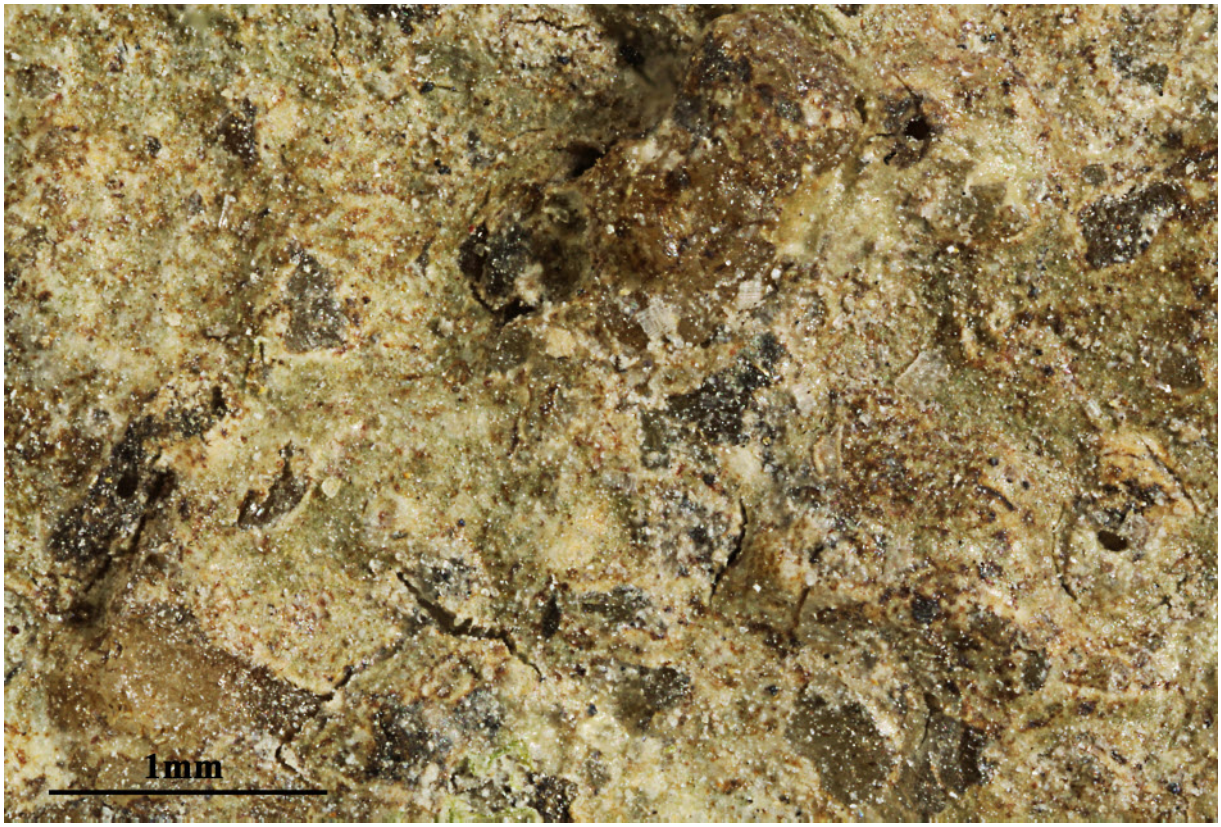
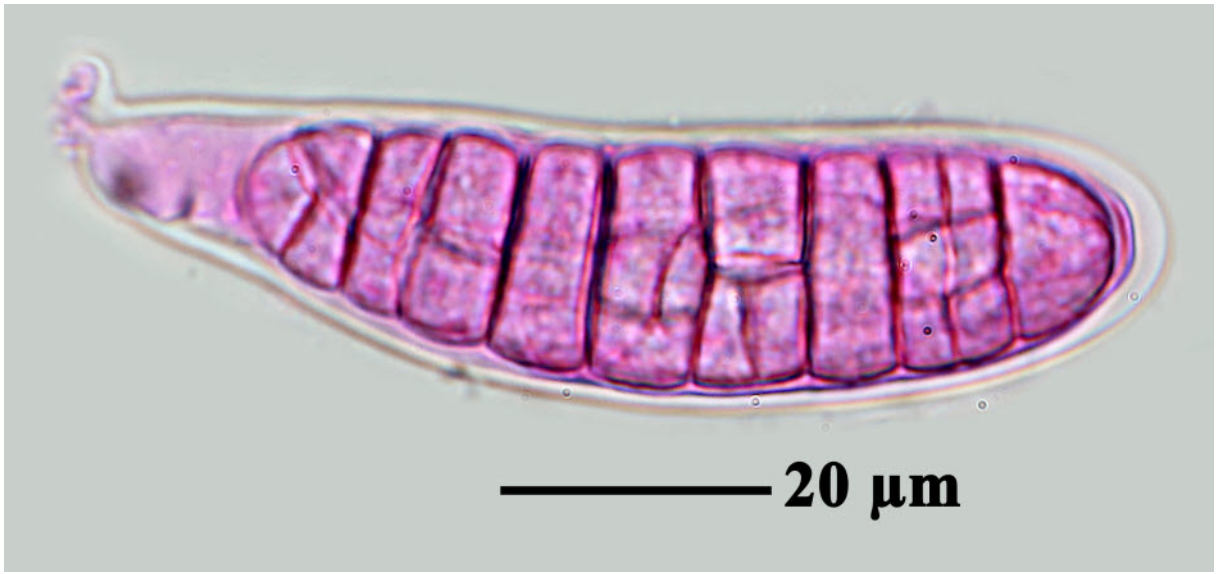


Felix Schumm & André Aptroot

Atlas of Pyrenulaceae and Trypetheliaceae
(Lichenized Ascomycota)

VOLUME 2



Felix Schumm & André Aptroot

Atlas of Pyrenulaceae and Trypetheliaceae
(Lichenized Ascomycota)

Volume 2

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Plates and descriptions.....1042-1561

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Index with synonymes.....2048-2081

new combinations

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

Astrothelium leucothelium Nyl., Annls Sci. Nat., Bot., sér. 5 7: 348 (1867)

Thallus corticate, greenish grey. Ascomata several chambers joined with eccentric, fused ostioles. Hamathecium clear. Spores 8/ascus, 3(–5) septate 32–52 ×10–17 µm, hyaline, IKI-. Chemistry Thallus and ascomata UV+ yellow, K-, TLC: lichexanthone

[ABL60477], 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. 60477), 15.03.2004, det. A. Aptroot 2004.



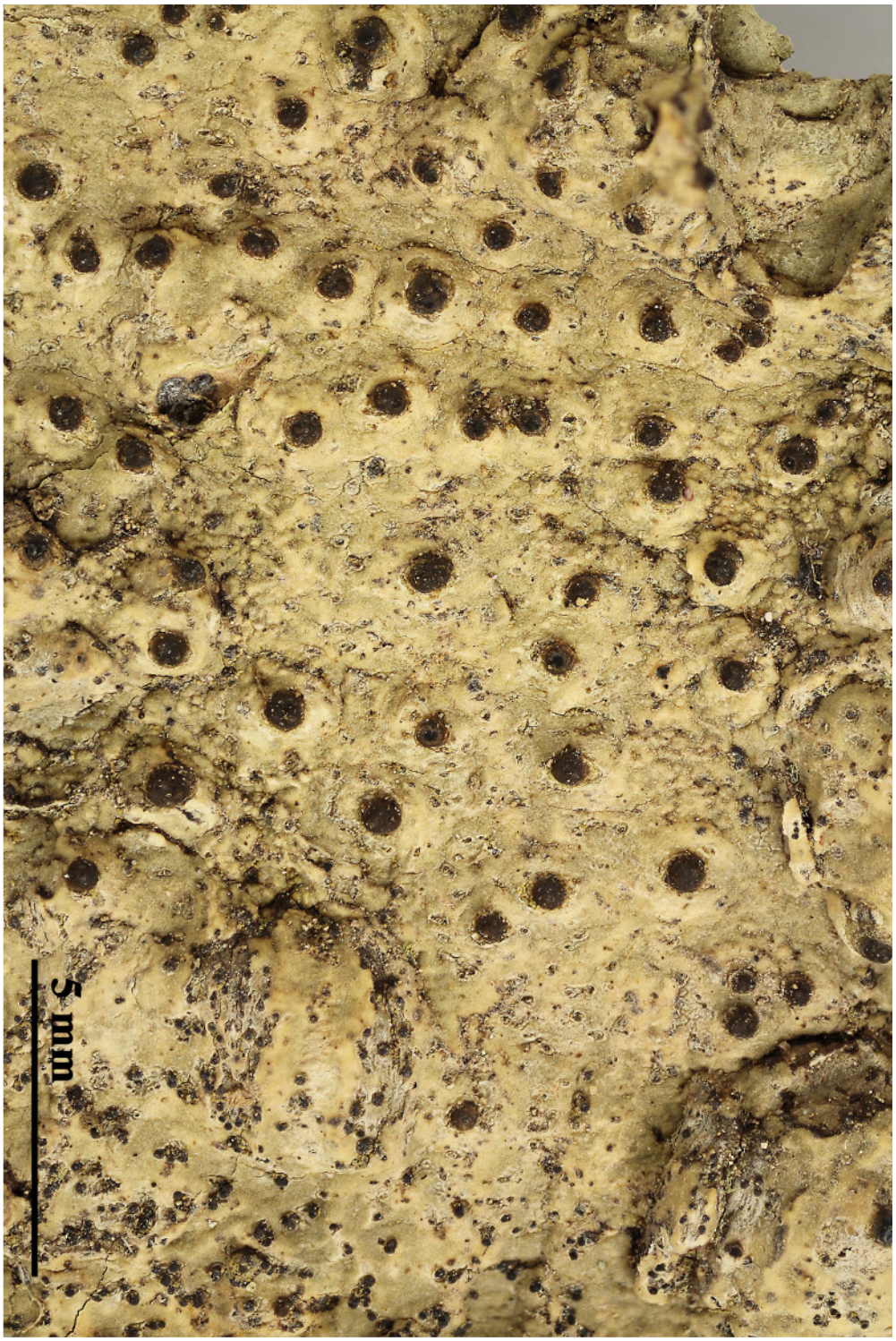


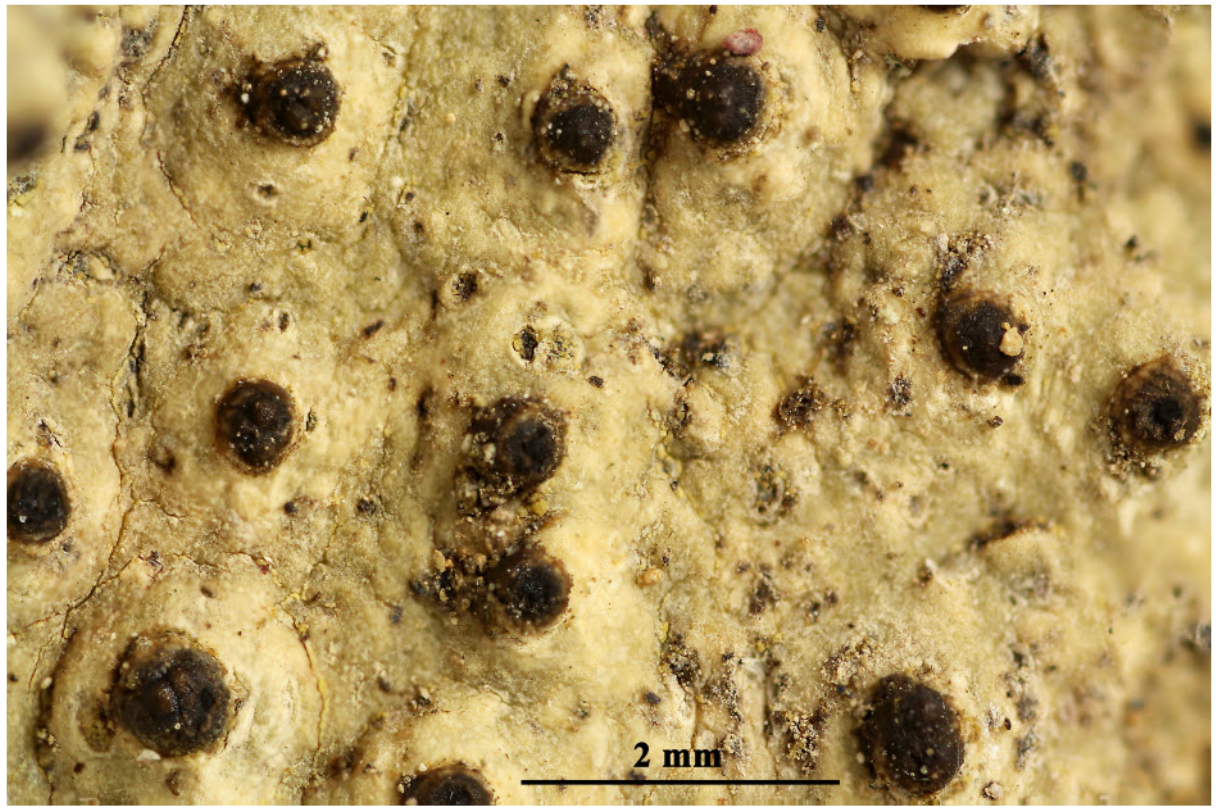
Astrothelium leucothelium

Astrothelium leucothelium Nyl., Annls Sci. Nat., Bot., sér. 5 7: 348 (1867)

Thallus corticate, greenish grey. Ascomata several chambers joined with eccentric, fused ostioles. Hamathecium clear. Spores 8/ascus, 3(–5) septate, 32–52 × 10–17 µm, hyaline, IKI–. Chemistry: Thallus and ascomata UV+ yellow, K–, TLC: lichexanthone

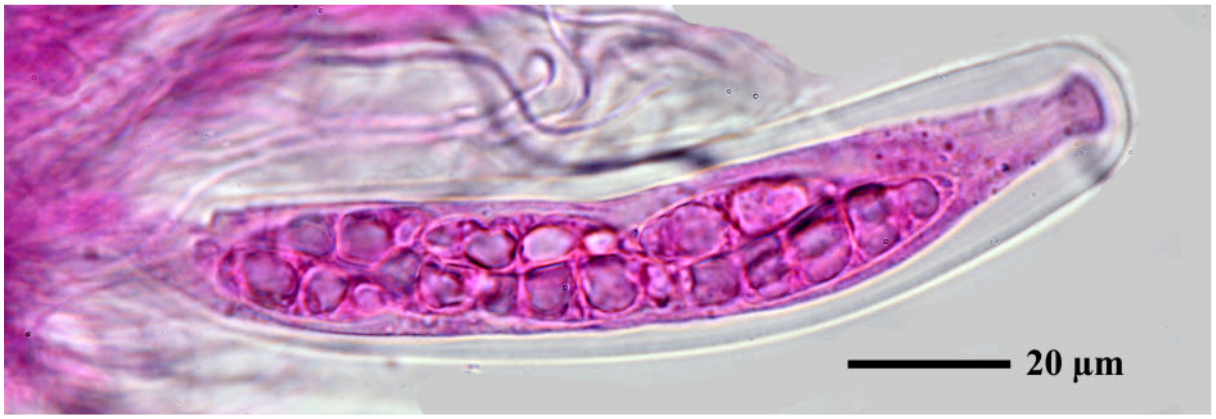
[ABL78465], Brazil, Santa Catarina, Joinville, Recanto das Nascentes Divinas, in Atlantic rain forest on tree bark. 225 m, 26°12’43’’ S, 49°00’11’’ W. Leg. A. Aptroot (no 78465), 29.03.2019, det. A. Aptroot, 2019.

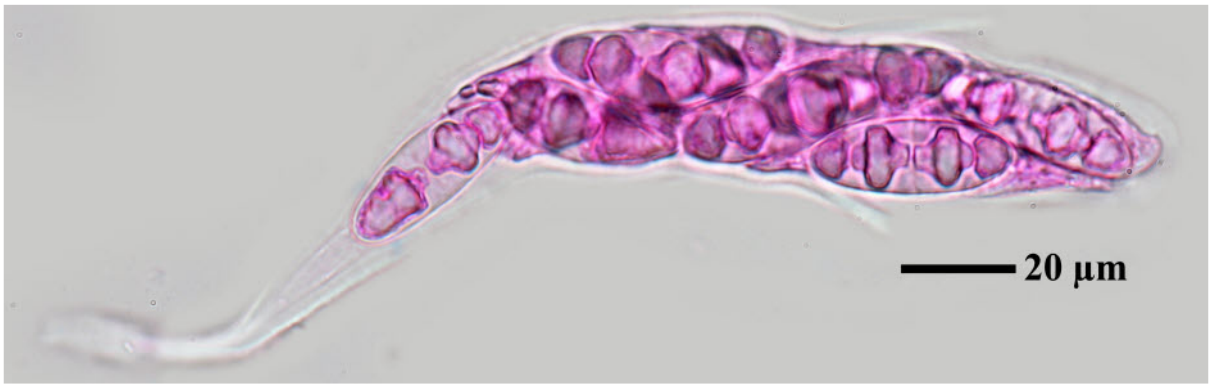


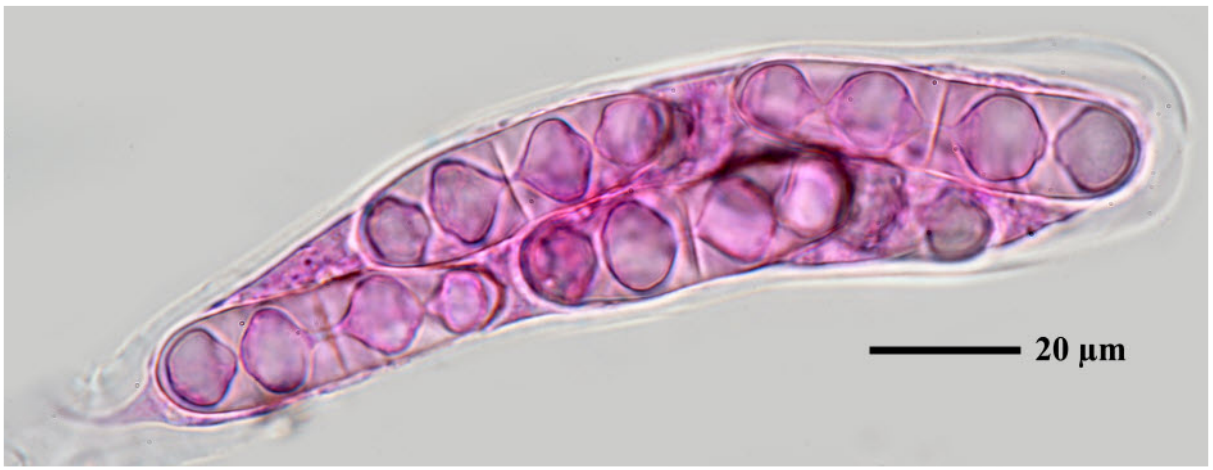


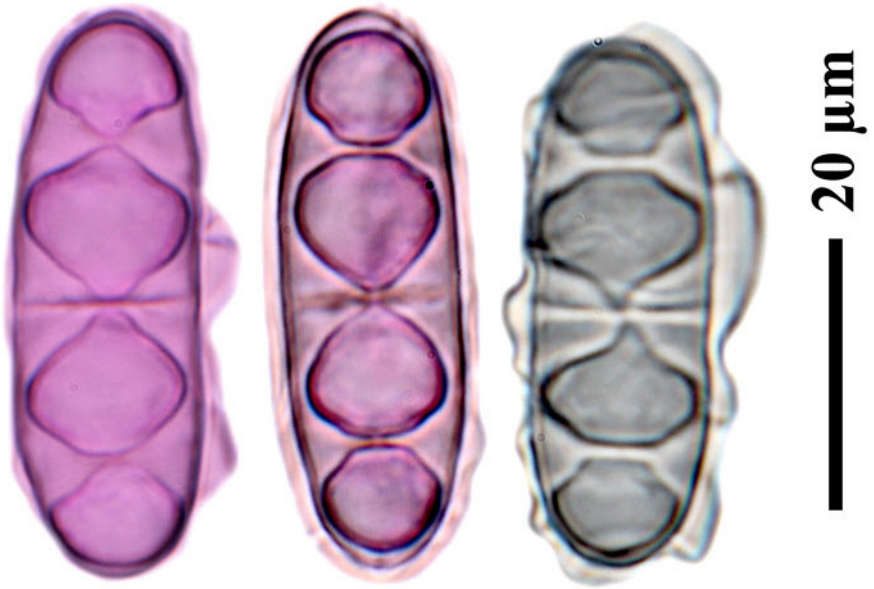


Astrothelium leucothelium







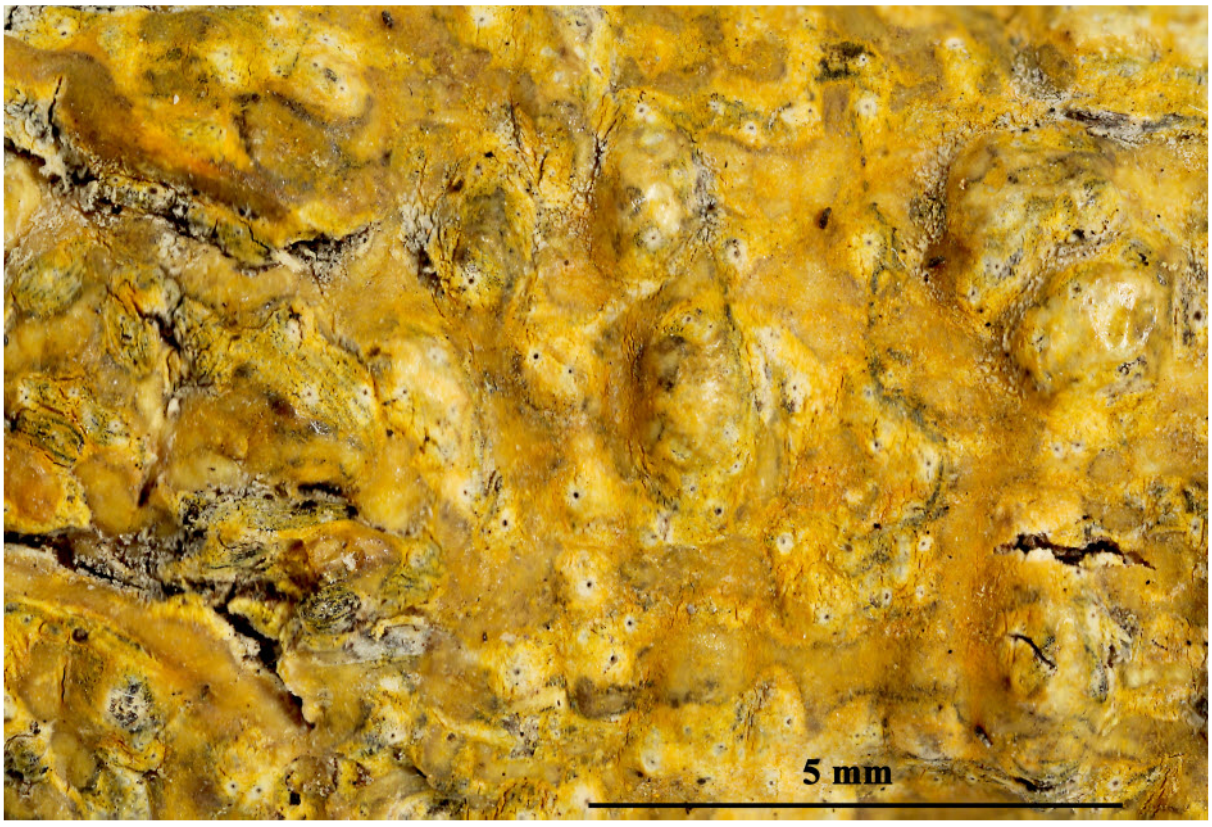


Astrothelium leucothelium

Astrothelium lineatum Aptroot & M. Cáceres, in Cáceres & Aptroot, Bryologist 119(3): 254 (2016)

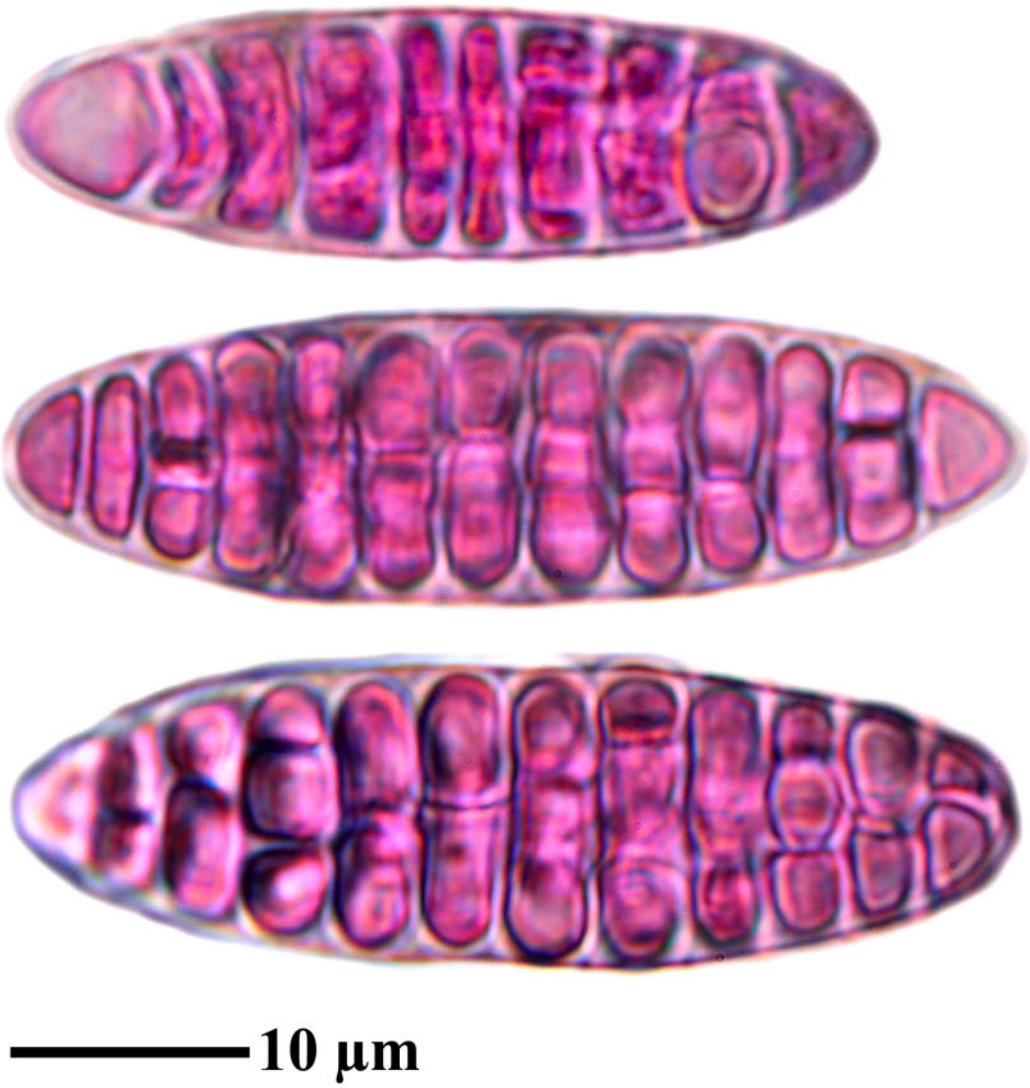
Thallus dull, ochraceous, completely covered with bright orange pigment, not surrounded by a prothallus, apparently inducing gall formation of the host bark. Ascomata globose to pyriform, 0.5–0.8 mm diam., deeply immersed in and below pseudostromata, in groups of 3–15. Pseudostroma not much differentiated from the thallus, ellipsoid to elongated or branched, occasionally forming a reticulum, orange pigmented on the surface, internally not pigmented. Ostioles apical, pale brown, surrounded by a c. 0.1 mm wide whitish ring. Hamathecium not inspersed, IKI–. Ascospores 8/ascus, hyaline, regularly muriform, 45–55 × 11–13 µm, long-ellipsoid, without distinctly thickened median septum, surrounded by a 10–13 µm wide gelatinous sheath. Pycnidia not observed.
Chemistry: Thallus and pseudostroma UV+ pink, C–, P–, K+ blood red. TLC: An anthraquinone, probably parietin.

[ABL27517], Brazil, Amapá, Mazagão, NE of Reserva extrativista Moracá, Ramal do Rio Preto on BR 156, 30 m, 0°00’ S, 51°40’ W. On tree bark in cerrado. Leg. M. Cáceres & A. Aptroot (no 27517), 21.08.2015, det. A. Aptroot, 2015. ISOTYPE.





Astrothelium lineatum



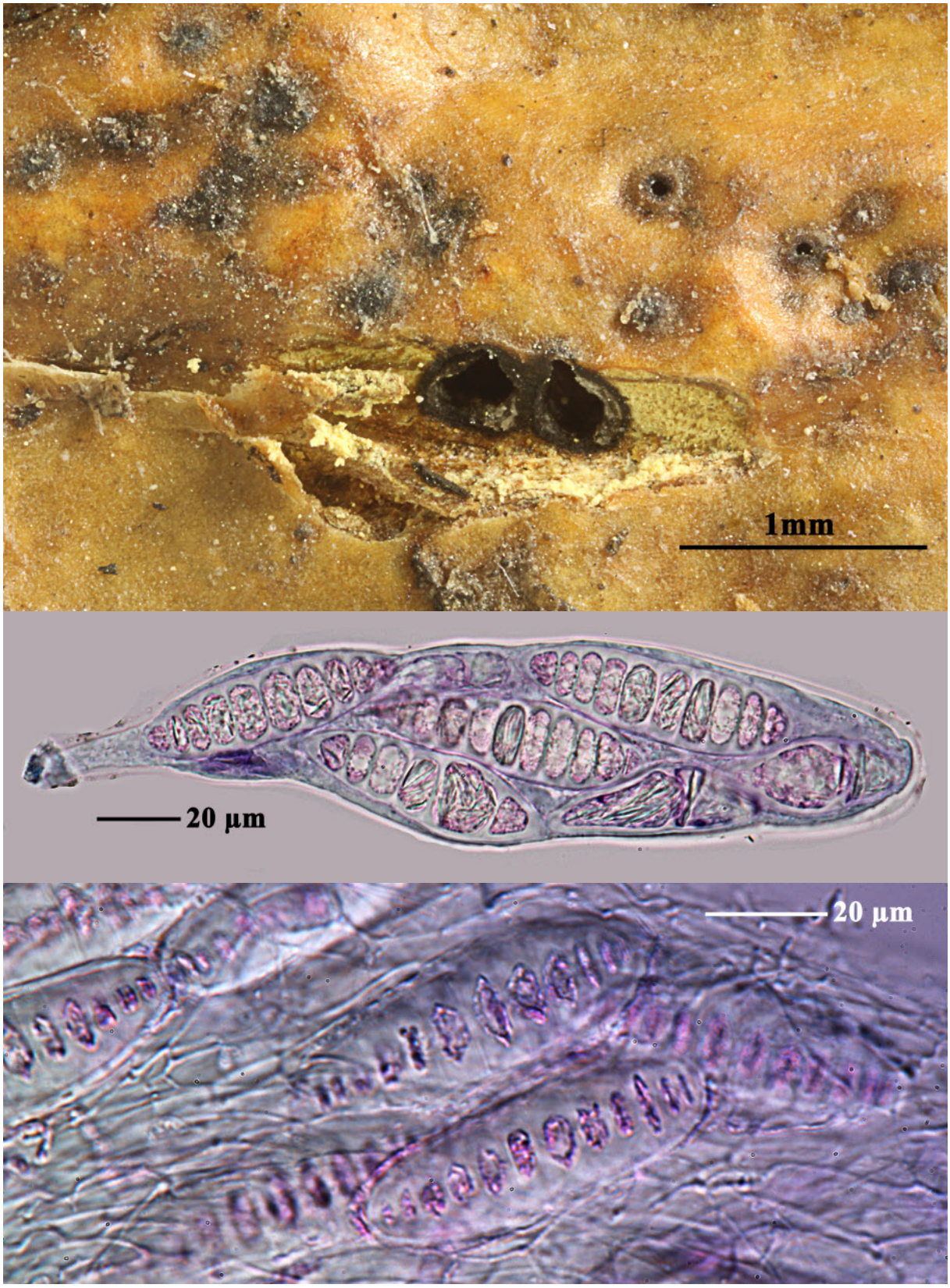
Astrothelium lineatum

Astrothelium luridum (Zahlbr.) Aptroot & Lücking, Lichenologist 48(6): 867 (2016)
= *Trypethelium luridum* Zahlbr., Annls mycol. 14(1/2): 47 (1916)
= *Trypethelium endosulfureum* Makhija & Patw., J. Hattori Bot. Lab. 73:197 (1993)

Thallus corticate, olive-brown to yellowish. Ascomata with apical ostioles; pseudostromata 0.8–1.5 mm broad, erumpent to prominent, covered by thallus except for dark ostiolar area. Hamathecium clear. Ascospores 8/ascus, 7–11-septate, 55–88 × 13–28 µm, hyaline, IKI-. Chemistry: thallus and pseudostromata UV-, internally K+ red with anthraquinone.

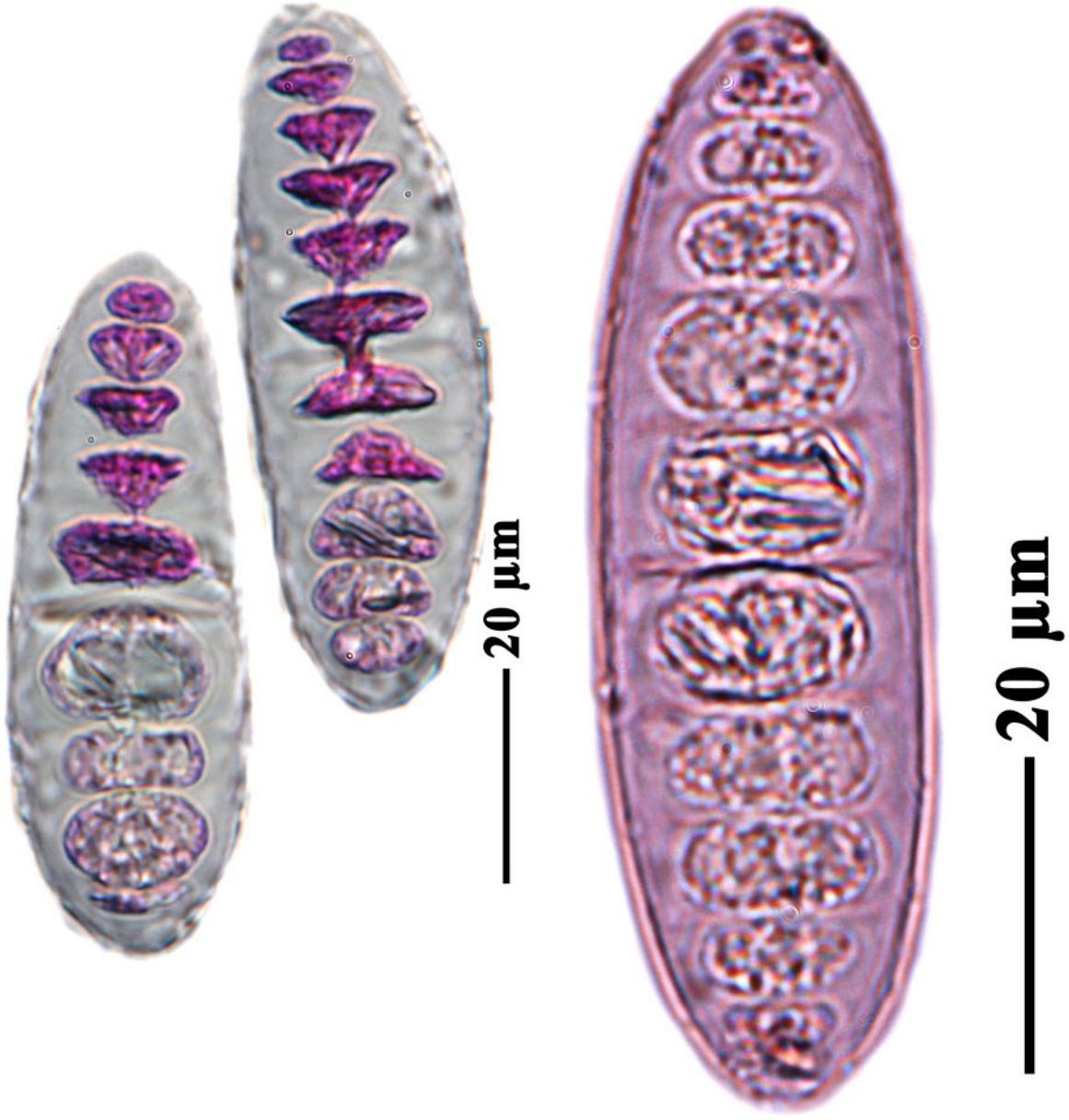
[AMH77905], India Meghalaya, Mohmtheid-Cherapunji road, leg. Patwardhan & Nagarkar, 20.10.1977. Part of HOLOTYPE of *Trypethelium endosulfureum*.





Astrothelium luridum



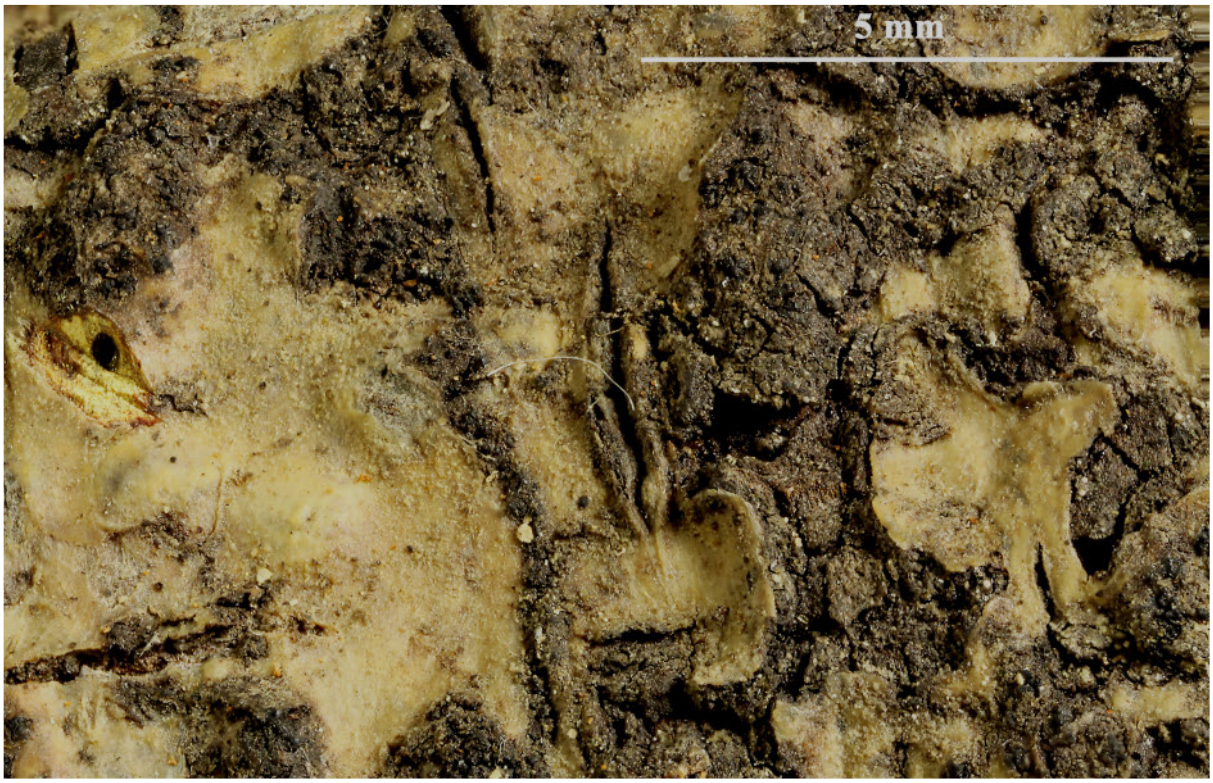


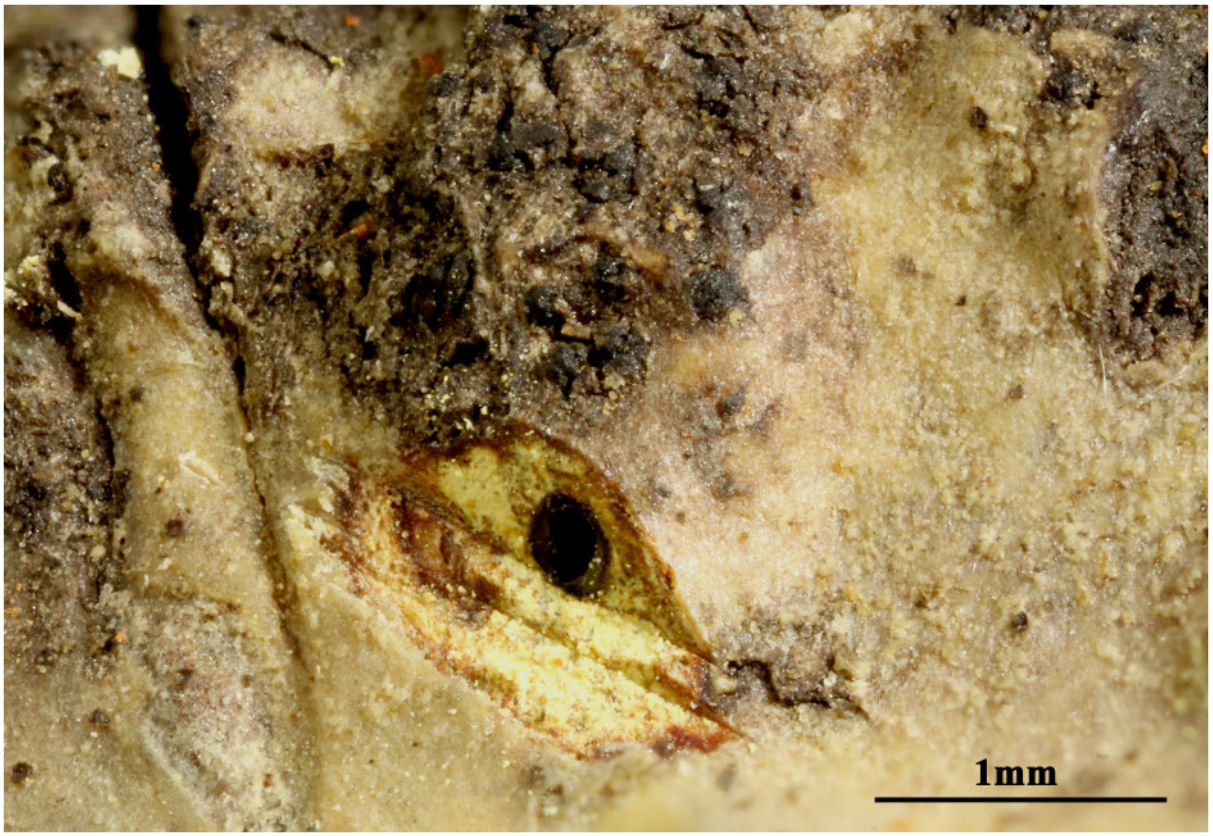
Astrothelium luridum

Astrothelium luridum (Zahlbr.) Aptroot & Lücking, Lichenologist 48(6): 867 (2016)
= *Trypethelium luridum* Zahlbr., Annls mycol. 14(1/2): 47 (1916)
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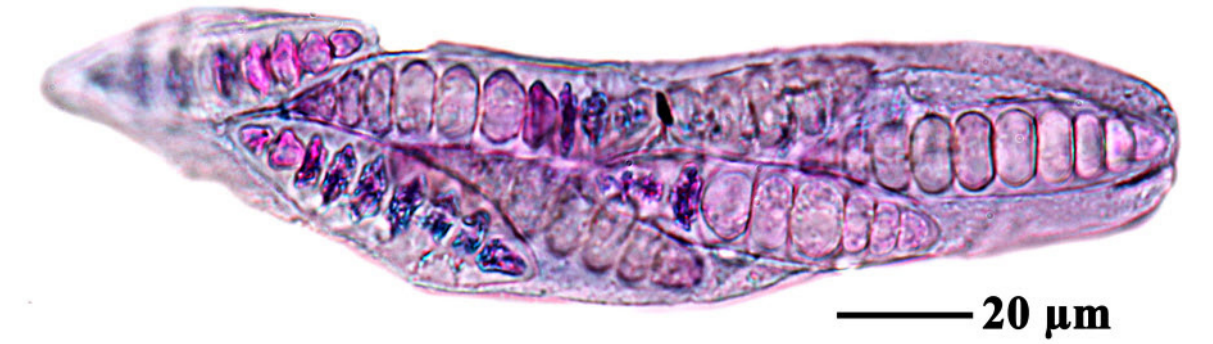
Thallus corticate, olive-brown to yellowish. Ascomata with apical ostioles; pseudostromata 0.8–1.5 mm broad, erumpent to prominent, covered by thallus except for dark ostiolar area. Hamathecium clear. Ascospores 8/ascus, 7–11 septate, 55–88 × 13–28 µm, hyaline, IKI-. Chemistry: thallus and pseudostromata UV-, internally K+ red with anthraquinone.

[Kashiw19781], Japan, Shikoku, Prov. Tosa: Kamikobi, Nakamura-city. On stone works; 200 m. Leg. H. Kashiwadani (no 19781), 24.03.1983, det. A. Aptroot.







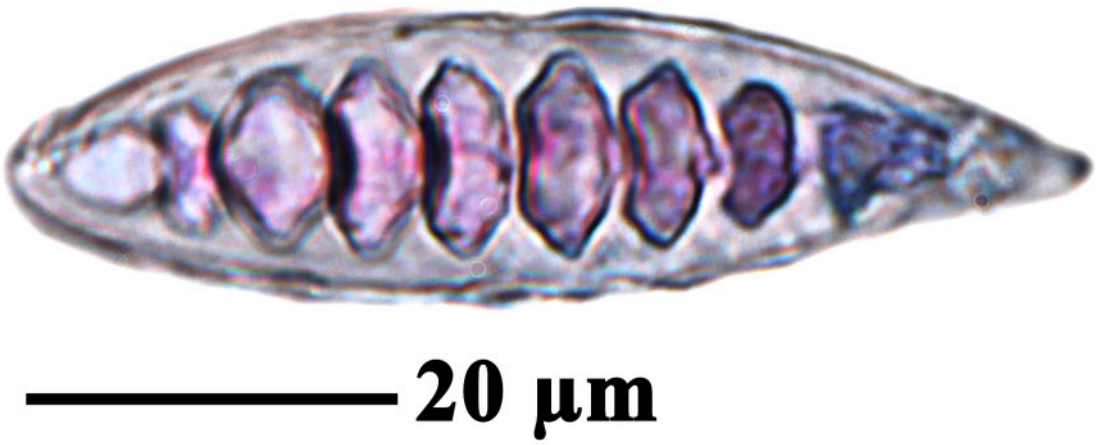


Astrothelium luridum









Astrothelium luridum

Astrothelium macrocarpum (Fée) Aptroot & Lücking, Lichenologist 48(6): 867 (2016)

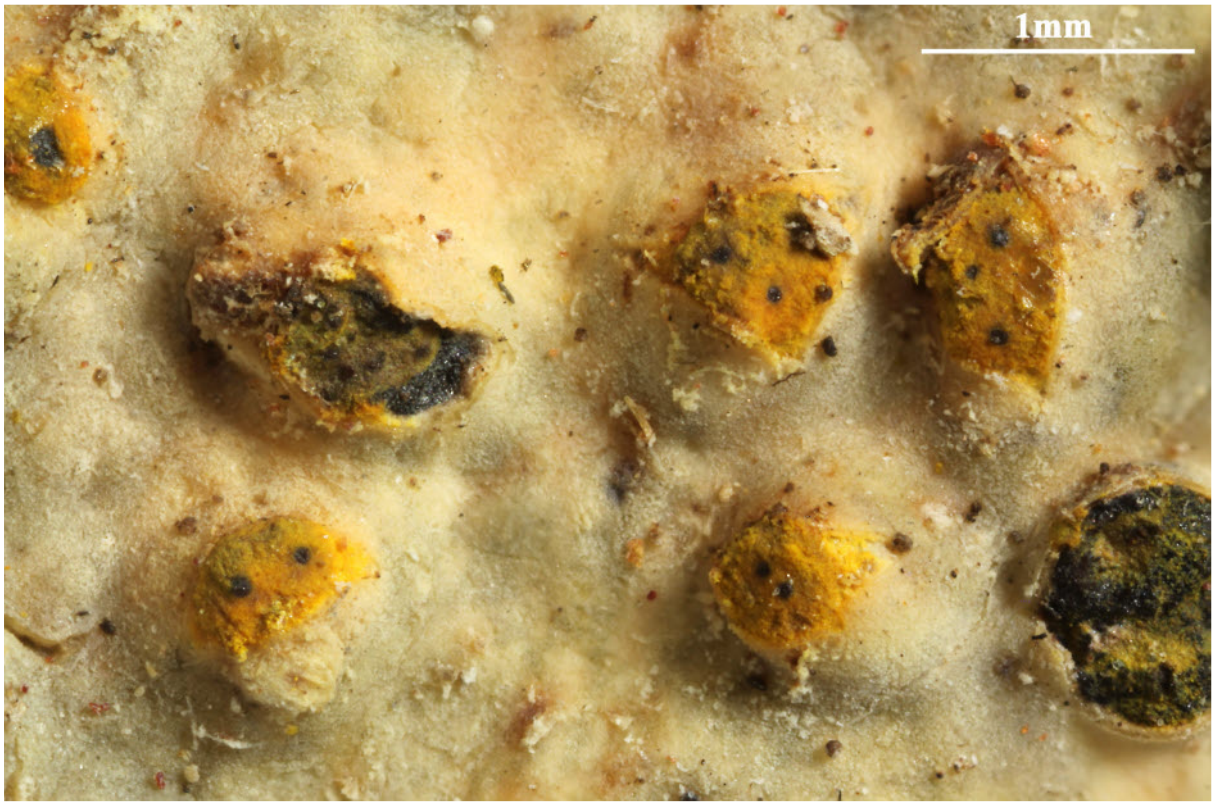
= *Porina macrocarpa Fée*, Essai Crypt. Exot. (Paris): 81 (1825) [1824]

= *Porophora macrocarpa* (Fée) Spreng., Syst. veg., Edn 16 4(1): 241 (1827)

Thallos corticate, olive-green to yellowish, smooth to uneven. Ascomata several chambers joined with eccentric, fused ostioles; joined ascomata pseudostromatic; pseudostromata 0.5-1 mm diam., erumpent to prominent, conical with flattened top, covered by thallus with lateral part whitish and upper part with yellow-orange pigment and dark ostiole. Hamathecium clear. Ascospores 8/ascus, fusiform-ellipsoid, 3 septate, hyaline, 21–28 × 7–11 µm, IKI-. Chemistry: Thallus UV+ yellow, K-, with lichexanthone; pseudostromata with yellow-orange, K+ purple, UV+ red anthraquinone, probably parietin.

[ABLISE48621], Brazil, Bahia, Itamarajú, Monte Pascual, on tree bark in cerrado forest, 16°51’57’’ S, 39°24’59’’ W, 130 m. Leg. M. Cáceres & A. Aptroot (no ISE 48621), 18.02.2019, det A. Aptroot, 2019.







Astrothelium macrocarpum

Astrothelium macroeustomum Aptroot & Sipman, in Aptroot, Sipman, Barreto, Nunes & Cáceres, Lichenologist 51(1): 32 (2019)

Thallus corticate, continuous, pale ochraceus brown. Ascomata 0.6–1 mm diam, mostly 2–5-aggregated, mostly immersed in the bark tissue below the thallus. Ostioles eccentric, fused, black, surrounded by a white pruinose rim. Hamathecium not inspersed. Ascospores 8/ascus, hyaline, 5-septate, 50–55 × 12–17 µm, IKI- or very pale blue. Chemistry: thallus and ascomata UV-, K-, ostiole UV+ yellow, TLC: lichexanthone.

[Sipman31769], French Guyana, tropical primary forest along pistea to Crique Limonade, about halfway. 3°35' N, 53°13' W, 300 m. Leg. H. Sipman (no 31769). On trunk and branches of fallen trees. ISOTYPE.





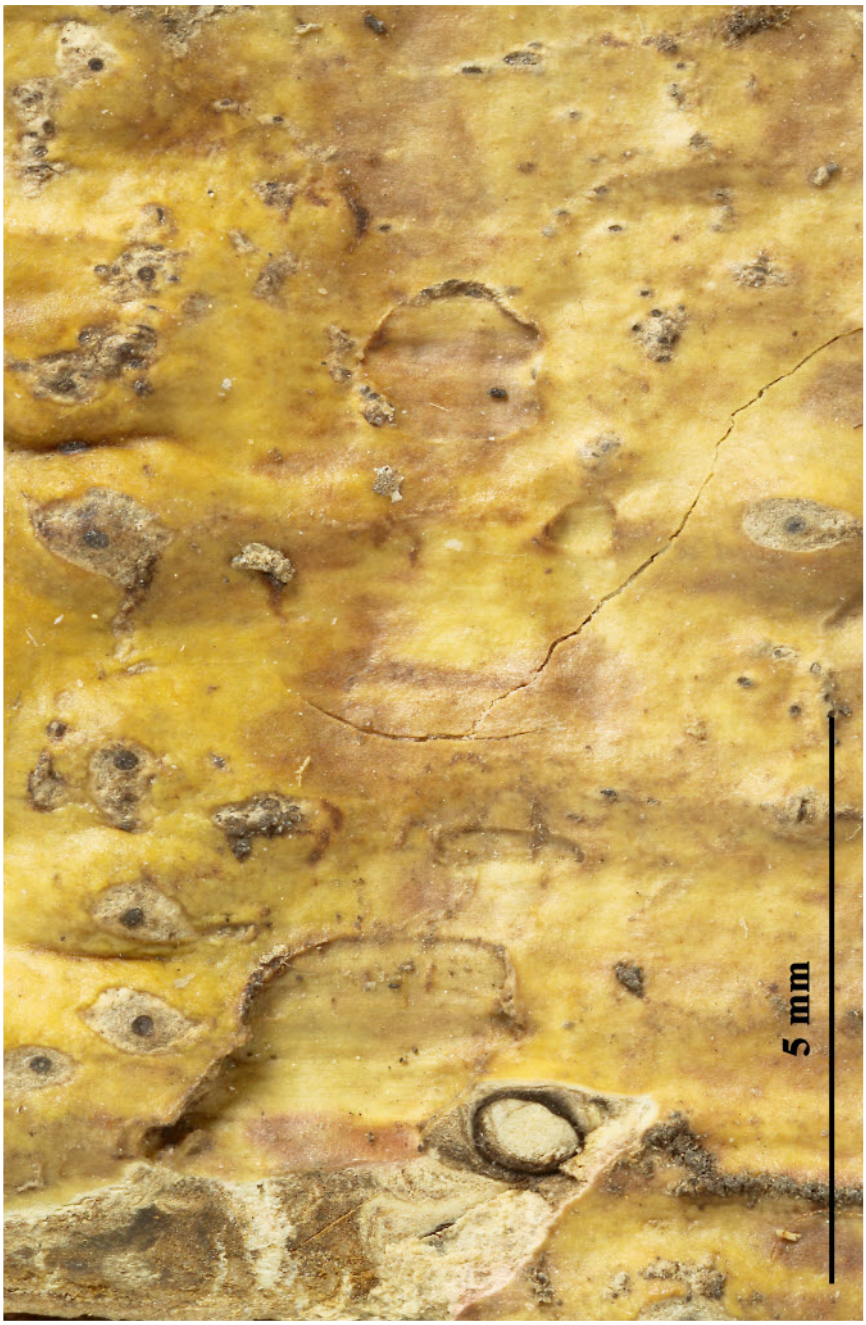
Astrothelium macroeustomum

Astrothelium macrosporum (Makhija & Patw.) Aptroot & Lücking, Lichenologist 48(6): 868 (2016)

= *Trypethelium macrosporum* Makhija & Patw., J. Hattori bot. Lab. 73: 200 (1993)

Thallus corticate, olive-green to yellowish. Ascomata with ostioles, solitary to irregularly confluent, 0.7–1 mm diam., erumpent, covered by thallus except dark ostiolar area, surounded by irregular whitish rim. Hamathecium finely inspersed. Spores 8/ascus, 9-13 septate, 120–195 × 17–22 µm, hyaline, IKI-. Chemistry: thallus and ascomata UV-, K-. TLC: no lichen substances detected.

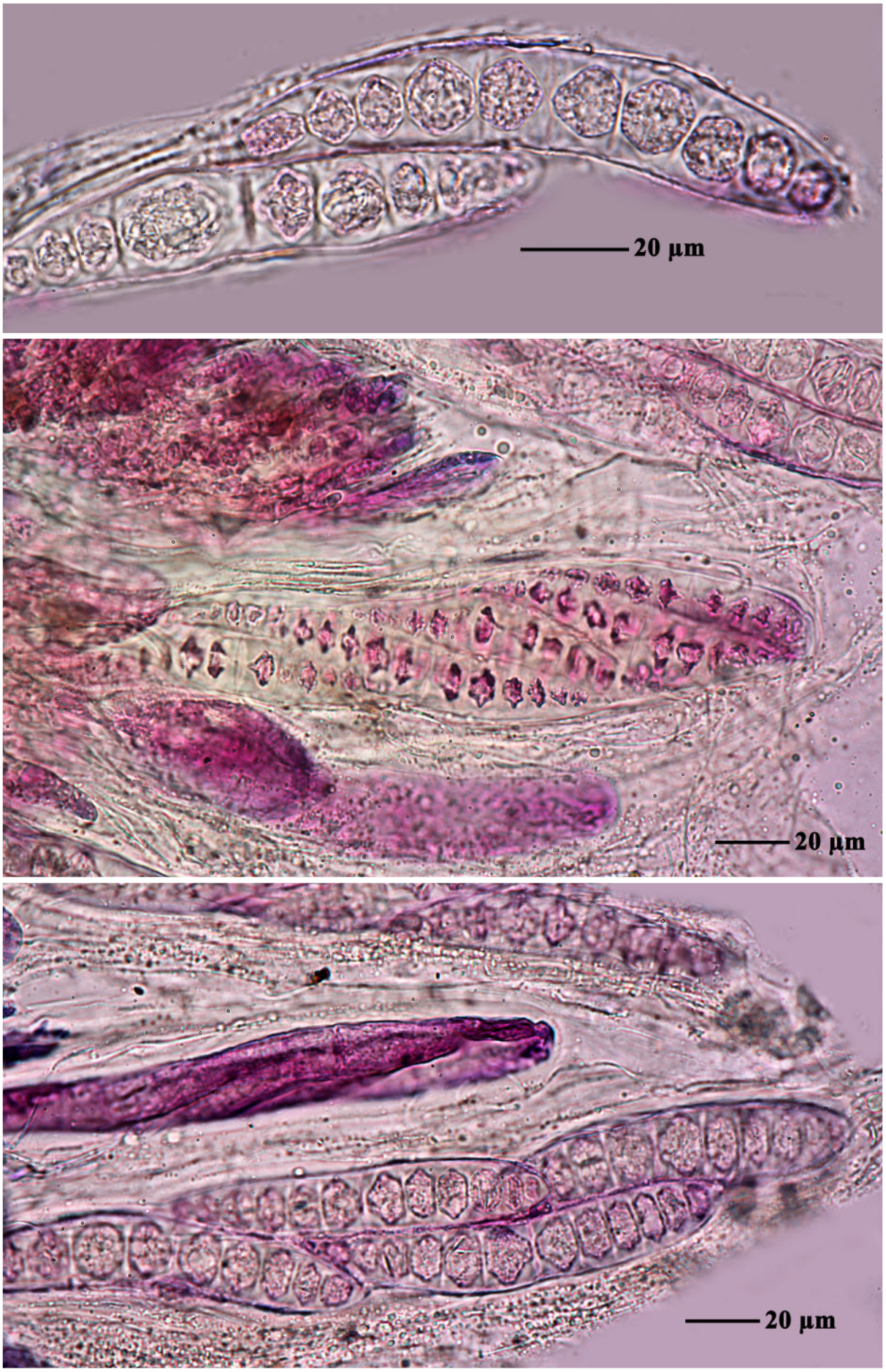
[AMH77826], India, Meghalaya, Cherapunji Road. Leg.Patwardhan & Nagarkar (AMH77826), 17.10.1977. ISOTYPE of *Trypethelium macrosporum*.



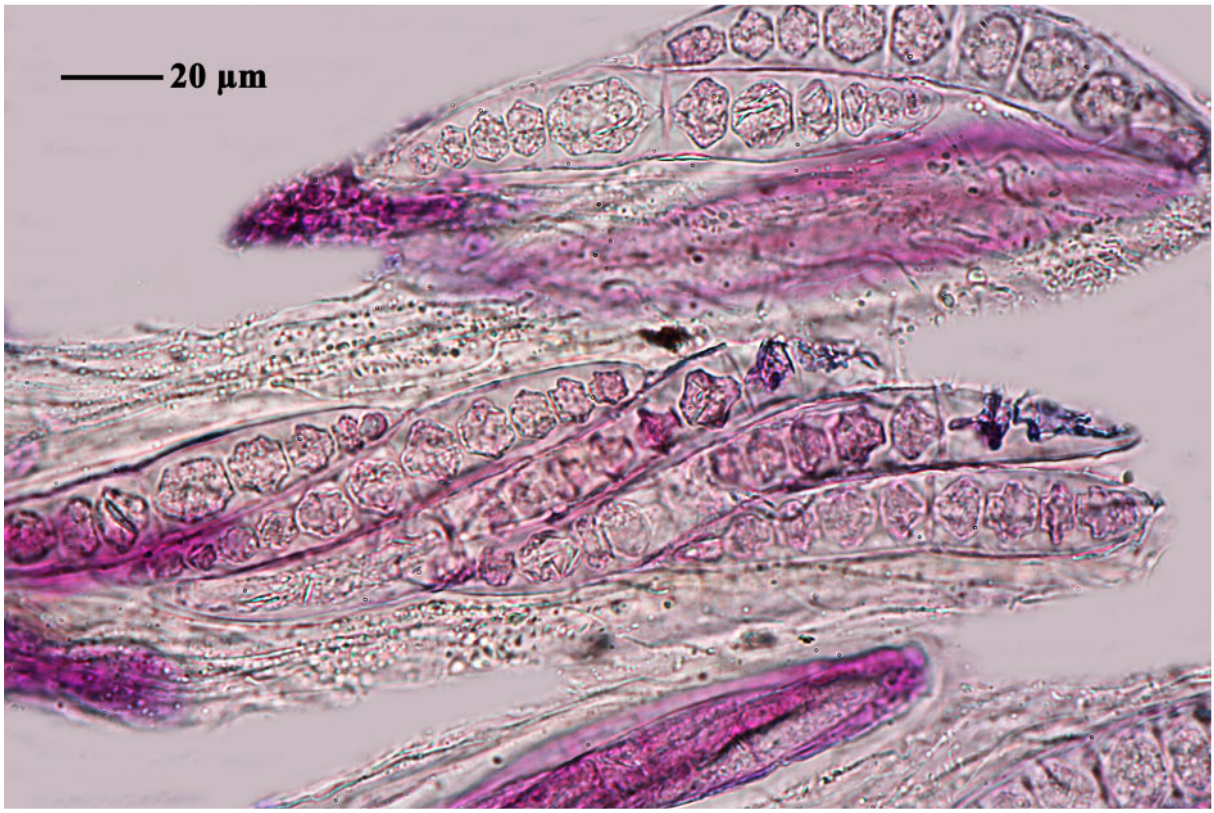




Astrothelium macrosporum



Astrothelium macrosporum



Astrothelium macrosporum

Astrothelium marcidum (Fée) Aptroot & Lücking, Lichenologist 48(6): 868 (2016)

= *Trypethelium marcidum* (Fée) Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 30(no. 3): 11 (1888)

= *Pyrenula marcida* Fée, Essai Crypt. Exot. (Paris): 77 (1825) [1824]

= *Verrucaria marcida* (Fée) Spreng., Syst. veg., Edn 16 4(1): 245 (1827)

Thallus corticate, olive-brown. Ascomata several chambers joined with eccentric, fused ostioles, immersed-erumpent covered by thallus or yellow white layer. Hamathecium clear. Spores 8/ascus, 3–septate, 35–45 × 14–16 µm, hyaline, IKI-. Chemistry: thallus and ascomata UV-, K-. TLC: no lichen substances detected.

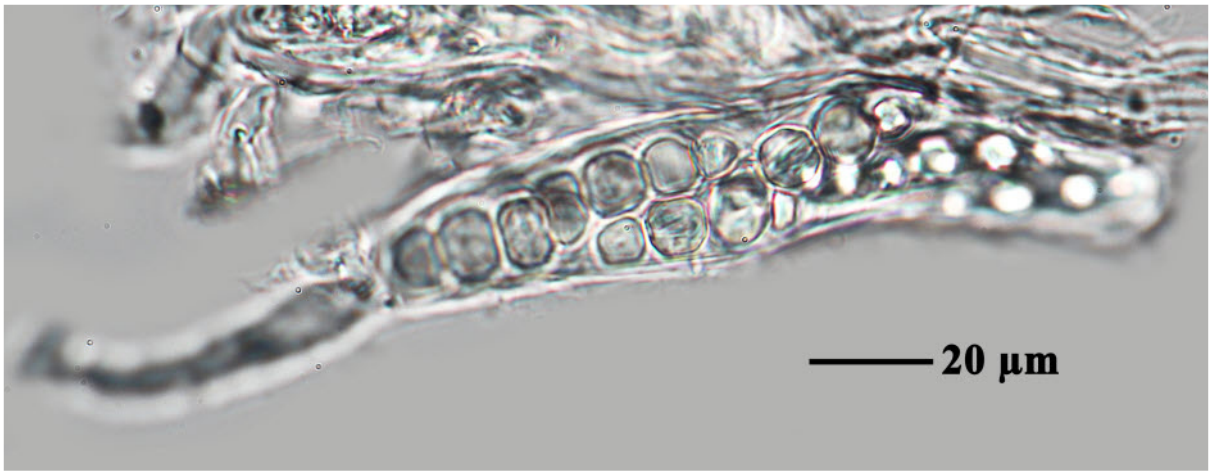
[ABL25608], U.S.A., Puerto Rico, Distr. Ponce, Caribbean National Forest. Toro Negro Division, road 143, km 25, mossy forest remnants on mountain top, on Ficus trees. Leg. A. & M. Aptroot (no 25608), 21.-31.05.1989, det. A. Aptroot, 1989.

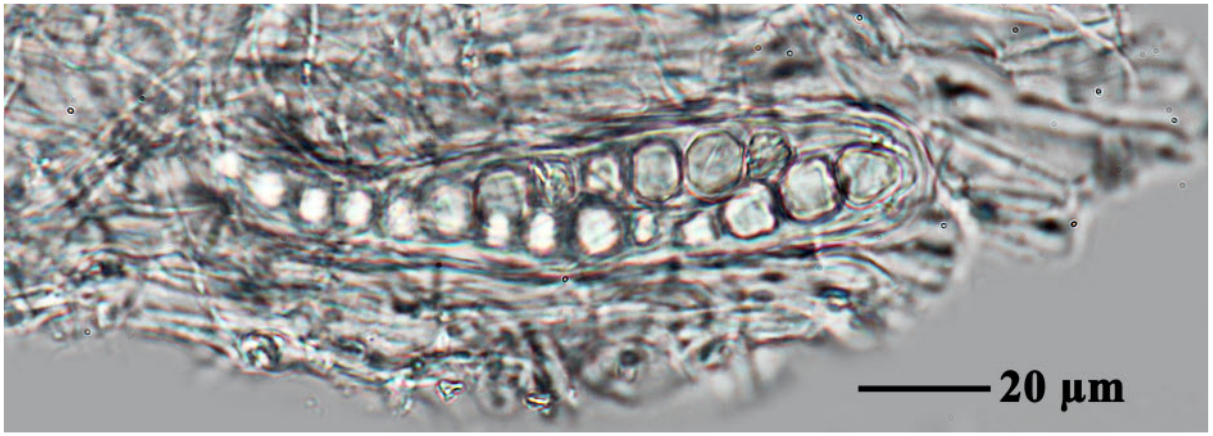






Astrothelium marcidum

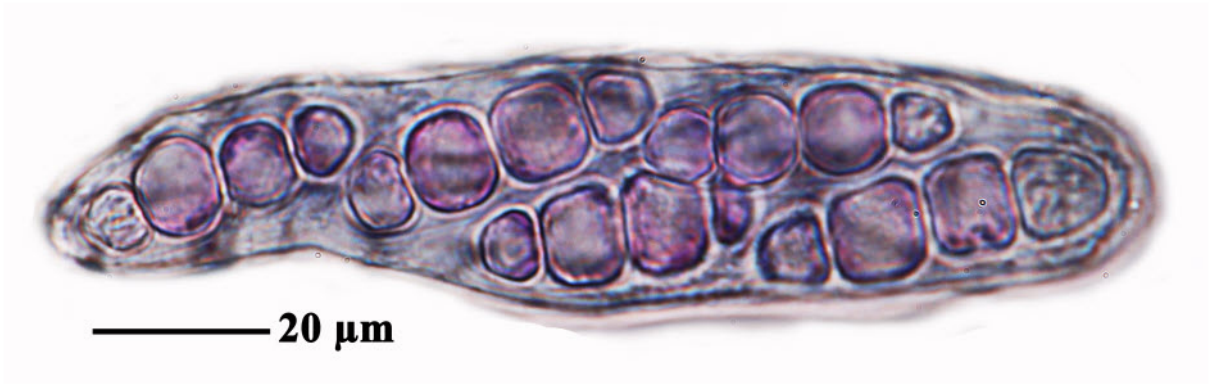




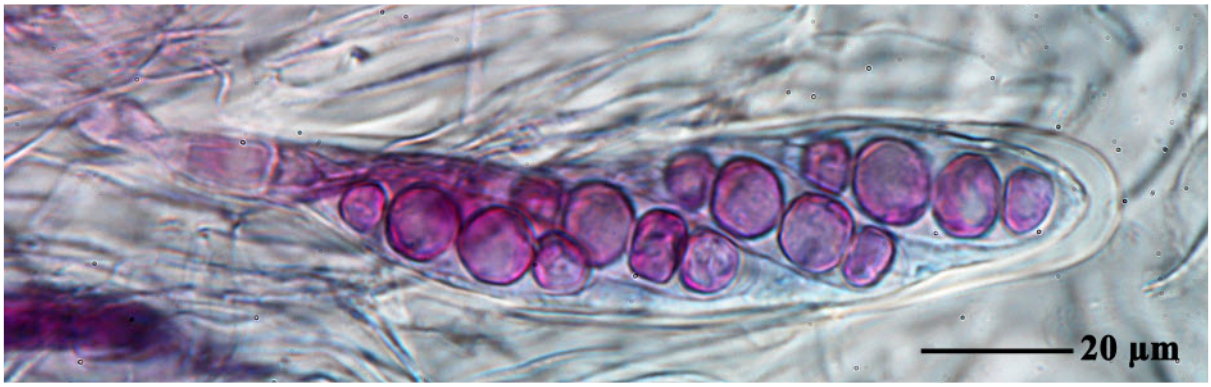




Astrothelium marcidum







Astrothelium marcidum

Astrothelium marcidum (Fée) Aptroot & Lücking, Lichenologist 48(6): 868 (2016)

= *Trypethelium marcidum* (Fée) Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 30(no. 3): 11 (1888)

= *Pyrenula marcida* Fée, Essai Crypt. Exot. (Paris): 77 (1825) [1824]

= *Verrucaria marcida* (Fée) Spreng., Syst. veg., Edn 16 4(1): 245 (1827)

Thallus corticate, olive-brown. Ascomata several chambers joined with eccentric, fused ostioles, immersed-erumpent covered by thallus or yellow white layer. Hamathecium clear. Spores 8/ascus, 3-septate, 35–45 × 14–16 µm, hyaline, IKI-. Chemistry: thallus and ascomata UV-, K-. TLC: no lichen substances detected.

[ABLISE28524a], Brazil, Bahia, Itamarajú, Monte Pascual, on tree bark in cerrado forest. 16°51’57” S, 39°24’59” W, 130 m. Leg. M.Cáceres & A. Aptroot (no ISE48524a), 18-02.2019, det. A. Aptroot, 2019.







Astrothelium marcidum



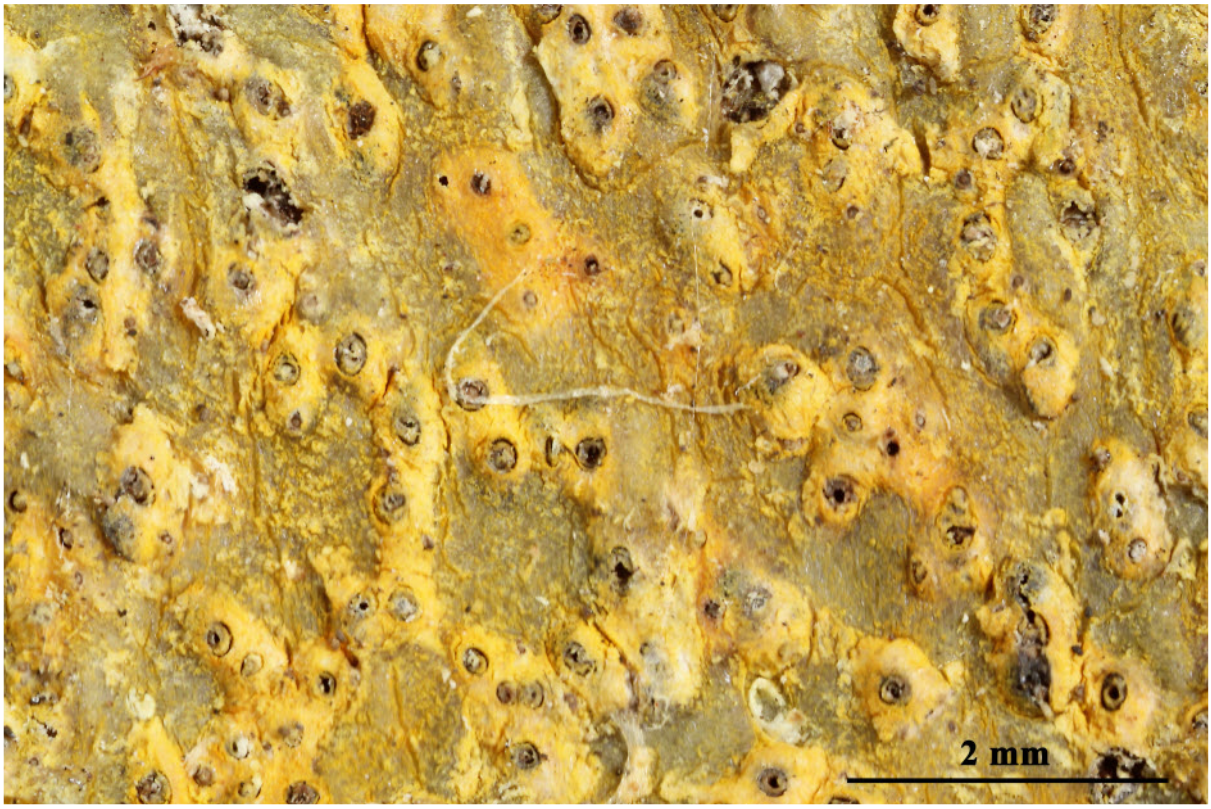


Astrothelium marcidum

Astrothelium megaeneum Flakus & Aptroot, in Flakus, Kukwa & Aptroot, Lichenologist 48(6): 668 (2016)

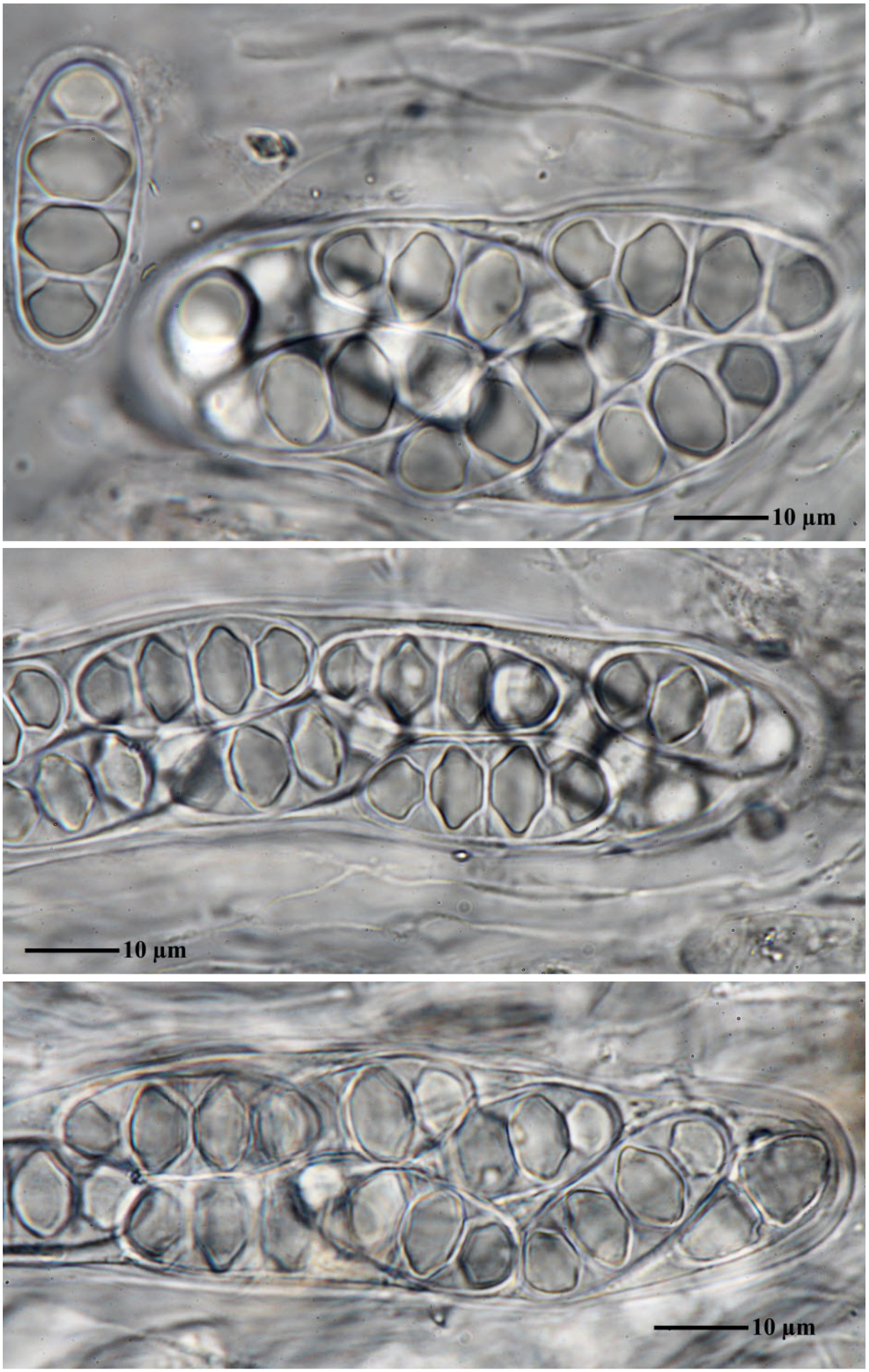
Thallus corticate, with corticiform layer c. 20 µm thick, smooth, matt, continuous, not inducing swellings of the host bark, covering areas ≤ 10 cm diam., c. 0.5 mm thick, orange, not surrounded by a black prothallus. Ascomata pyriform, 0.3–0.7 mm diam., single or 2–5 fused together, mostly aggregated, immersed in the thallus with base often immersed in the bark, ascomatal verrucae irregular in outline and with sloping sides, orange, thalline cover not containing bark tissue. Wall fully but not uniformly carbonized, composed of several layers, not differentiated into excipulum and involucrellum, ≤ c. 50 µm wide (in upper part sometimes ≤ c. 130 µm). Ostioles apical, fused to separated, when separated then 2–5 aggregated and surrounded by a common ostiolar area, black, surrounded by a greyish black, flat spot. Hamathecium clear. Asci 8-spored. Ascospores hyaline, 3-septate, narrowly ellipsoid, 26–35 × 11–12 µm, ends rounded, lumina diamond-shaped, surrounded by a gelatinous layer ≤ 3 µm thick. Pycnidia not observed. Chemistry: Thallus surface UV+ orange, K+ purple, thallus medulla K−; pseudostromata surface UV+ orange, inner part of pseudostromata K−. TLC: parietin (major) detected.

