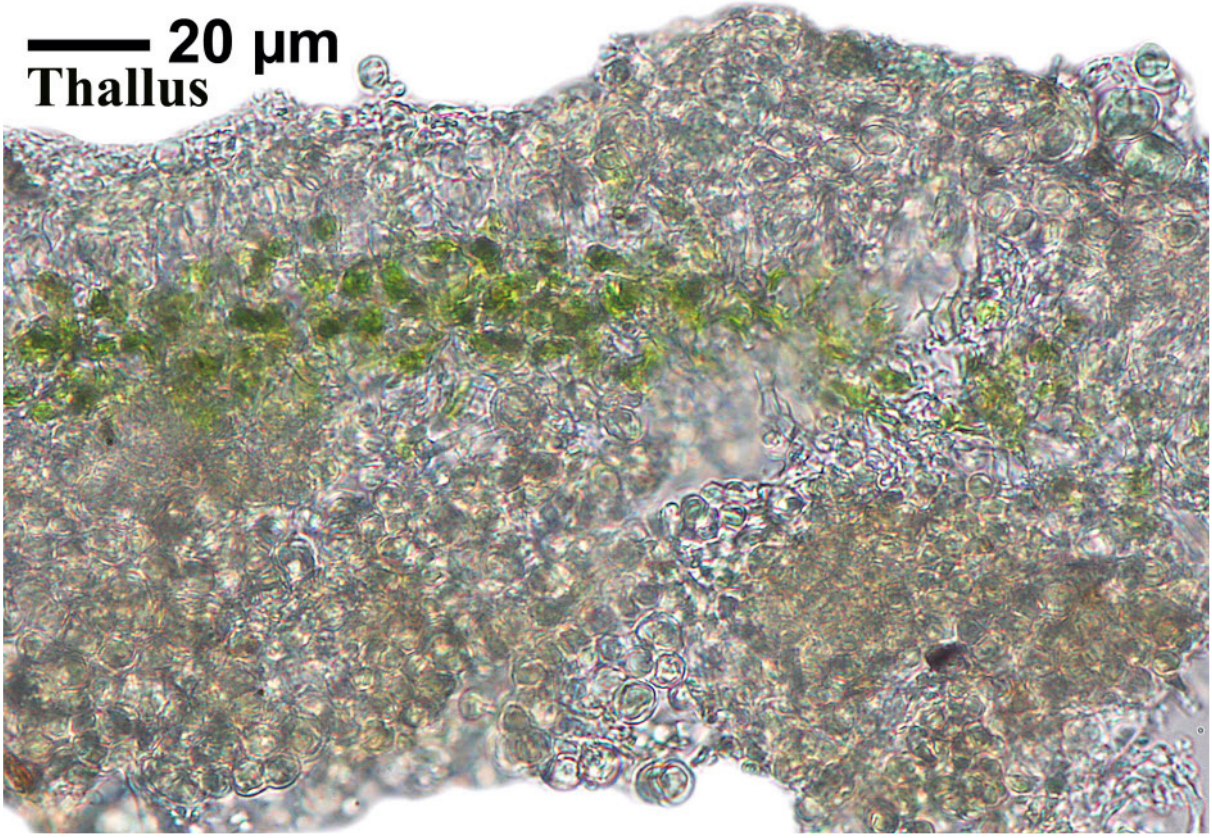


Monoblastia pellucida

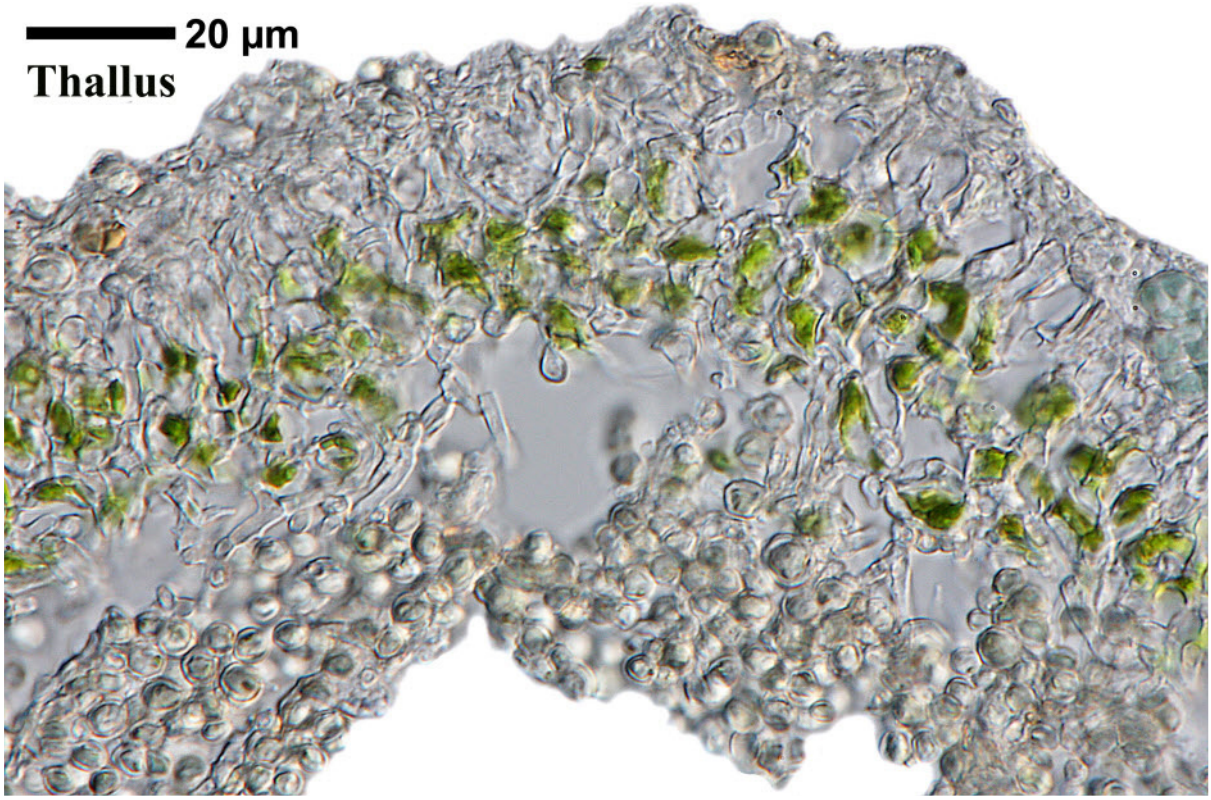


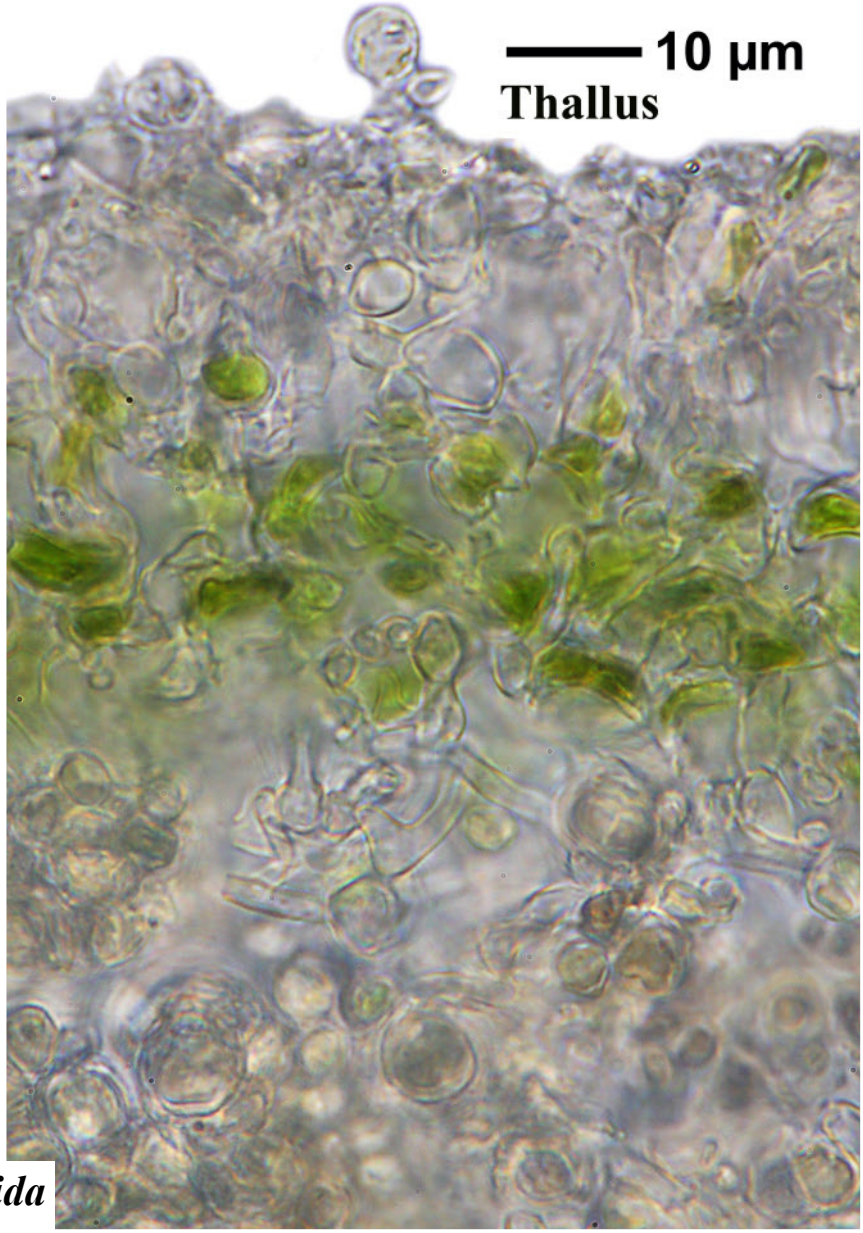
Monoblastia pellucida



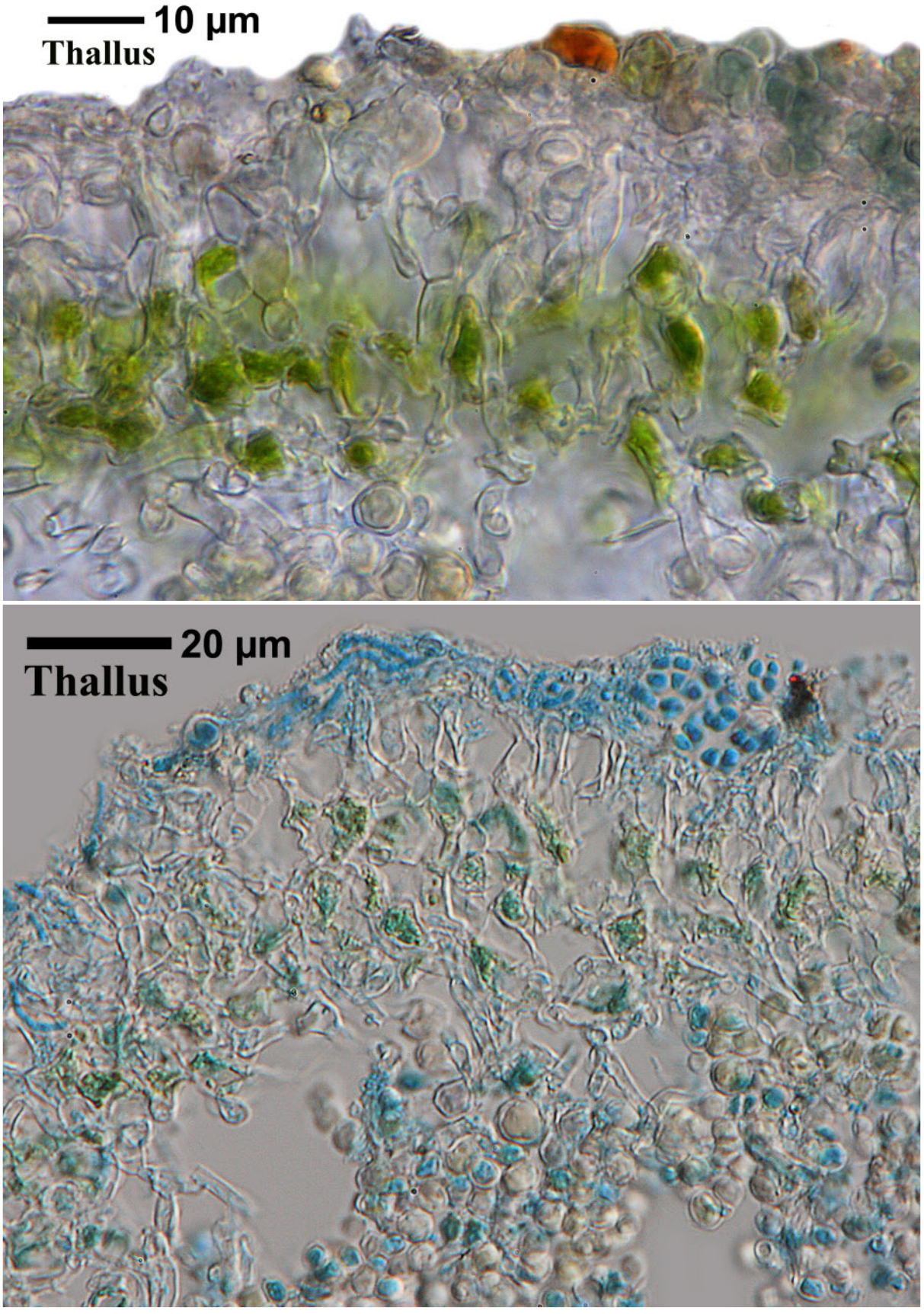


Monoblastia pellucida

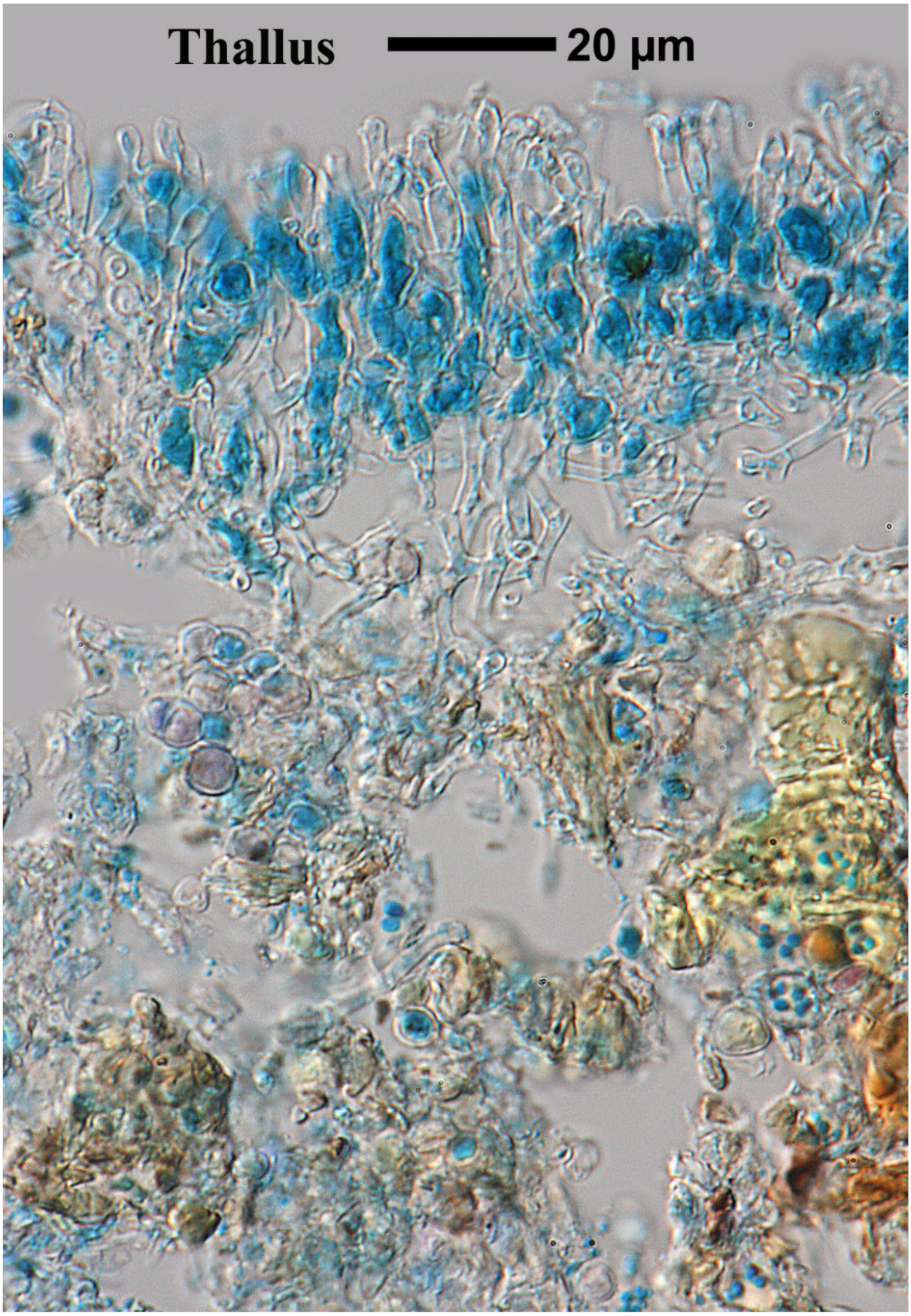




Monoblastia pellucida



Monoblastia pellucida



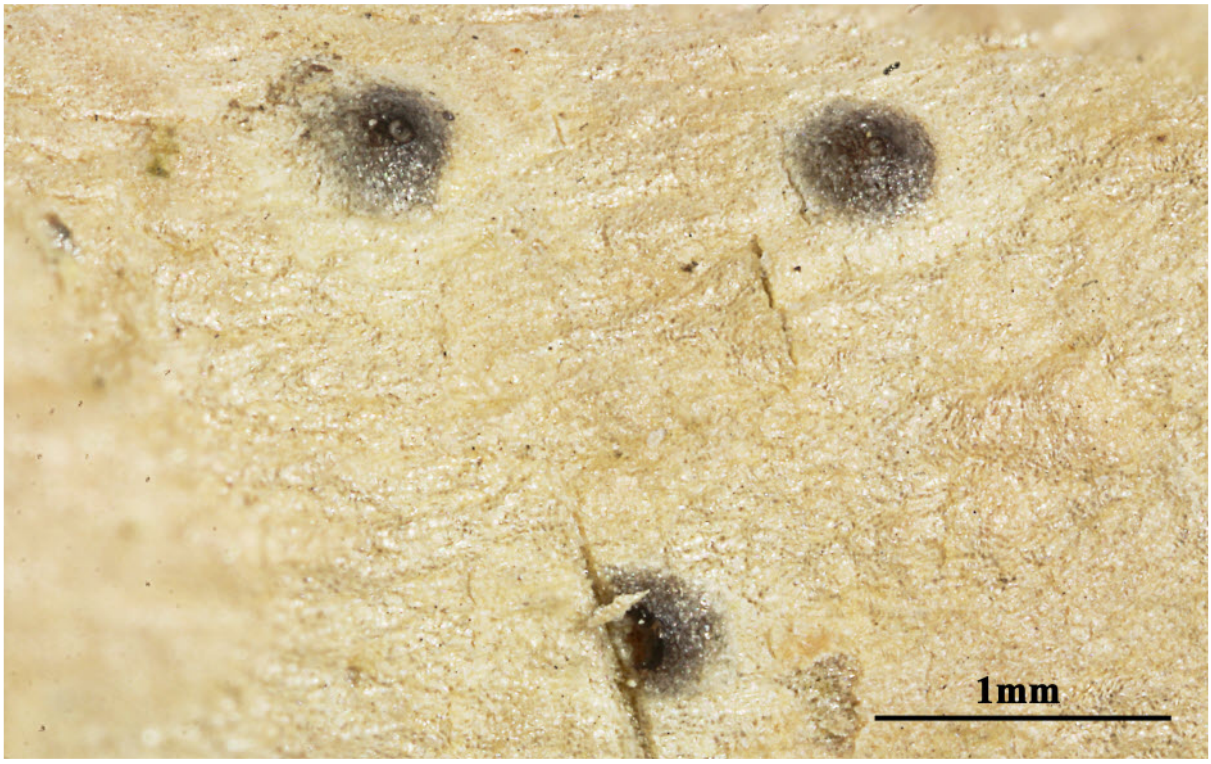
Monoblastia pellucida

Mycomicrothelia atlantica D. Hawksw. & Coppins, in Hawksworth, Bull. Br. Mus. nat. Hist., Bot. 14(2): 70 (1985)

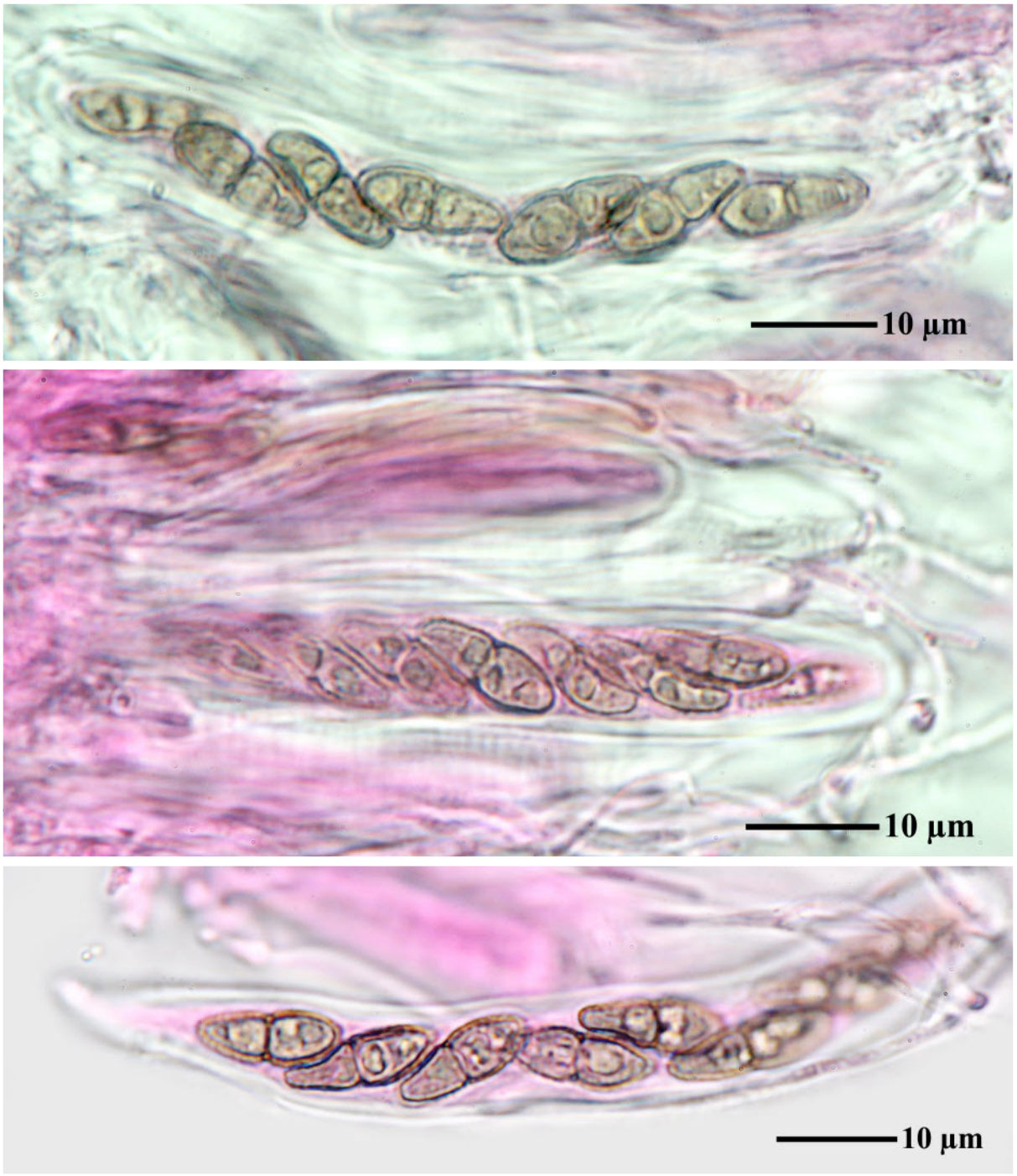
Ascomata arising singly, occasionally 1–2 adpressed, scattered on scarcely unchanged brownish portions of the bark, colonies not delimited by a marginal line, immersed, the outer peridermal layers slightly raised as low punctiform projections; individual ascomata dimidiate, (150–)200–300(–350) µm diam., 90–120 µm tall, black, shiny, with a purplish-black basal fringe extending for 30–50 µm around the ascomata, ostiole depressed; involucrellum dark reddish brown, becoming olivaceous in potassium hydroxide, 20–35 µm thick, consisting of periderm cells intermixed with fungal hyphae, hyphae irregularly orientated, 1.5–2.5 µm thick, uneven in diameter, sometimes penetrating the host cells which become somewhat occluded; exciple mainly 5–12 µm thick, composed of a few irregular layers of brown interwoven and compressed hyphae (textura intricata) ; base composed of similar hyphae to the exciple sides but often poorly developed, almost absent to c. 1 µm thick; centrum when young in parts turning pale violet (not blue) in iodine (following treatment in potassium hydroxide). Pseudoparaphyses cellular, persistent, branched and anastomosing, septate, 1.5–2.5 µm thick. Asci arising from the base of the ascomatal cavity, vertically orientated, clavate, bitunicate, strongly thickened apically, with an internal apical beak, short-stalked, 40–55 × 12–17 µm, 8-spored. Ascospores distichously arranged in the asci, ellipsoid, 1-septate, not or slightly constricted at the septum, cells equal in size, apices rounded, olivaceous, verruculose, with a thin gelatinous sheath 1–1.5 µm thick in potassium hydroxide, (12.5–)13.5–16(–17.5) × (5.5–)6.5–8(–9) µm. Anamorph: Pycnidia immersed, arising between the ascomata, 45-75 µm diam, brownishblack, ostiole depressed, to 30 µm diam; walls irregularly pseudoparenchymatous, sometimes extended around the ostiole into a clypeate involucrellum, mainly 3–7 µm thick, cells mainly 2–3 µm diam. Conidiogenous cells simple, hyaline, elongate-ampulliform, phialidic, 3–6 × 2–3 µm. Conidia bacillariform, hyaline, 34 × 0.5–0.7 µm.

[Etayo17190], Spain, Pyrenees, Navarro. Leg. Etayo (no 17190), 1999, det. A. Aptroot, 1999.





Mycomicrothelia atlantica

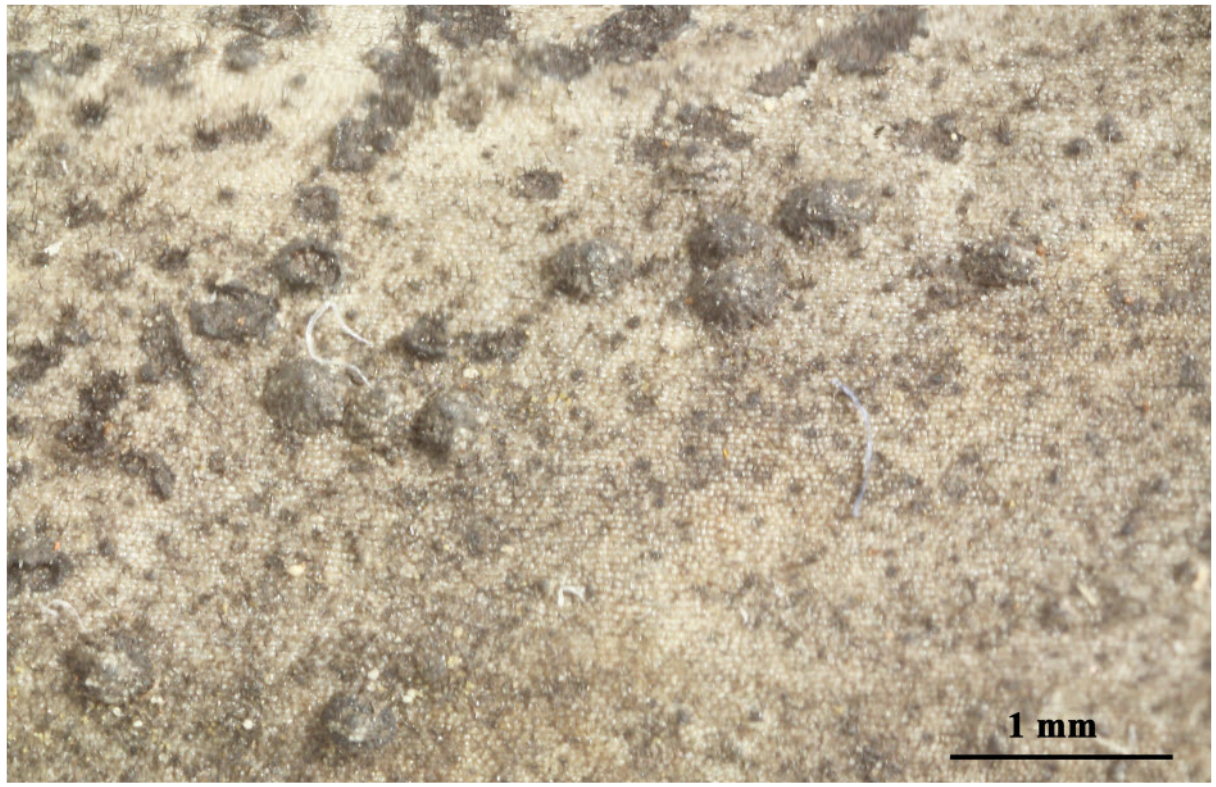


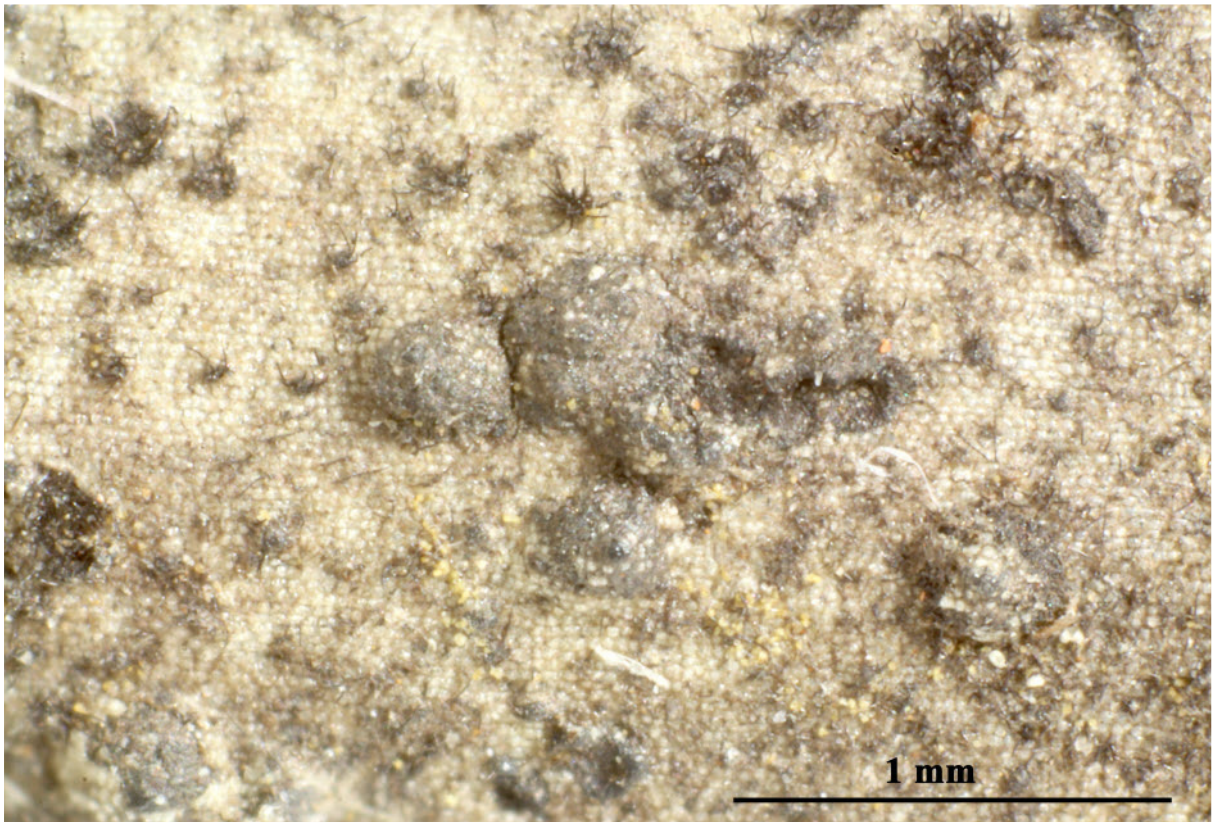
Mycomicrothelia atlantica

Mycomicrothelia inaequalis (Fabre) D. Hawksw., Bot. J. Linn. Soc. 82: 55 (1981)
= *Amphisphaeria inaequalis* Fabre, Annls Sci. Nat., Bot., sér. 6 9: 85 (1879) [1878]
= *Astrosphaeriella inaequalis* (Fabre) Scheinpflug, Ber. schweiz. bot. Ges. 68: 372 (1958)
= *Kirschsteiniella inaequalis* (Fabre) Petr., Sydowia 1(4-6): 213 (1947)
= *Microthelia inaequalis* (Fabre) E. Müll., in Müller & von Arx, Beitr. Kryptfl. Schweiz 11(no. 2): 287 (1962)
= *Kirschsteiniella californica* Petrak in Sydowia 6: 353 (1952).

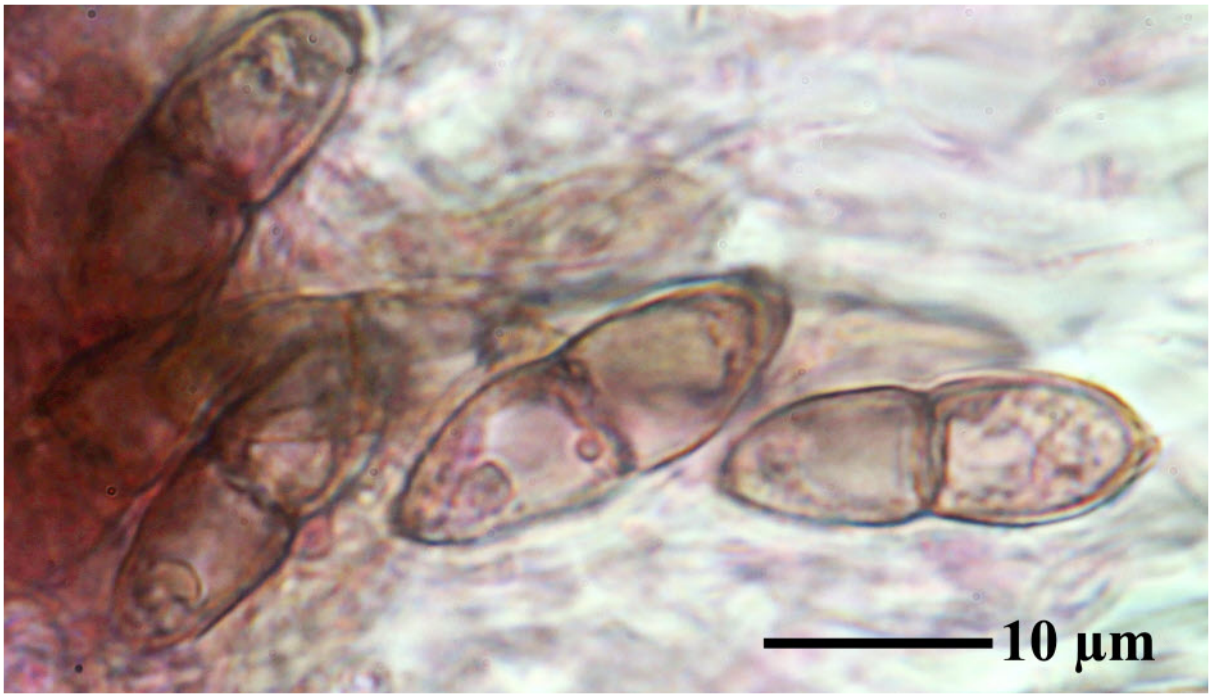
Ascomata arising singly, scattered, colonies not delimited by a black line, immersed in the outer layers of the wood, the surface raised to form convex but not hemispherical projections; individual ascomata dimidiate, 200–300 µm diam, 150–200 µm tall, basal fringe well-developed, lenticular with the grain of the wood, olivaceous black, extending to 350 µm in the direction of the grain, becoming olivaceous green in potassium hydroxide, ostiole depressed; involucrellum dark reddish brown to almost black, like the hyphal fringe turning olivaceous green in potassium hydroxide, mainly 60–100 µm thick, consisting of host cells intermixed with fungal hyphae, the host cells often remaining distinct, hyphae radially orientated, mainly 3–4 µm thick, rather uneven in diameter, entering and between the host cells, smooth-walled and similar to the hyphae in the basal fringe with which it is continuous; exciple 5–10 µm thick, composed of 3–6 layers of densely interwoven hyphae c. 2 µm thick (textura intricata), compacted, mainly subhyaline but becoming brownish in the uppermost parts, continuous below the centrum; centrum not reacting with iodine. Pseudoparaphyses cellular, persistent, branched and anastomosing, numerous, filiform, frequently septate, 1.5–2.5 µm thick. Asci arising from the base of the ascomatal cavity, vertically orientated or inclined towards the ostiole, elongate-clavate, short-stalked, bitunicate, with a shallow squared internal apical beak, (65–)70–100 × 15–20 µm, 8-spored. Ascospores distichously arranged in the asci, broadly ellipsoid, 1-septate, moderately constricted at the septum, the lower cell consistently somewhat smaller, rounded at the apices, olive-brown to red-brown, apparently smooth-walled, with a thin gelatinous sheath c. 1 µm thick, 18–22 × (7.5–)8.5–10.5 µm.

[Ratcliff], USA, Georgia, Glynn Co., on Smilax laurifolia. Leg. Ratcliff, 12.1941, det. A. Aptroot.





Mycomicrothelia inaequalis







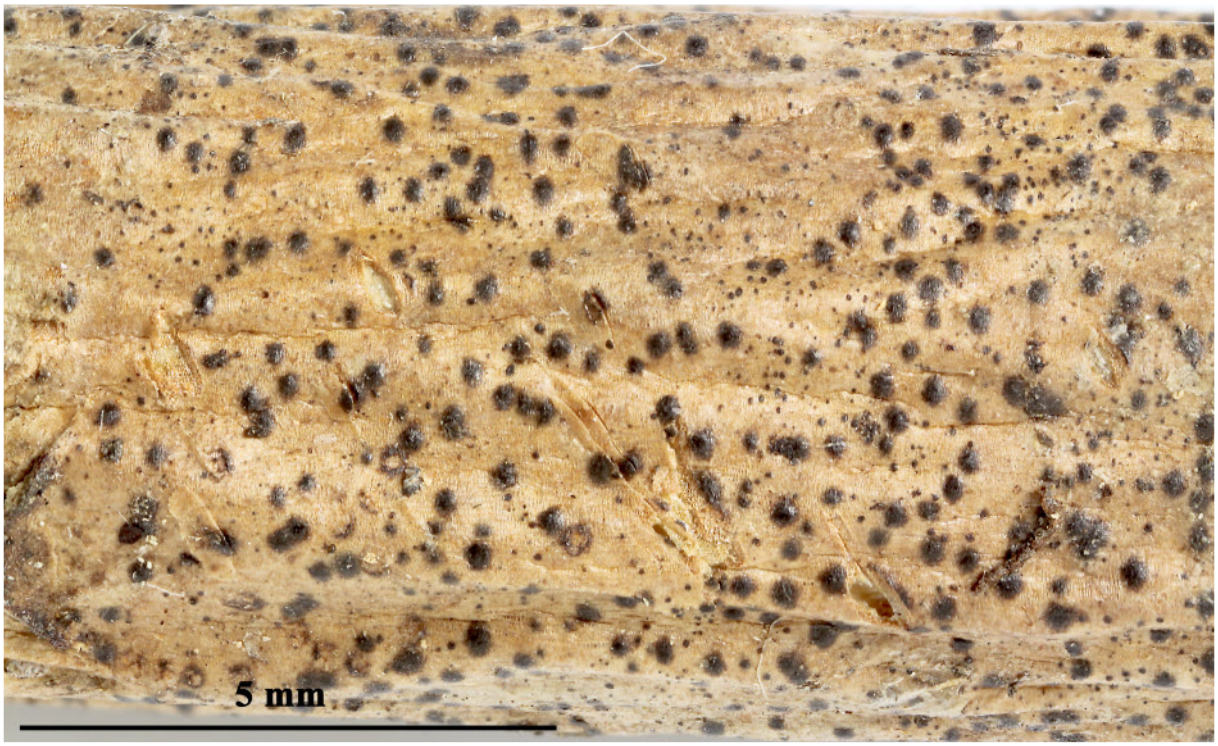
Mycomicrothelia inaequalis

Mycomicrothelia macularis (Hampe ex A. Massal.) Keissl., Rabenh. Krypt.-Fl., Edn 2 (Leipzig) 9(1.2): 36 (1936)
= *Melanospora macularis* Hampe, in Massalongo, Miscell. Lichenol.: 28 (1856)
= *Melanospora macularis* (Hampe ex A. Massal.) Körb., Parerga lichenol. (Breslau) 5: 397 (1865)
= *Melanotheca macularis* (Hampe ex A. Massal.) Th. Fr., Bot. Notiser: 56 (1866)
= *Microthelia macularis* Hampe ex A. Massal., Miscell. Lichenol.: 28 (1856)
= *Tomasellia macularis* (Hampe ex A. Massal.) Blomb. & Forssell, Enum. Pl. Scand.: 16 (1880)
= *Microthelia analeptoides* Bagl. & Car. in Comment. Soc. crittogam. Ital. 1: 446 (1863).
= *Verrucaria analeptoides* (Bagl. & Car.) Hue in Revue Bot., Courresan6: 139 (1888), nom. illegit. (Art. 64.1), non V. analeptoides Nyl. in Flora, Jena 50: 180 (1867).
= *Amphisphaeria analeptoides* (Bagl. & Car.) Rehm in Annls mycol. 4: 266 (1906).
= *Didymosphaeria analeptoides* (Bagl. & Car.) Rehm in Saccardo, Syll. Fung. 1: 715 (1882).
= *Arnaudiella ribis* E. Muller in Sydowia 12: 201 (1959 ['1958']).

Ascomata arising singly, often abundant, sometimes crowded and then occasionally confluent with adjoining ascomata, bark not discoloured, colonies not delimited, immersed, subepidermal, the epidermis raised to form slightly convex projections, only the ostiole and tissues in its immediate vicinity exposed; individual ascomata dimidiate, 100–175(–200) µm diam., circular to elliptical in surface view, mainly 60–80 µm tall, basal fringe well developed forming a ring to 50 µm wide (consistently narrower on Ribes) around the ascomata which is dark brown to black in surface view, ring distinctly olivaceous in potassium hydroxide, ostiole depressed, black; involucrellum dark brown, olivaceous in potassium hydroxide, mainly 9–12 µm thick, consisting of host tissue intermixed with fungal hyphae, hyphae radially orientated, 2–3 thick, rather uneven, irregularly branched, between the host cells, smooth-walled; exciple 2–8 µm thick, composed of 1–5 layers of interwoven hyphae 2–3 µm wide (textura intricata), compacted, brown throughout; centrum not reacting with iodine. Pseudoparaphyses cellular, persistent, filiform, rather sparse, septate, branched and anastomosing, 2–3 µm thick. Asci arising from the tissue lining the base of the ascomata, vertically orientated to inclined towards the ostiole, elongate-clavate, short-stalked, bitunicate, with a rather shallow and broad inter-

nal apical indentation, 45–62 × 12–16 µm, 8-spored. Ascospores irregularly to distichously arranged in the asci, ellipsoid, 1-septate, constricted at the septum, cells equal in size or the upper slightly longer and broader, the ends rounded, not attenuated, golden brown to brown, distinctly verruculose, with a gelatinous sheath swelling to c. 2 µm wide in potassium hydroxide, (11.5–)12.5–15(–17.5) × (4–)5–6(–7) µm. Anamorph: Pycnidia immersed, arising near the ascomata, 30–50 µm diam, black, only the ostiole visible, ostiole c. 15 µm diam., deeply pigmented; walls pseudoparenchymatous, cells pale brown, 3–5 µm diam. Conidiogenous cells simple, hyaline, elongate-ampulliform, phialidic, 5–8 x 2–3 µm. Conidia bacillar, hyaline, 5–8 × 0.7–1.5 µm.

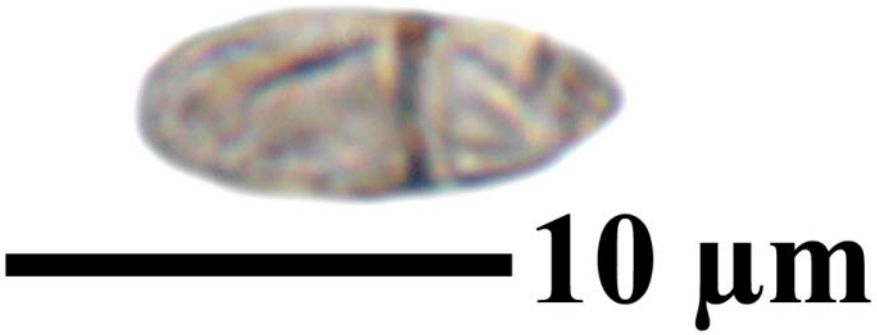
[Laurila7077], Finland, Prov. Kuusamo, Par. Salla, ad flumen Kutsajok in ripa accidentali locus Nivajanvi (ad insulam), ad corticem *Daphnis mezerei* in graminosa riparia. Leg. M. Laurila (no 7077, plantae fennicae), 25.07.1937, det. A. Aptroot.



Mycomicrothelia macularis







Mycomicrothelia macularis

Mycomicrothelia melanospora (Hepp) D. Hawksw., Lichenologist 14(2): 134 (1982)

= *Didymosphaeria melanospora* (Hepp) Vain., Acta Soc. Fauna Flora fenn. 49(no. 2): 151 (1921)

= *Pyrenula melanospora* Hepp, Flecht. Europ.: no. 710 (1860)

= *Verrucaria cinerella* Flotow ex Zwackh, Lich. exs. 37, 217 (1850), nom. inval. (Art. 32. 1), nom. illegit. (Art. 64.1).

= *Microthelia cinerella* Flotow ex Zwackh in Flora, Jena 45: 566 (1862).

= *Pyrenula cinerella* (Flotow ex Zwackh) Branth & Rostrup in Bot. Tidsskr. 3: 259 (1869).

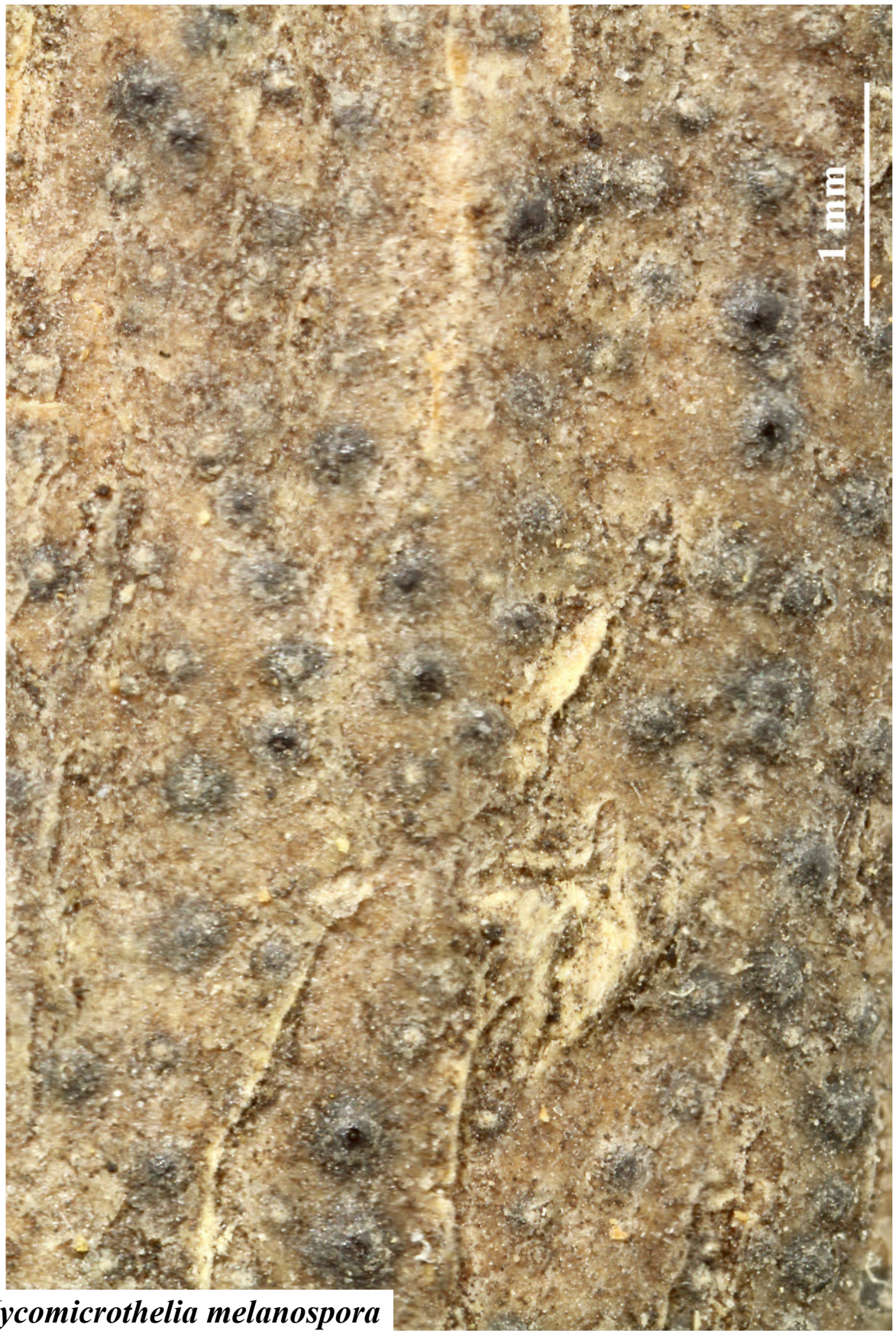
= *Arthopyrenia cinerella* (Flotow ex Zwackh) H. Olivier, Fl. Lich. Orne 2: 269 (1884).

= *Didymosphaeria epidermidis* f. *crataegi* Rehm in Annls mycol. 4: 267 (1906).

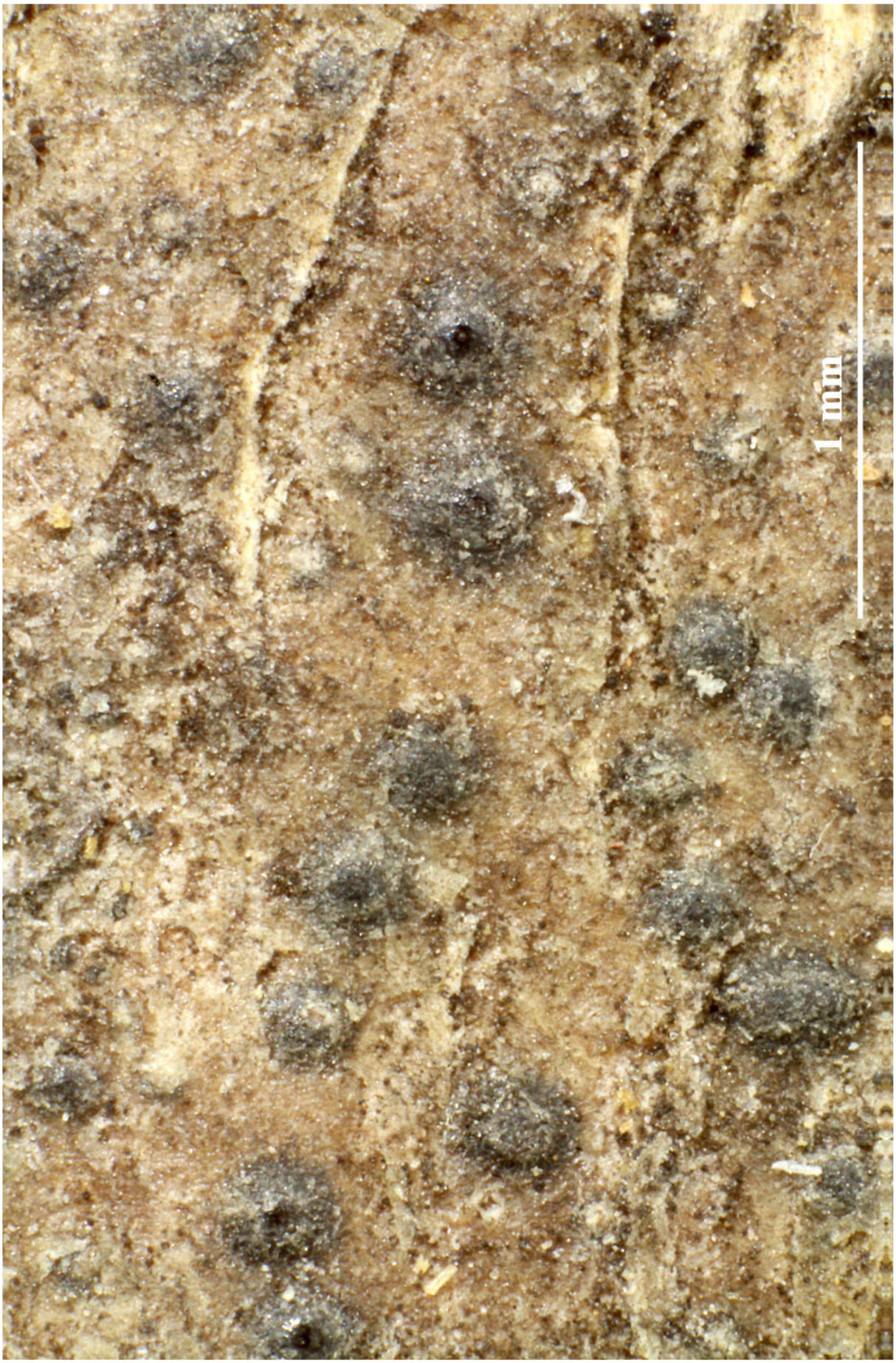
= *Didymosphaeria epidermidis* f. *mespili* Rehm in Annls mycol. 4: 267 (1906).

Ascomata arising singly, scattered, the bark not discoloured in any way, colonies not delimited, immersed, subepidermal, the epidermis raised to form low hemispherical projections, only the ostiole exposed; individual ascomata dimidiate, 150–250(–300) µm diam, mainly 100-125 µm tall, basal fringe forming a ring mainly 30–60 µm wide, black, fringe becoming distinctly olivaceous in potassium hydroxide, ostiole depressed; involucrellum dark brown, becoming distinctly olivaceous in potassium hydroxide, mainly 5–15 µm thick, penetrating between the layers of host cells and the upper epidermal layer becoming separated but also intermixed with host cells especially in the vicinity of the ascomata, hyphae radially orientated when viewed from above, 2–3 µm thick, uneven, smooth-walled; exciple mainly 5–10 µm thick but to about 15 µm near the ostiole, composed of 2–5 layers of interwoven hyphae 2–3 µm thick forming a intricata, compacted, brown but becoming olivaceous in potassium hydroxide, entire, continuing below the centrum at maturity and pigmented throughout; centrum not turning blue in iodine. Pseudoparaphyses cellular, persistent, numerous, regularly septate, branched and irregularly anastomosed, 2–3 µm thick. Asci arising from the tissue lining the base of the ascomatal cavity, vertically orientated, broadly clavate, short-stalked, bitunicate, with a small internal apical beak, 42–50 × (15–)18–20(–26) µm, 8-spored. Ascospores irregularly distichously arranged in the asci, ellipsoid, 1-septate, scarcely constricted at the septum, cells equal in size, rounded at the apices, dark brown, coarsely verruculose, with a thin gelatinous sheath to c. 1 µm thick, (12.5–)13.5–15.5(–17) × (6–)6.5–7.5(–8) µm.

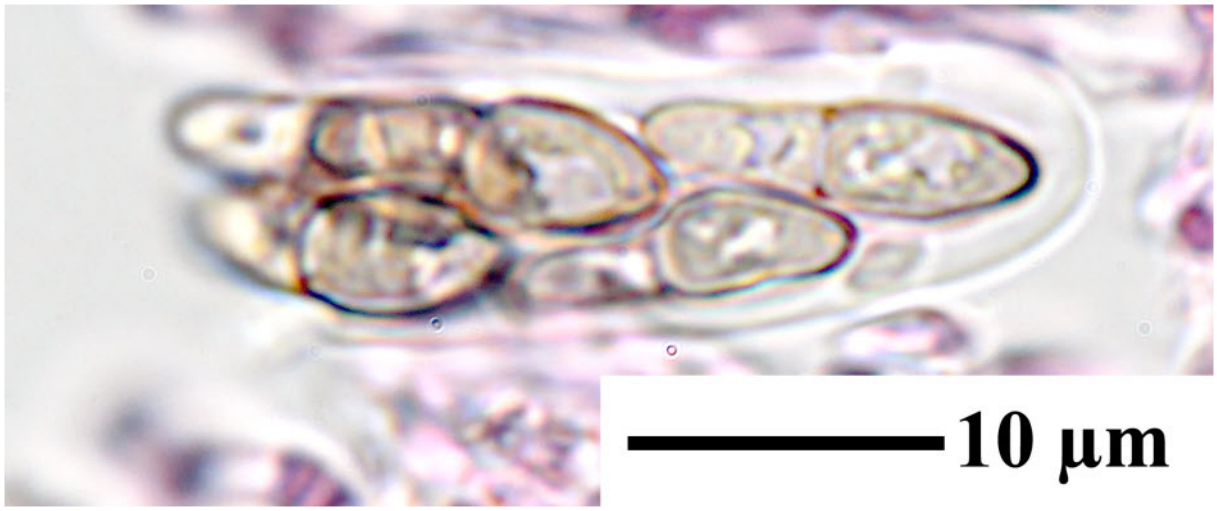
[Williams196], USA, Nebraska, Weeping Water, on bark of Zanthoxylum americanum. Leg. T. A. Williams (no 196), 29.11.1895, det. A. Aptroot. Distributed as ***196 Pyrenula cinerella*** (Flotow) Willey in DECADES OF NORTH AMERICAN LICHENS BY C.E. CUMMINGS, T.A. WILLIAMS & A.H. SEYMOUR.

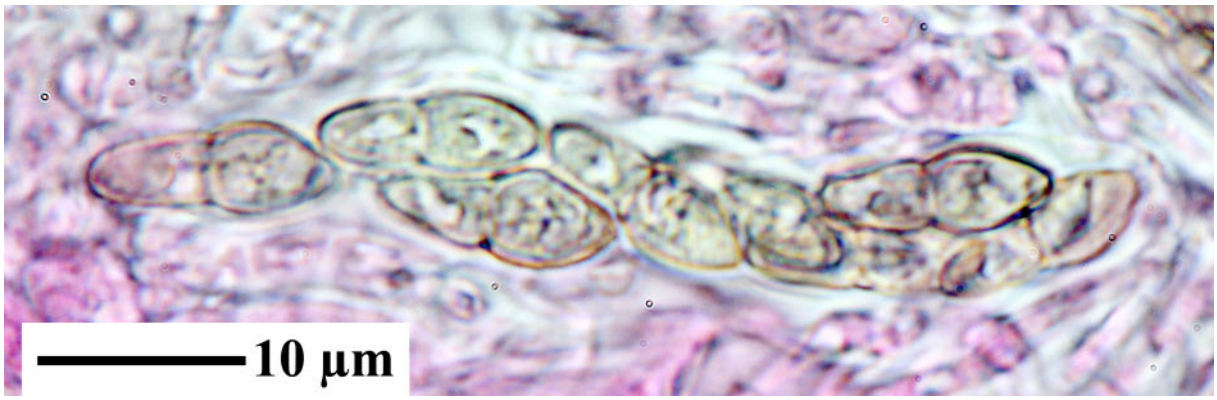


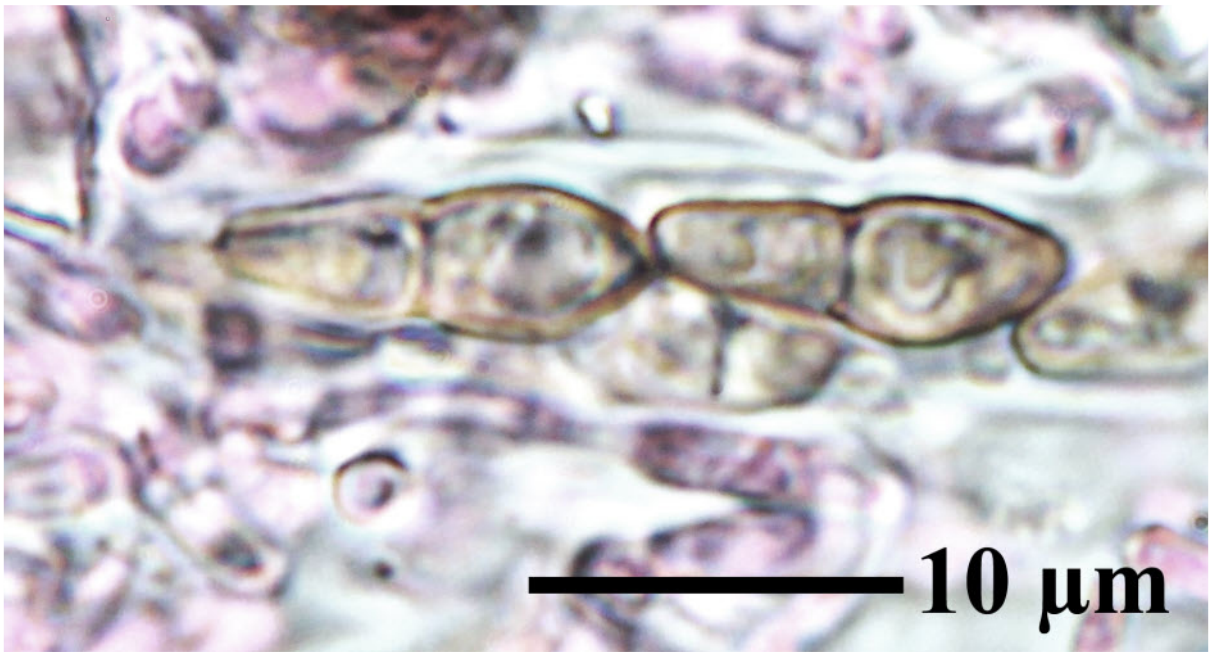
Mycomicrothelia melanospora

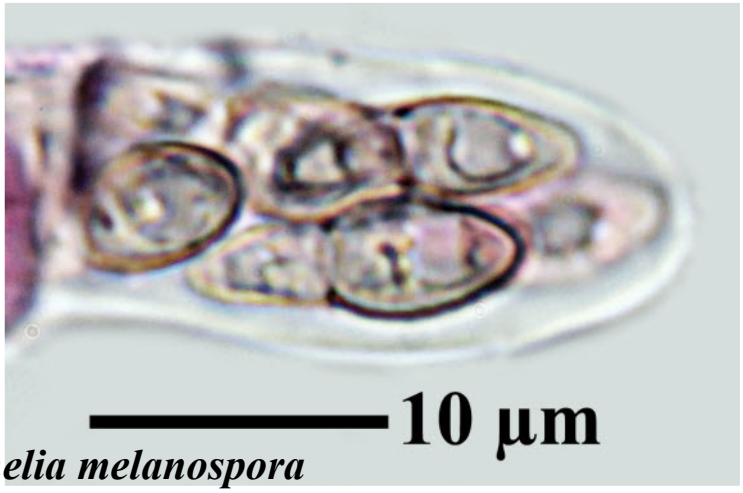


Mycomicrothelia melanospora







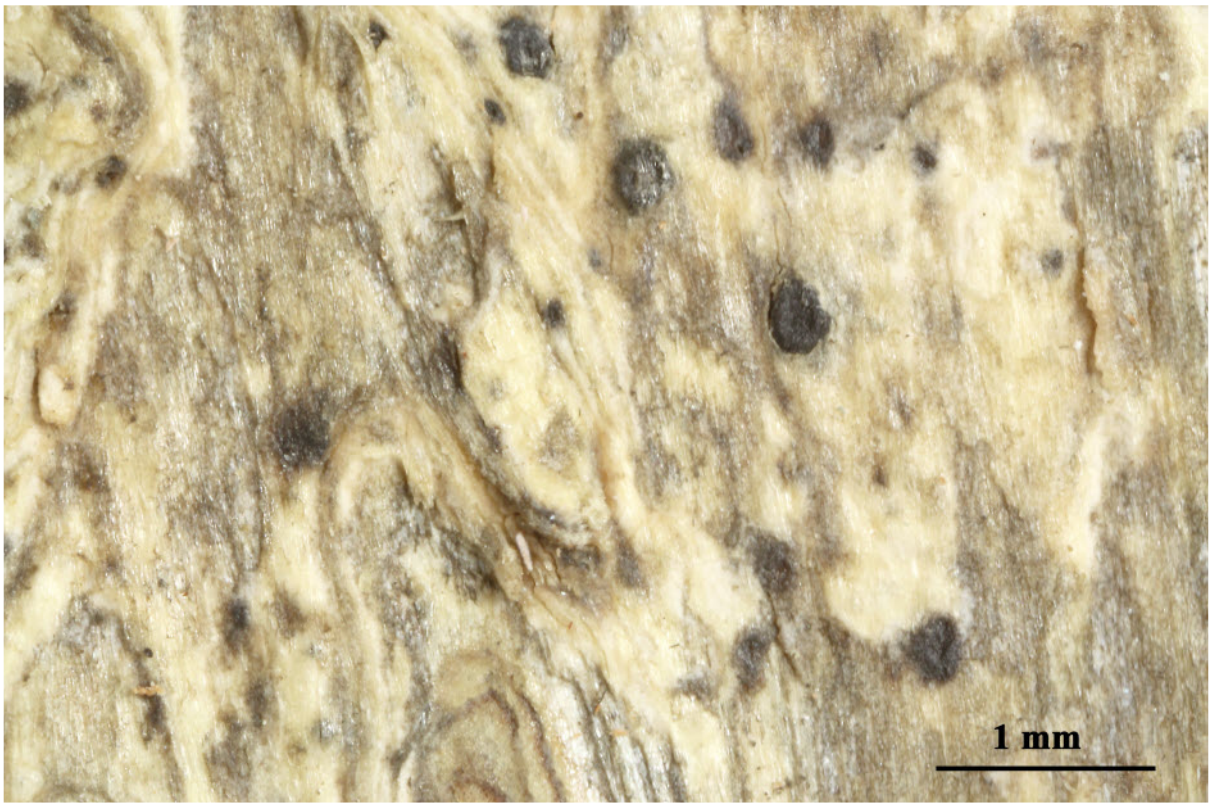


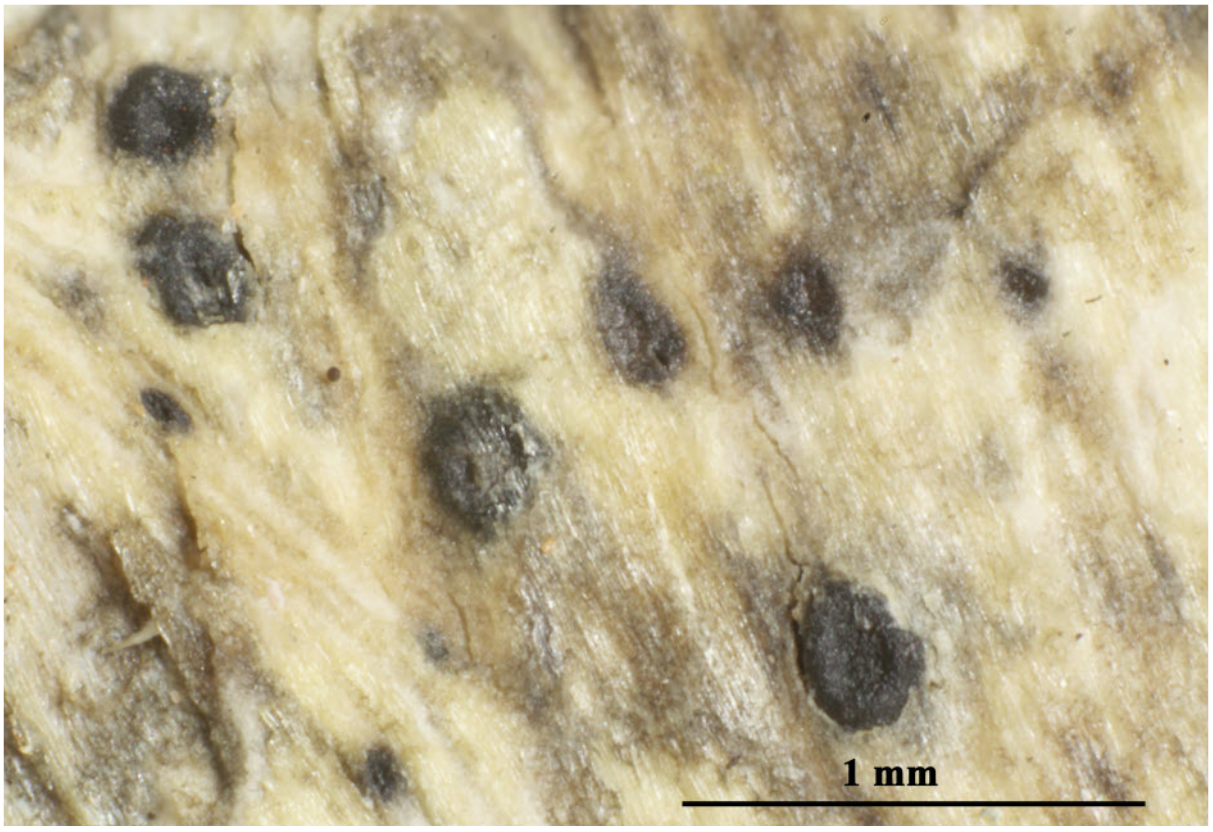
Mycomicrothelia melanospora

Mycomicrothelia wallrothii (Hepp) D. Hawksw., in Hawksworth, James & Coppins, Lichenologist 12(1): 107 (1980)
= *Didymosphaeria wallrothii* (Hepp) Rehm, Hedwigia 18: 163 (1879)
= *Massariopsis wallrothii* (Hepp) Rehm, Annls mycol. 4(3): 270 (1906)
= *Microthelia betulina* J. Lahm, in Körber, Parerga lichenol. (Breslau) 5: 397 (1865)
= *Microthelia cinerella* var. *betulina* (J. Lahm) Boistel, Nouv. Fl. Lich. 2: 289 (1903)
= *Microthelia wallrothii* (Hepp) Grummann, Cat. Lich. Germ. (Stuttgart): 15 (1963)
= *Pyrenula wallrothii* Hepp, Flecht. Europ.: no. 709 (1860)
= *Microthelia oblongata* Mull. Arg. in Flora, Jena 68: 332 (1885).
= *Pyrenula oblongata* (Mull. Arg.) Willey, Enum. Lich. New Bedford: 39 (1892).

Ascomata arising singly, scattered over the surface of the bark which is not discoloured in any way, colonies not delimited, immersed, subepidermal, the epidermis raised to form hemispherical projections, only the ostiole exposed; individual ascomata dimidiate, 150–250(–300) µm diam, 120–160 µm tall, basal fringe well-developed forming an ellipsoid ring to 300 µm wide which is dark grey, ring olivaceous in potassium hydroxide, ostiole depressed, black; involucrellum dark brown, somewhat olivaceous in potassium hydroxide, mainly 20–30 µm thick, consisting of host tissue intermixed with fungal hyphae, hyphae irregularly radially orientated, 2–3 µm thick, uneven, entering and between cells of the host, smooth-walled; exciple 10–18 µm thick, composed of 4–8 layers of densely interwoven hyphae 2–3 µm wide (textura intricata), compacted, subhyaline close to the involucrellum but brown to dark brown for most of its length; centrum not reacting with iodine. Pseudoparaphyses cellular, persistent, numerous, septate, branched and anastomosing, 1–2 µm thick. Asci arising from the tissue lining the base of the ascomata, vertically orientated, elongate-clavate, short-stalked, bitunicate, with a shallow squared internal apical indentation, 35–60 × 14–16(–20) µm, 8-spored. Ascospores irregularly to distichously arranged in the asci, ellipsoid, 1-septate, not to slightly constricted at the septum, cells equal in size, the ends rather abruptly rounded and not attenuated, dark brown, indistinctly verruculose, with a gelatinous sheath c. 1 µm thick, (12–)14–18(–20) × 6–8(–8.5) µm.

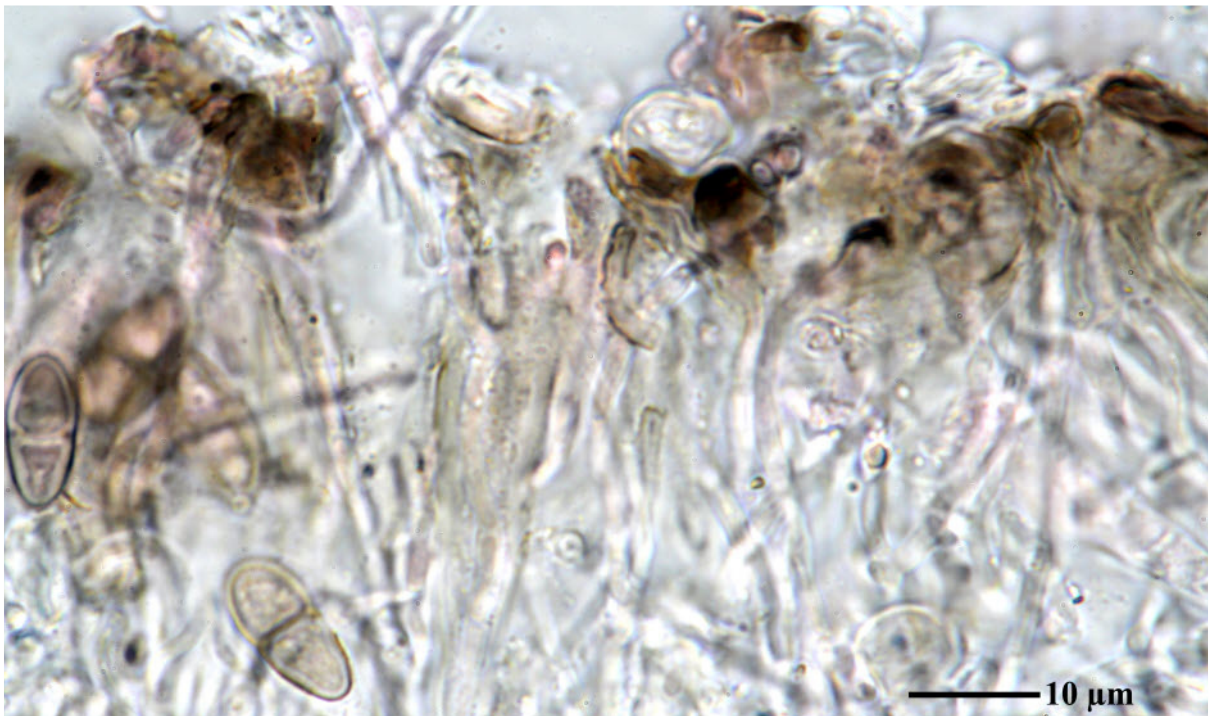
[ABL61829],Great Britain, Scotland, Argyll, Ardnamurchan, Kentra Bay, around Camas Clachach, 0-10 m, on *Betula.* Leg. A. Aptroot (no. 61829), 19.07.2004, det. A. Aptroot, 2004.





Mycomicrothelia wallrothii





Mycomicrothelia wallrothii

Mycomicrothelia wallrothii (Hepp) D. Hawksw., in Hawksworth, James & Coppins, Lichenologist 12(1): 107 (1980)
= *Didymosphaeria wallrothii* (Hepp) Rehm, Hedwigia 18: 163 (1879)
= *Massariopsis wallrothii* (Hepp) Rehm, Annls mycol. 4(3): 270 (1906)
= *Microthelia betulina* J. Lahm, in Körber, Parerga lichenol. (Breslau) 5: 397 (1865)
= *Microthelia cinerella* var. *betulina* (J. Lahm) Boistel, Nouv. Fl. Lich. 2: 289 (1903)
= *Microthelia wallrothii* (Hepp) Grummann, Cat. Lich. Germ. (Stuttgart): 15 (1963)
= *Pyrenula wallrothii* Hepp, Flecht. Europ.: no. 709 (1860)
= *Microthelia oblongata* Mull. Arg. in Flora, Jena 68: 332 (1885).
= *Pyrenula oblongata* (Mull. Arg.) Willey, Enum. Lich. New Bedford: 39 (1892).

Ascomata arising singly, scattered over the surface of the bark which is not discoloured in any way, colonies not delimited, immersed, subepidermal, the epidermis raised to form hemispherical projections, only the ostiole exposed; individual ascomata dimidiate, 150–250(–300) µm diam, 120–160 µm tall, basal fringe well-developed forming an ellipsoid ring to 300 µm wide which is dark grey, ring olivaceous in potassium hydroxide, ostiole depressed, black; involucrellum dark brown, somewhat olivaceous in potassium hydroxide, mainly 20–30 µm thick, consisting of host tissue intermixed with fungal hyphae, hyphae irregularly radially orientated, 2–3 µm thick, uneven, entering and between cells of the host, smooth-walled; exciple 10–18 µm thick, composed of 4–8 layers of densely interwoven hyphae 2–3 µm wide (textura intricata), compacted, subhyaline close to the involucrellum but brown to dark brown for most of its length; centrum not reacting with iodine. Pseudoparaphyses cellular, persistent, numerous, septate, branched and anastomosing, 1–2 µm thick. Asci arising from the tissue lining the base of the ascomata, vertically orientated, elongate-clavate, short-stalked, bitunicate, with a shallow squared internal apical indentation, 35–60 × 14–16(–20) µm, 8-spored. Ascospores irregularly to distichously arranged in the asci, ellipsoid, 1-septate, not to slightly constricted at the septum, cells equal in size, the ends rather abruptly rounded and not attenuated, dark brown, indistinctly verruculose, with a gelatinous sheath c. 1 µm thick, (12–)14–18(–20) × 6–8(–8.5) µm.

[ABL62389], Great Britain, Scotland, Argyll, Sunart, Resipole near Allt Mhic Chiarain river, 0-50 m, on *Corylus*. Leg. A. Aptroot (no 62389), 18-30.07.2004, det. A. Aptroot, 2004.



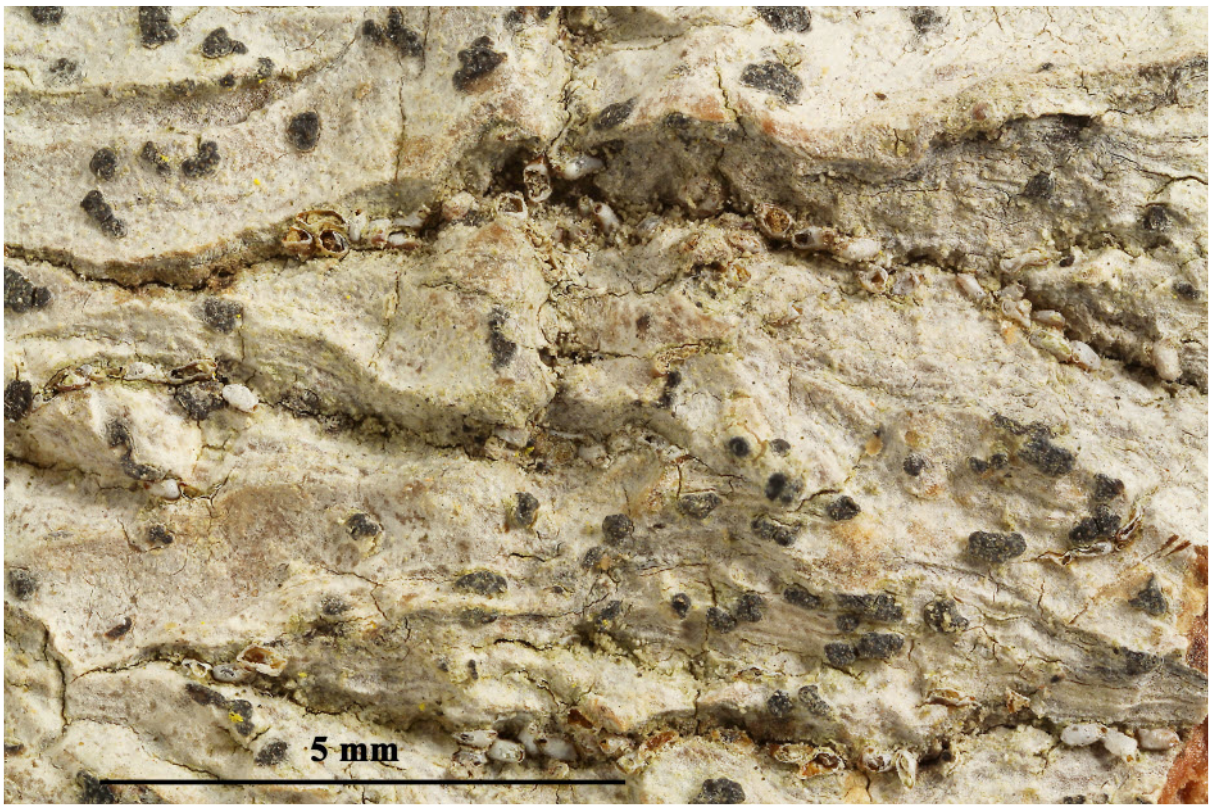


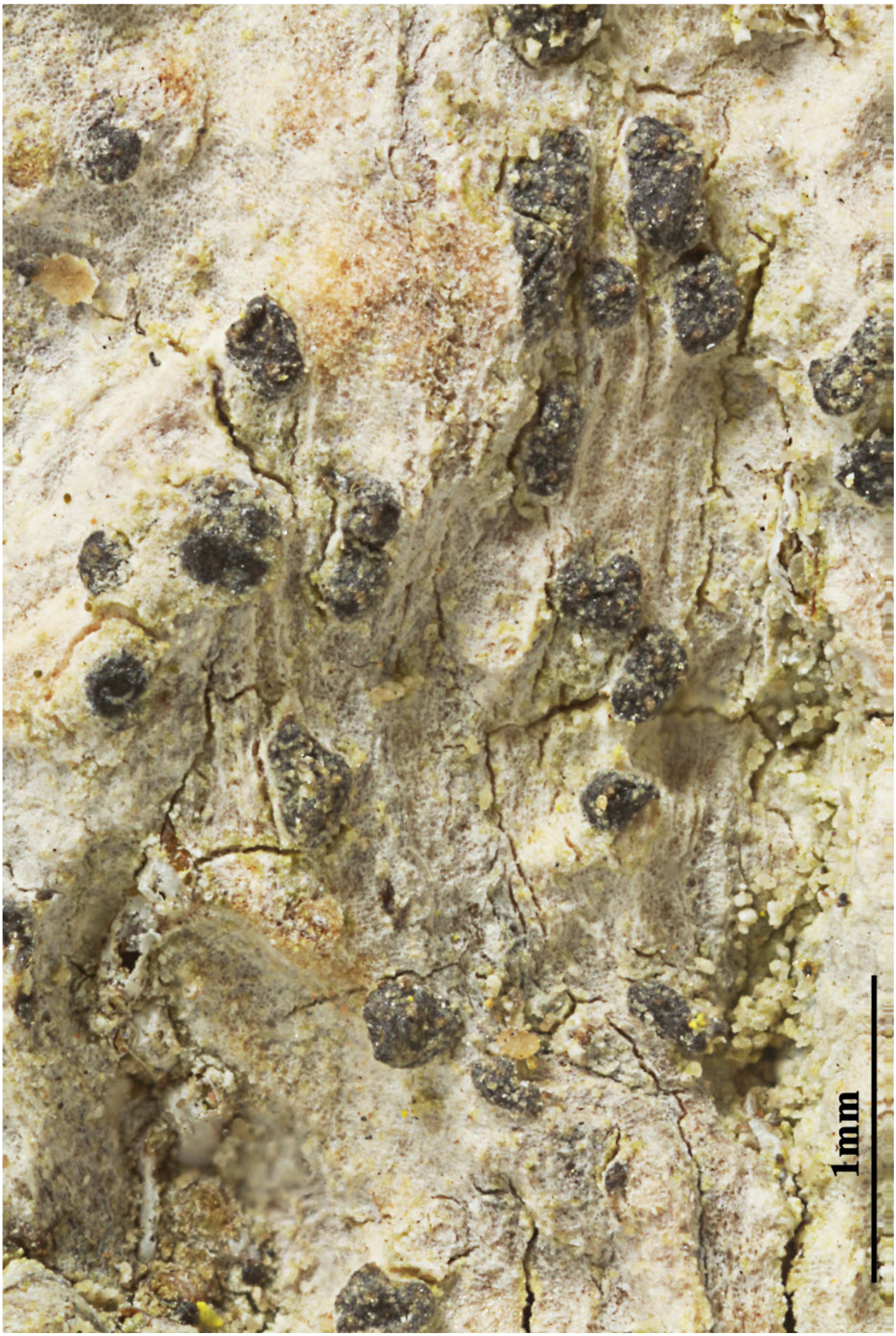
Mycomicrothelia wallrothii

Mycoporum compositum (A. Massal.) R.C. Harris, in Egan, Bryologist 90(2): 164 (1987)
= *Bottaria composita* A. Massal., Miscell. Lichenol.: 43 (1856)
= *Dermatina pyrenocarpa* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 550 (1922)
= *Mycoporum pycnocarpum* Nyl., Flora, Regensburg 41: 381 (1858)
= *Pyrenastrum compositum* Hepp, in Massal, Miscell. Lichenol.: 43 (1856)

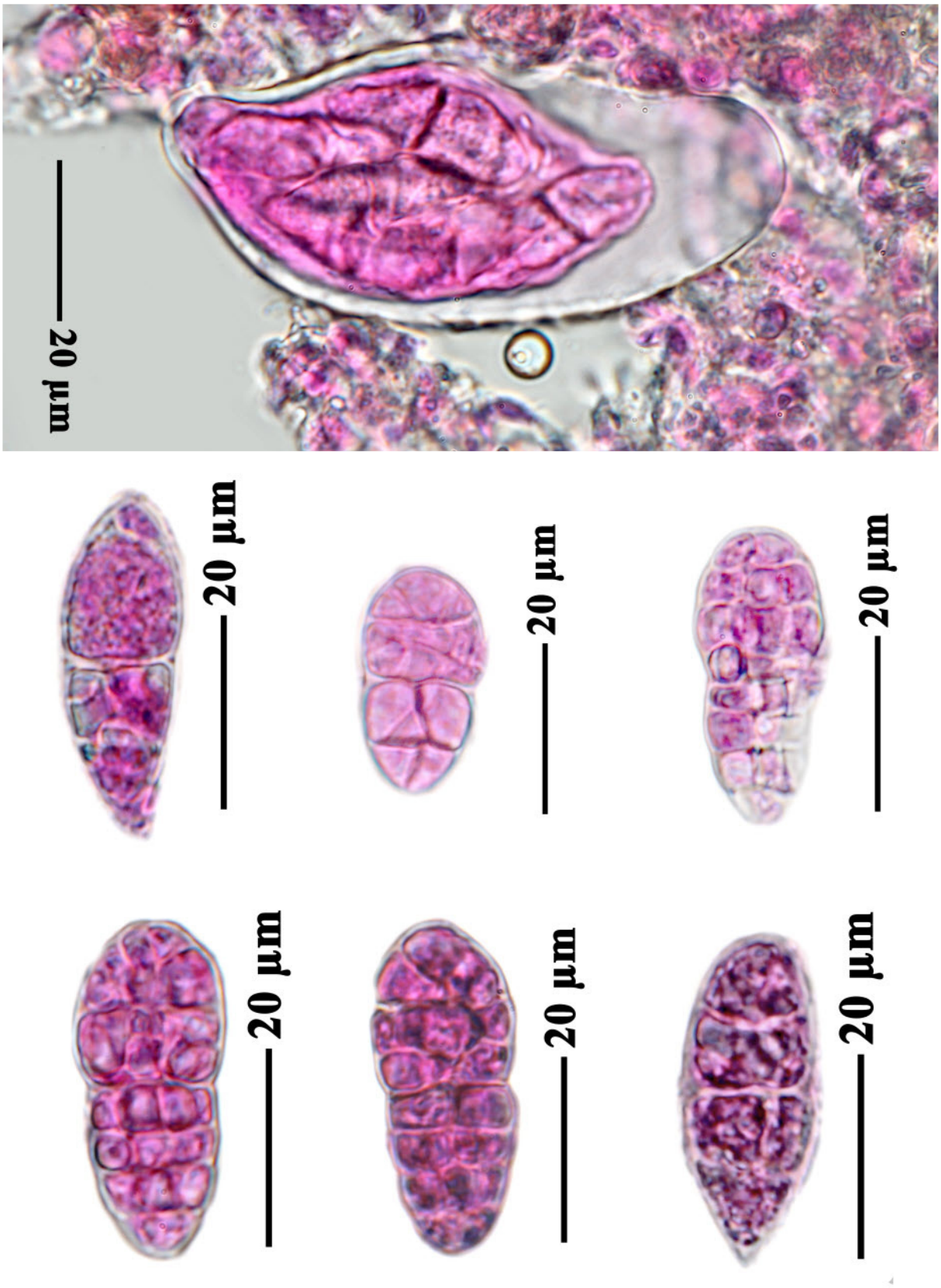
Thallus endophloeodal, indicated by a lighter area on the bark. Trentepohlia present in scattered clumps, not abundant. Ascocarps scattered, dark brown to black, cushion-shaped, elliptical in outline, containing 1–10 separate chambers. Ostioles large, usualy visible due to their lighter colour. Hymenium IKI- nterthecial hyphae not distinct, short celled, much branched and anastomosed, appearing almost parenchymatous. Ascospores 8/ascus, hyaline but soon brown, oblong, muriform with 7–11 traverse septa and 1–3 longitudinale septa, 30–48(–51) × (12–)15–18(–21) µm.

[ISE28953], Brazil, Tocantins, near Itaguatins, in cerrado remnant on farm on bark of tree. Leg. M. Cáceres & A. Aptroot (no 28953), 23.10.2016, det. A. Aptroot, 2016.





Mycoporum compositum



Mycoporum compositum

Mycoporum eschweileri (Müll. Arg.) R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 69 (1995)

= *Arthonia punctiformis* Eschw., in Martius, Fl. bras. enum. pl. 1(1): 110 (1833)

= *Mycoporellum eschweileri* Müll. Arg., Flora, Regensburg 72: 526 (1889)

= *Tomasellia eschweileri* (Müll. Arg.) R.C. Harris, in Tucker & Harris, Bryologist 83(1): 19 (1980)

Thallus ecorticate, whitish, UV-. Perithecia solitary or usually laterally grouped. Ostiole apical. Hamathecium oily, gelatinizing, filaments scarcely visible. Asci pyriform with long tip. Ascospores 8/ascus, hyaline, 1-septate, clavate, 17–20 × 5–6 µm, not ornamented, septum sightly submedian, upper cell somewhat wider than lower cell. Conidiomata absent.

[ABL22121], Brazil, Rio Grande do Sul, Viamão, near Parque Itapua, on palm, 30°05’ S, 51°00’ W, 100 m. Leg. M. Cáceres & A. Aptroot (no 22121), 26.09.2014, det. A. Aptroot, 2014.

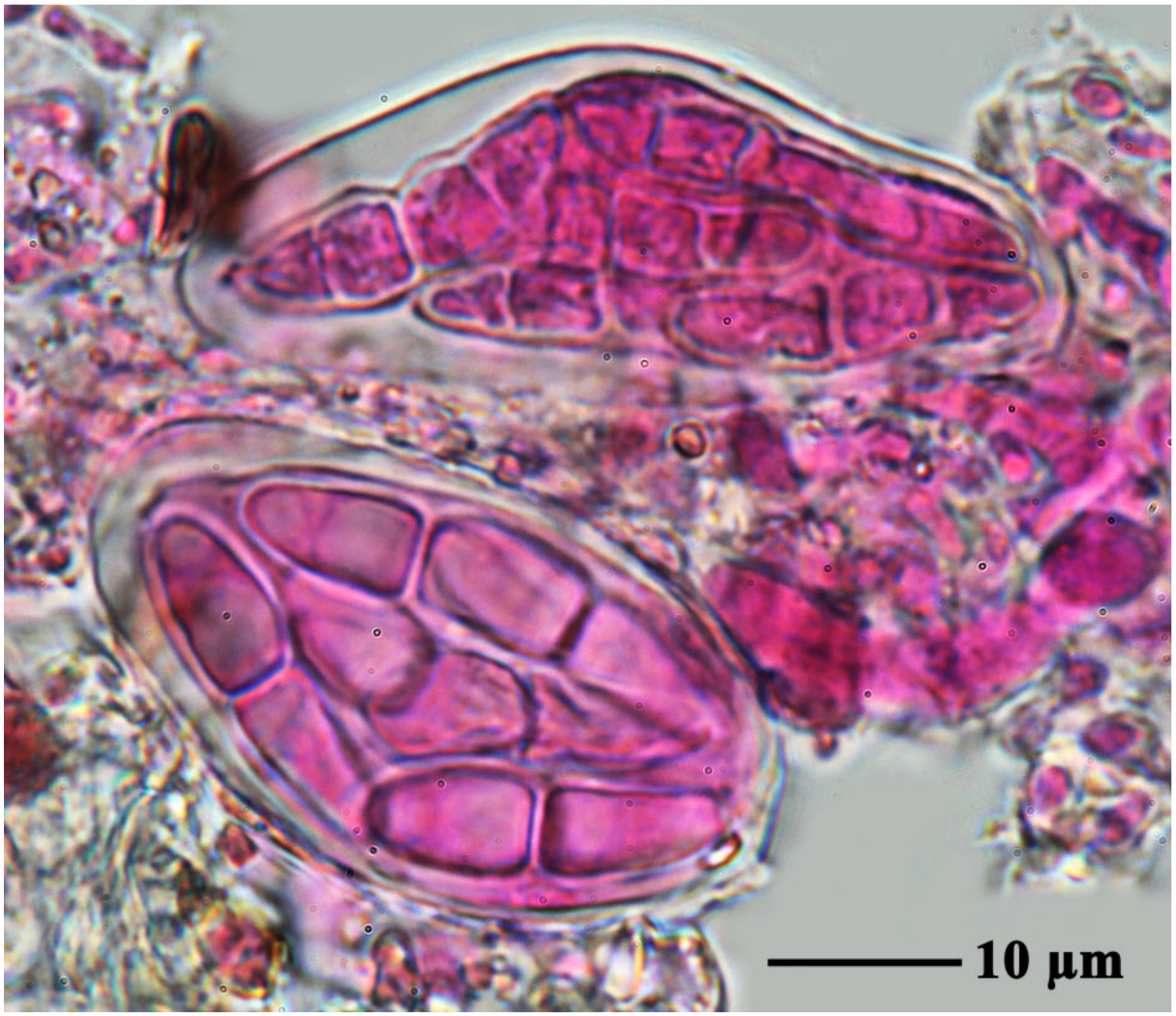




Mycoporum eschweileri



Mycoporum eschweileri







Mycoporum eschweileri

Mycoporum lacteum (Ach.) R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 69 (1995)
= *Mycoporellum lacteum* (Ach.) Zahlbr., Cat. Lich. Univers. 1: 554 (1922)
= *Tomasellia lactea* (Ach.) R.C. Harris, in Hawksworth, James & Coppins, Lichenologist 12(1): 108 (1980)
= *Verrucaria stigmatella* var. *lactea* Ach., Lich. univ.: 277 (1810)

Thallus ecorticate, whitish, UV-. Perithecia solitary, or usually laterally grouped. Ostiole apical. Hamathecium oily, gelatinizing, filaments scarcely visible. Asci pyriform, with long tip. Ascospores 8/ascus, hyaline 1-septate, clavate, 20–26 × 6.5–8 µm, not ornamented, septum slightly submedian, upper cell somewhat wider than lower cell. Conidiomata absent.

[ISE17846], Brazil, Santa Catarina, São Francisco do Sul, Parque Estadual do Acaraí. In restinga vegetation on tree. 26°19’14” S, 48°33’13” W, 10 m. Leg. M. Cáceres & A. Aptroot (no 17846), 7.10.2015, det. A. Aptroot, 2015.





Mycoporum lacteum



Mycoporum lacteum

Mycoporum sparsellum Nyl.,Ann. Sci. Nat. Bot. ser. 5, 7: 343, (1867)

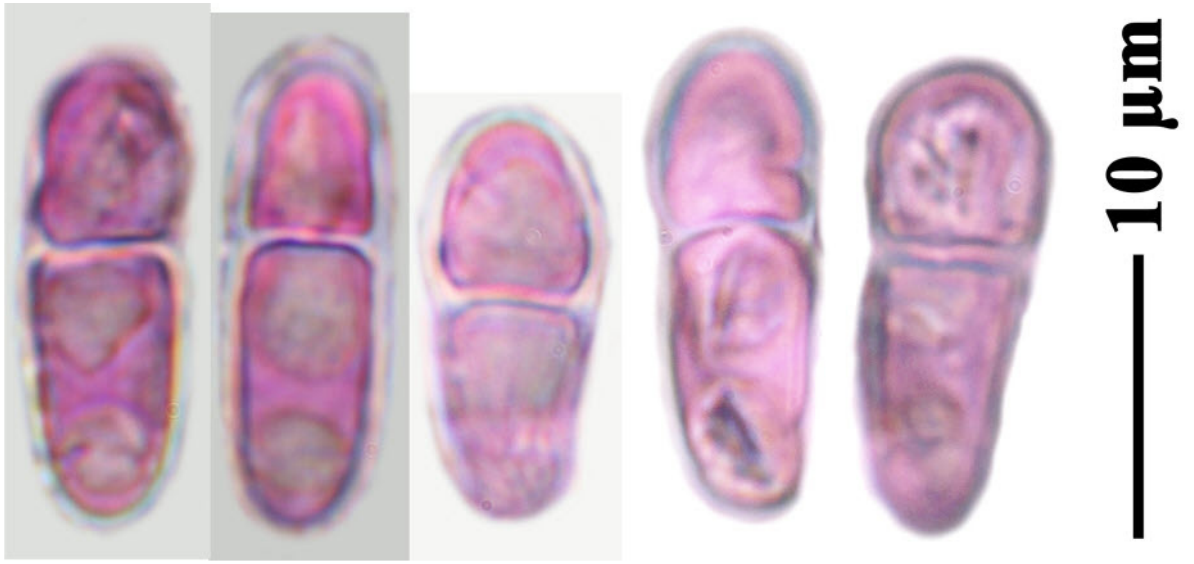
Thallus ecorticate, whitish, UV-. Perithecia solitary, or usually laterally grouped.Ostiole apical. Hamathecium oily, gelatinizing, filaments scarcely visible. Asci pyriform, with long tip. Ascospores 8/ascus, hyaline 1-septate, clavate, 18–22 × 8–10 µm, not ornamented, septum slightly submedian, upper cell somewhat wider than lower cell. Conidiomata absent.

[ABL13541], Brazil, Sergipe, Parque Nationmal Serra da Itabaiana, on bark in transitional forest. 10°44’35’’ S, 37°20’25’’ W, 400 m. Leg.M. Cáceres & A. Aptroot (no 13541), 6.09.2012, det. A. Aptroot, 2012.





Mycoporum sparsellum





Mycoporum sparsellum

Novomicrothelia oleosa (Aptroot) Aptroot, M.P. Nelsen & Lücking, in Lücking et al., Lichenologist 48(6): 758 (2016)

= *Mycomicrothelia oleosa* Aptroot, Biblthca Lichenol. 44: 133 (1991)

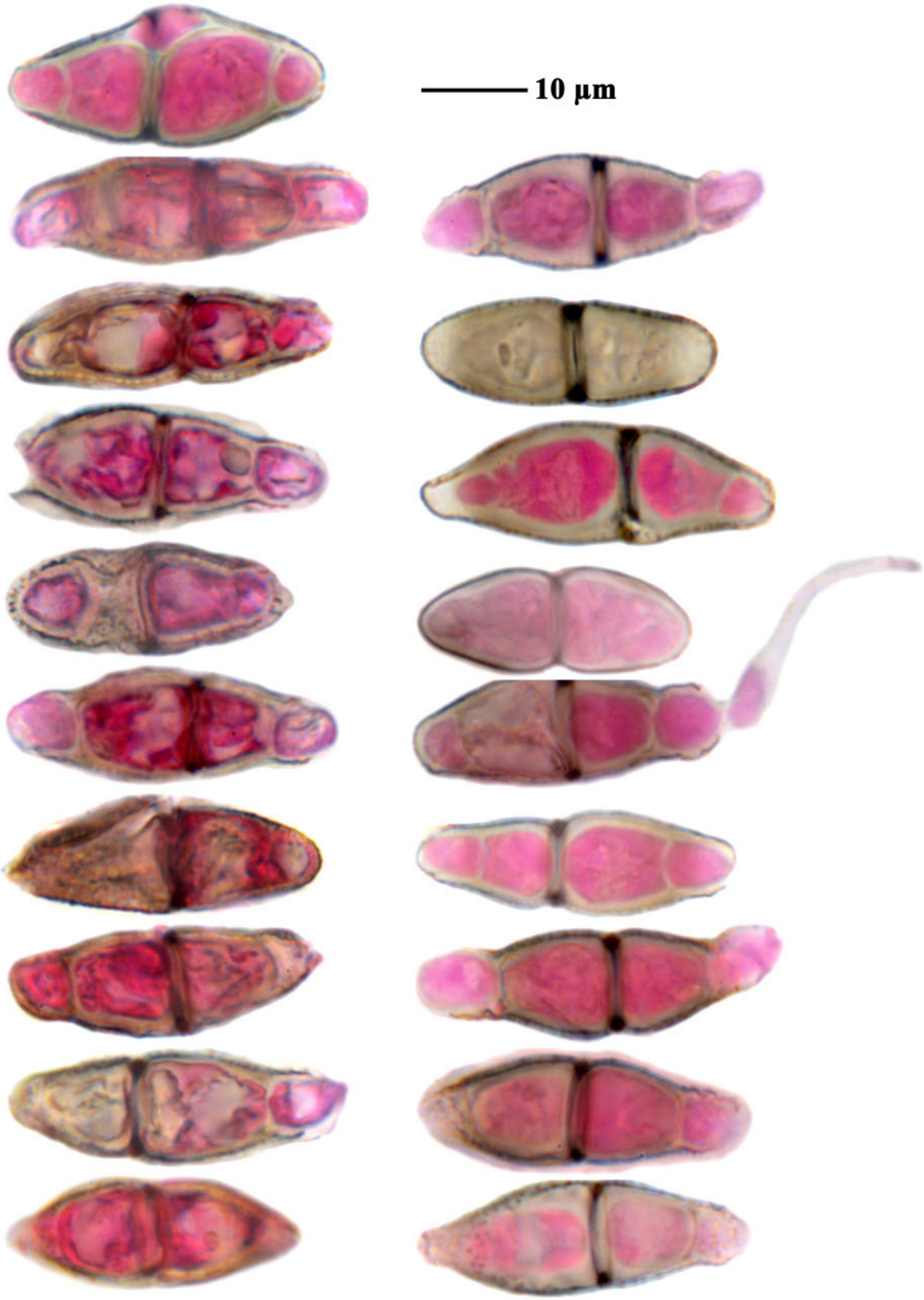
Thallus ecorticate, whitish grey, smooth to uneven, without prothallus-lines. Ascomata with apical ostioles, solitary, 0.3–0.5 mm diam., erumpent to prominent, lense-shaped to hemispherical with spreading base (fringe), exposed and black. Hamathecium inspersed. Ascospores 8/ascus, 1-septate, ellipsoid-oval, not constricted at septum, 24–33 × 8–12 µm, brown, verruculose. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[Britton869], Trinidad, Caroni, north bank road. Leg. Britton (no 869) et al., det. A. Aptroot, 2001.





Novomicrothelia oleosa



Novomicrothelia oleosa

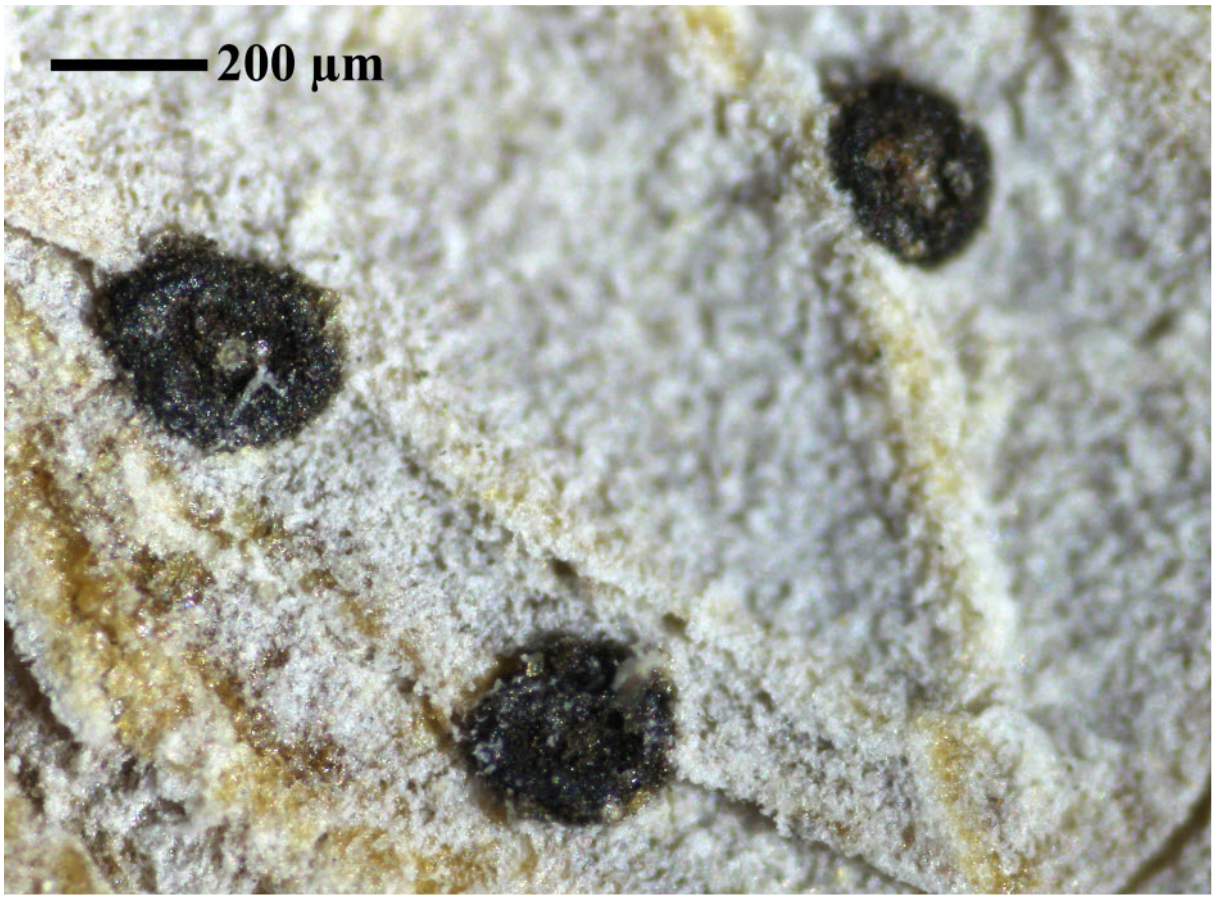
Papilionovela albothallina Aptroot, Mycol. Res. 101(3): 266 (1997)

Mycelium immersed, not lichenized, white, scurfy, up to 10 cm diam., surrounded by a black hypothallus. Apothecia erumpent, discoid, dark brown, 0.2–0.4 mm diam., margin concolourous, partly covering the disc. Epihymenium colourless. Hymenium colourless. Hypothecium colourless. Excipulum colourless, existing of a high margin, which partly covers the disc with a ca. 18–20 µm veil. Lower excipulum ca. 6.6–8.3 µm thick, with periclinal hyphae. Periphyses present on the inner side of the margin, clavate. Paraphyses present, simple, septate, 1.2 µm wide, often slightly longer than the asci, tips slightly clavate. Asci unitunicate, cylindrical, ca. 33 × 8.5 µm, tips thin, without apical apparatus, IKI- negative, also after pre-treatment with KOH. Ascospores 8/ascus, uniseriate to irregularly arranged, colourless, 1(-3)-septate, long ellipsoid, 8–12 × 2.5–3 µm, ornamented with two colourless, gelatinous wings.

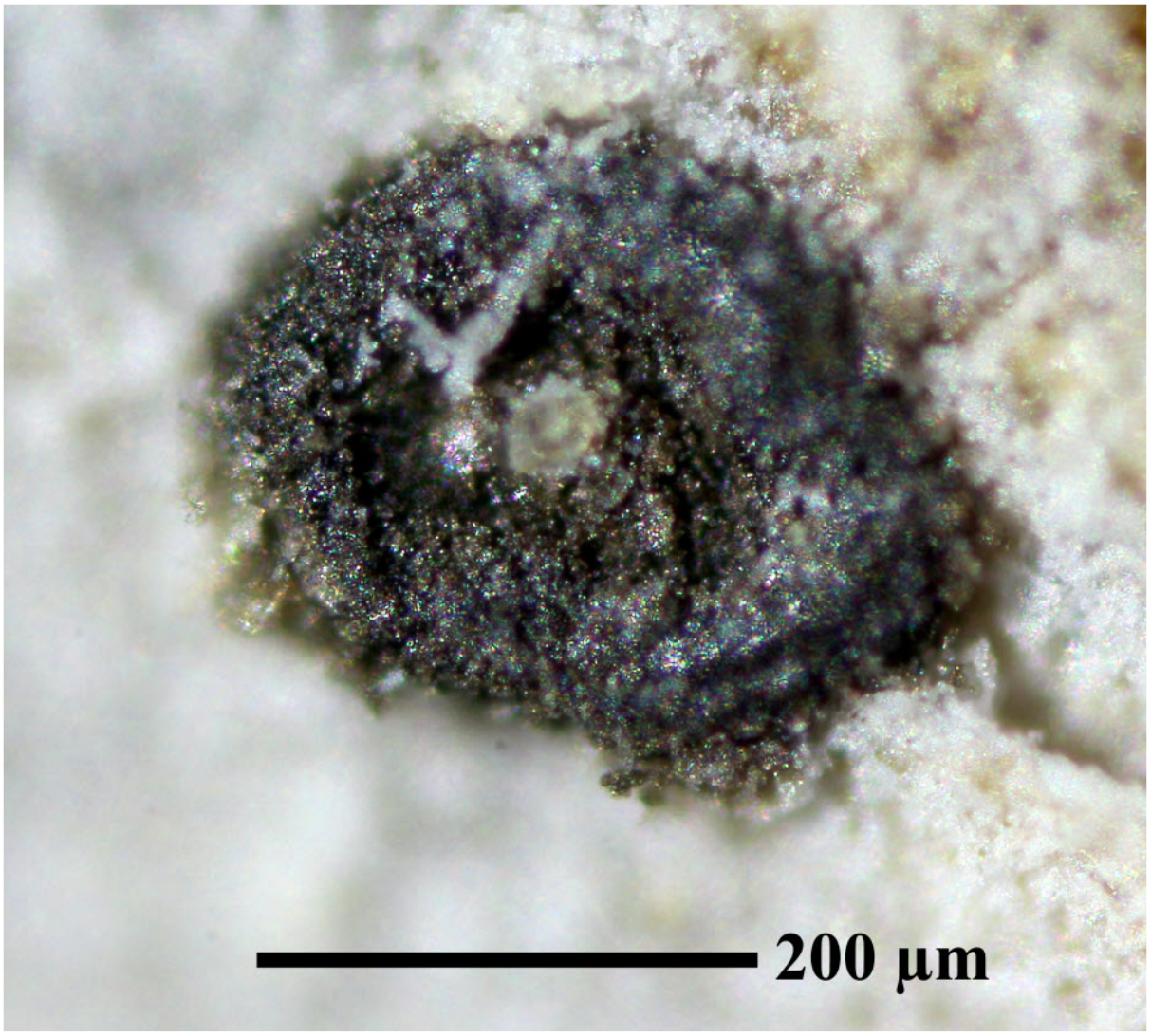
[ABL18451], Brazil, Sergipe, Parque National Serra de Itabaiana, entrance, in atlantic froest remnant, on tree bark. 10°45’57” S, 37°20’20” W, c. 200 m alt. Leg. A. Aptroot & M. Cáceres, 18. Sept. 2013, det. A. Aptroot, 2013.

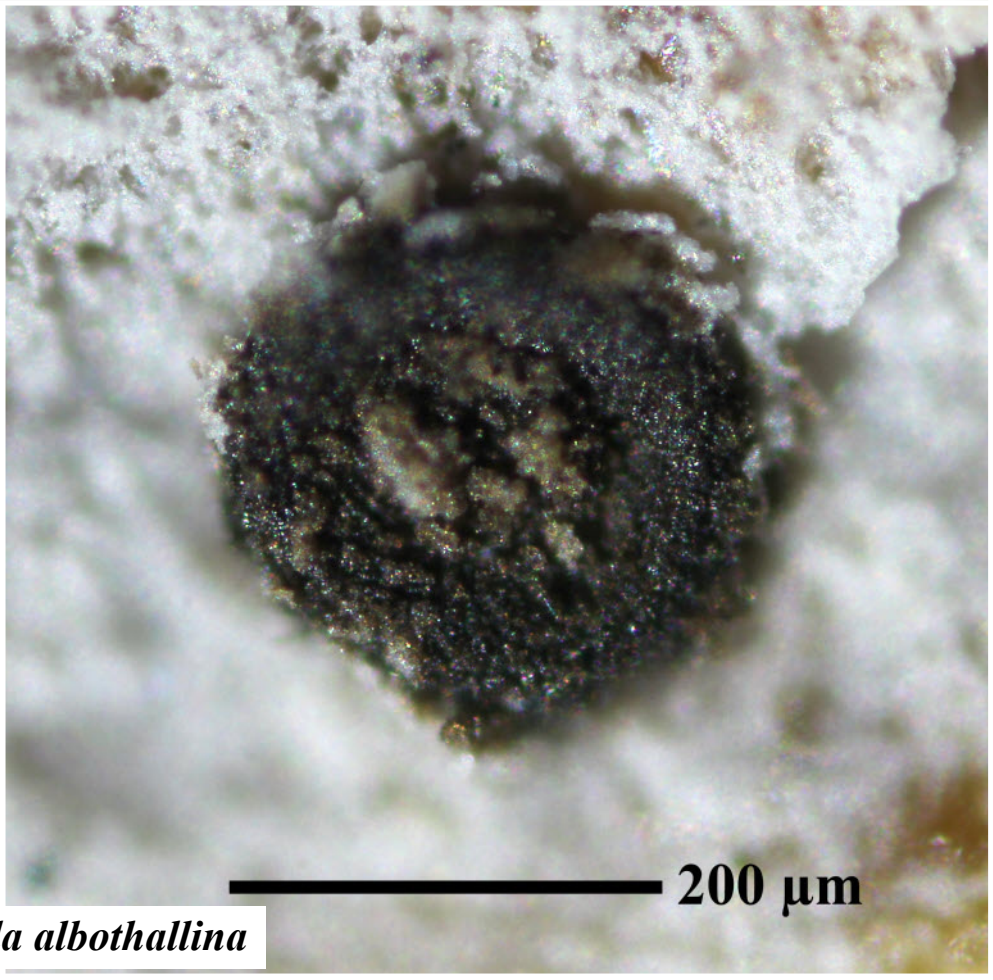




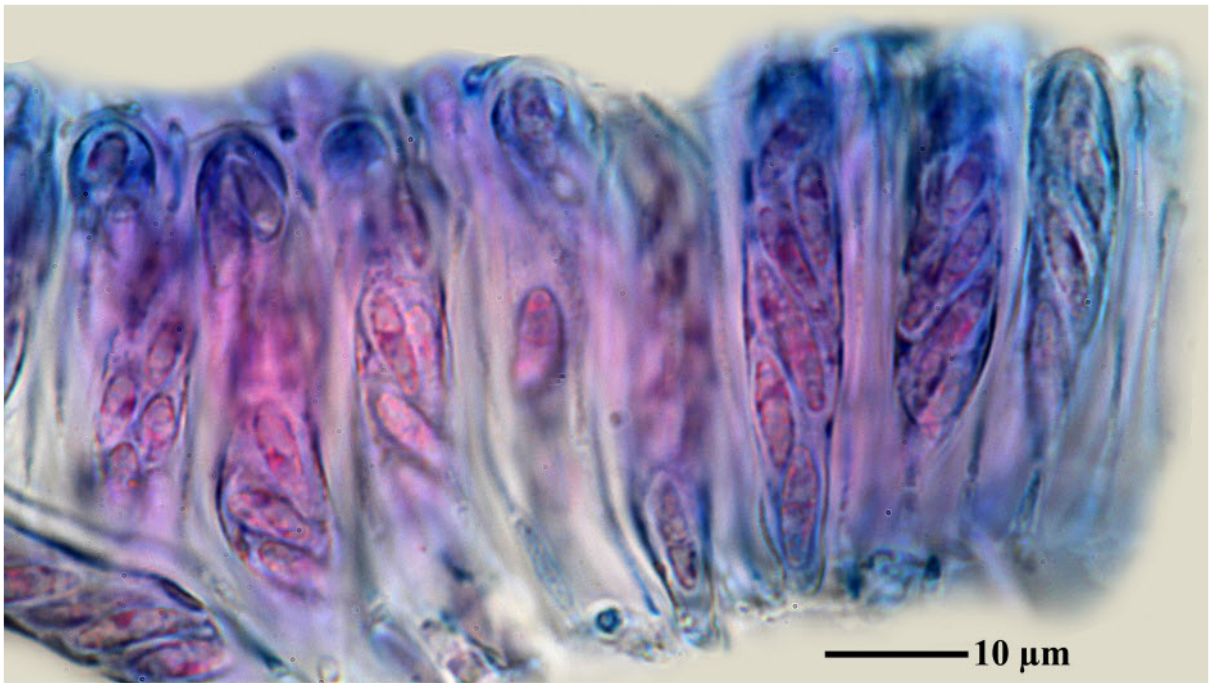


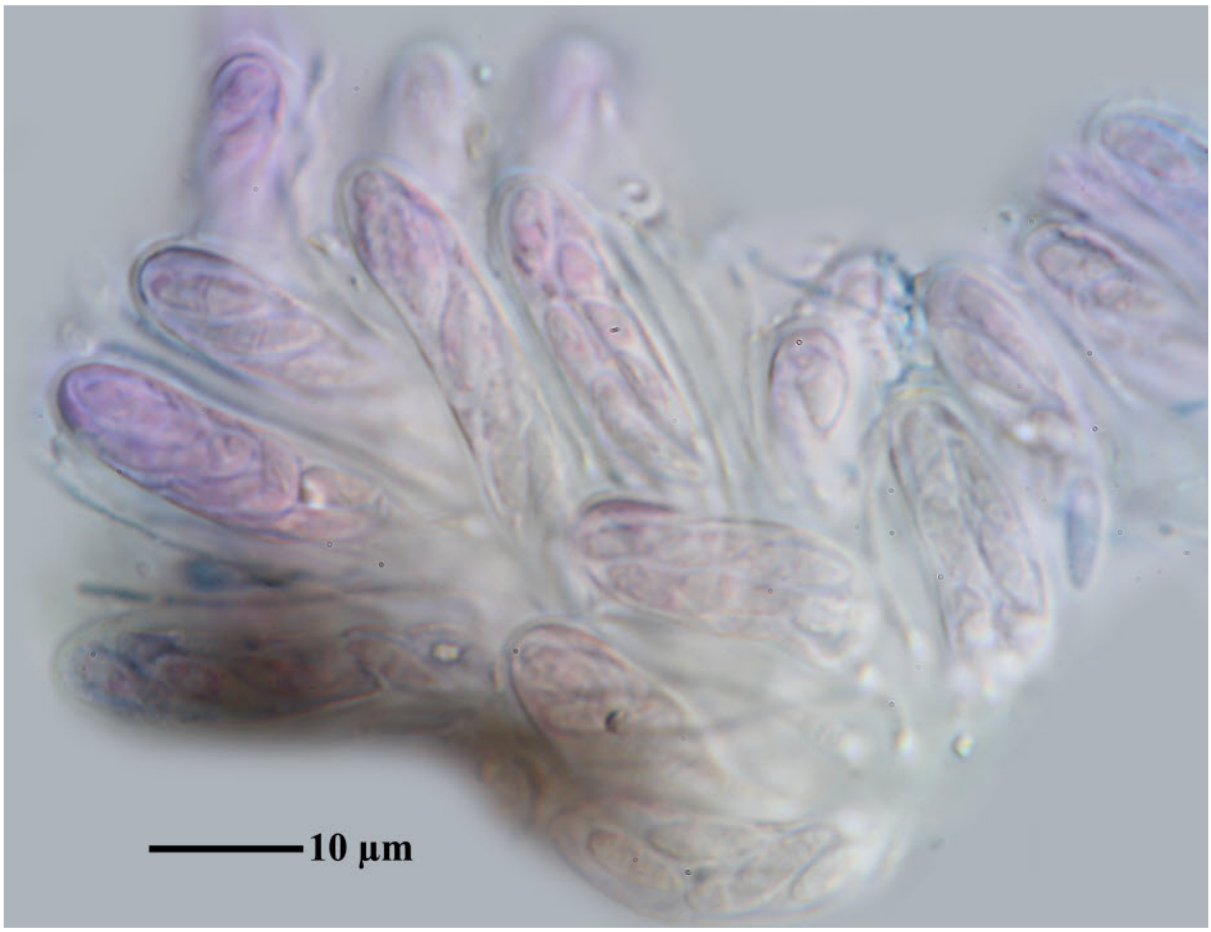
Papilionovela albothallina





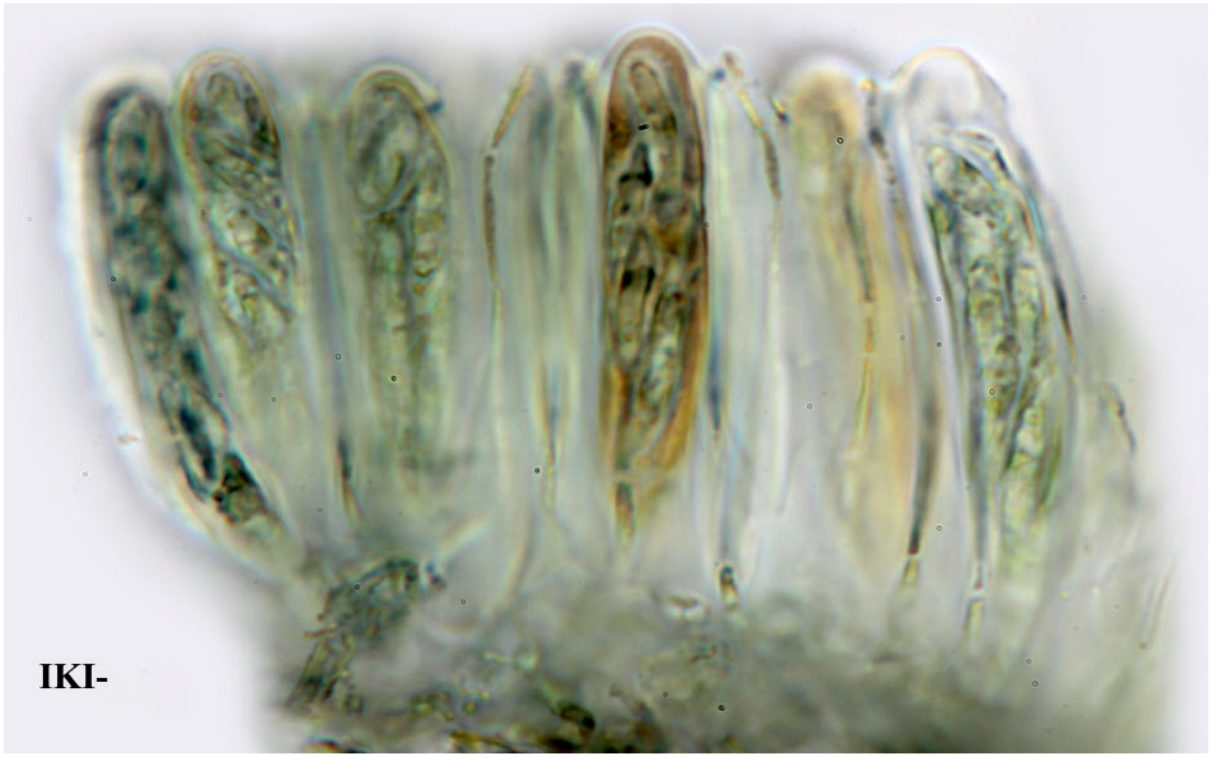
Papilionovela albothallina



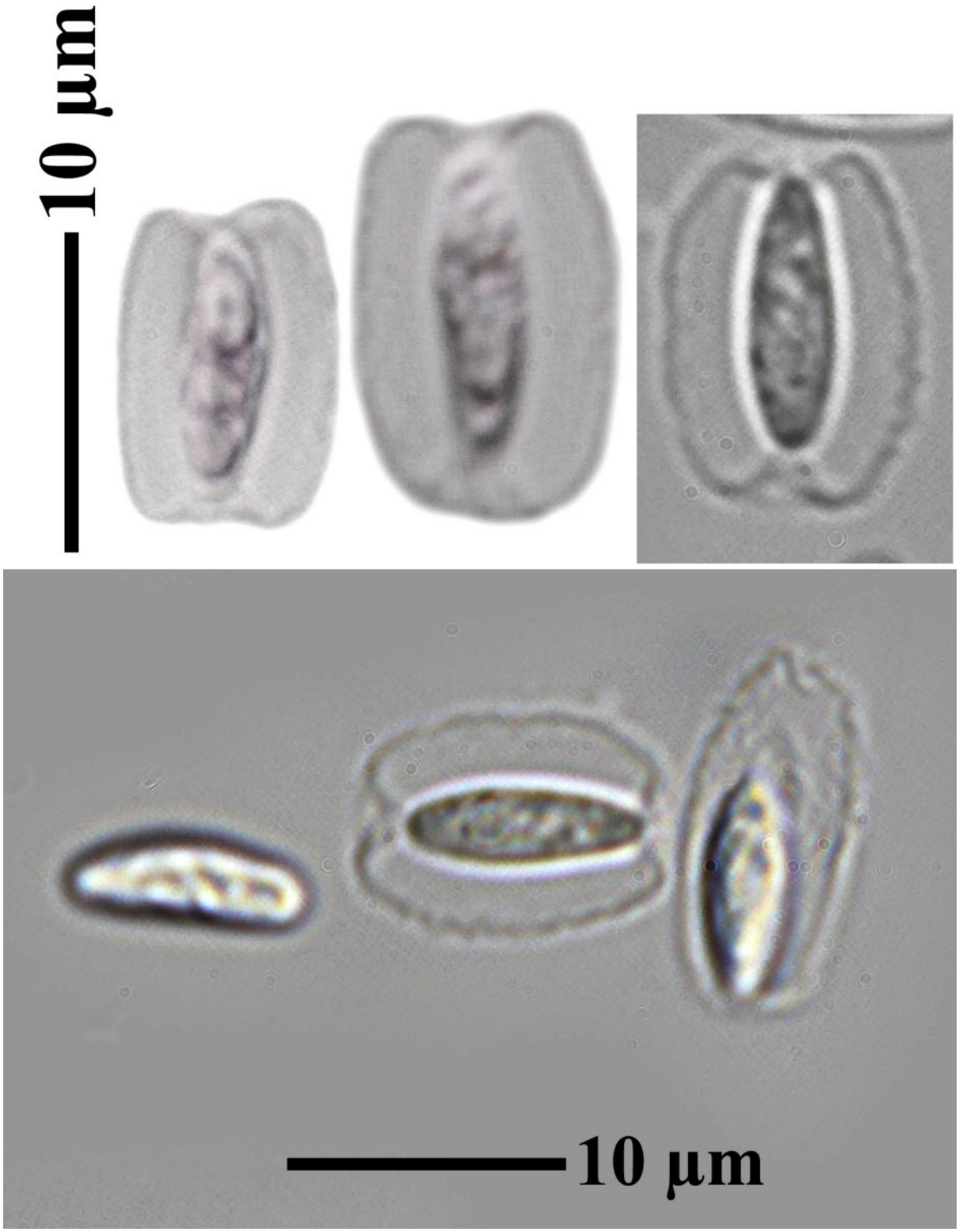


Papilionovela albothallina

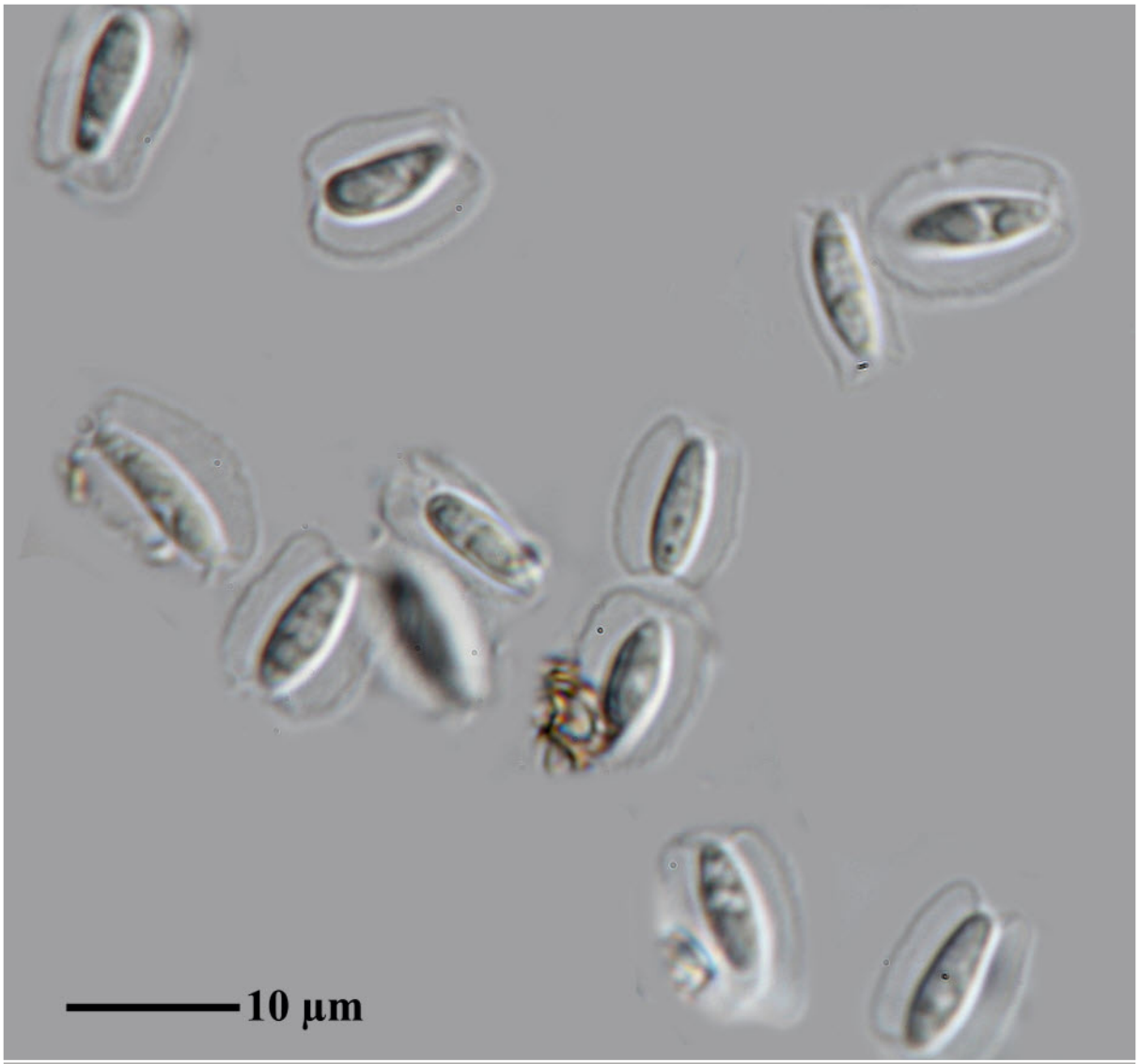




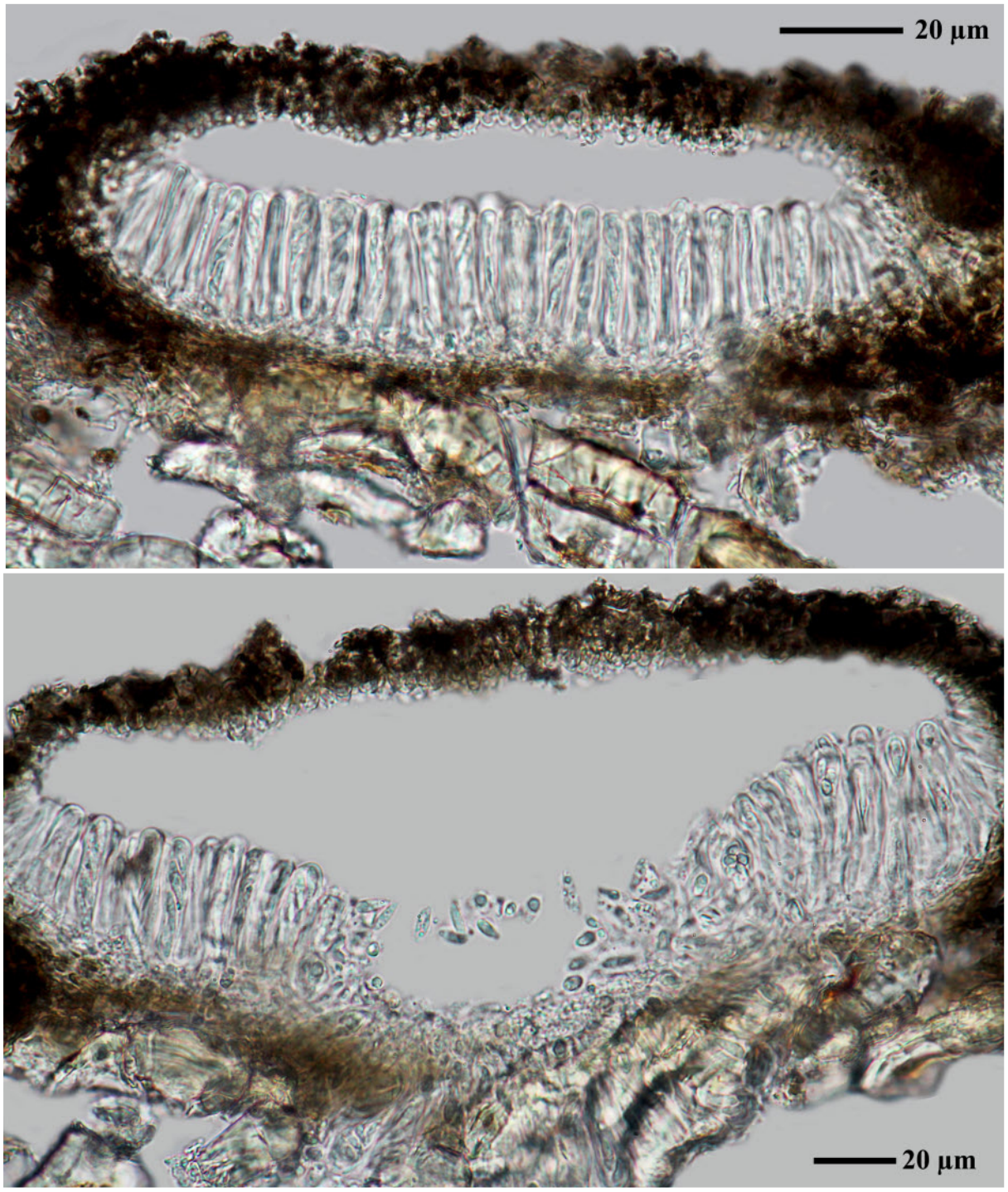
Papilionovela albothallina



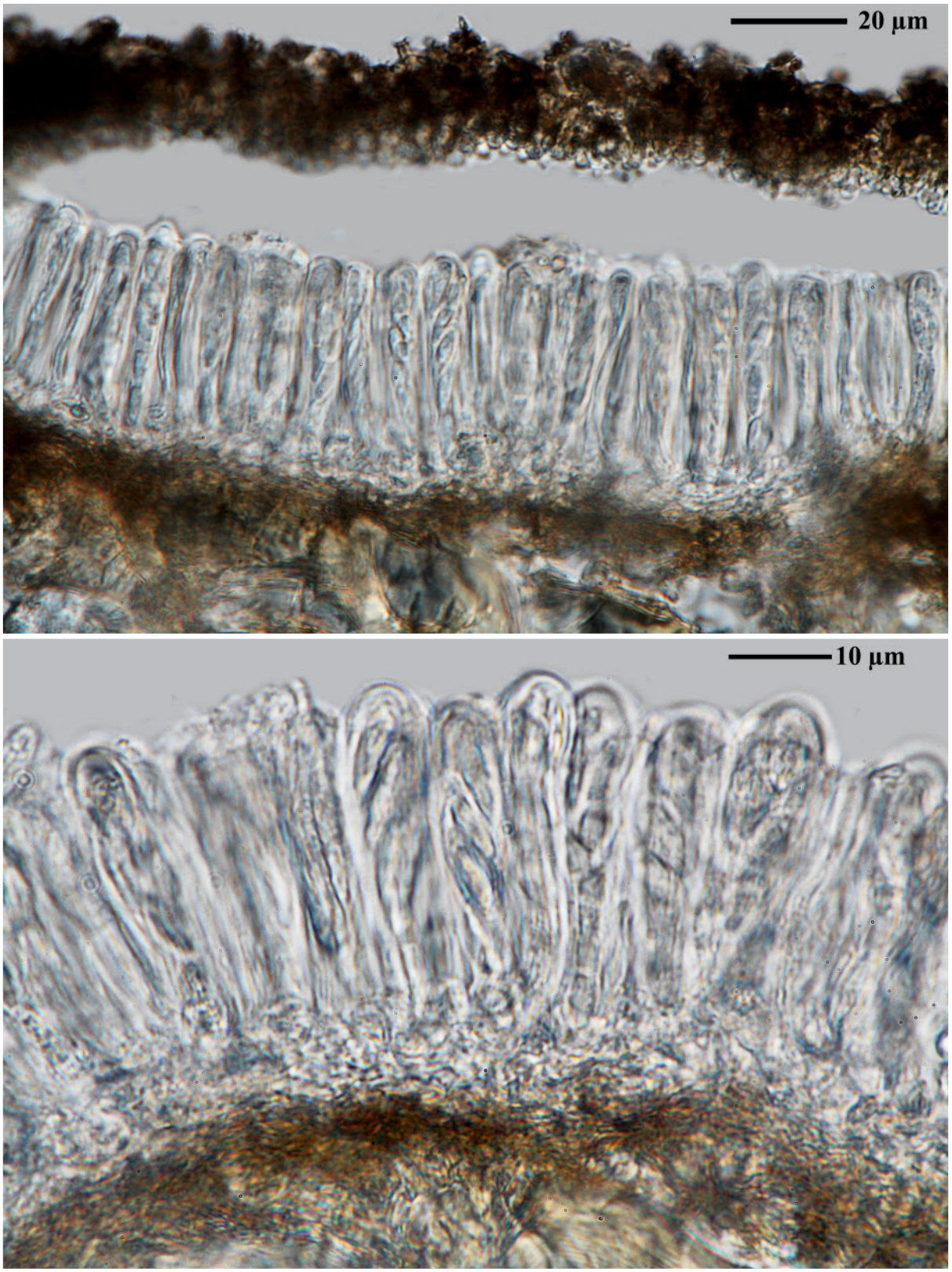
Papilionovela albothallina



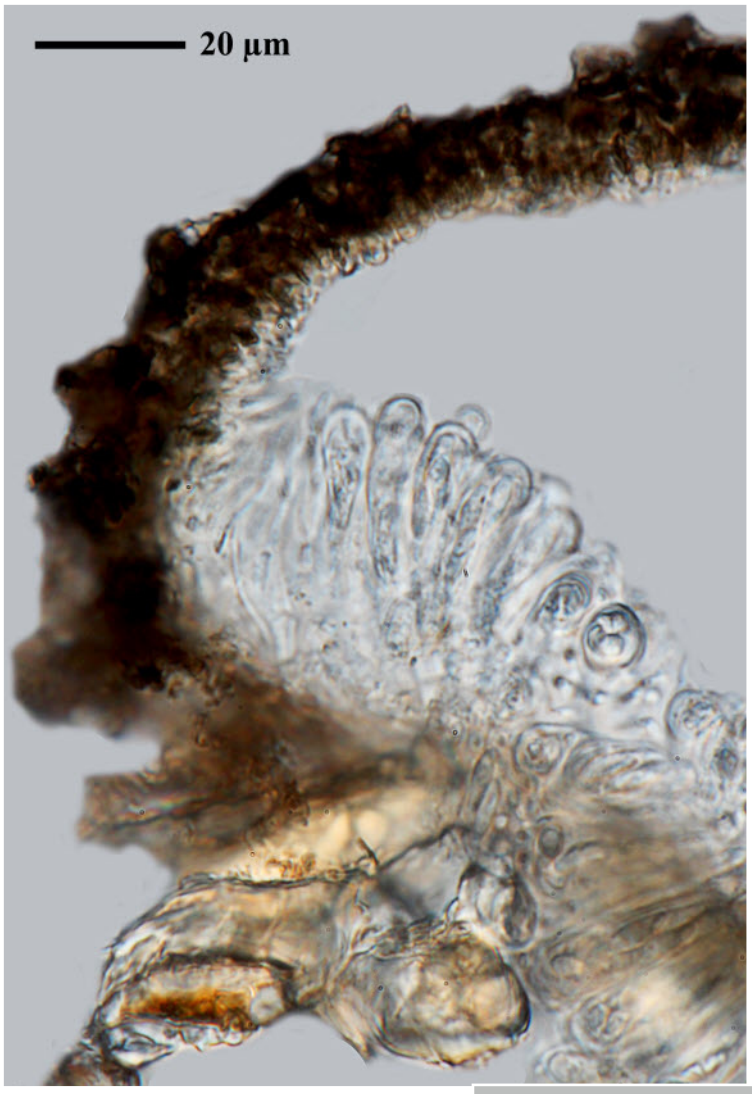
Papilionovela albothallina

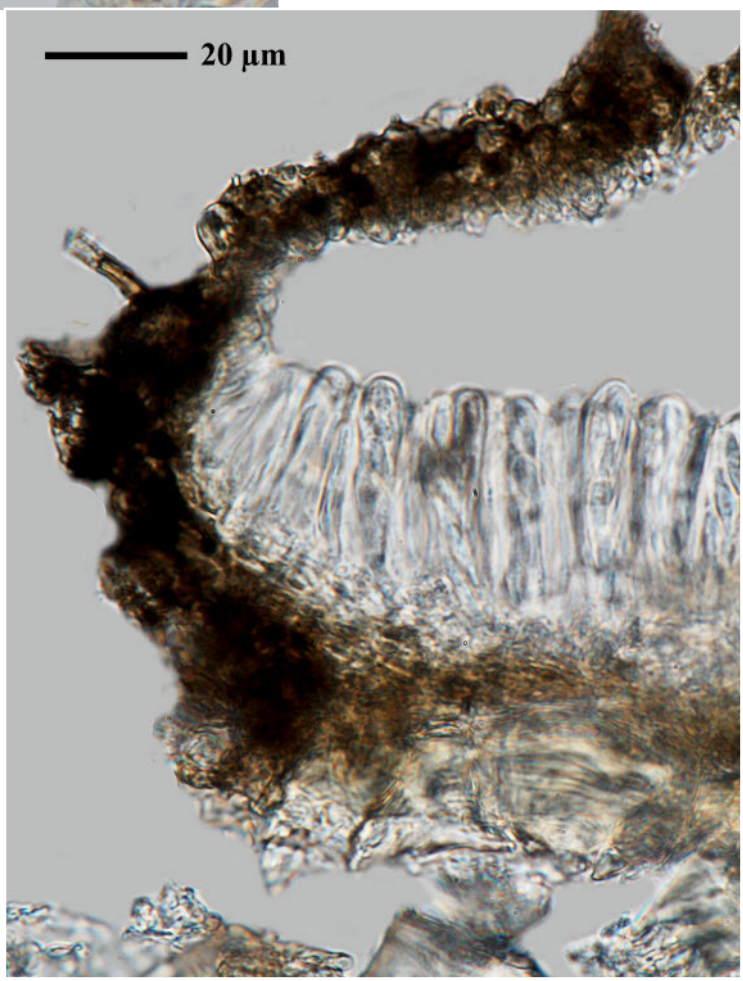


Papilionovela albothallina

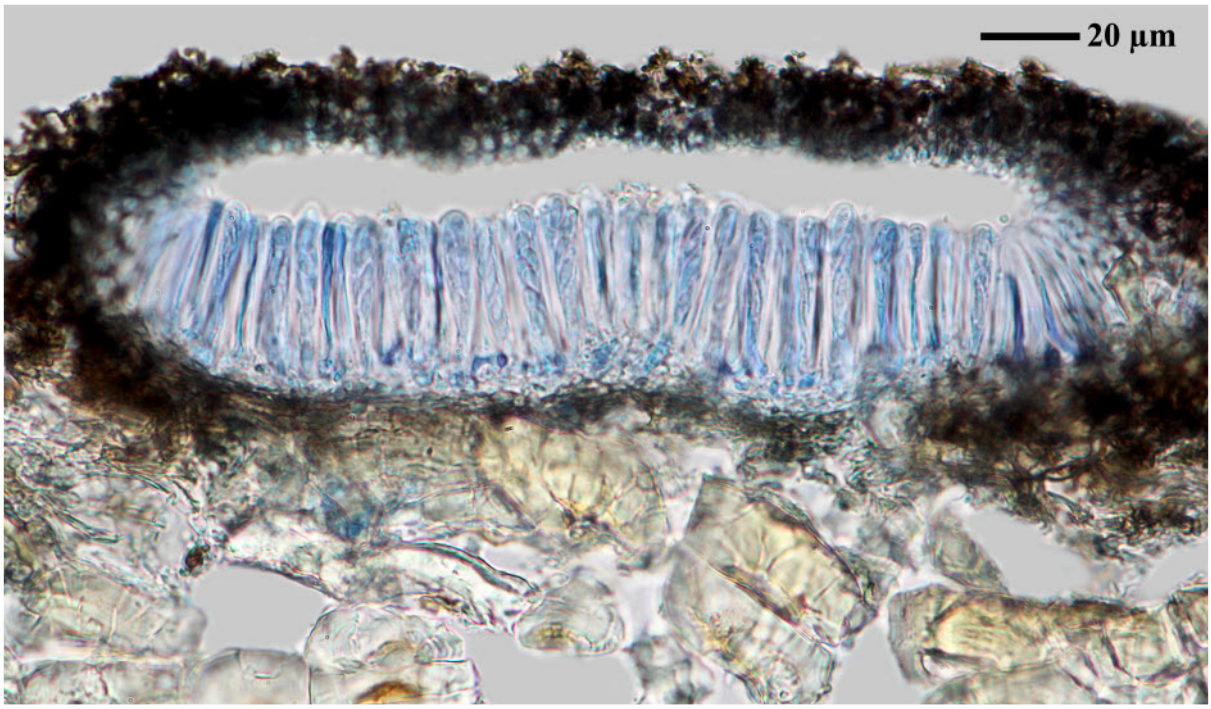


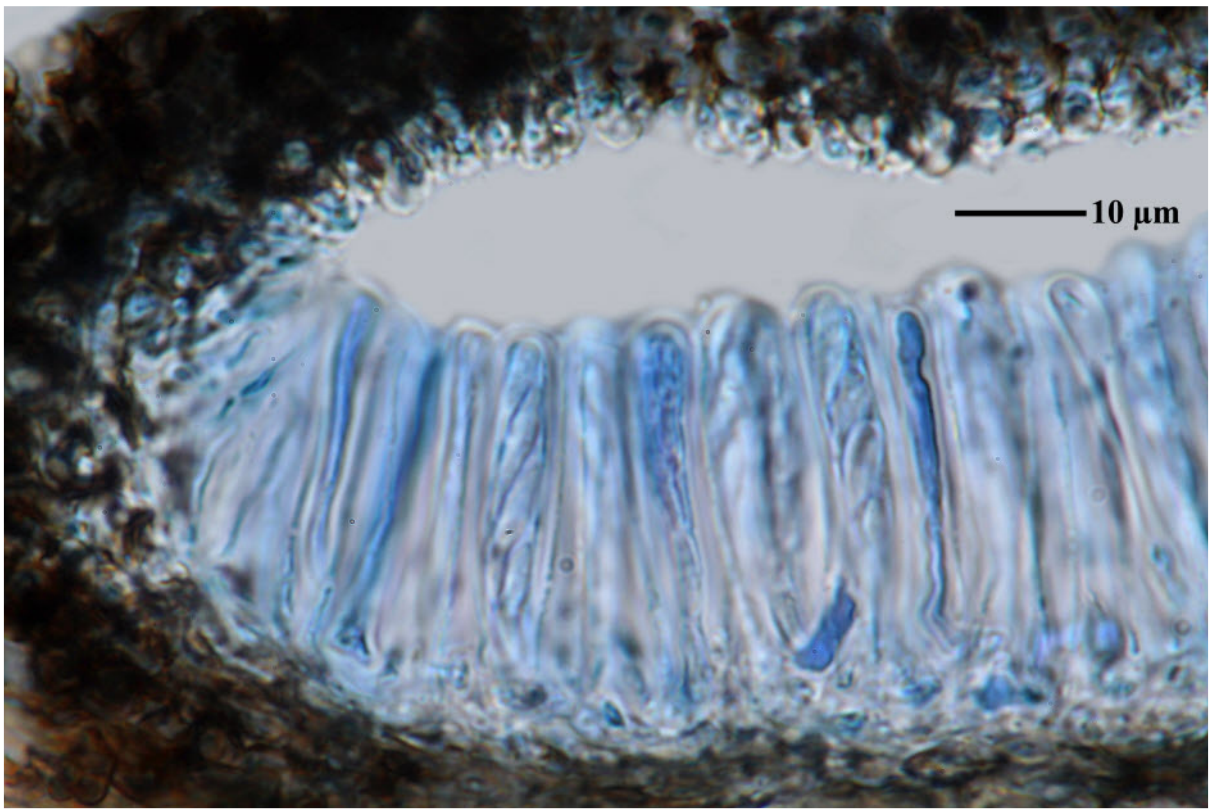
Papilionovela albothallina



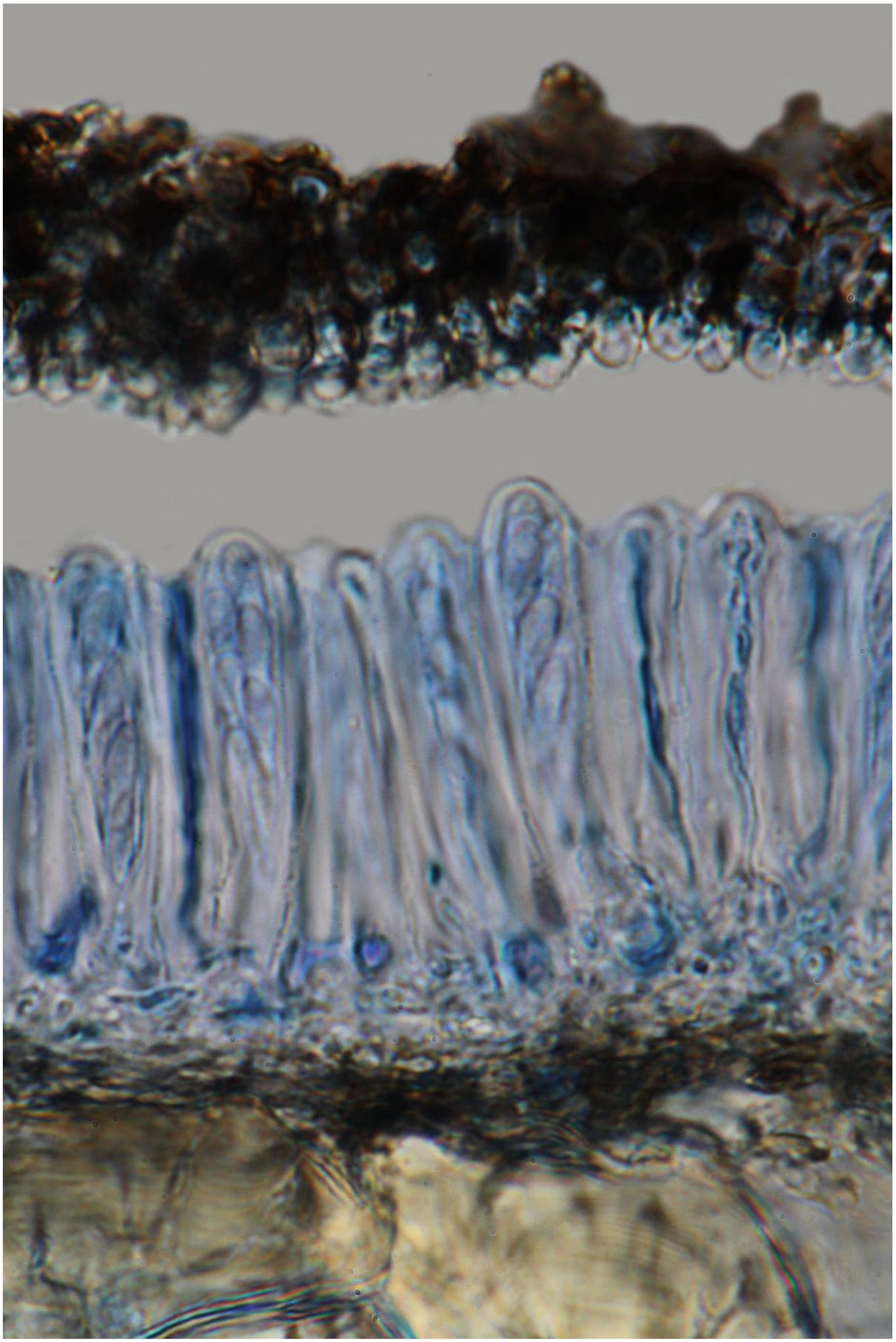


Papilionovela albothallina





Papilionovela albothallina

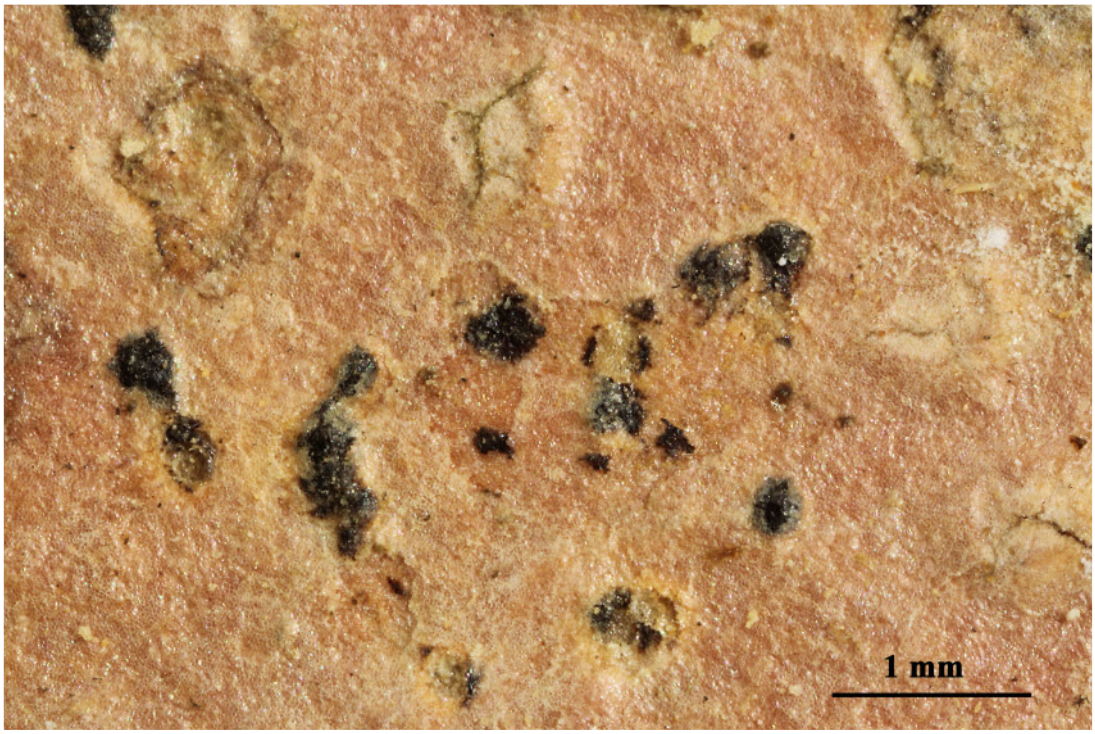


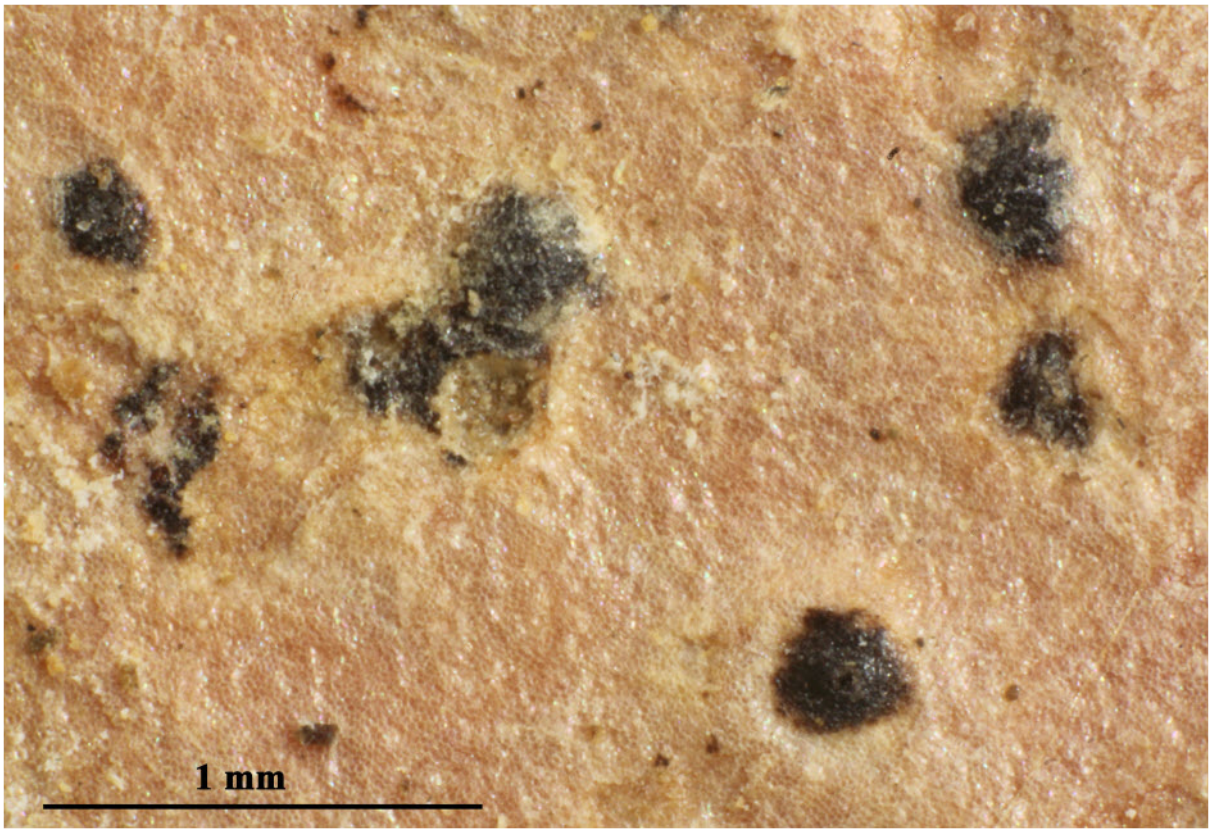
Papilionovela albothallina

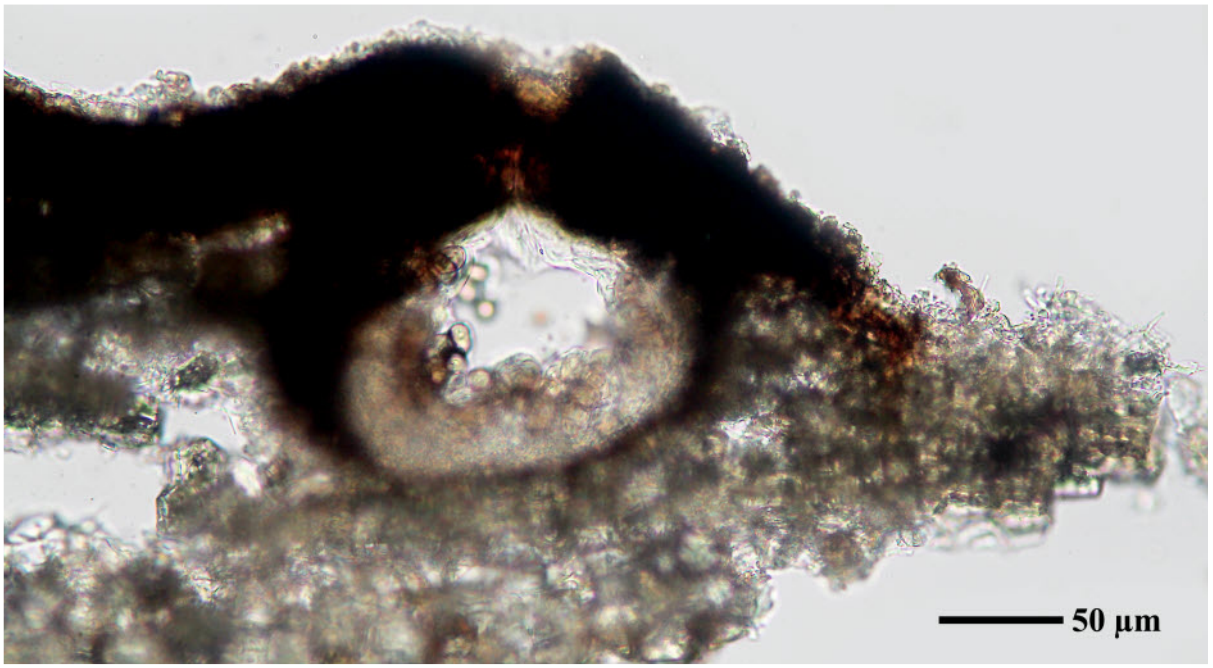
Parapyrenis aurora (Zahlbr.) Aptroot, Biblthca Lichenol. 44: 97 (1991)
= *Microthelia aurora* Zahlbr., Annls mycol. 2(3): 268 (1904)

Thallus pinkish-grey, blackened around the ascocarps, smooth, immersed in the substratum, continuous, without crystals, with a black, 0.2–0.4 mm broad hypothallus. Apparently not lichenized, although the pinkish colour would suggest the presence of Trentepohlia algae. Ascocarps simple or 2–3 with fused walls, without non-lichenized pseudostromatic tissues, without crystals, conical, distinctly flattened, superficial on the substratum, exposed, 0.2–0.4 mm diam, 0.1–0.2 mm high. Ascocarp wall completely carbonized, with distinct clypeus, up to 70 µm thick. Ostiole black, obconical, apical, 30–40 µm diam. Hamathecium not inspersed with oil droplets, not gelatinized, IKI negative. Interthecial hyphae cellular pseudoparaphyses, simple, not branched at the tips, 2–3 µm thick. Periphyses absent. Asci without ocular chamber, 50–70 × 12–17 µm. Ascospores 8 in the ascus, irregularly arranged, brown, ellipsoidal with rounded ends, symmetrically septate, constricted at the septa, 12–19 × 8–12 µm; with 1 median euseptum, 1–2 µm thick. Endosporium with small, angular lumina, up to 4 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC.

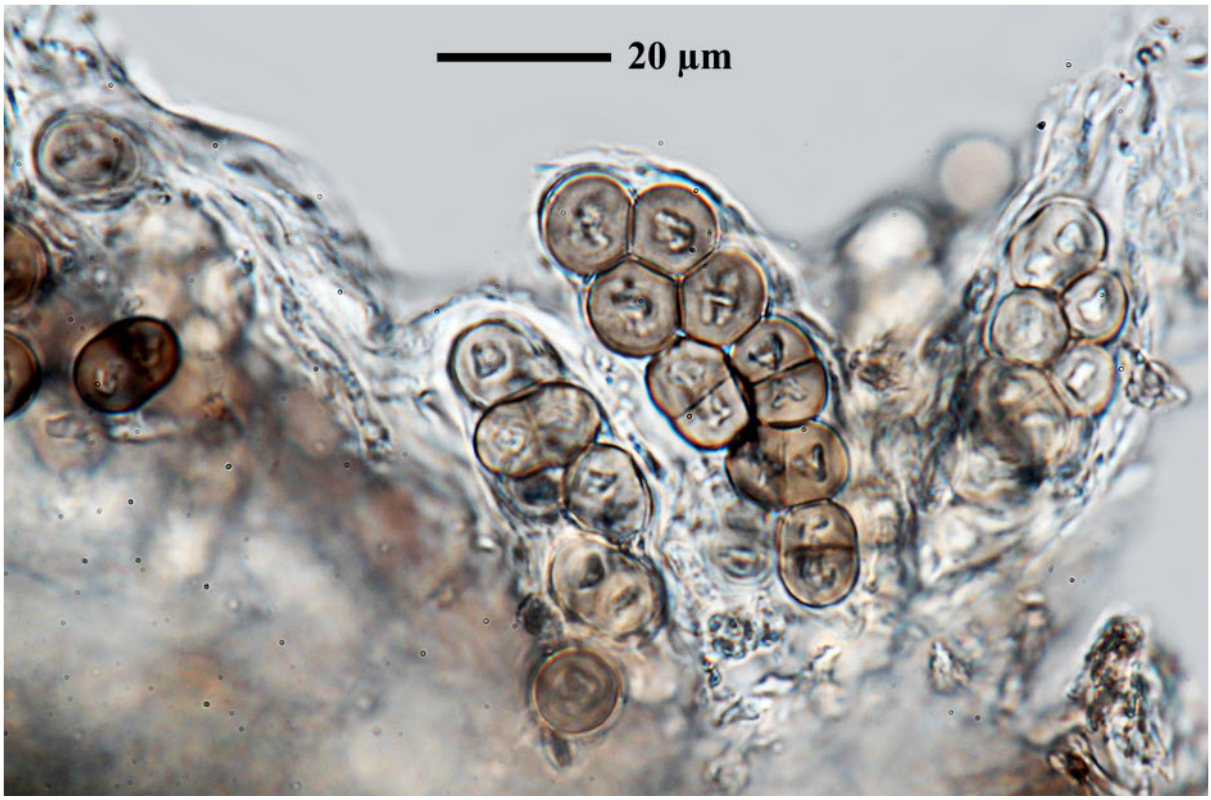
[Zahlbr43], Indonesia, Java, Bogor ("Buitenzorg"), Botanical garden, on bark of *Canariopsis decumana,* 300 m. Leg. K. Giesenhagen. Distributed in A. Zahlbruckner, Lichenes Rariores Exsiccati 43. ISOTYPE.





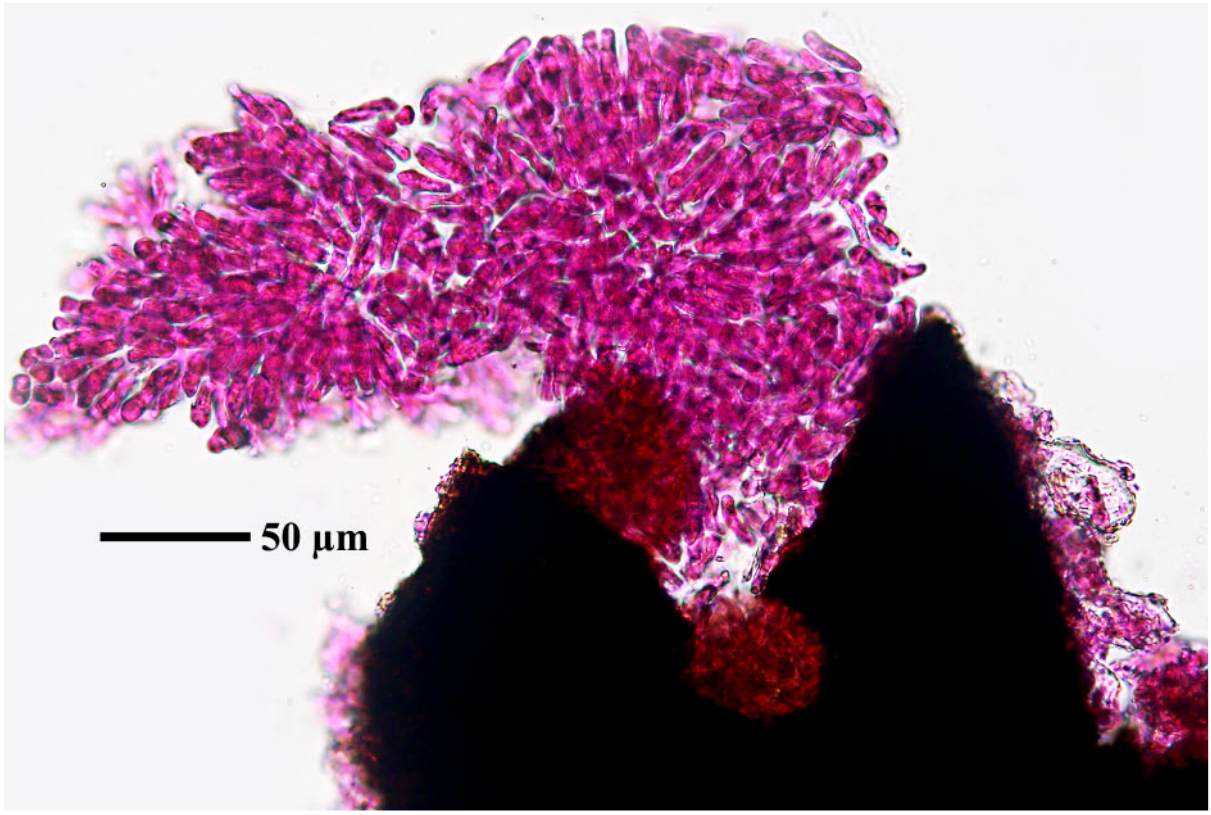


Parapyrenis aurora





Parapyrenis aurora





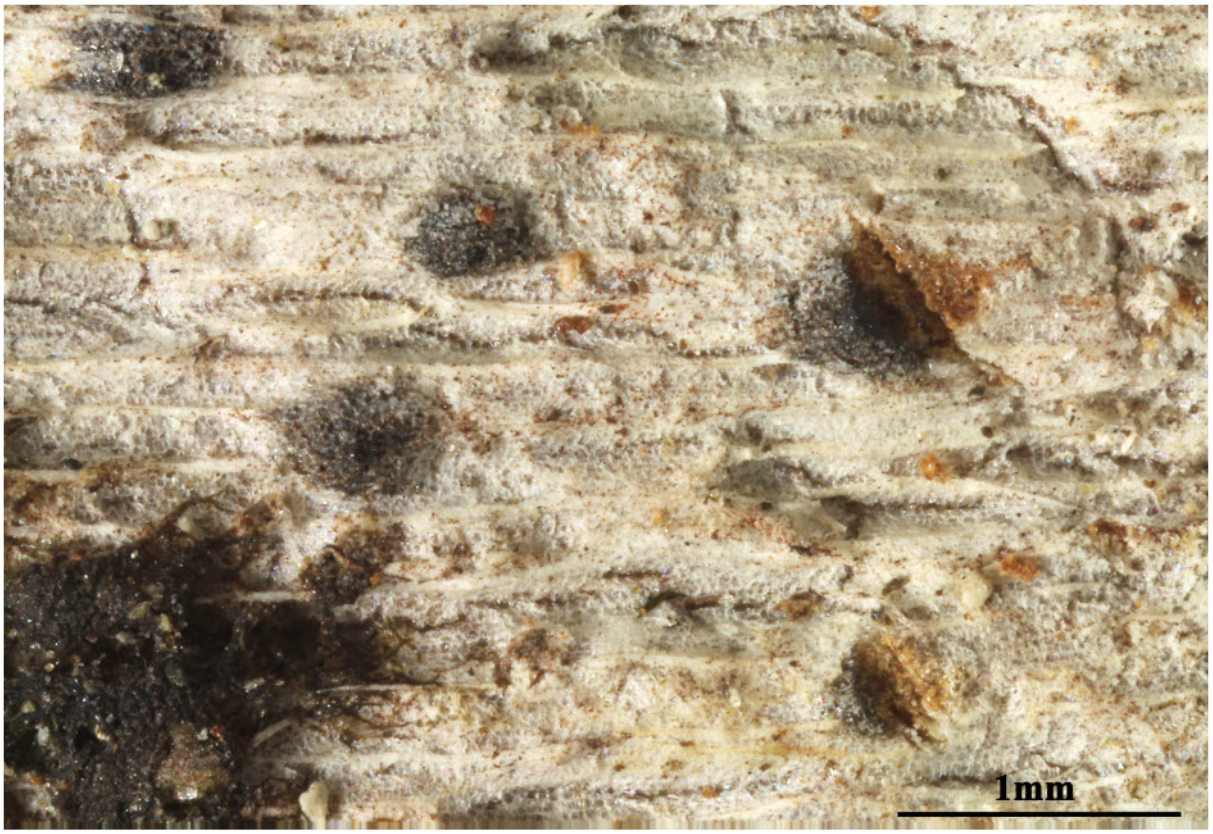
Parapyrenis aurora

Parapyrenis conica Aptroot, Biblthca Lichenol. 44:99 (1991)

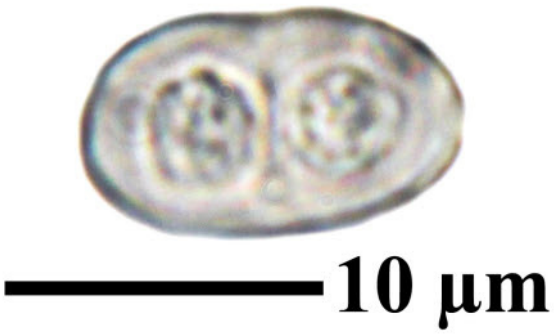
Thallus grey, blackened around the ascomata, dull, immersed in the substratum.Ascomata 0.3–0.6 mm diam., 0.2–0.3 mm high. Ascomatal wall to 100 µm thick; ostiole black, conical, apical, 50–70 µm diam. Hamathecium IKI+ blue. Asci 60–80 × 10–12 µm. Ascospores constricted at the septa, 11–13 × 6–7 µm; endospore with large rounded lumina to 2 µm thick

[ABL22160c], Australia, Queensland, Cairns, in the city along the Esplanade on Cocos nucifera. 145°46’ E, 16°55’ S, 0 m. Leg. A. & M. Aptroot (no 22160c), 03.1988, det. A. Aptroot 1988. HOLOTYPE.

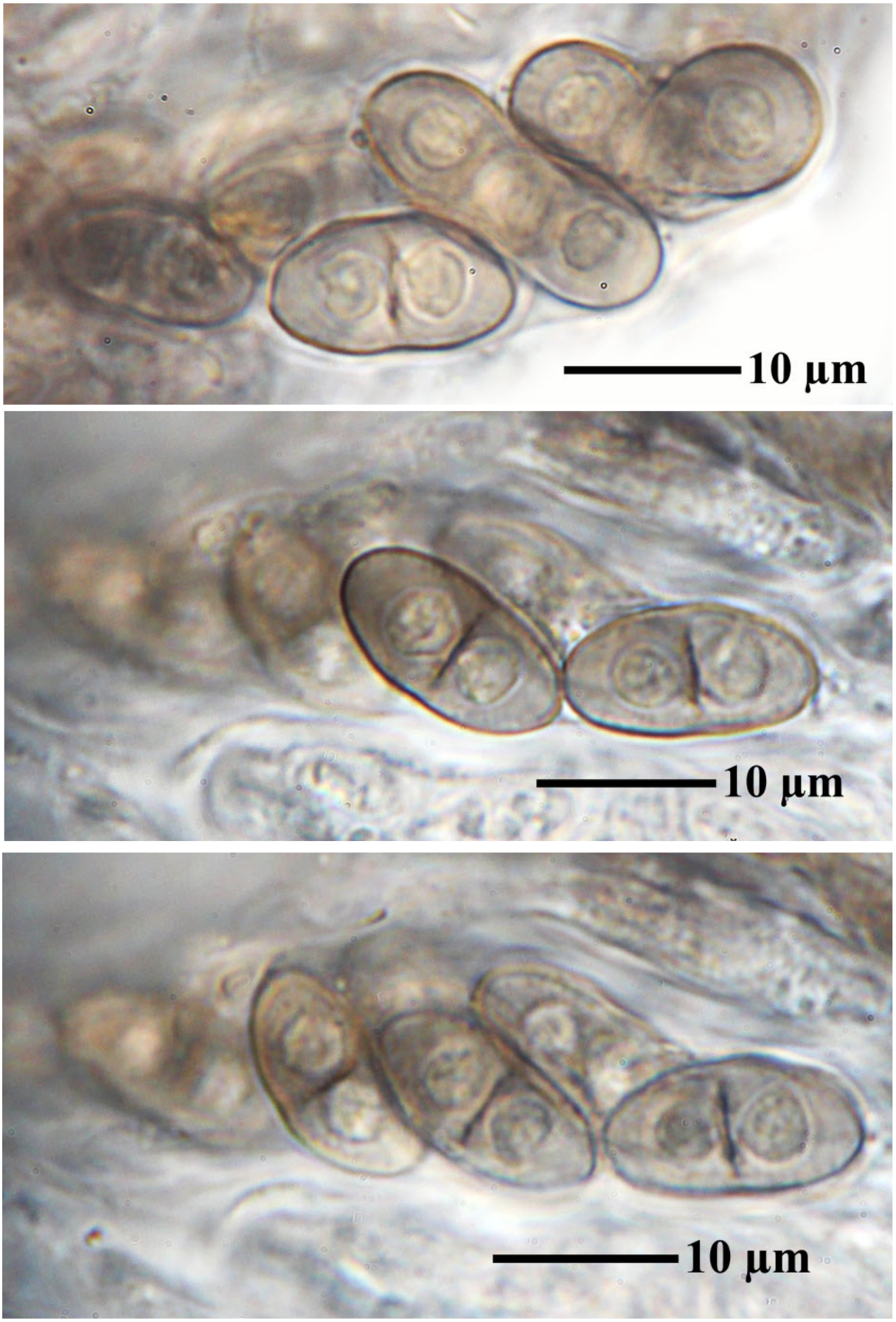








Parapyrenis conica

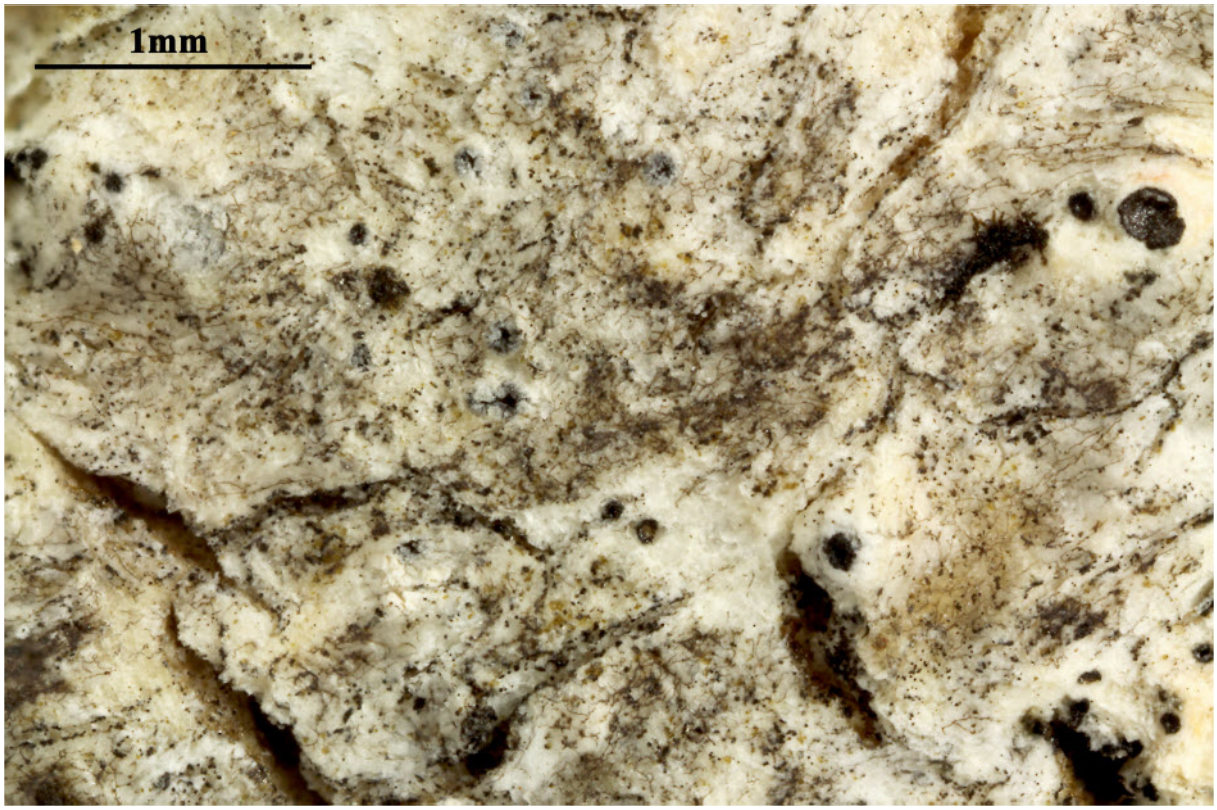


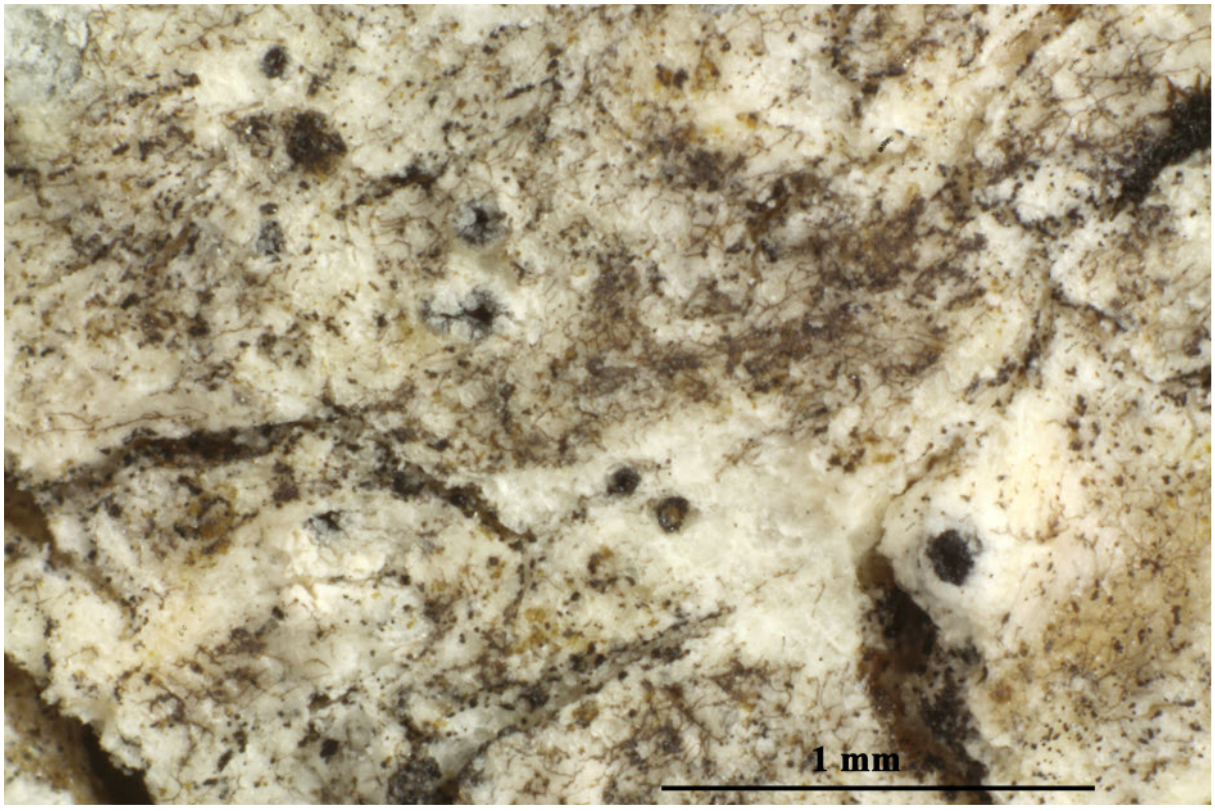
Parapyrenis conica

Parapyrenis lichenicola Aptroot & Diederich, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 64: 126 (1997)

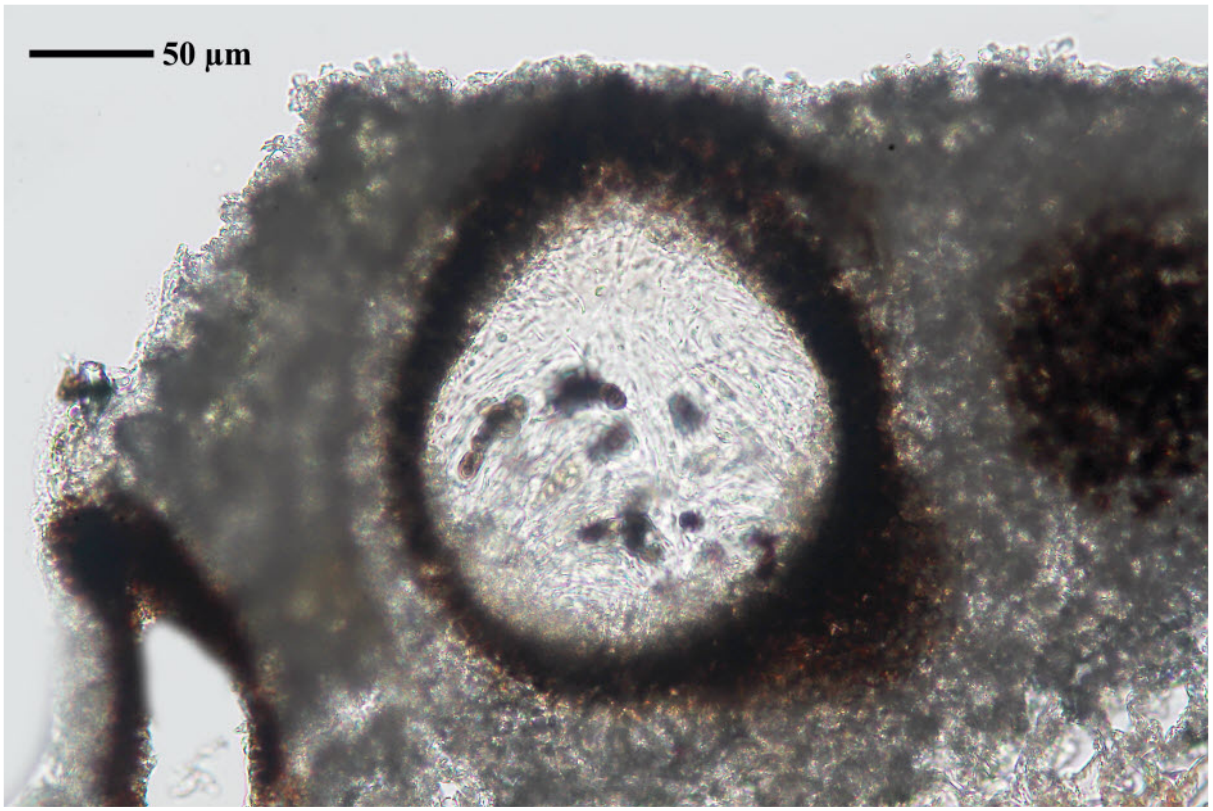
Ascomata lichenicolous on Pertusaria (?), gall-forming, solitary or 2–10 aggregated in irregular groups, immersed, pyriform, black, 80–170 mm wide, surrounded by a 100–200 μm wide, white rim of host thallus. Wall 50–80 μm thick, uniform, consisting of compressed cells with blackened walls (textura intricata), colour unchanged in KOH. Ostiole pale brown, with periphysoids similar in structure to the remaining hamathecium, the ostiolar neck erumpent and visible from above as a 50–100 μm wide, black disc. Hamathecium gel IKI-negative. Pseudoparaphyses cellular, branched, cells usually 5–15 μm long, 2.5–3.5 μm wide. Asci bitunicate, cylindrical, 50–60 × 10–15 μm, with a 1–2 μm wide and high, rounded ocular chamber in the tip, I-negative. Ascospores 8/ascus, uniseriately to irregularly biseriately arranged, uniformly ellipsoid, dark brown, with a median euseptum, not constricted at the septum, or slightly so when young, distoseptate with a 1–2 μm thick endospore leaving orbicular to (Pecten) shell-shaped lumina, outer spore wall 0.5–0.7 μm thick, 12.5–14 × 8–10 μm, without ornamentation.
Host: On a whitish, irregular, cracked thallus, with the medulla producing red needle-shaped crystals in KOH, C-, KC-, UV-, with norstictic acid shown by TLC, probably Pertusaria erythrella Müll. Arg.

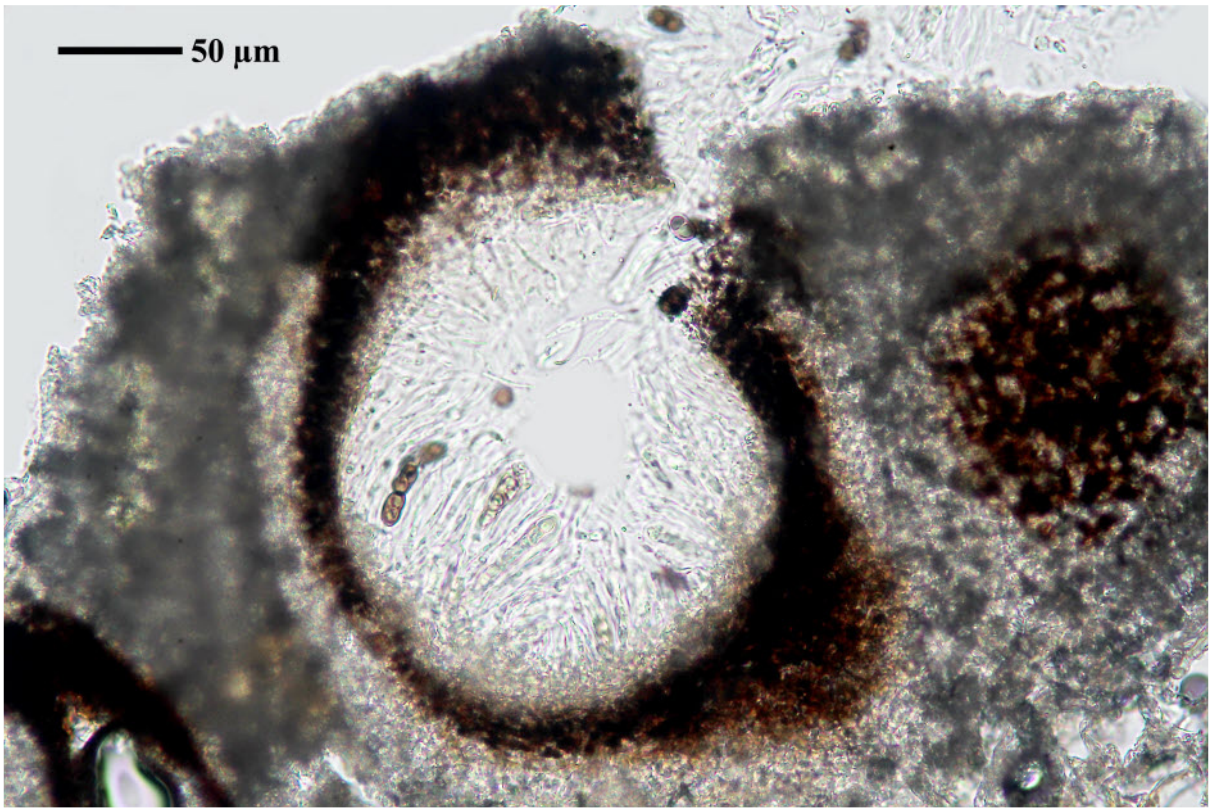
[Diederich10258], Papua New Guinea, Simbu prov., Mount Wilhelm, Pindaunde valley, near the hut on the shore of lake Piunde, on Pertusaria? on branch, in subalpine forest remnants, 3600 m, 5°47' S, 145°03' E. Leg. P. Diederich (no 10258), 05.08.1992, det. P. Diederich. ISOTYPE.



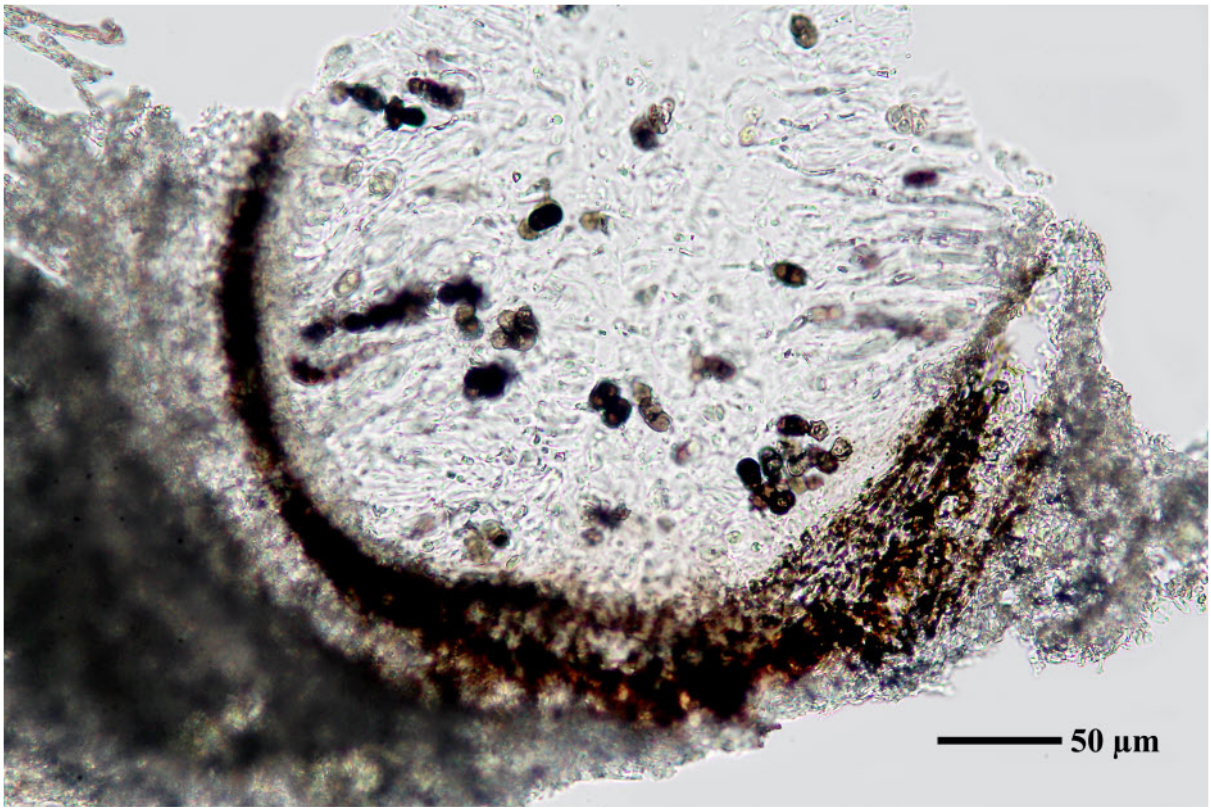


Parapyrenis lichenicola





Parapyrenis lichenicola





Parapyrenis lichenicola

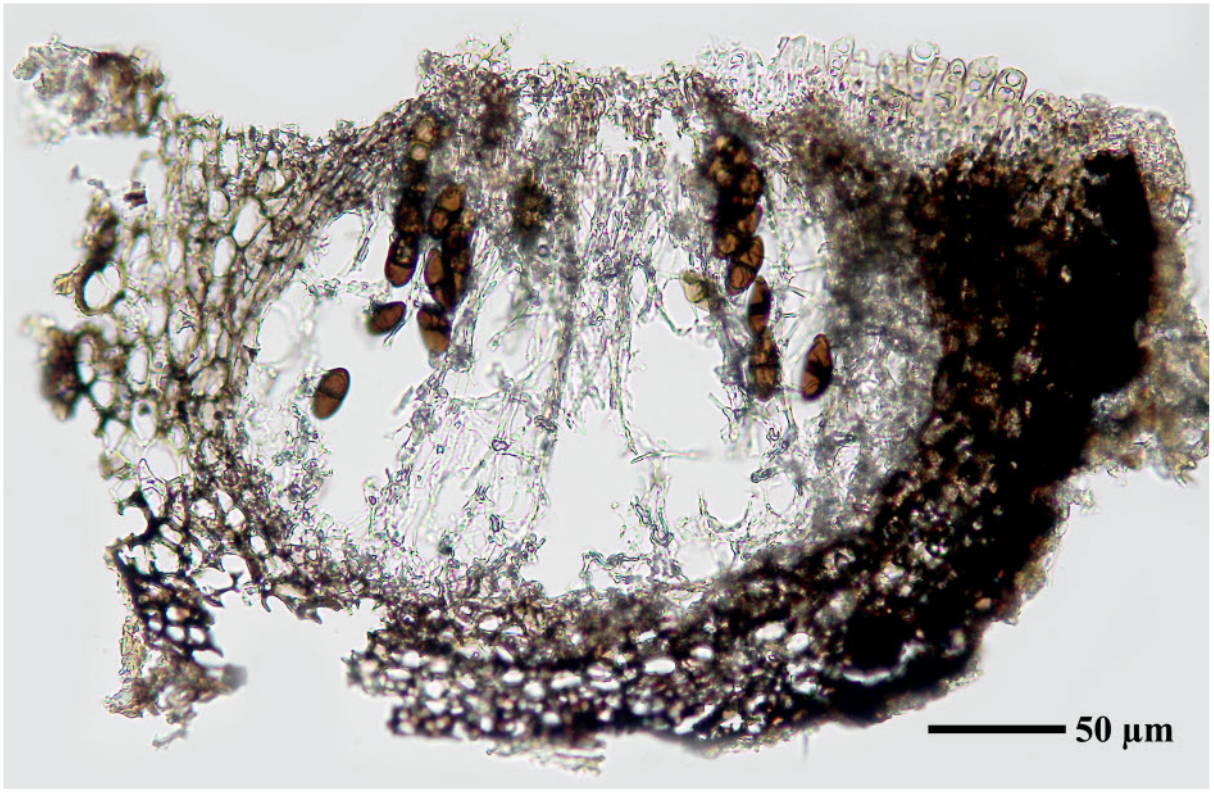
Parapyrenis maclurae (Săvul. & Sandu) Aptroot, Nova Hedwigia 60(3-4): 354 (1995)

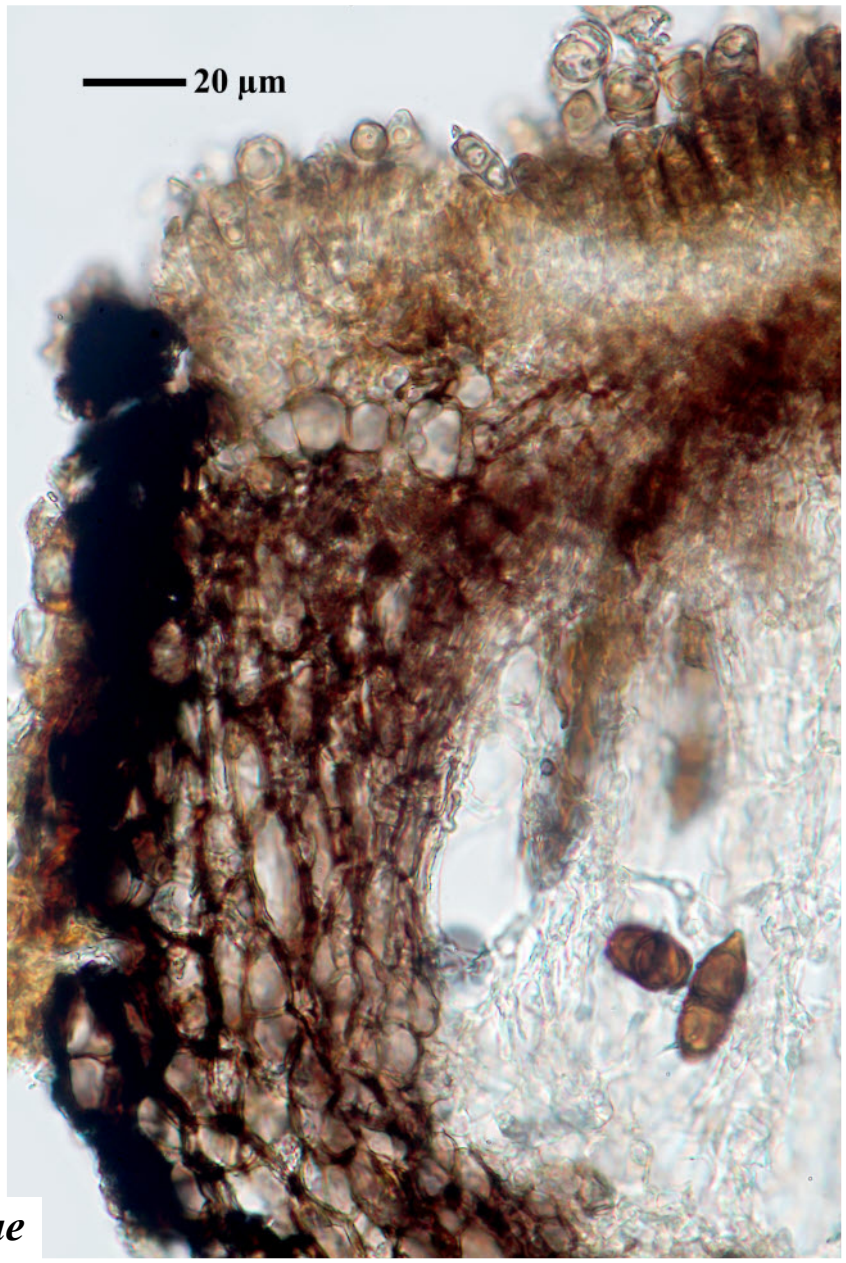
= *Didymosphaeria maclurae* Săvul. & Sandu, Mém. Sect. sci. Acad. Roum., Ser. 3 18: 421 (1940)

Saprobic on bark of tree. Ascocarps emergent, wall dense. Hamathecium IKI negative. Pseudoparaphyses oily. Ascospores dark brown, 1-septate, 19–21 × 9.5–10 µm, with c. 1.5 µm thick outer wall and 2–3 µm thick distoseptate inner wall which leaves rounded lumina. The anamorph is reported on the labels of the exsiccate to be a *Diplodia*, which is richly present in the type collection, but the connection has not been established in culture. Host plants recorded: *Maclura aurantiaca* (Moraceae).

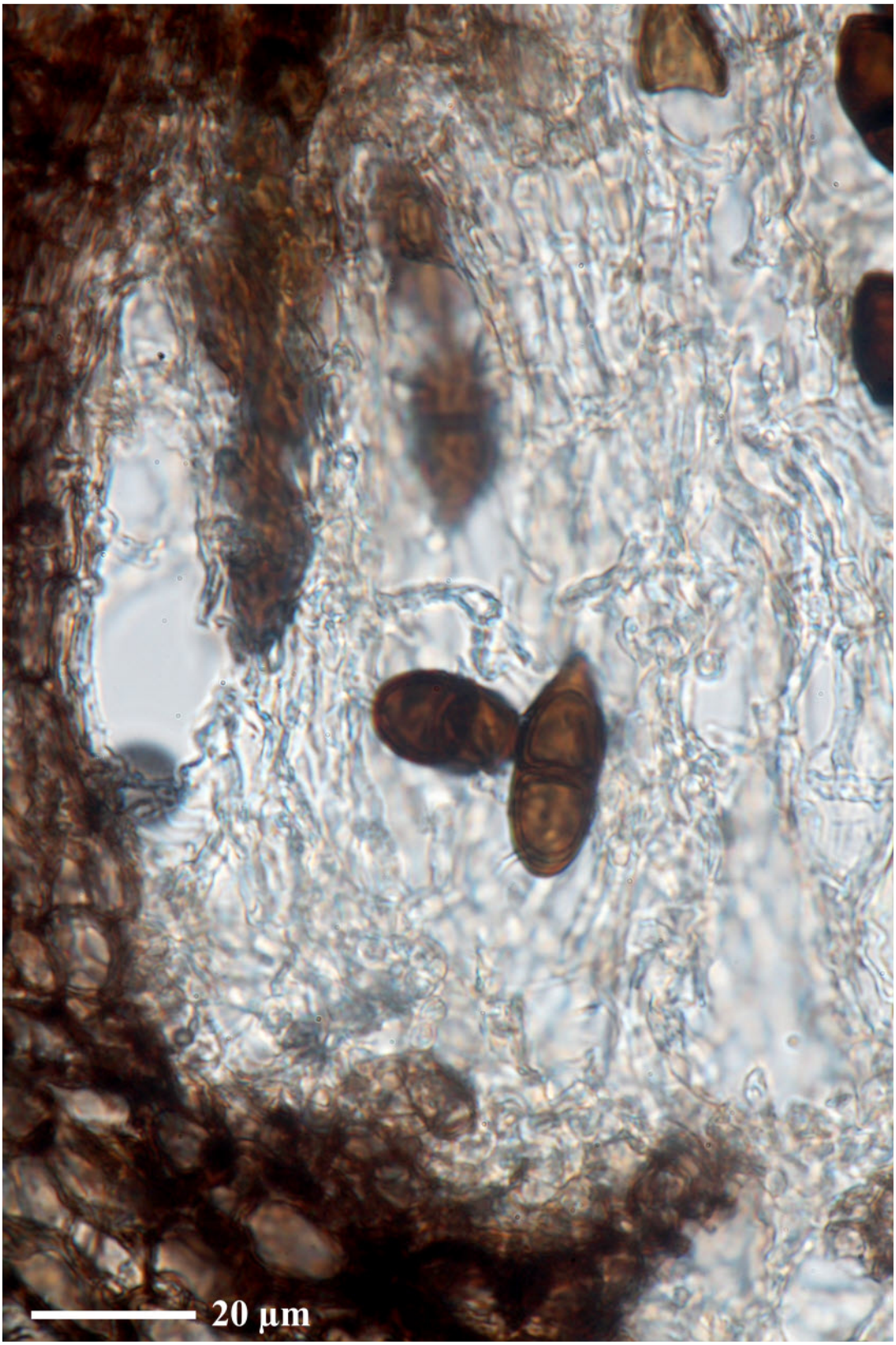
[Săvulescu 1316], Romania, distr. Ilfov, Muntenia near Bucarest, on Maclura aurantiaca. Leg. Săvulevscu, 11.1938, distributed in Herbarium Mycologicum Romanicum No 1316. ISOTYPE.





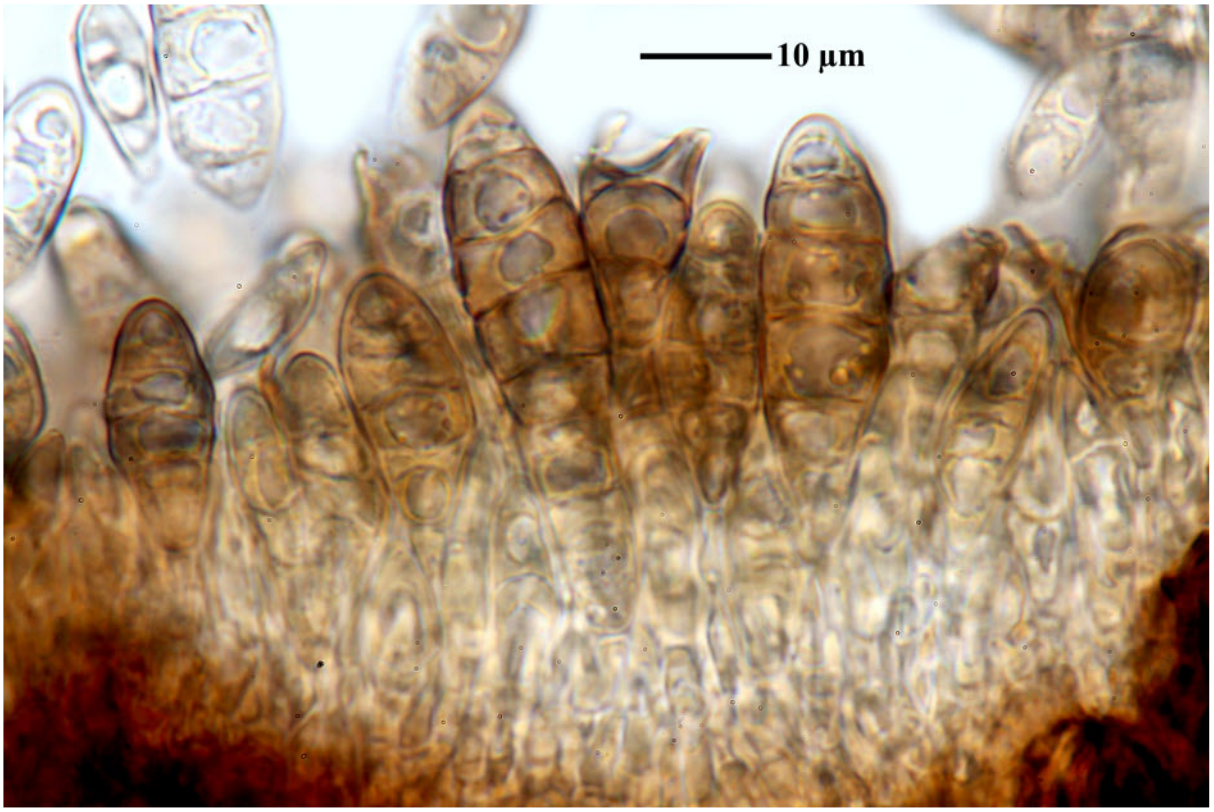


Parapyrenis maclurae





Parapyrenis maclurae





Parapyrenis maclurae





Parapyrenis maclurae

Parapyrenis maritima Aptroot, Nova Hedwigia 60(3-4): 354 (1995)

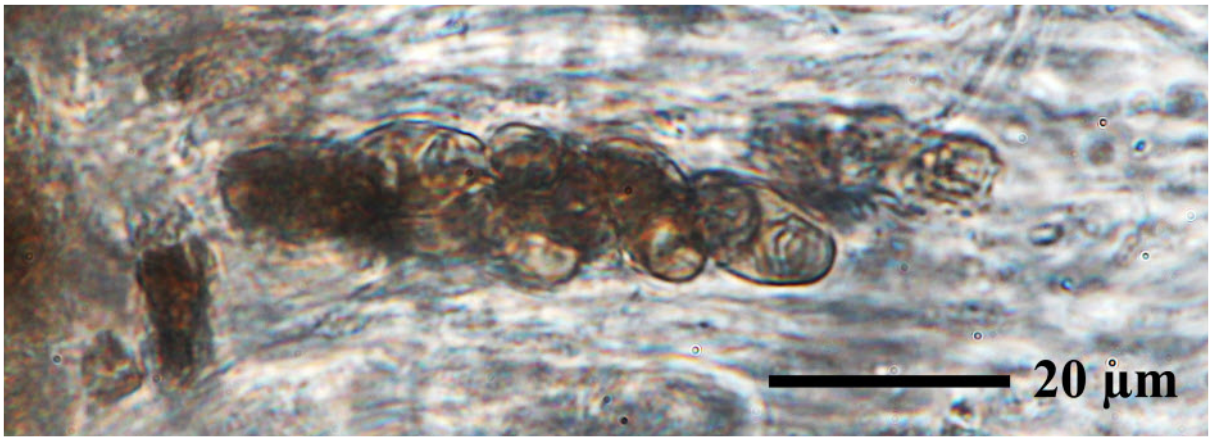
Saprobic on wood. Stroma massive, black, up to 2 mm diam. Ascomata 0.3–0.5 mm diam., globose, immersed solitary in the stroma. Hamathecium gel IKI+ blue. Ascospores 13–15 × 5–6 µm, ellipsoid, medium brown, without spinulose ornamentation, with a 2–3 µm thick endosporium leaving a cordate to sexangular lumen. Anamorph unknown. Culture with creamy white aerial mycelium, remaining sterile. The species is characterized by the amyloid reaction of the hymenial gel and the strong endosporium formation, which even remains visible in old, deformed ascospores.

[ABL30166], Papua New Guinea, Madang Prov., Laing Island in Hansa Bay near Bogia, in coastal forest on coral island, on wood, 144°52' E, 4°10' S, 1 m. Leg. A. Aptroot (no 30166), 20-26.06.1993, det. A. Aptroot, 1993. ISOTYPE.





Parapyrenis maritima







Parapyrenis maritima

Phylloporis hypothallina (R.C. Harris) S.H. Jiang, Lücking & Sérus., in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [134] (2020)

= *Strigula hypothallina* R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 157 (1995)

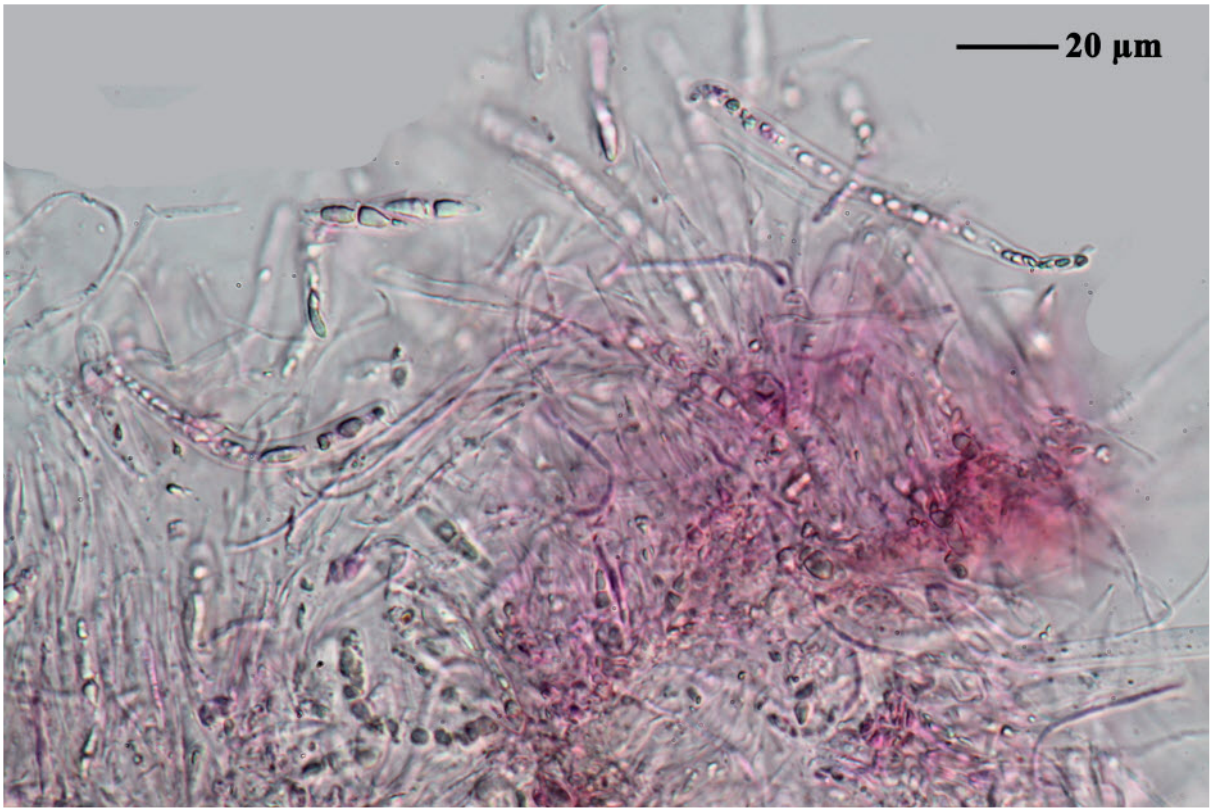
Thallus immersed light brown, shiny, with scattered white dots; hypothallus black, visible at thallus margin or in section. Ascomata complanate to hemispherical, 0.5–0.8 mm diam.; wall black, sometimes merging with hypothallus, lacking below. Asci cylindrical, 90–120 × 9–10 µm, with eight uniseriate spores. Ascospores narrowly ovate, with ± pointed ends, 1 septate, slightly constricted at septum, 17–22 × 5–6 µm. Conidia 1-septate.

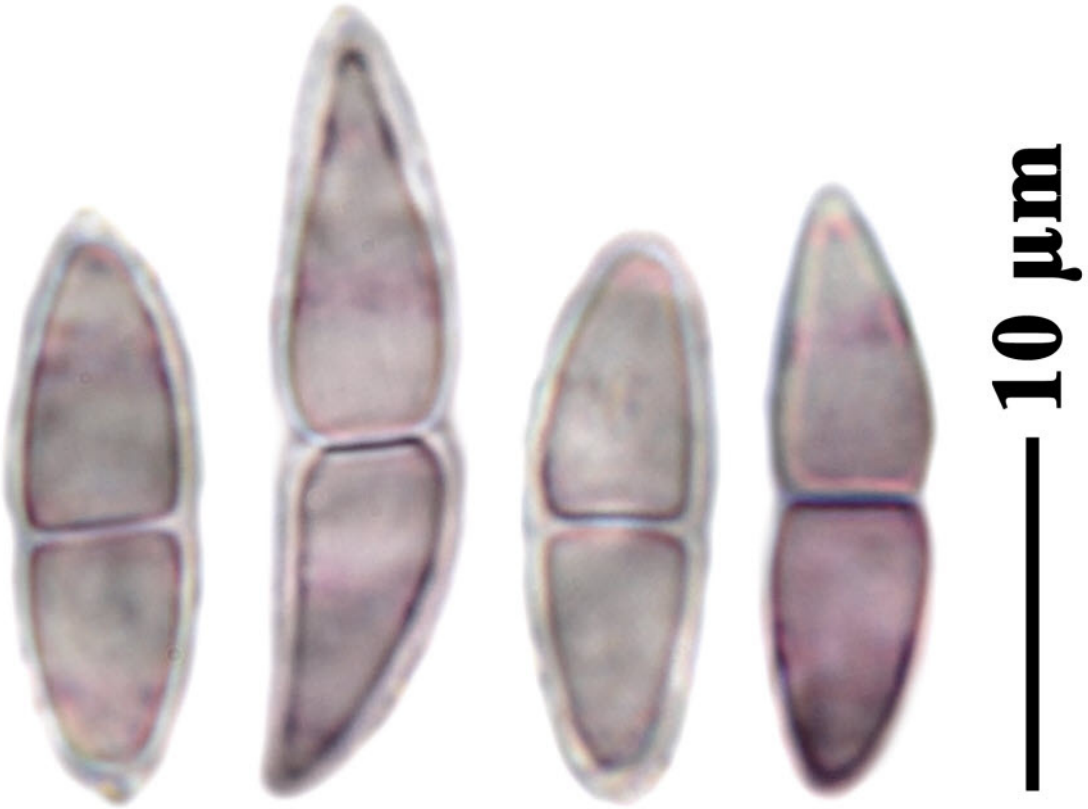
[Menezes], Brazil, Rio Grande do Norte, Mossoró. Povoada Juremal, Parque nacional de Furna Feia. Leg. A.A. Menezes, 2013, det. A. Aptroot, 2014.



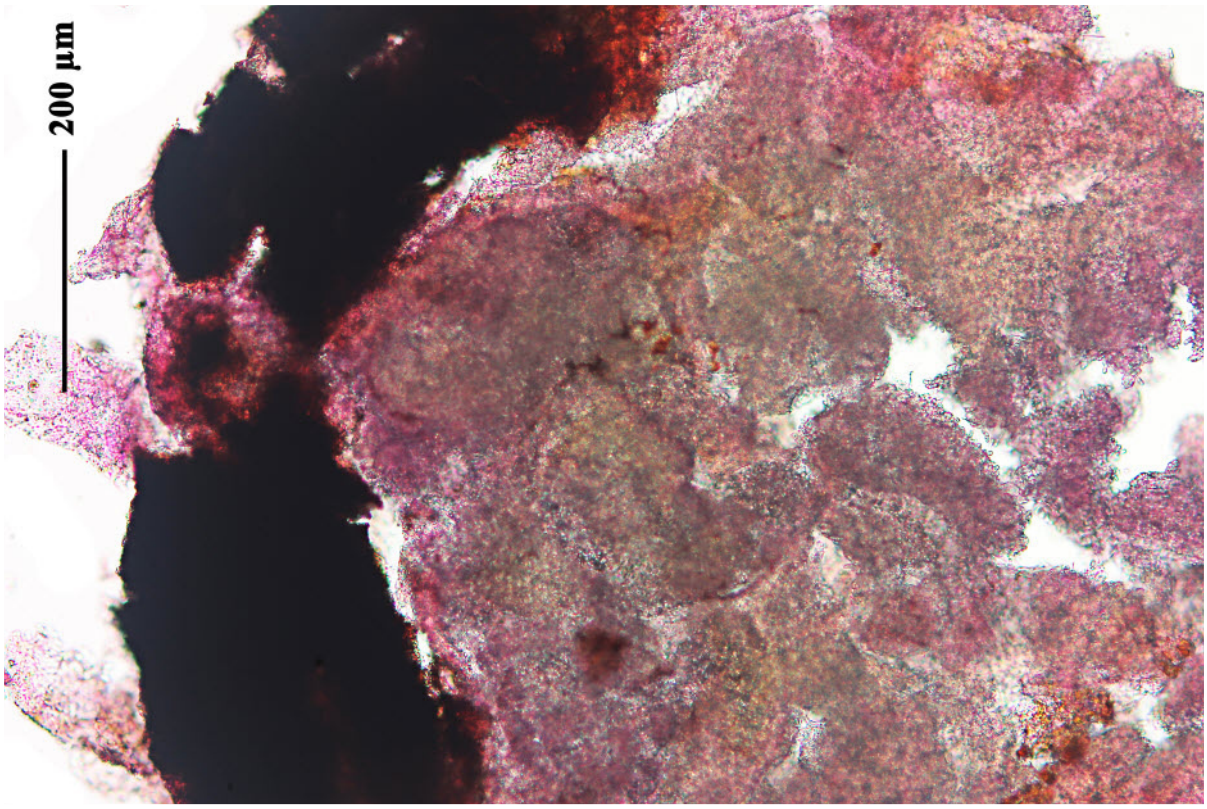


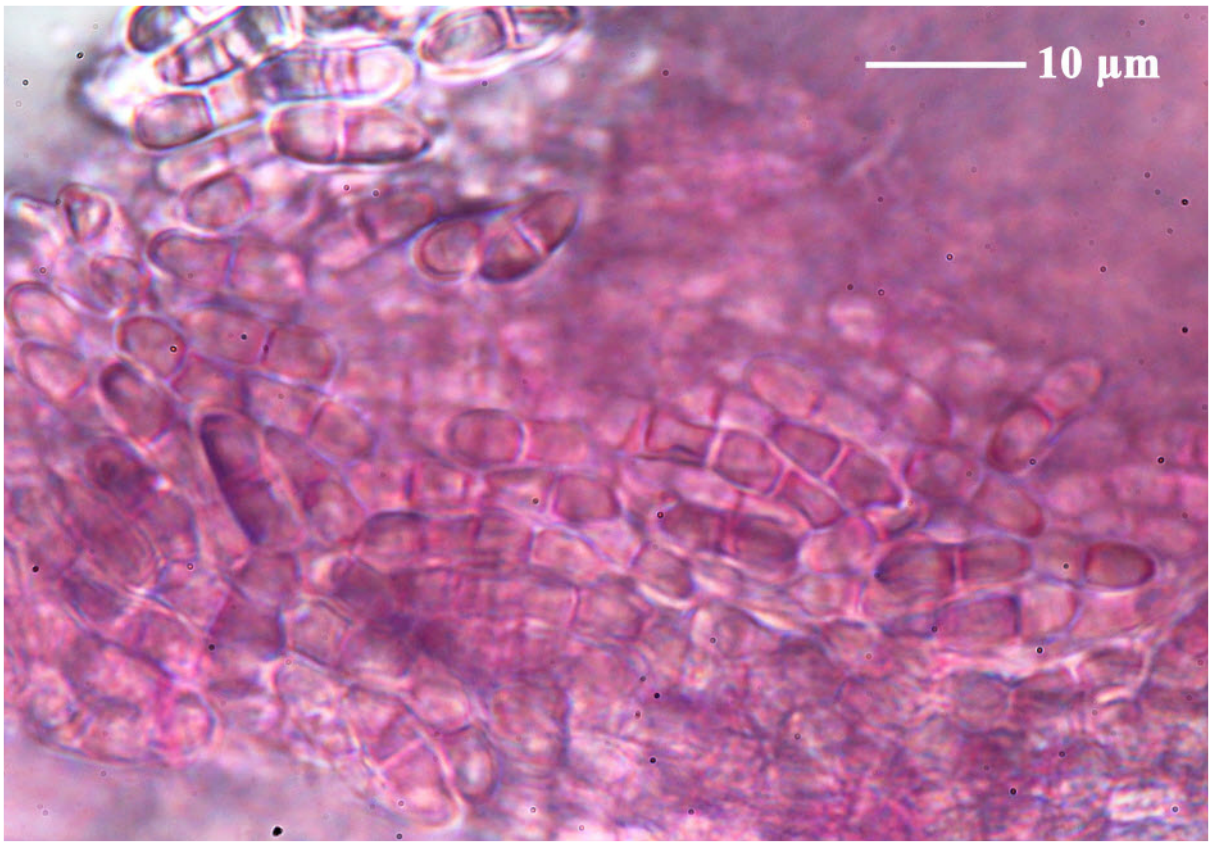
Phylloporis hypothallina





Phylloporis hypothallina





Phylloporis hypothallina

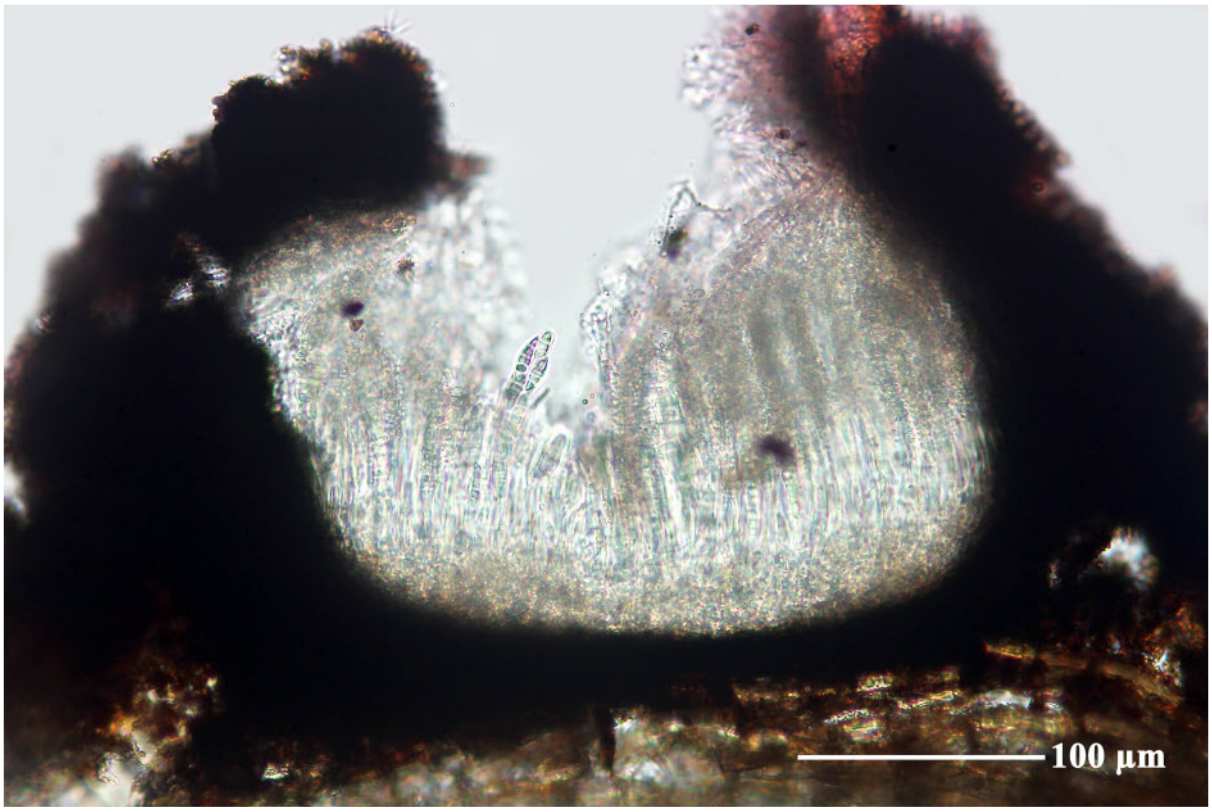
Polymeridium albidoreagens Aptroot, A.A. Menezes & M. Cáceres, Nova Hedwigia 98(1-2): 7 (2013) [2014]

Thallus ecorticate, whitish grey, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.4 mm diam., erumpent, exposed and black. Hamathecium clear. Ascospores 8 per ascus, 3-septate, fusiform, 20–23 × 6–8 µm, hyaline, IKI−, wall smooth. Chemistry: Thallus UV+ yellow, K−. TLC: lichexanthone.

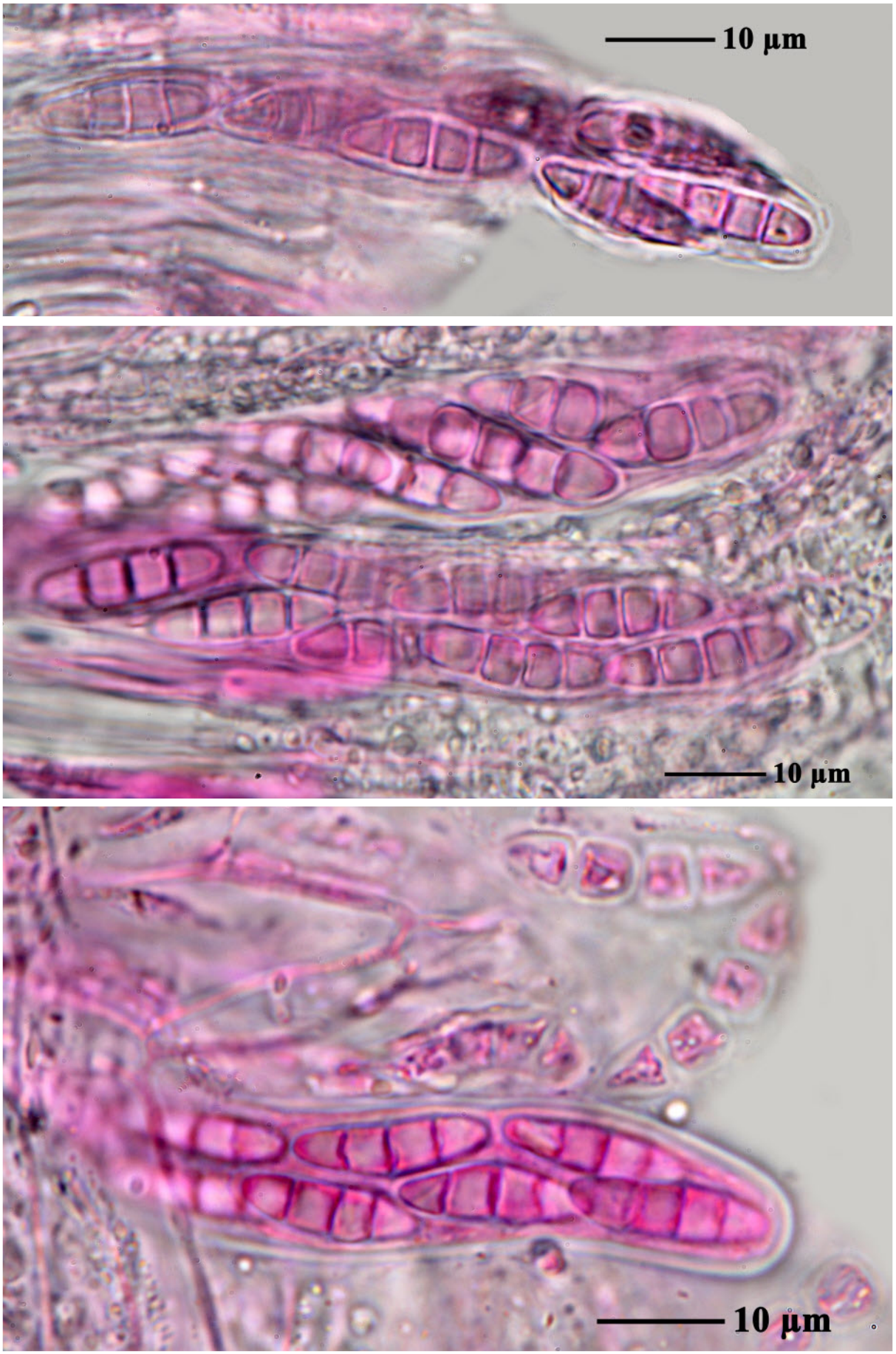
[ABL15194], Brazil, Rondônia, Porto Velho, Parque Natural Municipal, 100 m, 8°41’10” S, 63°52’05” W. on tree bark in park near rain forest. Leg. M. Cáceres & A. Aptroot (no 15194), 16.11.2012, det. A. Aptroot, 2012. ISOTYPE.



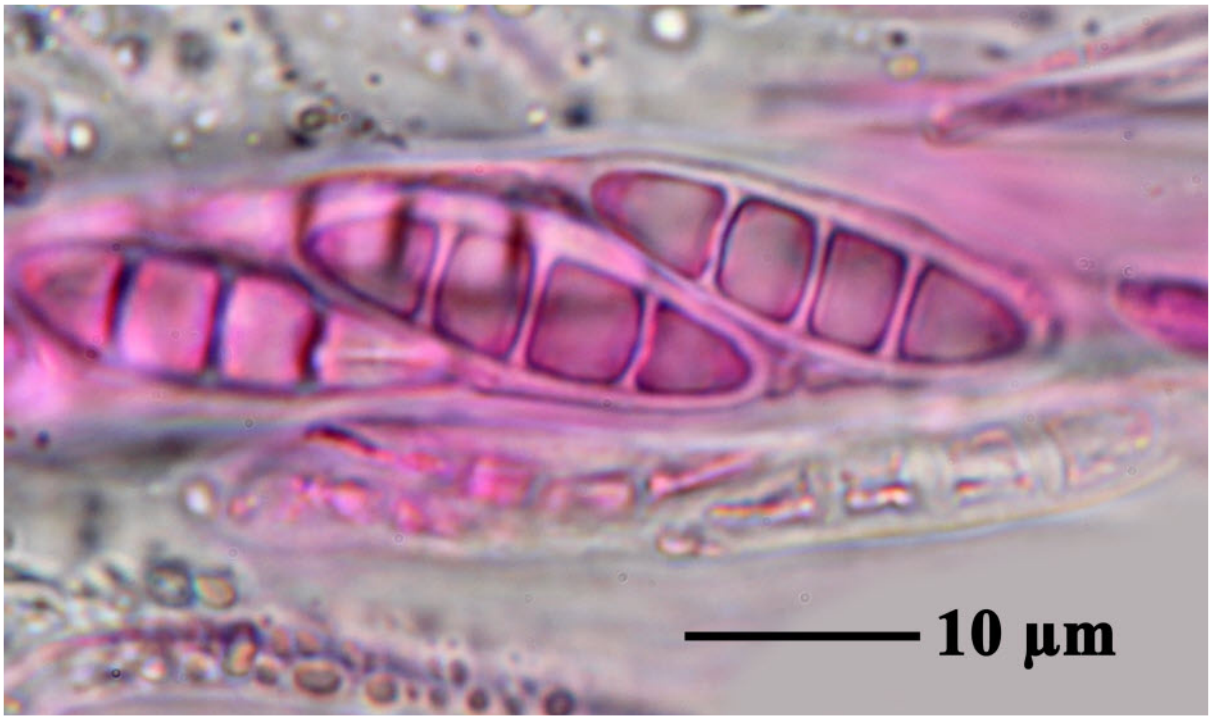




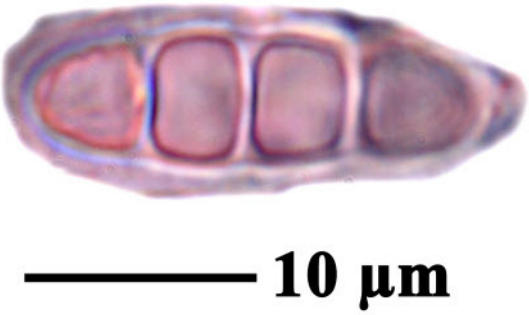
Polymeridium albidoreagens



Polymeridium albidoreagens







Polymeridium albidoreagens

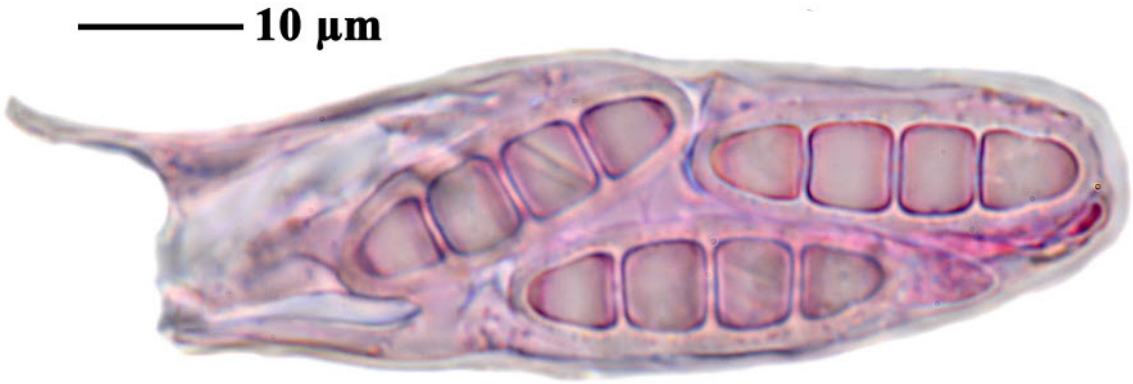
Polymeridium albidovarians Aptroot, Nova Hedwigia 98(1-2): 7 (2013) [2014]

Thallus ecorticate, yellowish white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.4 mm diam., erumpent, exposed and black. Hamathecium inspersed. Ascospores 8/ascus, 3-septate, fusiform, 20–23 × 6–8 µm, IKI-, wall smooth. Chemistry: Thallus UV+ yellow, K-. TLC: Lichexanthone.

[Groenhart5755], Indonesia, East Java, Kawi-complex, Wood Tjemarakandang. 2700m, Leg. P. Groenhart (no 5755), 21/22.07.1937, det. A. Aptroot. ISOTYPE:











Polymeridium albidovarians

Polymeridium albidum (Müll. Arg.) R.C. Harris, Acta Amazon., Supl. 14(1-2): 69 (1986) [1984]
= *Arthopyrenia albida* Müll. Arg., Flora, Regensburg 67(35): 664 (1884)

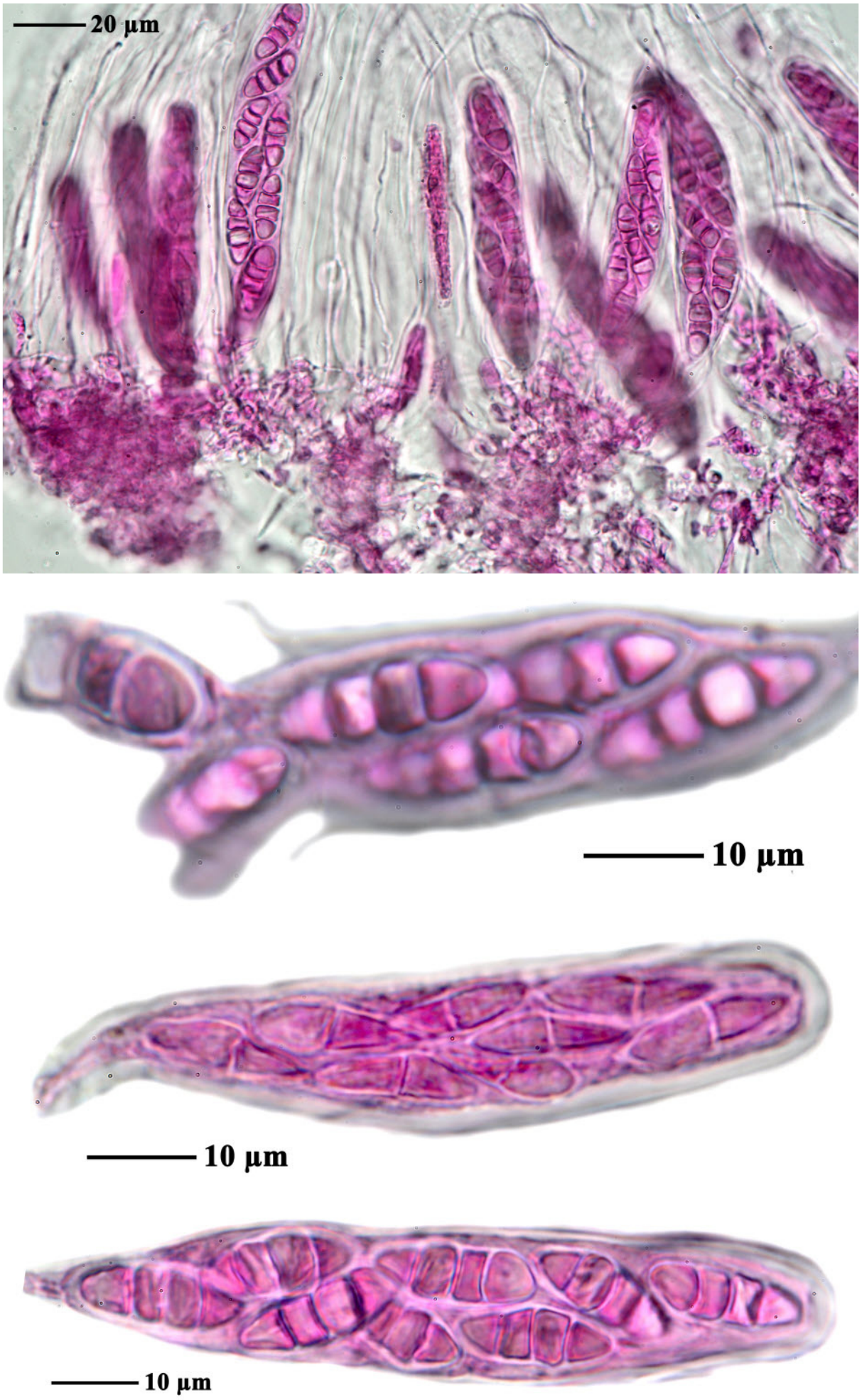
Thallus ecorticate, white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.4 mm diam., prominent, conical to wart-shaped, exposed and black. Hamathecium clear. Ascospores 8/ascus, 3-septate, fusiform, 20–23 × 6–8 µm. hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: No substanzes detected.

[ABL18749], Papua New Guinea, Eastern Highlands, prov., Mount Gahavisuki Nature Reserve, 8 km N of Goroka. 145°25’ E, 6°01’ S, 2300 m, on tree in forest remnants. Leg. A. Aptroot (no 18749), 03.1987, det. A. Aptroot, 1987.





Polymeridium albidum



Polymeridium albidum

Polymeridium albocinereum (Kremp.) R.C. Harris, Bol. Mus. Paraense Emilio Goeldi, ser. Bot. 7(2): 625 (1993) [1991]

= *Arthopyrenia albocinerea* (Kremp.) Müll. Arg., Flora, Regensburg 66(20): 318 (1883)

= *Verrucaria albocinerea* Kremp., Flora, Regensburg 59: 524 (1876)

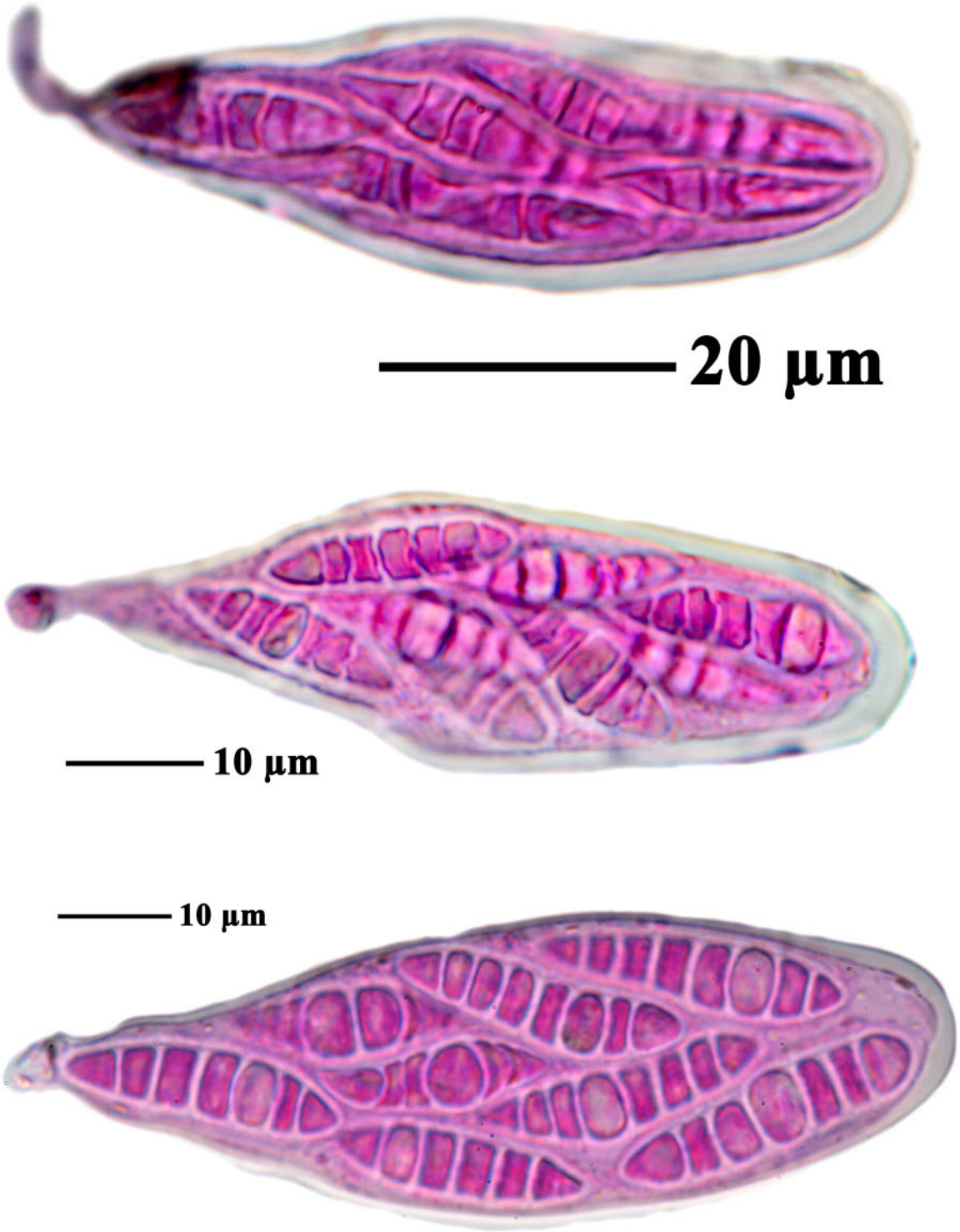
Thallus ecorticate, white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.3–0.4 mm diam., prominent, hemispherical, exposed and grey-black. Hamathecium clear. Ascospores 8/ascus, 7–11-septate, fusiform, (24–)28–39 × 6–9 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: No substances detected.

[ABL12595], Madagascar, Betioky, prov. Tulear, savannah of decideous trees W of the village, 44°21’ E, 23°44’ S, 300 m, on decideous trees. Leg. A. Aptroot (no 12595) & R. Hensen, 25.4.1984, det. A. Aptroot.





Polymeridium albocinereum



Polymeridium albocinereum

Polymeridium albopruinosum (Makhija & Patw.) Aptroot, Nova Hedwigia 98(1-2): 8 (2013) [2014]

= *Trypethelium albopruinosum* Makhija & Patw., J. Hattori bot. Lab. 73: 193 (1993)

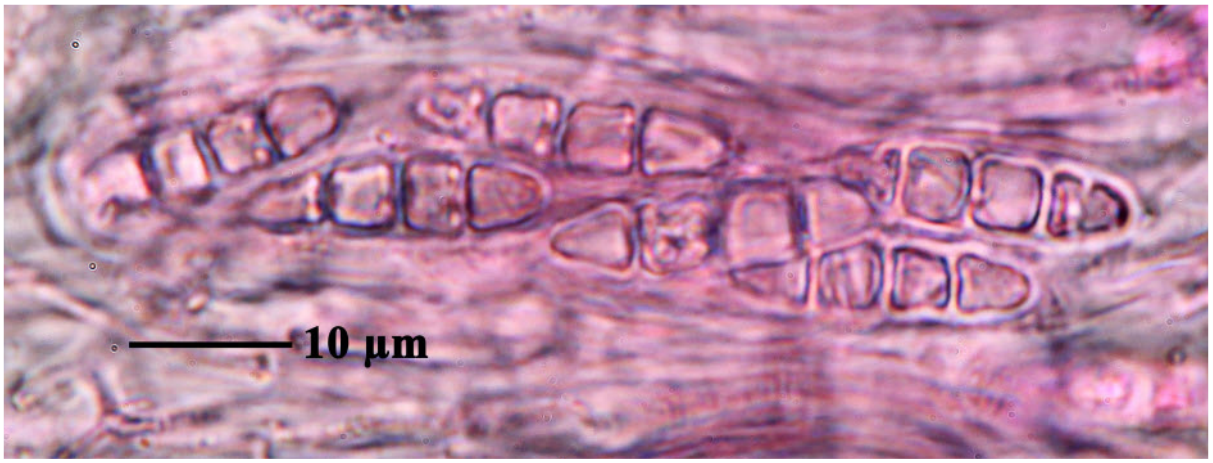
Thallus ecorticate, yellowish white, smooth to uneven, often in patches around ascomata. Ascomata with apical ostioles, solitary, 0.3–0.5 mm diam., erumpent, exposed and grey-black. Ascospores 8/ascus, 3-septate, fusiform, 13–17 × 4–7 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV+ yellow, K-. TLC: Lichexanthone.

[AMH852342], India, Andaman Islands, Middle Andaman, Dhanimali, leg. Padwardhan & Nagarkar (no 852342). ISOTYPE of *Trypethelium albopruinosum*.





Polymeridium albopruinosum





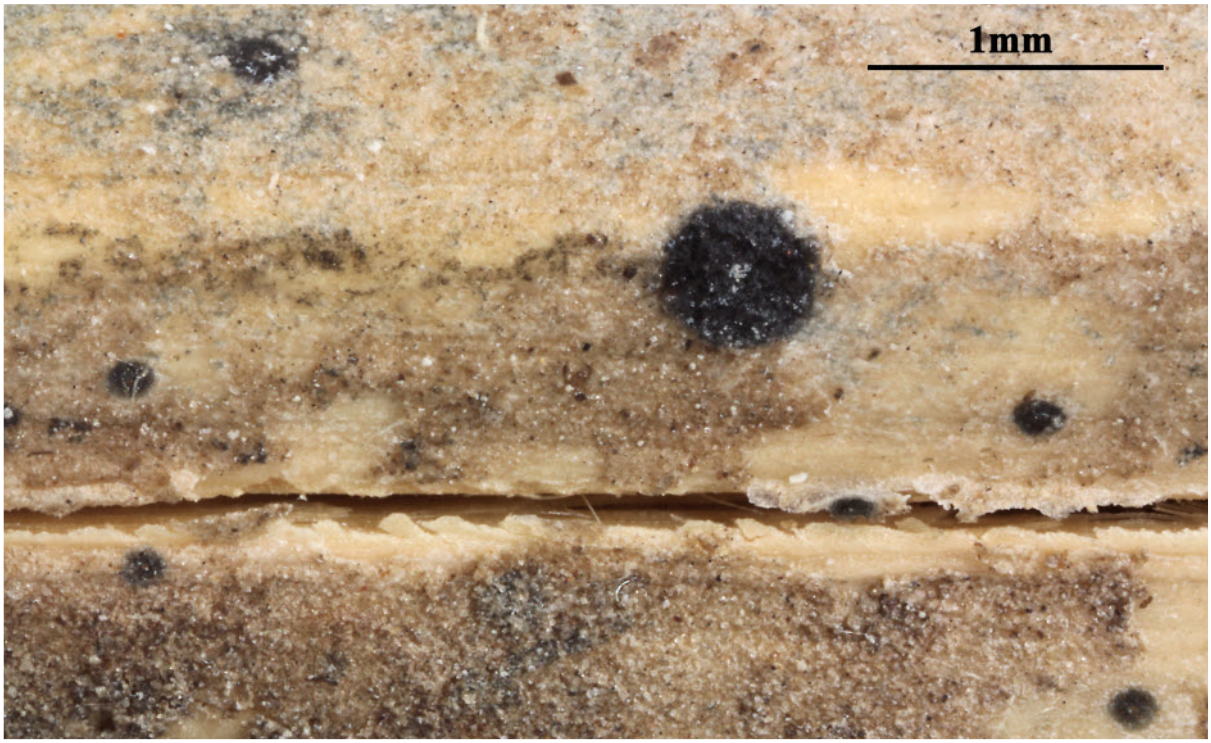


Polymeridium albopruinosum

Polymeridium bambusicola Aptroot & L.I. Ferraro, Bonplandia 10(1-4): 140 (2000)

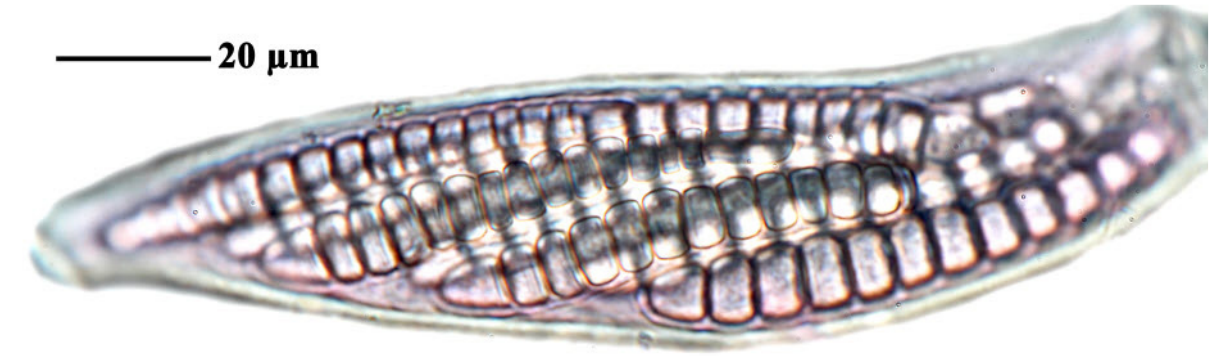
Thallus absent, not lichenized. Ascomata with ostioles, solitary, 0.5–0.8 mm diam., erumpent, exposed and grey-black. Hamathecium clear. Ascospores 8/ascus, 13–17-septate, oblong, 85–150 × 20–30 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: No substances detected.

[Arbo8269], Argentina, Corrientes, Dep. Mercedes, Macrosistema Iberá. Estancia Ricón del Diablo, alrededores del casco. 28°44’ S, 58°02’ W, 10 m. Interior de monte a la orilla del estero. Leg. M.M. Arbo (no 8269), A. Schinini, V. Marunak & F. Zanier, 4.12.1998, det. A. Aptroot. ISOTYPE.









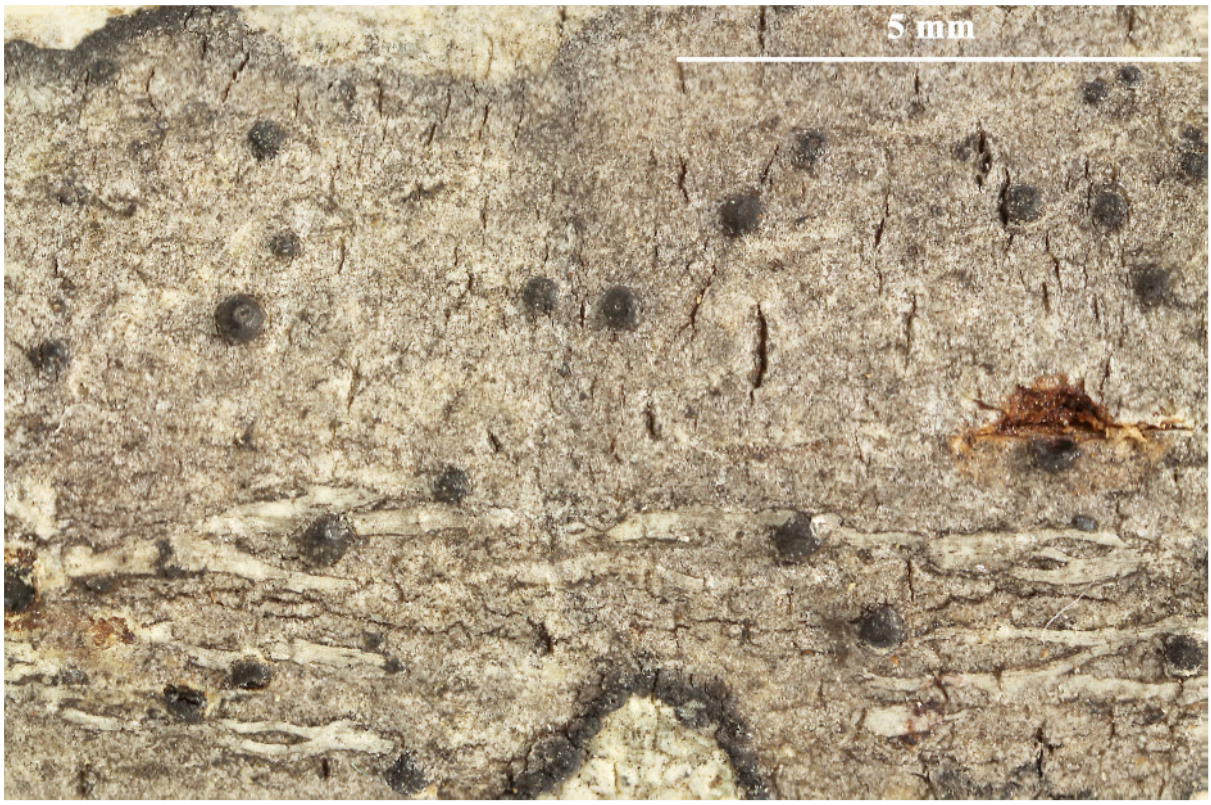




Polymeridium bambusicola

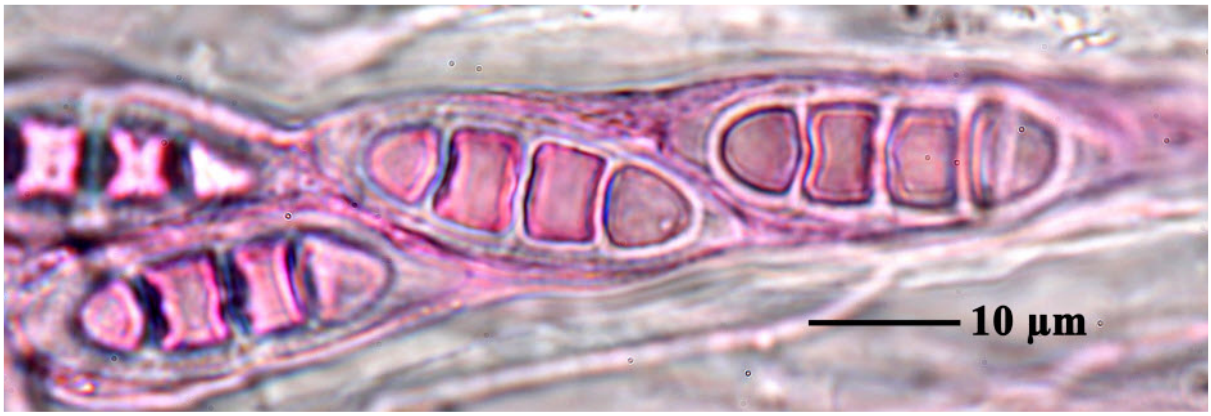
Thallus ecorticate, yellowish white, smooth to uneven. Ascomata with mostly apical, rarely somewhat eccentric ostioles, solitary, 0.3–0.5 mm diam., erumpent, hemispherical, exposed and black. Hamathecium clear. Ascospores 4–8/ascus, 3-septate, fusiform, 24–32 × 6–11 µm, hyaline, IKI-, wall smooth. Chemistry: UV-, K-. TLC: No substances detected.

[ABL18279], Papua New Guinea, Chimbu prov., Mount Wilhelm Area, Near lake Piunde (=Pindaunde), on tree in forest remnants, 145°03' E, 5°47' S, 3500 m. Leg. A. Aptroot (no 18279), 03.1987, det. A. Aptroot, 1987. HOLOTYPE.

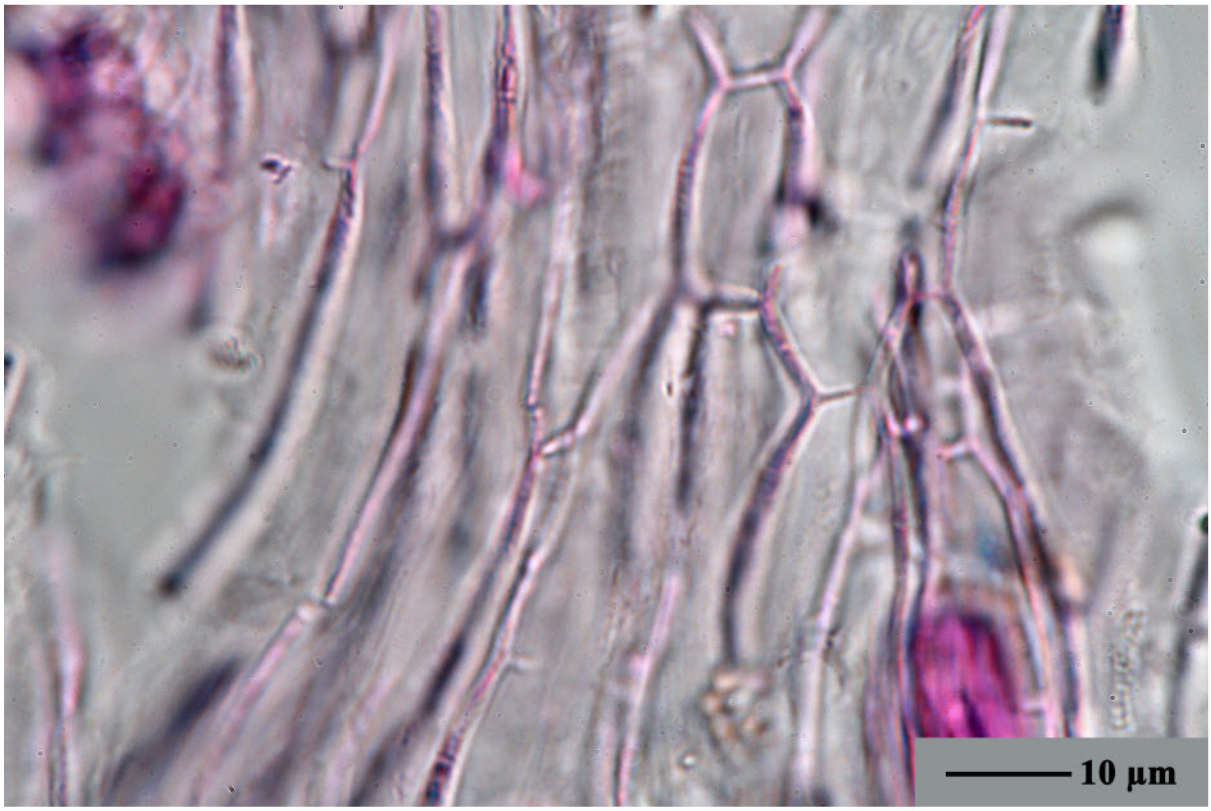




Polymeridium catapastoides







Polymeridium catapastoides

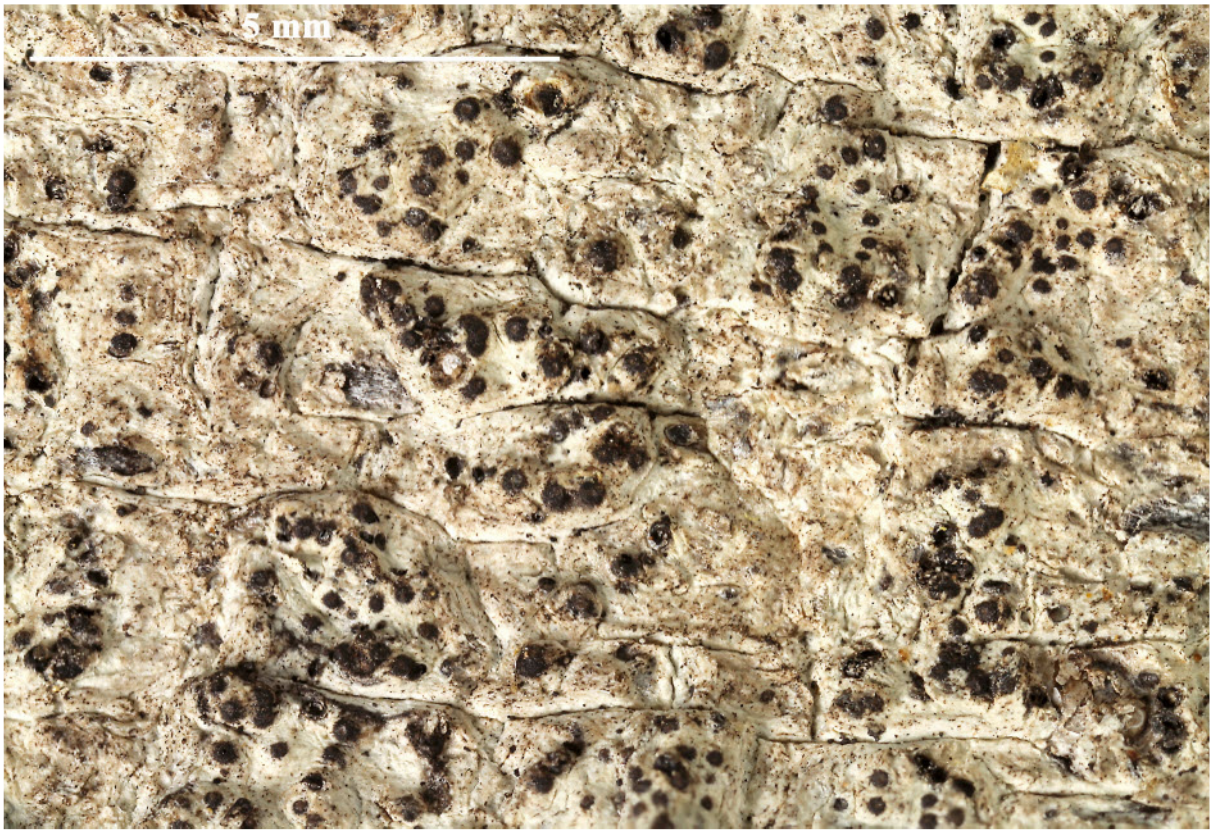
Polymeridium catapastum (Nyl.) R.C. Harris, Acta Amazon., Supl. 14(1-2): 70 (1986) [1984]

= *Arthopyrenia catapasta* (Nyl.) Müll. Arg., Flora, Regensburg 66(20): 318 (1883)

= *Verrucaria catapasta* Nyl., Annls Sci. Nat., Bot., sér. 4 20: 246 (1863)

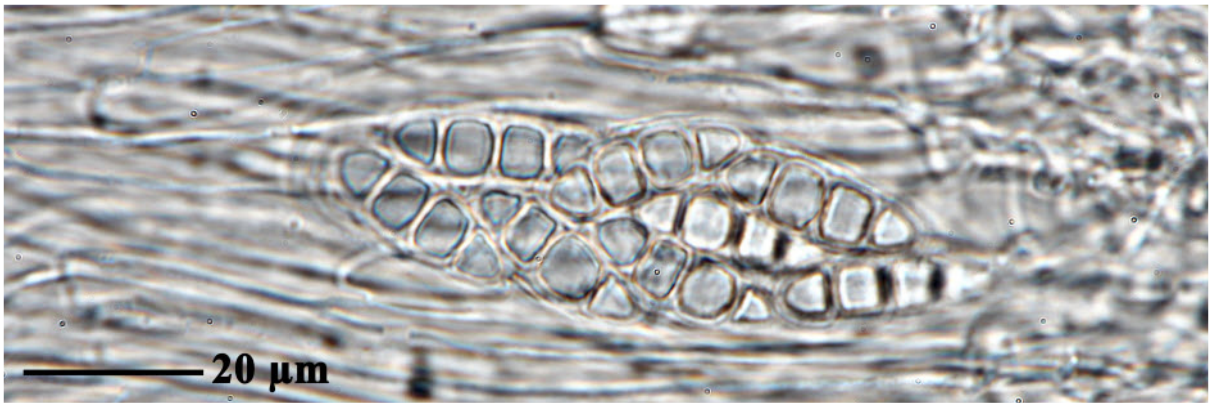
Thallus corticate, white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.3–0.4 mm diam., erumpent, exposed and black but ostiolar are sometimes whitish. Hamathecium clear. Ascospores 8/ascus, 3 septate, fusiform, hyline, wall smooth, 25–33 × 7–10 µm, IKI-. Chemistry: thallus UV+ yellow, K-. TLC: lichexanthone.

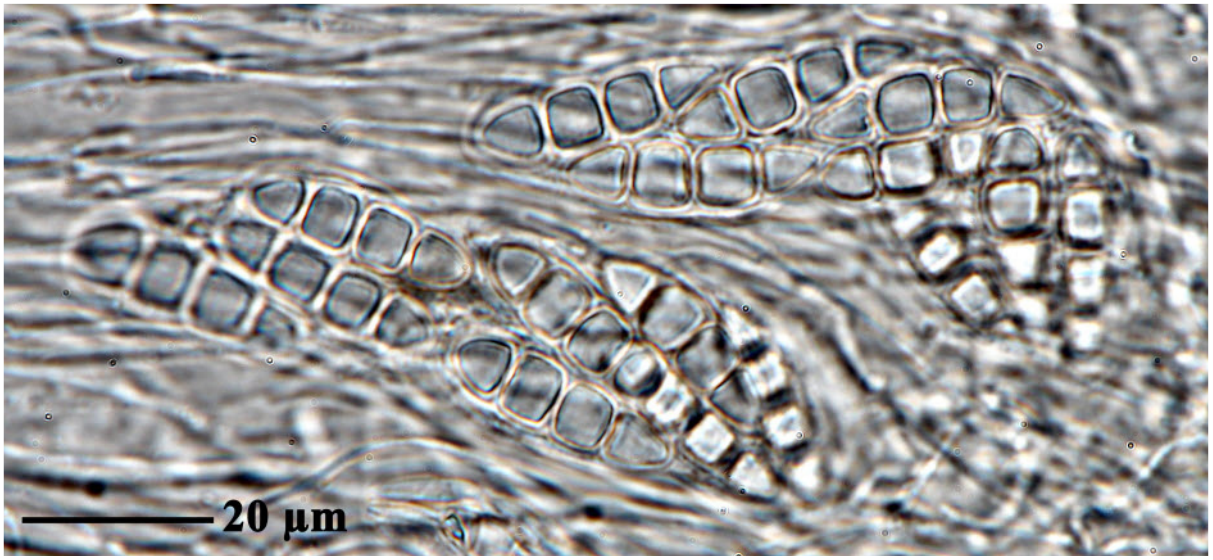
[ABLISE48615], Brazil, Bahia, Itamajarú, Monte Pascual, on tree in cerrado forest, 16°51’55” S, 39°24’54” W, 130 m. Leg. M. Cáceres & A. Aptroot, (no ISE 48615), 18.02.2019.

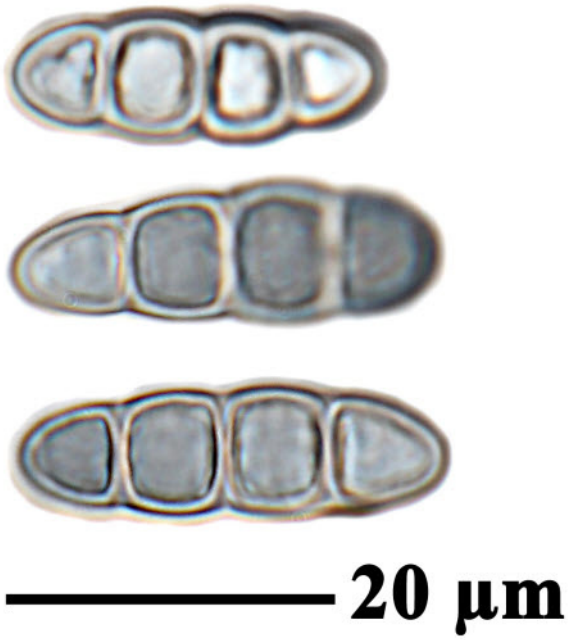




Polymeridium catapastum







Polymeridium catapastum

Polymeridium contendens (Nyl.) R.C. Harris, in Tucker & Harris, Bryologist 83(1): 12 (1980)

= *Arthopyrenia contendens* (Nyl.) Müll. Arg., Flora, Regensburg 66: 317 (1883)

= *Verrucaria contendens* Nyl., Acta Soc. Sci. fenn. 7(2): 492 (1863)

Thallus ecorticate, white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.4 mm diam., erumpent, lens-shaped, exposed and black. Hamathecium inspersed. Ascospores 8/ascus, 3-septate, oblong-fusiform, 12–16 × 4–6 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: No substances detected.

[Maas7373a], Guyana, Rupununi River, Monkey Pond landing, SW of Mt. Makarapan, along river, forest on inudated ground. 3°53' N, 58°55' W. Leg. P.J.M. Maas (no 7373a), J. Koek-N., H. Lall, B.J.H. ter Welle & L.Y.Th. Westra, 11.11.1988, det A. Aptroot 1989.





Polymeridium contendens

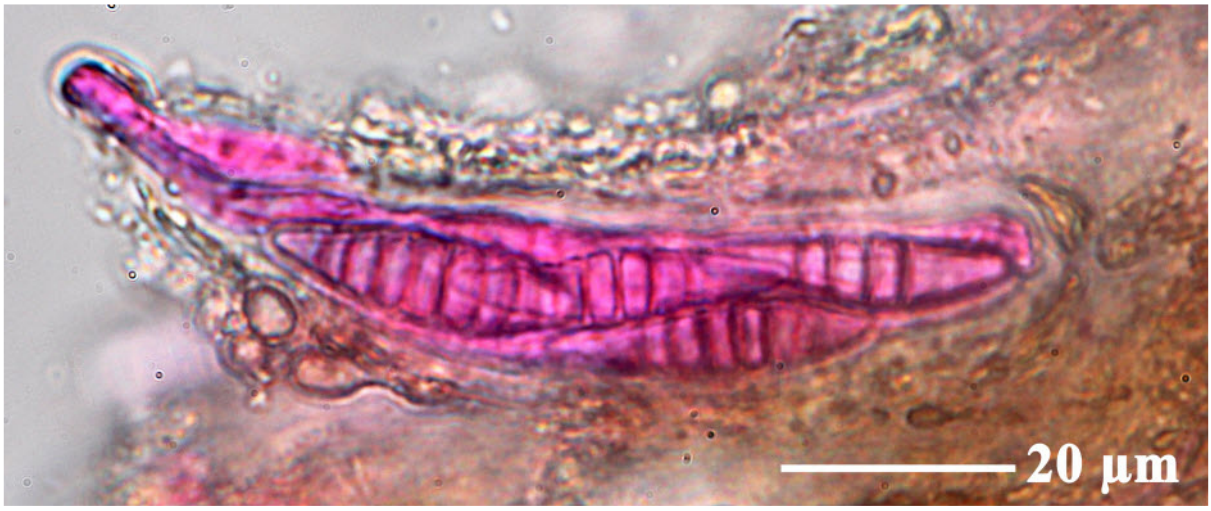
Polymeridium fernandoi Aptroot & Weerakoon, Cryptog. Mycol. 39(3): 375 (2018)

Thallus not corticate, smooth, dull, continuous, c. 0.2 mm thick, whitish grey. Ascomata hemispherical, c. 0.3–0.5 mm diam., single, black, erumpent to distinctly raised above the thallus. Wall carbonized, up to 80µm thick. Ostioles central, apical, flat, dark brown. Hamathecium inspersed with yellow oil globules that are KOH+ violet. Ascospores 8/ascus, hyaline, 6–8 septate, 35–39 × 7.5–8 µm (swelling to 43 µm long in KOH), slightly clavate, ends rounded, surrounded by a c. 1.5 µm thick gelatinous layer. Chemistry: UV-, K-. No TLC performed.

[Weerakoon890], Sri Lanka, Sinharaja rain forest, Mulawella trail, 6°25’ N, 8°25’ E, 576 m, Leg. G. Weerakoon (no 890), 16.5.2017, det. A. Aptroot. ISOTYPE.



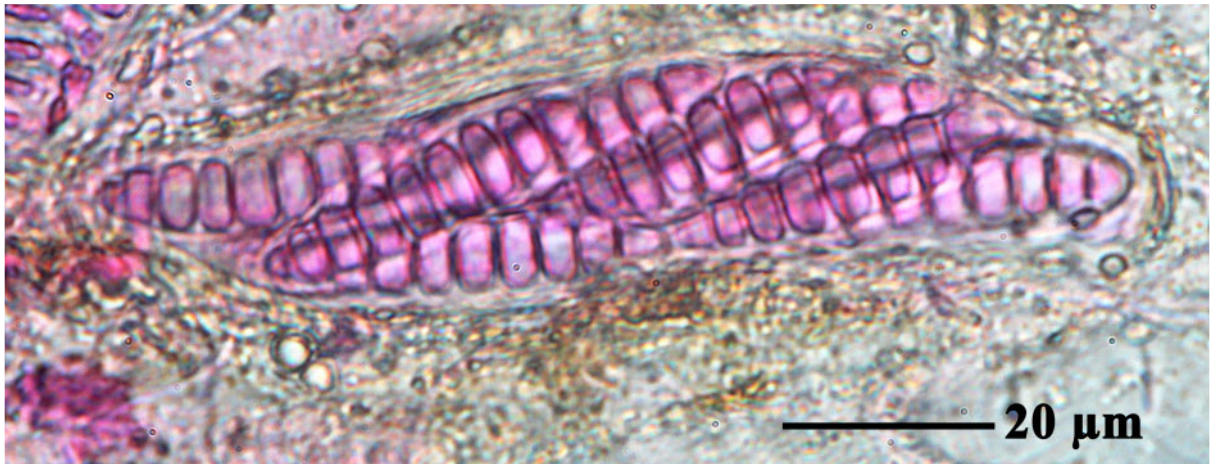




Polymeridium fernandoi







Polymeridium fernandoi

Polymeridium inspersum Aptroot, Nova Hedwigia 98(1-2): 16 (2013) [2014]

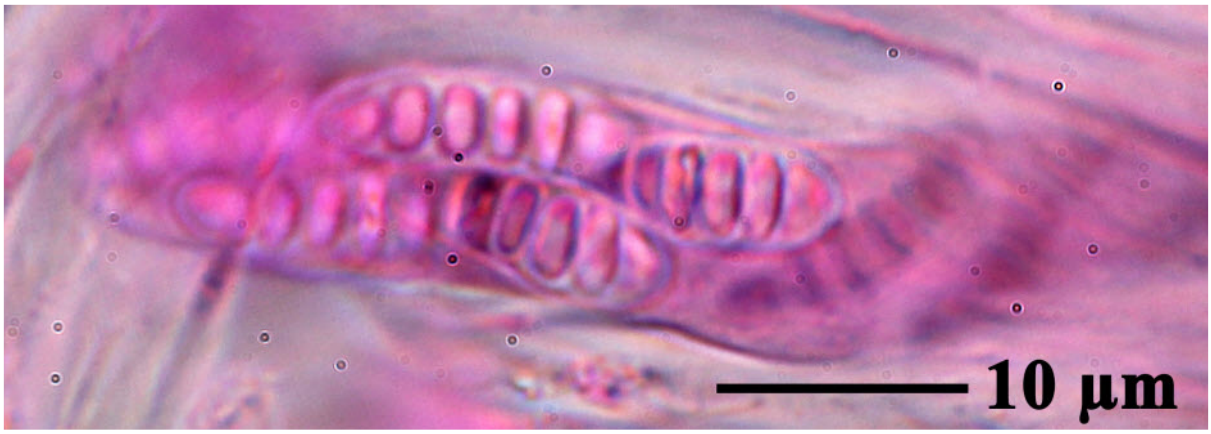
Thallus ecorticate, white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.4 mm diam., erumpent, exposed and black. Hamathecium inspersed. Ascospores 8/ascus, 3–5-septate, fusiform, 14–20 × 3–5 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: No substances detected.