[ISE48600], Brazil, Bahia, Itamarajú, Monte Pascual, on tree bark in cerrado forest, 130 m, 16°51’55” S, 39°24’54” W. Leg. M. Cáceres & A. Aptroot (no ISE48600), 18.02.2019, det. A. Aptroot, 2019.

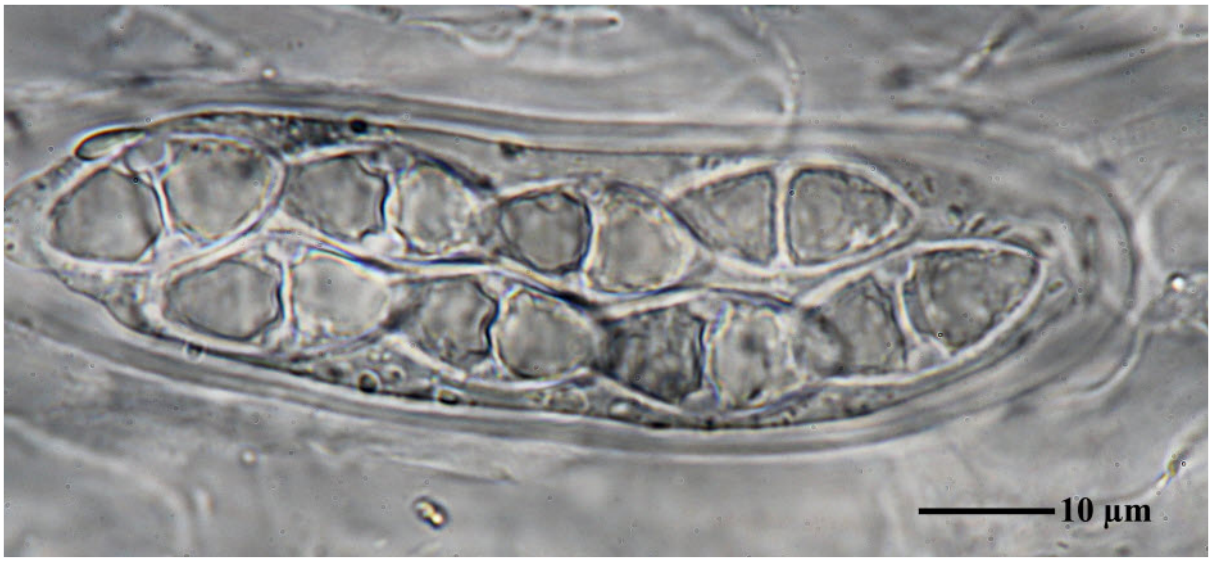


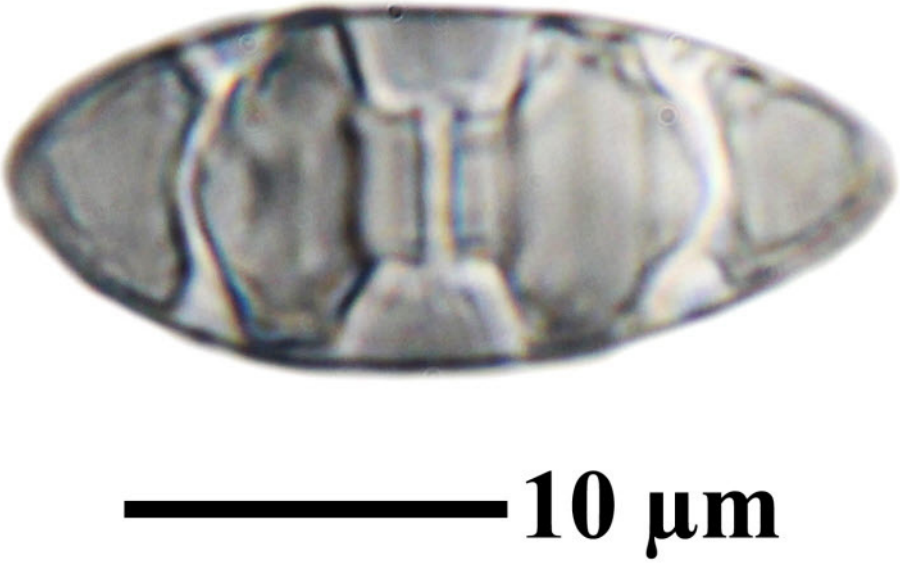


Astrothelium megaeneum



Astrothelium megaeneum





Astrothelium megaeneum

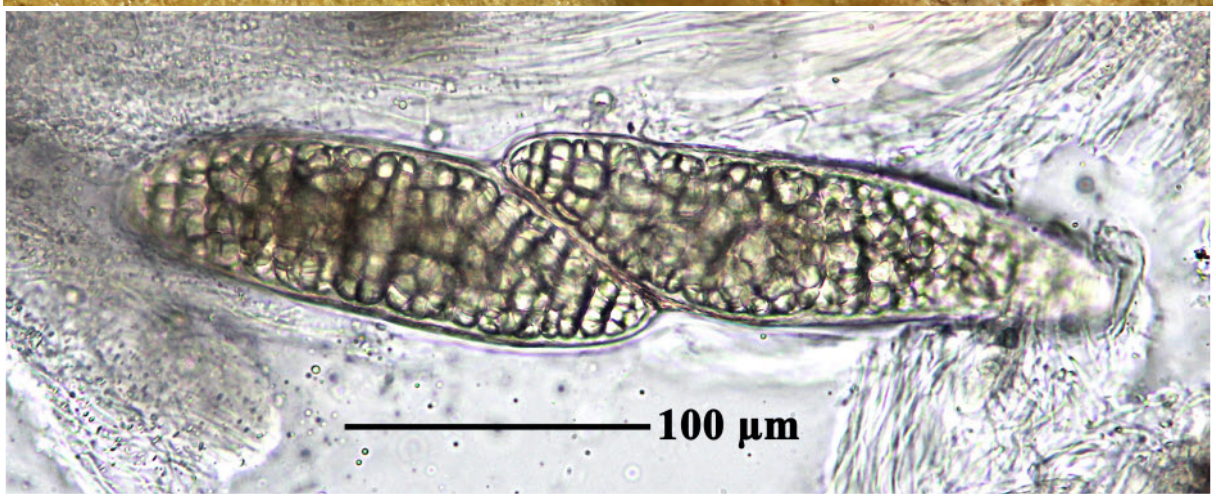
Astrothelium megalostomum (Vain.) Aptroot & Lücking, Lichenologist 48(6): 869 (2016)
= *Campylothelium megalostomum* (Vain.) Aptroot, Fungal Diversity 9: 29 (2002)
= *Cryptothelium megalostomum* (Vain.) Zahlbr., Cat. Lich. Univers. 1: 522 (1922)
= *Heufleria megalostoma* Vain., Acta Soc. Fauna Flora fenn. 7(no. 2): 193 (1890)

Thallus corticate, light olive-green. Ascomata several chambers joined with eccentric, fused ostioles; erumpent, covered by thallus except dark ostiolar area.Hamathecium inspersed. Spores 2/ascus, densely muriform, 170–200 × 50–64 µm, hyaline to light brown, IKI-. Chemistry: thallus UV-, K-; ascomata UV+ yellow, with lichexanthone, K-.

[ABL41334], Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque Natural Caraça near Funil, 1.5 km NW of monastery Santuário do Caraça, 1300 m, 10°06’ S, 43°29’ W, in secondary rain forest on tree. Leg. A. Aptroot (no 41334), 18.-21.09.1997, det. A. Aptroot. TOPOTYPE.



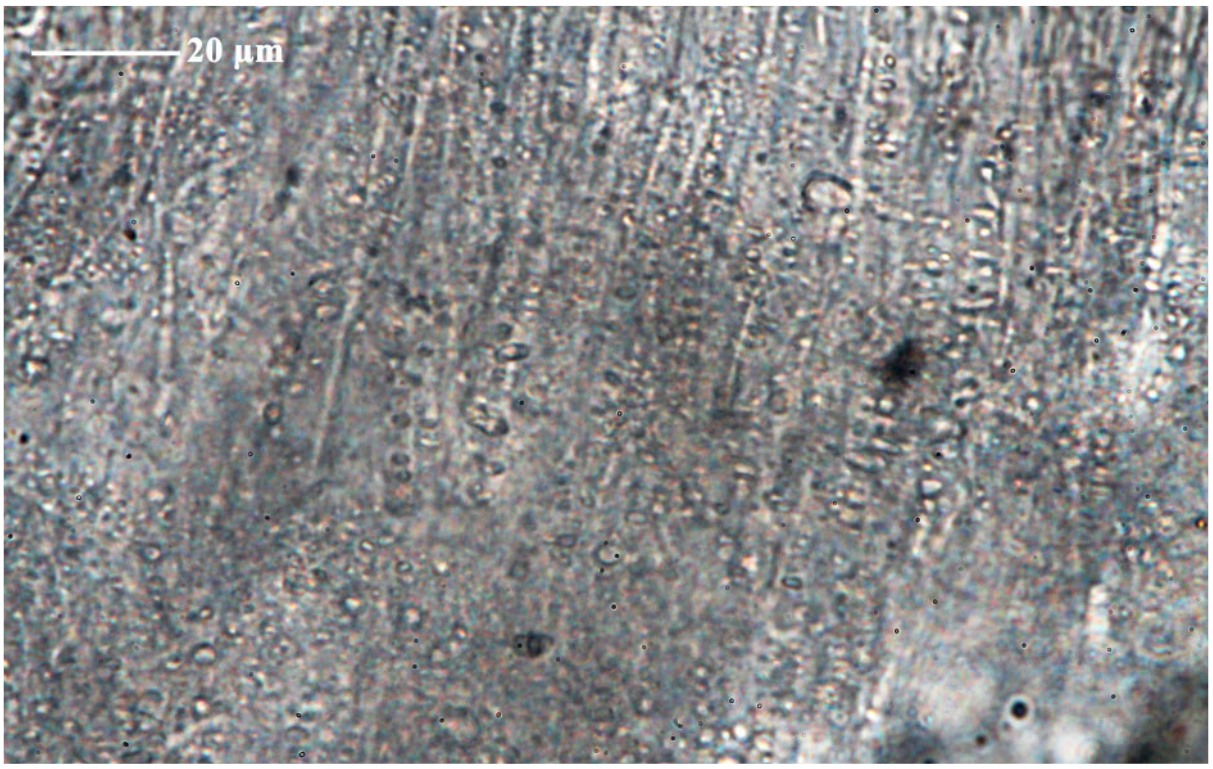






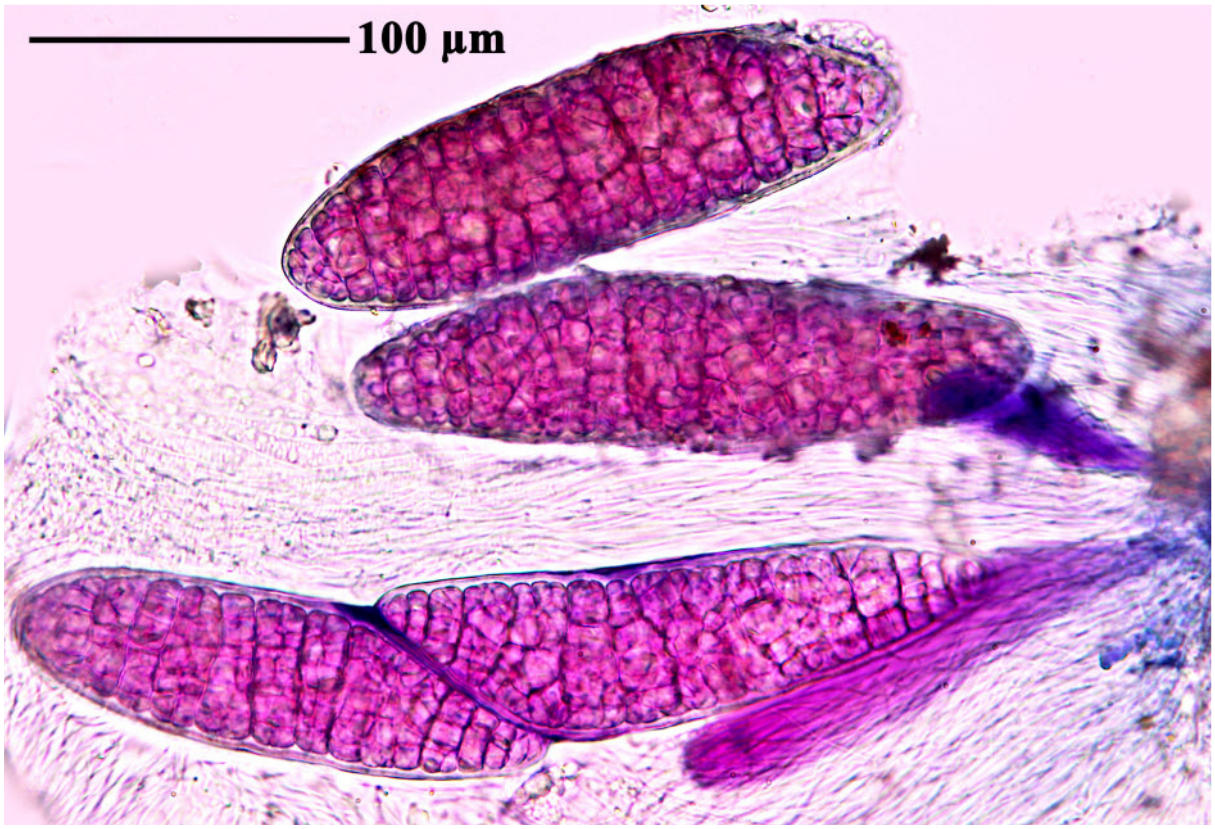
Astrothelium megalostomum

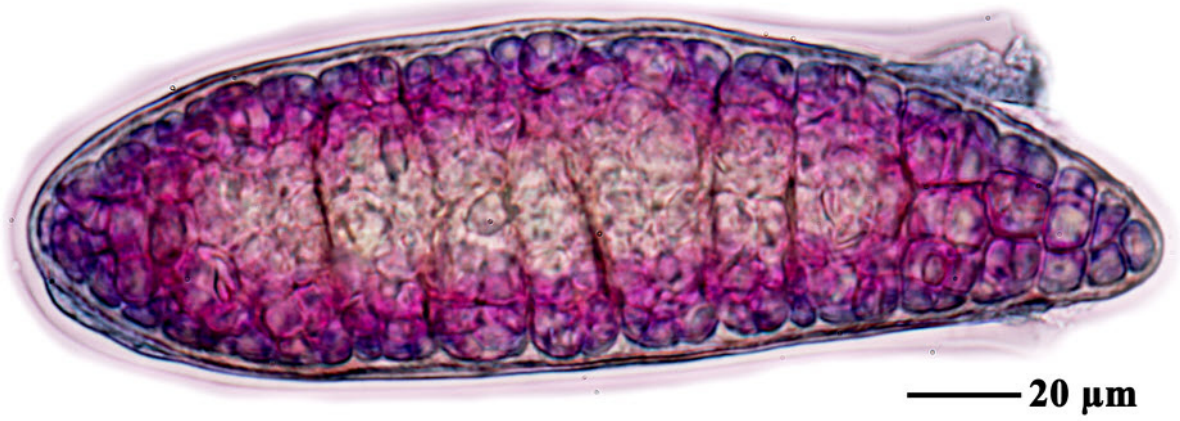






Astrothelium megalostomum





Astrothelium megalostomum

Astrothelium megaspermum (Mont.) Aptroot & Lücking, Lichenologist 48(6): 870 (2016)

= *Bathelium megaspermum* (Mont.) Trevis. (1861)

= *Laurera megasperma* (Mont.) Riddle, Bull. Torrey bot. Club 44(7): 323 (1917)

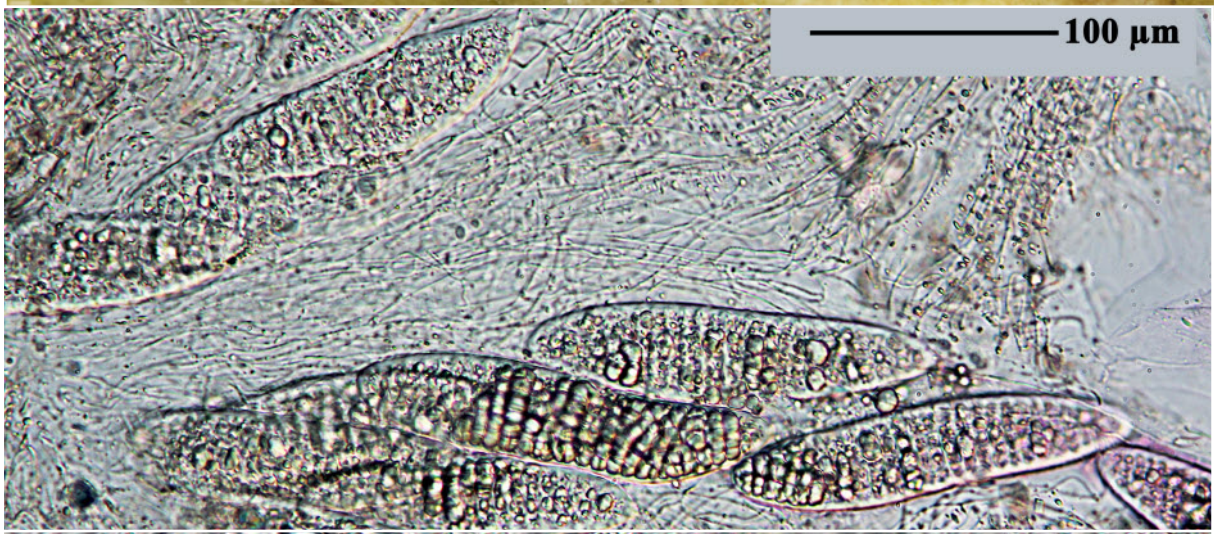
= *Trypethelium megaspermum* Mont., Annls Sci. Nat., Bot., sér. 2 19: 68 (1843)

Thallus corticate, olive-green, smooth to uneven. Ascomata trypetheli-oid, with apical ostioles, solitary, 0.8–1.5 mm diam., prominent, hemsi-pherical with flattened top, covered by thallus except for dark ostiolar area surrounded by whitish rim. Hamathecium inspersed. Ascospores generally 4/ascus, densely muriform, oblong-fusiform, 140–220 × 30–75 µm, without distinctly thickened median septum, hyaline, IKI-. Chemistry: Thallus and ascomata UV-, K-. TLC: no substances detected.

[ABL78777], Brazil, Rio Negrinho, Rio Preto, Fazenda Velha, on tree in temperate rain forest, 26°17’57” S, 49°37’24” W, 800 m. Leg. A. Aptroot (no 78777), 31.03.2019, det. A. Aptroot, 2019.









Astrothelium megaspermum



Astrothelium megaspermum

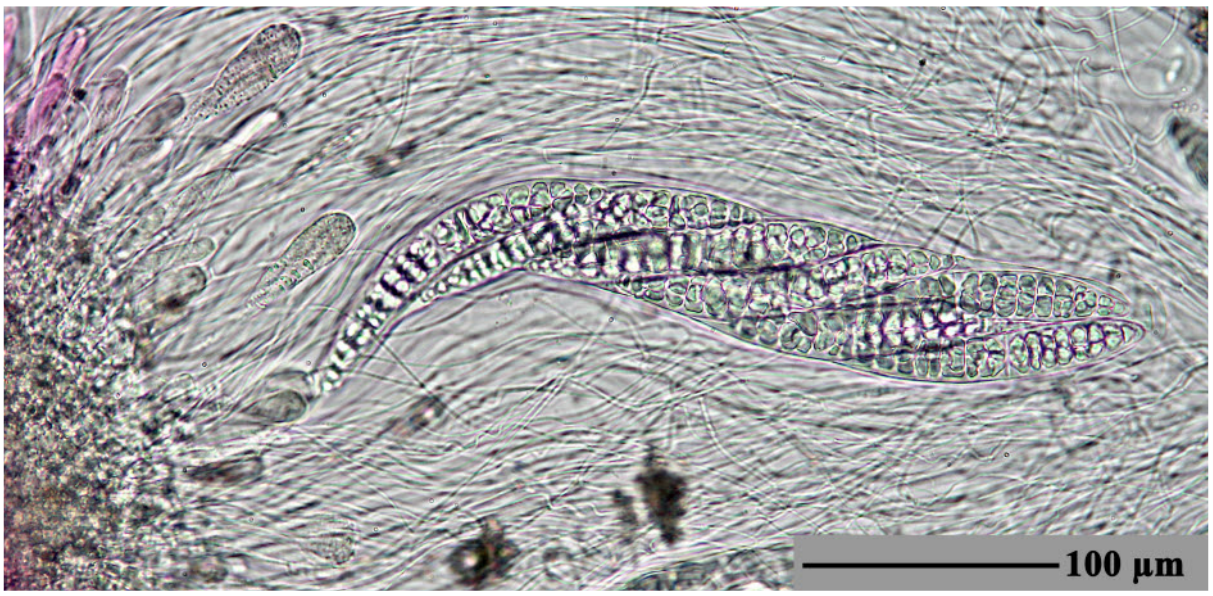
Astrothelium megeustomum Aptroot & C.A.V. Fraga, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 718 (2016)

Thallus corticate, smooth, somewhat shiny, continuous, pale yellowish green, not surrounded by prothallus, not including gall formation of the host bark. Ascomata pyriform, 0.6–1.2 mm diam., mostly aggregated 2–5, mostly immersed in the bark tissue below pseudostromata with a surface not much different from the thallus, and which are distinctly raised above the thallus and mostly irregular in outline, not forming a network. Ostioles eccentric, fused, flat, pale brownish, white pruinose, surrounded by a whitish zone. Hamathecium not inspersed with oil globules. Ascospores hyaline, muriform, fusiform, 8/ascus, 117–125 × 17–21 µm, ends pointed, median septum thickened. Pycnidia not observed. Chemistry: Thallus surface UV-, thallus medulla K-; ostiolar region UV+ yellow. TLC: lichexanthone.

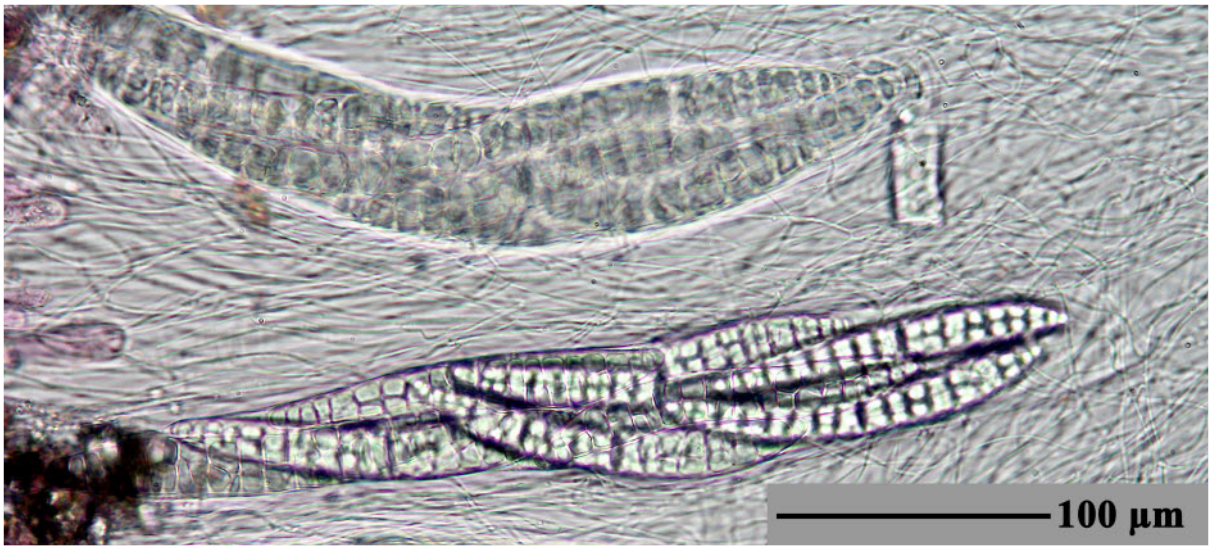
[ABL78779], Brazil, Sao Bento do Sul, CEPA Rugendas, on tree in temperate rain forest. 26°19’24” S, 49°18’26” W, 640 m. Leg. A. Aptroot (no 78779) 1.04.2019, det. A. Aptroot, 2019.

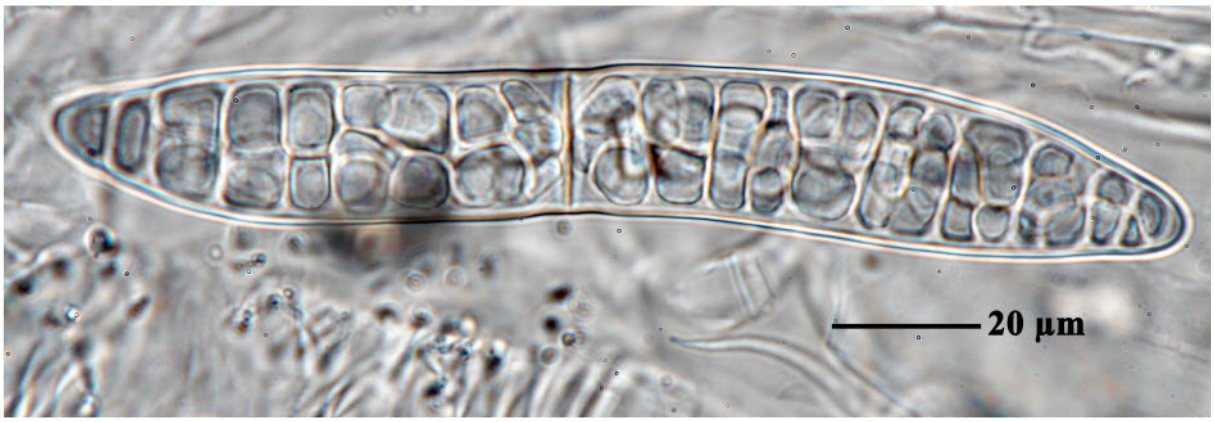


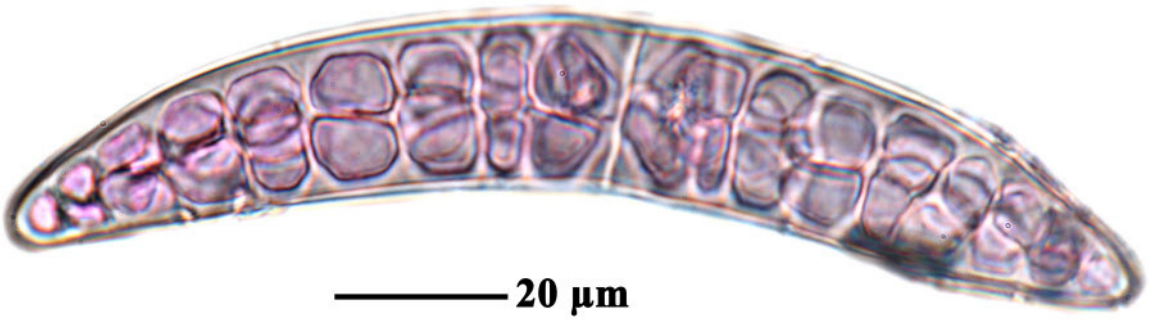




Astrothelium megeustomum







Astrothelium megeustomum

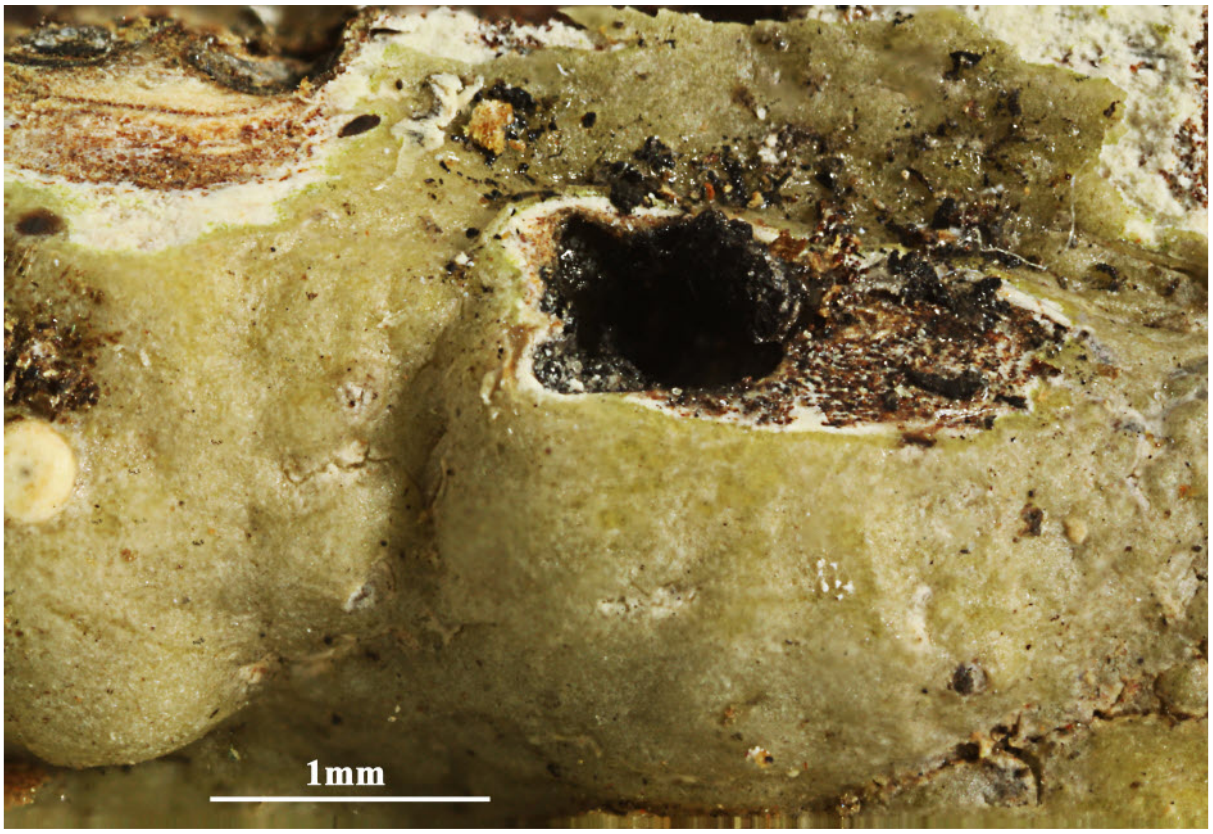
Astrothelium megeustomum Aptroot & C.A.V. Fraga, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 718 (2016)

Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤ 7 cm diam., c. 0.2 mm thick, pale yellowish green, not surrounded by prothallus, not inducing gall formation of the host bark. Ascomata pyriform, c. 0.6–1.2 mm diam., mostly aggregated 2–5, mostly immersed in the bark tissue below pseudostromata with a surface not much different from the thallus, and which are distinctly raised above the thallus and mostly irregular in outline, not forming a network. Wall carbonized, ≤ c. 80 µm thick. Ostioles eccentric, fused, flat, pale brownish, white-pruinose, surrounded by a whitish zone. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, muriform, fusiform, 117–125 × 17–21 µm, ends pointed, surrounded by a gelatinous layer ≤ 10 µm thick, median septum thickened. Pycnidia not observed. Chemistry. Thallus surface UV−, thallus medulla K−; ostiolar region UV+ yellow. TLC: lichexanthone.

[Fraga840], Brazil, Paraná, Guaratuba, Brejatuba, c. 10 m, on tree bark in arboreal restinga, Leg. C.A.V. Fraga Junior (no 840), 8.05.2015, det. A. Apotroot. 2015. ISOTYPE.







Astrothelium megeustomum



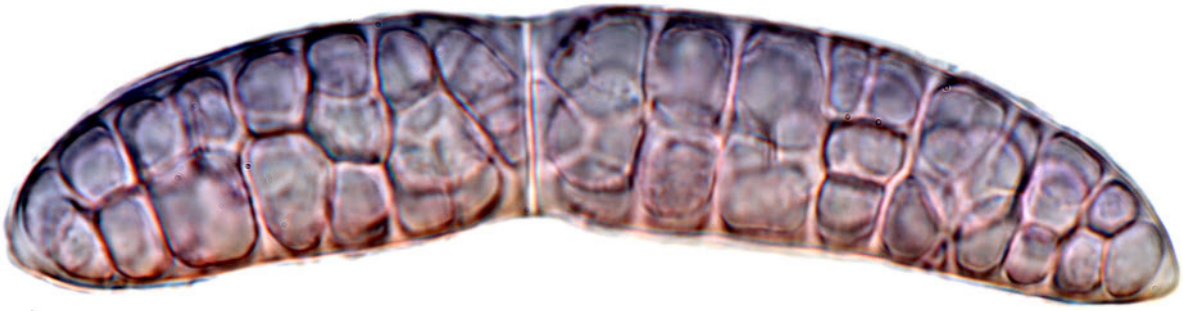




Astrothelium megeustomum





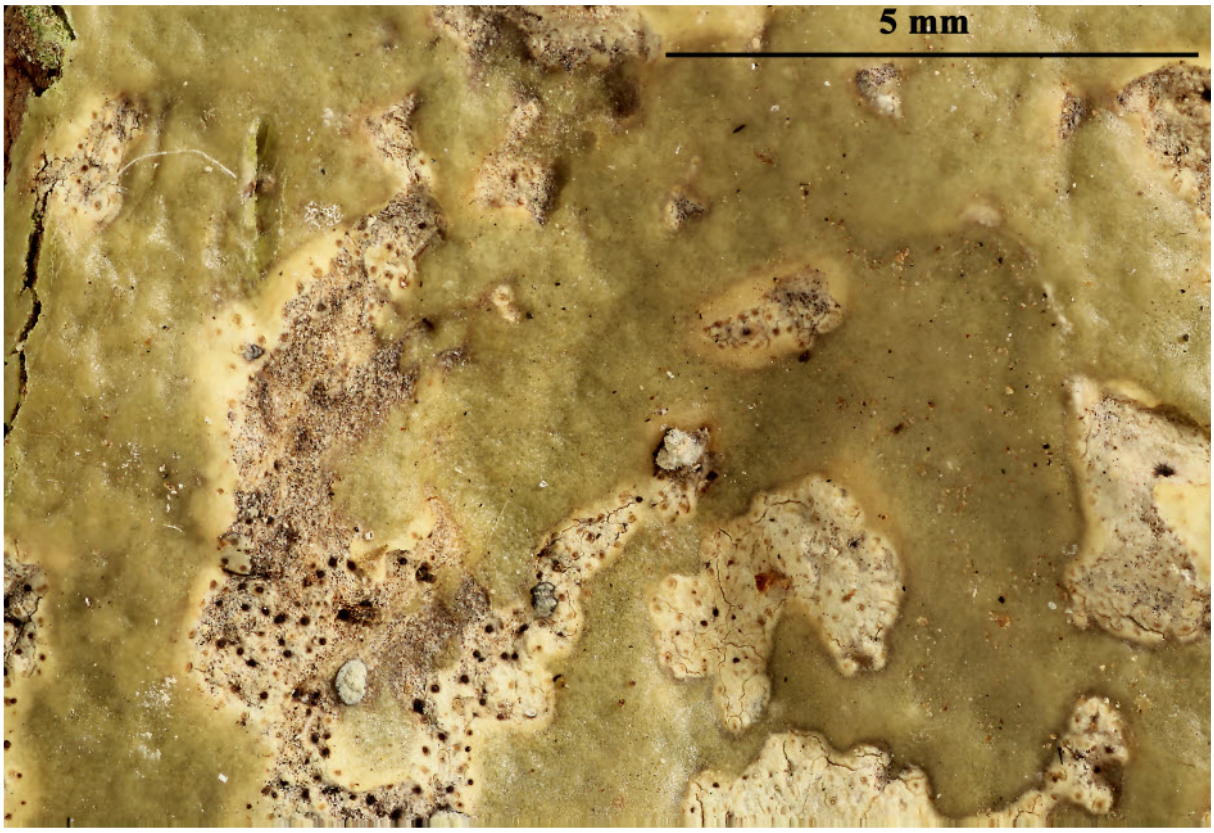


Astrothelium megeustomum

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

Thallus dull, olivaceous green, not surrounded by a prothallus. Ascomata globose to pyriform, 0.5–0.8 mm diam., immersed in and below pseudostromata, in groups of 5–15. Pseudostroma slightly raised to flush with the thallus, c. 1–6 mm diam., irregularly ellipsoid to elongated or branched, occasionally forming a reticulum, ochraceous, internally not pigmented. Ostioles eccentric, fused, often crater-like depressed, black, up to 0.2 mm, surrounded by a c. 0.1 mm wide grey ring. Hamathecium not inspersed, IKI–. Ascospores 4/ascus, hyaline, regularly muriform, 15–17 × 5–9-septate, 95–120 × 30–33 µm, long-ellipsoid, with distinctly thickened median septum, not surrounded by a wide gelatinous sheath. Pycnidia not observed. Chemistry: Thallus UV–, C–, K–, KC–, P–; pseudostroma UV+ yellow, C–, P–, K–. TLC: Pseudostroma with lichexanthone.

[ISE28522], Brazil, Amazonas, Manaus, Reserva Florestal Adolpho Ducke, along trails in vicinity of field station, 80 m, 2°56’ S, 59°57’ W, in primary rain forest on tree bark. Leg. M. Cáceres & A. Aptroot (no ISE 28522), 3–8.06.2016, det. A. Aptroot, 2016. ISOTYPE.

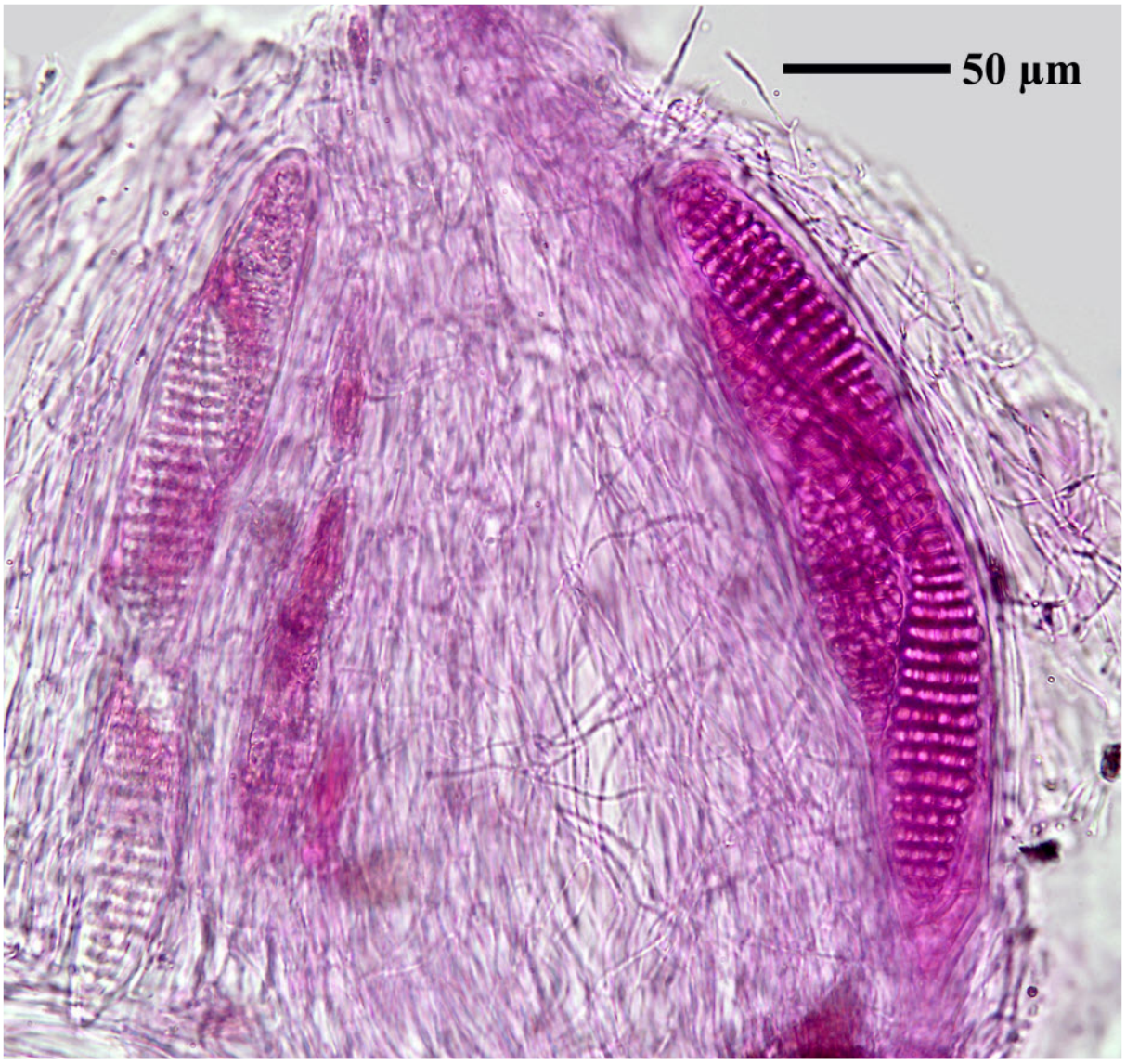




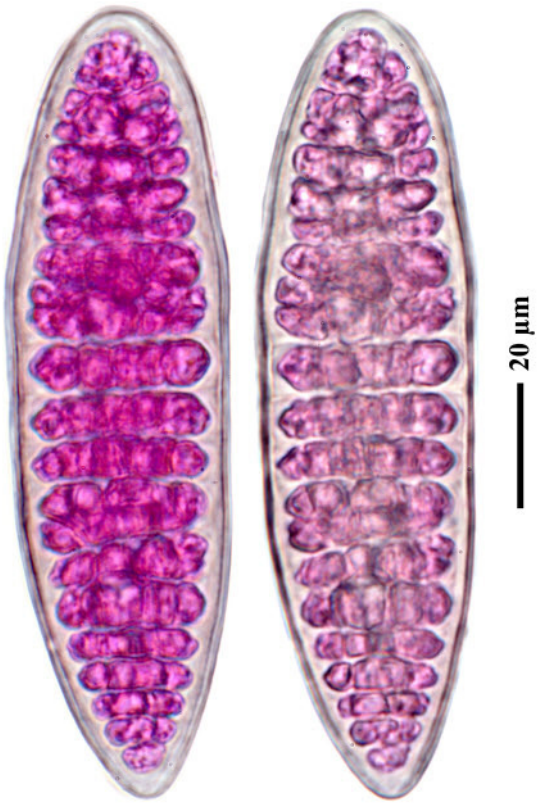
Astrothelium megeustomurale



Astrothelium megeustomurale







Astrothelium megeustomurale

Astrothelium meiophorum (Nyl.) Aptroot & Lücking, Lichenologist 48(6): 870 (2016)

= *Trypethelium annulare var. meiophorum* Nyl., Bull. Soc. linn. Normandie, sér. 2 2: 132 (1868)

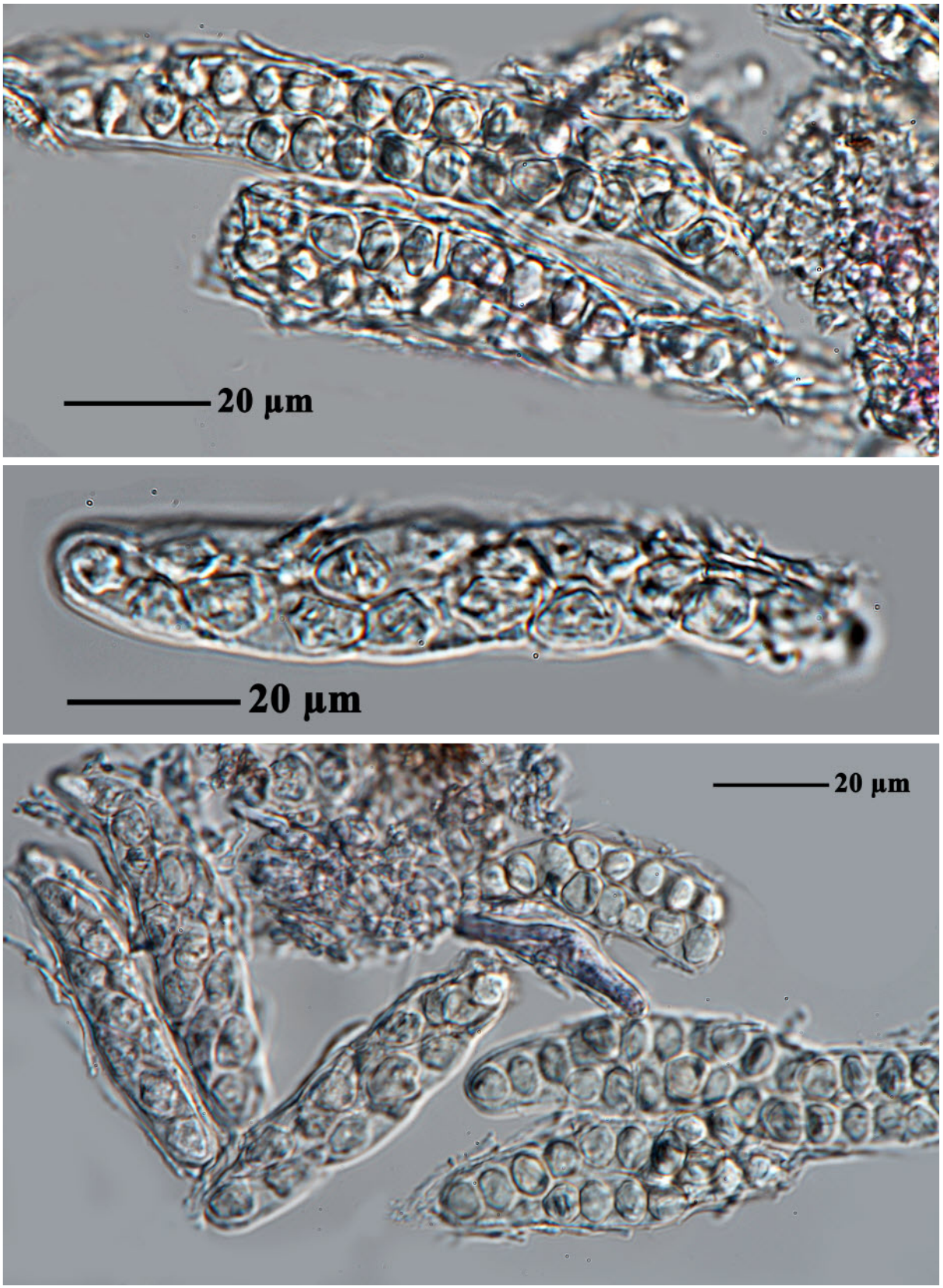
= *Trypethelium meiophorum* (Nyl.) Müll. Arg., Hedwigia 31: 286 (1892)

= *Trypethelium flavoalbum* Makhia & Patw., J.Hattori Bot. Lab 73: 197 (1993)

Thallus corticate, pale olive-green to yellowish. Ascomata irregularly grouped to diffusely pseudostromatic, erumpent, covered by thallus except for broad dark ostiolar area. Hamathecium clear. Spores 3-8/ascus, 3-septate, 20–25 × 7–8 µm, hyaline, IKI-. Chemistry: thallus and ascomata UV-, K-. TLC: no lichen substances detected.

[AMH86697], India, Megahalya, near Sohararim. Leg. Patwardhan & Nagakar (AMH86697), 20.10.1977. Part of the HOLOTYPE of *Trypethelium flavoalbum*.

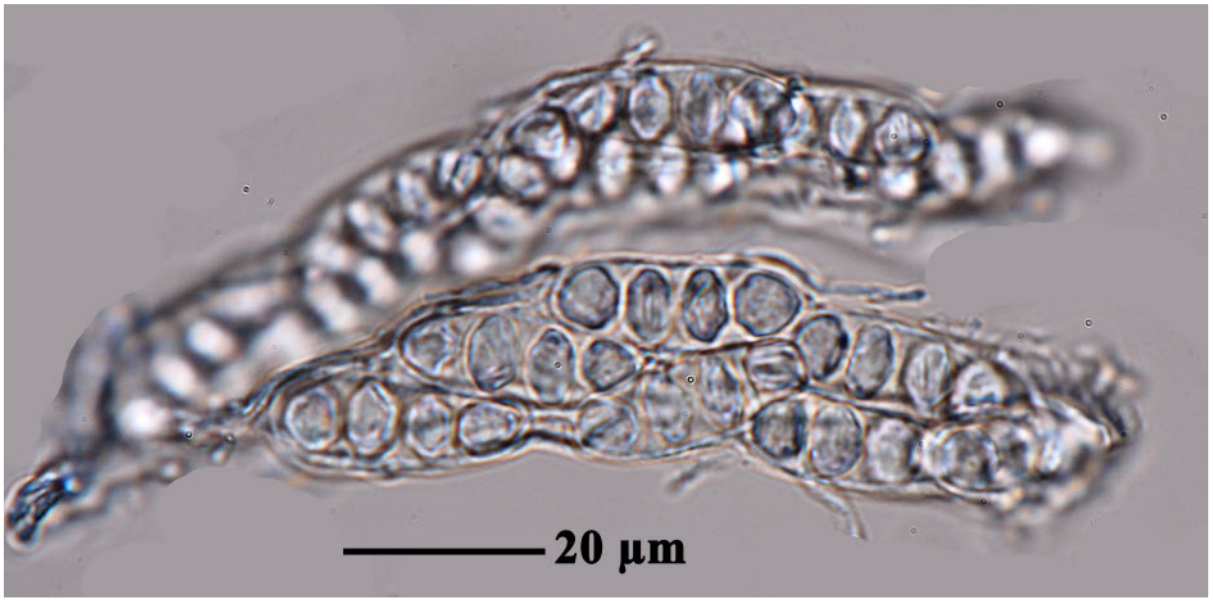


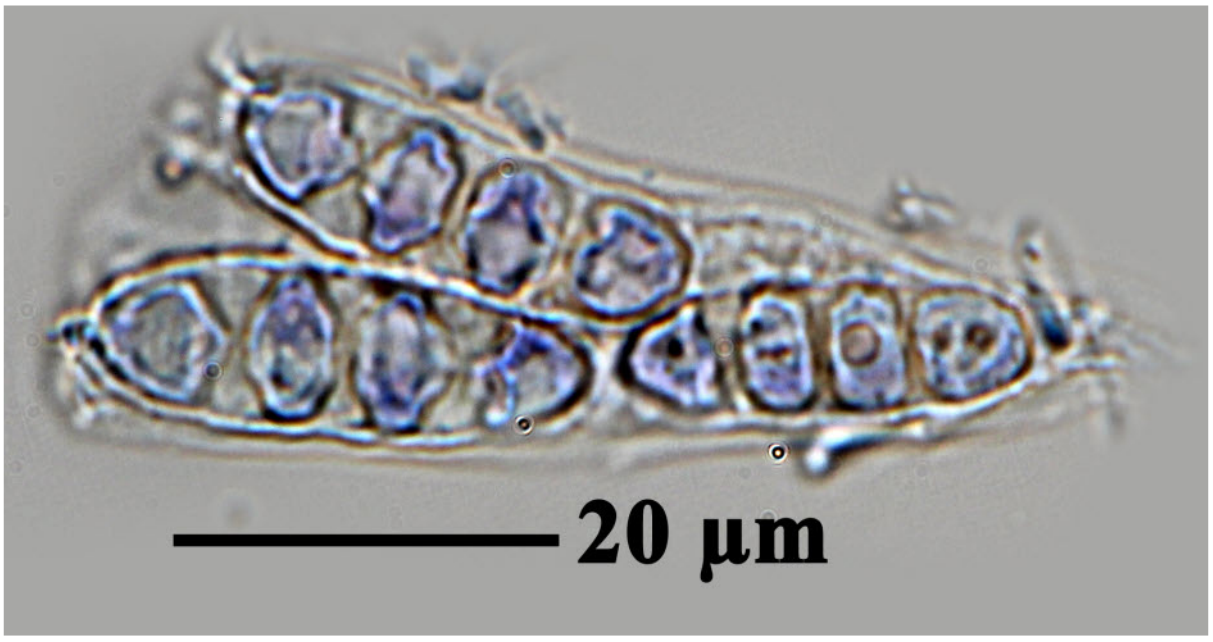


Astrothelium meiophorum



20 µm





Astrothelium meiophorum



Astrothelium meiophorum





Astrothelium meiophorum

Astrothelium meiophorum (Nyl.) Aptroot & Lücking, Lichenologist 48(6): 870 (2016)

= *Trypethelium annulare var. meiophorum* Nyl., Bull. Soc. linn. Normandie, sér. 2 2: 132 (1868)

= *Trypethelium meiophorum* (Nyl.) Müll. Arg., Hedwigia 31: 286 (1892)

= *Trypethelium flavoalbum* Makhia & Patw., J. Hattori Bot. Lab 73:197 (1993)

= *Trypethelium parvicarpum* Makhia & Patw. , J. Hattori Bot. Lab. 73:205 (1993)

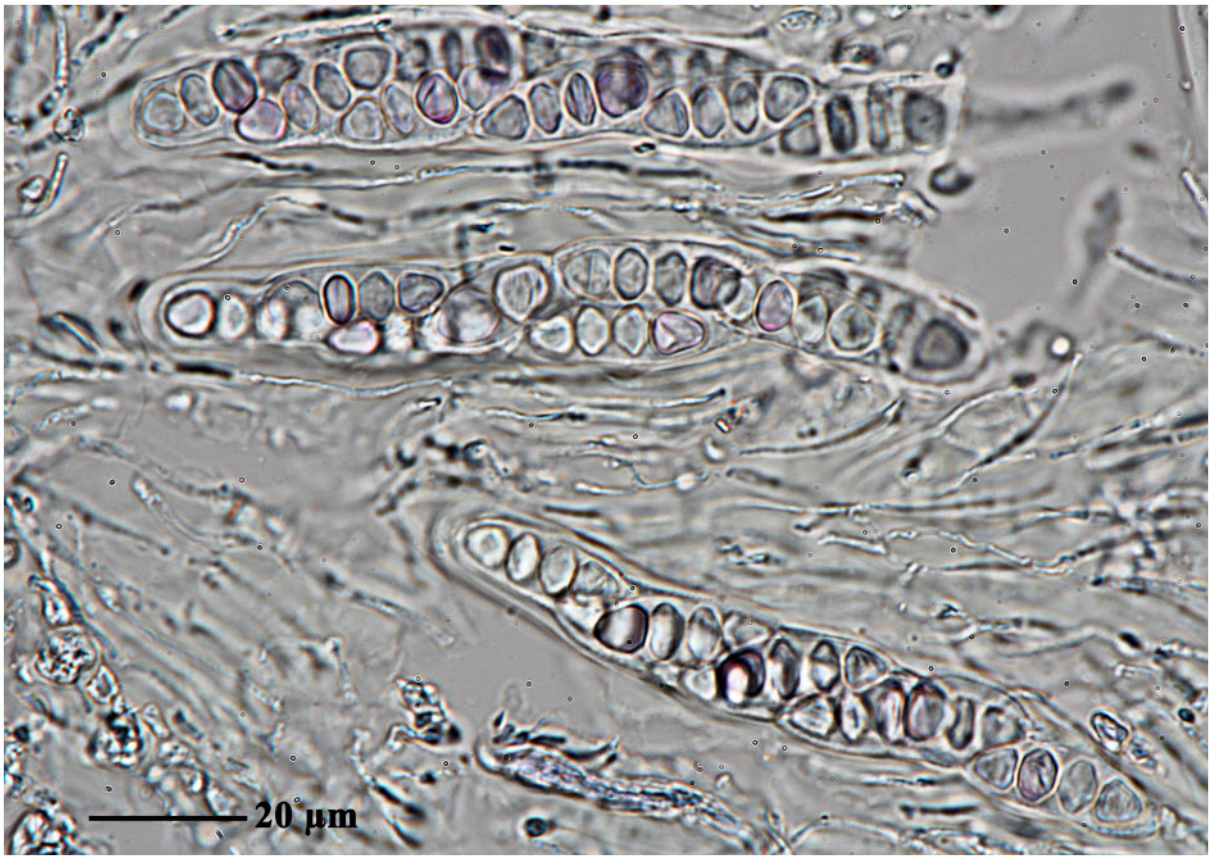
Thallus corticate, pale olive-green to yellowish. Ascomata irregularly grouped to diffusely pseudostromatic, erumpent, covered by thallus except for broad dark ostiolar area. Hamathecium clear. Spores 3–8/ascus, 3-septate, 20–25 × 7–8 µm, hyaline, IKI-. Chemistry: thallus and ascomata UV-, K-. TLC: no lichen substances detected.

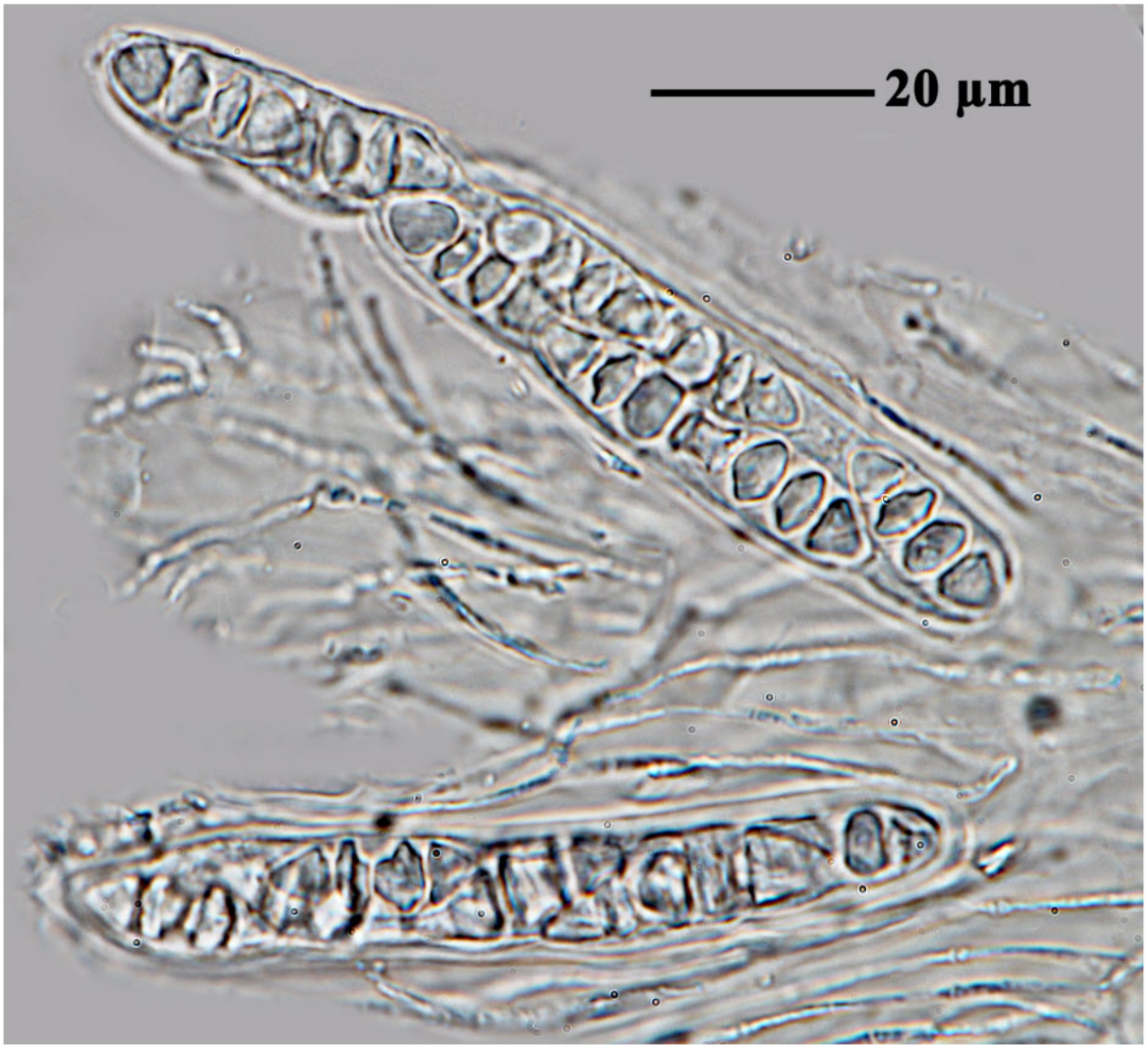
[AMH87389], India, Nicobar Islands, Kamorta, Daring. Leg. Nagarkar & Patwardhan, (AMH87389), 18.01.1987. Part of the HOLOTYPE of *Trypethelium parvicarpum*.



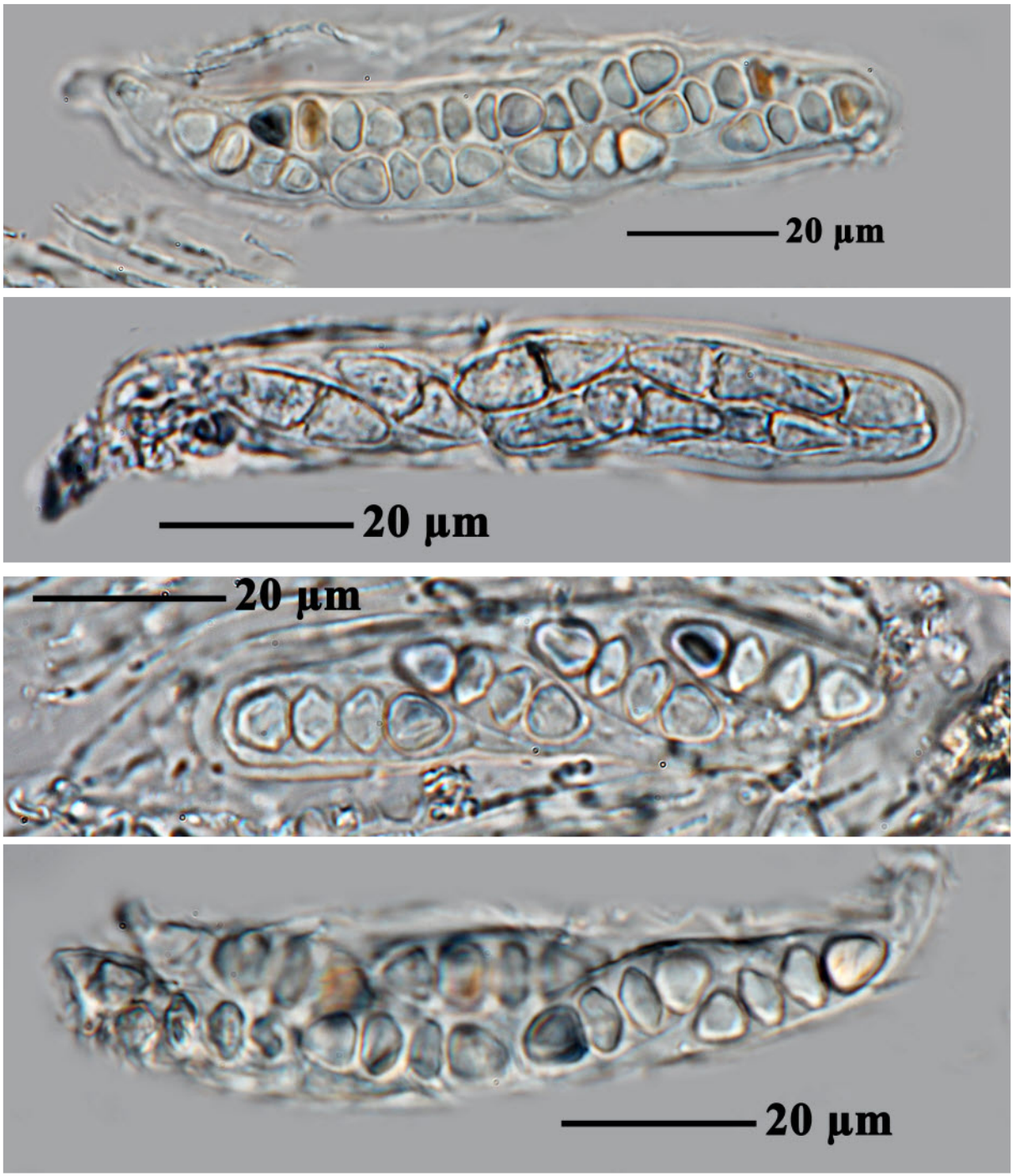


Astrothelium meiophorum





Astrothelium meiophorum



Astrothelium meiophorum

Astrothelium meristosporoides (P.M. McCarthy & Vongshew.) Aptroot & Lücking, Lichenologist 48(6): 871 (2016)

= *Laurera meristosporoides* P.M. McCarthy & Vongshew., in Vongshewarat, McCarthy, Mongkolsuk & Boonpragob, Mycotaxon 70: 228 (1999)

Thallus corticate, light greenish yellow, smooth to uneven. Ascomata with apical ostioles, solitary to irregularly confluent, prominent, whitish and black ostiolar area, 0.7–1.5 mm diam. Hamathecium inspersed. Spores 8/ascus, muriform, 68–120 × 18–24 µm, with somewhat thickened median septum, hyaline, IKI-. Chemistry: thallus and ascomata UV+ yellow, K-, lichexanthone.

[ABL19135], Papua New Guinea, Central prov., Varirata National Park, 20 km E of Port Moresby, 800 m, 147°22’ E, 9°27’ S. On tree in secondary tropical forest. Leg. A. Aptroot (no 19135), 03.1987, det. A. Aptroot.





Astrothelium meristosporoides

Astrothelium meristosporum (Mont. & Bosch) Aptroot & Lücking, Lichenologist 48(6): 871 (2016)

= *Laurera meristospora* (Mont. & Bosch) Zahlbr., Cat. Lich. Univers. 1: 505 (1922)

= *Trypethelium meristosporum* Mont. & Bosch, in Miquel, Pl. Jungh. 4: 487 (1856)

= *Laurera andamanica* D.D. Awasthi. Biblioth.Lichenol. 40: 3 (1991)

= *Laurera indica* Makhjia & Patw., Mycotaxon 31: 578 (1988) non Upreti & A. Singh (1987)

= *Laurera columellata* Makhjia & Patw., Mycotaxon 31: 574 (1988)

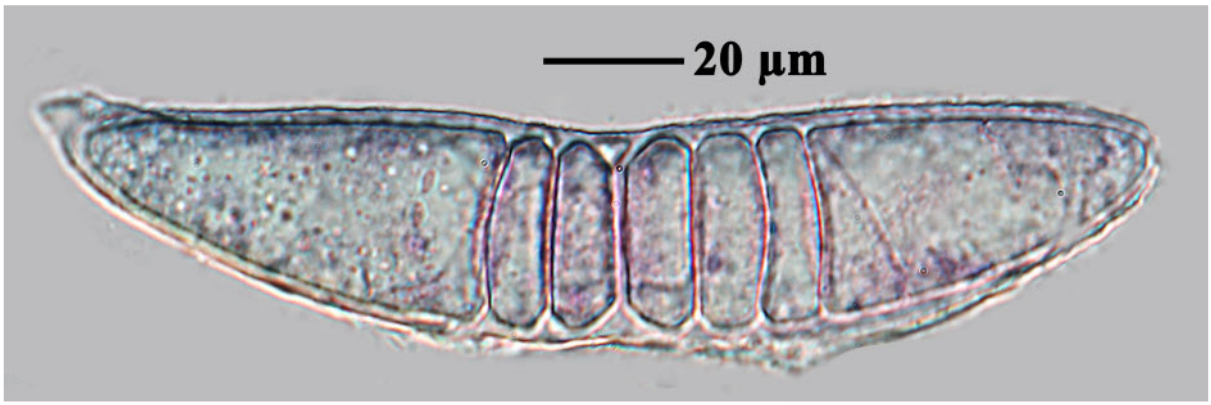
Thallus corticate, pale olive-green, uneven to verrucose. Ascomata with apical ostioles, 1–1.5 mm diam, prominent, hemispherical, with flattened top, covered by thallus except whitish to greyish ostiolar area, 0.7–2 mm diam. Hamathecium hyaline or slightly yellowish, inspersed. Spores (4–)8/ascus, muriform, 120–220 × 25–40 µm constricted at the markedly thickened median septum, hyaline, IKI-. Chemistry: thallus and pseudostromata UV+ yellow, K-, with lichexanthone.

[AMH7859], India, Karnataka, S. Kanara, Hiriyadaka, Udupi-Hebri Road. Leg. Patwardhan (AMH7859), 22.02.1978. ISOTYPE of *Laurera columellata.*



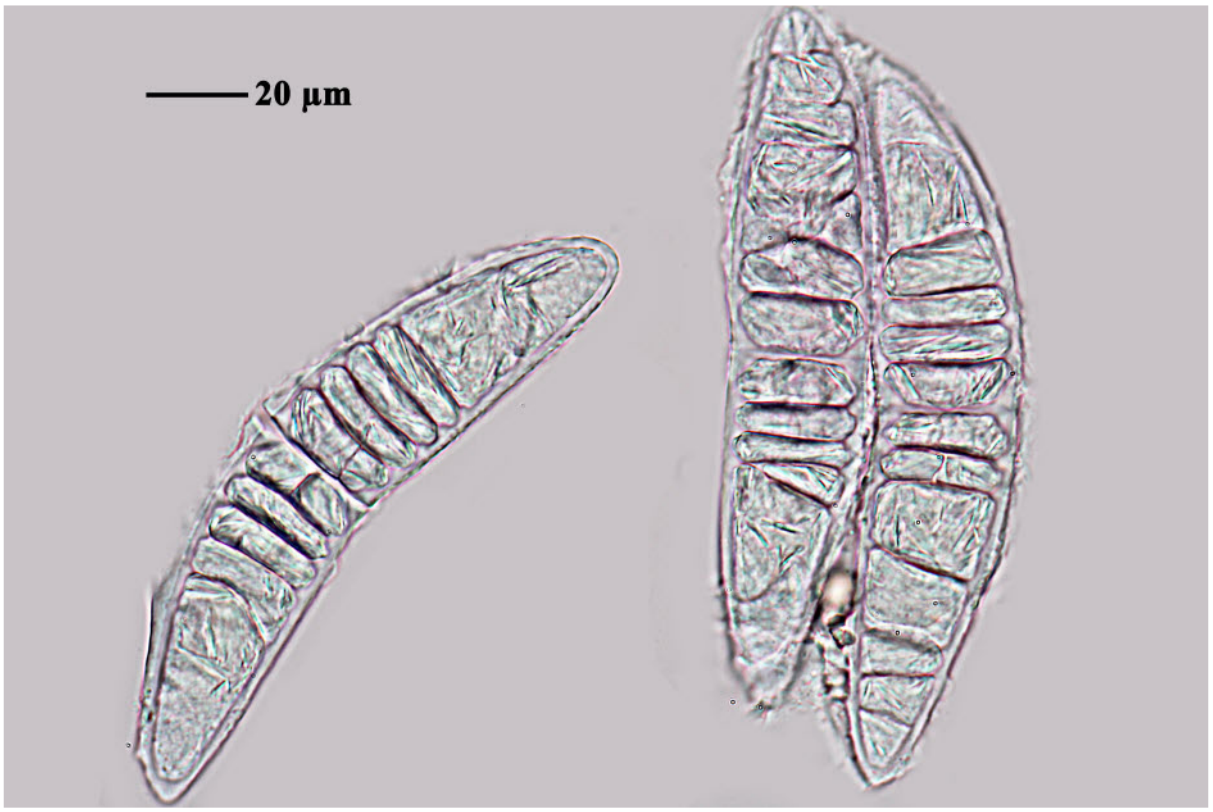


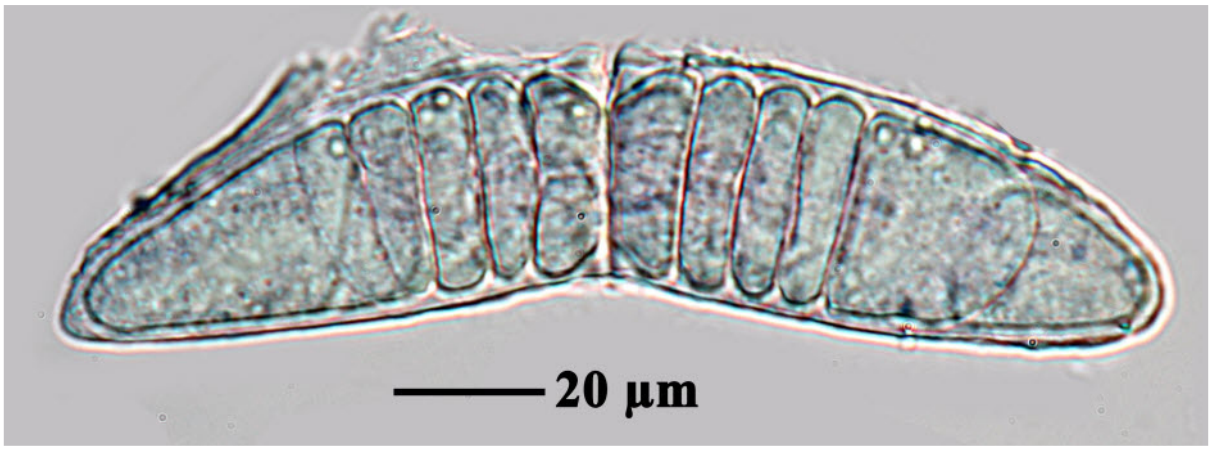




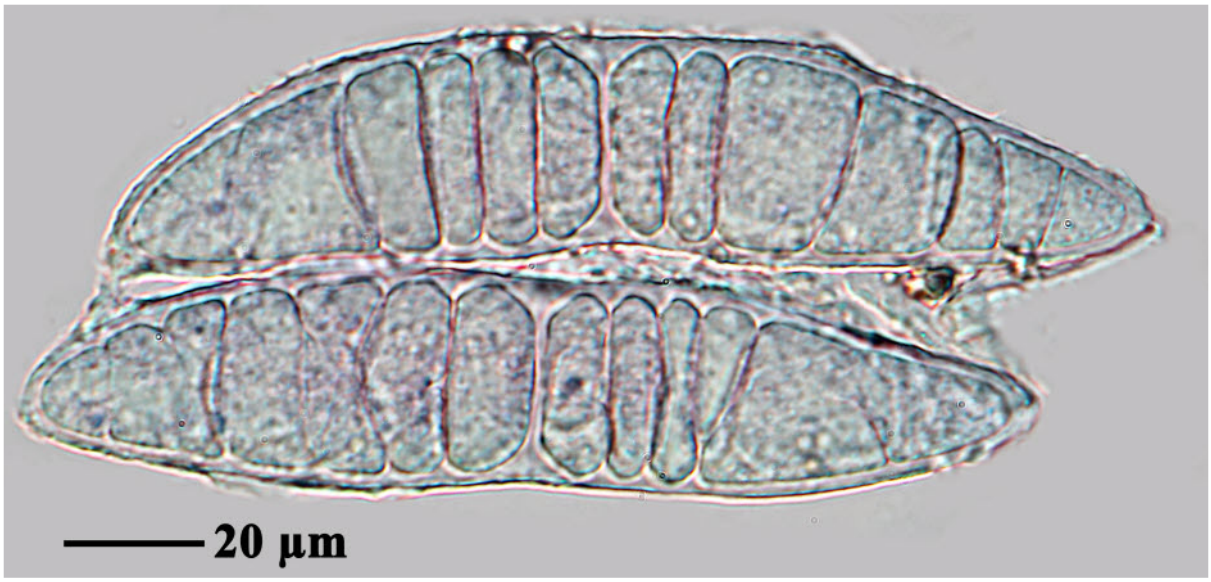
Astrothelium meristosporum

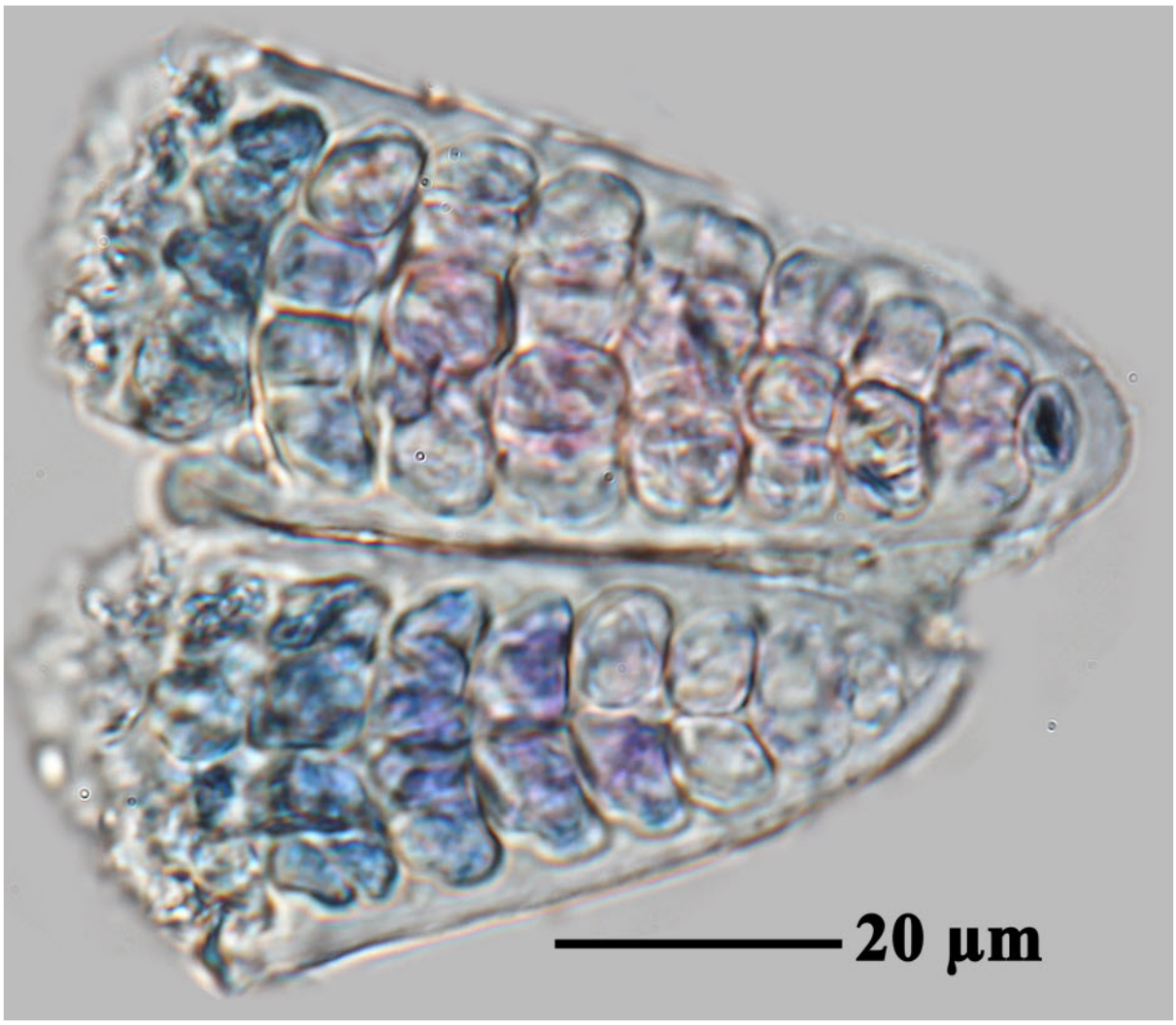






Astrothelium meristosporum





Astrothelium meristosporum

Astrothelium meristosporum (Mont. & Bosch) Aptroot & Lücking, Lichenologist 48(6): 871 (2016)

= *Laurera meristospora* (Mont. & Bosch) Zahlbr., Cat. Lich. Univers. 1: 505 (1922)

= *Trypethelium meristosporum* Mont. & Bosch, in Miquel, Pl. Jungh. 4: 487 (1856)

= *Laurera andamanica* D.D. Awasthi. Biblioth.Lichenol. 40: 3 (1991)

= *Laurera indica* Makhija & Patw., Mycotaxon 31: 578 (1988) non Upreti & A. Singh (1987)

Thallus corticate, pale olive-green, uneven to verrucose. Ascomata with apical ostioles, 1–1.5 mm diam, prominent, hemispherical, with flattened top, covered by thallus except whitish to greyish ostiolar area, 0.7–2 mm diam. Hamathecium hyaline or slightly yellowish, inspersed. Spores (4–)8/ascus, muriform, 120–220 × 25–40 µm constricted at the markedly thickened median septum, hyaline.IKI-. Chemistry: thallus and pseudostromata UV+ yellow, K-, with lichexanthone.