[ABL22755], Australia, Queensland, Kuranda, Jumrum Creek track, 18 km NW of Cairns, on tree in rainforest relict, 145°38’ E, 16°49’ S, 350 m. Leg. A. & M. Aptroot (no 22755), 03.1988, det. A. Aptroot 1988. ISOTYPE.

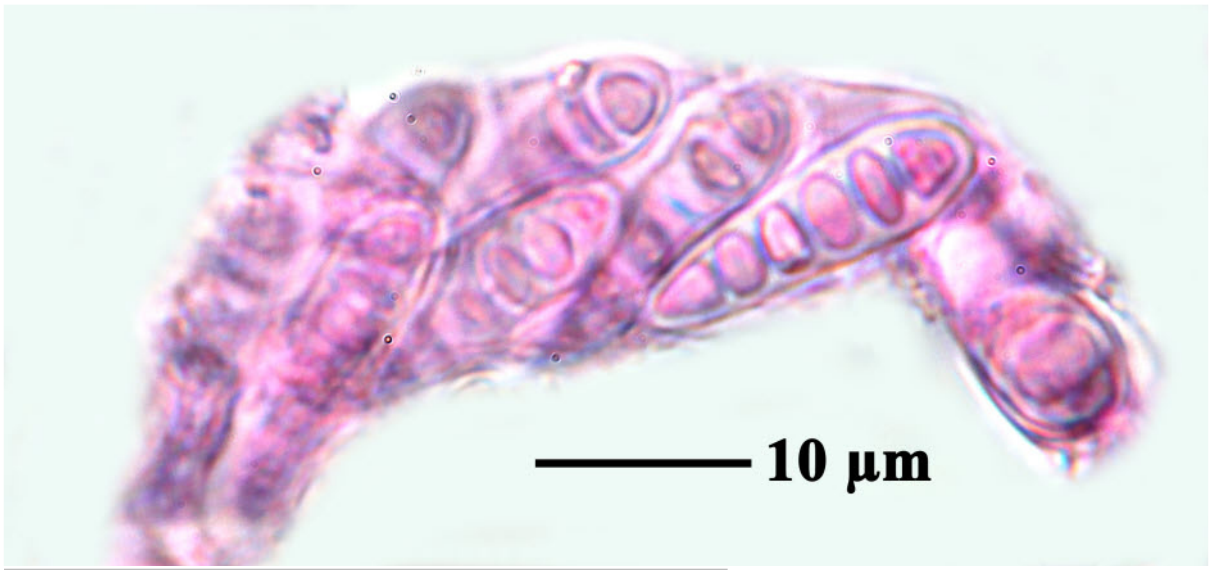




Polymeridium inspersum











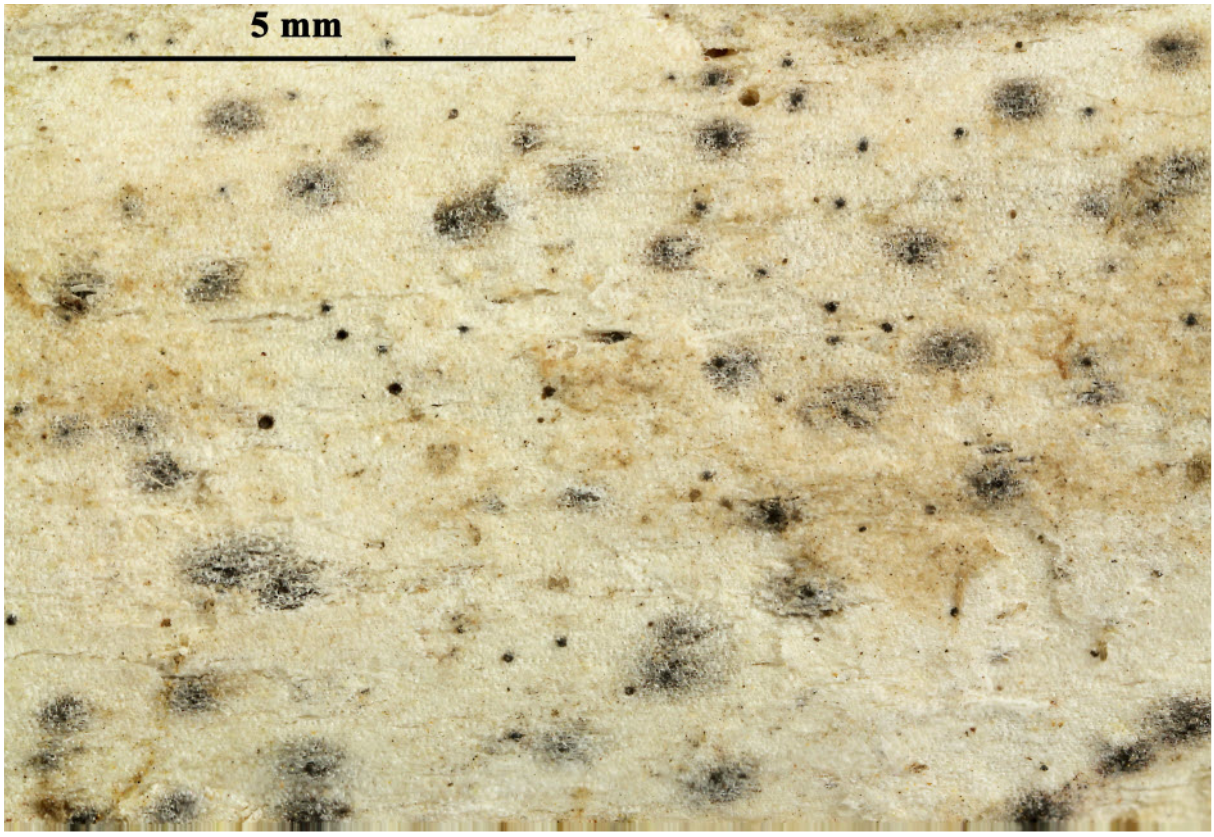
Polymeridium inspersum

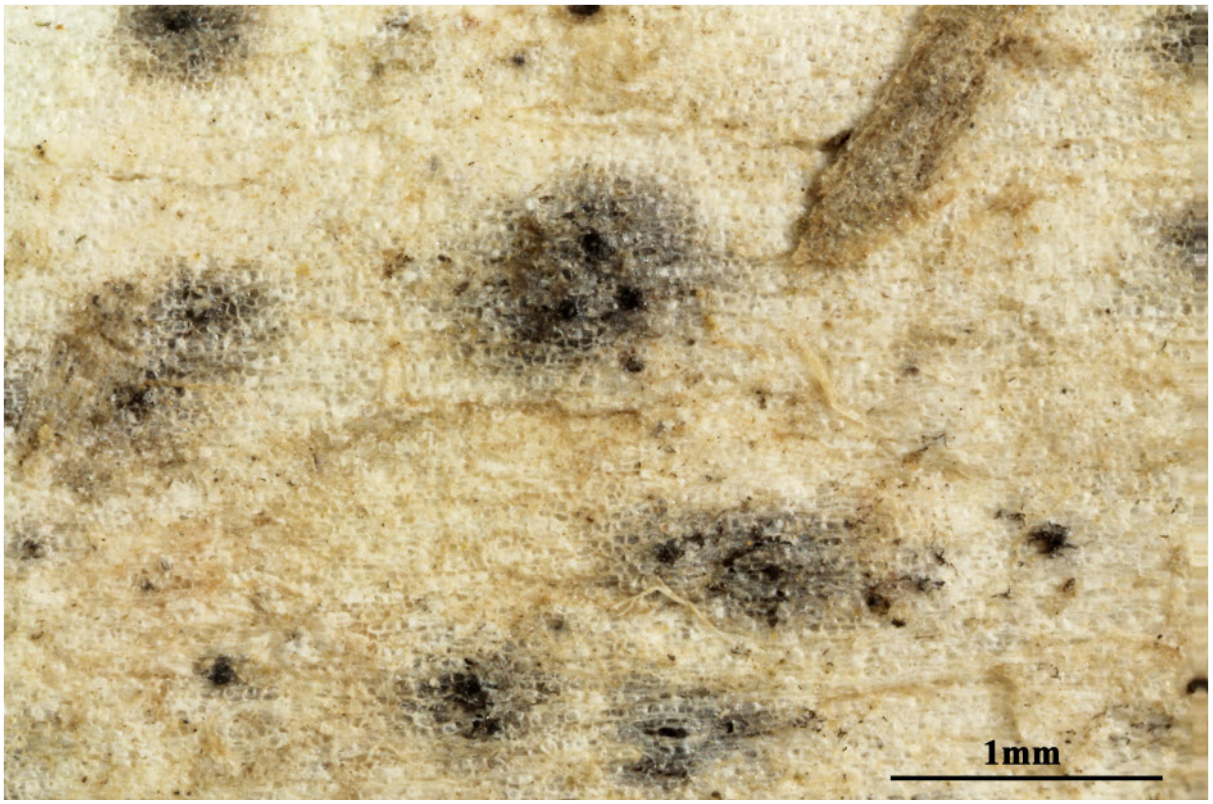
Polymeridium jordanii (C.W. Dodge) Aptroot, Nova Hedwigia 98(1-2): 18 (2013) [2014]
= *Pseudopyrenula jordanii* C.W. Dodge, Beih. Nova Hedwigia 12: 11 (1964)

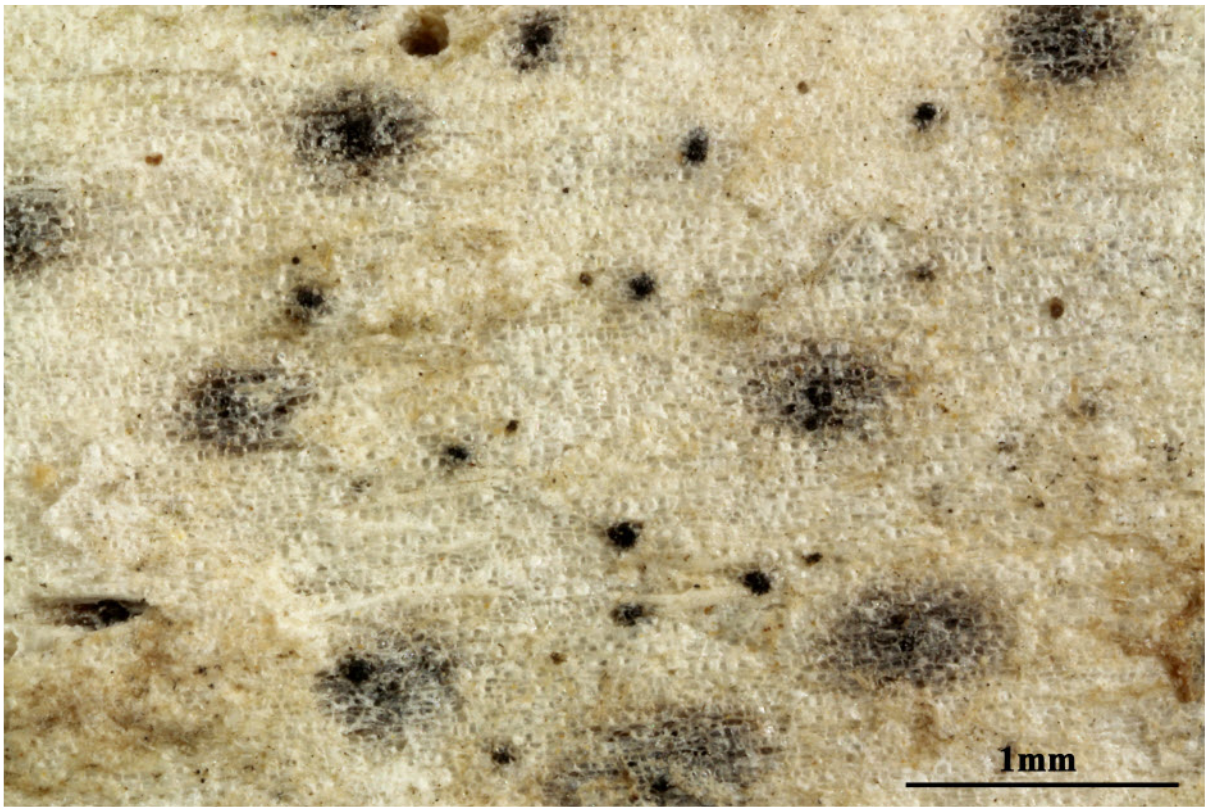
Achtung: Die nachfolgende Beschreibung (Lichenologist 48(6)) stimmt nicht mit meiner Beobachtung überein. Sporen 1-septiert, braun, 24-27 x 10-11.6 µm

Thallus ecorticate, white, smooth to uneven.Ascomata with apical ostioles, solitary, 0.2-0.4 mm diam., erumpent, exposed an black. Hamathecium clear. Ascospores 8/ascus, 4-7 septate, fusiform, 21-30 x 5-9, µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: no substances detected.

[ABL730181], Aldabra, Cinque Cases, on *Premna obtusifolia*. Leg. R.J. Hnatiuk, 17.04.1973.

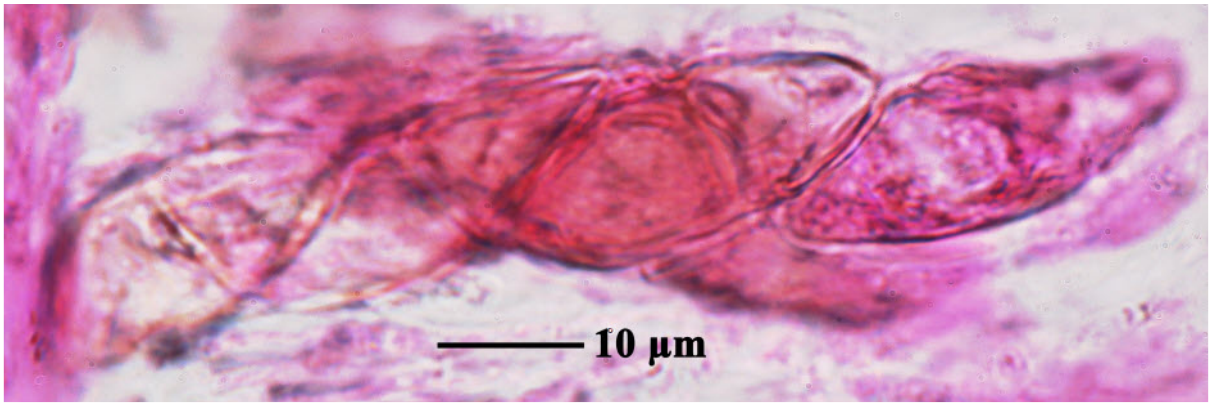






Polymeridium jordanii





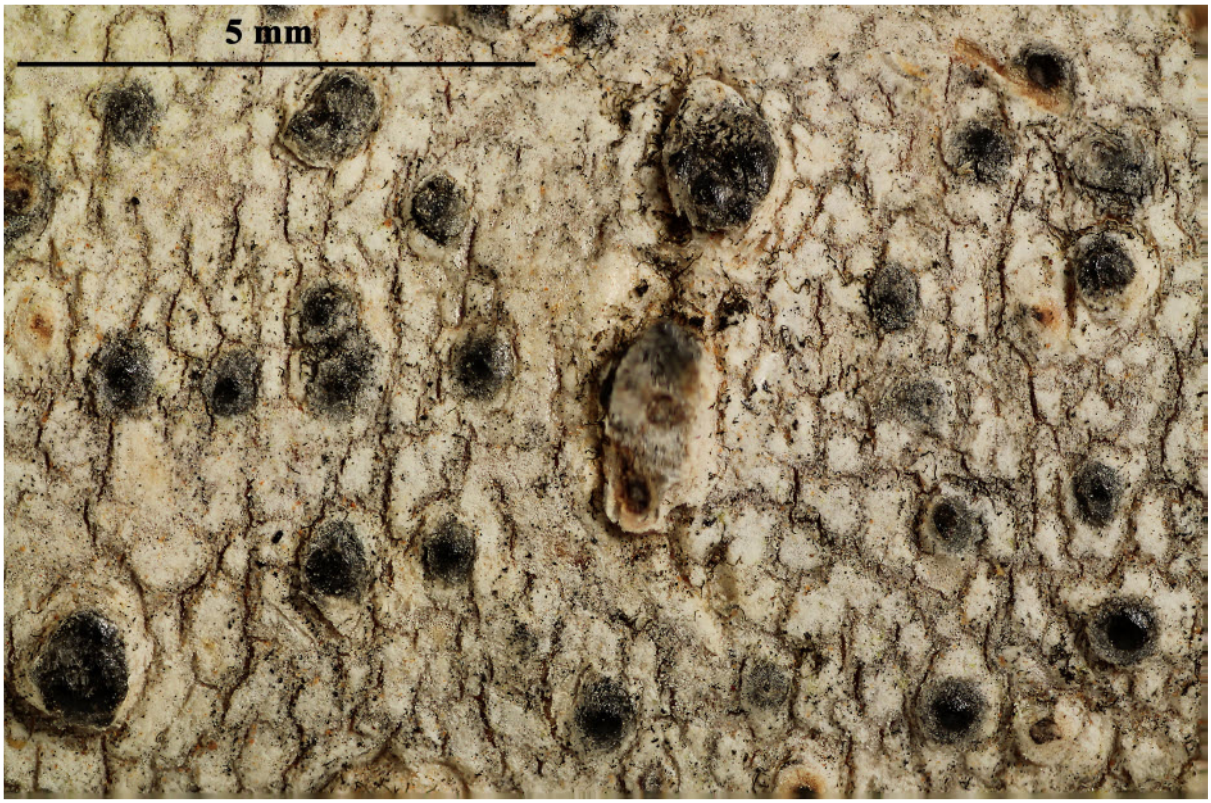


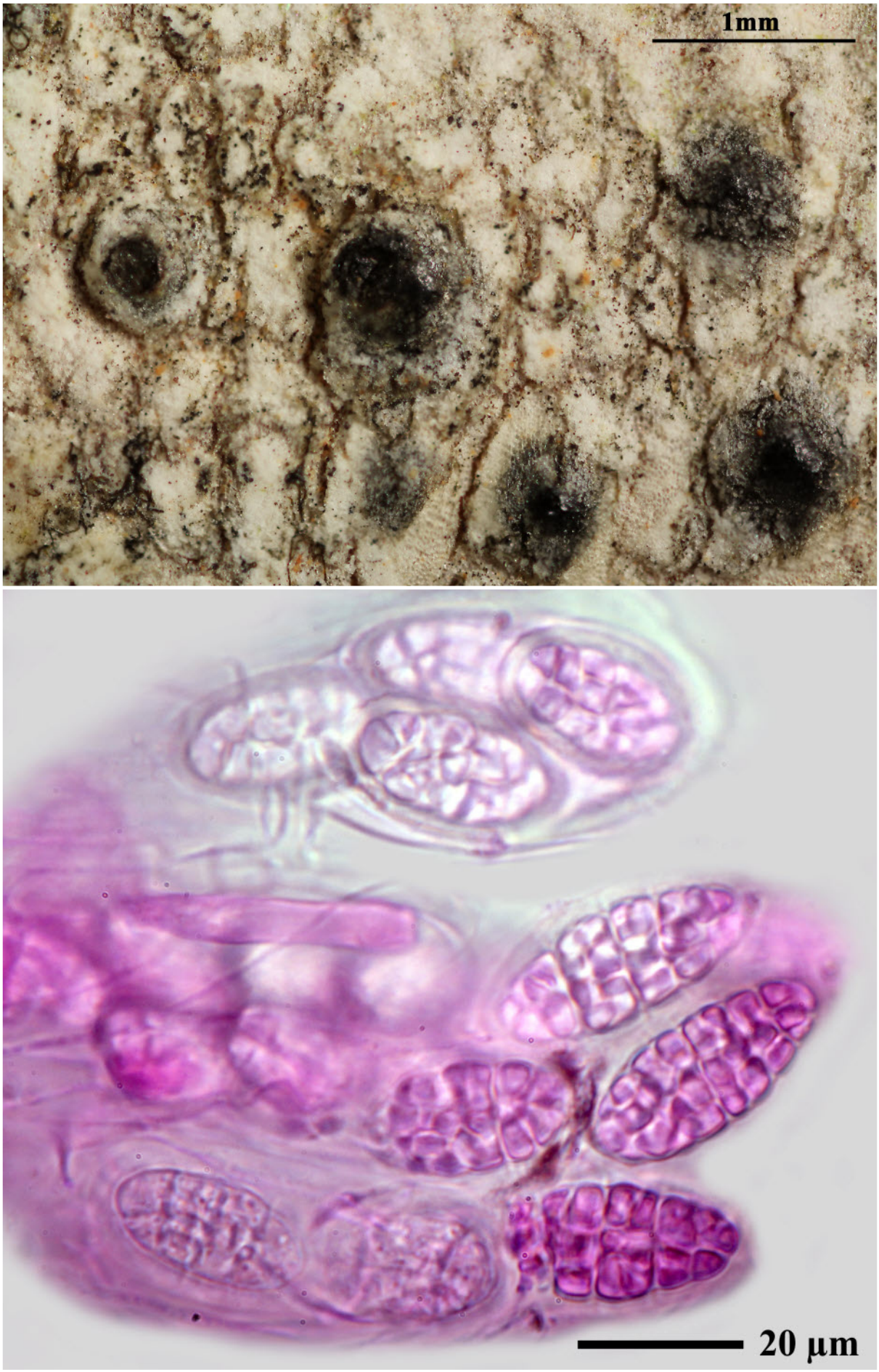
Polymeridium jordanii

Polymeridium julelloides E.L. Lima, M. Cáceres & Aptroot, Lichenologist 45(4): 548 (2013)

Thallus crustose, continuous, not corticate, dull, pale pinkish brown, very thin and closely following the bark surface, surrounded by a brown prothallus line. Algae trentepohlioid. Ascomata conical, superficial, somewhat glossy, 0.3–0.5 mm wide, black. Ostioles brown, apical. Hamathecium not inspersed. Ascospores muriform, 8 per ascus, hyaline, IKI–, 6–9 × 0–2-septate, ellipsoidal to slightly clavate, 25–29 × 11–13 µm, septa often partly oblique, outer wall generally constricted at a few septa. Pycnidia not observed. Chemistry: UV–, KOH–. TLC: no substances detected.

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

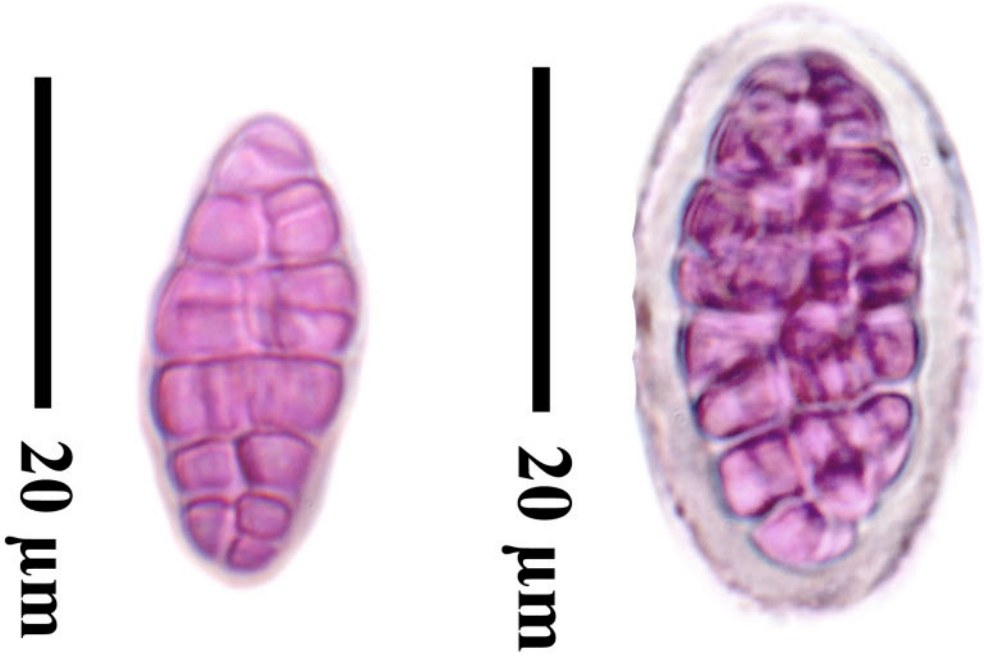




Polymeridium julelloides





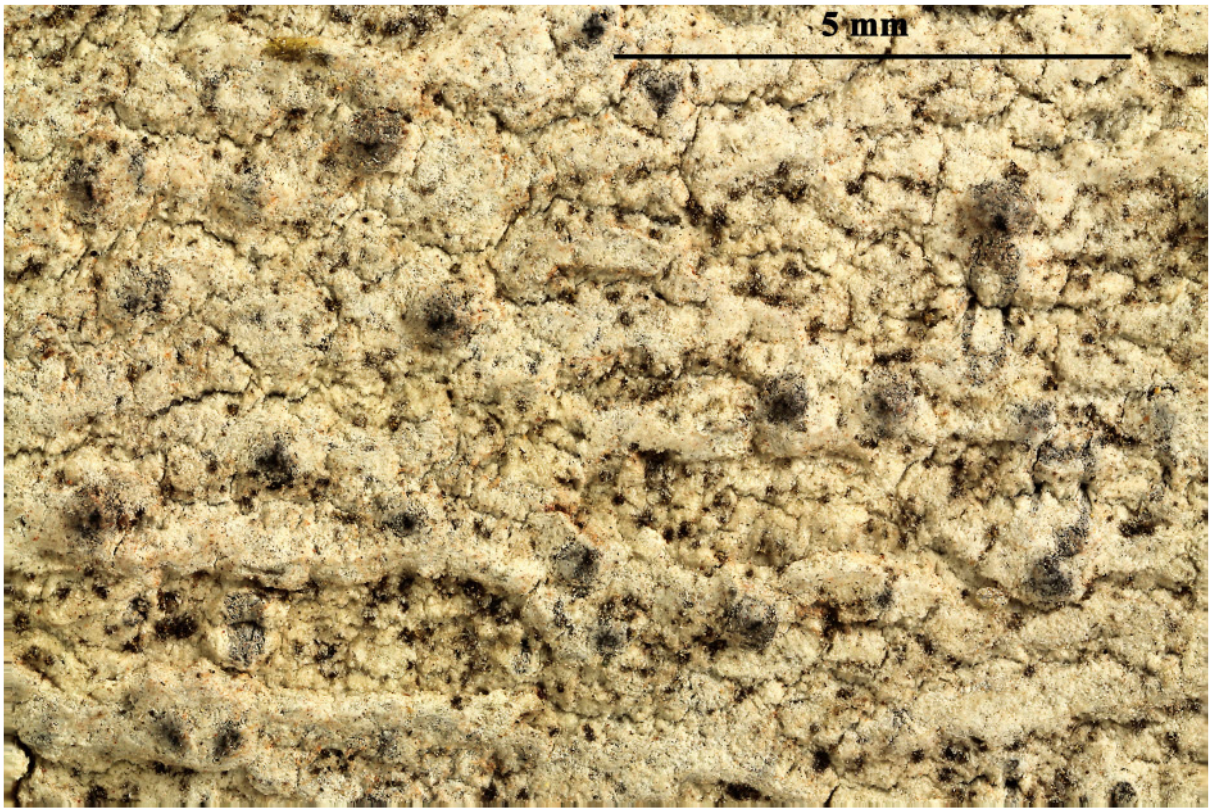


Polymeridium julelloides

Polymeridium longiflavens Aptroot, C. Mendonça & M. Cáceres, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 723 (2016)

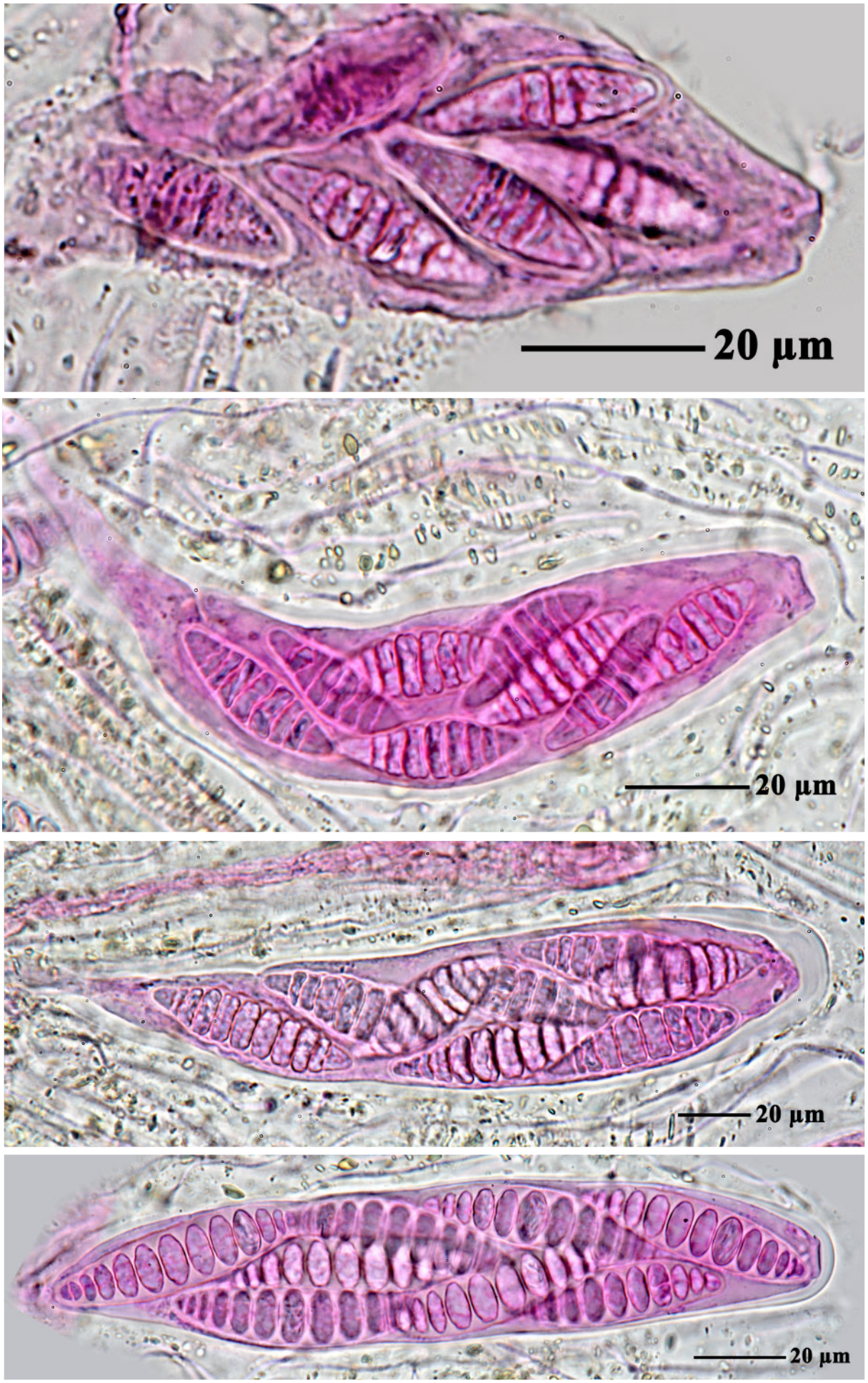
Thallus not corticate, dull, continuous, covering areas ≤ 2 cm diam., whitish grey, surrounded by a byssoid dark brown hypothallus line c. 0.4 mm wide, not inducing gall formation of the host bark. Ascomata globose, 0.25–0.35 mm diam., single, emergent from the thallus. Wall carbonized, ≤ c. 40 µm thick. Ostioles apical, not fused, flat, black. Hamathecium inspersed with yellow oil globules. Asci with 8 ascospores. Ascospores hyaline, 9–11-septate, fusiform, 57–70 × 12–14 µm, ends pointed, lumina rounded, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus UV+ yellow, KOH−. TLC: lichexanthone.
Yellow oil inspersion in the hamathecium is a rare character, and in the family is otherwise known only from a few *Astrothelium* and *Pseudopyrenula* species, and in the genus *Polymeridium* from *P. flavothecium* R. C. Harris (which has a lateral ostiole) and *P. endoflavens* (which has shorter and less septate ascospores).

[ABL18031], Brazil, Sergipe, Parque Nacional Serra de Itabaiana, c. 400 m, 10°44’35” S, 37°20’25” W, on bark of tree. Leg. M. Cáceres & A. Aptroot (no 18031), 27.07.2013, det. A. Aptroot, 2013. ISOTYPE.

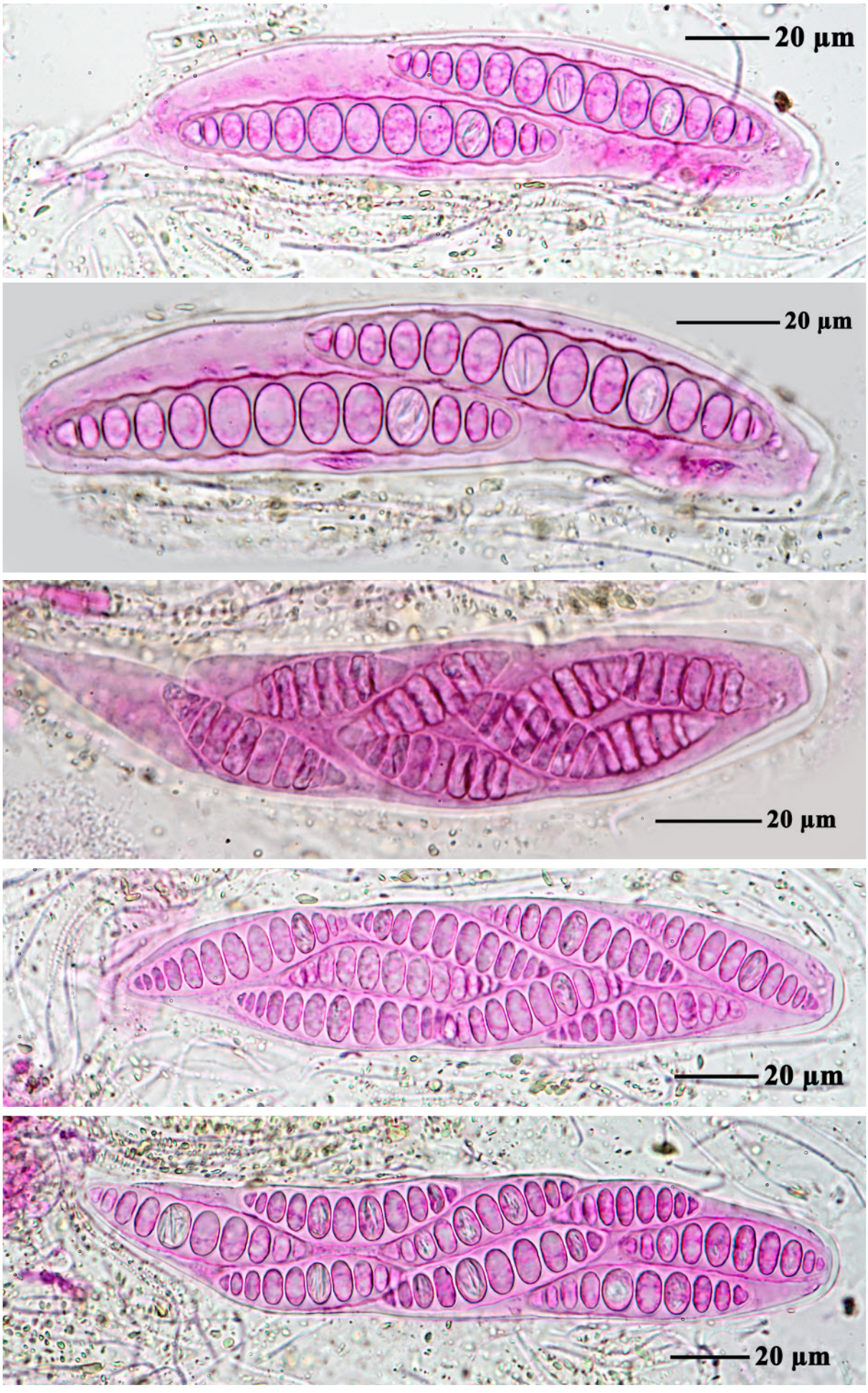




Polymeridium longiflavens



Polymeridium longiflavens



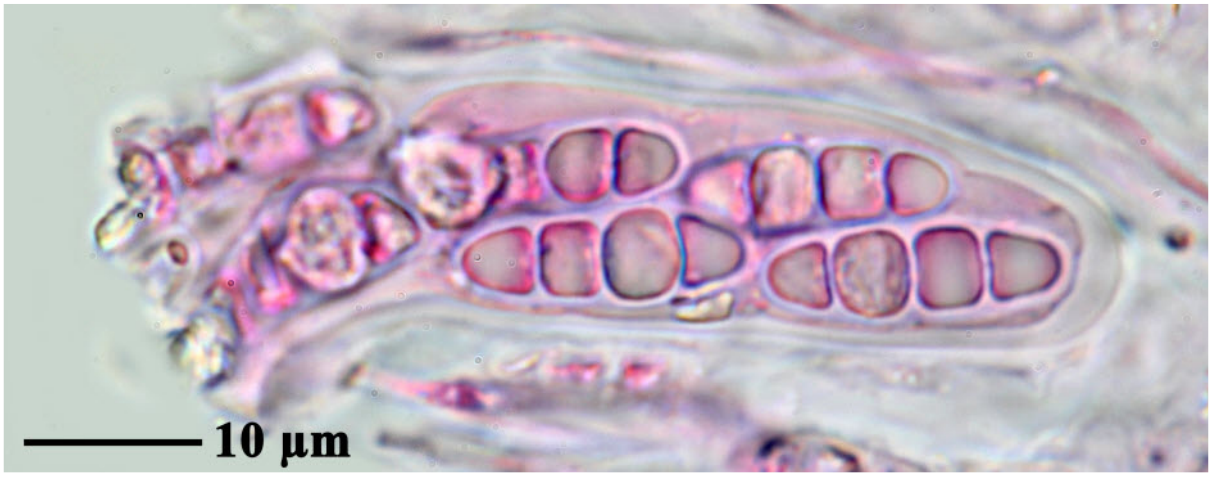
Polymeridium longiflavens

Polymeridium microsporum (Makhija & Patw.) Aptroot, Nova Hedwigia 98(1-2): 18 (2013) [2014]
= *Trypethelium microsporum* Makhija & Patw., J. Hattori bot. Lab. 73: 201 (1993)

Thallus ecorticate, brown, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.3 mm diam., erumpent, exposed and black. Hamathecium inspersed (?). Ascospores 8/ascus, 3 septate, fusiform, 11–16 × 3–6 µm, hyaline, IKI-. wall smooth. Chemistry: Thallus UV-, K-. TLC: No substances detected.

[AMH852210], India, Andaman Island, Middle Andaman, Yeratta. Leg. Sethy & Nagarkar (no 852210). ISOTYPE of *Trypethelium microsporum*.











Polymeridium microsporum

Polymeridium multiforme Aptroot, Nova Hedwigia 98(1-2): 18 (2013) [2014]

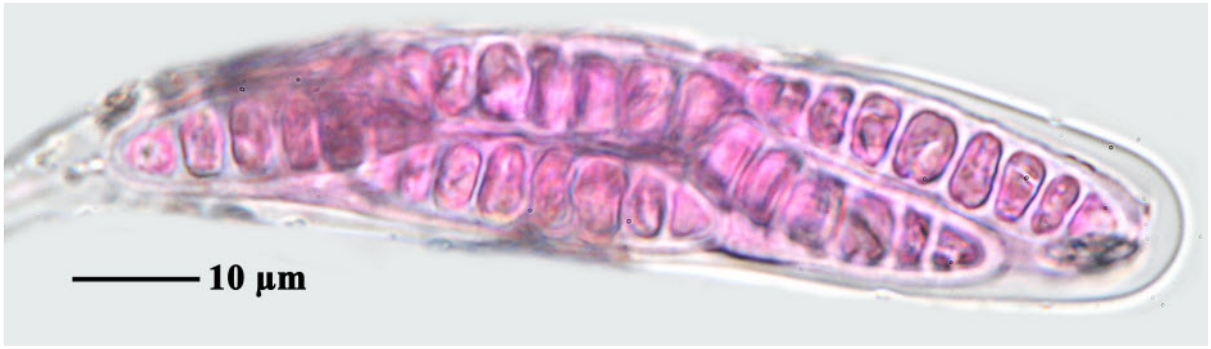
Thallus ecorticate, whitish grey, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.3 mm diam., erumpent, exposed and black. Hamathecium clear. Ascospores 8/ascus, (4–)5(–7)-septate, fusiform, 19–26 × 5–7 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV+ yellow, K-. TLC: Lichexanbthone.

[Maas7586c], Guyana, Rupununi distr., trail from abandoned bleeder's camp at base of Mt. Makarapan to Rupunni River. Shrub savanna on brown sand, temporarily inudated. 3°56' N, 58°56' W. Leg. P.J.M. Maas (no 7586c), J. Koek-Noorman, H. Lall, B.J.H. ter Welle & L.Y.Th. Westra, 20.09.1988. HOLOTYPE.





Polymeridium multiforme







Polymeridium multiforme

Polymeridium neuwirthii Aptroot, Nova Hedwigia 98(1-2): 20 (2014)

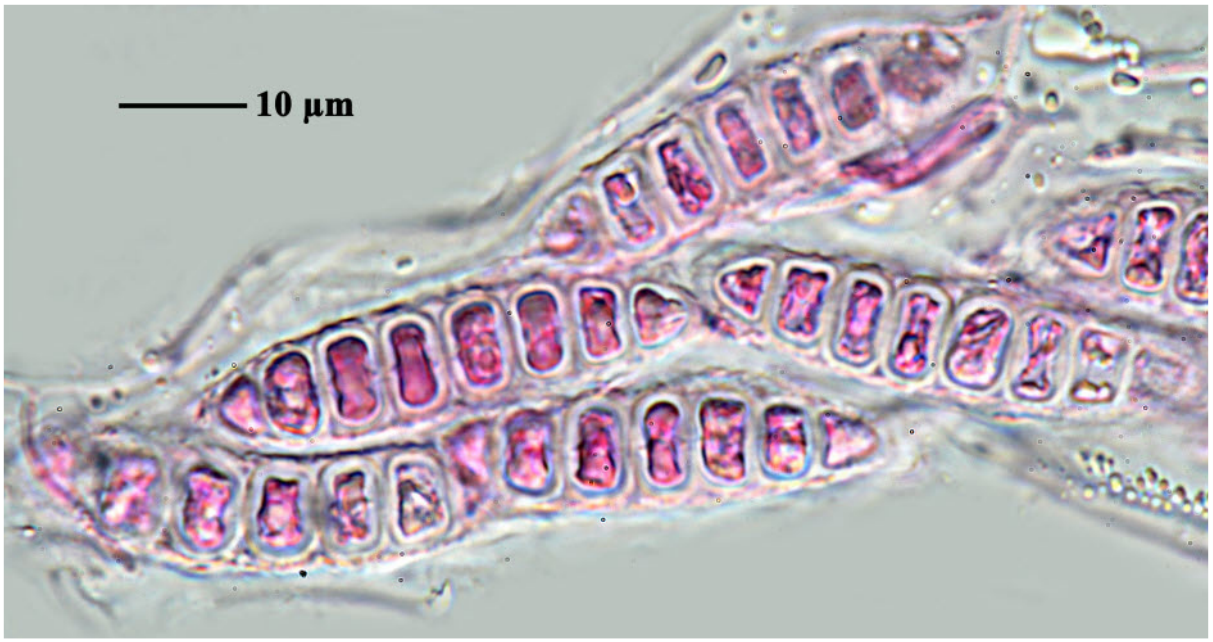
Thallus ecorticate, pinkish grey, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.4 mm diam., erumpent, exposed and black. Hamathecium inspersed with very large droplets. Ascospores 8/ascus, 7-septate, fusiform, 30–33 × 9–10 µm, hyaline, IKI-, wall smooth. Chemistry: UV-, K-. TLC: No substances detected.

[GN8409], S-Amerika, Venezuela, Puerto Ajacucho, Ufer des Orinoco, corticol auf Sträuchern. Leg. G. Neuwirth (no 8409), 10.11.2005, det. A. Aptroot. ISOTYPE.





Polymeridium neuwirthii







Polymeridium neuwirthii

Polymeridium pleiomerellum (Müll. Arg.) R.C. Harris, in Egan, Bryologist 90(2): 164 (1987)
= *Arthopyrenia pleiomerella* Müll. Arg., Bot. Jahrb. Syst. 6:406, 1885

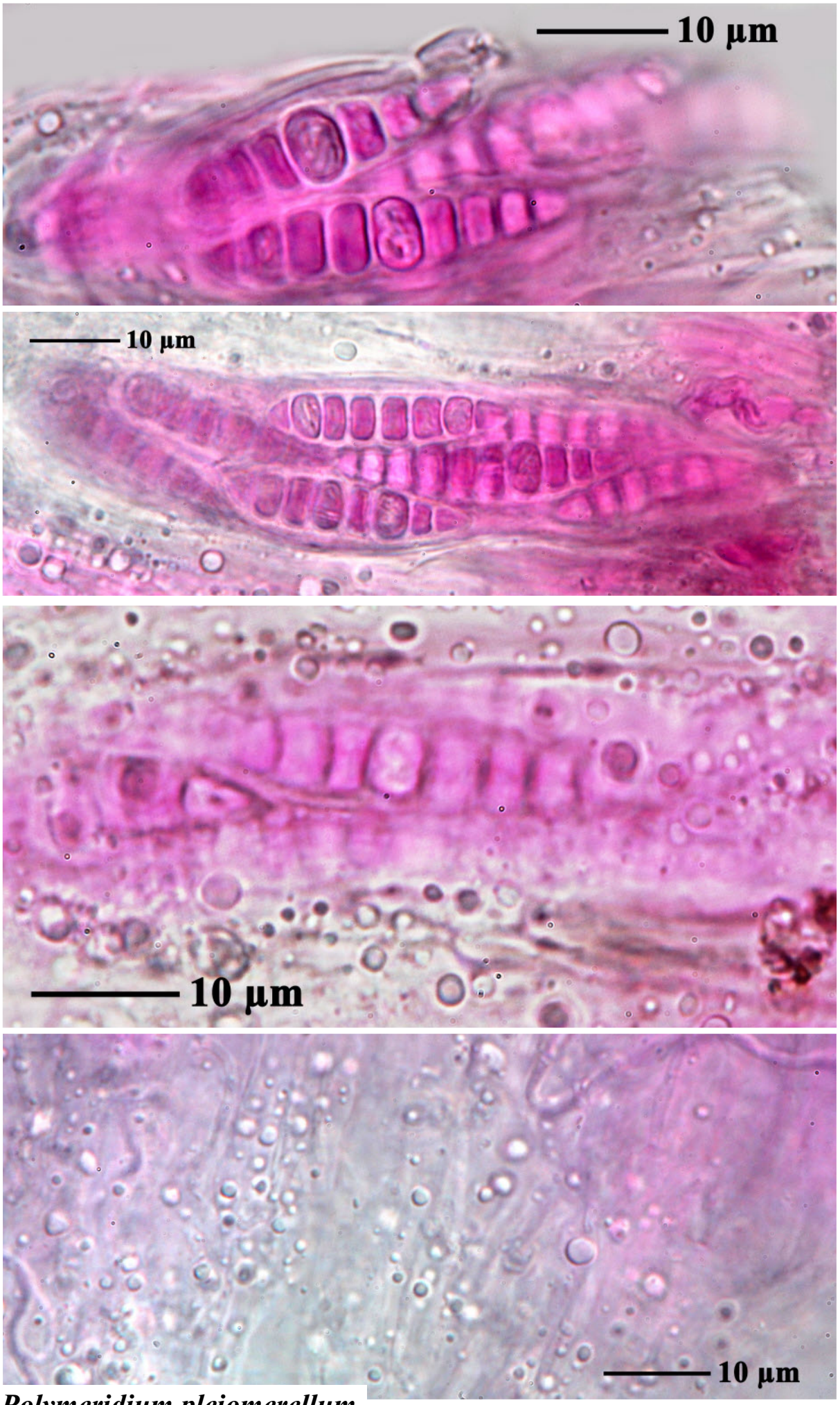
Thallus ecorticate, white-grey, smooth to uneven. Ascomata with apical ostioles, solitary, 0.3–0.4 mm diam., erumpent, exposed and grey-black. Hamathecium inspersed. Ascospores 8/ascus, 7–11-septate, fusiform. 25–36 × 5–9 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: No substances detected.

[ABL19095], 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 19095), 03.1987, det A. Aptroot, 1987.





Polymeridium pleiomerellum



Polymeridium pleiomerellum

Polymeridium pleurothecium R.C. Harris, Bolm Mus. paraense 'Emílio Goeldi', sér. bot. 7(2): 636 (1993) [1991]

Thallus ecorticate, white-grey, smooth to uneven. Ascomata with lateral, separate ostioles, solitary, 0.3–0.6 mm diam., prominent, wart-shaped, exposed and grey-black. Hamathecium clear. Ascospores 8/ascus, 9–13-septate, fusiform, (35–)50–70 × 12–13 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: no substances detected.

[ABL33169], Papua New Guinea, Madang Prov., foothills of Finisterre Range, along road Madang-Lae, km 39. Virgin lowland rainforest. On tree. 145°34' E, 5°25' S, 230 m. Leg. A. Aptroot (no 33169), 14.8.1992, det. A. Aptroot, 1993.





Polymeridium pleurothecium

Polymeridium quinqueseptatum (Nyl.) R.C. Harris, in Tucker & Harris, Bryologist 83(1): 12 (1980)
= *Amphoroblastia quinqueseptata* (Nyl.) Servít, Českoslov. Lišejn. Čeledi Verrucariaceae: 69 (1954)
= *Arthopyrenia quinqueseptata* (Nyl.) Müll. Arg., Flora, Regensburg 68(17): 326 (1885)
= *Polyblastia quinqueseptata* (Nyl.) Zschacke, Rabenh. Krypt.-Fl., Edn 2 (Leipzig) 9.1(1): 421 (1933)
= *Pyrenula quinqueseptata* (Nyl.) Tuck., Gen. lich. (Amherst): 273 (1872)
= *Spermatodium quinqueseptatum* (Nyl.) Trevis., Conspect. Verruc.: 11 (1860)
= *Thelidium quinqueseptatum* (Nyl.) Arnold, Verh. zool.-bot. Ges. Wien 18: 709 (1868)
= *Thelotrema quinqueseptatum* Hepp, Flecht. Europ.: no. 99 (1853)
= *Verrucaria hegetschweileri var. quinqueseptata* (Nyl.) Garov., Tentam. Dispos. Lich. Langob.: 147, tab. VIII, fig. 46 (1865)
= *Verrucaria quinqueseptata* Nyl. [as '5-septata'], Expos. Synopt. Pyrenocarp.: 58 (1858)

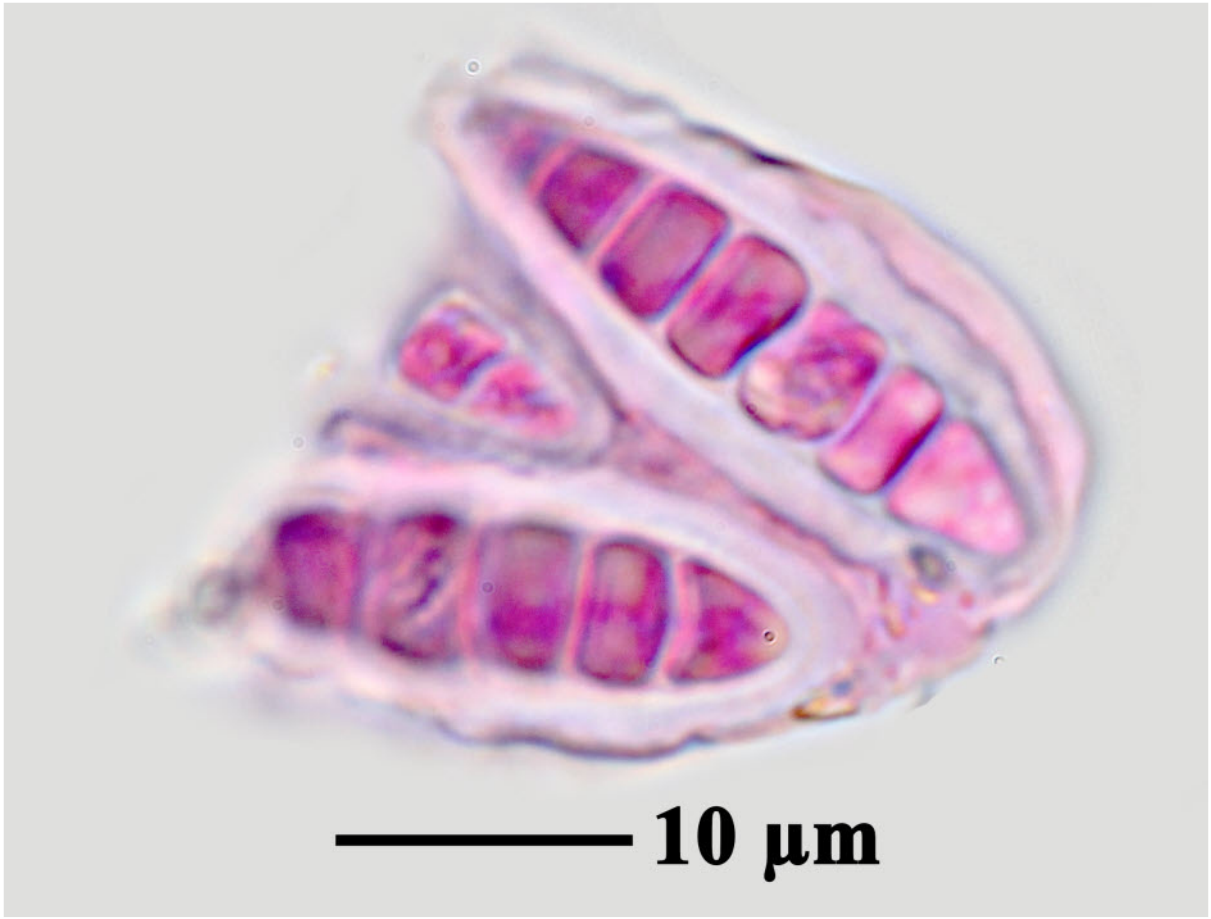
Thallus ecorticate, white-grey, smooth to uneven. Ascomata with apical ostioles, solitary, 0.3–0.4 mm diam., erumpent to prominent, hemispherical, exposed and black. Hamathecium inspersed. Ascospores 8/ascus, 4–7-septate, fusiform, 18–28 × 5–7 µm, hyaline, IKI-, wall smooth. Chemistry: thallus UV-, K-. TLC: No substances detected.

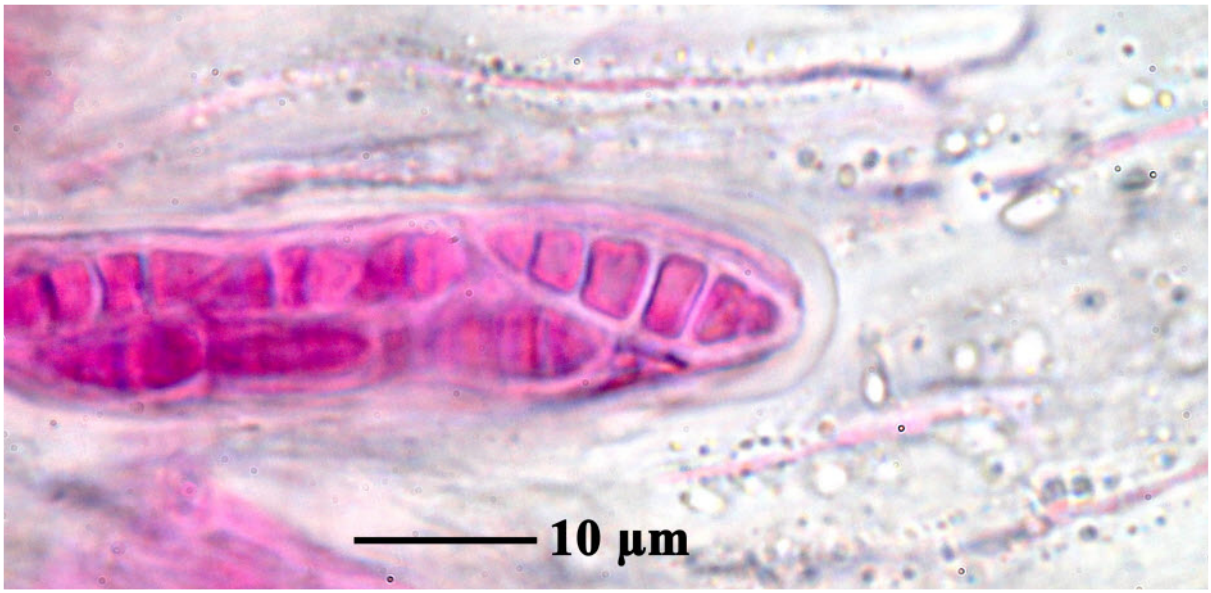
[Florschuetz5822], U.S.A., Florida state, Madison County, Greenville, Tree-farm Pocosin Pines, on various trees in garden, 100 m. Leg. J. Florschuetz (no 5822), 03.1988, det. A.Aptroot, 1988.





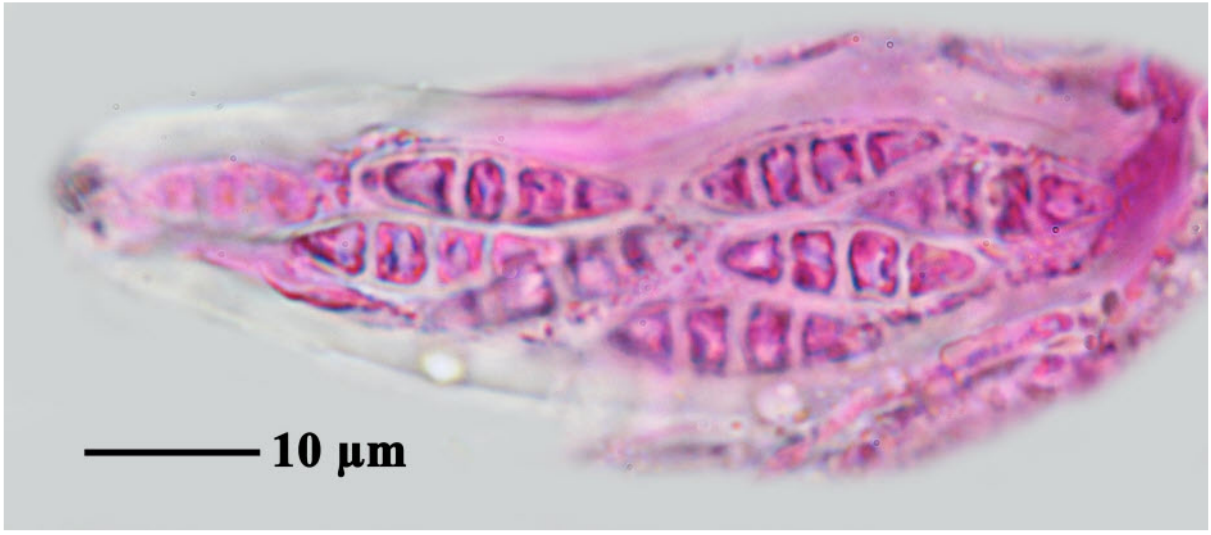
Polymeridium quinqueseptatum





Polymeridium quinqueseptatum



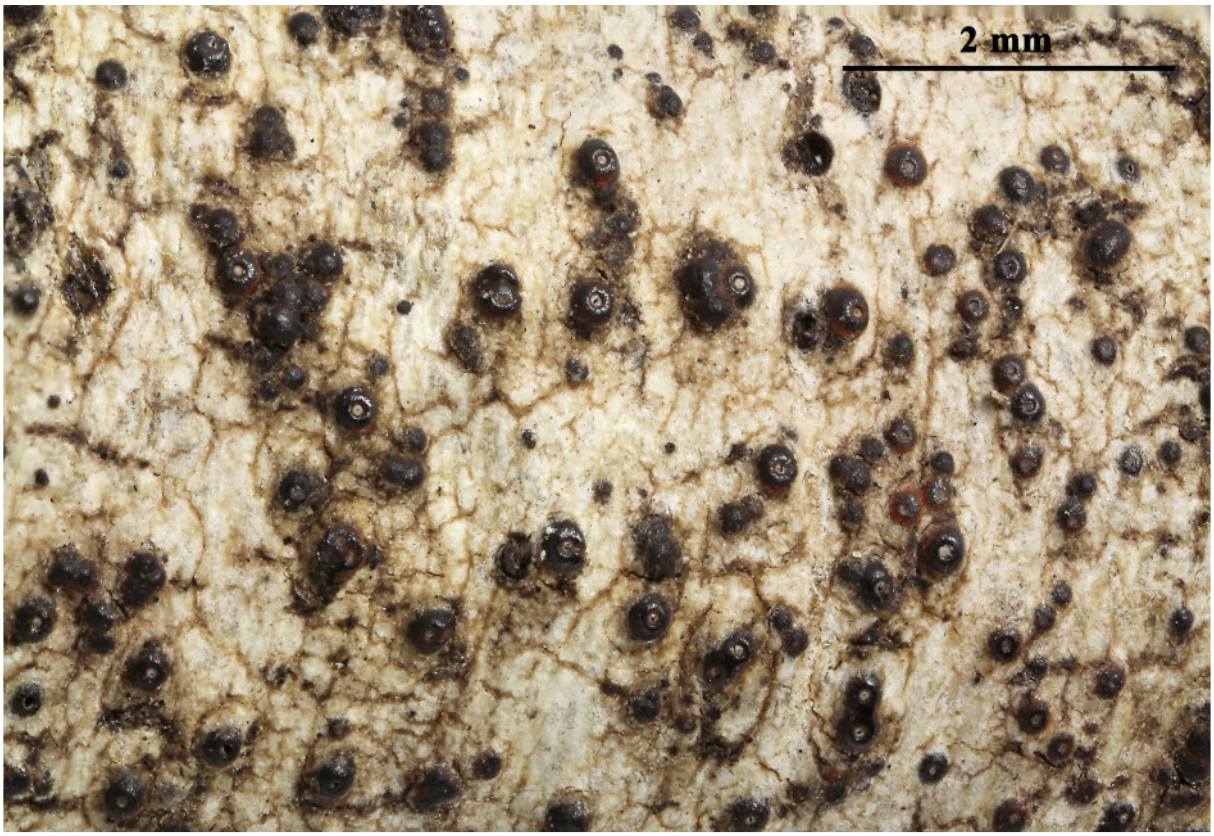


Polymeridium quinqueseptatum

Polymeridium rhodopruinosum Aptroot, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 633 (2016)

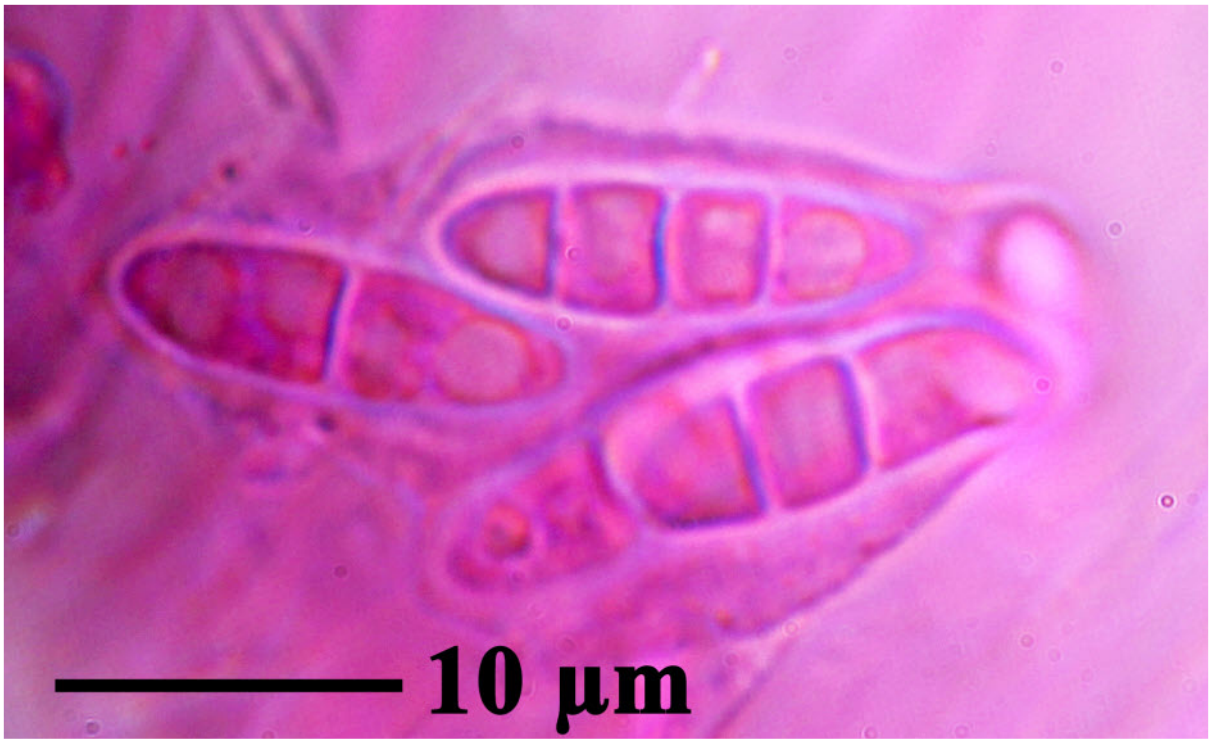
Thallus ecorticate, white. Ascomata 0.1–0.3 mm diam., solitary, erumpent, black, glossy, partly with dark red pruina. Ostioles apical, white. Hamathecium clear. Ascospores 8/ascus, IKI-, 3-septate, 17–19 × 3.5–5.0 µm, not ornamented, wall not thickened, surrounded by a 1 µm thick gelatinous sheath. Chemistry: Thallus UV-, ascoma pruina UV+ dark blood red (almost black). TLC: An antraquinone.

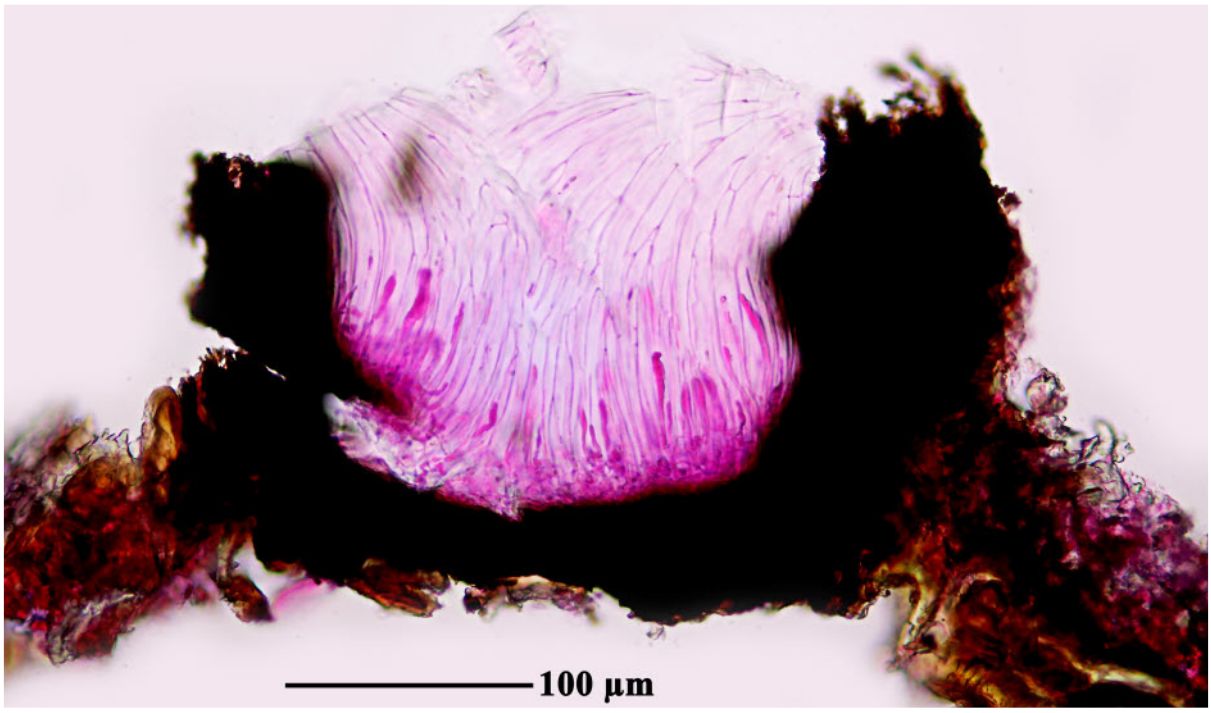
[ABL72208], Puerto Rico, Maricao, Bosque Estal de Maricao, Vereda Los Viveros. 18°09’ N, 66°59’ W, 850 m. Submontane evergreen wet forest on serpentinite, sclerophyllous, disturbed primary forest on slope. On tree bark. Leg. A. Aptroot (no 72208), 18.02.2014, det. A. Aptroot 2014. ISOTYPE.

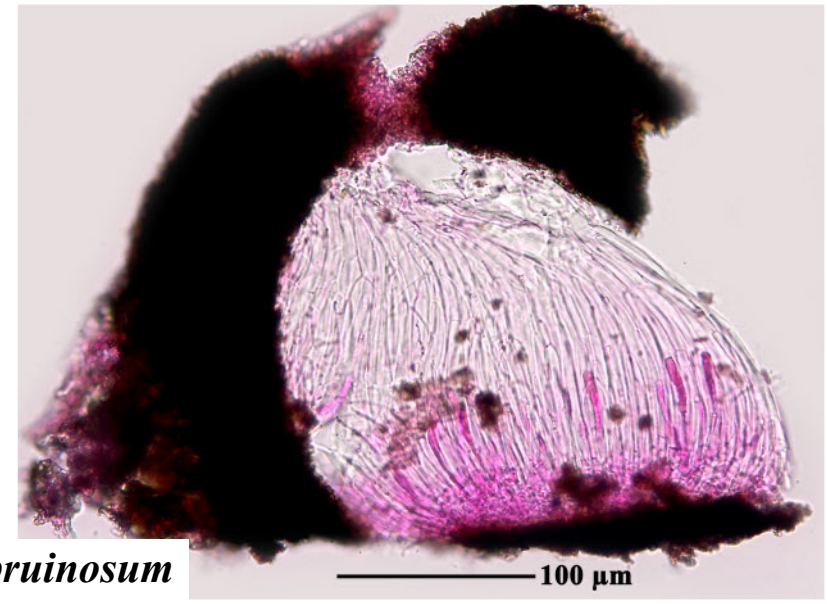




Polymeridium rhodopruinosum







Polymeridium rhodopruinosum

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

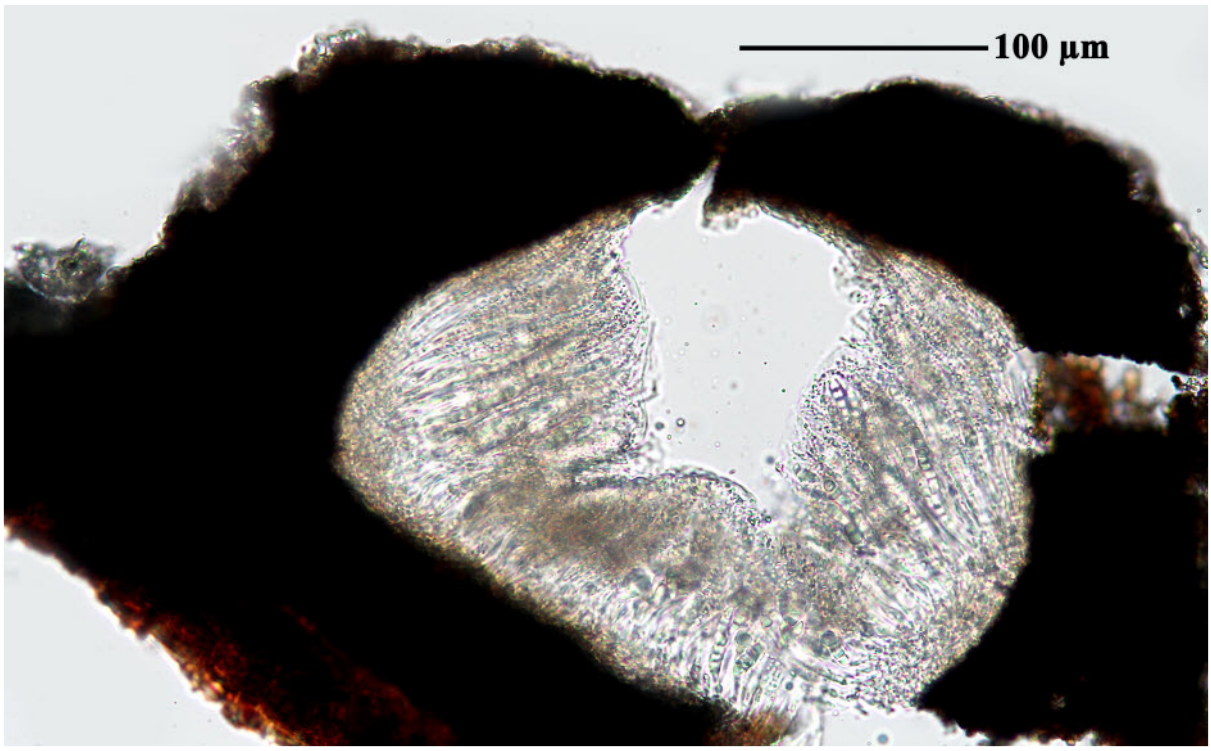
= *Arthopyrenia siamensis* Vain., Ann. bot. Soc. Zool.-Bot. fenn. Vanamo 1(no. 3): 55 (1921)

Thallus ecorticate, white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.4 mm diam., erumpent, exposed and black. Hamathecium inspersed. Ascospores 8/ascus, 3-septate, fusiform, 20–23 × 6–8 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: No substances detected.

[Jansen2574], Guyana, Rupununi District, Kuyuwini Landing, Kuyusini River. Forest. 2°10' N, 59°15' W, 200 m. Leg. M.J. Jansen-Jacobs (no 2574), B.J.H. ter Welle, D. Gopaul & V. James, 11.02.1991, det. A. Aptroot.







Polymeridium siamense



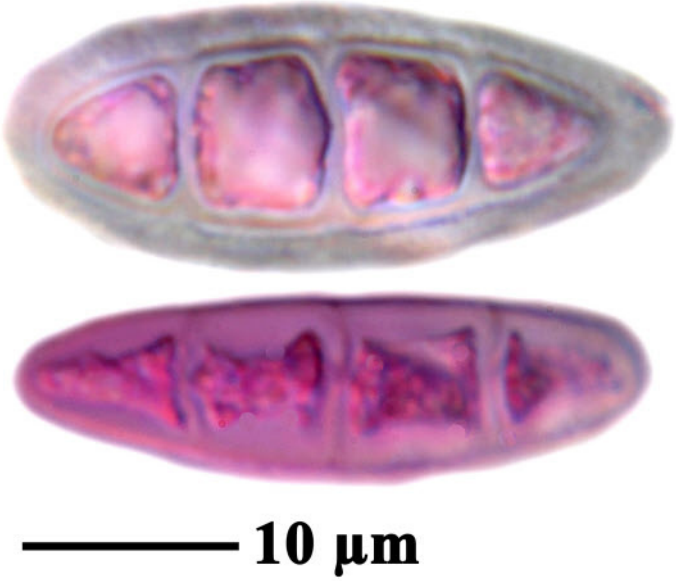
Polymeridium siamense

Polymeridium simulans R.C. Harris, Bolm Mus. paraense 'Emílio Goeldi', sér. bot. 7(2): 641 (1993) [1991]

Thallus ecorticate, white, smooth to uneven. Ascomata with lateral, separate ostioles, solitary, 0.4–0.6 mm diam., erumpent, pear-shaped, exposed and black. Hamathecium clear. Ascospores 8/ascus, 3-septate, fusiform, 30–35 × 12–13 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: No substances detected.

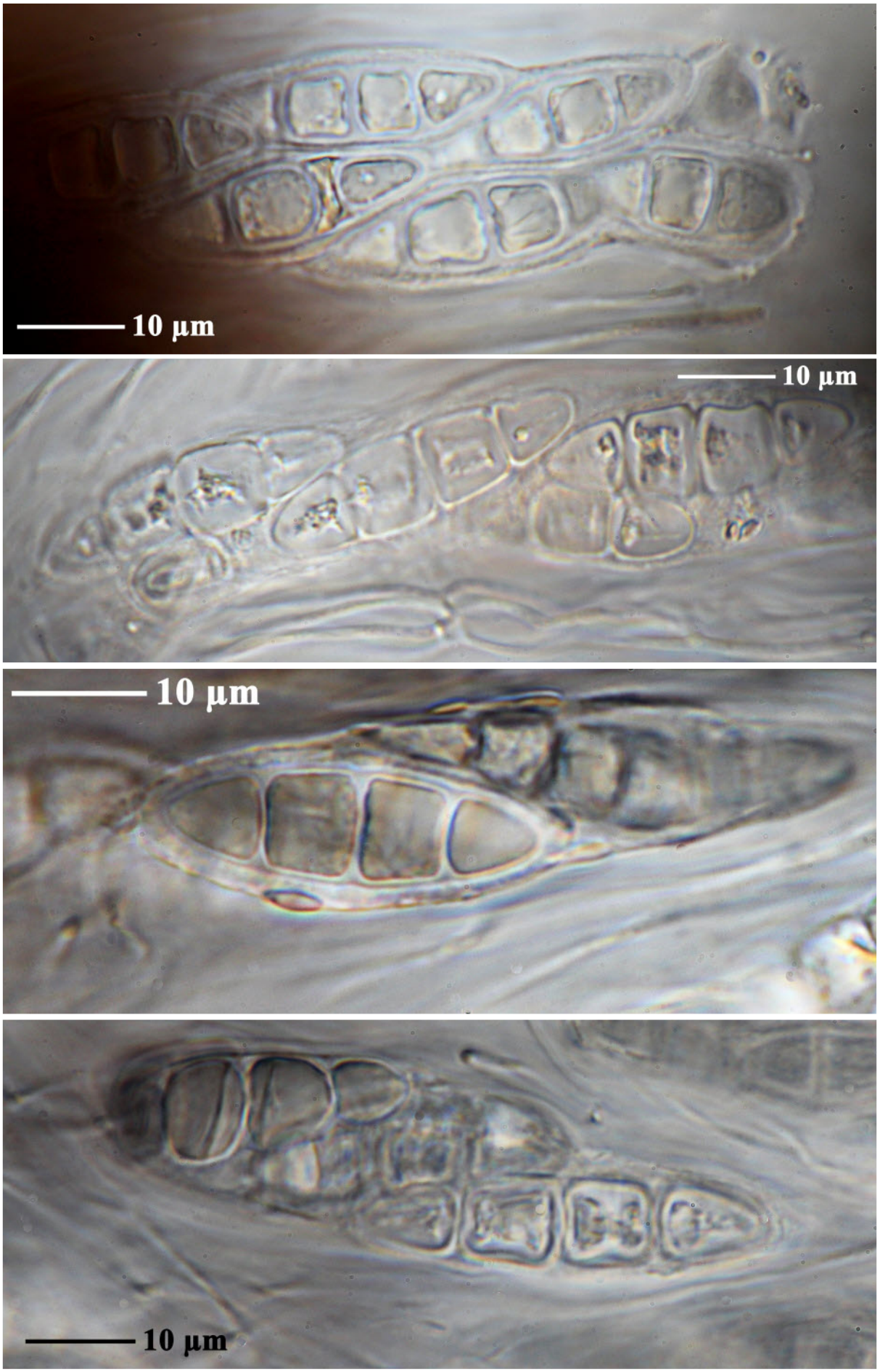
[Berger18504], Venezuela, Bolivar, NP Canaima, Rio Churrun, Isla Raton, Bergregenwald, 600 m, on bark. Leg. F. Berger (no 18504), 17.11.2003, det. A. Aptroot.







Polymeridium simulans



Polymeridium simulans

Polymeridium subcinereum (Nyl.) R.C. Harris, in Tucker & Harris, Bryologist 83(1): 12 (1980)

Thallus ecorticate, white, smooth to uneven. Ascomata with apical ostioles, solitary to sometimes confluent, 0.3–0.5 mm diam., erumpent, exposed and black. Ascospores 8/ascus, 3-septate, fusiform, 15–20 × 5–7 µm, hyaline, IKI-, wall smooth. Chemistry: UV-, K-. TLC: No substances detected.

[Maas7373c], Guyana, Rupununi River, Monkey Pond landing, SW of Mt. Makarapan. Along river, forest on innudated ground. 3°53’ N, 58°55’ W. Leg. P.J.M. Maas, J. Koek-Noorman, H. Lall, B.H.J. ter Welle & L.Y.Th. Westra, 11.9.1988, det. A. Aptroot 1989.

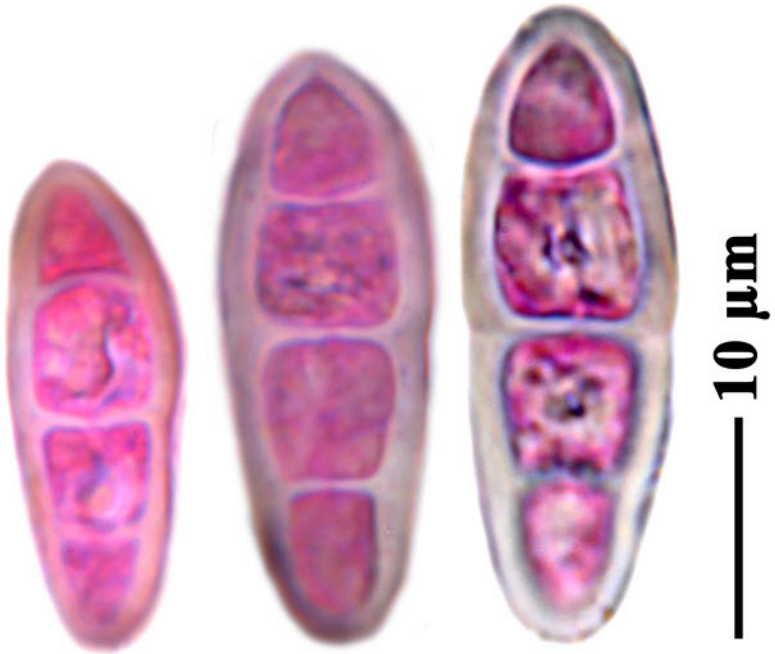




Polymeridium subcinereum







Polymeridium subcinereum

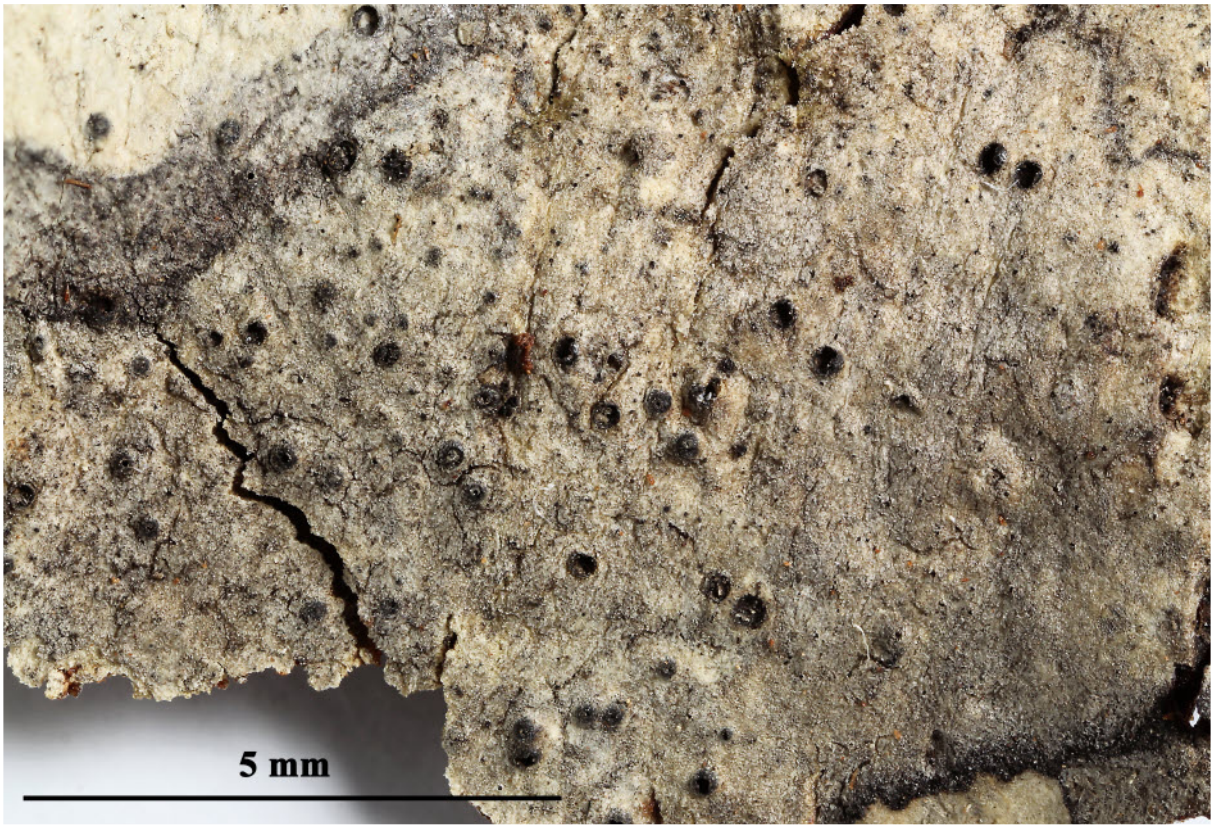
Polymeridium suffusum (C. Knight) Aptroot, Nova Hedwigia 98(1-2): 26 (2013) [2014]

= *Arthopyrenia suffusa* (C. Knight) Müll. Arg., Bull. Soc. R. Bot. Belg. 31(no. 2): 40 (1892)

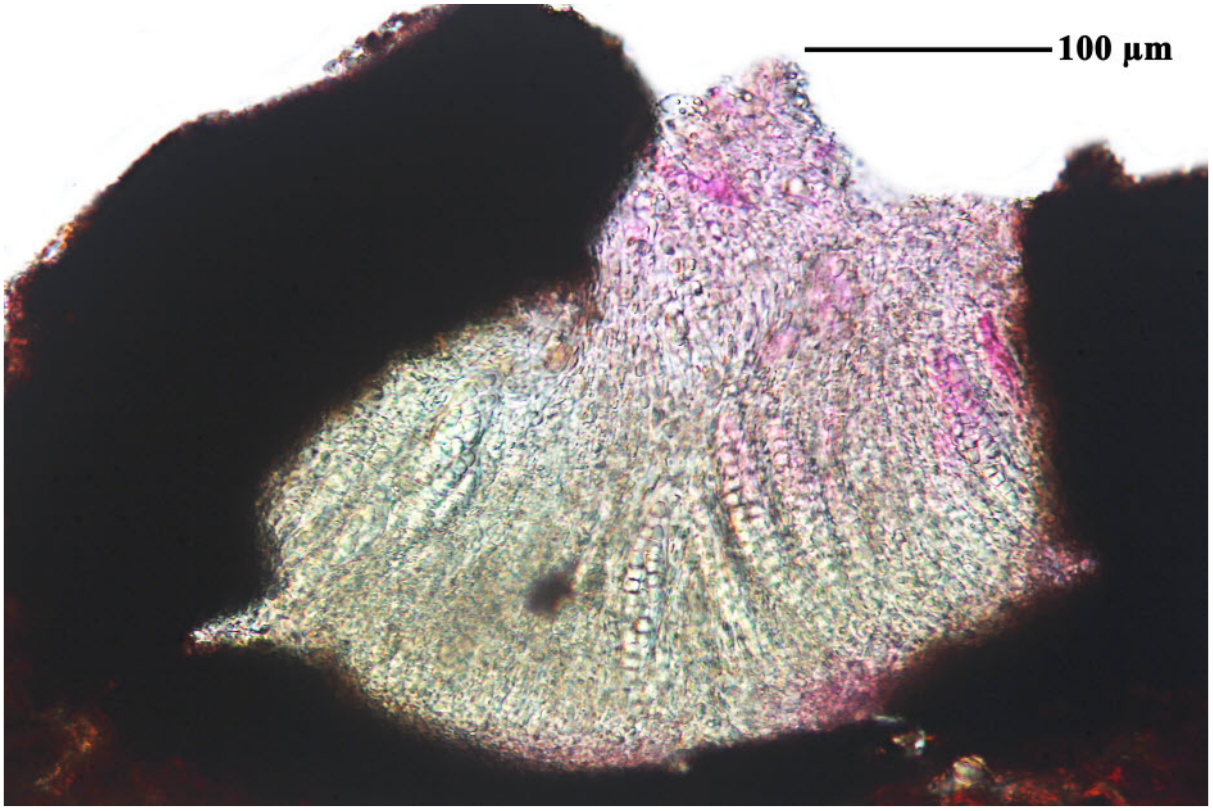
= *Verrucaria suffusa* C. Knight, Trans. Proc. N.Z. Inst. 15: 356, tab. XXXVI, fig. 12 (1883) [1882]

Thallus ecorticate, white, smooth to uneven. Ascomata with apical or partly lateral, separate ostioles, solitary, 0.3–0.4 mm diam., erumpent, mostly covered by thallus, but ostiolar area exposed and grey black. Hamathecium inspersed. Ascospores 8/ascus, 3-septate, fusiform, 24–30 × 6–9 µm, hyaline, IKI-, wall smooth. Chemistry: UV-, K-. TLC: No substances detected.

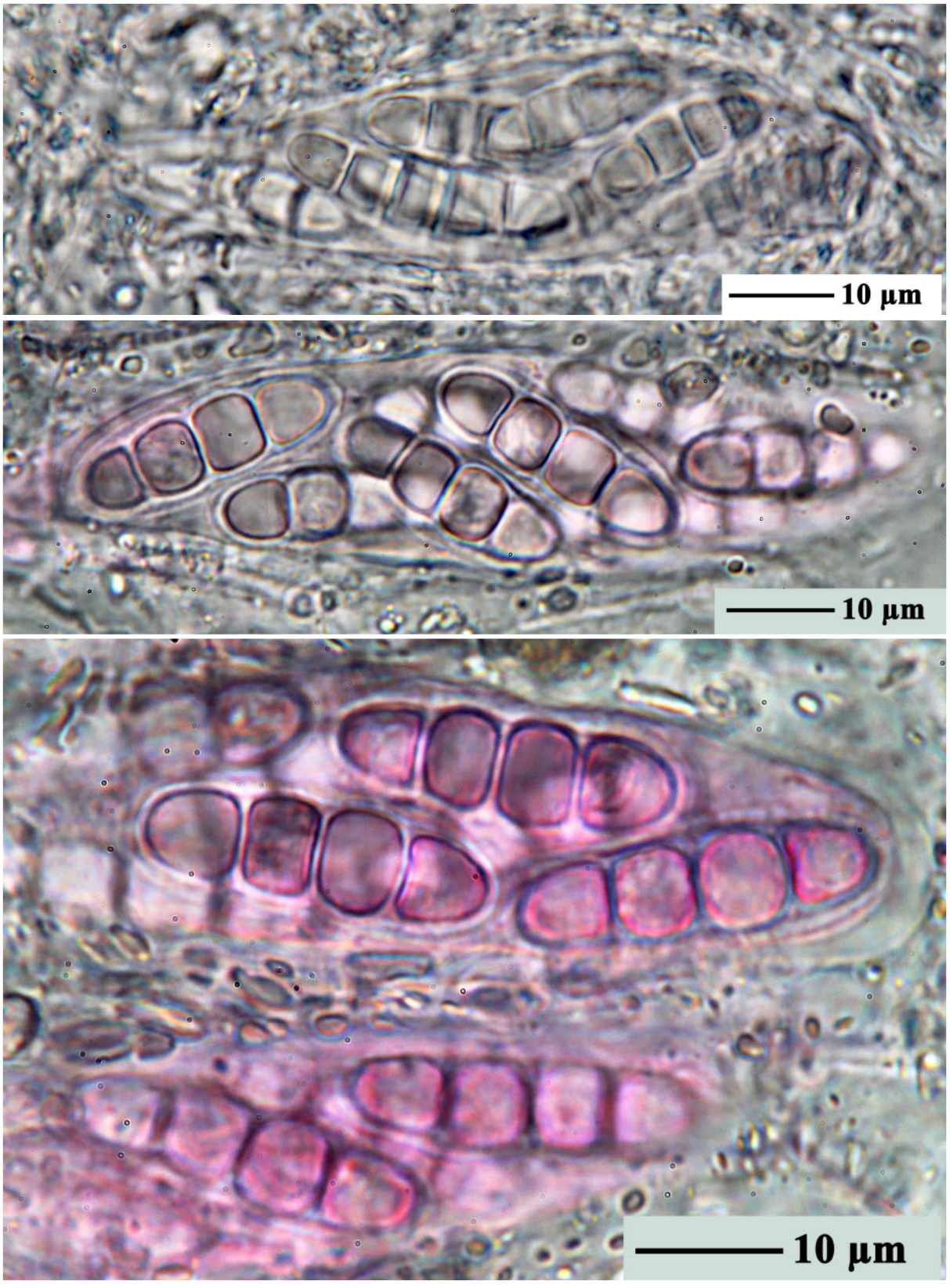
[ABL25625], U.S.A., Puerto Rico, Distr. Ponce, Caribbean National Forest, Toro Negro Division,, road 143, km 25, mossy forest remnants on moumtain top, on *Ficus* trees. 18°09’ N, 66°35’ W, 1150 m. Leg. A. & M. Aptroot (no 25625), 21-31.05.1989, det. A. Aptroot, 1989.







Polymeridium suffusum



Polymeridium suffusum

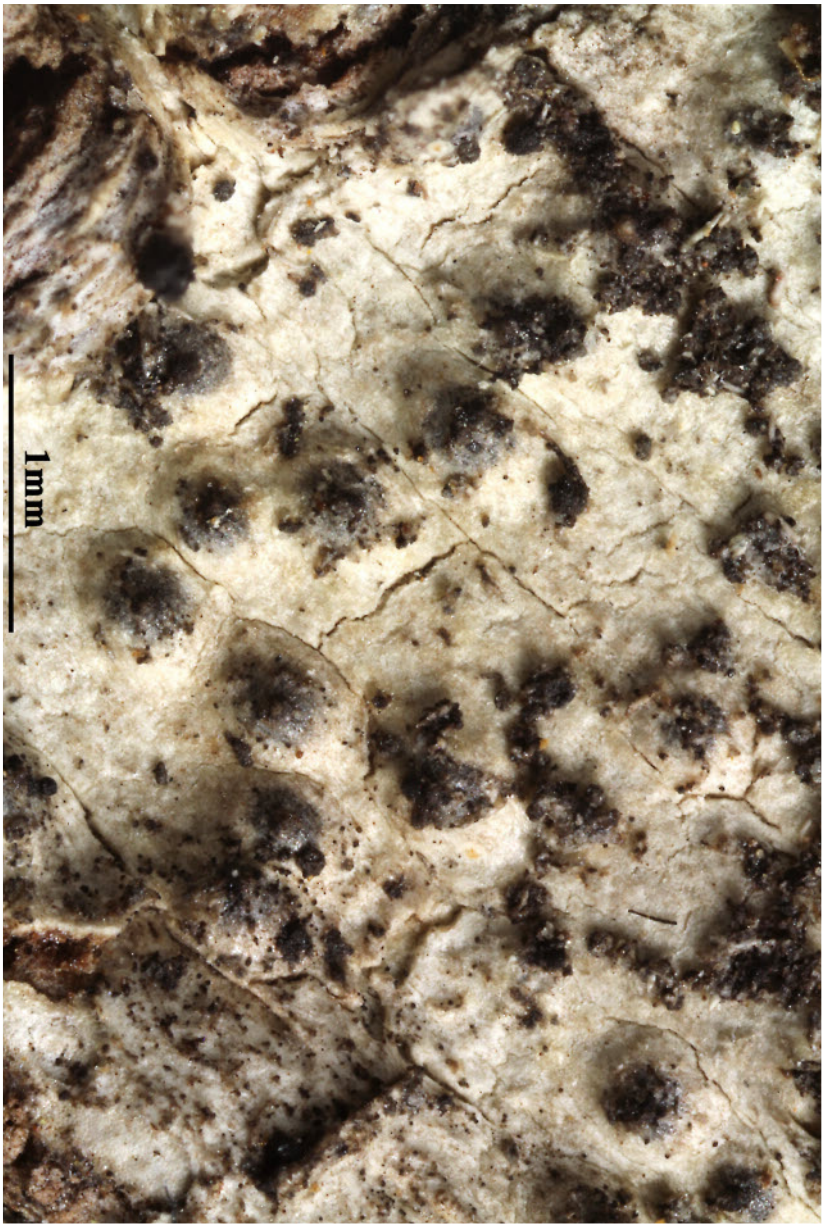
Polymeridium suffusum (C. Knight) Aptroot, Nova Hedwigia 98(1-2): 26 (2013) [2014]

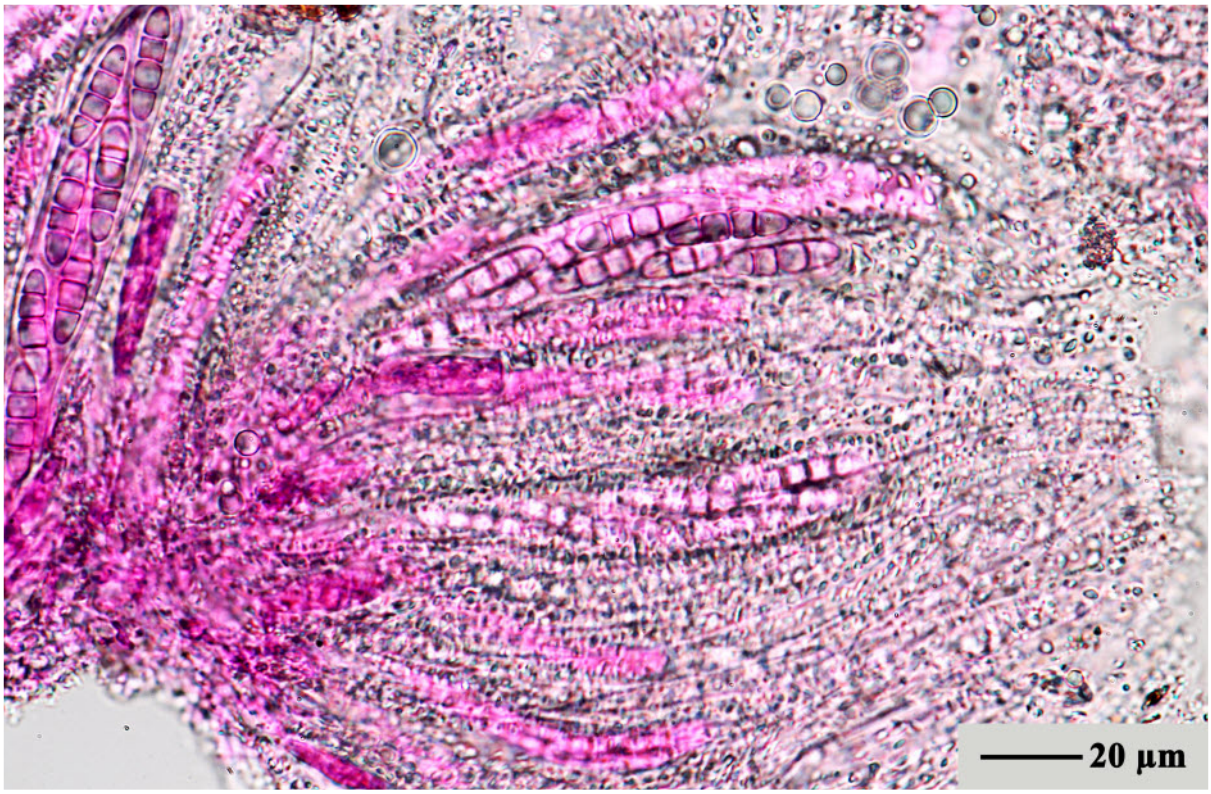
= *Arthopyrenia suffusa* (C. Knight) Müll. Arg., Bull. Soc. R. Bot. Belg. 31(no. 2): 40 (1892)

= *Verrucaria suffusa* C. Knight, Trans. Proc. N.Z. Inst. 15: 356, tab. XXXVI, fig. 12 (1883) [1882]

Thallus ecorticate, white, smooth to uneven. Ascomata with apical or partly lateral, separate ostioles, solitary, 0.3-0.4 mm diam., erumpent, mostly covered by thallus, but ostiolar area exposed and grey black. Hamathecium inspersed. Ascospores 8/ascus, 3-septate, fusiform, 24-30 x 6-9 µm, hyaline, IKI-, wall smooth. Chemistry: UV-, K-. TLC: No substances detected.

[Berger14076], Costa Rica, Prov. Heredia, Montana Azul, Valle Virgen, 1530 m, auf *Alnus acuminata*. Leg. F. Berger (no 14076), 29.01.2000, det. A. Aptroot, 2000.







Polymeridium suffusum





Polymeridium suffusum

Polymeridium sulphurescens (Müll. Arg.) R.C. Harris, Lichenogr. Thomsoniana, North American Lichenology in Honor of John W. Thomson (Ithaca): 147 (1998)

= *Arthopyrenia oculata* Müll. Arg., Rep. Meetings Australs. Assoc. Advancem. Sci. 6: 451 (1895)

= *Arthopyrenia suboculata* Müll. Arg., Bull. Herb. Boissier 3: 325 (1895)

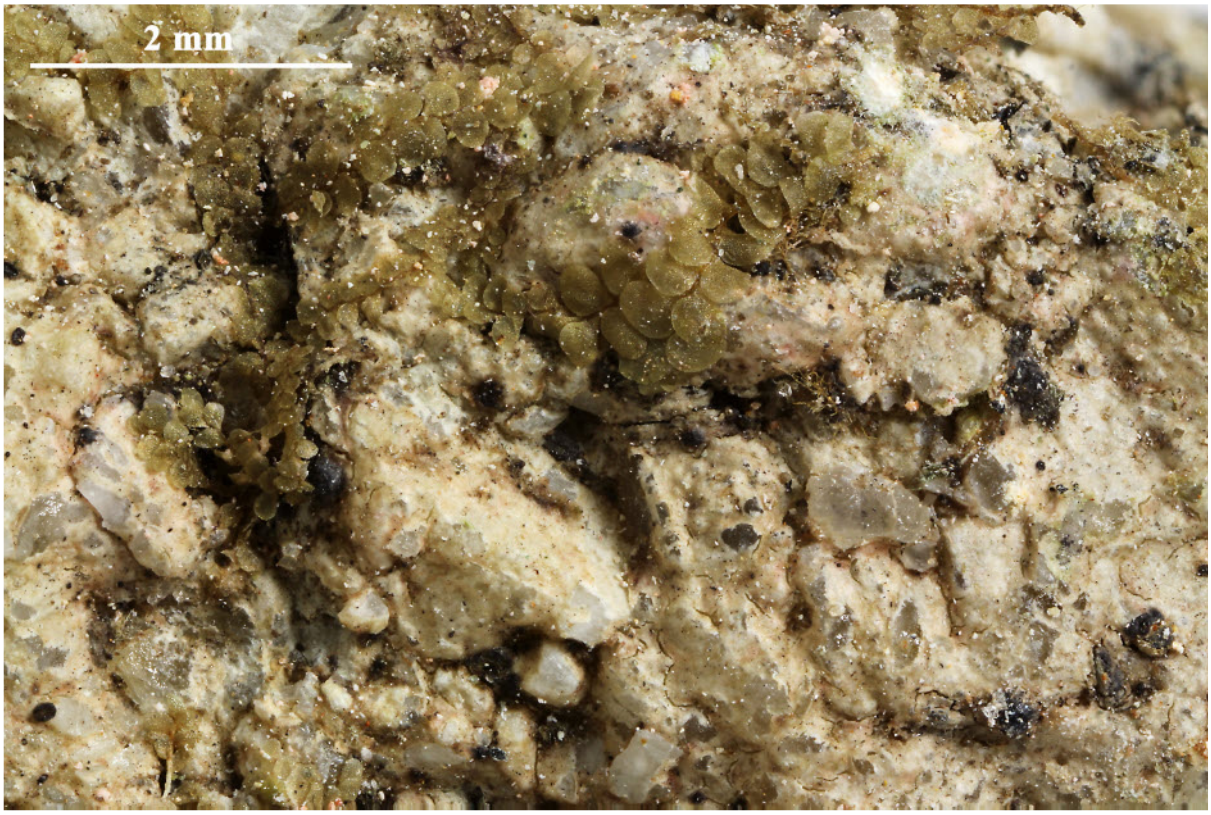
= *Arthopyrenia sulphurascens* Müll. Arg., Flora, Regensburg 65(33): 518 (1882)

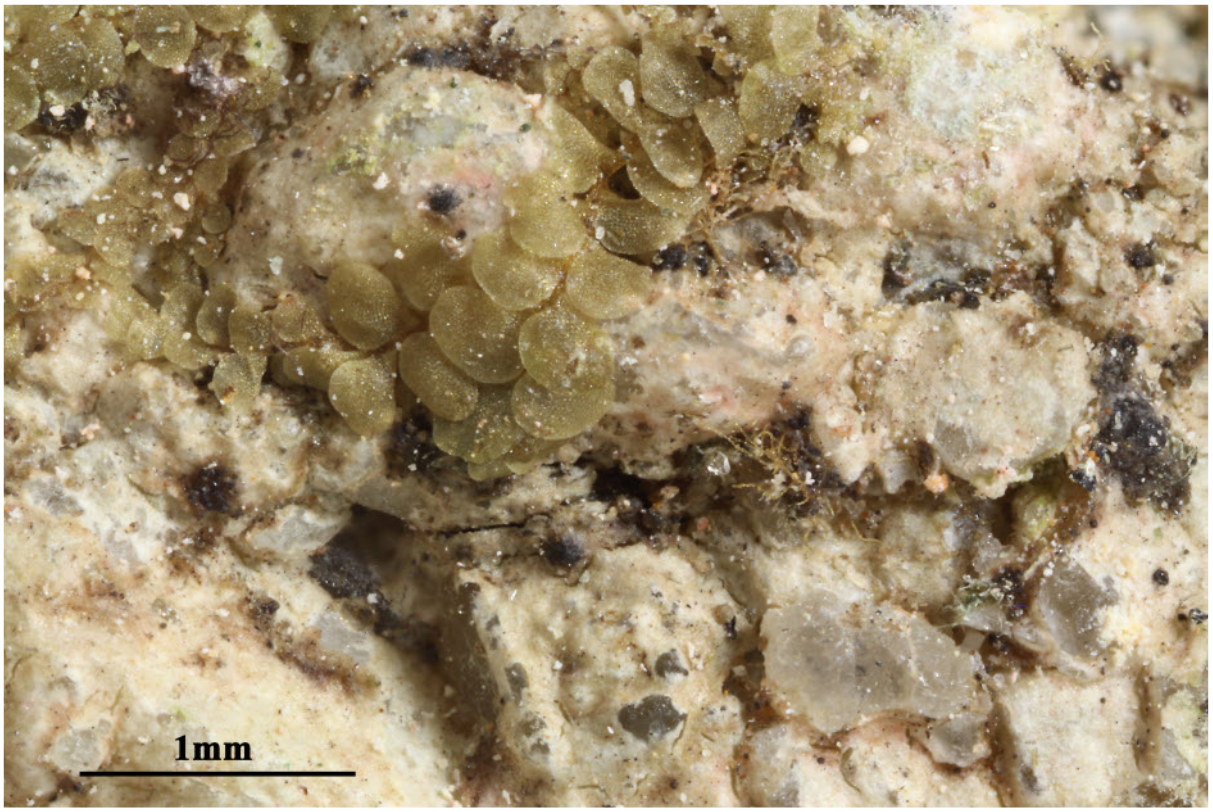
= *Polymeridium oculatum* (Müll. Arg.) R.C. Harris, Bolm Mus. paraense 'Emílio Goeldi', sér. bot. 7(2): 635 (1993) [1991]

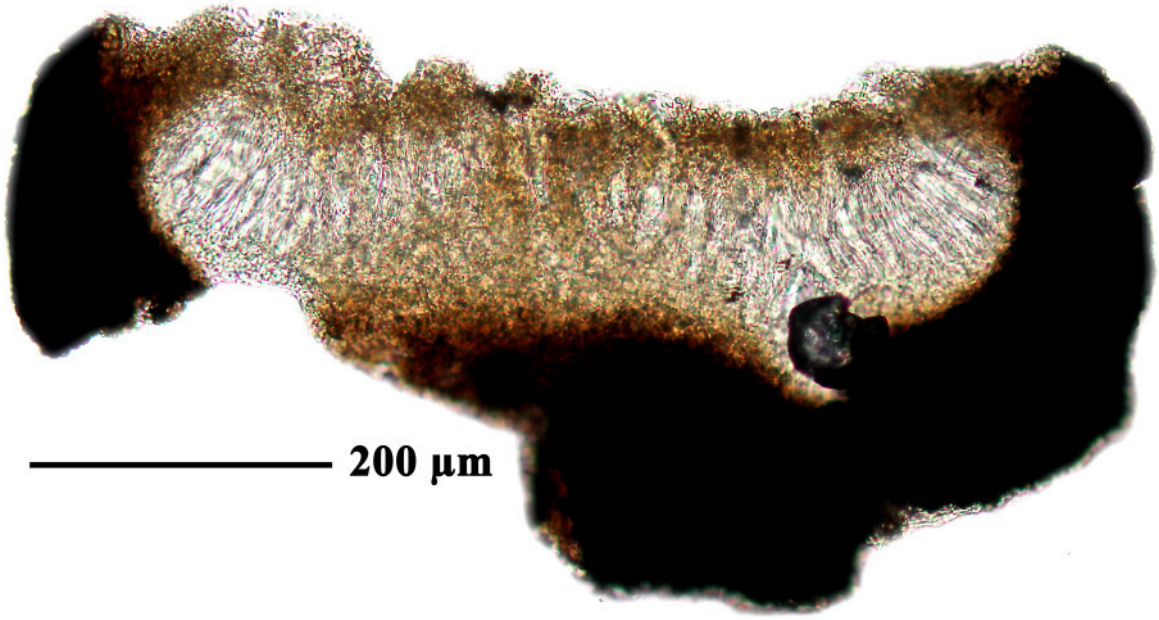
= *Pseudopyrenula sulphurascens* (Müll. Arg.) Müll. Arg., Flora, Regensburg 66: 249 (1883)

Thallus ecorticate, white, smooth to uneven. Ascomata with apical or partly lateral, separate ostioles, solitary, 0.3–0.5 mm diam., black but ostioles usually with a white rim. Hamathecium clear. Ascospores 8/ascus, 3(–8)-septate, 19–27 × 8–10 µm, hyaline, IKI-. Chemistry: Thallus UV-, K-. TLC: No substances detected.

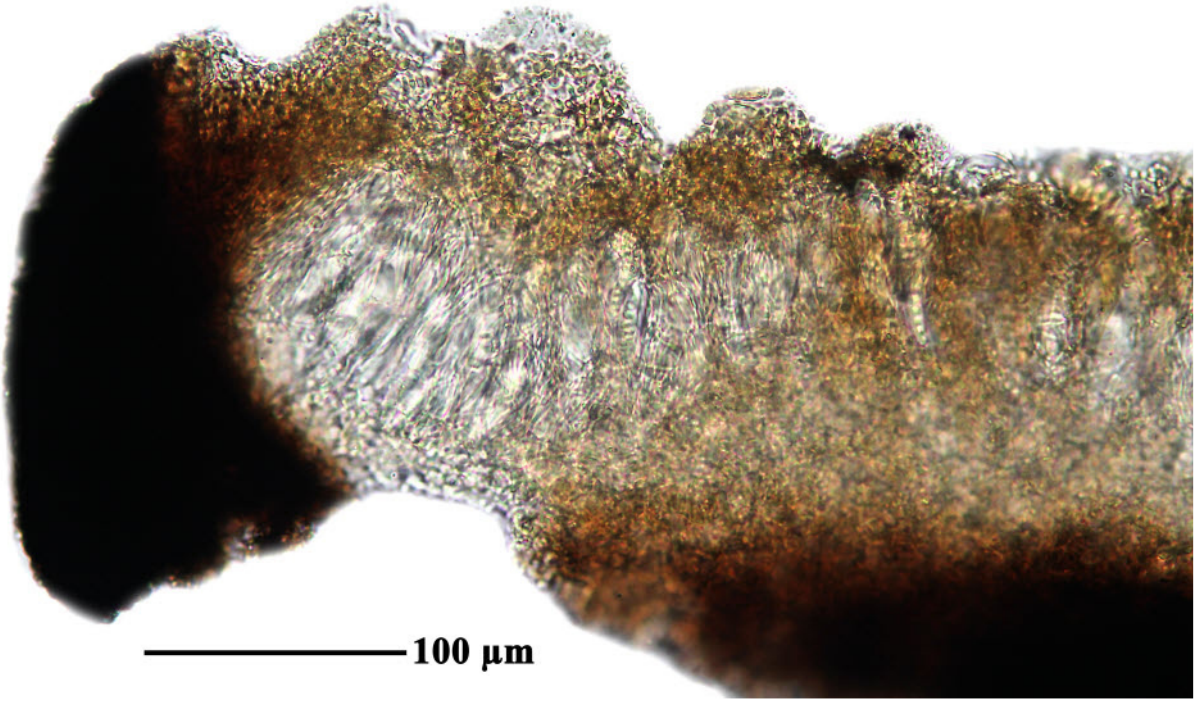
[ABL41643], Australia, Queensland., Fitzroy Island, on Great Barrier Reef, 25 km E of Cairns. 145°59’ E, 16°56’ S, 1-10 m. On quarzite in tropical rainforest. Leg. A. Aptroot (no 46143), 1-5.08.1999, det. A. Aptroot, 1999.

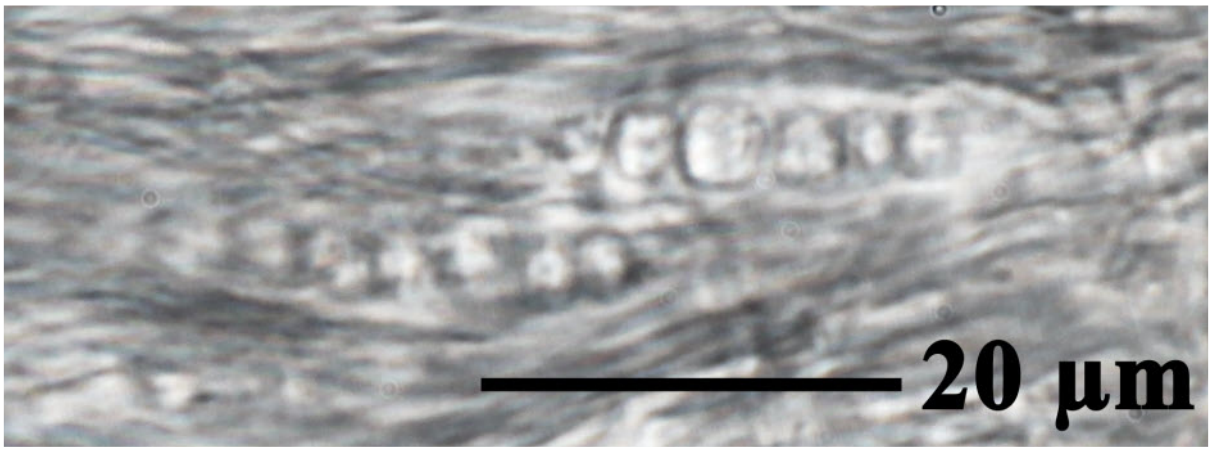






Polymeridium sulphurescens







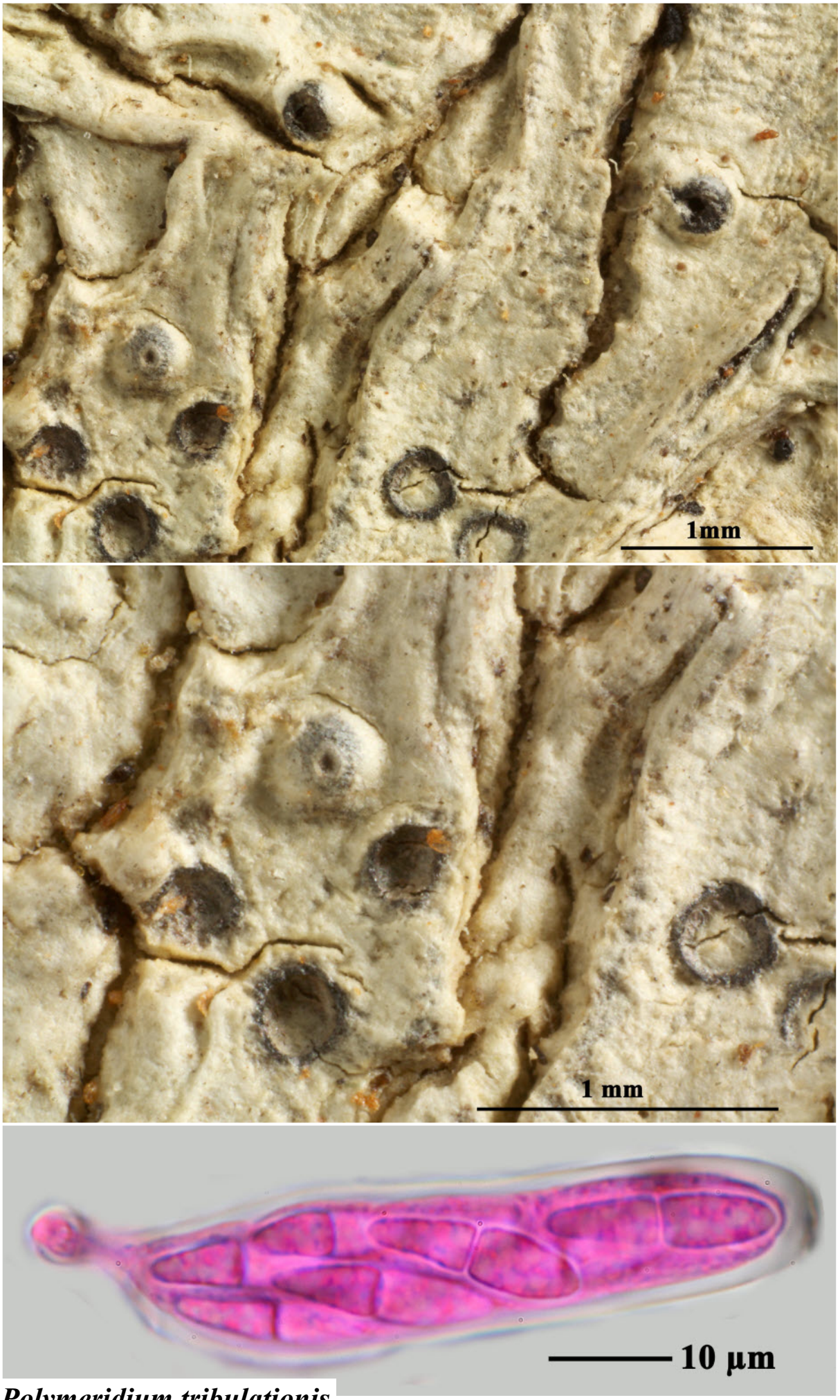
Polymeridium sulphurescens

Polymeridium tribulationis Aptroot, Nova Hedwigia 98(1-2): 26 (2013) [2014]

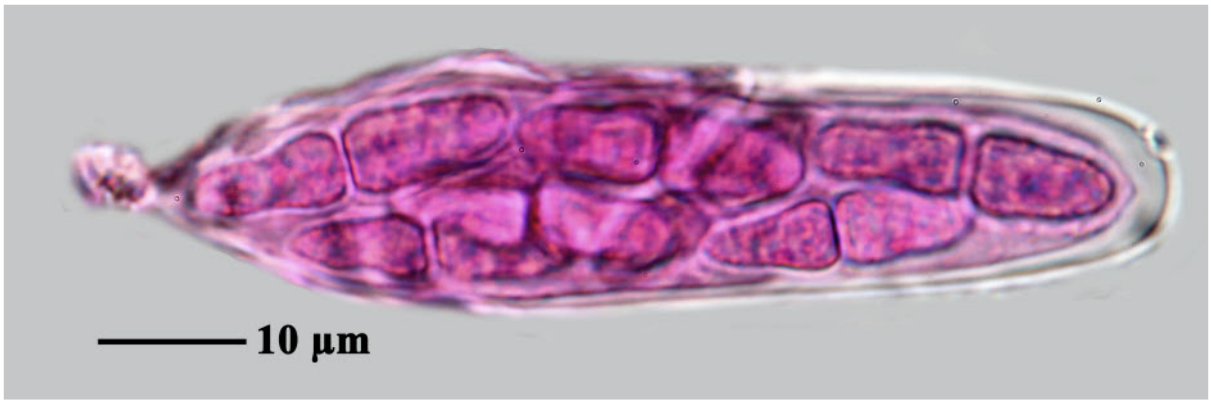
Thallus corticate, yellowish white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.3–0.4 mm diam., prominent to sessile, mostly covered by thallus and grey, except for black upper part, and ostioles usually with a white rim. Hamathecium inspersed. Ascospore 8/ascus, (1–)3-septate, fusiform, 20–24 × 7–10 µm, hyaline, IKI-, wall smooth. Chemistry: Thallus UV-, K-. TLC: No substances detected.

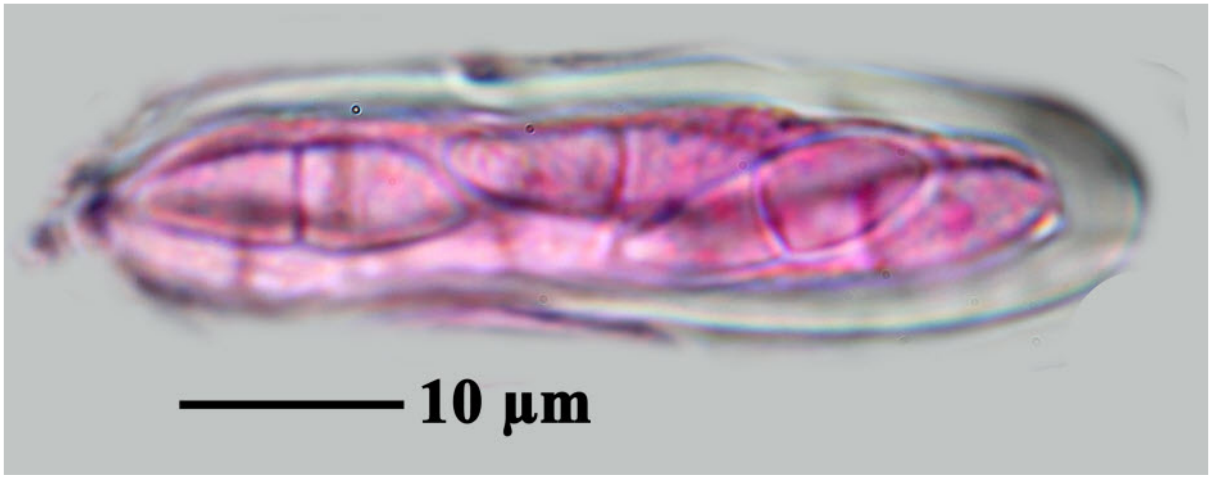
[Hale64171], Australia, Queensland, Cape Tribulation, ca. 2 km W of main road between Oil Palms and Coopers Creek, N of Daintree. 100 m. Cleared ares in rain forest. Leg. M.E. Hale (no 64171), 4.7.1983, det. A. Aptroot. ISOTYPE.





Polymeridium tribulationis







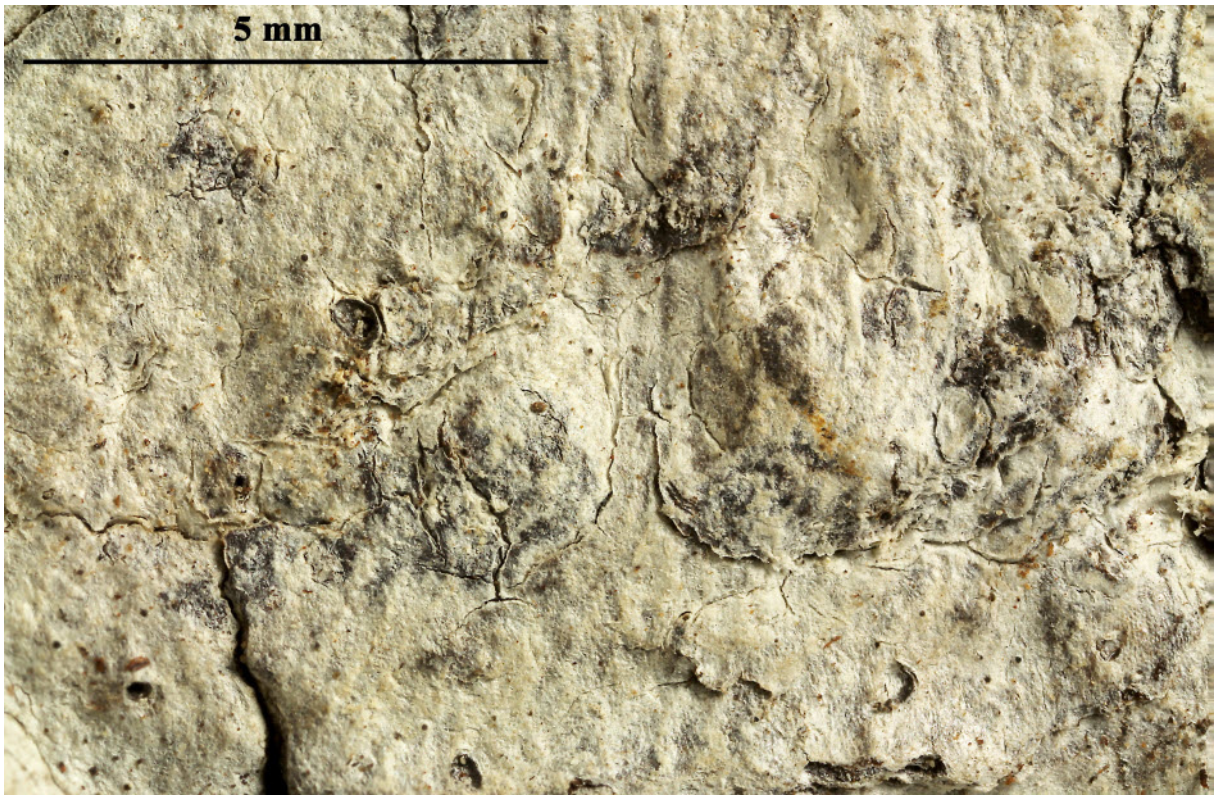


Polymeridium tribulationis

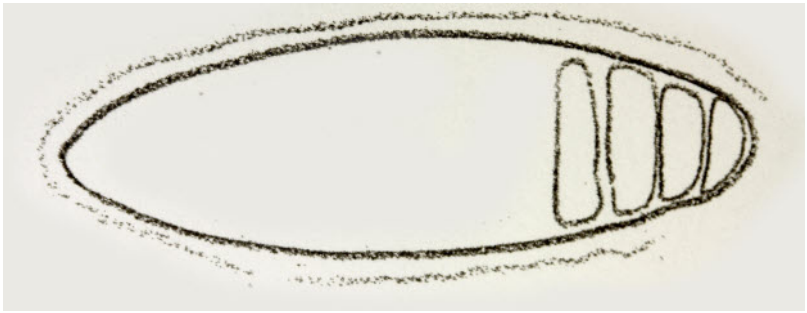
Polymeridium xanthopleurothecium Aptroot & Etayo, in Etayo & Aptroot, Bryologist 120(4): 508 (2017)

Thallus dull, ochraceous, not surrounded by a prothallus. Ascomata pyriform, 0.4–0.6 mm diam., initially immersed in the bark below the thallus. Ostioles lateral, black. Hamathecium not inspersed. Ascospores 8/ascus, hyaline, 11–13-septate, 52–86.3 × 16–19 µm, long-ellipsoid, constricted at the median septum, surrounded by a ca. 3–7 µm thick gelatinous sheath. Pycnidia not observed. Chemistry: thallus UV+ yellow. TLC: lichexanthone. Similar to Polymeridium pleurothecium R.C.Harris, but with yellow UV+ reaction due to lichexanthone.

[Etayo30296], Panamá, Prov. Verguas, Coiba: manglar del rio Santa Cruz, on Pelliciera (tree bark) Leg. J. Etayo, (no 30296), 30 August 1996, det. A. Aptroot, 2016. ISOTYPE.







Polymeridium xanthopleurothecium

Polymeridium xanthoreagens Aptroot, Nova Hedwigia 98(1-2): 27 (2013) [2014]

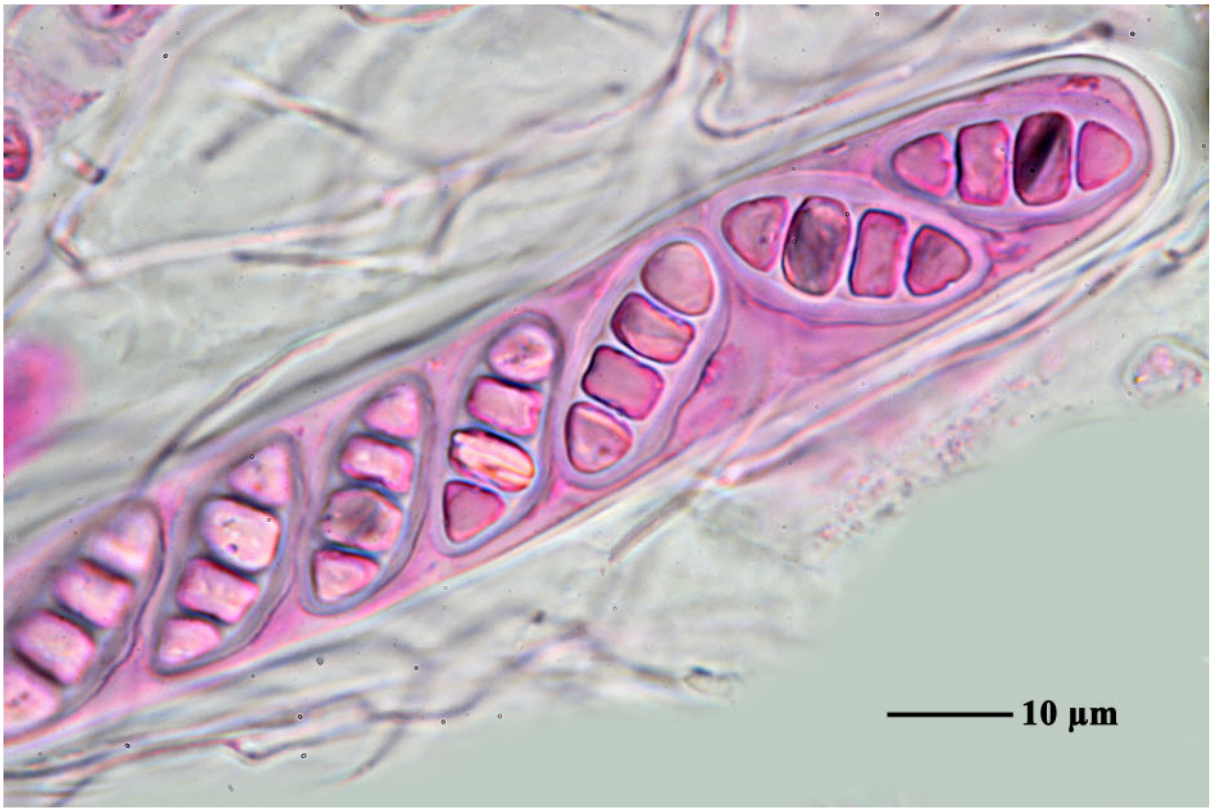
Thallus ecorticate, yellowish white, smooth to uneven. Ascomata with apical and partly lateral separate ostioles, solitary, 0.2–0.4 mm diam., erumpent, covered by thallus except grey black ostiolar area with a white ring around the black ostiole. Hamathecium clear. Ascospore 8/ascus, 3-septate, fusiform, 17–25 × 7–11 µm, hyaline IKI-, wall smooth. Chemistry: UV+ yellow, K-. TLC: Lichexanthone.

[Hale64168], Australia, Queensland, Davies Creek Road ca 17 km S of Kennedy Hwy, S of Davies Creek Falls Nat. Park, E of Mareeba, 600 m. Leg. M.E. Hale (no 64168), 7.07.1983, det. A.Aptroot. ISOTYPE.





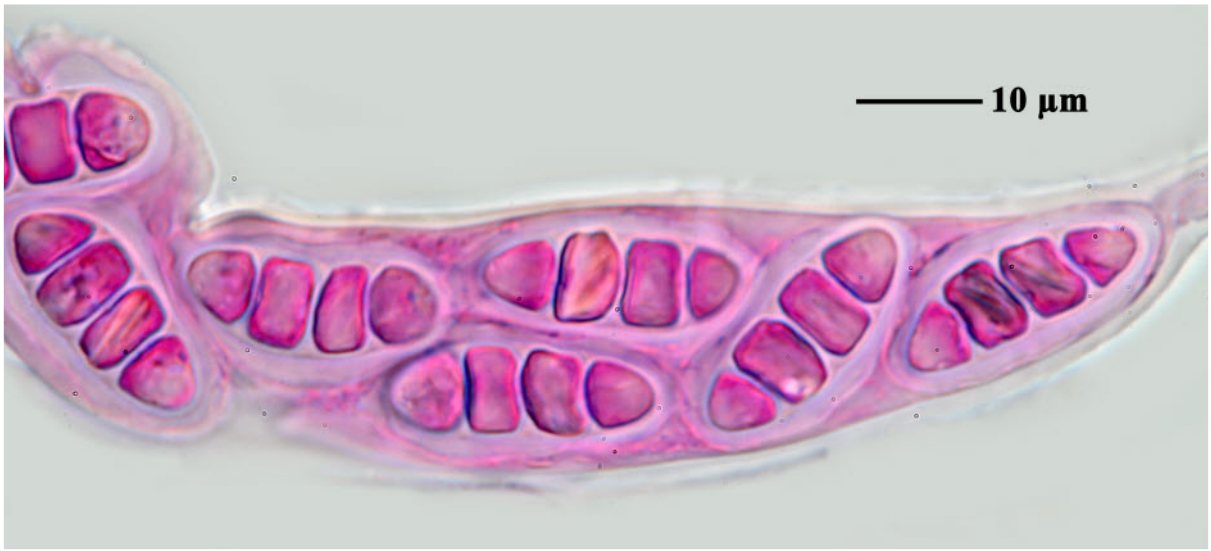
Polymeridium xanthoreagens





Polymeridium xanthoreagens





Polymeridium xanthoreagens

Porina lectissima (Fr.) Zahlbr., Cat. Lich. Univers. 1: 388 (1922)
= *Sagedia lectissima* (Fr.) Hepp, Flecht. Europ.: no. 696 (1860)
= *Verrucaria austriaca* Riedl, Linzer biol. Beitr. 22(1): 154 (1990)
= *Verrucaria erysiboda* Taylor, in Mackay, Fl. Hibern. 2: 98 (1836)
= *Verrucaria holochrodes* Nyl., Flora, Regensburg 59: 311 (1876)
= *Verrucaria irrigua* Zschacke, Hedwigia 67: 51 (1927)
= *Verrucaria lectissima* (Fr.) Nyl., Bot. Notiser: 181 (1853)
= *Verrucaria rubiginosa* Taylor, in Mackay, Fl. Hibern. 2: 94 (1836)

Thallus superficial, well-developed, continuous or cracked, pale ochre to orange-brown, reddish brown or brownish green. Perithecia red-brown (brighter red when wet) to black (often black only at apex), one quarter to one third immersed, 0.22–0.5 mm diam.; involucrellum thick, containing photobiont cells, either completely orange (Porina-yellow), or frequently also purple to violet, K+ dark blue-grey (Sagedia-red) at the surface. Ascus with ring structure. Ascospores 3-septate, 16–30(–40) × 4–8 µm. Pycnidia orange, more or less immersed; conidia narrowly ellipsoid to cylindrical, 3–4.5 × 0.7–1 µm

[20958], Austria. Steiermark, Eastern Alps, Styrian Fringe Mountains, Koralpe, 8.9 km NW of Eibiswald, 1.6 km ENE of the church of St. Katharina in der Wiel, 46°43'50" N, 15°08'50" E, 760 m, big boulders of eclogite, on steep rock faces. Leg. J. Hafellner (no 74867), 28.11.2009, det J. Hafellner. DUPLA GRAECENSIA LICHENUM NR. 1168.





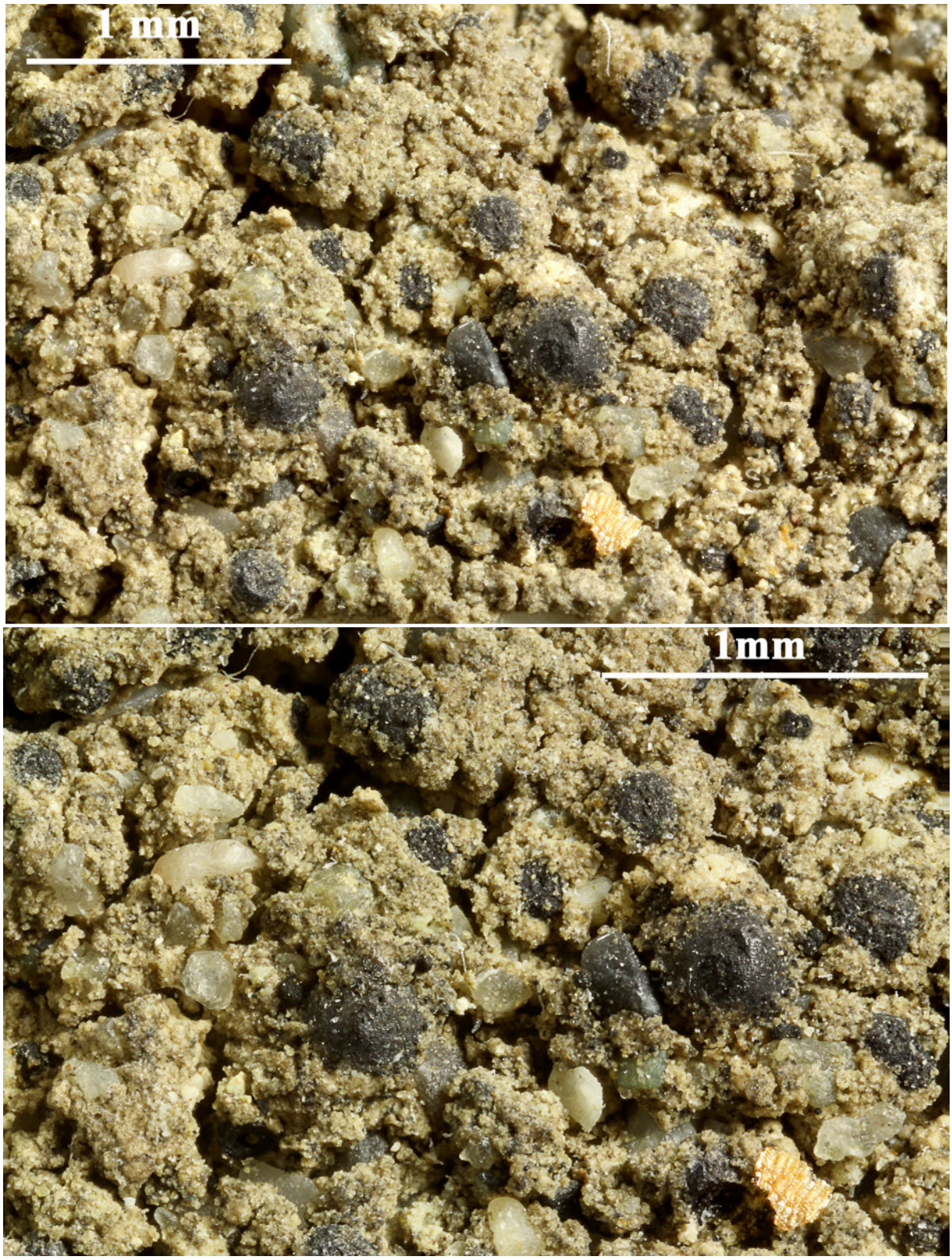
Porina lectissima

Porina peregrina Tretiach & P.M. McCarthy, in McCarthy, Biblthca Lichenol. 87: 79 (2003)

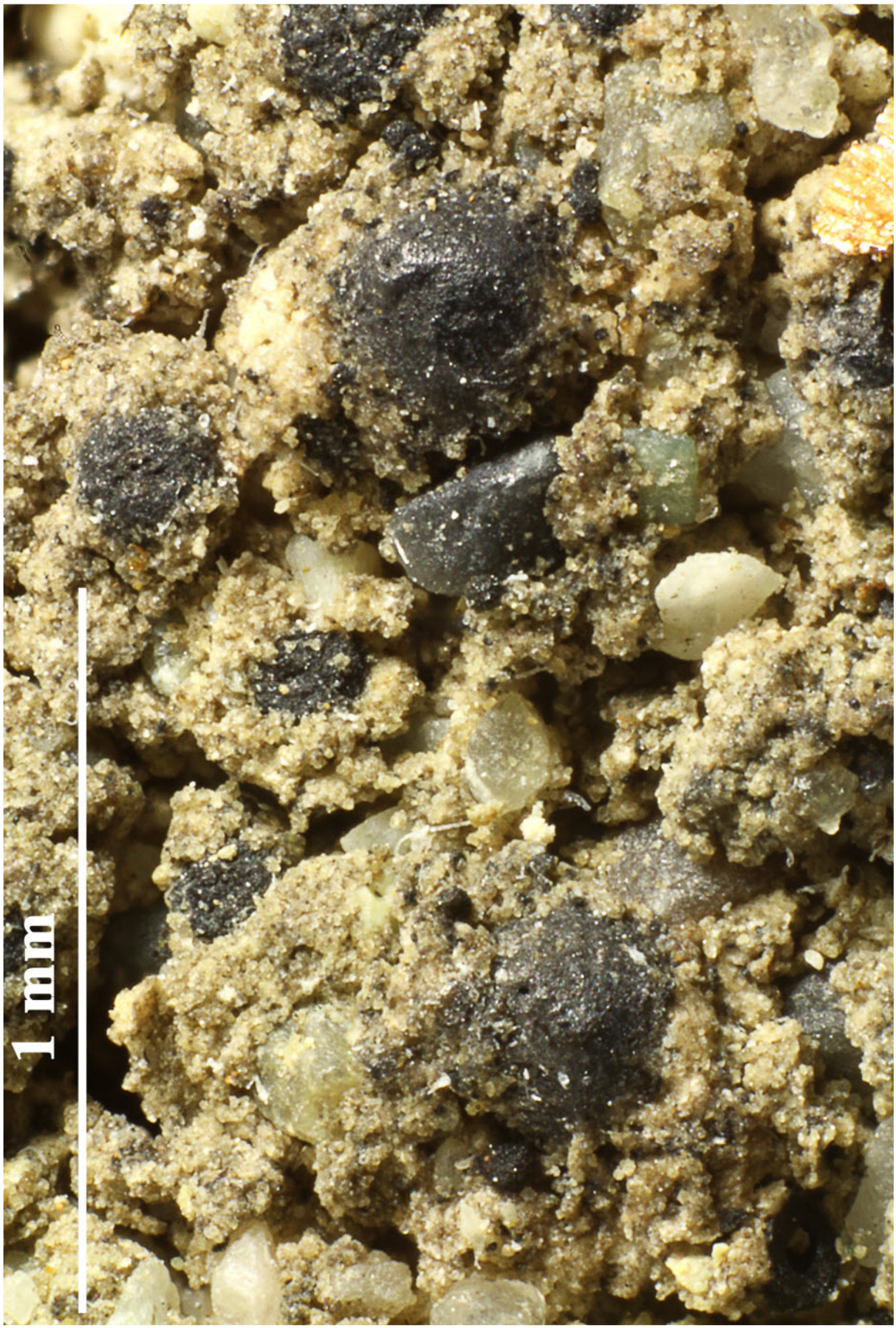
Perithecia 0.38–0.63 mm diam., semi-immersed. Involucrellum black, at basis of the excipilum expanding, K-. Hamathecium inspersed. Asci 135–160 × 10–13 µm, IKI-. Ascospores 8/ascus, hyalin, 7(–9)-septate, 40–52 × 4–6 µm.

[TSB-18316], USA, California, Santa Rosa Island, N-facing sedimentary outcrops below Barton Point, 350 m, 33°57’ N, 120°03’30” W. Leg. P.L. Nimis & M. Tretiach, 3.01.1994. **HOLOTYPE**.

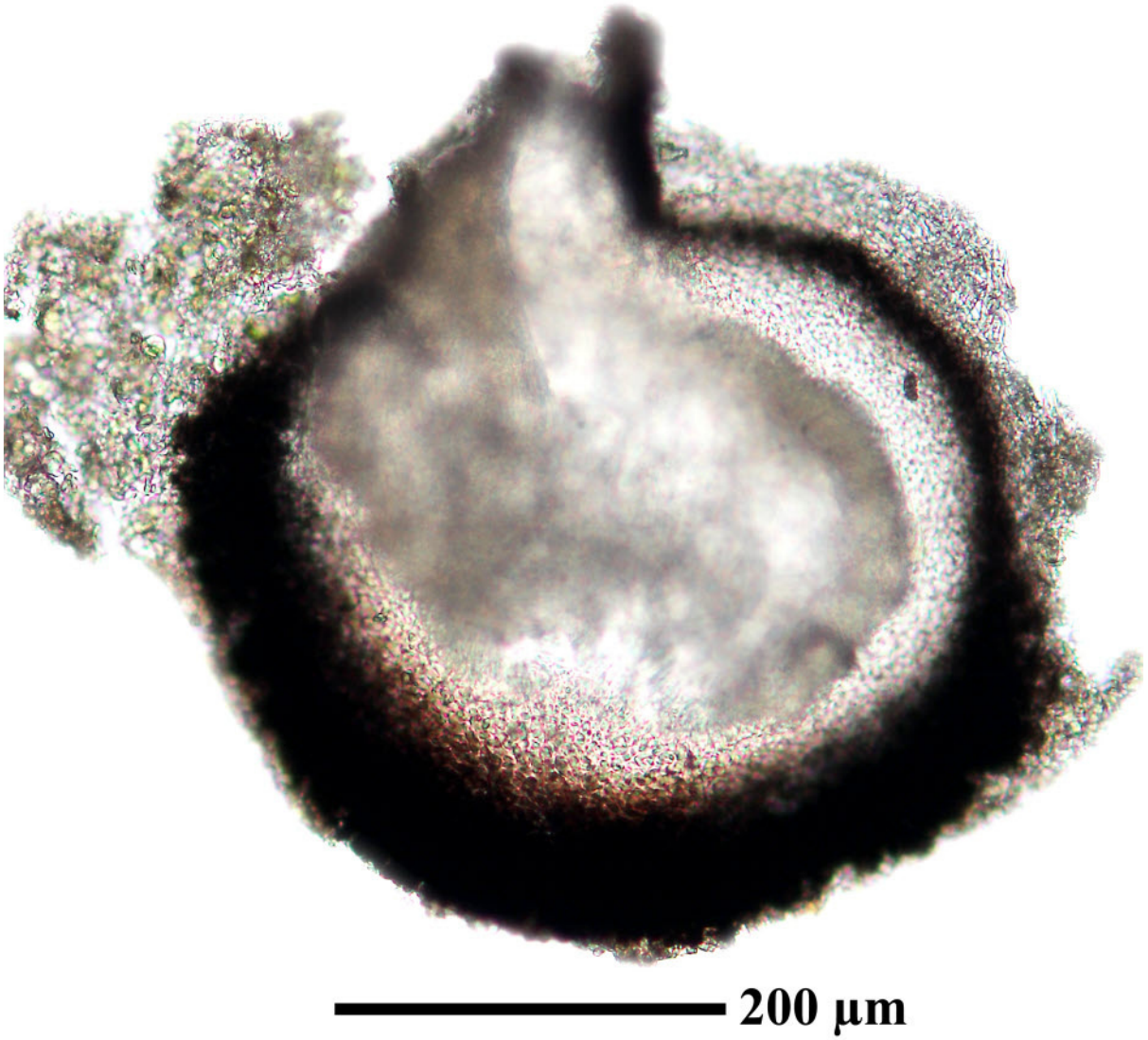


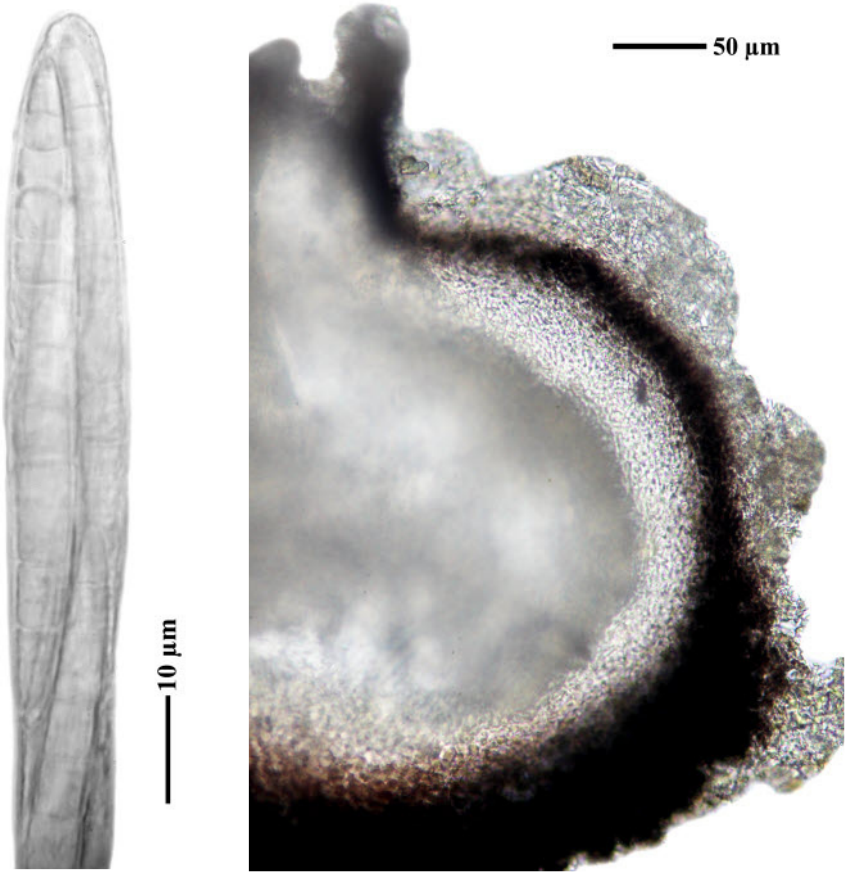


Porina peregrina

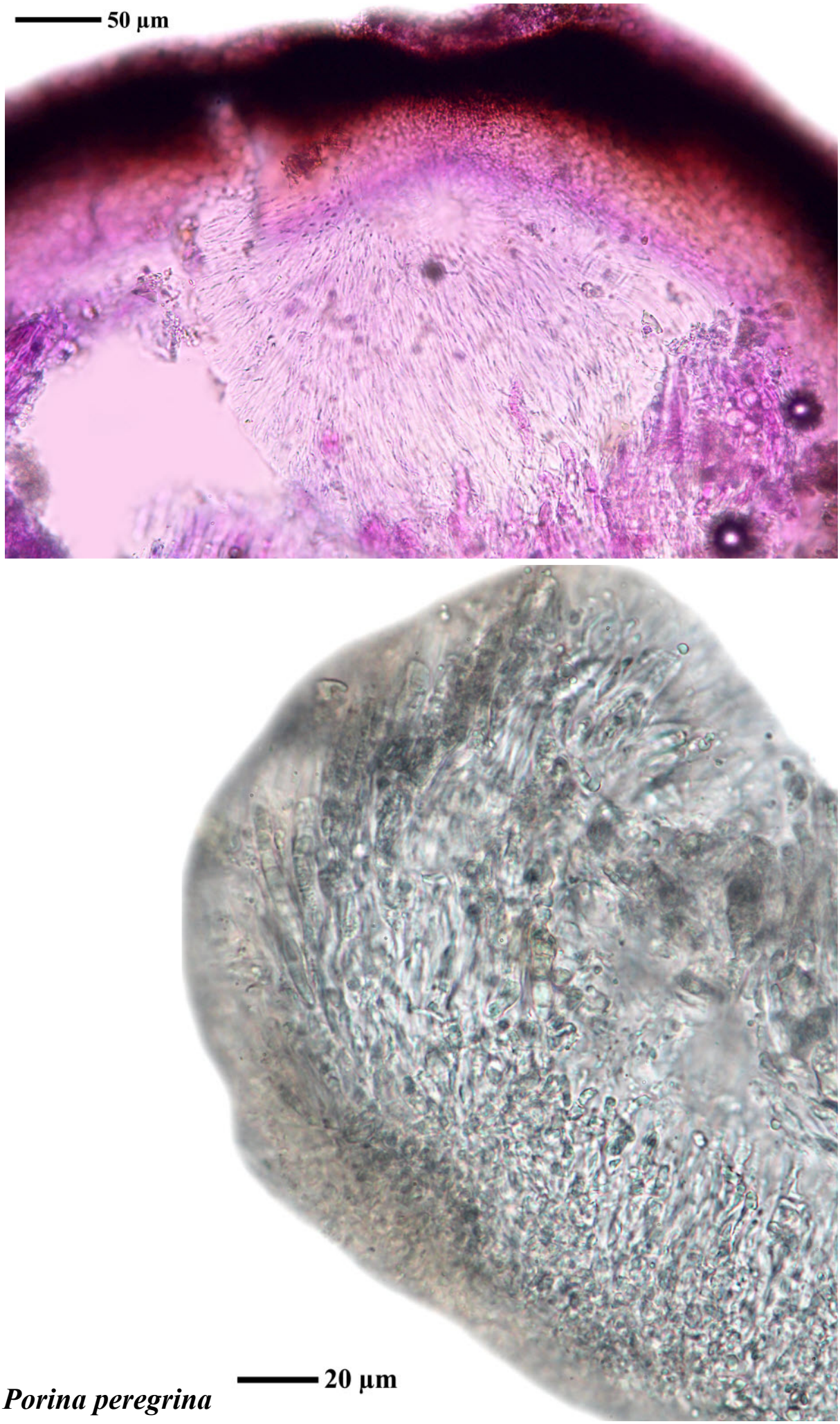


Porina peregrina

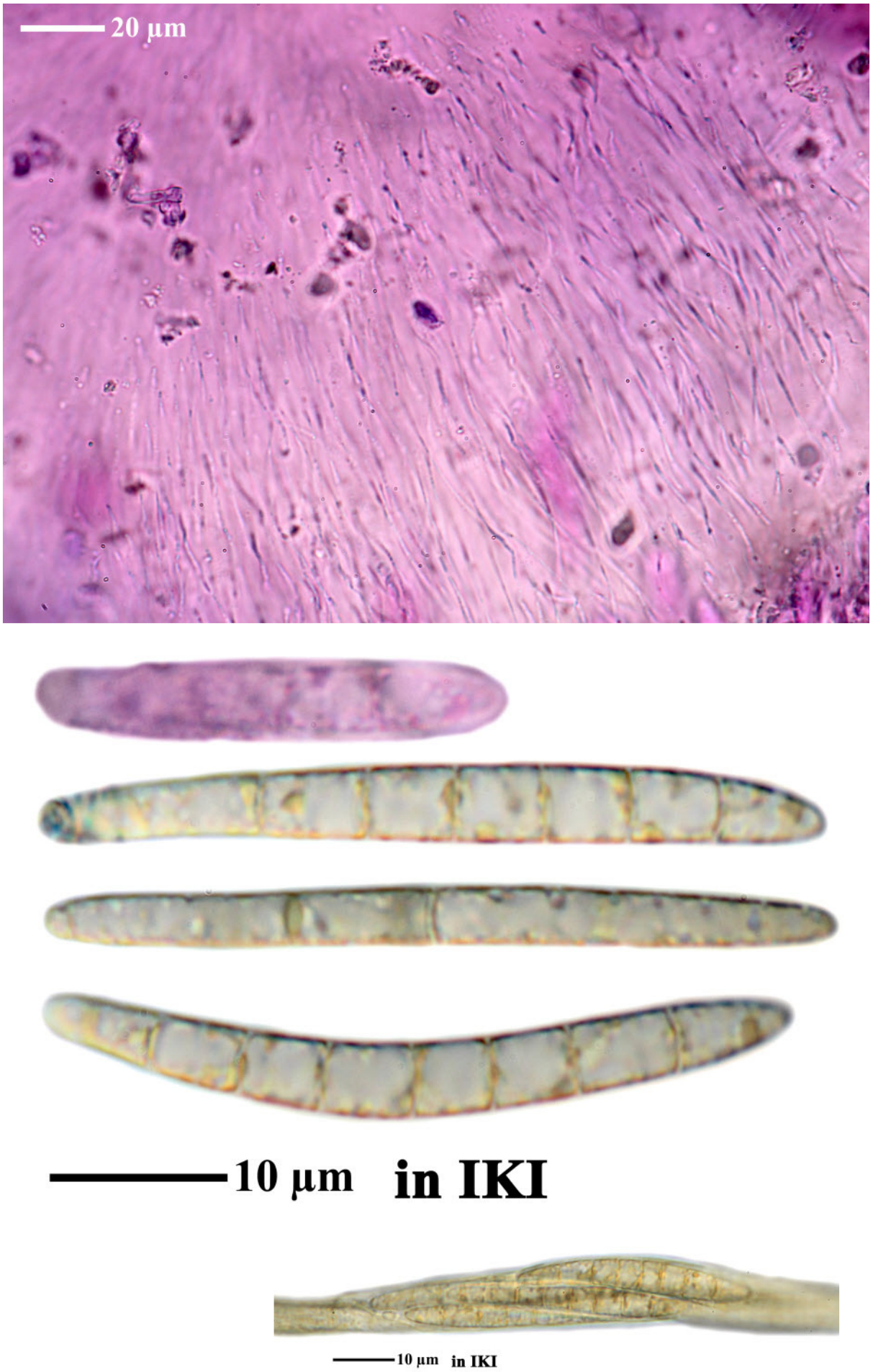




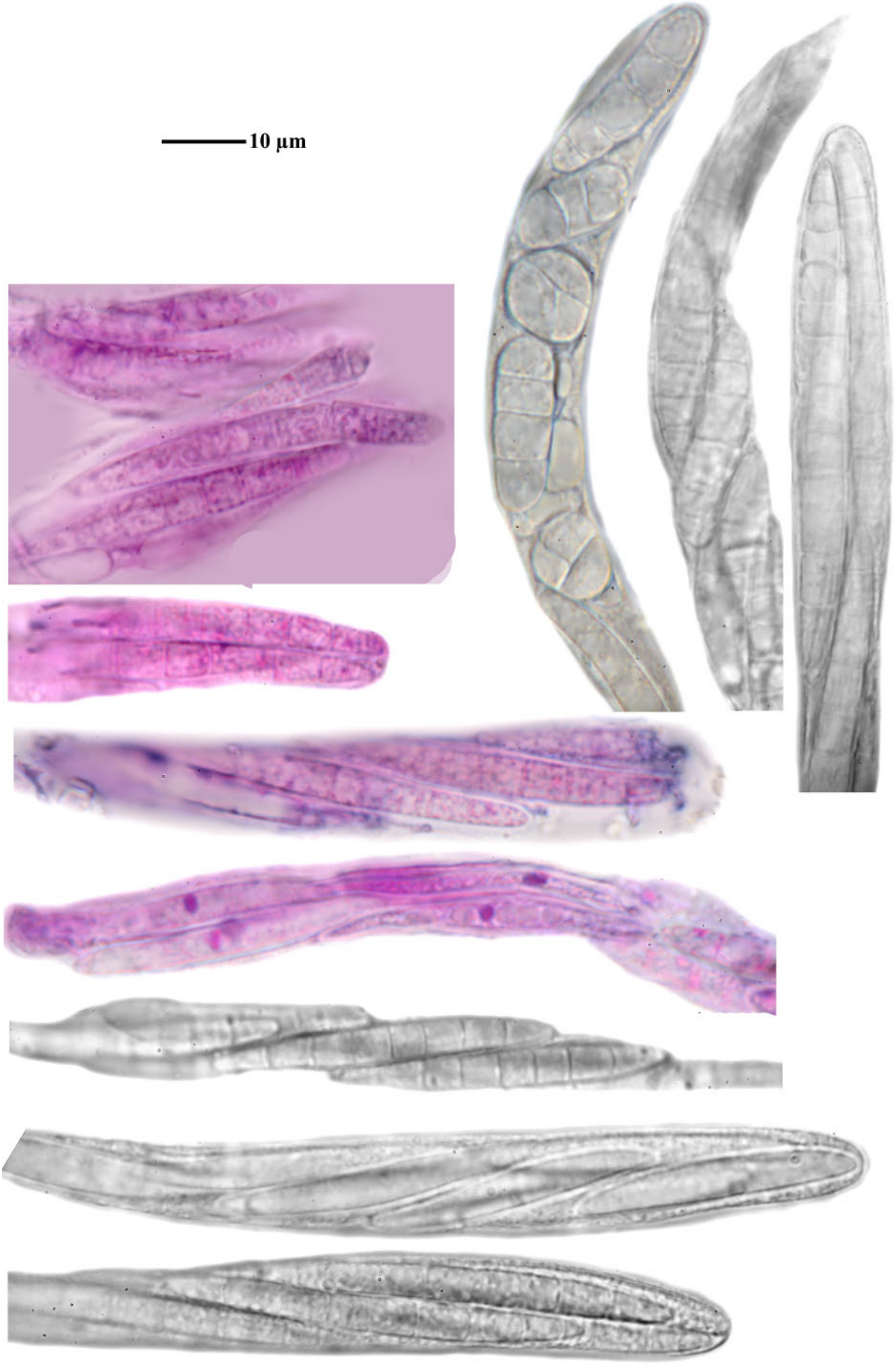
Porina peregrina



Porina peregrina



Porina peregrina



Porina peregrina

Pseudobogoriella fumosula (Zahlbr.) Lücking, R. Miranda & Aptroot, in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [172] (2020)

= *Bogoriella fumosula* (Zahlbr.) Aptroot & Lücking, Lichenologist 48(6): 910 (2016)

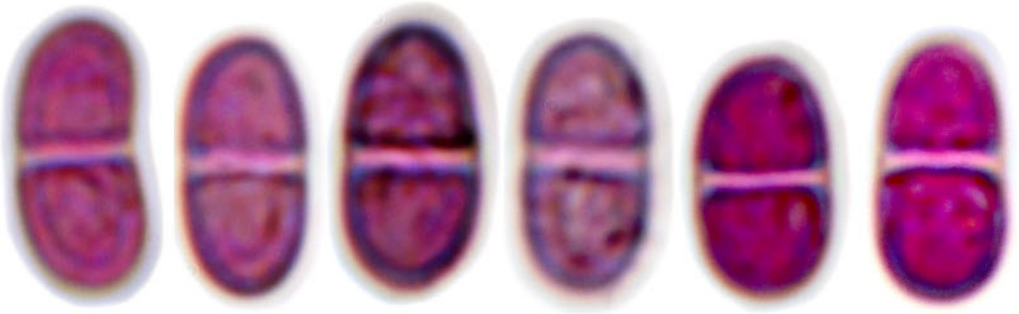
= *Microthelia fumosula* Zahlbr., in Handel-Mazzetti, Symb. Sinic. 3: 18 (1930)

= *Mycomicrothelia fumosula* (Zahlbr.) D. Hawksw., Bull. Br. Mus. nat. Hist., Bot. 14(2): 86 (1985)

Thallus whitish, with distint border lines. Ascomata with apical ostioles, solitary, with purplish basal fringe, 0.2–0.3 mm diam., and 0.07–0.11 mm high. Asi 55–65 × 10–14 µm. Paraphyses c. 2.5 µm thick. Ascospores (11–)12–15(–17) × (5.0–)5.5–6.5(–7.5) µm, with larger upper locule, with rounded to weakly attenuated ends, veruculose, pale brown to golden brown. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[ABL21823], Australia, Queensland, Lamington National Park, 100 km S of Brisbane, near lost world on tree in subtropical rainforest. 153°07' E, 28°16' S, 300 m. Leg. A. & M. Aptroot (no 21823), 02.1988, det. A. Aptroot, 1988.





——— 10 µm

Ascospores in Phloxin

Pseudobogoriella fumosula

Pseudobogoriella fumosula (Zahlbr.) Lücking, R. Miranda & Aptroot, in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [172] (2020)

= *Bogoriella fumosula* (Zahlbr.) Aptroot & Lücking, Lichenologist 48(6): 910 (2016)

= *Microthelia fumosula* Zahlbr., in Handel-Mazzetti, Symb. Sinic. 3: 18 (1930)

= *Mycomicrothelia fumosula* (Zahlbr.) D. Hawksw., Bull. Br. Mus. nat. Hist., Bot. 14(2): 86 (1985)

Thallus whitish, with distinct border lines. Ascomata with apical ostioles, solitary, with purplish basal fringe, 0.2–0.3 mm diam., and 0.07–0.11 mm high. Asci 55–65 × 10–14 µm. Paraphyses c. 2.5 µm thick. Ascospores (11–)12–15(–17) × (5.0–)5.5–6.5(–7.5) µm, with larger upper locule, with rounded to weakly attenuated ends, veruculose, pale brown to golden brown. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

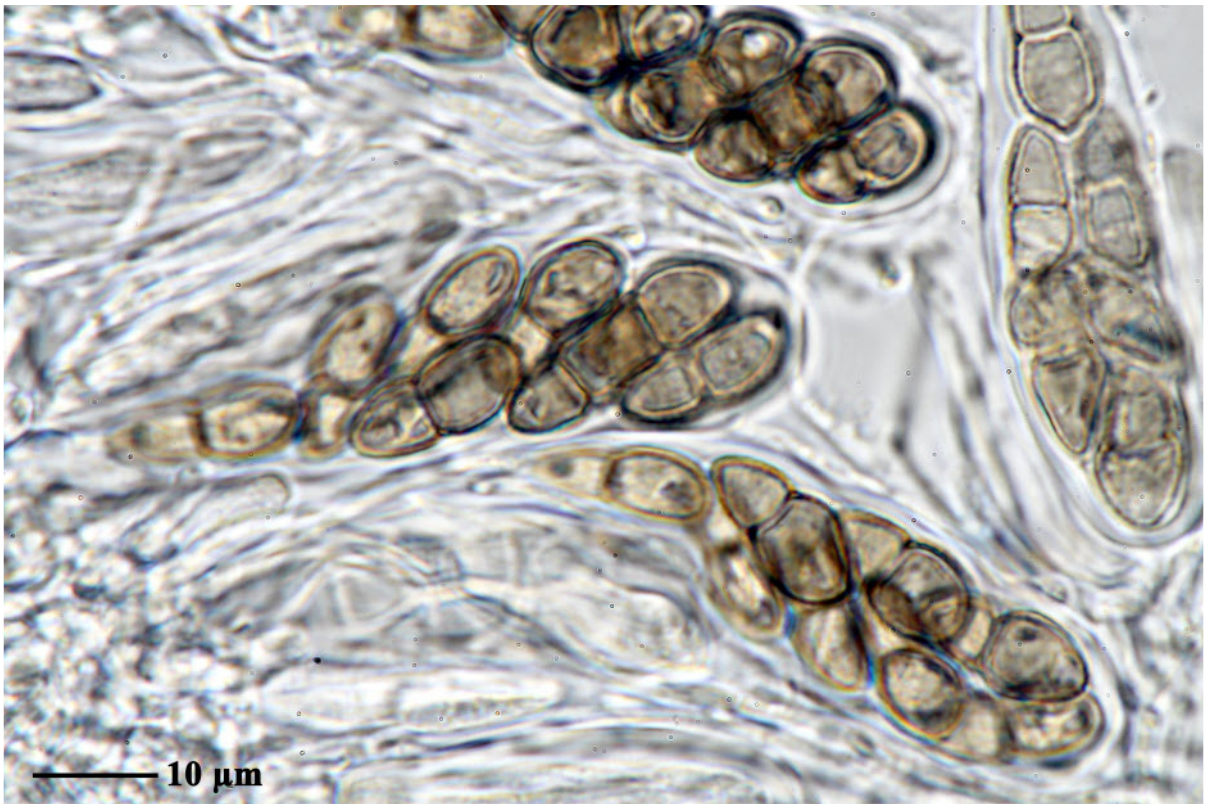
[ABL21823b], Australia, Queensland, Lamington National Park, 100 km S of Brisbane, near lost world on tree in subtropical rainforest. 153°07’ E, 28°16’ S, 300 m. Leg. A. & M. Aptroot (no 21823b), 02.1988, det. A. Aptroot, 1988.

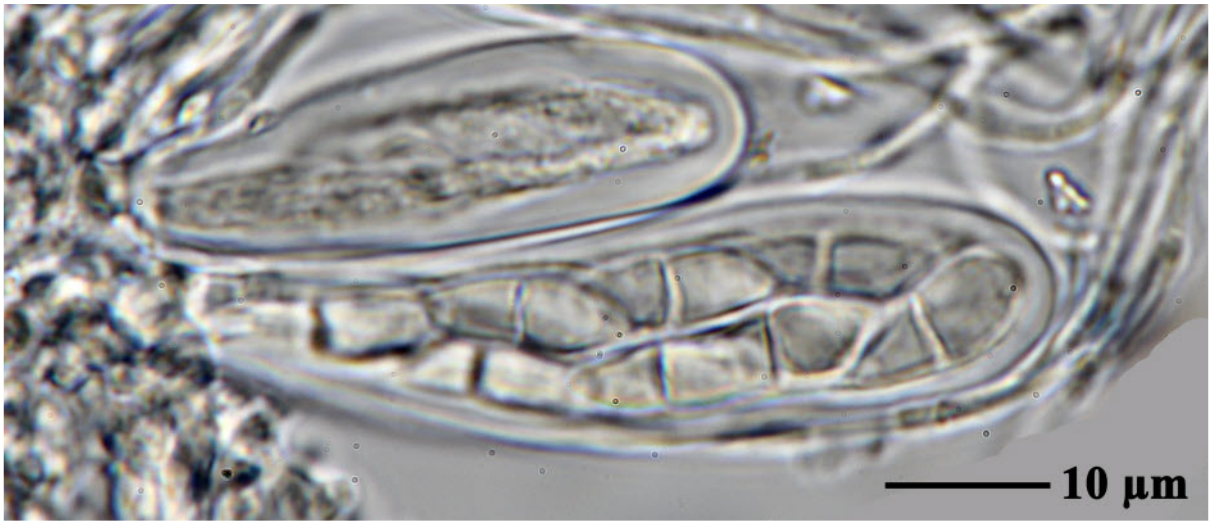




Pseudobogoriella fumosula







Pseudobogoriella fumosula





Pseudobogoriella fumosula

Pseudobogoriella hemisphaerica (Müll. Arg.) Lücking, R. Miranda & Aptroot, in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [172] (2020)

= *Bogoriella hemisphaerica* (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 910 (2016)

= *Microthelia hemisphaerica* Müll. Arg., in Engler, Bot. Jb. 6: 417 (1885)

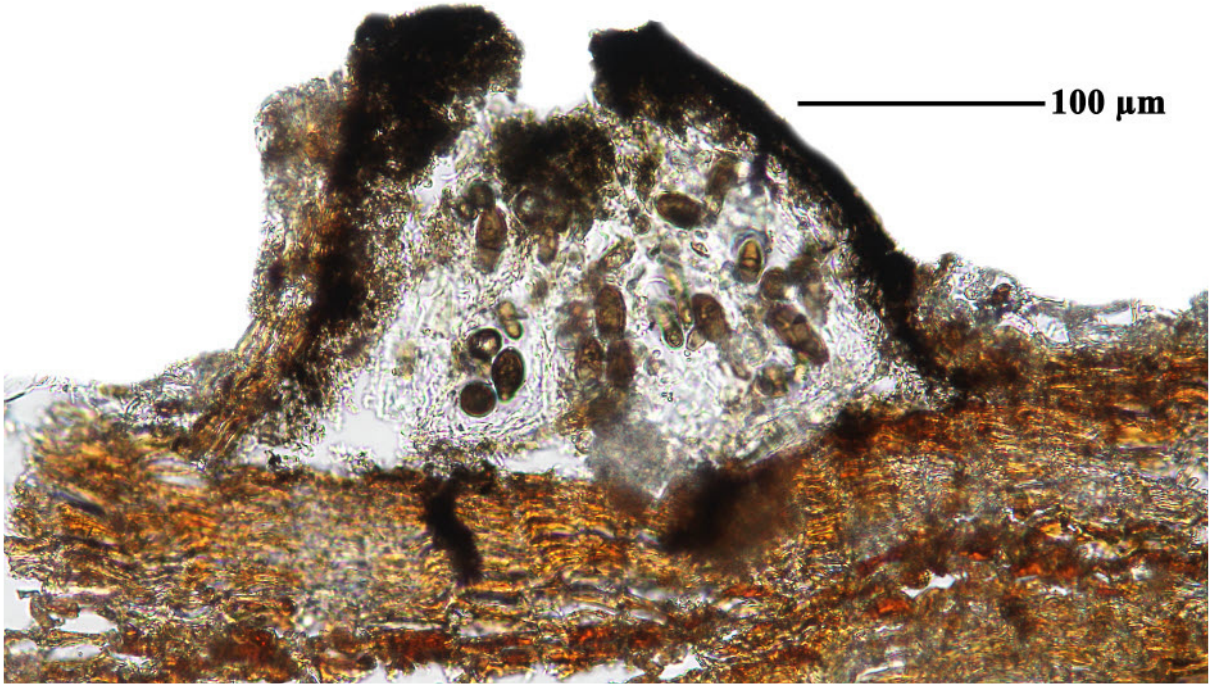
= *Mycomicrothelia hemisphaerica* (Müll. Arg.) D. Hawksw., Bull. Br. Mus. nat. Hist., Bot. 14(2): 86 (1985)

Thallus whitish,without prothallus lines. Ascomata with apical ostioles, solitary, 0.4–0.4 mm diam., without distict fringe. Wall 35–60 µm thick. Ascospores (21–)24–28(–30) × 5–9(–11) µm, with equal locules or slightly larger upper locule, with rounded ends, verruculose, olivaceous brown. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

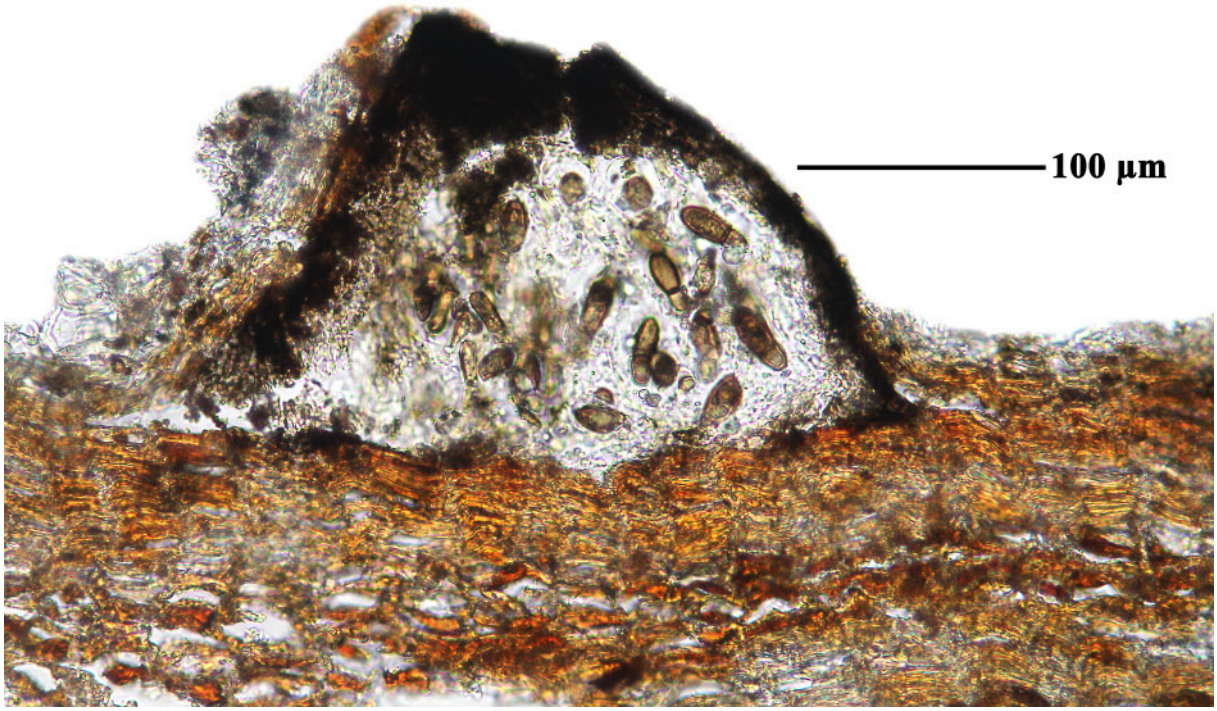
[ABL60925], Costa Rica, Prov. Guanacaste, Tropica Verde Reforestation, near Hojancha, 15 km SSE of Nicoya, 85°23’ W, 10°01’ N, 850 m, on exposed tree along road. Leg. A. Aptroot (no 60925), 22.03.2004, det. A. Aptroot, 2004.

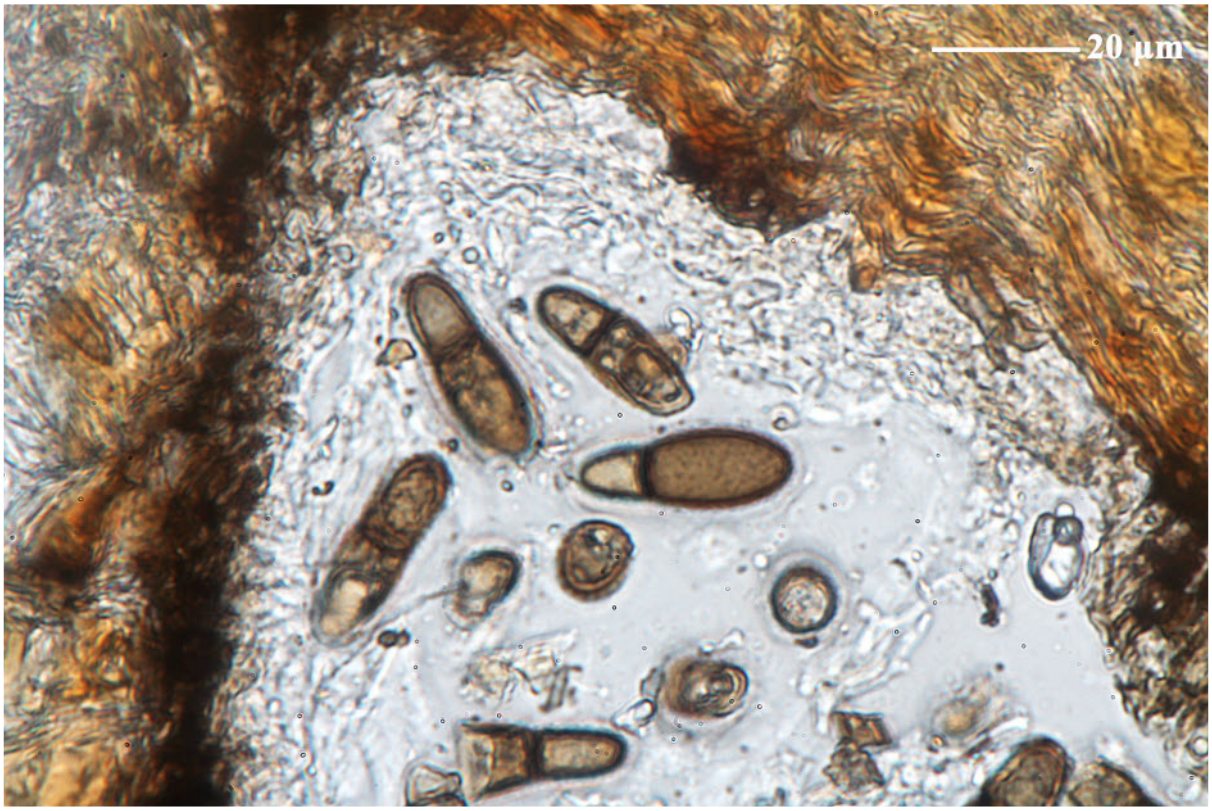




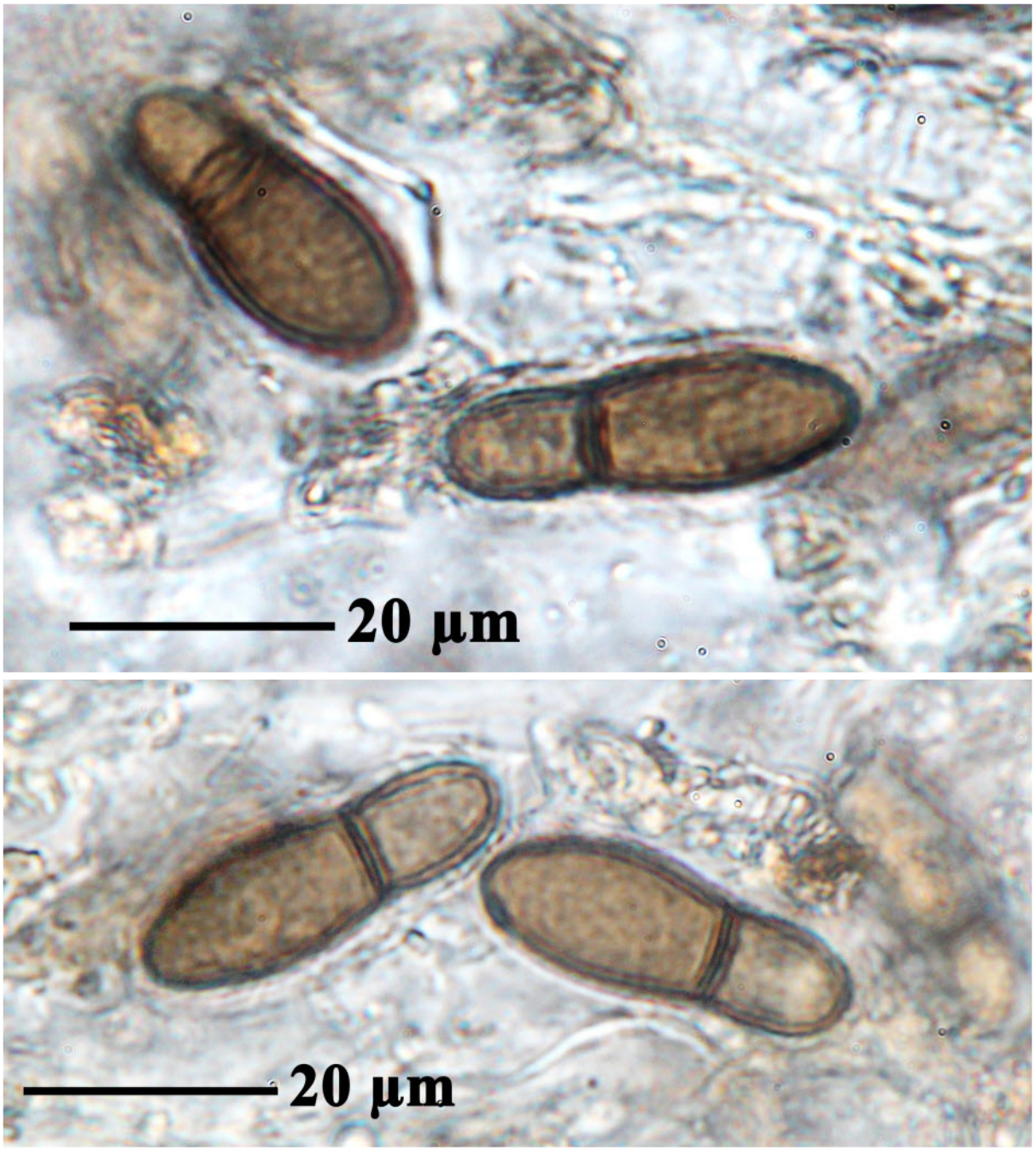


Pseudobogoriella hemisphaerica





Pseudobogoriella hemisphaerica



Pseudobogoriella hemisphaerica

Pseudobogoriella lateralis (Sipman) Lücking, R. Miranda & Aptroot, in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [172] (2020)

= *Bogoriella lateralis* (Sipman) Aptroot & Lücking, Lichenologist 48(6): 911 (2016)

= *Mycomicrothelia lateralis* Sipman, Lichenologist 37(4): 309 (2005)

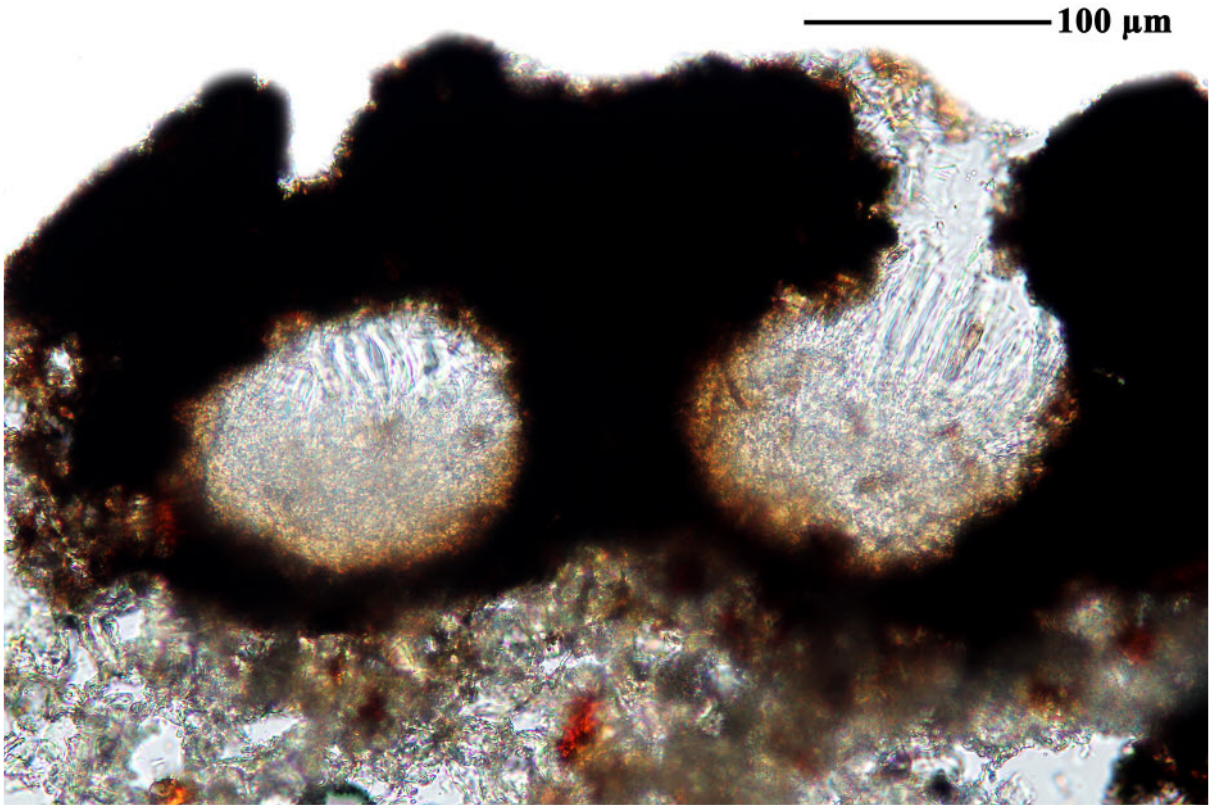
Thallus whitish, with dark prothallus lines. Ascomata with apical or lateral ostioles, solitary, usually oval,without fringe, 0.4–0.5 mm diam. Hamathecium clear, IKI-. Asci c. 130 × 10 µm. Ascospores uniseriate, 18–22 × 6–7 µm, with equal locules or slightly larger upper locule, with rounded ends, verrucolose, brown. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

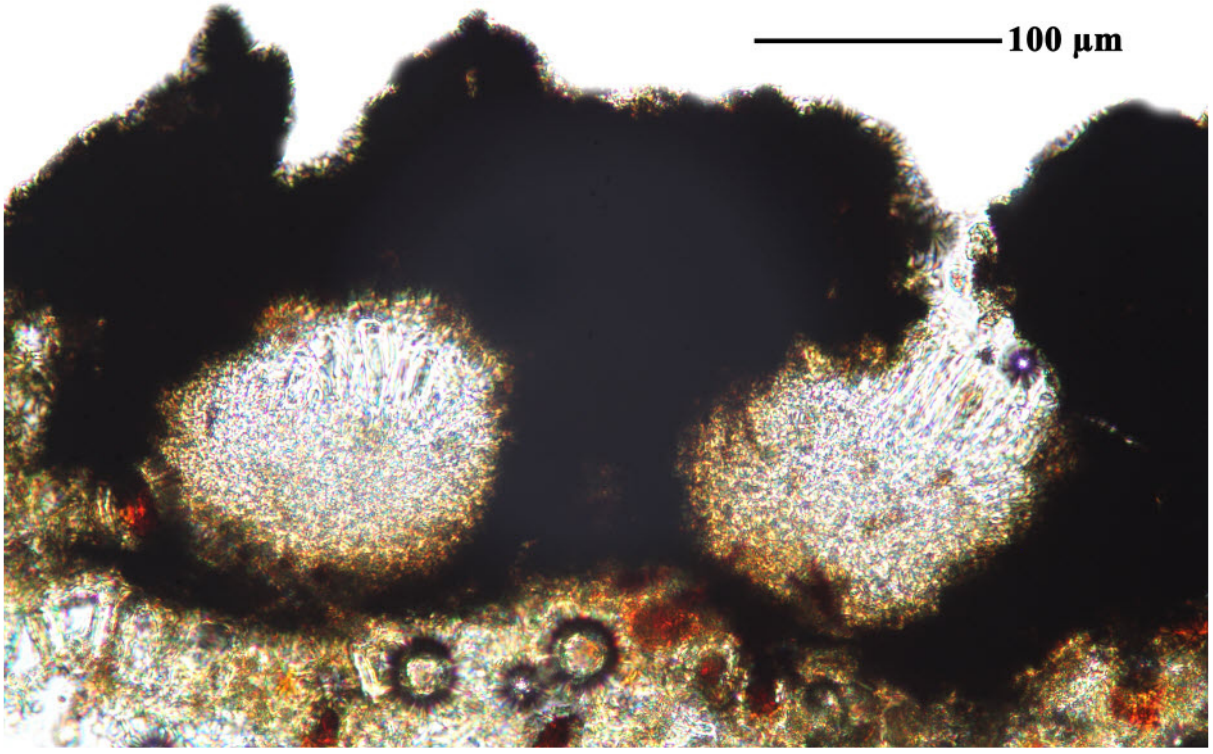
[Streimann34411], Norfolk Island, Mt. Pitt Reserve, track from Red Road to Mt. Bates. Relatively natural forest on gentle slope. On treelet stem. 29°00’40” S, 167°56’40” E, 220 m. Leg. H. Streimann (no 34411), 6.12.1984, det. H. Sipman. ISOTYPE.





Pseudobogoriella lateralis

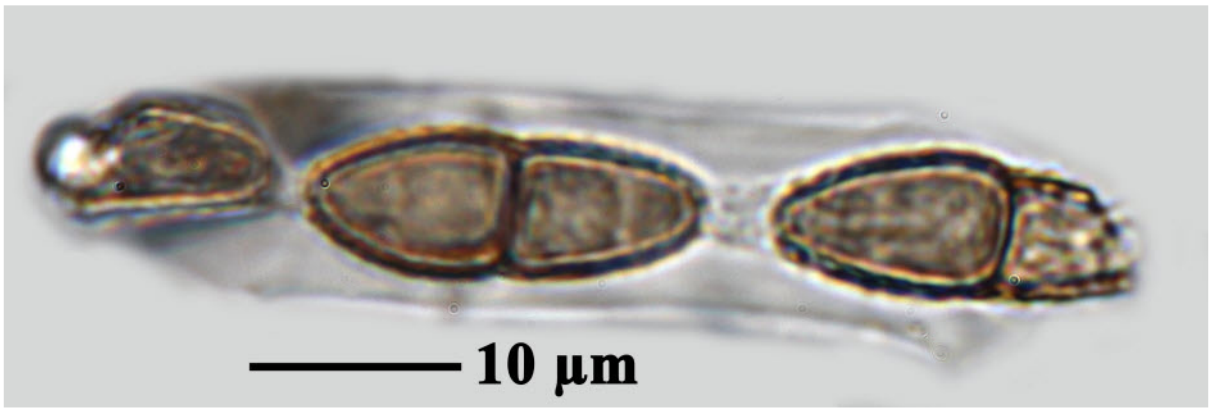




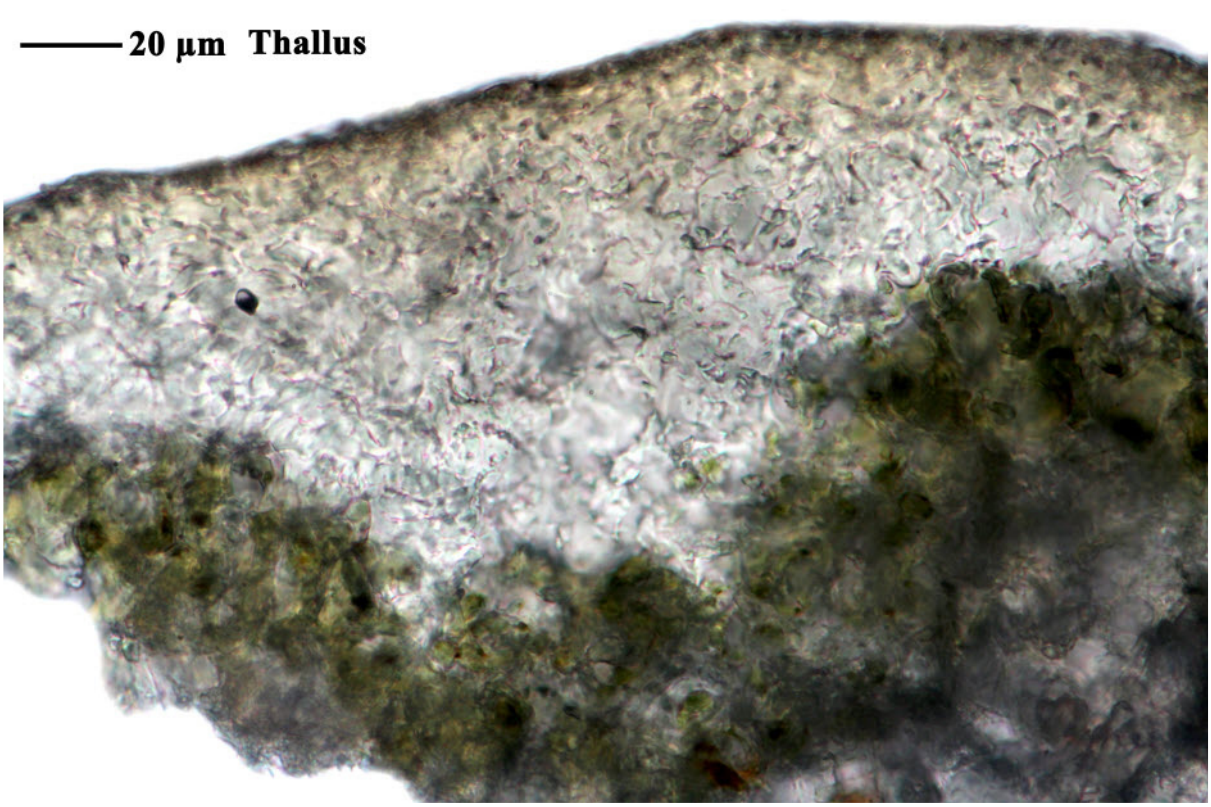


Pseudobogoriella lateralis









Pseudobogoriella lateralis

Pseudobogoriella miculiformis (Müll. Arg.) Lücking, R. Miranda & Aptroot, Index Fungorum 472: 1 (2021)

= *Bogoriella miculiformis* (Nyl. ex Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 912 (2016)

= *Microthelia miculiformis* Nyl. ex Müll. Arg., Bot. Jb. 6: 417 (1885)

= *Mycomicrothelia miculiformis* (Nyl. ex Müll. Arg.) D. Hawksw., Bull. Br. Mus. nat. Hist., Bot. 14(2): 99 (1985)

= *Verrucaria miculiformis* Nyl., Flora, Regensburg 59(23): 364 (1876)

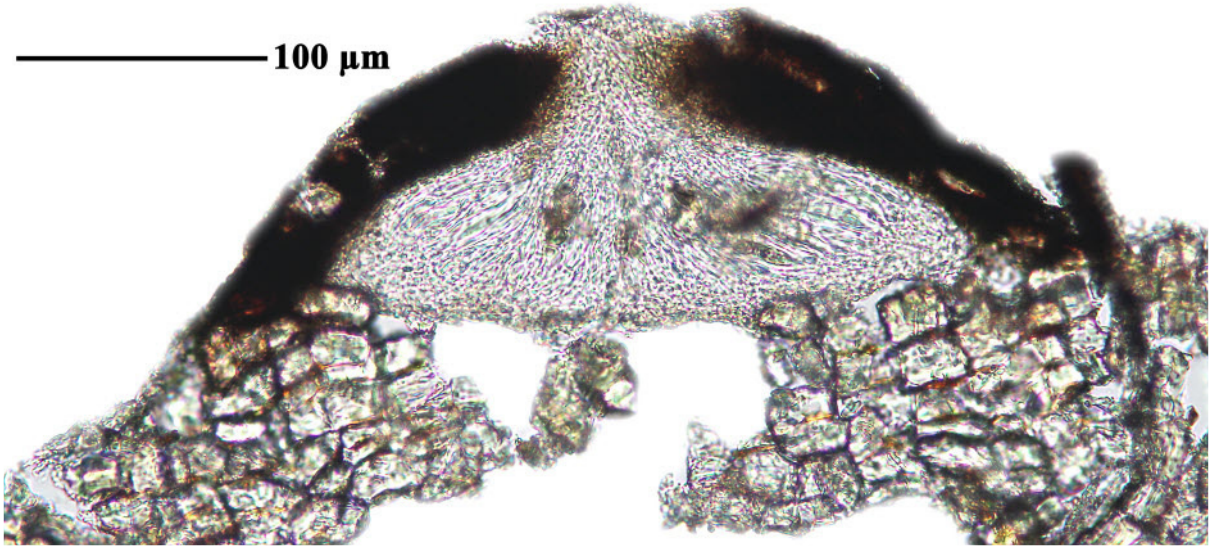
Thallus whitish to pale brown, with dark prothallus lines. Ascomata with apical ostioles, solitary, with fringe, 0.4–0.5 mm diam. Asci 65–80 × 12–15 µm. Ascospores 14.5–17.5(–19.0) × 6.0–7.5 µm, with upper locule about twice as large as lower locule, with rounded ends, verruculose, brown. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

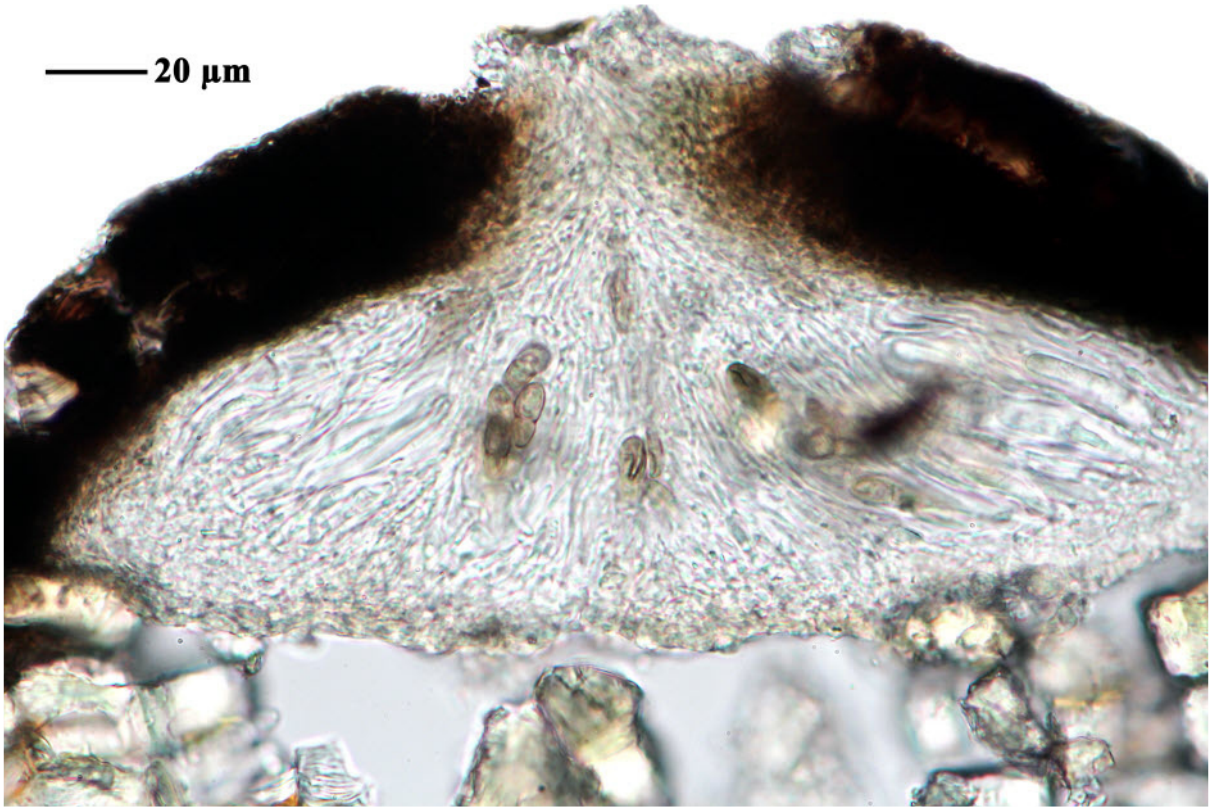
[ABL60385], Costa Rica, Prov. San José, Santa Rosa de Domingo, 4 km N of San José, INBioparque, 84°05' W, 9°59' N, 1150 m. On tree in park. Leg. A. Aptroot (no 60385), 14.03.2004, det. A. Aptroot, 2004.





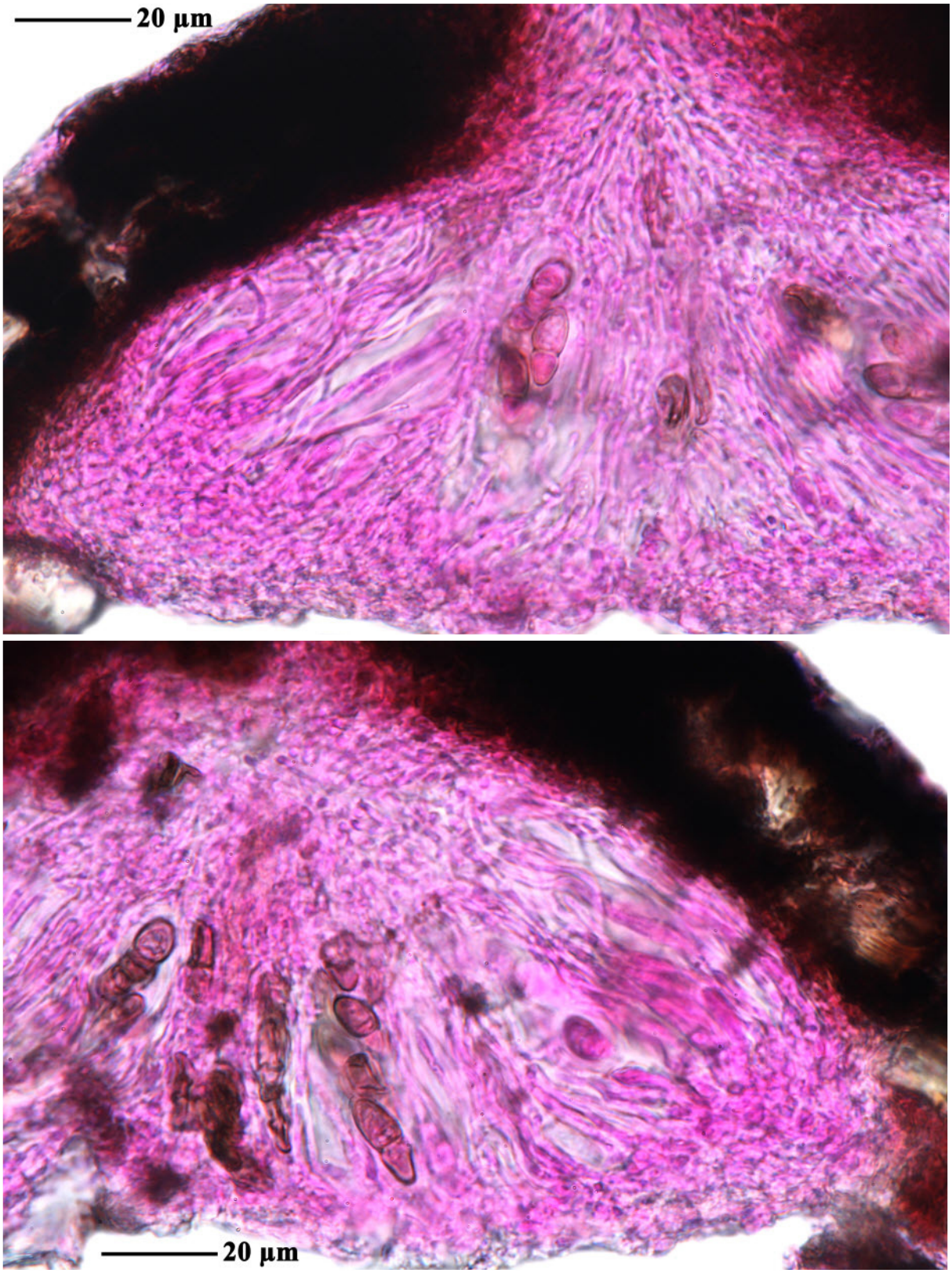
Pseudobogoriella miculiformis







Pseudobogoriella miculiformis



Pseudobogoriella miculiformis

Pseudobogoriella nonensis (Stirt.) Lücking, R. Miranda & Aptroot, in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [172] (2020)

= *Bogoriella nonensis* (Stirt.) Aptroot & Lücking, Lichenologist 48(6): 913 (2016)

= *Microthelia nonensis* (Stirt.) Zahlbr., Cat. Lich. Univers. 1: 264 (1921) [1922]

= *Mycomicrothelia nonensis* (Stirt.) D. Hawksw., Bull. Br. Mus. nat. Hist., Bot. 14(2): 105 (1985)

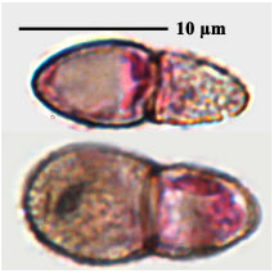
= *Verrucaria nonensis* Stirt., Proc. Roy. phil. Soc. Glasgow 11: 320 (1879) [1878]

Thallus whitish, without prothallus lines. Ascomata with apical ostioles, solitary, 0.3–0.4 mm diam. Asci 50–60 × 8–15 µm. Ascospores (14–)16–18 x (6.0–)6.5–7.5 µm, with equal locules or somewhat larger upper locule, with rounded ends, smooth to verruculose, olivaceous brown. Pycnidia absent. Chemistry: thallus and ascomata UV-, K-. TLC: No substances detected.

[Arvidsson6614], Ecuador, Prov. Napo, about 11 km E of Papallacta on road Quito - Baeza. 78°04’ W, 00°24’ S, 2700 m. Disturbed montane rainforest. Leg. L. Arvidsson (no 6614), M. Lindqvist & M. Lindström, 22.02.1985, det. A. Aptroot.







Pseudobogoriella nonensis

Pseudobogoriella punctata (Aptroot) Lücking, R. Miranda & Aptroot, in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [173] (2020)

= *Bogoriella punctata* (Aptroot) Aptroot & Lücking, Lichenologist 48(6): 914 (2016)

= *Mycomicrothelia punctata* Aptroot, Biblthca Lichenol. 44: 134 (1991)

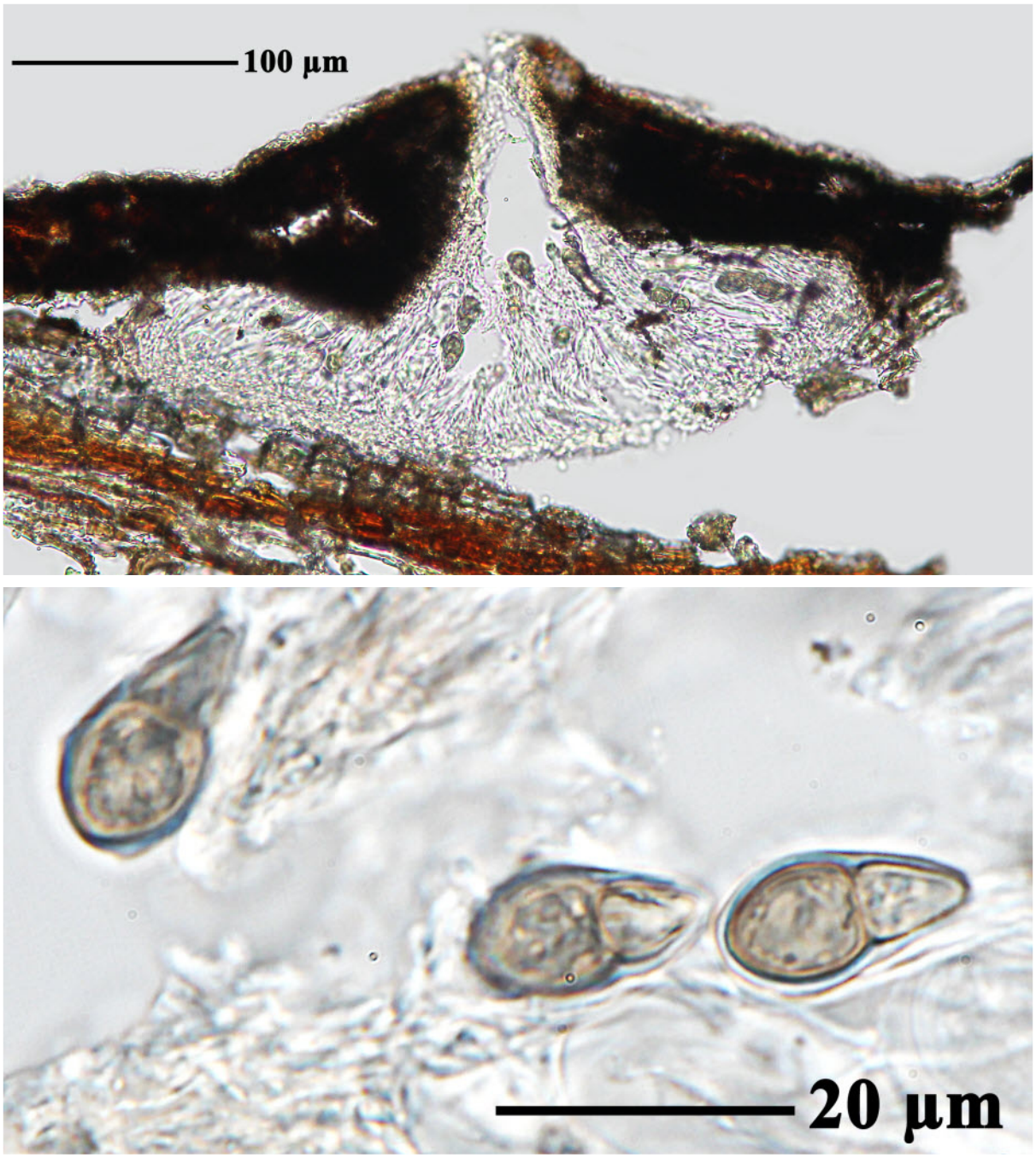
Thallus brownish, with dark prothallus lines. Ascomata with apical ostioles, solitary or in groups of 1(-3), with fringe, 0.4–0.7 µm diam., completely exposed. Asci 80–90 × 10–15 µm. Ascospores (12–)15–18(–21) × (6–)7–8 µm, with larger, rounded upper locule, and much smaller, often attenuated lower locule, smooth. Pycnidia mainly near the border lines. Chemistry: Thallus and ascomata UV-, K. TLC: No substances detected.

[ABL17994], Papua New Guinea, Morobe prov., Huon Peninsula, Saruwaged Range near Honzeukngon village S of Darim in Timbe valley. 147°06’ E, 6°14’ S, 2100 m. In mossy forest on tree. Leg. A. Aptroot (no 17994), 03.1987, det. A. Aptroot 1987. HOLOTYPE.

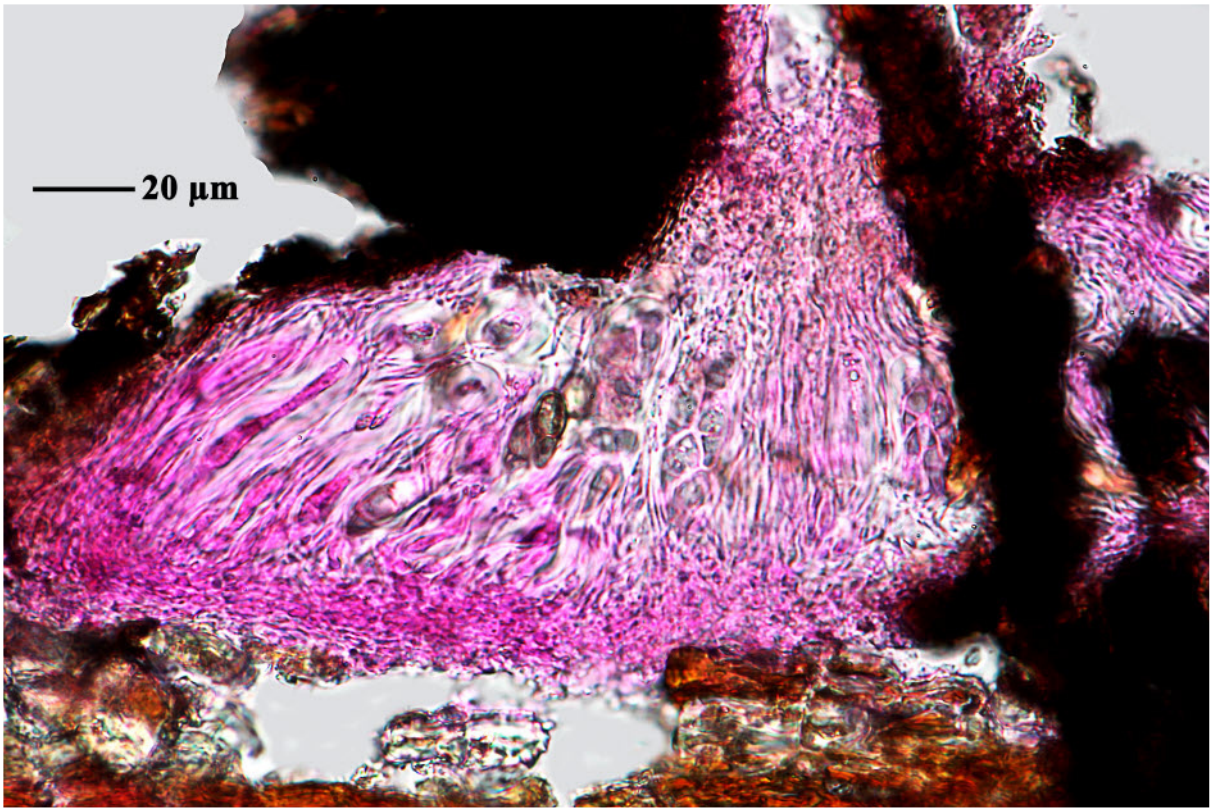


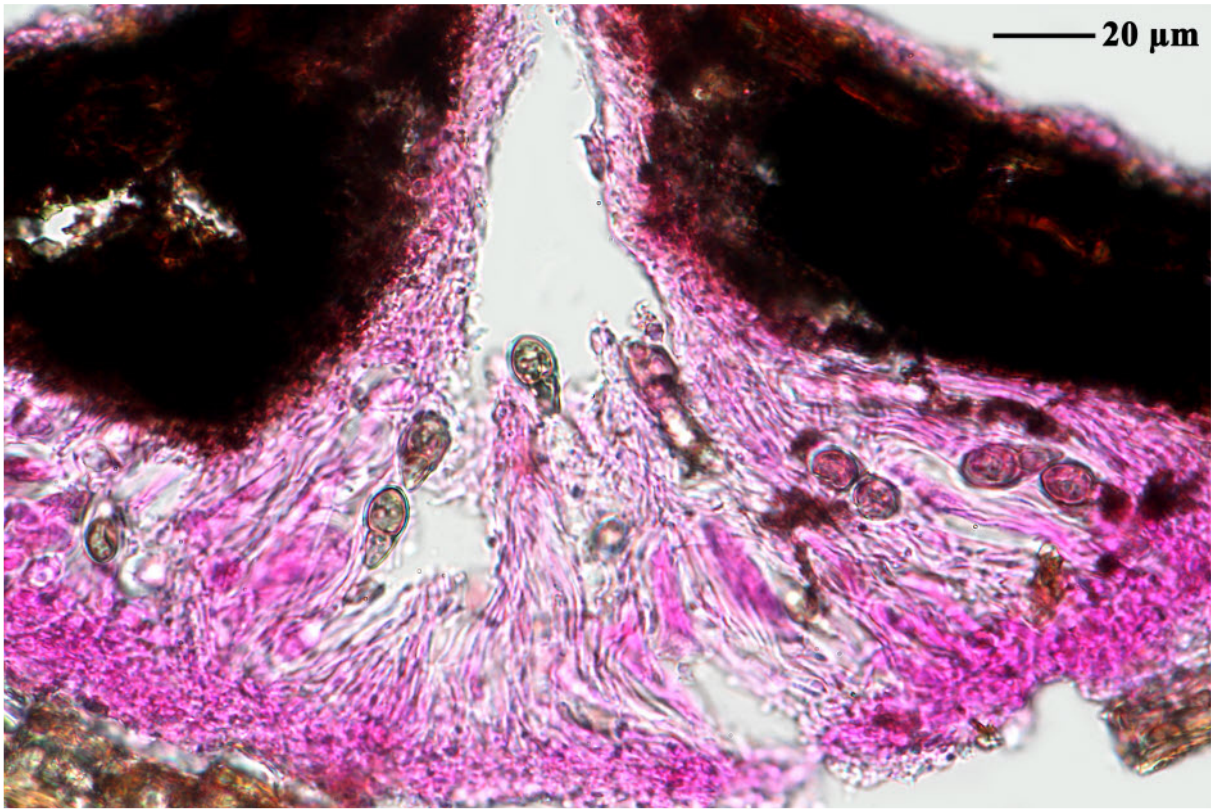


Pseudobogoriella punctata



Pseudobogoriella punctata





Pseudobogoriella punctata

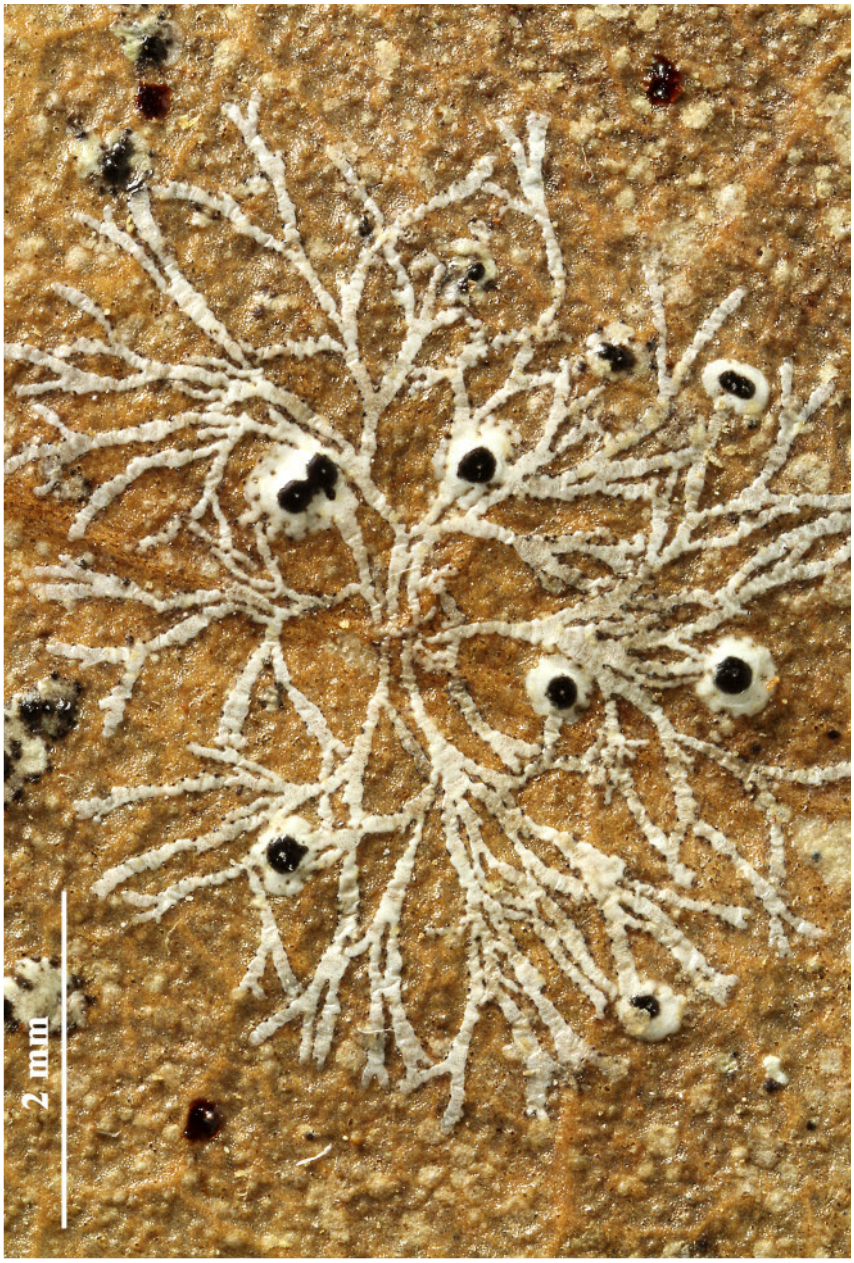
Pseudobogoriella striguloides (Sérus. & Aptroot) Lücking, R. Miranda & Aptroot, in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [173] (2020)

= *Bogoriella striguloides* (Sérus. & Aptroot) Aptroot & Lücking, Lichenologist 48(6): 915 (2016)

= *Mycomicrothelia striguloides* Sérus. & Aptroot, Bryologist 101(1): 145 (1998)

Thallus foliicolous, hypocuticular and lobed. Ascomata in groups of 1–8, 0.1–0.2 mm diam.. Asci 40–50(–55) × 10–12(–15) µm.Ascospores c. 14 × 4 µm, hyaline to dark brown. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

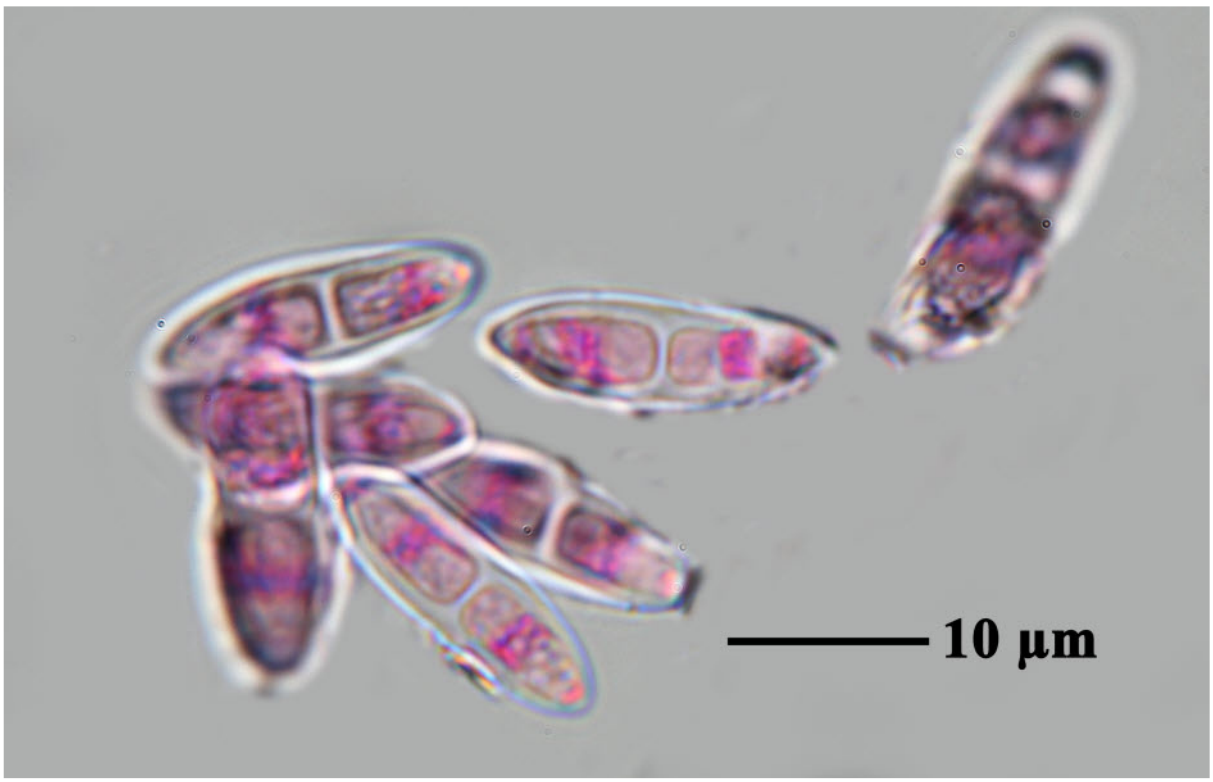
[Bartlett], New Zealand, North Island, in coastal forest near Orewa, 30 km N of Auckland. On leaves of *Beilschmiedia tawa*. Leg. J. K. Bartlett (s.n.). det. A. Aptroot, ISOTYPE.





Pseudobogoriella striguloides





Pseudobogoriella striguloides

Pseudobogoriella subfallens (Müll. Arg.) Lücking, R. Miranda & Aptroot, in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [173] (2020)

= *Bogoriella subfallens* (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 915 (2016)

= *Microthelia subfallens* Müll. Arg., in Engler, Bot. Jb. 6: 416 (1885)

= *Mycomicrothelia subfallens* (Müll. Arg.) D. Hawksw., Bull. Br. Mus. nat. Hist., Bot. 14(2): 111 (1985)

Thallus whitish to pale pink or brownish and nearly absent, with dark prothallus lines. Ascomata with apical ostioles, solitary, 0.4–0.5 mm diam. Asci 50–65 × 12–14 µm. Ascospores 13.5–16.0 × 6–7 µm, with upper locule almost twice as large as lower locule, with rounded ends, verruculose, brown. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

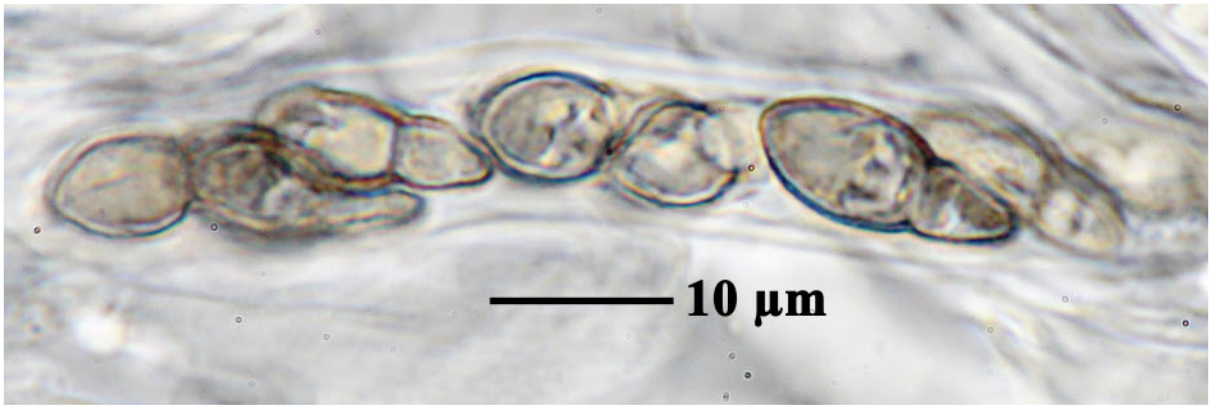
[ABL60452], Costa Rica, Prov. Guanacaste, Volcán Tenorio National Park, 25 km NNW of Tilarán, 84°59’ W, 10°43’ N, 700 m, on tree in meadow along access road to station near Bijagua. Leg. A. Aptroot (no 60452), 15.03.2004, det. A. Aptroot, 2004.





Pseudobogoriella subfallens







Pseudobogoriella subfallens

Pseudopyrenula americana Aptroot, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 633 (2016)

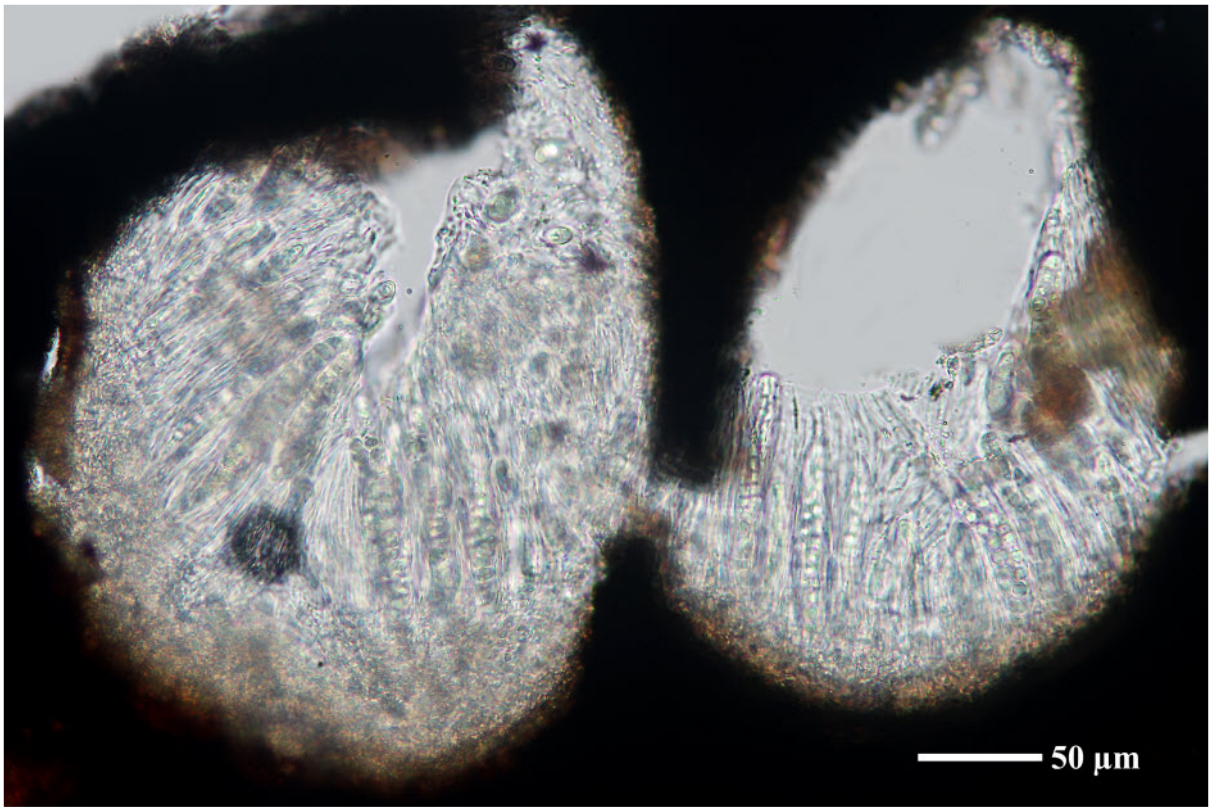
Thallus ecorticate, whitish. Algae trentepohlioid. Ascomata solitary or occasionally a few fused sideways, hemispherical, black, 0.3–0.5 mm diam. Ostioles apical, whitish to black. Hamathecium not inspersed, hyaline. Ascospores 8 per ascus, IKI–, 3-septate, 26–32 × 7–10 µm, not ornamented, lumina diamond-shaped. Chemistry: Thallus UV−. TLC: no secondary substances detected.

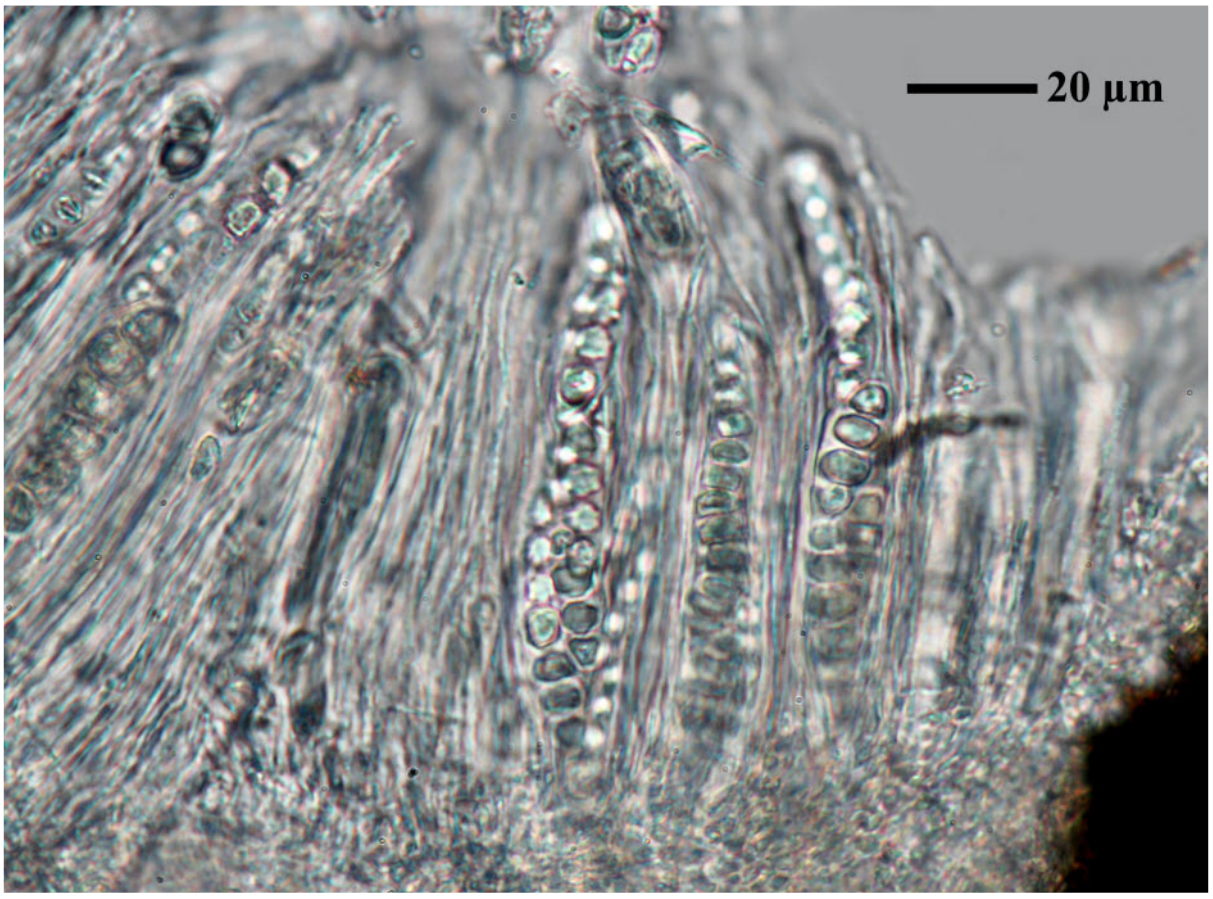
[Sip19117], Guyana, Upper Mazaruni Distr., Mount Latipu, c. 8 km N of Kamarang, in scrub on summit plateau, epiphytic on shrub, 5°57’ N, 60°38’ W, c. 1000 m. Leg. H. Sipman (no 19177) & A. Aptroot, 25.2.1985, det. A. Aptroot, 1990. PARATYPE.



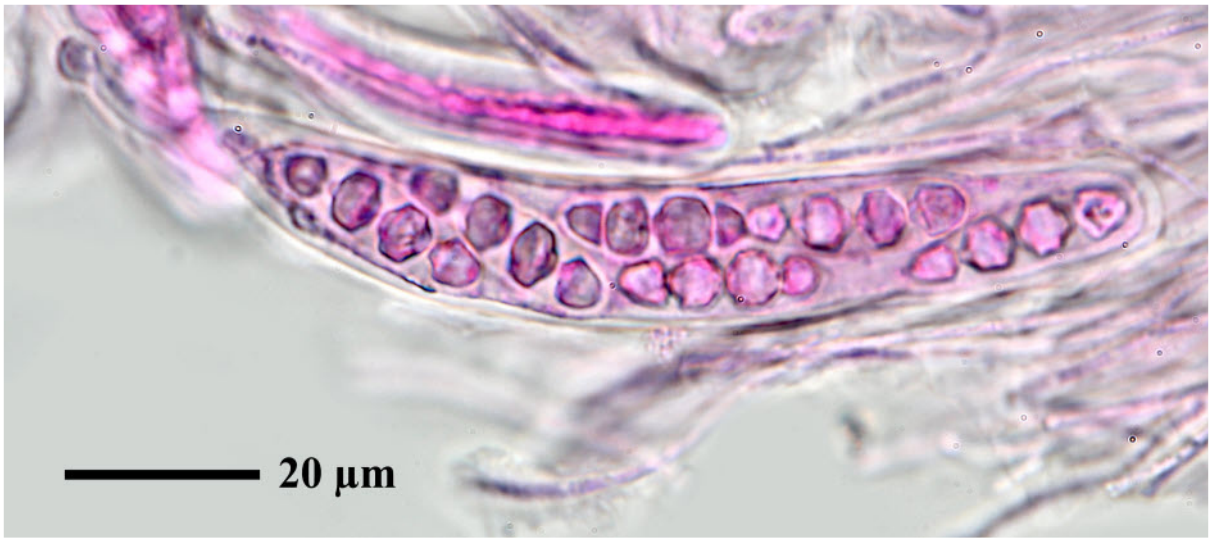


Pseudopyrenula americana





Pseudopyrenula americana







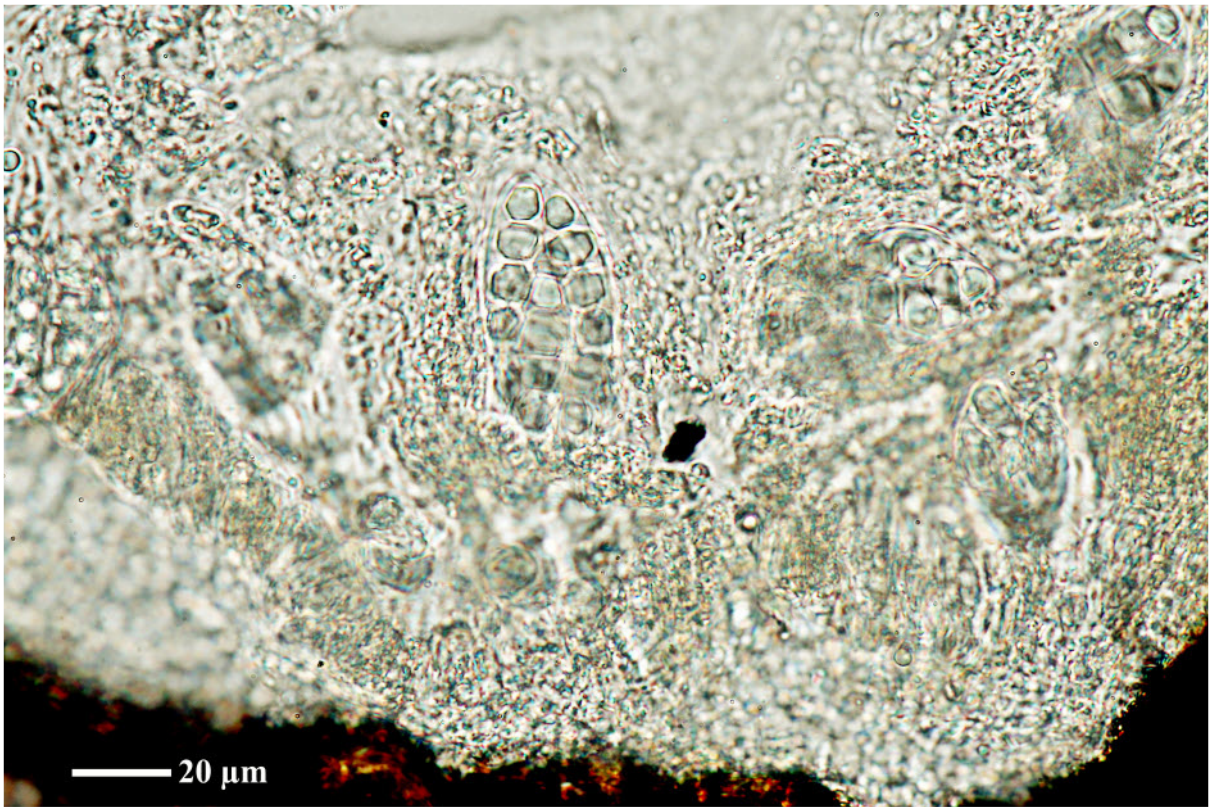
Pseudopyrenula americana

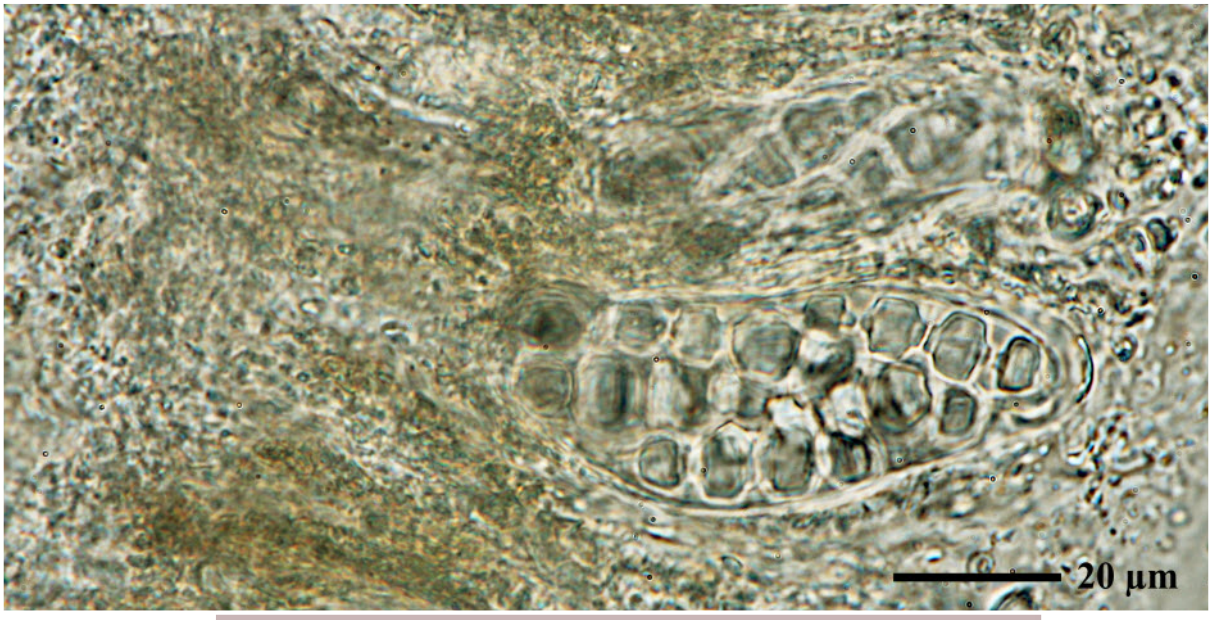
Pseudopyrenula endoxantha Vain., J. Bot. 34: 292 (1896)

Thallus ecorticate, white, smooth to uneven. Algae trentepohlioid. Ascomata with apical ostioles, solitary, 0.4–0.6mm diam., prominent, hemispherical, exposed and black. Hamathecium inspersed with yellow oil globules. Ascospores 8 per ascus, 3-septate, fusiform-ellipsoid, 37–44 × 10–12 µm, hyaline, IKI−, not ornamented. Chemistry: Thallus and ascomata UV−, K−; hamathecium, K+ reddish, with yellow anthraquinone.

[ABL60602], Costa Rica, prov. Guanacaste, Volcán Tenorio National Park, 15 km NNW of Tilarán, Alto Maso, on tree in disturbed elfin forest near Tierras Morenas, 85°00’ W, 10°37’ N, 950-1000 m. Leg. A. Aptroot (no 60602), 17.03.2004, det. A. Aptroot, 2004.



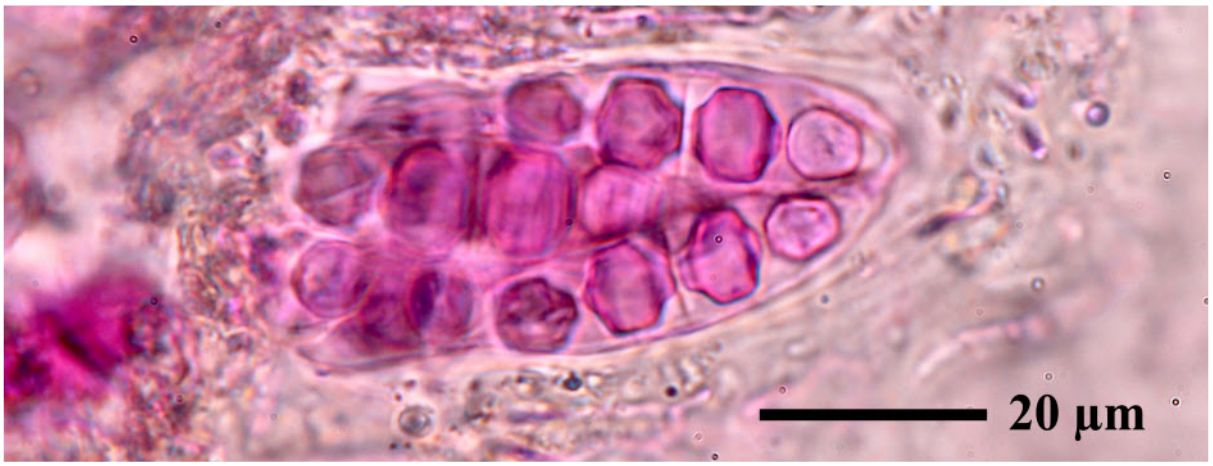






Pseudopyrenula endoxantha

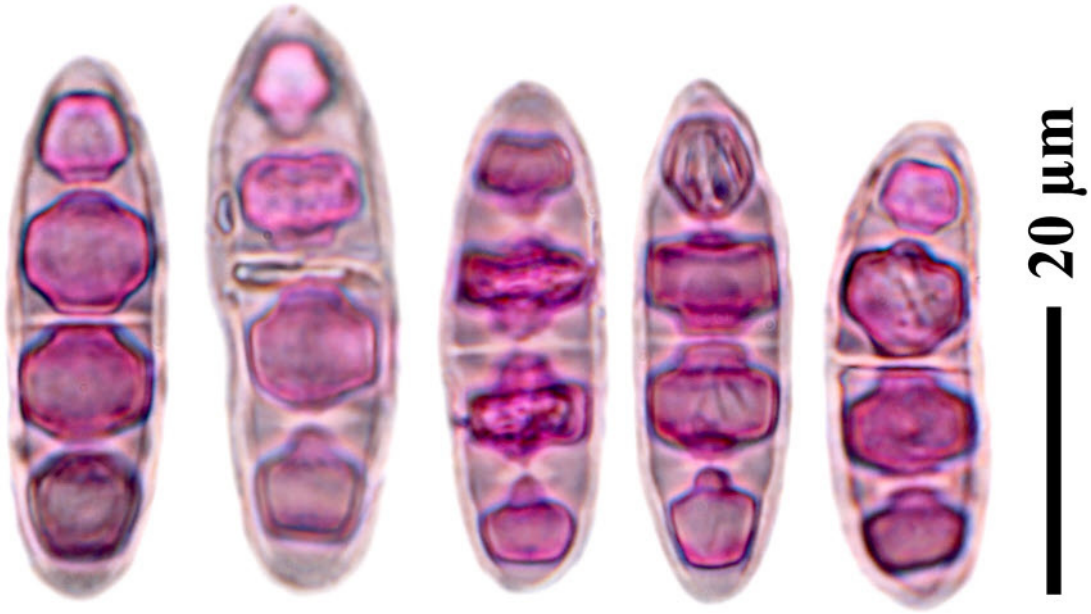






Pseudopyrenula endoxantha



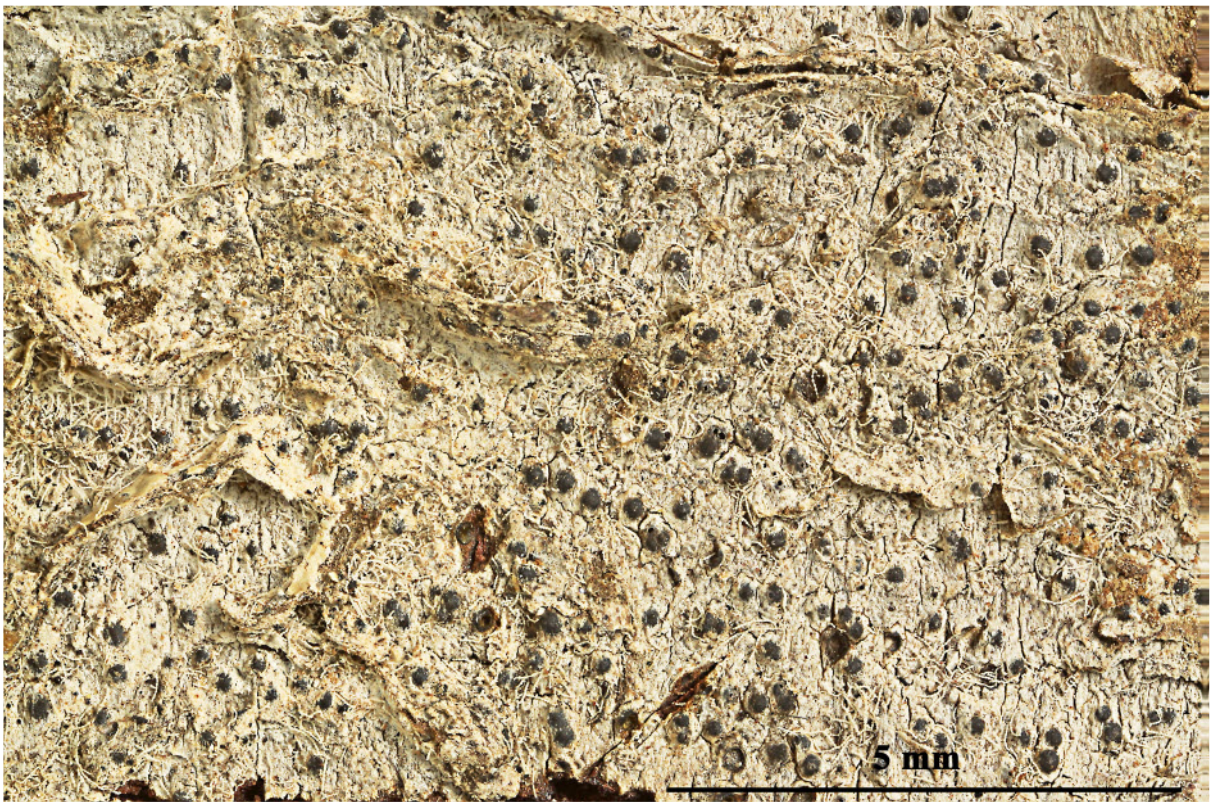


Pseudopyrenula endoxantha

Pseudopyrenula flavoreagens Aptroot & M. Cáceres, Lichenologist 48(6): 711 (2016)

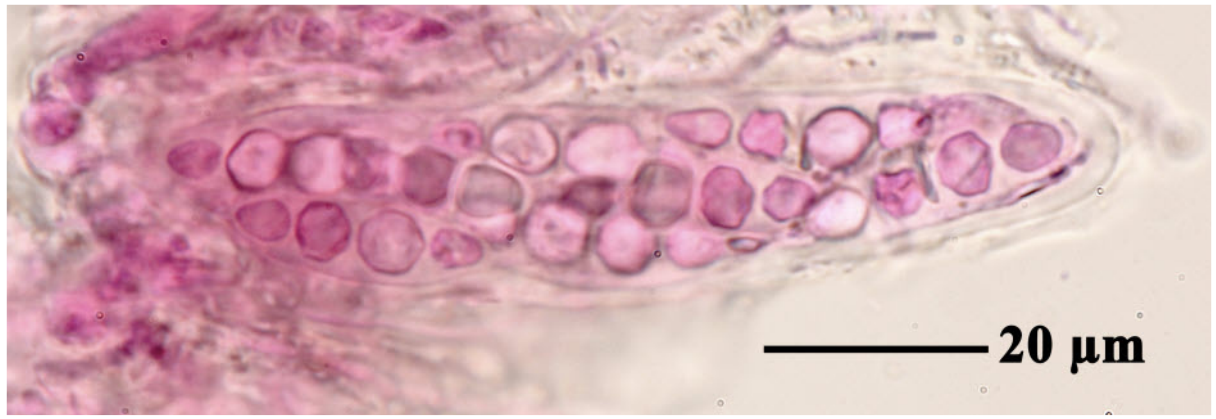
Thallus not corticate, dull, continuous, covering areas ≤ 2 cm diam., whitish grey, surrounded by a black hypothallus line c. 0.2 mm wide, not inducing gall formation of the host bark. Ascomata globose, 0.25–0.35 mm diam., single, emergent from the thallus. Wall carbonized, ≤ c. 40 µm thick. Ostioles apical, not fused, flat, black. Hamathecium inspersed with yellow oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 21–28 × 6–9 µm, ends pointed, lumina diamond-shaped, partly yellow, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus UV+ yellow, KOH−. TLC: lichexanthone.

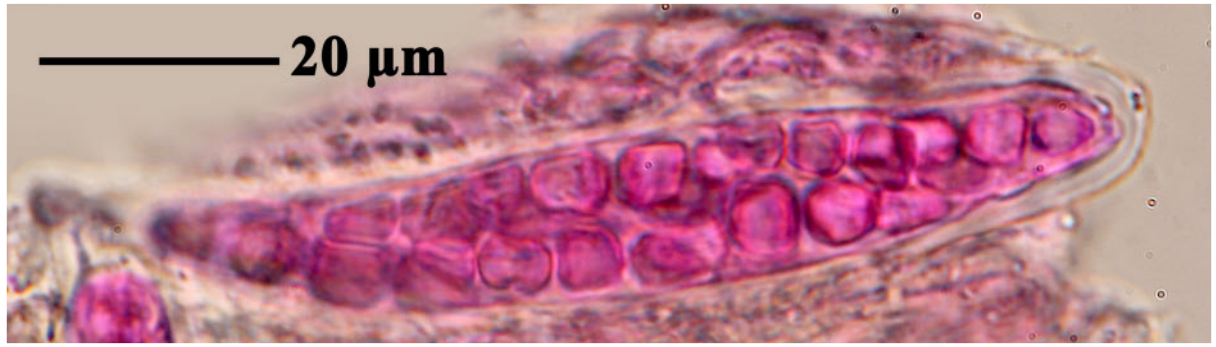
[ABL41518]. Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque National do Caraça, near Tanque Grande, c. 120 m, 20°06’ S, 43°29’ W, in rain forest remnant on *Auraucaria*. Leg. Aptroot (no 41518), 19-20.09.1997, det. A. Aptroot 1998. ISOTYPE.





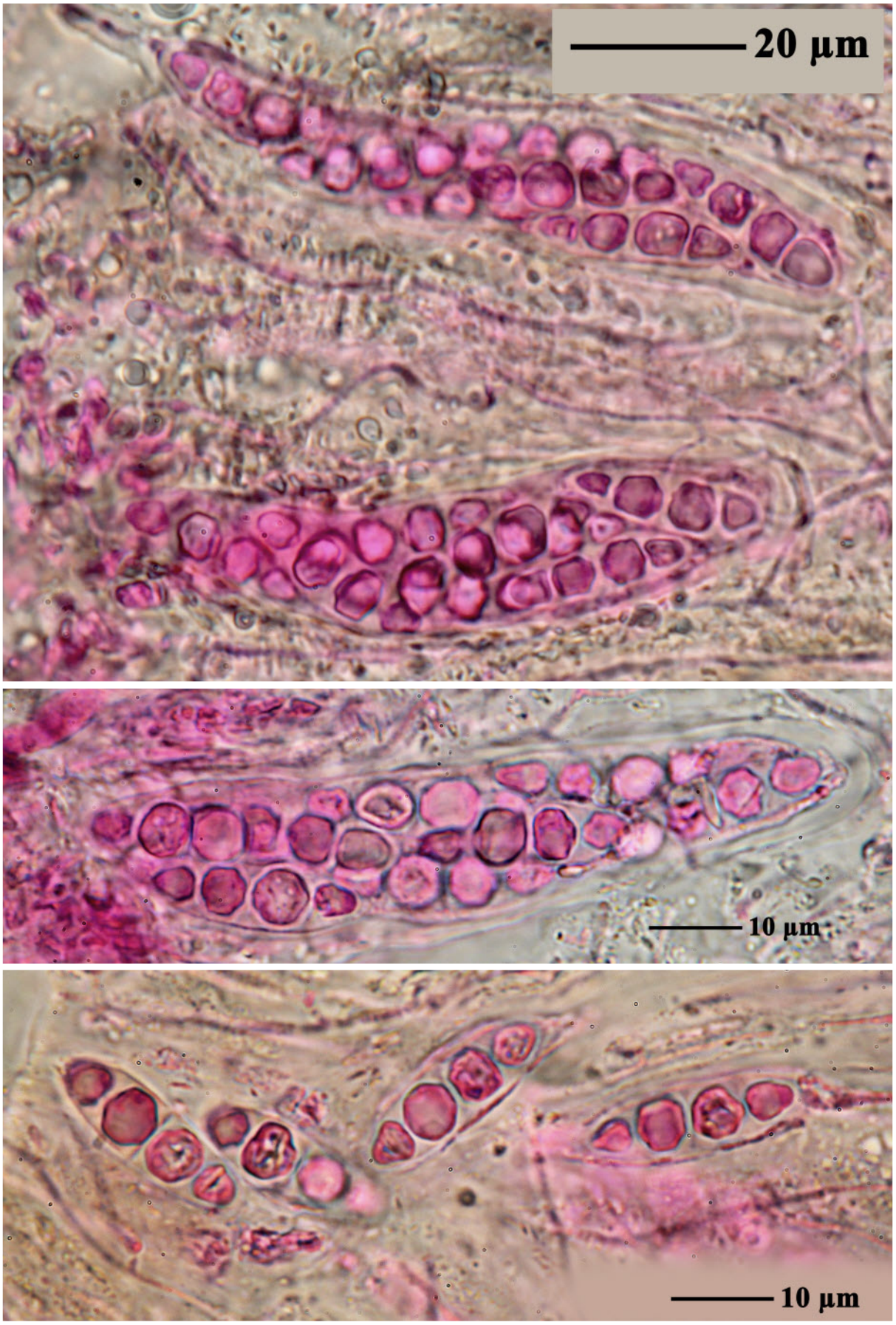
Pseudopyrenula flavoreagens







Pseudopyrenula flavoreagens



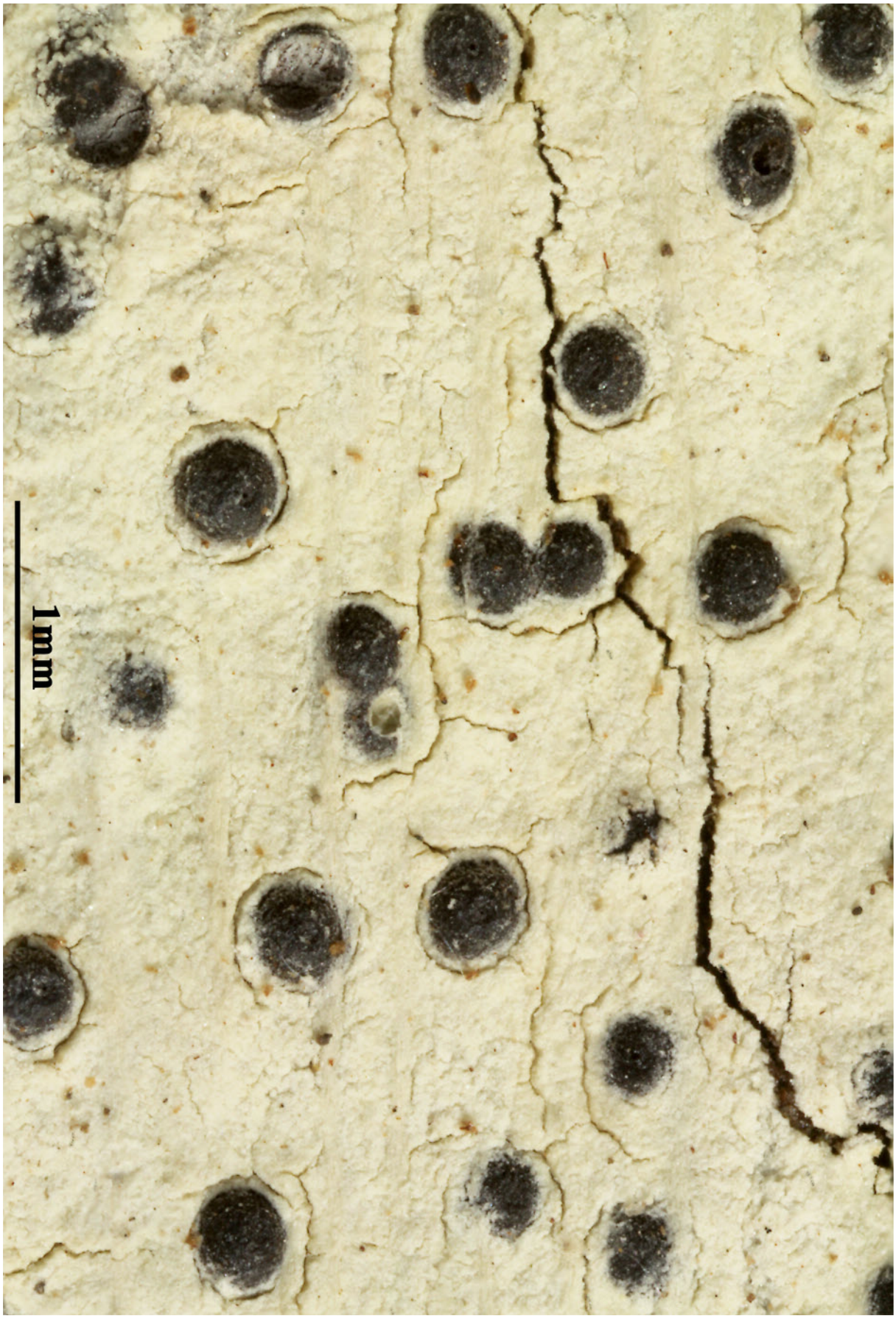
Pseudopyrenula flavoreagens

Pseudopyrenula flavoreagens Aptroot & M. Cáceres, Lichenologist 48(6): 711 (2016)

Thallus not corticate, dull, continuous, covering areas ≤2 cm diam., whitish grey, surrounded by a black hypothallus line c. 0.2 mm wide. Algae trentepohlioid. Ascomata globose, 0.25–0.35 mm diam., single, emergent from the thallus. Wall carbonized, ≤ c. 40 µm thick. Ostioles apical, not fused, flat, black. Hamathecium inspersed with yellow oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 21–28 × 6–9 µm, ends pointed, lumina diamond-shaped, partly yellow, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus UV+ yellow, KOH−. TLC: lichexanthone.

[Etayo18518], Panama: Veragues: Bahia Honda, camino del Edén base Cabañita, 0–25 m, on Cocos nucifera. Leg. J.A. Cabrera & J. Etayo (no 18518), 23.07.2001, det. A. Aptroot.





Pseudopyrenula flavoreagens

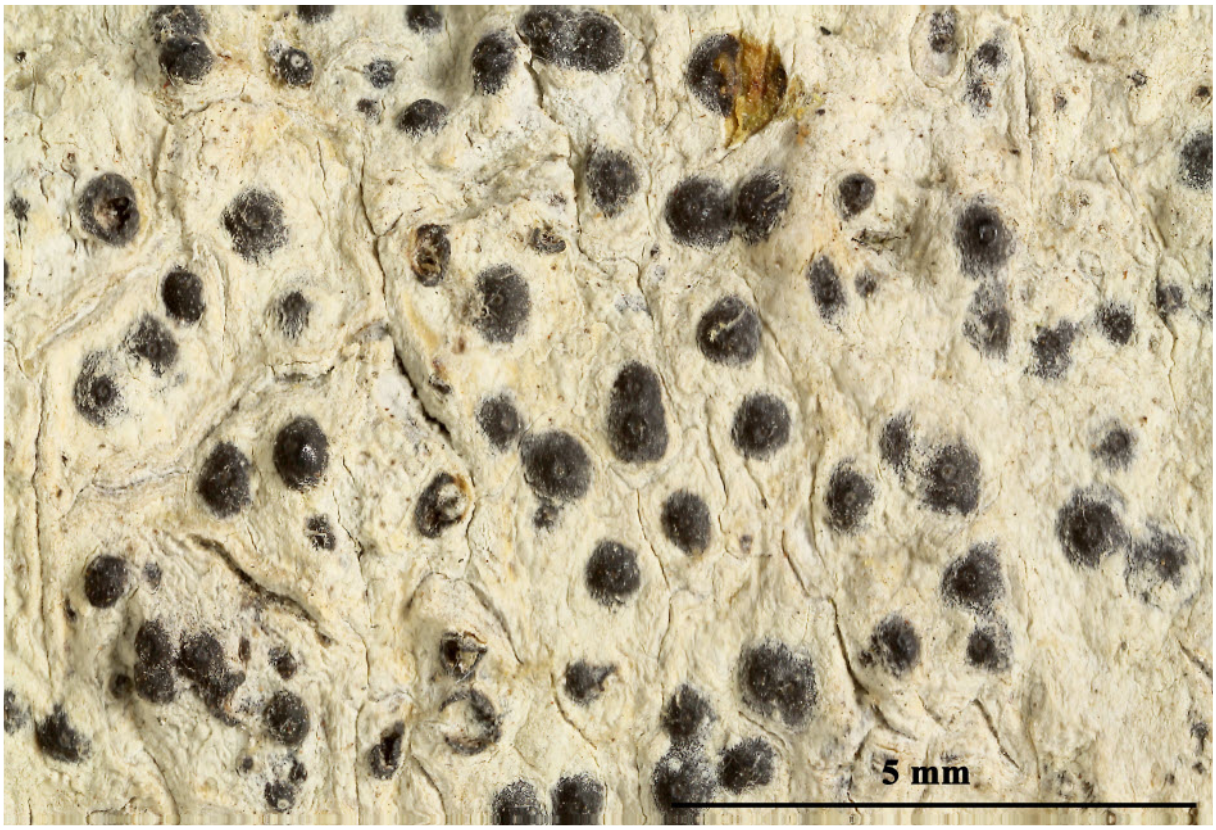


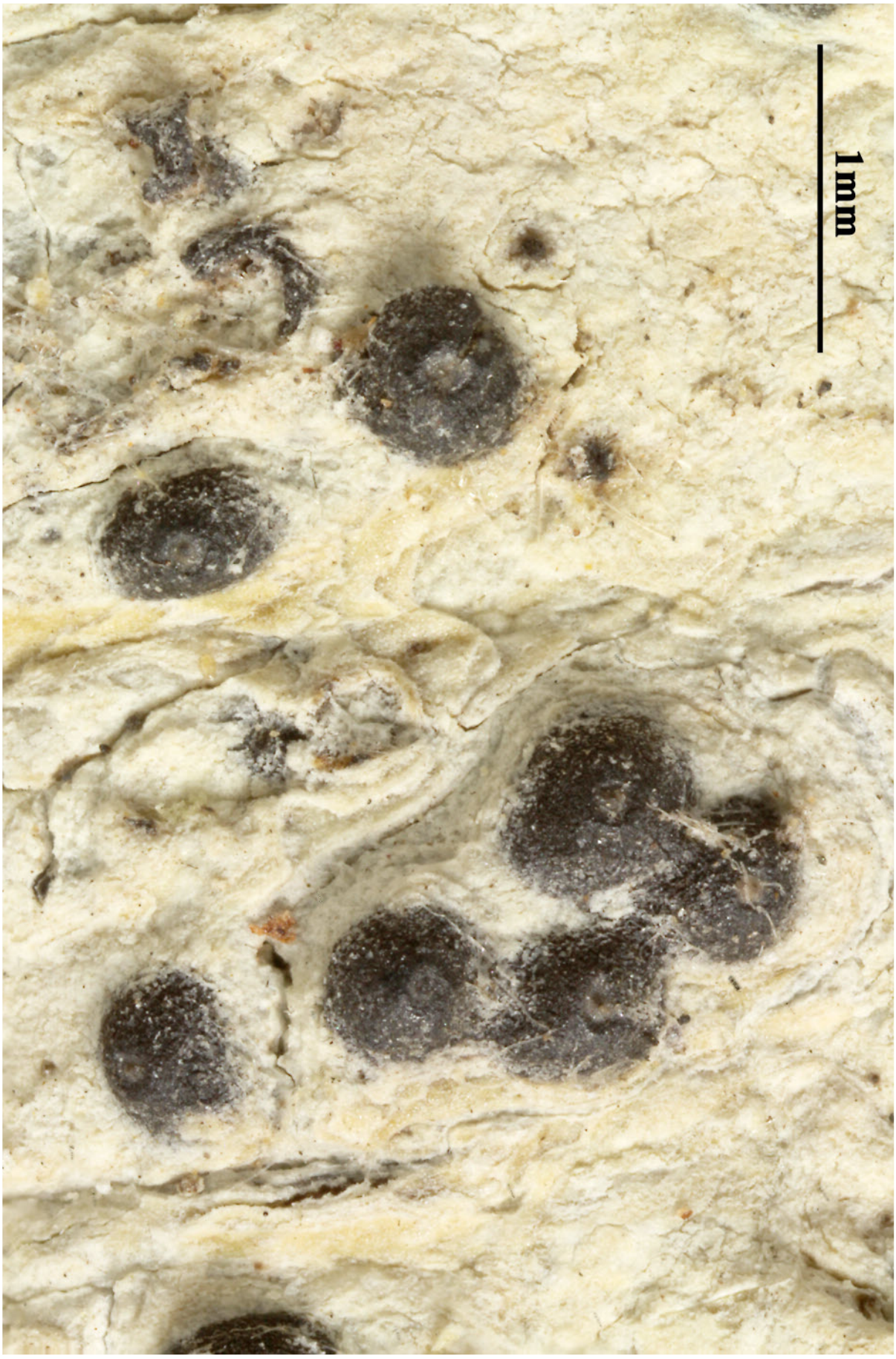
Pseudopyrenula flavoreagens

Pseudopyrenula flavosuperans Flakus & Aptroot, in Flakus, Kukwa & Aptroot, Lichenologist 48(6): 684 (2016)

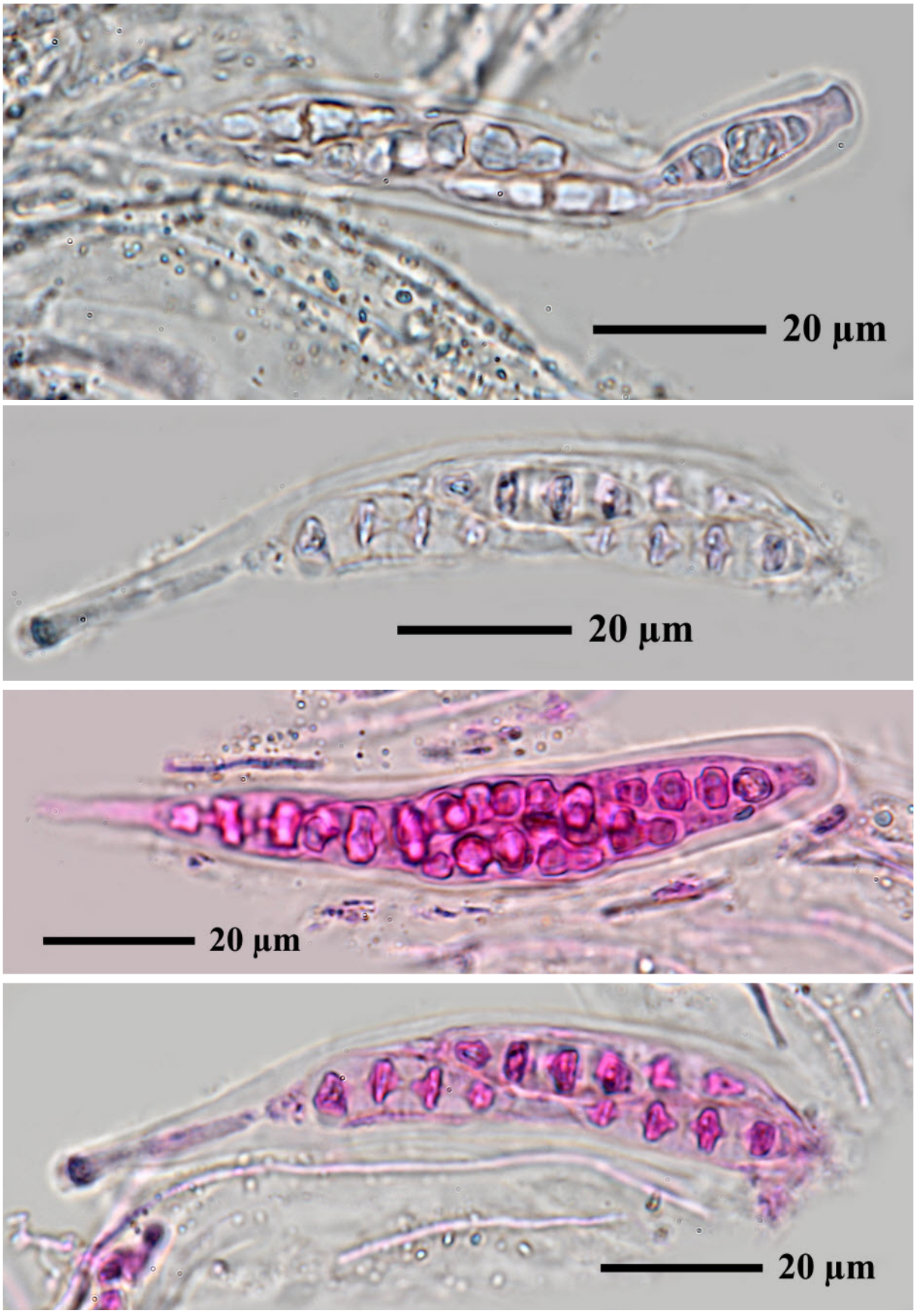
Thallus ecorticate, smooth, continuous, not inducing swellings of the host bark, covering areas ≤6 cm diam., c. 0.2mm thick, white, surrounded by a black prothallus. Algae trentepohlioid. Ascomata subglobose, 0.6–0.8 mm diam., solitary, superficial with a surface different from the thallus, ascomatal verrucae distinctly raised above the thallus, hemispherical, with sloping sides, black, often basally immersed in bark. Wall fully carbonized, not differentiated into excipulum and involucrellum, ≤ c. 100 µm wide. Ostioles apical, not fused, convex, black. Hamathecium inspersed with yellow oil globules. Asci 8-spored. Ascospores hyaline, IKI−, 3-septate, narrowly ellipsoid to fusiform, 26–36 × 7–10 µm, ends rounded, lumina diamond-shaped, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus surface UV+ yellow, thallus medulla K−; ascomata surface UV−. TLC: lichexanthone (major) detected.

[Flakus17880], Bolivia, Dept. Beni, Yacuma, RB Estatión Biológica del Beni, near la Estatión Biológica, island of lowland Amazon forest among savanna. 14°51’07” S, 66°20’23” W, 175 m. Leg. A. Flakus (no 17880) & F. Saavedra, 6.11.2010, det. A. Aptroot, 2014. PARATYPE.





Pseudopyrenula flavosuperans

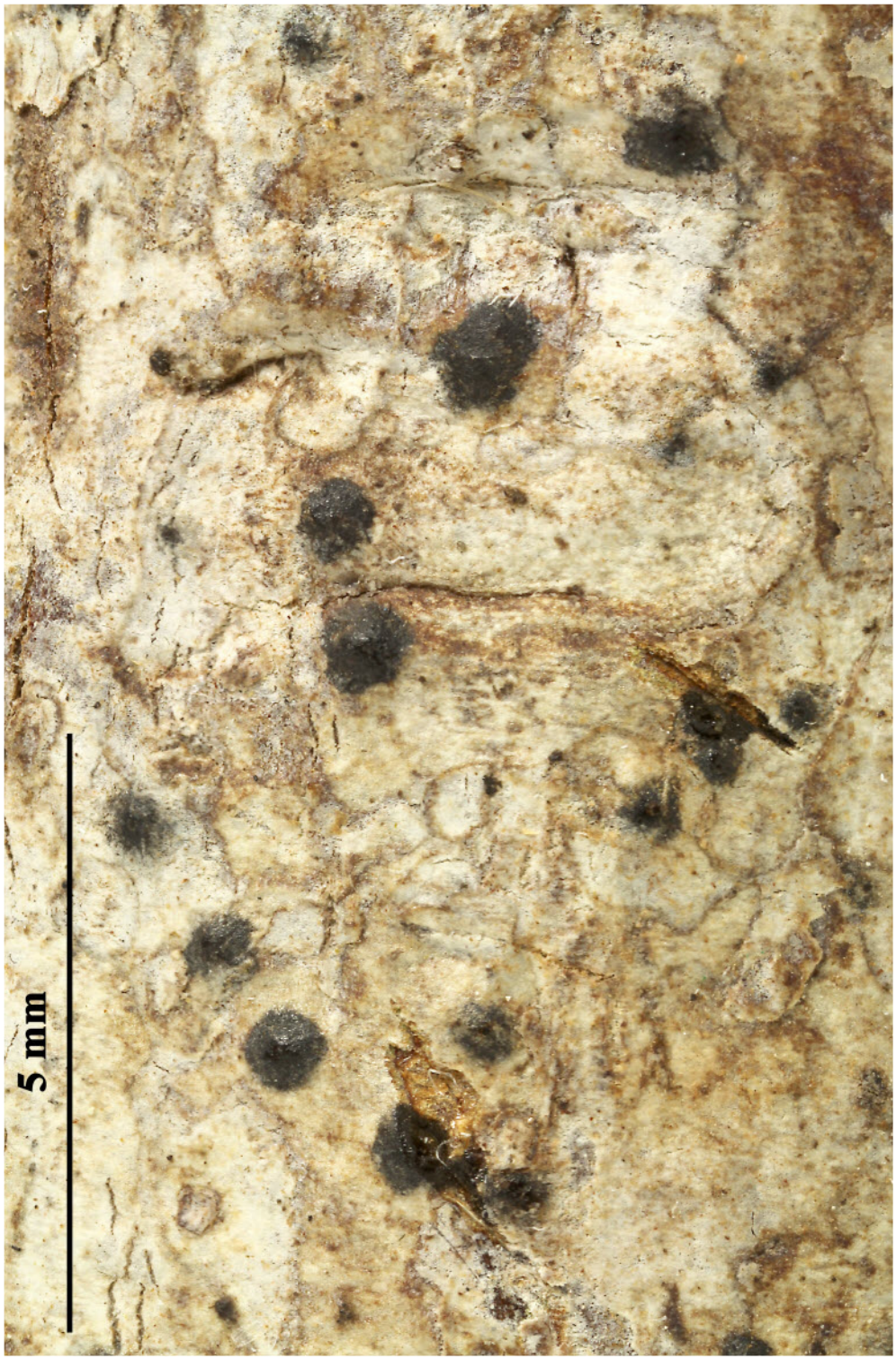


Pseudopyrenula flavosuperans

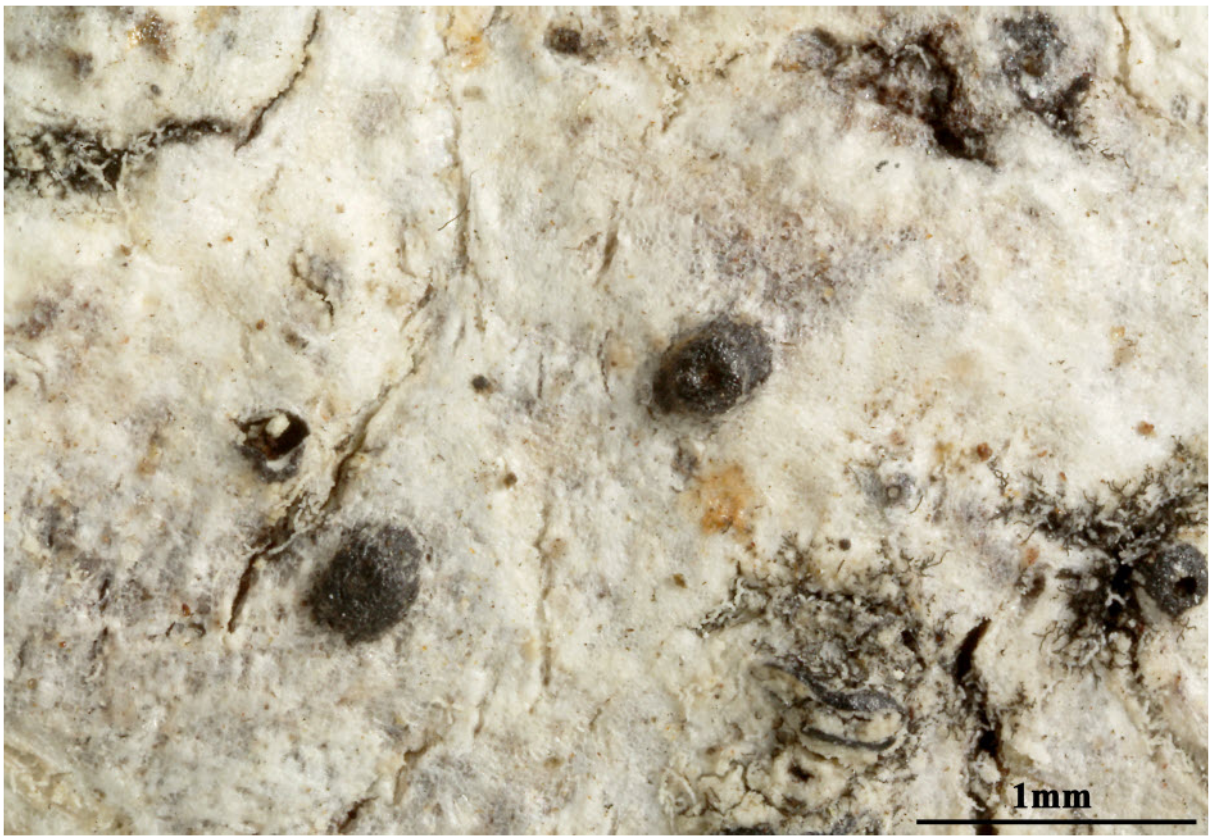
Pseudopyrenula media Aptroot & Diederich, in Diederich, Lücking, Aptroot, Sipman, Braun, Ahti & Ertz, Herzogia 30(1): 213 (2017)

Thallus not corticate. Hamathecium inspersed with yellow oil drops. Ascospores hyaline, 3-septate, 25–39 × 7.5–8.5 µm. Chemistry: thallus UV-. Similar to *Pseudopyrenula subgregaria*, but with larger ascospores.