[AMH85656], India, Andaman Islands, South Andaman, Baratang Islands, Bishnu Nala. Leg. Patwardhan & Sethy (AMH85656), 22.02.1985. ISOTYPE of *Laurera andamanica.*





Astrothelium meristosporum

Astrothelium mesoduplex Aptroot & M. Cáceres, Lichenologist 48(6): 702 (2016)

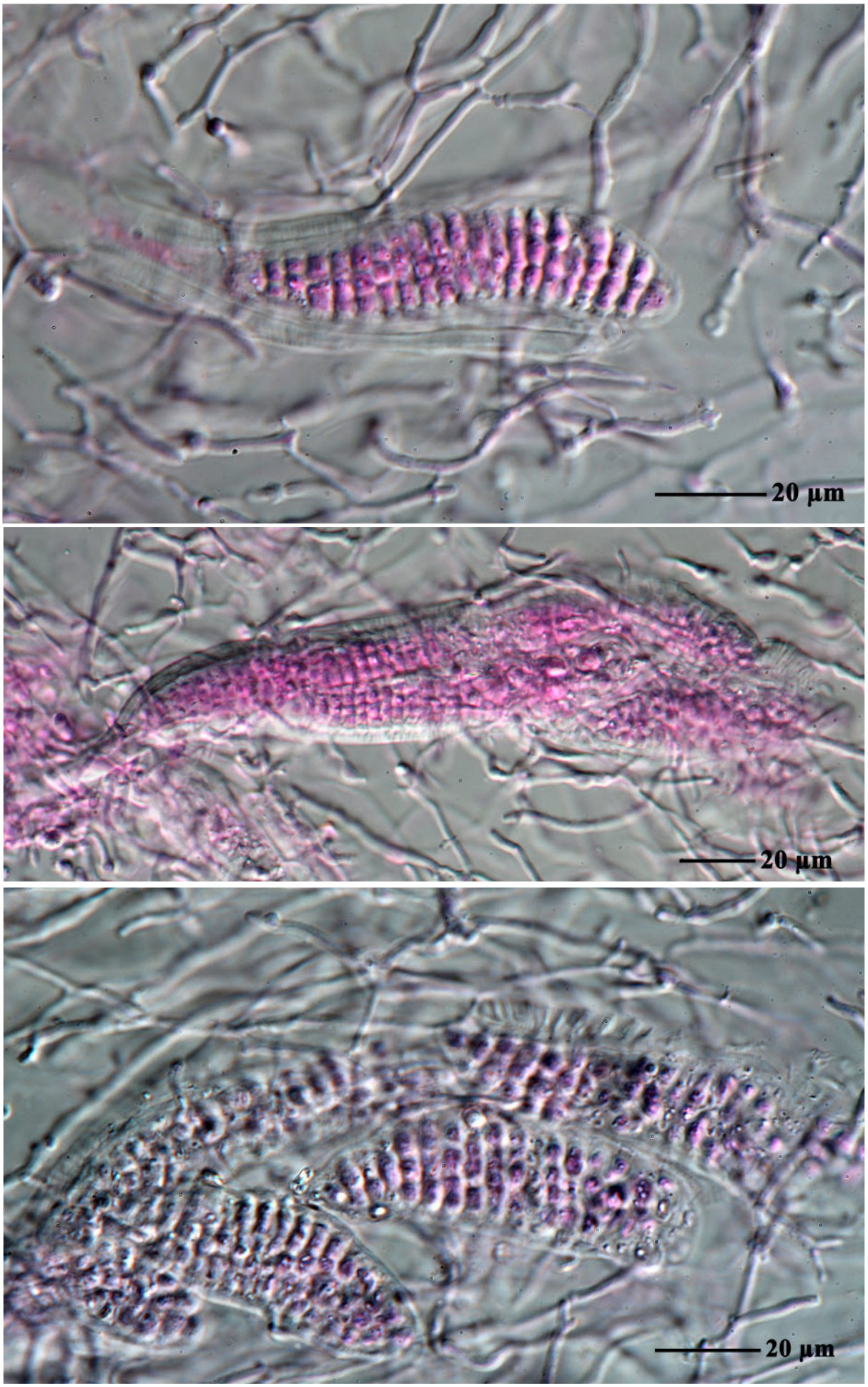
Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤ 8 cm diam., c. 0.1 mm thick, olive-green, surrounded by a black prothallus line c. 0.2 mm wide, not inducing gall formation of the host bark. Ascomata globose, 0.4–0.6 mm diam., immersed in groups of c. 3–50 in pseudostromata. Pseudostromata with a surface different from the thallus, c. 1 mm raised above the thallus, oval to irregular in outline, ≤ c. 3 mm wide, yellow to orange, pale yellow inside. Wall dark brown all around, ≤ c. 40 µm thick. Ostioles apical, not fused, flat to convex, brown. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, muriform with c. 22–30 transverse septa, fusiform to clavate, 90–100 × 20–23 µm, ends rounded, lumina angular with mostly oblique septa, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry. Thallus surface UV−, thallus medulla K−; pseudostroma surface and medulla UV+ red, K+ blood red. TLC: an anthraquinone, probably parietin.

[ABL15559], Brazil, Rondônia, Porto Velho, Parque Natural Municipal de Porto Velho, 8°41'10" S, 63°52'05" W, c. 100 m, on twig in primary rainforest, Leg. M. Cáceres & A. Aptroot (no 15559), 10.11.2012, det. A. Aptroot. ISOTYPE.





Astrothelium mesoduplex



Astrothelium mesoduplex



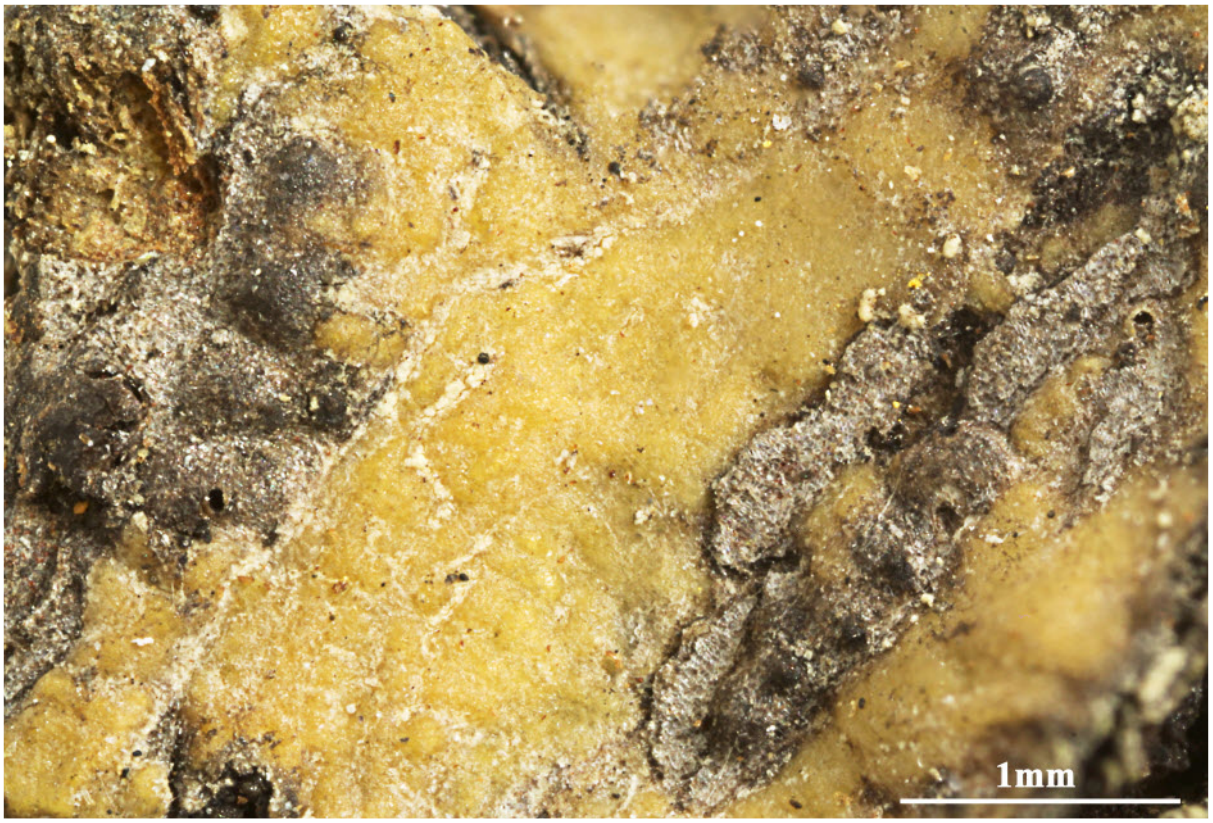
Astrothelium mesoduplex

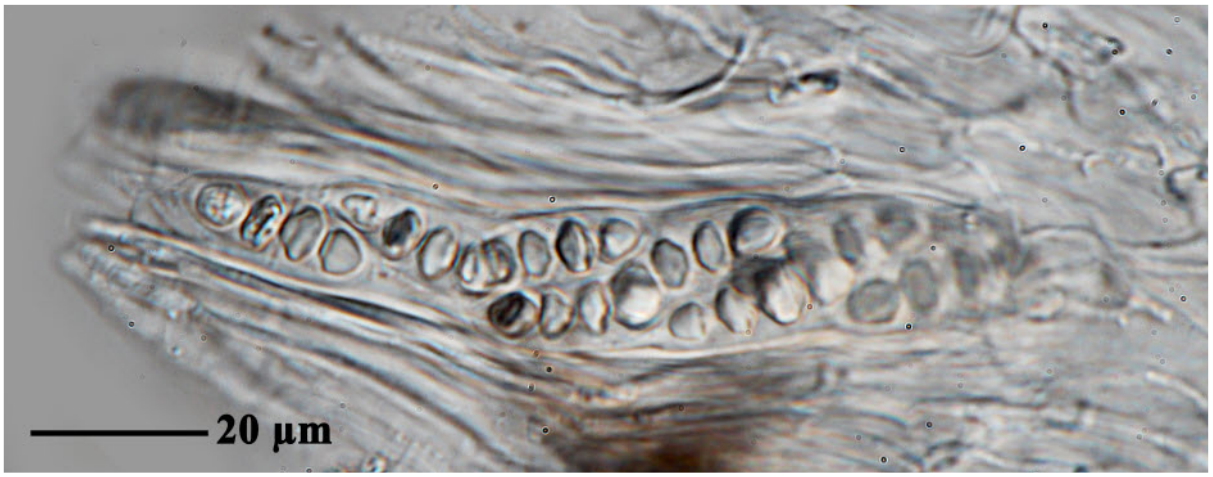
Astrothelium nigratum (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 872 (2016)
= *Astrothelium minus* var. *nigratum* Müll. Arg., Bot. Jb. 6: 382 (1885)

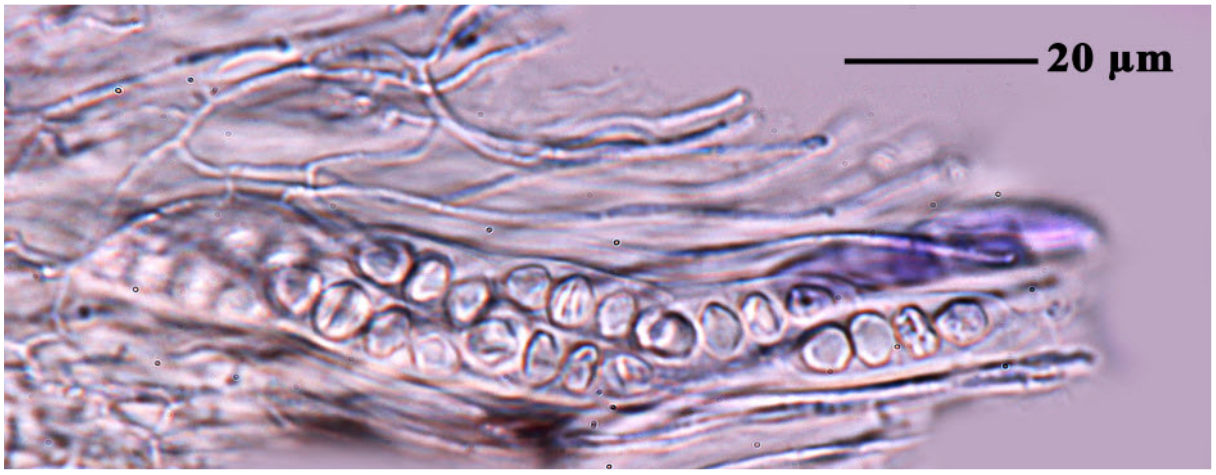
Thallus corticate, olive-brown, smooth to uneven. Ascomata with apical ostioles, 0.2–0.3 mm diam, immersed-erumpent. Hamathecium clear. Spores 8/ascus, 3-septate, 20–27 × 7–10 µm, hyaline, IKI-. Chemistry: thallus and pseudostromata UV-, K-. TLC: no lichen substances detected.

[ABL25753], U.S.A., Puerto Rico, Distr. Mayaguez, Reserva forestal Maricao, N of Sabana Grande, along road 120, km 16-17, on tree in low mountain forest on dry serpentine, 800 m, 19°09’ N, 66°59’ W. Leg. A. Aptroot (no 25753), 21.-31.05.1989, det. A. Aptroot 1989.

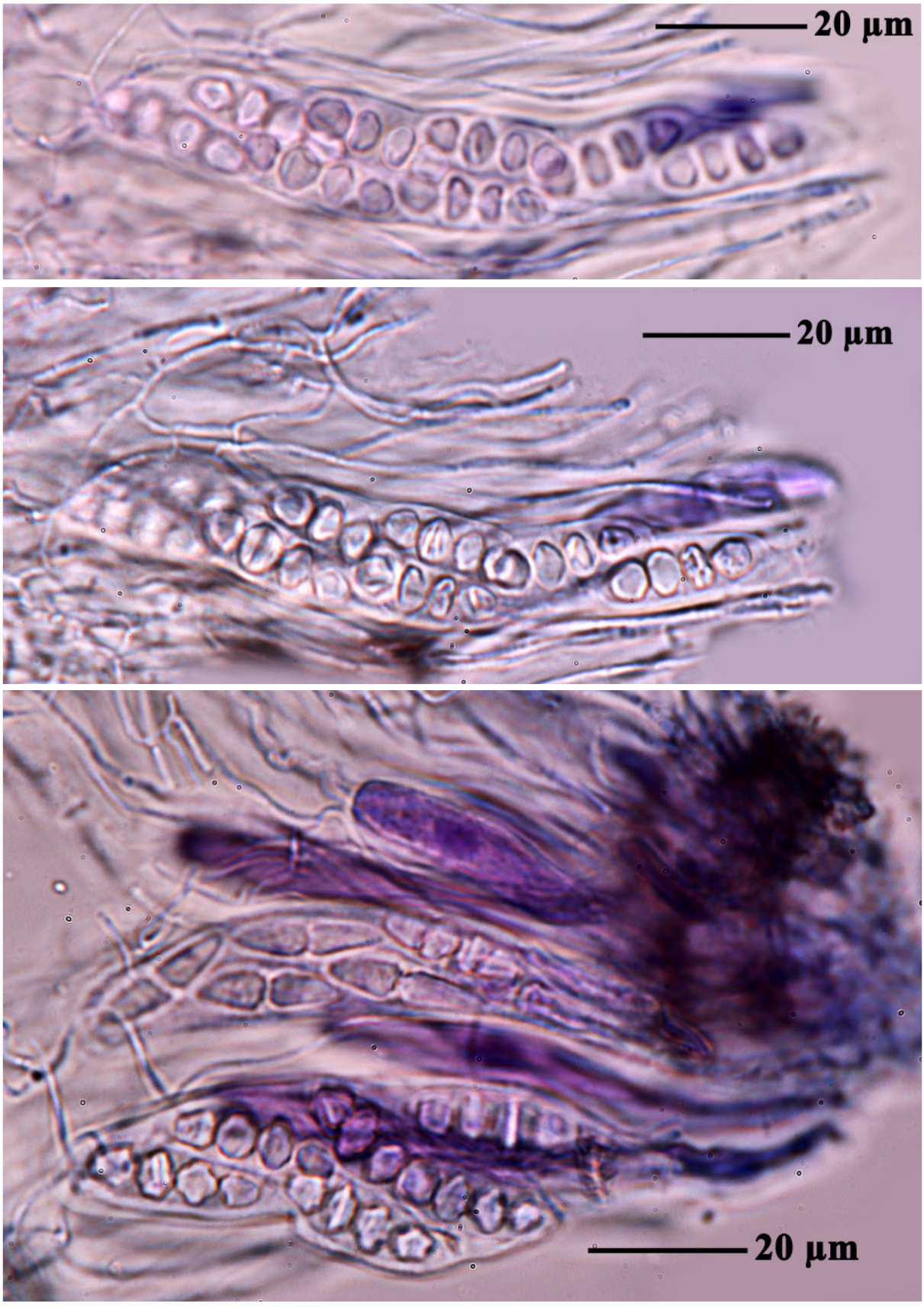






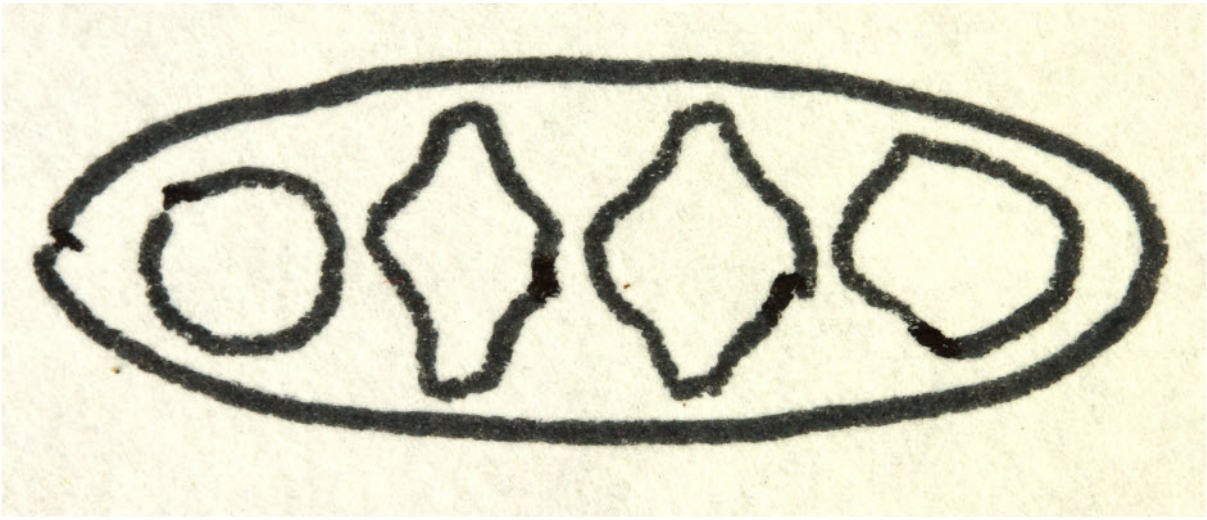


Astrothelium nigratum



Astrothelium nigratum





Astrothelium nigratum

Astrothelium nigrorufum (Makhija & Patw.) Aptroot & Lücking, Lichenologist 48(6): 873 (2016)

= *Trypethelium nigrorufum* Makhija & Patw., J. Hattori bot. Lab. 73: 203 (1993)

Thallus corticate, olive-brown to yellowish. Ascomata with apical ostioles, pseudostromatic; pseudostromata 1–2 mm broad, immersed–erumpent, exposed and brown-black, internally with yellow-orange. K+ purple pigment. Hamathecium clear. Ascospores 8/ascus, 9–13-septate, fusiform,29–35(–46) × 7–9 µm, IKI-. Chemistry: thallus UV-, K-; pseudostromata UV-, internally K+ purple, with anthraquinone.

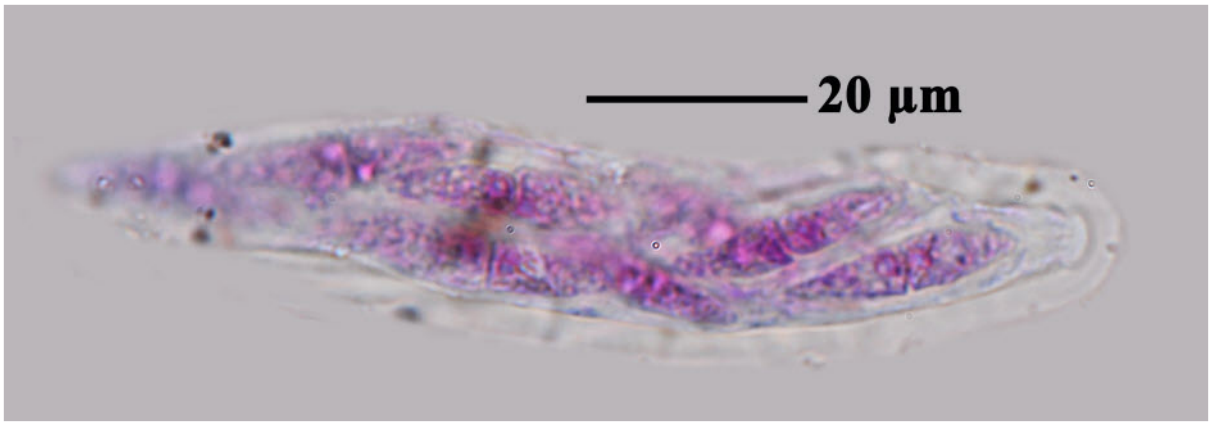
[AMH85845], India, Andaman Islands, Baratang. Leg. Padwardhan & Sethy (AMH85845), 23.02.1985. ISOTYPE of *Trypethelium nigrorufum*.

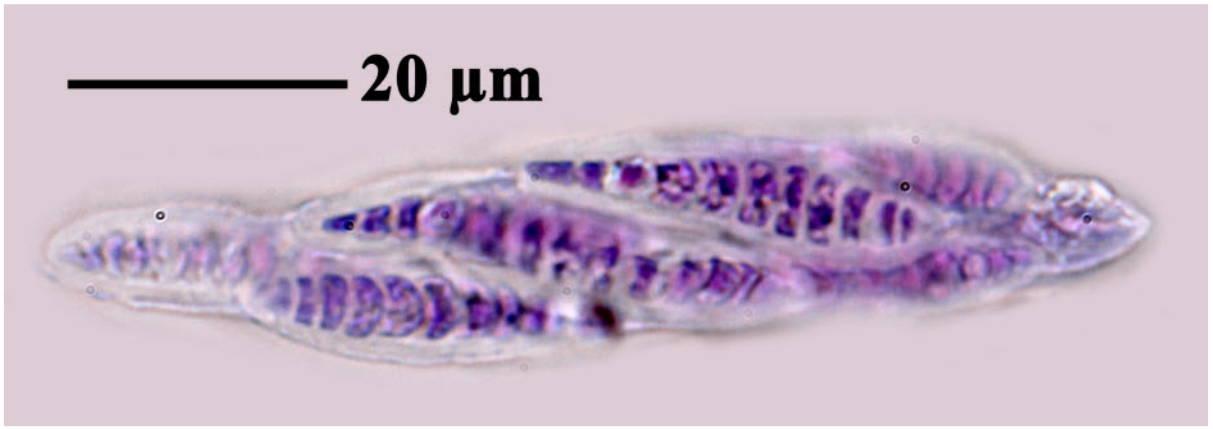


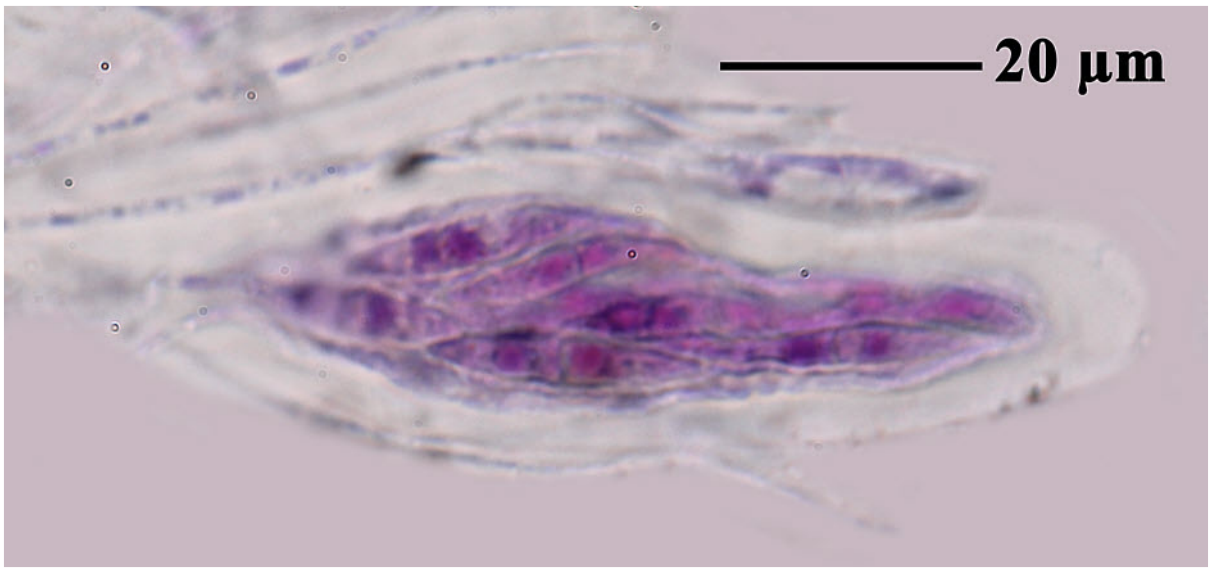


Astrothelium nigrorufum







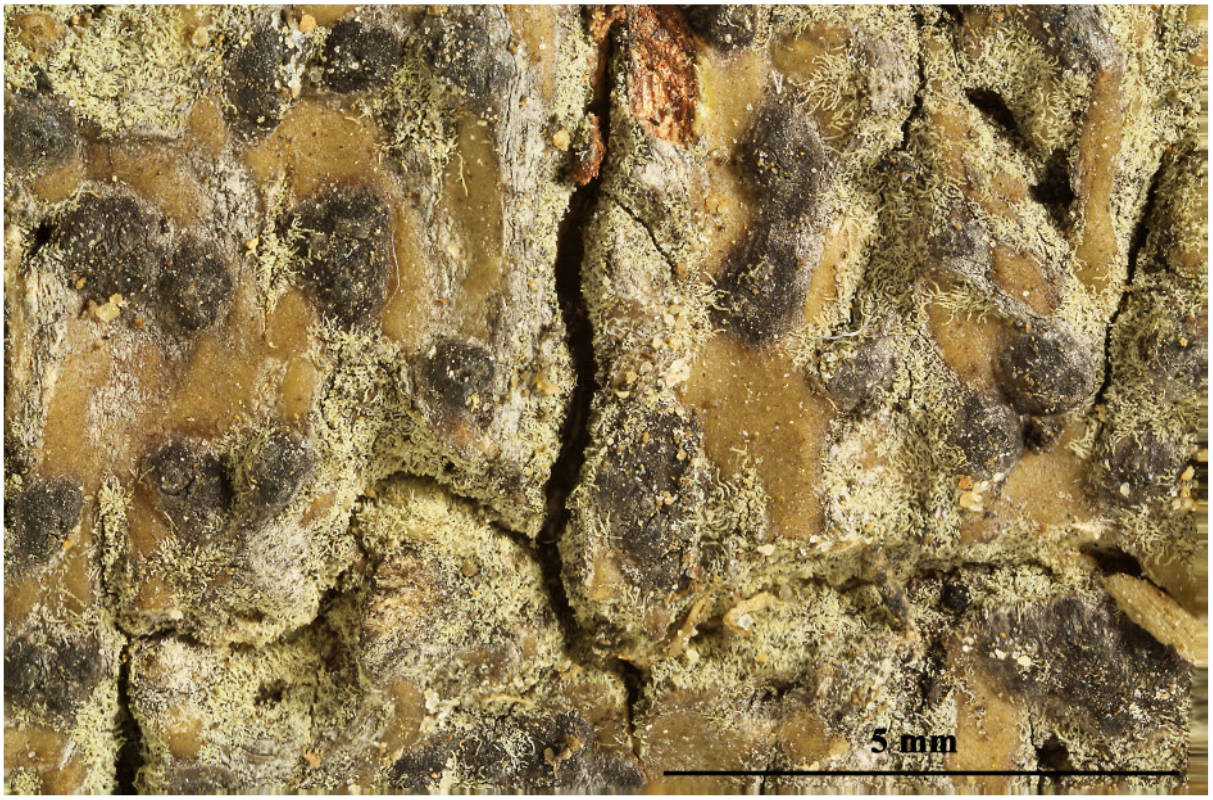


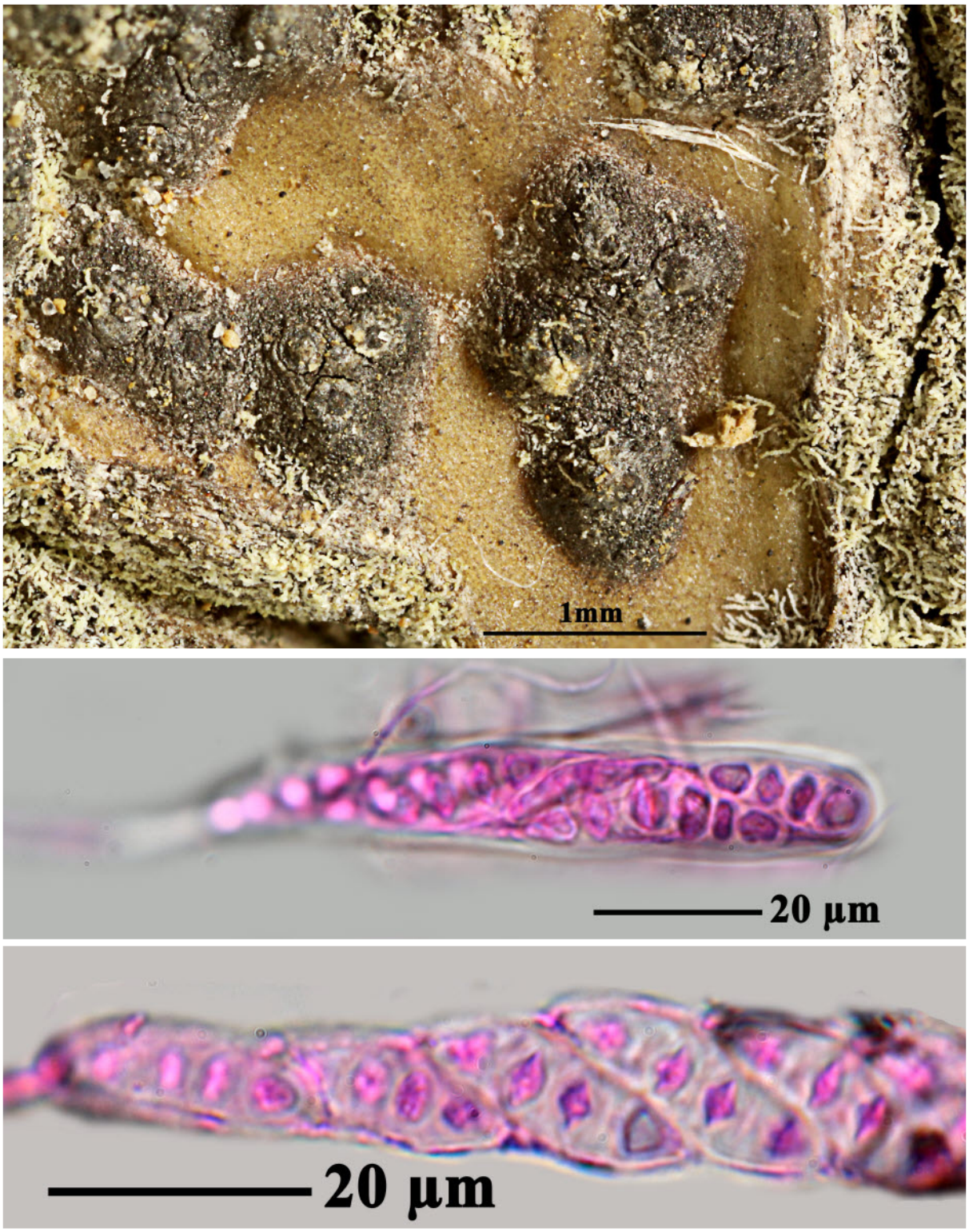
Astrothelium nigrorufum

Astrothelium nigrum Aptroot & M. Cáceres, Lichenologist 48(6): 702 (2016)

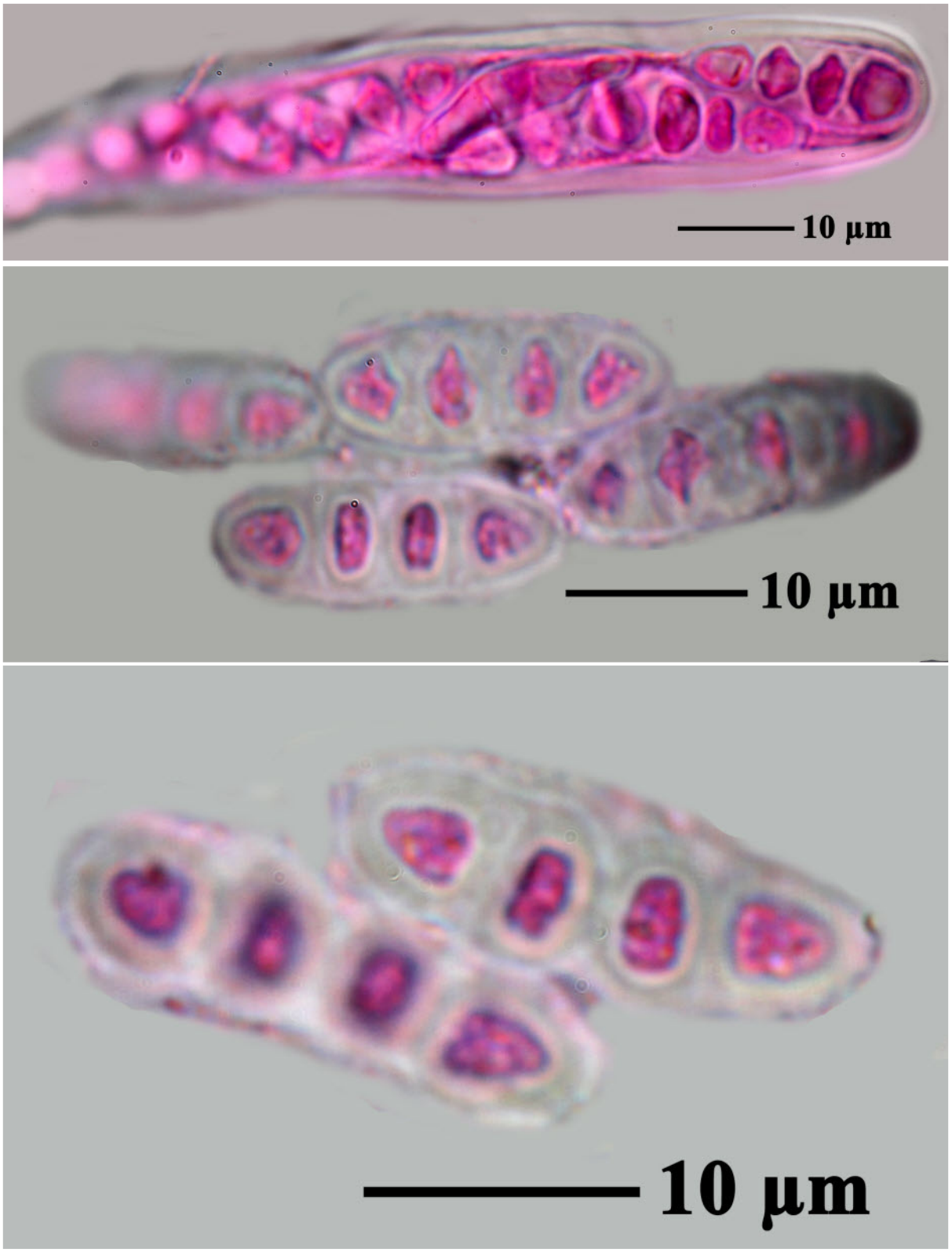
Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤ 10 cm diam., c. 0.1mm thick, ochraceous green, surrounded by a black prothallus line c. 0.4 mm wide, inducing gall formation of the host bark in the form of making the bark pieces become slightly concave and thickened along the cracks so that they are almost flaking off. Ascomata pyriform, 0.2–0.4 mm wide, 0.5–0.7 mm high, mostly 4–16 aggregated, immersed in conical to hemispherical pseudostromata with a black surface which is not corticated; pseudostromata distinctly raised above the thallus, regular in outline, sides sloping, ≤ c. 2 mm diam. and 0.7 mm high, consisting of carbonized bark tissue. Wall carbonized all around, ≤ c. 100 µm thick. Ostioles eccentric, fused, flat to convex, black, surrounded by a dull grey pruinose rim. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 19–21 × 7–8 µm, ends rounded, lumina diamond-shaped, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry. Thallus surface UV−, thallus medulla K−; pseudostroma UV−, K−. TLC: no secondary substances detected.

[ABL15703], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 NNE of Porto Velho, 8°02'44" S, 63°29'11" W, c. 100 m, on tree bark in primary rainforest. Leg. M. Cáceres & A. Aptroot (no 15703), 20.11.2012, det. A. Aptroot, 2012. ISOTYPE.





Astrothelium nigrum



Astrothelium nigrum

Astrothelium nitidiusculum (Nyl.) Aptroot & Lücking, Lichenologist 48(6): 873 (2016)

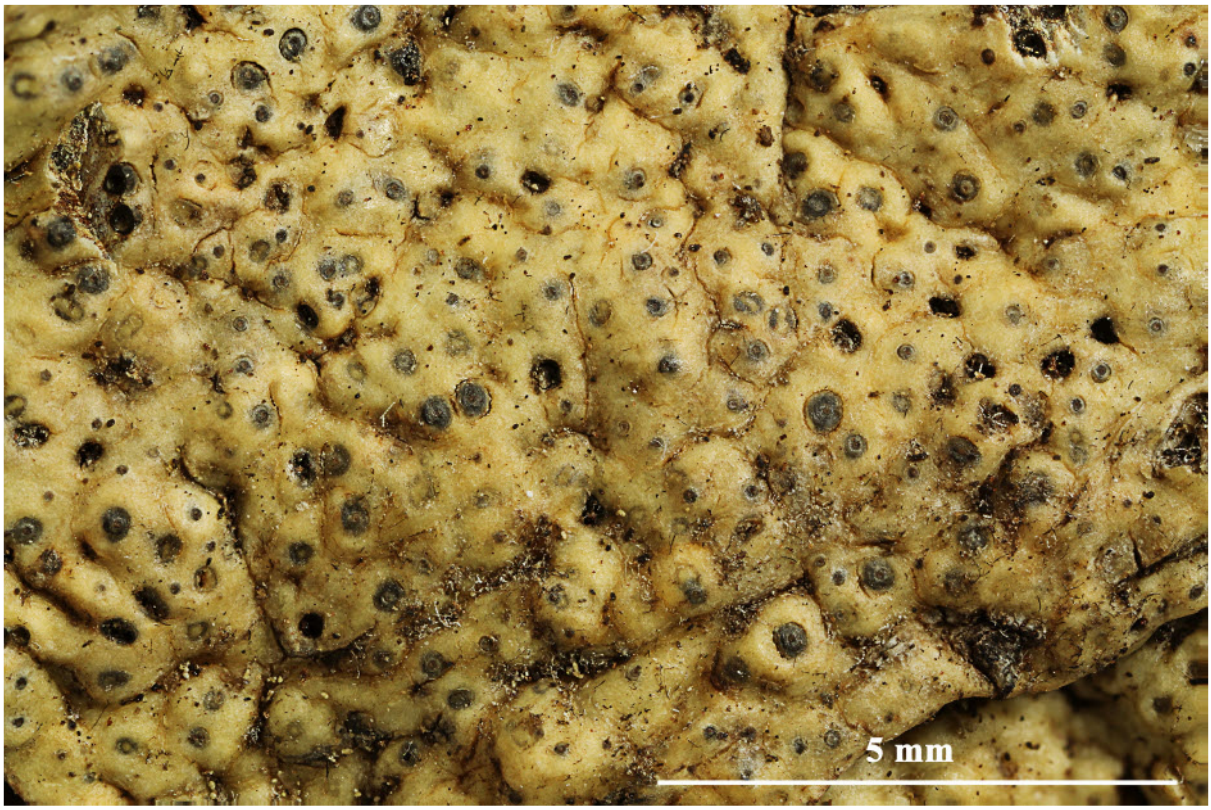
= *Pseudopyrenula nitidiuscula* (Nyl.) Müll. Arg., Flora, Regensburg 66: 248 (1883)

= *Trypethelium nitidiusculum* (Nyl.) R.C. Harris, Acta Amazon., Supl. 14(1-2): 75 (1986) [1984]

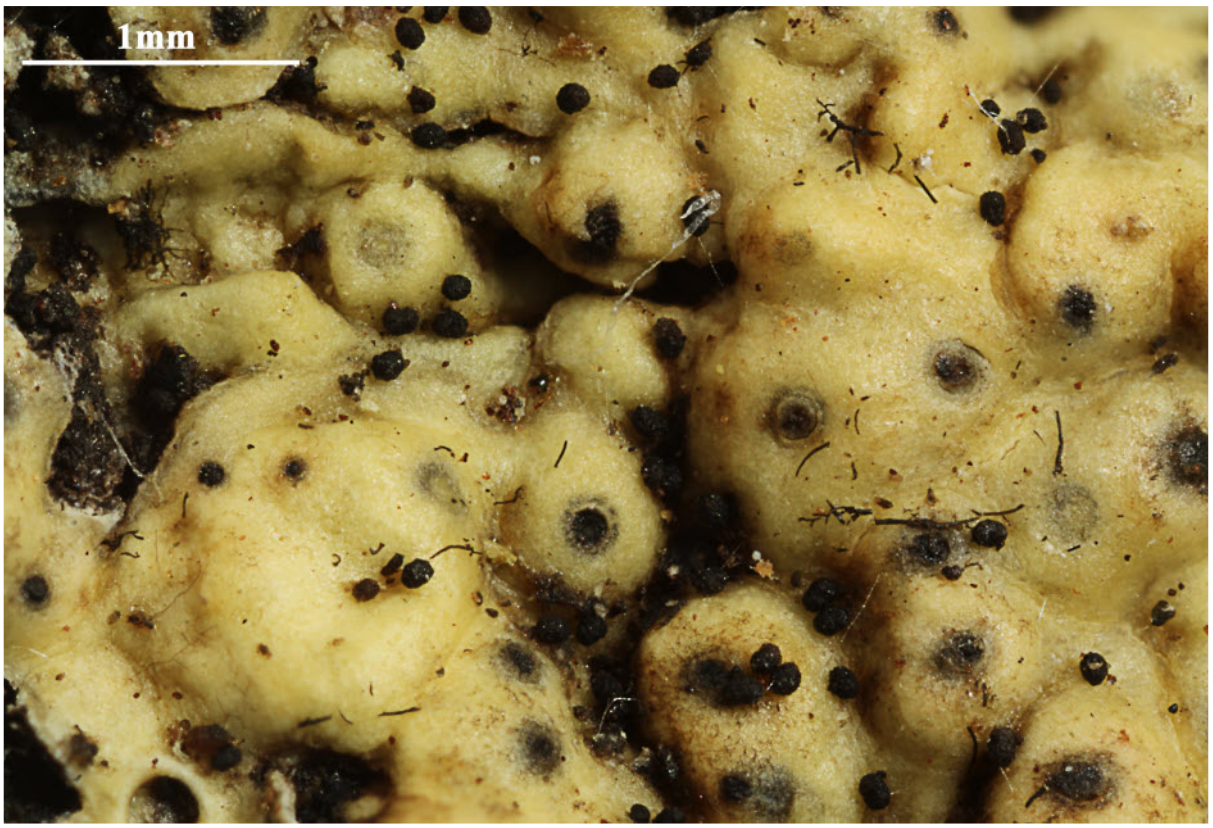
= *Verrucaria nitidiuscula* Nyl., Acta Soc. Sci. fenn. 7(2): 491 (1863)

Thallus corticate, olive-green, smooth to uneven. Ascomata with apical ostioles, solitary to confluent, but not distinctly pseudostromatic, 0.2–0.3 mm diam., erumpent, covered by thallus but upper portion whitish (or a white rim only) with dark ostiolar area. Hamathecium clear. Ascospores 8/ascus, 3-septate, fusiform-ellipsoid, hyaline, 15–27 × 7–10 µm, IKI-. Chemistry: thallus and pseudostromata UV-, K-. TLC: no substances detected.

[ABL18767], Guyana, upper Mazaruni distr., M-slope of Mount Roraima, 5°17' N, 60°46' W, 700 m. 7 m high on 40 cm diam. treetrunk in c. 25 m tall, virgin, mossy forest. Leg. H. Sipman & A. Aptroot (no 18767), 12.-19.02.1985. LICHENOTHECA LATINOAMERICANA NO 100







Astrothelium nitidiusculum



Astrothelium nitidiusculum

Astrothelium novemseptatum Aptroot & M. Cáceres, Lichenologist 48(6): 703 (2016)

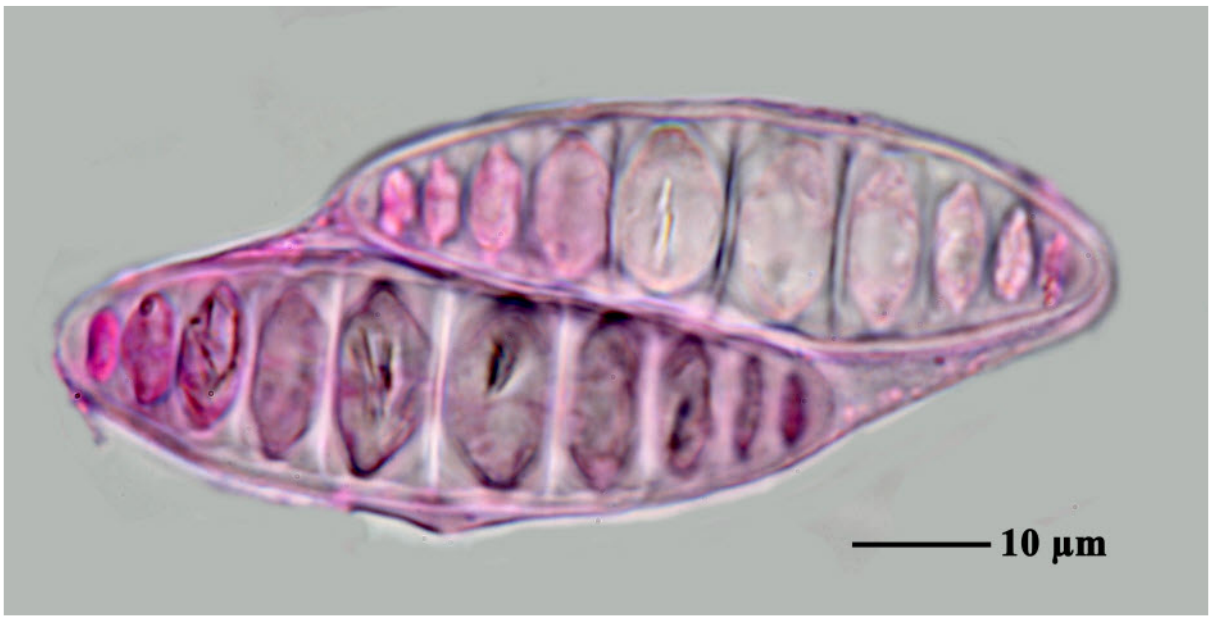
Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤7 cm diam., c. 0.2 mm thick, pale greenish grey, with or without a black prothallus line c. 0.3 mm wide, inducing infrequent semiglobose galls of the host bark (lower bark locally swollen and erupting through bark). Ascomata pyriform, c. 0.4–0.7 mm diam., mostly aggregated with 4–10, mostly immersed in the bark tissue below pseudostromata with a whitish surface different from the thallus, and which are distinctly raised above the thallus and mostly oval in outline, and ≤ 3 mm wide and ≤ 6 mm long. Wall carbonized, ≤ c. 40 µm thick. Ostioles eccentric, fused, flat, pale brown, surrounded by a whitish zone. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 9-septate, fusiform, 49–55 × 12–17 µm, ends pointed, lumina diamond-shaped, when fresh surrounded by a gelatinous layer ≤ 8 µm thick. Pycnidia not observed. Chemistry. Thallus surface UV−, thallus medulla K−; pseudostroma UV−, K−. TLC: no secondary substances detected.

[ABL11538], Brazil, Rondônia, Porto Velho, Parque Natural Municipal de Porto Velho, 8°41'10" S, 63°52'05" W, c. 100 m, on tree bark in primary rainforest. Leg. M. Cáceres & A. Aptroot (no 11538), 9–12.03.2012, det. A. Aptroot, 2012. ISOTYPE.

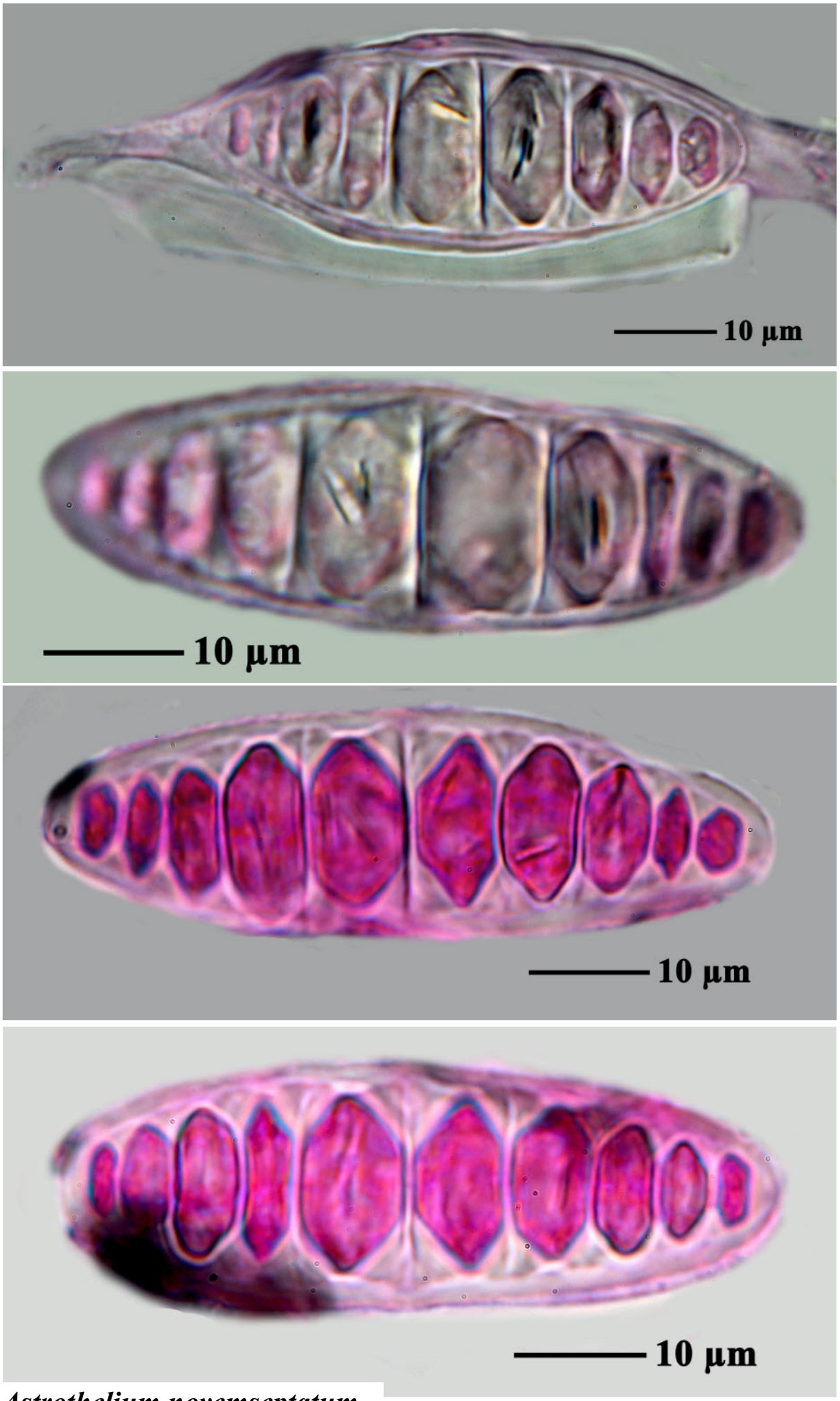








Astrothelium novemseptatum



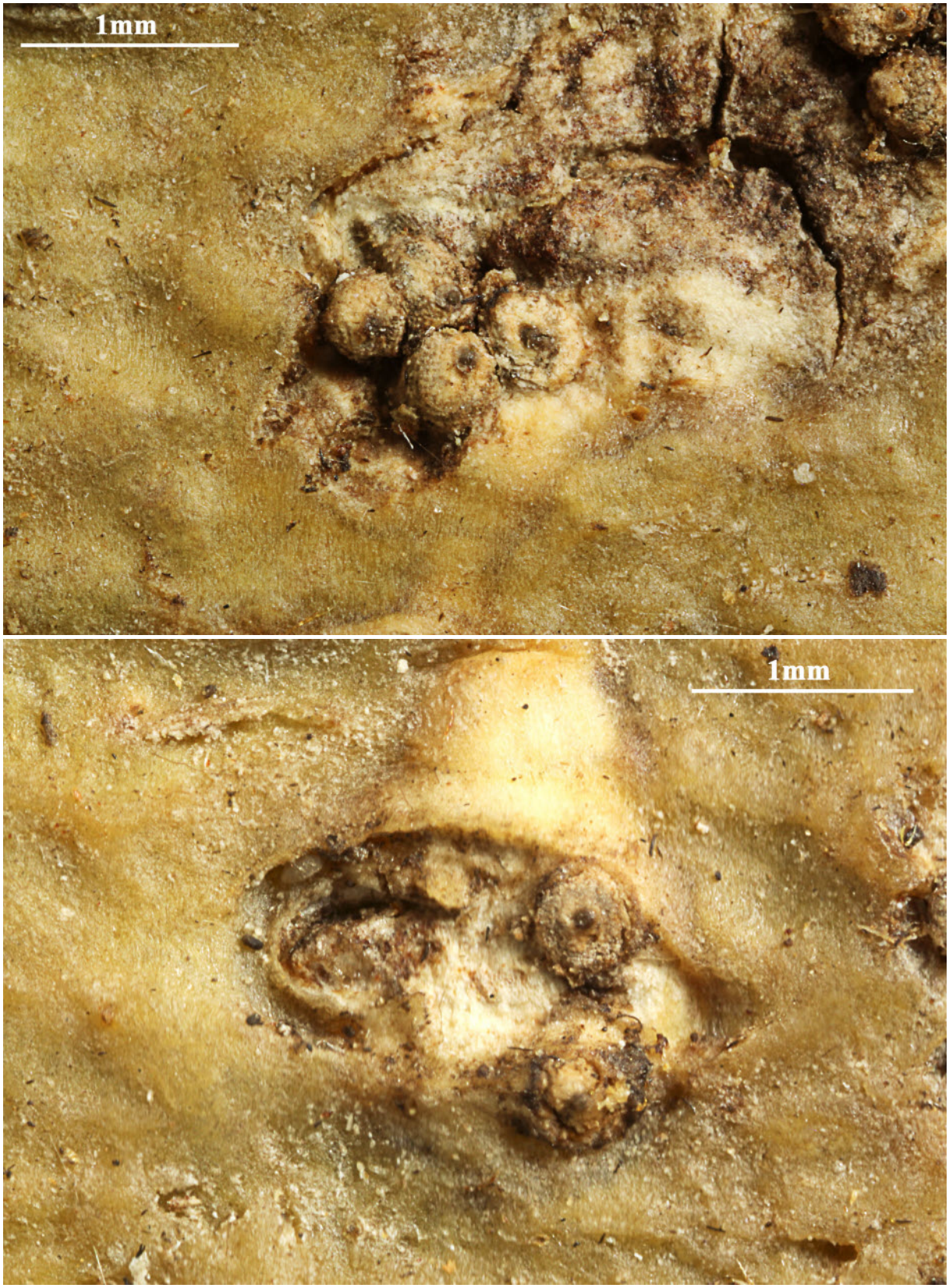
Astrothelium novemseptatum

Astrothelium novemseptatum Aptroot & M. Cáceres, Lichenologist 48(6): 703 (2016)

Thallus corticate, pale greenish gray. Hamathecium not inspersed. Spores 8/ascus, hyaline, 9-septate, fusiform, 49–55 × 12–17 µm. Chemistry: thallus surface UV-, K-, medulla K-, pseudostroma UV-, K-. TLC: no secondary substances detected.

[Jacobs1868], Guyana, Gunn's Essequibo River, Forest near airstrip. On trunk. 01°39' N, 58°38' W, 240-260 m. Leg. M.J. Jansen-Jacobs (no 1868), 27.09.1989.





Astrothelium novemseptatum

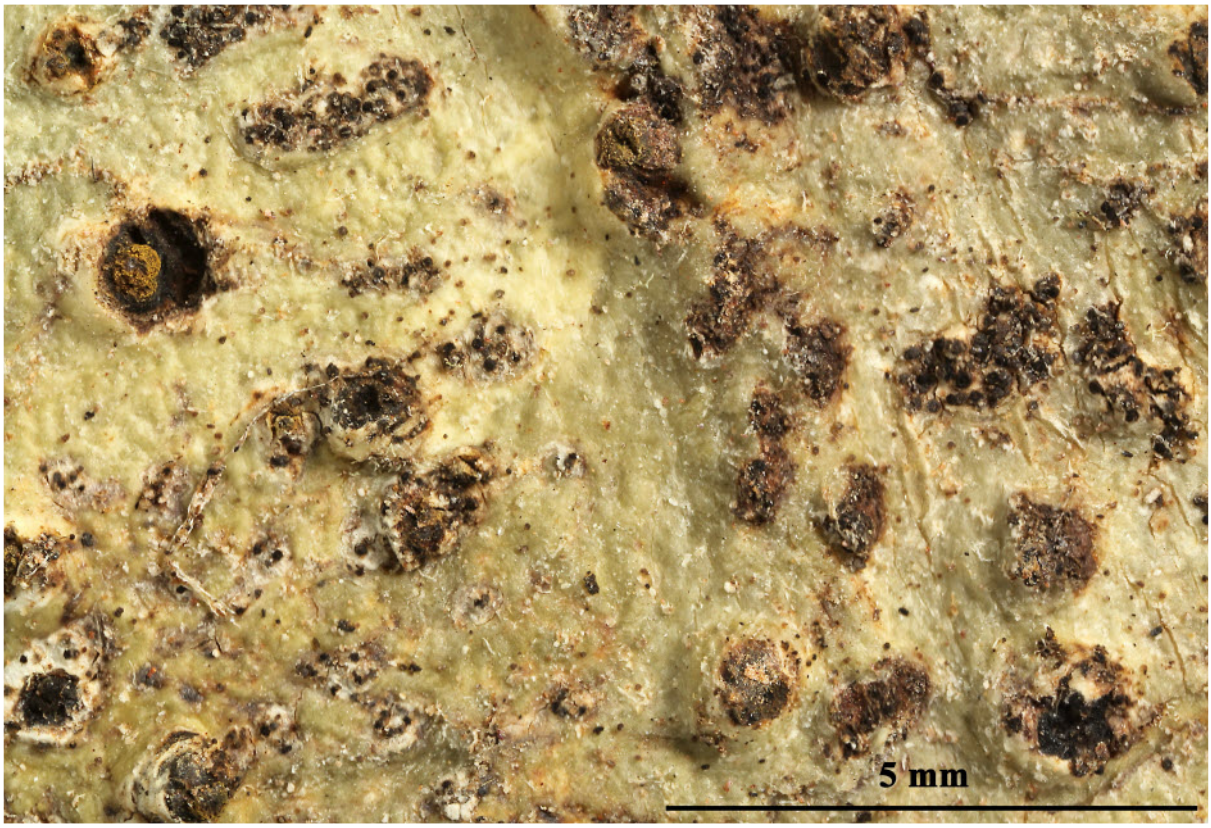


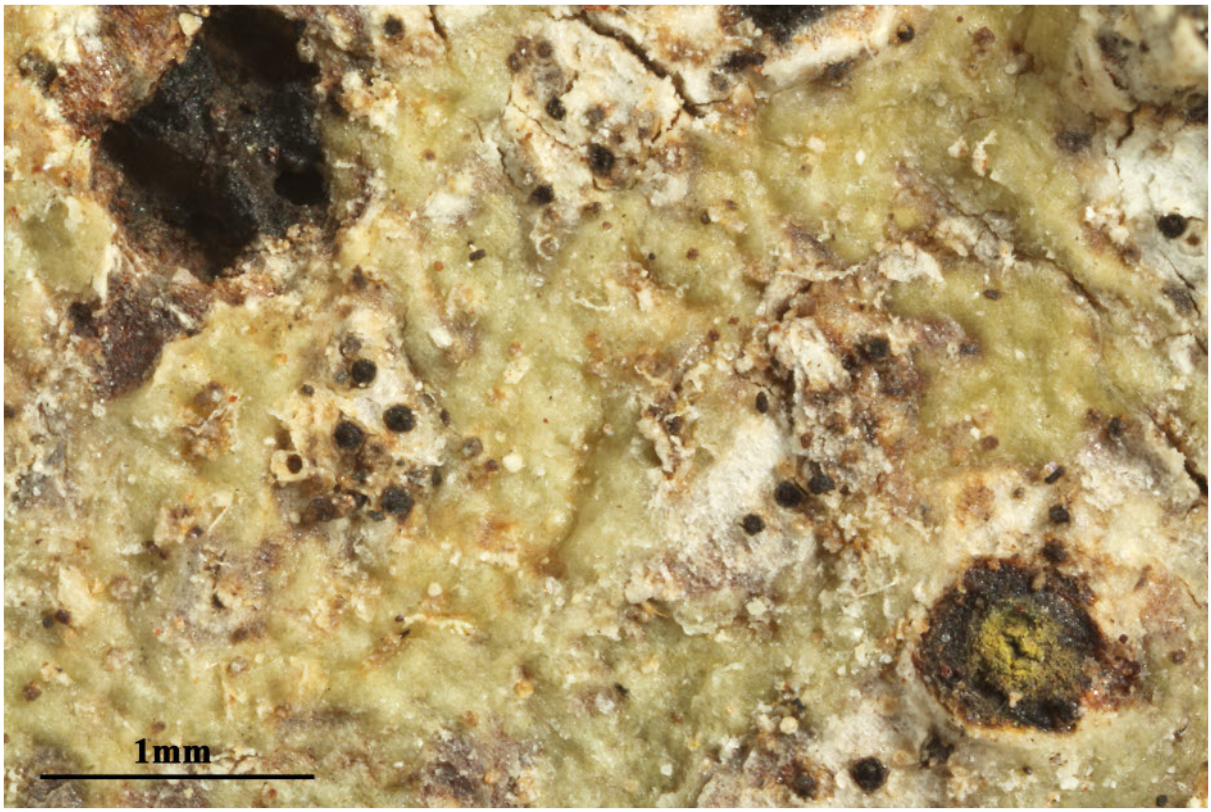
Astrothelium novemseptatum

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

Thallus corticate, olive-green, smooth to uneven or shallowly bullate. Ascomata several chamber joined with eccentric, fused ostioles; joined ascomata solitary to confluent but not pseudostromatic, 1–1.8 mm diam., eumpent, covered by thallus but papilliform ostiolar area ochraceous brown, with yellow-orange pigment and surrounded by an irregular whitish rim. Hamathecium clear. Ascospores 8/ascus, 3 septate, fusiform-ellipsoid, hyaline, 55–65 × 15–25 µm, IKI-. Chemistry: thallus UV-, K-, without lichexanthone; pseudostromata with yellow-orange, K+ purple, UV+ red anthraquinone.

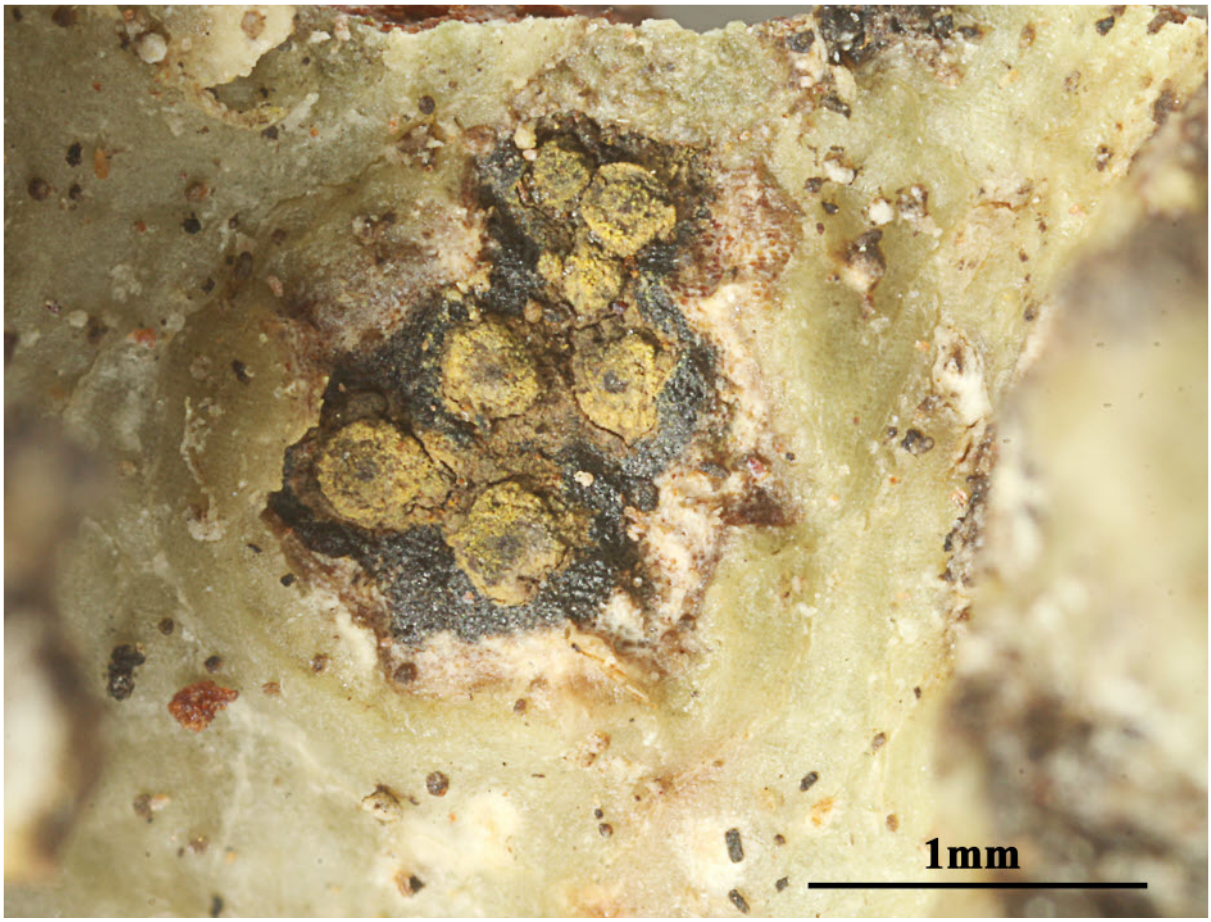
[ABLISE48617], Brazil, Bahia, Itamarajú, Monte Pascual, on tree bark in cerrado forest. Leg. M. Cáceres & A. Aptroot (no ISE 48167), 18.02.2019, det. A. Aptroot, 2019.

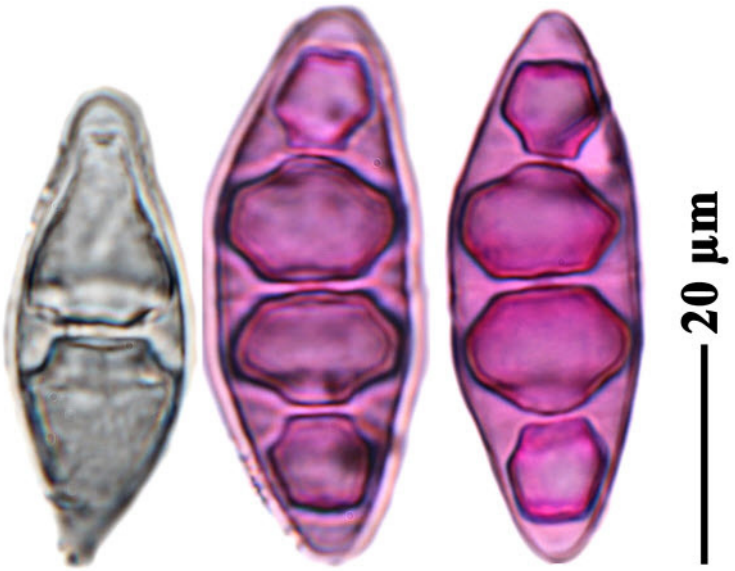






Astrothelium ocellatum





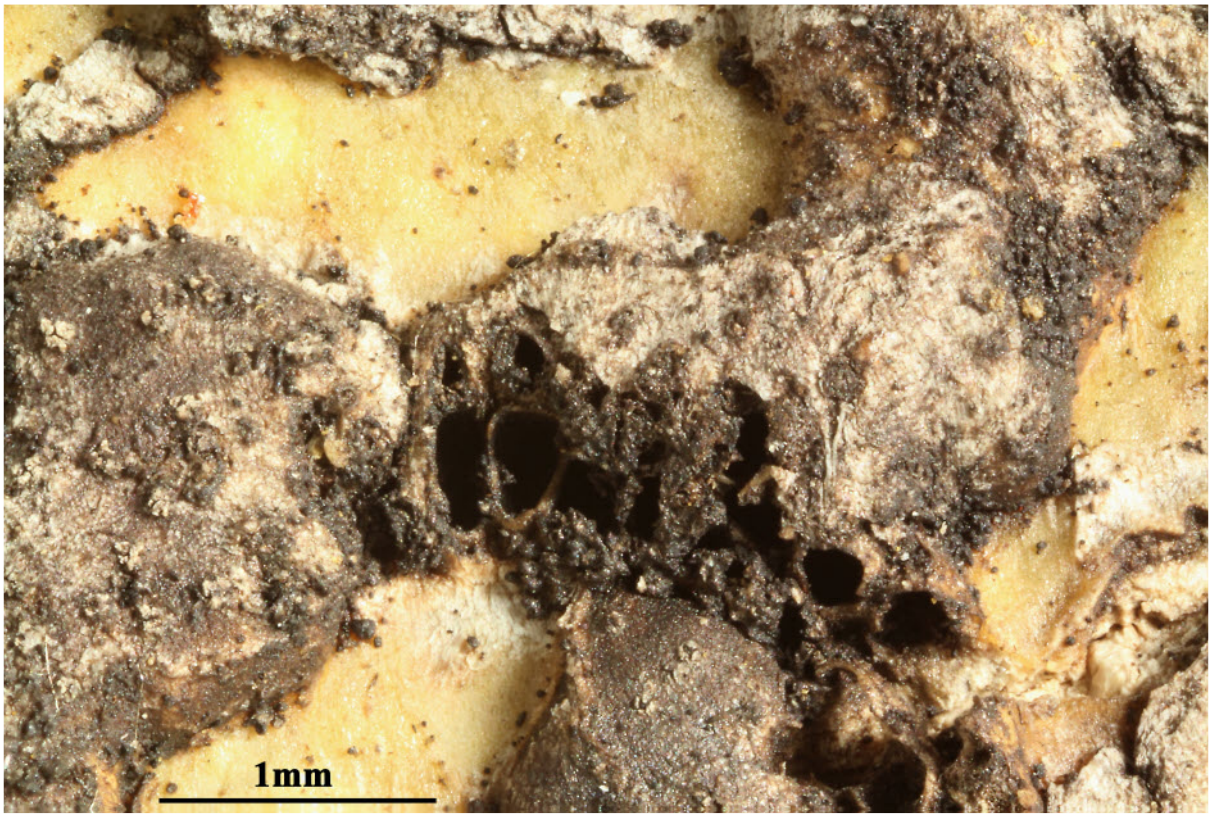
Astrothelium ocellatum

Astrothelium ochroleucoides Aptroot & M. Cáceres, Lichenologist 48(6): 703 (2016)

Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤ 8 cm diam., c. 0.1 mm thick, olive-green, surrounded by a black prothallus line c. 0.3 mm wide, not inducing gall formation of the host bark. Ascomata globose, 0.4–0.6 mm diam., immersed in groups of c. 2–40 in pseudostromata. Pseudostroma with a surface different from the thallus, c. 0.5–1.0 mm raised above the thallus, oval to irregular or reticulate in outline, ≤ c. 3 mm wide brownish black, usually partly with whitish cover, partly brownish, partly whitish inside. Wall dark brown all around, ≤ c. 40 µm thick. Ostioles apical, not fused, flat to convex, brown. Hamathecium not inspersed with oil globules. Asci with 4 ascospores. Ascospores hyaline, muriform, fusiform, 80–115 × 15–24 µm, upper end rounded, lower end pointed, lumina angular with only a few transverse, mostly oblique septa, old not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry. Thallus surface UV+ yellow, thallus medulla K−; whitish parts of pseudostroma surface UV+ yellow, K−, pseudostroma medulla K−. TLC: lichexanthone in the thallus and on pseudostroma.

[ABL15705], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 NNE of Porto Velho, 8°02'44" S, 63°29'11" W, c. 100 m, on tree bark in primary rainforest. Leg. M. Cáceres & A. Aptroot (no 15705), 20.11.2012, det. A. Aptroot, 2012. ISOTYPE.