[Diederich17951], Seychelles, Mahé, from Victoria to Port Glaud, Morne Blanc. 600-680 m, 4.65722° S, 55.43297° E. On tree twigs in a cloud forest. Leg. P. Diederich (no 17951), 30.07.2015, det. A. Aptroot,

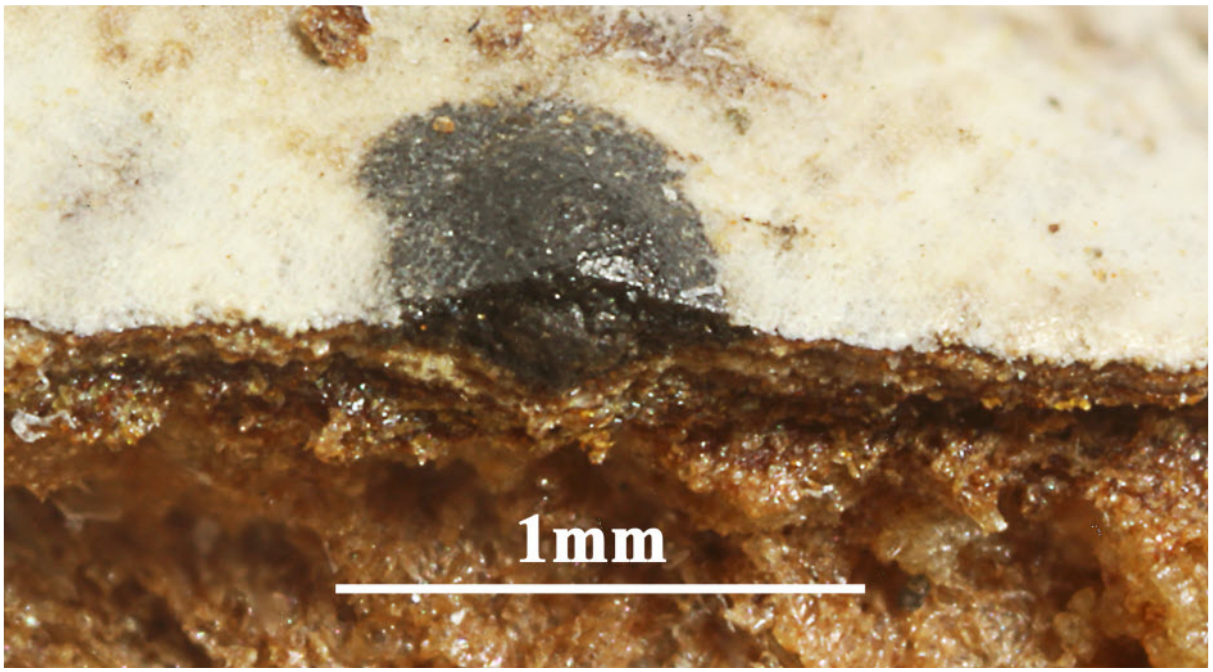




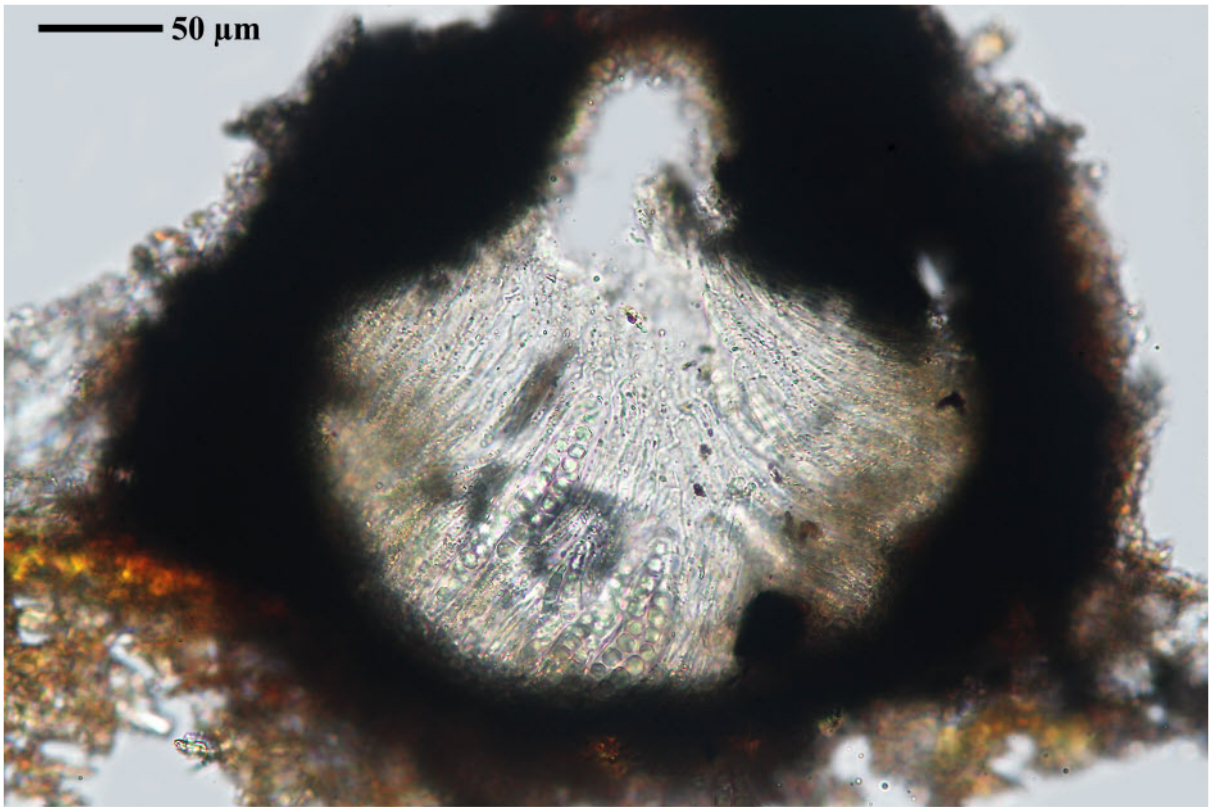


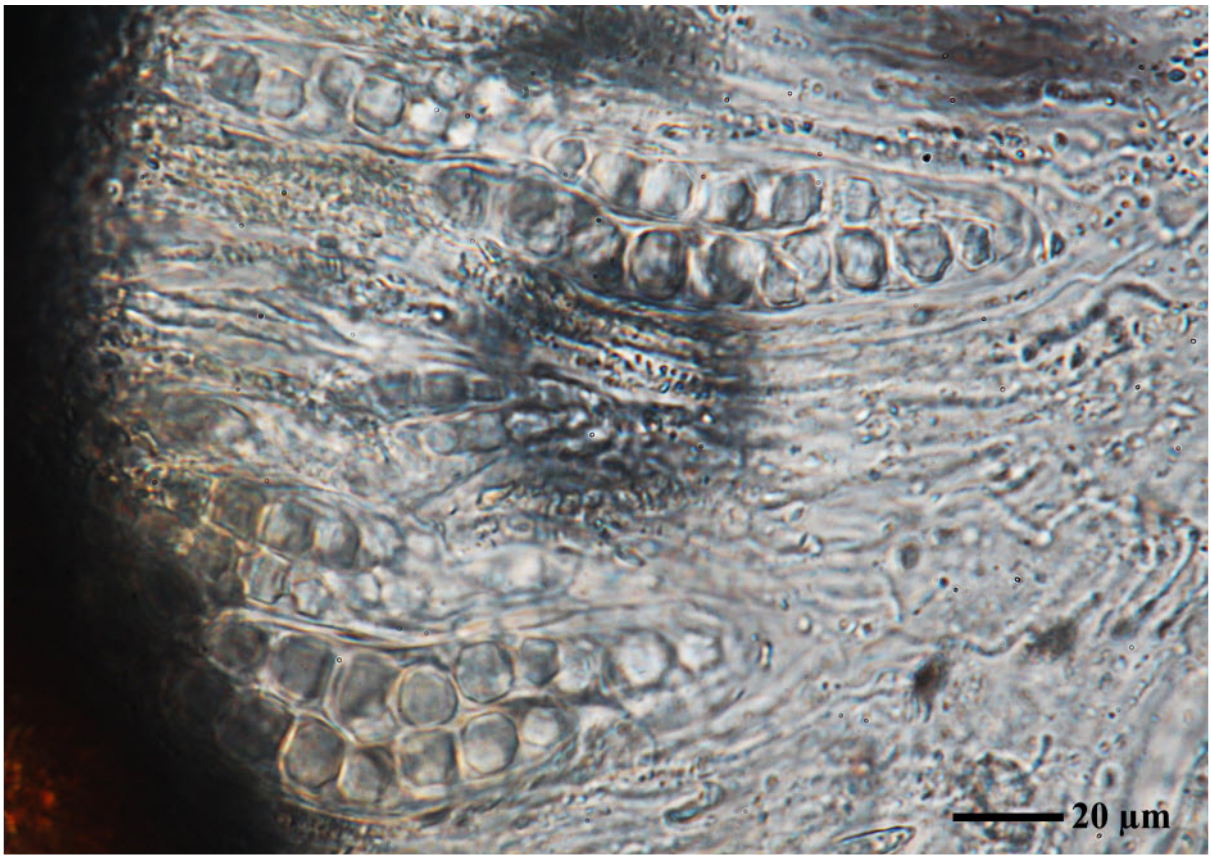
Pseudopyrenula media



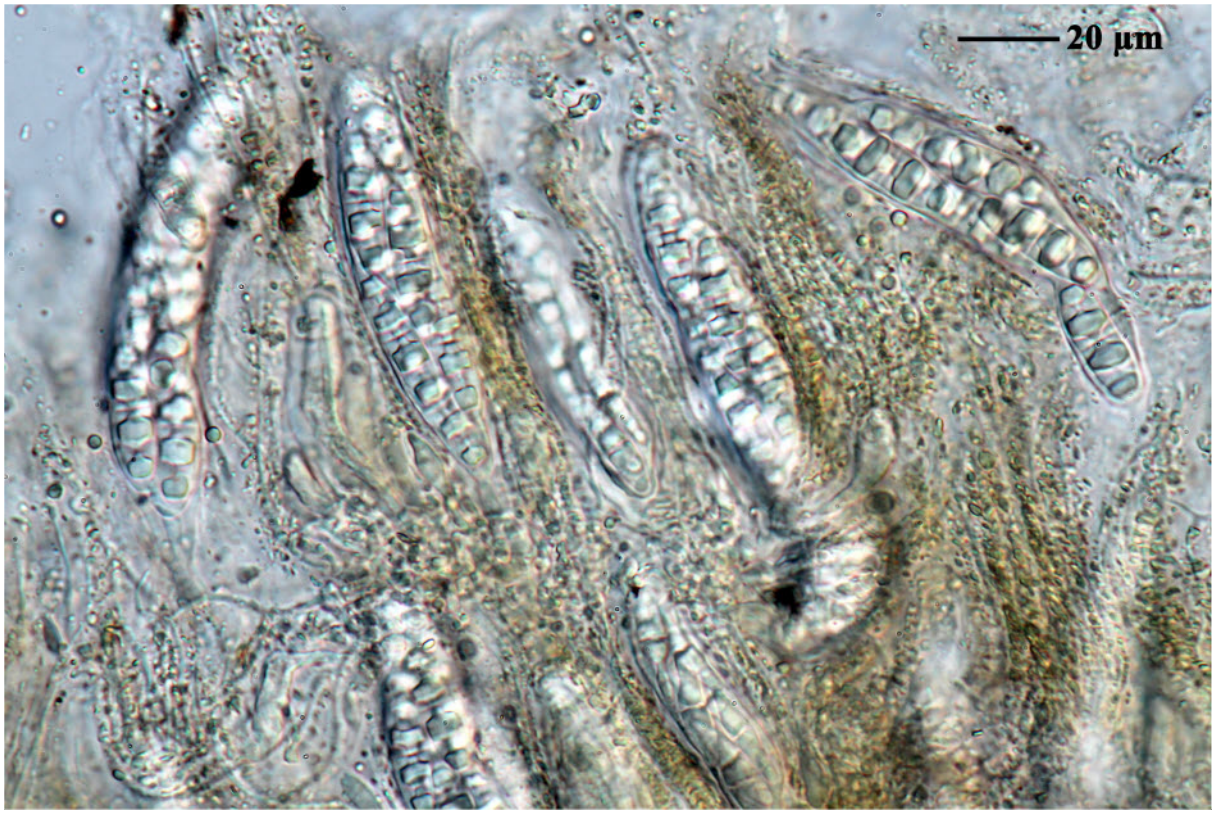


Pseudopyrenula media

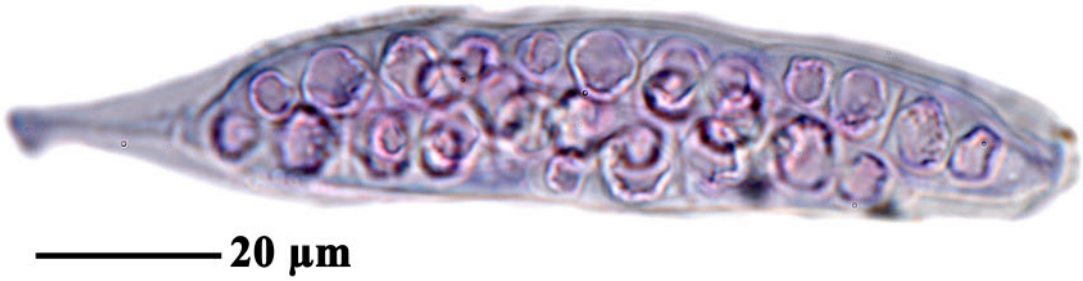




Pseudopyrenula media



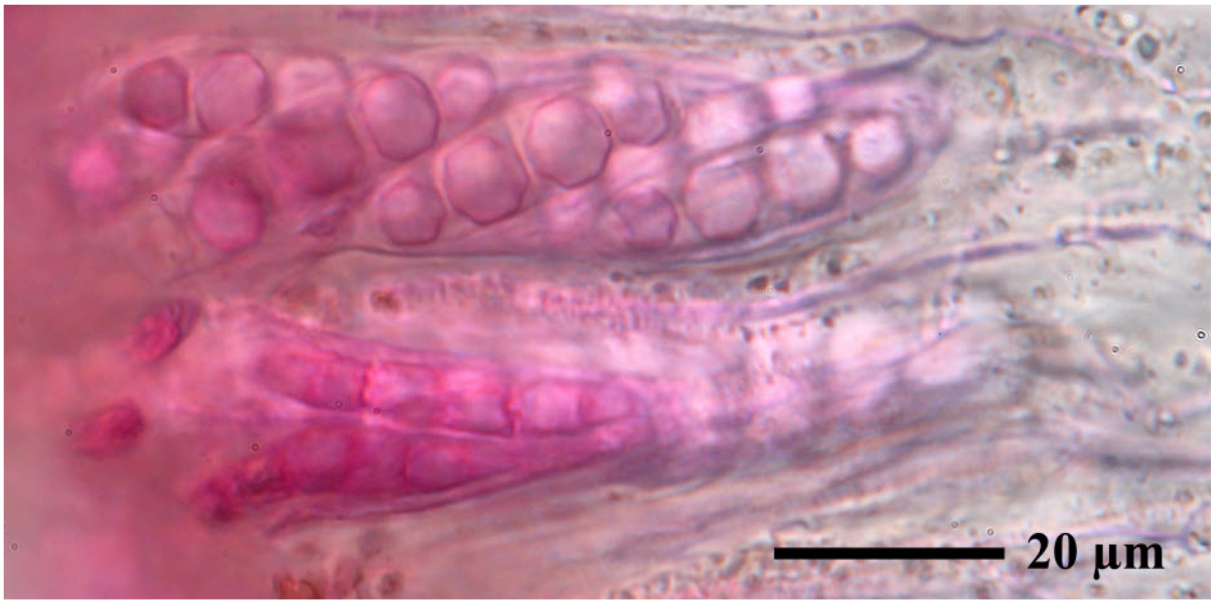


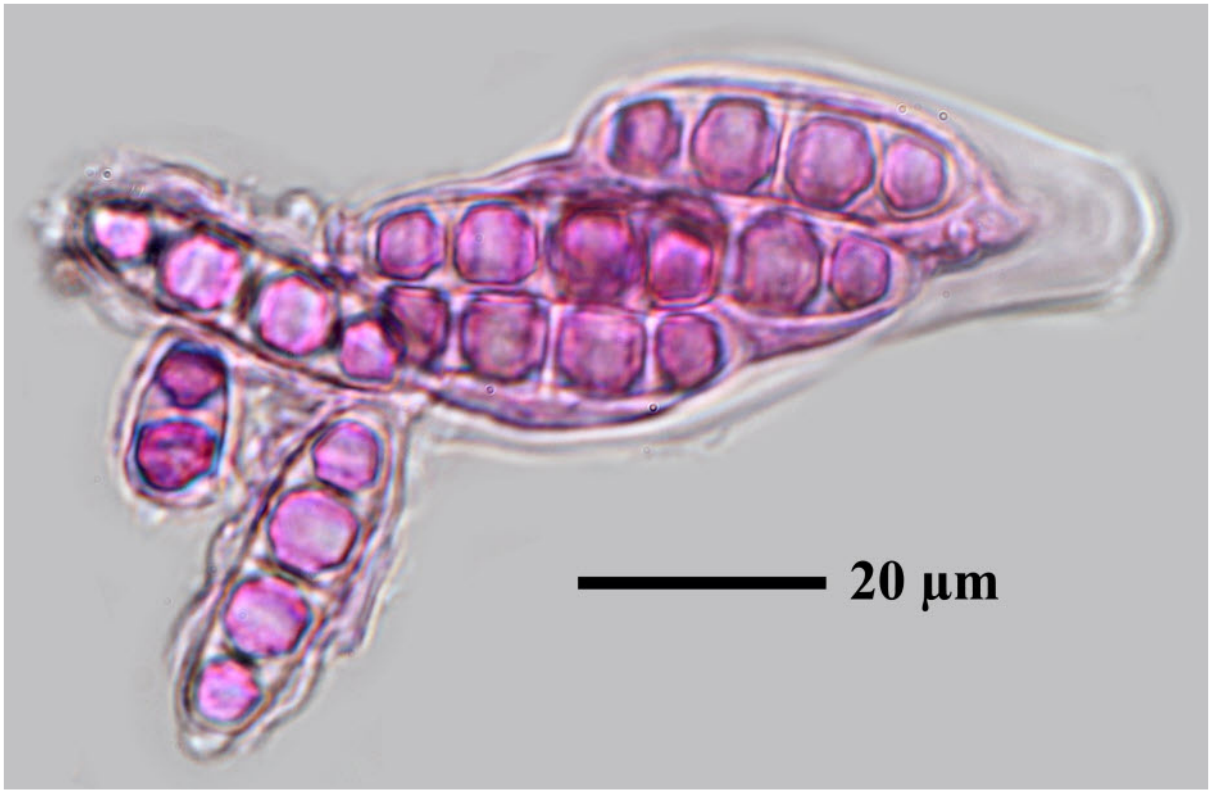


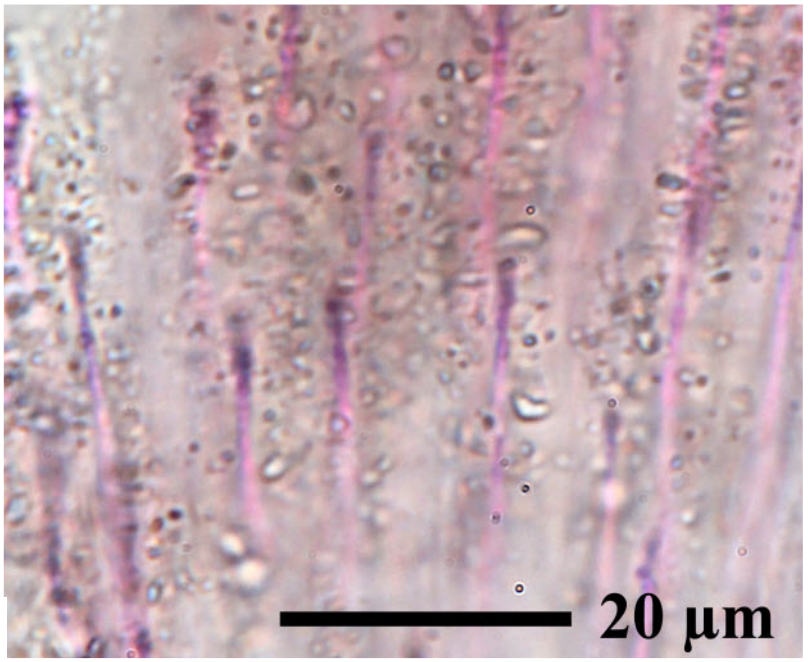
Pseudopyrenula media



Pseudopyrenula media





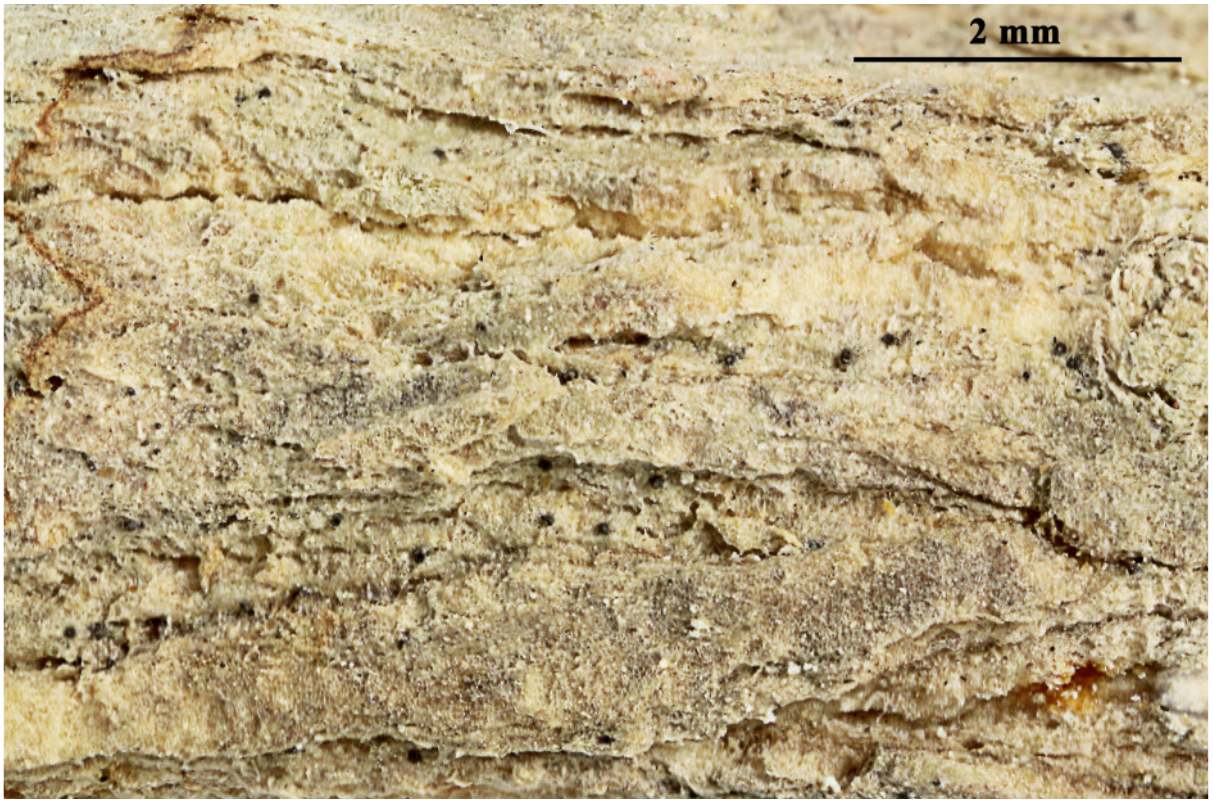


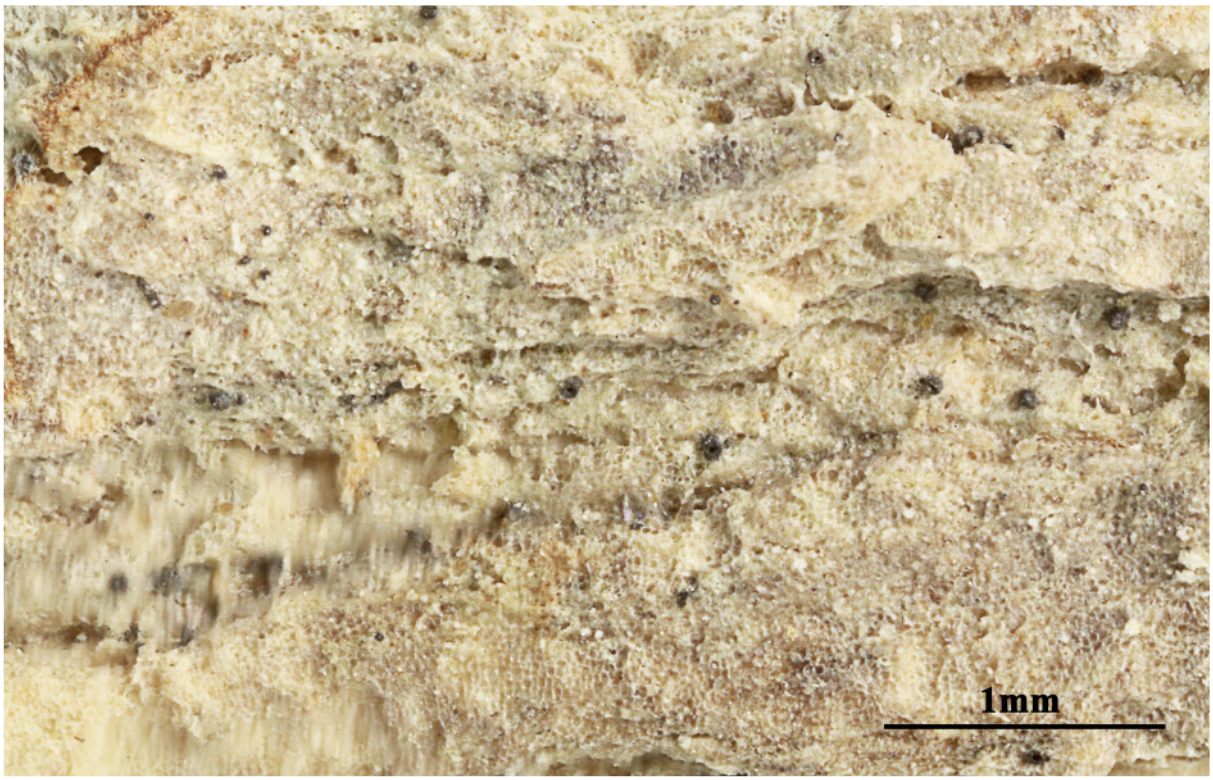
Pseudopyrenula media

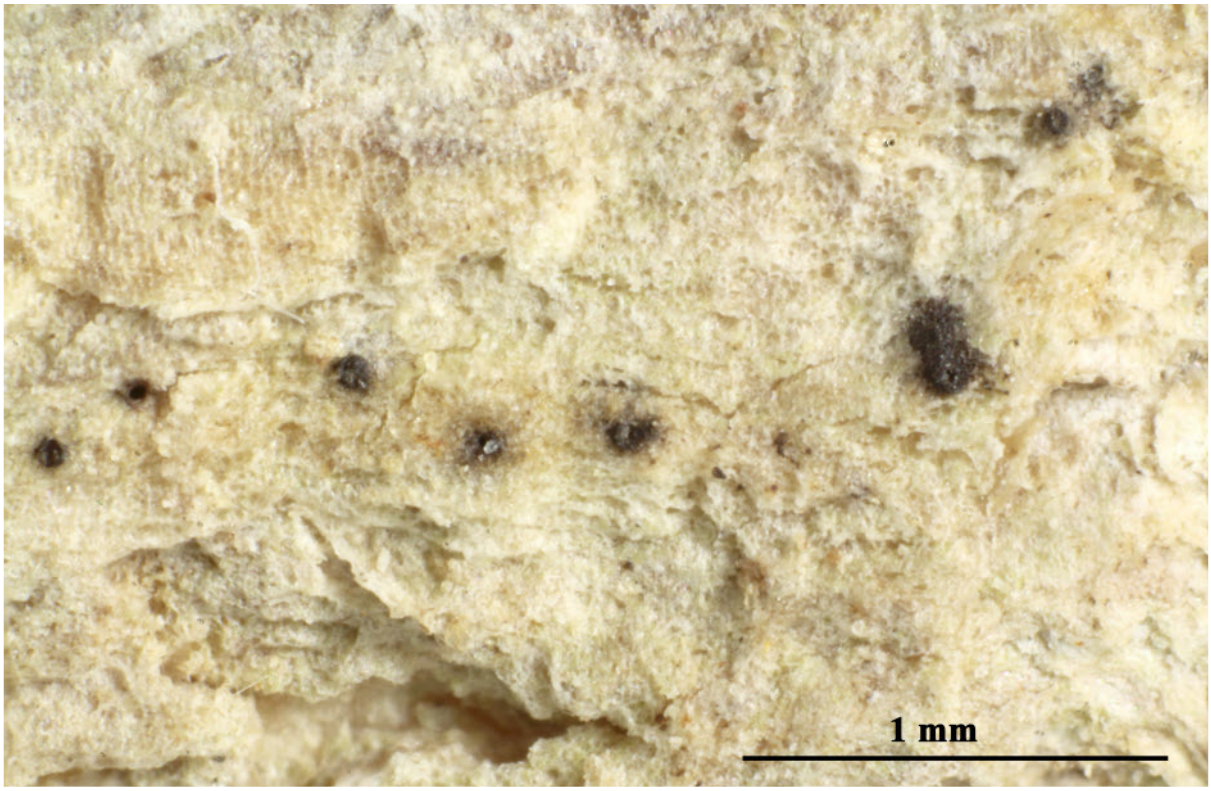
Pseudopyrenula serusiauxii Aptroot, Trop. Bryol. 14: 29 (1998)

Thallus immersed in the bark, visible as a pale greenish discoloration of the bark, covering areas up to 5 cm diam., not delimited, not corticate, with sparse Trentepohlia algae. Ascomata immersed in the bark, sphaeroid, 200–400 µm diam., wall black, c. 50 µm thick, near the ostiole up to c. 100 µm thick, incorporating remnants of a clypeus, ostiole central, flat (not conical), black, c. 0.2 mm diam. All internal structures hyaline. Hamathecium consisting of anastomosing trabeculate pseudoparaphyses, not inspersed, filaments c. 1.5 µm wide. Ascospores 8/ascus, fusiform, 3-septate, 30–39 × 6–8 µm, with angular, diamond-shaped lumina and up to 4 µm thickened distosepta. Chemistry: all reactions negative, no substances detected with TLC.

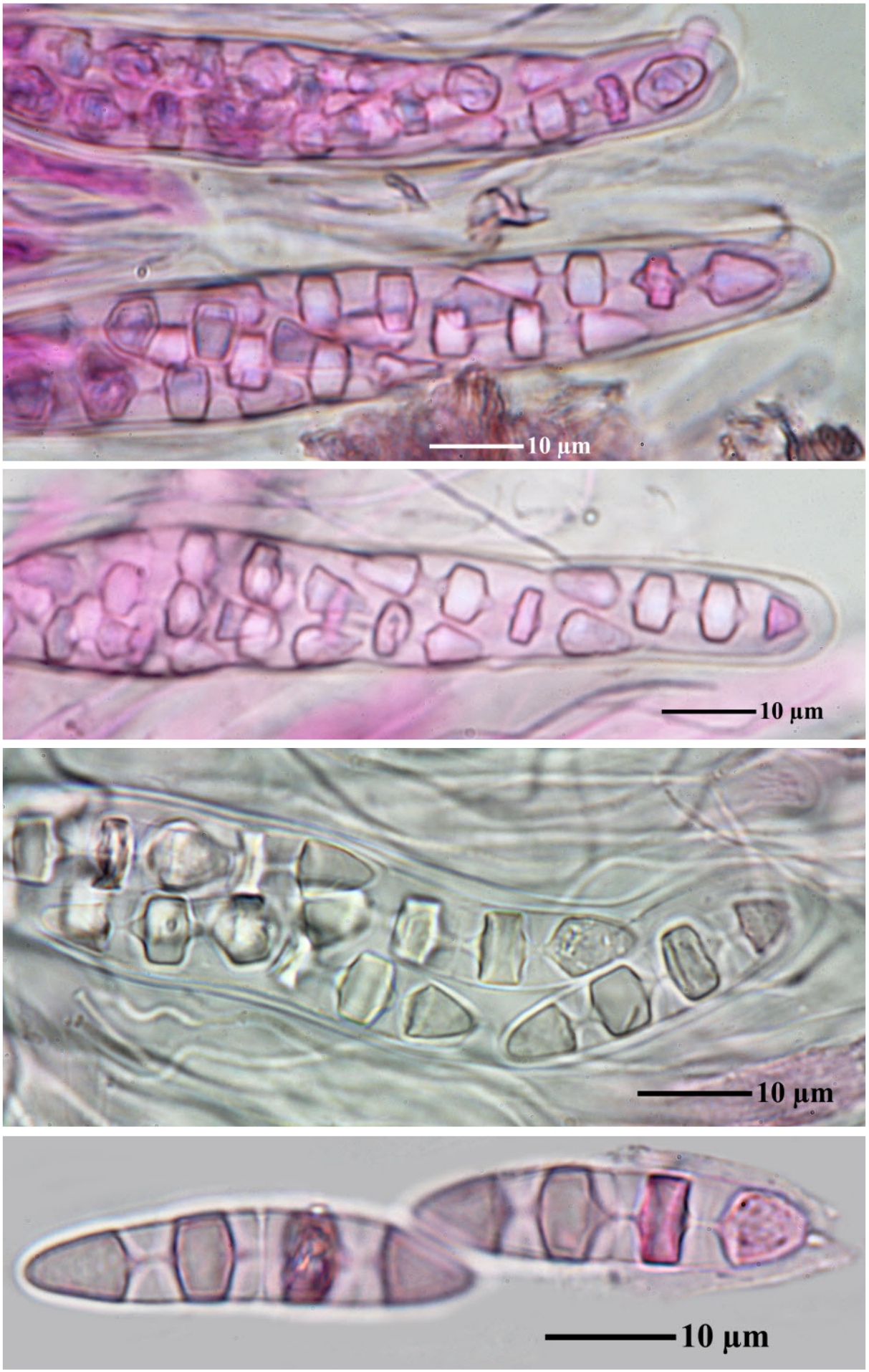
[ABL36864], Papua New Guinea, Madang Province, Balek Wildlife Sanctuary, c. 15 km S of Madang, along road to Lae. 5º18' S, 145º43' E. c. 20 m. On Macaranga (Euphorbiaceae) tree trunks in forest relics in secondary forest. Leg. A. Aptroot (no 36864), 3.11.1995, det. A. Aptroot, 1996. ISOTYPE.







Pseudopyrenula serusiauxii



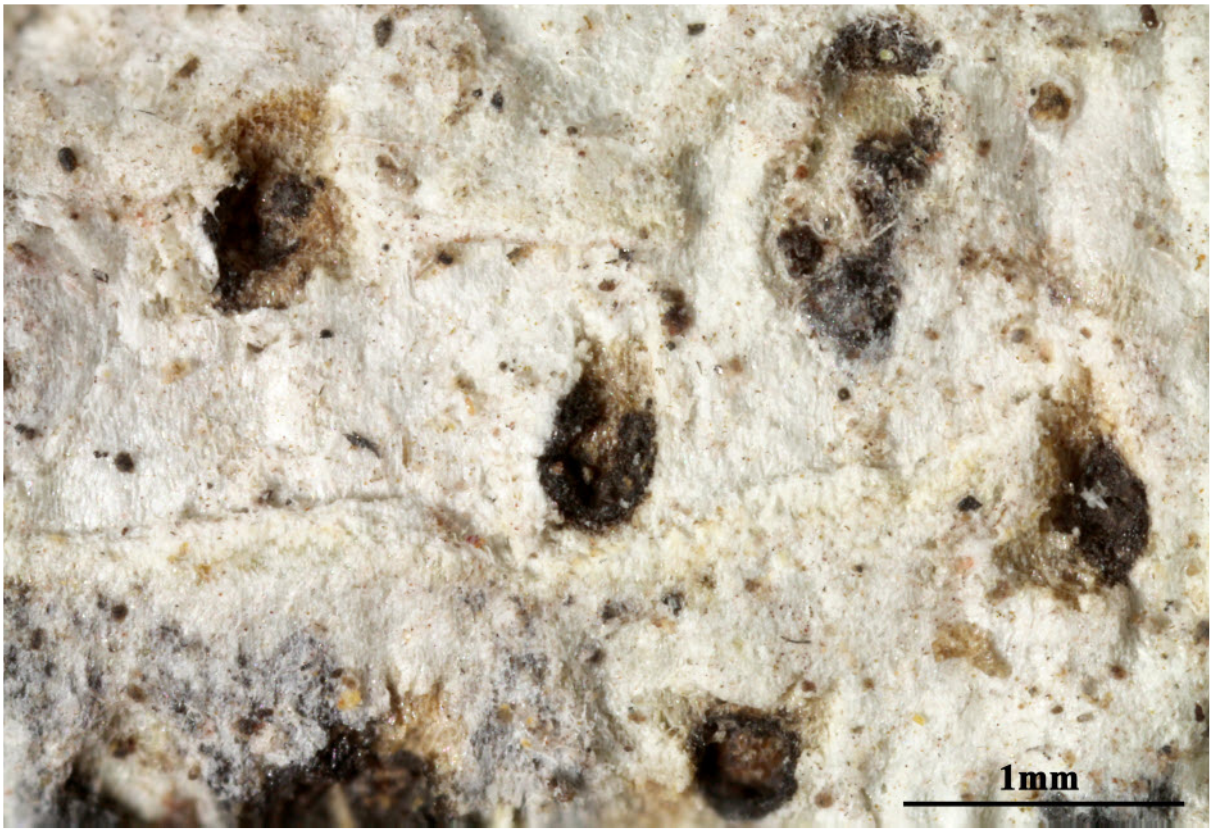
Pseudopyrenula serusiauxii

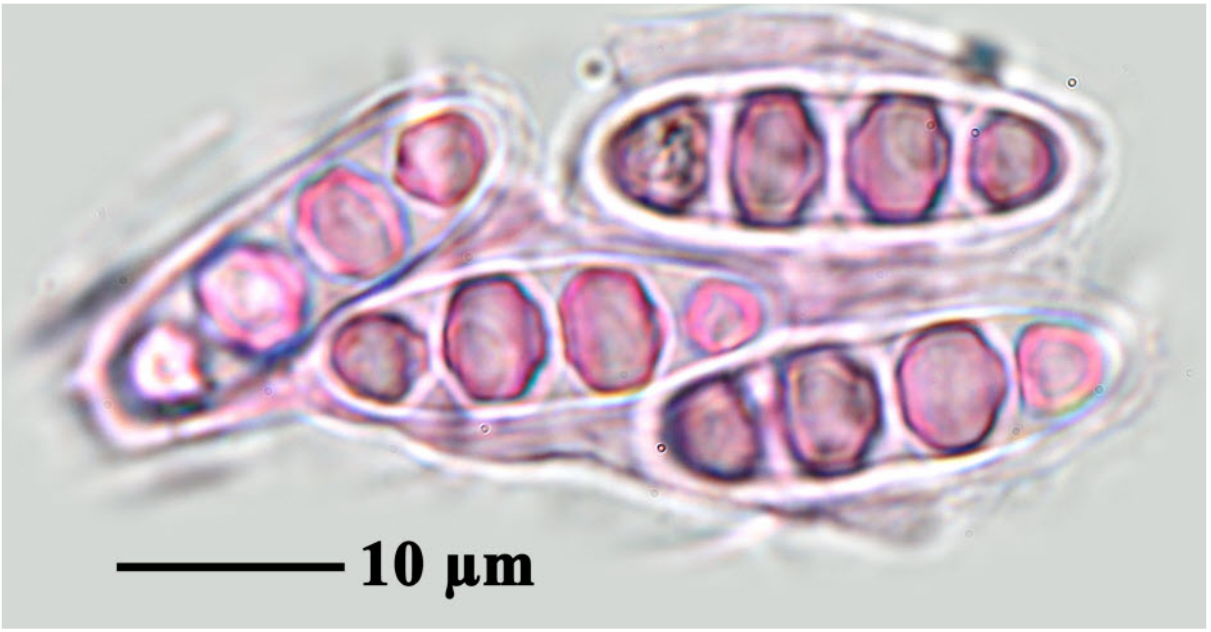
Pseudopyrenula subgregaria Müll. Arg., Bot. Jb. 6: 408 (1885)

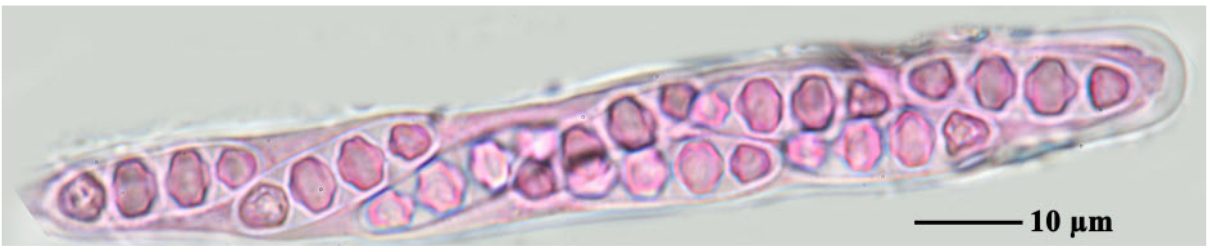
Thallus ecorticate, white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.3–0.4 mm diam., prominent, hemispherical, exposed an black. Hamathecium yellow inspersed. Ascospores 8/ascus,3-septate, fusiform-ellipsoid, 21–25 × 6–9 µm, hyaline, IKI-, not ornamented. Chemistry: Thallus and ascomata UV-, K-; hamathecium K+ deep yellow to reddish, with yellow anthraquinone.

[ABL15028], Brazil, Sergipe, Parque fos Falcões, just E of Itabaiana, 400 m, 10°44’50’’ S, 37°22’39’’ W, on tree bark in transitional forest. Leg. M. Cáceres & A. Aptroot (no 15028), 11.11.2012, det A. Aptroot,





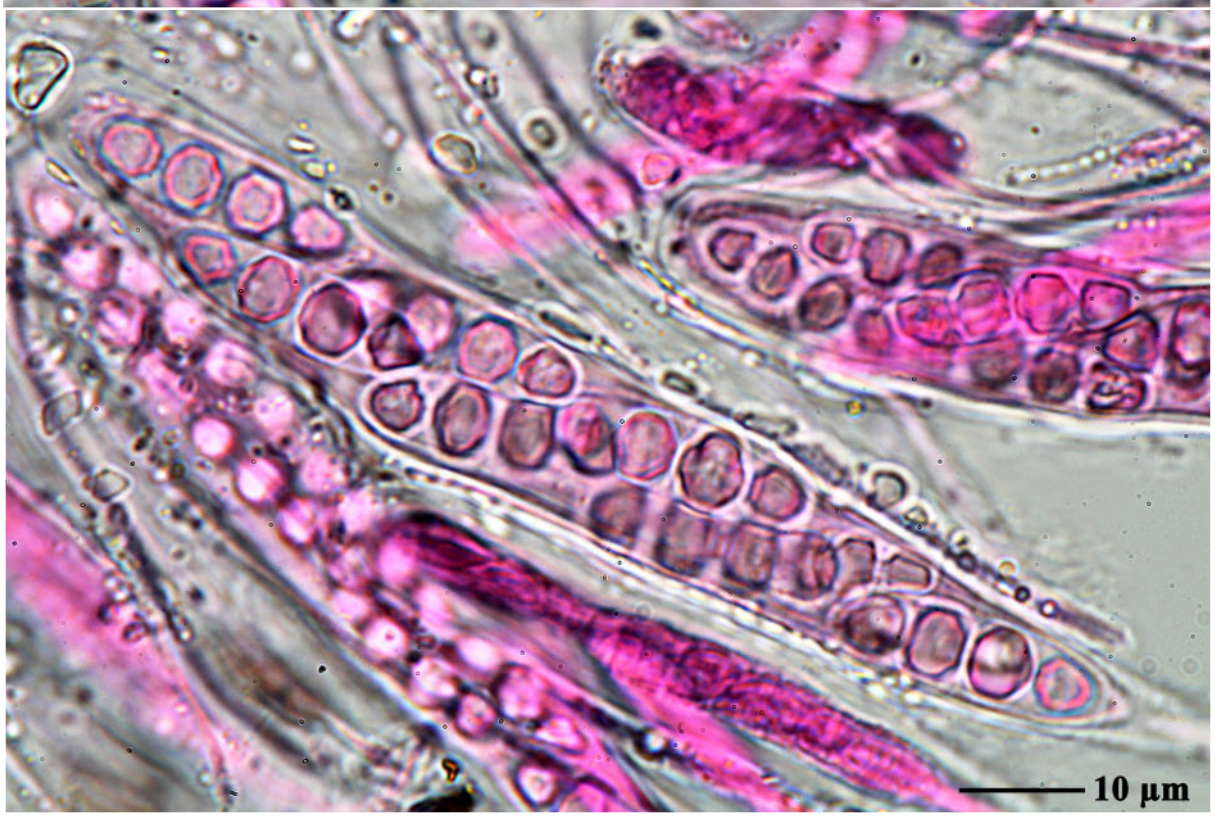




Pseudopyrenula subgregaria





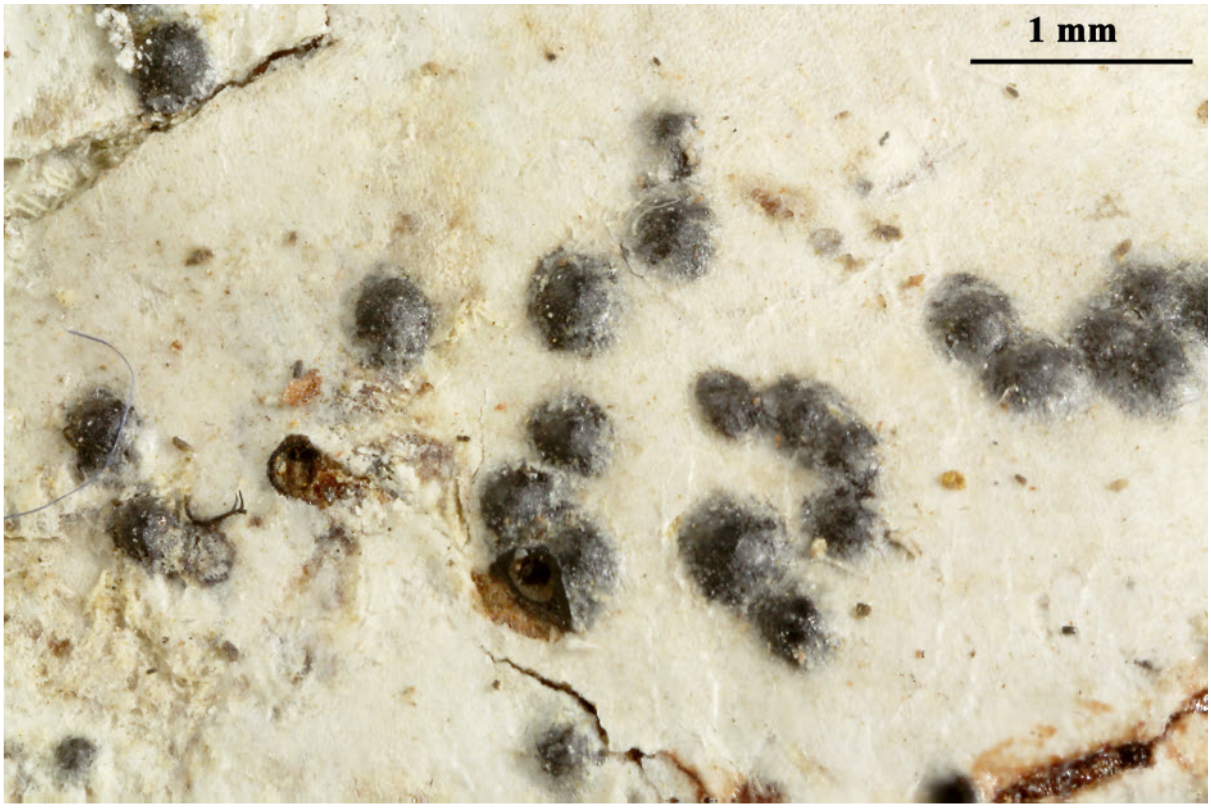


Pseudopyrenula subgregaria

Pseudopyrenula subgregaria Müll. Arg., Bot. Jb. 6: 408 (1885)

Thallus ecorticate, white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.3–0.4 mm diam., prominent, hemispherical, exposed and black. Hamathecium yellow inspersed. Ascospores 8 per ascus, 3-septate, fusiform-ellipsoid, 21–25 × 6–9 μm, hyaline but sometimes lumina with yellow oil, IKI−, not ornamented. Chemistry: Thallus and ascomata UV−, K−; hamathecium K+ deep yellow to reddish, with yellow anthraquinone.

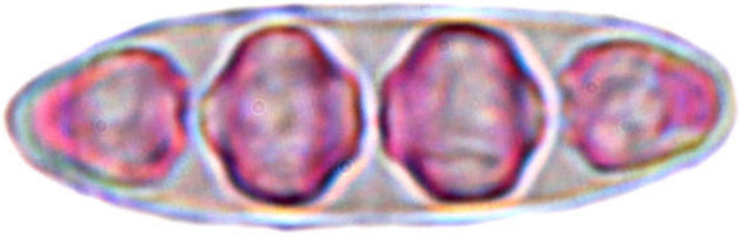
[ABL60912], Costa Rica, Prov. Guanacaste, Tropica Verde Reforestation, near Honjancha, 15 km SSE of Nicoya, 85°23' W, 10°01' N, 850 m. On exposed tree along road. Leg. A. Aptroot (no 60912), 22.03.2004, det. A. Aptroot, 2004.





Pseudopyrenula subgregaria





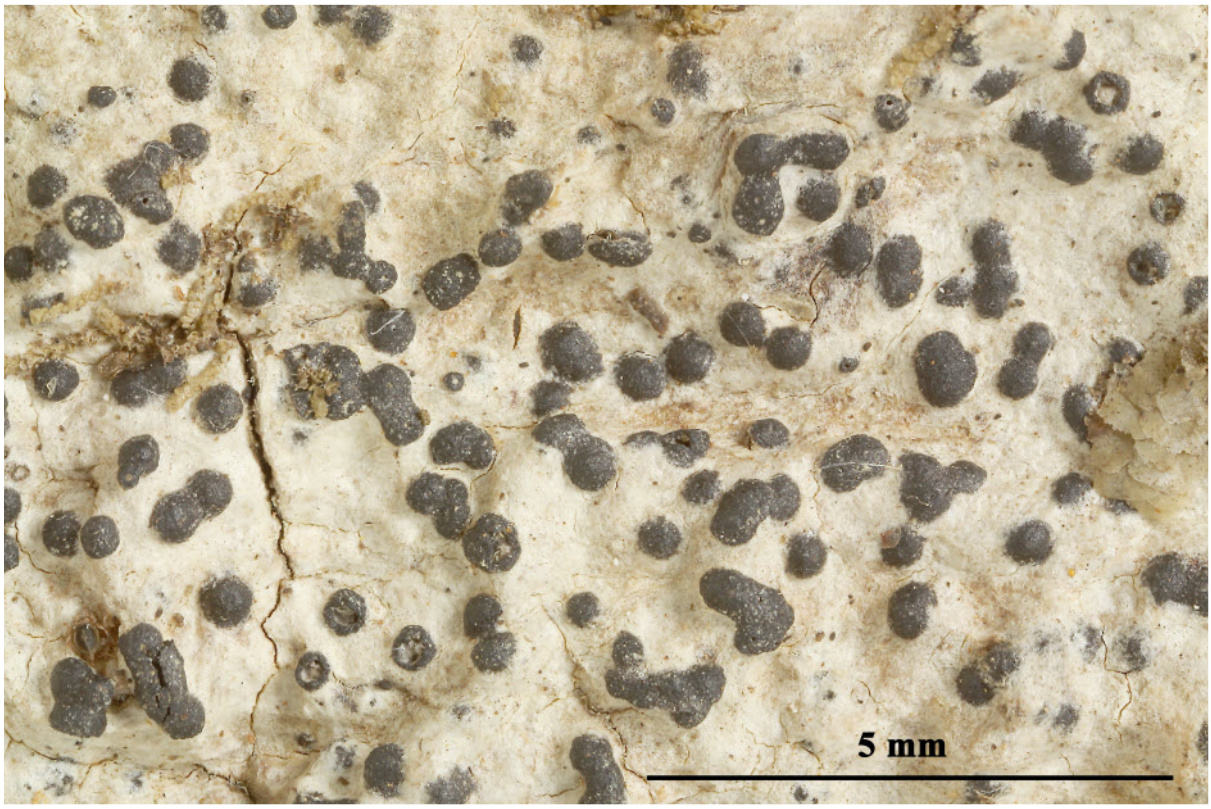
10 µm

Pseudopyrenula subgregaria

Pseudopyrenula subnudata Müll. Arg., Flora, Regensburg 66(16): 249, 272 (1883)
= *Pseudopyrenula flavicans* Müll. Arg., Bot. Jahrb. Syst. 6: 408 (1885)
= *Pseudopyrenula elliptica* Müll. Arg., Bot. Jahrb. Syst. 6: 409 (1885)
= *Pseudopyrenula araucariae* Vain., Acta Soc. Fauna Fl. Fenn. 7(2): 212 (1890)
= *Arthopyrenia minutissima* Vain., Acta Soc. Fauna Fl. Fenn. 7(2): 234 (1890)
= *Pseudopyrenula diluta* var. *degenerans* Vain., in Schmidt, Bot. Tidsskr. 29: 148 (1909)
= *Pseudopyrenula confluens* G. Merr. ex Hedrick, Mycologia 22: 247 (1930)
= *Pyrenula hagmannii* Redinger, Hedwigia 73: 56 (1933)
= *Pseudopyrenula limitata* Szatala, Ann Mus. Nat. Hungar. n.s. 7: 17 (1956)

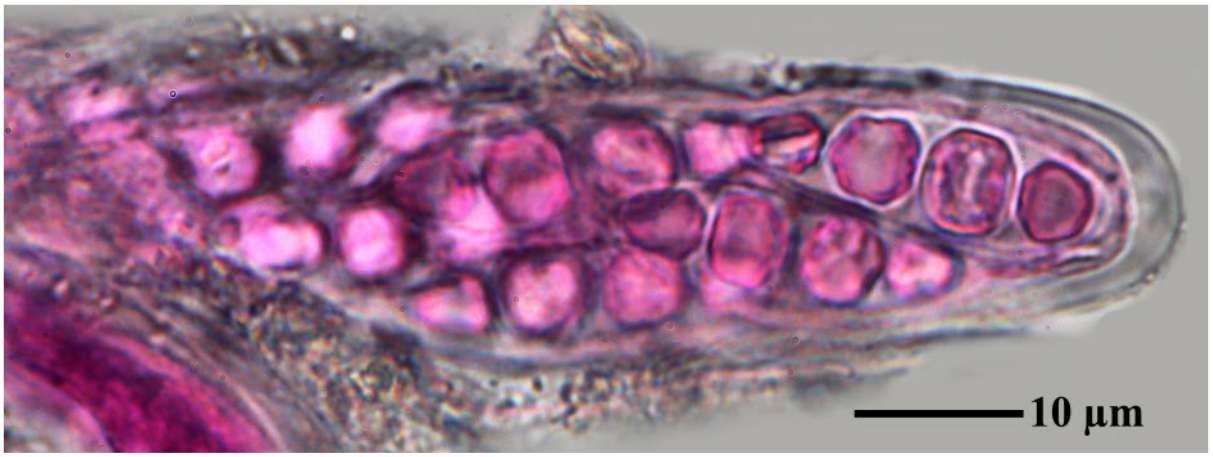
Thallus ecorticate, white, smooth to uneven. Ascomata with apical ostioles, solitary, 0.2–0.4 mm diam., prominent, hemispherical, exposed and black. Hamathecium inspersed, hyaline. Ascospores 8 per ascus, 3-septate, fusiform-ellipsoid, 21–25 × 6–9 µm, hyaline but sometimes lumina with yellow oil, IKI−, not ornamented. Chemistry. Thallus and ascomata UV−, K−. TLC: no substances detected.

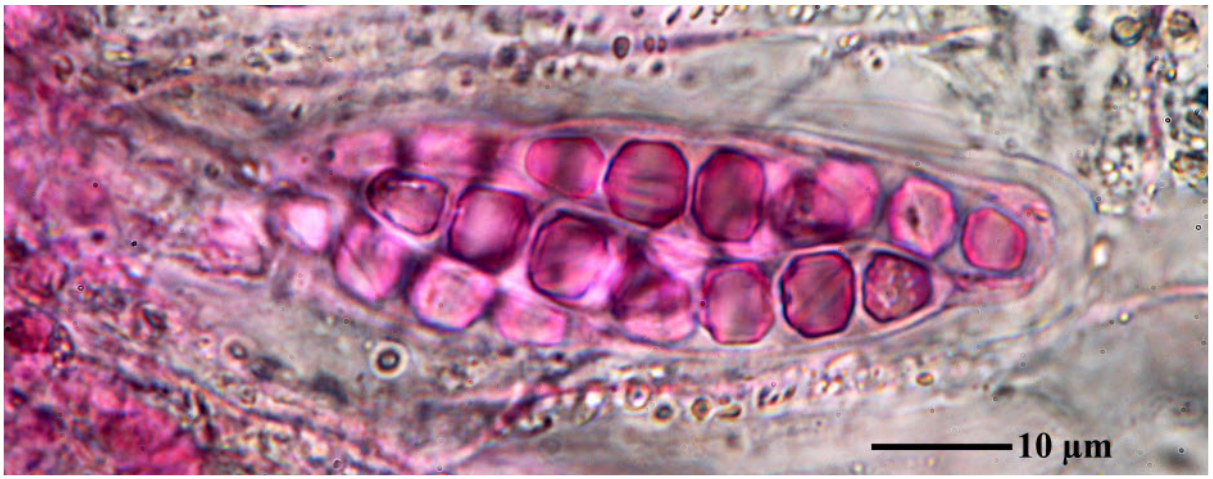
[ABL18321], Guyana, Upper Mazaroni District, Jawalla village, at the confluence of Kukui river and Mazaroni river, cultivated, well-lit area near the village. On Persea. 5°40'N, 60°29' W, 500 m. Leg. H. Sipman & A. Aptroot (no 18321), 6.2.1985, det. A. Aptroot, 1990.

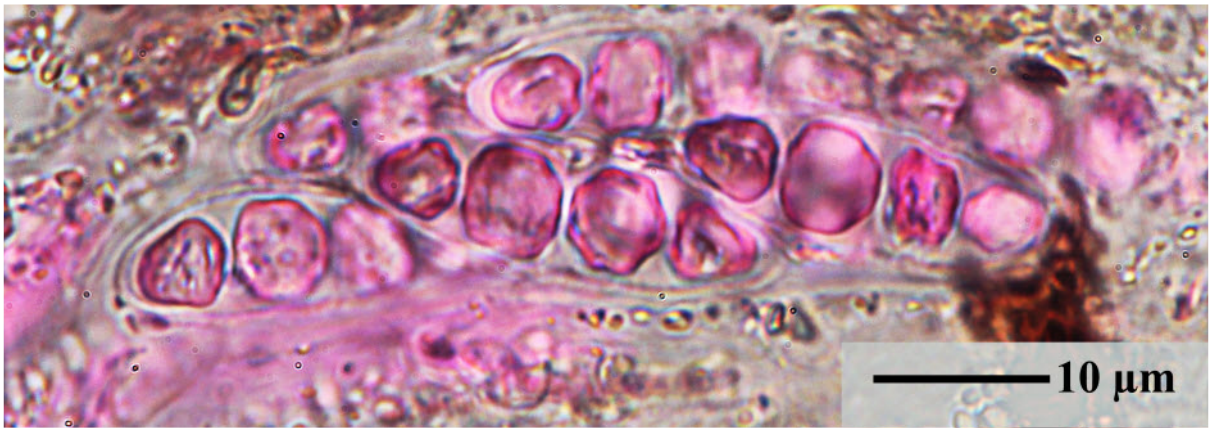


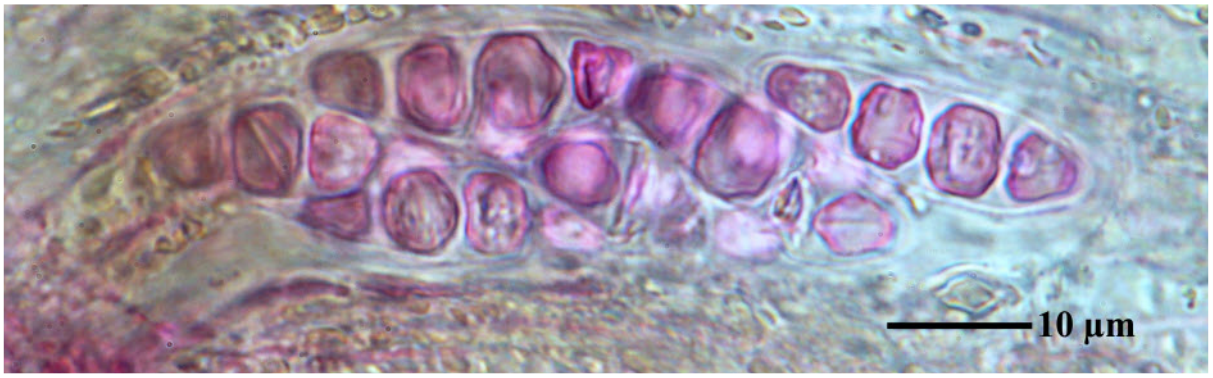


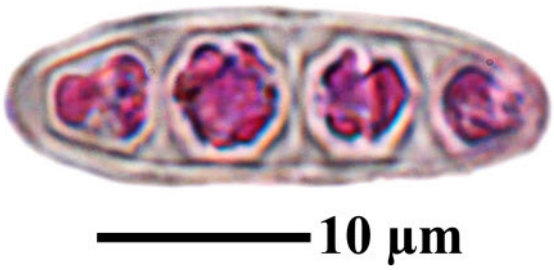
Pseudopyrenula subnudata









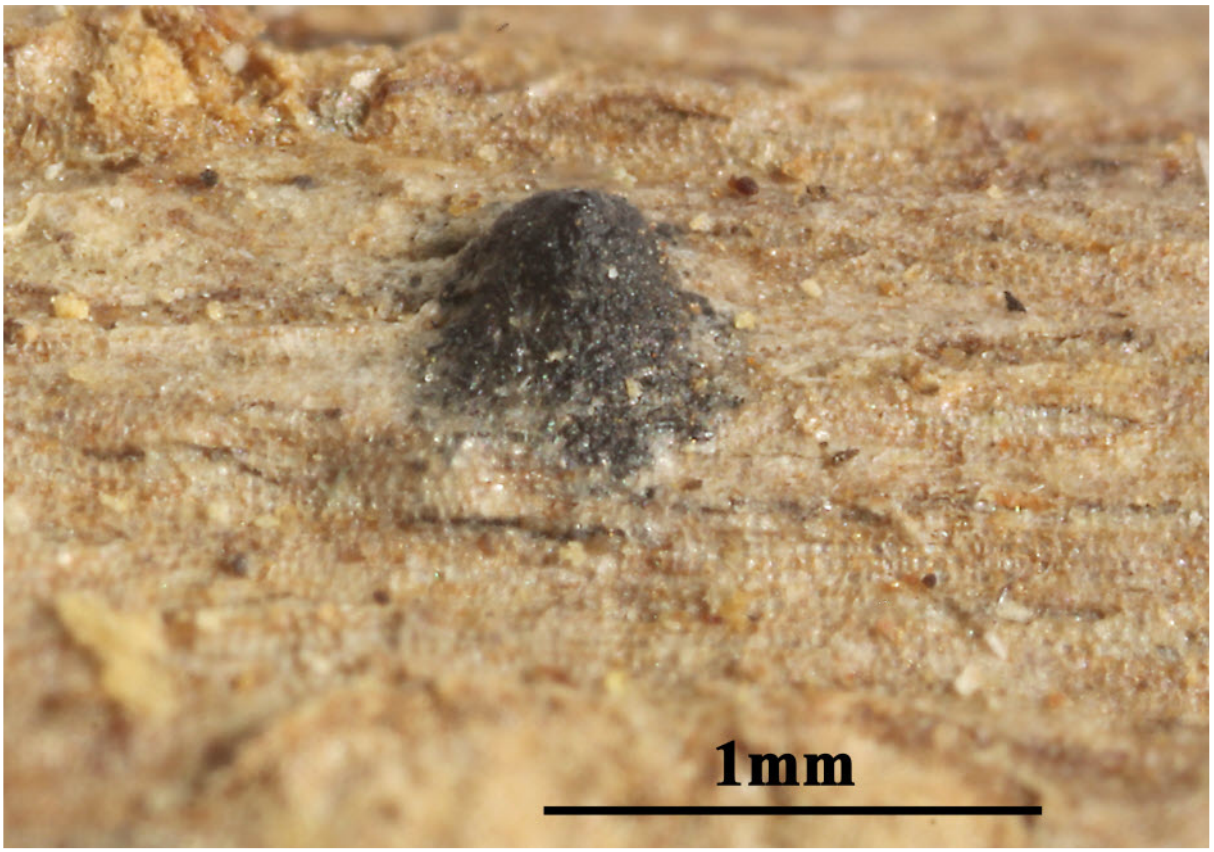


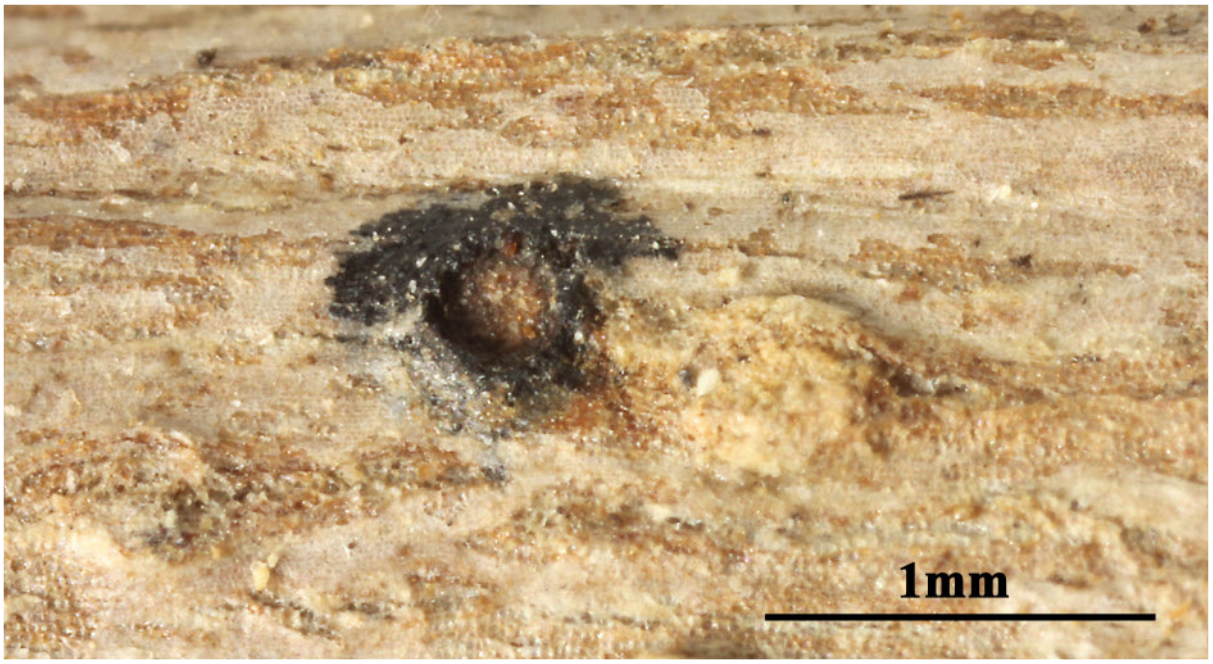
Pseudopyrenula subnudata

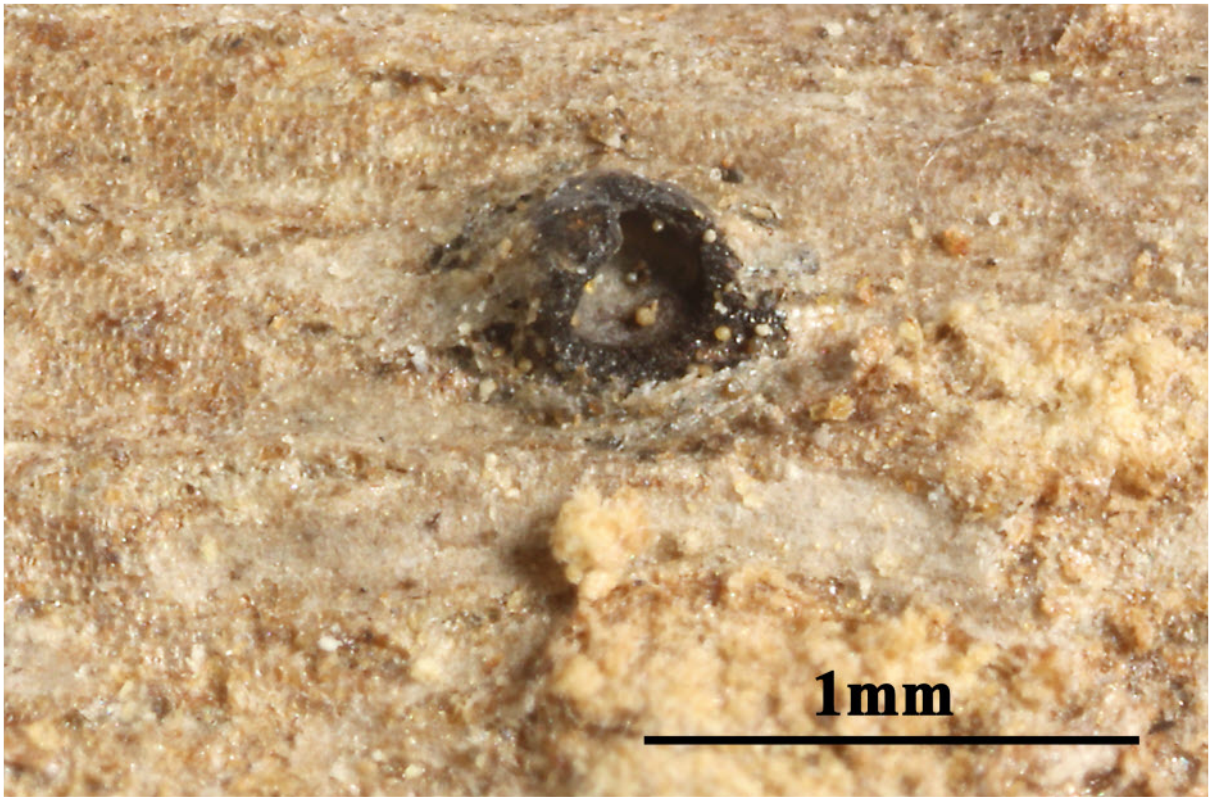
Pseudopyrenula papuana Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 64: 148 (1997)

Thallus absent to endophloeodic, very thin, smooth, greenish, up to 5 cm wide, without prothallus; photobiont absent. Perithecia superficial, conical, dull, black, 0.8–1.6 mm wide, 0.8–1.2 mm high. Wall entire, carbonized, 60–100 mm thick, clypeus extending downward into the bark; ostiole black, shiny, apical, conical, apiculate to nearly pointed, up to 200 µm wide. Hamathecium not inspersed, colourless. Paraphysoids anastomosing, c. 1 µm wide. Ascus 110–180 × 10–13 µm, I-, tip with double ring. Ascospores 5–8/ascus, uniseriate, hyaline, broadly fusiform, distoseptate, 3-septate, with diamond-like lumina, 25–29 × 7–9 µm.

[ABL30754], Papua New Guinea, Madang prov., Bubura logging site, 30 km NNW of Madang, 13 km along road from the coast, virgin rainforest on low hills, on bark of tree. 145°38’ E, 4°50’ S,70 m. Leg. A. Aptroot (no 30754), 28.07.1992, det. A. Aptroot, 1993. PARATYPE.

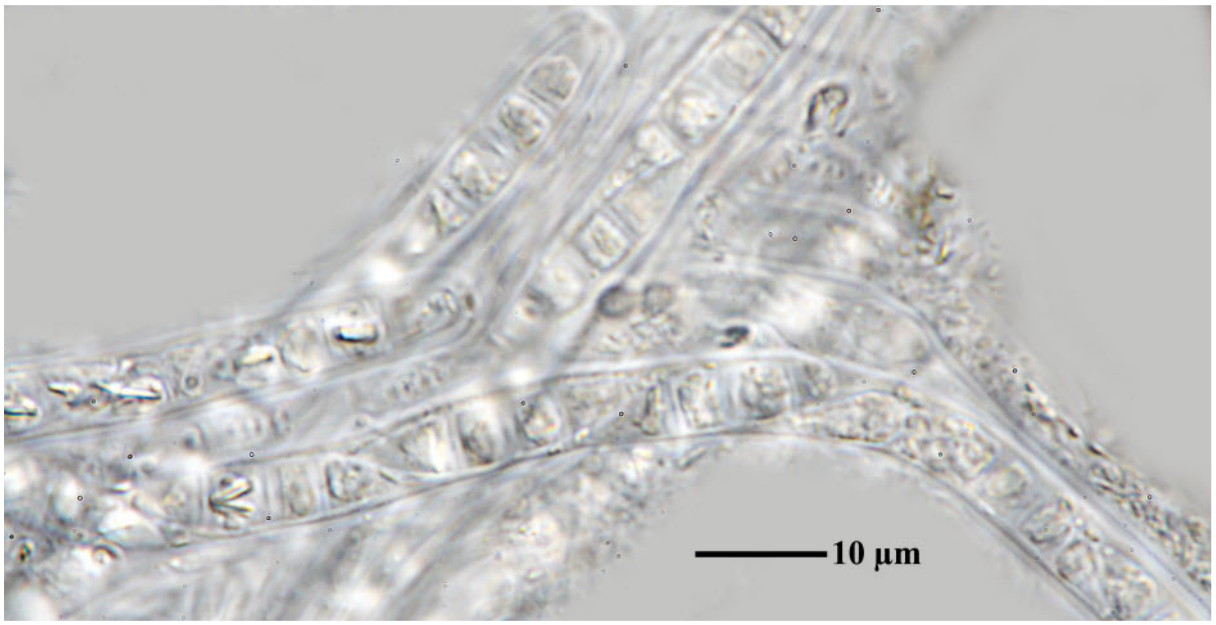


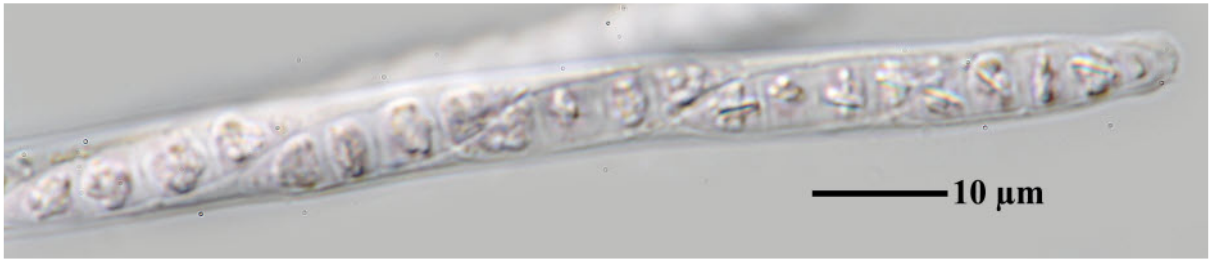




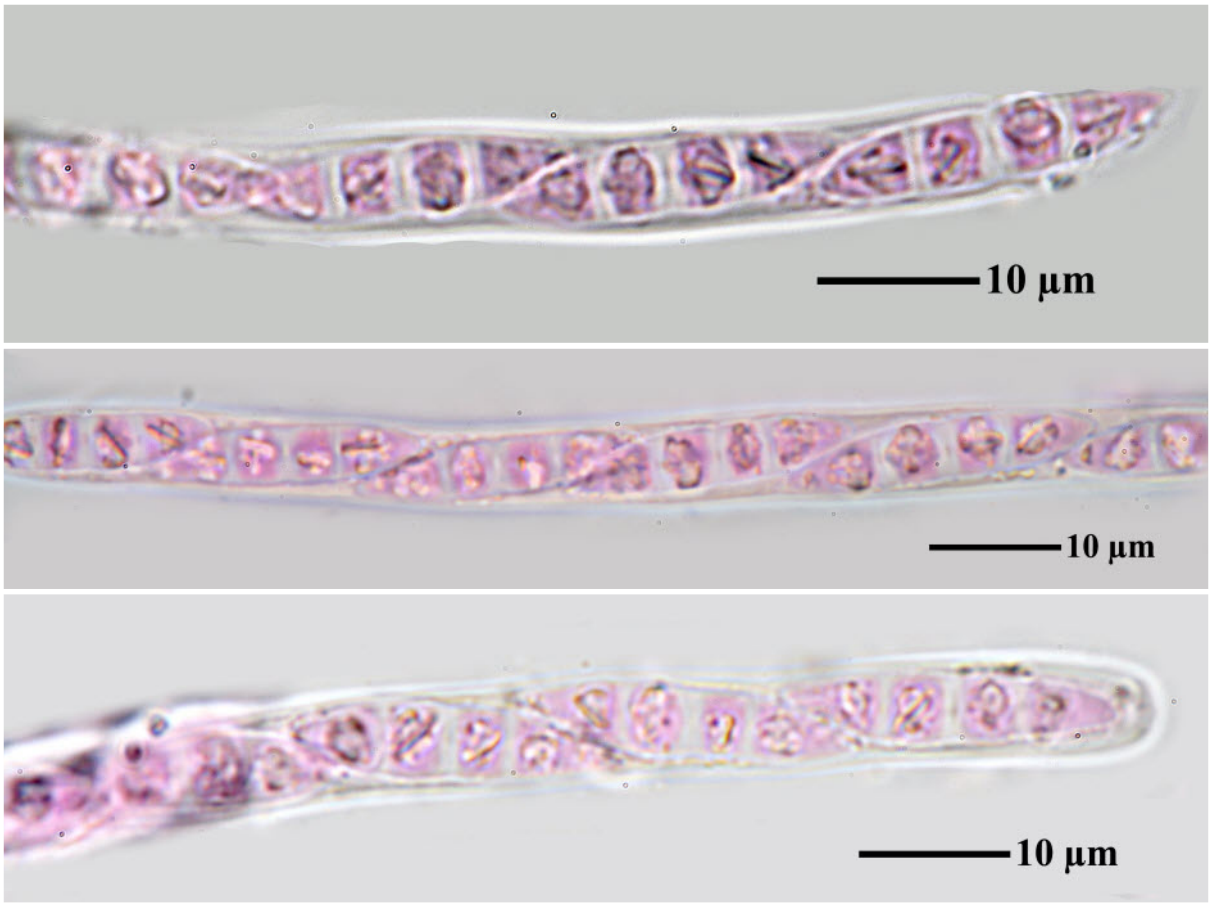
Pseudopyrenula papuana







Pseudopyrenula papuana



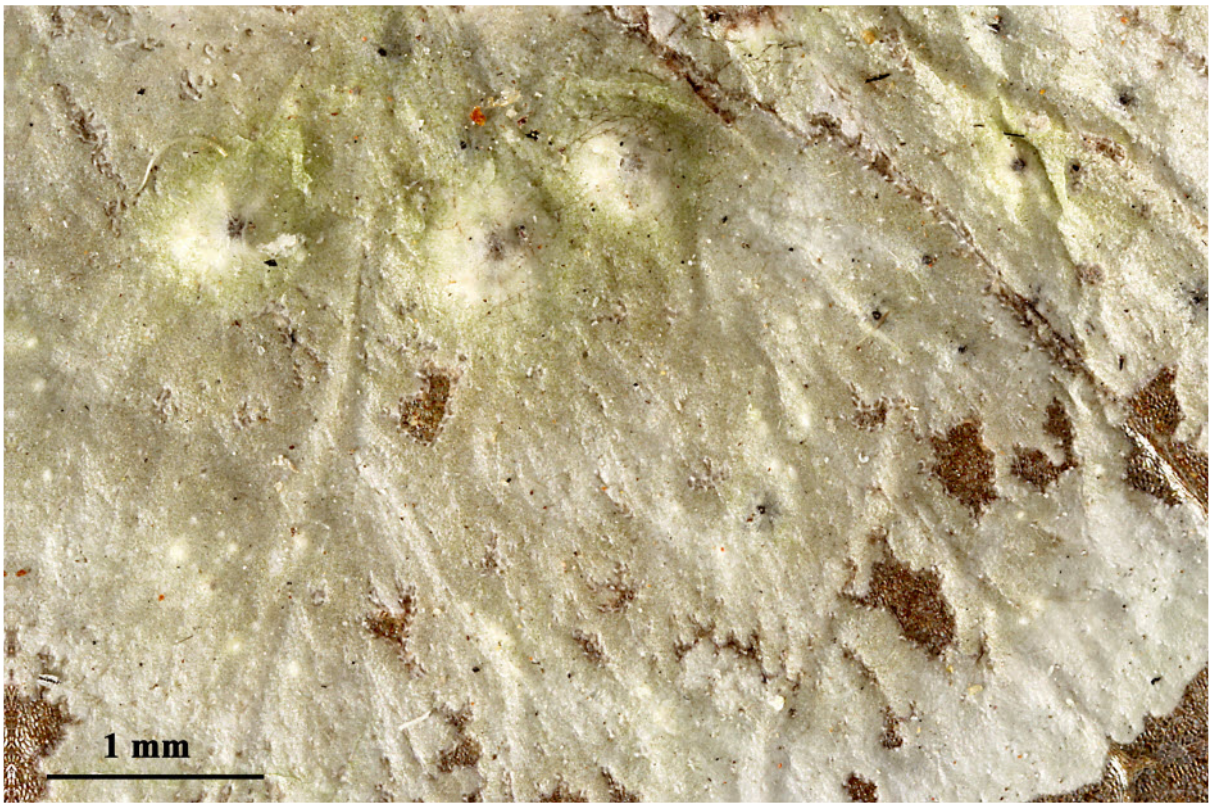
Pseudopyrenula papuana

Puiggariella nemathora (Mont.) S.H. Jiang, Lücking & J.C. Wei, in Jiang, Lücking, Xavier-Leite, Cáceres, Aptroot, Portilla & Wei, Fungal Diversity 102: 282 (2020)

= *Strigula nemathora* Mont., in Sagra 1845

Thallus greenish grey, subcuticular, 5–25 mm across, 25–50 µm thick, minutely papillose. Perithecia semi-immersed, wart-shaped, 0.4–0.7 diam. Paraphyses unbranched. Ascospores 1-septate and pseudosepta, constricted at the septum, 15–22 × 4–6 µm.

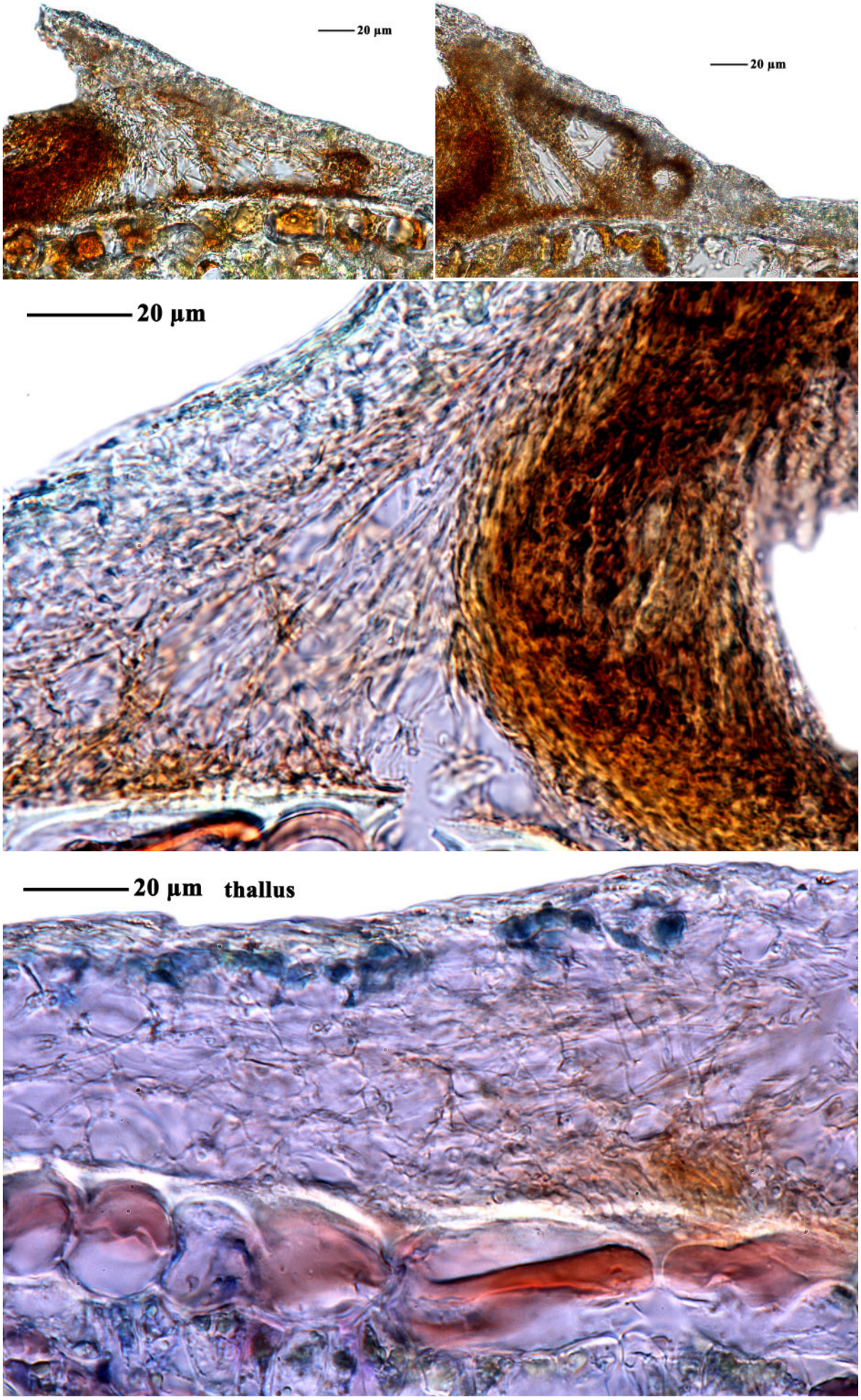
[19276], Australia, Northern Territory, Pethericks Rainforest, Litchfield Park, 39 km west-south-west of Batchelor, 13°08' S, 130°49' E, 60 m, growing on leaves in disturbed lowland forest with *Ficus* and *Gmelina* on moderate slope. Leg. J.A. Elix (27564), H.T. Lumbsch & H. Streimann 03.07.1991, det. R. Lücking. Chemistry: no lichen substances detected by TLC, anal. J.A. Elix. LICHENES AUSTRALASICI EXSICCATI NO. 246.



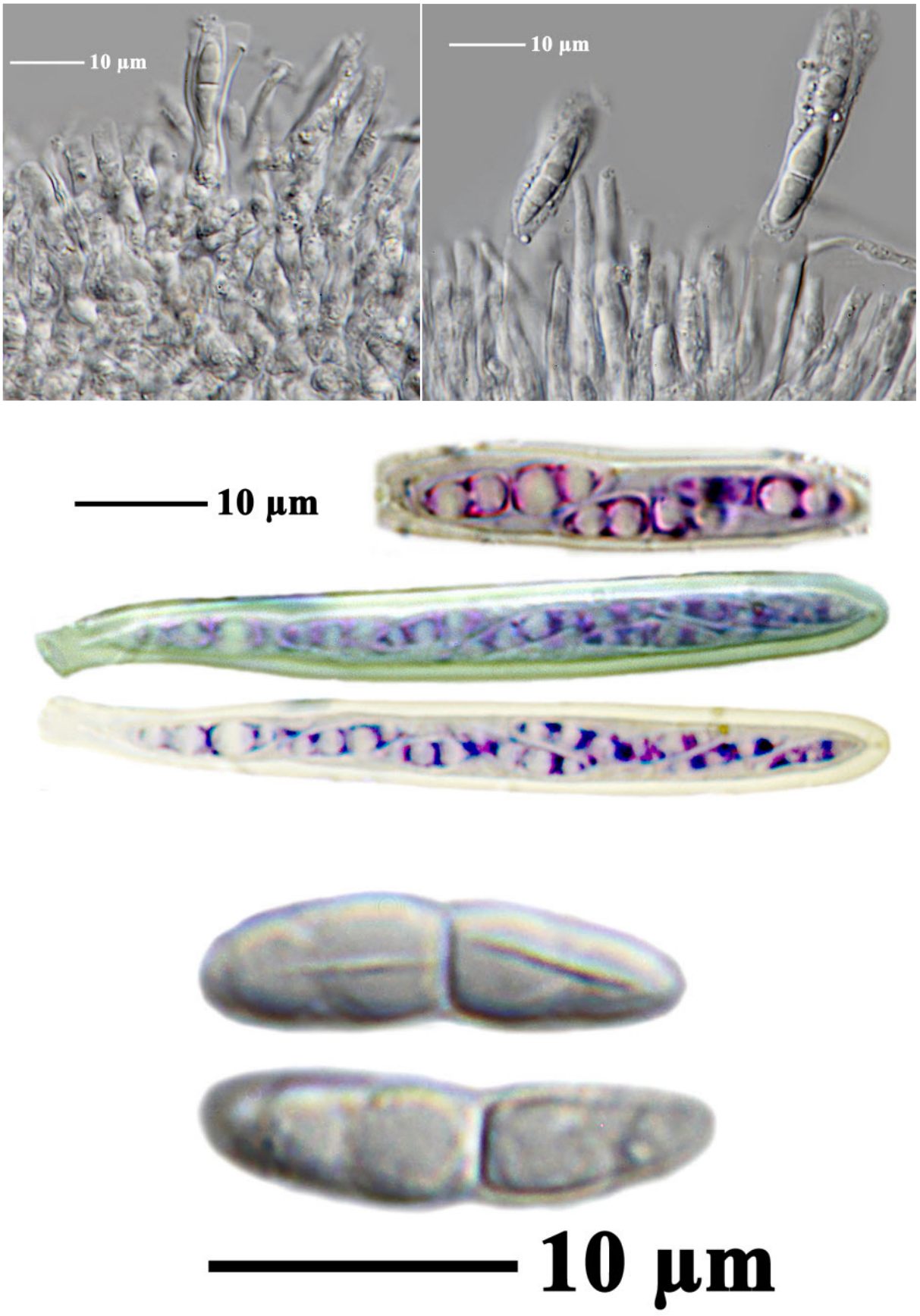




Puiggariella nemathora



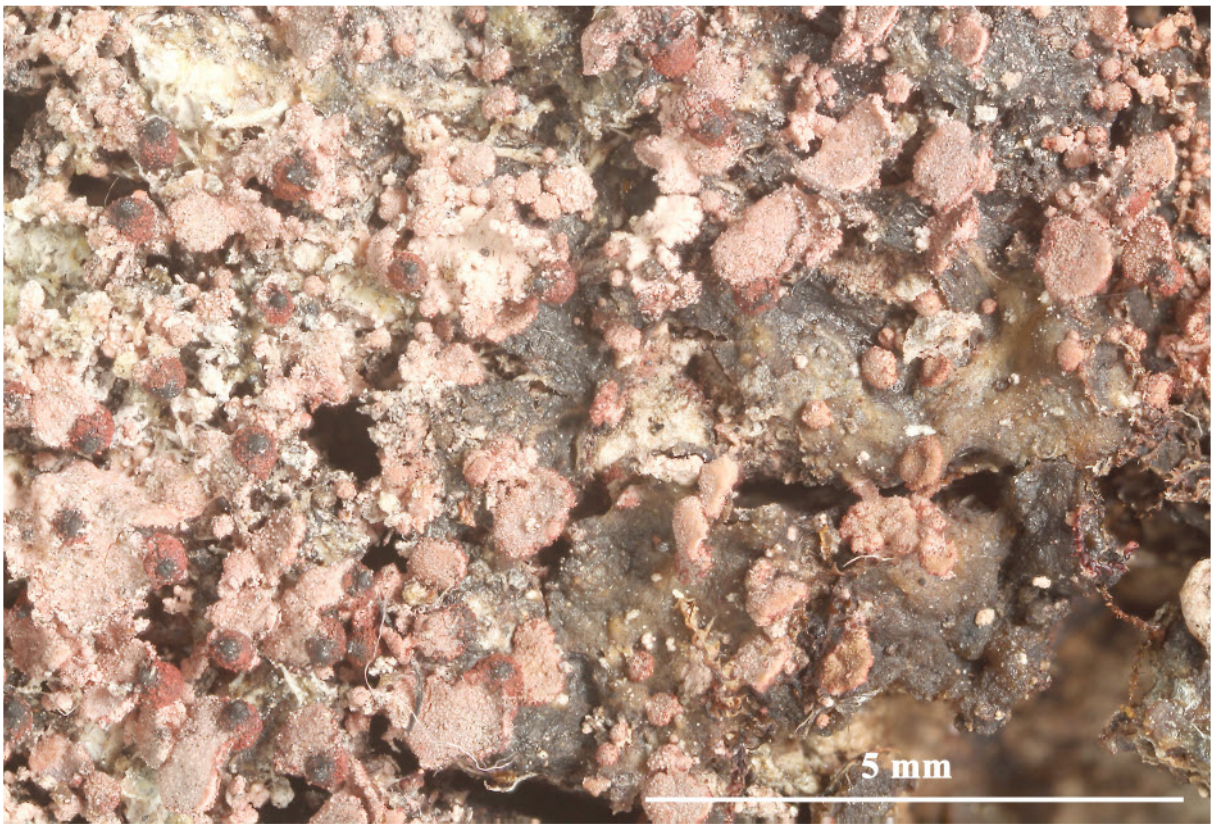
Puiggariella nemathora

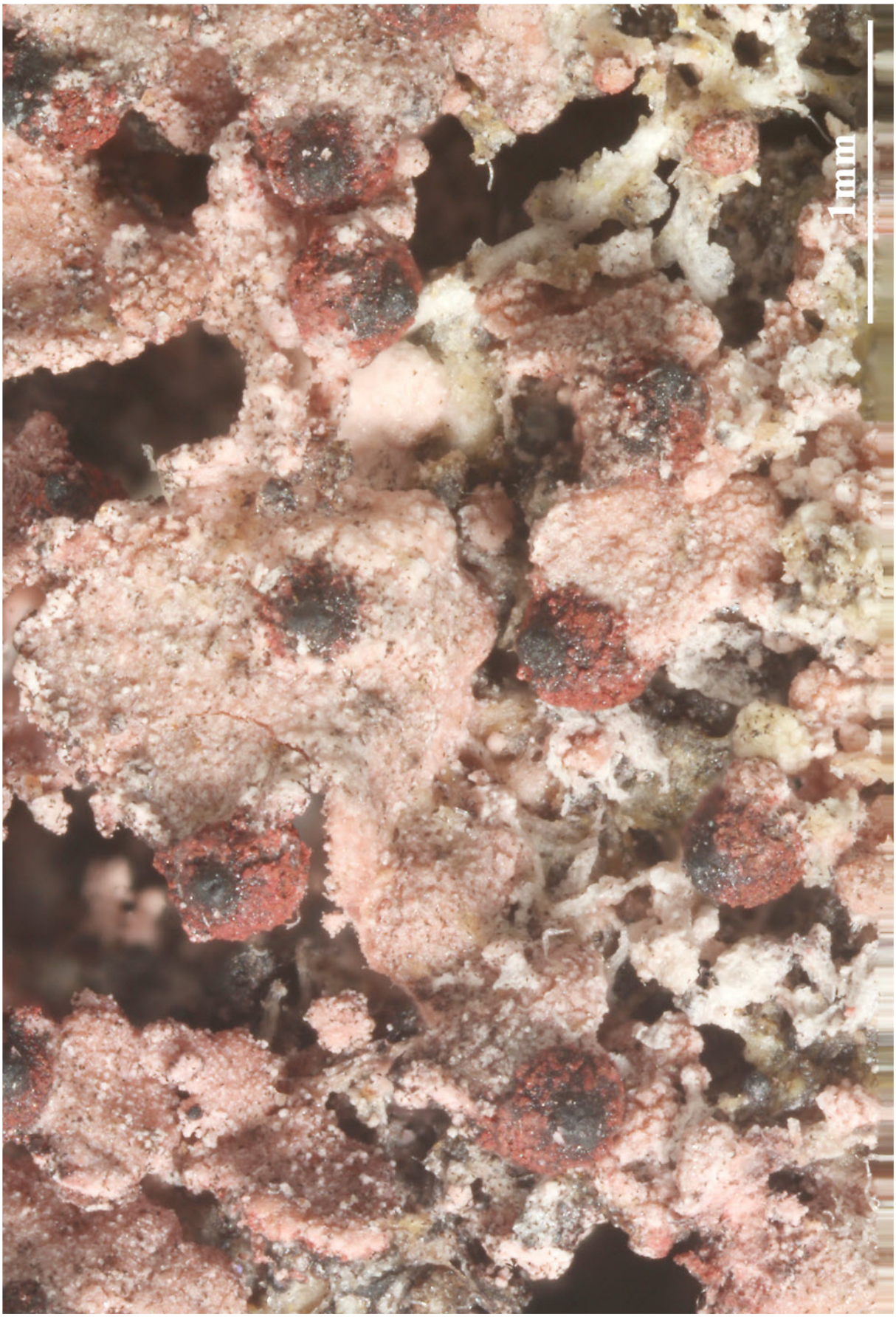


Puiggariella nemathora

Thallus absent; lichenicolous on Siphula decumbens, the thallus of which is altered mostly in color, as it becomes pink due to the anthraquinone exuding from the hyphae of the lichenicolous fungus. Ascomata perithecioid, superficial, pyriform, 0.3–0.5 mm diam., 0.4–0.7 mm high, black, but covered by a thick layer of blood red pruina. Wall carbonized all around, up to ca. 100 µm thick. Ostioles black, not pruinose, conical, ca. 0.2 mm diam., ca. 0.2 mm high. Hamathecium hyaline, not inspersed with oil droplets. Paraphyses simple, ca. 1 µm wide. Asci cylindrical, with 8 uniseriate ascospores; tips with ocular chamber. Ascospores brown, 3-septate, fusiform, without constrictions, 17–21 × 7.5–8.5 µm; ends obtuse but rather pointed; middle cells darker than end cells; wall roughly ornamented with low warts, surrounded by a ca. 1 µm wide gelatinous sheath. Pycnidia not observed. Chemistry: Red pigment K+ purple. Medulla of host thallus UV+ green. Perithecia containing two purple fungal anthraquinones with Rf 5 and 6 in TDA (TLC).

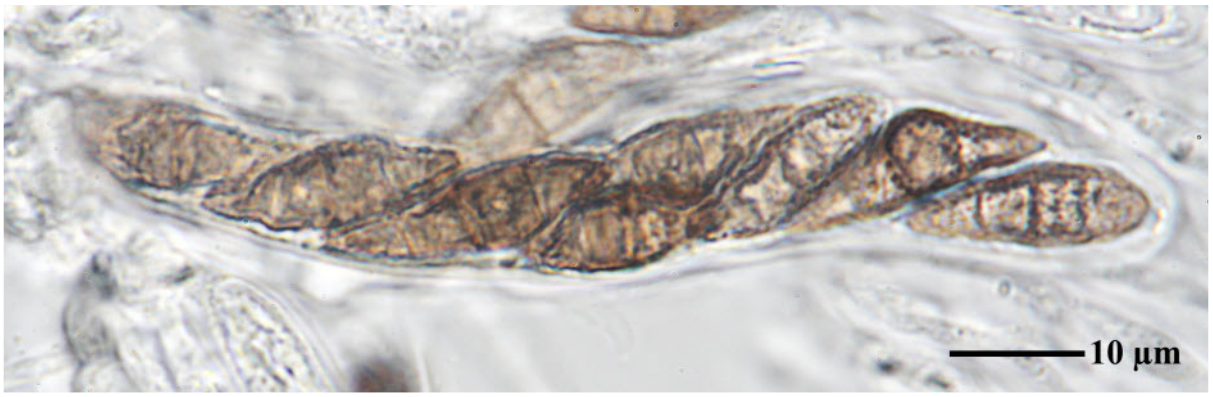
[Hill9463], Solomon Islands, Guadalcanal Island, central part, Mt Popomansiu, summit area, ca. 2200 m, on soil. Leg. D.J. Hill (no 9463), 5.11.1065, det. A. Aptroot, 2013. ISOTYPE.

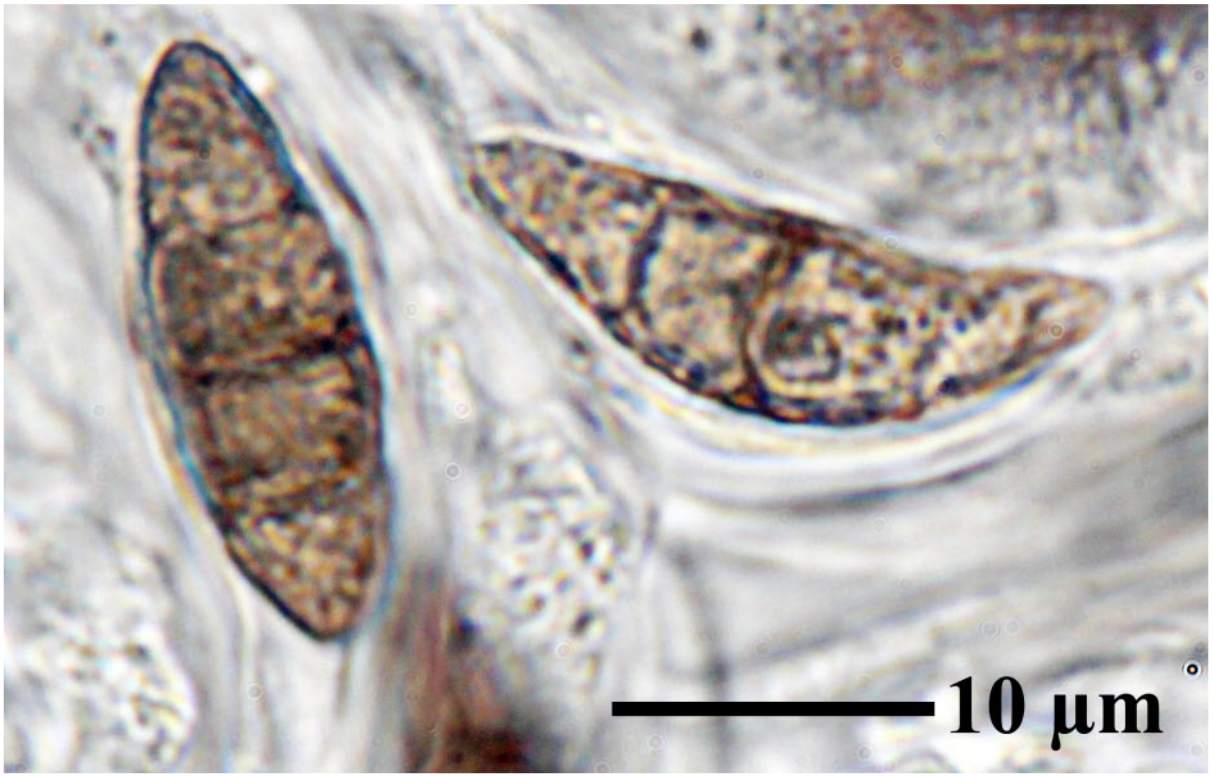




Pyrenidium coccineum









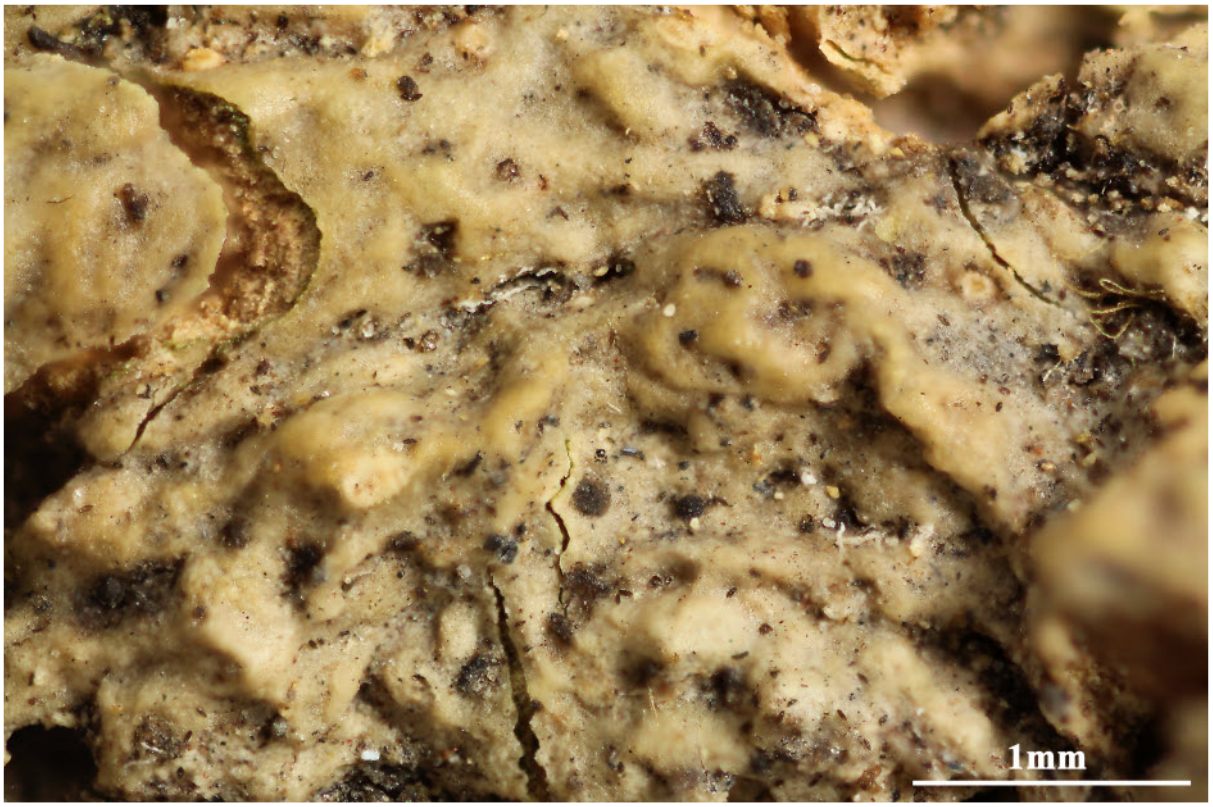
Pyrenidium coccineum

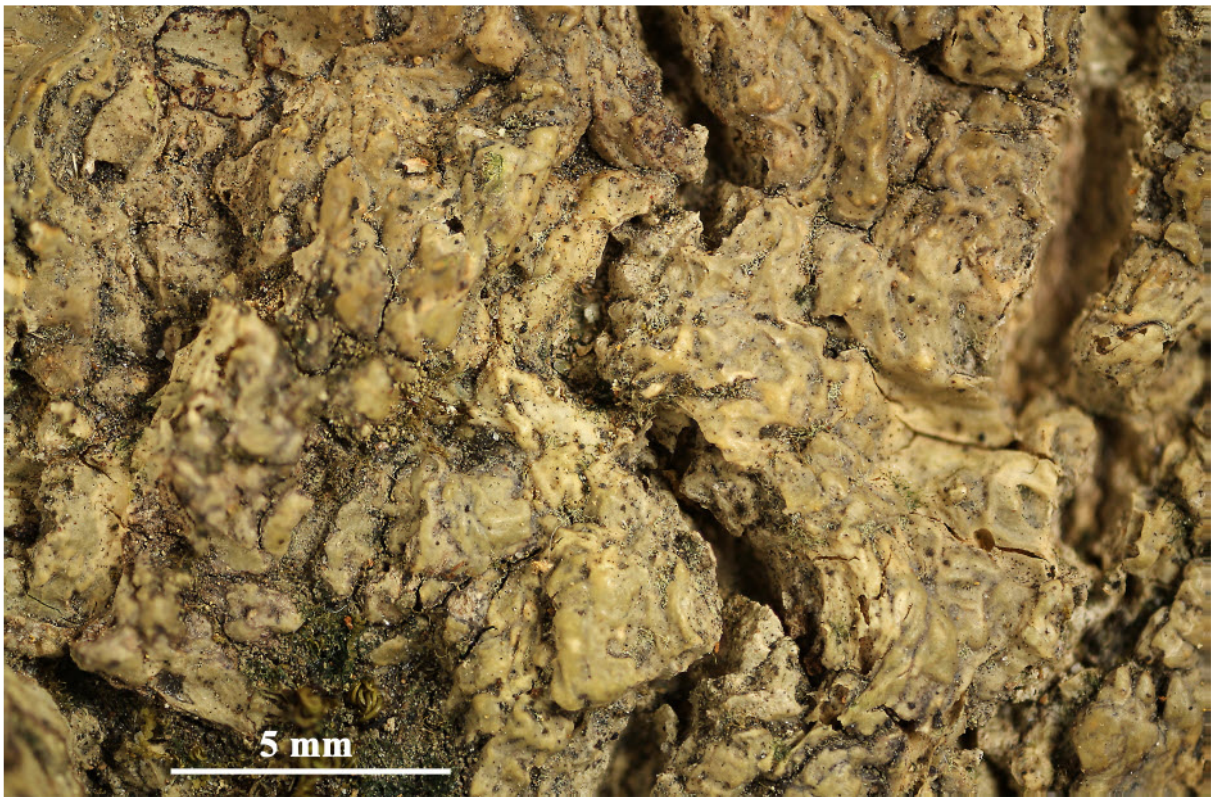
Pyrenula abditicarpa Aptroot & M. Cáceres, in Aptroot, Andrade, Mendonça, Lima & Cáceres, Phytotaxa 197(3): 199 (2014)

Thallus thin, corticate, olive brown, smooth, closely following the rough bark, without pseudocyphellae, without prothallus. Ascomata 1–2 mm deep immersed in the bark underneath the thallus, pyriform, 0.6–0.8 mm diam., single. Wall carbonized all around. Ostiole apical, pale brown, depressed. Hamathecium not inspersed with oil droplets. Ascospores 8/ascus, irregularly biseriate, brown, distoseptate muriform, 7–9 × 3–7-septate, 50–55 × 23–25 µm, lumina mostly rounded. Pycnidia not observed. Chemistry: Thallus UV–. TLC: no substances detected.

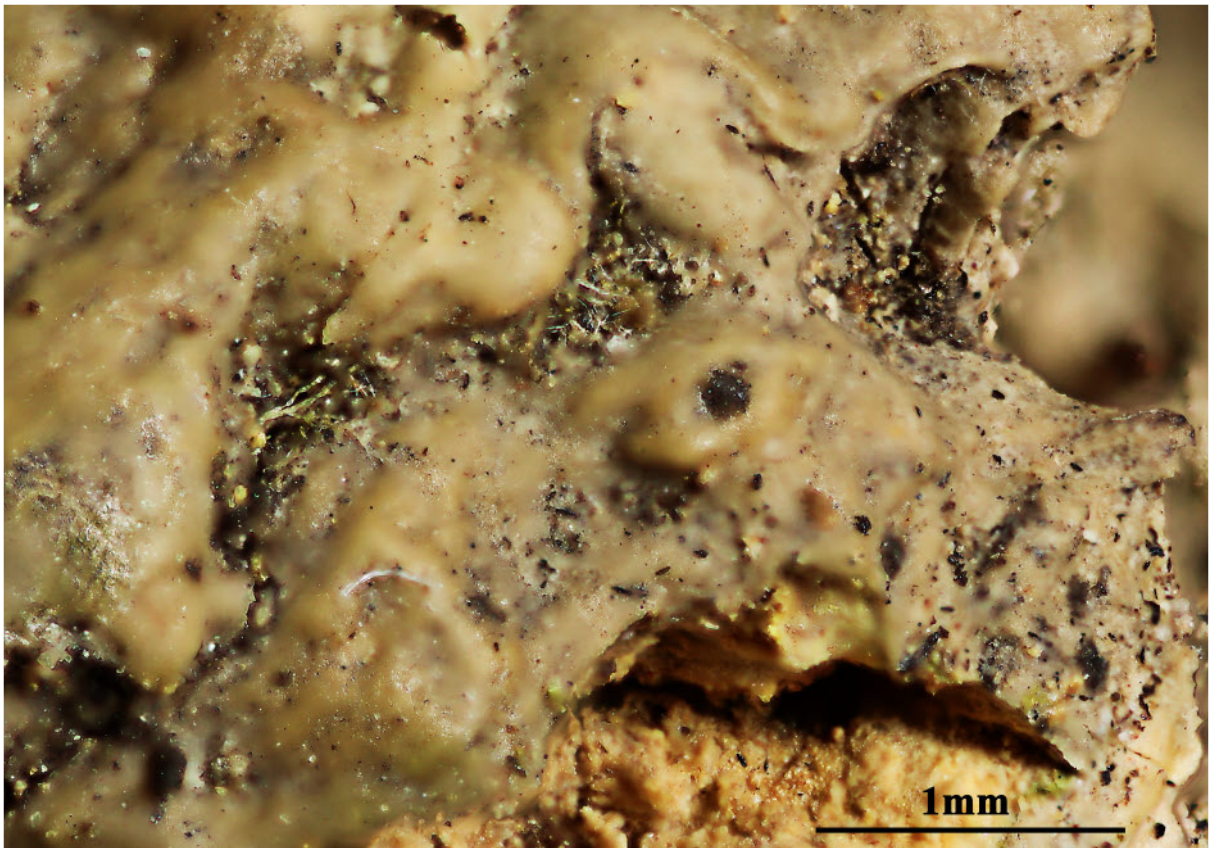
[ABL18589], Brazil. Sergipe, Areia Branca, Parque Nacional Serra de Itabaiana; 10˚45’37” S, 37˚22’15” W, 250 m; on bark of tree. Leg. M. Cáceres & A. Aptroot (no 18589), 18.09.2013, det. A. Aptroot, 2013. ISOTYPE.





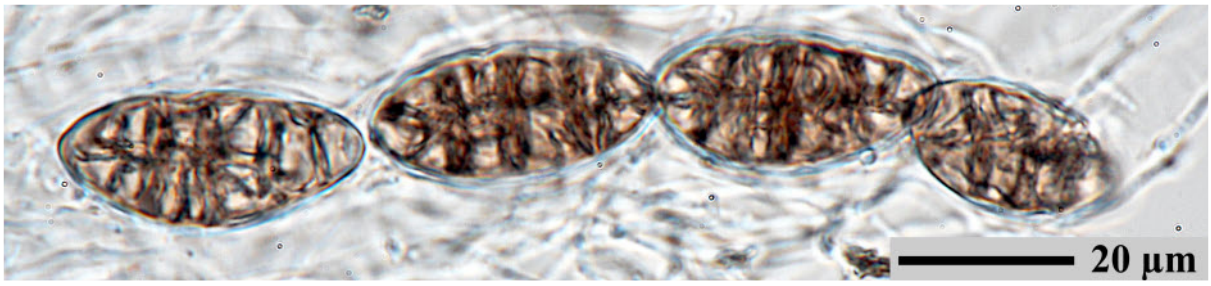


Pyrenula abditicarpa





Pyrenula abditicarpa



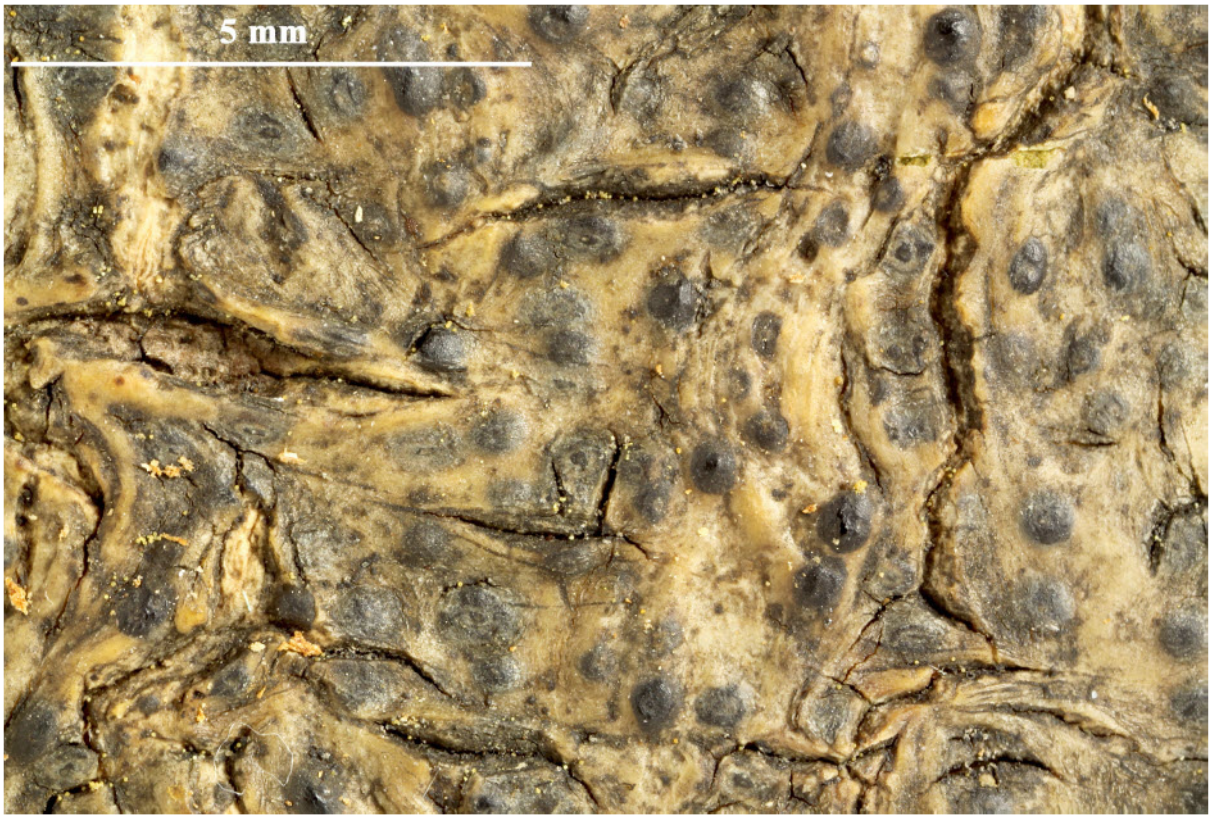


Pyrenula abditicarpa

Pyrenula acutalis R.C. Harris, Mem. N. Y. bot. Gdn 49: 85 (1989)

Thallus corticate, brownish to olive green, without pseudocyphellae. Perithecia solitary, subglobose, erumpent from the substratum, sides partly covered by thallus, c. 0.5–0.7 mm diam. Perithecial wall without crystals, up to 100 µm thick. Ostiole pale, apical. Hamathecium only inspersed in the upper part, IKI–, filaments unbranched. Ascospores 8/ascus, grey brown, irregularly biseriate, 3-septate, fusiform with pointed ends, 22–26 × 10–12 µm, lumina angular, terminal lumina mostly not separated from the exospore by an endospore layer. Chemistry: No substances detected.

[Konno108], Japan, Honshu, Prov. Iwashiro (Pref. Fukushima), Mt. Yahazu, Azuma Mts. Kitashiobara-mura, Yama-gun, 37°44’ N, 140°06’ E, 1100–1500 m, on bark of Fagus crenata. Leg. Konno (no 108), 31.05.1995, det. A. Aptroot.







Pyrenula acutalis

Pyrenula acutispora Kalb & Hafellner, Herzogia 9(1-2): 84 (1992)
= *Pyrenula kakouettae* Sérus., Nova Hedwigia 55(3-4): 533 (1992)

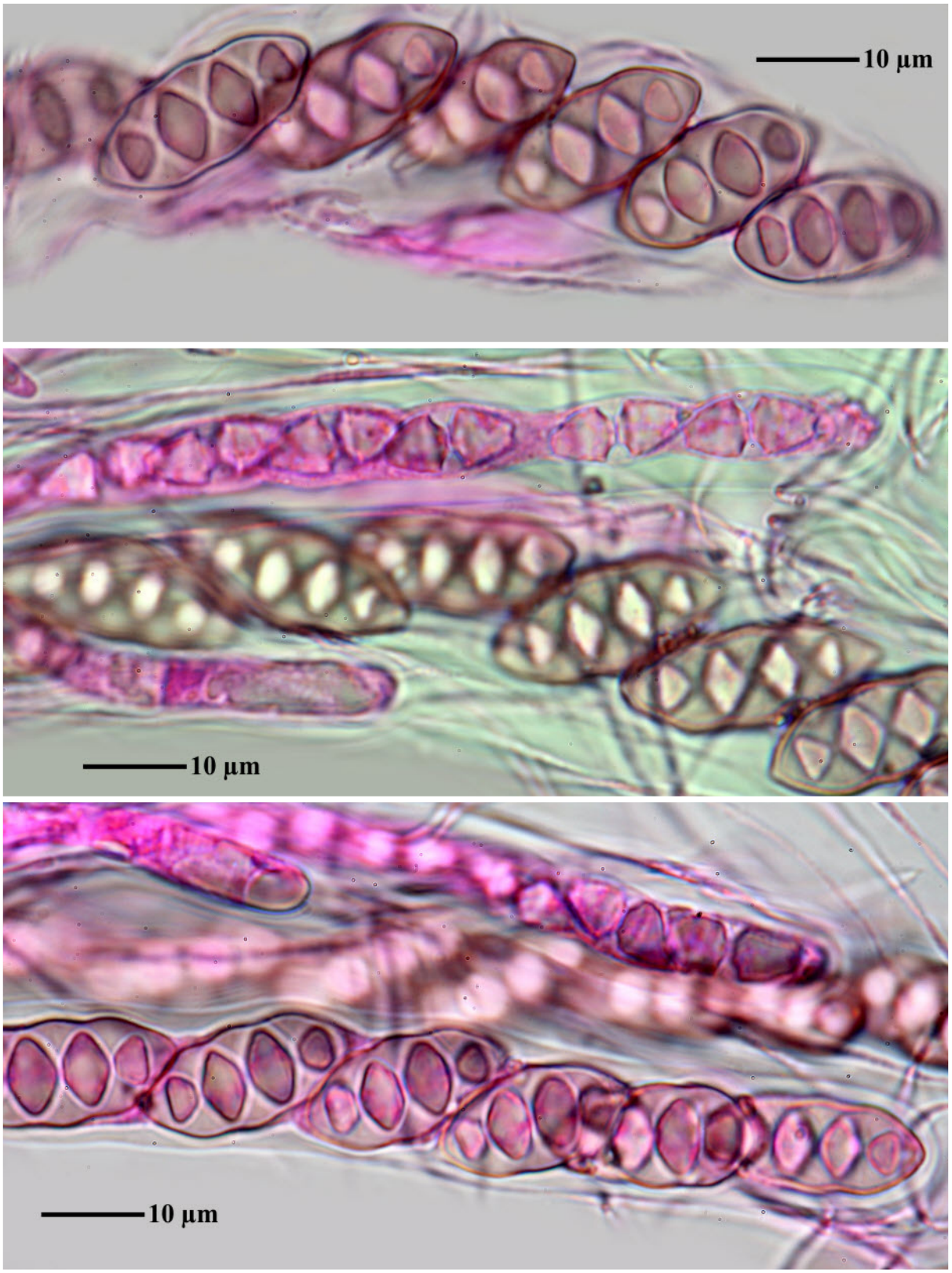
Thallus immersed, pale yellow-grey, without pseudocyphellae. Ascomata subglobose, erumpent, sides thallus-covered, c. 0.6–1.0 mm diam. Ostiole apical or lateral, pale. Hamathecium not inspersed or only inspersed in upper part. Ascospores 3-septate, 24–(27.8)–30 × 10–(11.5)–13 µm, fusiform, with thick apical walls with (filled) apical points. Chemistry: No substances detected. This species is similar to *Pyrenula acutalis* Harris, but has larger spores.

[ABL75491], Canary Islands, Tenerife, Anaga, 1 km E of Casa Forestal, on laurisilva tree, 28°32’25” N, 16°13’35” W, 850 m. Leg. A. Aptroot (no 75491), 07.01.2017, det. A. Aptroot, 2007.

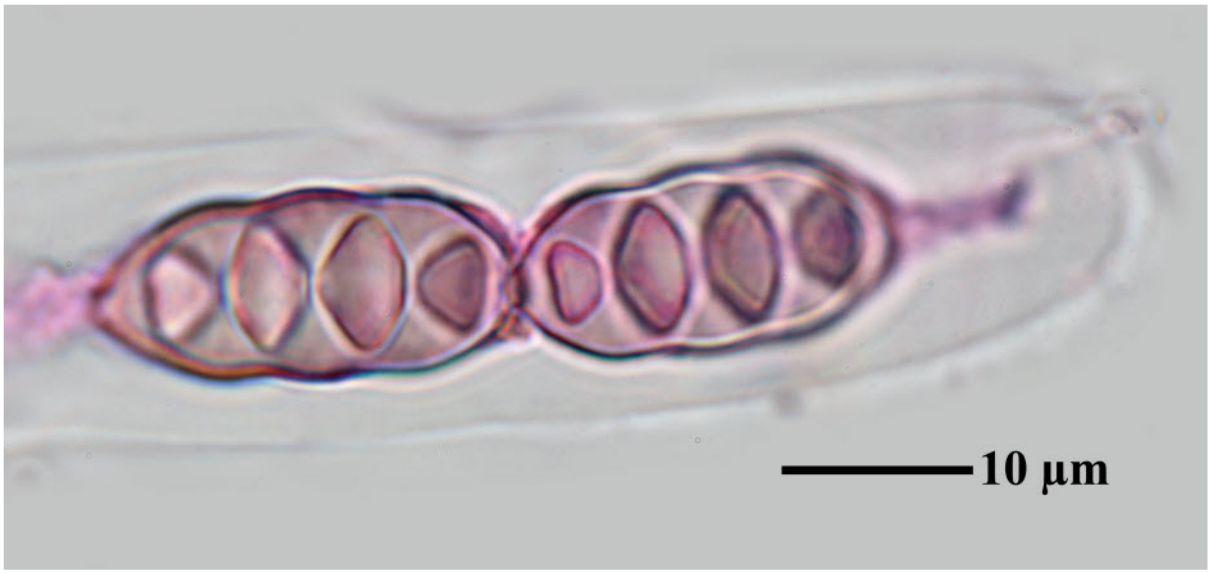




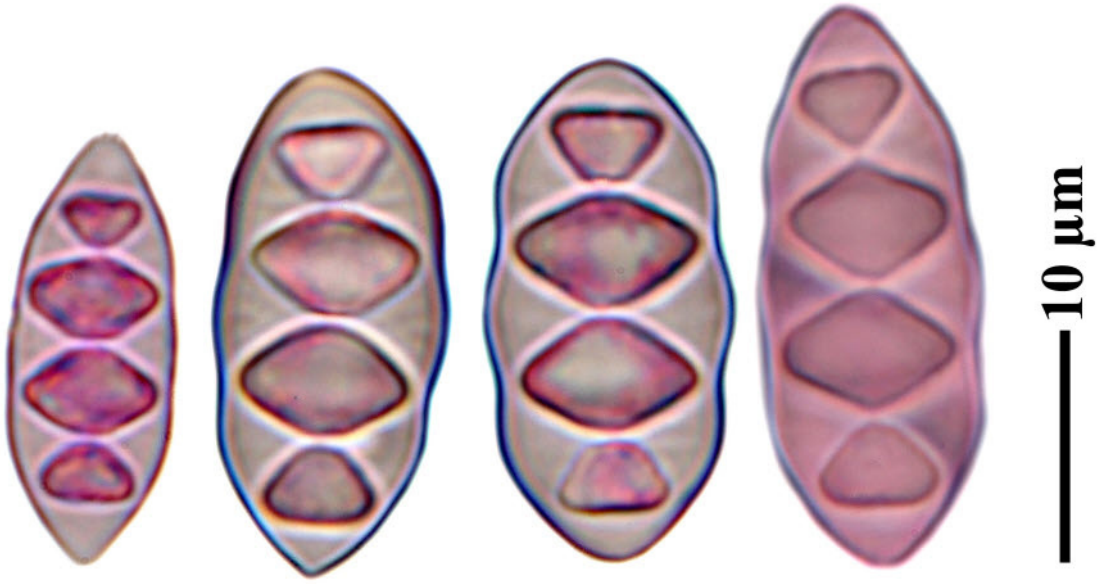
Pyrenula acutispora



Pyrenula acutispora







Pyrenula acutispora

Pyrenula adacta Fée, Essai Crypt. Exot. (Paris): 74 (1825) [1824]
= *Pyrenula marginatula* Müll. Arg., Müller Argoviensis, Bull. Soc. Roy. Bot. Belg. 30: 93 (1891).
= *Pyrenula caraibica* Aptroot & Etayo, in Etayo & Aptroot, Lichenologist 35(3): 235 (2003)

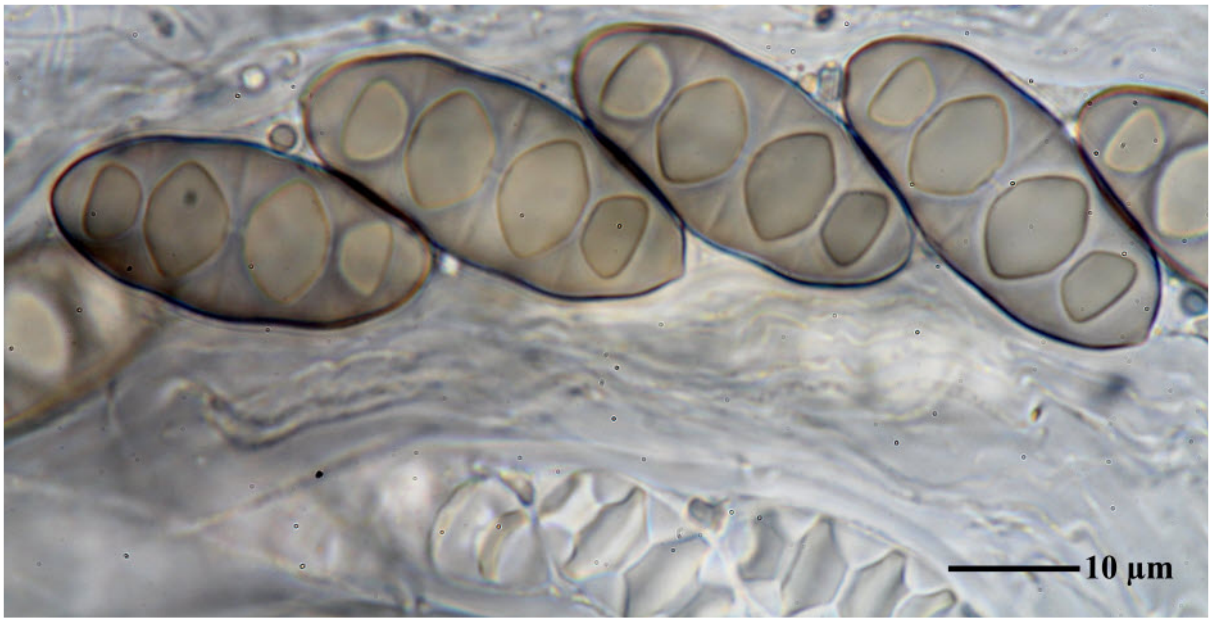
Thallus corticate, brownish to olive green, with pseudocyphellae. Perithecia solitary, flattened to conical, erumpent from the substratum, sides often partly covered by thallus, c. 0.7–1.0 mm diam. Perithecial wall with or without crystals, up to 200 µm thick. Ostiole pale, lateral. Hamathecium not inspersed, IKI+ orange, filaments unbranched. Ascospores 8/ ascus, grey brown, irregularly biseriate, 3-septate, fusiform with rounded ends, 35–45 × 12–20 µm, lumina rounded, all lumina separated from the exospore by a thick endospore layer. Chemistry: No substances detected.

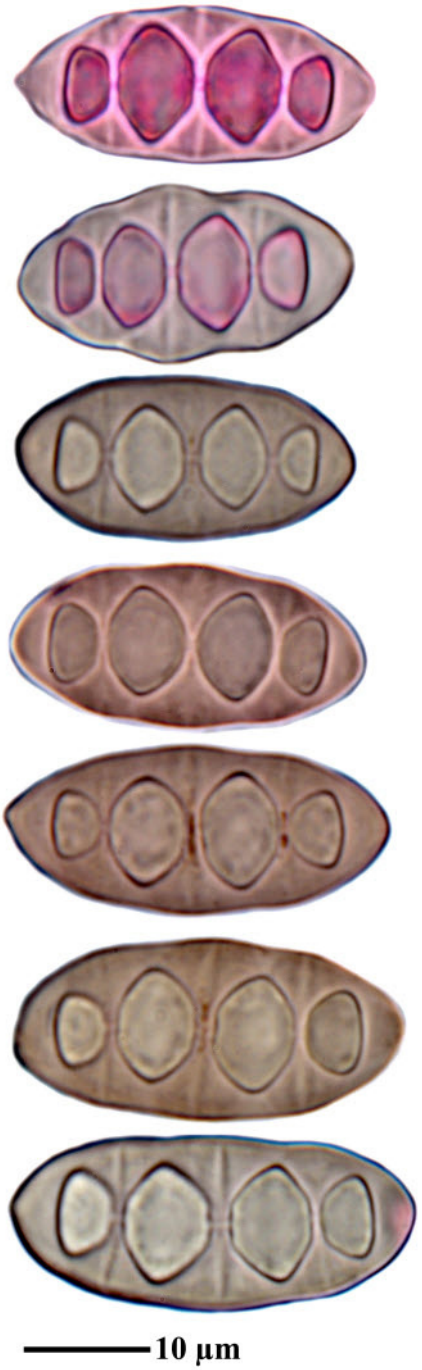
[Navarro4855], Costa Rica, Cartago, Tapanti National Park, La Esperanza del Guarco, 2400–2500 m, 9°42’ N, 83°51’ W. Leg. Navarro (no4855), 4.07.2002, det. A. Aptroot, 2004.





Pyrenula adacta





Pyrenula adacta

Pyrenula aggregans Vain., J. Bot., Lond. 34: 265 (1896)

Thallus thick, with calcium oxalate crystals, with pseudocyphellae. Ascomata conical to hemispherical, densely aggregated, c. 0.25–0.3 mm diam. Ascospores 3-septate, locules not in a straight line, 13–15 x (6-)7–8(-10) μm. Chemistry: Thallus UV+ yellow, with lichexanthone.

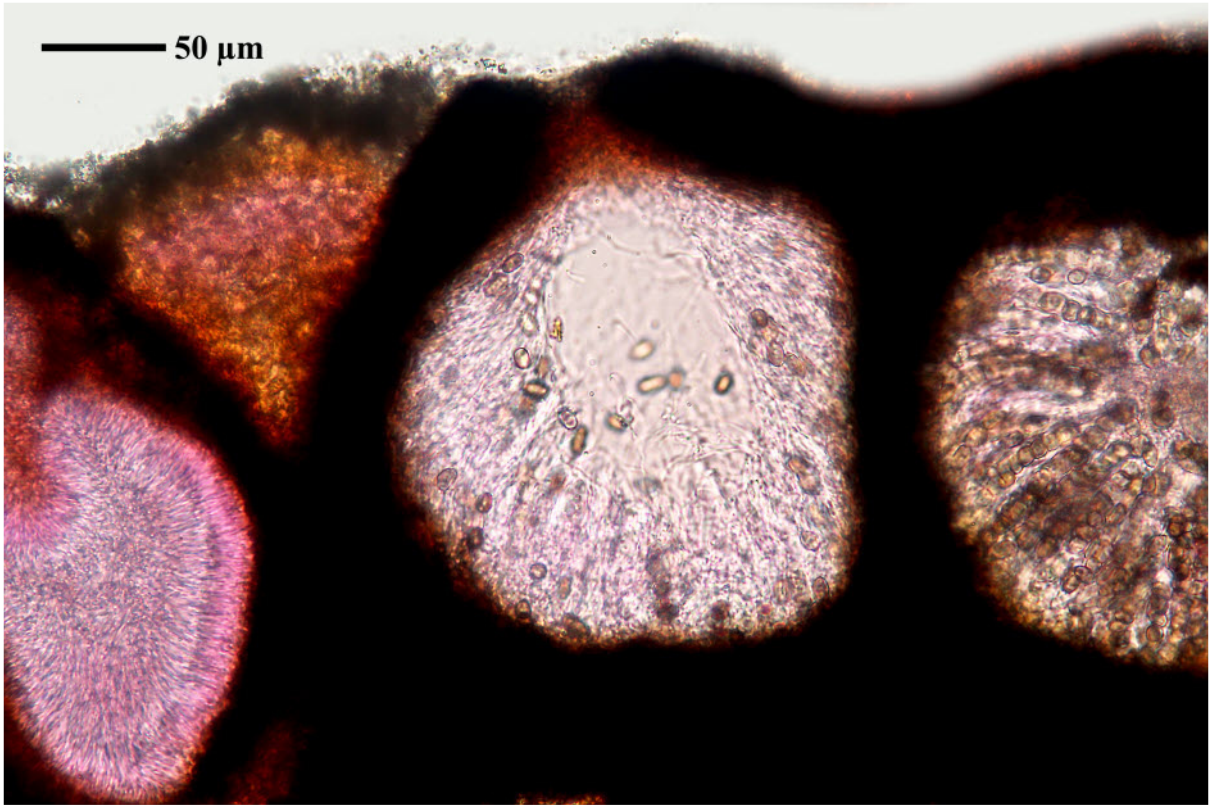
[ABL17488], Papua New Guinea, Madang prov., Madang city, parks and gardens near the coast, 5 m, 145°45’ E, 5°15’ S, on Cocos. Leg. A. Aptroot (no 17488), 02.1987, det. A. Aptroot, 1987.



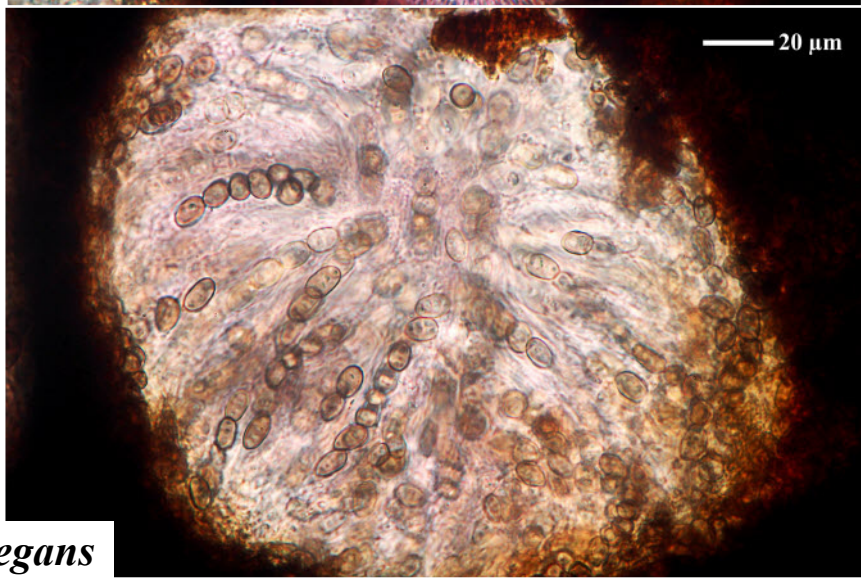




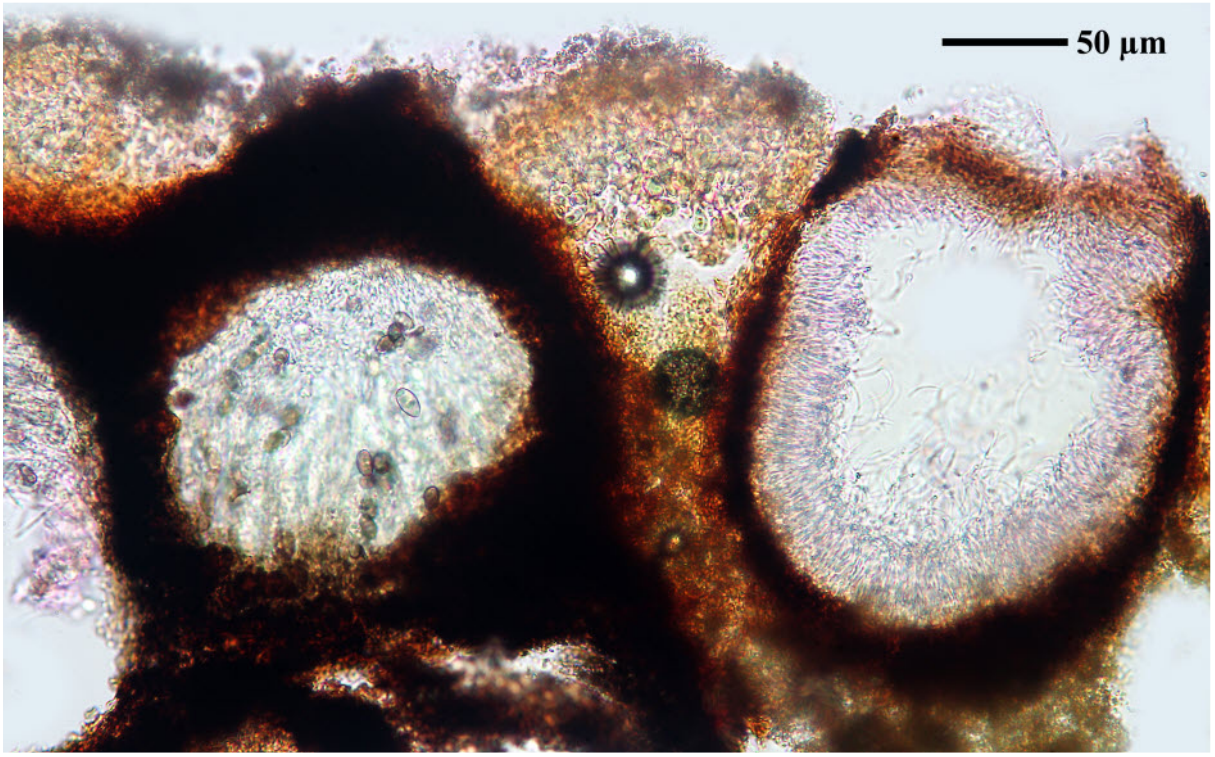
Pyrenula aggregans

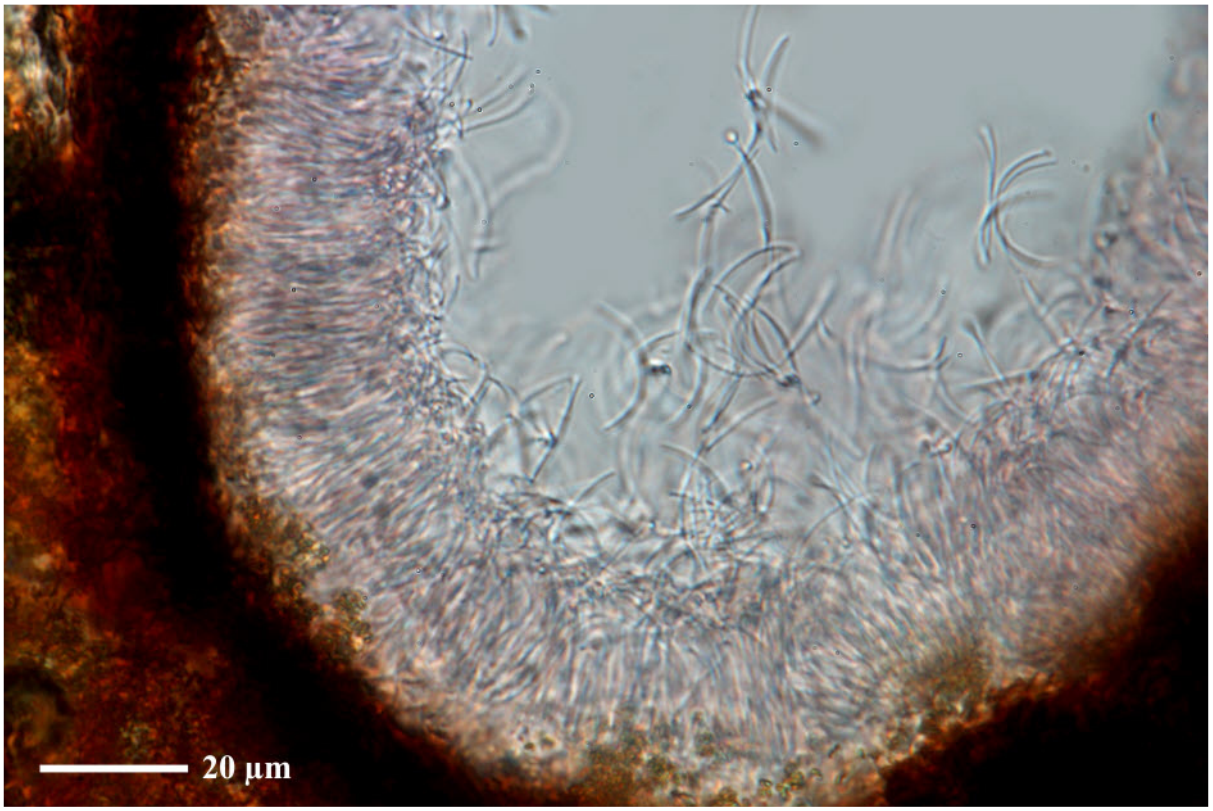




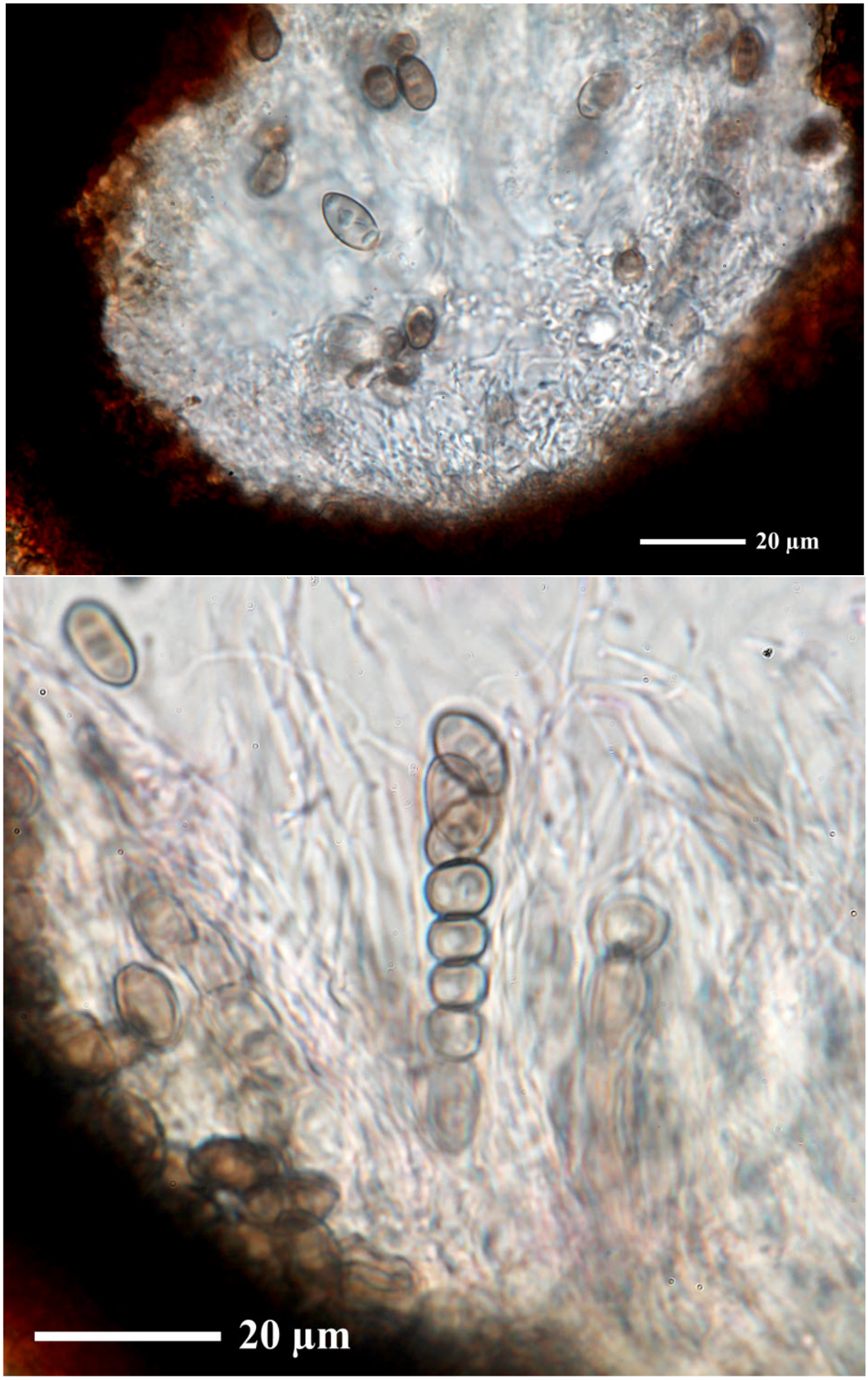


Pyrenula aggregans

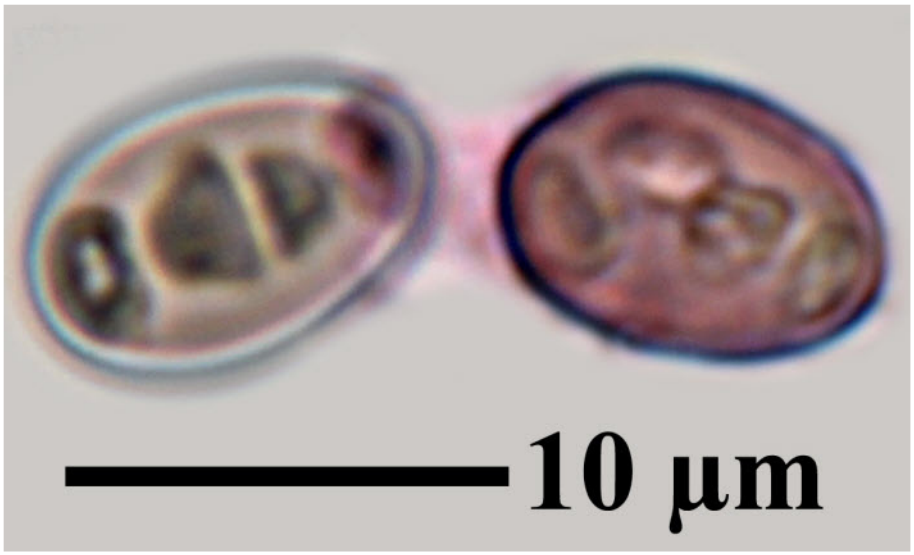




Pyrenula aggregans



Pyrenula aggregans





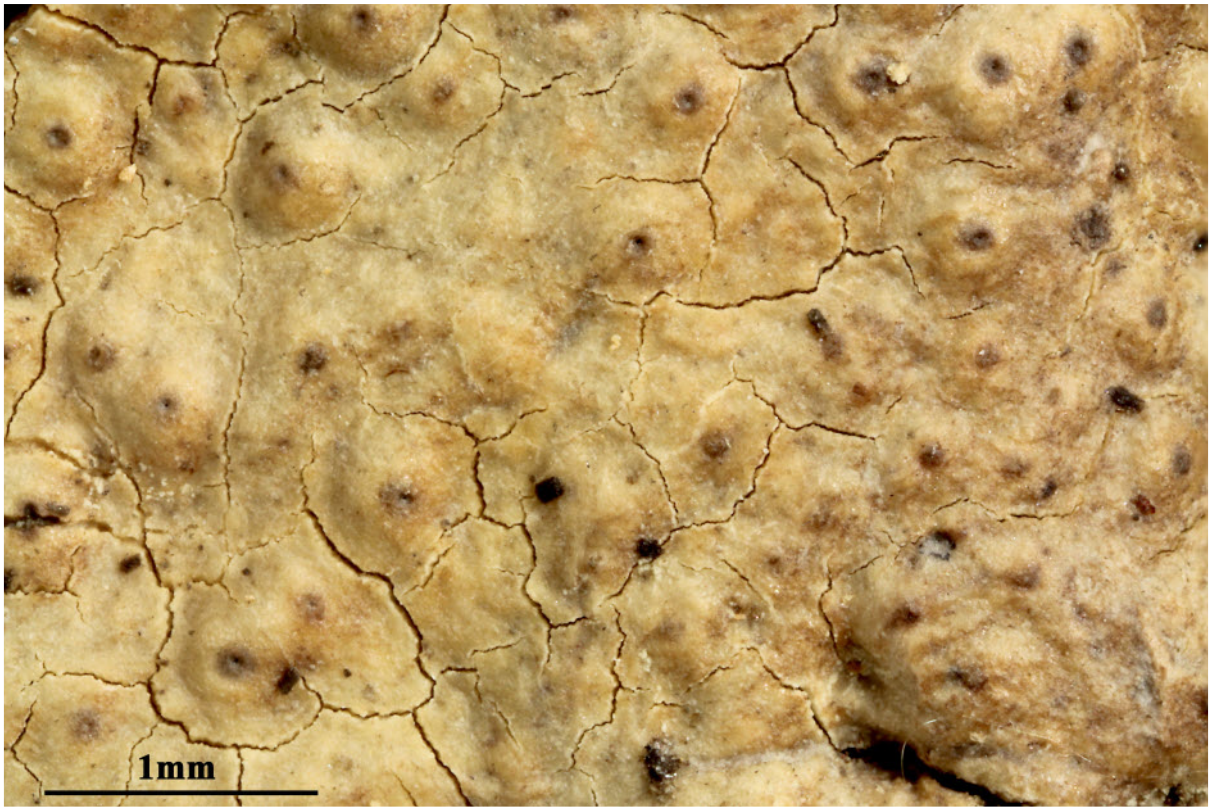
Pyrenula aggregans

Pyrenula aggregata (Fée) Fée, Essai Crypt. Exot., Suppl. Révis. (Paris): 80 (1837)
= *Verrucaria aggregata* Fée
= *Spermatodium aggregatum* (Fée) Trevis.
= *Melanotheca aggregata* (Fée) Müll. Arg. (nom. illeg.)
= *Verrucaria subnitidella* Nyl.
= *Pyrenula subnitidella* (Nyl.) Müll. Arg.
= *Pyrenula costaricensis* Müll. Arg.
= *Pyrenula gracilior* Müll. Arg.
= *Pyrenula virens* Müll. Arg.
= *Pyrenula tenella* Müll. Arg.
= *Pyrenula fuscoolivacea* Vain.
= *Pyrenula aspisteoides* Vain.
= *Pyrenula parva* Vain.
= *Pyrenula irrubescens* Vain.
= *Pseudopyrenula awajiensis* Vain.
= *Pyrenula awajiensis* (Vain.) Kashiw.
= *Pyrenula oblonga* Zahlbr.
= *Pyrenula athallina* H. Magn.
= *Pyrenula nuda* Ajay Singh & Upreti

Thallus thin, with pseudocyphellae. Ascomata conical to hemispherical, generally partly single and partly aggregated, c. 0.4–0.6 mm diam. Ascospores 3-septate, 16–20 × 6–8 μm. Chemistry: No substances detected. A species without any distinguishing special character, except for the partly aggregated ascomata. It was described many times, or may be several species are hidden now in this taxon.

[ABL61754], Vietnam, Vin Phuc Prov., Ba Vi National Park, summit region, on bark, 1200–1300 m, 21°03’38” N, 105°21’48” E. Leg. A. Aptroot (no 61754), 8.07.2004, det. A. Aptroot, 2004.



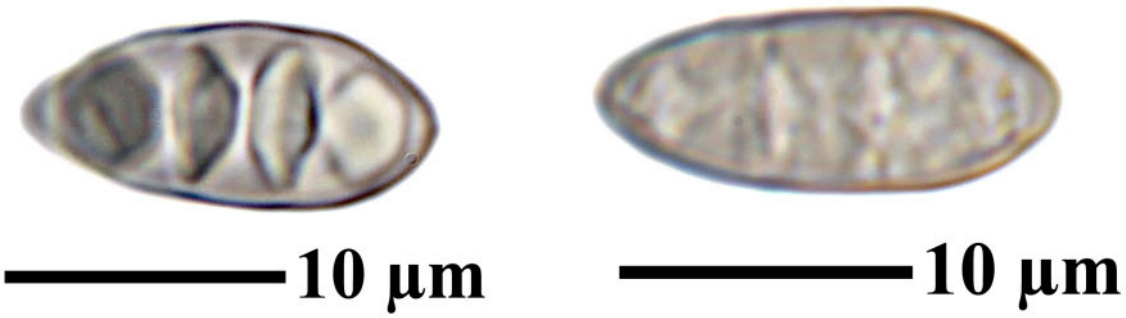


Pyrenula aggregata









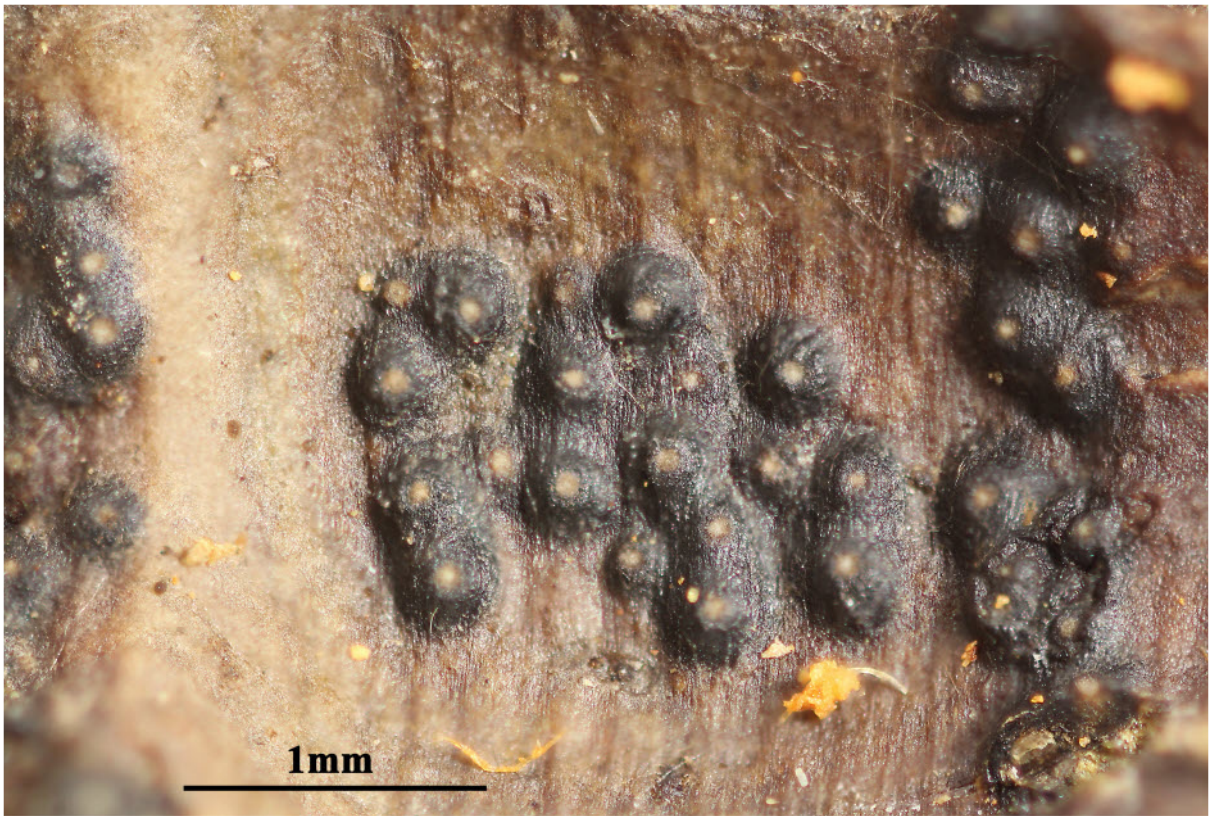
Pyrenula aggregata

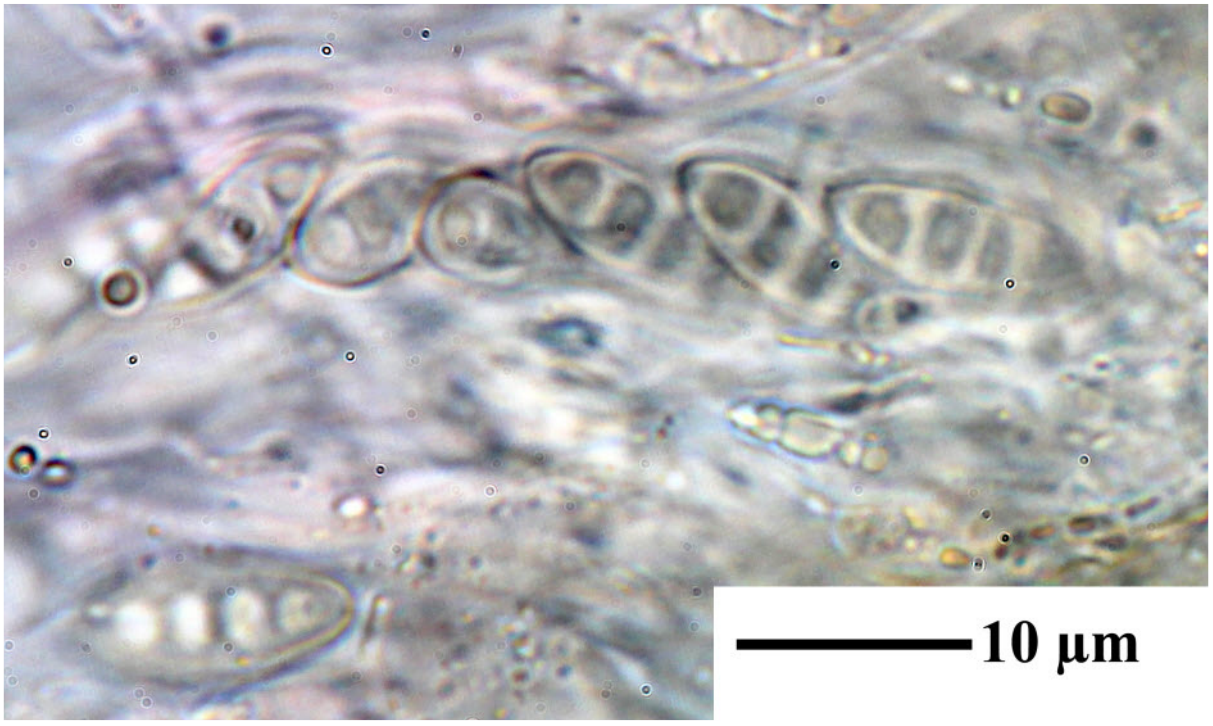
Pyrenula aggregataspistea Aptroot & M. Cáceres, Lichenologist 45(2): 170 (2013)

Thallus thin, chocolate brown, glossy, widely spreading, without pseudocyphellae, without a prothallus. Ascomata superficial, conical, 0.3–0.4mm diam., mostly in groups of 3–20 and partly fused sideways with incompletely fused walls and separate ostioles. Ostiole apical, yellowish. Hamathecium not inspersed. Ascospores 8/ascus, irregularly biseriate, 3-septate, 11–13 × 3.5–5.0 µm, lumina angular, central lumina wider than long, end lumina longer than wide, with a thick layer of endospore in the spore tips. Pycnidia not observed. Chemistry: No substances detected.

[ABL11216], Brazil, Rondônia, Porto Velho, Parque Natural Municipal, 8°41'10''S, 63°52'05'' W, 100 m, in primary rainforest, on Ceiba samauma tree bark, leg. M. Cáceres & A. Aptroot (no 11216), 9.–12.03.2012, det. A. Aptroot 2012. ISOTYPE.









Pyrenula aggregataspistea

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

Thallus thin, corticate, mineral grey, somewhat glossy, without pseudocyphellae, surrounded by an up to 1 mm wide black prothallus line. Ascomata superficial, hemispherical, 0.3–0.4 mm diam., single, covered by the thallus except for a wide black spot around the ostiole. Wall carbonized all around. Ostiole apical, black. Hamathecium not inspersed with oil droplets. Ascospores 8/ascus, brown, irregularly biseriate, 3-septate, 17–20 × 7–9 µm, lumina diamond-shaped, separated from the wall by a thick layer of endospore. Pycnidia not observed. Chemistry: Thallus UV– no substances detected with TLC.

[Andrade], Brazil. Sergipe: Capela, Refúgio de Vida Silvestre Mata do Junco; 10˚32’ S, 37˚03’ W; 150 m; on bark of tree. Leg. D.S. Andrade (no T2A27), 11.2.2014, det. A. Aptroot, 2014. ISOTYPE





Pyrenula albonigra

Pyrenula andina Aptroot, in Aptroot, Lücking, Sipman, Umaña & Chaves, Biblthca Lichenol. 97: 91 (2008)

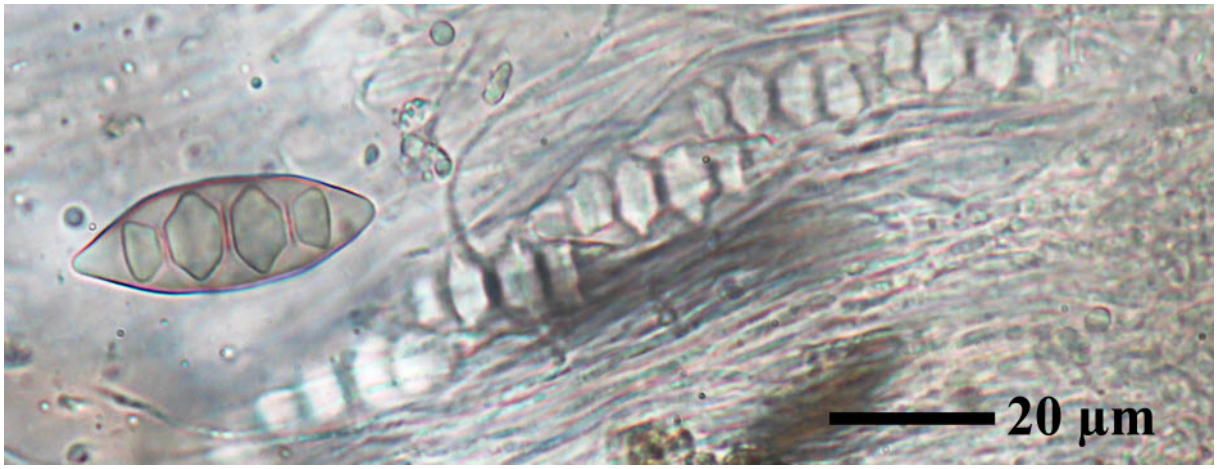
Thallus ochraceous, corticate, without pseudocyphellae. Perithecia solitary, globose but emergent in hemispherical warts, fully covered by thallus, but the thallus often becoming darker brown over the perithecia, 0.3–0.8 mm diam., 0.2–0.5 mm high. Perithecial wall without crystals, up to 100 µm thick. Ostiole black, punctiform. Hamathecium not inspersed, IKI–, filaments unbranched. Asci c. 100–160 × 12–22 µm. Ascospores 8/ascus, grey brown, irregularly biseriate, grey brown, broadly fusiform with mostly subacute, rarely rounded ends, symmetrically septate, 25–40 × 10–15 µm; with 3 distosepta, eusepta indicated by incomplete thin bands of dark material, lumina angular, end lumina smaller than central lumina and pointed inside. Conidiomata unknown. Chemistry: Thallus UV+ yellow or rarely UV–, KOH–, with lichexanthone.

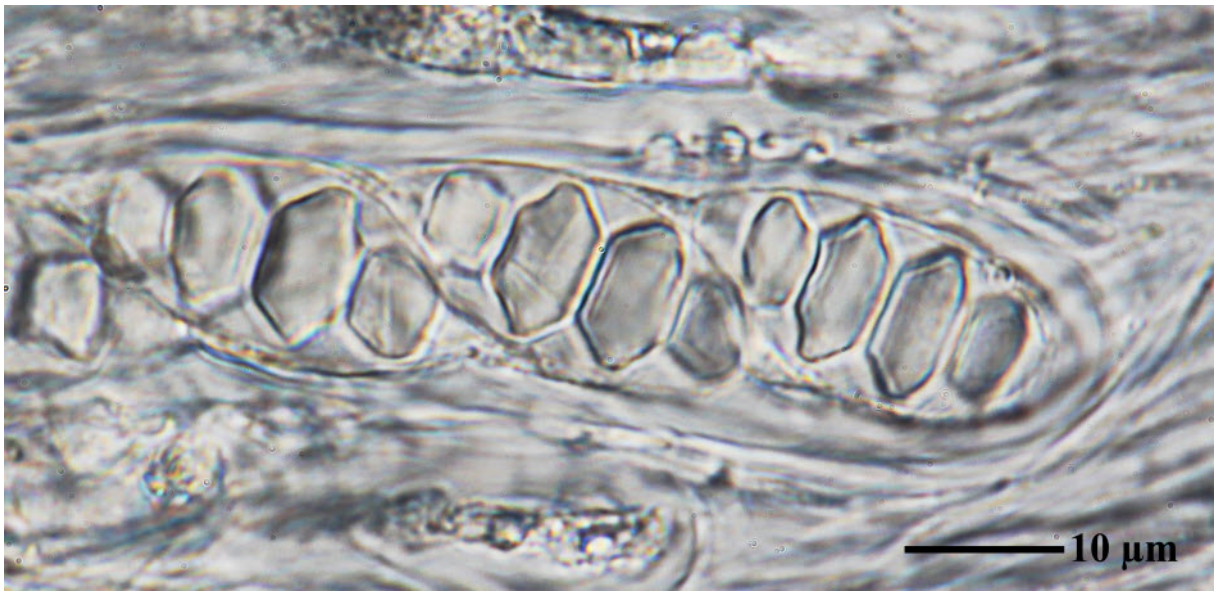
[Sip20843], Costa Rica, prov. San José, Cordillera de Talamanca, c. 5 km W of Cerro de la Muerte, San Gerardo de Dota, along Quebrada Ojo de Agua. 83°48’ W, 9°35’ N, 2800 m. Leg. H. Sipman (no 20843) & A. Chaverri, 21.03.1985, det. A. Aptroot.

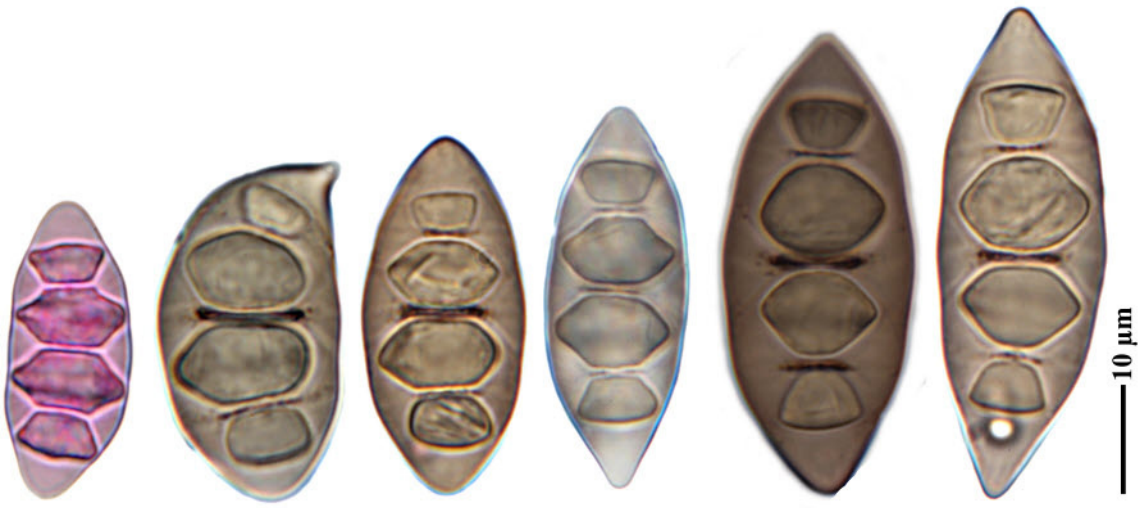




Pyrenula andina







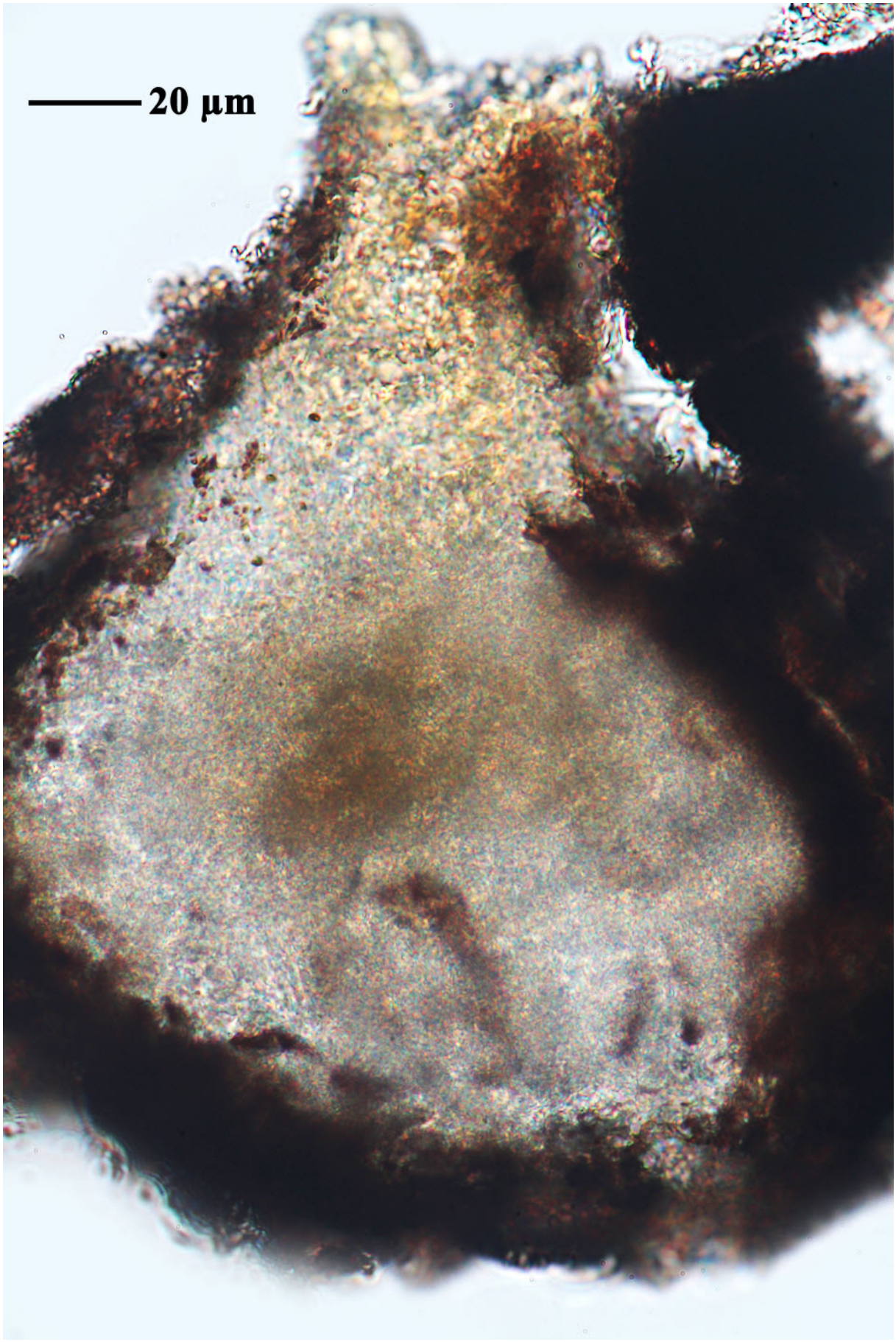
Pyrenula andina

Pyrenula arthoniotheca Upreti, Nova Hedwigia 66(3-4): 566 (1998)
= *Melanotheca arthonioides* (Eschw.) Müll. Arg., Flora, Regensburg 67: 665 (1884)
= *Porodothion arthonioides* (Eschw.) Trevis., (1860)
= *Porothelium arthonioides* Eschw., Syst. Lich.: 26 (1824)
= *Pyrenula arthonioides* (Eschw.) Vain., in Hiern, Cat. Welwitsch Afric. Pl. 2(2): 463 (1901)
= *Verrucaria arthonioides* (Eschw.) Eschw., (1833) [1829-1833]

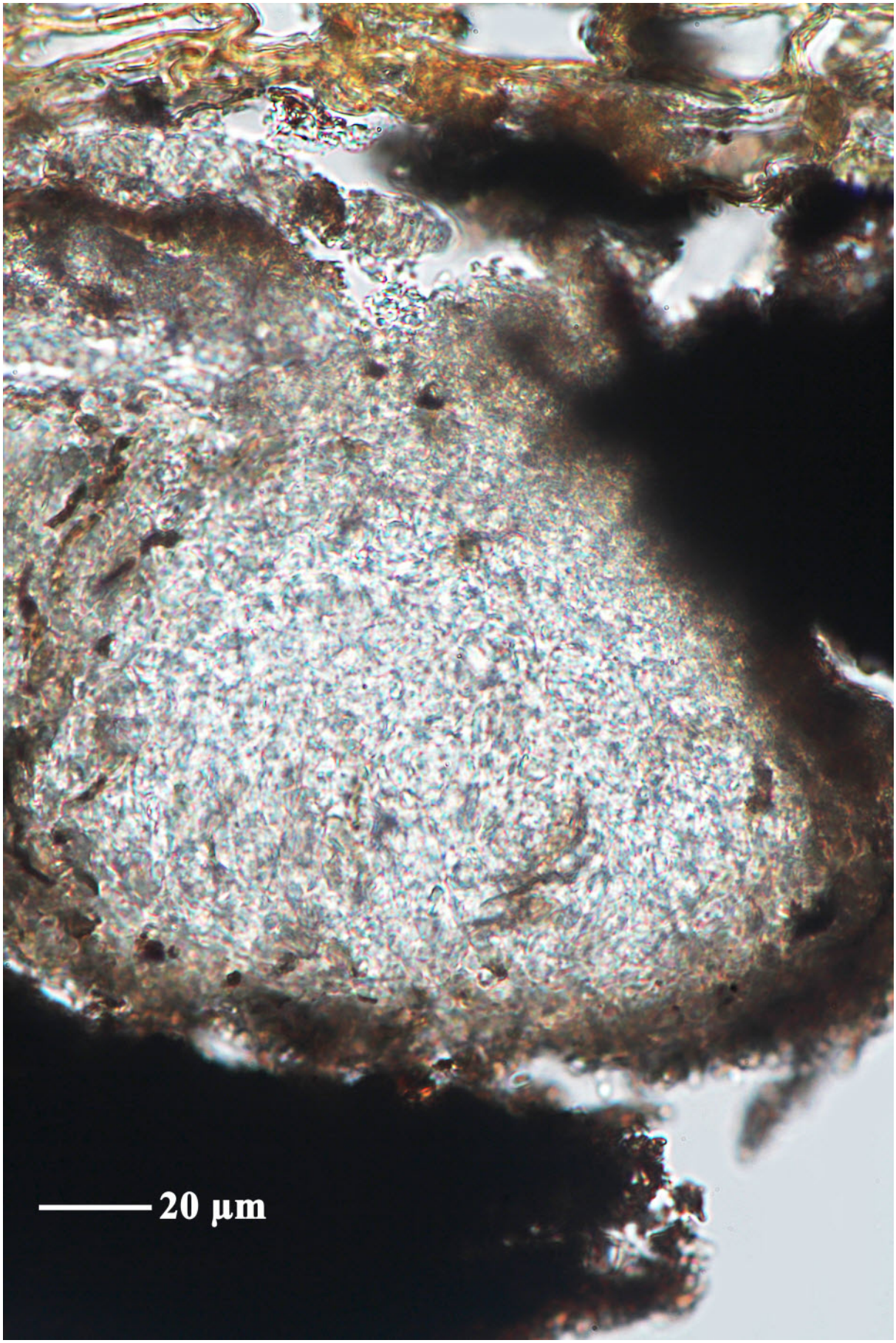
Ascomata densely aggregated in well-delimited, exposed groups, subglobose, c. 0.3–0.6 mm diam.; ostioles mostly apical, whitish; ascospores 4-loculate, 12–15 × 4.5–6 µm, fusiform, with thick apical walls.

[ABL15037], Brazil, Sergipe, Parque dos Falcões, just E of Itabaiana, on tree bark in transitional forest, leg. M. Cáceres & A. Aptroot (no 15037), 11.11.2012, det. A. Aptroot, 2012.

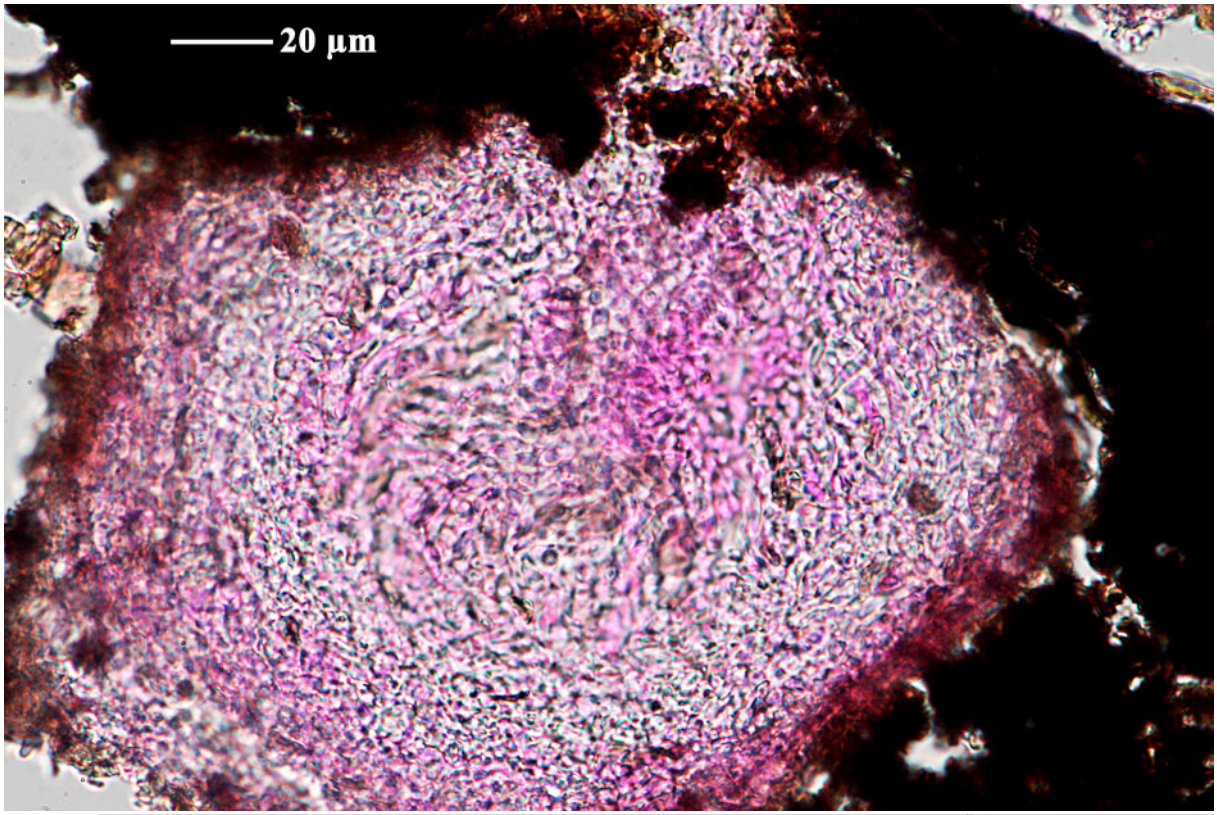


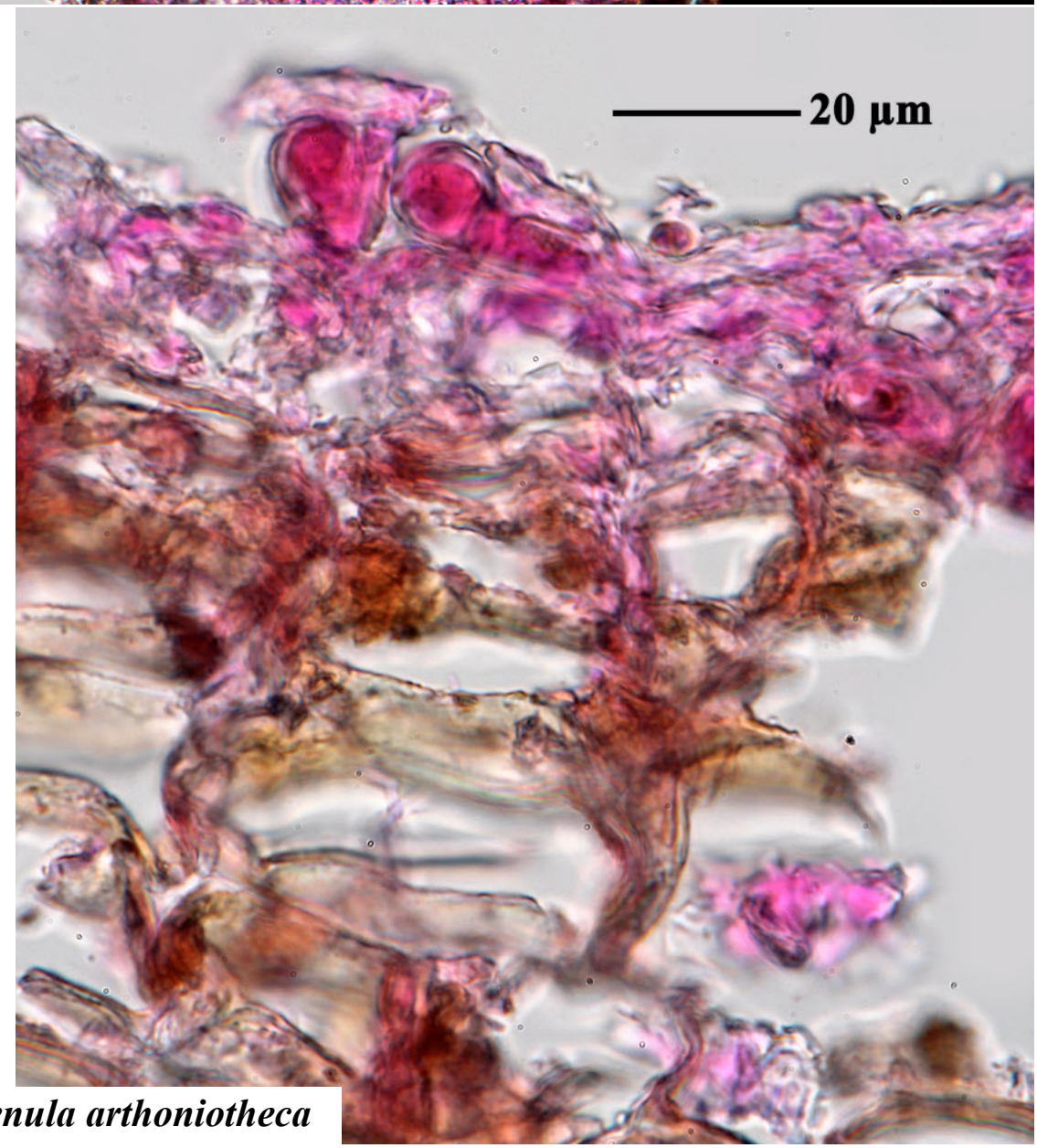


Pyrenula arthoniotheca



Pyrenula arthoniotheca





Pyrenula arthoniotheca

Pyrenula atropurpurea (Eschw.) Müll. Arg., Flora, Regensburg 67(35): 665 (1884)

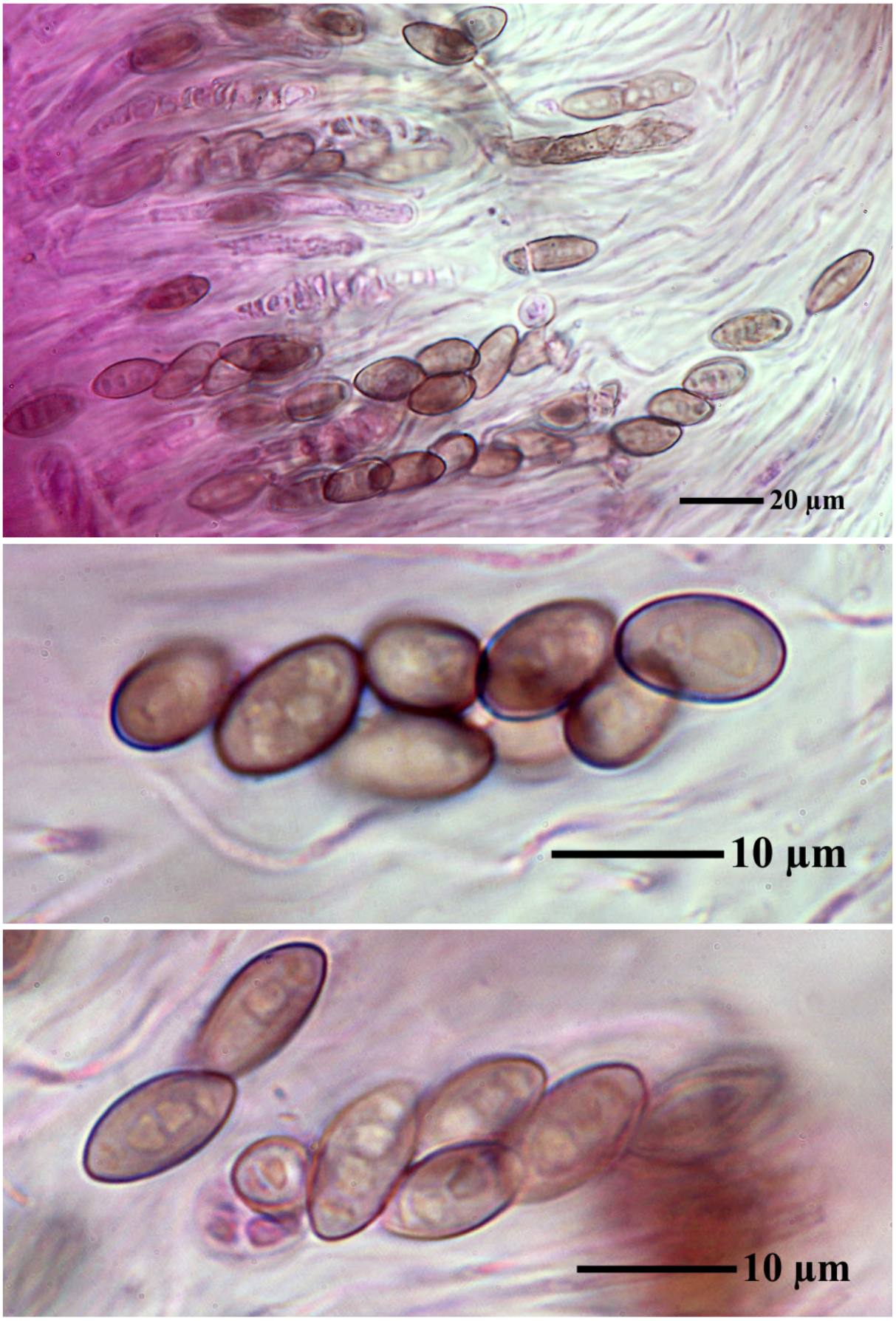
Thallus without pseudocyphellae. Ascomata flat-conical, like *P. mamillana*, c. 0.8 mm diam. Ascospores 3-septate, 11–14 x 4.5–5.5 µm, with thick apical walls. Chemistry: No substances detected.

[Ferraro10547], Argentina, Prov. Misiones,Puerto Iguazú, near Hotel Selvático Don Horazio, on tree bark in evergreen tropical rainforest, 230 m, 25°36'20" S, 54°33'33" W. Leg. L.I. Ferraro (no 10547), A. Aptroot & M. Cáceres, 22.02.2013, det. A. Aptroot, 2013.



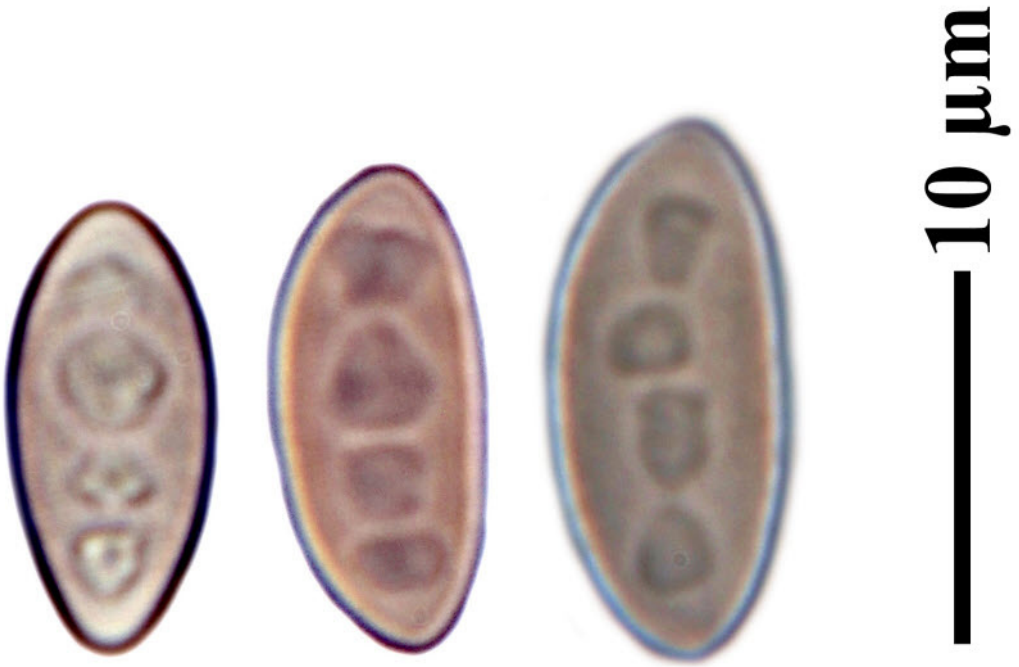


Pyrenula atropurpurea



Pyrenula atropurpurea



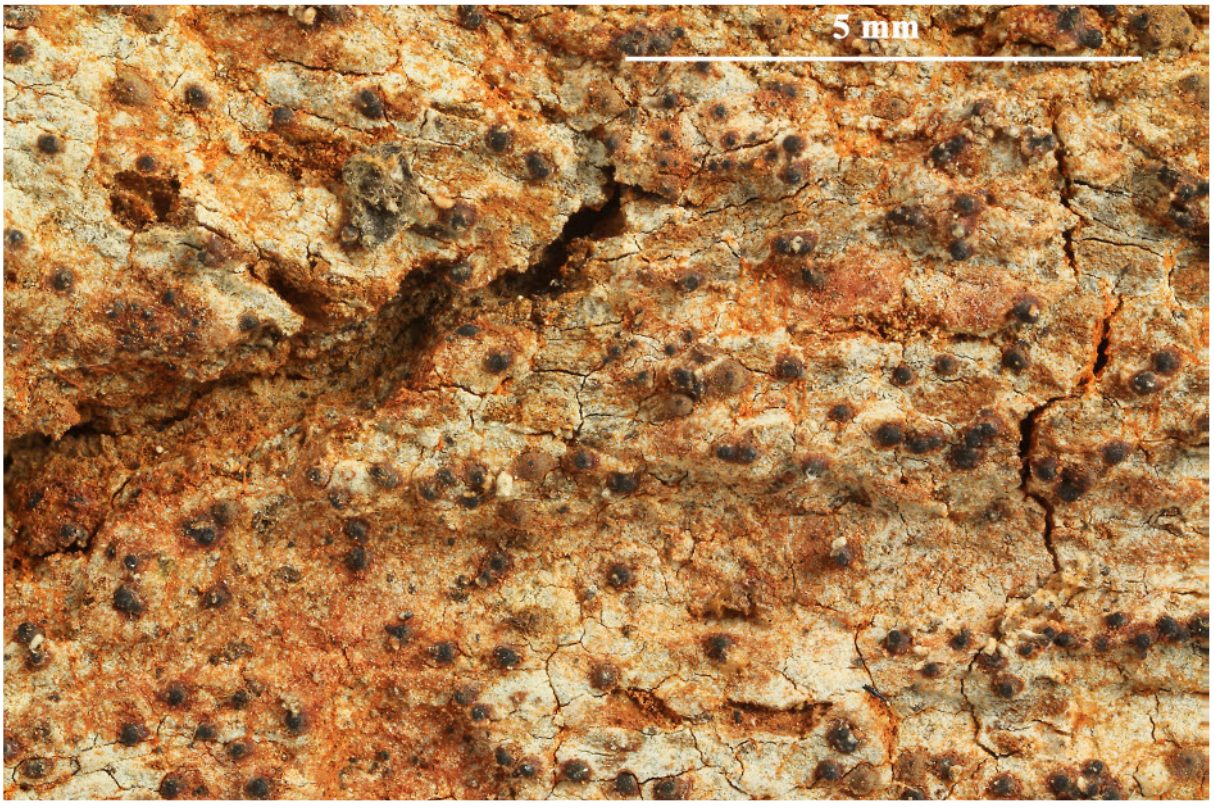


Pyrenula atropurpurea

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

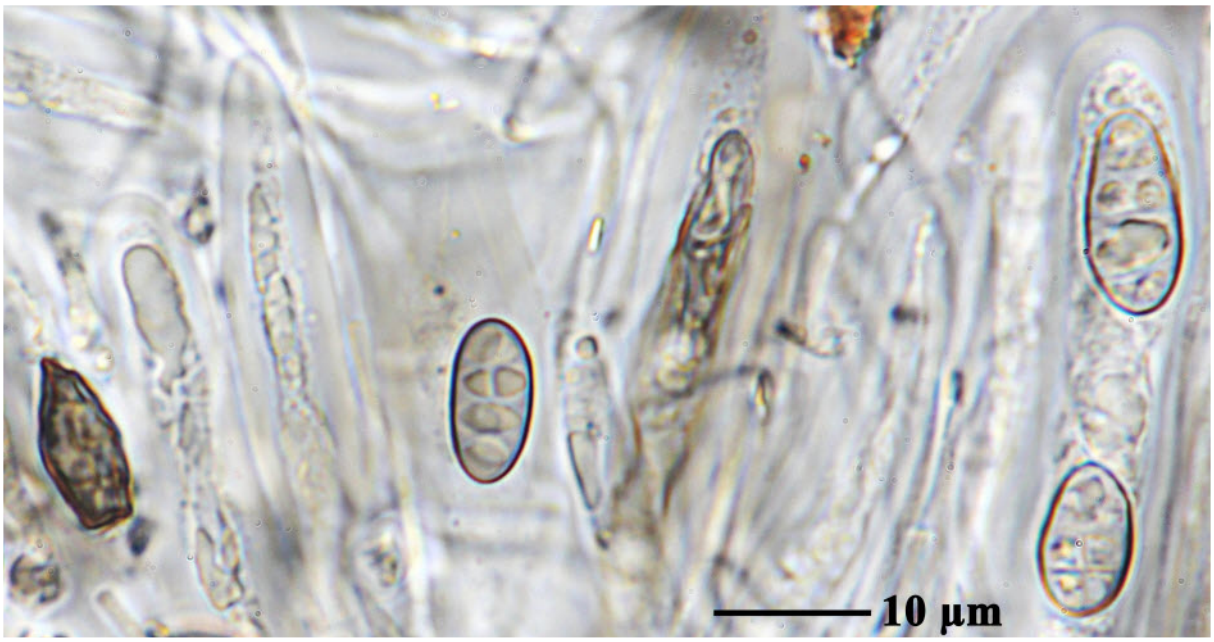
Thallus thin, somewhat granular, orange red mottled with some grey, without pseudocyphellae, without prothallus. Ascomata superficial, globose, 0.2–0.35 mm diam., single, distinctly brown, generally with orange with red pruina. Wall barely carbonized. Ostiole apical, black. Hamathecium not inspersed. Ascospores 8/ascus, brown, irregularly biseriate, muriform, 3(–5) × 1–2-septate, 9–18 × 5–10 µm, lumina mostly rounded. Pycnidia not observed. Chemistry: Pigment K+ deep crimson, UV+ orange. TLC revealed several anthraquinones including 7-chloroemodin as major compound, and one or more derivatives of it as minor compounds; the lower part of the TLC plate is streaked with purple until as high as Rf 4.

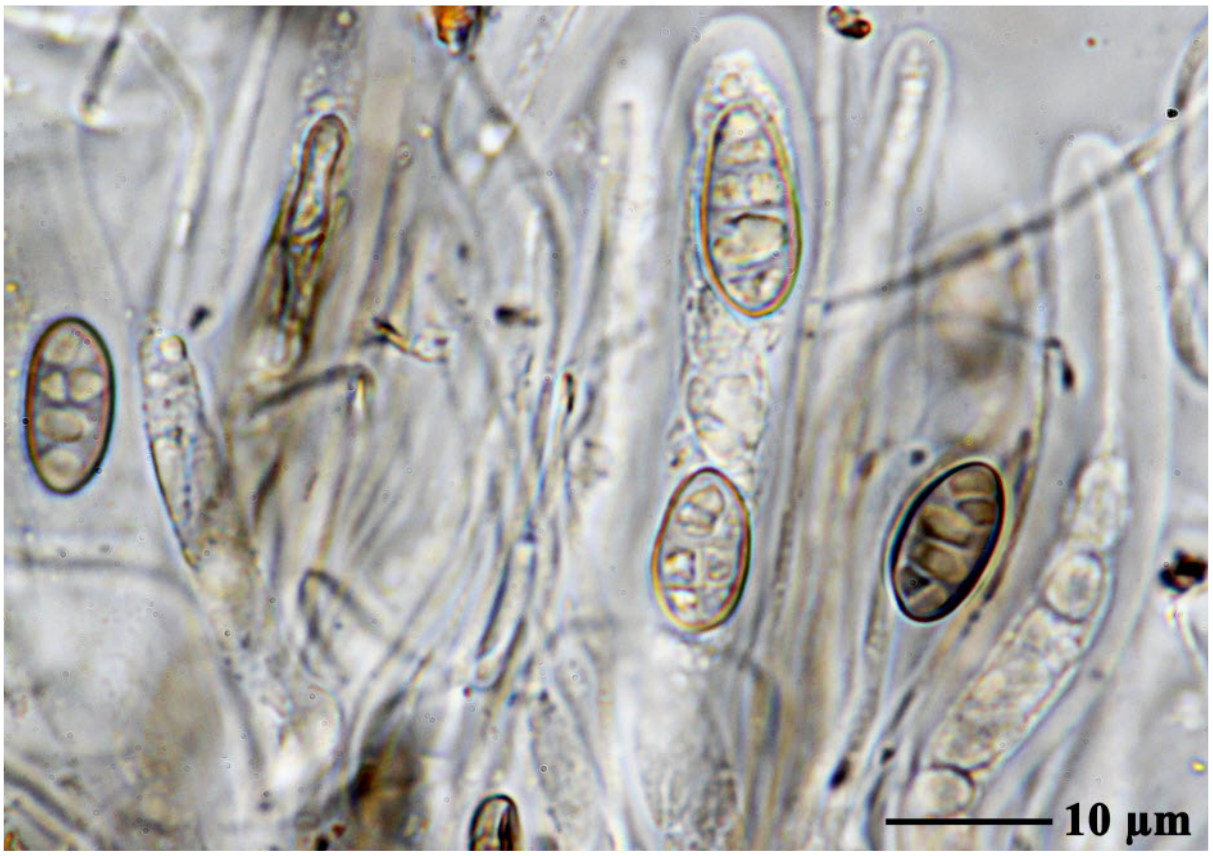
[ABL21677], Brazil. Sergipe, Ribeirópolis, Serra do Machado, 10°33’ S, 37°22’ W, 250 m, on bark of tree in secondary rainforest. Leg. M. Cáceres & A. Aptroot (no 21677), 9.05.2014, det. A. Aptroot, 2014. ISOTYPE.

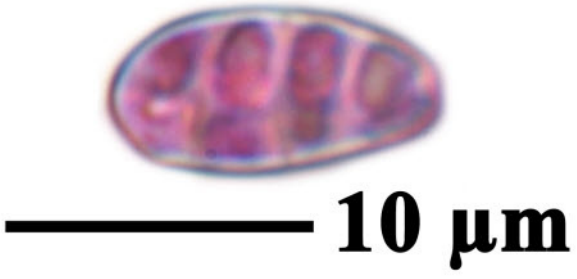




Pyrenula aurantiacorubra







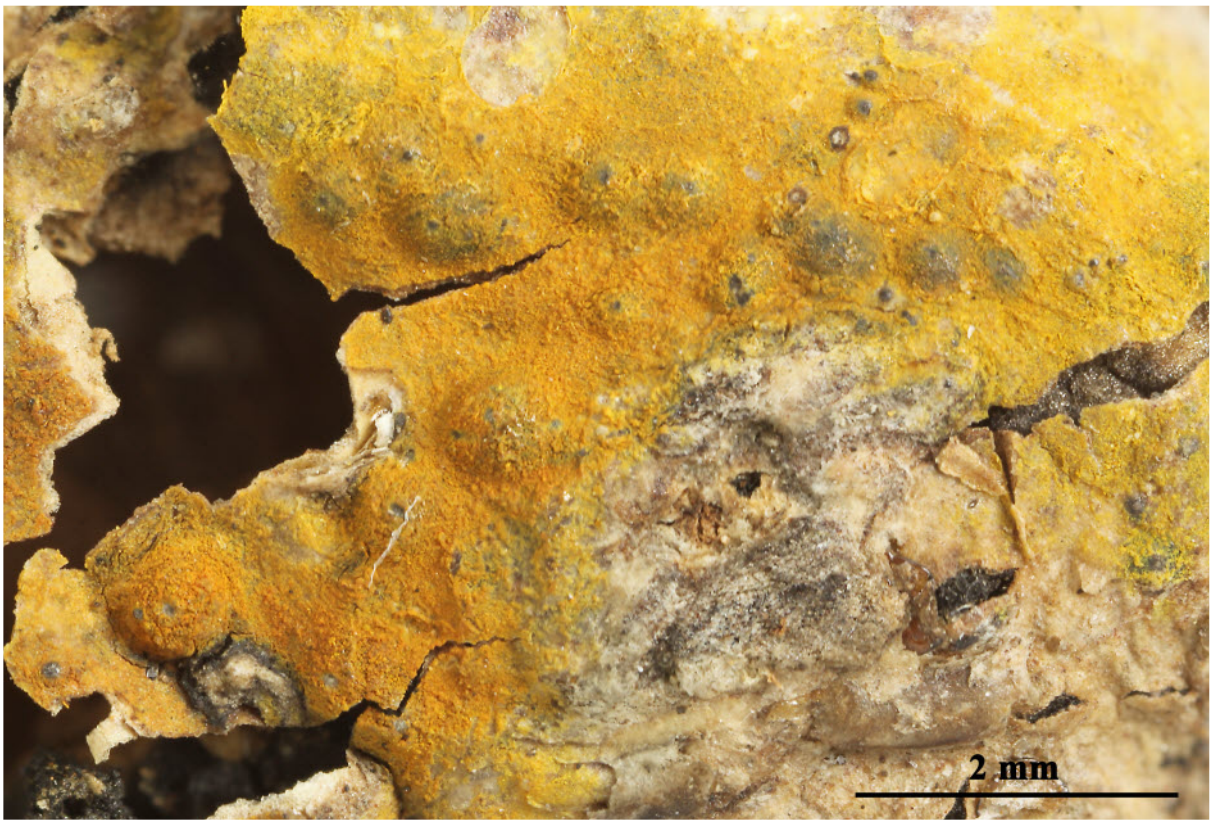


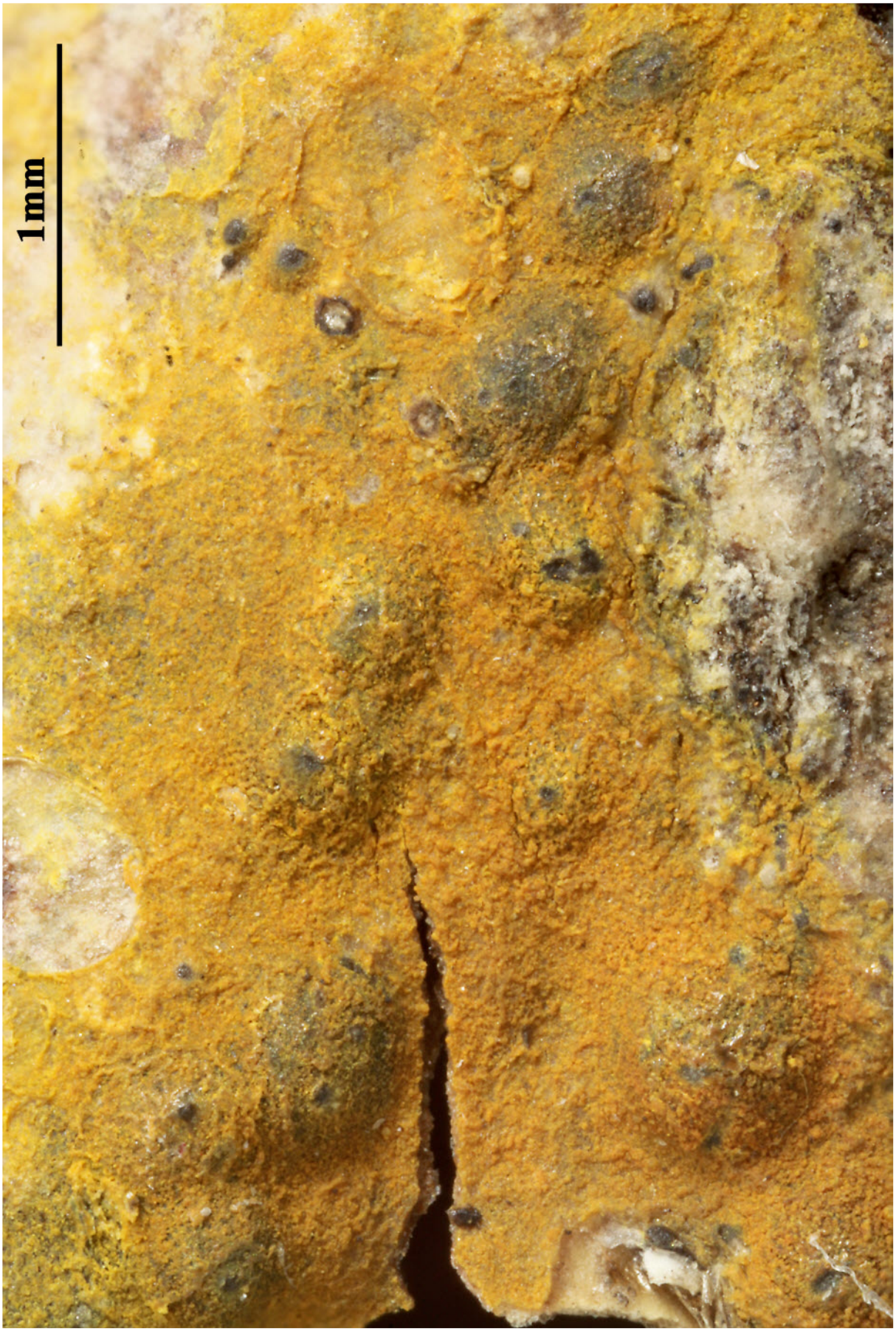
Pyrenula aurantiacorubra

Pyrenula aurantiopileata Aptroot, in Aptroot, Saipunkaew, Sipman, Sparrius & Wolseley, Fungal Diversity 24: 118 (2007)

Thallus covered by reddish, K+magenta UV+ orange pruina, without pseudocyphellae. Ascomata erumpent, covered by red pruina, flattened, c. 0.4–0.7 mm diam., 0.3–0.5 mm high; ostioles black. Hamathecium heavily inspersed with colorless oil globules, gel IKI+ bluegreen. Ascospores pale grey, 3-septate, 19–22 x 10–12 µm, with rounded locules, apical locules thin-walled and bulging out (*pseudobufonia*-type).

[Allen430], Thailand, Chiang Dao Wildlife Sanctuary Biodiversity Survey, C.M.U. Dept. of Biology, Spine ridge with Erica sp., on trunk, 1.5 m. Leg. D. Allen (no 430), 02.12.1995, det. A. Aptroot. ISOTYPE.





Pyrenula aurantiopileata



Pyrenula aurantiopileata

Pyrenula aurantiothallina C.O. Mendonça, Aptroot & M. Cáceres, Phytotaxa 286(3): 170 (2016)

Thallus rather thick, with uniformly orange surface, smooth, dull, corticate, without pseudocyphellae, without a prothallus. Algae trentepohlioid. Ascomata erumpent, low conical, simple, 0.7–1 mm diam., not covered by thallus. Ostioles apical, brown. Hamathecium inspersed with hyaline oil droplets. Asci with 8 uniseriate ascospores. Ascospores not curved, brown, 3-septate, 19.5–22.5 × 7–8.5 µm, generally somewhat constricted at the septa, lumina diamond-shaped, wider than long, terminal lumina not directly against the outer wall, without granules in the wall, without gelatinous layer, upper and lower end somewhat pointed, without ornamentation. Pycnidia not observed. Chemistry: Thallus KOH+ purple, UV–. TLC: unidentified anthraquinone.

[ISE23953], Brazil, Bahia, Povoado Ouro Verde, Catolé, Chapada Diamantina, 12°37’ S, 41°21’ W, 1200 m, on tree bark. Leg. C. Mendonça (no ISE 23953), 10.01.2015, det. A. Aptroot, 2015. ISOTYPE.







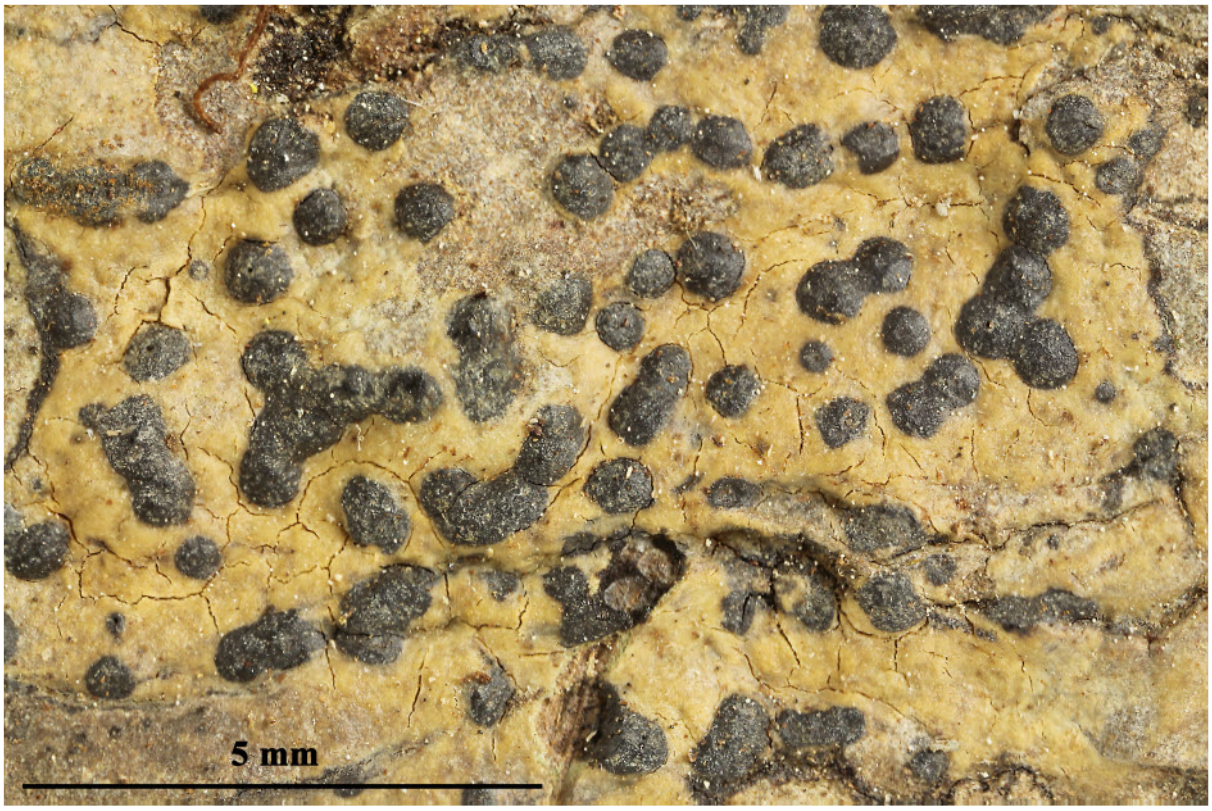


Pyrenula aurantiothallina

Pyrenula balia (Kremp.) R.C. Harris, Lichenogr. Thomsoniana, North American Lichenology in Honor of John W. Thomson (Ithaca): 141 (1998)
= *Verrucaria balia* Kremp., Nuova Giorn. Boz. Ital. 7: 48 (1875)
= *Pseudopyrenula balia* (Krempelh.) Müll. Arg.
= *Pyrenula mamillana* var. *santensis* (Nyl.) Trevis.
= *Pyrenula marginata* var. *santensis* (Nyl.) Tuck.
= *Pyrenula santensis* (Nyl.) Müll. Arg.
= *Pyrenula nitida* var. *commutata* Trevis.
= *Pyrenula deplanata* Müll. Arg.
= *Pyrenula longislandica* Ajay Singh & Upreti
= *Verrucaria marginata* var. *santensis* Nyl.
= *Verrucaria santensis* (Nyl.) Nyl.
= *Verrucaria hymnothora* Krempelh. (nom. illeg.)

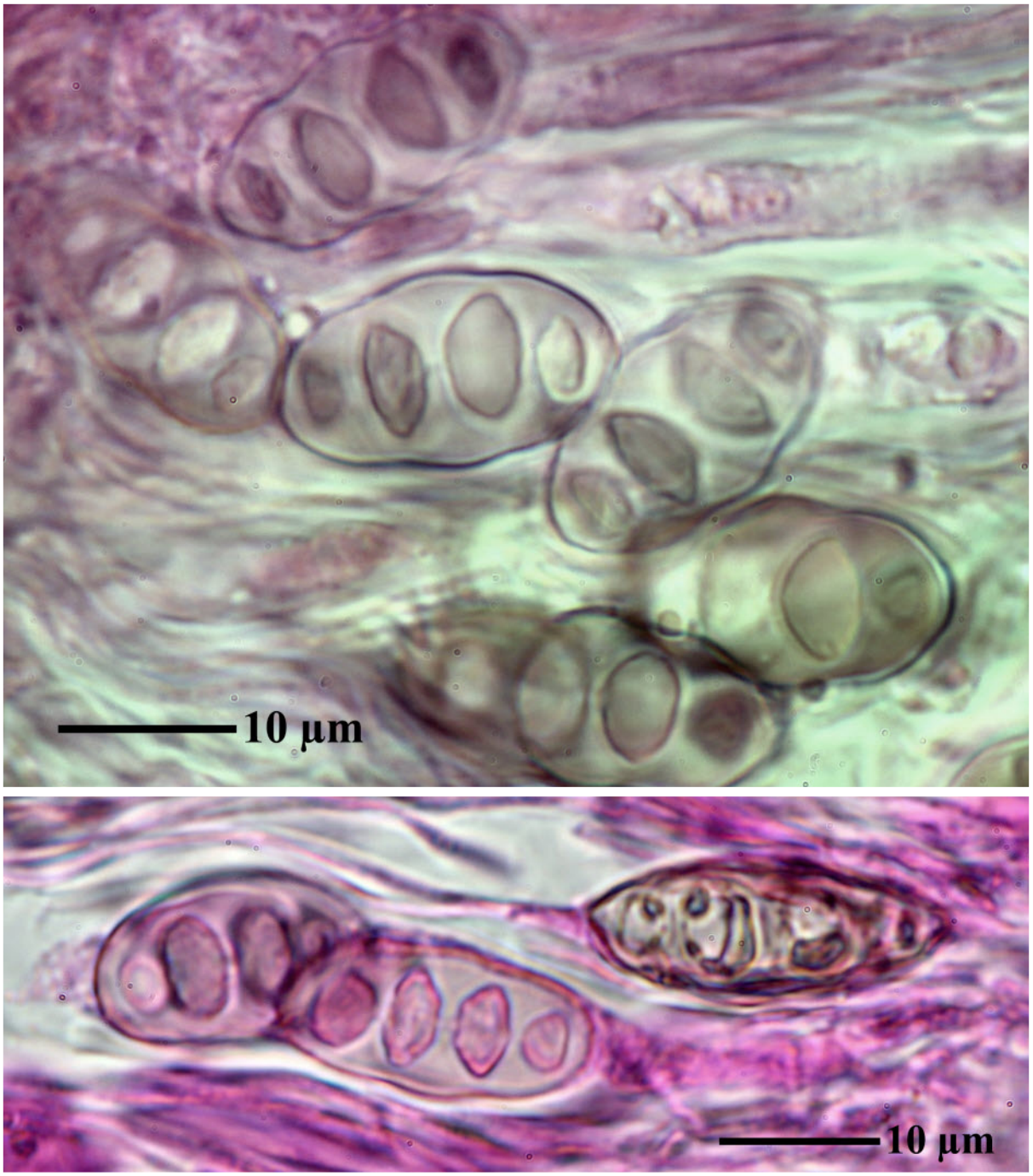
Thallus thin, with pseudocyphellae. Ascomata conical, superficial, sides often partly thallus-covered, c. 0.7–1.2 mm diam.; ostioles apical, pale; ascospores 3-septate, 15–19 x 5–8 µm, fusiform, with thick apical walls. Chemistry: No substances detected. Another species without any distinguishing special characters. It was described many times, or may be several species are hidden now in this taxon.

[ABL26350], Hawaii, Oahu Island, Honolulu, Lyon Arboretum, Manoa Road, on palm tree in open park. 21°20’ N, 157°47’ W, 300 m. Leg. A. & M. Aptroot (no 26350), 8.-13.06.1989, det. A. Aptroot, 1989.





Pyrenula balia

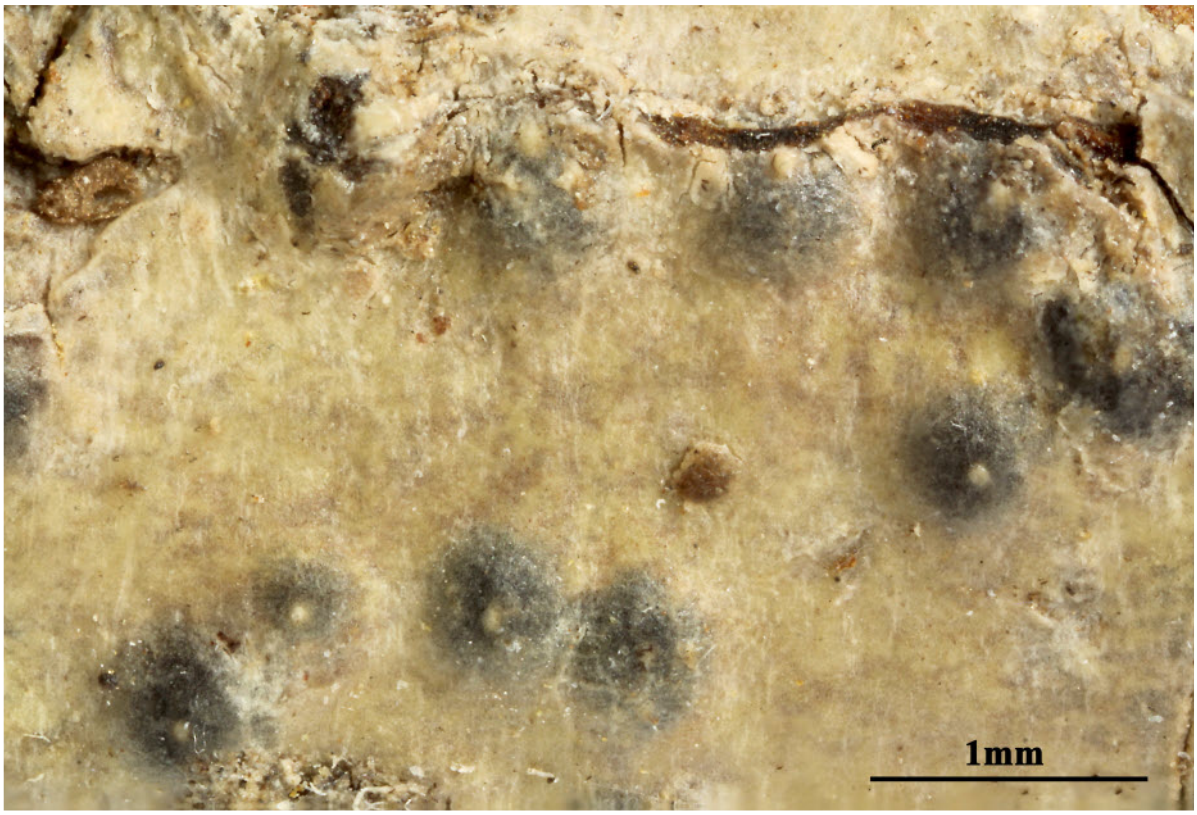


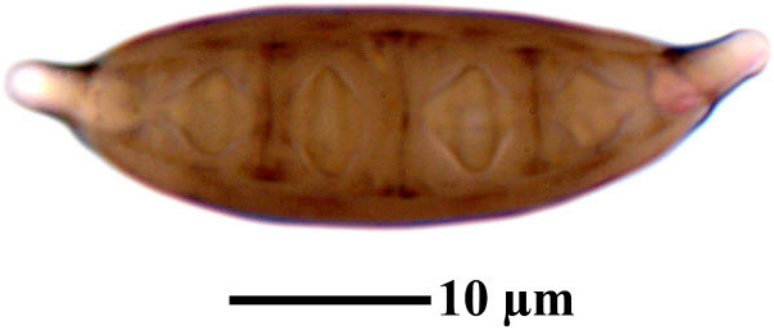
Pyrenula balia

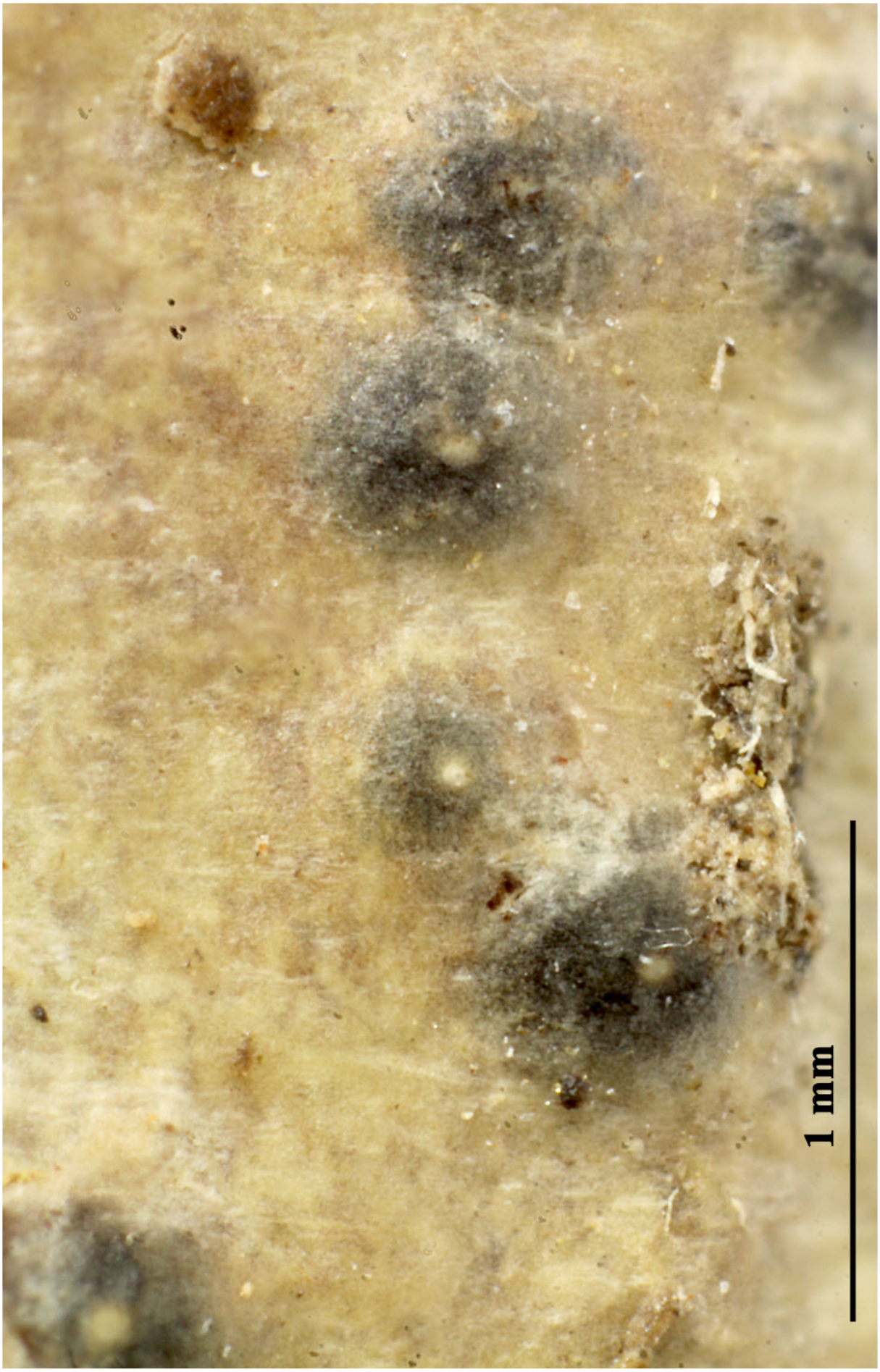
Pyrenula bicuspidata Müll. Arg., Hedwigia 32: 136 (1893)

Thallus brownish to olive-green, lacking pseudocyphellae, corticate. Ascomata solitary, subglobose, erumpent from the substratum, the sides often partly covered by the thallus, c. 0.5–1 mm diam. Ascomatal wall without crystals, to 100 µm thick; ostiole apical, pale. Hamathecium not inspersed with oil droplets. IKI–. Ascospores 8 per ascus, irregularly biseriate, 3-septate, but seemlingly 5-septate, elongate-fusiform, brown, 35–47 × 7–14 µm; apices with attenuated and bent tapering „tails“; lumina elongate. Chemistry: No substances detected.

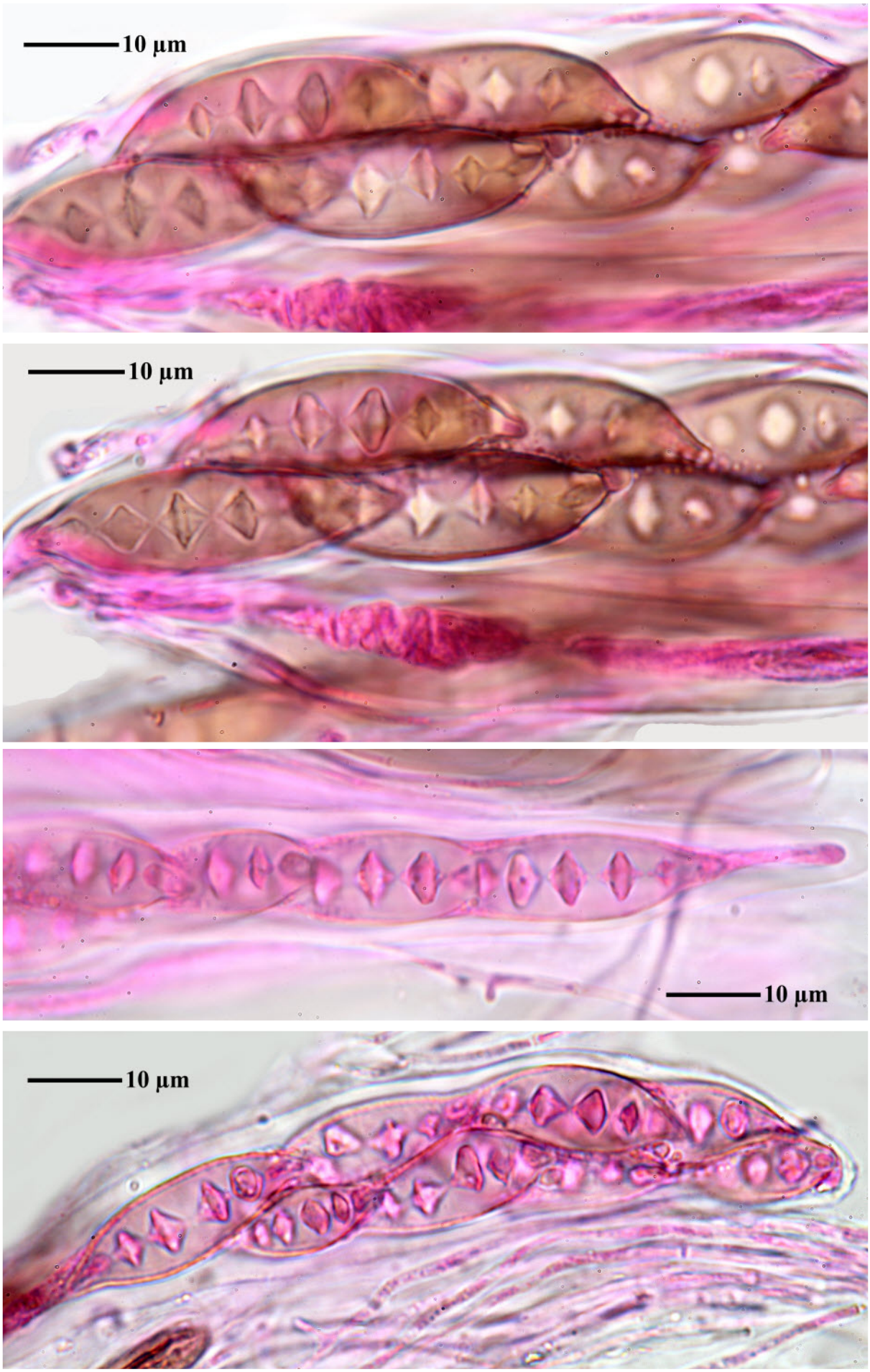
[Hafellner16503], Australia, New South Wales, McPherson Range, Gradys Creek E of Cougal, at the edge of the Border Ranges National Park, at the edge of a rainforest, 800 m, 28°21’30” S, 153°00’30” E. Leg. J. Hafellner (no 16503), P. Merrotsy & R. Rogers, 29.08.1986, det. A. Aptroot, 2007.







Pyrenula bicuspidata

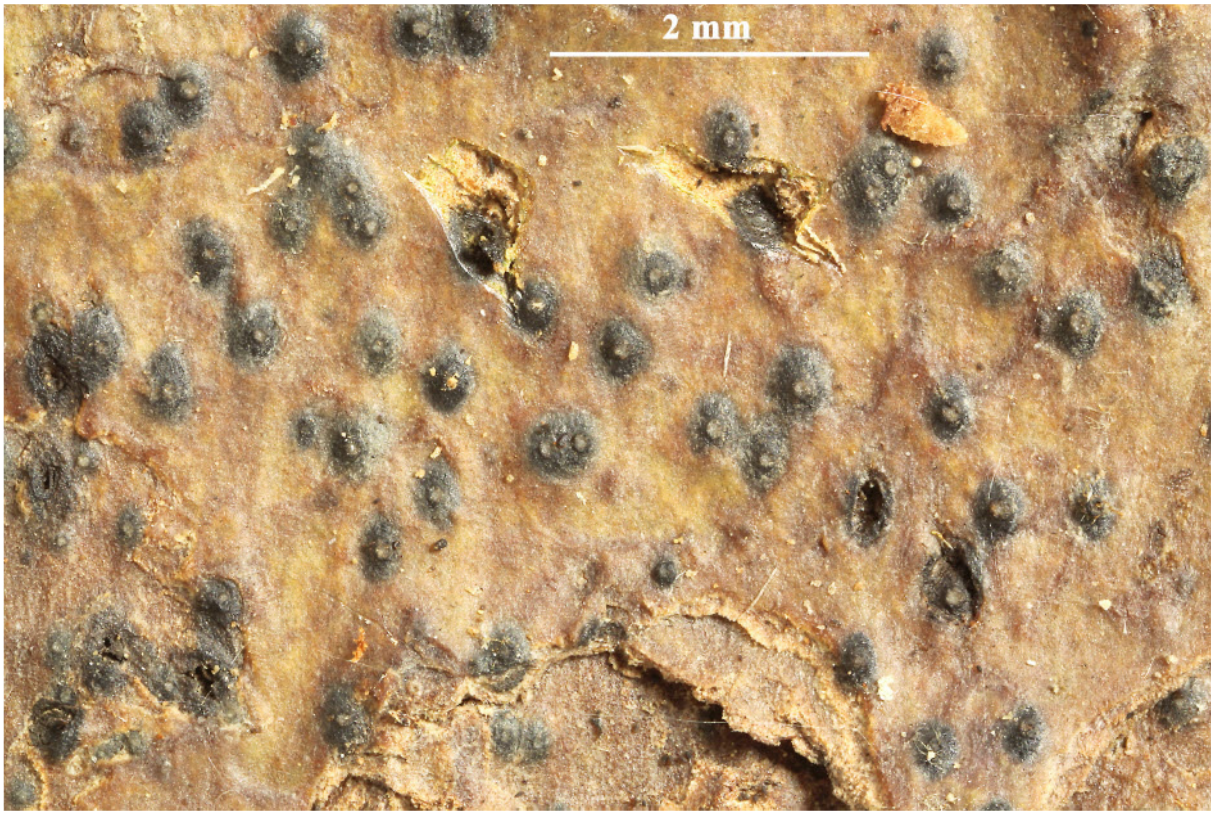


Pyrenula bicuspidata

Pyrenula biseptata Aptroot & M. Cáceres, in Aptroot, Sipman, Mercado Diaz, Mendonça, Feuerstein, Cungy-Diaz, Pereira & Caceres, Lichenologist 50(1):78 (2018)

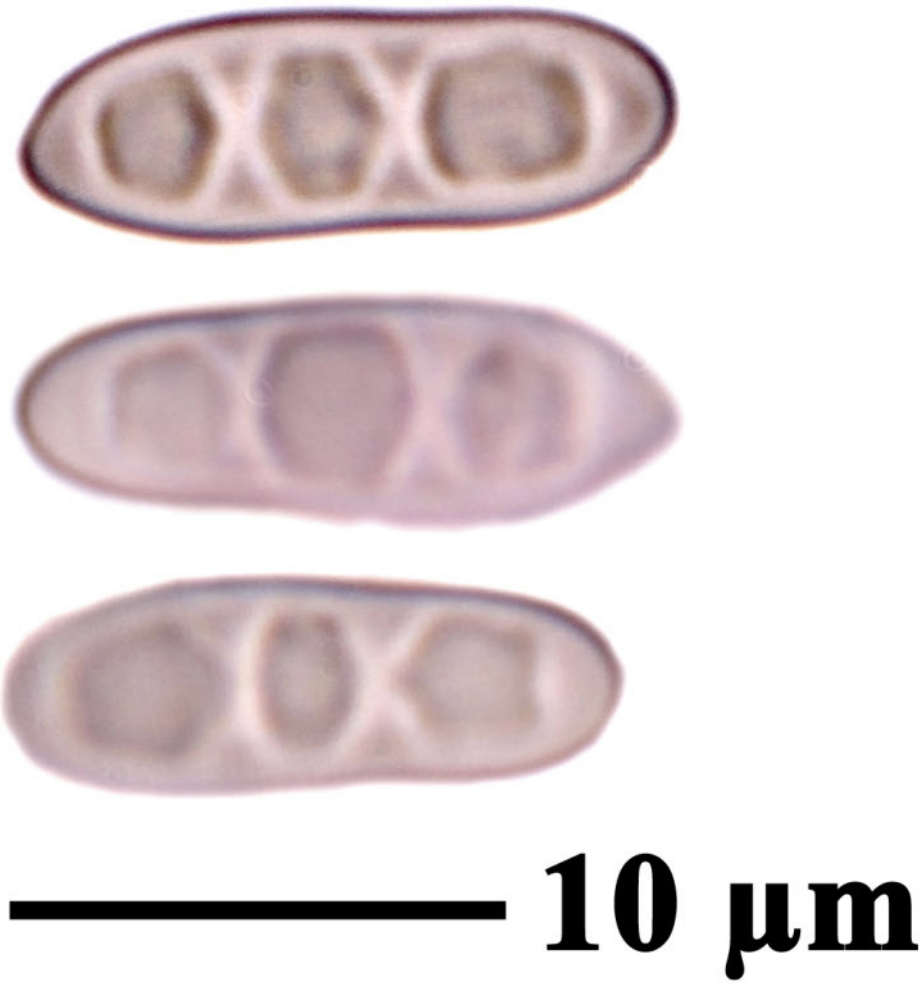
Thallus corticate, smooth, continuous, thin, dark brown, without pseudocyphellae or pockets of crystals; algal cells trentepohlioid. Ascomata perithecioid, simple, dispersed, flat conical, superficial, often elongated, 0.2–0.4 mm diam., black, without thallus covering. Wall more or less equally carbonized, without crystals, 50 µm thick. Ostioles apical, brown. Hamathecium hyaline, heavily inspersed with oil droplets. Asci cylindrico-clavate, with 8 irregularly arranged ascospores. Ascospores brown, 2-septate, long ellipsoid, without constrictions, 11–12(–13.5) × (4.0–)4.5–5.0 µm, ends rounded; lumina rounded to diamond-shaped, terminal lumina separated from the end wall by an endospore layer. Pycnidia not observed. Chemistry: No secondary lichen substances detcted.

[ISE40367], Brazil, Pará. Fazenda Pantera, 85 km N of Dom Eliseu, in primary tropical lowland rain forest on bark of tree. 3°49’54” S, 48°03’37”, leg. M. Cáceres & A. Aptroot (no 40367), 20.10.2016, det. A. Aptroot, 2016. ISOTYPE.





Pyrenula biseptata

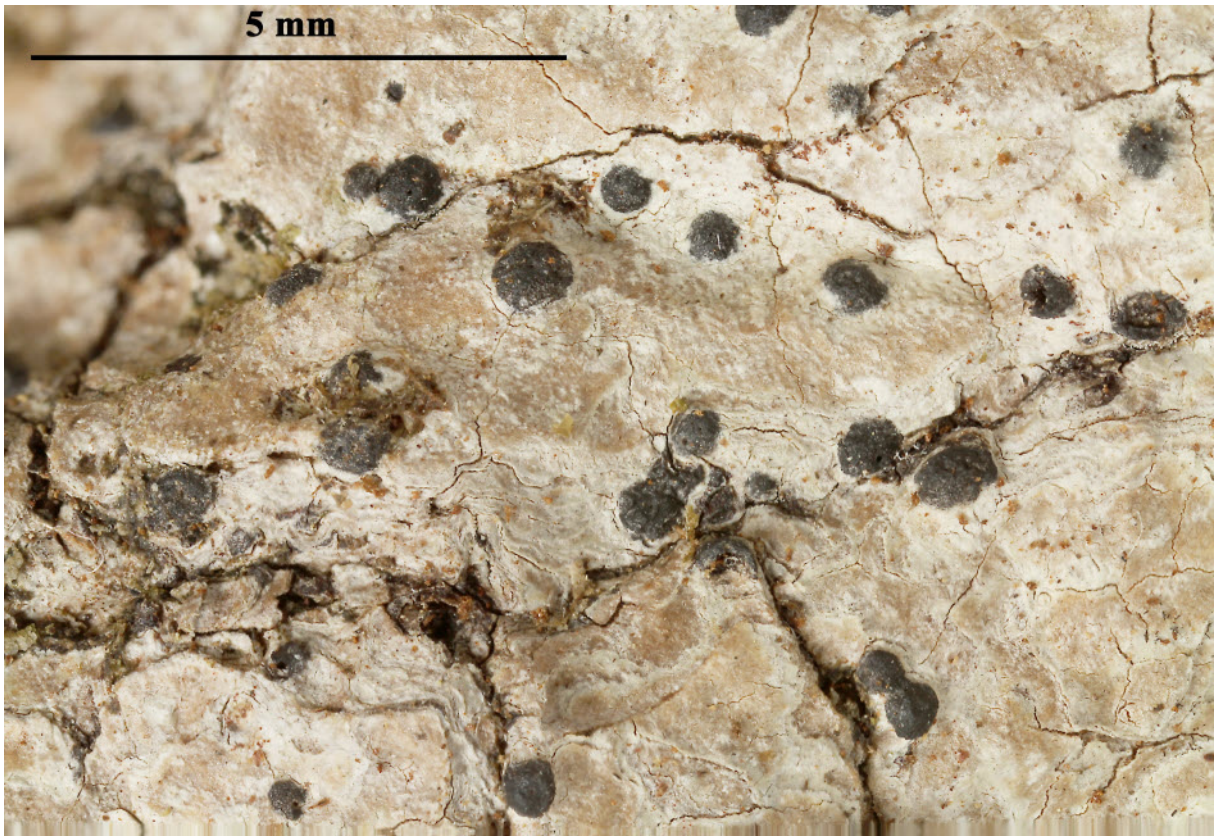


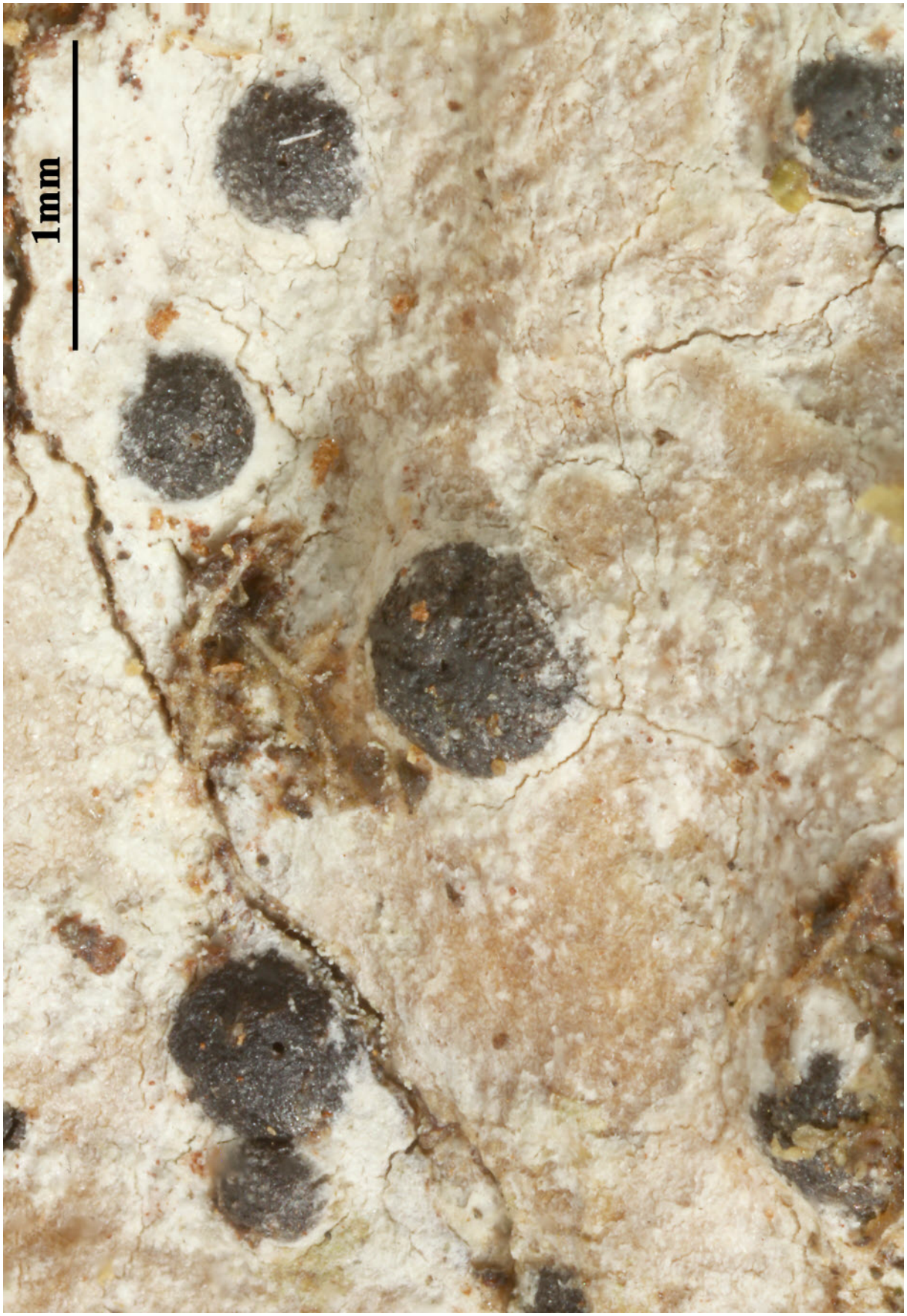
Pyrenula biseptata

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

Thallus not corticate, smooth, continuous, thin, whitish, without pseudocyphellae, without prothallus line; algae trentepohlioid. Ascomata perithecioid, simple, dispersed, hemispherical, emergent, 0.4–0.7 mm diam., black, edges with thallus covering. Wall only carbonized above, extending sideways as a clypeus, without crystals, up to c. 100 µm thick. Ostioles black, apical. Hamathecium hyaline, densely inspersed with oil droplets. Asci cylindrico-clavate, with 2 ascospores. Ascospores brown, densely distoseptately muriform, fusiform, 55–75 × 19–23 µm. Pycnidia not observed. Chemistry: No reactions with K or UV; no secondary substances detected.

[ABL15683], 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 15683), 20.11.2012, det . A. Aptroot, 2012. ISOTYPE.





Pyrenula bispora

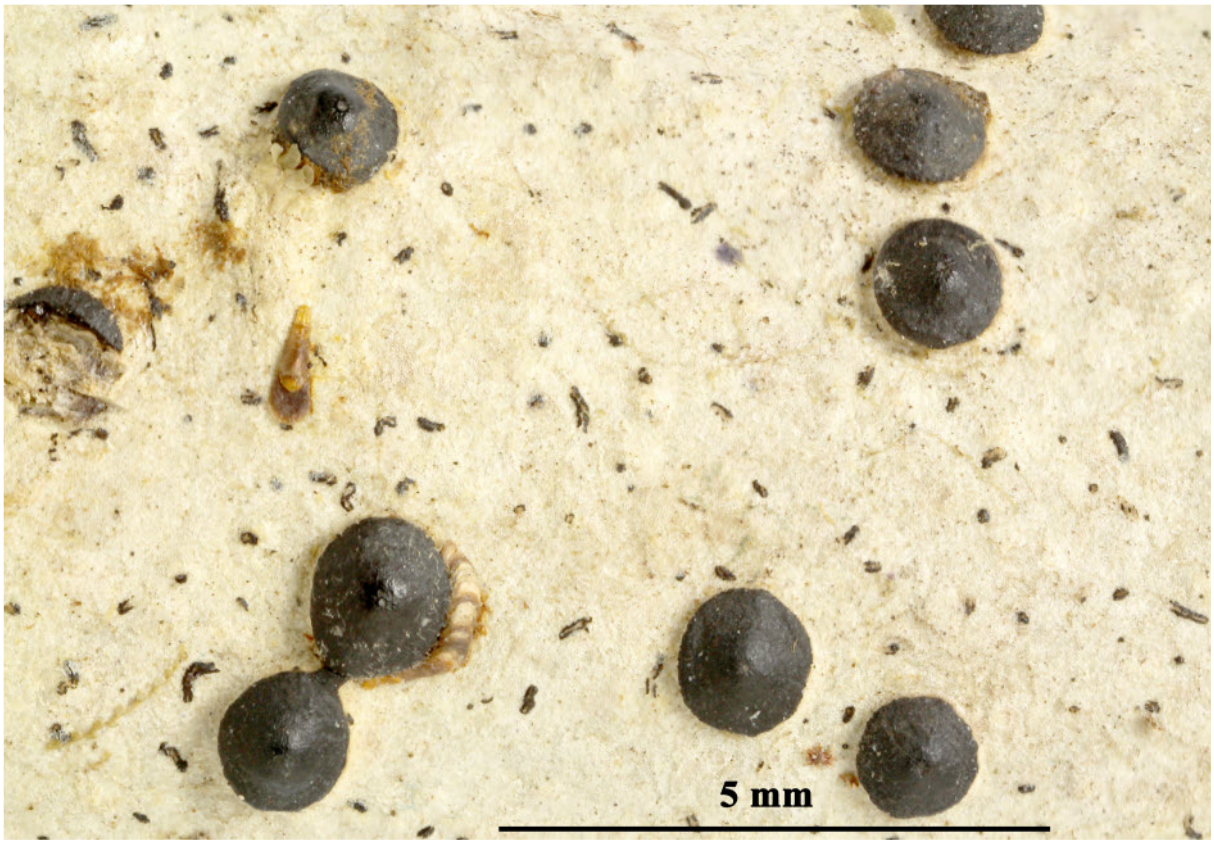


Pyrenula bispora

Pyrenula borneensis Aptroot, Lichenologist 44(5): 611 (2012)

Thallus corticate, smooth, continuous, thin, pinkish white, without pseudocyphellae or pockets of crystals; algae trentepohlioid. Ascomata perithecioid, simple, dispersed, conical, emergent, 0.5–1.3 mm diam., black, edges without thallus covering. Wall only carbonized above, extending sideways as a clypeus, without crystals, KOH–, c. 150 mm thick. Ostioles black, KOH–, apical. Hamathecium hyaline, densely inspersed with oil droplets. Asci cylindrico-clavate, IKI–, with 8 uniseriate ascospores. Ascospores brown, IKI–, muriform with 3 primary transverse eusepta and 2–5 locules per row, fusiform, without constrictions at the septa, (19–)20–26(–28) × (8–)10–12(–13) µm, ends rounded, lumina mostly rounded or irregularly elongated. Pycnidia not observed. Chemistry: No substances detected.

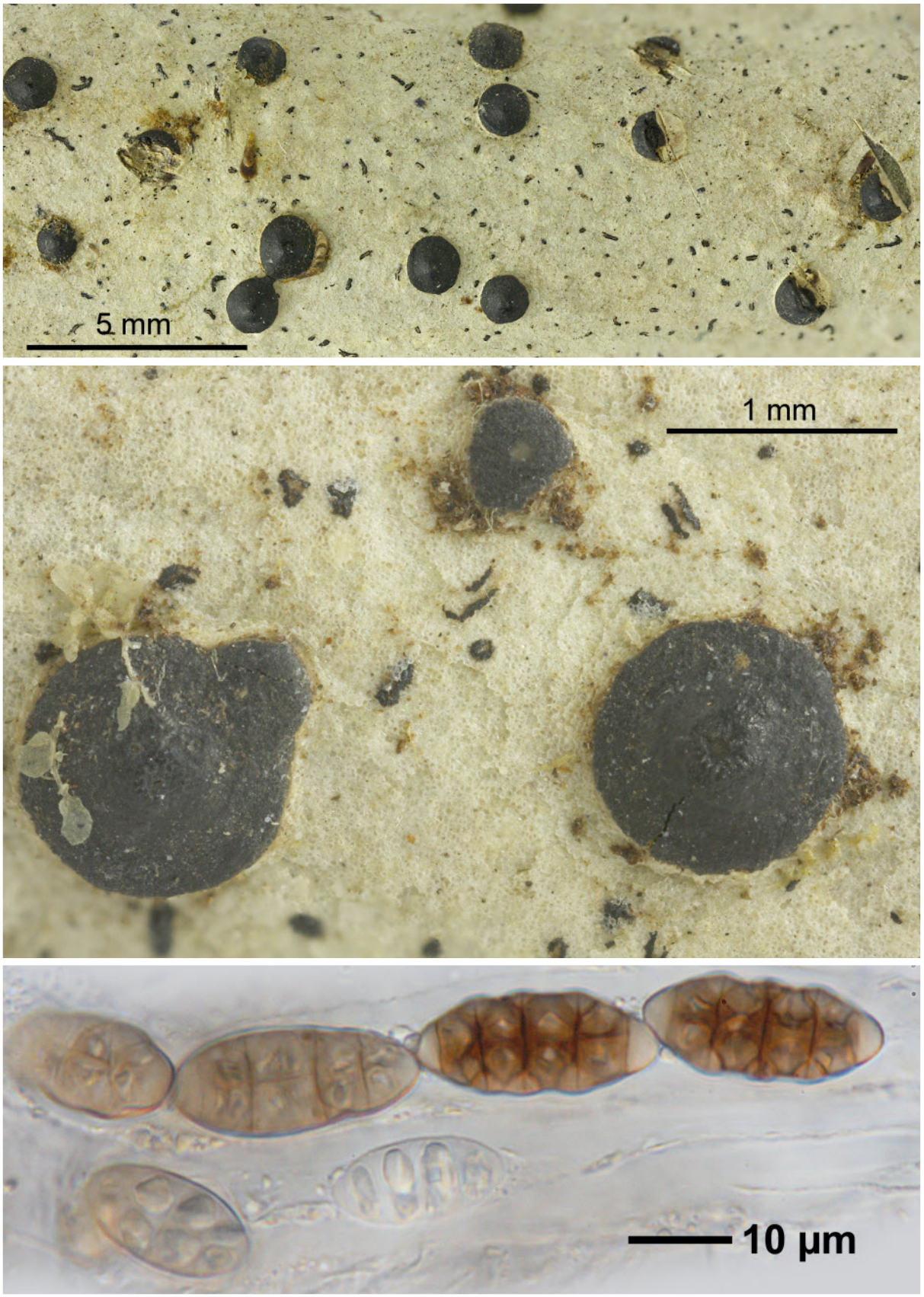
[Coppins5126], Borneo, Gunong Mulu National Park, 4th Division, Baram District, Valley of Ulu Jerneh (Hidden Valley), on twigs and stem of young tree, c. 500 m. Leg. B. J. Coppins (no 5126), 7.04.1978, det. A. Aptroot. ISOTYPE.



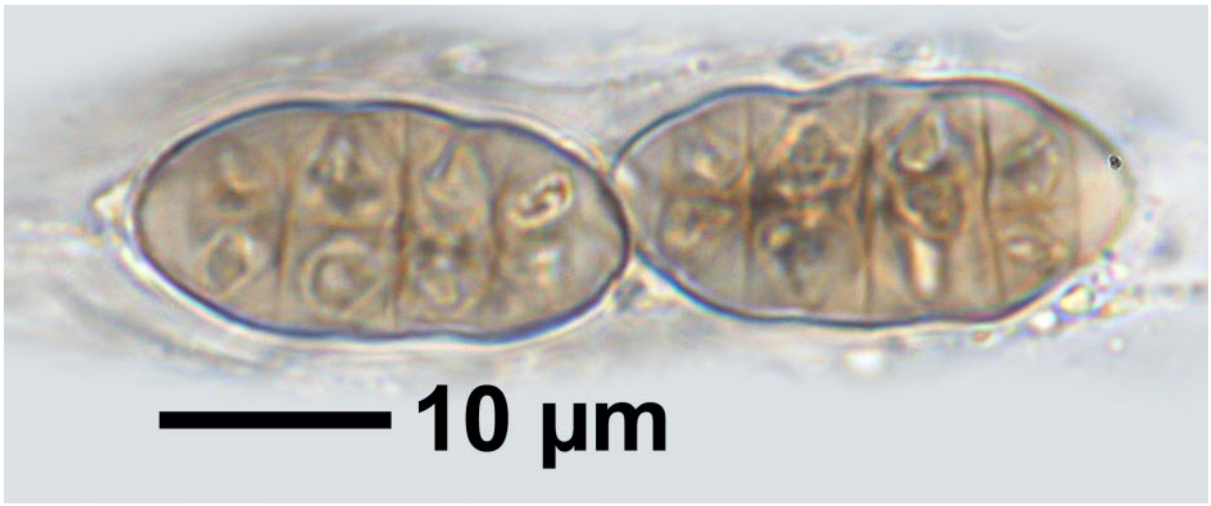




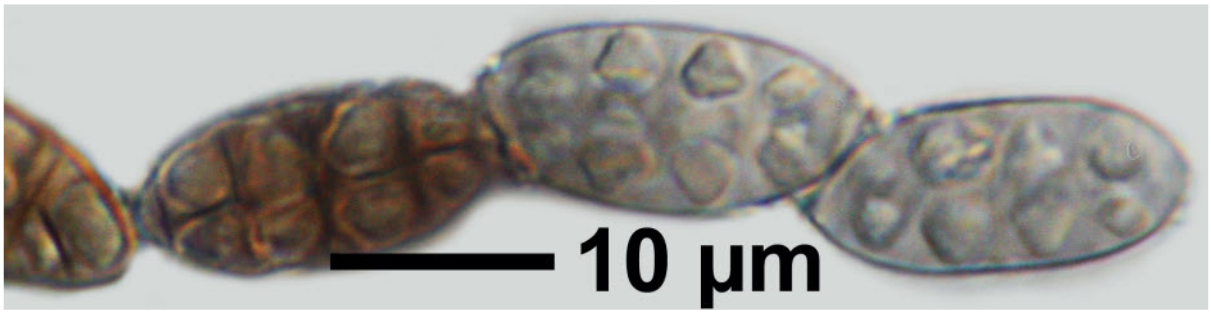
Pyrenula borneensis



Pyrenula borneensis

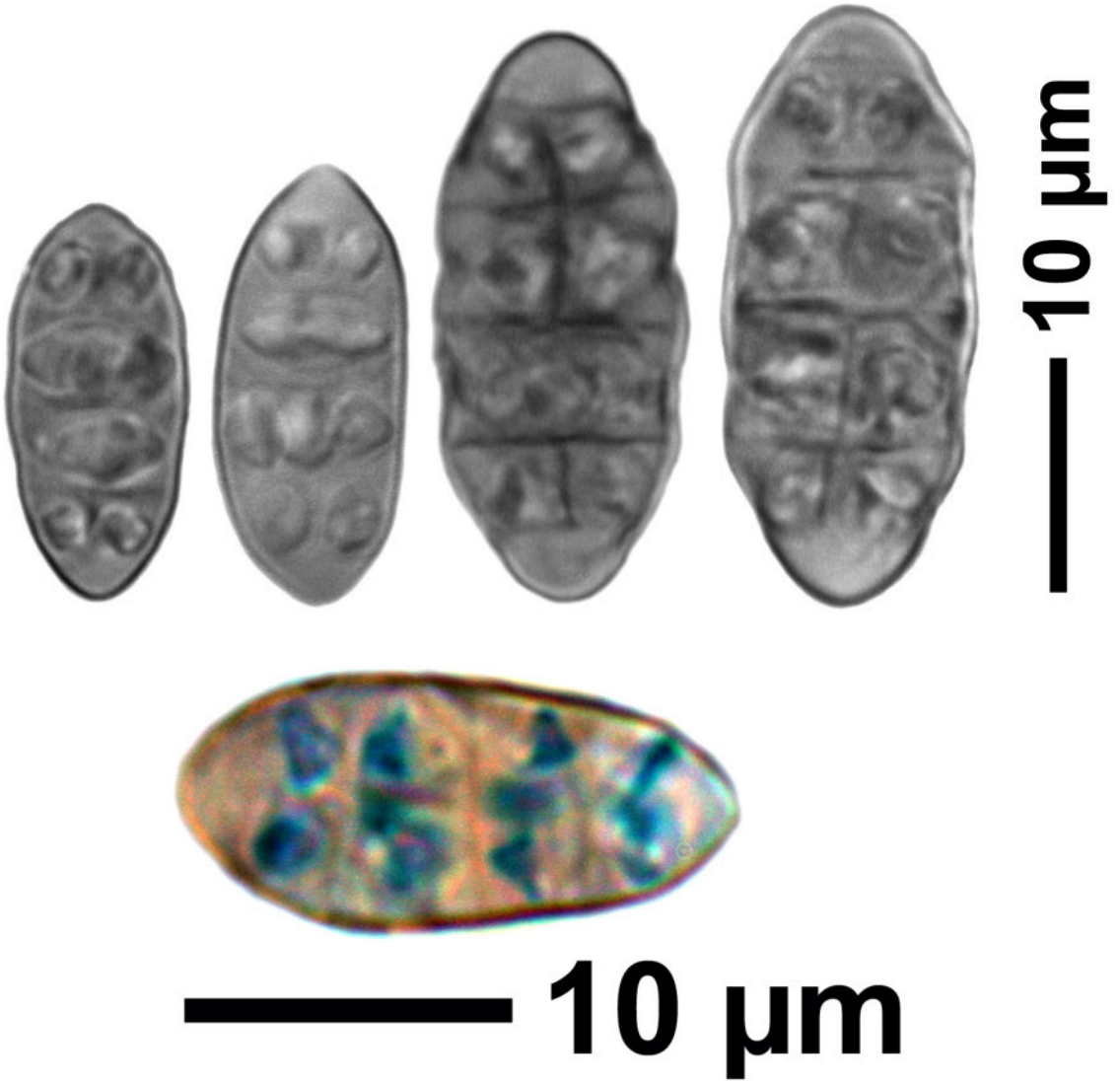






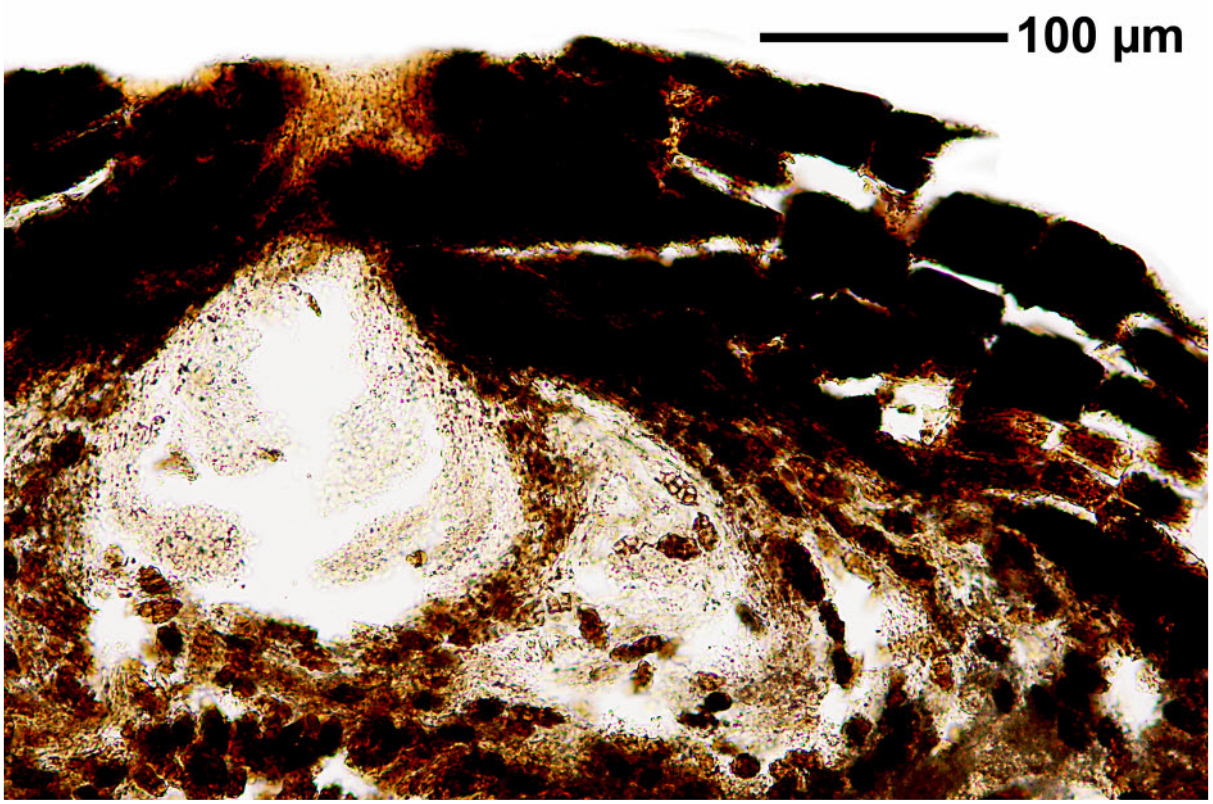


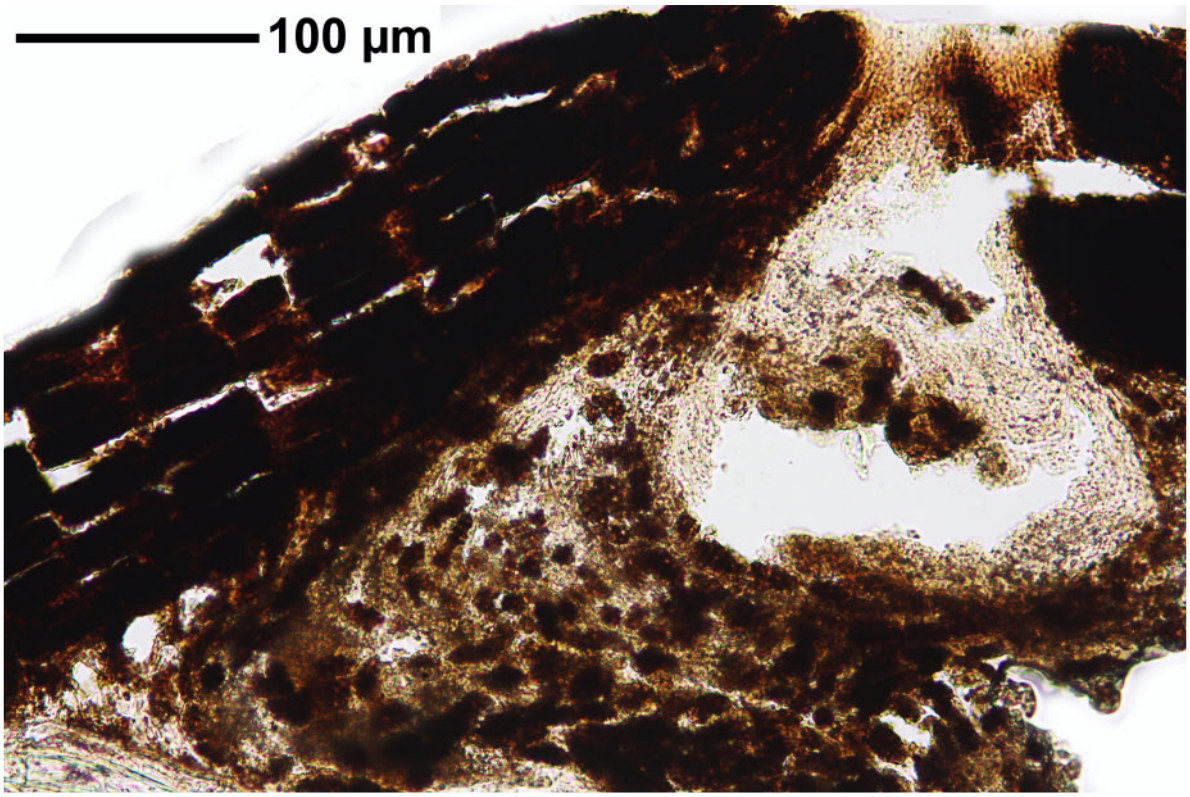
Pyrenula borneensis





Pyrenula borneensis





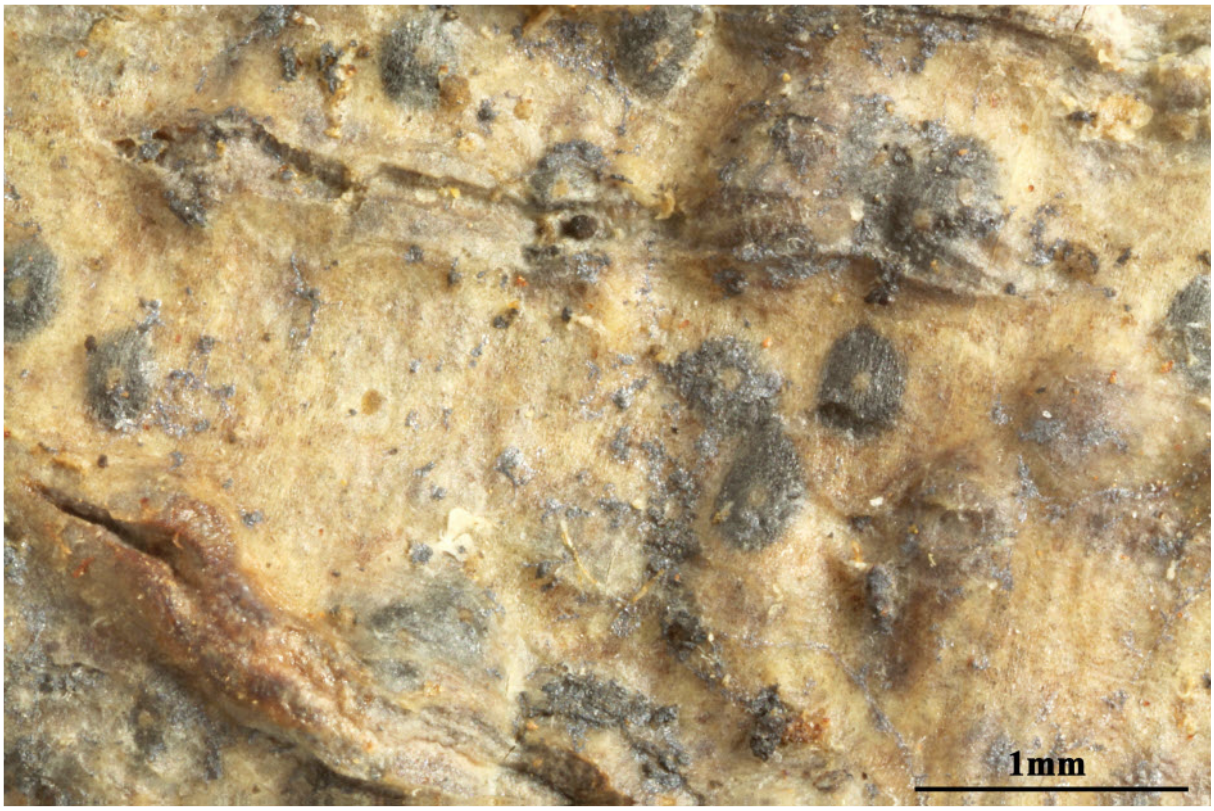
Pyrenula borneensis

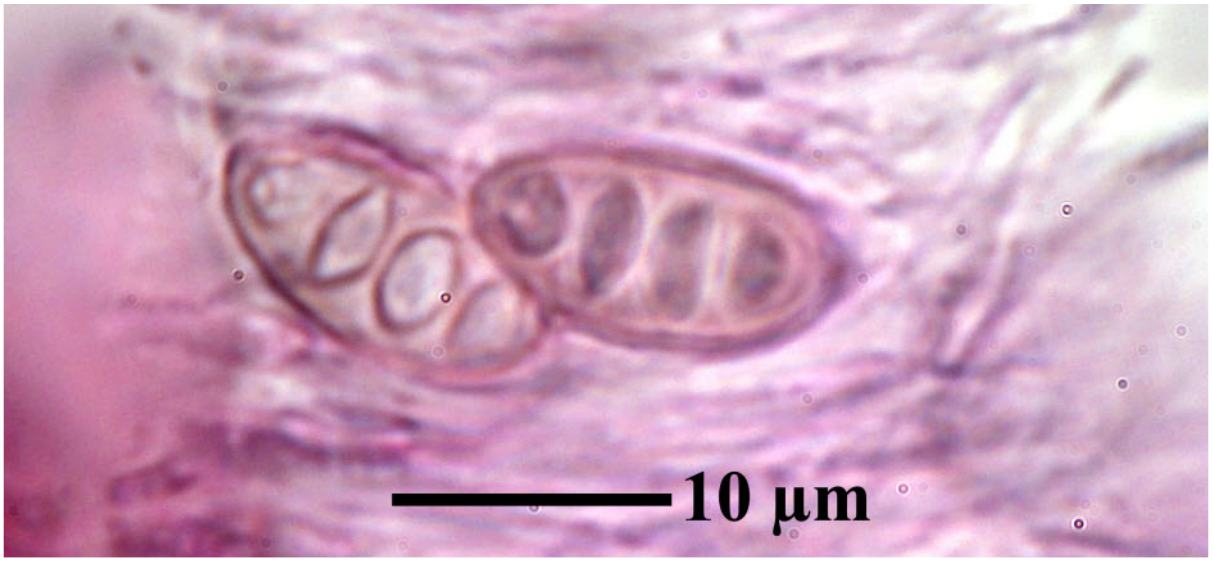
Pyrenula brunnea Fée, Essai Crypt. Exot., Suppl. Révis. (Paris): 81 (1837)

Thallus endophloeodal, buff-yellowish brown, smooth, not pseudocyphellate, hypothallus like a black border line, Ascocarps solitary or 2–3 aggregated, depressed- conical-semiglobose, with corticiform layer of thallus, dull black, ostioles indistinct or sometimes slightly papillate, peridium conical, very thick at sides, base thin, laterally spreading, centrum IKI-, without oil globules. Asci cylindrical, 80–100 × 10–13 µm. Ascospores 8/ascus, uniseriate, 3-septate, brown, oblong-ellipsoid, 12–17 × 5–7 µm.

[Hill11965], New Caledonia, Sarramea, col d'Amieu, forestry station, 500 m, on planted Araucaria cookii. Leg. D. J. Hill (no11965), 16.03.1966, det. A. Aptroot, 2013.