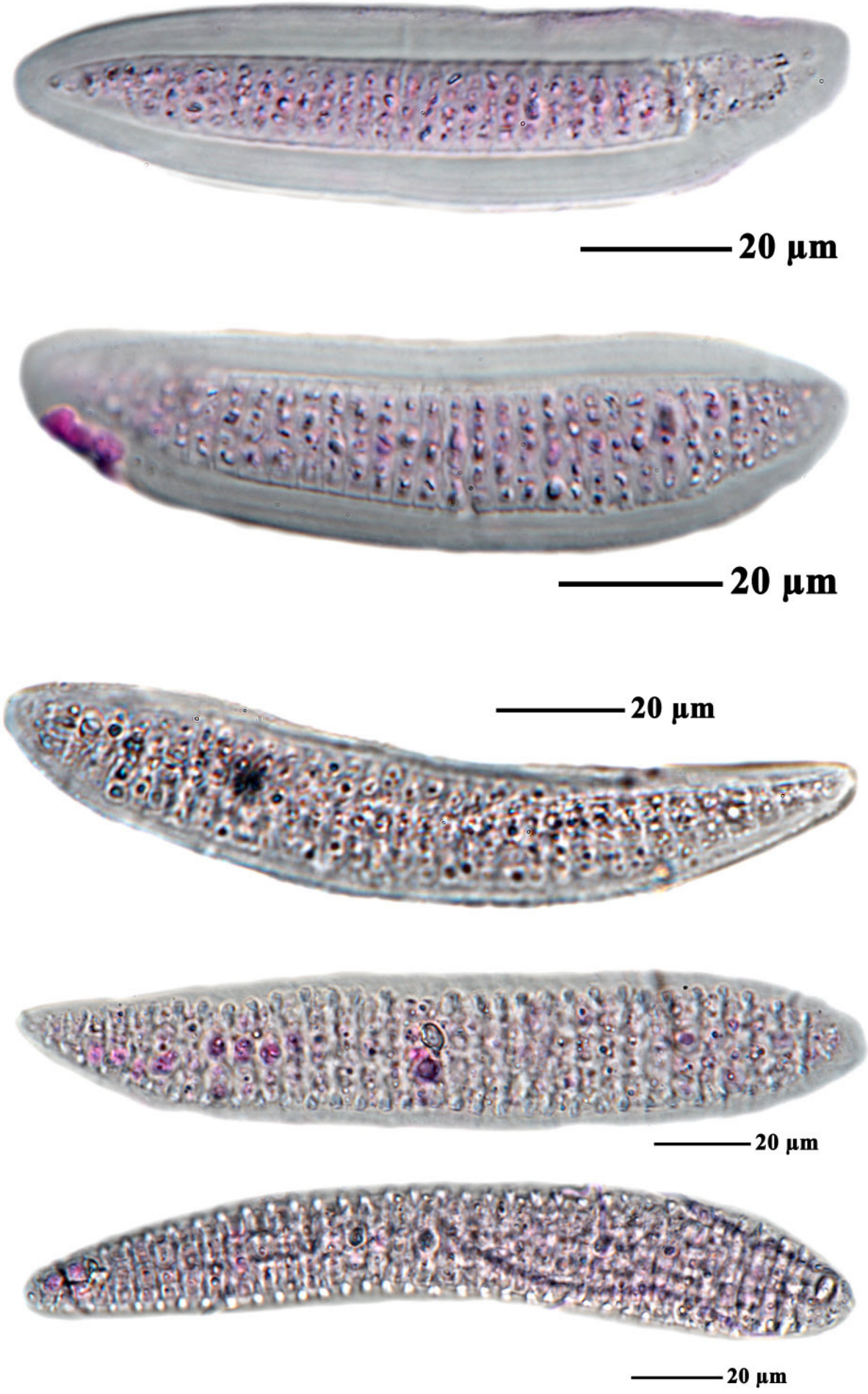








Astrothelium ochroleucoides



Astrothelium ochroleucoides

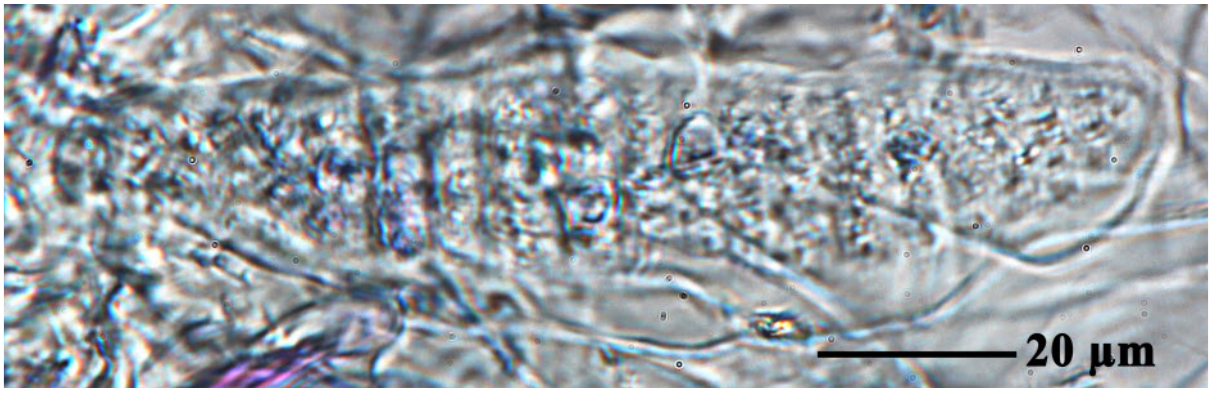
Astrothelium ochroleucoides Aptroot & M. Cáceres, Lichenologist 48(6): 703 (2016)

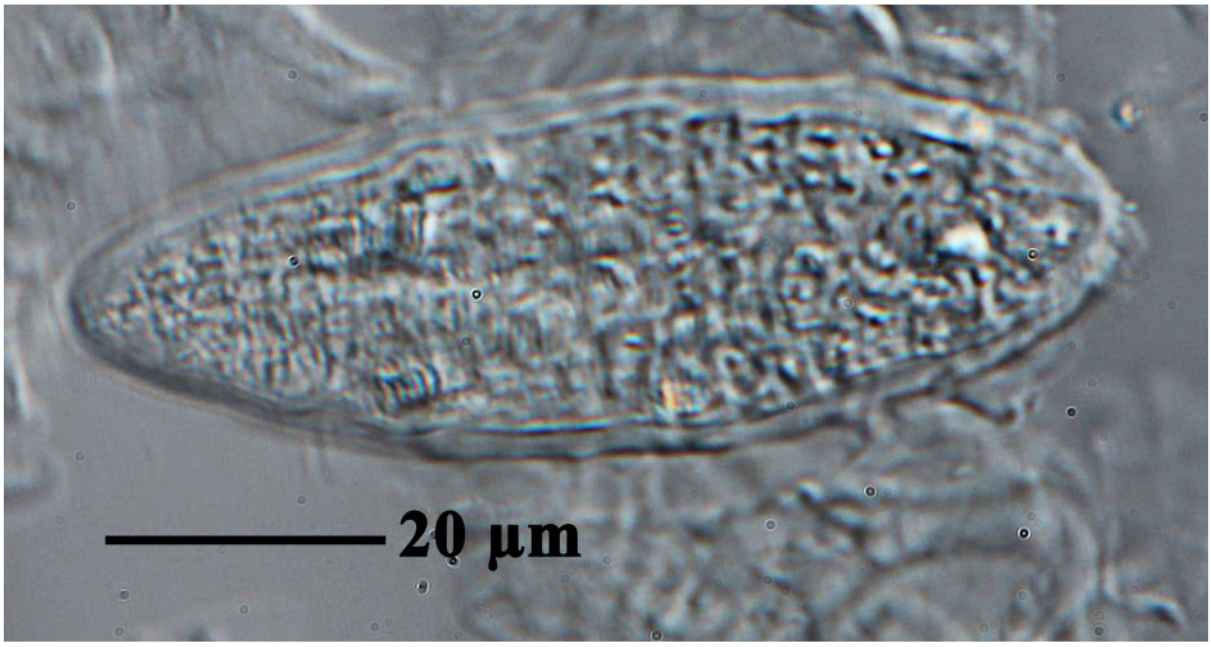
Thallus corticate, continuous, olive-green. Ascomata globose, immersed in groups of c. 2–40 in pseudostromata. Pseudostromata with a surface different from the thallus. Hamathecium not inspersed. Ascospores 4/ascus, hyaline, muriform, fusiform, 80–115 × 15–24 µm. Chemistry: thallus surface UV+ yellow, medulla K-. TLC: lichexanthone in the thallus and on pseudostromata.

[ABL19603], Guyana, East Demerara district. Savannah bush along Linden highway, E of Timehri airport. 6°29’ N, 58°12’ W, 10 m. Leg. A. Aptroot & H. Sipman (no 19603), 7.03.1985, det. A. Aptroot, 1990. ISOTYPE.

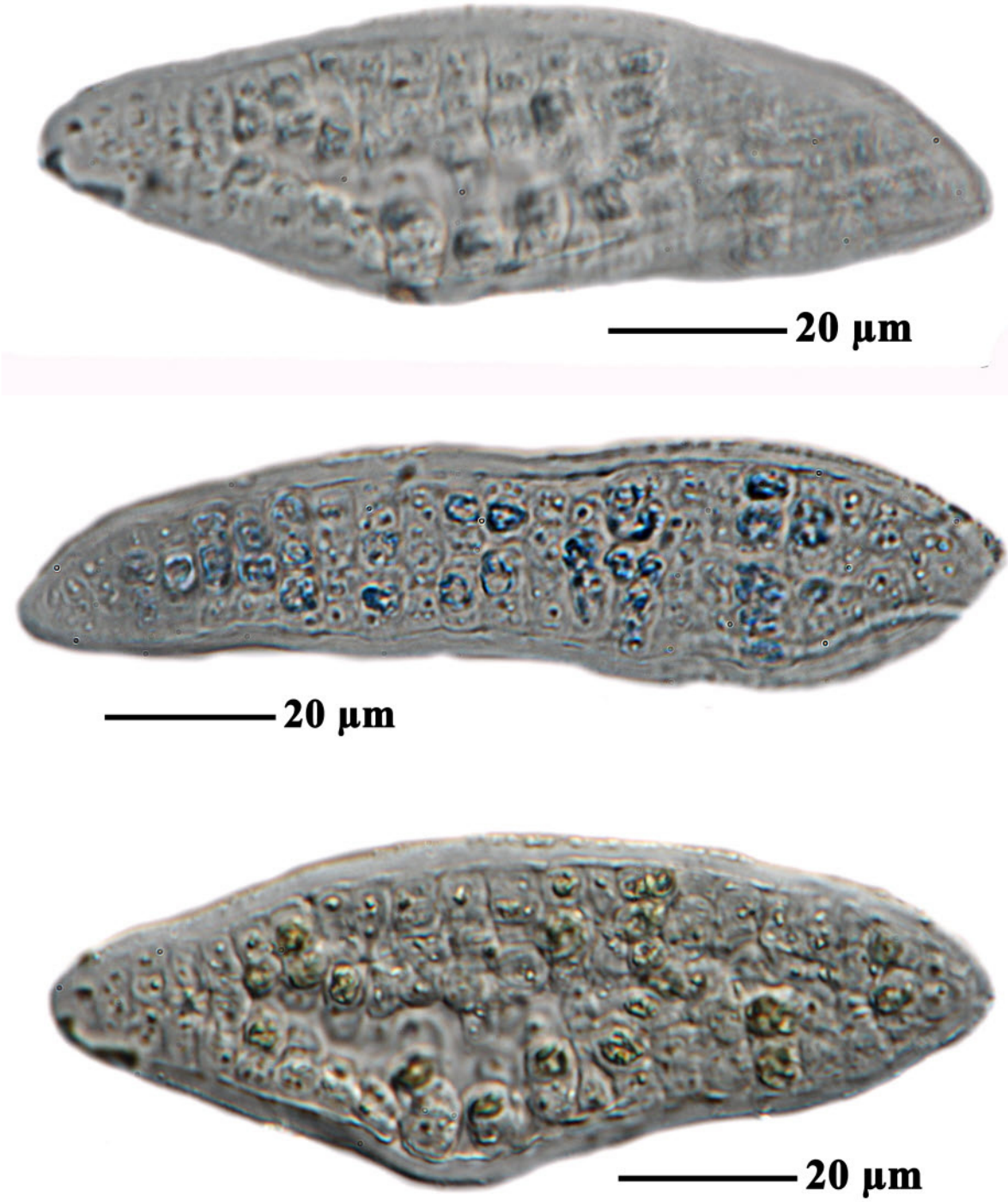








Astrothelium ochroleucoides

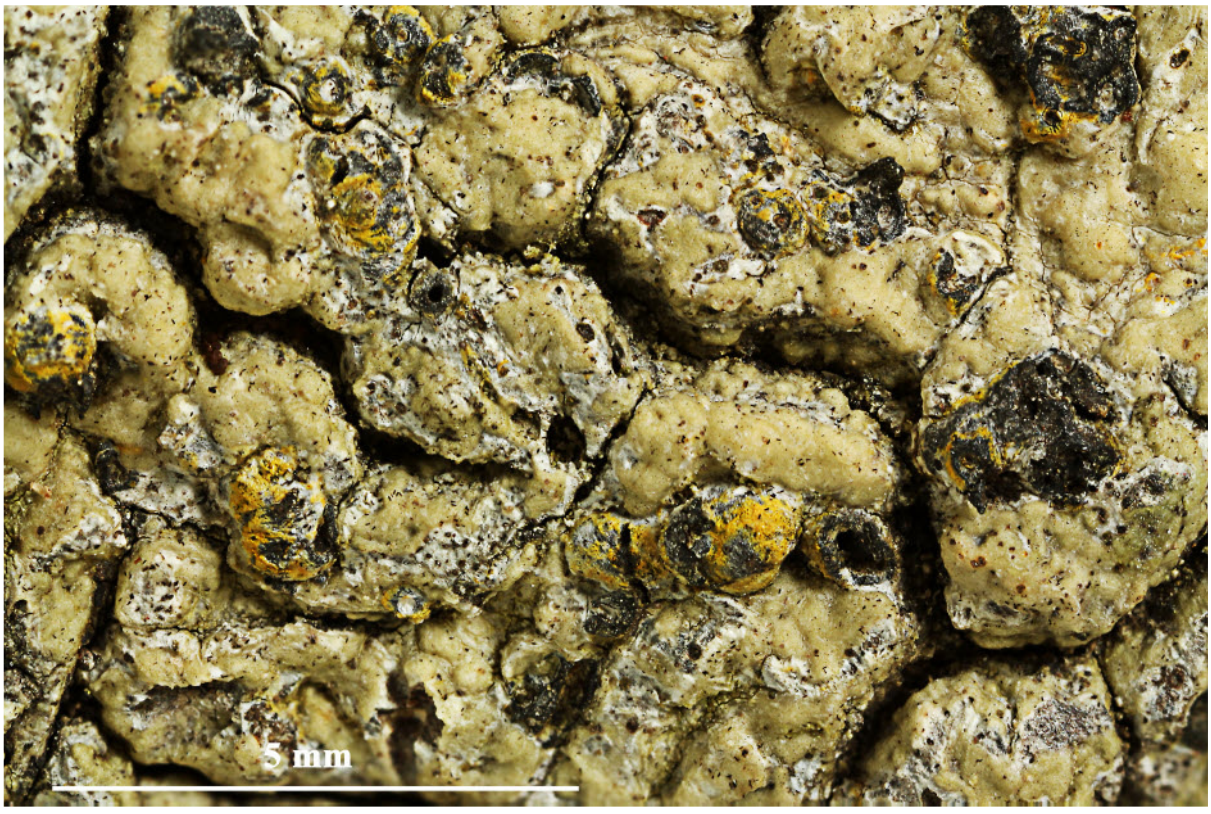


Astrothelium ochroleucoides

Astrothelium ochrothelium (Nyl.) Müll. Arg., Flora 68: 255 (1885)

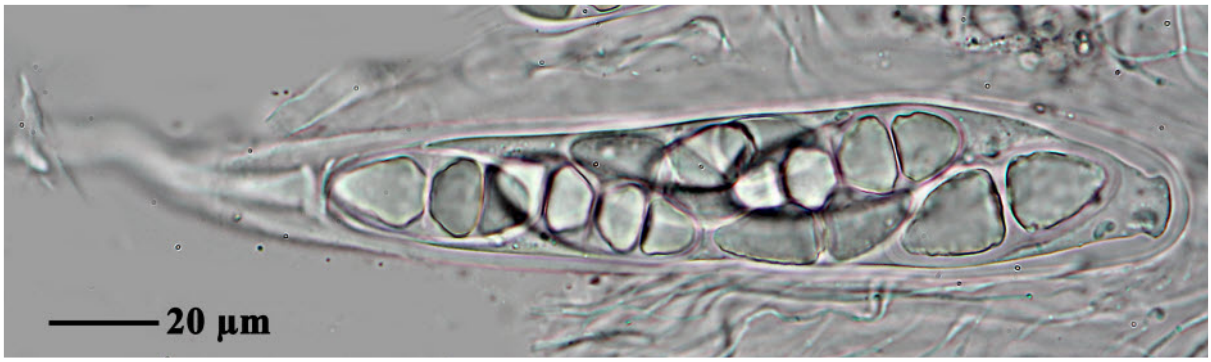
Thallus corticate, olive-green to yellowish or brownish, uneven to shallowla verrucose. Ascomata several chambers joined with eccentric, fused ostioles, joined ascomata pseudostromatic; pseudostromata 0.8–1.5 mm diam., erumpent, irregular, often confluent, covered by thallus and upper portion with yellow-orange pigment. Hamathecium clear. Ascospores 8/ascus, fusiform-ellipsoid, 3-septate, hyaline, (37–)43–45 × 15–23 µm, IKI-. Chemistry: thallus UV+ yellow, K-, with lichexanthone; pseudostromata UV-, K+ purple, with yellow-oramge anthraquinone.

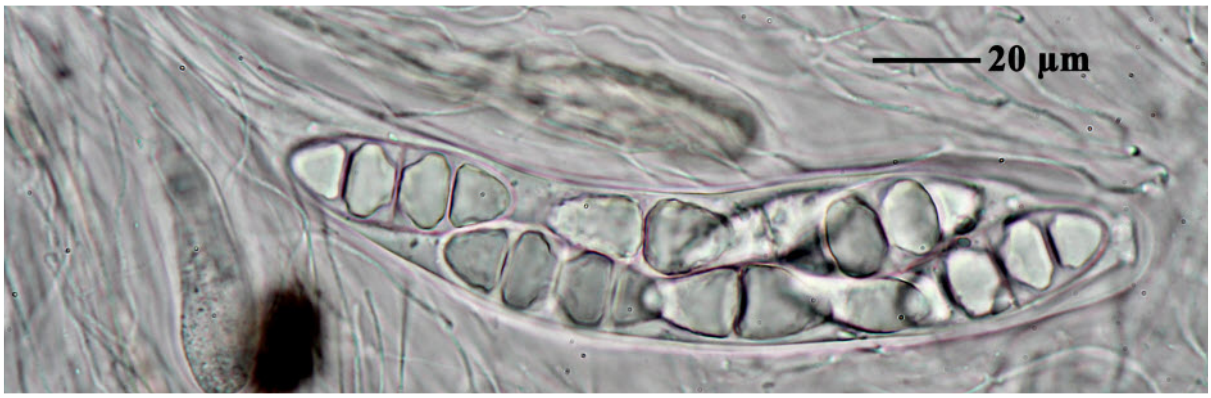
[ABLISE48624], Brazil, Itamarajú, Monte Pascual, on tree bark in cerrado forest. Leg. M. Cáceres & A. Aptroot (no ISE 48624), 18.2.2019.

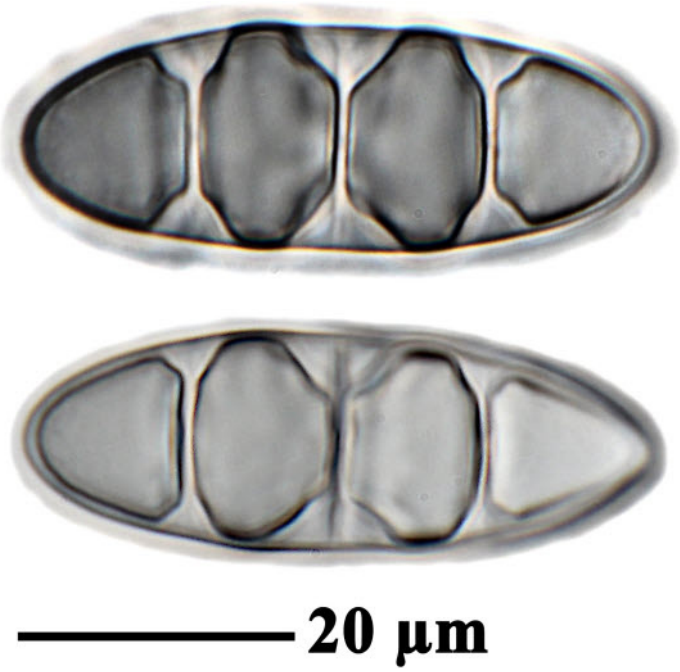




Astrothelium ochrothelium





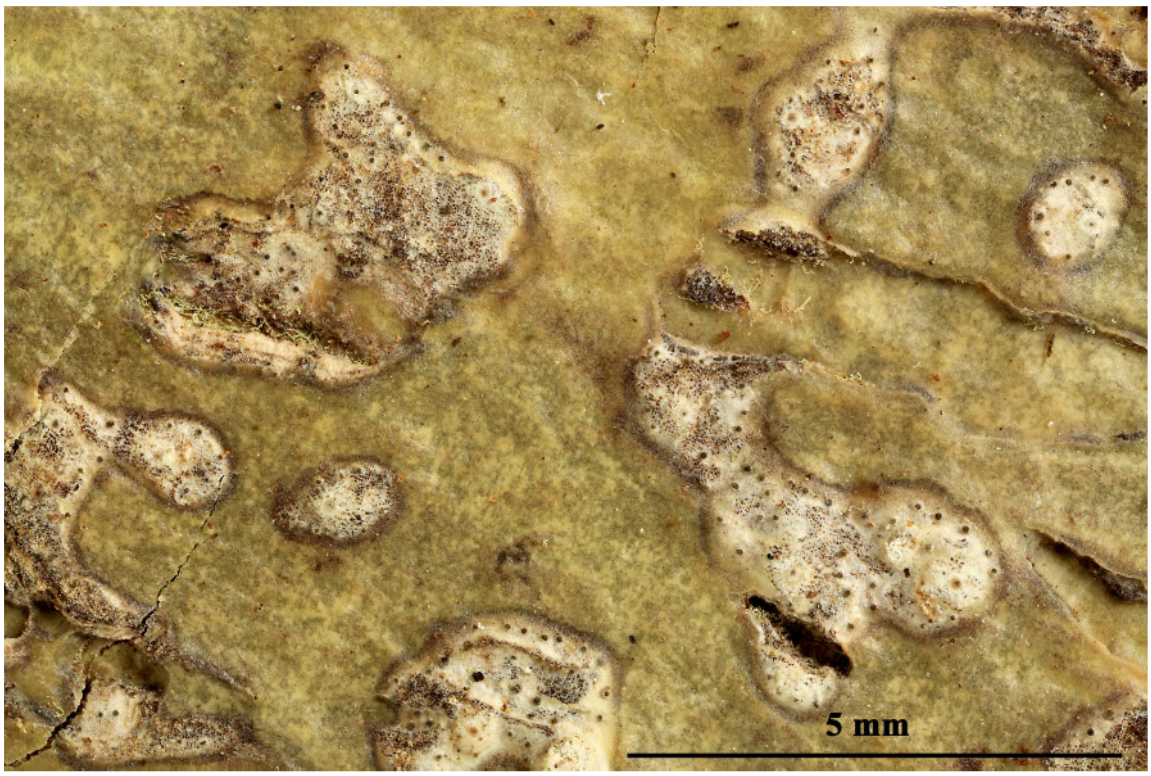


Astrothelium ochrothelium

Astrothelium octoseptatum Aptroot & M. Cáceres, Lichenologist 48(6): 705 (2016)

Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤ 7 cm diam., c. 0.1 mm thick, pale greenish grey, not surrounded by a prothallus, not inducing gall formation of the host bark. Ascomata pyriform, c. 0.6–0.9 mm diam., mostly 2–5 aggregated, mostly immersed in the bark tissue below pseudostromata. Pseudostroma well delimited, not corticate, brown with a whitish (partly brown when abraded) surface clearly different from the thallus, distinctly c. 0.5 mm raised above the thallus, ≤ 3 mm wide and ≤ 7 mm long, irregular in outline and sometimes forming a network. Wall brown, ≤ c. 30 µm thick. Ostioles eccentric, fused, flat, brown, surrounded by a whitish zone. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, (7–)8(–9)-septate, fusiform, 40–57 × 15–19 µm, middle septum (if present) asymmetrical (dividing the ascospore into two unequal parts), ends rounded, lumina diamond-shaped, surrounded by a gelatinous layer ≤ 7 µm thick. Pycnidia abundant, black, only on the pseudostromata. Chemistry: Thallus surface UV−, thallus medulla K−; pseudostroma surface UV+ yellow. TLC: lichexanthone.

[ABL15614], Brazil, Rondônia, Porto Velho, Parque Natural Municipal de Porto Velho, 8°41'10" S, 63°52'05" W, c. 100 m, on tree bark in primary rainforest. Leg. M. Cáceres & A. Aptroot (no 15614), 19.11.2012, set. A. Aptroot, 2012. ISOTYPE.







Astrothelium octoseptatum

Astrothelium octosporum (Vain.) Aptroot & Lücking, Lichenologist 48(6): 875 (2016)

= *Cryptothelium octosporum* (Vain.) Zahlbr., Cat. Lich. Univers. 1: 522 (1922)

= *Heufleria octospora Vain.*, Acta Soc. Fauna Flora fenn. 7(no. 2): 192 (1890)

Thallus corticate, olive-green to browenish. Ascomata with several chambers joined with eccentric, fused ostioles, immersed to erumpent. Hamathecium inspersed. Ascospores 8/ascus, densely muriform, 110–135 × 19–23 µm, hyaline, IKI-. Chemistry: thallus and ascomata UV+ yellow, K-. TLC: lichexanthone.

[ABL40821], Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque Natural do Caraça. Near monastery Santuário do Caraça, on tree, 1300 m, 20°06’ S, 43°29’ W. Leg. A. Aptroot (no 40821), 15.-21.09.1997 , det. A. Aptroot 1998.

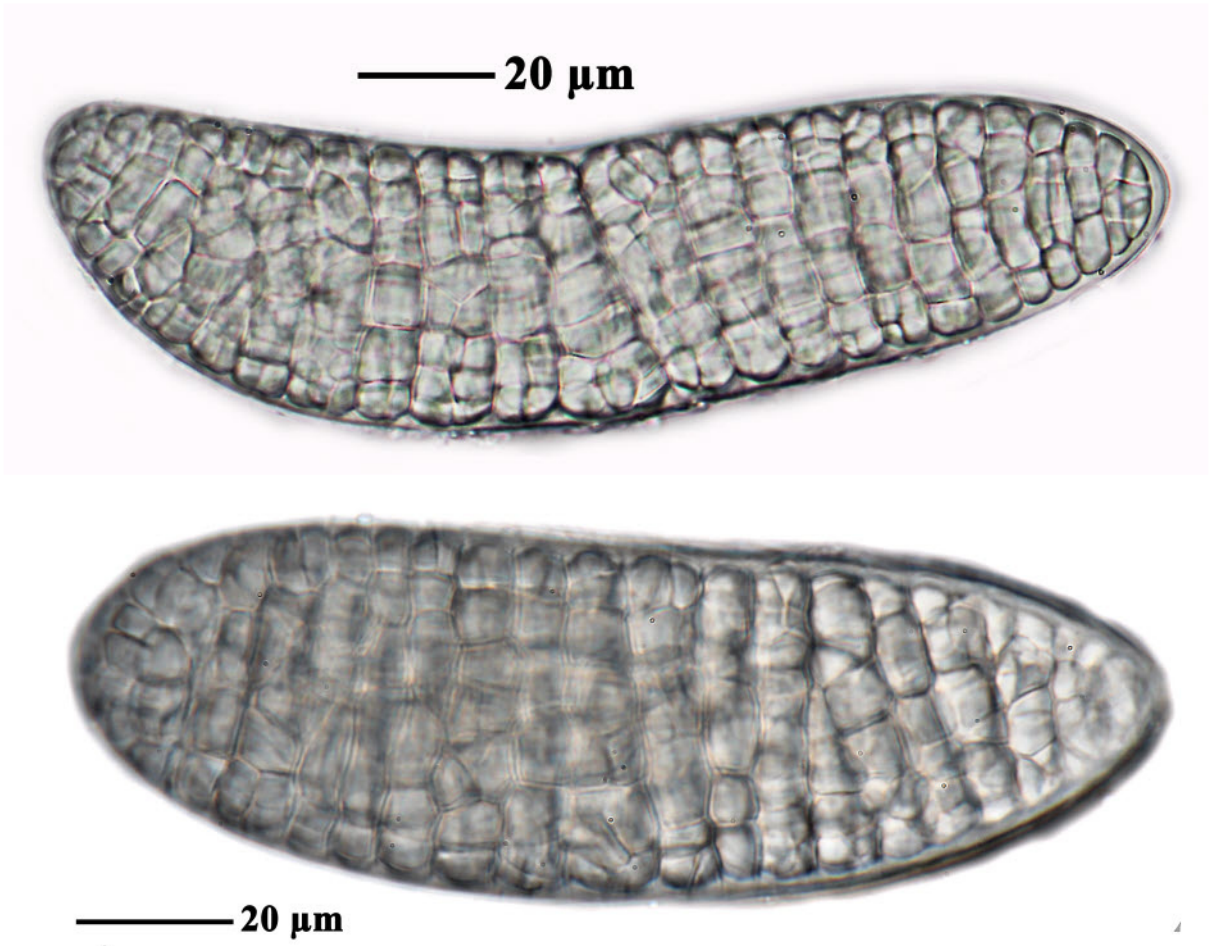






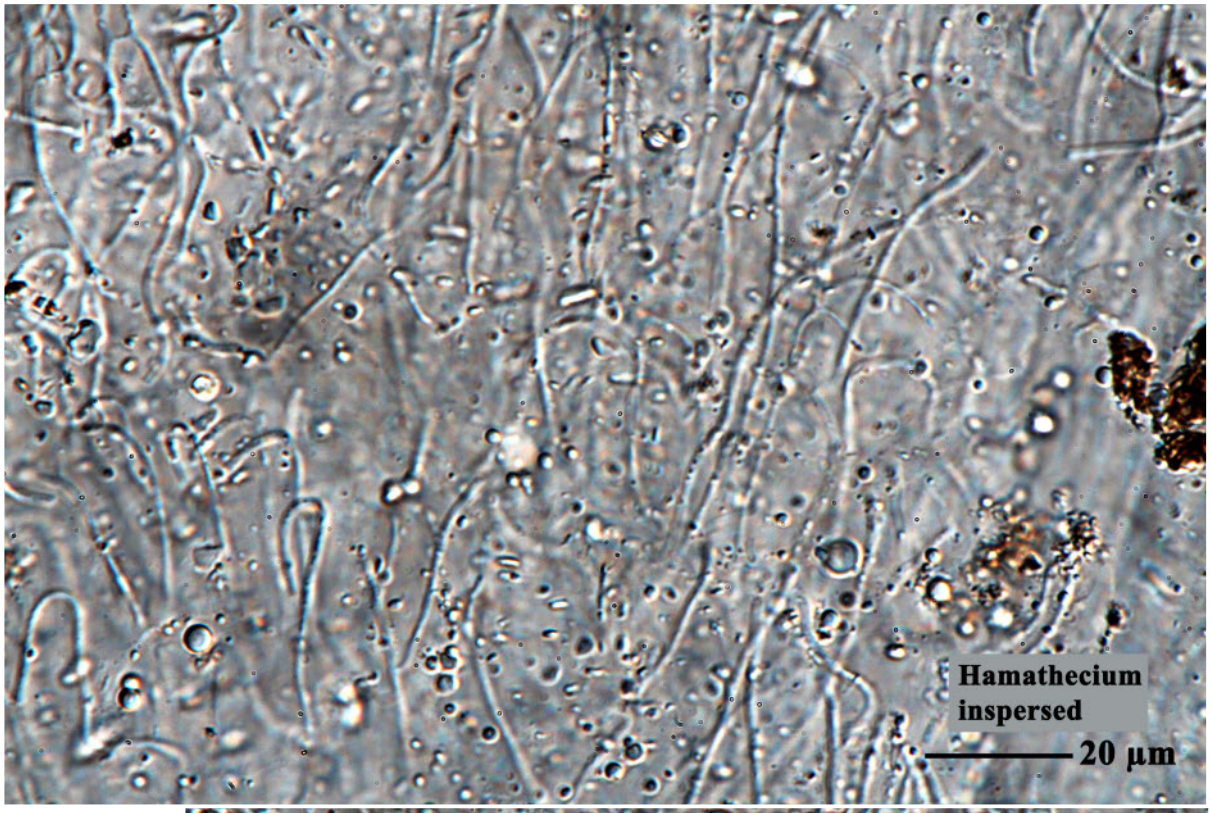
Astrothelium octosporum

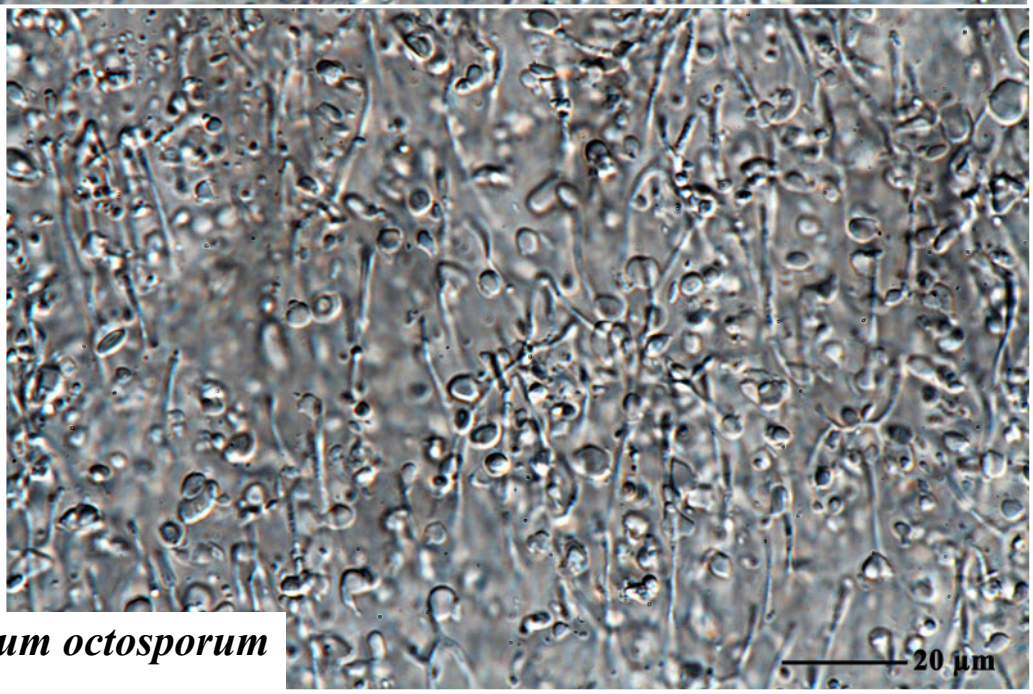




Astrothelium octosporum





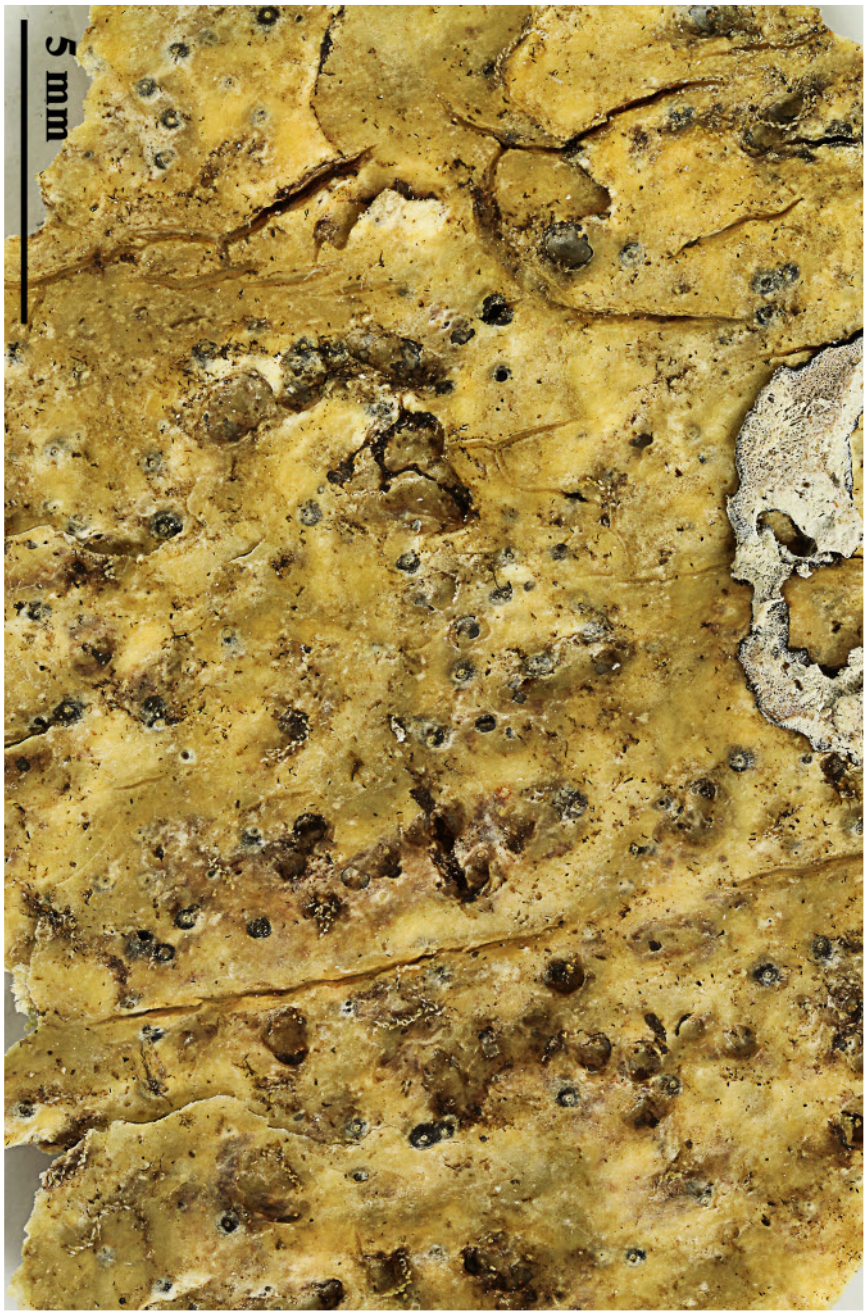


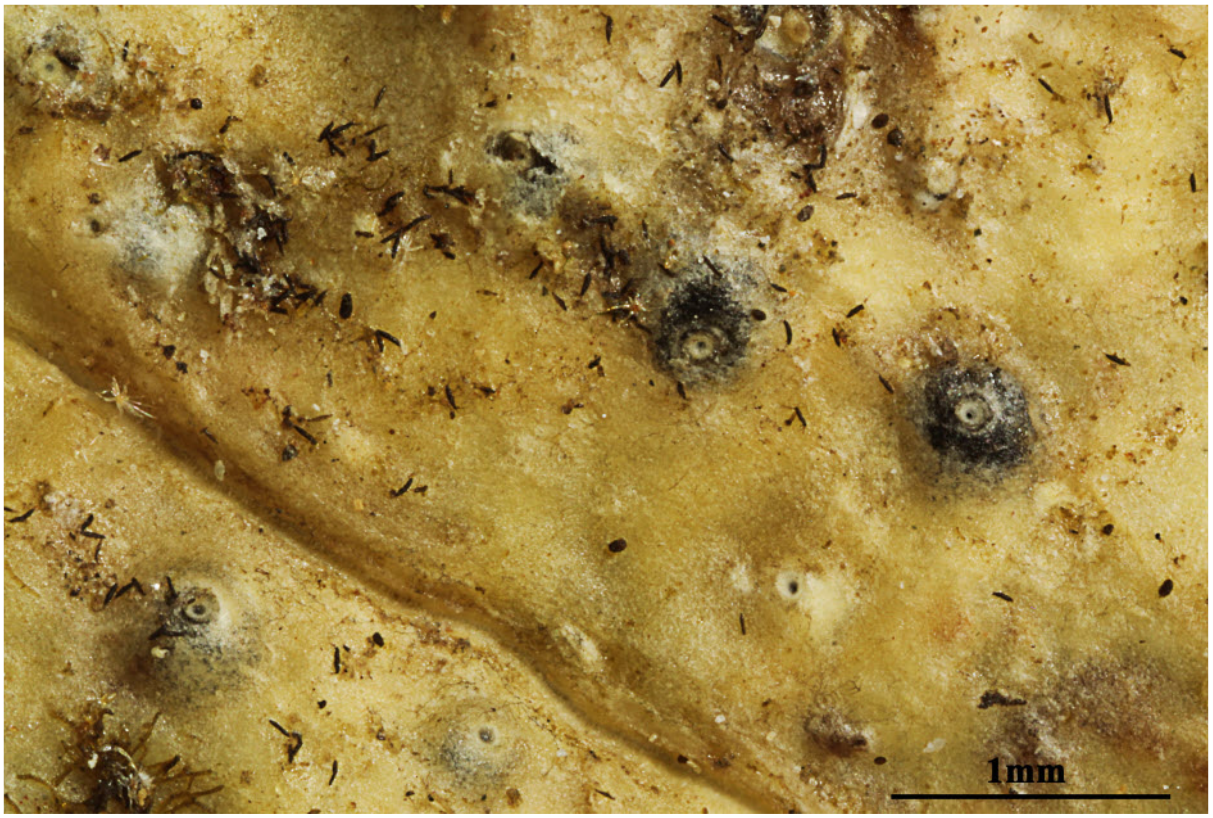
Astrothelium octosporum

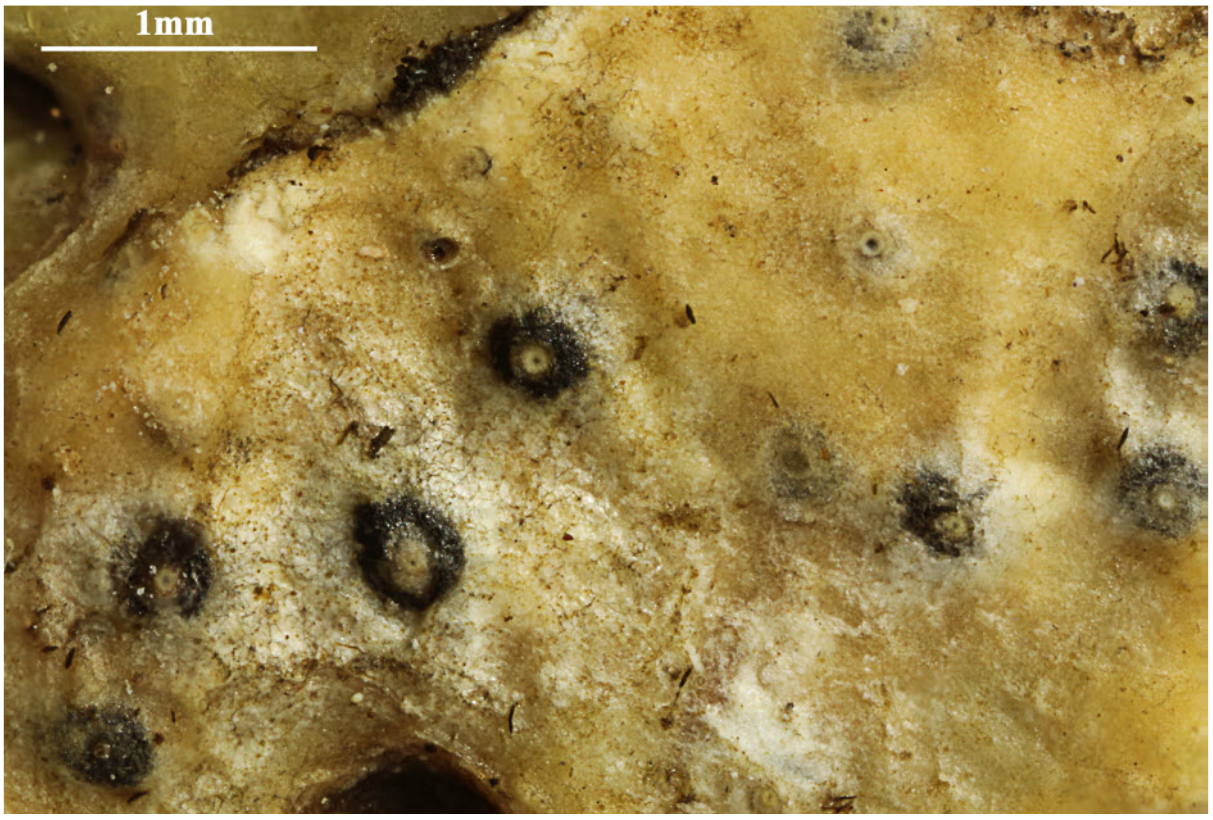
Astrothelium olivaceofuscum (Zenker) Aptroot & Lücking, Lichenologist 48(6): 876 (2016)
= *Trypethelium olivaceofuscum* Zenker, (1829)

Thallus corticate, browenish to pale greyish green or yellowish, smooth to uneven. Ascomata with apical ostioles, solitary to often irregularly confluent but not distinctly pseudostromatic, erumpent, covered by thallus but protuding ostiole dark. Hamathecium clear. Ascospores 8/ascus, 9–17-septate, fusiform, 85–100 × 8–16 µm, hyaline, IKI-. Chemistry: thallus UV-, K-. TLC: no substances detected.

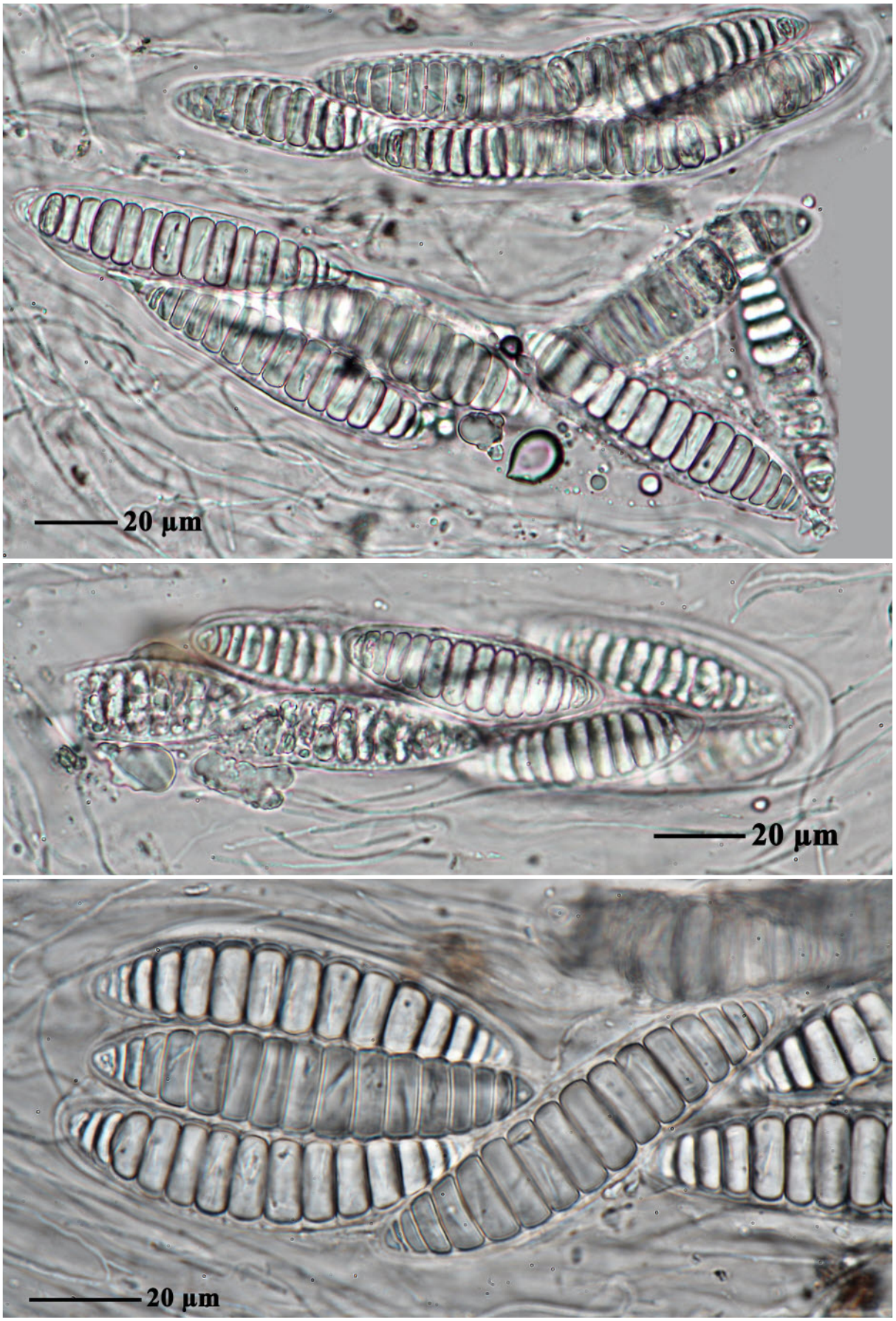
[ABL60454], Costa Rica, Prov. Guanacaste, Volcán Tenorio National Park, 25 km NNW of Tilarán, 84°59’ W, 10°43’ N, 700 m. On tree in meadow along access road to station near Bijagus. Leg. A. Aptroot (no 60454), 15.03.2004, det. A. Aptroot 2004.



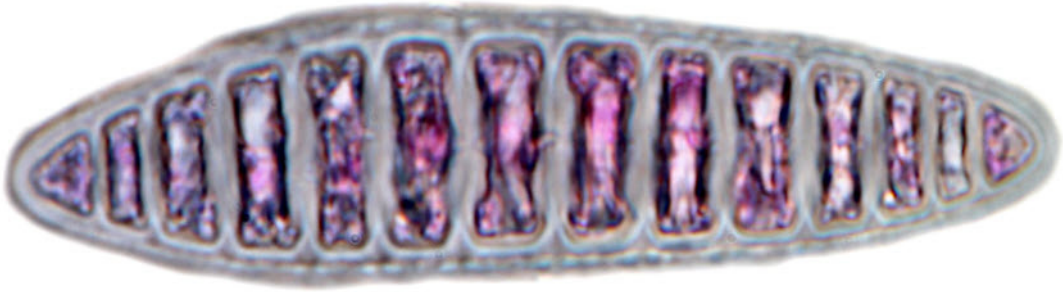




Astrothelium olivaceofuscum



Astrothelium olivaceofuscum







Astrothelium olivaceofuscum

Astrothelium papillosum (P.M. McCarthy) Aptroot & Lücking, Lichenologist 48(6): 876 (2016)
= *Laurera papillosa* P.M. McCarthy, Lichenologist 27(4): 311 (1995)

Thallus corticate, green, distinctly verrucose-papillose. Ascomata with apical or eccentric but then separate ostioles, immersed and covered by thallus except for brownish black ostioles. Hamathecium orange, inspersed. Spores 8/ascus, muriform, fusiform-ellipsoid, 130–195 × 26–34 µm, constrcted at the markedly thickened median septum, hyaline, IKI-. Chemistry: thallus UV-, K-. TLC: no substances detected.

[ABL 37607], Papua New Guinea, Northern province, Owen Stanley Range, Myola, c. 2 km along trail from guesthouse towards NE, 9°08' S, 147°47' E, 2400-2800 m. In primary montane forest dominated by *Phyllocladus sp*. on montain ridge. Leg. A. Aptroot (no 37607), 16.10.1995, det. A. Aptroot 1996.





Astrothelium papillosum

Astrothelium papulosum (Nyl.) Aptroot & Lücking, Lichenologist 48(6): 876 (2016)

=*Pseudopyrenula papulosa* (Nyl.) Müll. Arg., Flora, Regensburg 66: 248 (1883)

= *Trypethelium papulosum* (Nyl.) Makhija & Patw., Int. J. Mycol. Lichenol. 5(3): 242 (1992)

= *Verrucaria papulosa* Nyl., Annls Sci. Nat., Bot., sér. 5 7: 345 (1867)

Thallus corticate, yellowish brown, uneven to verrucose-papillose. Ascomata with apical ostioles, aggregate in diffuse pseudostromata; pseudostromata 1–5(–5) mm diam., (individual ascomata 0.2–0.4 mm diam.), immersed to erumpent, covered by thallus except for dark ostioles. Hamathecium clear. Ascospores 8/ascus, fusiform ellipsoid, 3-septate, hyaline, 26–38 × 7–9 µm, IKI-. Chemistry: thallus UV-, K-. TLC: no substances detected.

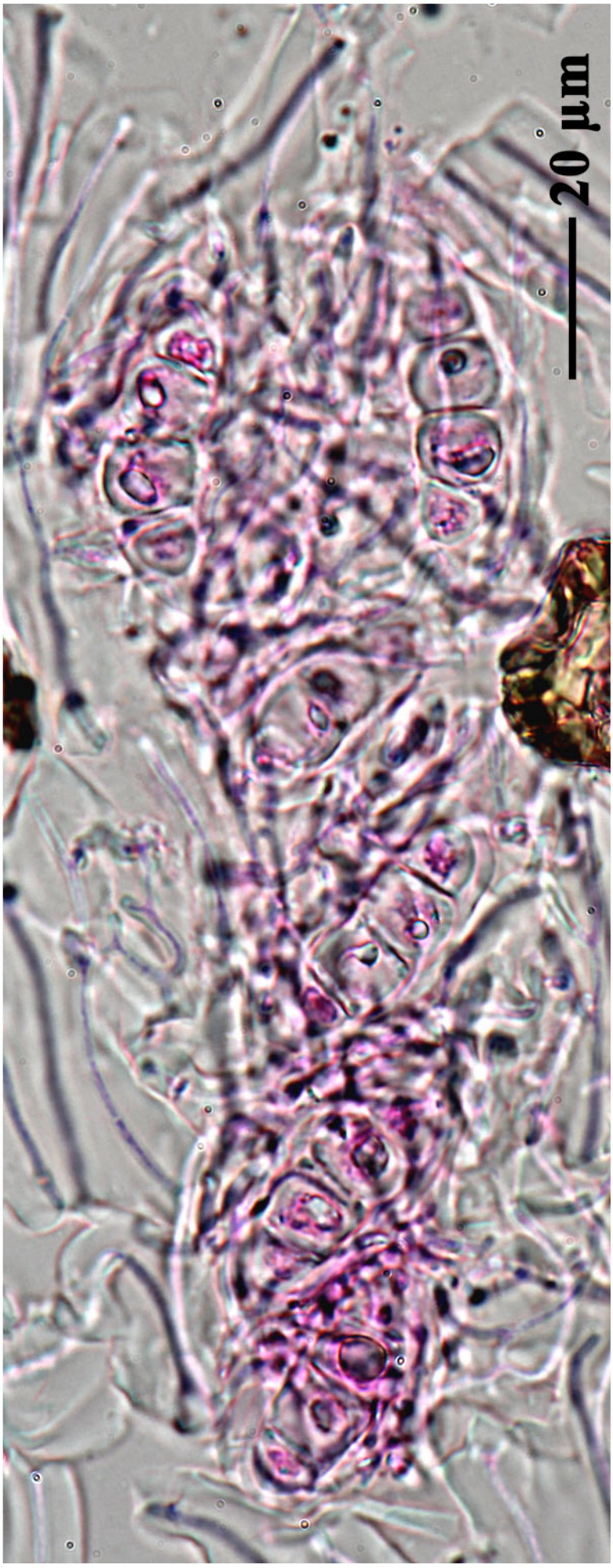
[ABLISE48628], Brazil, Bahia, Itamajarú, Monte Pascual, on tree in cerrado forest, 16°51’57” S, 39°24’59” W, 139 m. Leg. M. Cáceres & A. Aptroot, (no ISE 48628), 18.02.2019.







Astrothelium papulosum



Astrothelium papulosum

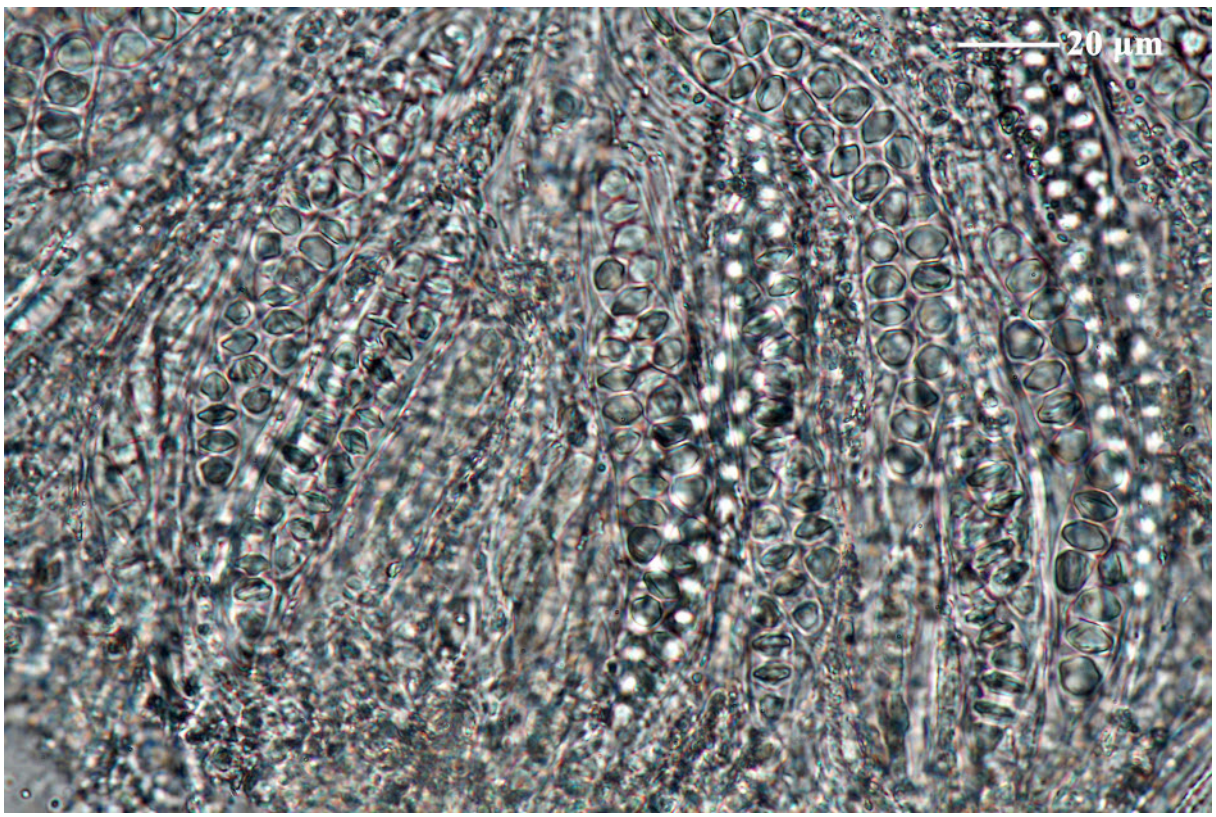
Astrothelium perspersum Aptroot & Ertz, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 625 (2016)

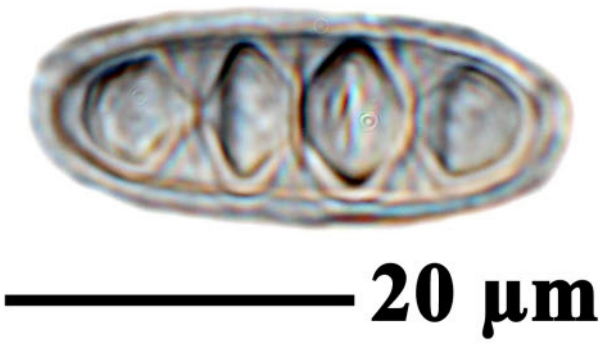
Thallus corticate, smooth, pale greenish grey, surrounded by a black prothallus line, c. 0.1 mm wide. Ascomata immersed in pseudostromata, but also in the bark, mostly in groups of 2-8, usually clustered in lines. Pseudostromata whitish, slightly raised and linear. Ostioles apical, surrounded by a thin black ring. Hamathecium inspersed with oil globules. Spore 8/ascus, hyaline, 3-septate, 26–38 × 7–9 µm, lumina partly diamond-shaped. Chemistry: thallus and pseudostromata UV-, K-. TLC: no secondary substances detected.

[Ertz9716], Gabon, branche dans la cime d'un arbre récemment abattu, en forêt dense soumise à une exploitation forestière légère. Leg. D. Ertz (no 9716), 12.04.2006, det. A. Aptroot. ISOTYPE.

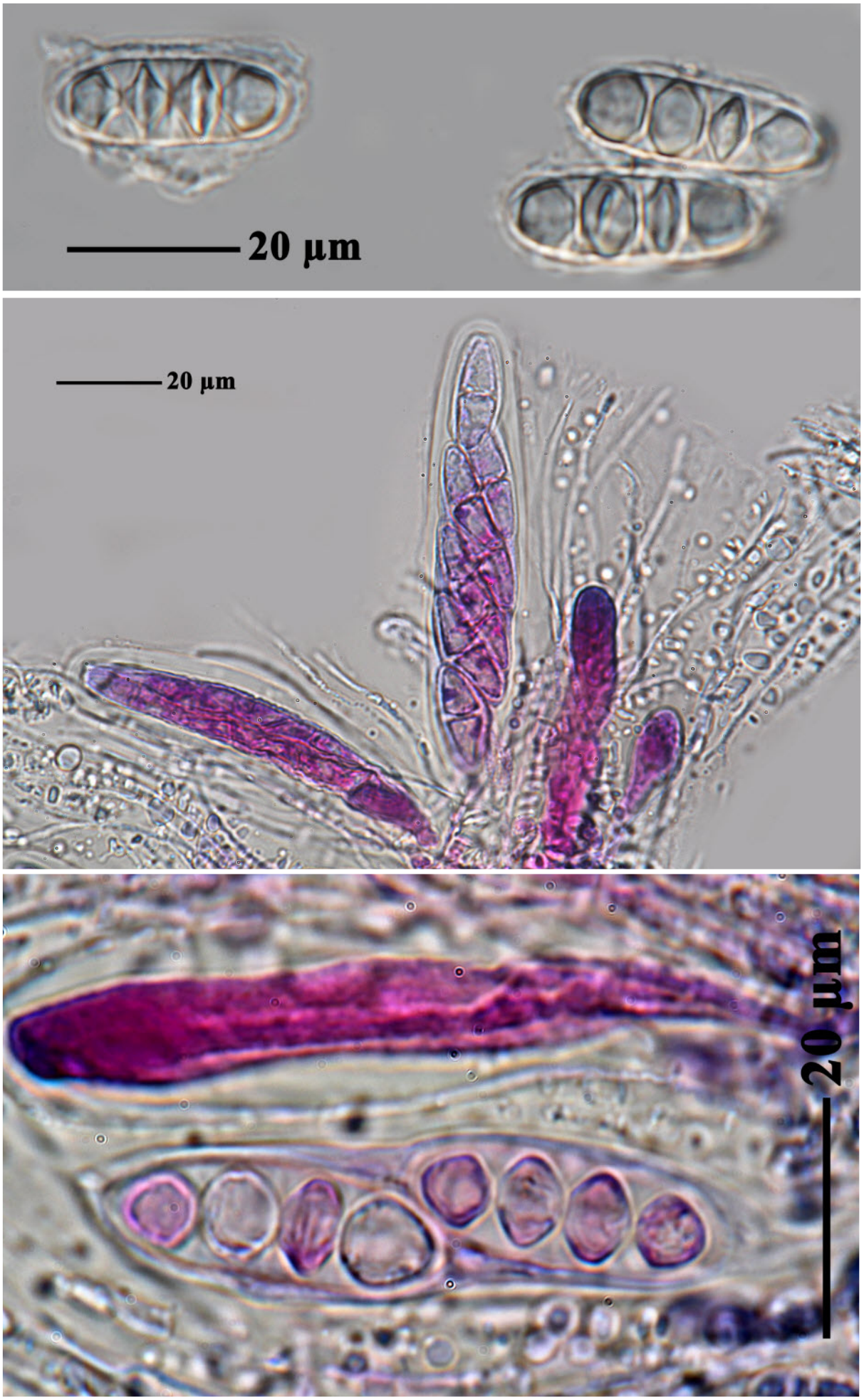




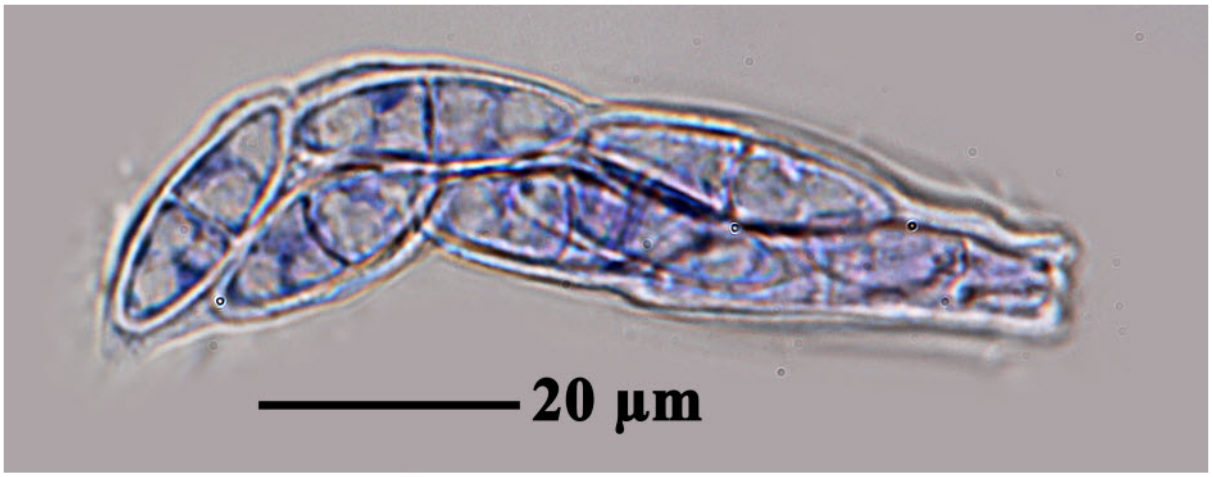




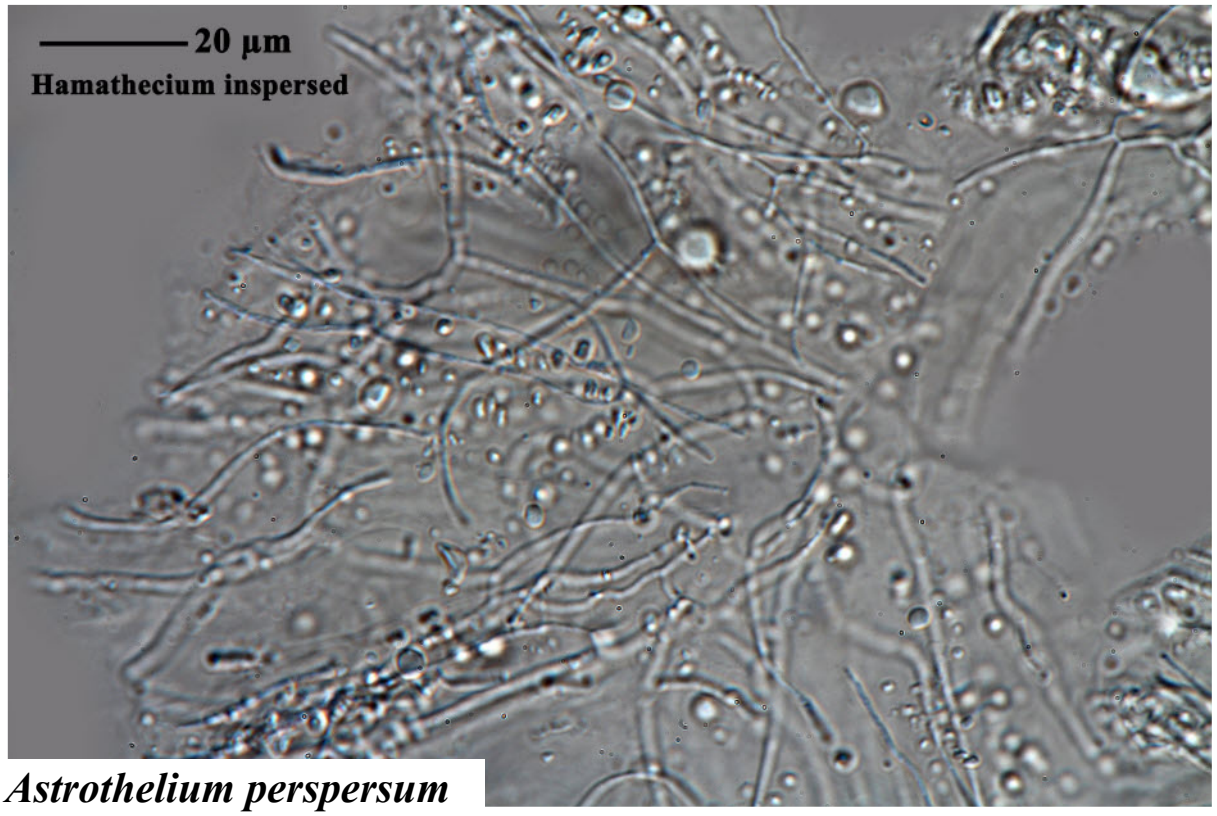
Astrothelium perspersum



Astrothelium perspersum







Astrothelium perspersum

Astrothelium philippinense Aptroot & Schumm, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 625 (2016)

Thallus corticate, smooth, shiny, covering areas ≤ 7 cm diam., c. 0.2mm thick, pale ochraceous green, surrounded by a brown to black prothallus line c. 0.4 mm wide, inducing gall formation of the host bark in the form of numerous c. 1–2 mm wide hemisperical warts. Ascomata pyriform, 0.6–0.9 mm diam., solitary, completely immersed in the bark, below the thallus cortex which, however, can be raised in warts by the bark galls, not in pseudostromata. Wall carbonized all around, ≤ c. 80 µm thick. Ostioles apical, simple, flat, black, presenting the only part of the ascoma that is visible from above. Hamathecium
inspersed with oil globules. Asci with 4 ascospores. Ascospores hyaline, muriform, 125–170 × 30–35 µm, ellipsoid, with a distinctly thickened median septum. Pycnidia not observed with certainty, although some of themany black dots around the ostioles may represent young pycnidia. Chemistry: Thallus and pseudostromata UV−. TLC: no secondary substances detected.

[7532], Philippinen, Negros, Prov. Negros Oriental, Mt. Talinis (Cuernos de Negros), Lunga Nature Trail vom Camp Vendiola (N 09°16.281, E 123°11.410) bis zum Lake Nailig (N 9°14.882, E 123°10.490), zwischen 1100-1600 m, bei 1180 m. Leg F. Schumm (no 7532) & U. Schwarz 10.08.2000, det. Aptroot 2009. ISOTYPE.

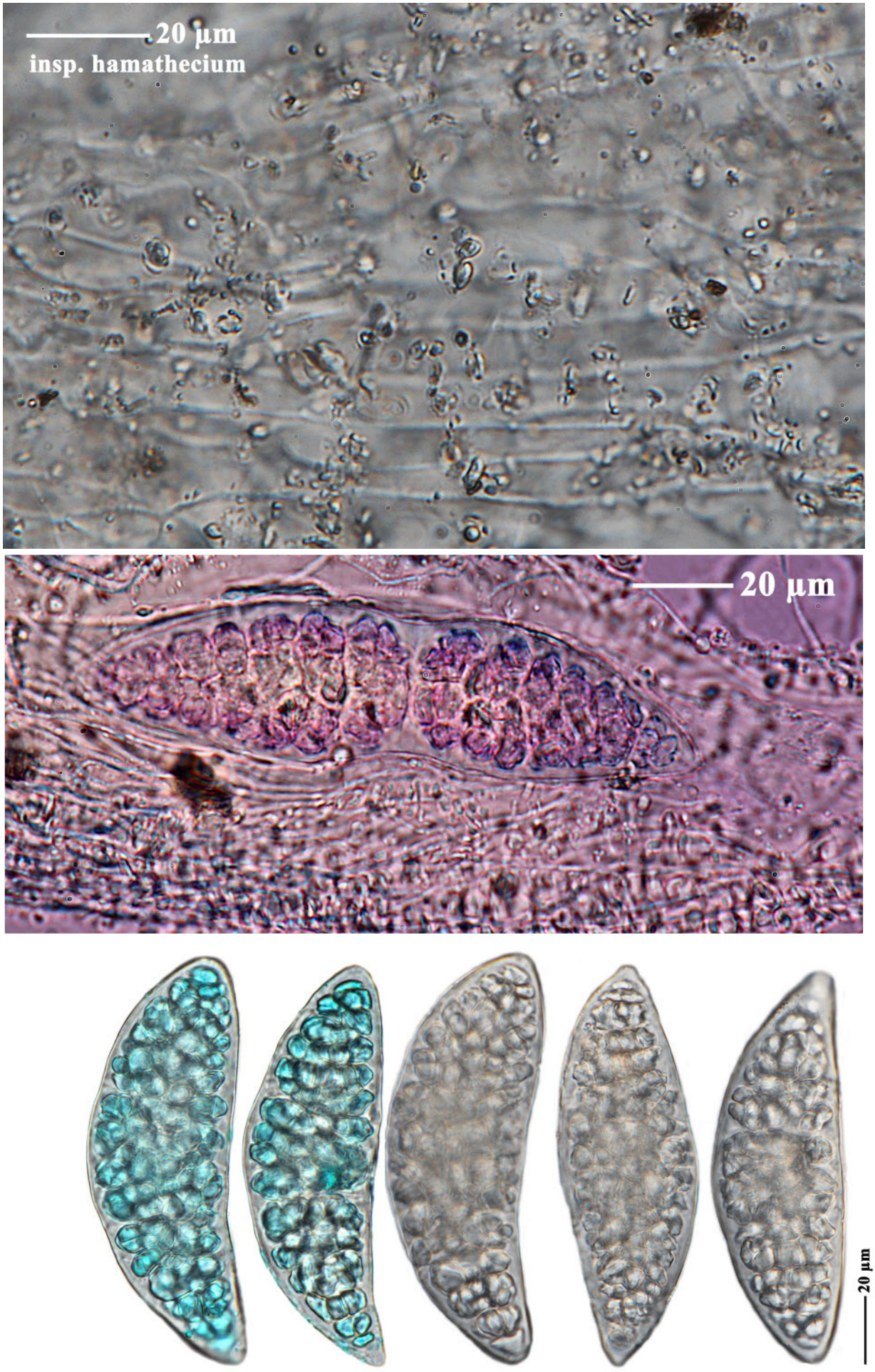




Astrothelium philippinense



Astrothelium philippinense



Astrothelium philippinense

Astrothelium phlyctaena (Fée) Aptroot & Lücking, Lichenologist 48(6): 877 (2016)

= *Trypethelium phlyctaena* Fée, Essai Crypt. Exot. (Paris): 68 (1825) [1824]

= *Trypethelium scoria* var. *phlyctaena* (Fée) Trevis., Flora, Regensburg 44: 19 (1861)

= *Verrucaria catervaria* Fée, Essai Crypt. Écorc.: 90 (1824)

= *Pyrenula catervaria* (Fée) Massal., Framment. Lich: 25 (1855).

= *Spermatodium catervarium* (Fée) Trevis., Conspect. Verruc.: 10 (1860).

= *Pseudopyrenula catervaria* (Fée) Müll. Arg., Flora 66: 248 (1883).

= *Trypethelium catervarium* (Fée) Tuck., Genera Lich. 260 (1872).

= *Verrucaria decolorata* Fée, Essai Crypt. Écorc.: 91 (1824).

= *Verrucaria tessella* Pers., in Gaudichaud, Voy. Uranie: 183 (1827).

= *Pseudopyrenula tessella* (Pers.) Graff, Mycologia 9: 16 (1917).

= *Verrucaria ochroleuca* Eschw., in Martius, Icon. Sel. Pl. Crypt. 2: 16, t. 8, figs 3, 4 (1828).

= *Pseudopyrenula ochroleuca* (Eschw.) Vain., Acta Soc. Fauna Fl. Fenn. 7(2): 209 (1890).

= *Spermatodium ochroleucum* (Eschw.) Trevis., Conspect. Verruc.: 11 (1860).

= *Trypethelium ochroleucum* (Eschw.) Nyl., Flora 52: 126 (1869).

= *Trypethelium duplex* Fée, Ann. Sci. Nat., Bot. 23: 437 (1831).

= *Chooicia feei* Trevis. (1861) nom. illeg.

= *Trypethelium cascarillae* Müll. Arg., Mém. Soc. Phys. Hist. Nat. Genève 30(3): 14 (1888) nom. illeg.

= *Pseudopyrenula duplex* (Fée) Vain., Acta Soc. Fauna Fl. Fenn. 7(2): 208 (1890).

= *Bathelium duplex* (Fée) C. W. Dodge, Ann. Missouri Bot. Gard. 40: 290 (1953).

= *Trypethelium quassiicola* Fée, Ann. Sci. Nat., Bot., sér. 1 23: 448 (1831).

= *Trypethelium pallescens* Fée, Ann. Sci. Nat., Bot., sér. 1 23: 440 (1831).

= *Trypethelium ochroleucum* var. *pallescens* (Fée) Müll. Arg., Bot. Jahrb. Syst. 6: 392 (1885).

= *Pseudopyrenula ochroleuca* var. *pallescens* (Fée) Vain., Acta Soc. Fauna Fl. Fenn. 7(2): 209 (1890).

= *Trypethelium leprieurii* Mont., Ann. Sci. Nat., Bot., sér. 2 19: 70 (1843).

= *Trypethelium triplex* Nyl., Flora 52: 125 (1869).

= *Trypethelium euporum* Kremp., Flora 59: 527 (1876).

= *Trypethelium bicolor* var. *pyrenuloides* C. Knight, Trans. Proc. New Zealand Instit. 16: 405 (1884).

= *Trypethelium phlyctaena* var. *pyrenuloides* (C. Knight) Zahlbr., Catal. Lich. Univ. 1: 498 (1922).

= *Trypethelium ochroleucum* var. *depauperatum* Müll. Arg., Bot. Jahrb. Syst. 6: 392 (1885).

= *Trypethelium leprosum* Müll. Arg., Bot. Jahrb. Syst. 6: 393 (1885).
= *Trypethelium subalbens* Nyl., Flora 69: 178 (1886).
= *Bathelium subalbens* (Nyl.) C. W. Dodge, Ann. Missouri Bot. Gard. 40: 290 (1953).

Thallus corticate, light greenish to brownish grey or yellowish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, diffusely pseudostromatic; pseudostromata 0.8–1.5(–2.0) mm broad., erumpent to prominent, covered by thallus but usually paler and cream-coloured. Hamathecium clear. Ascospores 8 per ascus, fusiform-ellipsoid, 3-septate, 15–27 × 7–10 µm, hyaline, IKI−. Chemistry: Thallus and pseudostromata UV+ yellow, K−, with lichexanthone (or 1,8-dihydroxy-3,6-dimethoxyxanthone).