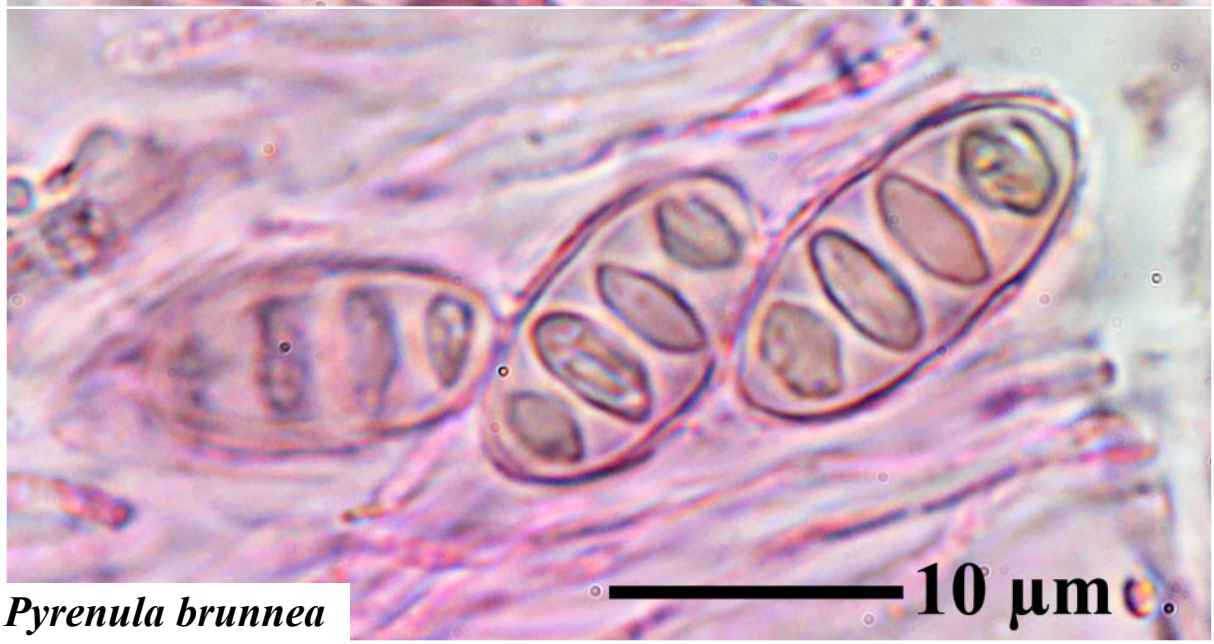




Pyrenula brunnea





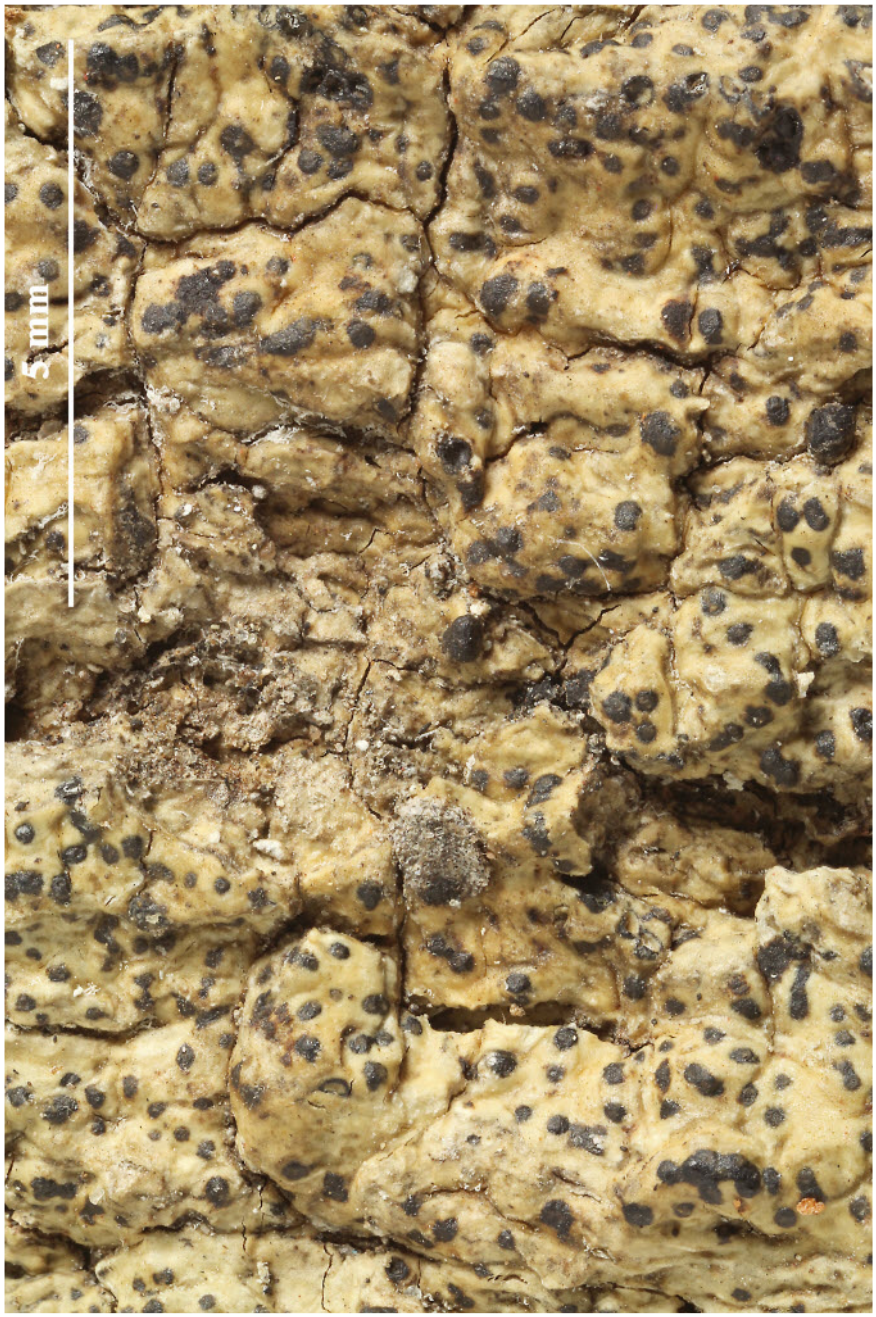


Pyrenula brunnea

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

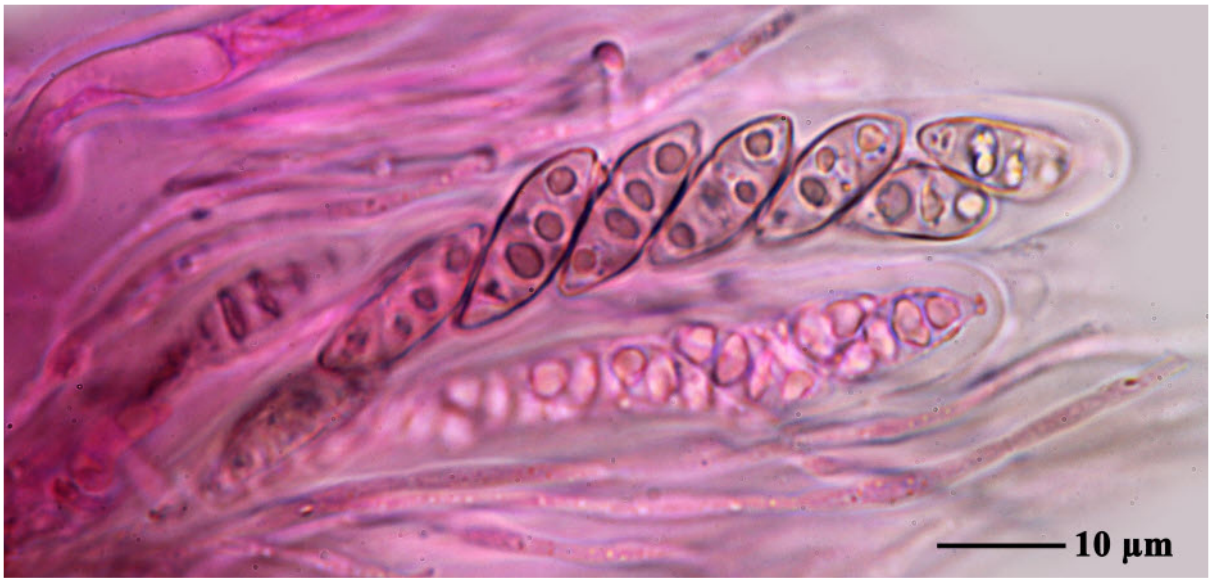
Thallus endophloeodal, buff-yellowish brown, smooth, not pseudocyphellate, hypothallus like a black border line, Ascocarps solitary or 2–3 aggregated, depressed- conical-semiglobose, with corticiform layer of thallus, dull black, ostioles indistinct or sometimes slightly papillate, peridium conical, very thick at sides, base thin, laterally spreading, centrum IKI-, without oil globules. Asci cylindrical, 80–100 × 10–13 µm. Ascospores 8/ascus, uniseriate, 3-septate, brown, oblong-ellipsoid, 12–17 × 5–7 µm.

[ISE28850], Brazil, Tocantins, near Itaguatins, in cerrado remnant on farm on bark of tree. 150 m, 5°44’48” S, 47°33’46” W, leg. M. Cáceres & A. Aptroot (no ISE28850), 23.10.2016, det. A. Aptroot, 2016.





Pyrenula brunnea





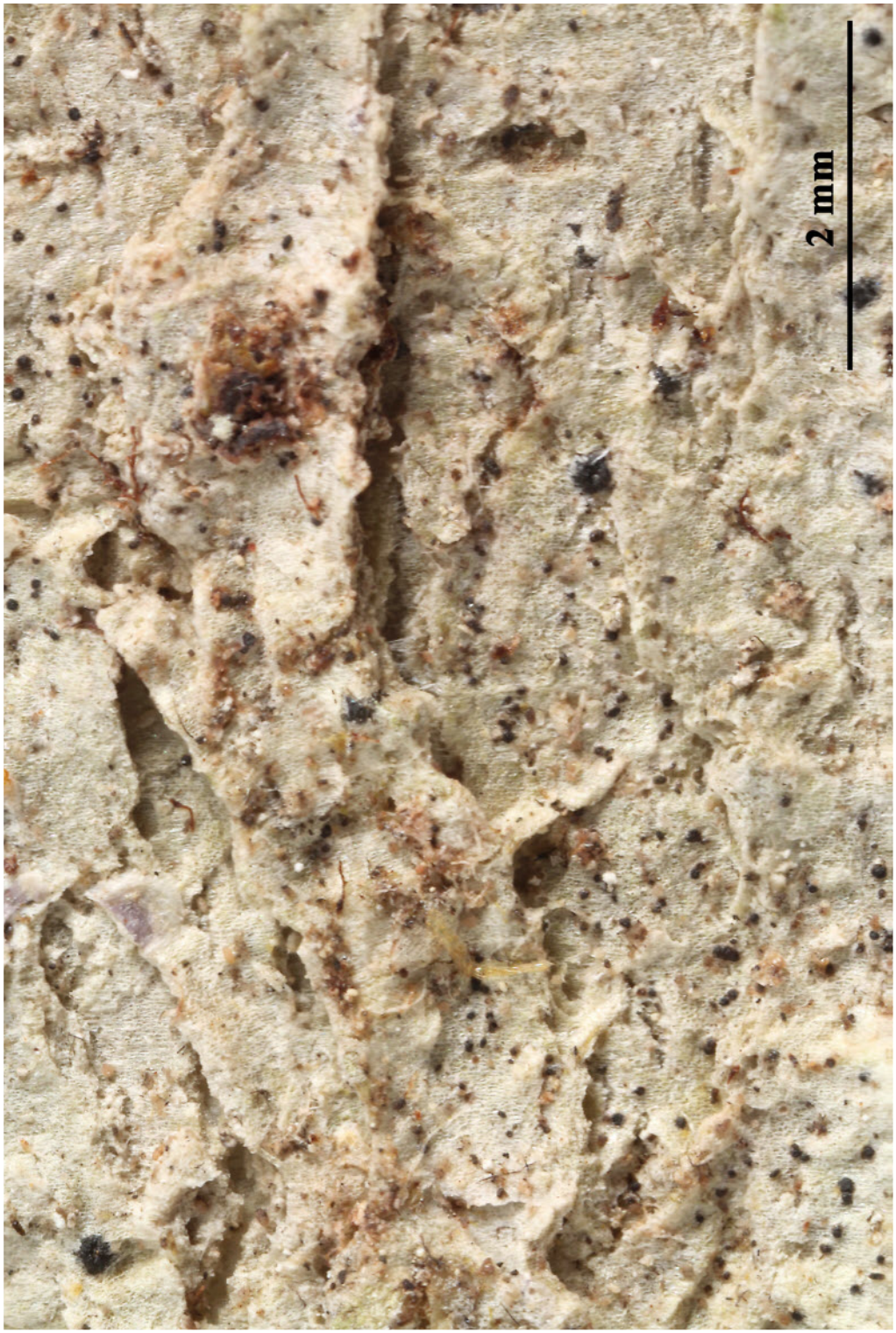


Pyrenula brunnea

Pyrenula cayennensis Müll. Arg., Flora, Regensburg 67(35): 662 (1884)

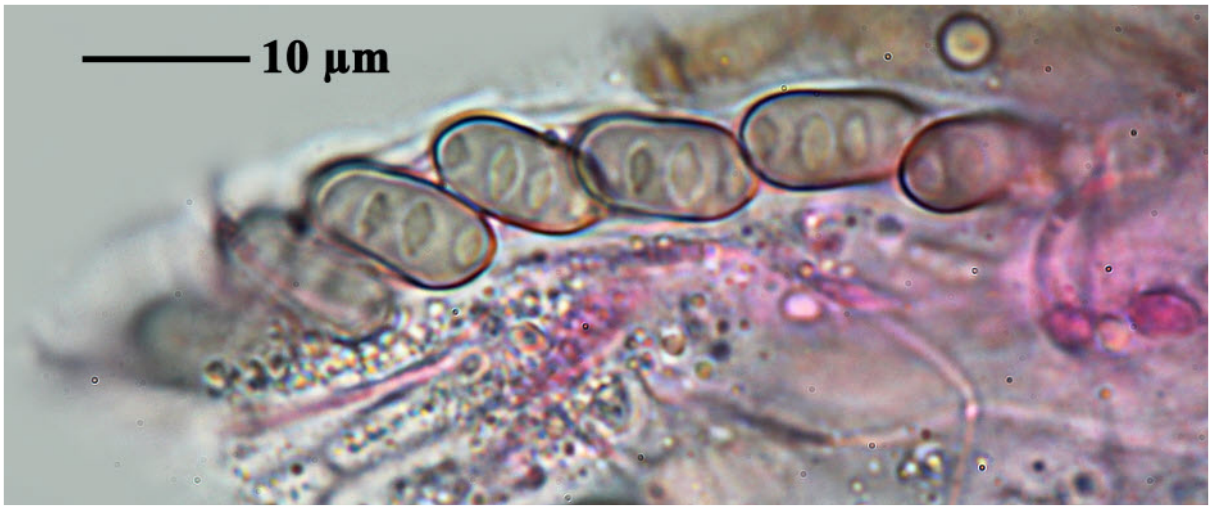
Ascomata convex to depressed-conical, thallus covered, 0.3–0.8 mm diam.; ostioles plain; hamathecium inspersed with colorless oil globules; ascospores 13–20 × 7–13 µm, ovoid to subglobose, central locules lenticular, apical locules subglobose, cayennensis-type.

[ABL27227], Brazil, Amapá, Flona, Floresta National do Amapá, near station. on tree bark in disturbed forest. 30 m, 0°55’ N, 51°36’ W. Leg. M. Cáceres & A. Aptroot (no 27227), 19.08.2015, det. A. Aptroot, 2015.

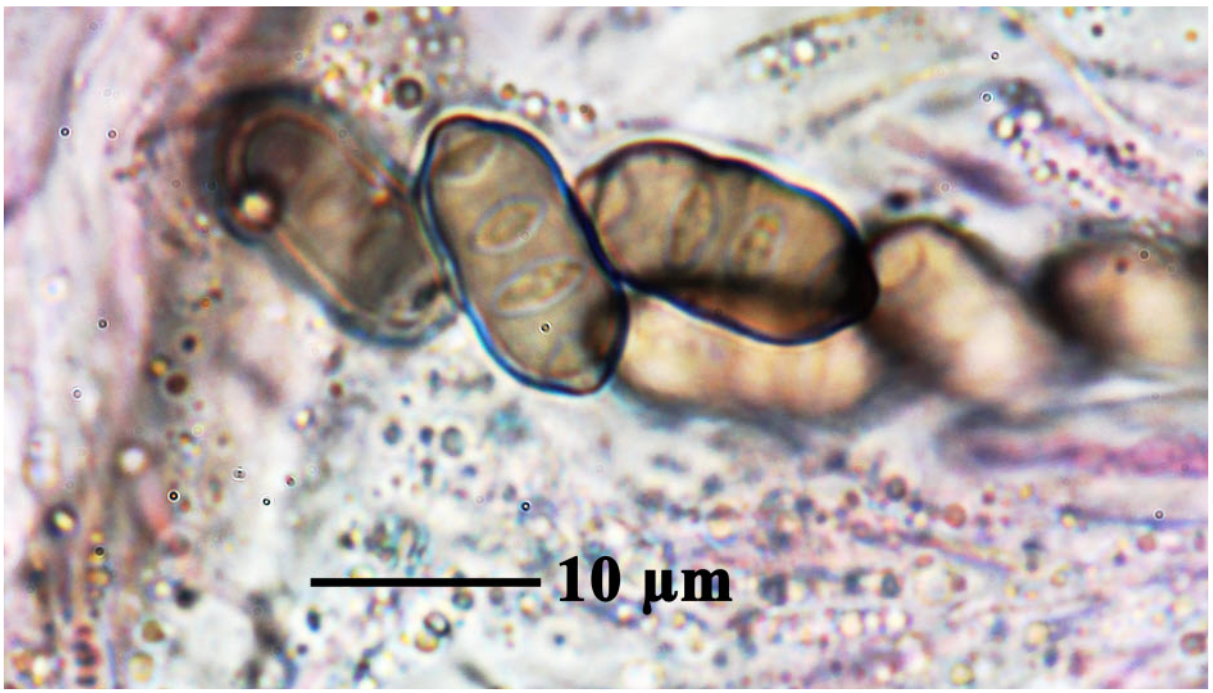




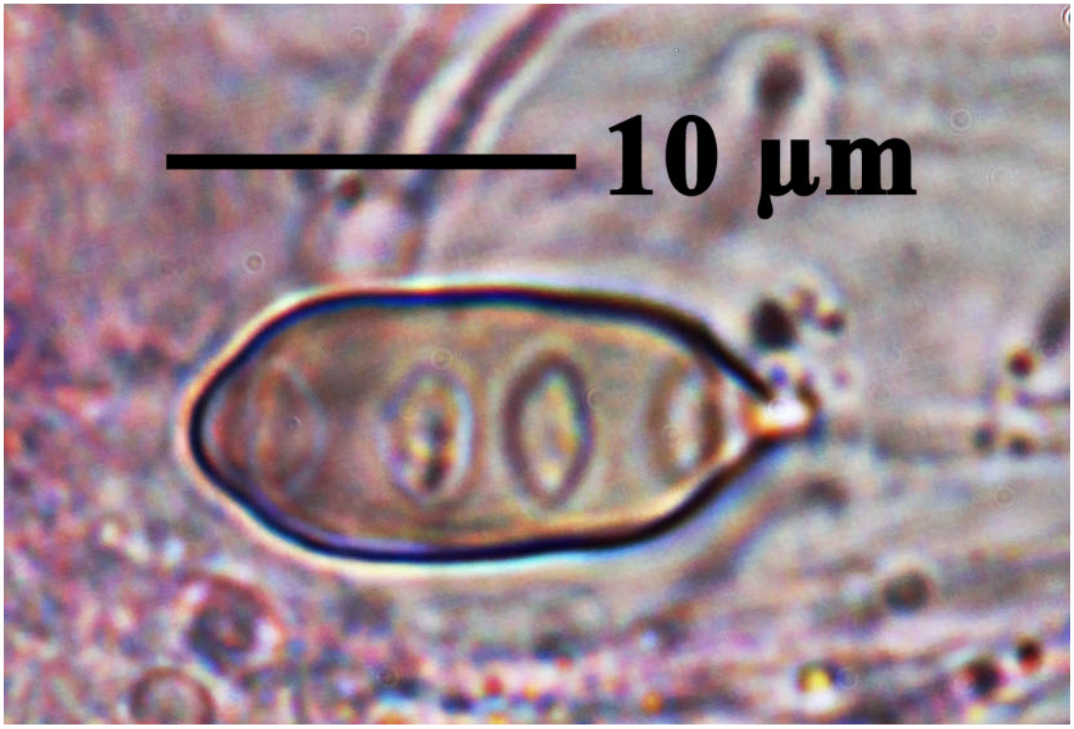
Pyrenula cayennensis

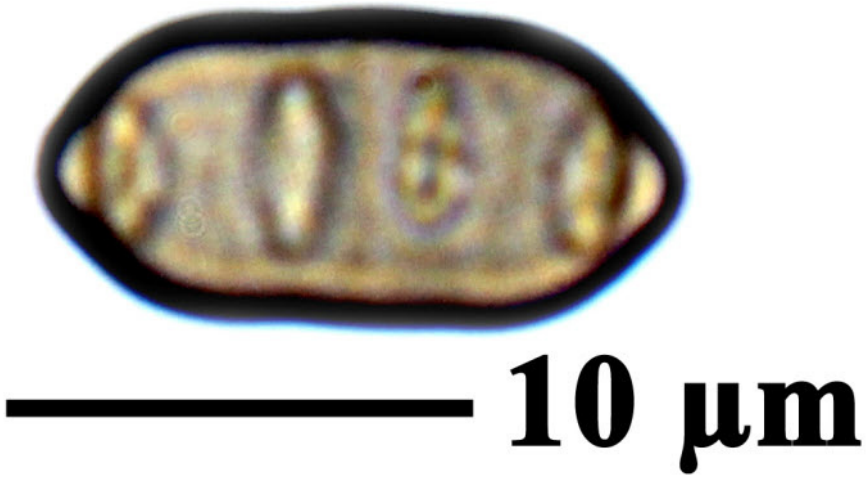


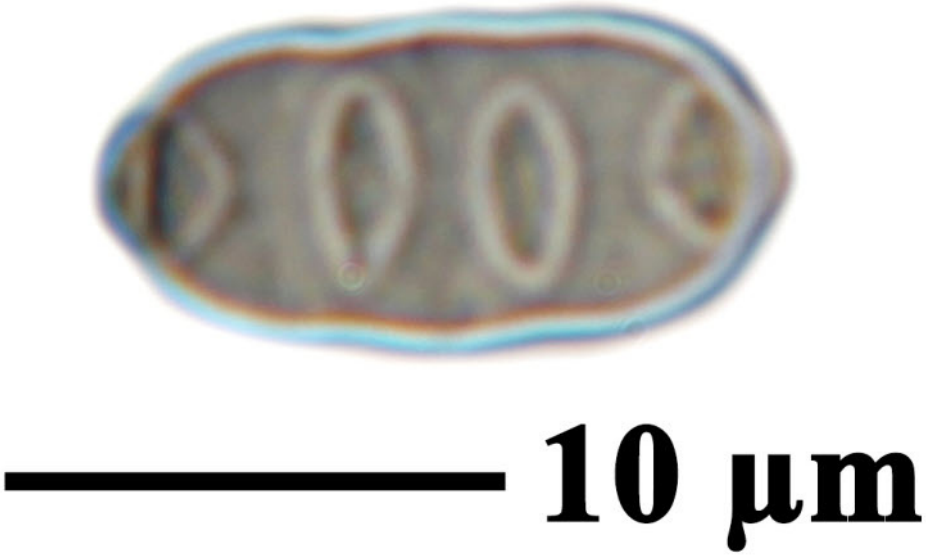




Pyrenula cayennensis







Pyrenula cayennensis

Pyrenula cayennensis Müll. Arg., Flora, Regensburg 67(35): 662 (1884).

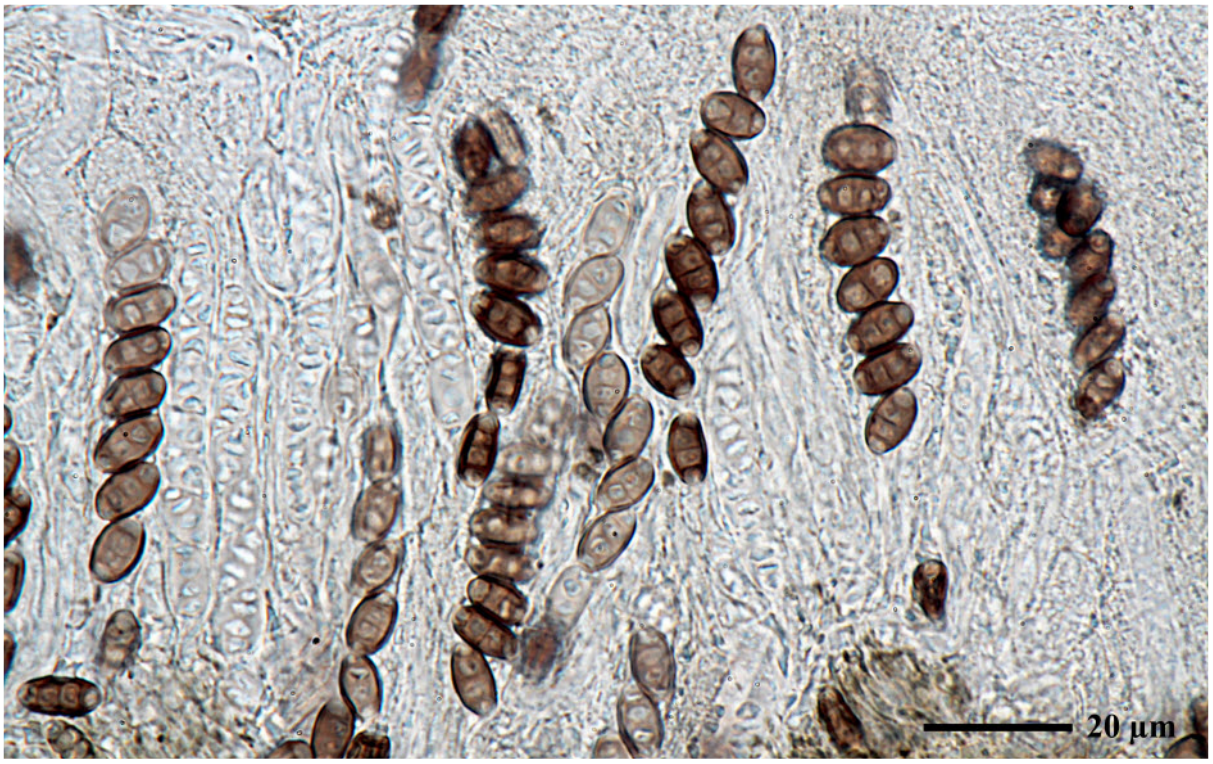
Ascomata convex to depressed-conical, thallus covered, 0.3–0.8 mm diam.; ostioles plain; hamathecium inspersed with colourless oil globules; ascospores 13–20 × 7–13 µm, ovoid to subglobose, central locules lenticular, apical locules subglobose, cayennensis-type.

[Hill9791], Solomon Islands, Guadalcanal island, central part, Mount Popomansiu, on ridge SE of Sutakiki river, 1500 m. Leg. D. J. Hill (no 9791), 9.11.1965, det. A. Aptroot, 2013.



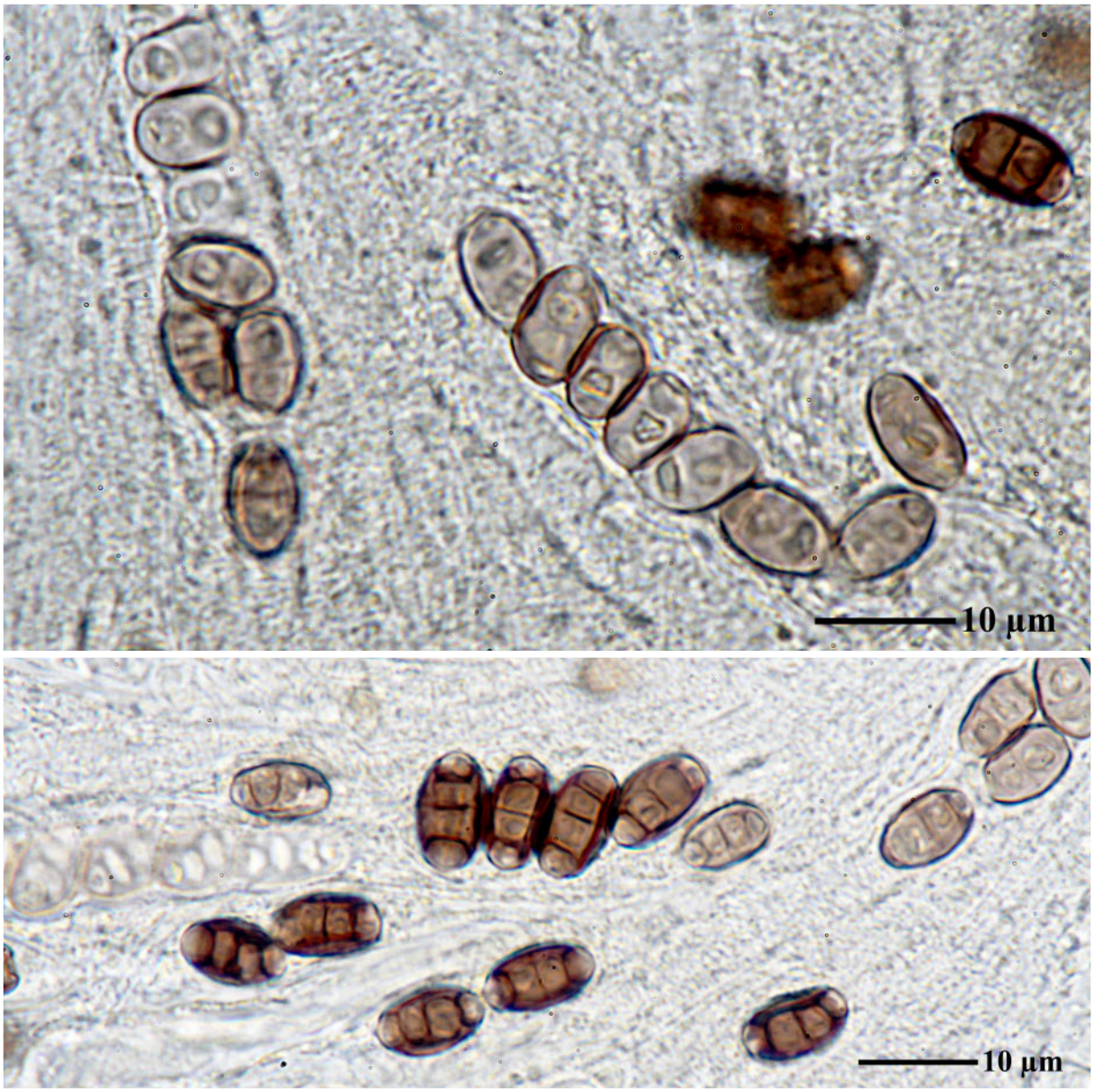


Pyrenula cayennensis





Pyrenula cayennensis

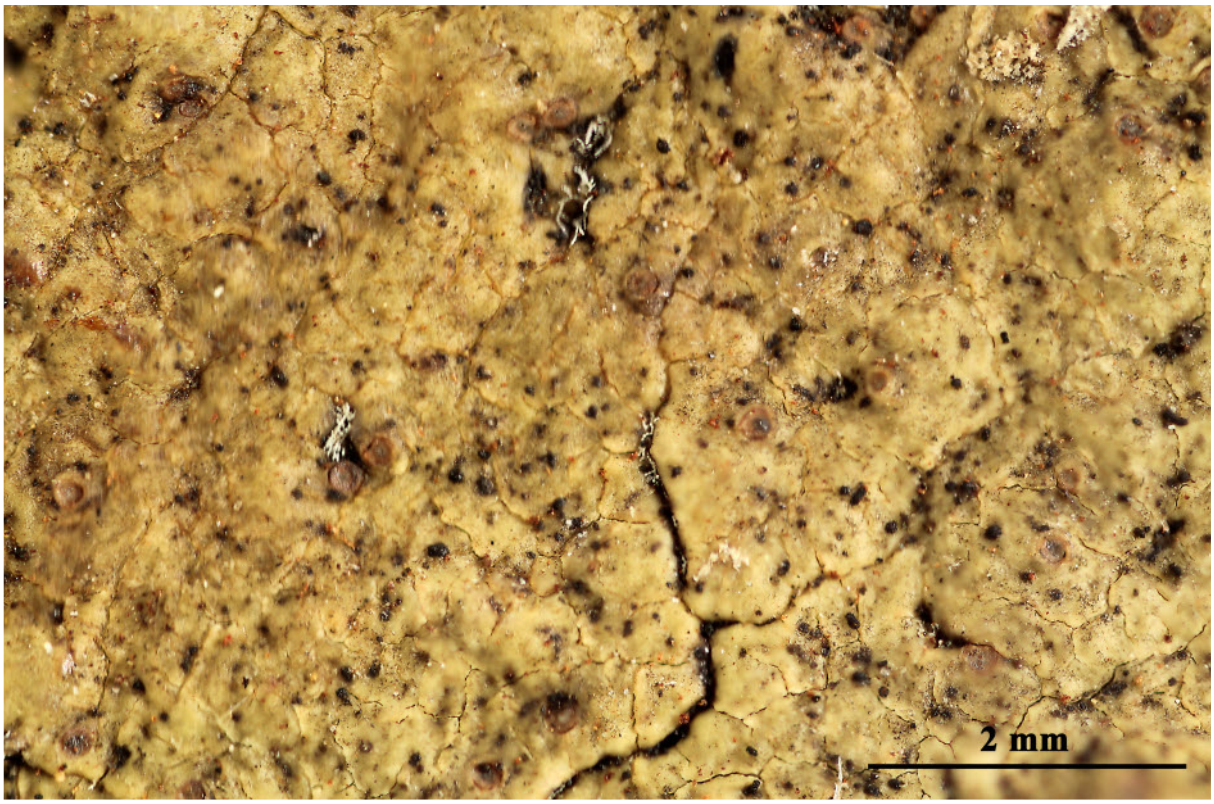


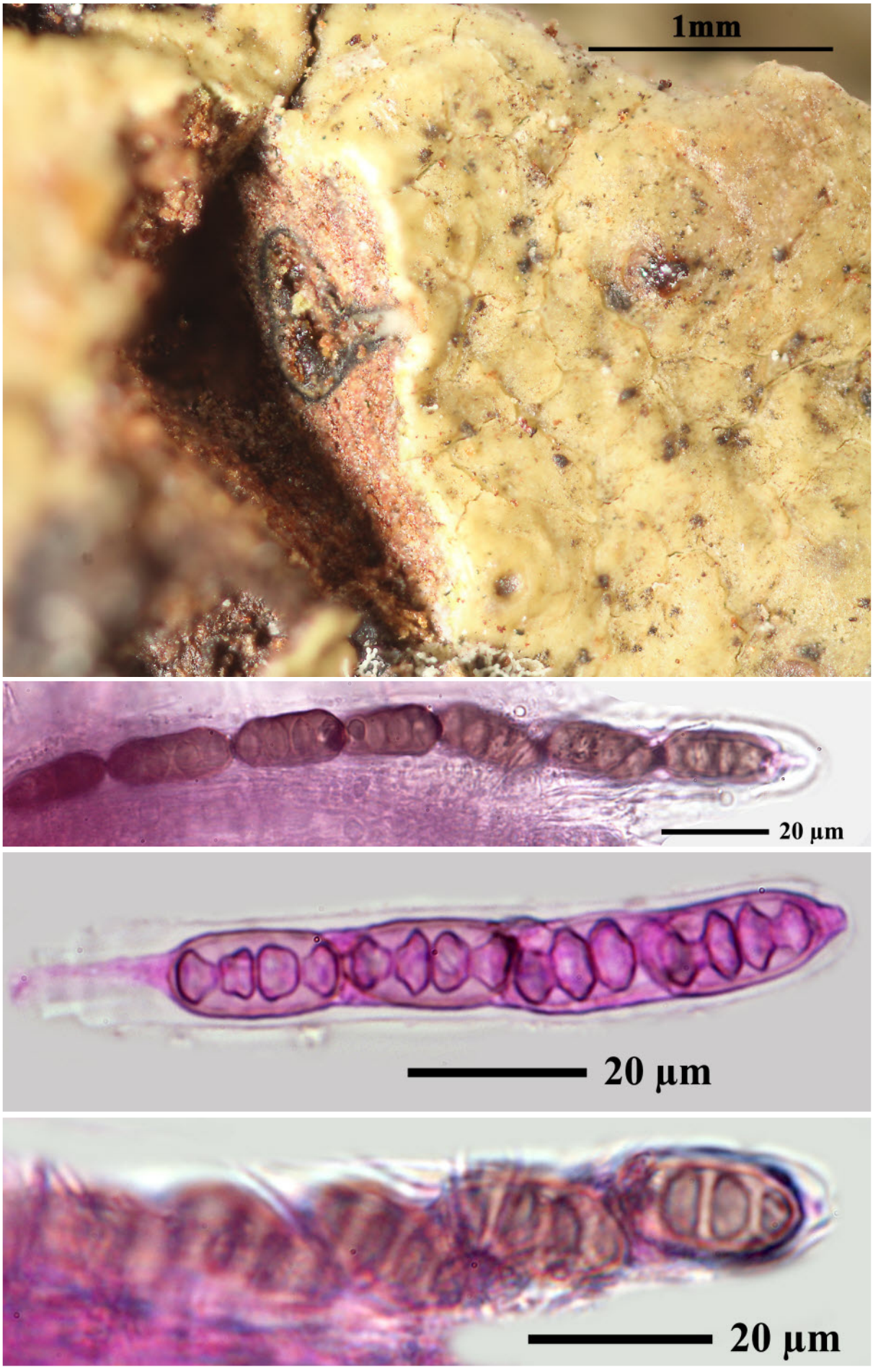
Pyrenula cayennensis

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

Thallus rather thick (0.1–0.2 mm thick), corticate, olive green, minutely cracked throughout, without pseudocyphellae, without prothallus. Ascomata 1– 2 mm deep immersed in the bark underneath the thallus, pyriform, 0.6–0.9 mm diam., single. Wall carbonized all around. Ostiole apical, usually red brown to red, rarely pale brown or almost black, flush to distinctly convex. Hamathecium inspersed with hyaline oil droplets. Ascospores 8/ascus, irregularly biseriate, dark brown, 3-septate, 21–24 × 10–11 µm, lumina diamond-shaped, separated from the wall by a thick layer of endospore, ends pointed, often slightly constricted at the septa. Pycnidia not observed. Chemistry: Ostiole K+ crimson, with unidentified anthraquinone (too little for TLC); thallus UV–, K+ orange brown, possibly due to traces of the same anthraquinone.

[ABL18593], Brazil, Sergipe, Areia Branca, Parque Nacional Serra de Itabaiana, 10˚45'37" S, 37˚22'15" W, c. 250 m, on bark of tree. Leg. M. Cáceres & A. Aptroot (no 18593), 18.09.2013, det. A. Aptroot, 2013. ISOTYPE.





Pyrenula celaticarpa





Pyrenula celaticarpa

Pyrenula cerina Eschw., Syst. Lich.: 25 (1824)

Thallus yellow to orange, K+ purplish, UV+ red, with pseudocyphellae; ascomata immersed, subglobose, c. 0.3 mm diam.; hamathecium gel IKI+ orangish; ascospores 4-loculate, 26–42 × 12–15 µm.

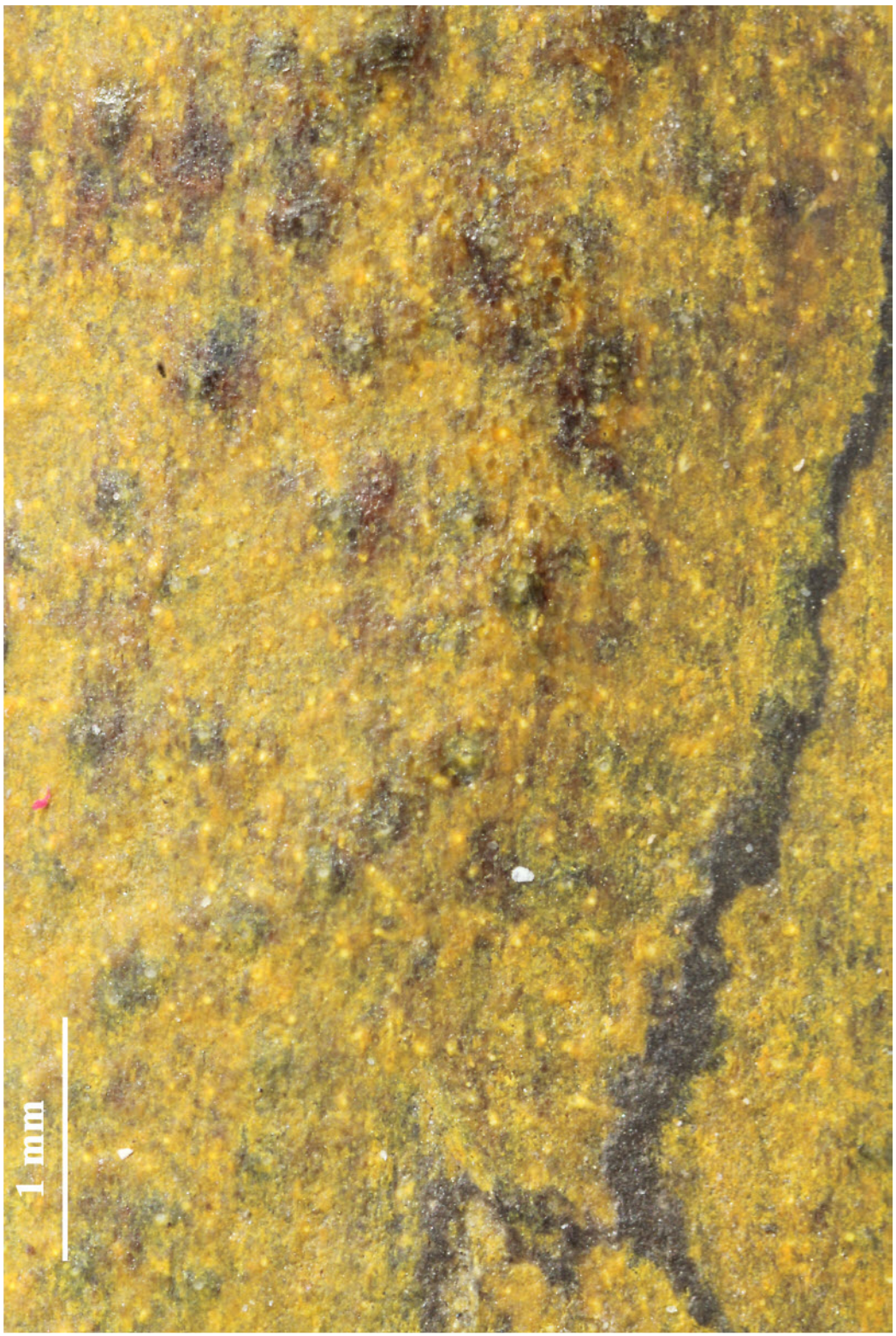
[ABL10994a], Ecuador, Prov. Esmeraldas, San Lorenzo, mangrove an Rhizophora. Leg. A. Aptroot (no 10994a) & R. Hensen, 17.7.1982, det. R. C. Harris, 1988.

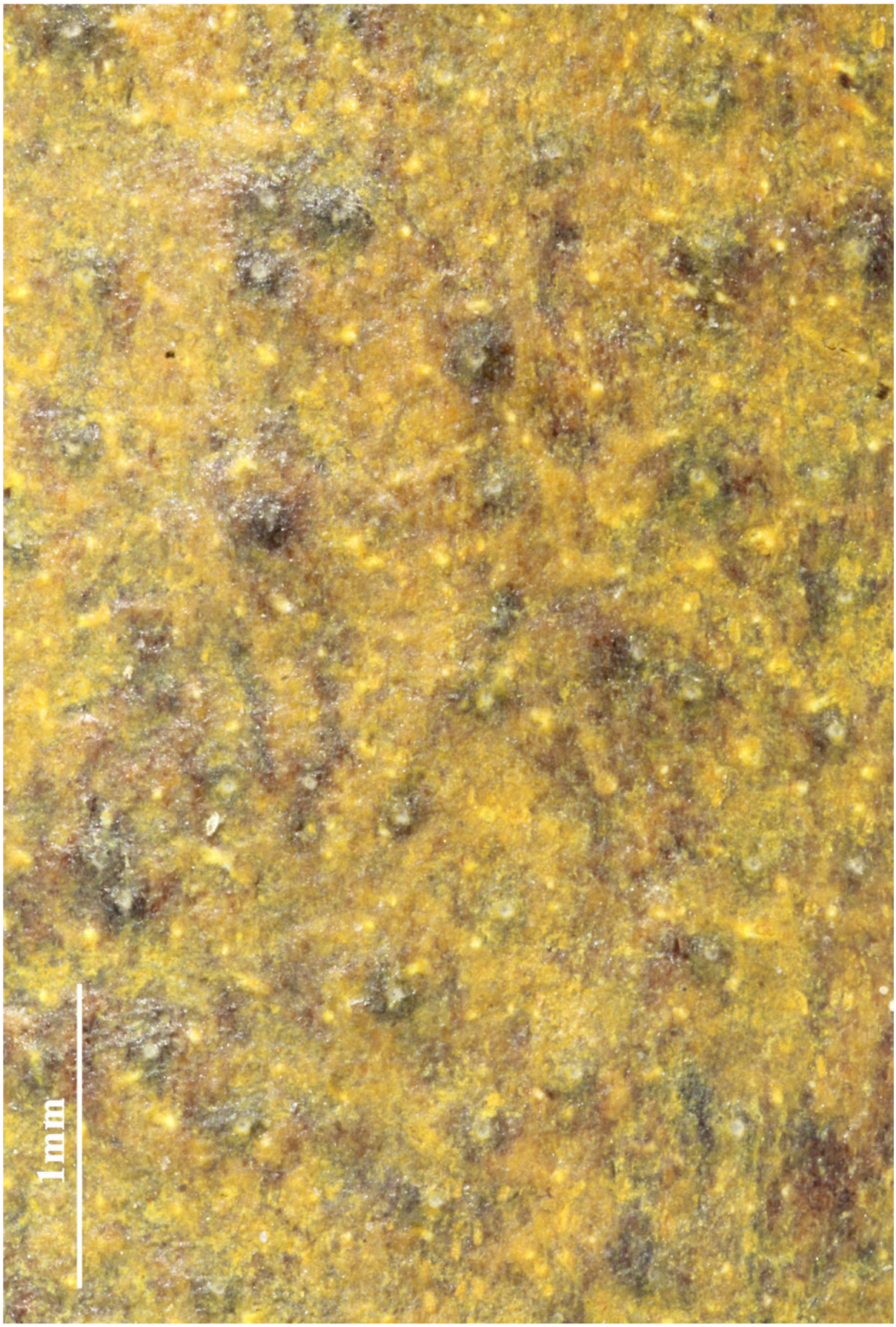


Pyrenula cerina Eschw., Syst. Lich.: 25 (1824)

Thallus yellow to orange, K+ purplish, UV+ red, with pseudocyphellae; ascomata immersed, subglobose, c. 0.3 mm diam.; hamathecium gel IKI+ orangish; ascospores 4-loculate, 26–42 × 12–15 µm.

[ISE27699], Brazil, Santa Catarina, Sao Francisco do Sul, Univille Campus, on tree in mangrove. Leg. M. Cáceres & A. Aptroot (no ISE27699), 5.10.2015, det. A. Aptroot, 2015.





Pyrenula cerina



Pyrenula cerina

Pyrenula ceylonensis (Ajay Singh & Upreti) Aptroot, Lichenologist 44(1): 35 (2011) [2012]
= *Pleurotheliopsis ceylonensis* Ajay Singh & Upreti, Geophytology 16(2): 262 (1987) [1986]
= *Parmentaria anamalaiensis* Upreti & Ajay Singh
= *Pyrenula anamalaiensis* (Upreti & Ajay Singh) Upreti
= *Parmentaria oligocarpa* Ajay Singh
= *Pyrenula suboligocarpa* Upreti

Anthraquinones absent, ostioles lateral, Ascospores 4–8 per ascus, muriform, 50–90 µm long. Septation only or mostly distoseptate, with notably thickened endospore.

[Hill9784], Solomon Islands, Guadalcanal island, central part, Mount Popmansiu, on ridge SE of Sutakiki river, 1500 m. Leg. D. J. Hill (no 9784), 0.11.1965, det. A. Aptroot, 2013





Pyrenula ceylonensis

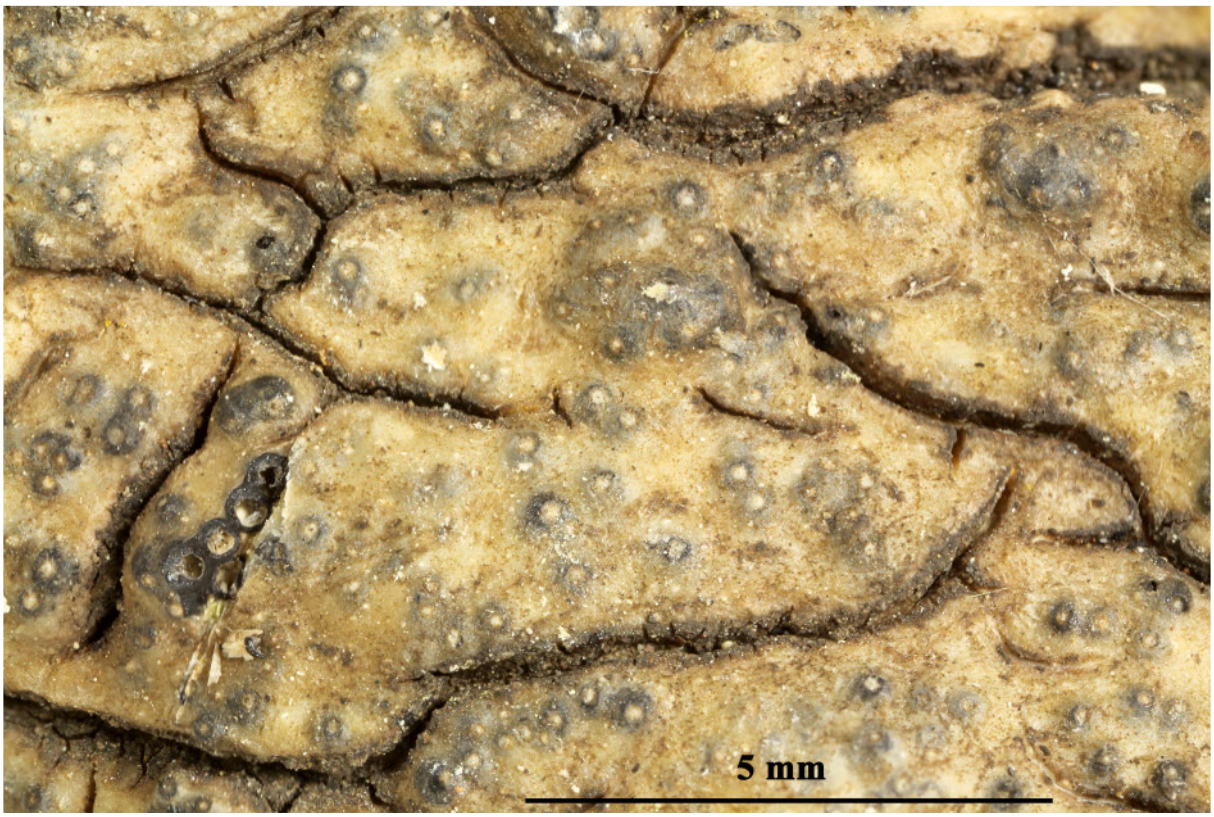


Pyrenula ceylonensis

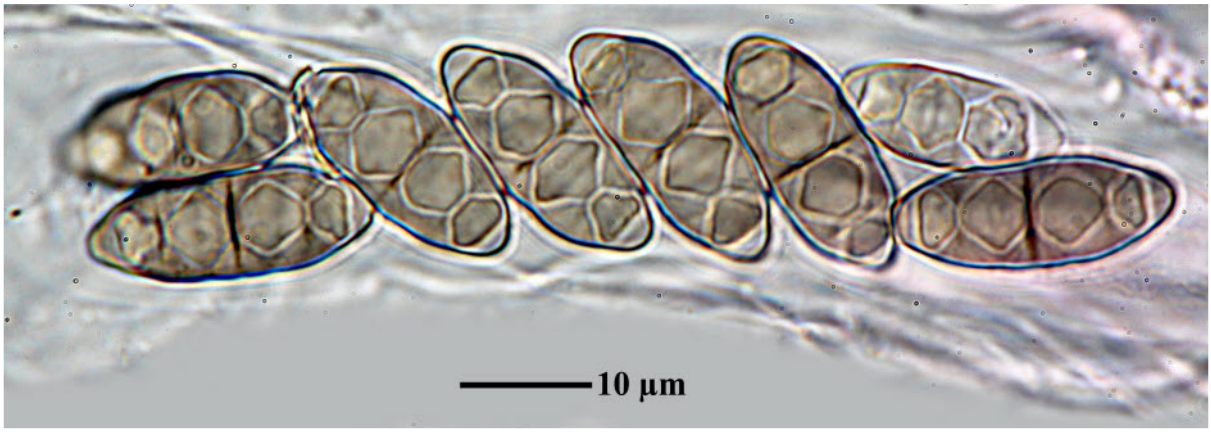
Pyrenula chlorospila Arnold, Flora, Regensburg 70: 155 (1887)
= *Pyrenula nitida f. chlorospila* (Arnold) Keissl., Rabenh. Krypt.-Fl., Edn 2 (Leipzig) 9(1.2): 414 (1937)
= *Pyrenula nitidella f. chlorospila* (Arnold) Szatala, in Rechinger, Baumgartner, Petrak & Szatala, Annln naturh. Mus. Wien 50: 521 (1940) [1939]
= *Verrucaria chlorospila* Nyl., Flora, Regensburg 69: 464 (1886)

Thallus olive-green to pale brown or fawn; pseudocyphellae 40–120 µm diam., white. Ascomata small, 0.2–0.4 mm diam., often rather densely arranged, forming very low projections in the thallus or not forming projections; exciple containing colourless crystals; hamathecium not inspersed with droplets, without anthraquinones. Ascospores (25–)28–32(–35) × (9–)11–13(–14) µm, brown, 3-septate. Thallus C-, K+ yellow, KC-, P+ faintly yellow, UV+ whitish (unidentified substance).

[ABL75500], Tenerife, Los Silos, along track to Erjos, on laurisilva tree, 400 m, 28°21’02’’ N, 16°48’48’’ W. Leg. A. Aptroot (no 75500), 8.01.2017, det. A. Aptroot, 2017.







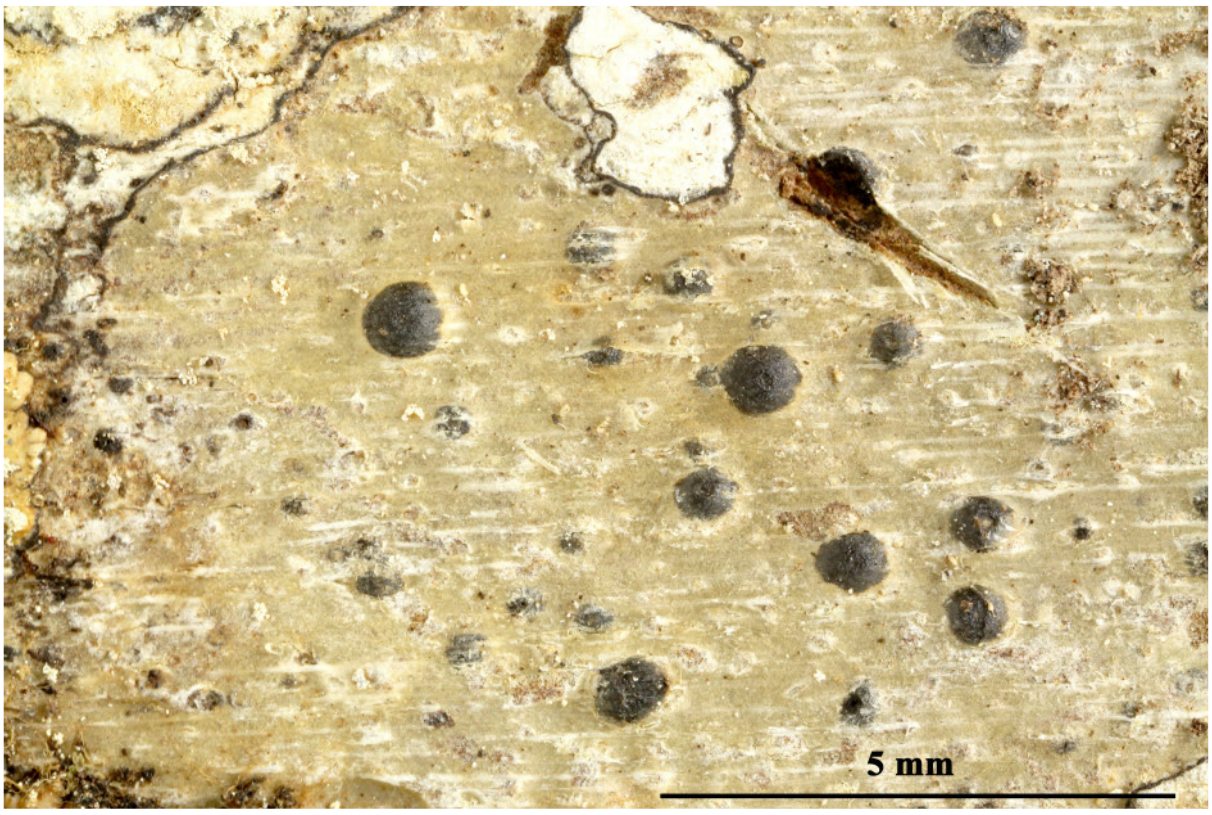


Pyrenula chlorospila

Pyrenula ciliata Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 64: 154 (1997)

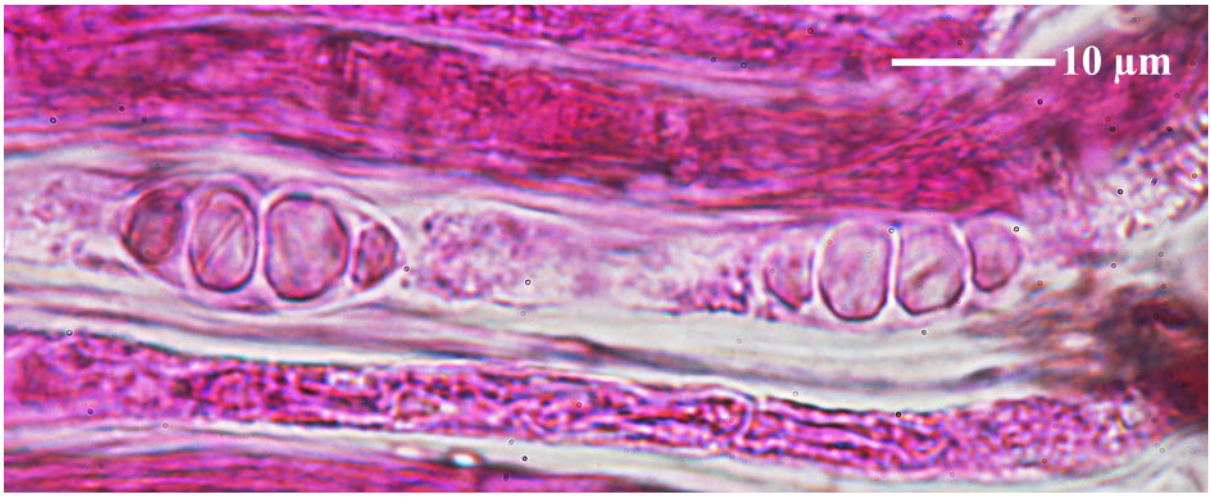
Thallus olive greenish grey, thin, rather smooth, corticate, without pseudocyphellae, UV-; photobiont *Trentepohlia*-like. Perithecia hemispherical, not distinctly flattened, erumpent from the substratum, exposed, 0.4–0.7 mm wide, 0.1–0.3 mm high; ascoma wall completely carbonized, hyphal (textura intricata), up to 200 µm thick; ostiole black, inconspicuous, surrounded by an obconical black depression; hymenium with true, unbranched paraphyses, not inspersed, partly I+ red, partly I+ blue; asci bitunicate, cylindrical; ascospores 8/ascus, uniseriate, ellipsoidal with rounded ends, dark brown, nearly black, 3-septate, distoseptate with rounded to diamond-shaped lumina, (23–)27–29 × 10–11(–13) µm, both ends or only the upper end often with 3–8 (usually 4) hyaline flagellar appendages which are 10-15 µm long and originate from one point at the apex.

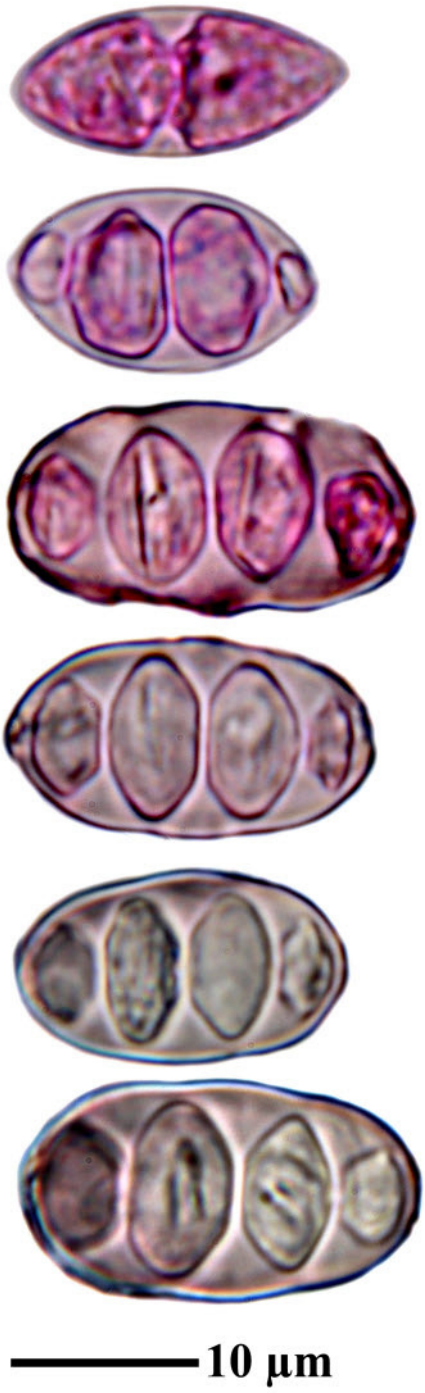
[ABL31881], Papua New Guinea, Madang prov., Big Pig island near Madang. Secondary forest on coral island, on Cocos. 1m, 145°50' E, 5°10' S. Leg. A. Aptroot (no 31881), 16.08.1992, det. A. Aptroot, 1993. PARATYPE.





Pyrenula ciliata



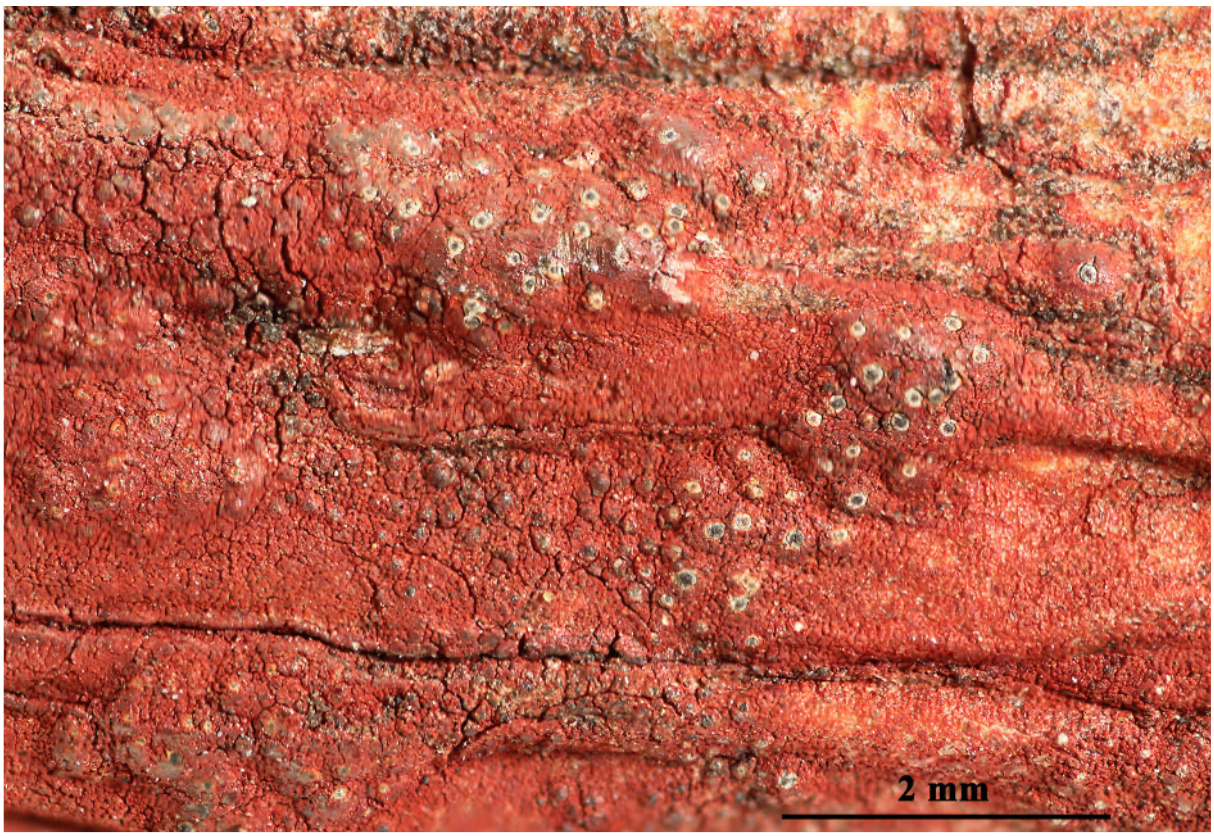


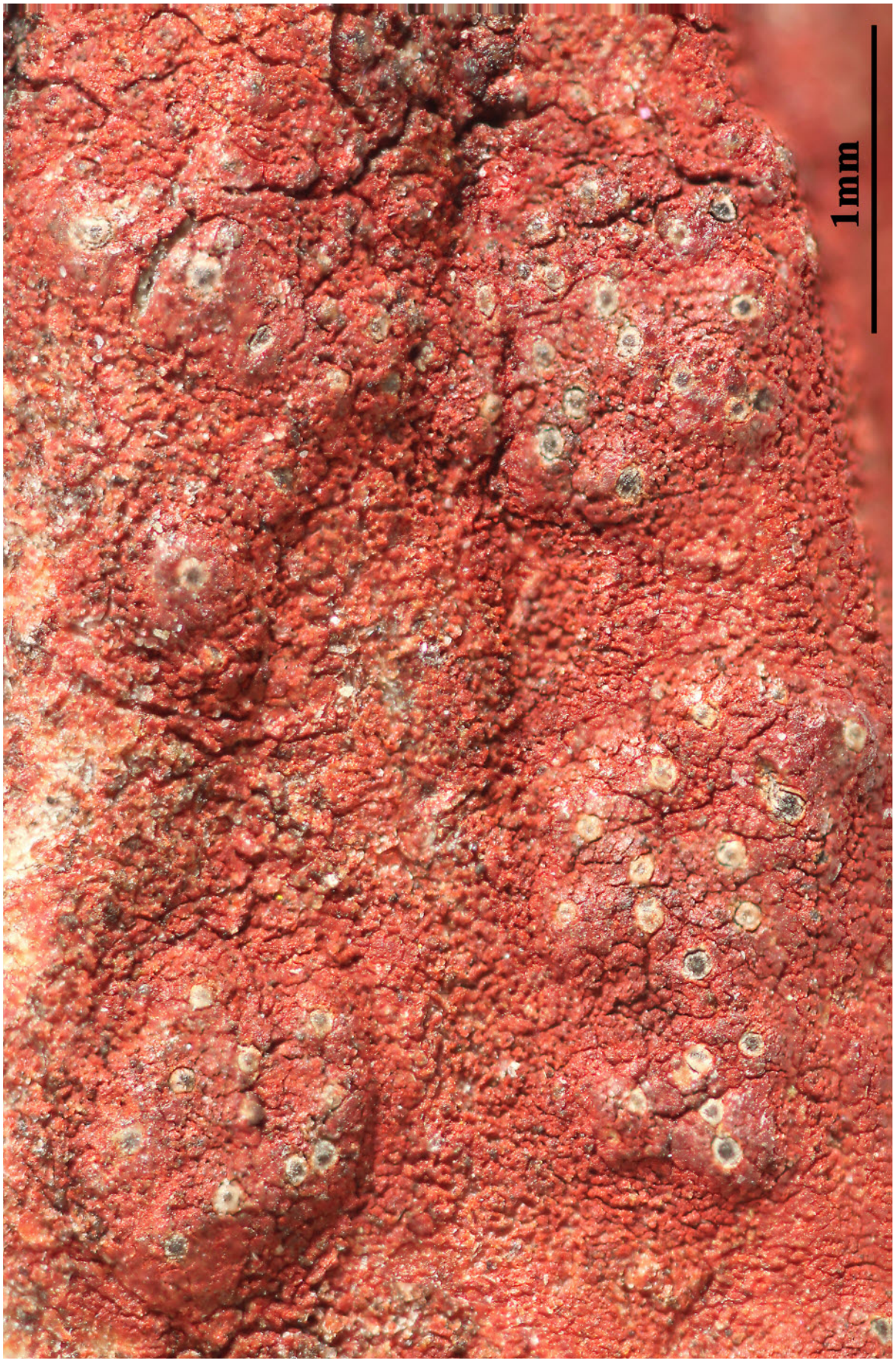
Pyrenula ciliata

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

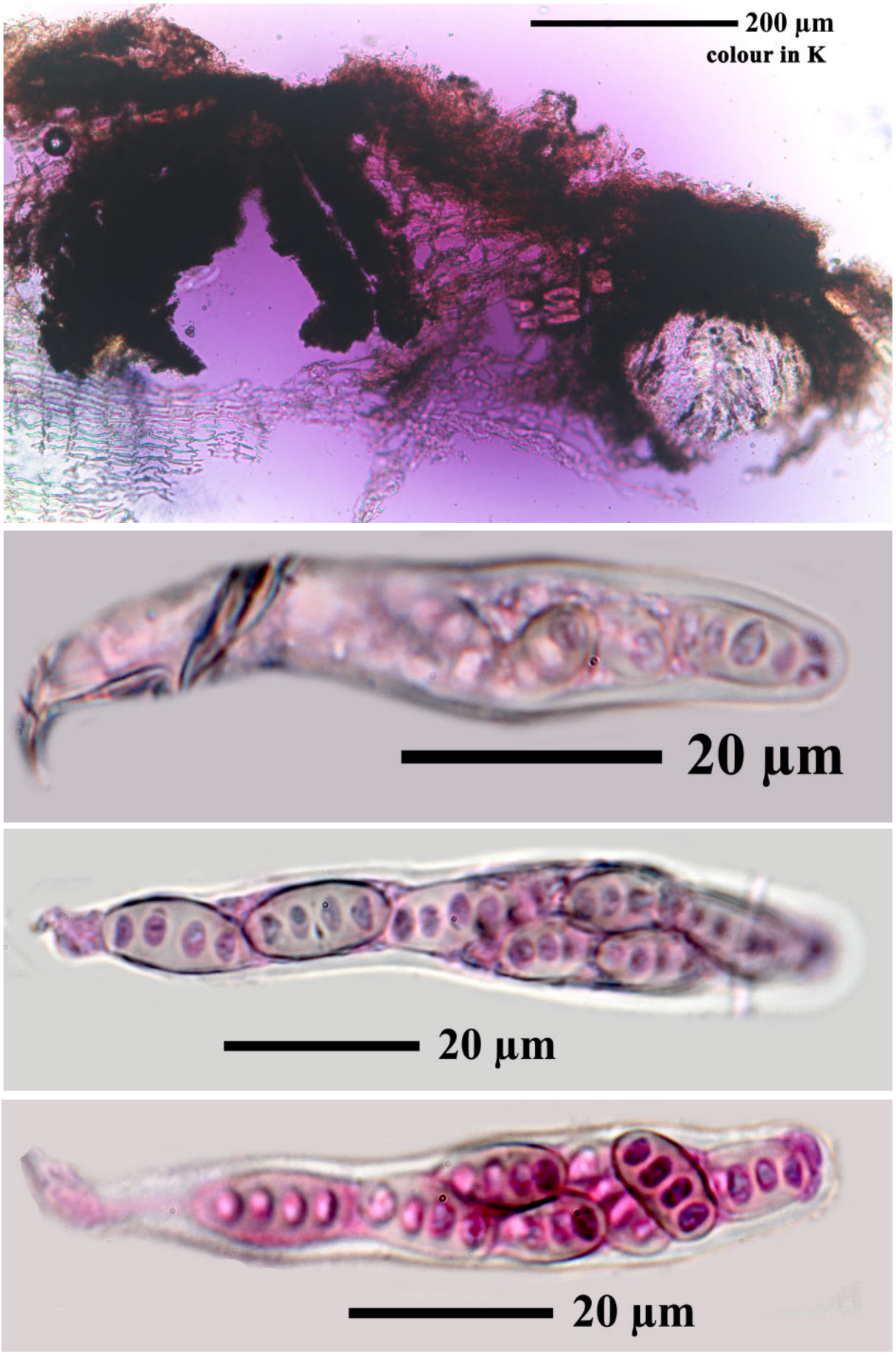
Thallus thin, surface granular, dark carmine red, without pseudocyphellae, without prothallus. Ascomata superficial, globose, 0.2–0.35 mm diam., in groups of 5–30 fused sideways with clearly fused walls but with separate ostioles, completely covered by thallus. Wall carbonized all around. Ostiole apical, pale, nearly whitish. Hamathecium not inspersed with oil droplets. Ascospores 8/ascus, brown, uniseriate, 3-septate, 12–15 × 6– 7 µm, lumina mostly diamond-shaped, separated from the wall by a thick layer of endospore. Pycnidia not observed. Chemistry: Thallus K+ crimson, UV+ orange; TLC revealed an anthraquinone with pink colour at Rf 2.

[Lima], Brazil. Pernambuco, Buíque, Parque Nacional Vale do Catimbao, *c*. 880 m, on bark of tree. Leg. E. L. Lima, 08.2012, det. A. Aptroot, 2013. ISOTYPE.

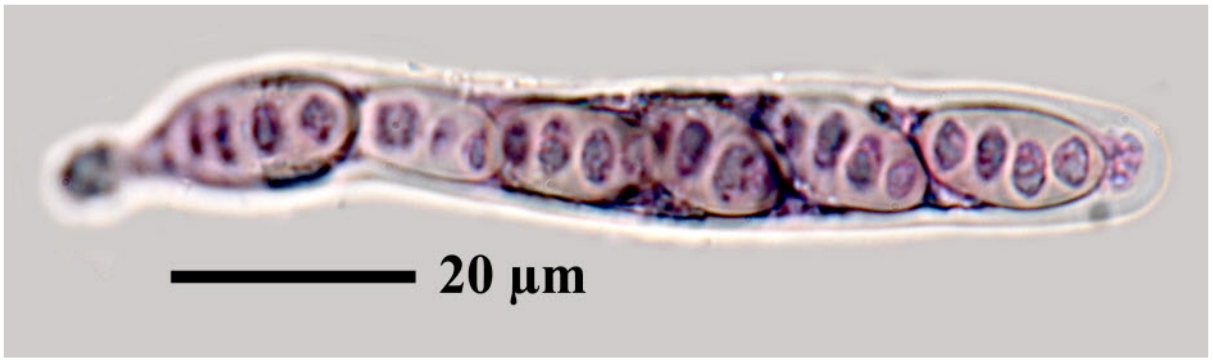


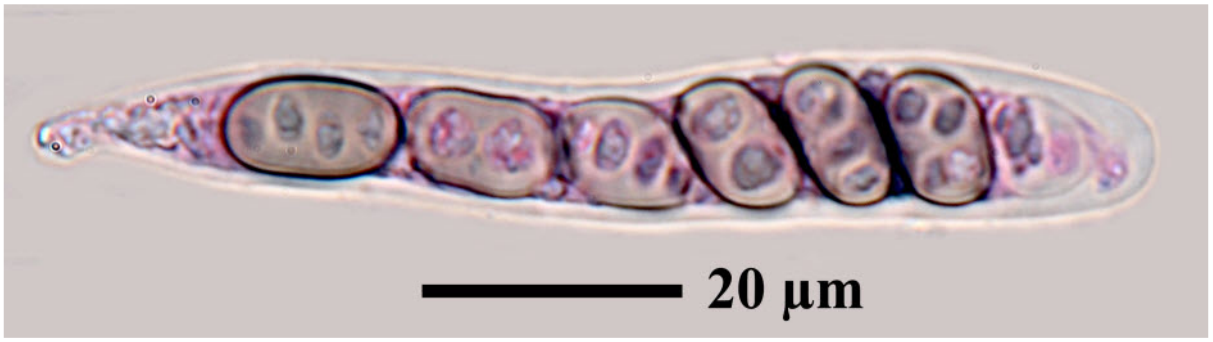


Pyrenula cinnabarina

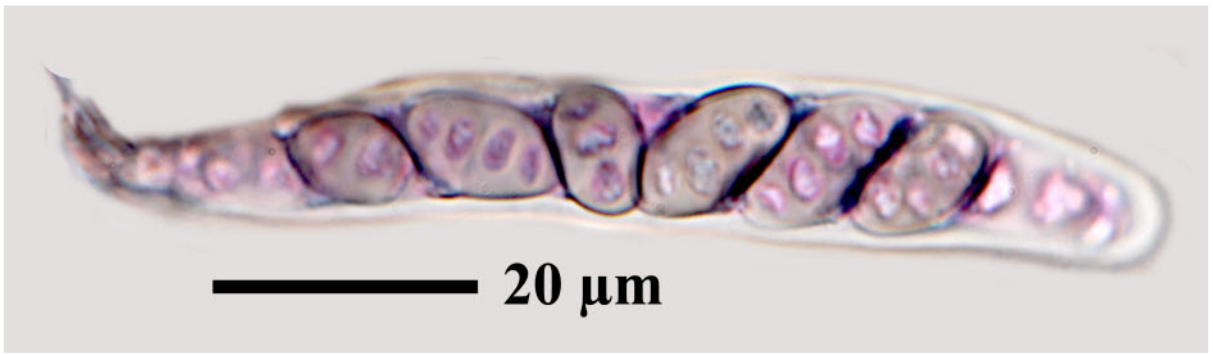


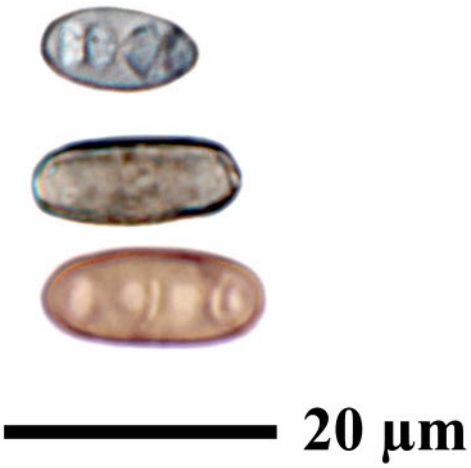
Pyrenula cinnabarina













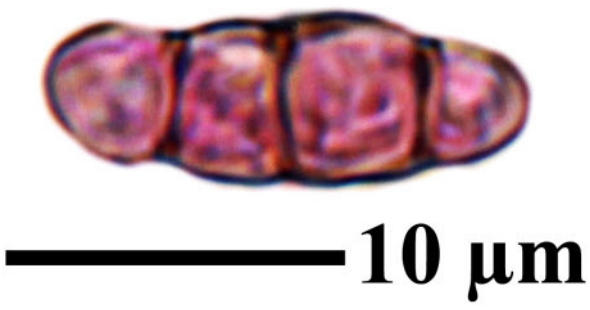
Pyrenula cinnabarina

Pyrenula circumfiniens Vain., Ann. Acad. Sci. fenn., Ser. A 6(no. 7): 195 (1915)

Thallus with pseudocyphellae. Ascomata pyriform, erumpent, mostly thallus-covered, c. 0.4–0.6 mm diam. Ostioles lateral, pale. Ascospores 3-septate, 18–25 × 7–9 µm, fusiform, apical locules elongated, thin-walled.

[ABL60185], Costa Rica, Prov. Limón, Hitoy Cerere Reserve, near Pandora, 40 km S of Limón, on tree in disturbed primary forest along trail. 83°02’ W, 9°40’ N, 150–500 m. Leg. A. Aptroot (no 60185), 1003.2004, det. A. Aptroot, 2004.





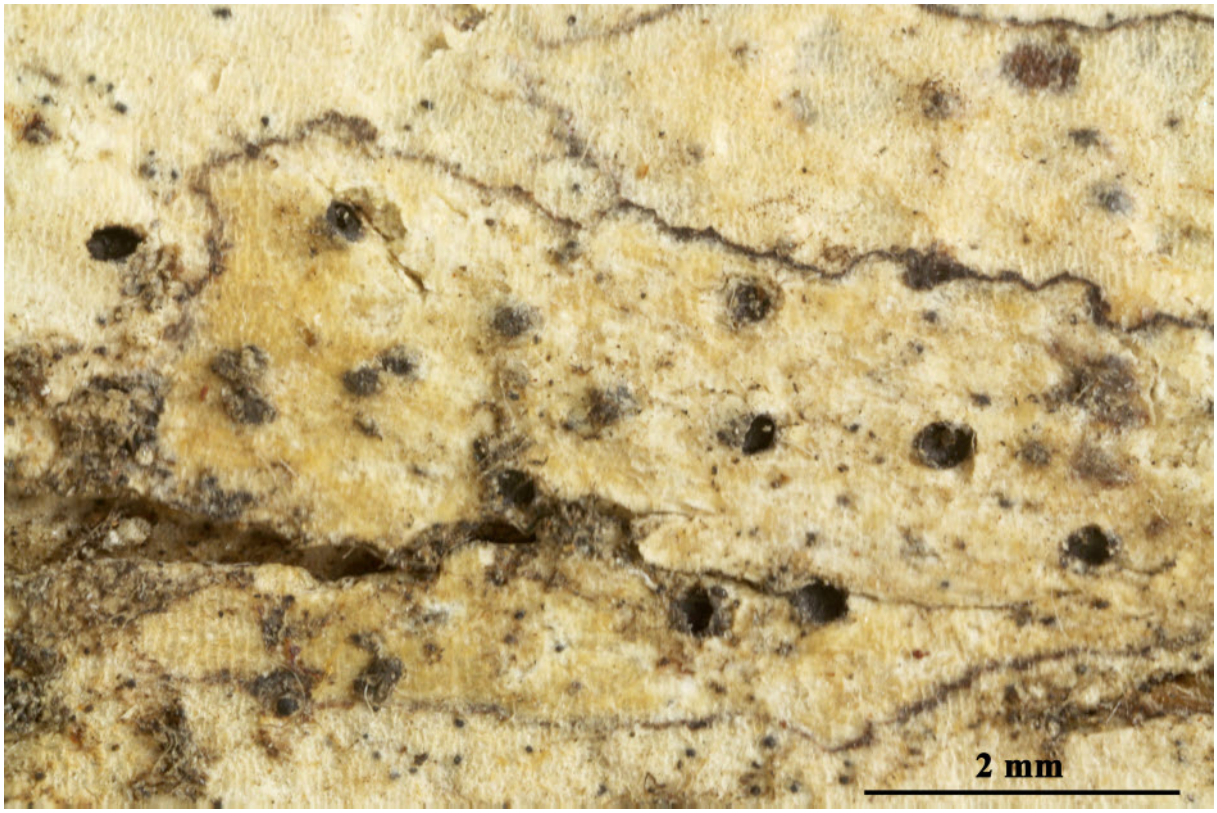


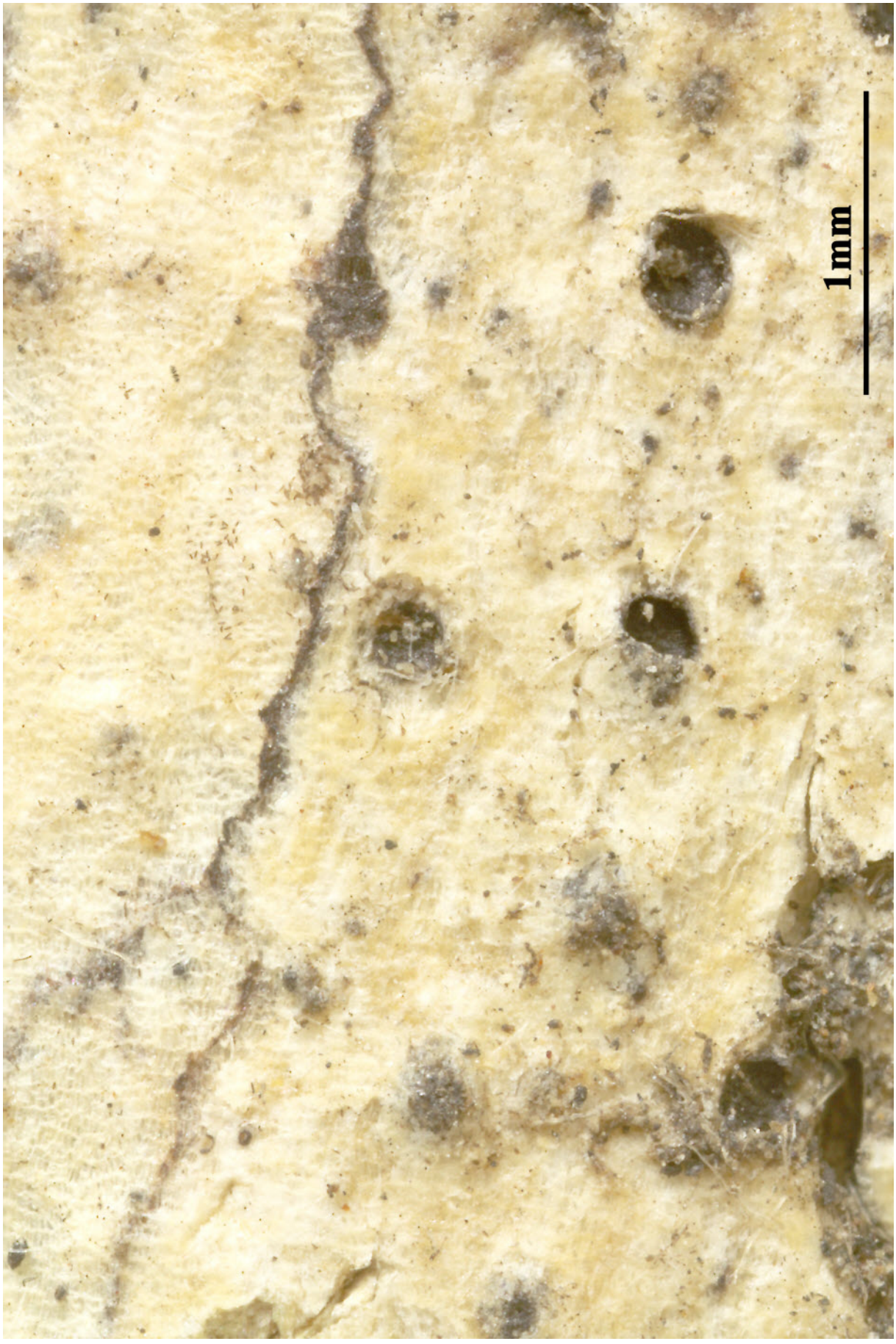
Pyrenula circumfiniens

Pyrenula clavatispora Common & Aptroot, in Aptroot & Common, Bryologist 120(3): 270 (2017)

Thallus corticate, smooth, continuous, rather thin, cream, without pseudocyphellae, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata perithecioid, erumpent, 0.3–0.5 mm diam., black, conical with flattened tips, single, largely covered by a thallus layer. Wall carbonized all around. Ostioles exposed, usually black, apical, flat. Hamathecium hyaline, densely inspersed with oil droplets, in IKI partly reddish, in IKI after pretreatment with KOH clearly blue. Asci clavate, with 8 ascospores, 77–95 × 16–22.5 µm. Ascospores brown, 7–12-distoseptate, narrowly clavate, without constrictions, 50–65(–70) × 4–5 µm, lower end attenuated, tail-like, but septate. Pycnidia not observed. Chemistry: Thallus UV- negative; no substances detected.

[Common3747A], U.S.A., Florida, Charlotte Co., near Gulf of Mexico, S of Grove City, Florida Route 775 near Duck Creek. Dry wooded area with pine and palmetto, mangroves along margin of creek. Leg. R. S. Common (no3747A), 1.1.1976, det. A. Aptroot. ISOTYPE.

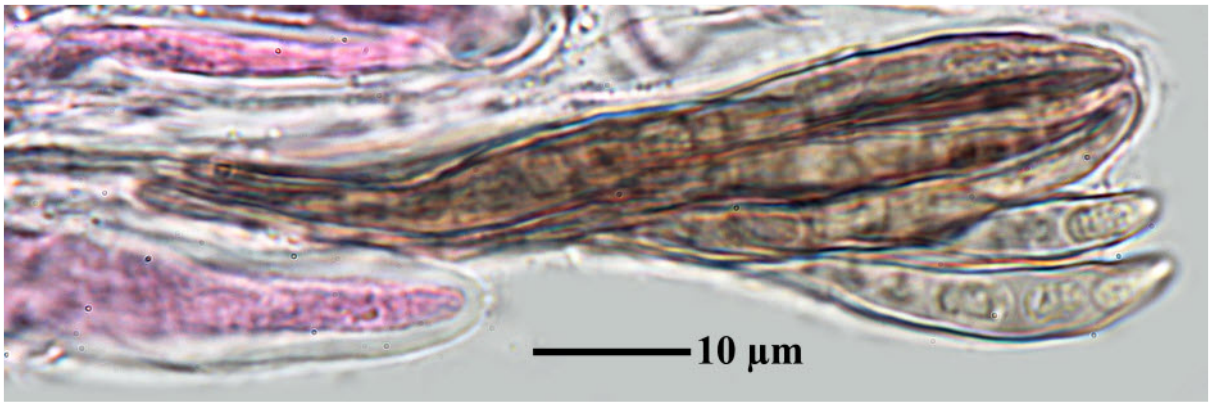


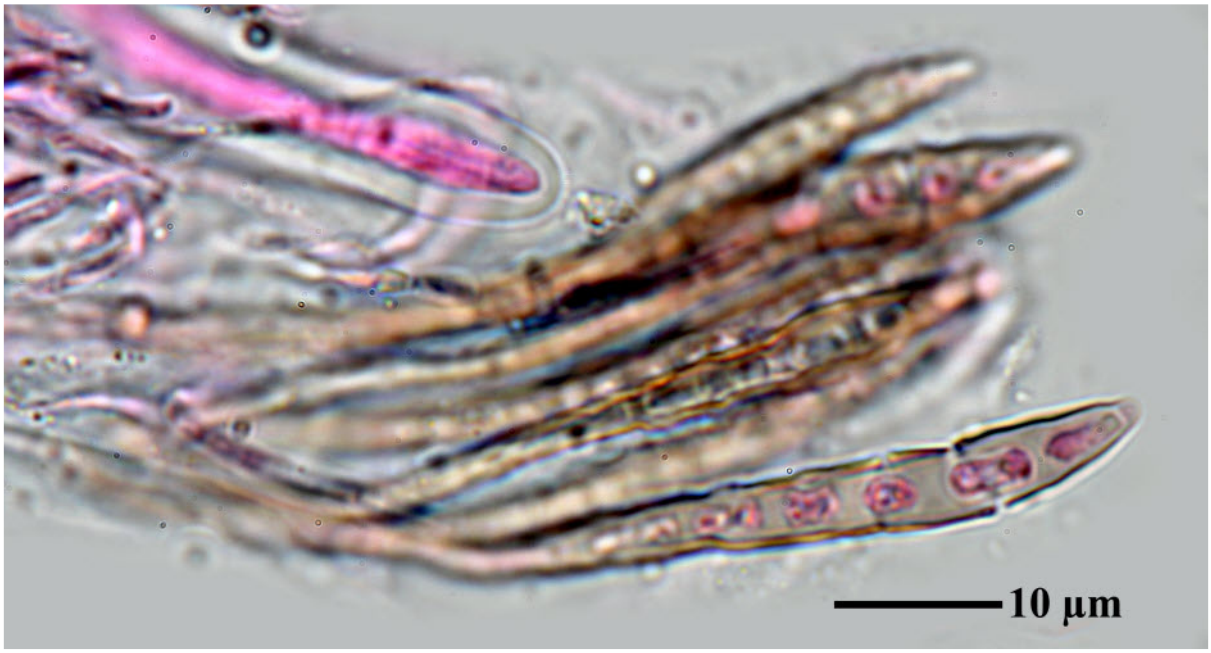


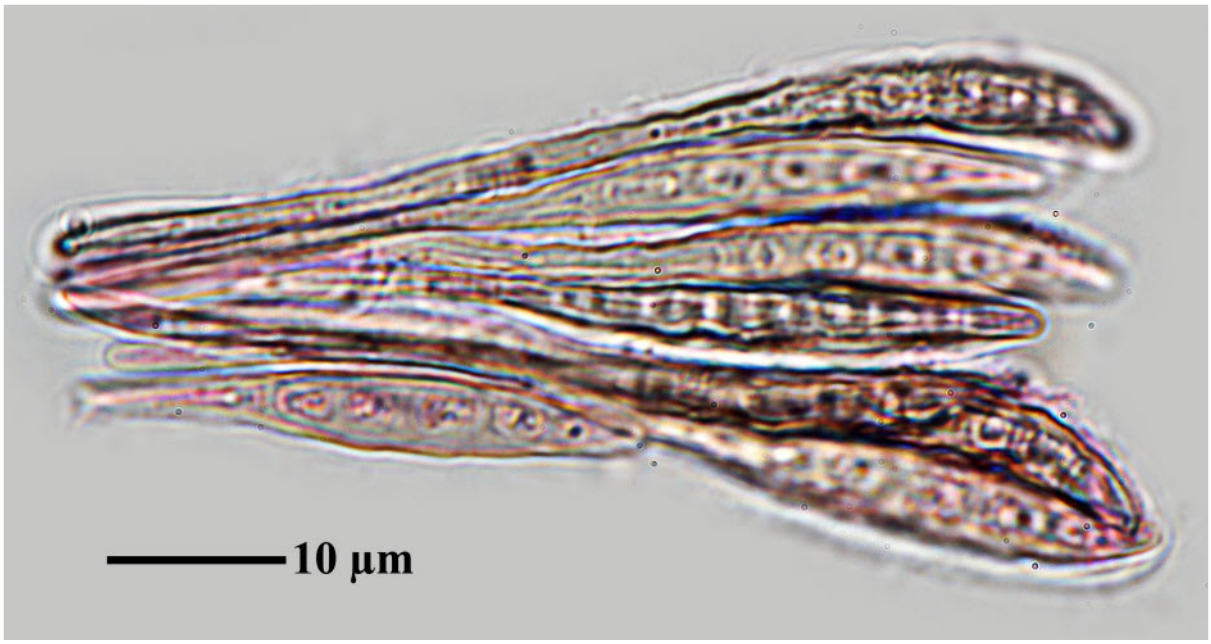
Pyrenula clavatispora



Pyrenula clavatispora





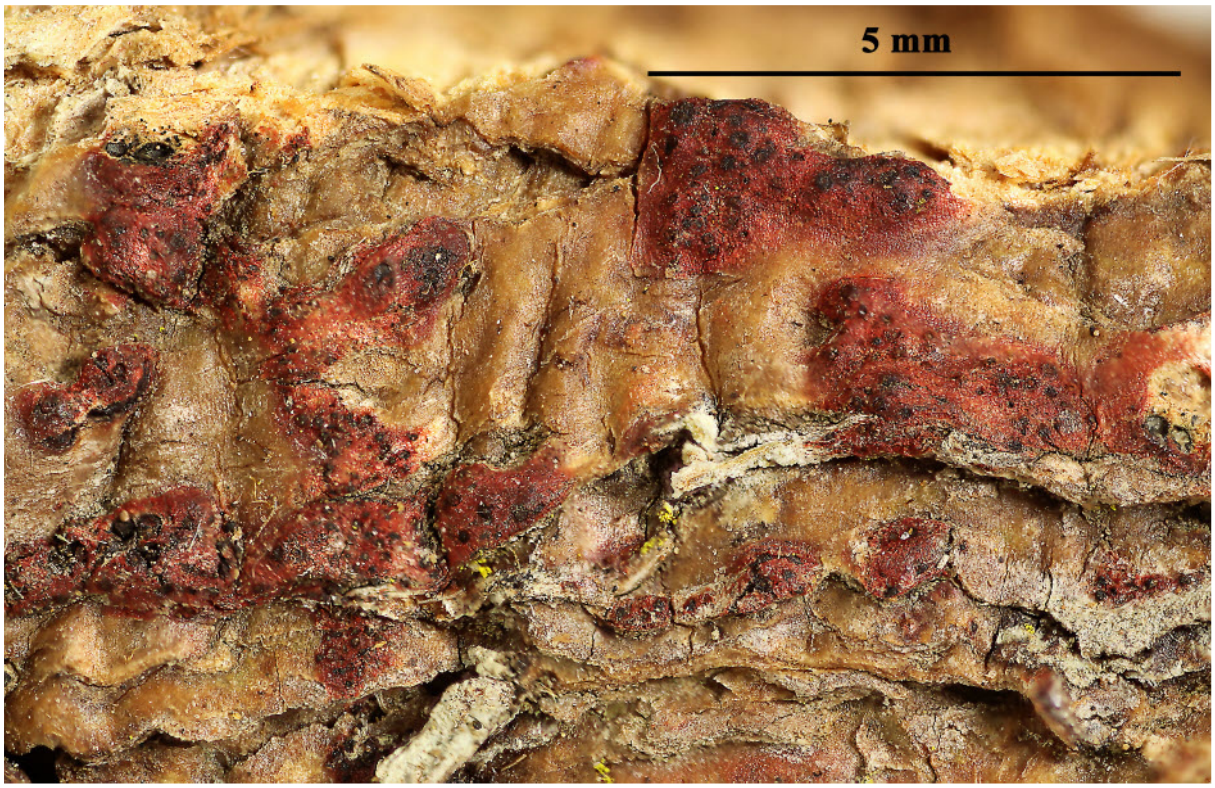


Pyrenula clavatispora

Pyrenula coccinea C.O. Mendonça, Aptroot & M. Cáceres, Phytotaxa 286(3): 172 (2016)

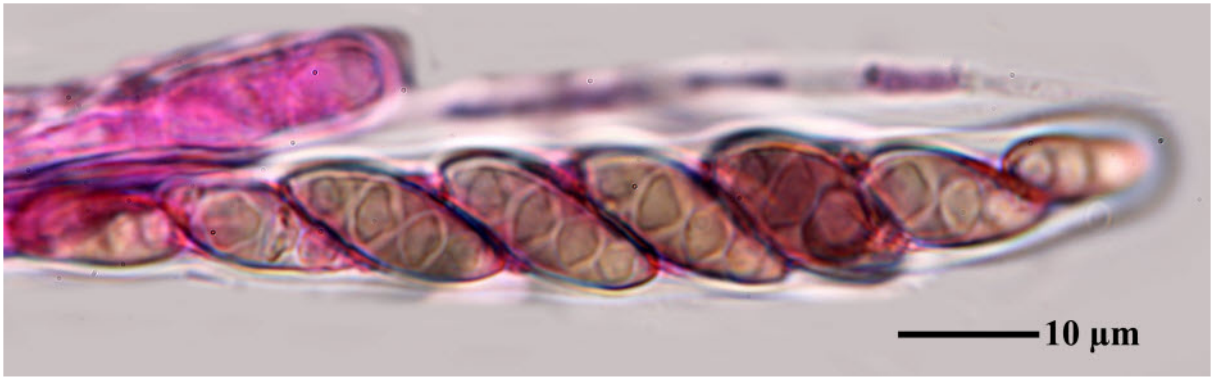
Thallus crustose, thin, yellowish brown, corticate, somewhat shiny, without pseudocyphellae, without a prothallus, red pruina absent. Algae trentepohlioid. Ascomata erumpent to prominent, pyriform, 0.4–0.5 mm diam., with 6 to 25 together immersed in pseudostromata which are generally somewhat constricted, round to lobate with partly fused outer walls but separate, apical ostioles, covered with red pruina. Hamathecium not inspersed. Asci with 8 uniseriate ascospores. Ascospores with 8 per ascus, brown, not curved, 3-septate, 15–18(–20) × 5–6 µm, distoseptate, terminal lumina not directly against the outer wall, somewhat rounded to diamond-shaped (at least during part of the development), upper and lower end rounded, without ornamentation. Pycnidia not observed. Chemistry**:** Pseudostroma surface KOH+ purple, UV–; TLC: unidentified anthraquinone.

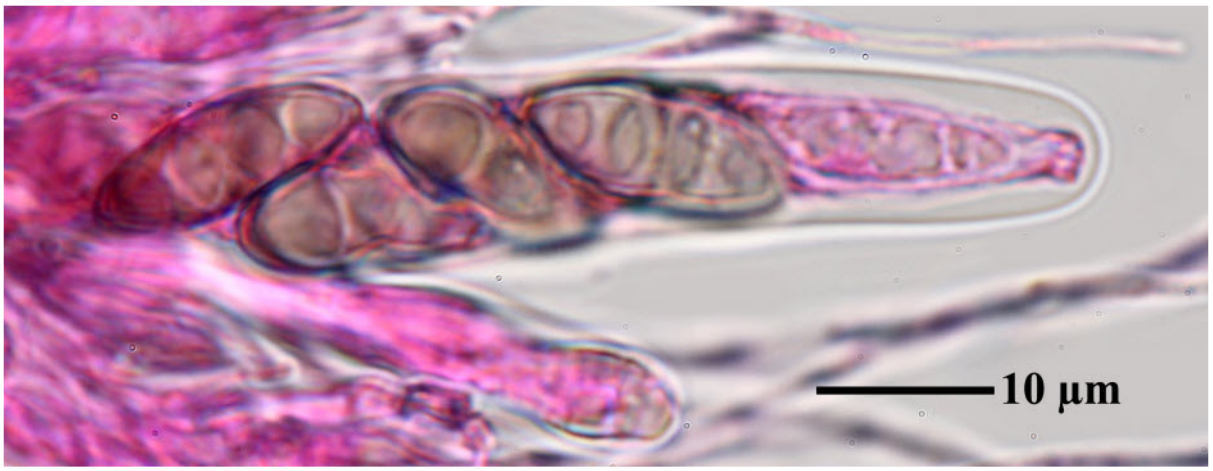
[ISE23938], Brazil, Bahia, Povoado Ouro Verde, Catolé, Chapada Diamantina, 13°17’49” S,41°54’02” W, 1636 m, on tree bark. Leg. C. Mendonça (no ISE 23938), 10.01.2015, det. A. Aptroot, 2015. ISOTYPE.

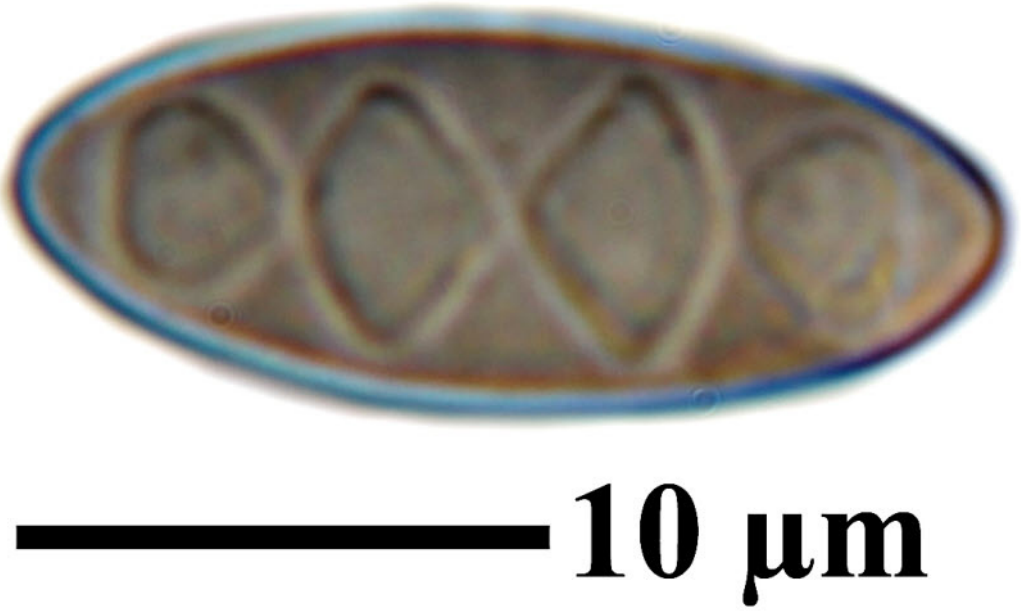




Pyrenula coccinea





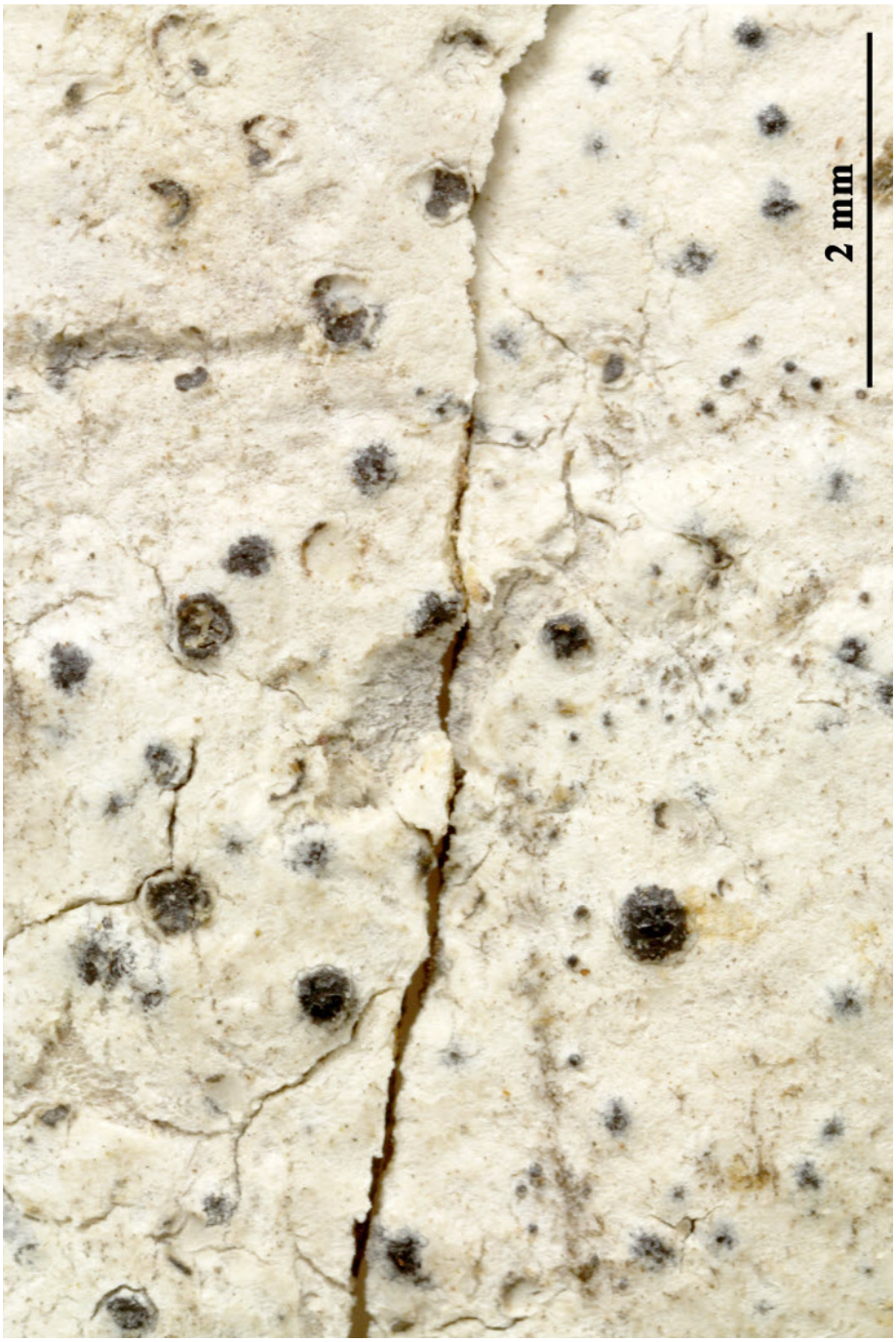


Pyrenula coccinea

Pyrenula cocoes Müll. Arg. [as 'cocoës'], Hedwigia 32: 136 (1893)
= *Pyrenula rugulosa* Müll. Arg.
= *Pyrenula insularum* H. Magn.

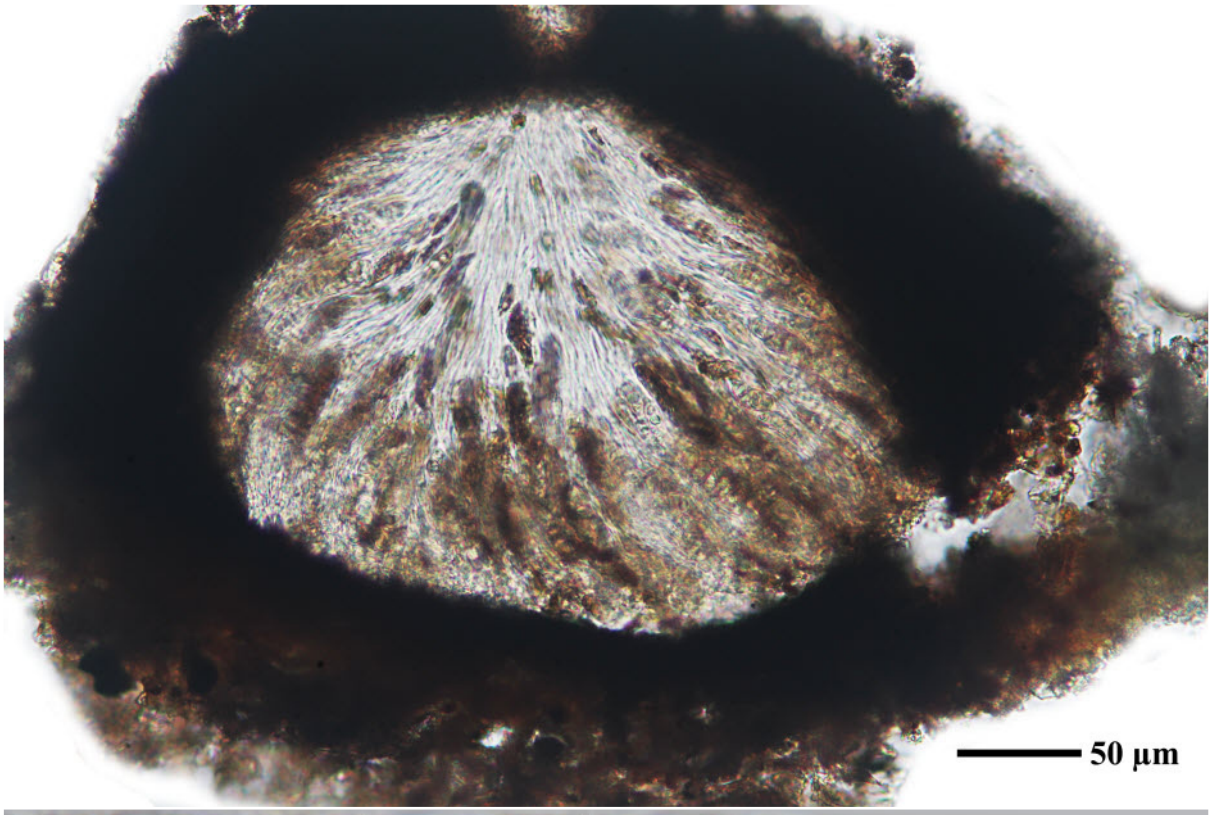
Thallus ecorticate, whitish, UV+ yellow; ascomata flattened to conical, erumpent, sides often partly thallus-covered, c. 0.5–1.0 mm diam.; ostioles apical, pale to black; ascospores 4-loculate, 18–21 × 10–13 µm, fusiform, with thick apical walls.

[Sip19528], Guyana, East Demerara distr. Along western dike at mouth Mahaica river. Cultivated coastal area. On *Avicennia*. 0 m, 8°41'-43' N, 57°55' W. Leg. H. Sipman (no 19528) & A. Aptroot, 5.3.1985, det. A. Aptroot, 1990.





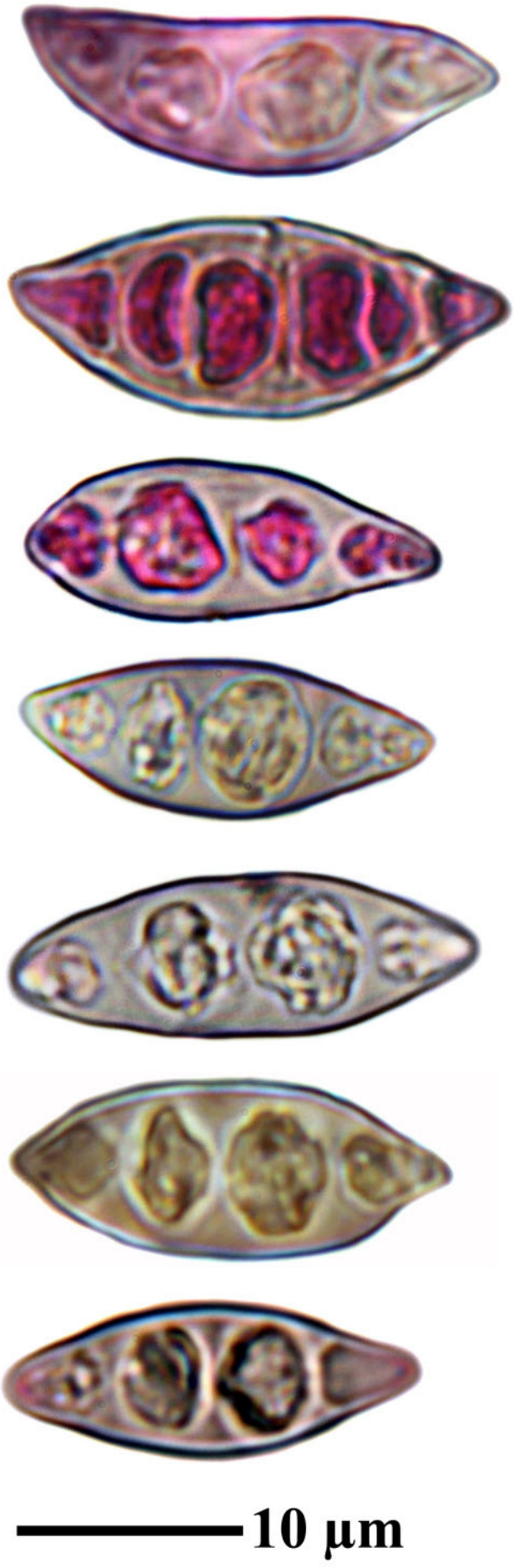
Pyrenula cocoes







Pyrenula cocoes

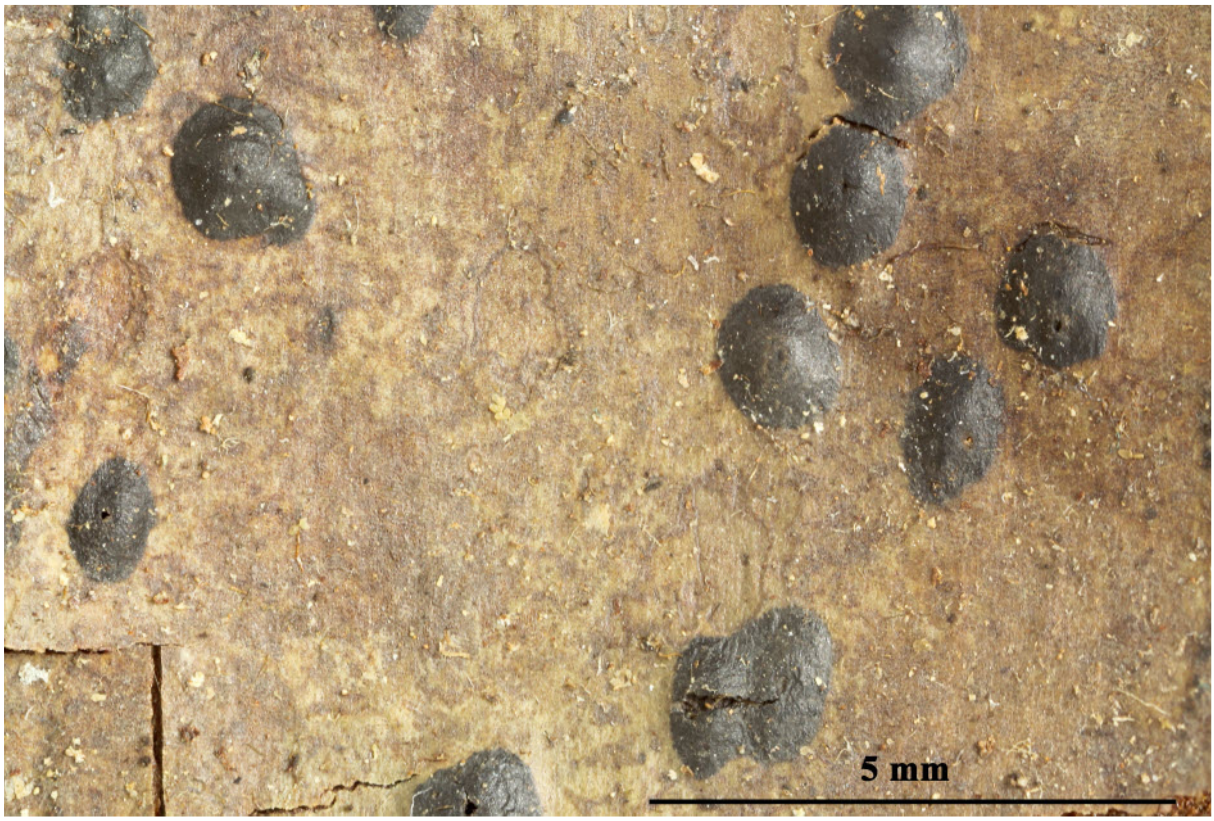


Pyrenula cocoes

Pyrenula complanata (Mont.) Trevis., Spighe Paglie: 17 (1853)
= *Verrucaria complanata* Mont. 1843
= *Spermatodium complanata* (Mont.) Trevis.
= *Pyrenula macrocarpa* A. Massal.
= *Pyrenula ectypa* (Krempelh.) Zahlbr.
= *Pyrenula introducta* (Stirt.) Zahlbr.
= *Pyrenula cordatula* Zahlbr.
= *Verrucaria ectypa* Krempelh.
= *Verrucaria introducta* Stirt.

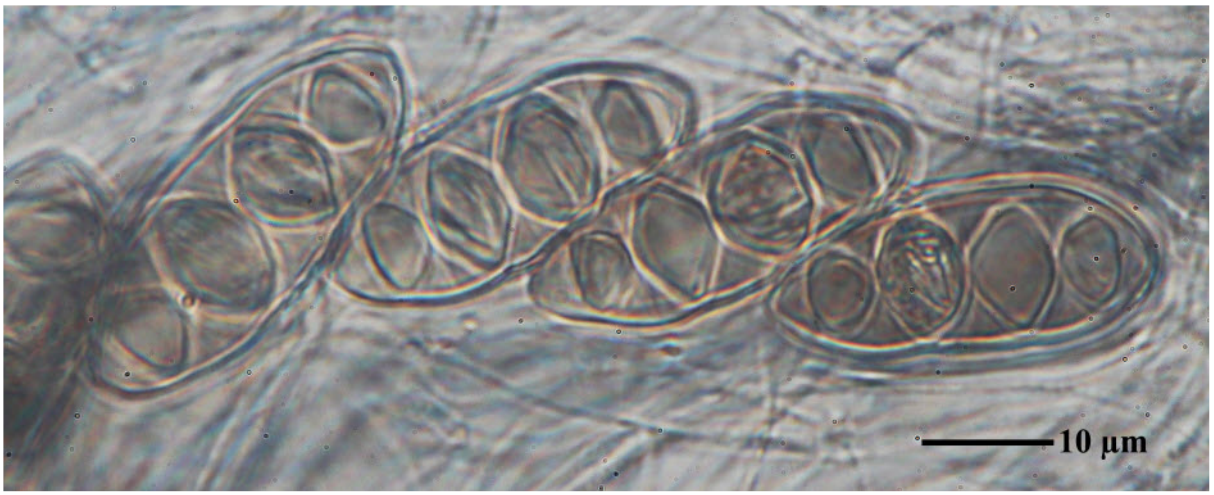
Ascomata hemispherical, erumpent, mostly exposed, c. 0.7–1.4 mm diam.; ostioles apical, pale; ascospores 4-loculate, 30–40 × 10–14 µm, fusiform with pointed ends, with thick apical walls.

[Sip18985], Guyana, Upper Mazaruni district. Mount Latipu, c. 8 km N of Kamarang, c. 15 m tall forest on N-foot, on 5 cm diam. stemlet. 600 m, 5°57’ N, 60°38’ W. Leg. G. Sipman (no 18985) & A. Aptroot, 24.02.1985, det. A. Aptroot, 1990.

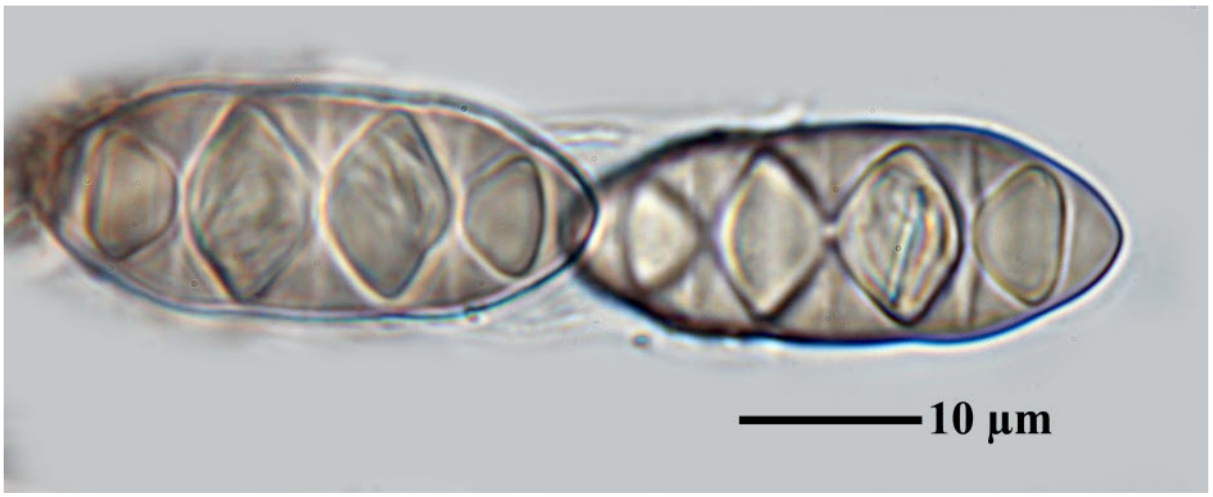


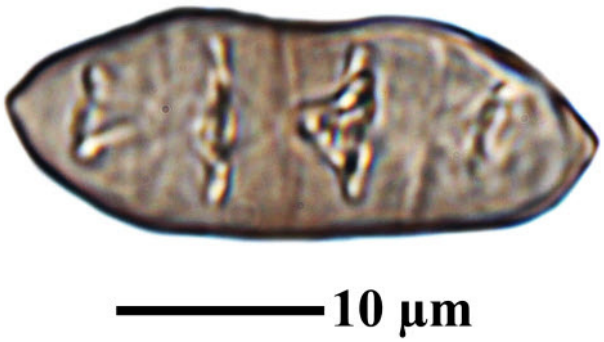


Pyrenula complanata









Pyrenula complanata

Pyrenula concatervans (Nyl.) R.C. Harris, in Tucker & Harris, Bryologist 83(1): 15 (1980)

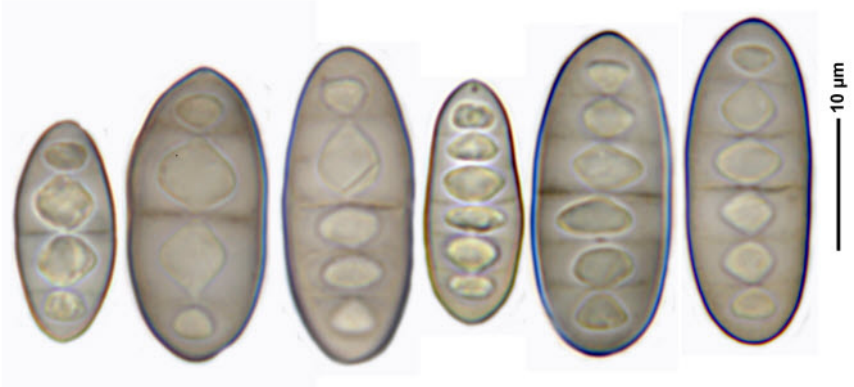
= *Melanotheca concatervans* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 479 (1922)

= *Verrucaria concatervans* Nyl., Lich. Japon.: 109 (1890)

Thallus corticate, brownish to olive green, with pseudocyphellae. Perithecia solitary, subglobose, immersed to erumpent from the substratum, often partly or mostly covered by thallus, c. 0.3–0.5 mm diam. Perithecial wall with crystals, up to 100 µm thick, often not fully carbonized. Ostiole pale, apical. Hamathecium not inspersed, IKI+ orange, filaments unbranched. Ascospores 8/ascus, grey brown, irregularly biseriate, 3–5-septate, fusiform with rounded ends, 24–32 × 8.0–15 µm, lumina angular to usually somewhat rounded, all lumina separated from the exospore by a thick endospore layer, old spores with orange oil. Chemistry: No substances detected, K-, C-, KC-, UV-.

[14340], Seychelles, Praslin, Anse La Blague, beim Hotel La Vanilla, 4°19.793' S, 55°47.019' E, 17 m, auf Cocos. Leg. F. Schumm & J.-P. Frahm 27.09.2008, det. A. Aptroot 2008.

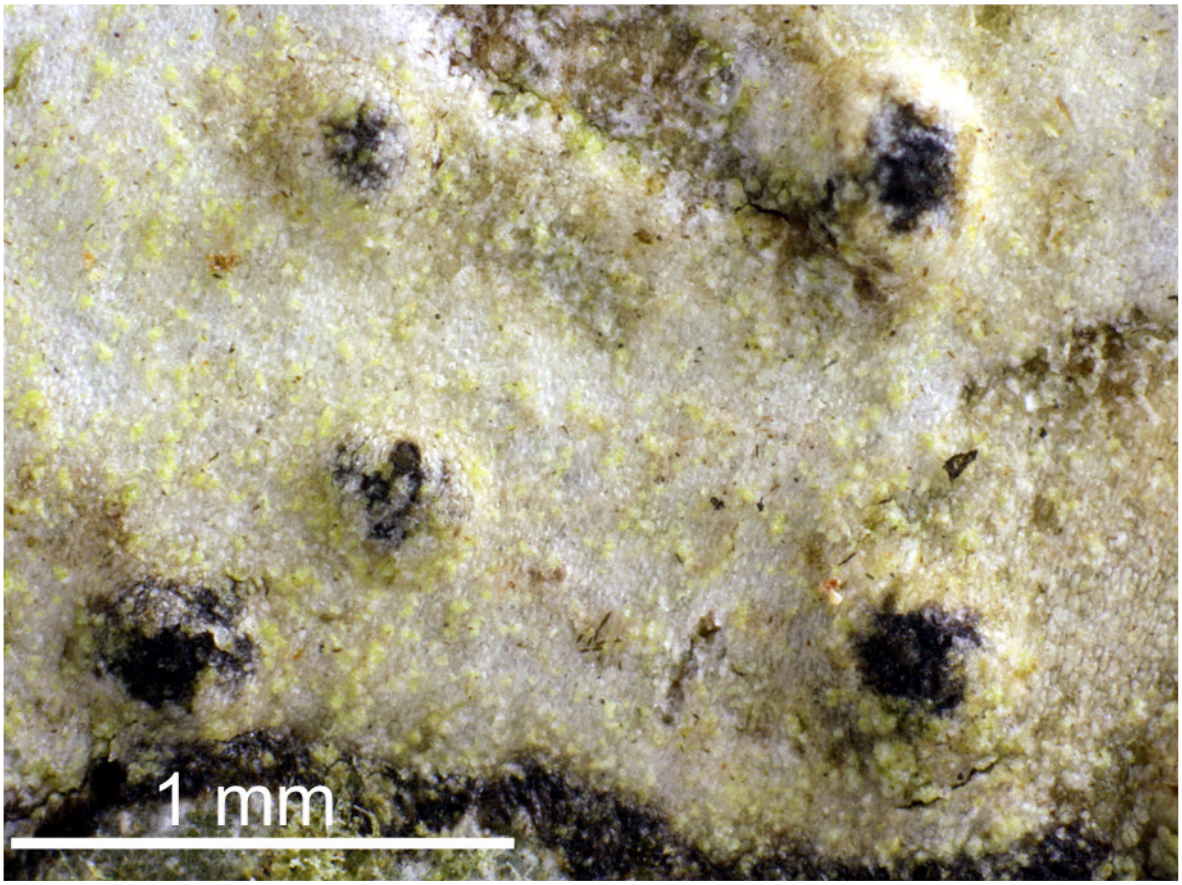


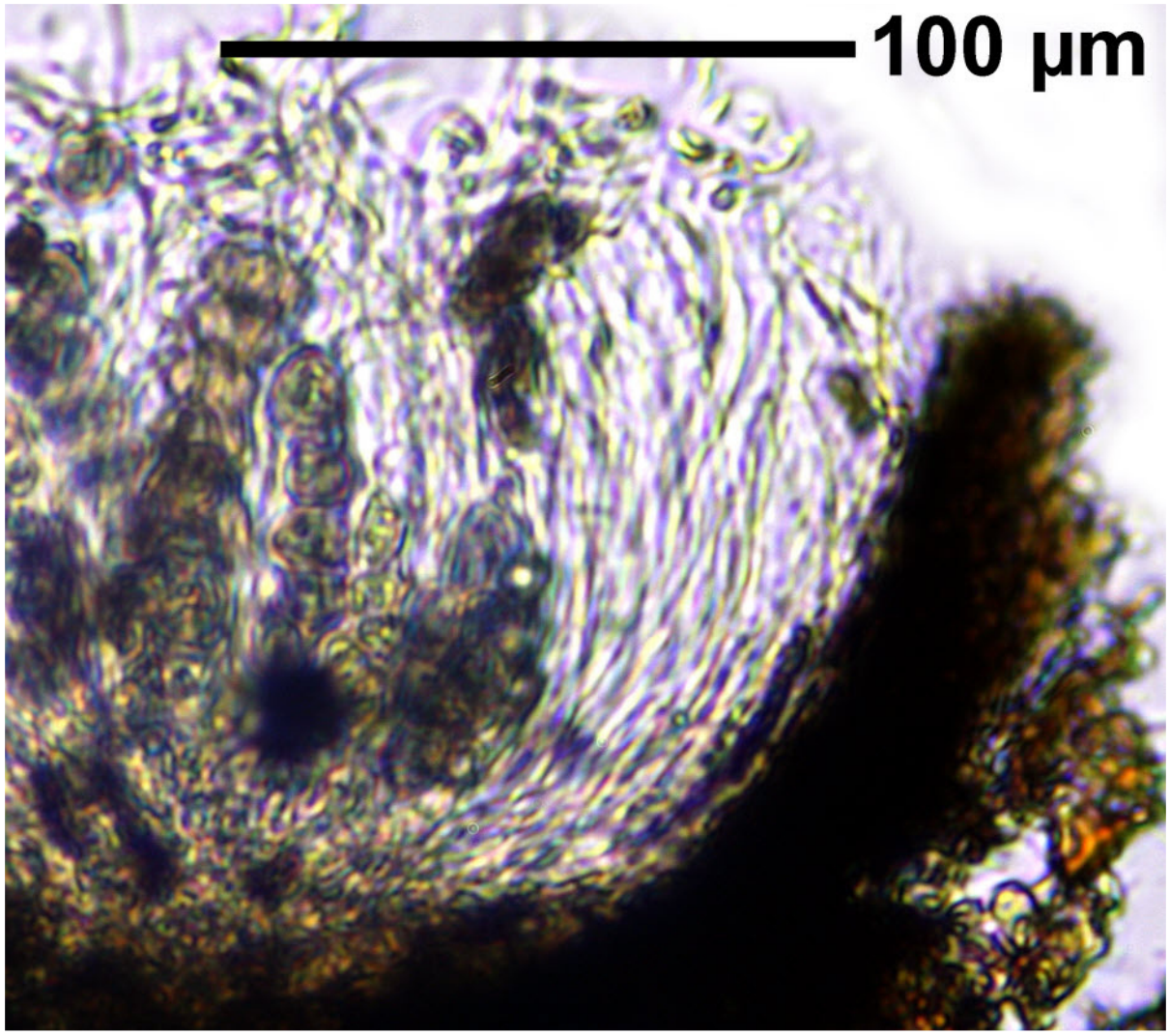


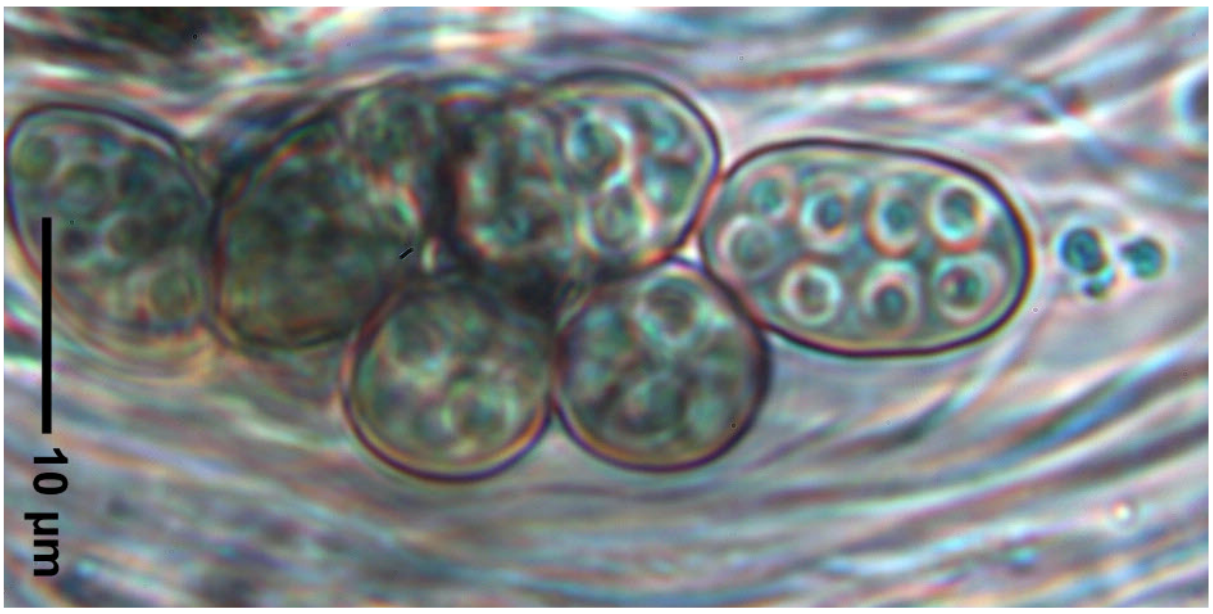
Pyrenula confinis (Nyl.) R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 109 (1995)
= *Anthracothecium confine* (Nyl.) Müll. Arg., Linnaea 43: 45 (1880)
= *Bottaria confinis* (Nyl.) Vain., Bot. Tidsskr. 29: 144 (1909)
= *Sporodictyon confine* (Nyl.) Trevis., Conspect. Verruc.: 13 (1860)
= *Verrucaria confinis* Nyl., Annls Sci. Nat., Bot., sér. 4 3: 173 (1855)
= *Anthracothecium corticatum* Müll. Arg., Bull. Soc. Roy. Bot. Belg. 30(1): 96 (1891)
= *Pyrenula corticata* (Müll. Arg.) R. C. Harris

Thallus ecorticate, white to greyish (lichexanthone-colour), without pseudocyphellae. Perithecia solitary, subglobose, erumpent from the substratum, sides often partly covered by thallus, c. 0.3–0.5 mm diam. Perithecial wall without crystals, up to 100 µm thick. Ostiole black, apical. Hamathecium not inspersed, IKI+ orange, filaments unbranched. Ascospores 8/ascus, grey brown, irregularly uniseriate, muriform with c. 4 rows of 2–4 locelli, ellipsoid with rounded ends, 12–22 × 7–13 µm, lumina angular to mostly rounded. Chemistry: Thallus UV+ yellow, lichexanthone detected with TLC.

[14463], Seychelles, Praslin, Nationalpark Sentier Glacier Noire, 4°19.916' S, 55°44.465' E, ca. 200-320 m; auf Cinnamomum verum. Leg. F. Schumm & J.-P. Frahm 30.09.2008, det. Schumm, teste A. Aptroot.