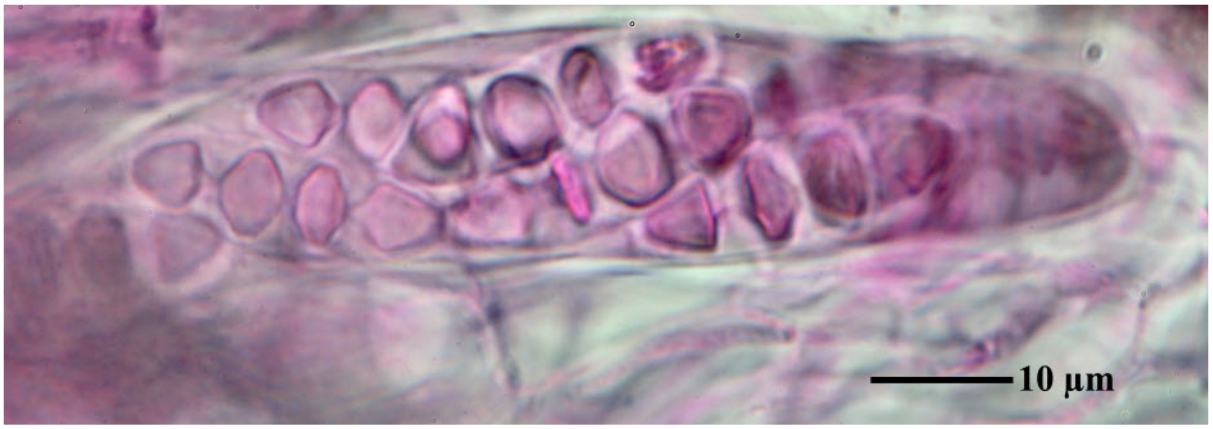
[ISE48584], Brazil, Bahia, Itamarajú, Monte Pascual, on tree bark in cerrado forest. 130 m, 16“51’55” S, 30°24’54” W. Leg. M. Cáceres & A. Aptroot (no ISE 48584), 18.02.2019, det. A. Aptroot, 2019.

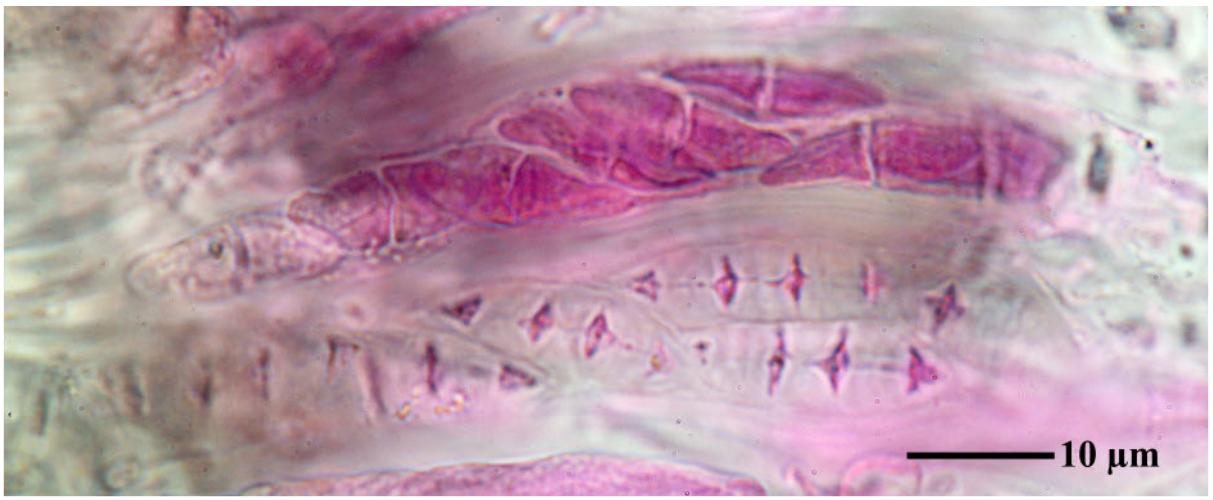


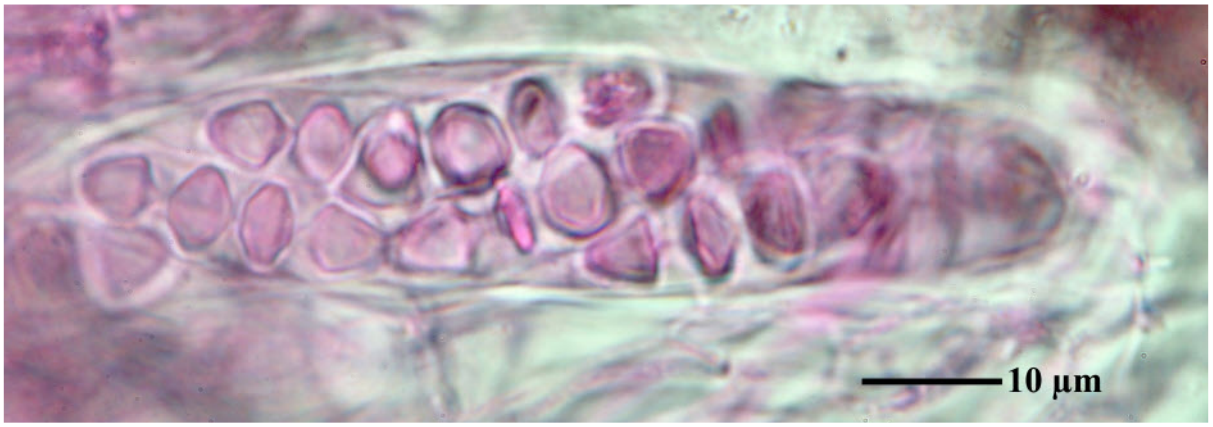
Astrothelium phlyctaena

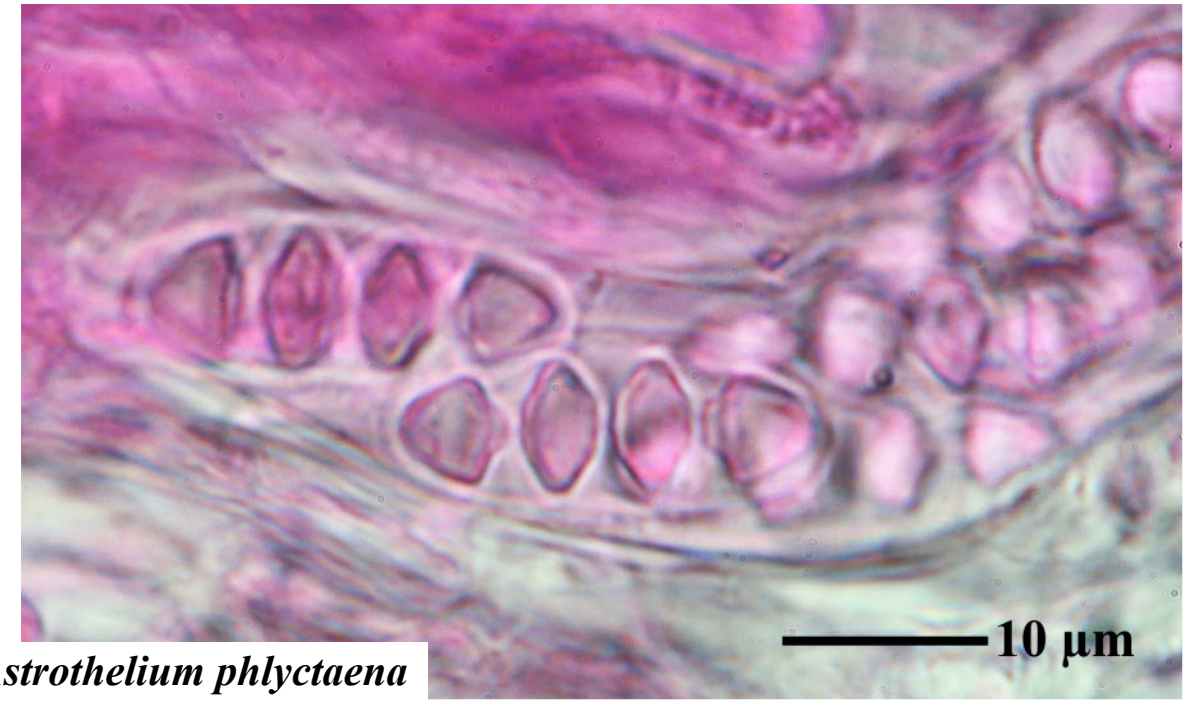


Astrothelium phlyctaena







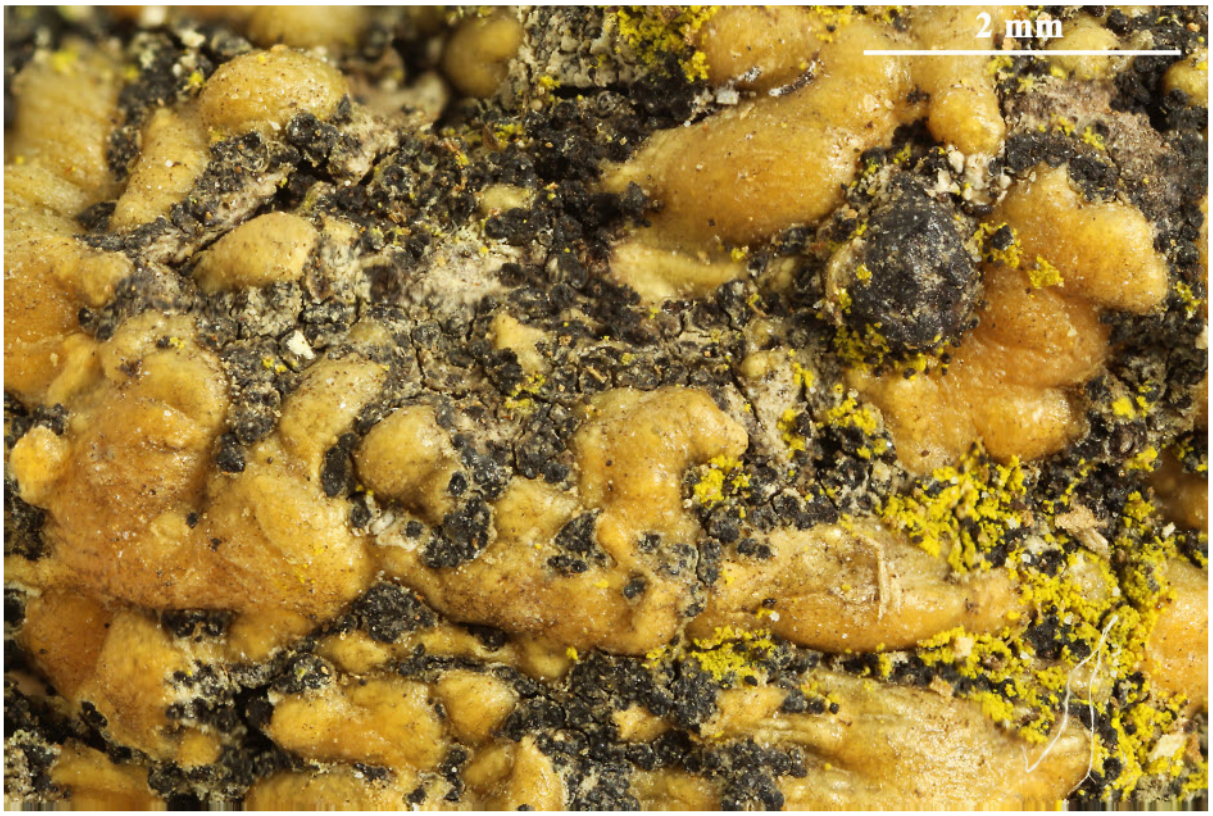


Astrothelium phlyctaena

Astrothelium pictum Aptroot, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 718 (2016)

Thallus bullate, smooth, somewhat shiny, continuous, covering areas ≤ 5 cm diam., c. 0.2 mm thick, olive-green to olive-grey, not surrounded by a prothallus, inducing gall formation of the host bark. Ascomata globose, 0.8–1.2 mm diam., immersed in groups or lines of 5–25 in pseudostromata with a surface different from the thallus, which are not distinctly raised above the thallus and irregular to linear in outline, whitish, inside with red crystals. Wall black all around, ≤ c. 70 µm thick. Ostioles apical, not fused, flat, brown. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, (3–)5-septate, fusiform, 90–115 × 22–27 µm, ends rounded, lumina diamond-shaped, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus surface UV+ yellow, crystals in pseudostroma medulla K+ purple. TLC: an anthraquinone and lichexanthone.

[ABL40608], Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque Natural do Caraça, 20°06' S, 43°29' W, 1300 m, on *Brunfelsia*. Leg. A. Aptroot (no 40608), 15.-21.11.1997, det. A. Aptroot, 1997. ISOTYPE.







Astrothelium pictum

Astrothelium pleiostomum Redinger, Hedwigia 73: 58 (1933)
= *Trypethelium violascens* R.C. Harris, Acta Amazon., Supl. 14(1-2): 79 (1986)

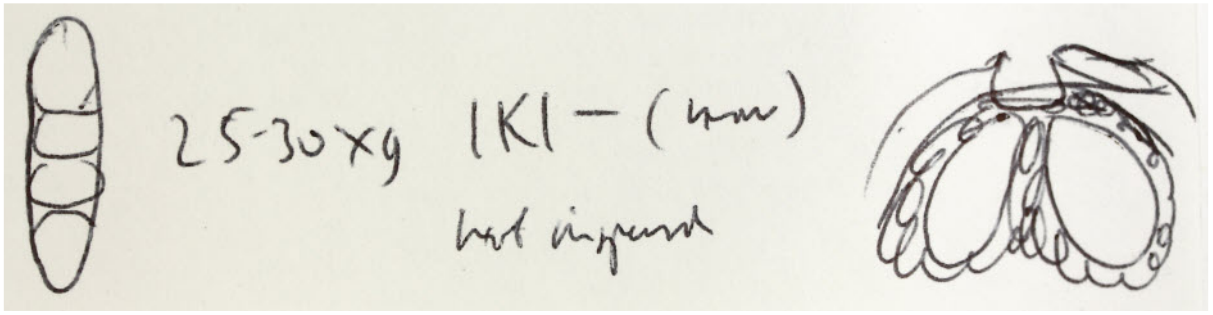
Thallus corticate, olive-green to yellowish, uneven somewhat bullate. Ascomata with eccentric, separate ostioles, diffusely pseudostromatic, erumpent, covered by thallus, internally with yellowish pigment. Hamathecium clear. Spores 8/ascus, fusiform-ellipsoid, 3-septate, 28–33 × 8–10 µm, hyaline, IKI-. Chemistry: thallus and pseudostromata UV-, K-, pseudostromata internally K+ yellow, with anthraquinone.

[Buck 2937], Brazil, along Igarapé Caititu off Rio Uatumã at Antônio Filinto (old rosewood factory); campina; 01°45’ S, 59°40’ W. Leg. W. R. Buck (no 2937), 18.-19.08.1979. ISOTYPE of *Trypethelium violascens*.

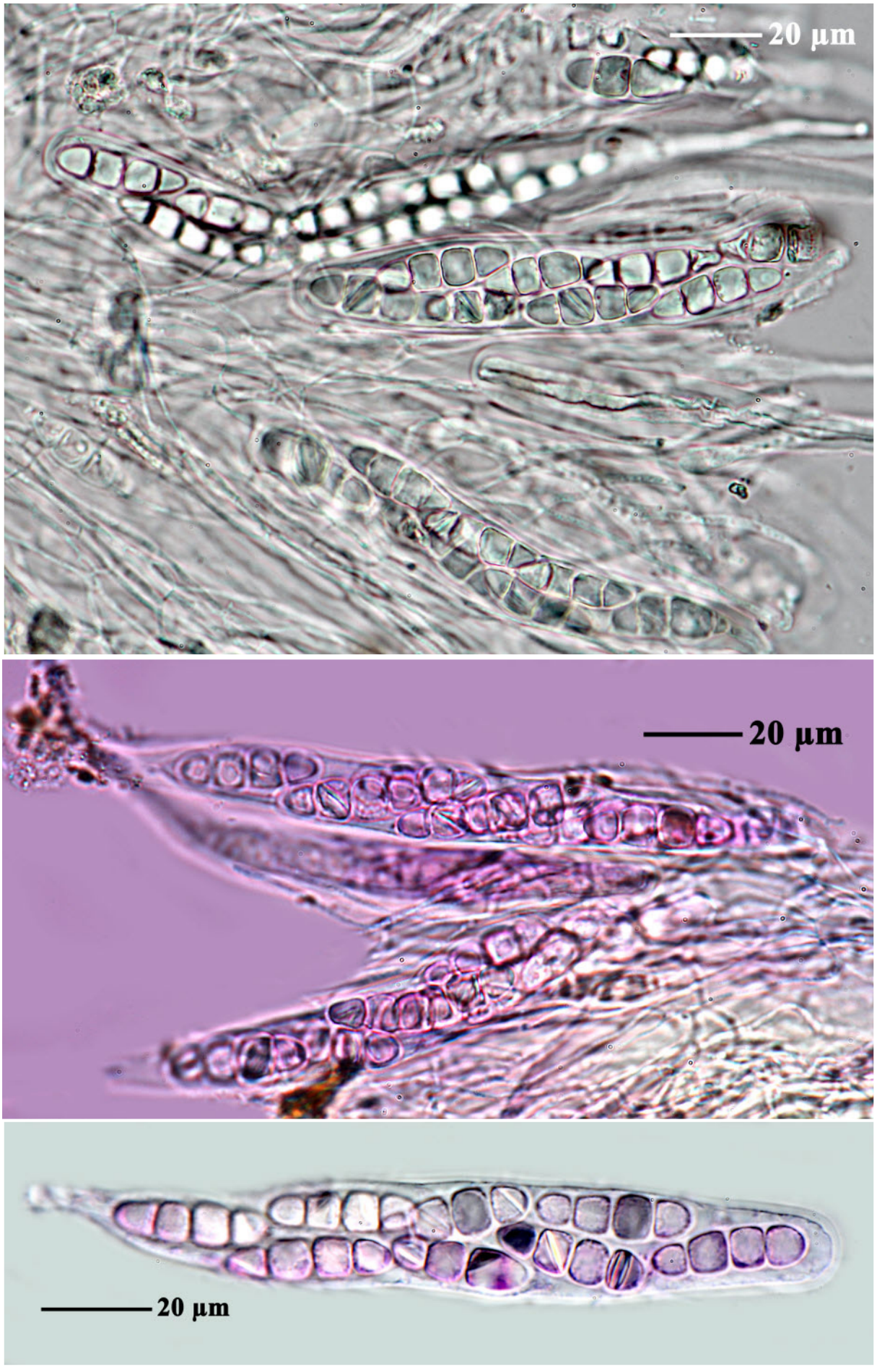






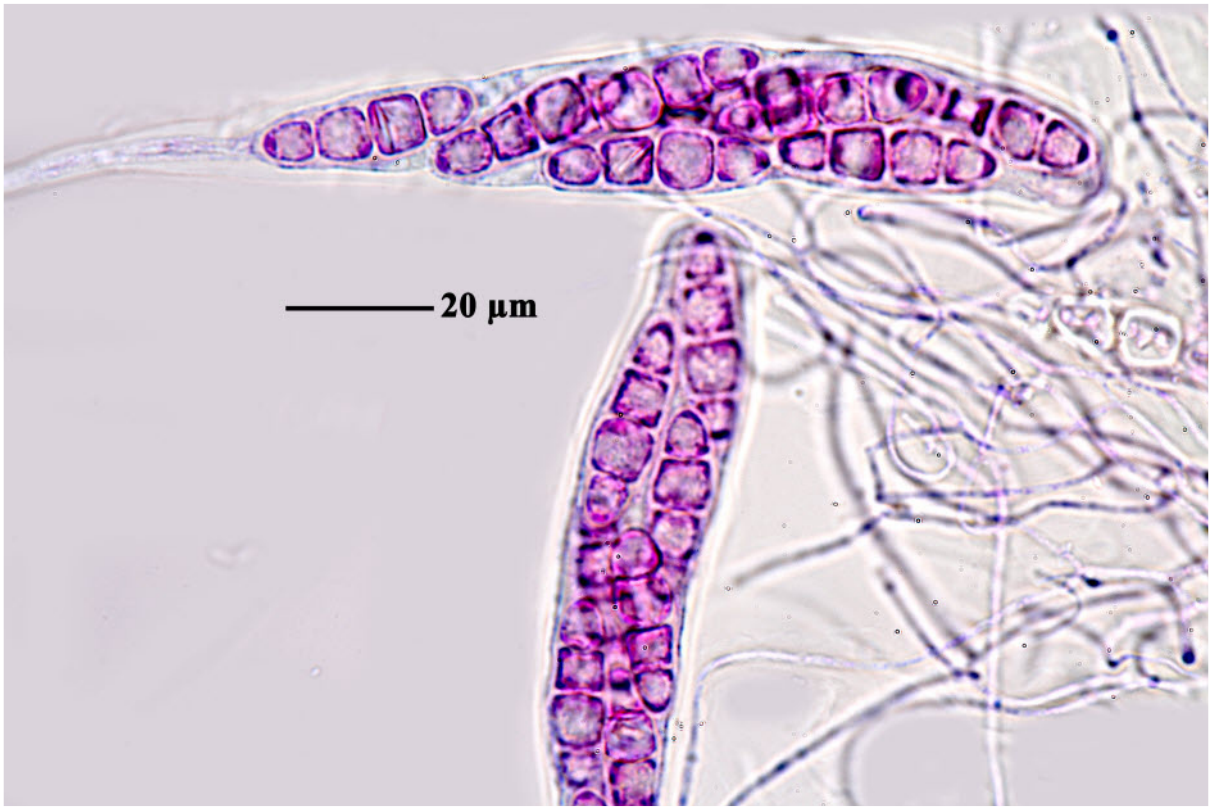


Astrothelium pleiostomum



Astrothelium pleiostomum



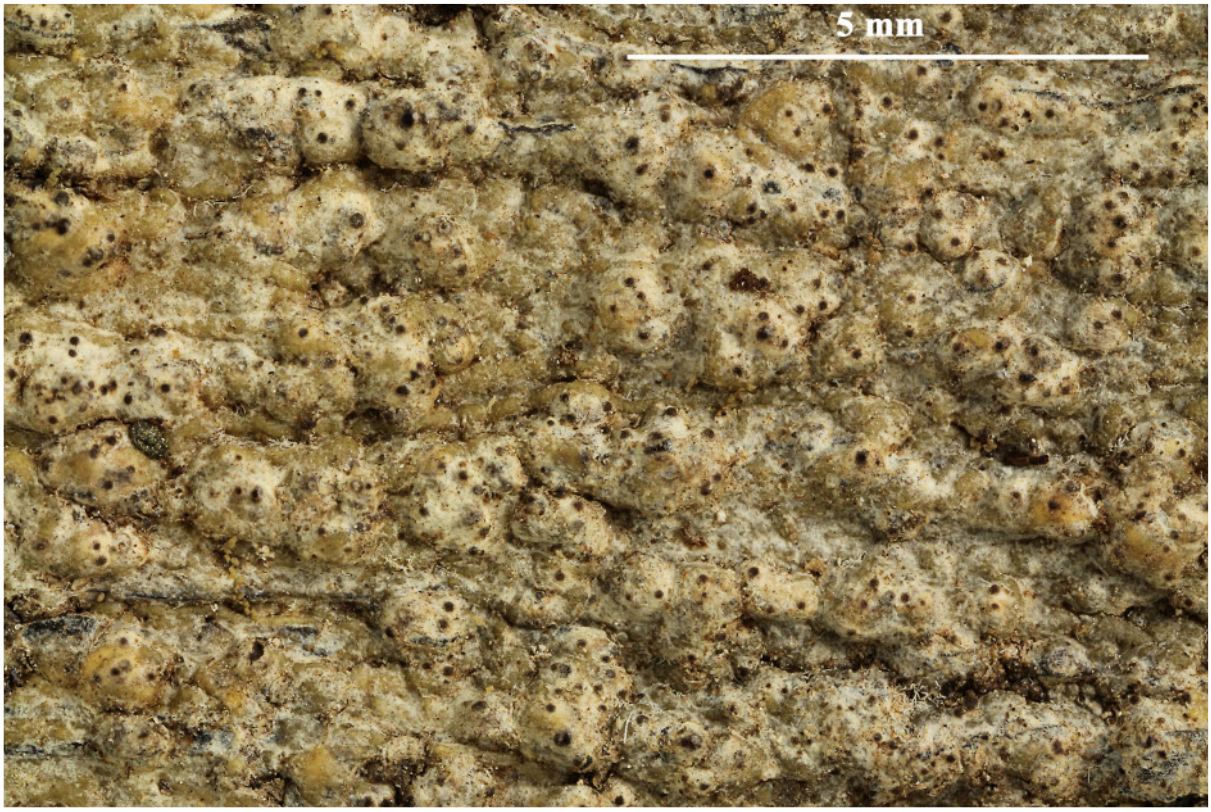


Astrothelium pleiostomum

Astrothelium porosum (Ach.) Aptroot & Lücking, Lichenologist 48(6): 879 (2016)
= *Bathelium porosum* (Ach.) C.W. Dodge, Ann. Mo. bot. Gdn 40: 290 (1953)
= *Leightonia porosa* (Ach.) Trevis., Flora, Regensburg 44: 19 (1861)
= *Trypethelium porosum* Ach., Syn. meth. lich. (Lund): 106 (1814)
= *Trypethelium sprengelii* var. *porosa* (Ach.) Nyl., in Hue, Nouv. Arch. Mus. Hist. Nat., Paris, 3 sér. 4: 129 (1892)
= *Verrucaria porosa* (Ach.) Eschw., in Martius, Fl. bras. enum. pl. 1(1): 135 (1833)

Thallus corticate, light greenish to browenish grey or yellowish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, diffusely pseudostromatic; pseudostromata 0.8–1.5 mm diam., erumpent to prominent, covered by thallus but usually paler and cream-colored. Hamathecium clear. Ascospores 8/ascus, fusiform-ellipsoid, 3-septate, 17–27 × 7–10 µm, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV+ yellow, K-, with lichexanthone (or 1,8-dihydroxy-3,6-dimethoxyxanthone).

[ABL17623], Papua New Guinea, Madang prov., Karkar island, NW side. Kinim station S of the airstrip, tropical rainforest, on tree. 145°55' E, 4°37' S, 50 m, leg. A. Aptroot (no 27623), 03.1987, det. A. Aptroot, 1987.

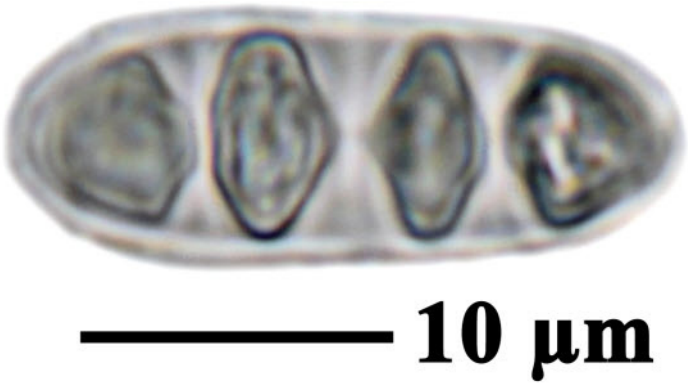




Astrothelium porosum







Astrothelium porosum

Astrothelium pseudannulare Aptroot & Etayo, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 625 (2016)

Thallus consisting of isolated patches, corticate, olive-green to brownish, smooth to uneven. Ascomata trypethelioid, with apical to eccentric ostioles, solitary to confluent, not pseudostromatic, 0.7–1.3 mm diam., immersed-erumpent, covered by thallus except for the dark ostiole surrounded by a narrow, whitish rim. Hamathecium clear. Ascospores 2–4/ascus, 3-septate, fusiform, 62–80 × 20–25 μm, hyaline, IKI-. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[Etayo20154], Ecuador, Sierra sur, Loja, Cajanuma, Parque Nac. Podocarpus, bosque nublado y Páramo, montañas „nudo de Sabamilla“, 2750-3000 m. Leg. J. Etayo (no 20154) & Z. Palice, 04.08.1999, det. A. Aptroot. ISOTYPE.





Astrothelium pseudannulare







Astrothelium pseudannulare

Astrothelium pseudoferrugineum Aptroot, in Aptroot, Ertz, Etayo Salazar, Gueidan, Mercado Diaz, Schumm & Weerakoon, Lichenologist 48(6): 627 (2016)

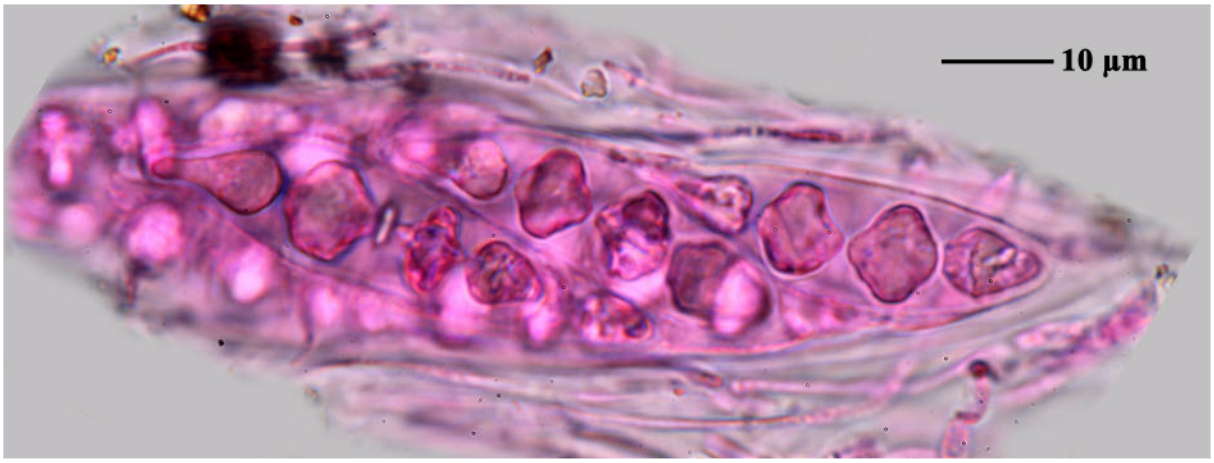
Thallus corticate, smooth, somewhat shiny to glossy, continuous, bright orange, not surrounded by a prothallus. Ascomata pyriform, 0.2–0.3 mm wide, 0.3–0.5 mm high, immersed in pseudostromata. Pseudostromata conical, raised above the thallus, with orange pruina. Wall black all around. Ostioles eccentric, 2–5 fused, convex to pointed, black. Hamathecium not inspersed with oil globules. Ascospores 8/ascus, hyaline, 3 septate, fusiform, 28–31 × 9–11 µm, ends somewhat pointed, lumina diamond-shaped, not surrounded by gelatinous layer. Chemistry: Thallus UV-, K-, pseudostromata UV+ red, K+ purple. TLC: An orange anthraquinone, possibly parietin

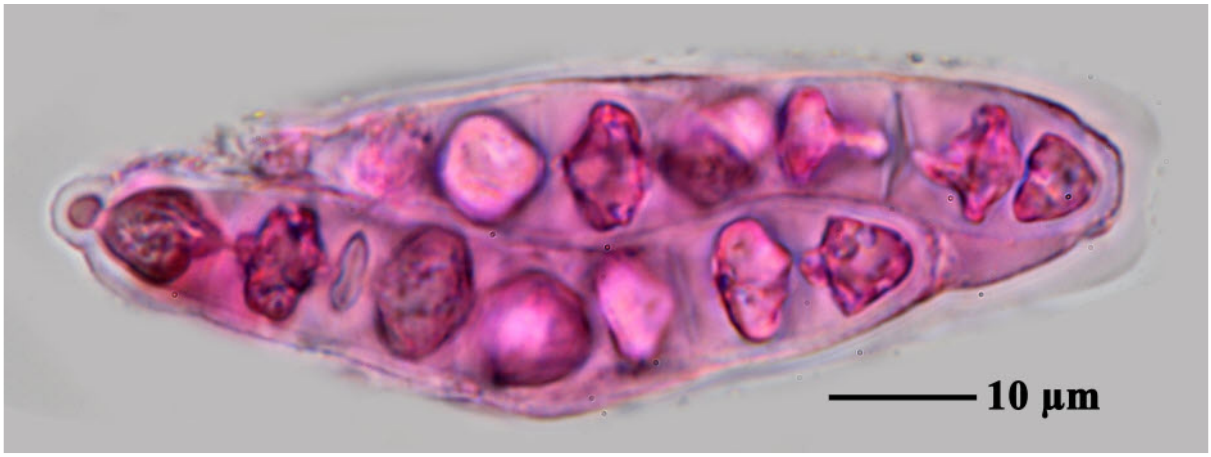
[Groenhart5739], Indonesia, East Java, Djombang, leg. P. Groenhart (no 5739), 10.1937, det. A. Aptroot. ISOTYPE.

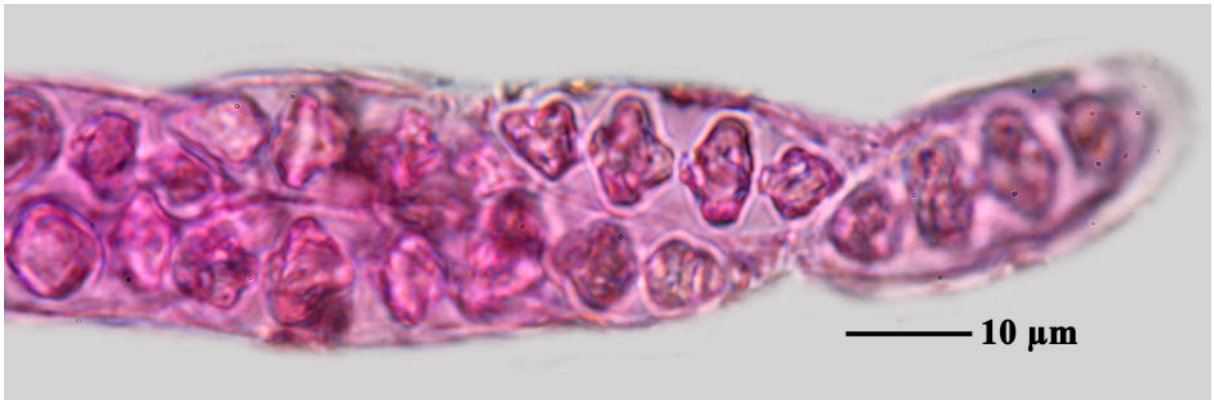


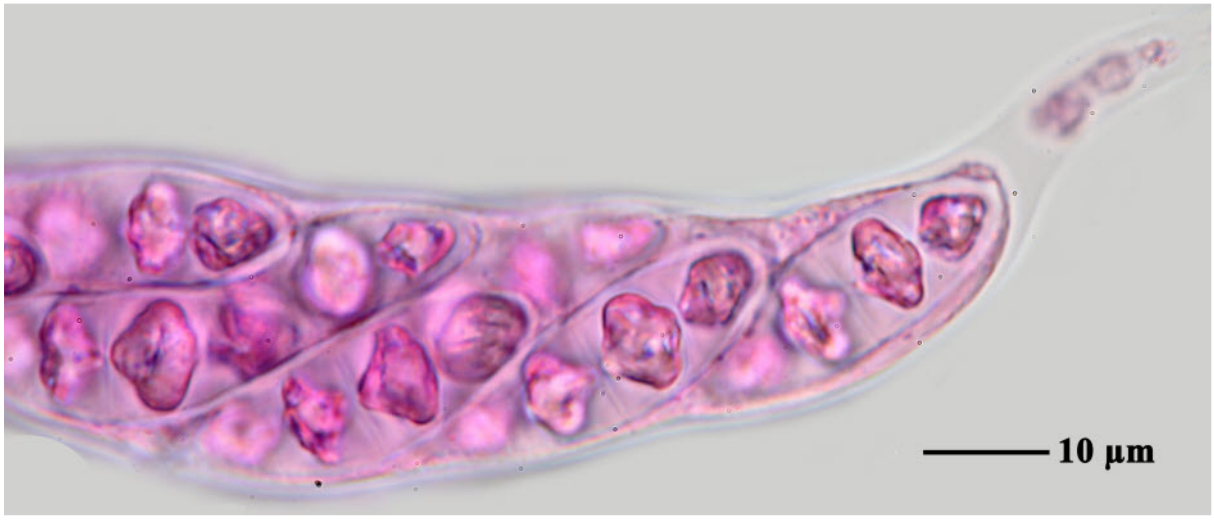


Astrothelium pseudoferrugineum









Astrothelium pseudoferrugineum

Astrothelium puiggarii (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 880 (2016)

= *Campylothelium puiggarii* Müll. Arg., Flora, Regensburg 66(16): 245 (1883)

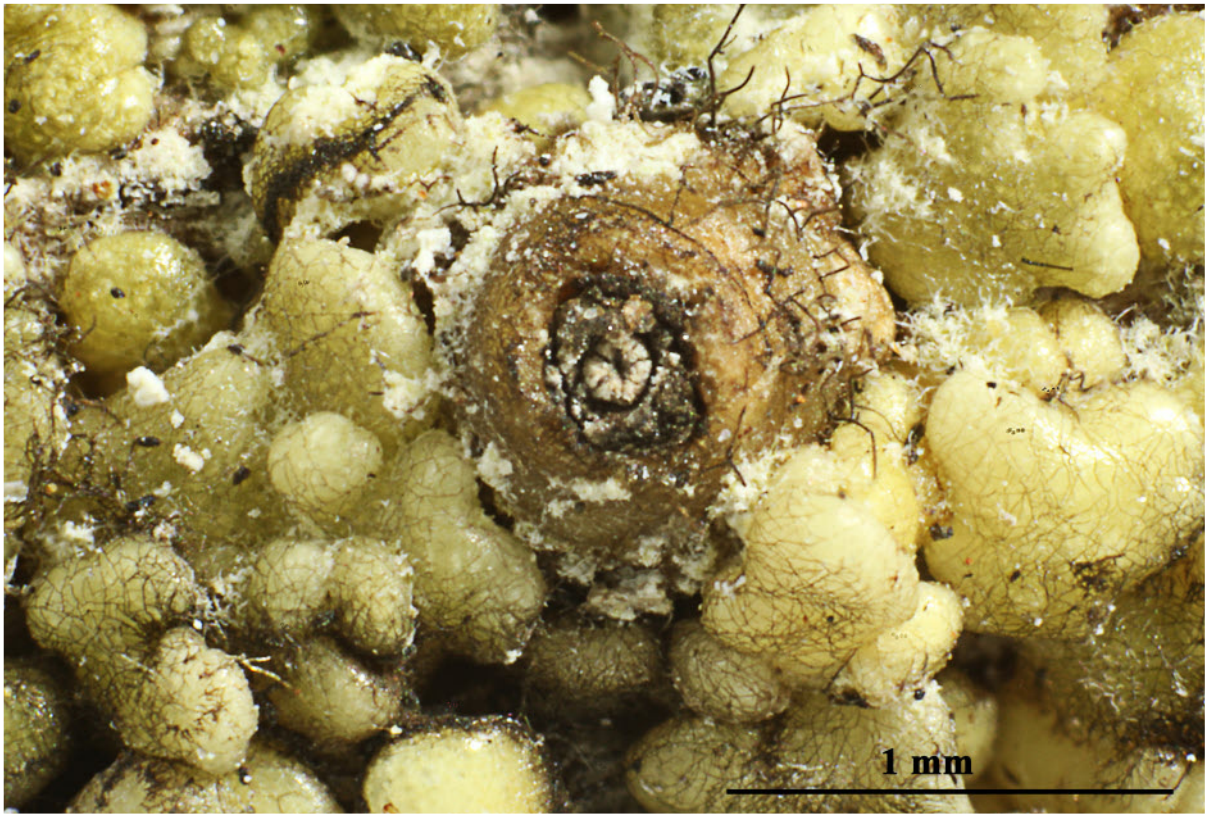
Thallus corticate, olive-green, verrucose-bullate. Ascomata pleurotheli-oid, with eccentric, separate ostioles,solitary, 0.8–1.3 mm diam., promi-nent to almost sessile, covered by thallus except for the protuding, papilliform, brownish grey ostiole, 1.0–1.5 mm diam. Hamathecium inspersed. Ascospores 2/ascus, densely muriform, fusiform, 70–90 × 20–25 µm, without distinctly thickened median septum, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: no substances detected.

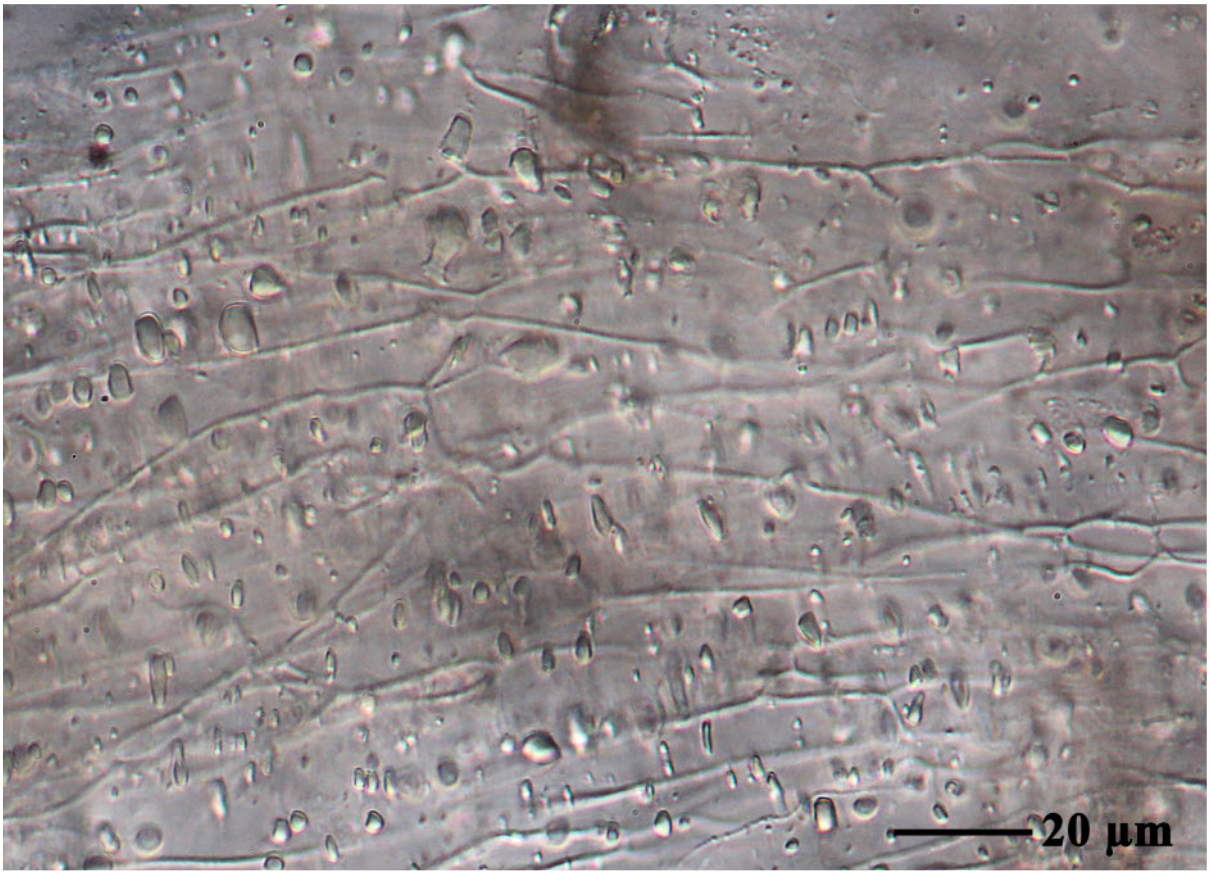
[ABL11672], Brazil, Rondônia, Estação Ecológica de Cuninã, 760 km on road BR 319 N of Porto Velho, 8°02’44’’ S, 63°29’11 W, 100 m, onb tree bark in primary rain forest. Leg. M. Cáceres & A. Aptroot (no 11672), 13.03.2012, det. A. Aptroot 2012.



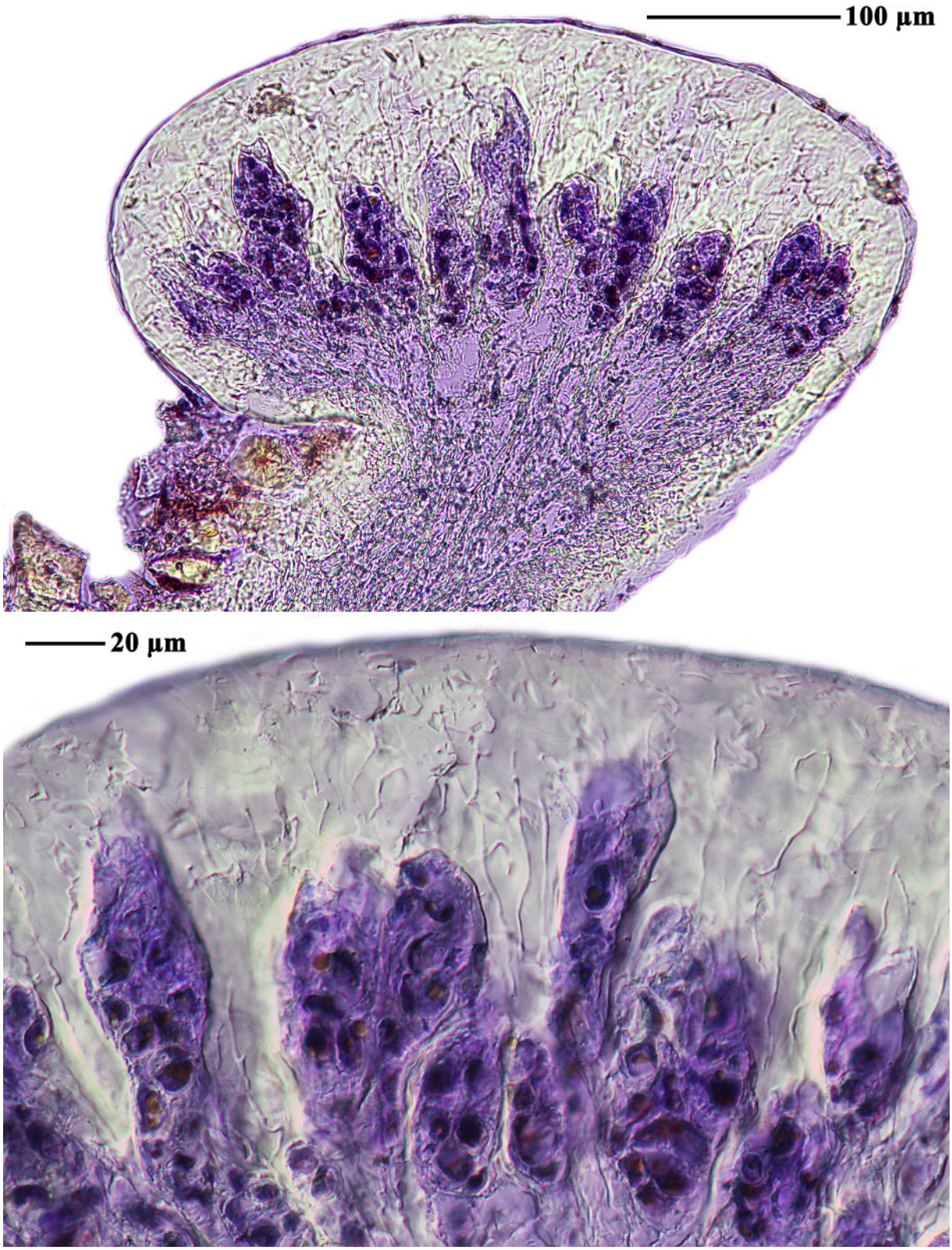


Astrothelium puiggarii

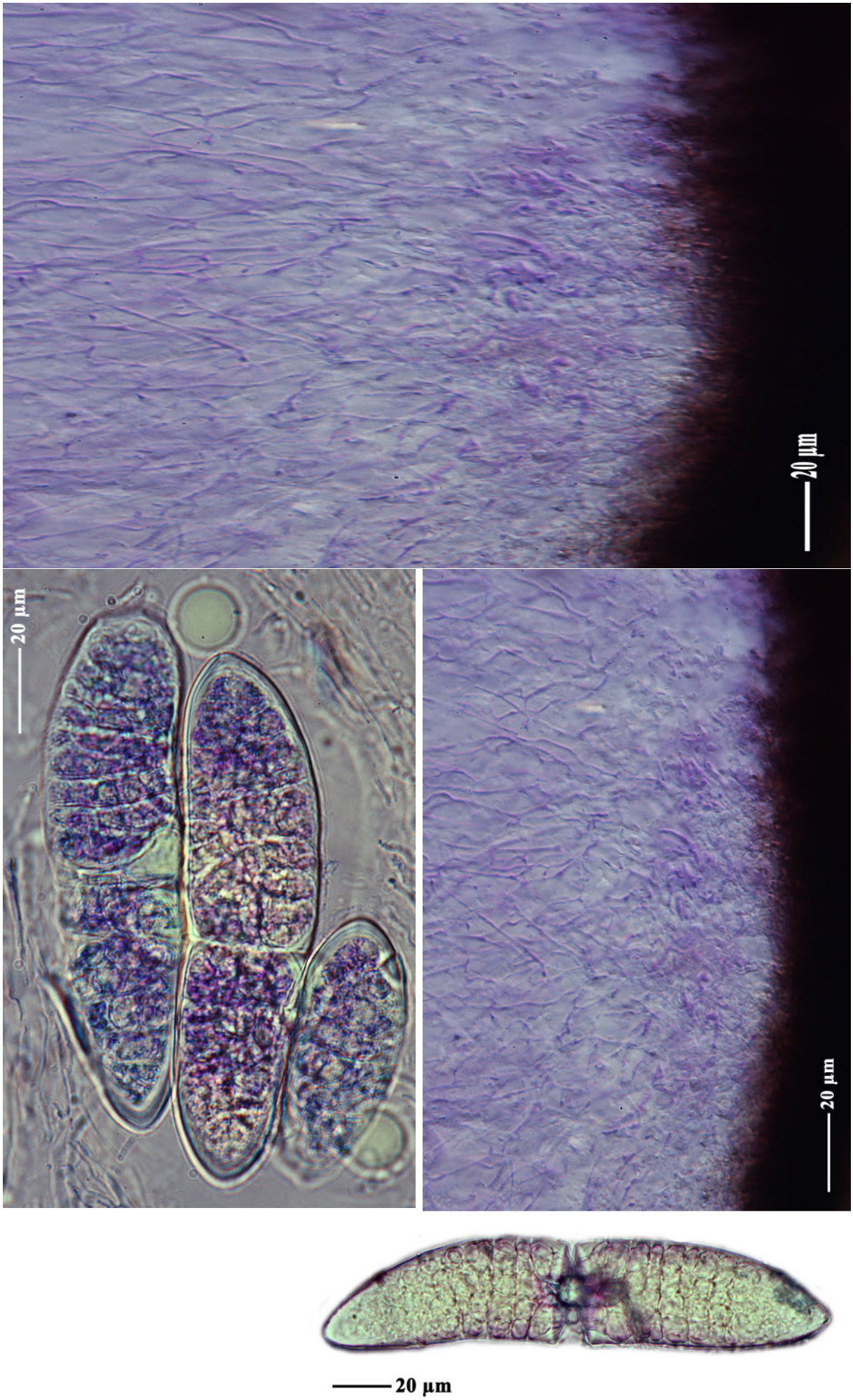




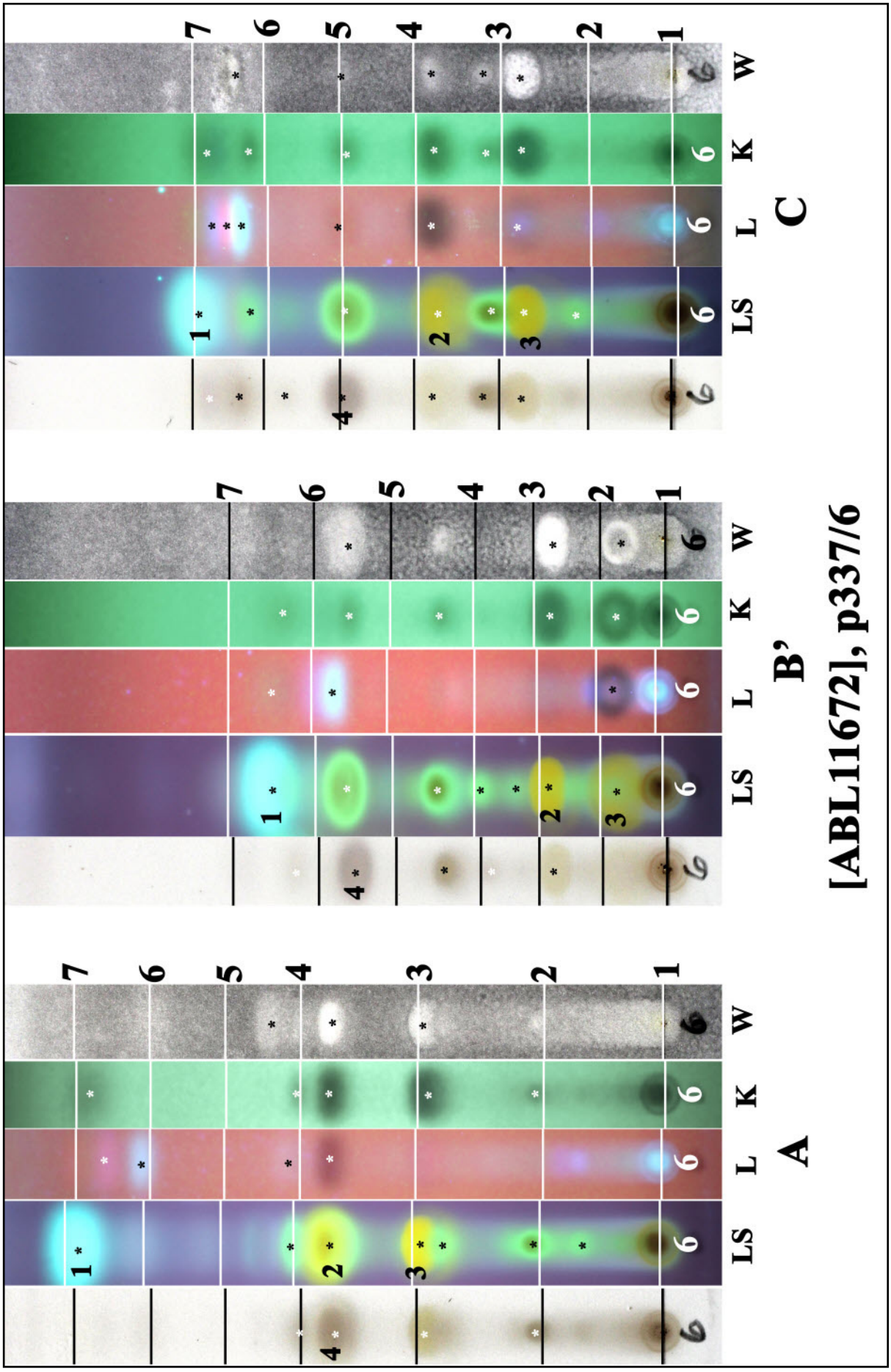
Astrothelium puiggarii



Astrothelium puiggarii



Astrothelium puiggarii



1: lichexanthone, 2:?, 3:?, 4:?

Astrothelium puiggarii

Astrothelium puiggarii (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 880 (2016)

= *Campylothelium puiggarii* Müll. Arg., Flora, Regensburg 66(16): 245 (1883)

Thallus corticate, olive-green, verrucose-bullate. Ascomata pleurothelioid, with eccentric, separate ostioles,solitary, 0.8–1.3 mm diam., prominent to almost sessile, covered by thallus except for the protuding, papilliform, brownish grey ostiole, 1.0–1.5 mm diam. Hamathecium inspersed. Ascospores 2/ascus, densely muriform, fusiform, 70–90 × 20–25 µm, without distinctly thickened median septum, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: no substances detected.

[ABL78657],Brazil,Rio Negrinho, Rio Preto, Fazenda Velha, on tree in temperate rain forest, 26°17’57” S, 49°37’24” W, 800 m. Leg. A. Aptroot (no 78657), 31.03.2019, det. A. Aptroot, 2019.









Astrothelium puiggarii



Astrothelium puiggarii

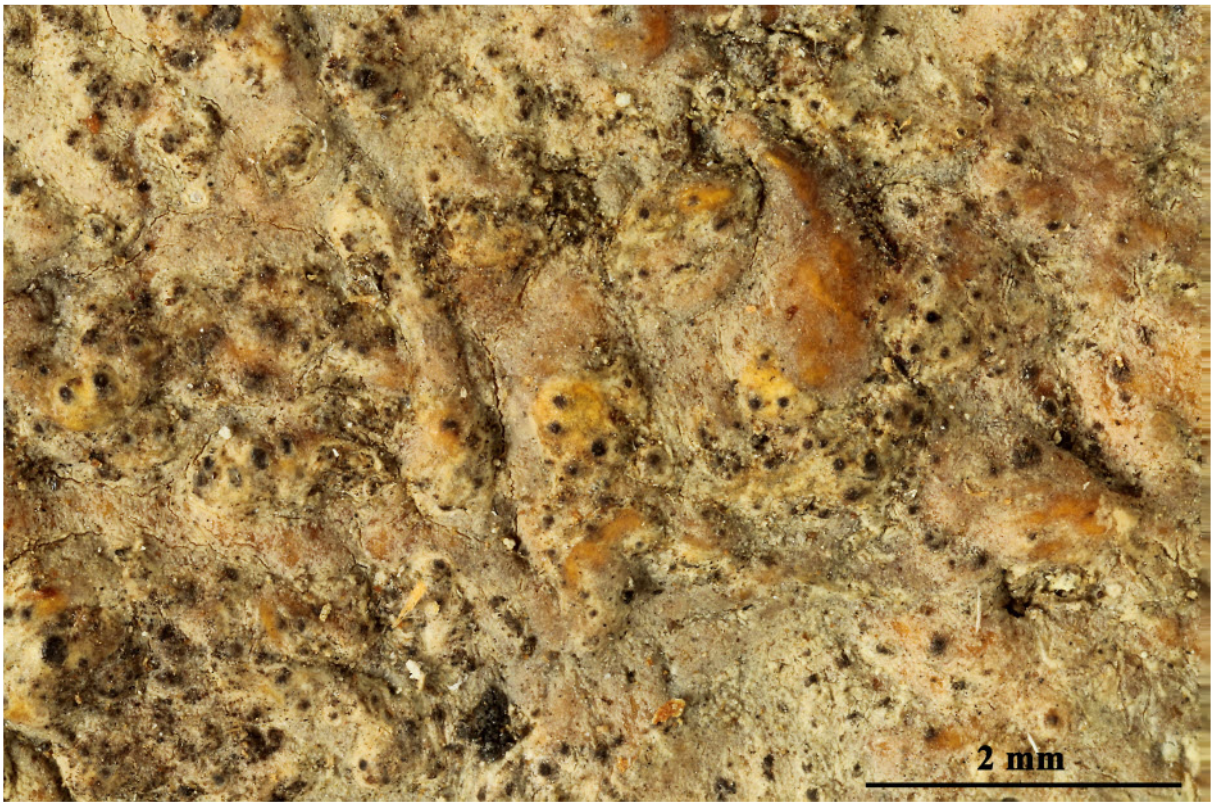
Astrothelium pulcherrimum (Fée) Aptroot & Lücking, Lichenologist 48(6): 881 (2016)

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

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

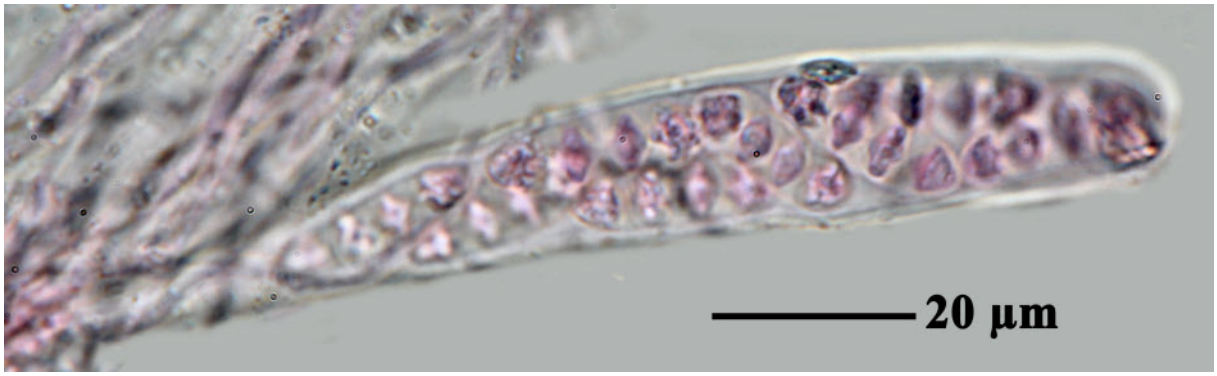
Thallus corticate, light olive-brown to brownish greenish grey to yellowish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary but usualy dense, 0.2–0.3 mm diam., erumpent, covered by thallus except dark ostioles surrounded by whitish rim. Hamathecium clear. Ascospores 8/ascus, fusiform-ellipsoid, 3-septate, 15–27 × 7–10 µm, hyaline, IKI-. Chemistry: Thallus and ascomata UV+ yellow, K-, with lichexanthone (or 1,8-dihydroxy-3,6-dimethoxyxanthone).

[Groenhart5095], Indonesia, East Java, Malang, garden of the Agricultural School, on Albizzia sp., 450 m. Leg. P. Groenhart (no 5095), 11.08.1939, det. A. Aptroot.

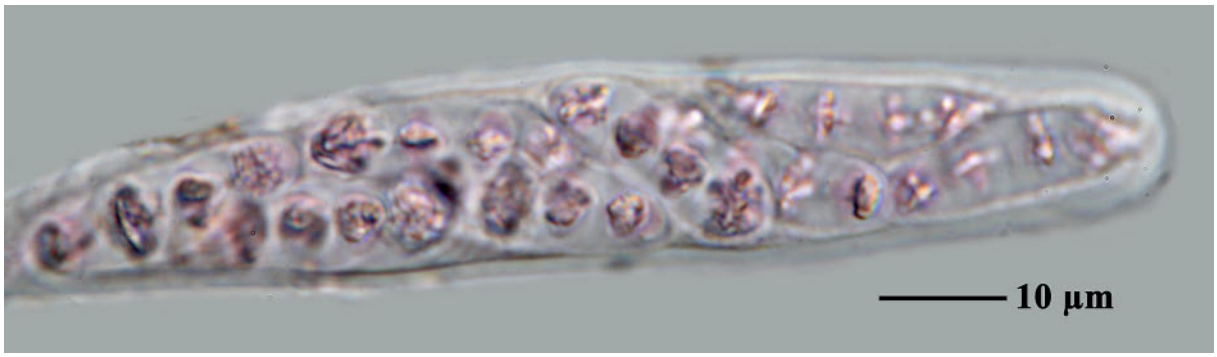




Astrothelium pulcherrimum







Astrothelium pulcherrimum

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

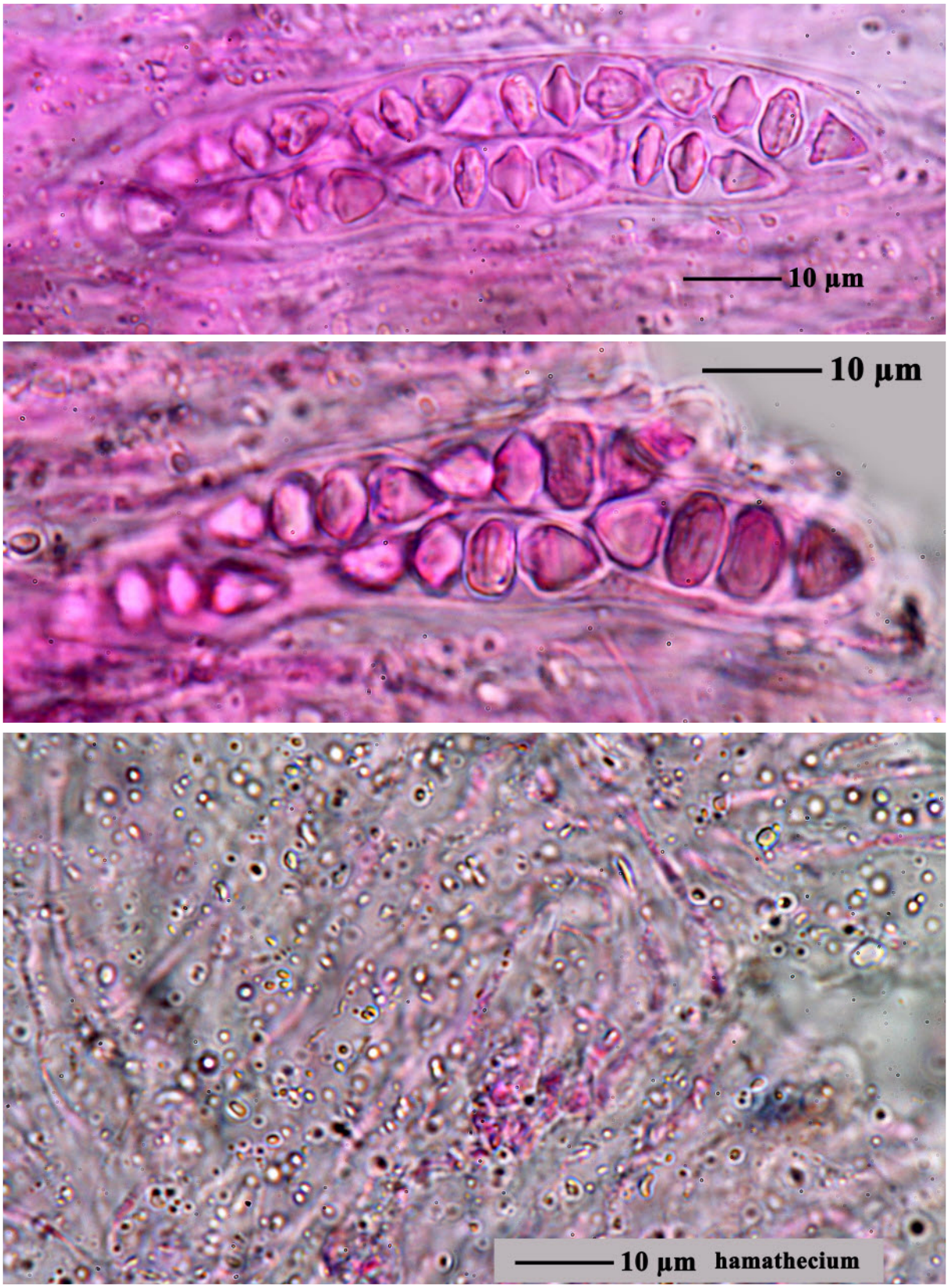
Thallus corticate, olive-green to greyish, verrucose-bullate, somwhat pseudogall-inducing. Ascomata trypethelioid, with apical ostioles, solitary to confluent, but often dense, 0.8–1.5 mm diam., immersed-erumpent in elevated thallus portions, covered by thallus, except for dark ostiole surrounbded by white ring. Hamathecium heavily inspersed. Ascospores 8/ascus, fusiform-ellipsoid, 3-septate, 23–27 × 8–9 µm, hyline, IKI-. Chemistry: Thallus UV-, K-, ostioles UV+ yellow, K-, with lichexanthone.

[Bleij], Guyana, upper Demerara-Berbice Distr., Mabura Hill, 5°21’ N, 58°40’ W, 0-50 m, 180 km SSE of Georgetown. In evergreen forest, in middle canopy of *Mora excelsa*. Leg.B. Bleij & J.C. Biesmeijer, 11.-12.1988, det. A. Aptroot, 1990.





Astrothelium punctulatum

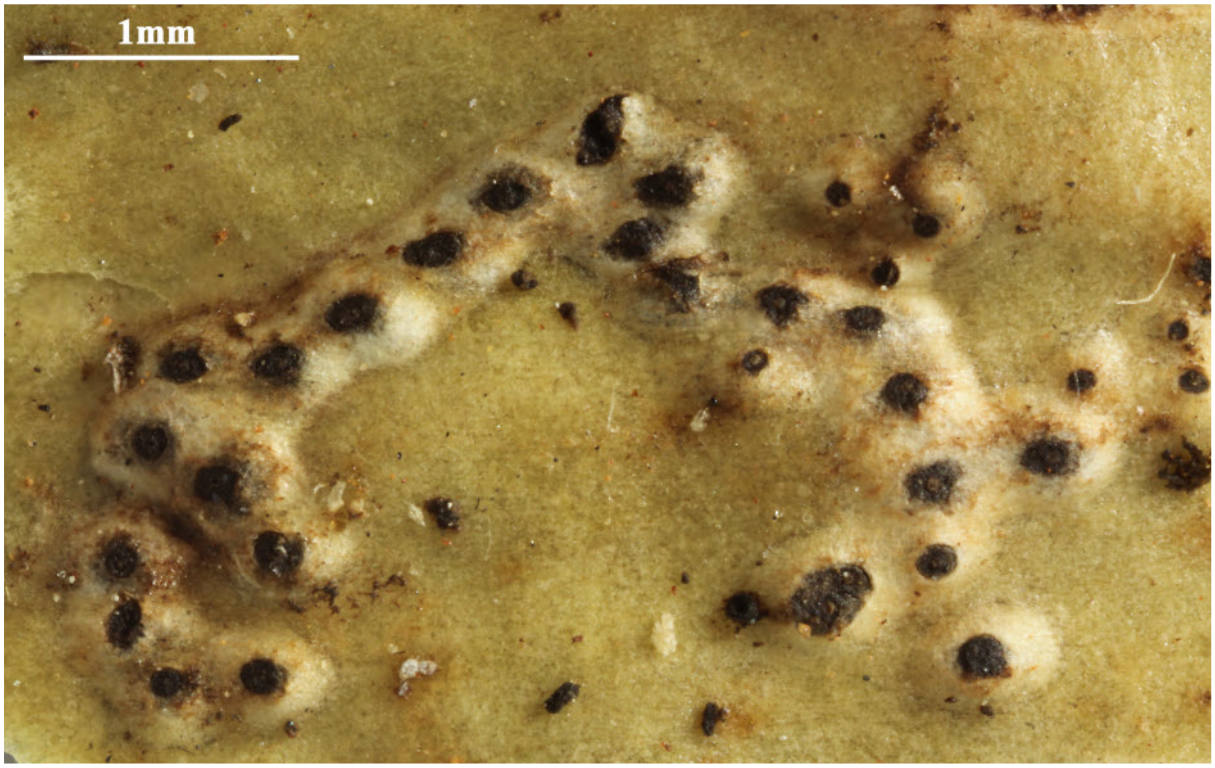


Astrothelium punctulatum

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

Thallus corticate, greyish green to yellowish (lichexanthone colour), smnooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary, 0.4–0.6 mm diam., erumpent, covered by thallus except for blackish ostiolar area. Hamathecium clear. Ascospores 8/ascus, fusiform-ellipsoid, 3-septate, 33–40 × 10–13 µm, hyaline, IKI-. Chemistry: Thallus and ascomata UV+yellow, K-. TLC: Lichexanthone.

[ABL40918], Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque Natural do Caraça, near football field near monastery Santuário do Caraça, on tree. 1250 m, 20°06’ S, 43°29’ W. Leg. A. Aptroot (no 40918), 16.9.1997, det. A. Aptroot, 1998.





Astrothelium pupula



Astrothelium pupula

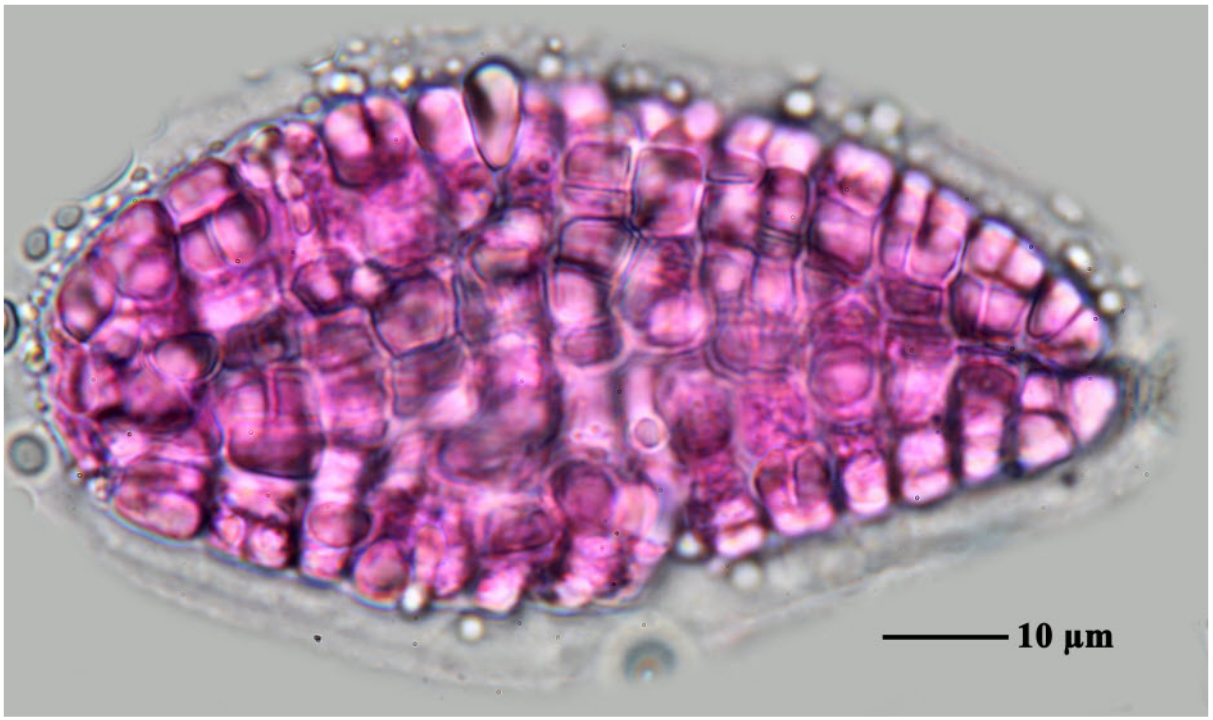
Astrothelium pyrenuliforme Flakus & Aptroot, in Flakus, Kukwa & Aptroot, Lichenologist 48(6): 673 (2016)

Thallus corticate, with corticiform layer ≤ c. 90 µm thick, smooth, somewhat shiny, continuous, not including swellings of the host bark, grey-green, with small to irregular white verrucae due to the presence of crystals (calcium oxalate) below cortical layer, not surrounded by a black prothallus; pseudocortex layer covering verrucae usually breaking and forming pseudocyphellae. Ascomata globose, 0.4–0.8 mm diam., mostly single, immersed in the thallus to half exposed, ascomatal verrucae barely to distinctly raised above the thallus, hemispherical with sloping sides, black, inside without a coloured layer, thalline cover not containing bark tissue, but ascomatal base often immersed in the bark. Wall fully carbonized, not differentiated into excipulum and involucrellum, thicker in the upper part and much thinner at the base. Ostioles eccentric, not fused, flat, black, sometimes surrounded by a white spot. Hamathecium inspersed with hyaline oil globules. Ascospores 1–2/ascus, hyaline, IKI-, densely muriform, without distinctly thickened median septa, broadly ellipsoid to fusiform, 86–135 × 27–55 µm, ends rounded, lumina diamond-shaped. Chemistry: Thallus surface and medulla UV-, K-; pseudostromata surface and inner part UV-, K-. TLC: Undetermined xanthone similar to lichexanthone (trace) detected.

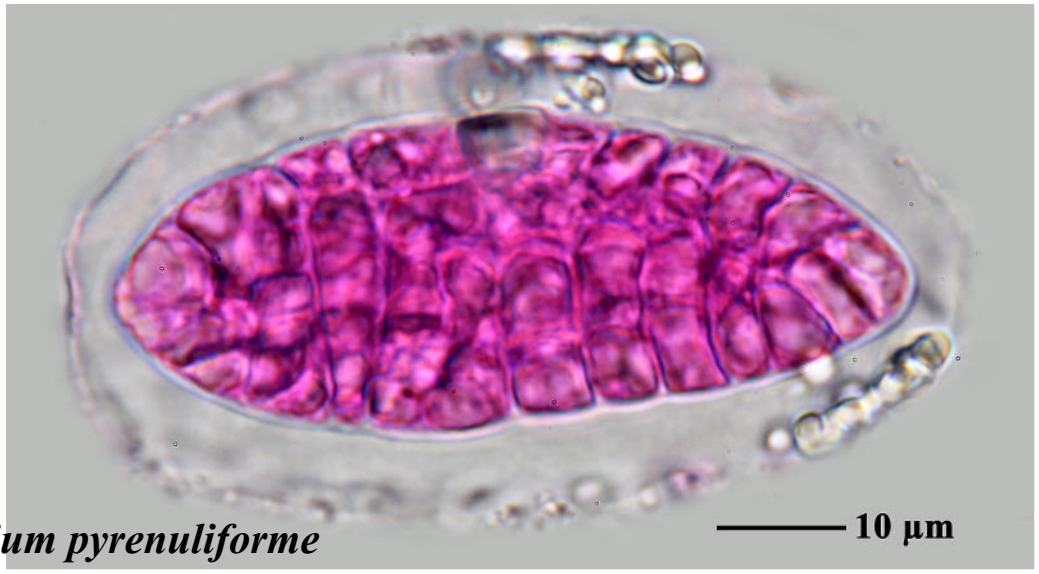
[Flakus23568], Bolivia, Santa Cruz, Cordillera, Pn Kaa-Iya del Gran Chaco, near Peto Blanko, park guards station, Chiquitano forest, 18°56’26’’ S, 60°22’39’’ W, 340 m. Leg. A. Flakus (no 23568), 5.12.2011, det. A. Aptroot. ISOTYPE.



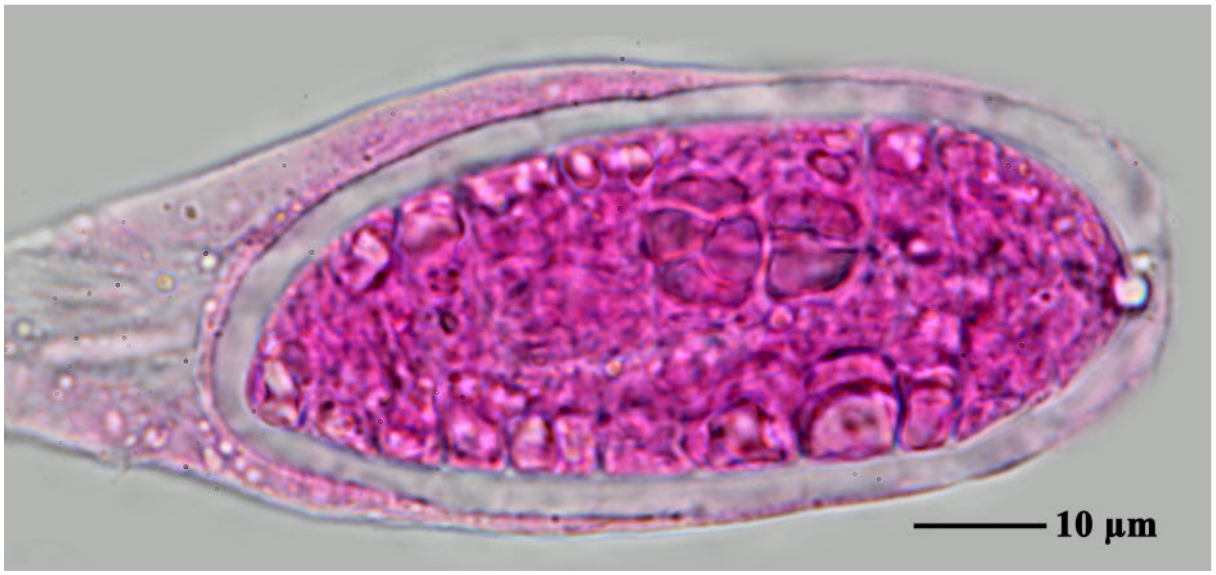
Astrothelium pyrenuliforme







Astrothelium pyrenuliforme

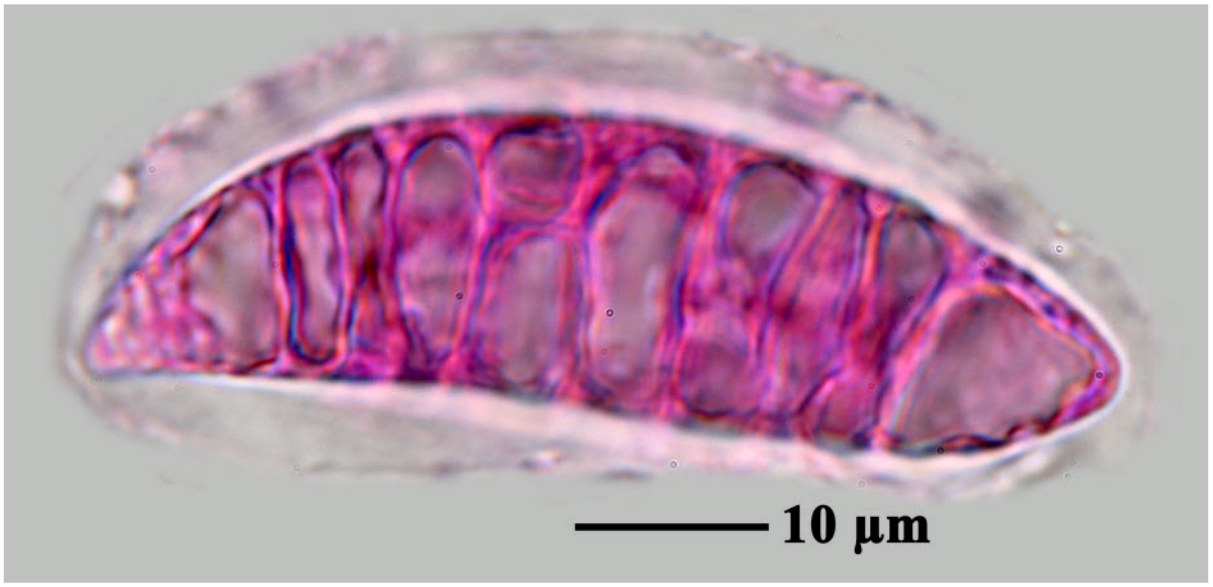






Astrothelium pyrenuliforme







Astrothelium pyrenuliforme

Astrothelium quatuorseptatum Aptroot & M. Cáceres, Lichenologist 48(6): 706 (2016)

Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤ 7 cm diam., c. 0.1 mm thick, pale greenish grey, surrounded by a prothallus line c. 0.1 mm wide, inducing gall formation of the host bark in the form of making the bark pieces become slightly concave and thickened along the cracks so that they are almost flaking off. Ascomata pyriform, c. 0.6–0.8 mm diam., mostly 2–5 aggregated, mostly immersed in the bark tissue below pseudostromata. Pseudostroma well delimited, not corticate, brown, occasionally with a whitish (usually abraded) surface clearly different from the thallus, distinctly c. 0.3 mm raised above the thallus, ≤ 2 mm diam., rounded to somewhat irregular in outline. Wall brown, ≤ c. 30 µm thick. Ostioles eccentric, fused, flat to convex, brown, surrounded by a whitish grey zone. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, (3–)4(–5)-septate, fusiform, 45–55 × 15–18 µm, middle septum (if present) asymmetrical (dividing the ascospore into two unequal parts), ends rounded, lumina diamond-shaped, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus surface UV−, thallus medulla K−; pseudostroma UV−, K−. TLC: no secondary substances detected.

[ABL15717], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 NNE of Porto Velho, 8°02'44" S, 63°29'11" W, 100 m, on tree bark in primary rainforest, leg. M. Cáceres & A. Aptroot (no 15717), 20.11.2012, det. A. Aptroot ,2012. ISOTYPE.





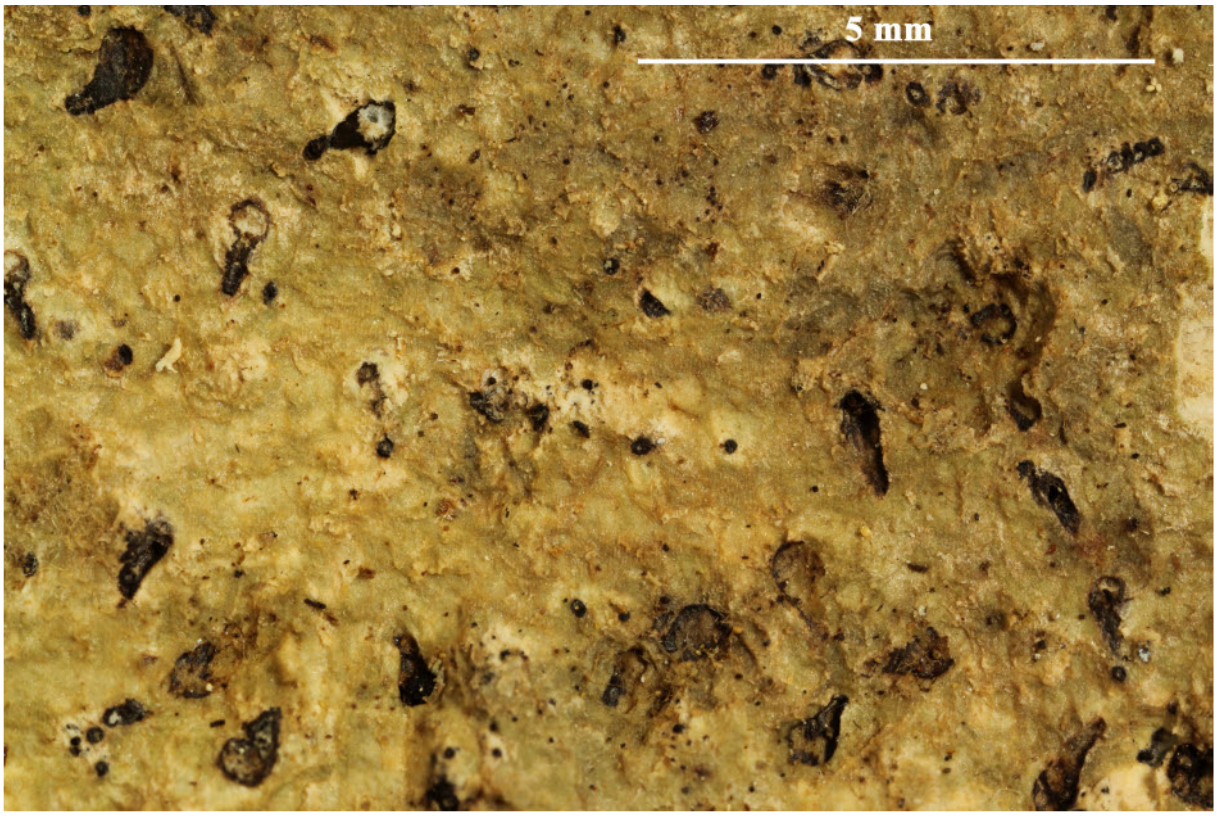


Astrothelium quatuorseptatum

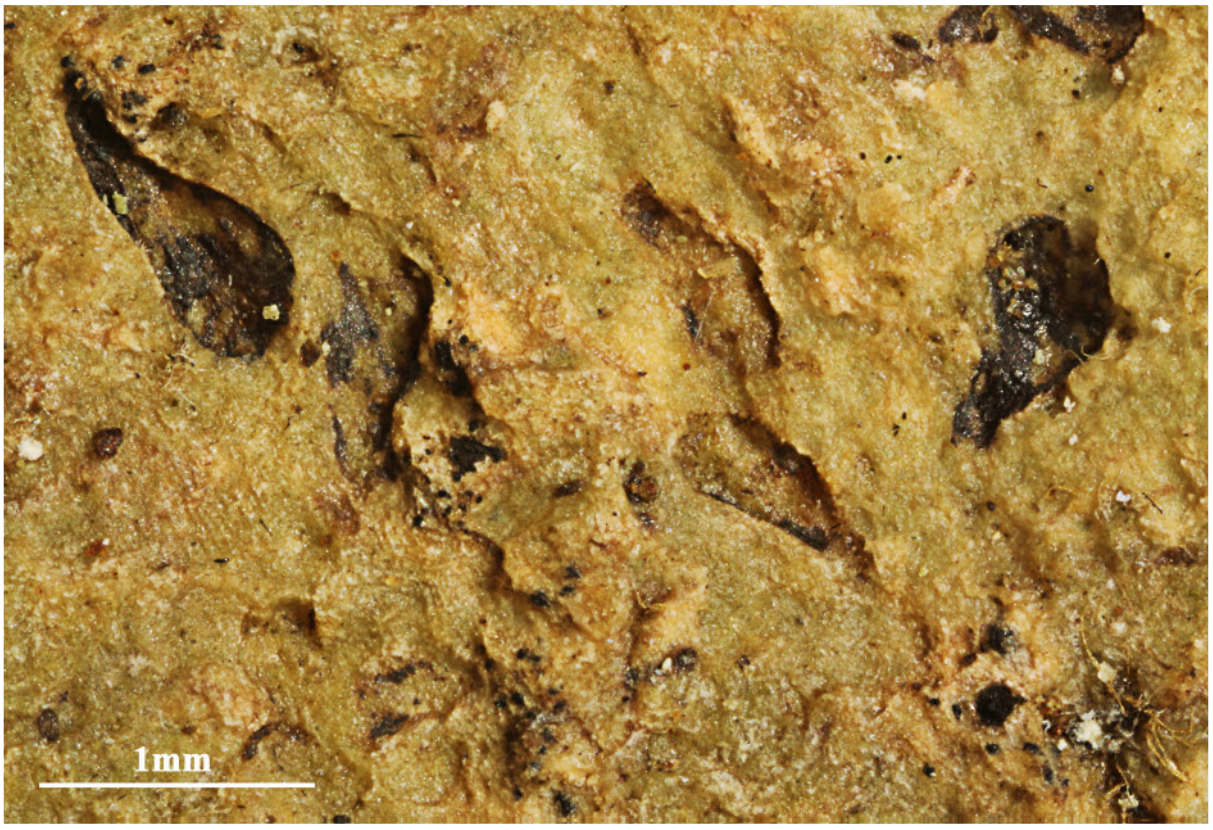
Astrothelium robustosporum Aptroot & M. Cáceres, Lichenologist 48(6): 706 (2016)

Thallus corticate, smooth, dull, continuous but locally abraded, covering areas ≤ 10 cm diam., c. 0.1 mm thick, pale ochraceous green, not surrounded by a prothallus, not inducing gall formation of the host bark. Ascomata pyriform (somewhat triangular in horizontal section), 0.6–0.9 mm wide, 0.7–1.1 mm long, solitary, completely immersed in the bark, without visible pseudostromata or swellings. Wall carbonized all around, ≤ c. 60 µm thick. Ostioles eccentric, simple, flat to convex, black, presenting the only part of the ascoma that is visible from above. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 11–15-septate, fusiform, 90–125 × 20–27 µm, pointed, lumina diamond-shaped, surrounded by a gelatinous layer ≤ 10 µm thick, central septum much thickened at the sides. Pycnidia not observed with certainty, although some of the black dots around the ostioles may represent young pycnidia. Chemistry: Thallus and medulla UV−, K−. TLC: no secondary substances detected.

[ABL11696], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 NNE of Porto Velho, 8°02'44" S, 63°29'11" W, c. 100 m, on tree bark in primary rainforest. Leg. M. Cáceres & A. Aptroot (no 11696), 13.03.2012, det. A. Aptroot, 2012. ISOTYPE.







Astrothelium robustosporum



Astrothelium robustosporum

Astrothelium robustum Müll. Arg., Bull. Soc. R. Bot. Belg. 32(2): 164 (1893)

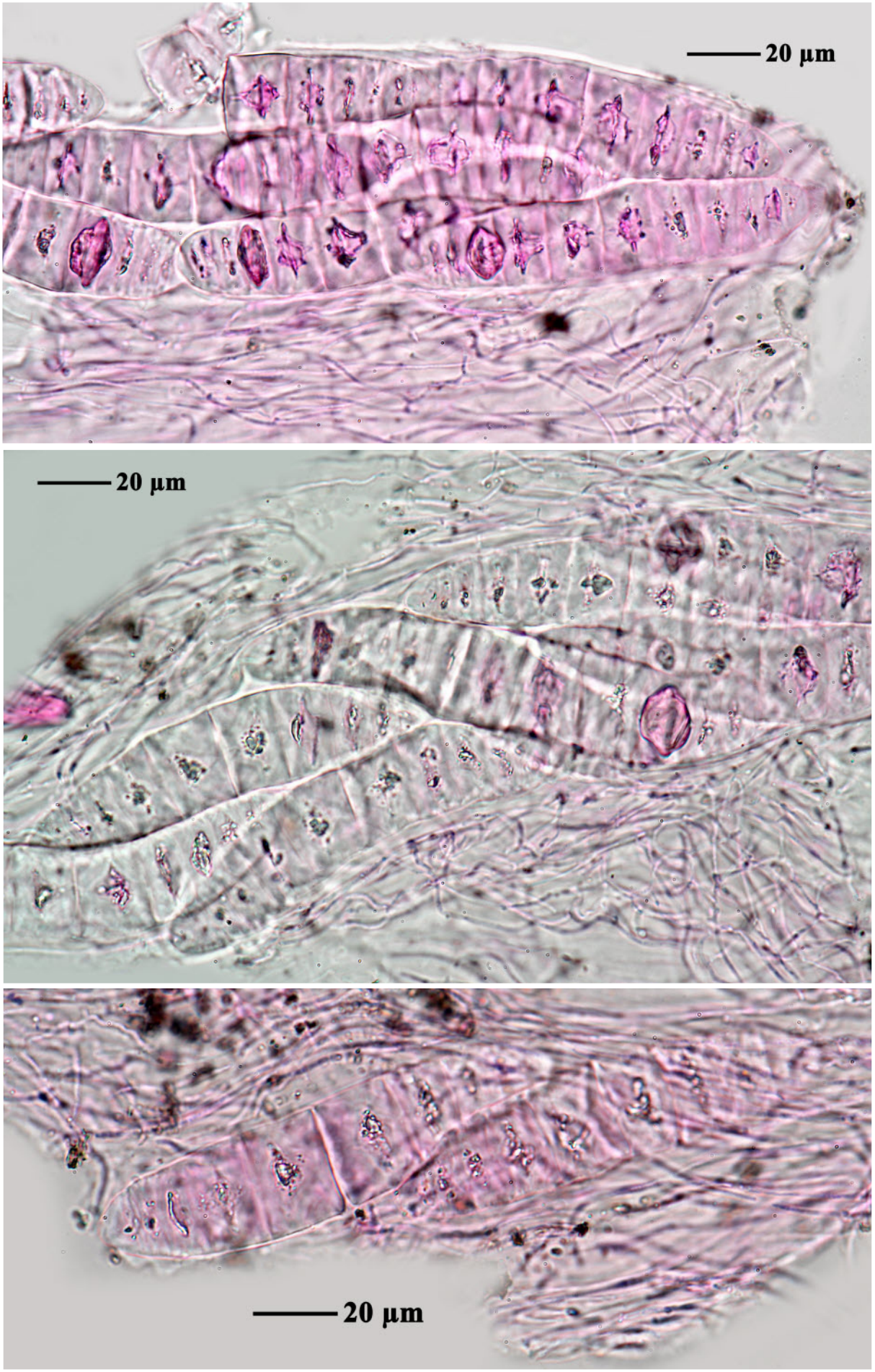
Thallus corticate, olive-green to yellowish, uneven to bullate, sometimes pseudogall-inducing. Ascomata astrothelioid, several chambers joined with eccentric, fused ostioles; joined ascomata dispersed to irregularly confluent or diffusely pdeudostromatic, 1–3 mm diam., erumpent to prominent, covered by thallus except for blackish ostiolar area. Hamathecium clear. Ascospores 8/ascus, (3–)5–7(–9)-septate, fusiform, (70–)90–130 × 20–30 µm, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

[ABL25602], U.S.A., Puerto Rico, Distr. Ponce, Caribbean National Forest, Toro Negro Division, road 143, km 25, mossy forest remnants on moutain top, on Ficus trees, 18°09’ N, 66°35’ W, 1150 m. Leg. A. & M. Aptroot (no25602), 21-31.05.1989, det. A. Aptroot, 1989.



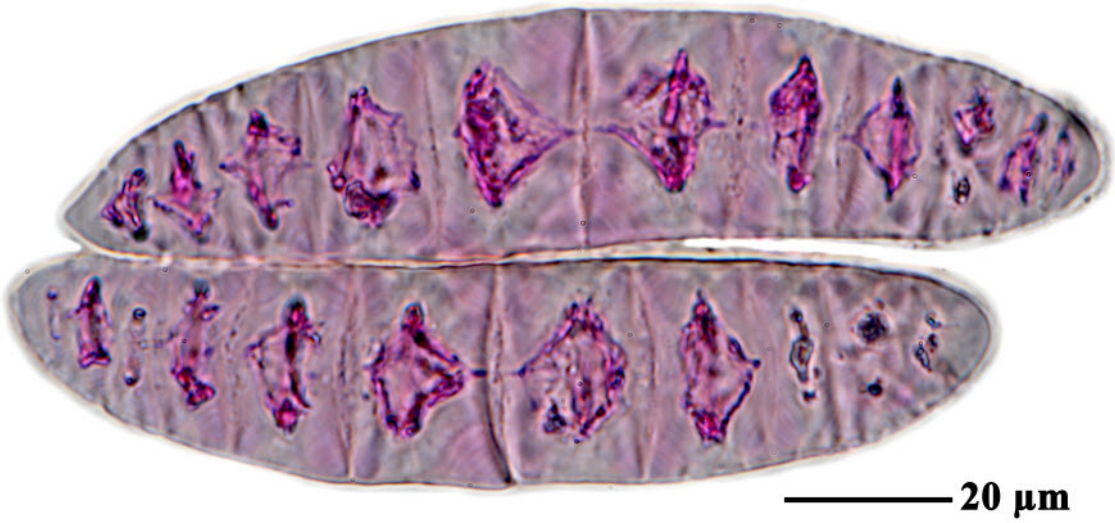


Astrothelium robustum



Astrothelium robustum



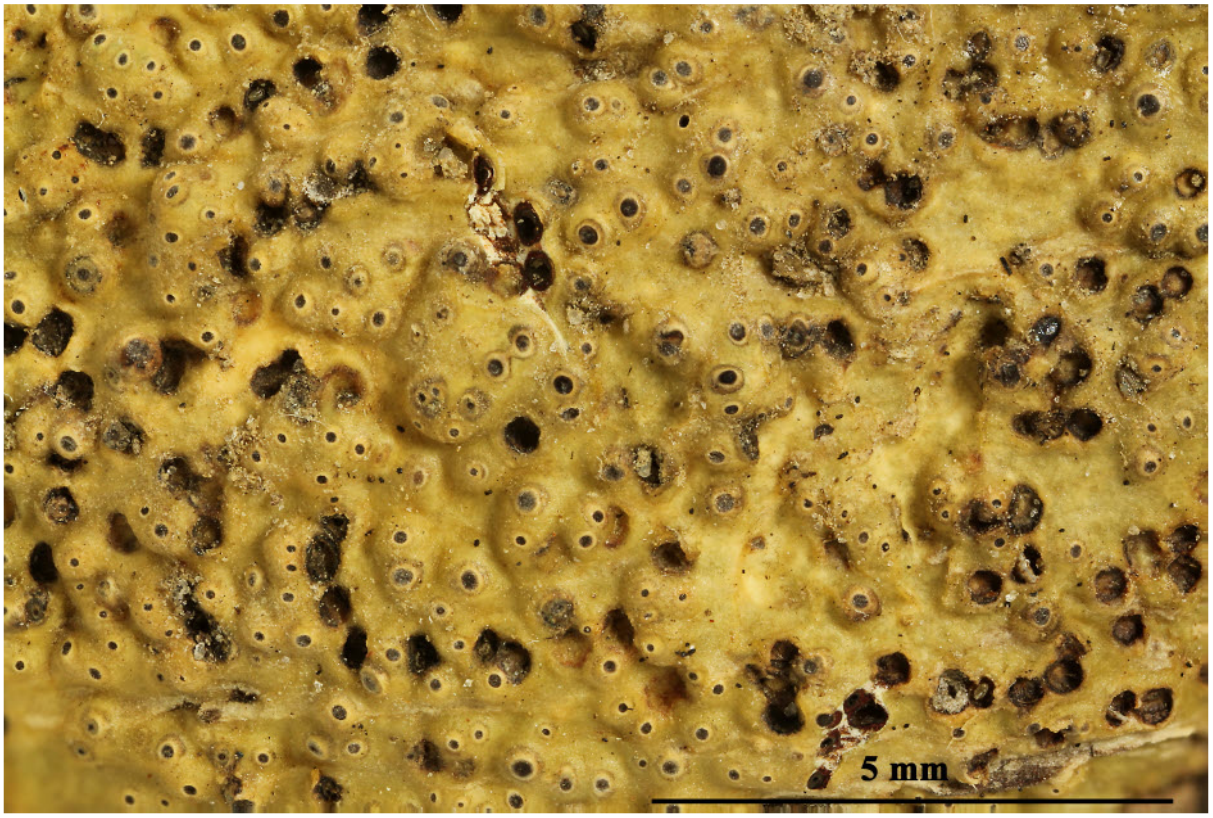


Astrothelium robustum

Astrothelium rubrocrystallinum Aptroot & M. Cáceres, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 719 (2016)

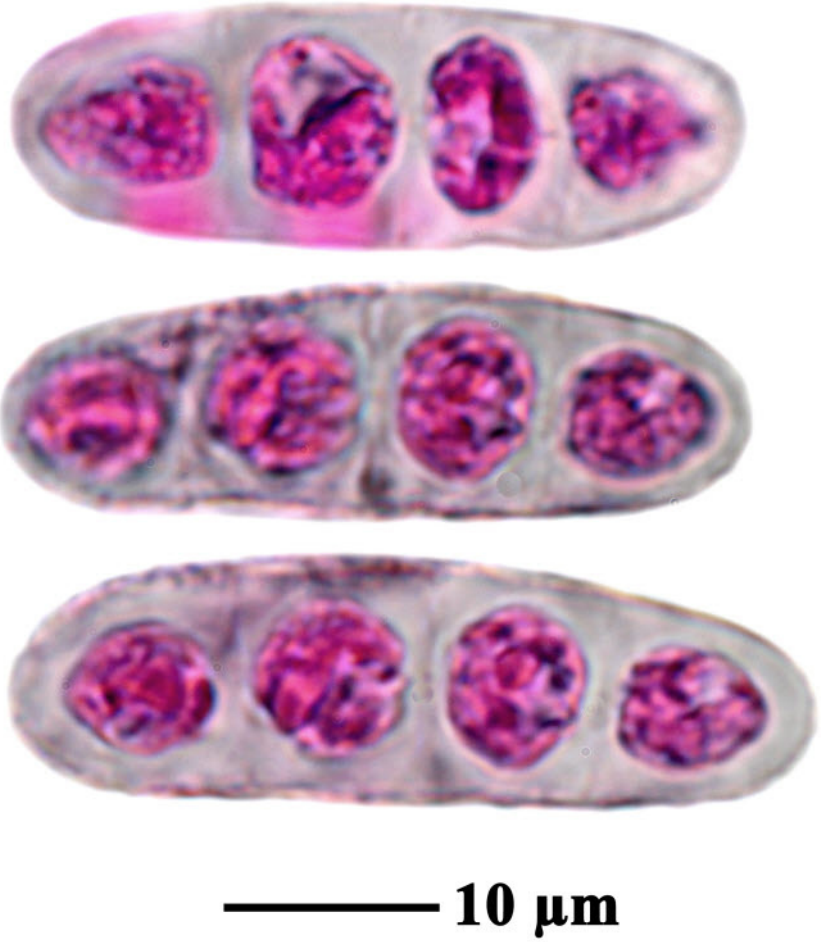
Thallus bullate, smooth, somewhat shiny, continuous, covering areas ≤ 5 cm diam., c. 0.2 mm thick, olive-brown, surrounded by a black prothallus line c. 0.2 mm wide, not inducing gall formation of the host bark. Ascomata globose, 0.30–0.45 mm diam., mostly in groups or lines of 2–5 in poorly distinguished pseudostromata, which are mostly distinctly raised above the thallus, of thallus colour, inside with a dense layer of red crystals c. 0.2 mm wide all around the ascoma wall, which is visible from above as dark granules through the hyaline cortex around the ostiole. Wall black all around, ≤ c. 50 µm thick. Ostioles apical, not fused, flat, black, surrounded by an ochraceous ring of c. 0.2 mm, which itself sometimes has a grey margin. Hamathecium inspersed with hyaline oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 22–27 × 7–9 µm, ends rounded, lumina diamond-shaped, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus surface UV−, crystals in pseudostroma medulla K+ purple. TLC: an anthraquinone.

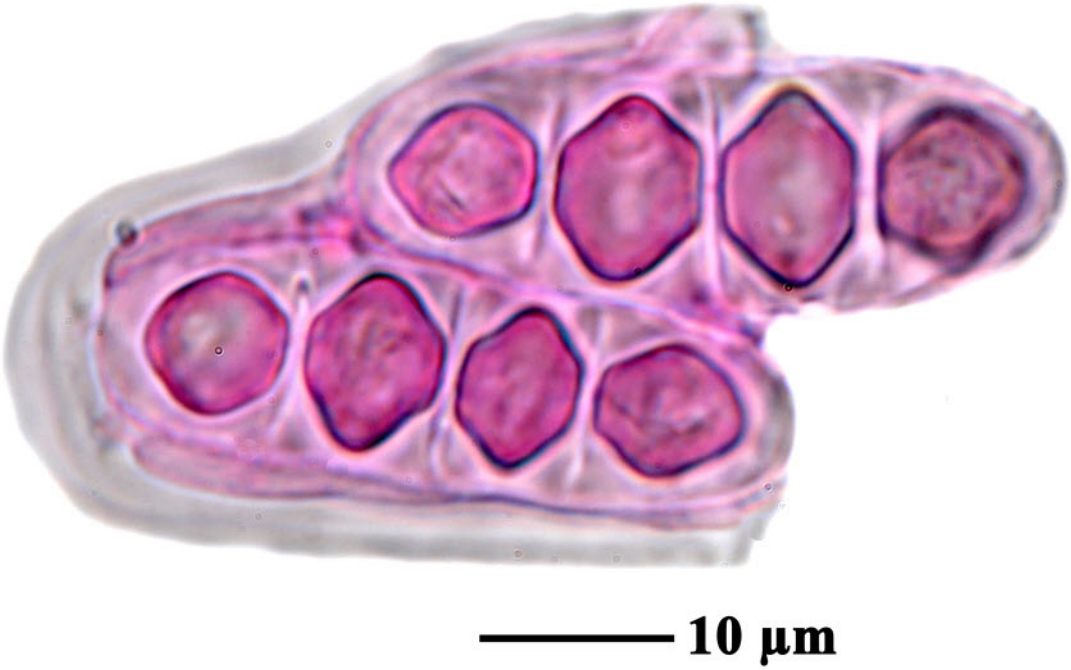
[ABL7409], Brazil, Sergipe, Santa Luzia do Itanhy, Mata do Junco, c. 150 m, on bark of tree. Leg. M. Cáceres (no 7409), 15.04.2011, det. A. Aptroot, 2013. ISOTYPE.





Astrothelium rubrocrystallinum





Astrothelium rubrocrystallinum

Astrothelium rubrostiolatum M. Cáceres & Aptroot, Bryologist 120(2): 174 (2017)

Thallus dull, ochraceous, not surrounded by a prothallus. Ascomata globose to pyriform, 0.5–0.8 mm diam., immersed in and below pseudostromata, in groups of 7–25. Pseudostroma not much differentiated from the thallus, c. 1–3 mm diam., irregularly raised, roundish, internally not pigmented. Ostioles eccentric, fused (sometimes only partly so that up to three joined ostioles surface next to each other), ending in a conical, c. 0.3 mm wide black mound with red brown pigment inside and sometimes also outside. Hamathecium not inspersed, IKI–. Ascospores 8/ascus, hyaline, muriform, 11–15 × 0–2-septate, 90–125 × 25–30 µm, long-ellipsoid, with distinctly thickened median septum, not surrounded by a gelatinous sheath. Pycnidia not observed. Chemistry: Thallus and pseudostroma UV–, C–, K–, KC–, P–; ostiole inside with red crystals, which react K+ blood red. TLC: A red anthraquinone.

[ISE28090], Brazil, Amazonas, Manaus, Reserva Florestal Adolpho Ducke, along trails in vicinity of field station, on tree bark in primary rain forest, 80 m, 2°56' S, 59°57' W. Leg. M. Cáceres & A. Aptroot (no ISE 28090), 3–8.06.2016, det. A. Aptroot, 2016. ISOTYPE.





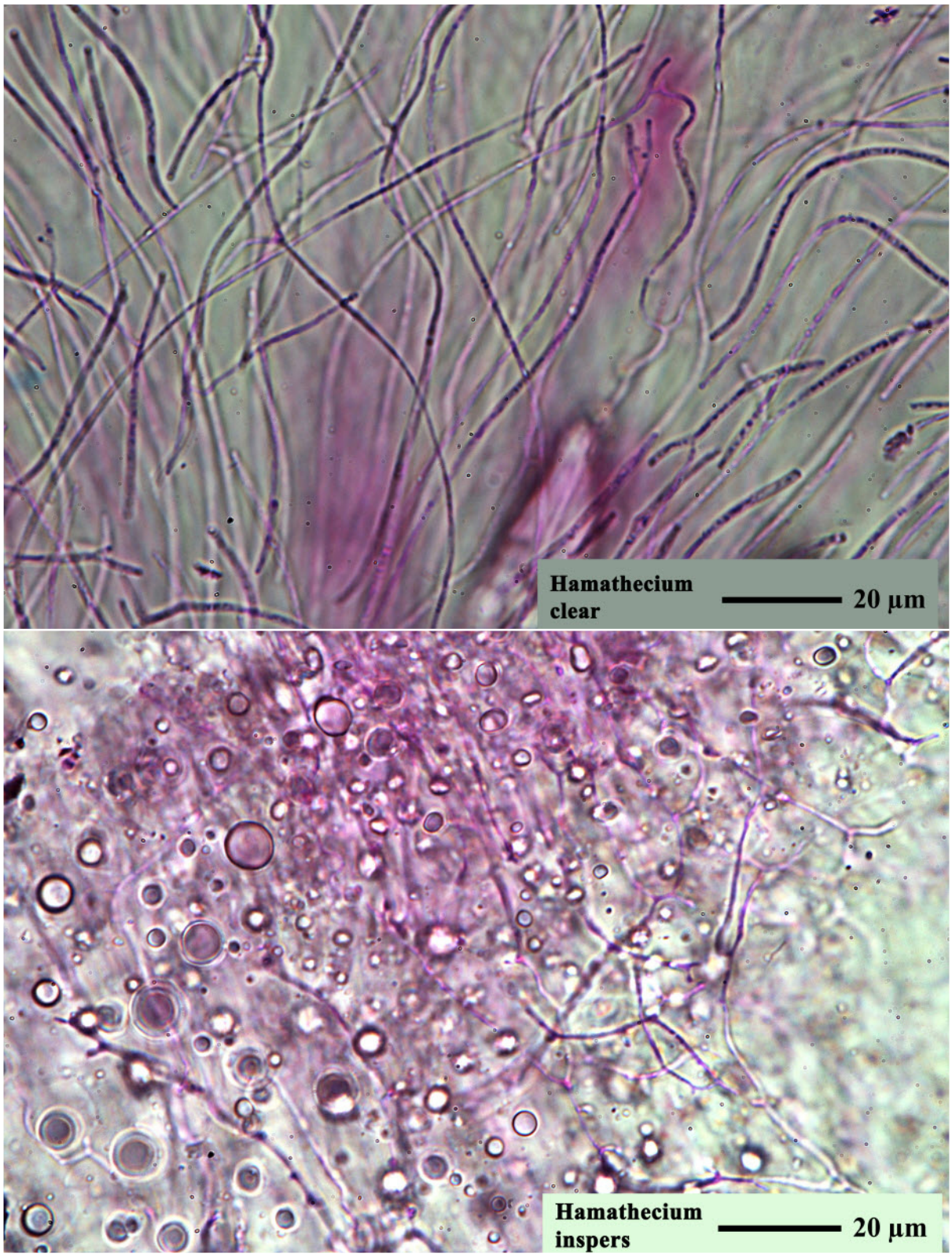
Astrothelium rubrostiolatum







Astrothelium rubrostiolatum

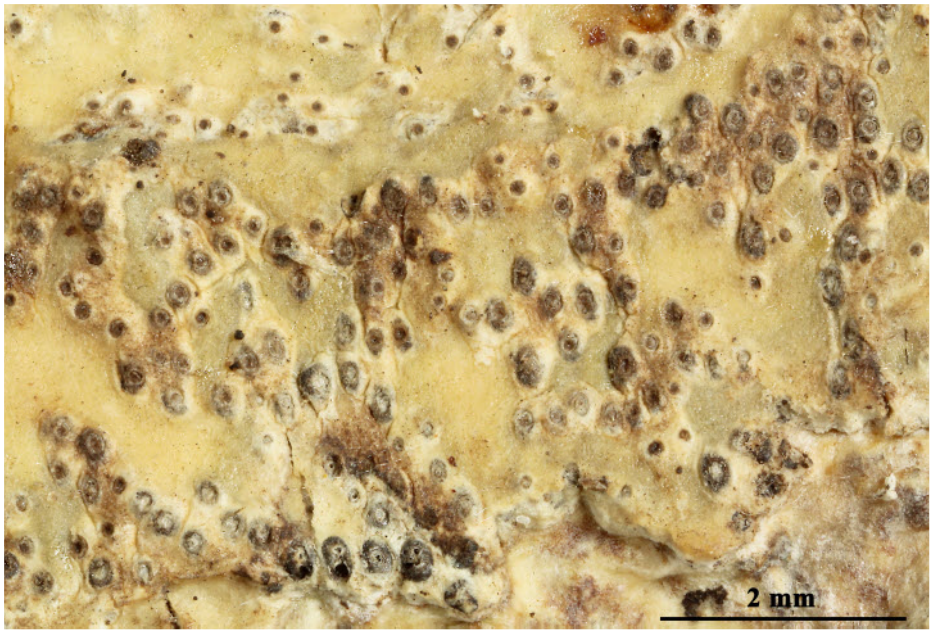


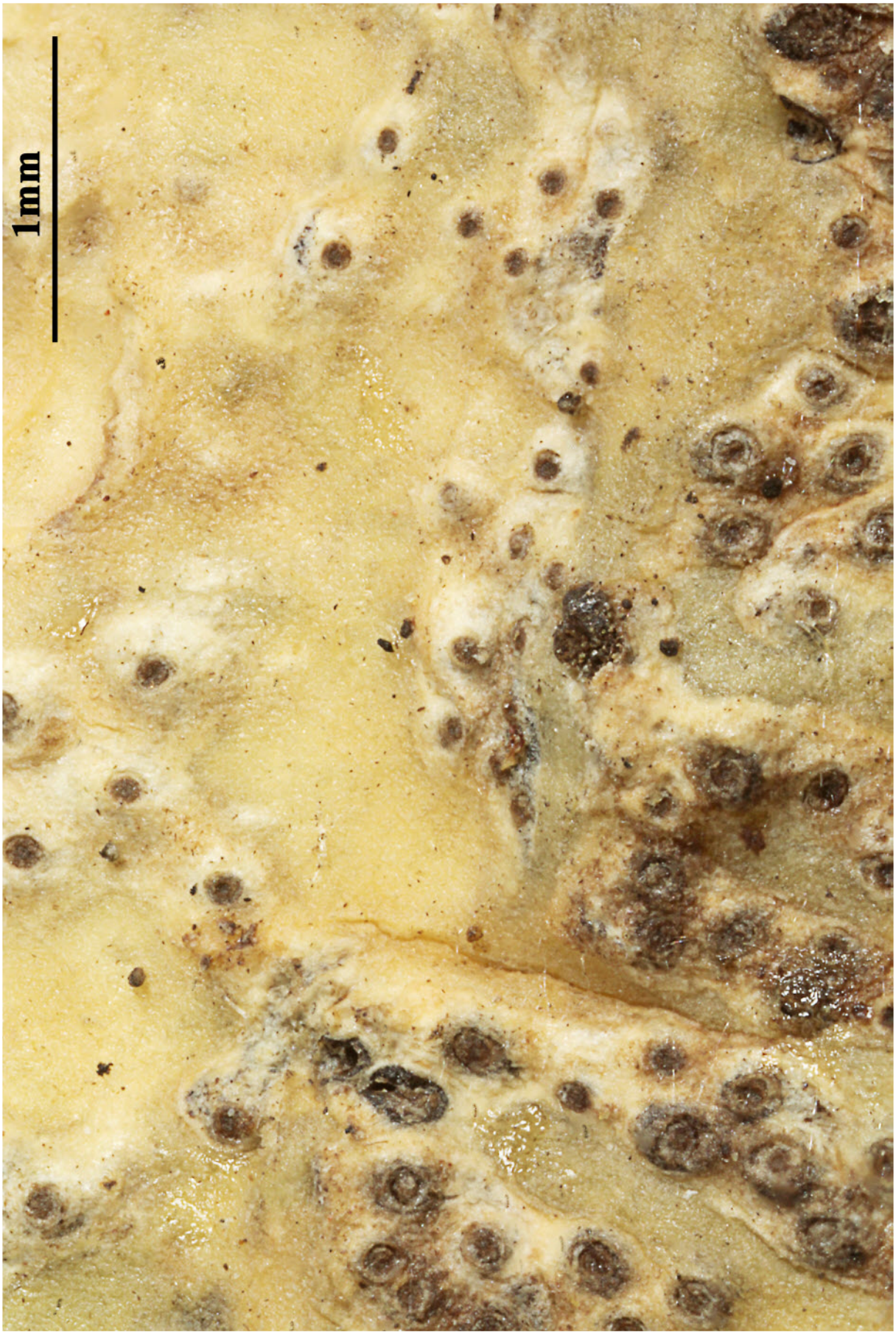
Astrothelium rubrostiolatum

Astrothelium scoria (Fée) Aptroot & Lücking, Lichenologist 48(6): 885 (2016).
= *Pseudopyrenula scoria* (Fée) Vain. [as 'scoriae'], Bolm Soc. broteriana, Coimbra, sér. 2 6: 178 (1930) [1929-30].
= *Trypethelium scoria* Fée, Essai Crypt. Exot. (Paris): 69 (1825) [1824].
= *Pyrenula myriocarpa* Fée, Essai Crypt. Écorc.: 74 (1824).
= *Verrucaria myriocarpa* (Fée) Spreng., Syst. Veget. 4(1): 245 (1827).
= *Spermatodium myriocarpum* (Fée) Trevis., Conspect. Verruc.: 11 (1860).
= *Trypethelium myriocarpum* (Fée) Müll. Arg., Bot. Jahrb. Syst. 6: 391 (1885).
= *Trypethelium scoria* var. *sordidius* Nyl., Flora 52: 126 (1869).
= *Trypethelium dichroum* Makhija & Patw., J. Hattori Bot. Lab. 73: 195 (1993).
= *Trypethelium indicum* Makhija & Patw., J. Hattori Bot. Lab. 73: 199 (1993).
= *Trypethelium meghalayense* Makhija & Patw., J. Hattori Bot. Lab. 73: 201 (1993).

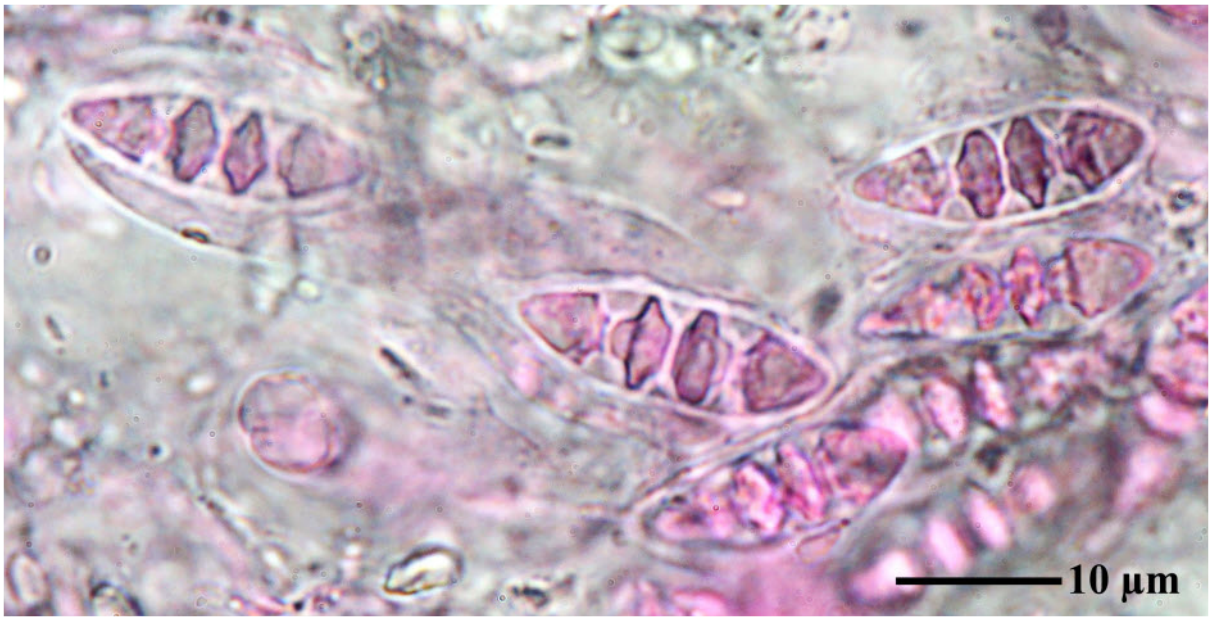
Thallus corticate, olive-green to yellowish or brownish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, diffusely pseudostromatic, 0.3–0.5 mm diam., erumpent, laterally covered by thallus but upper portion blackish brown with whitish rim. Hamathecium inspersed. Ascospores 8 per ascus, fusiform-ellipsoid, 3-septate, 15–27 × 7–10 µm, hyaline, IKI−. Chemistry: Thallus and pseudostromata UV−, K−. TLC: no substances detected.

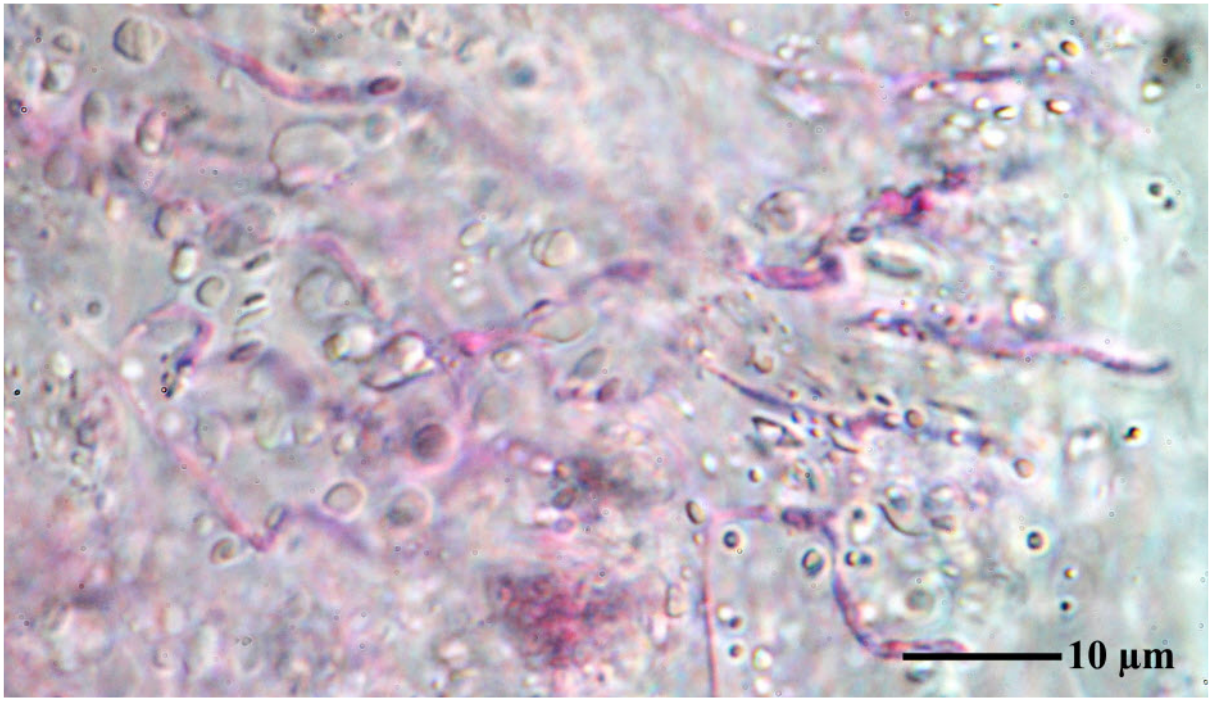
[ISE48602], Brazil, Bahia, Itamarajú, Monte Pascual, on tree bark in cerrado forest. 130 m, 16°51’55” S, 39°24’54” W. Leg. M. Cáceres & A. Aptroot (no ISE 48602), 18.02.2019, det. A. Aptroot, 2019.

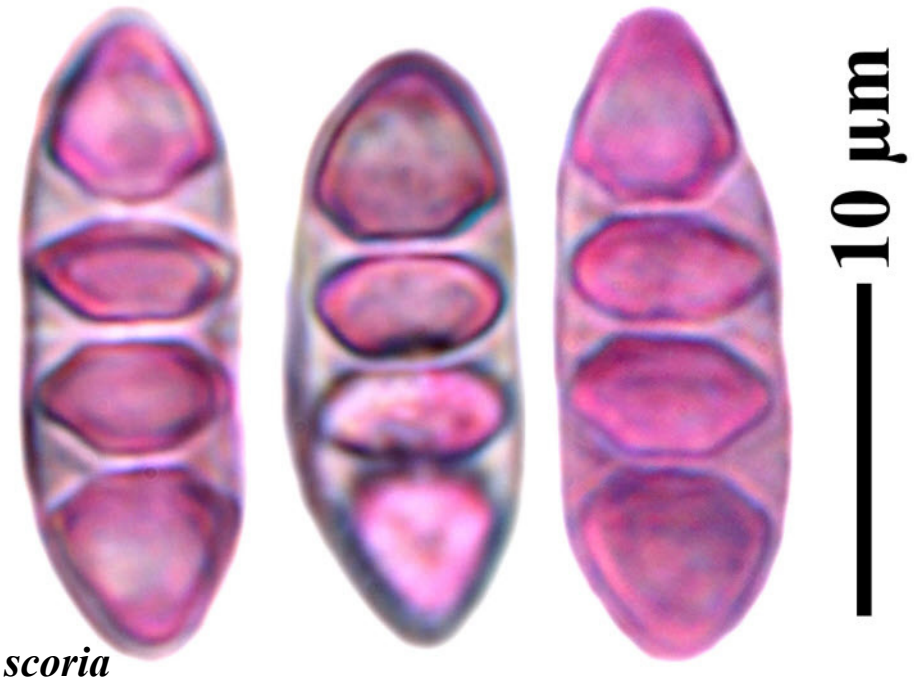




Astrothelium scoria







Astrothelium scoria

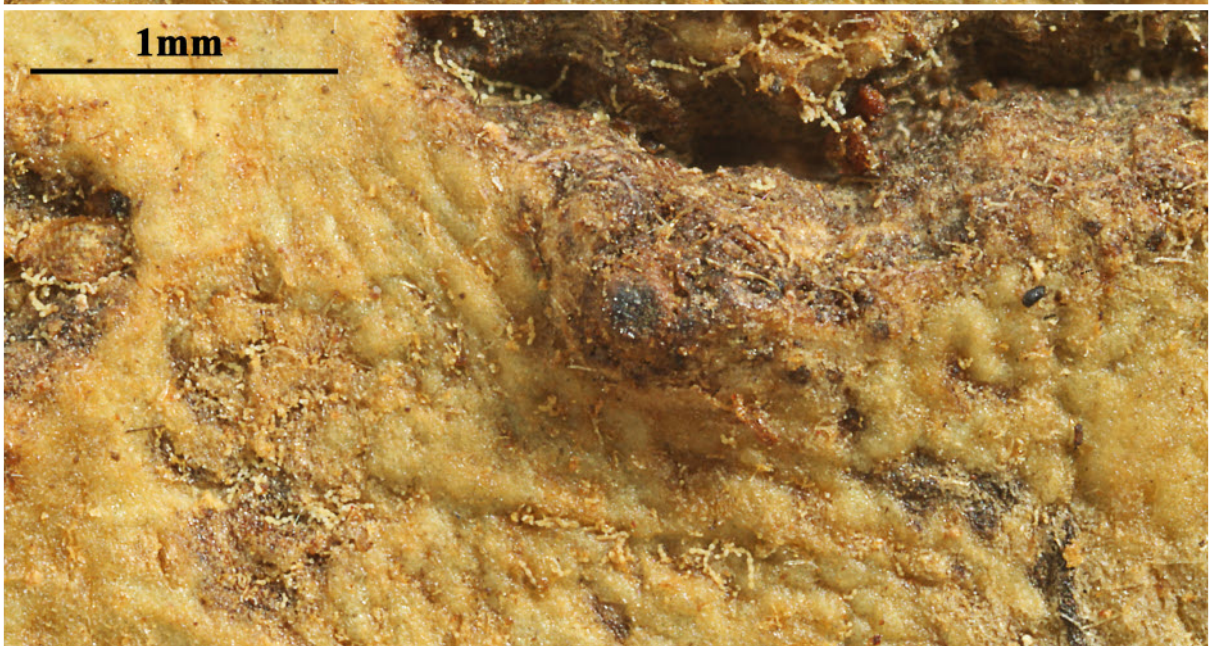
Astrothelium scorioides Nyl., Annls Sci. Nat., Bot., sér. 5 7: 348 (1867)

Thallus corticate, pale greenish to yellowish, smooth to uneven. Ascomata several chambers joined with eccentric, fused ostioles; joined ascomata dispersed to confluent, 0.3–0.5 mm diam., erumpent, conical with flattened top, covered by thallus and upper part with yellow-orange pigment. Hamathecium clear. Ascospores 8/ascus, 3-septate, fusiform-ellipsoid, 33–45 × 10–17 µm, IKI-. Chemistry: thallus UV-, K-; ascomata with yellow to orange, K+ purple, UV+ red anthraquinone.

[ABL15694], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 N of Porto Velho, 8°02’44” S, 63°20’11 W, c. 100 m, on tree bark in primary rain forest. Leg. M. Cáceres & A. Aptroot (no 15694), 20.11.2012, det. A. Aptroot 2012.









Astrothelium scorioides

Astrothelium scorioides Nyl., Annls Sci. Nat., Bot., sér. 5 7: 348 (1867)

Thallus corticate, pale greenish to yellowish, smooth to uneven. Ascomata several chambers joined with eccentric, fused ostioles; joined ascomata dispersed to confluent, 0.3–0.5 mm diam., erumpent, conical with flattened top, covered by thallus and upper part with yellow-orange pigment. Hamathecium clear. Ascospores 8/ascus, 3-septate, fusiform-ellipsoid, 33–45 × 10–17 µm, IKI-. Chemistry: thallus UV-, K-; ascomata with yellow to orange, K+ purple, UV+ red anthraquinone.

[ABLISE48625], Brazil, Bahia, Itamajarú, Monte Pascual, on tree in cerrado forest, 16°51’57” S, 39°24’59” W, 139 m. Leg. M. Cáceres & A. Aptroot, (no ISE 48625), 18.02.2019.







Astrothelium scorioides

Astrothelium scoriothelium Aptroot & Lücking, Lichenologist 48(6): 886 (2016)
= *Trypethelium scorioides* Leight., Trans. Linn. Soc. London 25: 459 (1866) non *Astrothelium scorioides* Nyl. (1867)

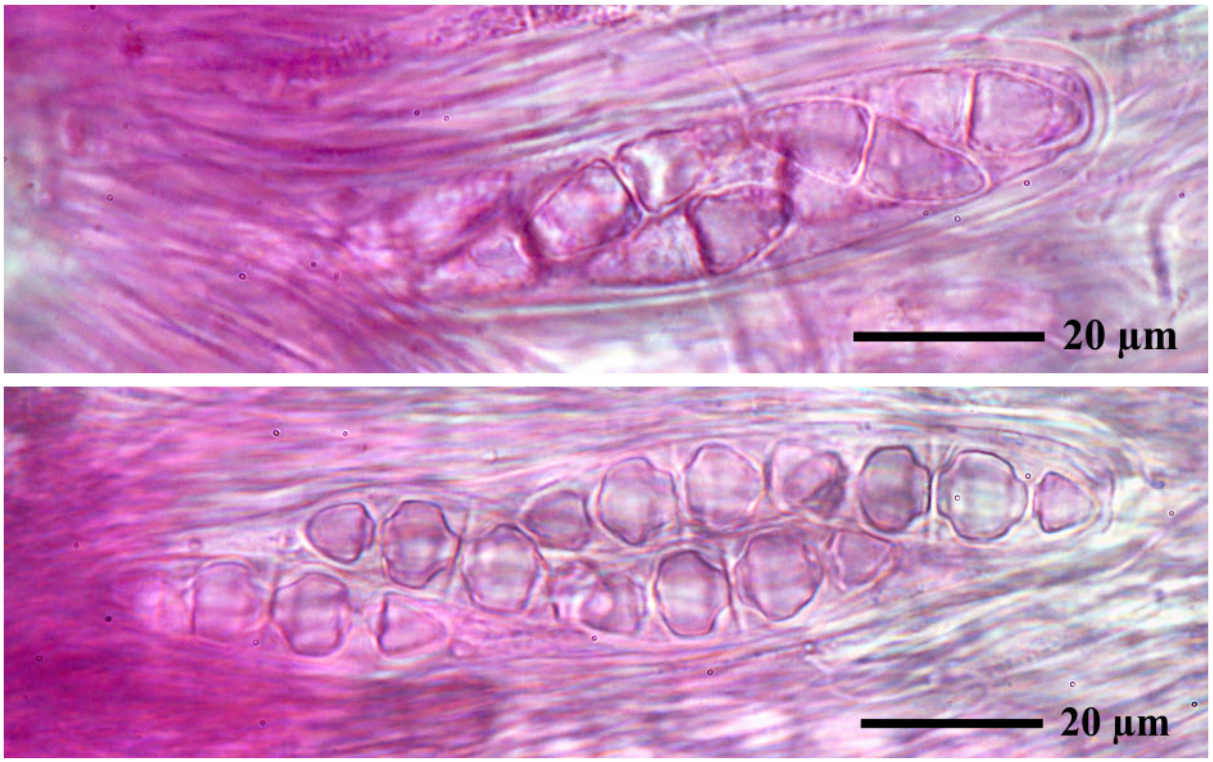
Thallus corticate, olive-green, uneven verrucose. Ascomata trypetheli-oid, with apical ostioles, pseudostromatic; pseudostromata irregular, 0.7–1.7 mm broad, immersed to erumpent, exposed and blackish, with ostioles only visible by their pale rings. Hamathecium clear. Ascospores 8 per ascus, 3-septate, fusiform-ellipsoid, 36–39 × 11–12 µm, hyaline, IKI−. Chemistry: Thallus and pseudostromata UV−, K−. TLC: no substances.

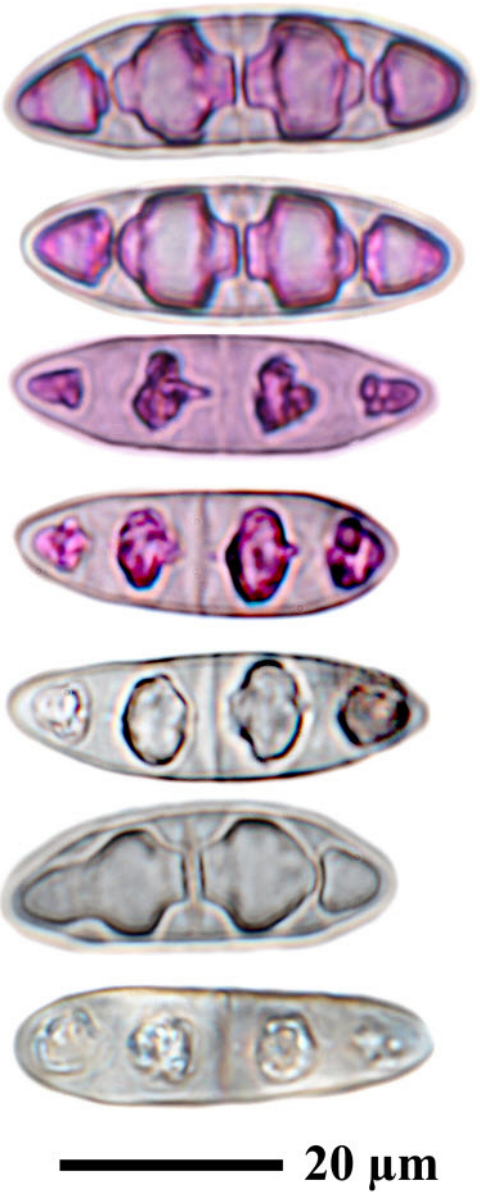
[ABL78809], Brazil, Santa Catarina, São Bento do Sul, APA Rio Ver-melho, on tree in temperate rain forest, 26°15’10” S, 49°16’19” W, 900 m. Leg. A. Aptroot (no 78809), 1.04.2019, det. A. Aptroot, 2019.





Astrothelium scoriothelium



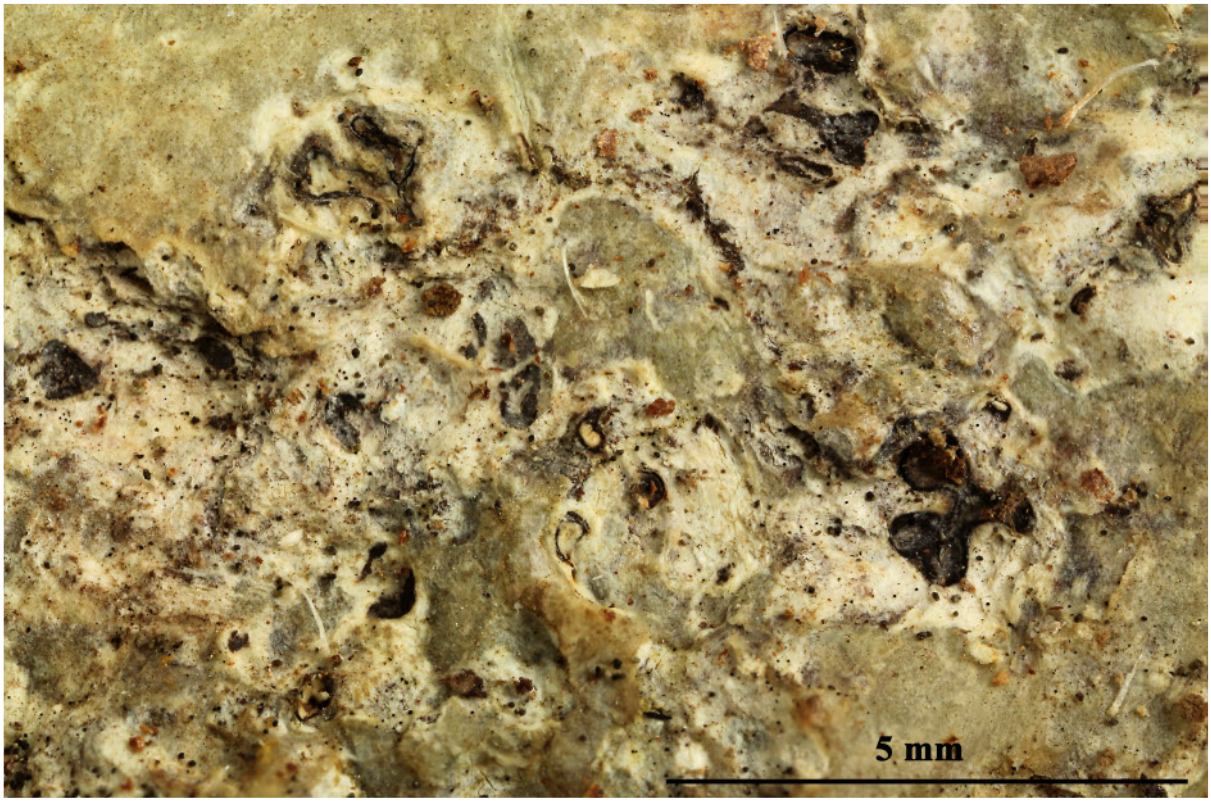


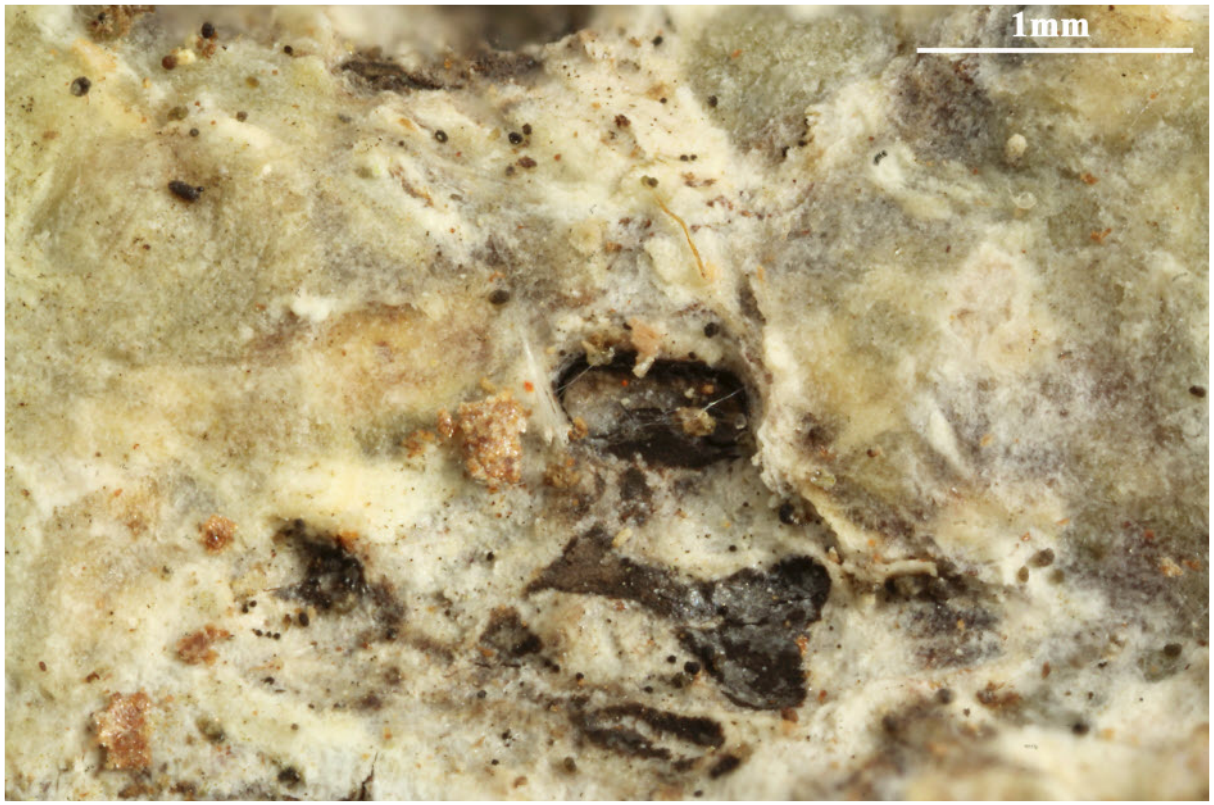
Astrothelium scoriothelium

Astrothelium sepultum Mont., Annls Sci. Nat., Bot., sér. 2 19: 74 (1843)
= *Laurera sepulta* (Mont.) O.E. Erikss., Op. bot. 60: 50 (1981)
= *Cryptothelium sepultum* (Mont.) A. Massal., Atti Inst. Veneto Sci. lett., ed Arti, Sér. 3 5: 335 (1860) [1859-1860]
= *Heufleria sepulta* (Mont.) Trevis., Flora, Regensburg 44: 23 (1861)

Thallus corticate, greenish grey to pale yellowish brown (lichexanthone colour), smooth to uneven. Ascomata astrothelioid, several chambers joined with eccentric, fused ostioles; joined ascomata dispersed to confluent but not distictly pseudostromatic, 1.0–1.3 mm diam., erumpent, covered by thallus but with upper part whitish and ostiole dark. Hamathecium clear. Asocpores 2/ascus, densely muriform, fusiform, 150–250 × 30–65 µm, with distinctly thickened median septum, hyaline, IKI-. Chemistry: Thallus and usually also ascomata UV+ yellow, with lichexanthone.

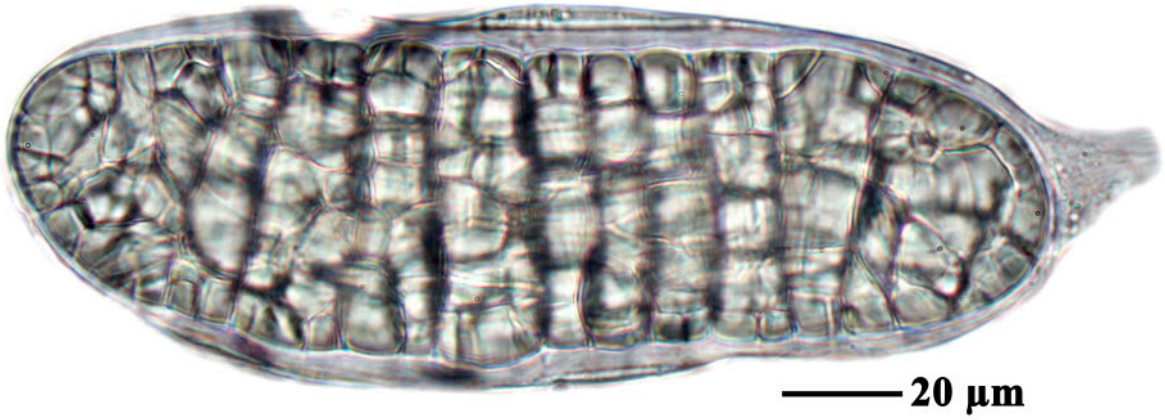
[ISE48573], Brazil, Bahia Itamarajú, Monte Pascual, on tree bark in palm forest, 16°51’16” S, 39°34’40” W, 30 m. Leg. M. Cáceres & A. Aptroot (no ISE48573), 17.2.2019, det. A. Aptroot 2019.

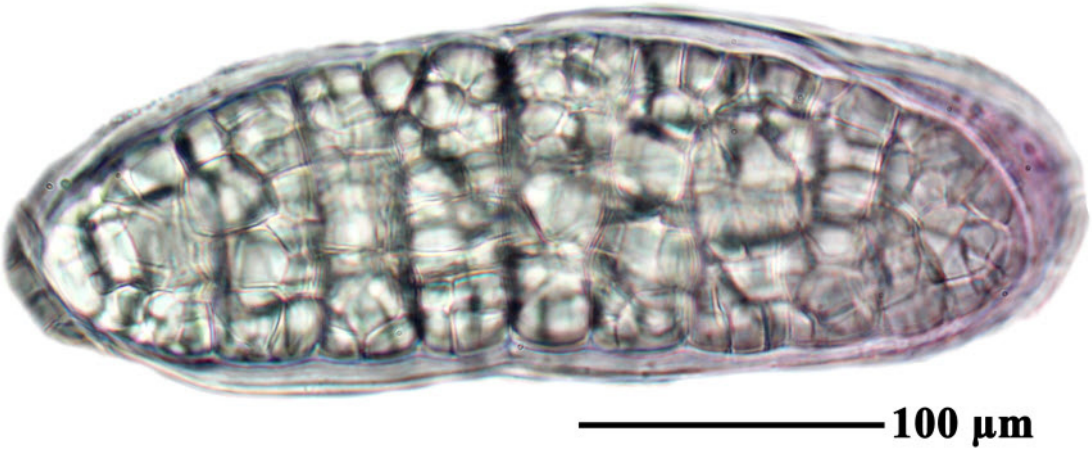






Astrothelium sepultum







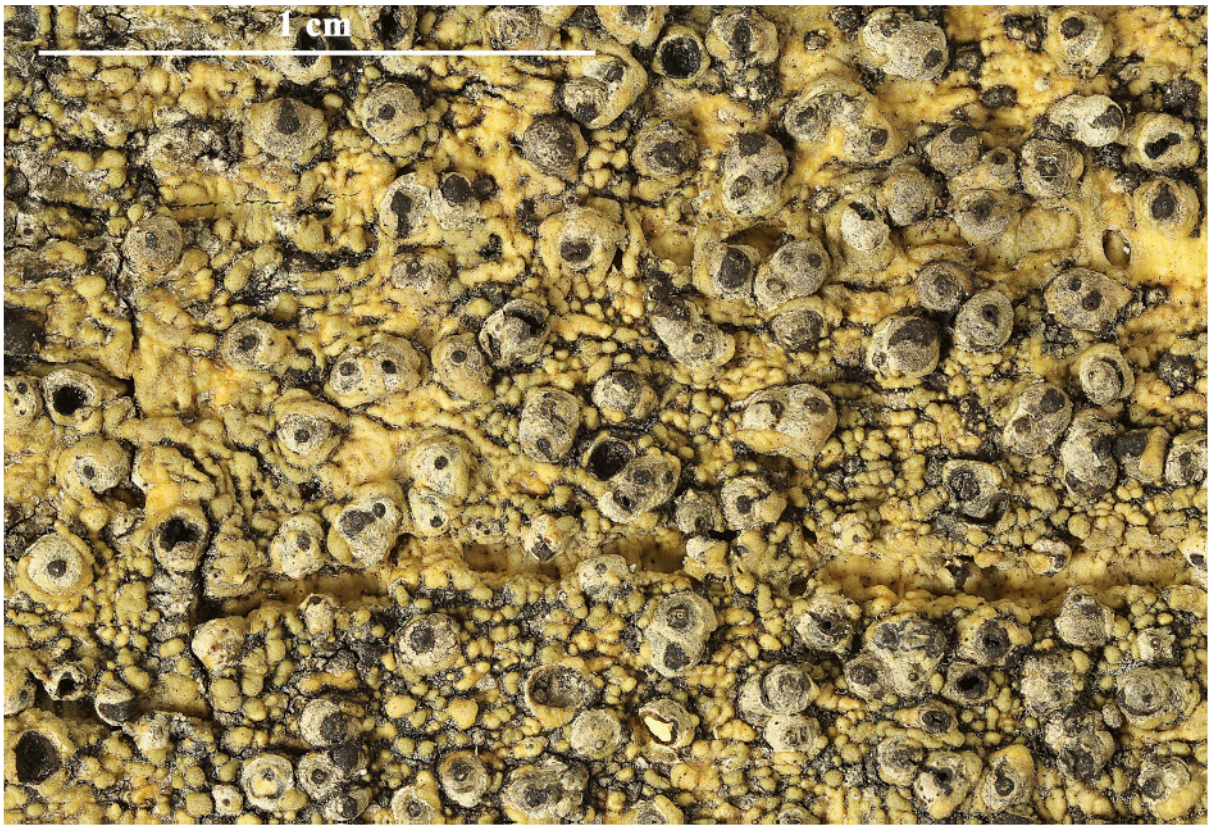


Astrothelium sepultum

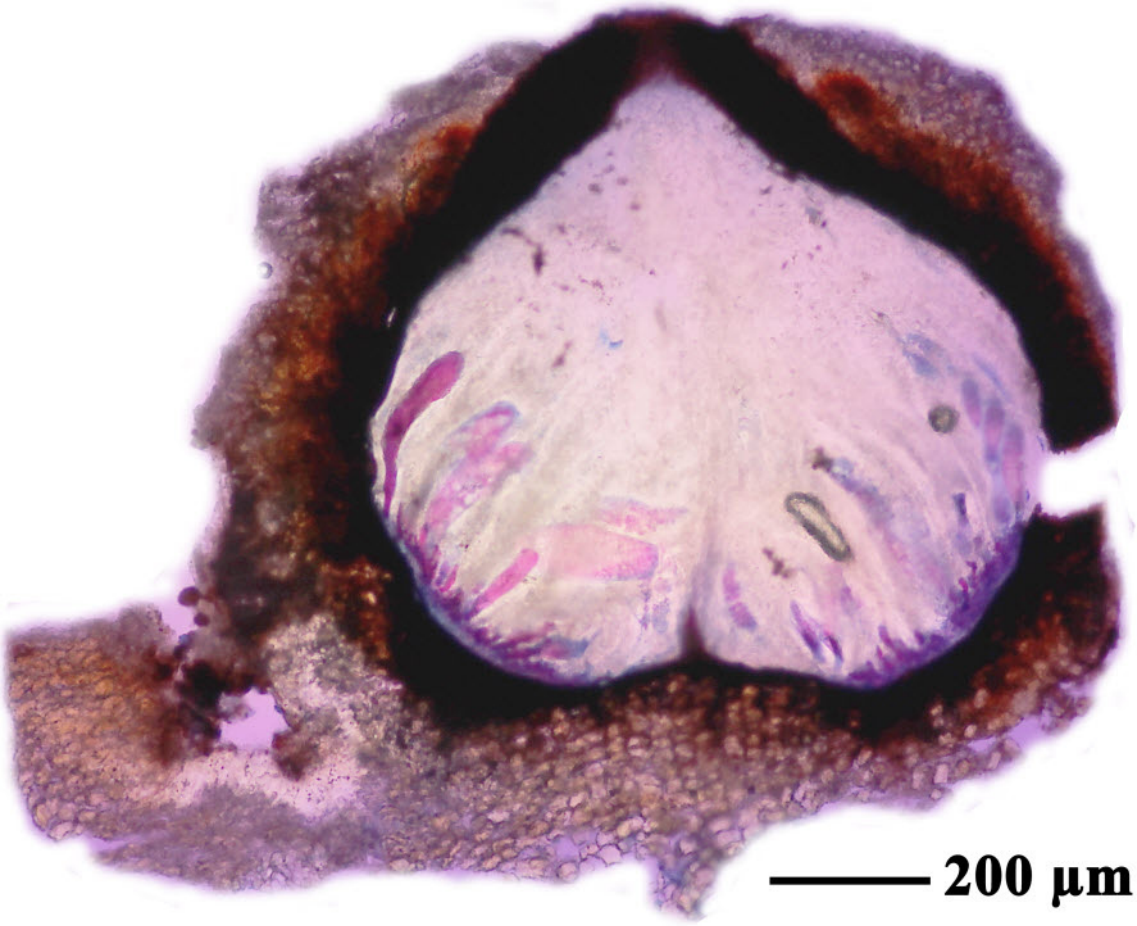
Astrothelium sikkimense (Makhija & Patw.) Aptroot & Lücking, Lichenologist 48(6): 887 (2016)
= *Laurera sikkimensis* Makhija & Patw., Mycotaxon 31(2): 580 (1988)

Thallus corticate, brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary to irregularly confluent, 1–2 mm diam., immersed to erumpent, covered by thallus except black ostiole surrounded by whitish rim. Hamathecium inspersed. Ascospores 6–8/ascus, muriform, ellipsoid, 120–140 × 25–30 µm, with somewhat thickened median septum, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected (or lichexanthone ?).