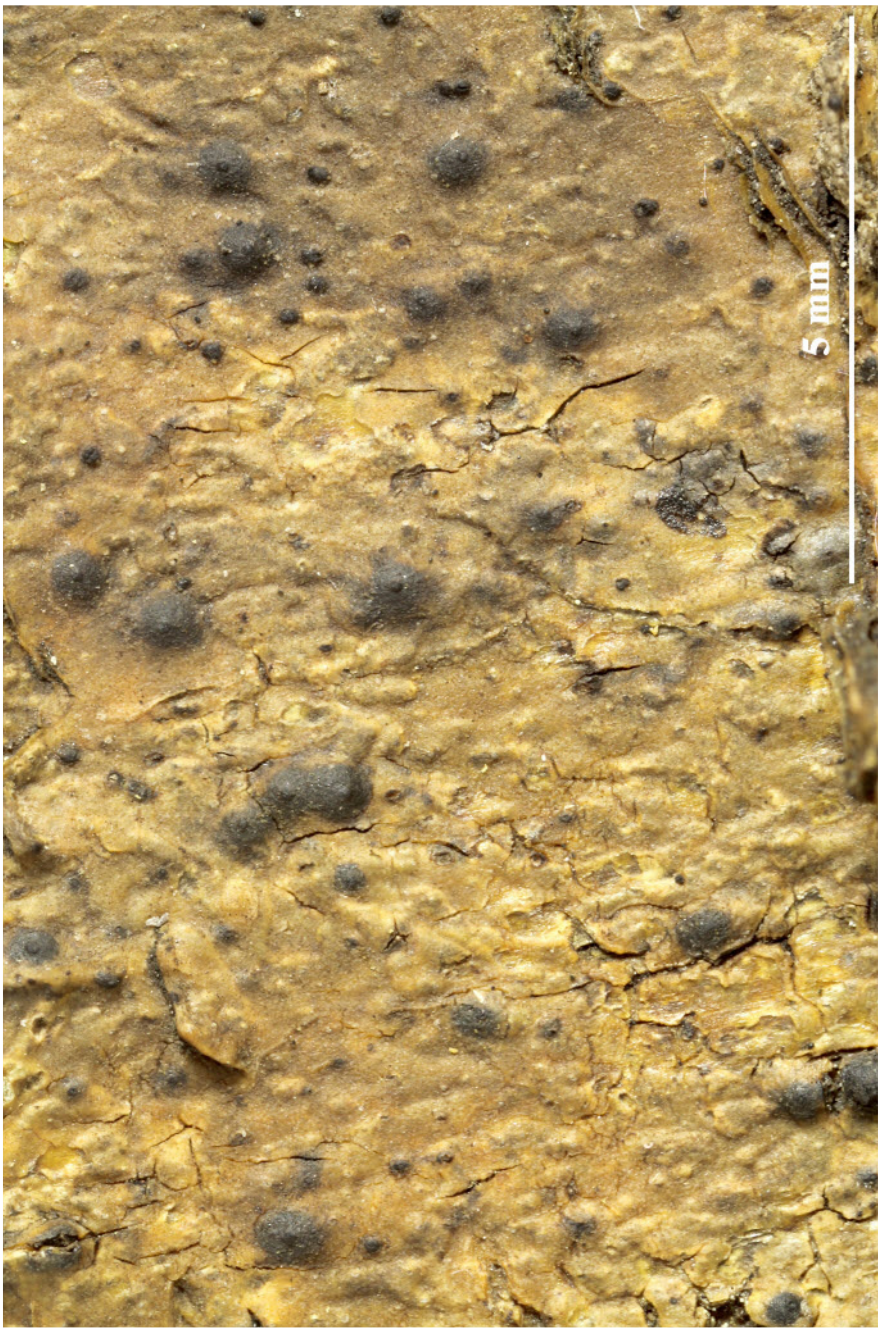


Pyrenula confinis

Pyrenula confoederata R.C. Harris, Mem. N. Y. bot. Gdn 49: 89 (1989)

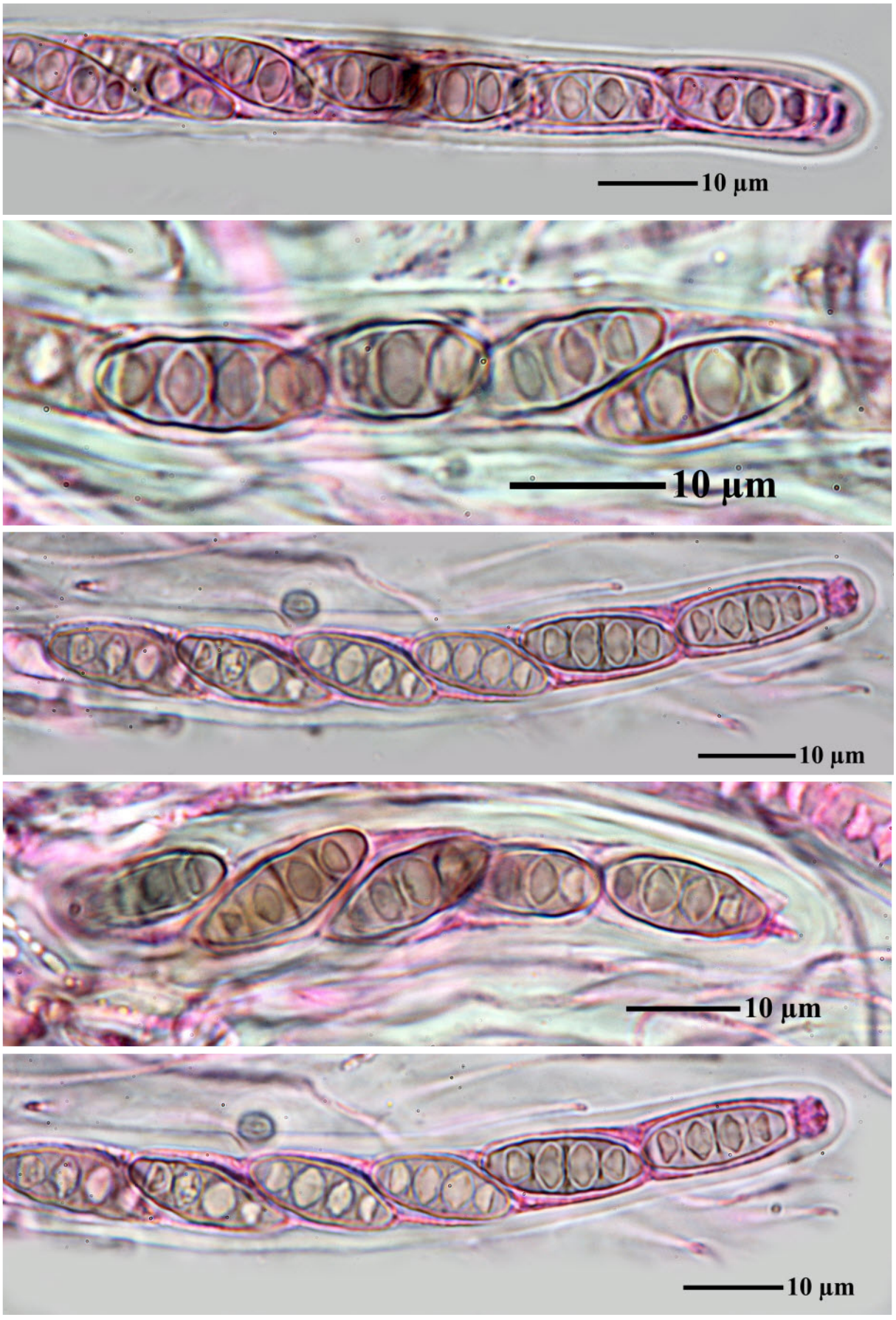
Thallus corticate, not pseudocyphellate, UV-. Ascomata hemispherical to subglobose, 0.5–0.8 mm diam.; crystals lacking. Hamathecium not inspersed; hymenial gel IKI-. Ascospores uniseriate, occasionally with 1–2 cells divided lengthwise, with a darker and apparently denser plate separating the locules (± bowtie-shaped in optical section), 15–19 × 6–7.5 µm.

[ABL72858], Korea, Gangwon-do, Distr. Hongcheon-gun, Nae-myeoun, Myunggae-ri, Mt. Odae, Odaesansan National Park, along the Geybang stream, en route from Naemyeoun Information Centre to Pass Duro-ryeong, 700-900 m, 37°50’ N, 128°32’ E. Leg. A. Aptroot (no 72858), 17.10.2014, det. A. Aptroot 2014.





Pyrenula confoederata

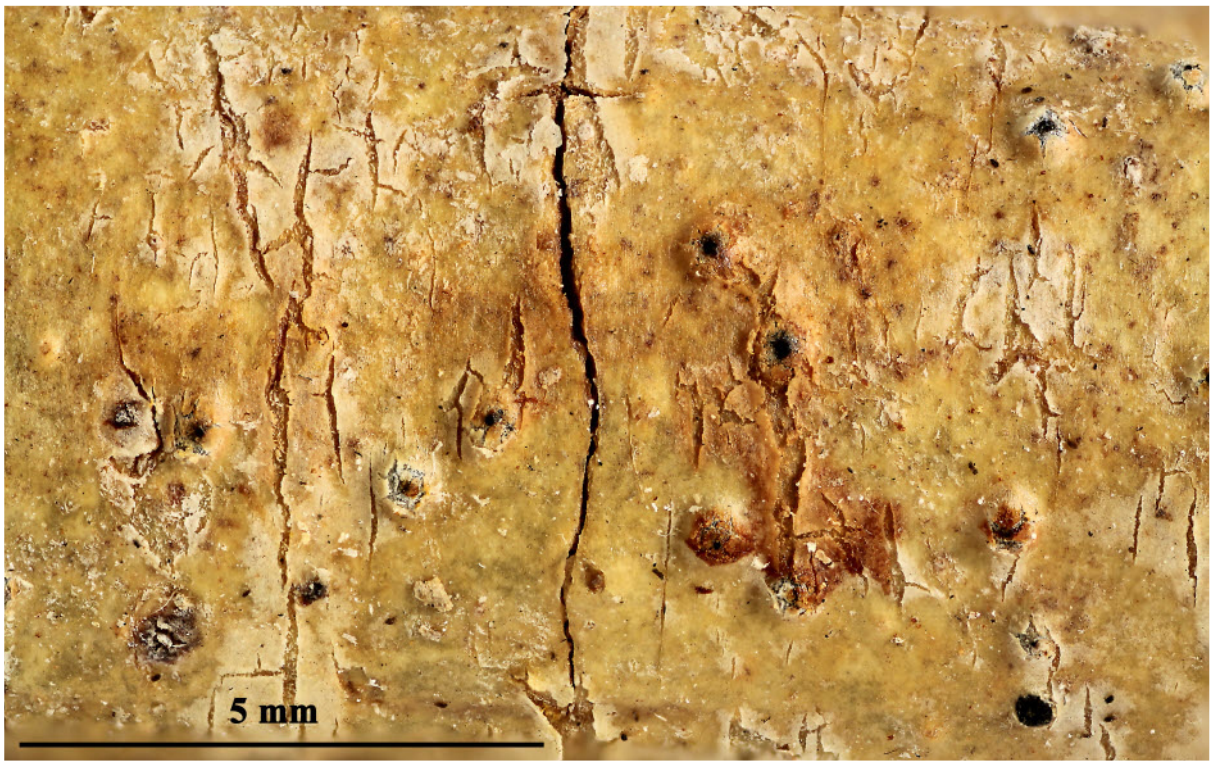


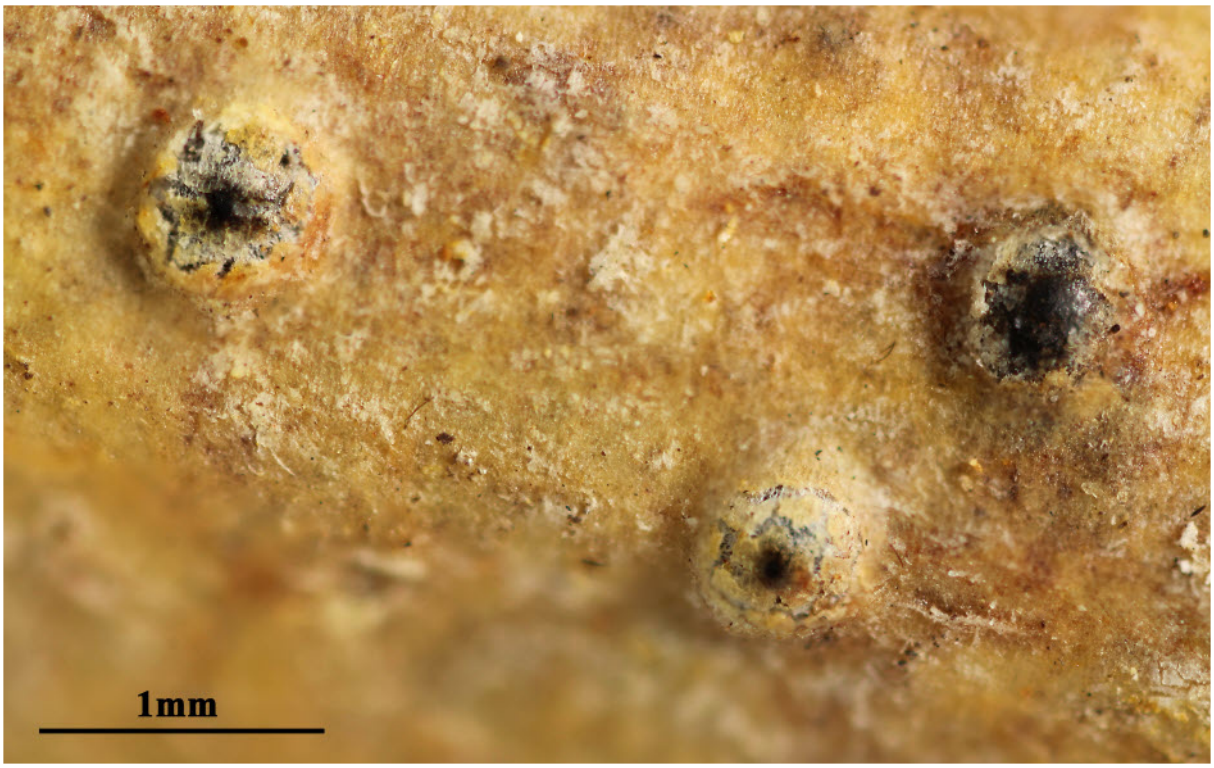
Pyrenula confoederata

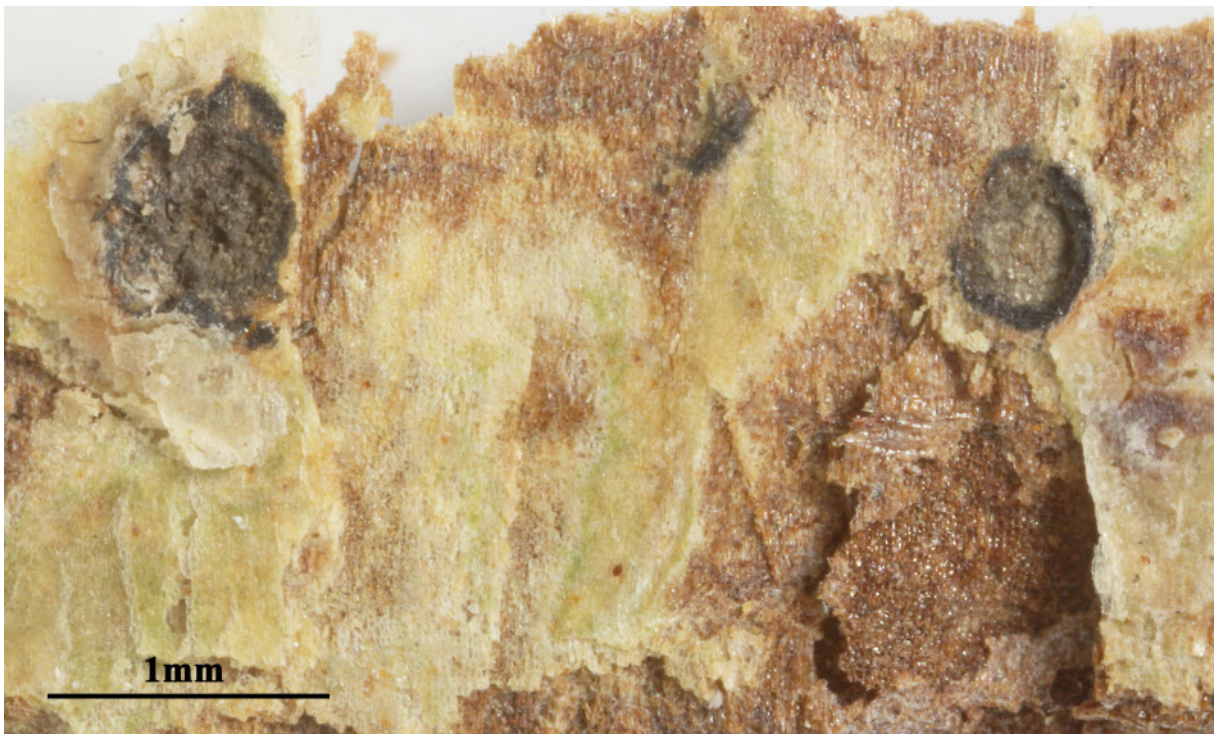
Pyrenula cornutispora Aptroot & M. Cáceres, Lichenologist 45(2): 172 (2013)

Thallus thin, yellowish brown, widely spreading, without pseudocyphellae, without a prothallus. Ascomata emergent, hemispherical, mostly completely covered by the thallus except for the ostiole, 0.4–0.7 mm diam., solitary. Ostiole apical, black. Hamathecium inspersed with hyaline oil globules. Ascospores 8 per ascus, irregularly biseriate, 3-septate, (21–)25–29(–32) × 8–10 µm, dark brown (ends paler), lumina angular, central lumina wider than long, end lumina longer than wide, without endospore in the spore tips, tips pointed to attenuated, mostly slightly bent, slightly constricted at the septa. Pycnidia not observed. Chemistry: no substances detected.

[ABL11938], Brazil, Amazonsa, Fazenda São Francisco off BR319, 30 km N of Porto Velho, on tree bark in primary rain forest. Leg. M. Cáceres & A. Aptroot (no 11938), 15.3.2012, det. A. Aptroot, 2012. ISOTYPE.







Pyrenula cornutispora







Pyrenula cornutispora



Pyrenula cornutispora

Pyrenula coryli A. Massal., Ric. auton. lich. crost. (Verona): 164 (1852)
= *Arthopyrenia coryli* (A. Massal.) Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 16(2): 430 (1862)
= *Arthopyrenia glabrata var. coryli* (A. Massal.) H. Olivier, Flora Lich. Orne 2: 272 (1884)
= *Microthelia glabrata var. coryli* (A. Massal.) Boistel, Nouv. Fl. Lich. 2: 288 (1903)
= *Mycopyrenula coryli* (A. Massal.) Vain., Acta Soc. Fauna Flora fenn. 49(no. 2): 139 (1921)
= *Verrucaria coryli* (A. Massal.) Nyl., Mém. Soc. Imp. Sci. Nat. Cherbourg 3: 193 (1855)
= *Verrucaria glabrata var. coryli* (A. Massal.) Nyl., Mém. Soc. Acad. Maine Loire 4: 47 (1858)

Thallus pale grey; pseudocyphellae mor or less absent; probably lichenized. Ascomata 0.2–0.3 mm diam. and c. 0.1 mm high, with laterally extending involucrellum; pigmented exciple not continuous below the perithecial cavity; anthraquinones absent. Ascospores 10–17 × 4–6 µm, 3-septate. Pycnidia scattered amongst the perithecia; conidia 20 × 0.5 µm, thread-like.

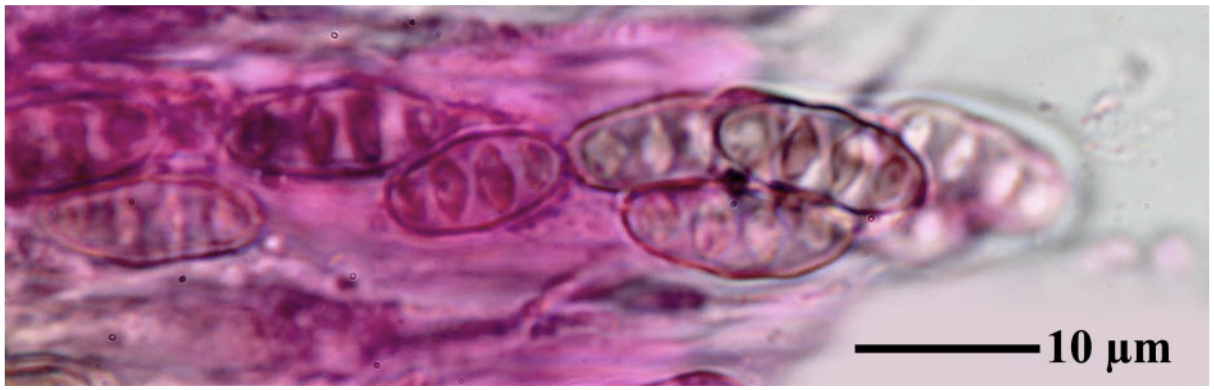
[Boom9793], Switzerland, Valais, Val d'Hérens S of Sion near Evlène, on Corylus. 1410 m. Leg. H. F. van Dobben & W. O. van der Knaap, 22.07.1990, det. A. Aptroot, 1990.

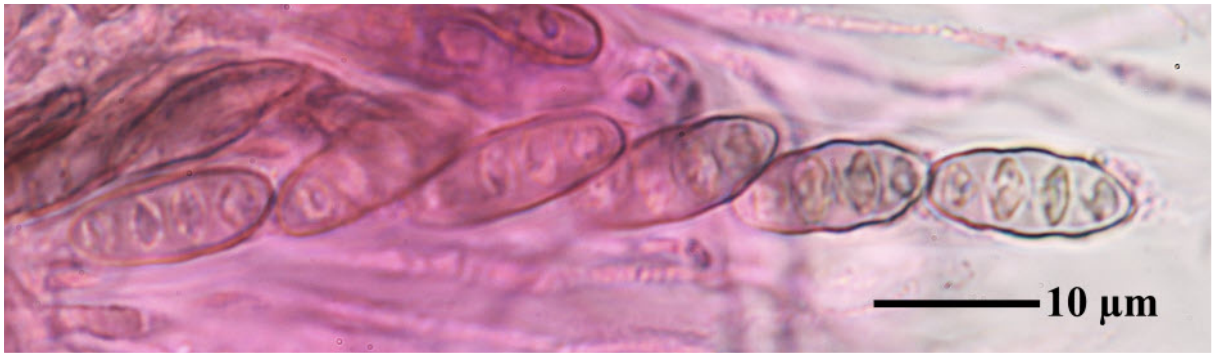




Pyrenula coryli







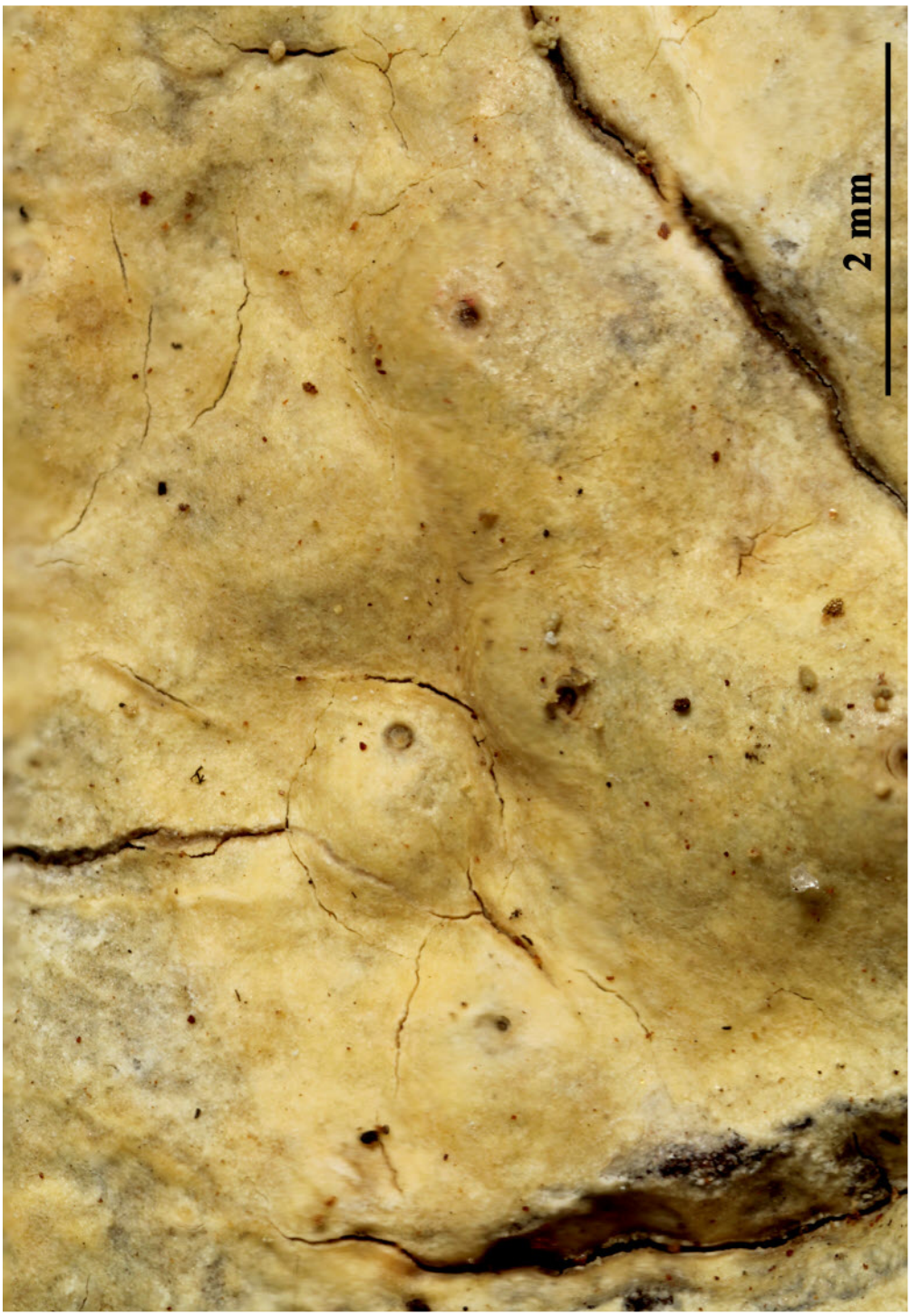


Pyrenula coryli

Pyrenula crassiuscula (Malme) Aptroot, Fungal Diversity 9: 30 (2002)
= *Parathelium crassiusculum* Malme, Ark. Bot. 19(no. 1): 20 (1924)

Thallus thick, areolate, UV+ yellow; ascomata emergent, 0.7–0.8 mm diam.; ostioles subapical, pale; hamathecium inspersed with colourless oil globules, gel IKI+ wine-red; ascospores uniseriate, 4-loculate, 38–48 × 15–19 µm.

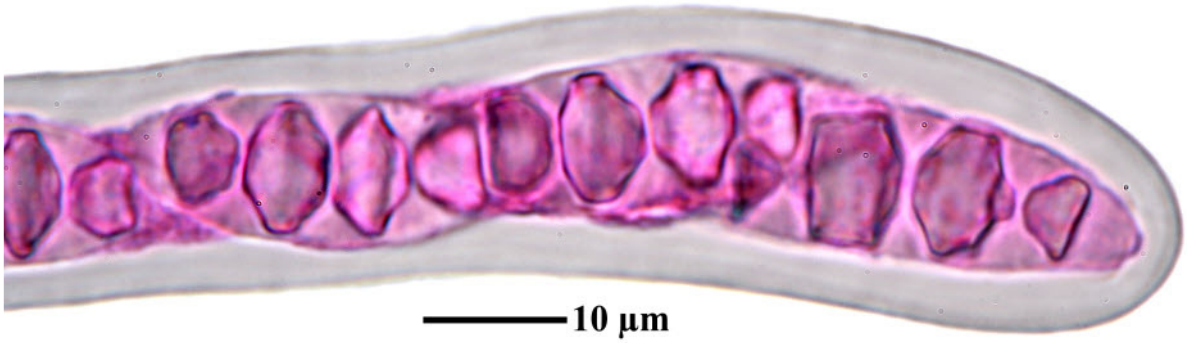
[ABL41727], Brazil, São Paulo, Serra da Mantiqueira, Campos do Jordão, Mirante de São José dos Alpes, in cloud forest, c. 1750 m. 22°40’ S, 45°30’ W. Leg. A. Aptroot (no 41727), 25.09.1997, det. A. Aptroot, 1998.

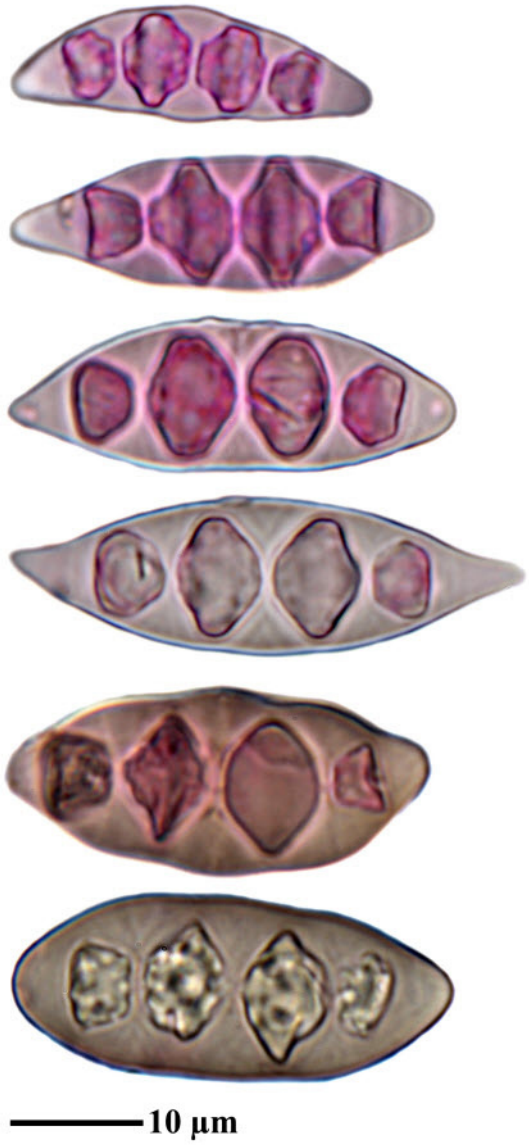




Pyrenula crassiuscula







Pyrenula crassiuscula

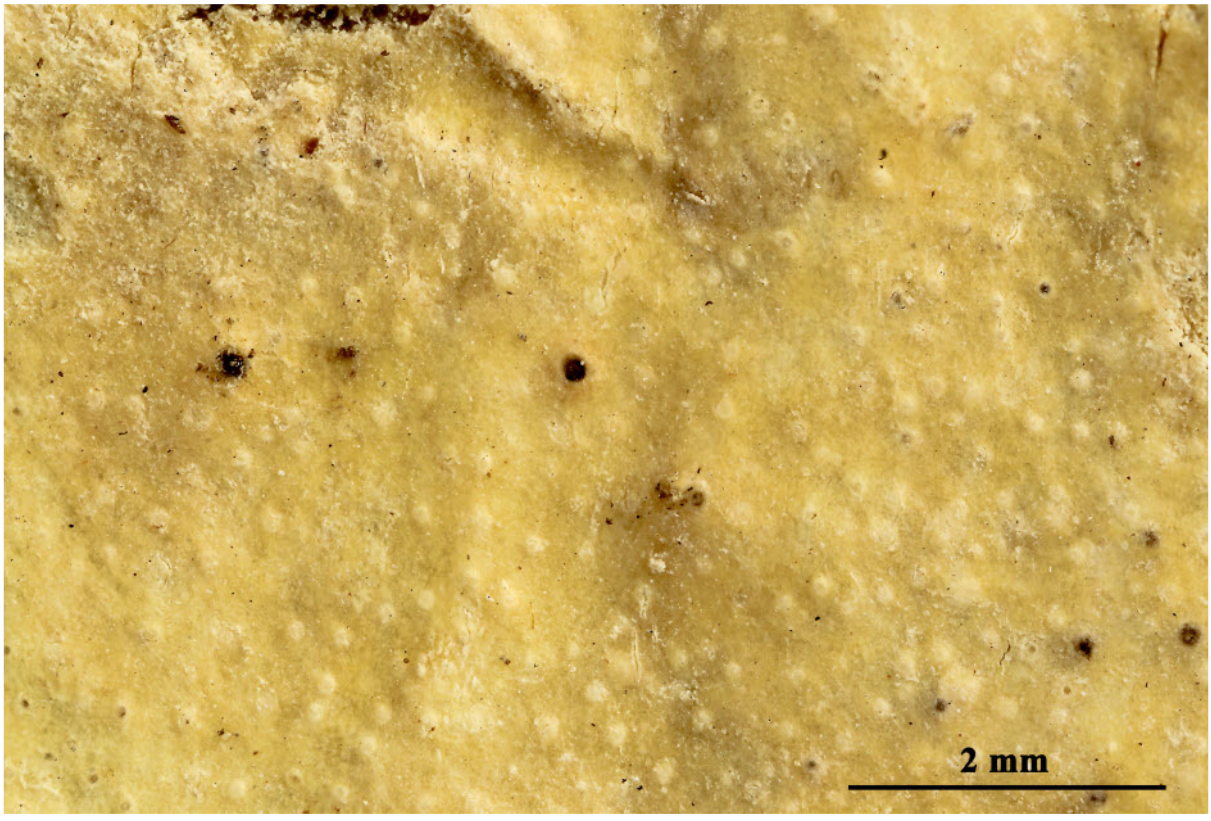
Pyrenula cryptothelia (Müll. Arg.) Aptroot & Etayo, in Etayo & Aptroot, Lichenologist 35(3): 235 (2003)

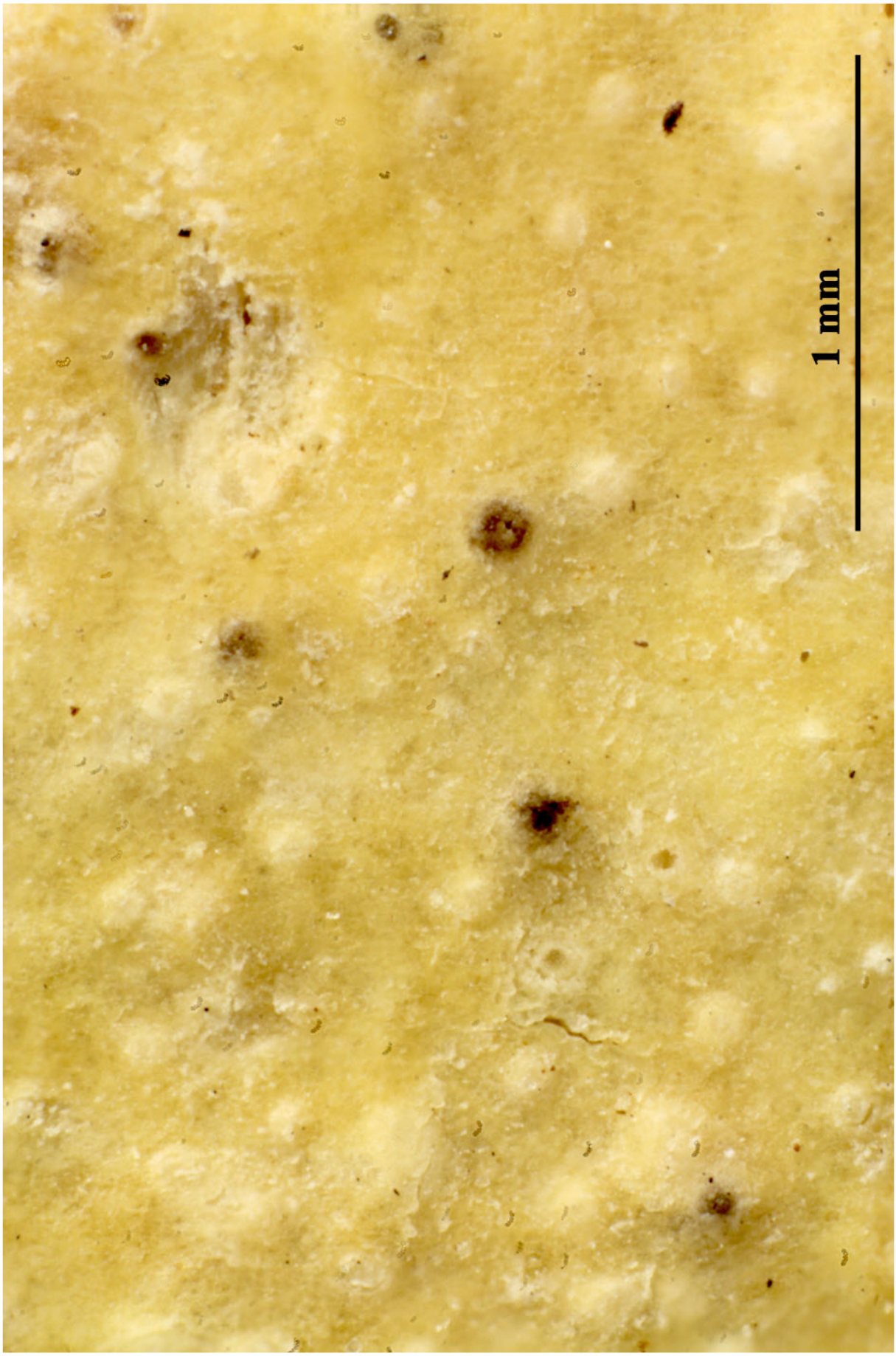
= *Astrothelium cryptothelium* (Müll. Arg.) Nyl., in Hue, Nouv. Arch. Mus. Hist. Nat., Paris, 3 sér. 4: 132 (1892)

= *Pyrenastrum cryptothelium* Müll. Arg., Bot. Jb. 6: 386 (1885)

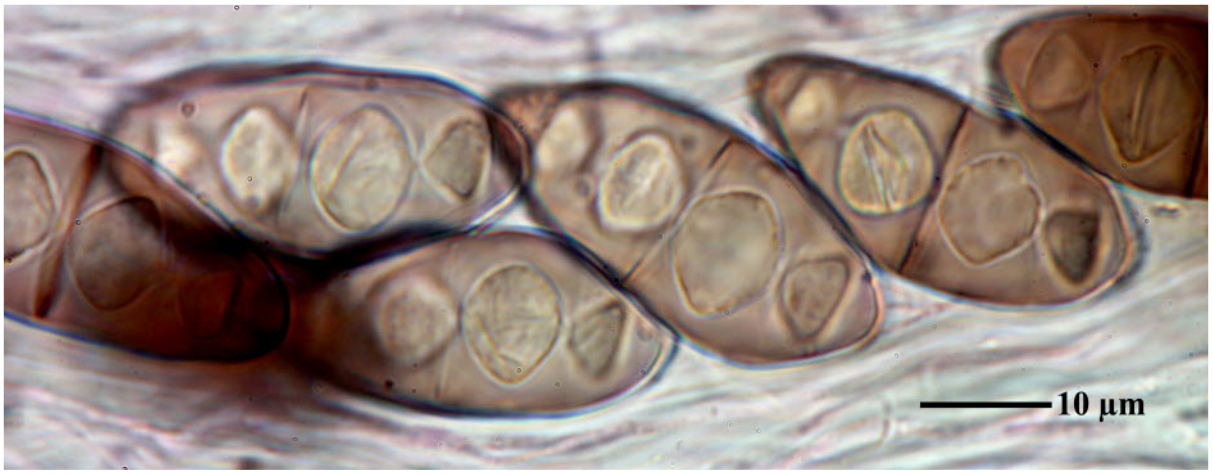
Thallus with pseudocyphellae. Ascomata with 2–7 erumpent, pyriform chambers and central, joint, pale ostiole. Ascospores 3-septate, 30–45 × 12–22 µm (in our samples 32–37 x 13–15.5 µm), fusiform, with thick apical walls. This species is similar to *P. cubana* (Müll. Arg.) R. C. Harris, but that species has smaller spores of 21–25 x 8–10 µm (Harris 1995).

[ABL11224], Ecuador, Los Rios, 54 km N of Quevedo, primary rain-forest, 200 m. Leg A. Aptroot (no 11224) & R. Hensen,15.07.1982, det. A. Aptroot.

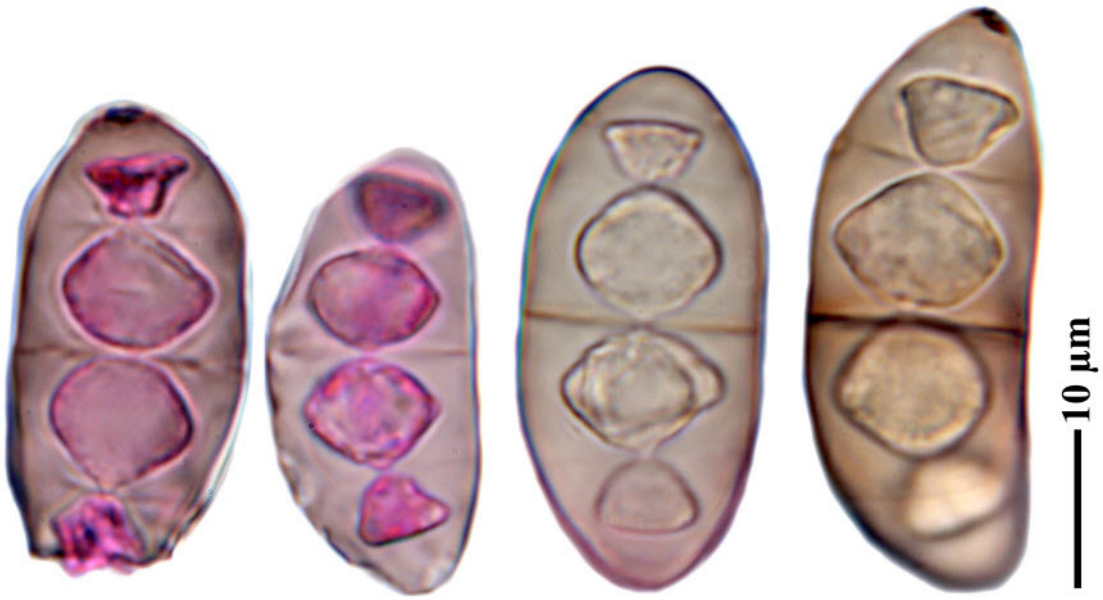




Pyrenula cryptothelia







Pyrenula cryptothelia

Pyrenula cubana (Müll. Arg.) R.C. Harris, Mem. N. Y. bot. Gdn 49: 91 (1989)
= *Pyrenastrum cubanum* Müll. Arg. 1885

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 to fully exposed, c. 0.3–0.5 mm diam. Perithecial wall without crystals, up to 100 µm thick. Ostiole pale, lateral. Hamathecium not inspersed, IKI+ orange, filaments unbranched. Ascospores 8/ascus, grey brown, uniseriate, 3-septate, fusiform with rounded ends, 20–30 × 8–11 µm, lumina angular, end lumina separated from the exospore by an endospore layer. Chemistry: No substances detected.

[Johnson], Cuba, Camaguey province, Cubitos Mountains, midway between Camaguey and La Gloria. Leg. G. T. Johnson s.n., 21.02.1941.





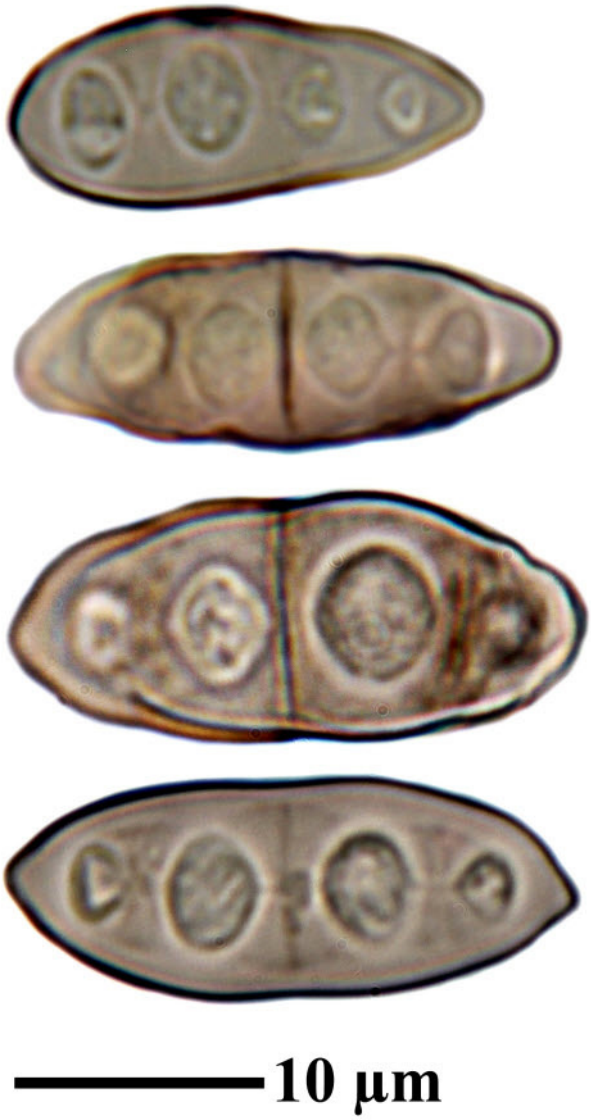
Pyrenula cubana





Pyrenula cubana





Pyrenula cubana

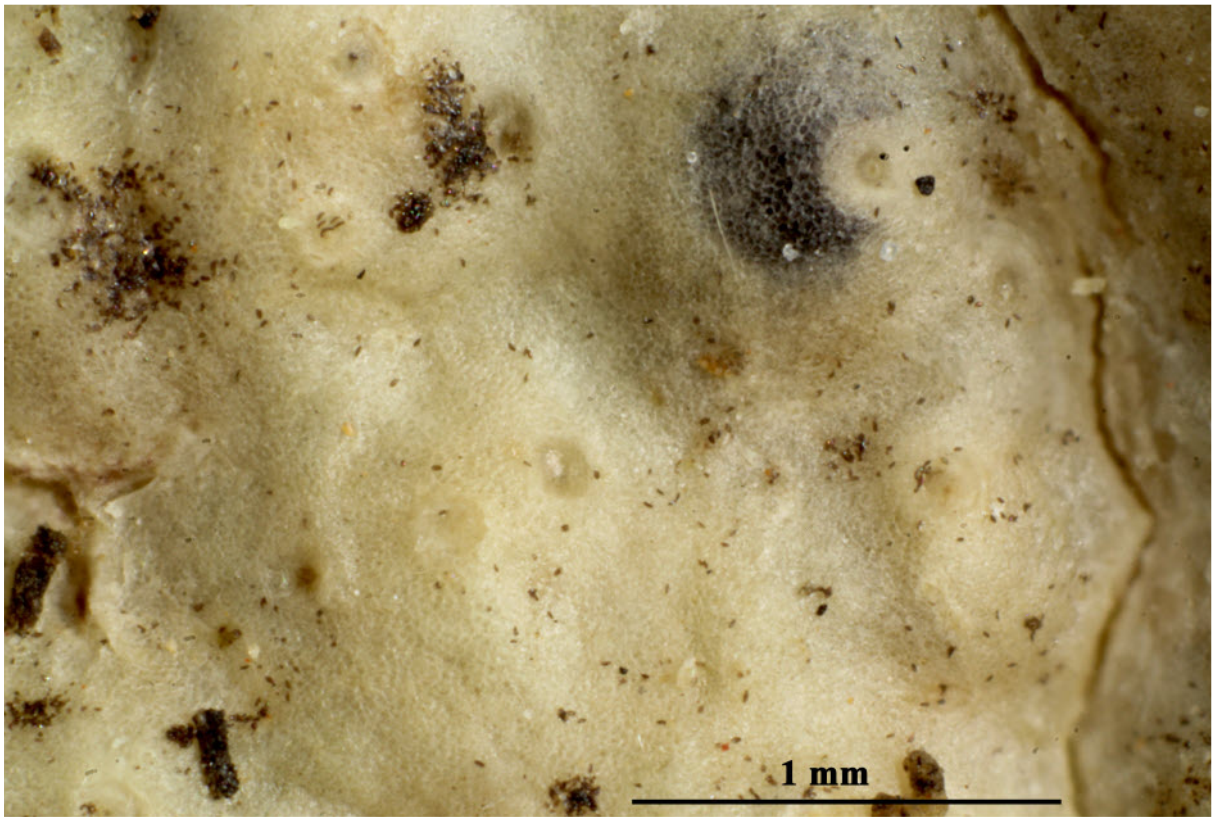
Pyrenula cuyabensis (Malme) R.C. Harris, Mem. N. Y. bot. Gdn 49: 91 (1989)
= *Parathelium cuyabense* Malme 1924

Thallus corticate, pseudocyphellate or not, UV-. Ascomata flask-shaped, 0.5–0.6 mm long; ostiole lateral; crystals lacking. Hamathecium not inspersed, hymenial gel IKI+ blue-green. Ascospores mostly uniseriate, 3-septate, 25–32 × 10–13 µm.

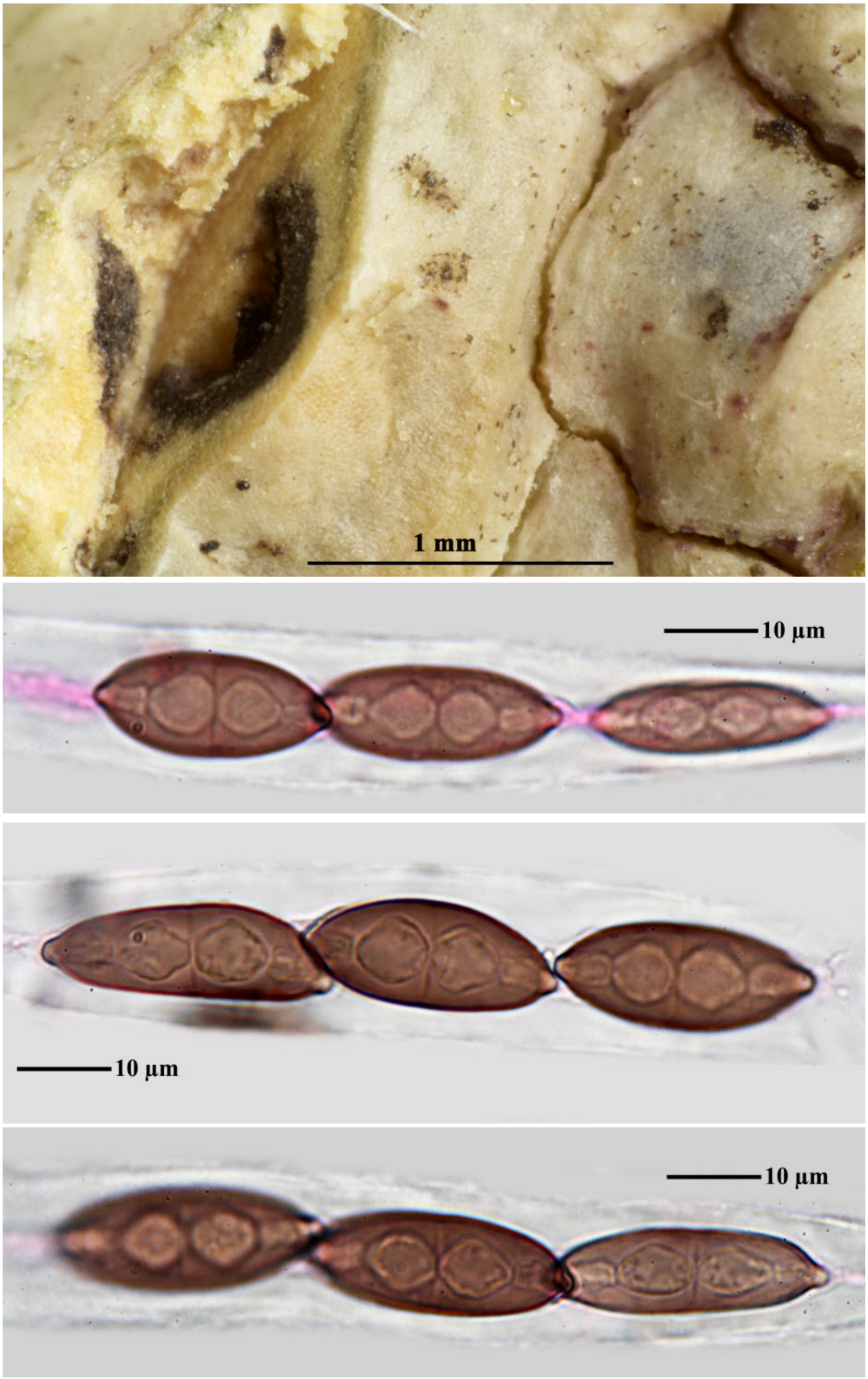
[Kirika3374], Kenya, Rift Valley, Kapsabet, Nandi North, Monoo area, disturbed wet upland forest, on bark, 2007 m, 00°17’ N, 35°59’ E. Leg. P. Kirika (no 3374), 29.07.2013, det. A. Aptroot, 2015.



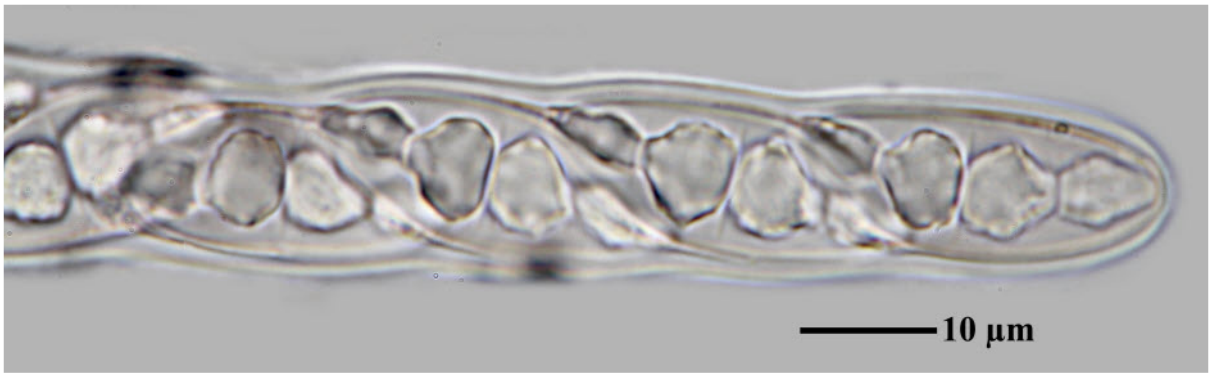


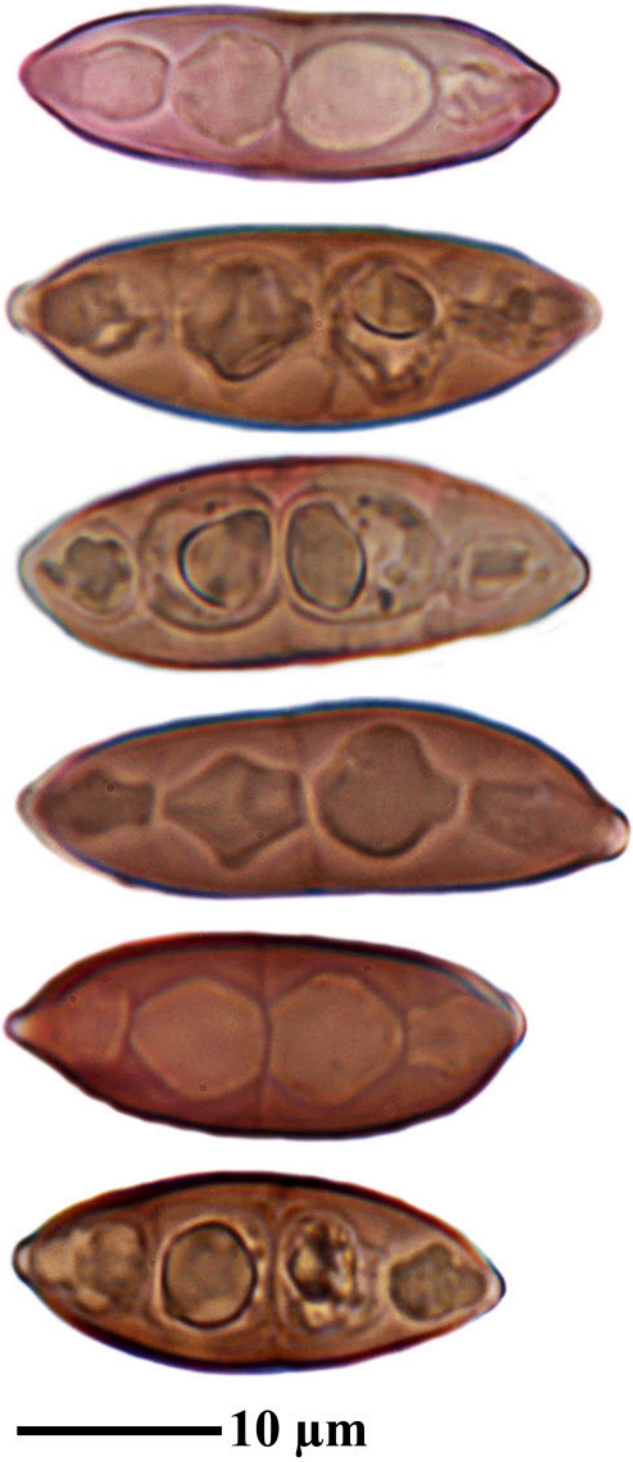


Pyrenula cuyabensis



Pyrenula cuyabensis





Pyrenula cuyabensis

Pyrenula cylindrica Kashiw., Mem. Natn Sci. Mus, Tokyo 22: 44 (1989)

Ascomata hemispherical, prominent, 0.5–0.7 mm diam.; ostioles apical, darkbrown; hamathecium gel I+ blue green; ascospores 13–18-loculate, 45–60 × 4–6 µm, cylindrical or submoniliform.

[Kashiwadani35533], Japan, Ryukyu, upper stream of Sumiyou River, Sumiyou-mura, Oshima-gun, Amami Oshima, on bark of *Quercus glauca* v. *amamiana,* c. 140 m. Leg. H. Kashiwadani (no 35533), 2.12.1988.





Pyrenula cylindrica

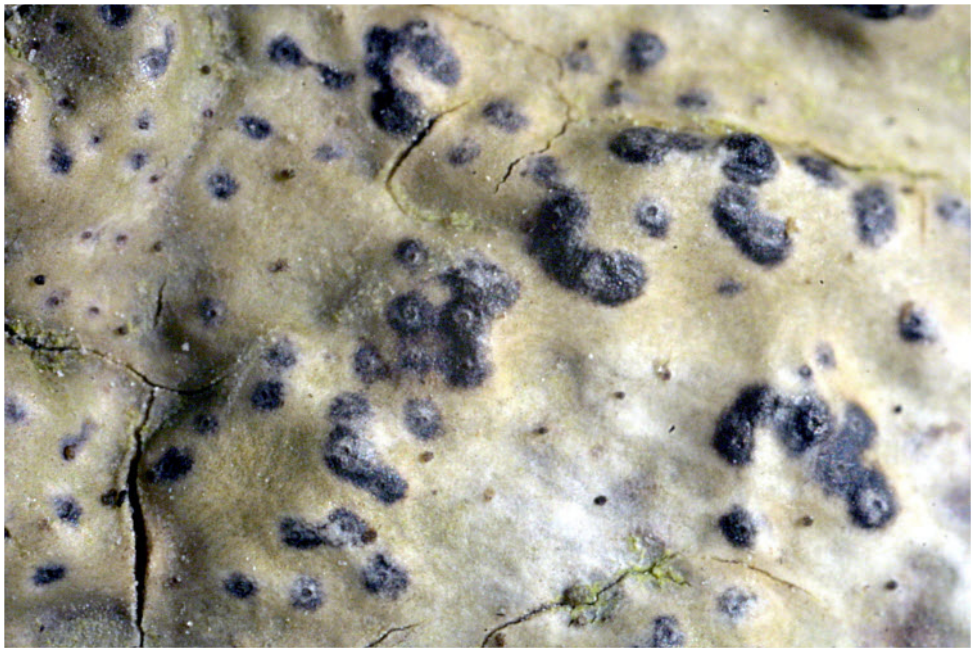


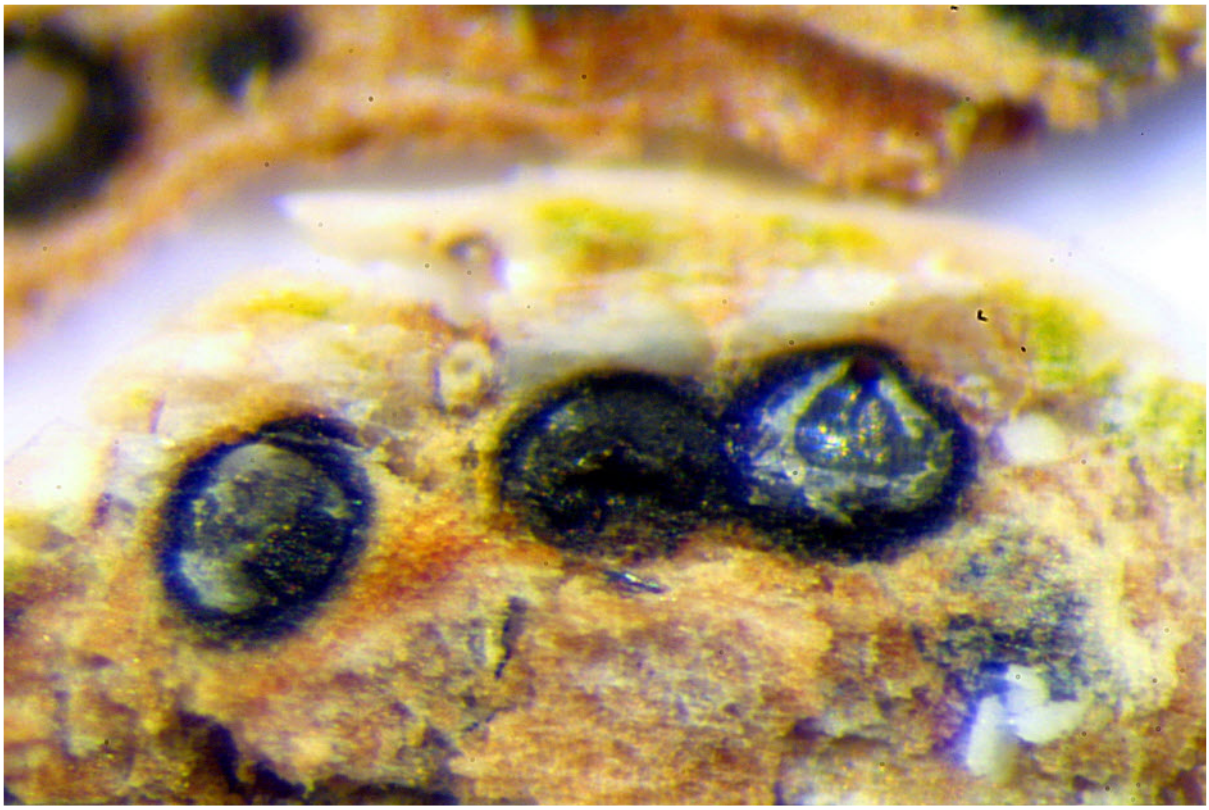
Pyrenula cylindrica

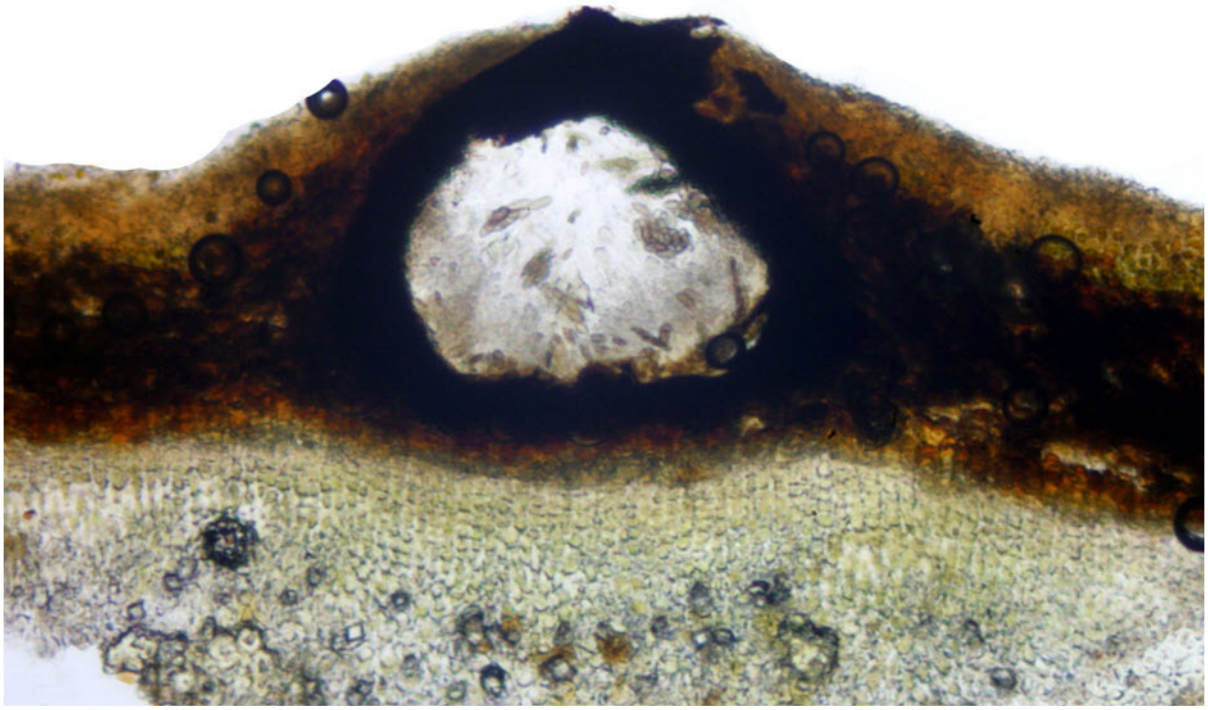
Pyrenula dermatodes (Borrer) Schaer., Enum. critic. lich. europ. (Bern): 213 (1850)
= *Pyrenula achroopora* (Nyl.) Arnold, Flora, Regensburg 53(30–31): 486 (1871)
= *Pyrenula glabratula* (Nyl.) Arnold, Flora, Regensburg 53(30–31): 486 (1871)
= *Pyrenula nitida* var. *dermatodes* (Borrer) Trevis., Conspect. Verruc.: 13 (1860)
= *Verrucaria achroopora* Nyl., Flora, Regensburg 50: 179 (1867)
= *Verrucaria dermatodes* Borrer, in Hooker & Sowerby, Suppl. Engl. Bot. 1: tab. 2607, fig. 2 (1831)
= *Verrucaria glabrata* var. *dermatodes* (Borrer) Leight., Lich.-Fl. Great Brit.: 449 (1871)
= *Verrucaria glabratula* Nyl., Flora, Regensburg 50: 330 (1867)
= *Verrucaria nitida* var. *dermatodes* (Borrer) Leight., Brit. Sp. Ang. Lich.: 36, 74, tab. XV, fig. 4 (1851)

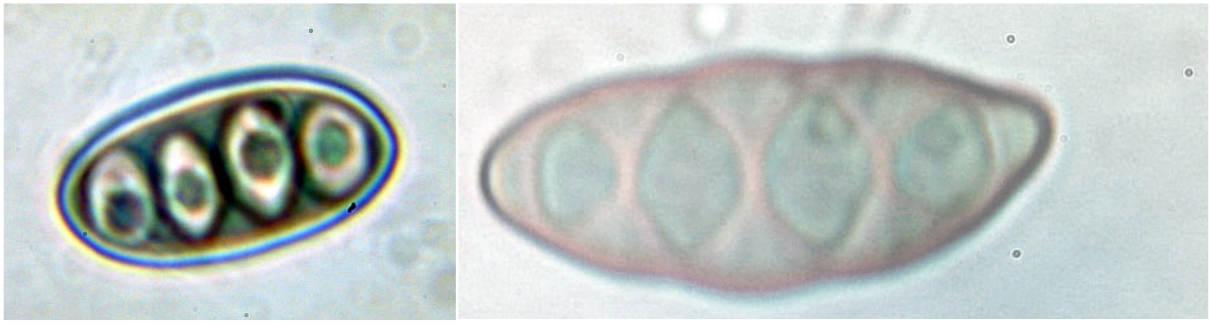
Thallus corticate, yellowish to olive green, without pseudocyphellae. Perithecia solitary, subglobose, immersed or sometimes erumpent from the substratum, always mostly covered by thallus, c. 0.3–0.8 mm diam. Perithecial wall without crystals, up to 100 µm thick. Ostiole pale, apical. Hamathecium not inspersed, IKI–, filaments unbranched. Ascospores 8/ascus, grey brown, irregularly biseriate, 3-septate, fusiform with rather pointed ends, 14–20 × 6–8 µm, lumina angular, terminal lumina separated from the exospore by an endospore layer. Chemistry: Thallus UV+ yellow or UV–, lichexanthone often detected with TLC.

[10985], Portugal, Azores, Sao Miguel: Südufer des Lagoa das Furnas, 270 m, 37°45.022' N, 25°19.807' W. Leg. et det. F. Schumm, 03.06.2003.







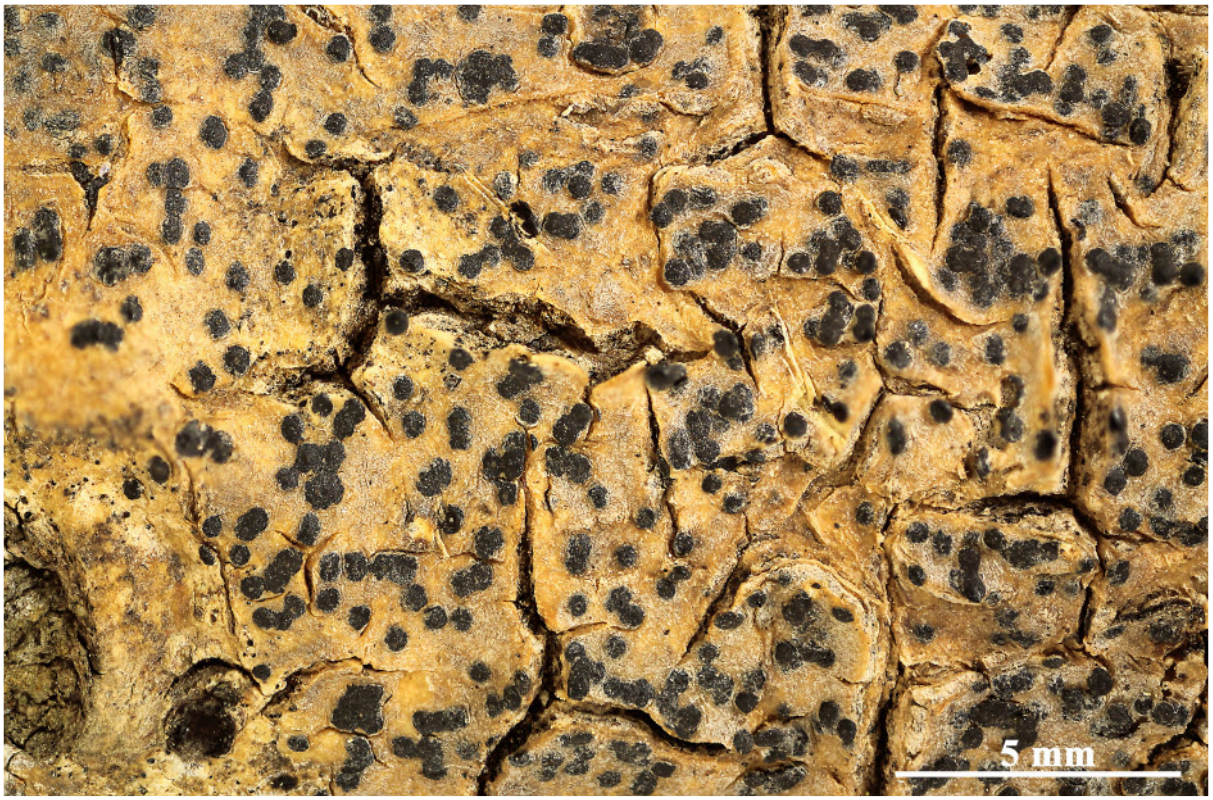


Pyrenula dermatodes

Pyrenula diamantinensis C.O. Mendonça, Aptroot & M. Cáceres, Phytotaxa 286(3): 172 (2016)

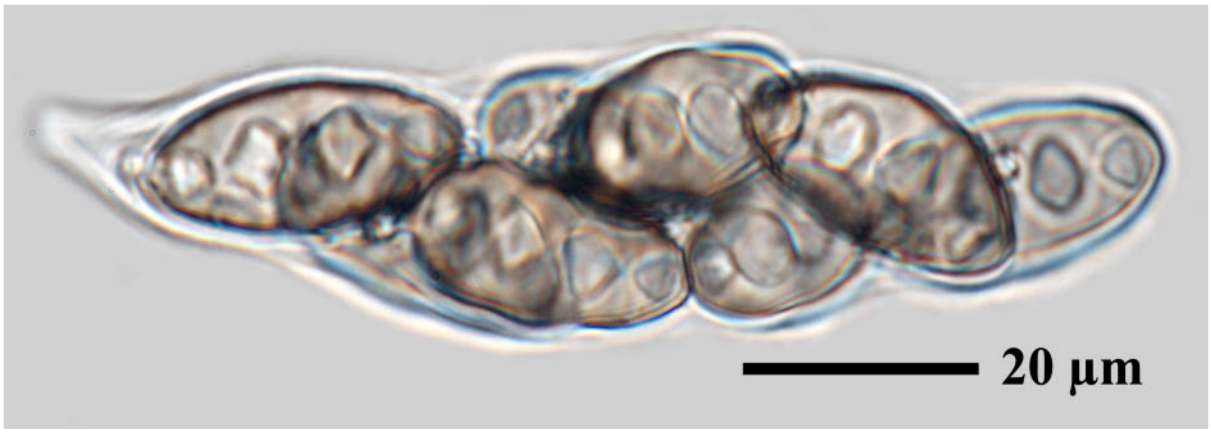
Thallus crustose, thin, yellowish brown, corticate, somewhat shiny, partly with a layer of whitish pruina, with (often eroded) pseudocyphellae, without a prothallus. Algae trentepohlioid. Ascomata erumpent, flattened to subglobose, numerous, partly covered by layer of whitish pruina, 0.3–0.5 mm diam., mostly with 2–10 sideways touching but not totally fused, clypeus in upper half much thicker than below. Ostioles apical, black. Hamathecium not inspersed. Asci with 8 biseriate ascospores. Ascospores brown, not curved, 3-septate, 26–33 × 11–16 µm, distoseptate, lumina mostly obliquely quadrangular, terminal lumina not directly against the outer wall, without gelatinous layer, upper and lower end rounded, without ornamentation. Pycnidia absent. Chemistry: KOH–, UV–; TLC: no substances detected.

[ISE23963], Brazil. Bahia, Povoado Ouro Verde, Catolé, Chapada Diamantina, 13°17’49’ S, 41°54’02’ W, 1636 m, in primary Brejo de Altitude. Leg. C. Mendonça (no ISE 23963), 10.01.2015, det. A. Aptroot, 2015. ISOTYPE.





Pyrenula diamantinensis







Pyrenula diamantinensis

Pyrenula dissimulans (Müll. Arg.) R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 110 (1995)
= *Pleurothelium dissimulans* Müll. Arg. Bot. Jahrb. Syst. 6: 387, 1885

Thallus UV-. Ascomata solitary, subglobose, erumpent, sides often partly thallus covered, c. 0.6–0.7 mm diam.: ostioles apical, pale; ascospores 8/ascus, uniseriate, muriform, 35–42 × 14–18 µm, old ascospores without oil.

[ABL21457], Brazil, Ceará, Quixadá, Serra do Estevao, near chapel, on tree bark in Caatinga, 250 m, 04°55'44" S, 39°08'50" W. Leg. M. Cáceres & A. Aptroot (no 21457), 1.4.2014, det. A. Aptroot, 2014.





Pyrenula dissimulans

Pyrenula endocrocea Aptroot, Lichenologist 44(5): 612 (2012)

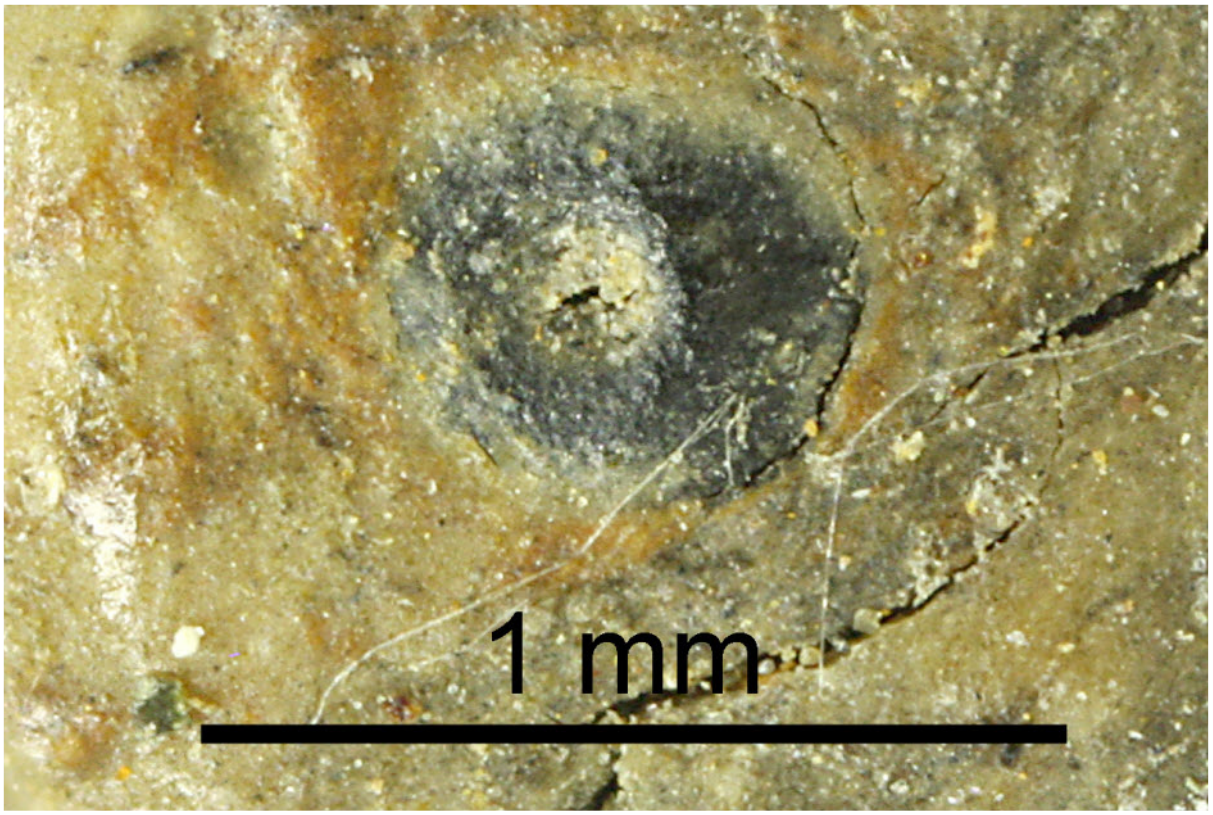
Thallus corticate, smooth, continuous, rather thick, brownish, without pseudocyphellae, medulla with a soft layer of copious orange anthraquinone crystals reacting UV+ red and KOH+ crimson; algae trentepohlioid. Ascomata perithecioid, simple, dispersed, conical, emergent, 0.3–0.6 mm diam., black, at least the edges with thick thallus covering. Wall more or less equally carbonized, without crystals, KOH-, c. 200 µm thick. Ostioles brown, KOH-, apical. Hamathecium hyaline, densely inspersed with oil droplets. Asci cylindrico-clavate, IKI-, with 8 irregularly arranged ascospores. Ascospores brown, IKI-, initially 3-septate, soon becoming muriform with 1–3 transverse eusepta and 4–8 rows of 1–4 lumina per row, fusiform, usually with one median constriction, (30–)32–44(–50) × 13–16(–19) µm, ends rounded, lumina mostly rounded; postmature ascospores with red oil inside. Pycnidia not observed. Chemistry. Medulla with orange anthraquinone reacting UV+ red and KOH+ crimson. Ecology and distribution.

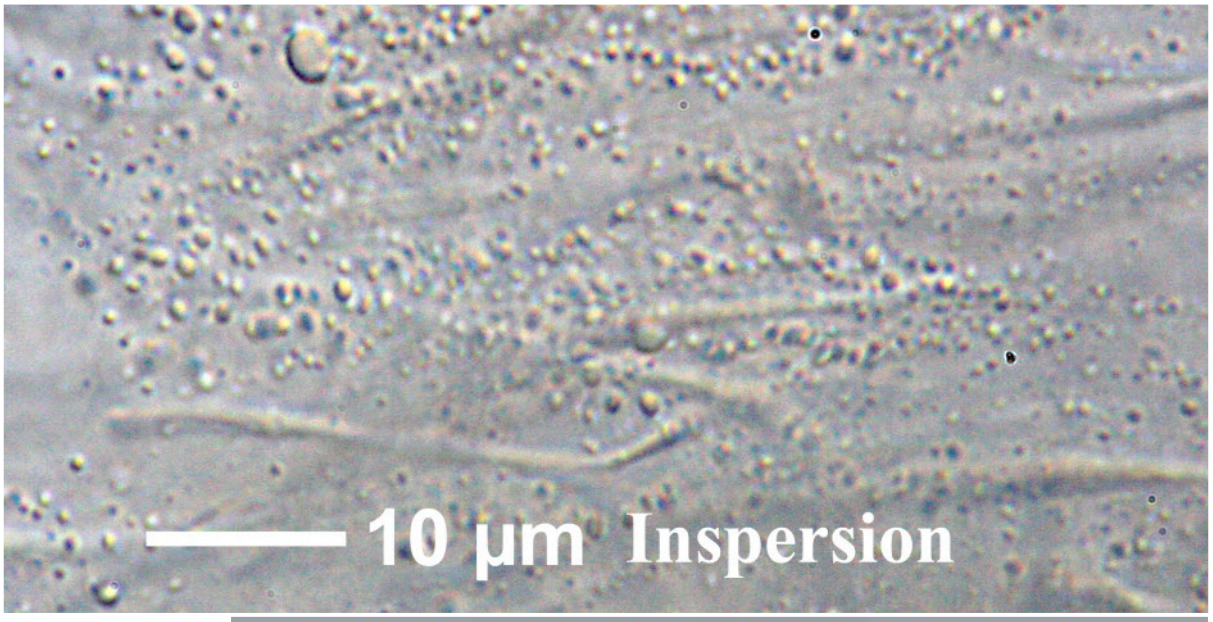
[ABL-20225], Philippines, Island of Luzon, Prov. Benguet, Baguio, Burnham Park, on *Alnus japonica*. 16°26’ N, 120°33’ E, 1300m. Leg. A. Aptroot (no 20225), 02.1987, det. A. Aptroot. ISOTYPE.

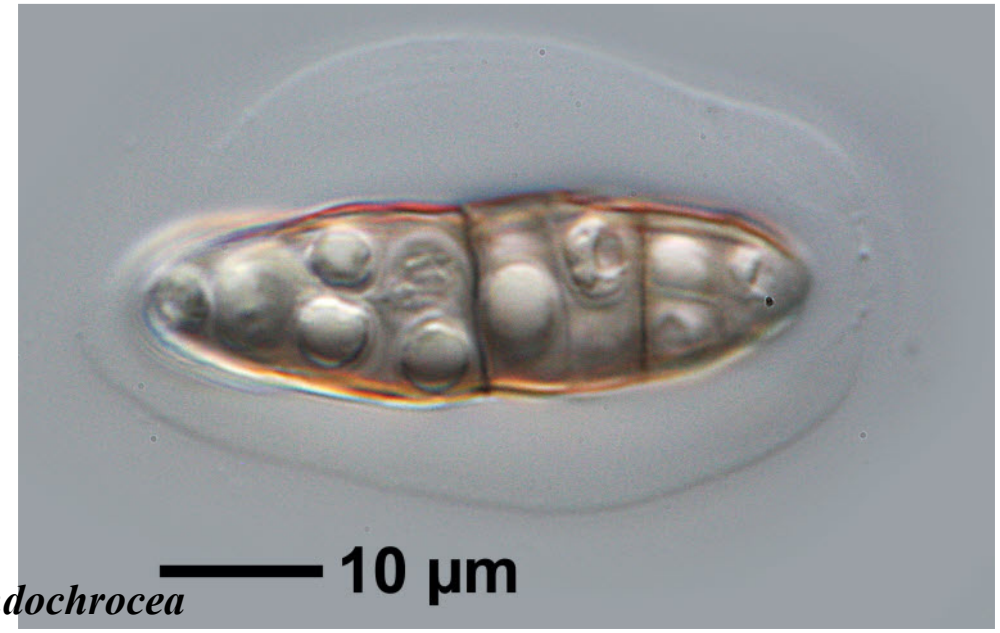




Pyrenula endochrocea







Pyrenula endochrocea



Pyrenula endochrocea

Pyrenula erumpens R.C. Harris, Mem. N. Y. bot. Gdn 49: 91 (1989)

Thallus corticate, not pseudocyphellate, UV-. Ascomata flask-shaped, 0.5–0.7 mm long; ostioles eccentric to lateral; crystals lacking. Hamathecium not inspersed. Hymenial gel IKI+ bluegreen. Ascospores mostly uniseriate, 6–9 traverse cells, 2–3 of them often divided lengthwise, 45–65 × 20–25 µm, weakly apiculate.

Die abgebildete Probe nur mit abgefressenen Ascomata. Keine Sporen gefunden.

[Ferraro10535], Argentina, Prov. Misiones, Puerto Iguazú, near Hotel Selvático Don Horatio, 230 m, 25°36’20” S, 54°33’33” W. On tree bark in evergreen tropical rainforest. Leg. L. I. Ferraro (no 10535), & A. Aptroot & M. Cáceres, 22.02.2013, det. A. Aptroot, 2013.





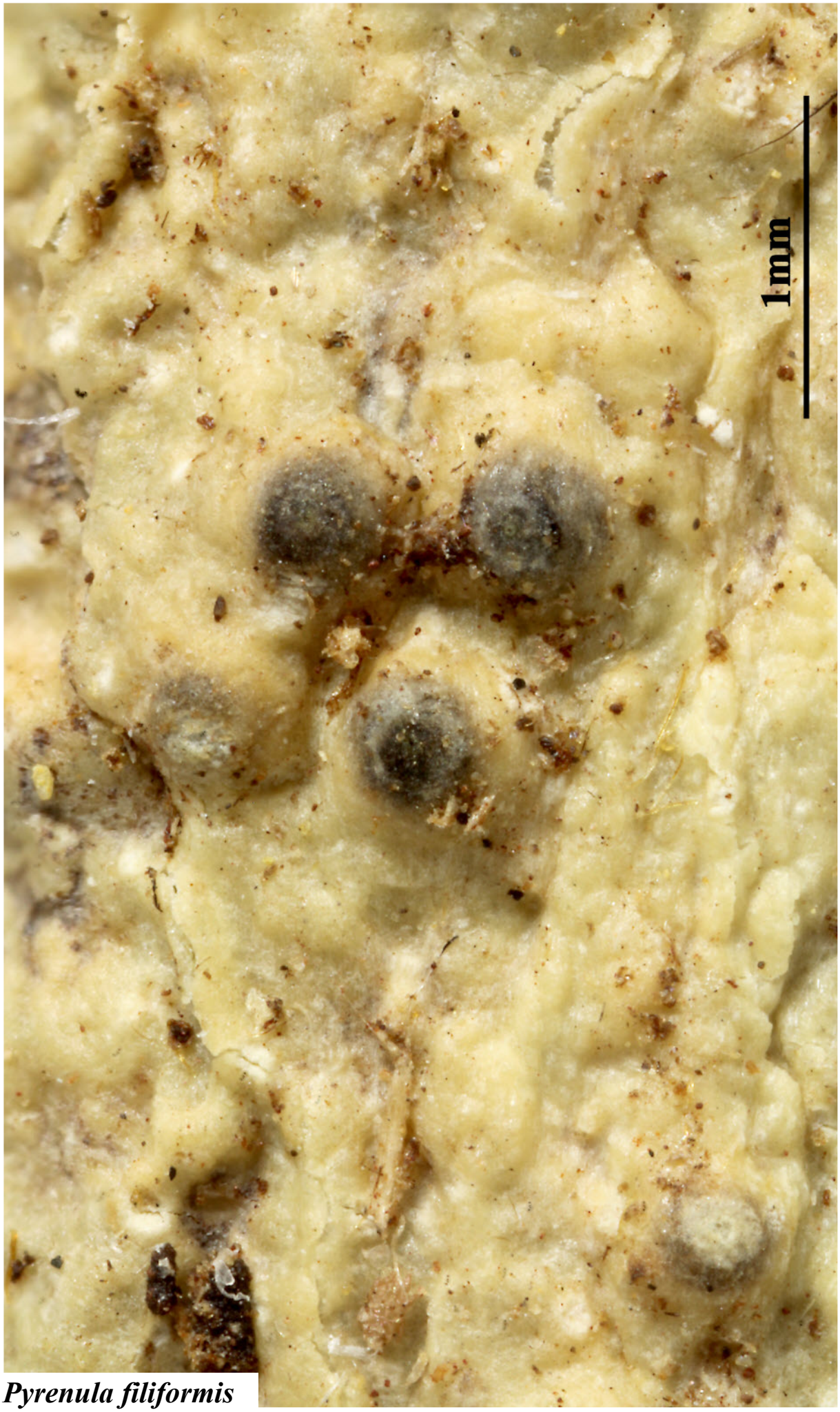
Pyrenula erumpens

Pyrenula filiformis Aptroot, Bryologist 117(3): 286 (2014)

Thallus corticate, smooth, continuous, rather thick, cream, with whitish pseudocyphellae, surrounded by a black prothallus line. Algae trentepohlioid. Ascomata perithecioid, erumpent, 0.4–0.8 mm diam., black, conical with flattened tips, single, mostly covered by a thallus layer. Wall carbonized all around, up to ca.100 mm thick. Ostioles pale brown to usually black, apical, flat. Hamathecium hyaline, not inspersed with oil droplets. Asci cylindrico-clavate, with 8 ascospores. Ascospores brown,11–17-distoseptate, slender fusiform to slightly clavate, without constrictions, 75–90 × 4.5–6.5 µm, ends pointed, especially the lower one, but lower end not a tail but a septate part of the ascospore. Pycnidia not observed. Chemistry: Thallus UV-, C-, K-, KC-, P-. No secondary metabolites found in the thallus (TLC).

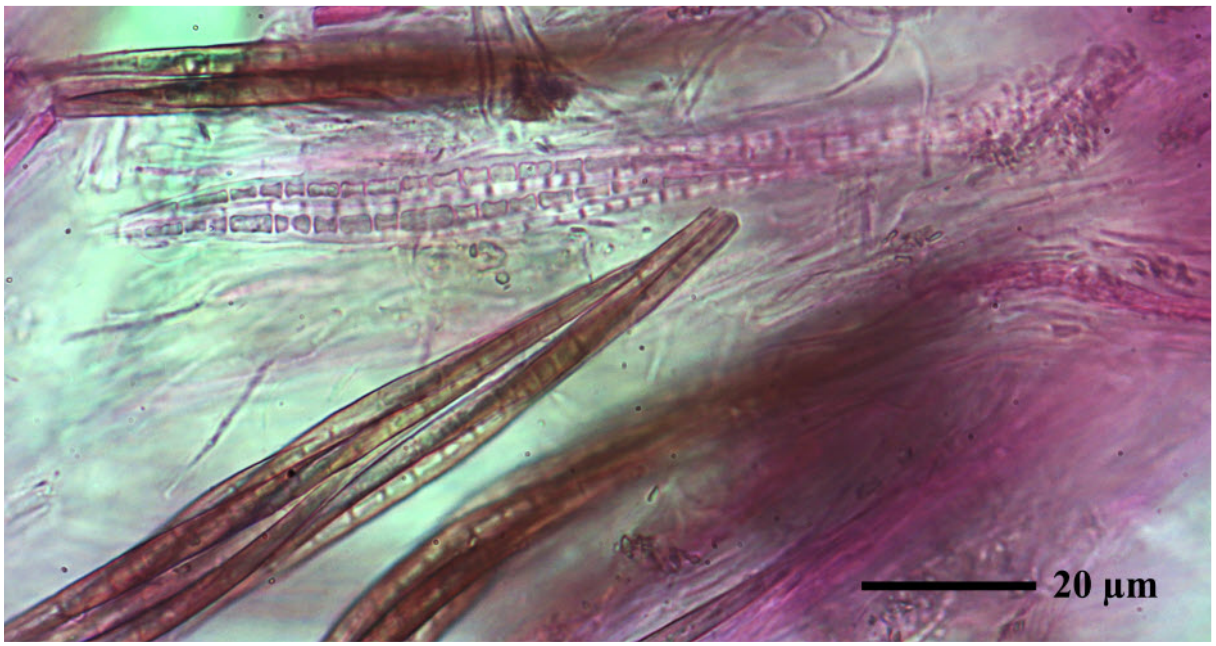
[Hill11732], New Caledonia, Yaté, between Yaté and Goro, on tree bark. Leg. D.J. Hill (no 11732), 6.03.1966, det. A. Aptroot, 2013. ISOTYPE.





Pyrenula filiformis







Pyrenula filiformis







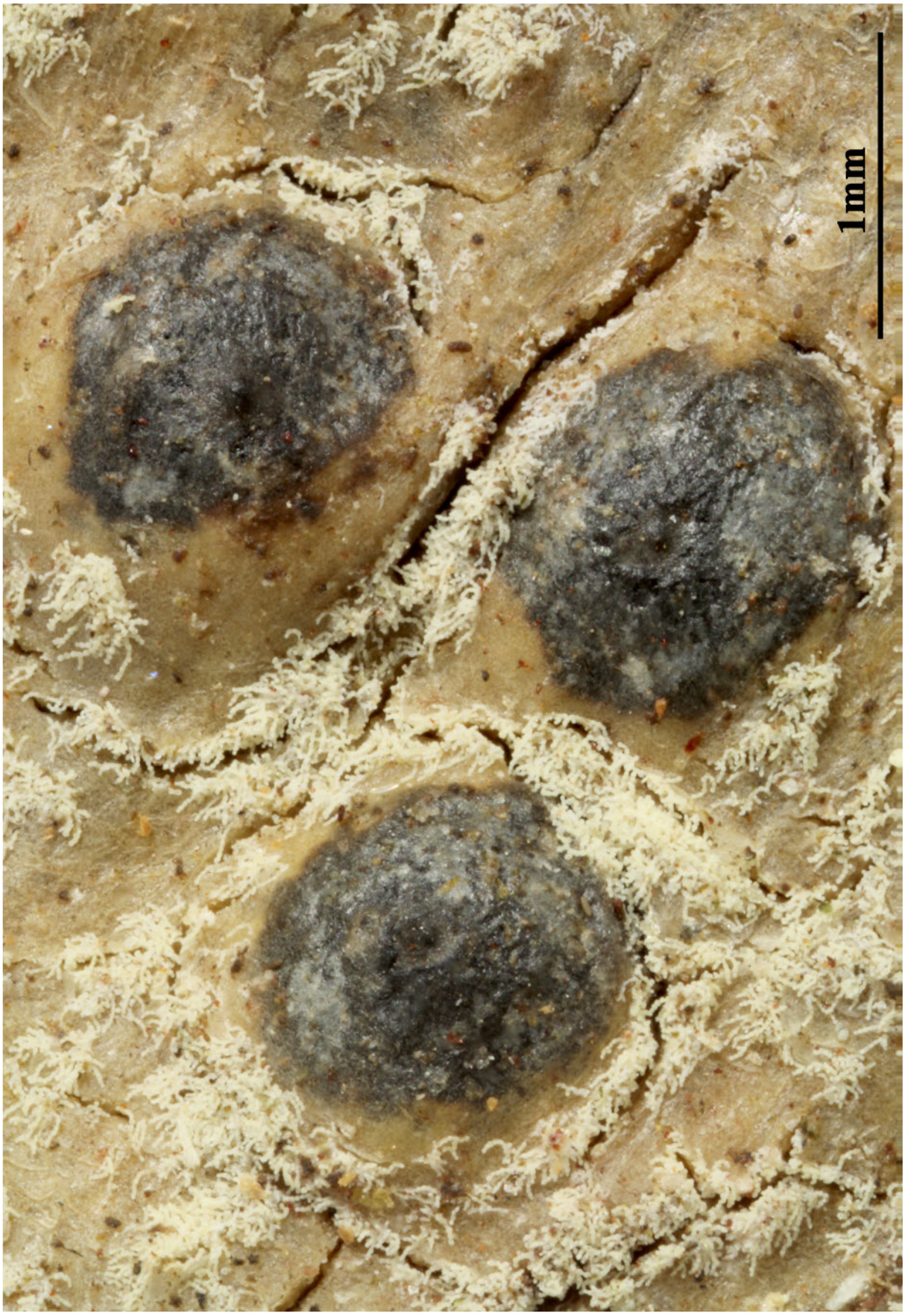
Pyrenula filiformis

Pyrenula finitima Müll. Arg., Flora, Regensburg 70: 429 (1887)

Thallus brownish to olive.green, lacking pseudocyphellae, corticate. Ascomata solitary,subglobose, erumpent from the substratum, the sides often partly covered by the thallus, c. 0.5–0.7 mm diam. Ascomatal wall lacking crystals, to 100 µm thick; ostiole apical, pale. Hamathecium not inspersed with oil droplets, or somewhat inspersed near the apex, IKI–. Ascospores 8 per ascus, irregularly biseriate, 3-septate, fusiform, with pointed and at leastone acuminate end, grey to brown, 21–28 × 7–10 µm; lumina angular; terminal lumina often elongate, not or only slightly separated from the exospore by an endospore layer. Chemistry: No substances detected

[Hill10076], Solomon Islands, Guadalcanal island, central part, N coast, along road to Henderson Airfield, on coconut palm, 0 m. Leg. D. J. Hill (no 10076), 26.07.1965, det. A. Aptroot, 2013.





Pyrenula finitima







Pyrenula finitima

Pyrenula fulva (Kremp.) Müll. Arg., Flora, Regensburg 68: 335 (1885)
= *Verrucaria marginata* var. *fulva* Kremp. 1875.

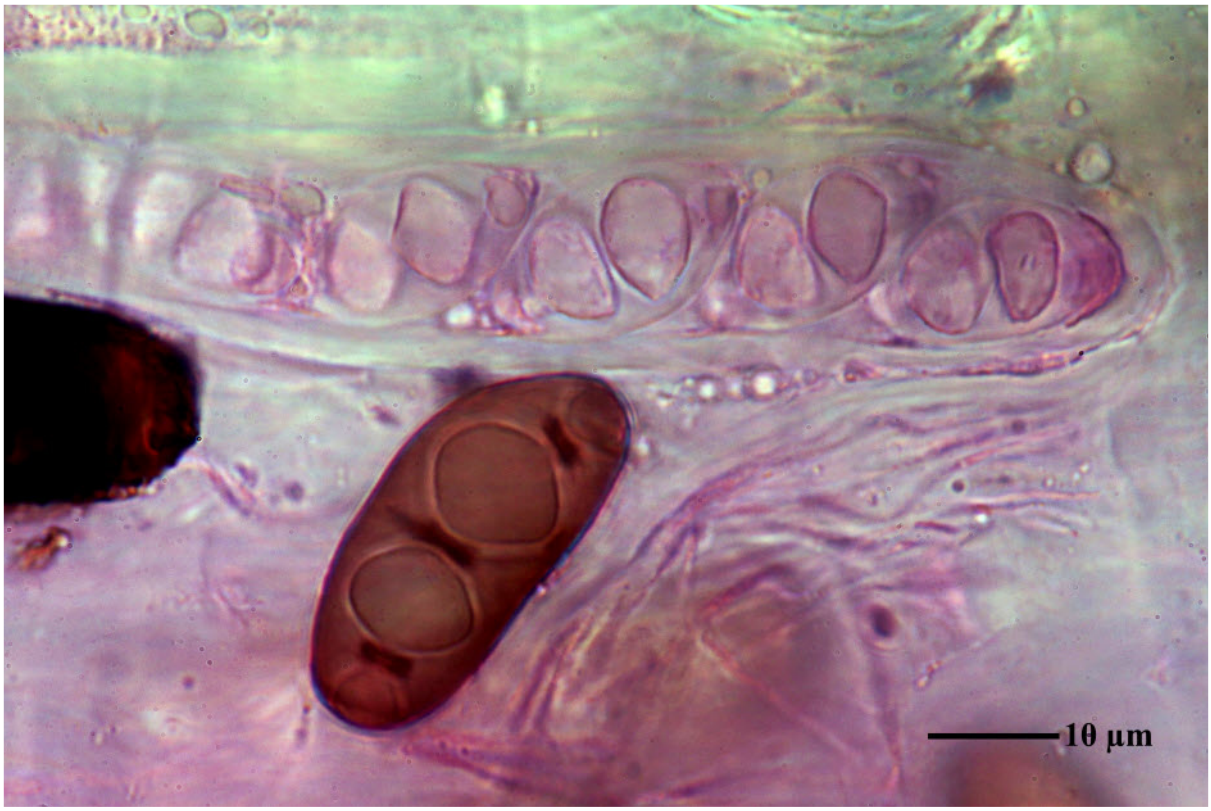
Hamathecium inspersed with colourless oil globules. Ascospores 4-loculate, 35–44 × 15–27 μm, apical locules much smaller.

[Kirika4044], Kenya, Coast Prov., Kwale, Shimba Hills National Park, Pengo Hill, open woodland at peak, on bark, 448 m, 04°15’ S, 39°23’ E. Leg. P. Kirika (no 4044) & H. T. Lumbsch, 17.03.2014, det. A. Aptroot, 2015.





Pyrenula fulva



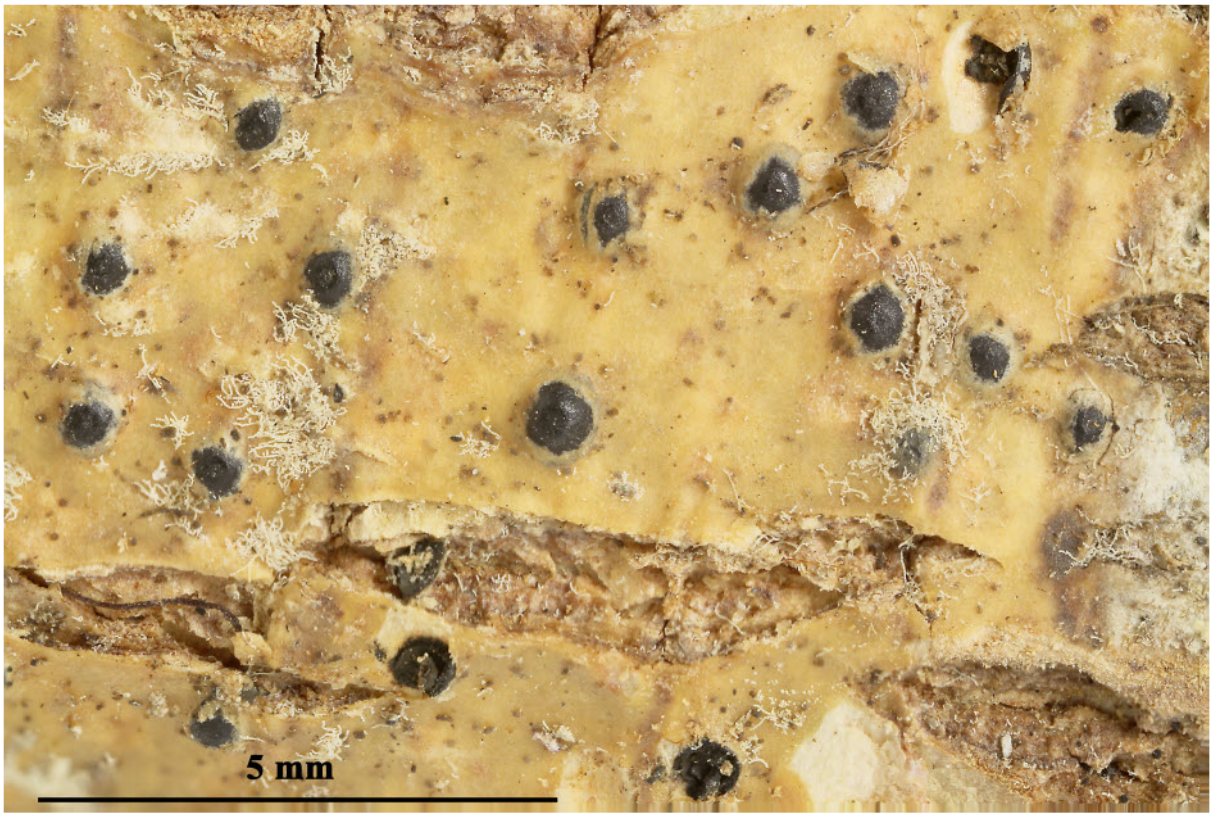


Pyrenula fulva

Pyrenula fuscoluminata Aptroot, Fungal Diversity 9: 22 (2002)

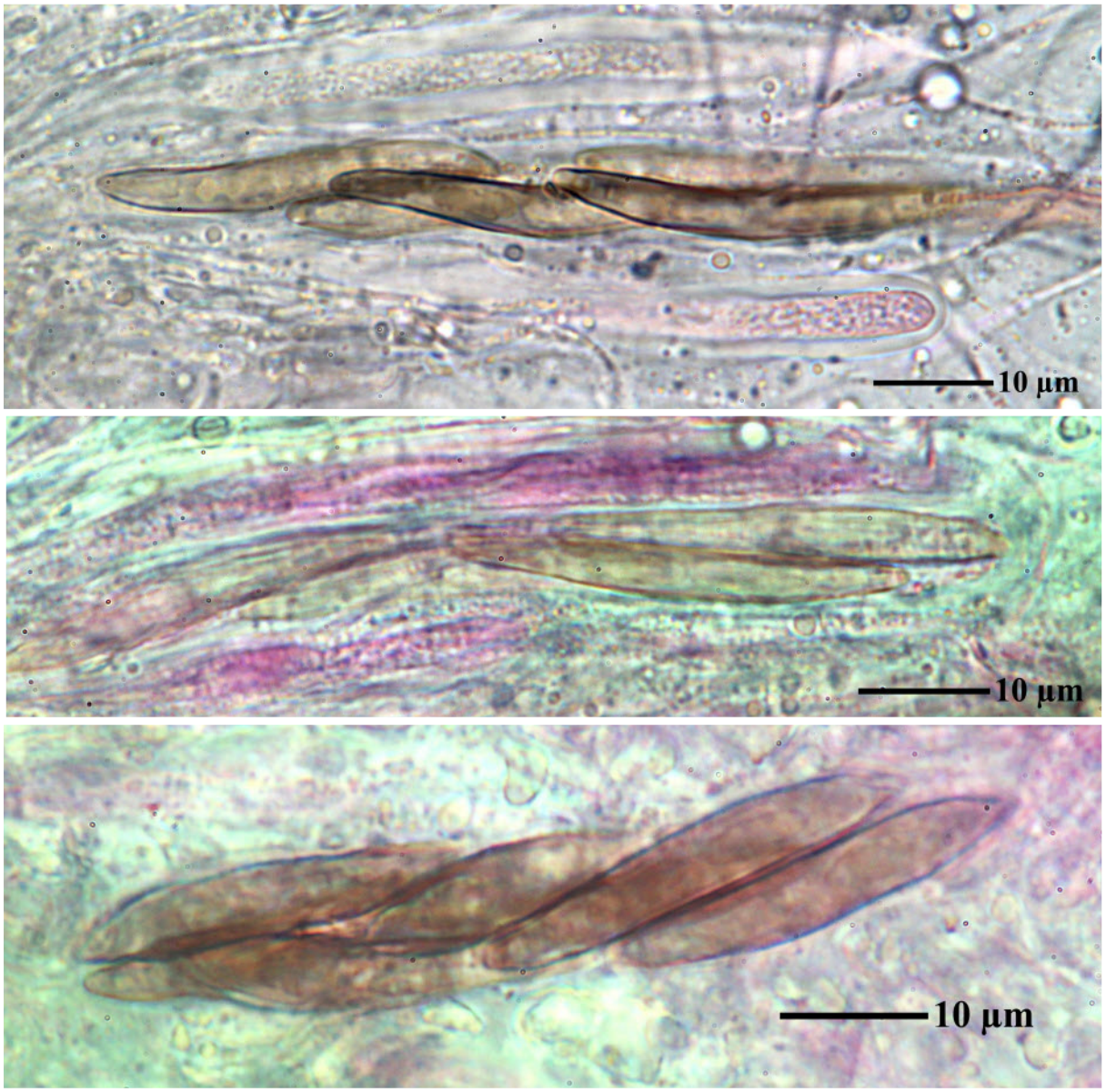
Thallus crustose, up to 10 cm diam., yellowish-brown, superficial, corticate, without pseudocyphellae, somewhat glossy, without hypothallus. Algae Trentepohlia-like, sparse. Perithecia with the basal half covered by the thallus, hemispherical, black, 0.7–1.2 mm diam. Ascomal wall entire, 100–250 µm thick, without crystals, IKI- negative. Ostiole a central depression, black, 0.1–0.2 mm wide. Hamathecium heavily inspersed with oil globules, hyaline, IKI- negative. Asci cylindrical to clavate, ca. 95–110 × 8–11 µm, without ocular chamber. Paraphyses simple, up to 0.8 µm wide. Ascospores 4(–5) in one ascus, irregularly arranged, mostly towards the tips of the asci, chocolate brown, distoseptate with consistently 4 fusiform, lumina in one row (the middle two about twice as long as the end ones, up to 10 µm long, the end ones up to 5 µm long), fusiform, often the lower end attenuated, (25–)35–45(–50) × 4–6(–7.5) µm, without gelatinous sheath. Pycnidia not observed. Chemistry: K-, C-, UV- (no substances).

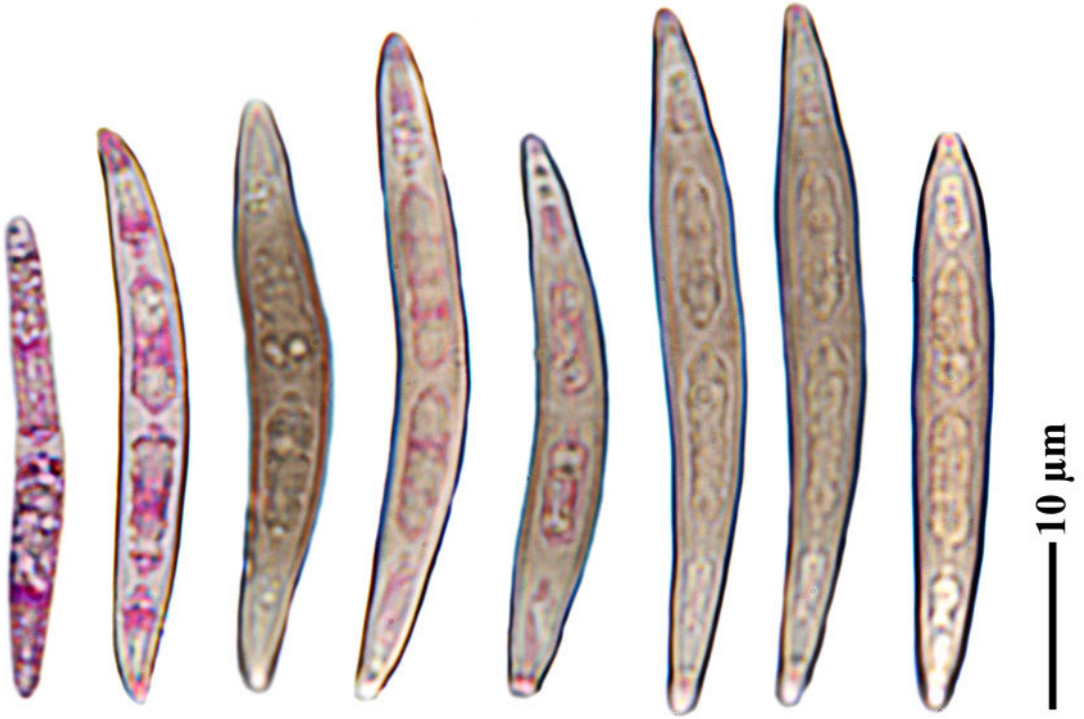
[ABL41102], Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque Natural do Caraça, near Banho do Belchior, c. 1250 m, 20°06' S, 43°29' W. Leg. A. Aptroot (no 41102), 17.09.1997, det. A. Aptroot, 1998. ISOTYPE.





Pyrenula fuscoluminata



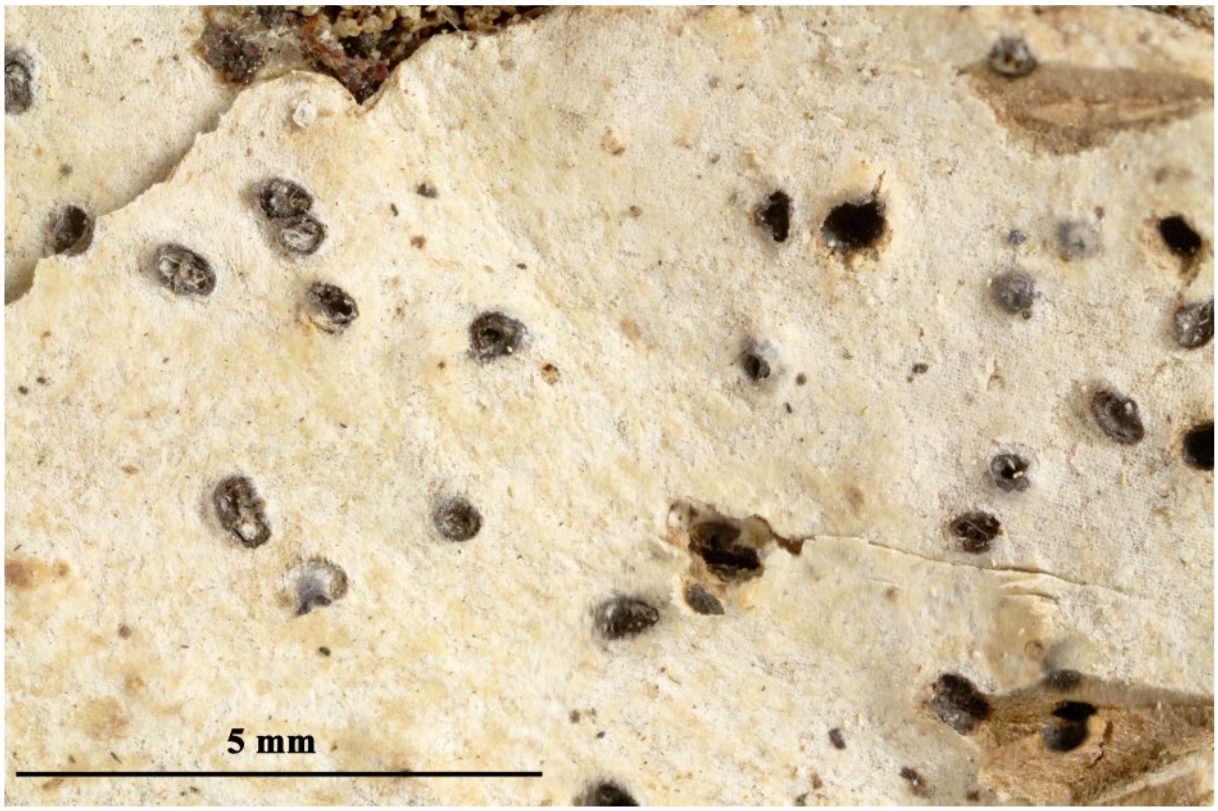


Pyrenula fuscoluminata

Pyrenula gahavisukana Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 64: 156 (1997)

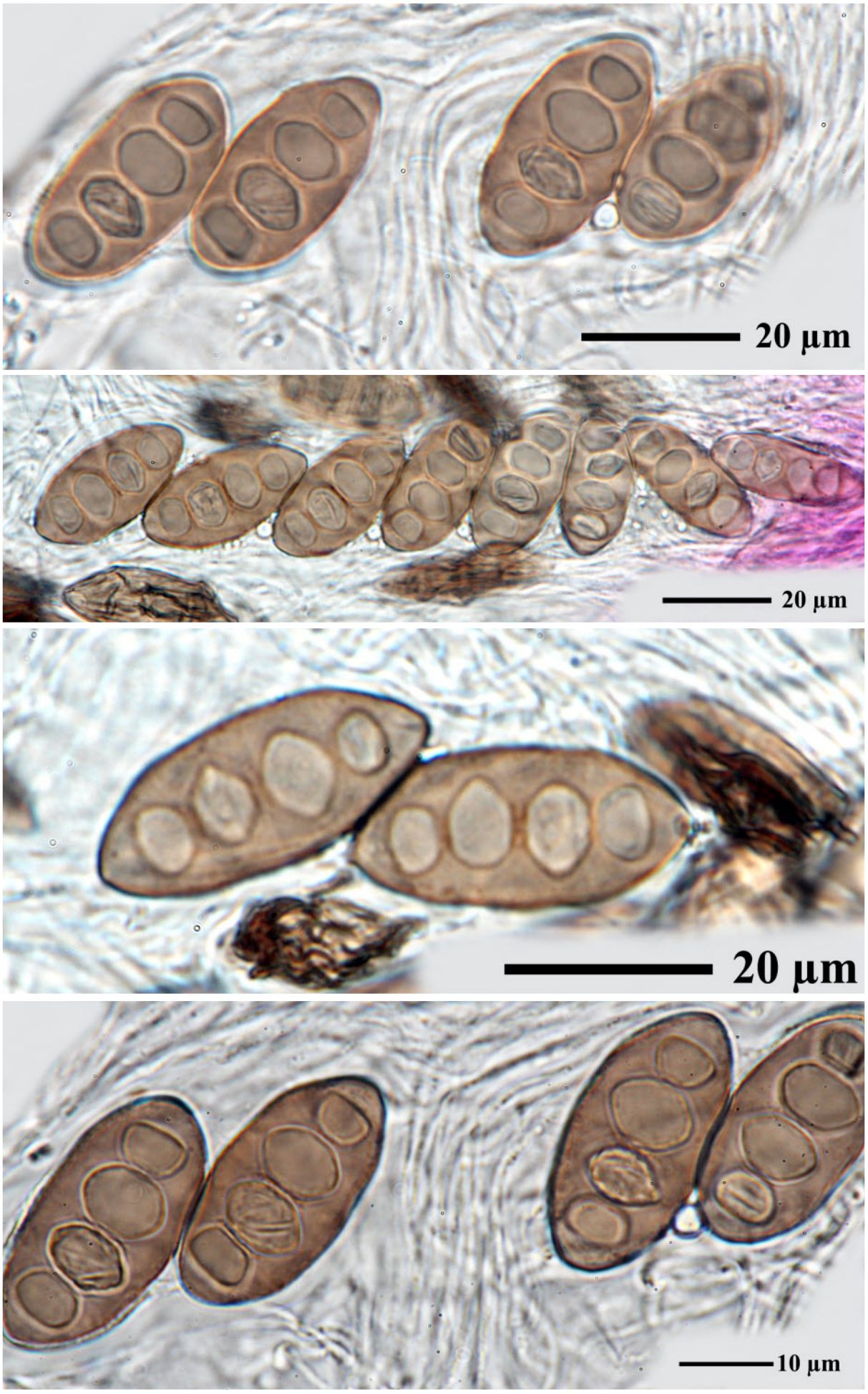
Thallus up to 5 cm wide, brownish to whitish, continuous, smooth, corticate, without pseudocyphellae, UV-, surrounded by a black prothallus. Ascocarpia initially immersed in the thallus and bark, becoming exposed, black, dull, hemispherical, 0.6–0.8 mm wide, covered by the thallus; ascoma wall entire, carbonized, with clypeus up to 100 µm thick; ostiole lateral, visible as a brownish, *c.* 200 µm wide wart next to the ascocarps; hamathecium IKI-, not inspersed; ascospores 8/ascus, irregularly arranged in the ascus, 3-septate, distoseptate but also with remnants of 3 eusepta which do not reach the outer wall, 28–32 × 14–16 µm, citriform, with pointed ends, constricted at the lumina, lumina angular.

[ABL31182], Papua New Guinea, Eastern Highlands prov., Mount Gahavisuka Provincial Park, 11 km N of Goroka, along trail to Lookout, in little disturbed mossy mountain forest, on tree. 2300-2450 m, 145°25' E, 6°01' S. Leg. A. Aptroot (no 31182), 11.08.1992, det. A. Aptroot, 1993.

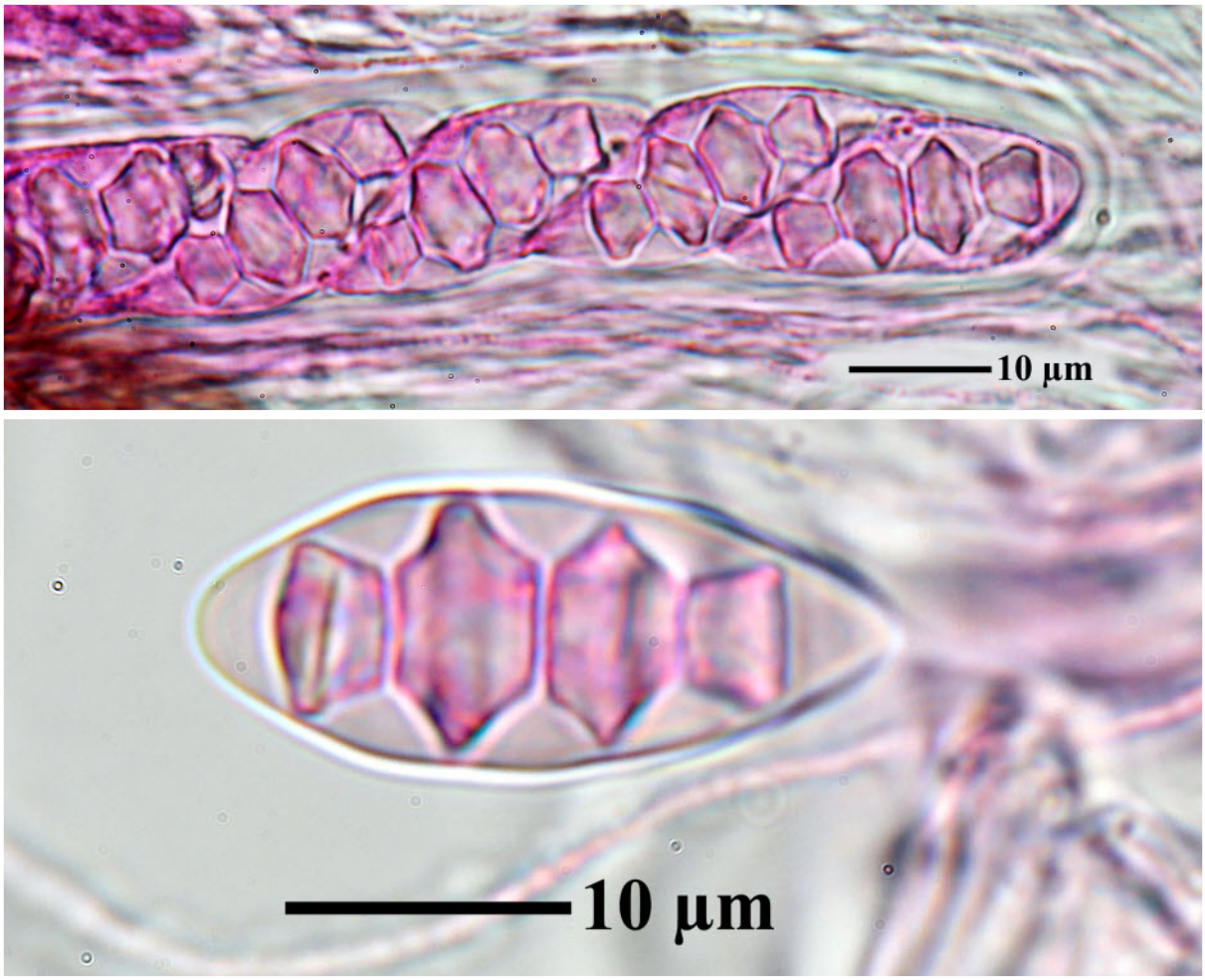




Pyrenula gahavisukana



Pyrenula gahavisukana



Pyrenula gahavisukana

Pyrenula gibberulosa (Vain.) Aptroot, Lichenologist 44(1): 35 (2011) [2012]
= *Anthracothecium gibberulosum* (Vain.) Zahlbr., Cat. Lich. Univers. 8: 122 (1931) [1932]
= *Bottaria gibberulosa* Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 329 (1921)
= *Pyrenula subochraceoflavens* Upreti
= *Anthracothecium goaense* Ajay Singh

Thallus with pseudocyphellae. Ascomata immersed, subglobose, laterally expanded, 0.5–1.0 mm diam. Ostioles indistinct to papilliform. Ascospores 6–8 × 1–2 loculate, 25–32 × 11–13 µm

[ABL17229], Papua New Guinea, Central prov., Motupore Island in Bootless Bay, 12 km SE of Port Moreby, coastal area, on shrubs, 0–5 m, 147°16’ E, 9°32’ S. Leg. A. Aptroot (no 17229), 03.1987, det. A. Aptroot 1987.

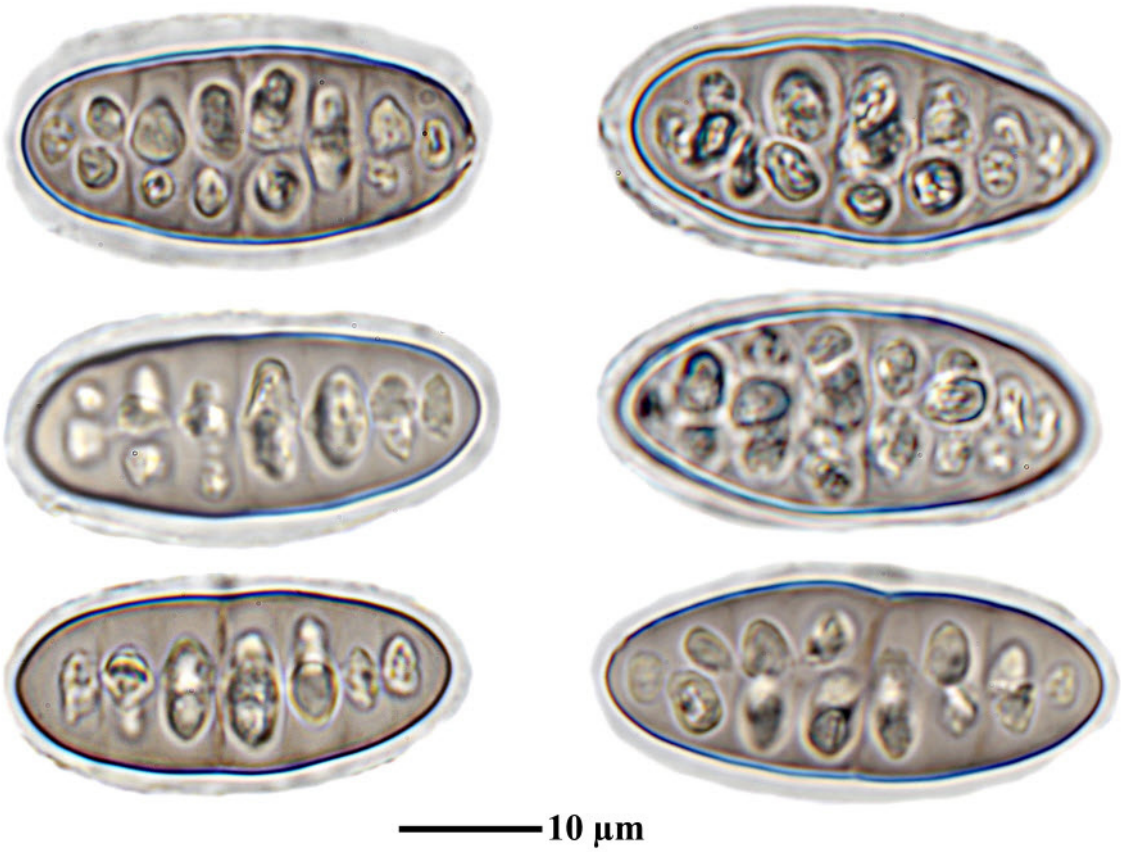




Pyrenula gibberulosa







Pyrenula gibberulosa

Pyrenula gigas Zahlbr., Annls mycol. 14: 46 (1916)

Ascomata very large, exposed, 3.5–4 mm diam. Ostioles apical. Ascospores 4-loculate, 16–23 × 6–8 μm, ellipsoidal to oblong-ellipsoidal.

[Thor13213], Japan. Yaeyama Islands (Pref. Okinawa), Iriomote-jima island, along the trail in the mountains along the Urauchi river from 500 m N of the southernmost starting point 6 km NW of Ohara village to the small camping site between two streams 2.5 km NNE of the starting point (7.5 km NNW of Ohara village), Taketomi-cho, Yaexama-gun. 24°18-20' N, 123°51' E. On bark of Ilex goshiensis. Dense humid, old growth, subtropical/tropical deciduous forest. Leg. G. Thor (no 13213), 02.1995, det. G. Thor. DISTRIBUTED AS H. KASHIWADANI: LICHENES MINUS COGNITI EXSICCATI NO. 73.



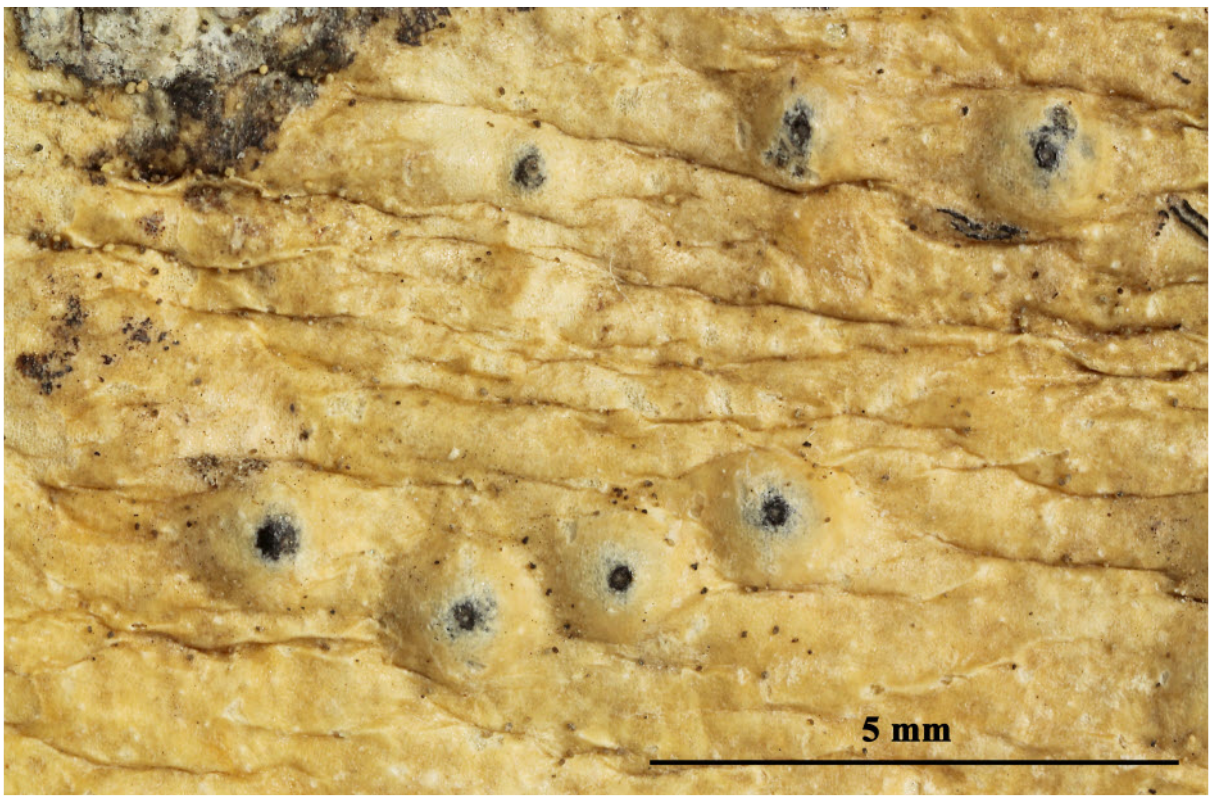


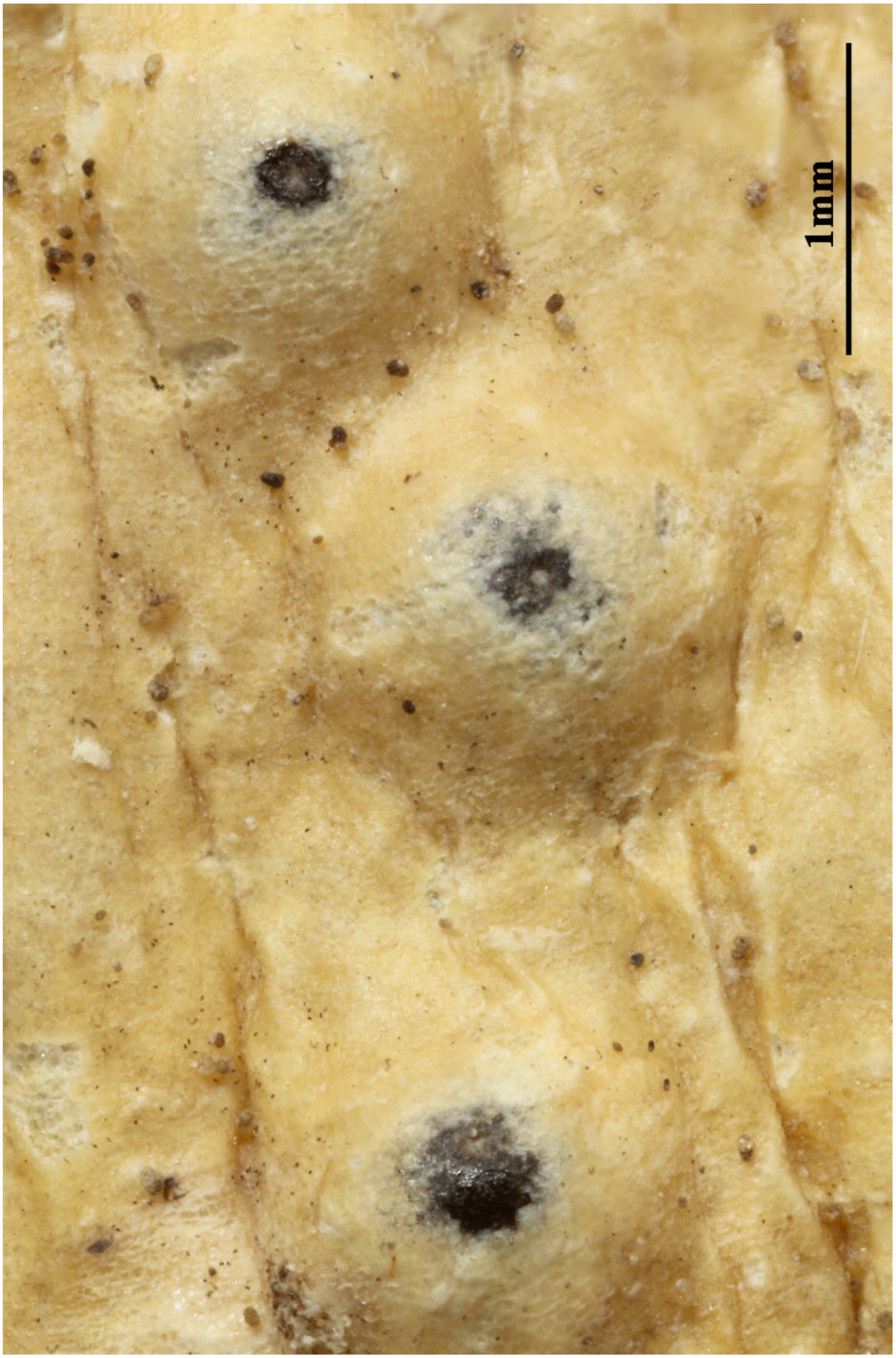
Pyrenula gigas

Pyrenula globifera (Eschw.) Aptroot, in Aptroot, Lücking, Sipman, Umaña & Chaves, Biblthca Lichenol. 97: 103 (2008)
= *Anthracothecium globiferum* (Eschw.) Müll. Arg., Flora, Regensburg 67(35): 666 (1884)
= *Sporodictyon globiferum* (Eschw.) Trevis., Conspect. Verruc.: 13 (1860)
= *Verrucaria globifera* Eschw., in Martius, Fl. bras. enum. pl. 1(1): 131 (1833)

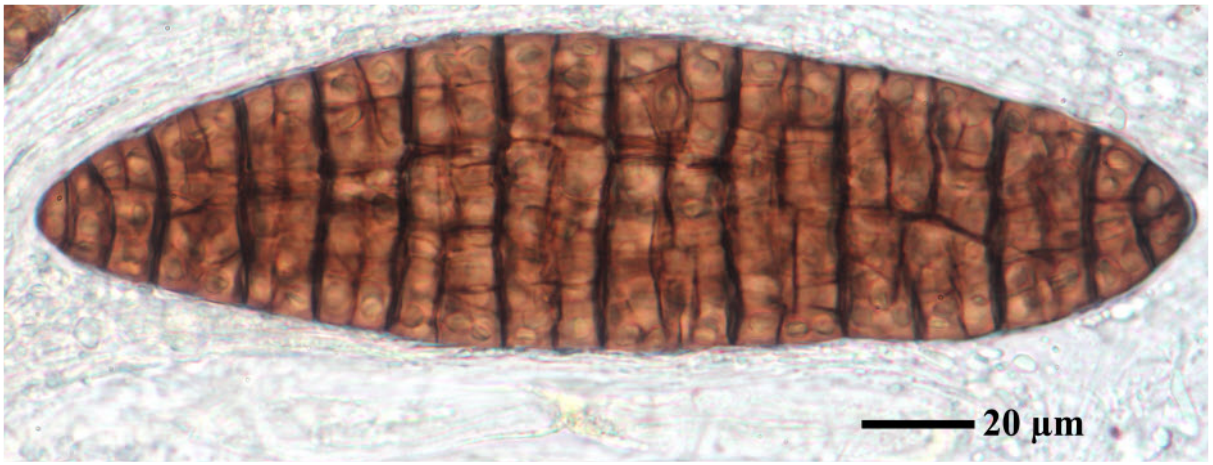
Thallus corticate, yellowish to olive green, with pseudocyphellae. Perithecia solitary, subglobose, erumpent from the substratum, often mostly covered by thallus, c. 0.4–0.7 mm diam. Perithecial wall with crystals, up to 200 µm thick. Ostiole black, apical. Hamathecium inspersed, IKI+ orange, filaments unbranched. Ascospores 2/ascus, grey brown, densely muriform with c. 9–15 primary septa, ellipsoid with rounded ends, 90–200 × 25–45 µm, lumina mostly rounded. Chemistry: No substances detected.

[Groenhart582], Indonesia, East Java, Mt. Wilis, above desa Besuki, on tree in forest, 1000-1200 m. Leg. P. Groenhart (no 582), 29.05.1938, det. A. Aptroot.

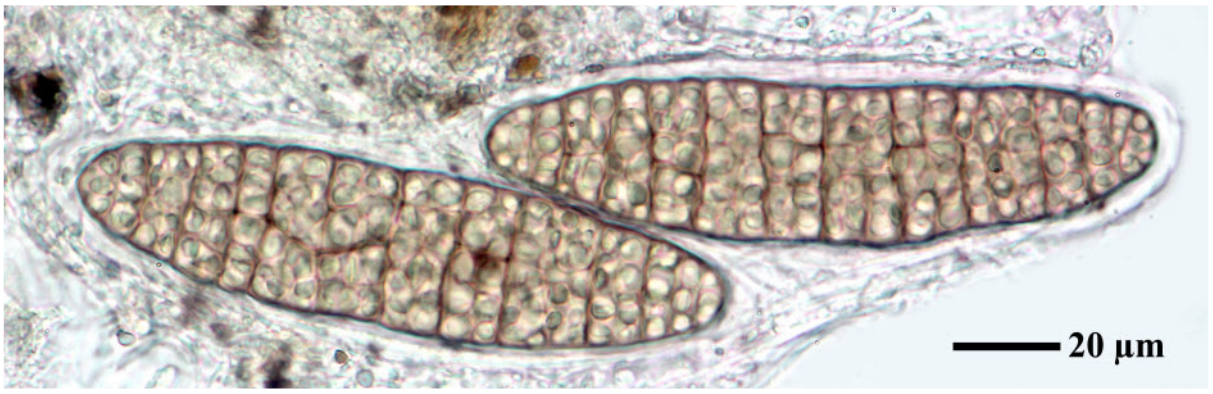




Pyrenula globifera











Pyrenula globifera

Pyrenula grossa Aptroot, in Aptroot, Diederich, Sérusiaux & Sipman, Bibliotheca Lichenol. 64: 157 (1997)

Thallus up to 10 cm wide, chocolate brown with raised pale patches, corticate, without pseudocyphellae, uneven, bullate-areolate (areoles 0.5–2 mm wide), minutely cracked, up to 3 mm thick, UV-, deforming the bark, without prothallus, resembling *Trypethelium grossum*; young areoles separate, breaking through the upper cortex of the bark. Ascomata completely immersed below the thallus in the bark, black, spherical, 0.8–1.0 mm wide, covered by the thallus; ascoma wall entire, carbonized, up to 300 µm thick, without recognizable clypeus; ostiole apical, flush to convex, conspicuous, white, 100–200 µm wide; hamathecium IKI-, heavily inspersed; ascospores 8/ascus, irregularly arranged in the ascus, 3-septate, distoseptate, of the pseudobufonia-type, with the outer locules much smaller and nearly bulging out of the wall and colourless, but surrounded by a dark brown ring (darker than the rest of the spore), 32–39 × 19–23 µm.

[ABL18348], Papua New Guinea, Simbu prov., Mount Wilhelm Area, near lake piunde (=Pindaunde). On tree in forest remnants, 3500 m, 145°03' E, 5°47' S. Leg. A. Aptroot (no 18348), 03.1987, det. A. Aptroot, 1987.

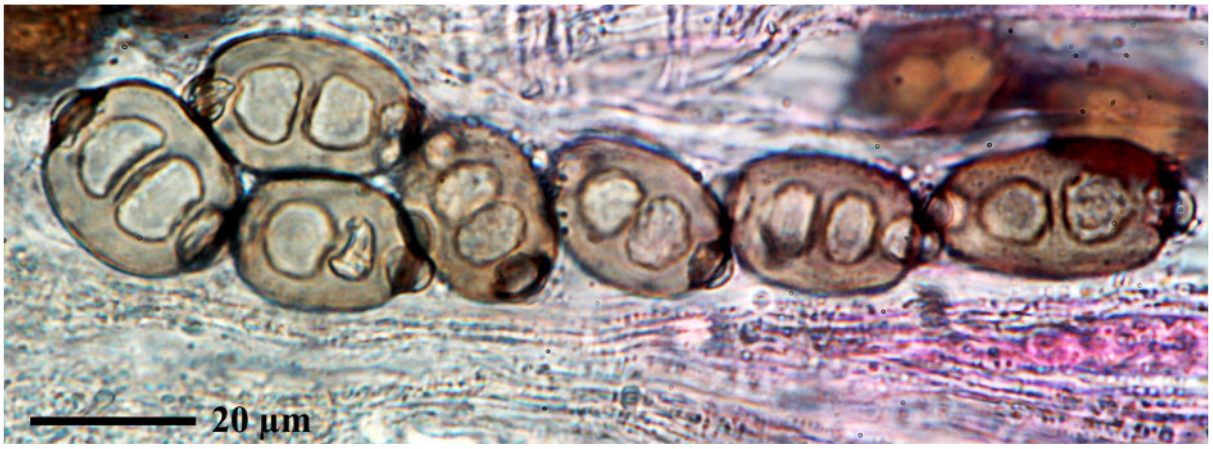




Pyrenula grossa







Pyrenula grossa



Pyrenula grossa

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.