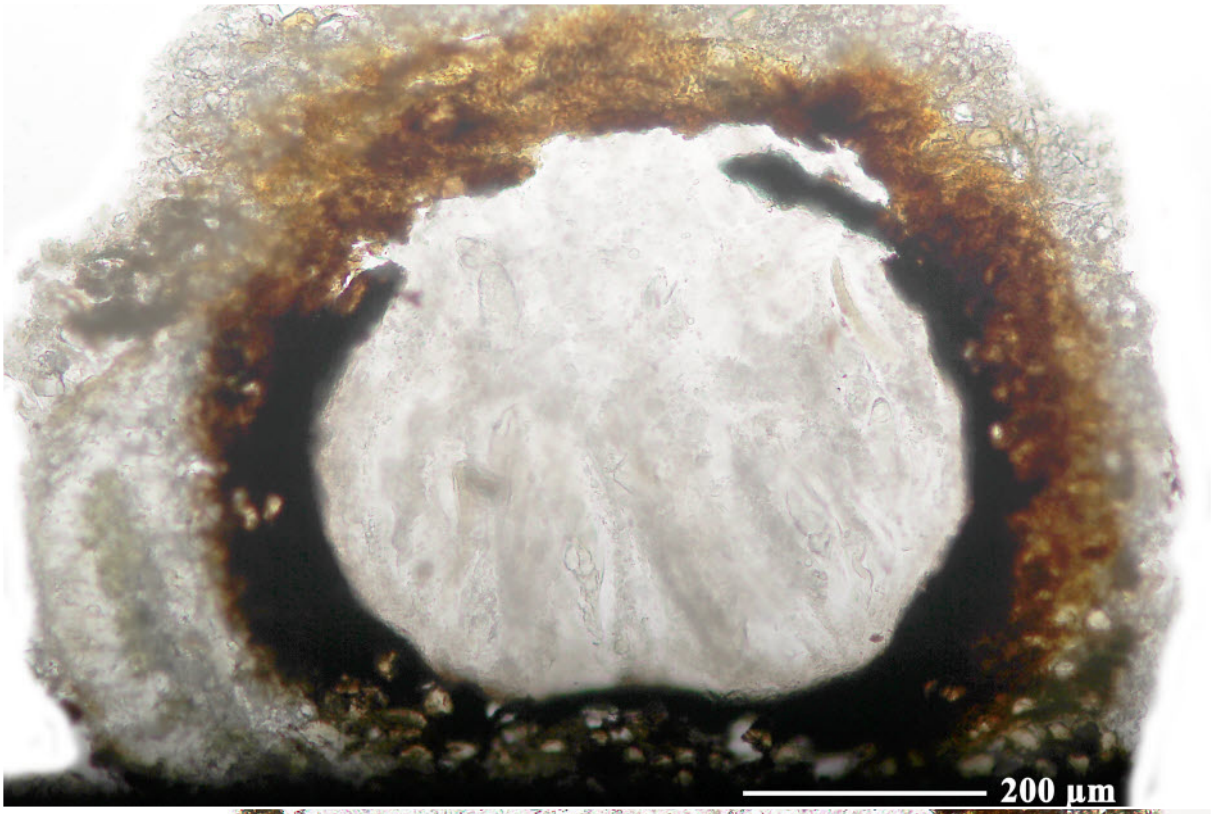
[ABL19135], Papua New Guinea, Central prov., Varirata National Park, 20 km E of Port Moresby, 147°22’ E, 9°27’ S, 800 m, on tree in secondary tropical forest. Leg. A. Aptroot (no 19135), 03.1987, det. A. Aptroot.

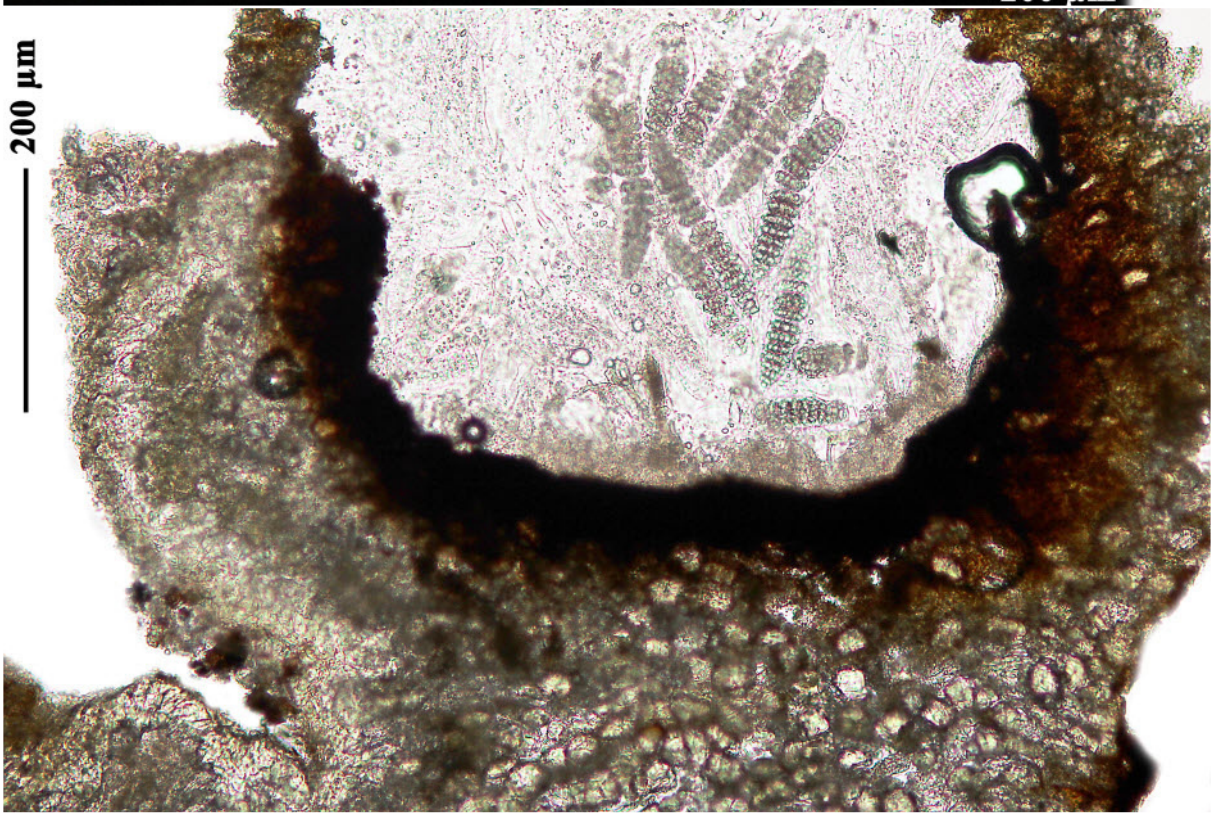




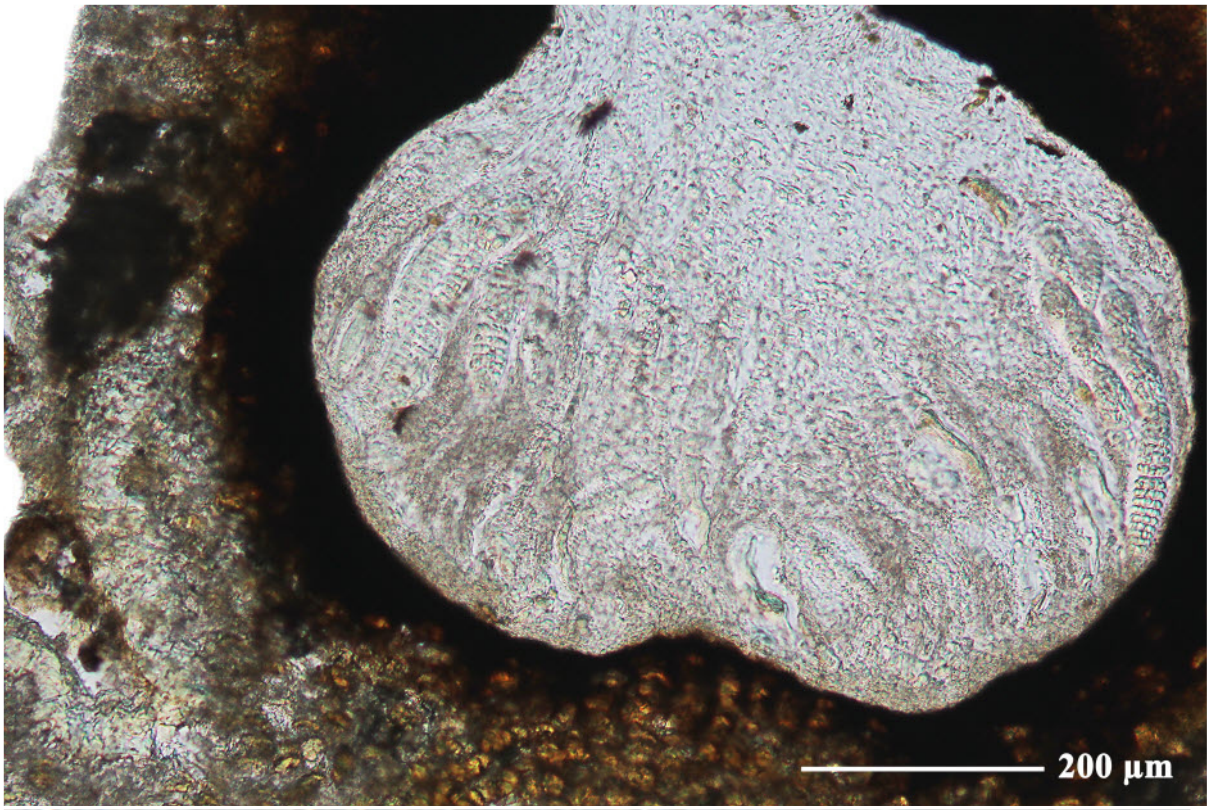


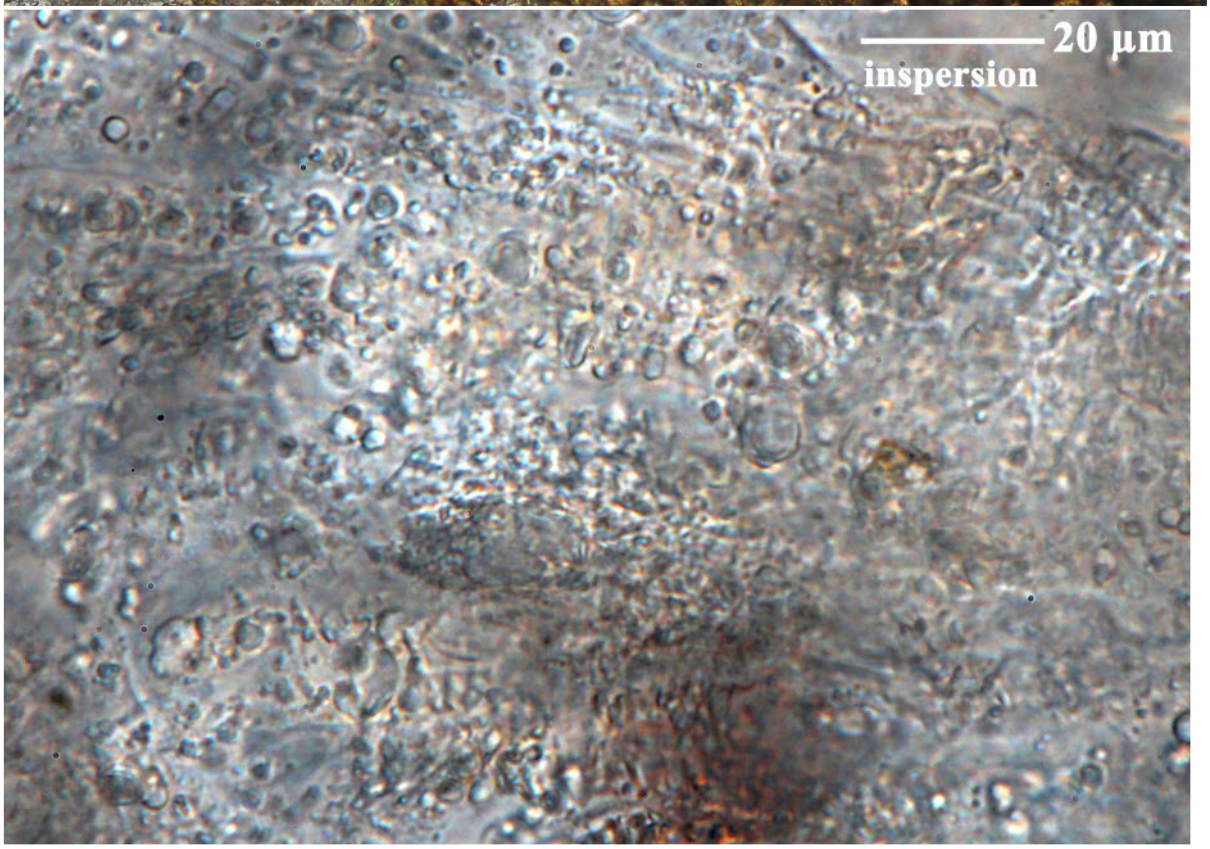
Astrothelium sikkimense



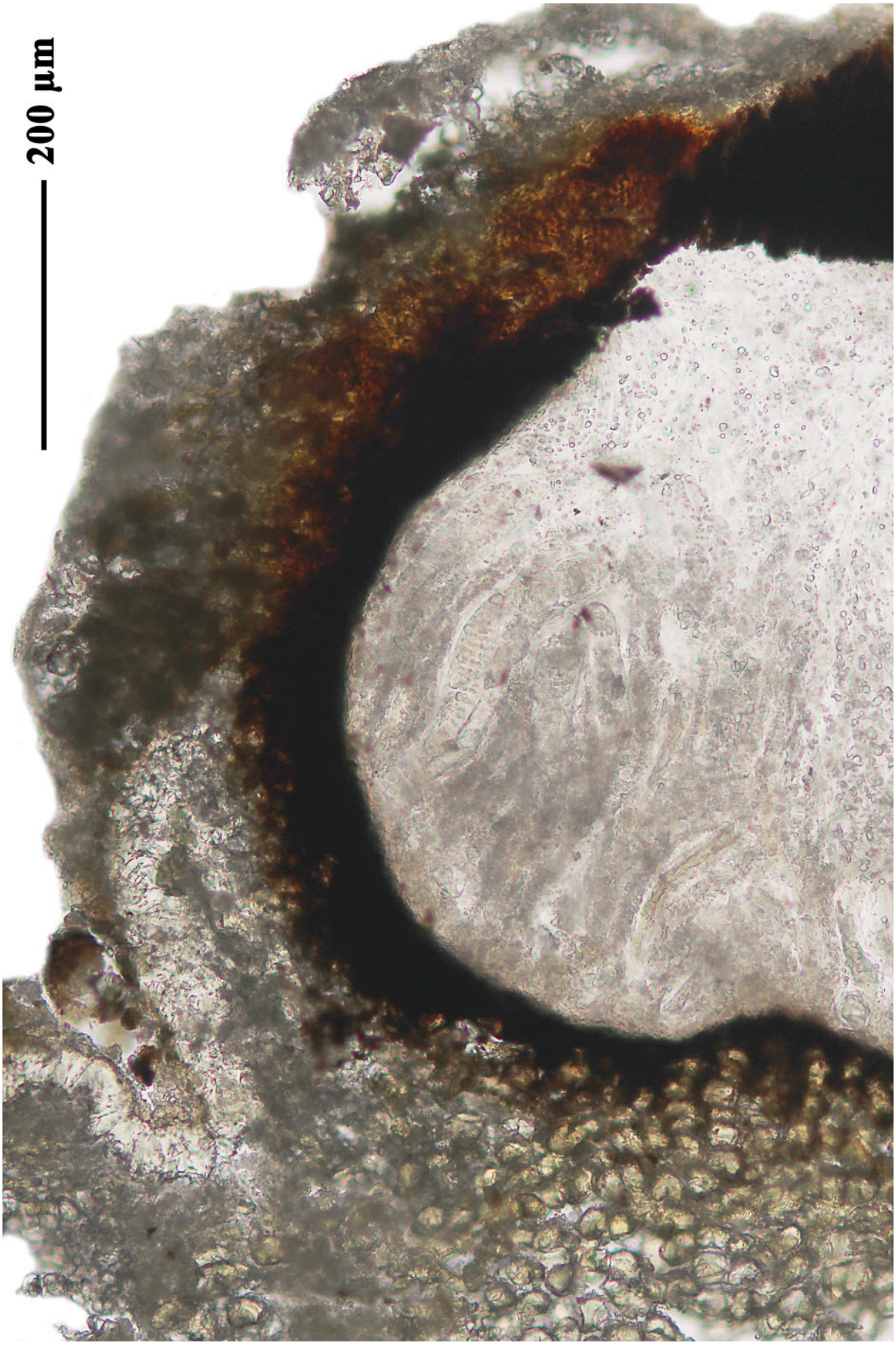


Astrothelium sikkimense

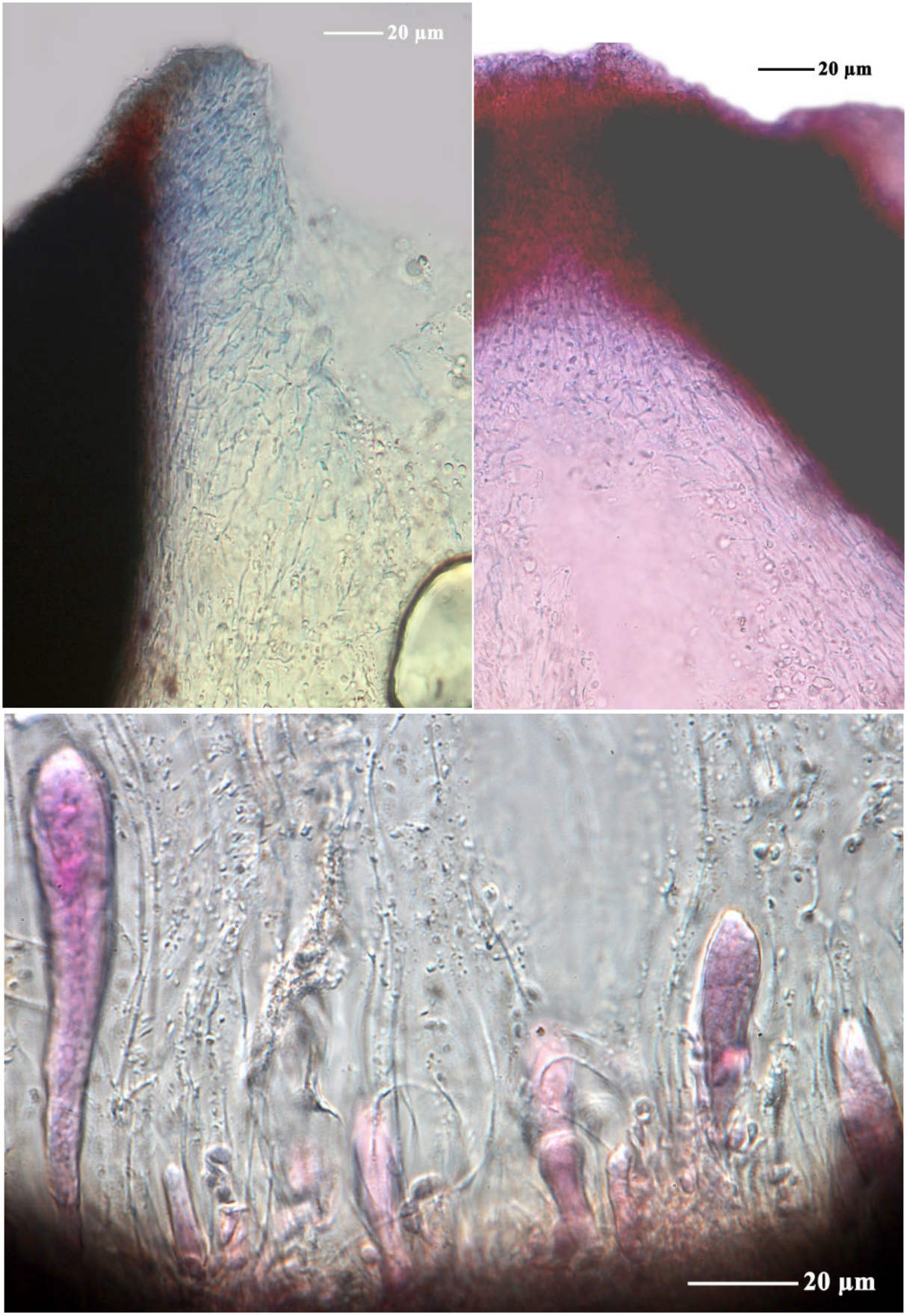




Astrothelium sikkimense



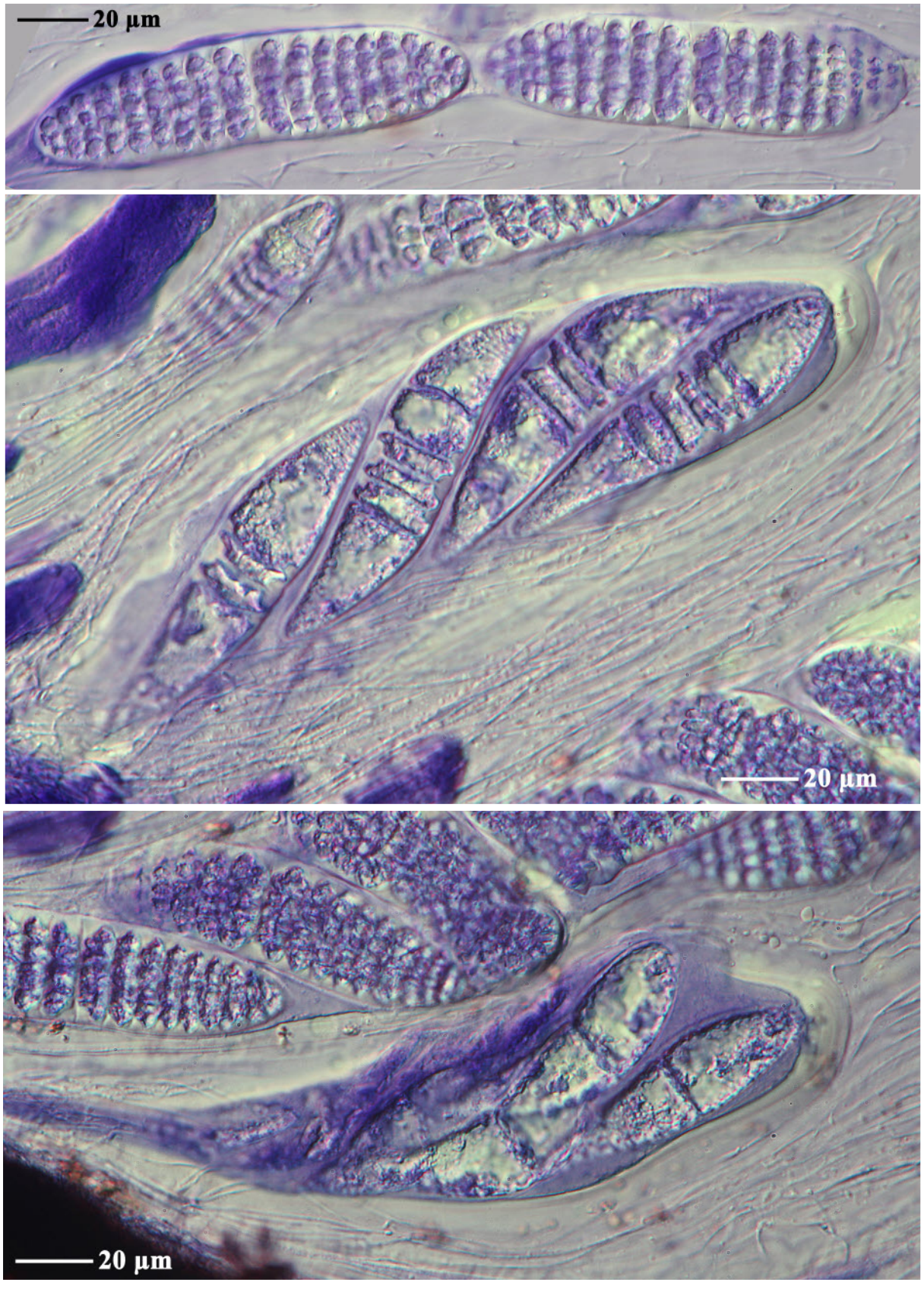
Astrothelium sikkimense



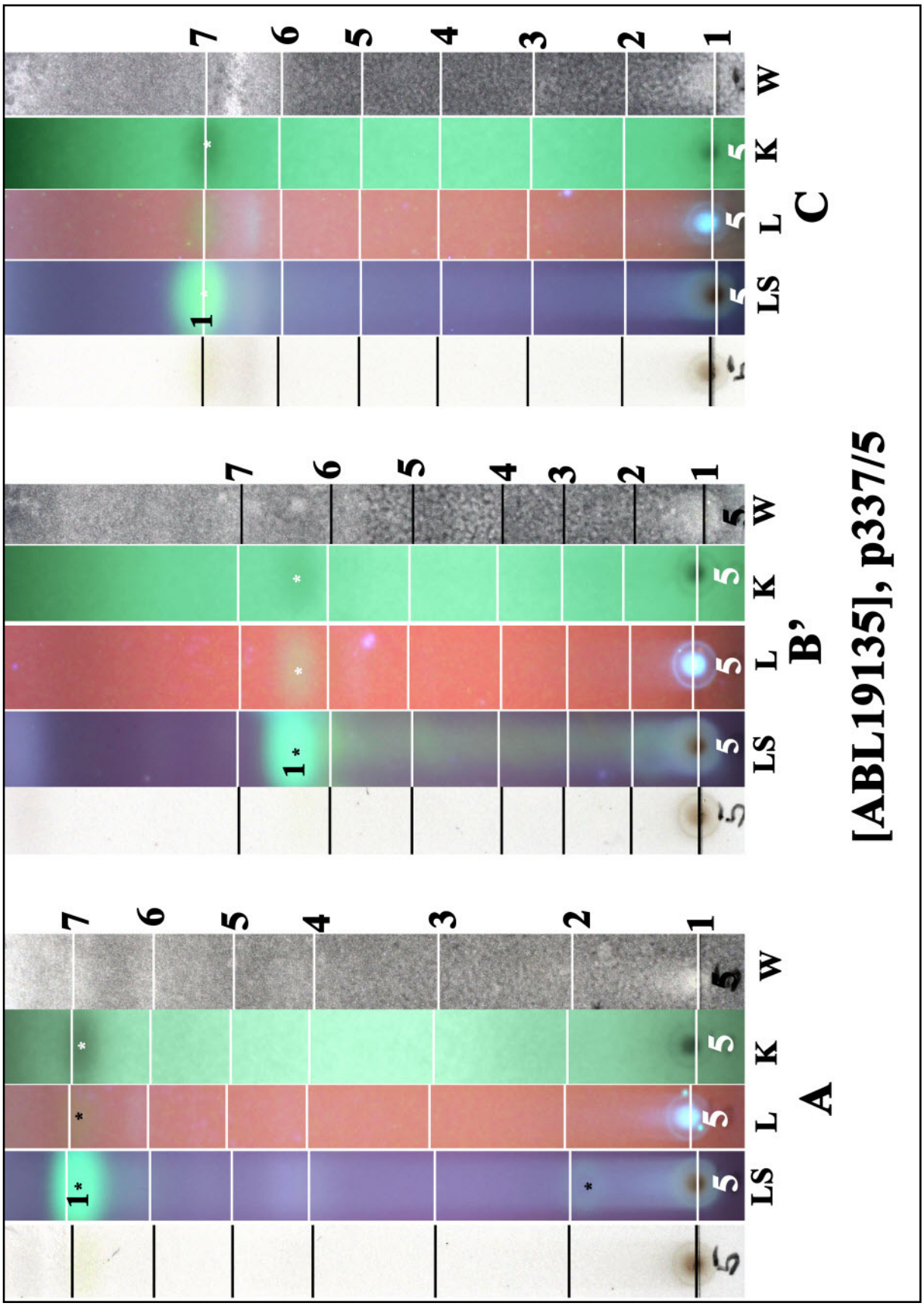
Astrothelium sikkimense



Astrothelium sikkimense



Astrothelium sikkimense



1: lichexanthone

Astrothelium sikkimense

Astrothelium sikkimense (Makhija & Patw.) Aptroot & Lücking, Lichenologist 48(6): 887 (2016)
= *Laurera sikkimensis* Makhija & Patw., Mycotaxon 31(2): 580 (1988)

Thallus corticate, brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary to irregularly confluent, 1–2 mm diam., immersed to erumpent, covered by thallus except black ostiole surrounded by whitish rim. Hamathecium inspersed. Ascospores 6–8/ascus, muriform, ellipsoid, 120–140 × 25–30 µm, with somewhat thickened median septum, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

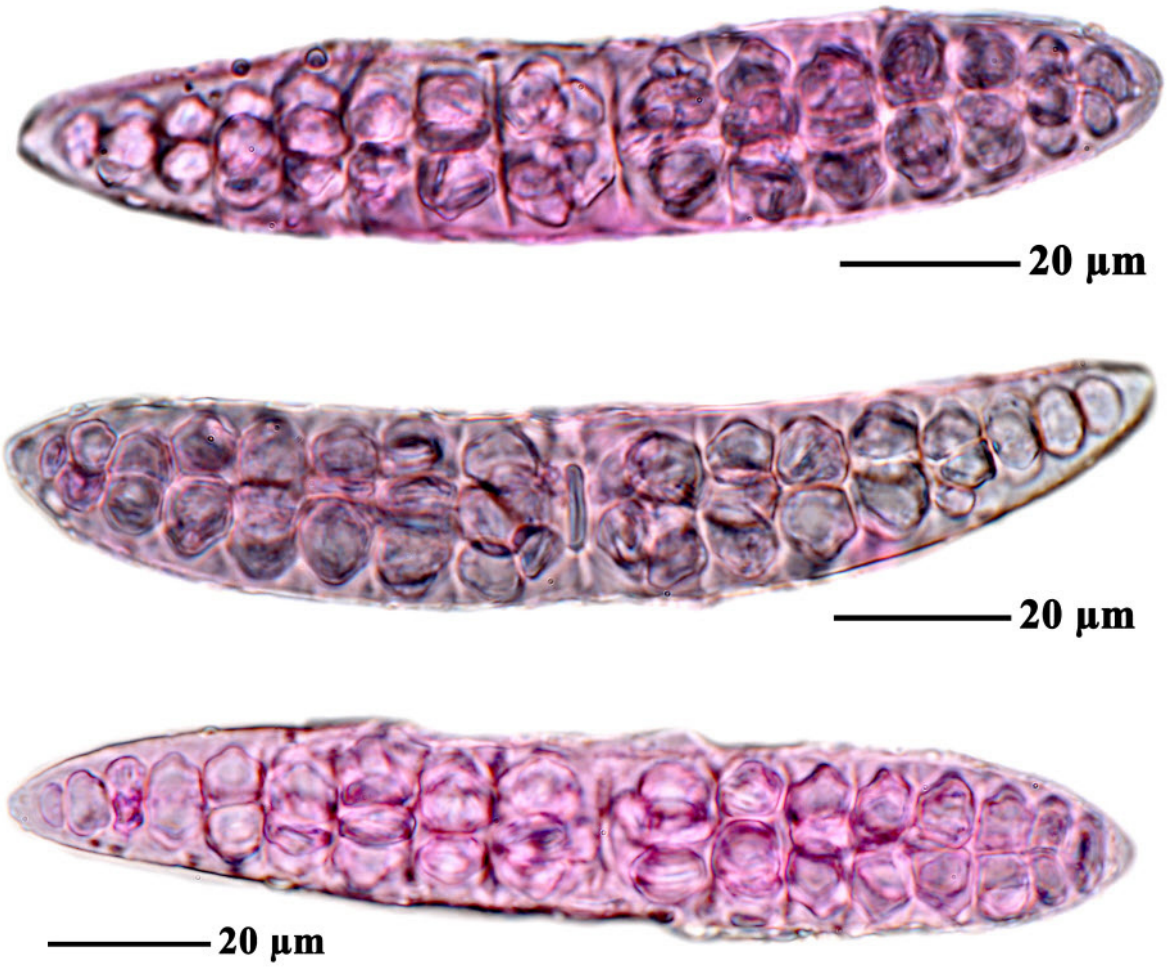
[AMH771970], India, Gangtok, Near Tangshi View Point. Leg. Padwardhan & Nagakar (no AMH771970). ISOTYPE of *Laurera sikkimensis*.







Astrothelium sikkimense



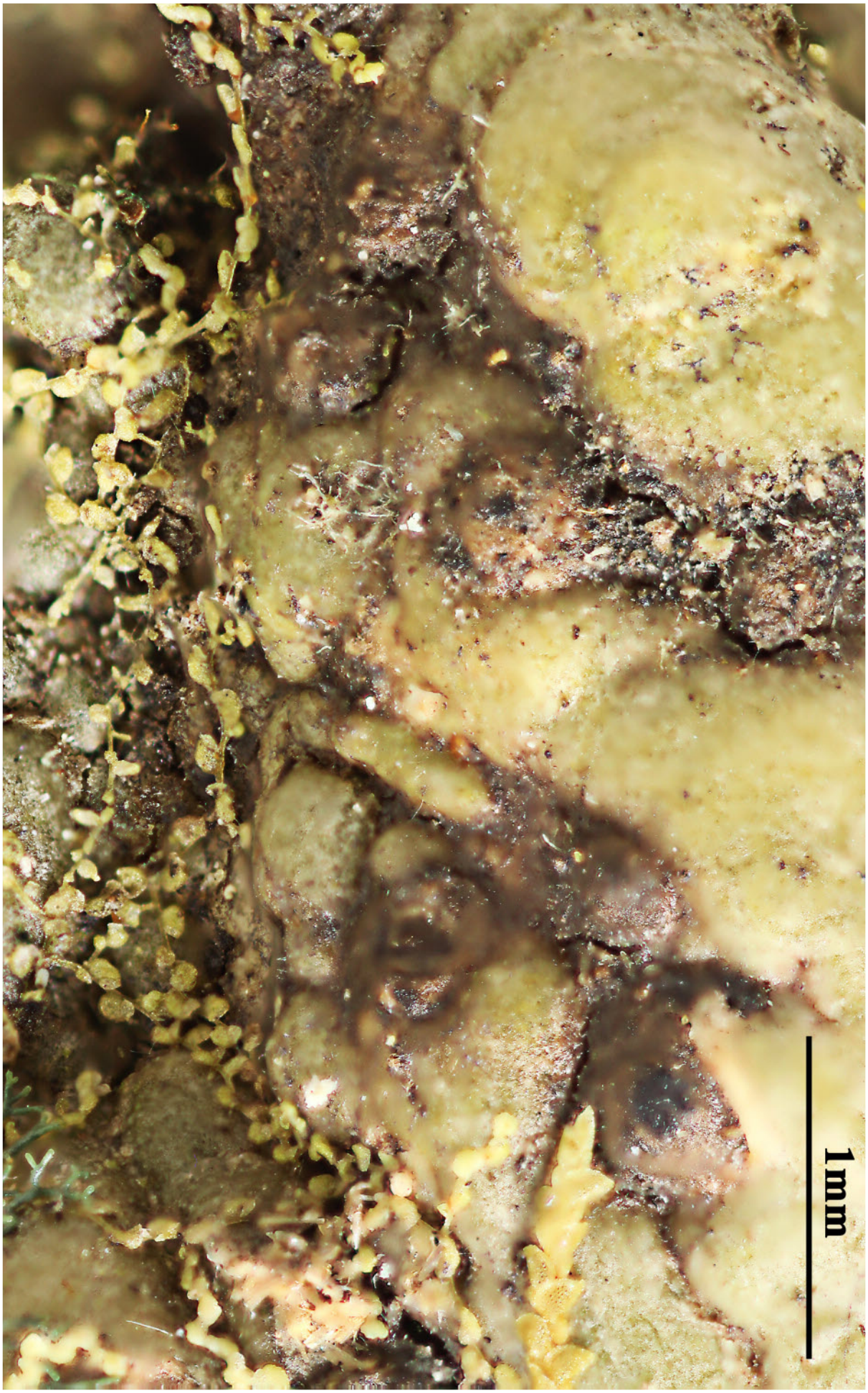
Astrothelium sikkimense

Astrothelium simplex Aptroot & S.M. Martins, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 720 (2016)

Thallus corticate, bullate, somewhat shiny, continuous, covering areas ≤ 7 cm diam., c. 0.3 mm thick, olive-green, not surrounded by a prothallus, inducing gall formation of the host bark. Ascomata pyriform, c. 0.6–0.9 mm diam., mostly aggregated 2–5, mostly immersed in the bark tissue. Wall carbonized, ≤ c. 80 µm thick. Ostioles eccentric, fused, raised, dark brown, surrounded by an ochraceous zone. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 56–63 × 15–19 µm, ends pointed, lumina diamond-shaped, without gelatinous sheath. Pycnidia not observed. Chemistry: Thallus surface UV−, thallus medulla K−; TLC: no substances detected.

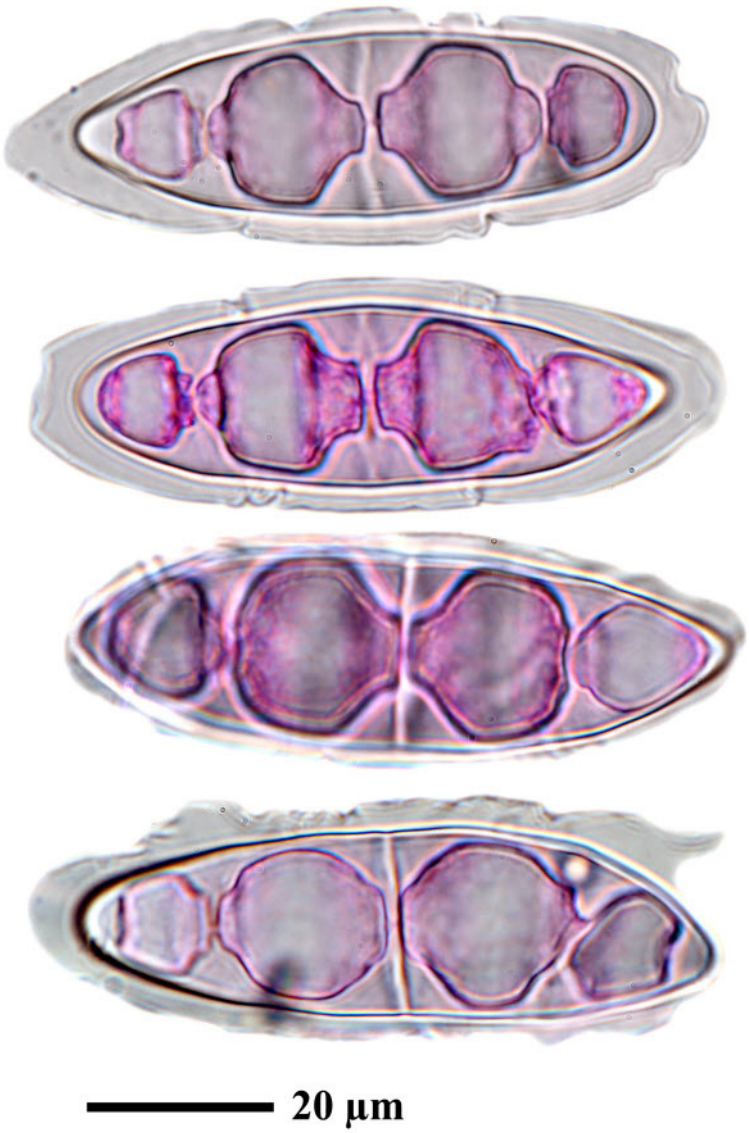
[ABL78803], Brazil, Santa Catarina, São Bento do Sul, CEPA Rugendas, on tree in temperate rain forest, 26°19’24” S, 49°18’26” W, 640 m. Leg. A: Aptroot (no 78803), 1.04.2019, det. A. Aptroot, 2019.





Astrothelium simplex





Astrothelium simplex

Astrothelium simplex Aptroot & S.M. Martins, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 720 (2016)

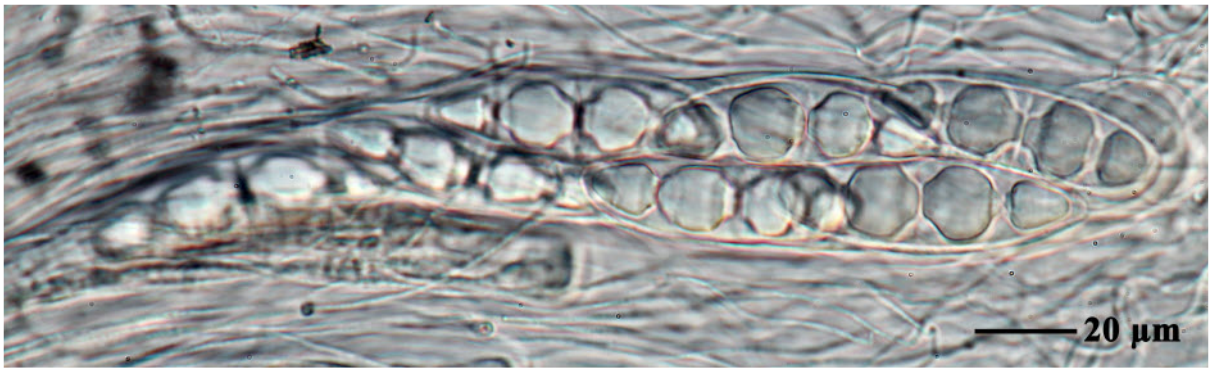
Thallus corticate, bullate, somewhat shiny, continuous, covering areas ≤ 7 cm diam., c. 0.3 mm thick, olive-green, not surrounded by a prothallus, inducing gall formation of the host bark. Ascomata pyriform, c. 0.6–0.9 mm diam., mostly aggregated 2–5, mostly immersed in the bark tissue. Wall carbonized, ≤ c. 80 µm thick. Ostioles eccentric, fused, raised, dark brown, surrounded by an ochraceous zone. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 56–63 × 15–19 µm, ends pointed, lumina diamond-shaped, without gelatinous sheath. Pycnidia not observed. Chemistry: Thallus surface UV−, thallus medulla K−; TLC: no substances detected.

[Martins2274], Brazil, Rio Grande do Sul, Caraá, Fraga. Leg. S.A. Martins (no 2274), 27.04.2009, det. A. Aptroot, 2016. ISOTYPE.

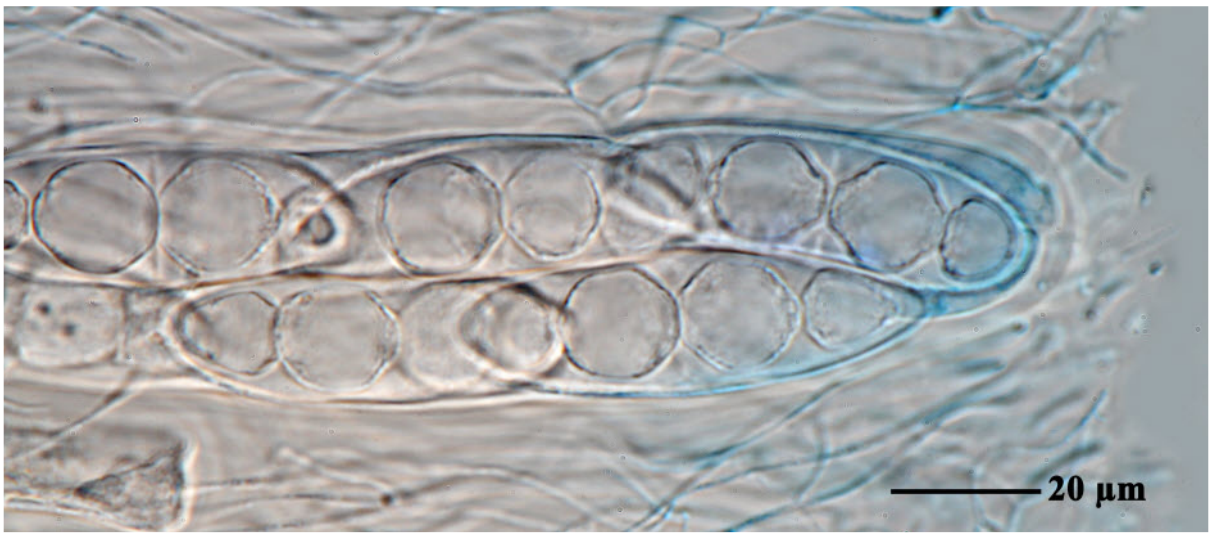


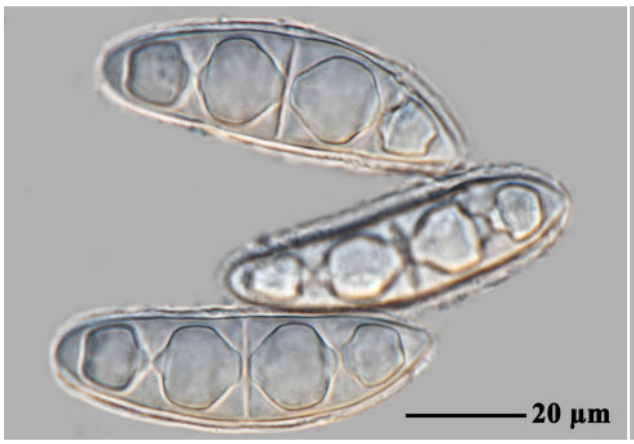


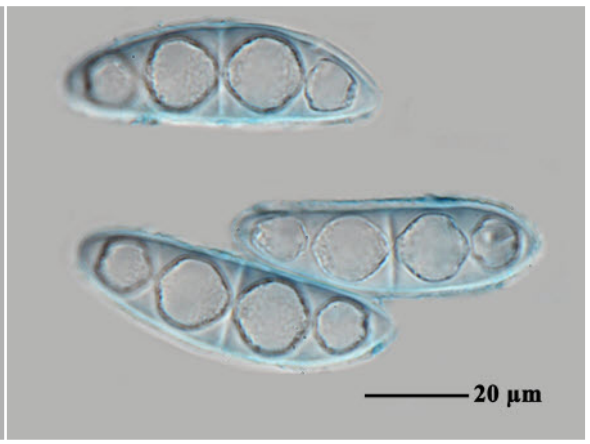
Astrothelium simplex











Astrothelium simplex

Astrothelium sinuosum Aptroot & Gumboski, in Aptroot, Mendonça, Andrade, Silva, Martins, Gumboski, Fraga Junior & Cáceres, Lichenologist 48(6): 720 (2016)

Thallus corticate, bullate, somewhat shiny, continuous, covering areas ≤ 7 cm diam., c. 0.2 mm thick, olive-green, not surrounded by a prothallus, inducing gall formation of the host bark. Ascomata pyriform, c. 0.6–1.2 mm diam., mostly aggregated 2–5, mostly immersed in the bark tissue. Wall carbonized, ≤ c. 80 µm thick. Ostioles eccentric, fused or with 2–3 together next to each other in the same ostiolar region, raised, brown, surrounded by a raised, c. 0.2–0.4 mm wide, whitish zone. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 62–67 × 17–20 µm, ends pointed, lumina diamond-shaped, surrounded by a rather irregular and often discontinuous, wavy gelatinous sheath ≤ 4 µm thick, which is at least present at the central septum and at the poles. Pycnidia not observed. Chemistry: Thallus surface UV−, thallus medulla K−; ostiolar region UV+ yellow. TLC: lichexanthone.

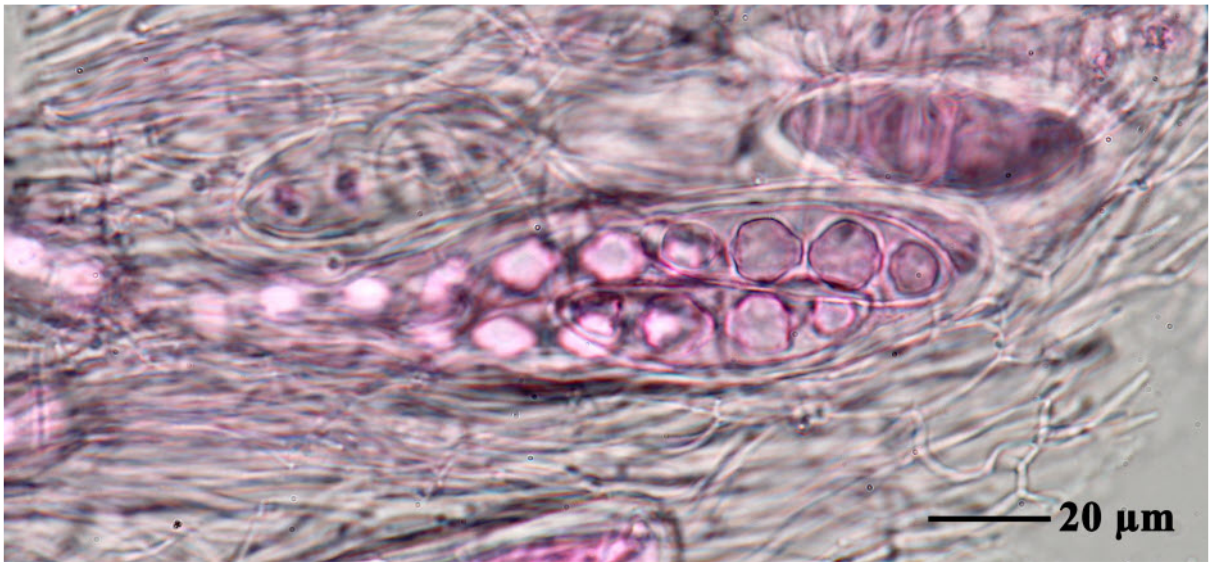
[Gumboski3906], Brazil, Santa Catarina, São Bento do Sul, Área de Proteção Ambiental Rio Vermelho, Humboldt, on tree bark. Leg. E. Gumboski (no 3906), 6.9.2012, det. A. Aptroot, 2023. ISOTYPE.

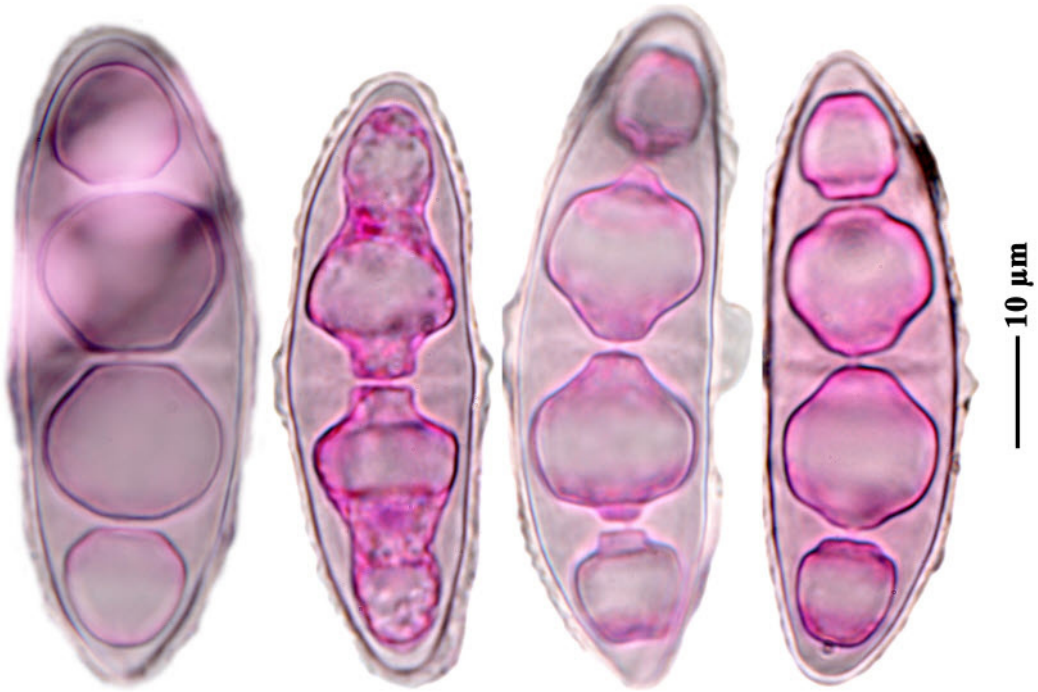




Astrothelium sinuosum





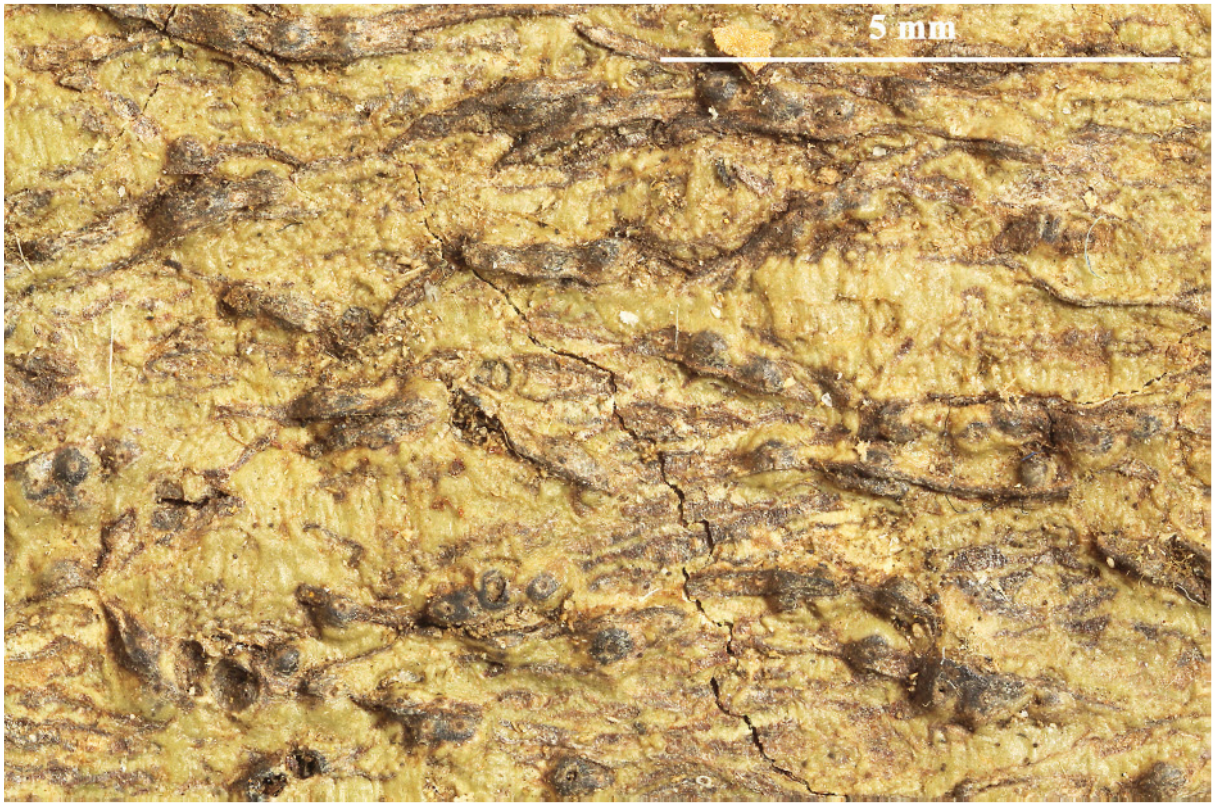


Astrothelium sinuosum

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

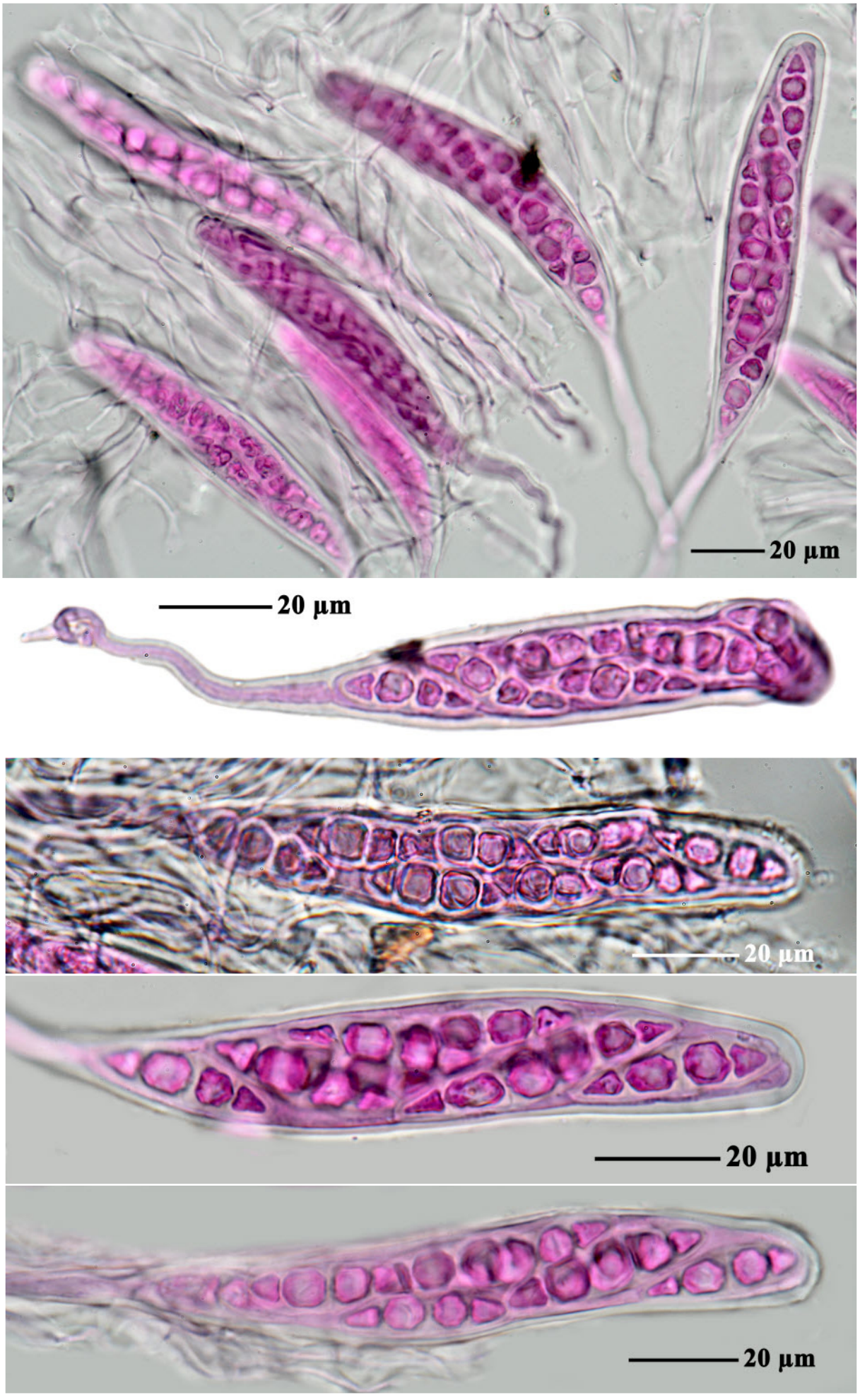
Thallus corticate, smooth, shiny, continuous, covering areas ≤ 3 cm diam., under 0.1 mm thick, olive-green, surrounded by a dark brown prothallus line c. 0.1 mm wide, not inducing gall formation of the host bark. Ascomata globose, 0.3–0.5 mm diam., solitary or in groups of 2–4, erumpent from the bark, black, partly with irregular thallus coverage, not in pseudostromata. Wall black all around, ≤ c. 30 µm thick. Ostioles apical, not fused, flat, dark brown, often surrounded by a pale brown ring. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 33–36 × 10–11 µm, ends rounded, lumina diamond-shaped, not surrounded by a gelatinous layer. Pycnidia not observed. Chemistry: Thallus and medulla UV−, K−. TLC: no secondary substances detected.

[ABL15501], Brazil, Rondônia, Porto Velho, Parque Natural Municipal de Porto Velho, 8º41'10" S, 63º52'05" W, c. 100 m, on tree bark in primary rainforest. Leg. M. Cáceres & A. Aptroot (no 15501), 19.11.2012, det. A. Aptroot 2012. ISOTYPE.





Astrothelium solitarium



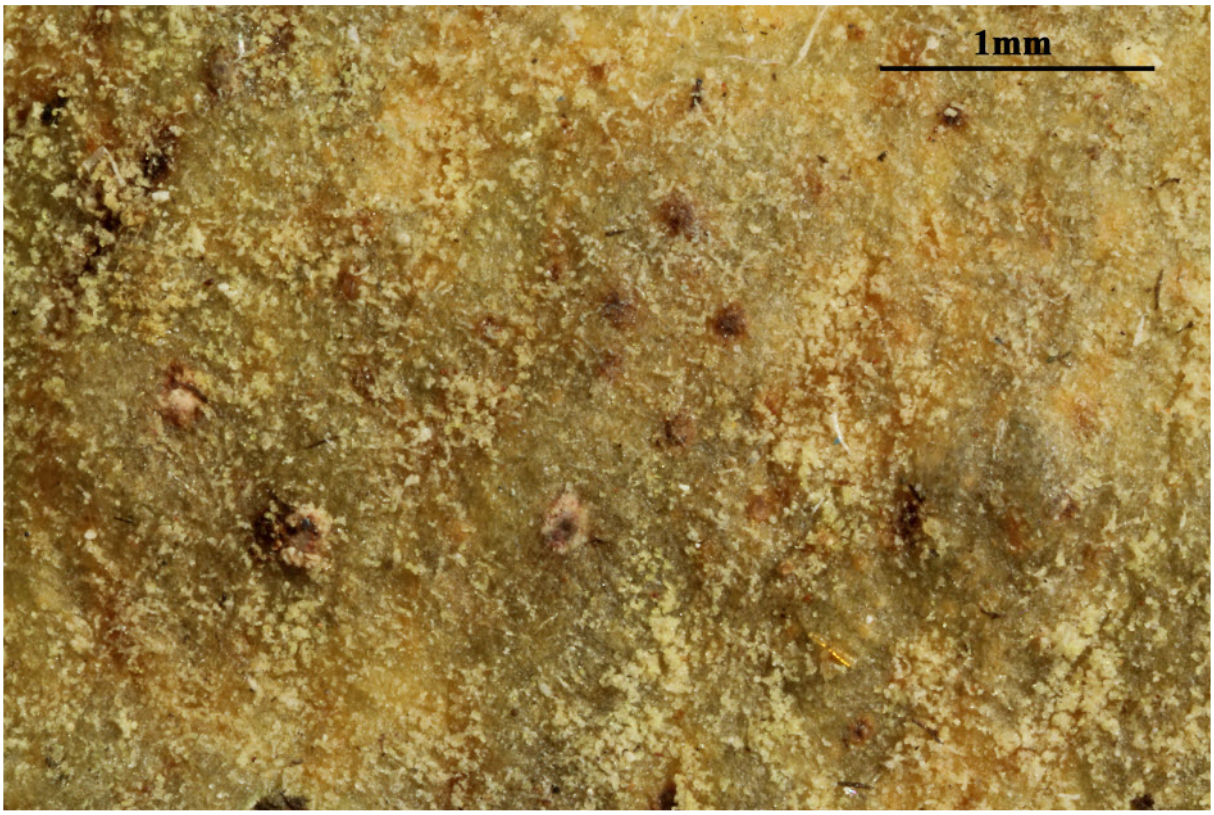
Astrothelium solitarium

Astrothelium spectabile (Aptroot & L.I. Ferraro) Aptroot & Lücking, Lichenologist 48(6): 887 (2016)

= *Trypethelium spectabile* Aptroot & L.I. Ferraro, Kurtziana 31(1-2): 59 (2005)

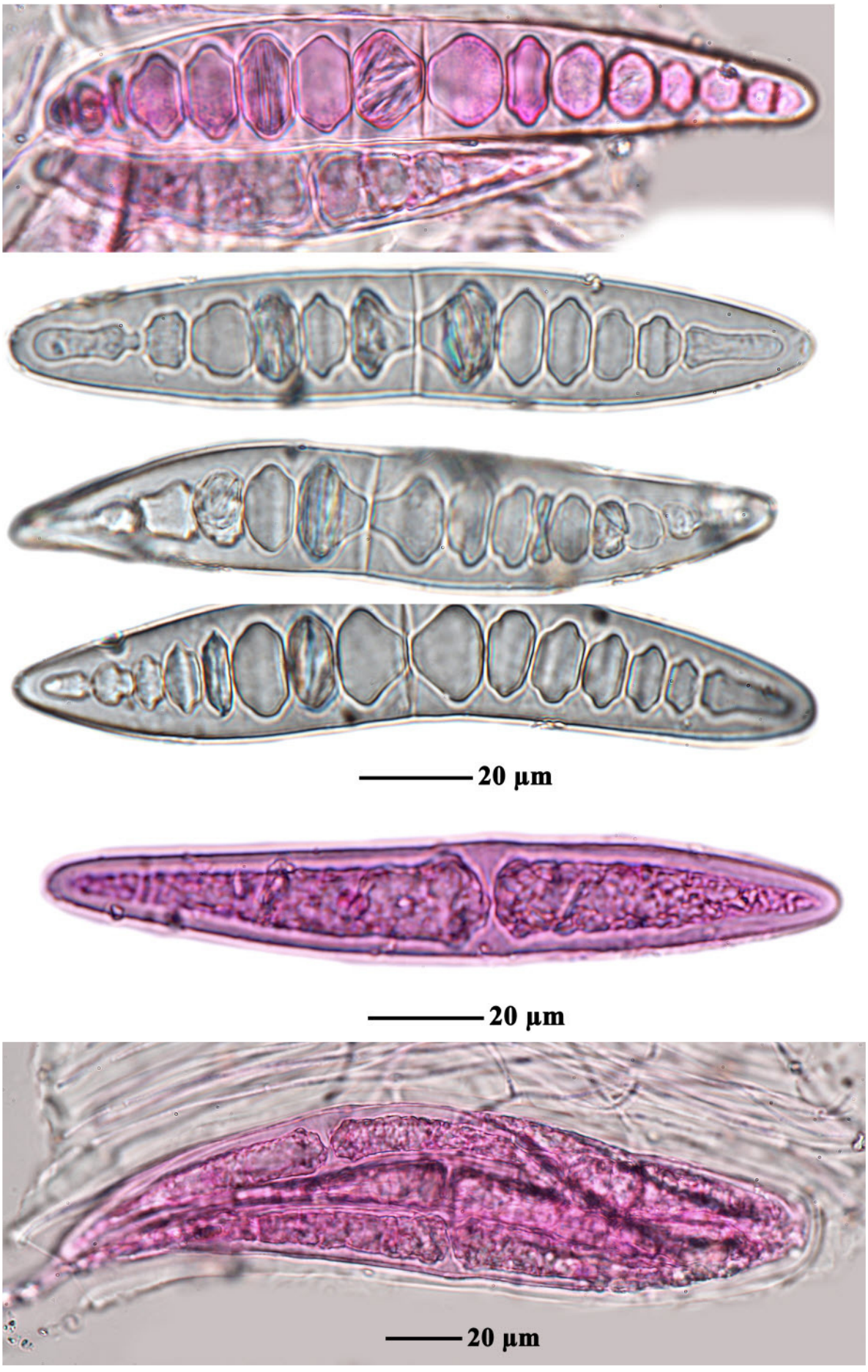
Thallus corticate, light green, smooth. Ascomata trypethelioid, with apical ostioles, solitary to irregularly confluent, 0.7–1.2 mm diam., immersed, completely covered by thallus. Hamathecium clear. Ascospores 8/ascus, 11–19-septate, fusiform, 140–190 × 20–25 µm, hyaline, IKI-. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[Ferraro6602], Argentina, Prov. Misiones, Parque National Iguazú. Leg. L. I. Ferraro (no 6602)& O. Popoff, 4.3.2003, det. A. Aptroot. ISOTYPE.





Astrothelium spectabile

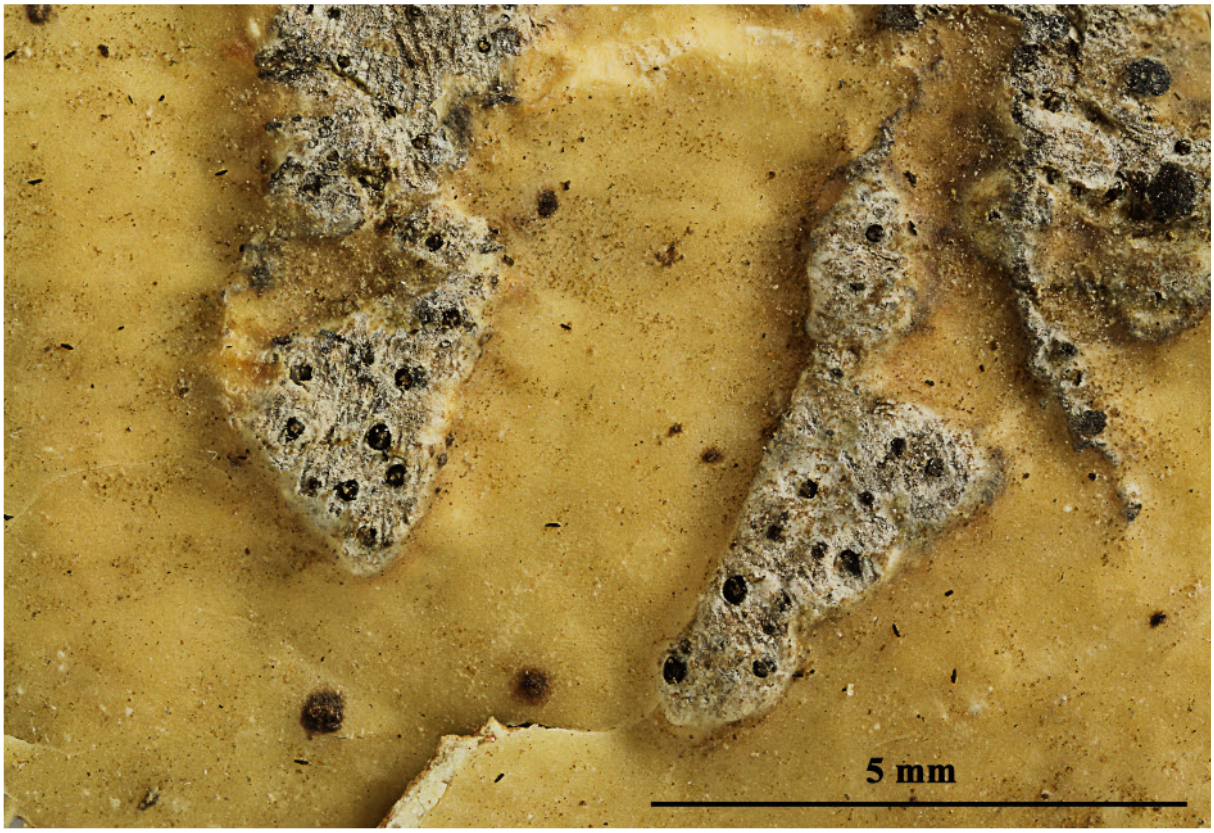


Astrothelium spectabile

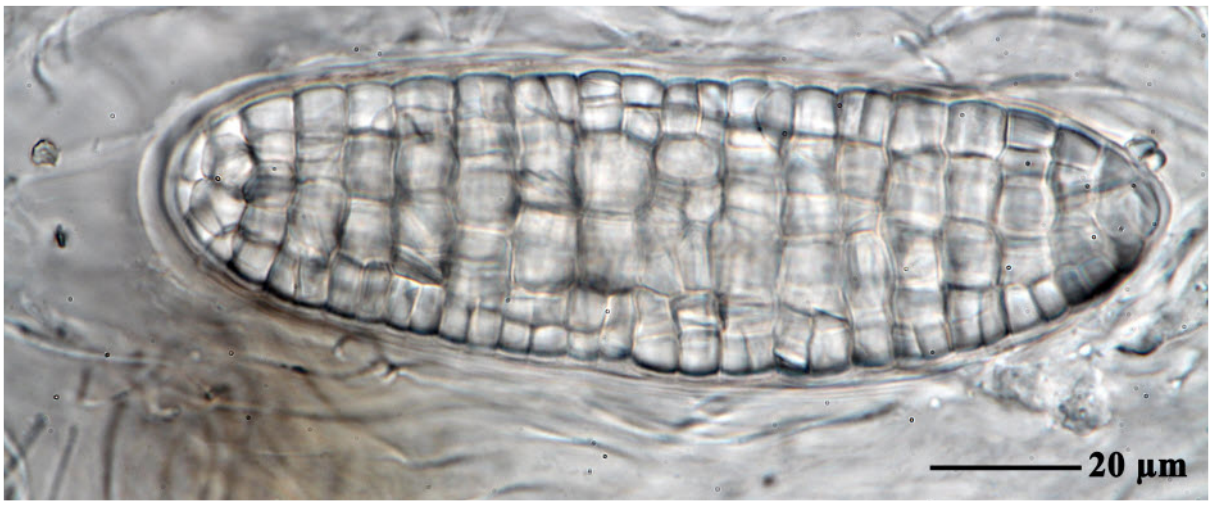
Astrothelium sphaerioides (Mont.) Aptroot & Lücking, Lichenologist 48(6): 888 (2016)
= *Bathelium sphaerioides* (Mont.) Trevis., Flora, Regensburg 44: 21 (1861)
= *Laurera sphaerioides* (Mont.) Zahlbr., Cat. Lich. Univers. 1: 506 (1922)
= *Trypethelium sphaerioides* Mont., Annls Sci. Nat., Bot., sér. 2 19: 73 (1843)

Thallus corticate, olive-green to brownish, smooth to uneven. Ascomata with apical to eccentric, separate ostioles, distinctly pseudostromatic, 0.5–1.5 mm broad, erumpent to prominent, whitish and black ostioles. Hamathecium clear. Ascospores 2-4/ascus, muriform, ellipsoid, 80–175 × 25–50 µm, without distinctly thickened median septum, hyaline, IKI-. Chemistry: thallus and pseudostromata UV-, K-. TLC: no substances detected.

[Etayo30235], Panamá. Veraguas, Bahia Honda, playa del Sol (campamento) con magnos y cocos, 0 m (Ver, Pan). Tronco inde, en playa. Leg. J. Etayo, (no 30255), 1.08.2001, det. A. Aptroot.

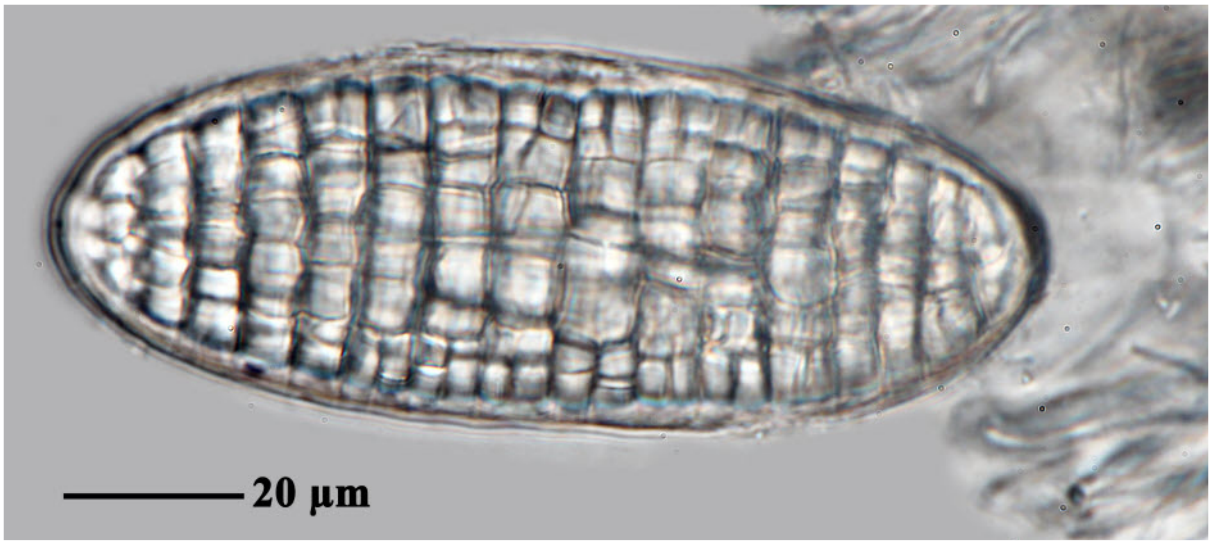


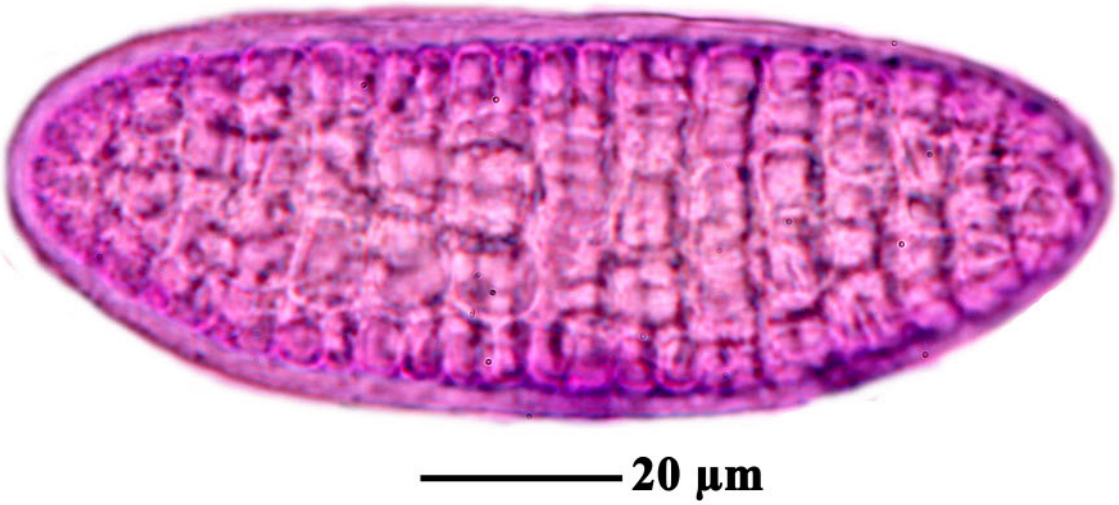






Astrothelium sphaerioides





Astrothelium sphaerioides

Astrothelium sphaerioides (Mont.) Aptroot & Lücking, Lichenologist 48(6): 888 (2016)
= *Bathelium sphaerioides* (Mont.) Trevis., Flora, Regensburg 44: 21 (1861)
= *Laurera sphaerioides* (Mont.) Zahlbr., Cat. Lich. Univers. 1: 506 (1922)
= *Trypethelium sphaerioides* Mont., Annls Sci. Nat., Bot., sér. 2 19: 73 (1843)

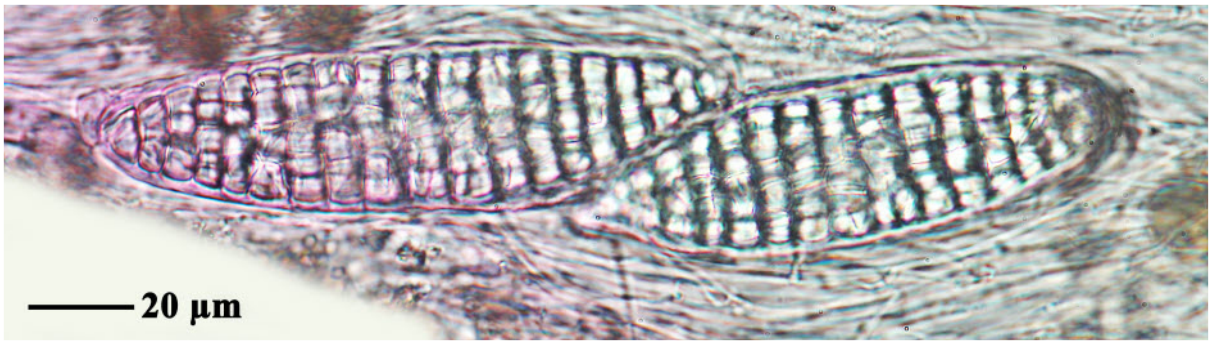
Thallus corticate, olive-green to brownish, smooth to uneven. Ascomata trypethelioid to pleurothelioid, with apical to eccentric, separate ostioles, distictly pseudostromatic; pseudostromata irregular, 0.5–1.5 mm broad, erumpent to prominent, witish and black ostioles. Hamathecium clear. Ascospores 2–4/ascus, muriform, ellipsoid, 80–175 × 25–50 µm, without distinctly thickened median septum, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

[Montfoort302], French Guiana, Saül, 2 km SW of the village „sentier Limonade“, 180-210 m, 3°32’ N, 53°12’ W. Mixed forest on lateritic soil. Epiphytic in higher canopy of large tree. Leg. D. Montfoort (no 302) & R.C. Ek, 01.11.1986, det A. Aptroot.

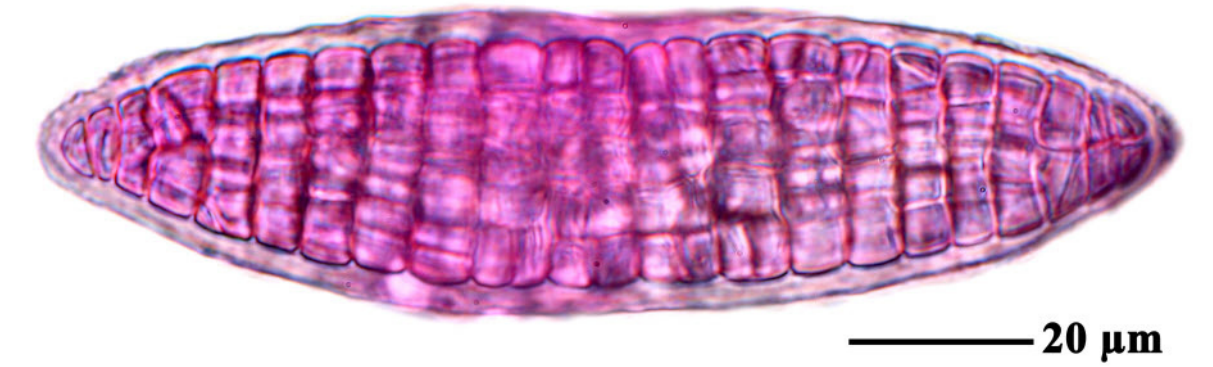




Astrothelium sphaerioides

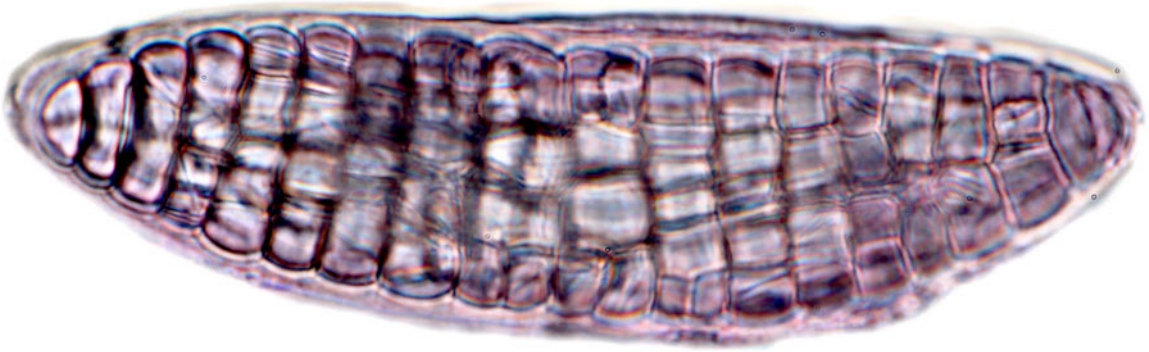


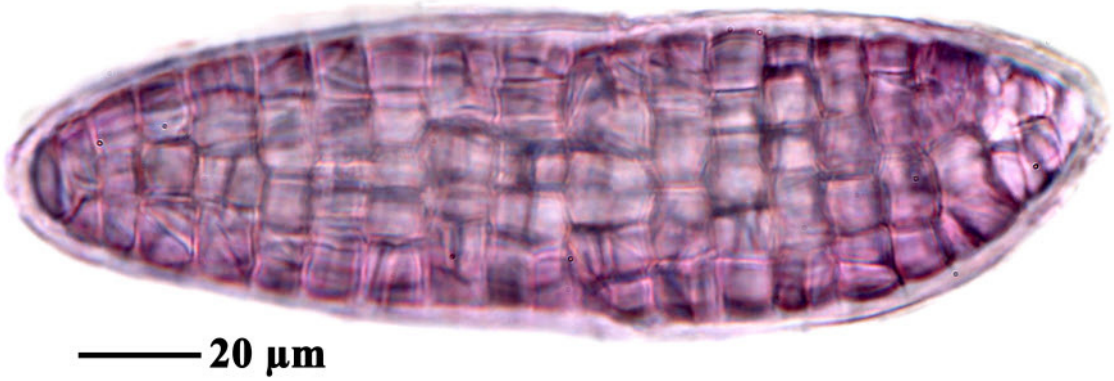


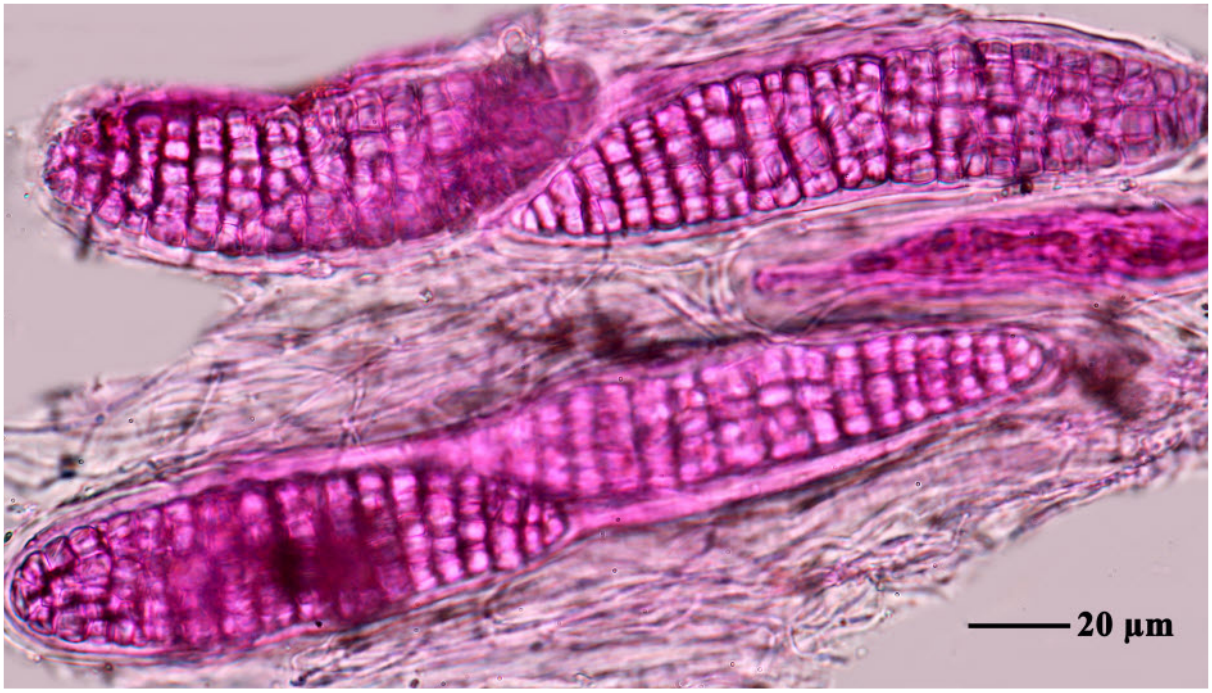




Astrothelium sphaerioides







Astrothelium sphaerioides

Astrothelium straminicolor (Nyl.) Aptroot & Lücking, Lichenologist 48(6): 888 (2016)
= *Trypethelium straminicolor* Nyl., Lich. Japon.: 115 (1890)
= *Astrothelium subvariolosum* Makjija & Patw., Biovigyanam 15: 64 (1989)

Thallus corticate, olive-green to yellowish brown, uneven to shallowly bullate. Ascomata astrothelioid, several chambers joined with eccentric, fused ostioles; joined ascomata pseudostromatic; pseudostromata 1-2 mm diam., erumpent to prominent, covered by thallus except for blackish upper part surrounded by a thin, whitish rim, with blackish ostiolar areas, arranged in lobate fashion. Hamathecium inspersed. Ascospores 8/ascus, 3-septate, fusiform ellipsoid, 20–25 × 7–9 µm, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detrected.

[AMH87-70], India, Nicobar Islands, Great Nicobar, Campell Bay to Laful Bay. Leg. Parwardhan & Nagarkar (no AMH 87-70), 2.1.1987. ISOTYPE of *Astrothelium subvariolosum*.



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

Thallus corticate, smooth, somewhat shiny, continuous, covering areas ≤ 7 cm diam., c. 0.1 mm thick, pale ochraceous green, surrounded by a black prothallus line c. 0.2 mm wide, not inducing gall formation of the host bark. Ascomata globose, 0.2–0.5 mm diam., immersed in groups of 7–50 in pseudostromata, not all reaching the surface at one time. Pseudostromata well delimited, not corticate, slate grey with a whitish (partly slate grey when abraded) surface clearly different from the thallus, distinctly c. 1 mm raised above the thallus, ≤ 7 mm diam., irregular in outline and sometimes forming a network, inside with carbonized bark tissue. Wall black, ≤ c. 30 µm thick. Ostioles apical, not fused, flat to concave, ferrugineous brown, surrounded by a whitish zone. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, fusiform, 20–23 × 7–9 µm, ends rounded, lumina diamond-shaped, surrounded by a gelatinous layer ≤ 6 µm thick. Pycnidia not observed. Chemistry: Thallus surface UV−, thallus medulla K−; pseudostroma surface UV+ yellow. TLC: lichexanthone.

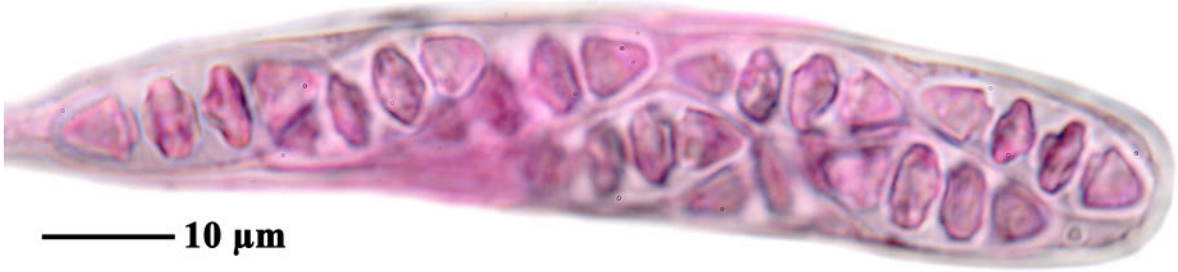
[ABL15224], Brazil, Rondônia, Porto Velho, Parque Natural Municipal de Porto Velho, 8°41'10" S, 63°52'05" W, c. 100 m, on tree bark in park near rainforest. Leg. M. Cáceres & A. Aptroot (no 15224), 16.11.2012, det. A. Aptroot, 2012. ISOTYPE.



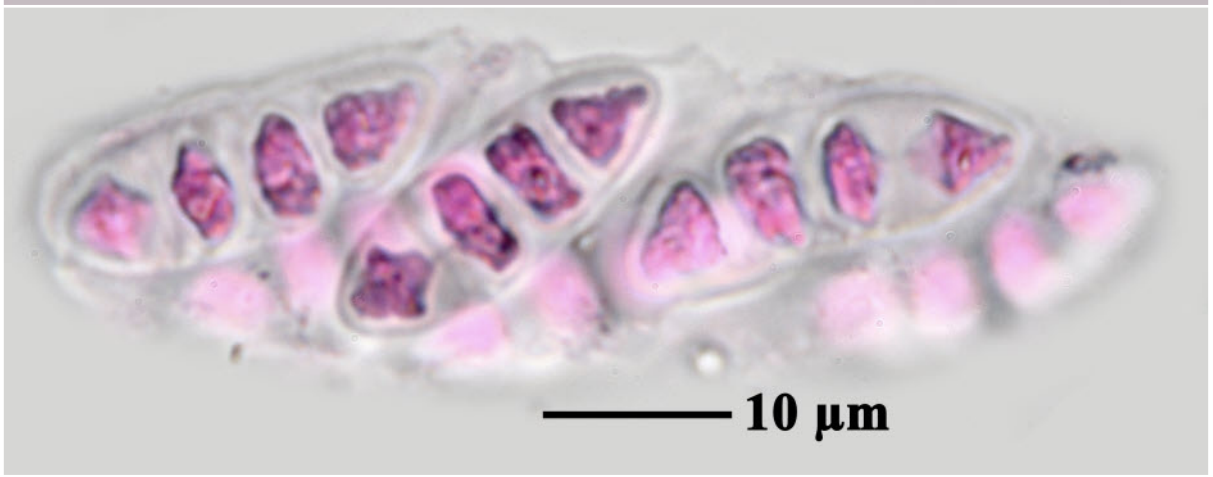


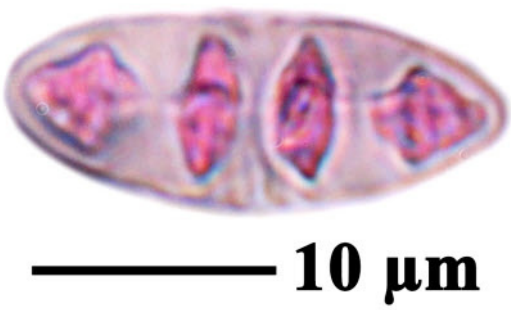
Astrothelium stromatofluorescens











Astrothelium stromatofluorescens

Astrothelium studerae Aptroot & M. Cáceres, in Aptroot, Sipman, Barreto, Nunes & Cáceres, Lichenologist 51(1): 35 (2019)

Thallus olive-green to yellowish green, bullate, surrounded by a black line denoting the prothallus c. 0.3 mm wide, not inducing gall formation in the host bark. Ascomata pyriform, 0.7–1.1 mm diam., 2–5 aggregated with a common ostiole, black, in often somewhat unclear, thallus-like but paler to whitish, slightly raised pseudostromata. Wall carbonized, ≤ c. 70 µm thick. Ostioles apical, brown, flat, c. 0.1 mm wide, often surrounded by a wide area where the pseudostromatal tissue is abraded and the black ascoma wall exposed. Hamathecium inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 3-septate, 21.5–23.0 × 6.5–7.5 µm, ellipsoid, IKI−, lumina diamond-shaped, surrounded by a gelatinous layer up to 7 µm thick. Pycnidia not observed. Chemistry: Thallus UV−, KOH−, pseudostromata UV+ yellow, KOH−. TLC: lichexanthone.

[ISE42813], Brazil, Alagoas, Quebrangulo, Pedra Talhada private area, in Atlantic rain forest on tree bark, 500–700 m, 9°15’ S, 36°25’35” W. Leg. M. Cáceres & A. Aptroot (no ISE 42813), 21–23.10.2017, det. A. Aptroot, 2017. ISOTYPE.

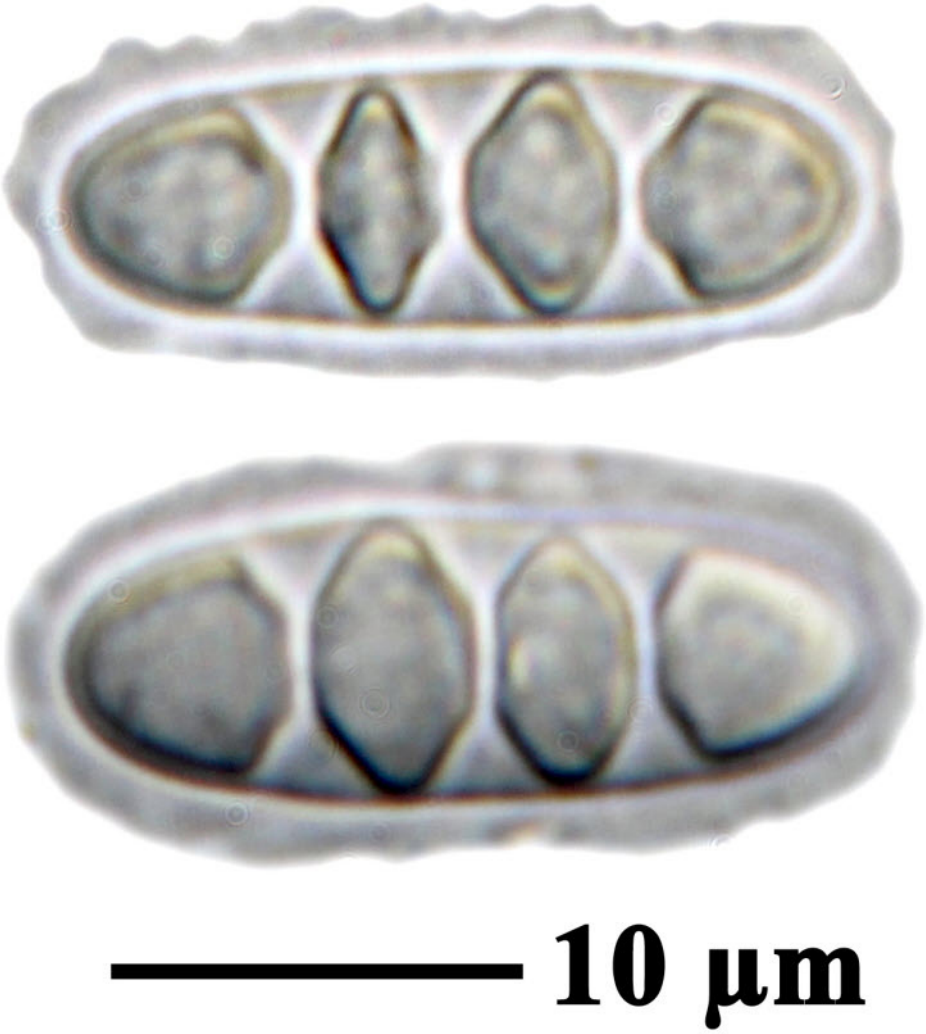




Astrothelium studerae



Astrothelium studerae



Astrothelium studerae

Astrothelium subaequans Müll. Arg., Bot. Jb. 6: 383 (1885)

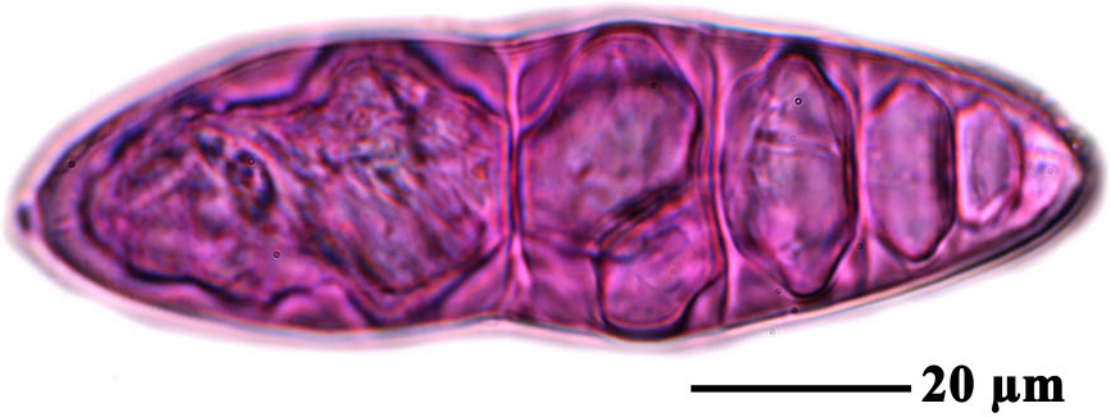
Thallus corticate, olive-green to yellowish, uneven to shallowly bullate. Ascomata astrothelioid, several chambers joined with excentric, fused ostioles; joined ascomata dispersed, 1–2 mm diam., erumpent, covered by thallus except dark, protuding and papilliform ostiole, thinly covered with yellow-orange pigment. Hamathecium clear, Ascospores 8/asus, 5–7-septate to submuriform, fusiform, (45–)72–83 × 15–25 µm, hyaline, IKI-. Chemistry: Thallus UV-, K-; ascomata with yellow-orange, K+ purple, UV+ red, anthraquinone.

[ABL60294], Costa Rica, Prov. Limón, Hitoy Cerere Reserve, near Pandora, 40 km S of Limón, 83°02’ W, 9°40’ N, 159 m. On Inga tree along access road. Leg. A. Aptroot (no 60294], det. A. Aptroot.





Astrothelium subaequans







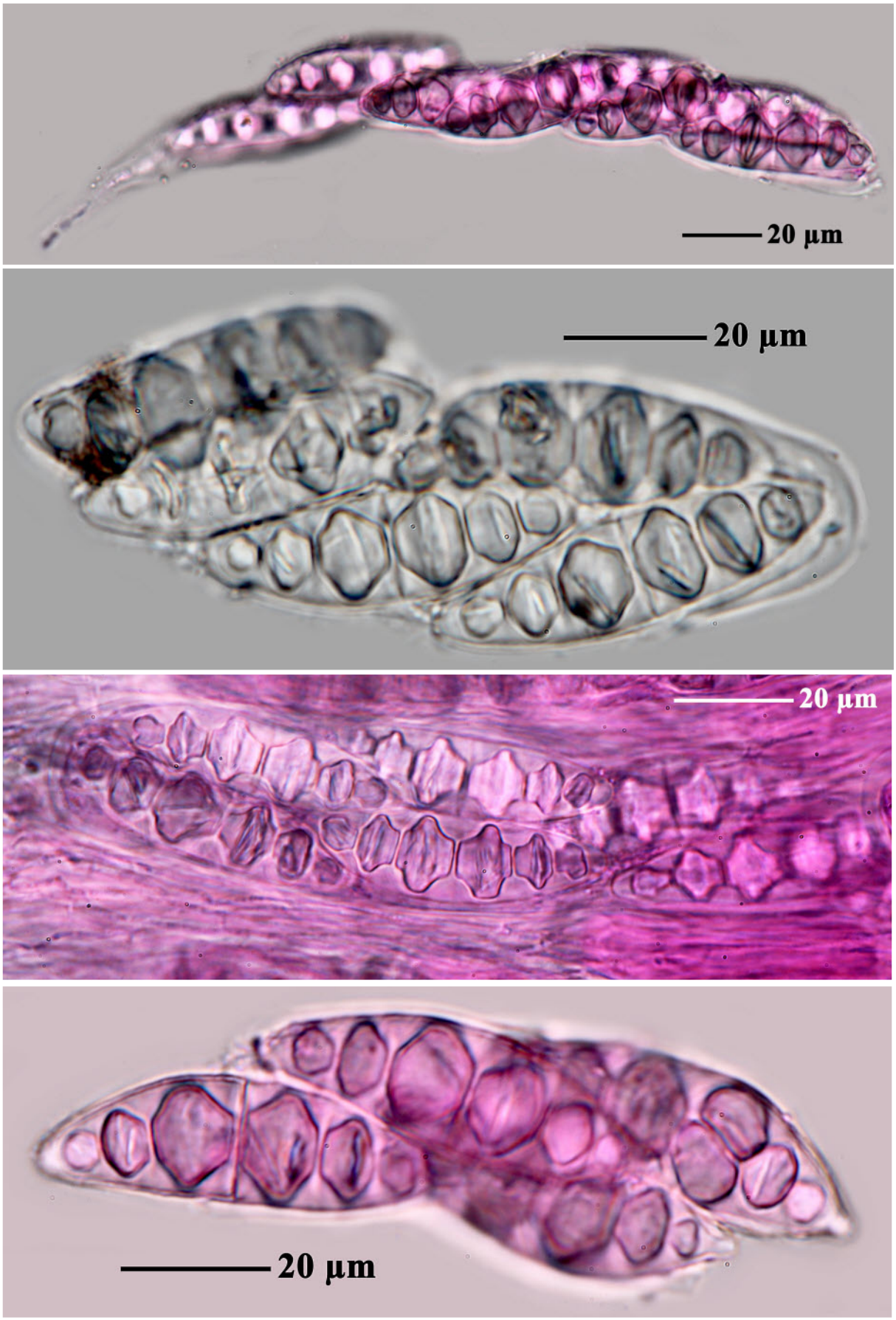
Astrothelium subaequans

Astrothelium subclandestinum Leight., Trans. Linn. Soc. London 25: 460 (1866)

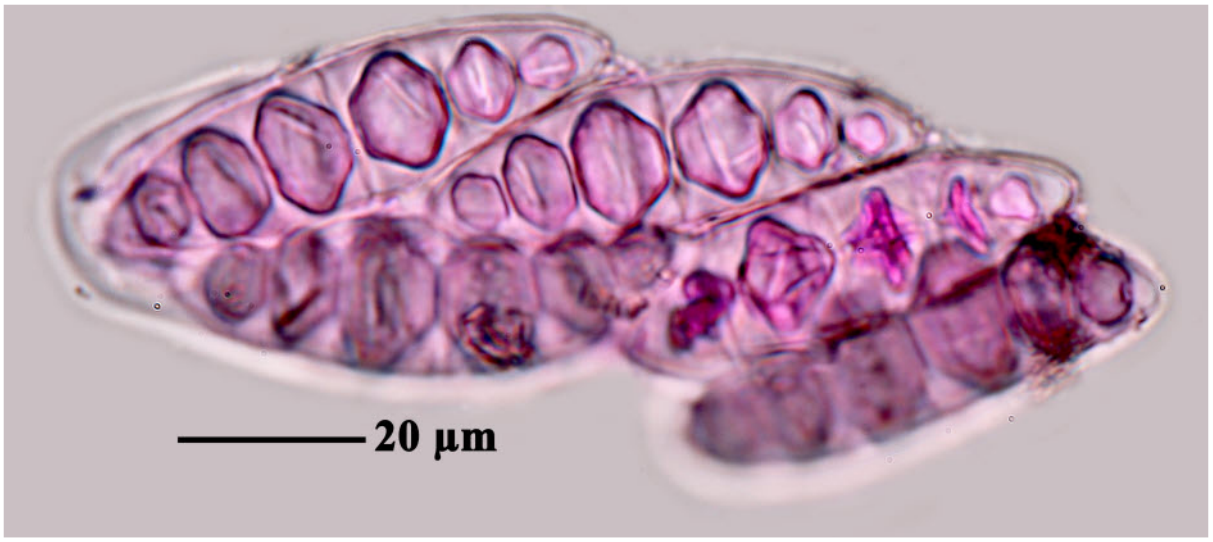
Thallus corticate, olive-green to yellowish, uneven to shallowly bullate. Ascomata astrothelioid, several chambers joined with eccentric, fused ostioles; joined ascomata diffusely pseudostromatic; pseudostromata 1.0–1.5 mm diam., erumpent, laterally covered by thallus but apically greyish. Hamathecium inspersed. Ascospores 8/ascus, 5-septate, fusiform, 50–75 × 14–22 µm, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

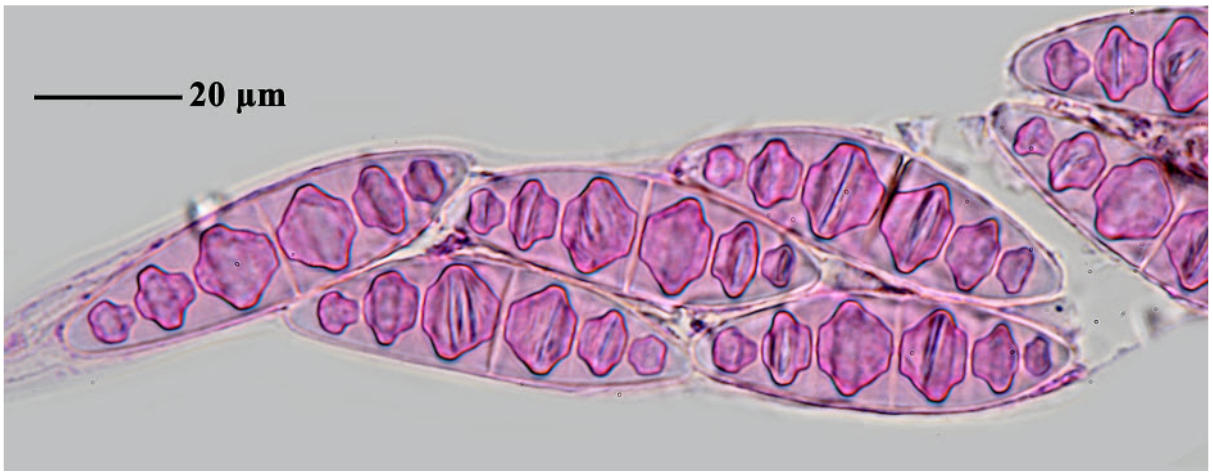
[ABL33209], Papua New Guinea, Madang Prov., foothills of Finisterre Range, along road Madang-Lae, km 39. Virgin lowland rainforest, on branches, 145°34’ E, 5°25’ S, 230 m. Leg. A. Aptroot (no 33209), 14.8.1992, det. A. Aptroot, 1993.

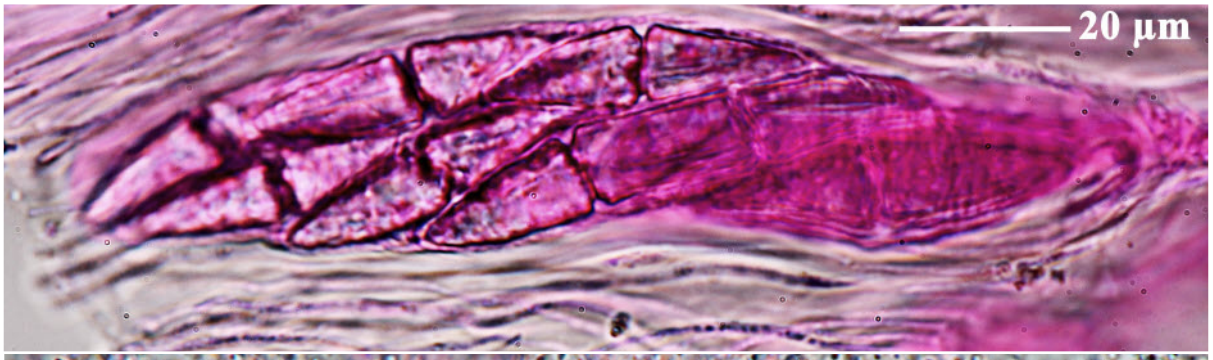


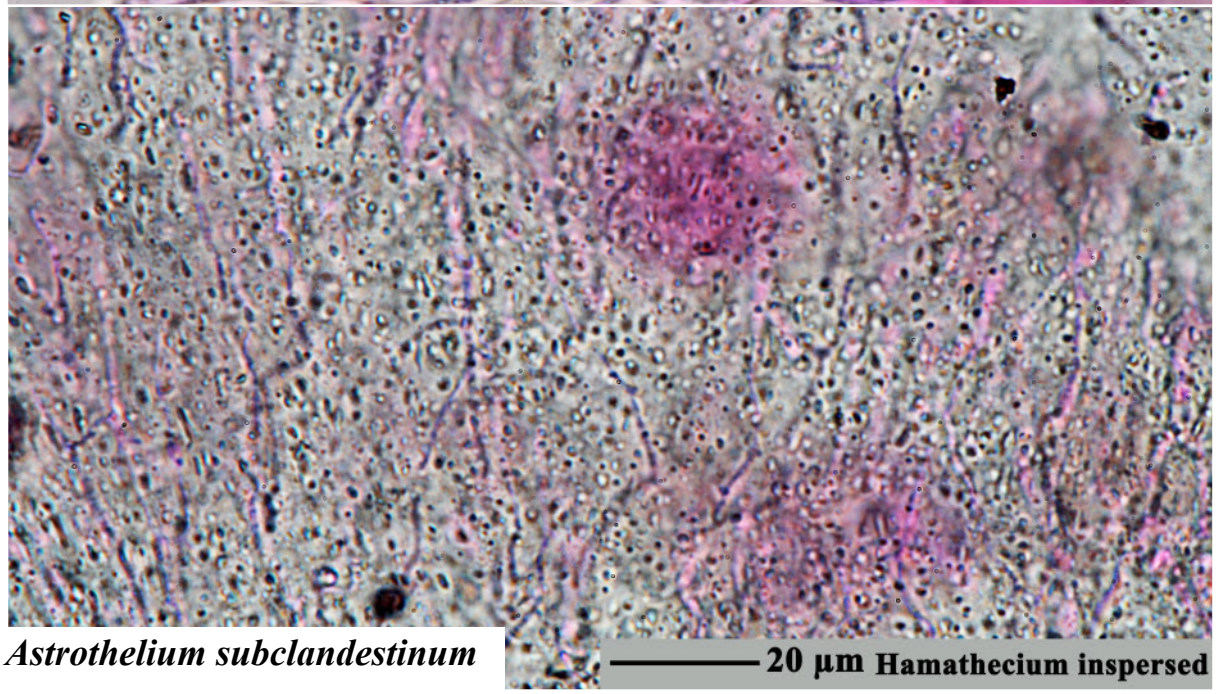


Astrothelium subclandestinum







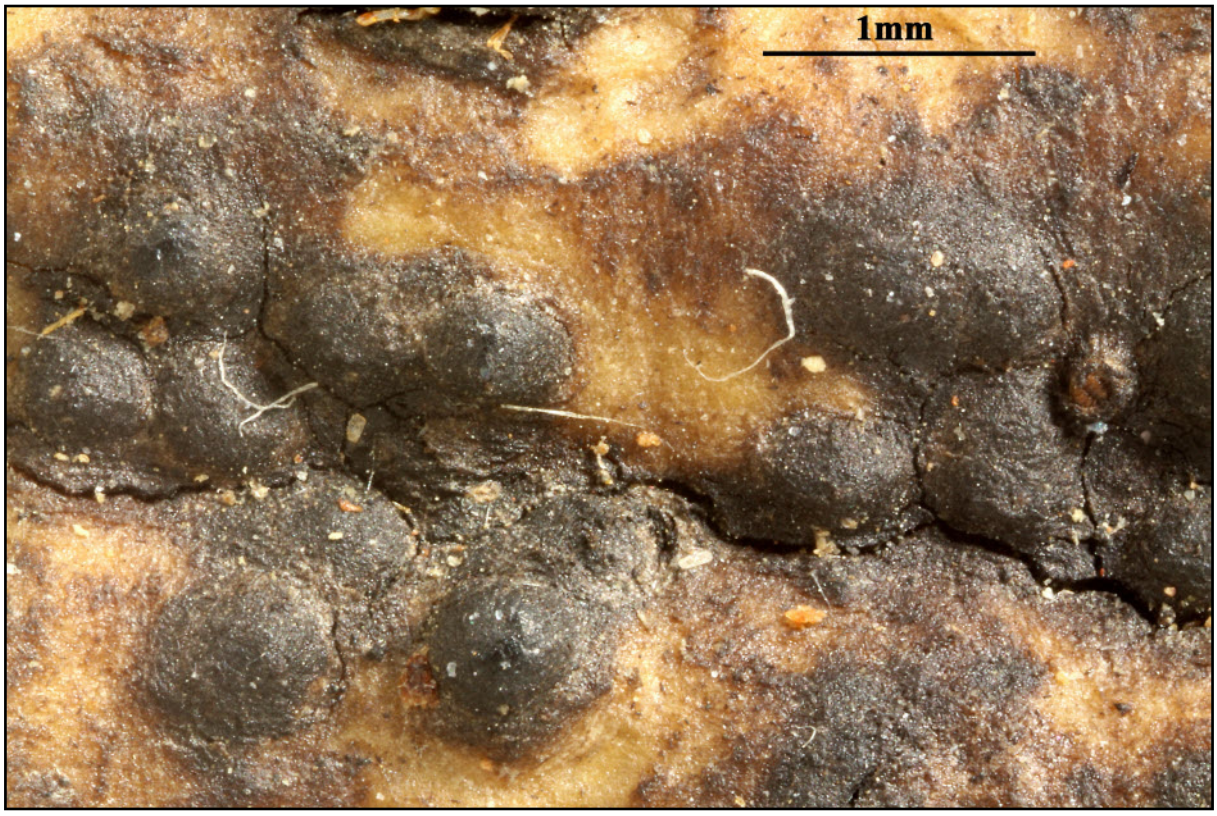


Astrothelium subclandestinum

Astrothelium subdiscretum (Nyl.) Aptroot & Lücking, Lichenologist 48(6): 890 (2016)
= *Bathelium subdiscretum* (Nyl.) Müll. Arg., Bot. Jb. 6: 395 (1885)
= *Laurera subdiscreta* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 506 (1922)
= *Trypethelium subdiscretum* Nyl., Flora, Regensburg 52: 73 (1869)
= *Laurera verrucoaggregata* Makhija & Patw., Mycotaxon 31:586 (1988).

Thallus corticate, olive-green to brownish, uneven to verrucose-rugulose. Ascomata trypethelioid, with apical ostioles, pseudostromatic; pseudostromata 0.8–1.5(–2.0) mm broad, immersed-erumpent, irregular to linear and often confluent and reticulate, with ascomata exposed and black. Hamathecium inspersed or clear. Ascospores 8/ascus, muriform, 35–50 × 12–18 µm, without distinctly thickened median septum, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

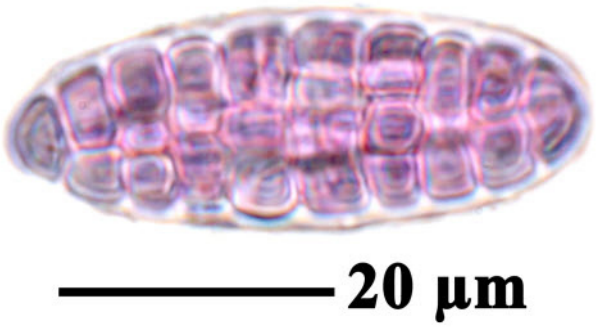
[AMH86550], India, Andaman Islands, North Andaman, Lamia Bay, leg. Nagarkar (no AMH 86559) & Sethy, 5.1. 1986. ISOTYPE of *Laurera verrucoaggregata.*

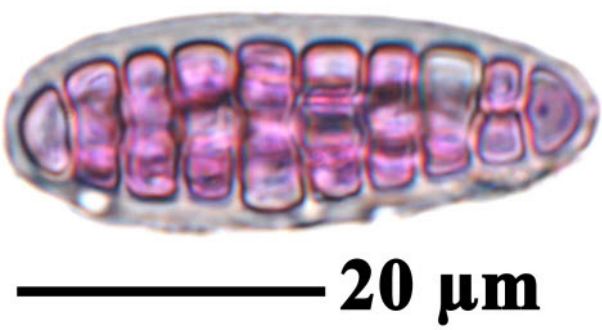












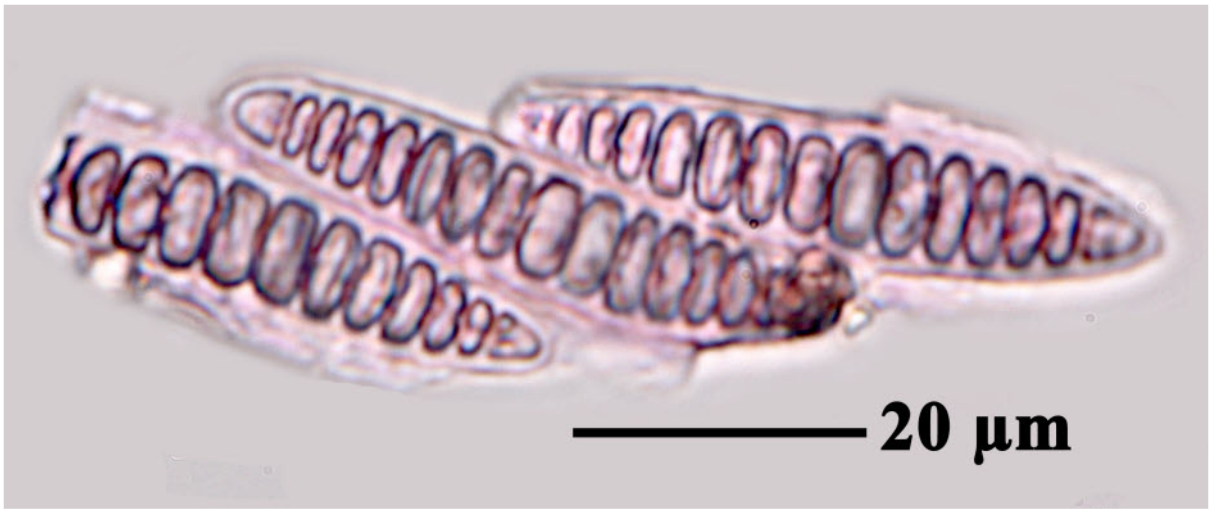
Astrothelium subdiscretum

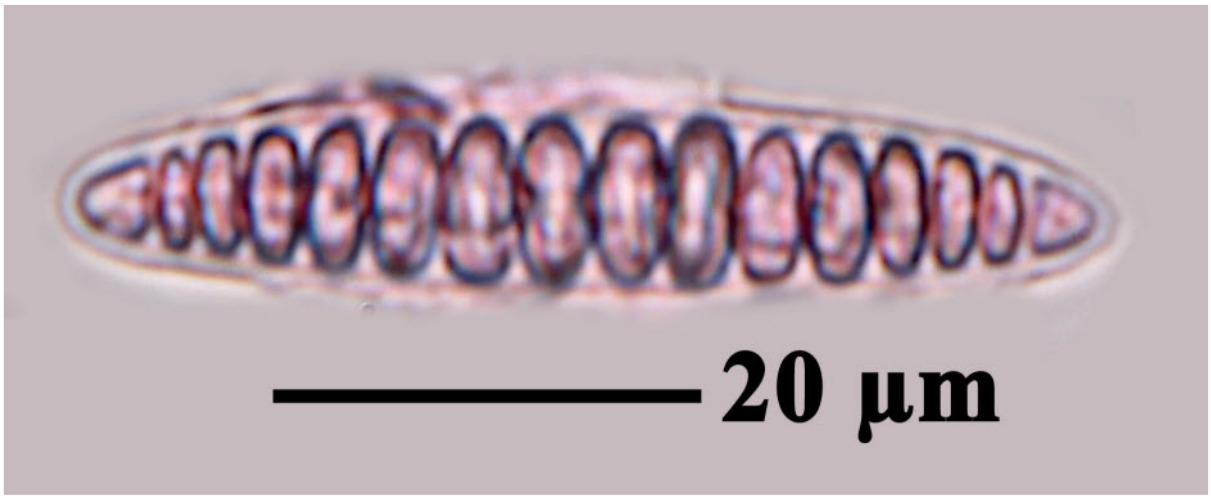
Astrothelium subdiscretum (Nyl.) Aptroot & Lücking, Lichenologist 48(6): 890 (2016)
= *Bathelium subdiscretum* (Nyl.) Müll. Arg., Bot. Jb. 6: 395 (1885)
= *Laurera subdiscreta* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 506 (1922)
= *Trypethelium subdiscretum* Nyl., Flora, Regensburg 52: 73 (1869)
= *Laurera fusispora* Makhija & Patw., Mycotaxon 31:576 (1988).

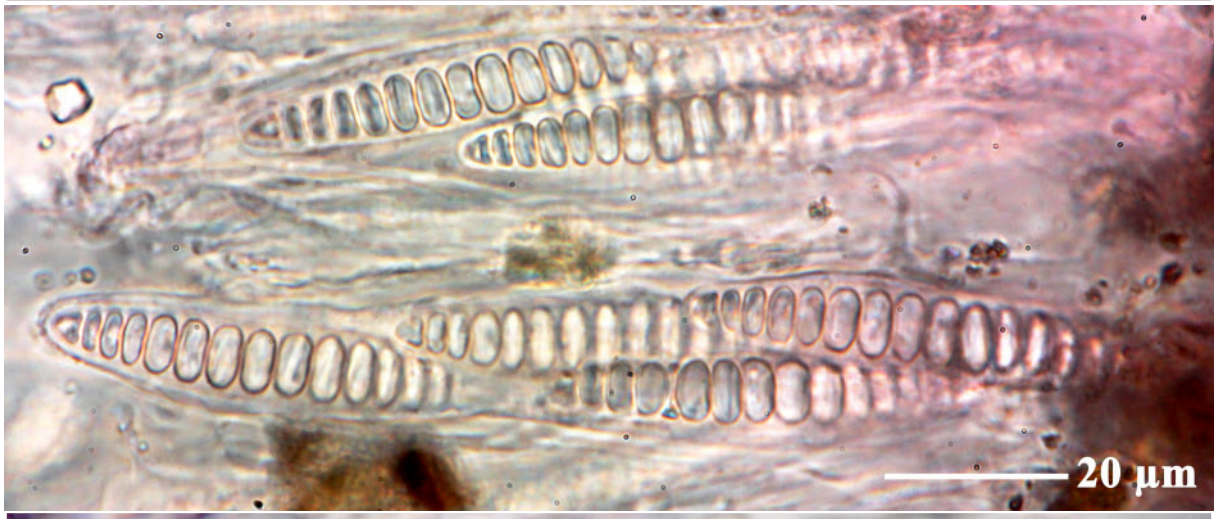
Thallus corticate, olive-green to brownish,unev3n to verrucose-rugulose. Ascomata trypethelioid, with apical ostioles, pseudostromatic; pseudostromata 0.8–1.5(–2.0) mm broad, immersed-erumpent, irregular to linear and often confluent and reticulate, with ascomata exposed and black. Hamathecium inspersed or clear. Asospores 8/ascus, 13–17-septate, 35–50 ×12–18 µm, without distinctly thickened median septum, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: no substances detected.

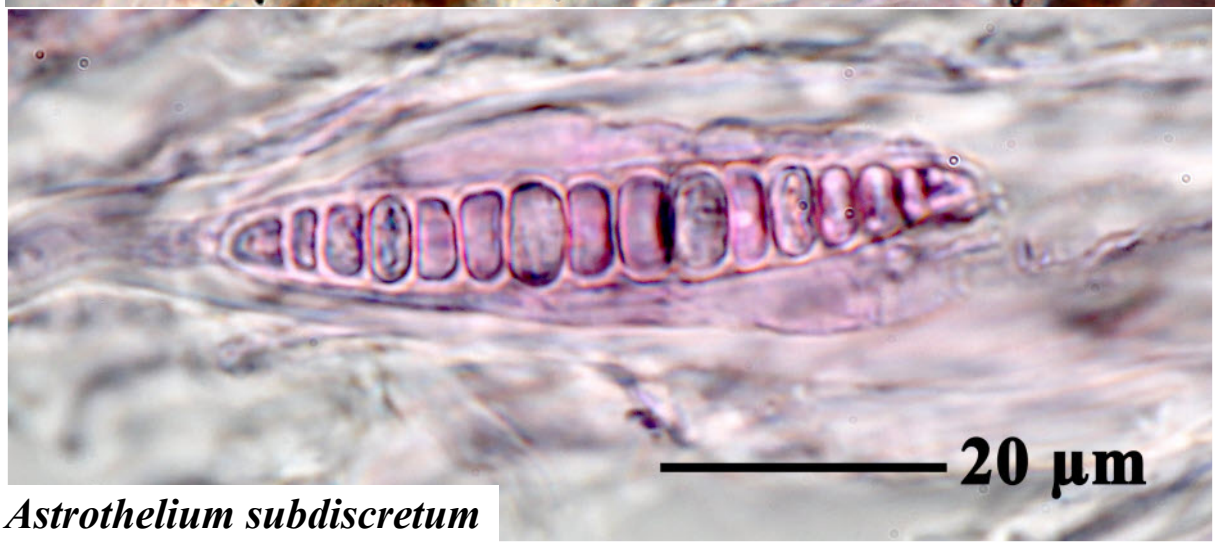
[AMH742499], India, Karnataka, Anamod ghat, Anamod-Goa Road. Leg. Patwardhan (no AMH7424399) & Prabhu, 10.12.1974. ISOTYPE of *Laurera fusispora* Makhija & Patw.











Astrothelium subdiscretum

Astrothelium subdisjunctum (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 890 (2016)

= *Bottaria subdisjuncta* Müll. Arg., Bot. Jb. 6: 395 (1885)

= *Laurera subdisjuncta* (Müll. Arg.) R.C. Harris, Acta Amazon., Supl. 14(1-2): 66 (1986) [1984]

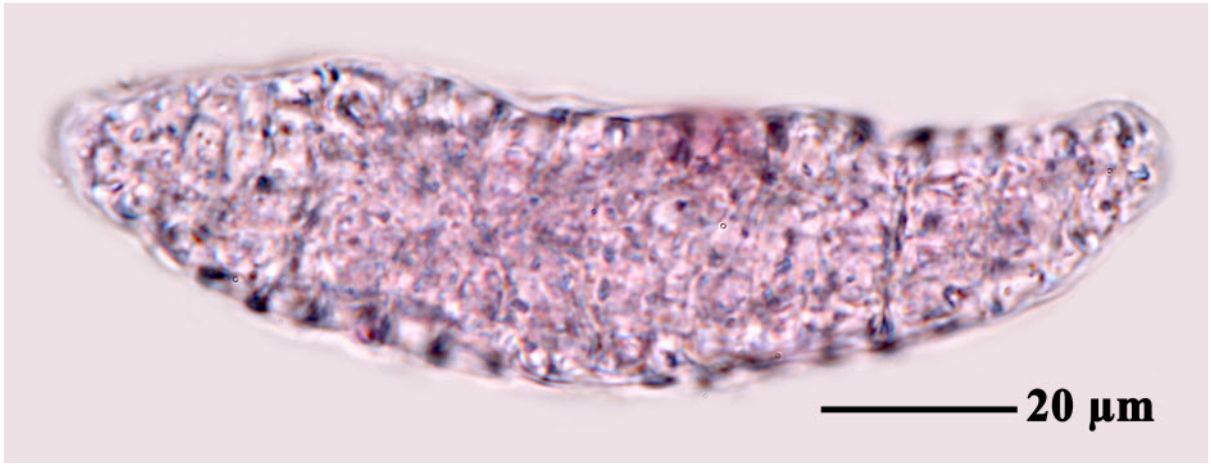
Thallus corticate, olive-green to brownish, smooth to uneven. Ascomata trypethelioid, with apical ostioles, pseudostromatic. Pseudostromata 0.7–1.5 mm broad, immersed-erumpent, irregular to linear and often confluent and reticulate, with ascomata exposed and black. Hamathecium clear. Ascospores 4/ascus, densely muriform, fusiform, 120–175 × 30–45 µm, without distinctly thickened median septum, hyalin, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

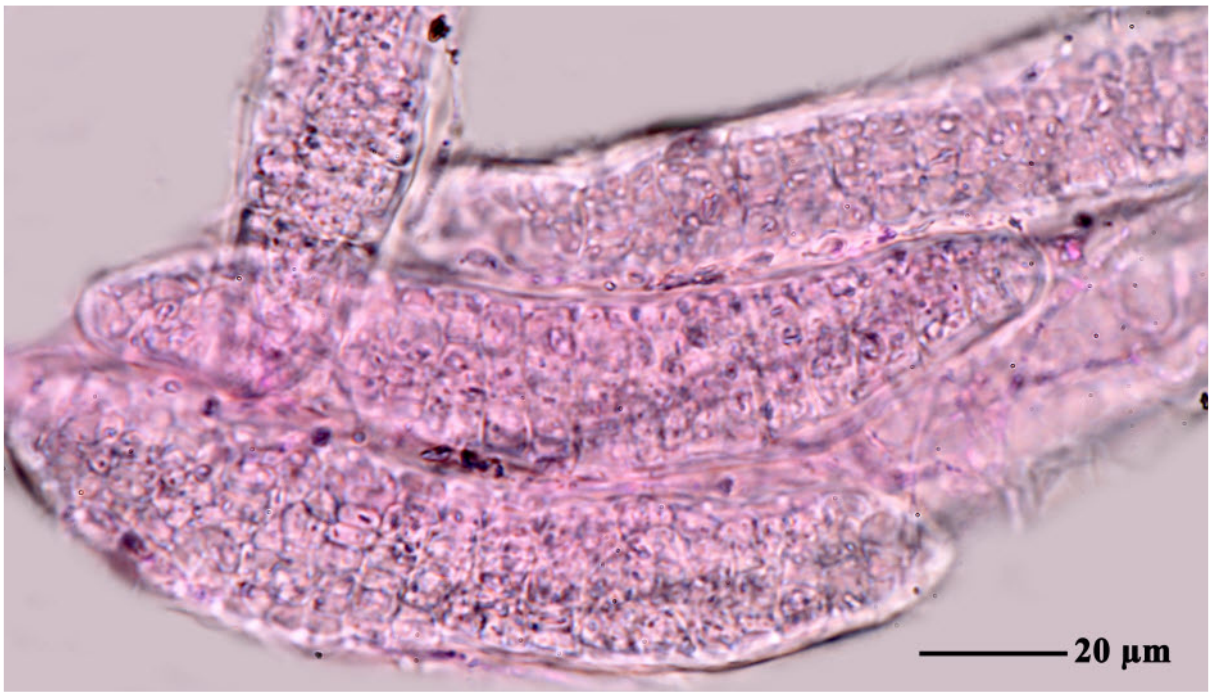
[ABL19348], Guiana, Upper Mazaruni district, Trail from Kamarang river to PwiPwi mountain, N of Waramadan, Rocky savannah, ca 10 km N of Waramadan. 5°57’ N, 60°45’ W, 800 m. Leg. H. Sipman & A. Aptroot (no 19348), 28.2.1985, det. A. Aptroot, 1990.





Astrothelium subdisjunctum







Astrothelium subdisjunctum

Astrothelium subfuscum Kremp., Nuovo Giorn. bot. ital. 7(1): 64 (1875)

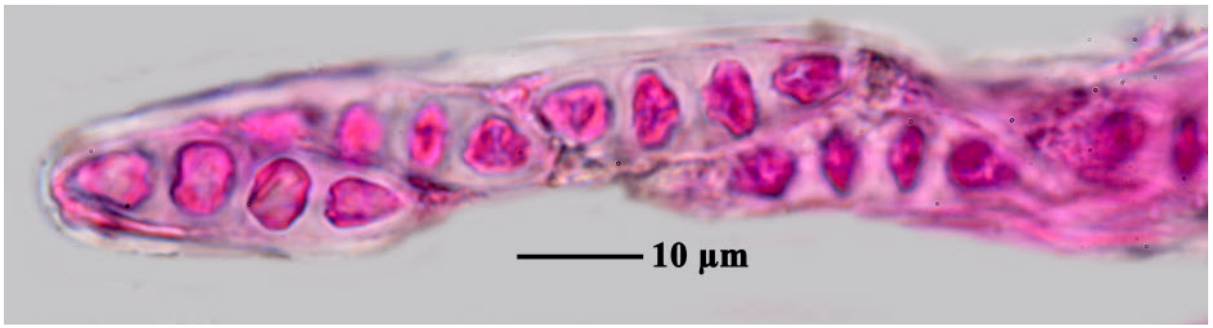
Thallus corticate, olive-green to brownish, rather thick, uneven to bullate-folded. Ascomata astrothelioid, several chambers joined with eccentric, fused ostioles; joined ascomata confluent to diffusely pseudostromatic; pseudostromata 0.7–1.3 mm diam., erumpent, irregular in outline, laterally covered by thallus but upper part of ascomata exposed, blackish and groups of ascomata bordered by thin whitish line. Hamathecium clear. Ascospores 8/ascus, fusiform-ellipsoid, 3-septate, 21–27 × 8–10 µm, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

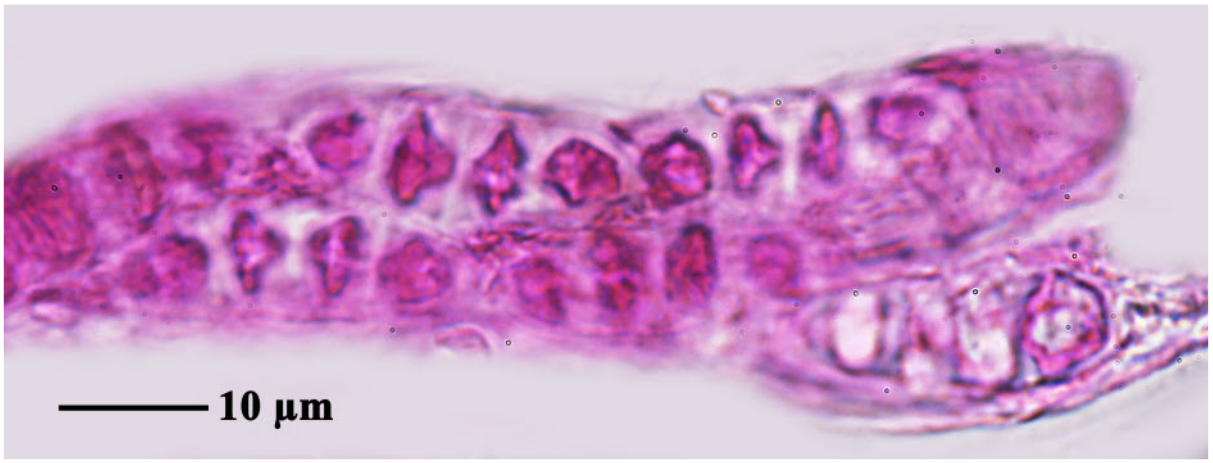
[ABL22235c], Australia, Queensland, Cairns, in the City near the Centenary Lakes at the Botanical Garden on cultivated tree. 145°44’ E, 16°54’ S, 5 m. Leg. A. & M. Aptroot (no 22235c), 03.1988, det. A. Aptroot, 1988.

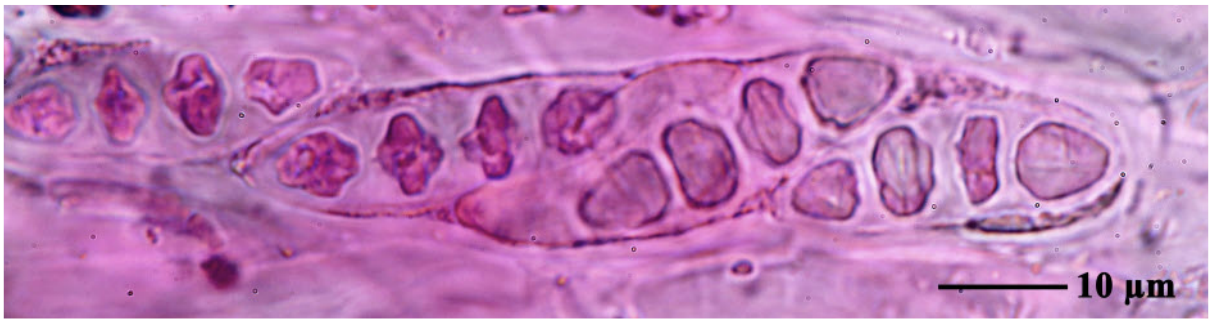


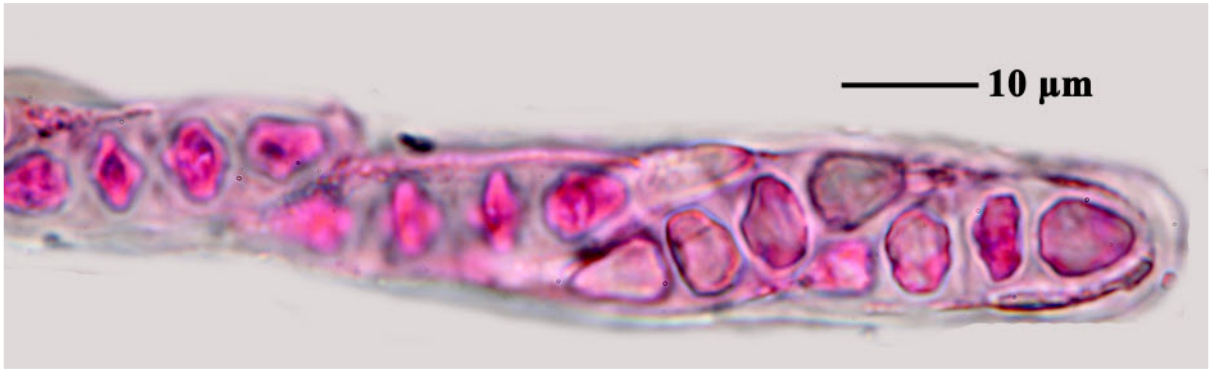


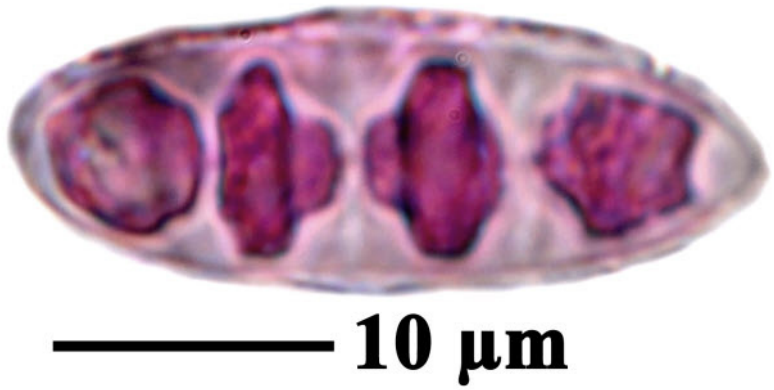
Astrothelium subfuscum









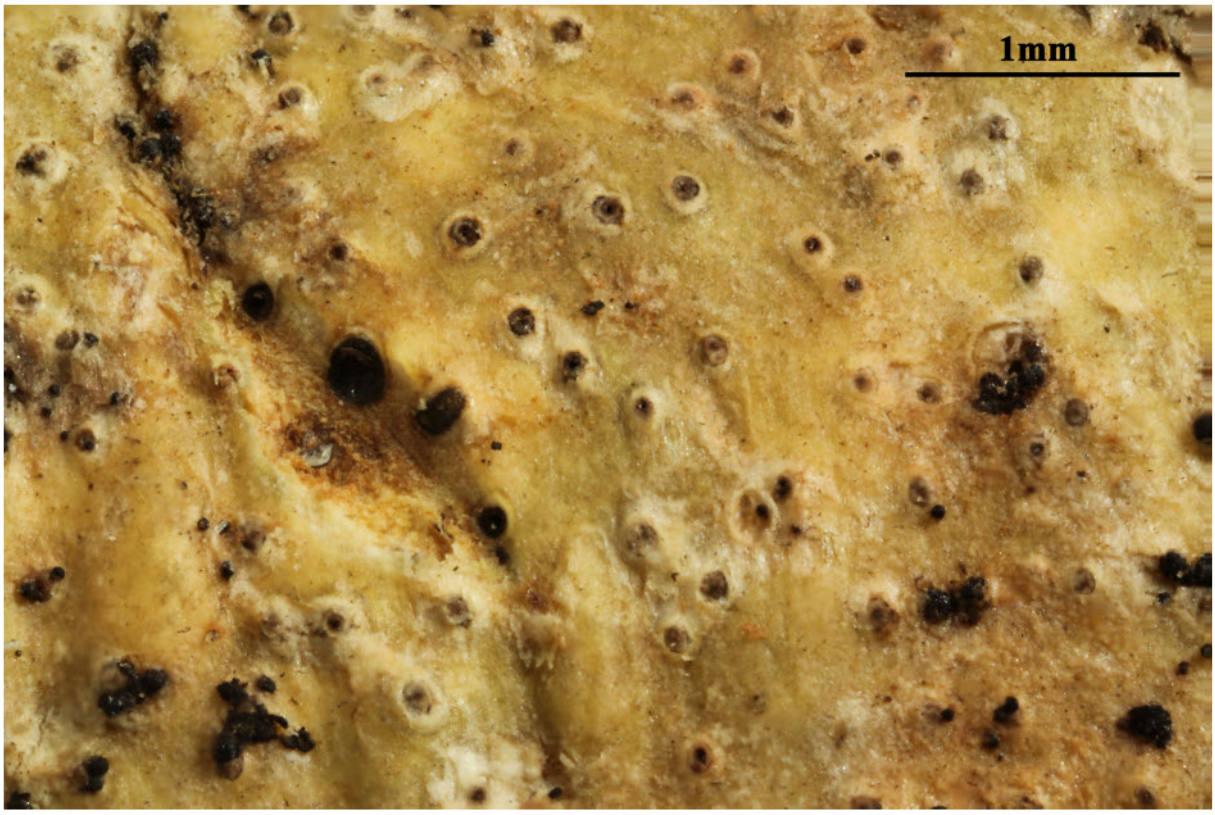


Astrothelium subfuscum

Astrothelium subscoria Flakus & Aptroot, in Flakus, Kukwa & Aptroot, Lichenologist 48(6): 674 (2016)

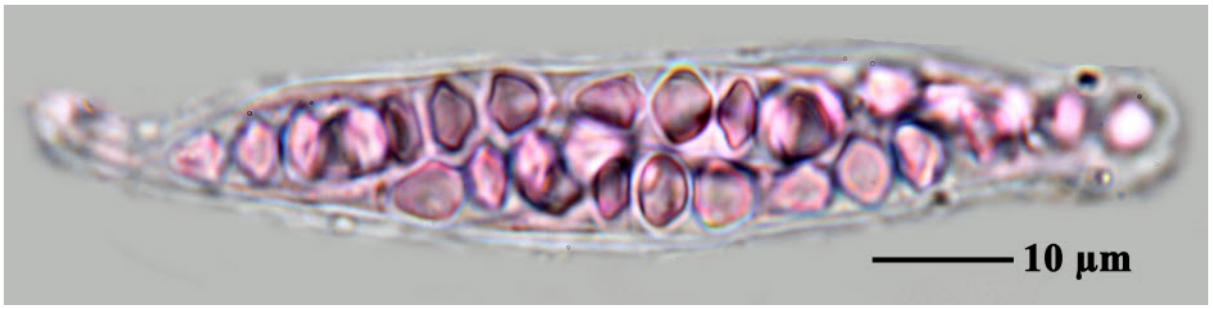
Thalus corticate, with corticiformn layer ≤ 30 µm thick, smooth, somewhat shiny, continuous, not including swellings of the host bark, greyish green, surrounded by a black prothallus. Ascomata subglobose, 0.2–0.4 mm diam., single, immersed in the thallus, ascomatal verrucae with a surface different from the thallus, not distinctly raised aboveth thallus, hemispherical, with sloping sides, white, inside without a coloured layer, thalline cover without black tissues, but ascomata often immersed in the bark. Wall fully but not strongly carbonized, not differntiated into excipulum and involucrellum. Ostioles apical, not fused, flat, grey, surrounded by a white spot. Hamathecium inspersed with hyaline oil globules. Ascospores 8/ascus, hyaline, 3-septate, narrowly ellipsoid, 21–28 × 8–10 µm, ends rounded, lumina diamond-shaped, surrounded by a gelatinous ≤ 2 µm thick sheath. Chemistry: All parts UV-, K-. TLC: No secondary substances detected.

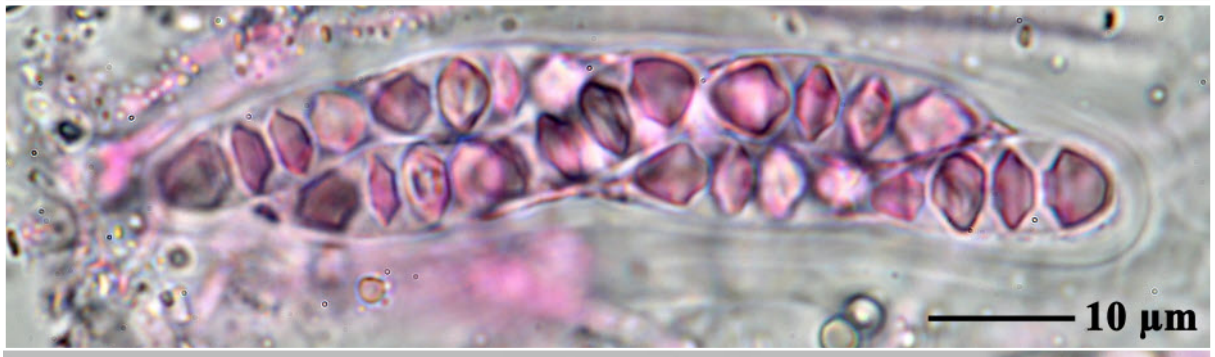
[ABL60282], Costa Rica, Prov. Limón, Hitoy Cerere Reserve, near Pandora, 40 km S of Limón, 83°02'' W, 9°40' N, 150 m, on Inga tree along access road. Leg. A. Aptroot (no 60282), 10.03.2004, det. A. Aptroot, 2004.

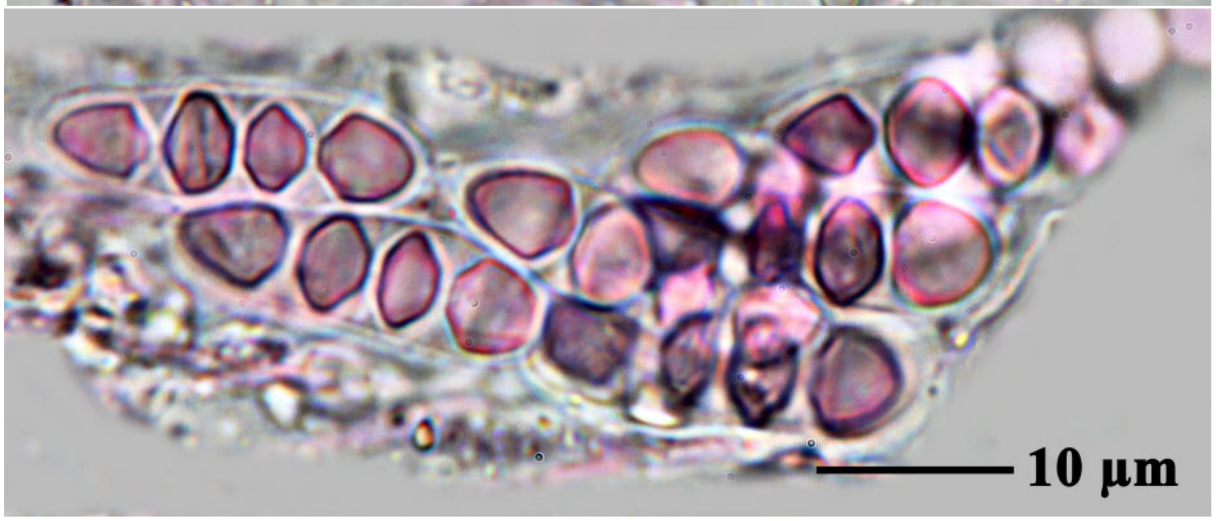


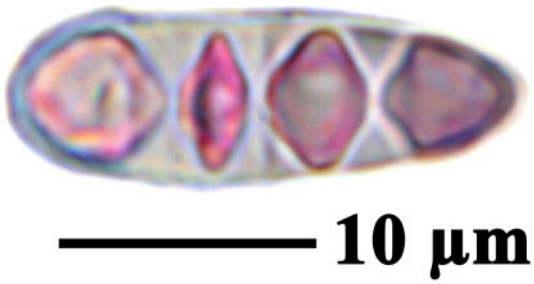


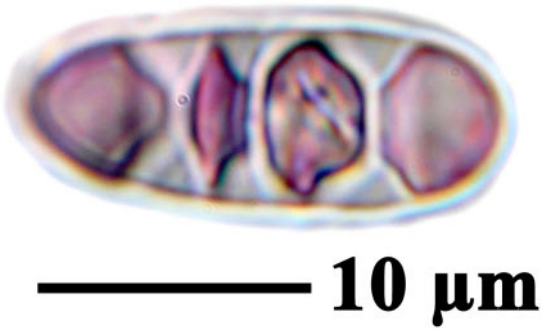
Astrothelium subscoria









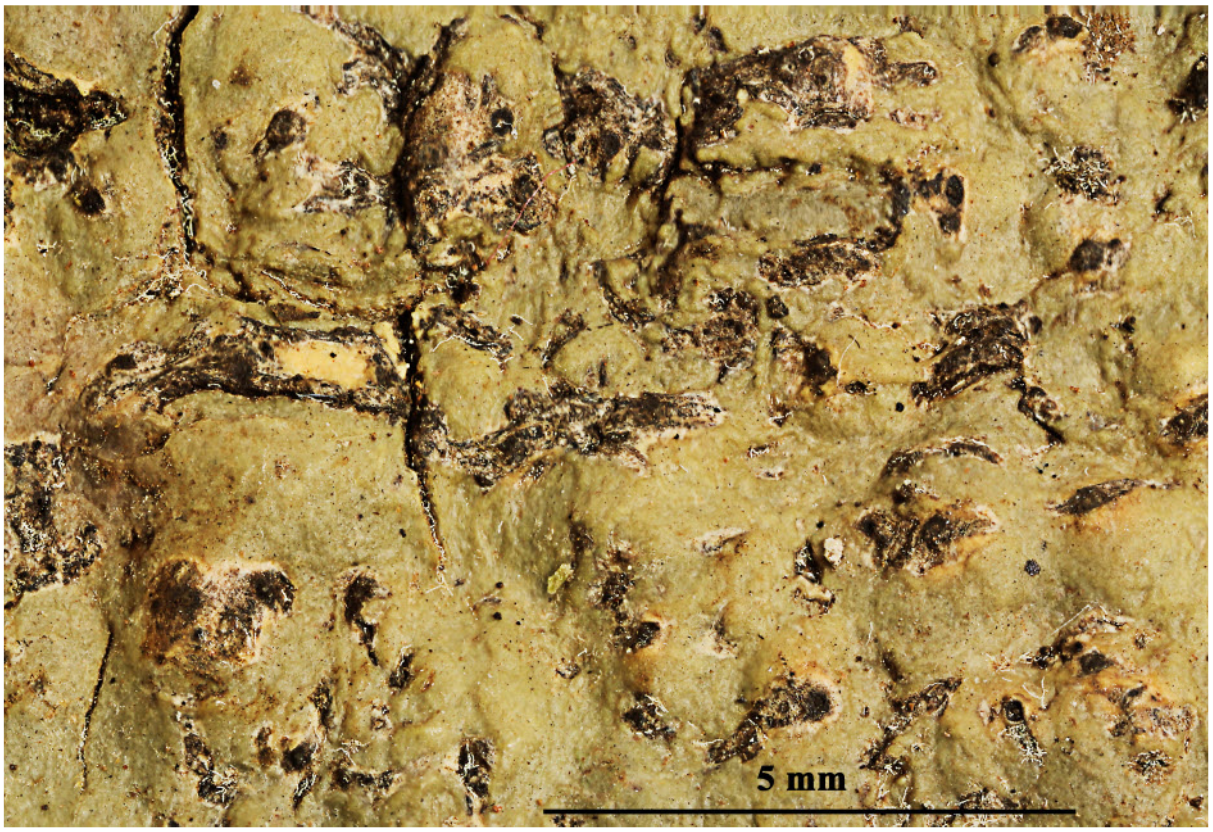


Astrothelium subscoria

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

Thallus corticate, smooth to somewhat bullate, somewhat shiny, continuous, covering areas ≤ 7 cm diam., c. 0.1 mm thick, greenish grey, surrounded by a prothallus line c. 0.2 mm wide, infrequently inducing semiglobose galls of the host bark (lower bark locally swollen and erupting through bark). Ascomata pyriform, c. 0.5–0.8 mm diam., mostly 2–5 aggregated, mostly immersed in the bark tissue below pseudostromata. Pseudostromata indistinctly delimited, not corticate, ochraceous or concolorous with the thallus, not much raised above the thallus, ≤ 2 mm diam., rounded to somewhat irregular in outline. Wall black, ≤ c. 60 µm thick. Ostioles eccentric, fused, flat to convex, brown to black. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, 4–5-septate, fusiform, 50–75 × 14–22 µm, ends rounded, lumina diamond-shaped, surrounded by a gelatinous layer ≤ 2 µm thick. Pycnidia frequent, in the pseudostromata. Chemistry: Thallus surface UV−, thallus medulla K−; pseudostroma UV−, K−. TLC: no secondary substances detected.

[ABL11344], Brazil, Rondônia, Porto Velho, Parque Natural Municipal de Porto Velho, 8°41'10" S, 63°52'05" W, c. 100 m, on tree bark in primary rainforest. Leg. M. Cáceres & A. Aptroot (no 11344), 9–12.03.2012, det. Aptroot, 2012. ISOTYPE.





Astrothelium supraclandestinum



Astrothelium supraclandestinum

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

Thallus corticate, olive-green to yellowish, uneven to shallowly bullate. Ascomata astrothelioid, several chambers joined with eccentric, fused ostioles; joined ascomata diffusely pseudostromatic; pseudostromata 1.0–1.5 mm diam., erumpent, laterally covered by thallus but apically greyish. Hamathecium not inspersed. Ascospores 8/ascus, 5(–8)-septate, fusiform, 50–75 × 14–22 µm, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

[Lücking15256e], Costa Rica, Puntarenas, La Amistad International Park, Altamira Station, 9°02' M, 83°00' W, 1600-1800 m, montane rainforest zone, secondary forest and open secondary vegetation dominated by Cecropia, on bark (lower trunk). Leg. R. Lücking (no 15256e), 1.07.2002, det. A. Aptroot.



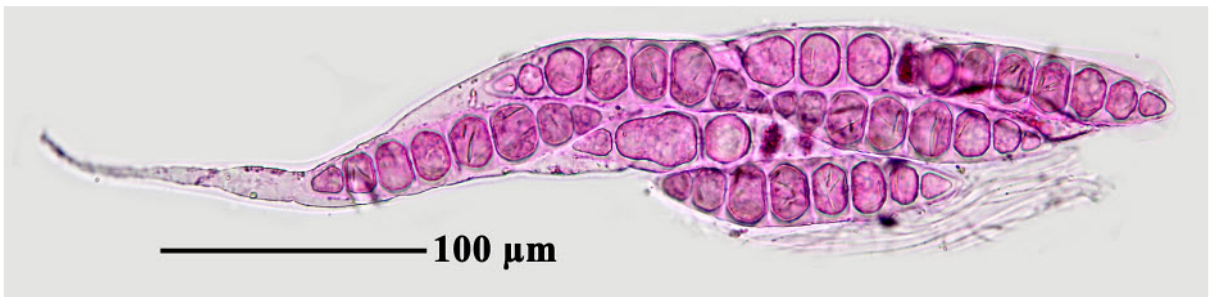


Astrothelium supraclandestinum

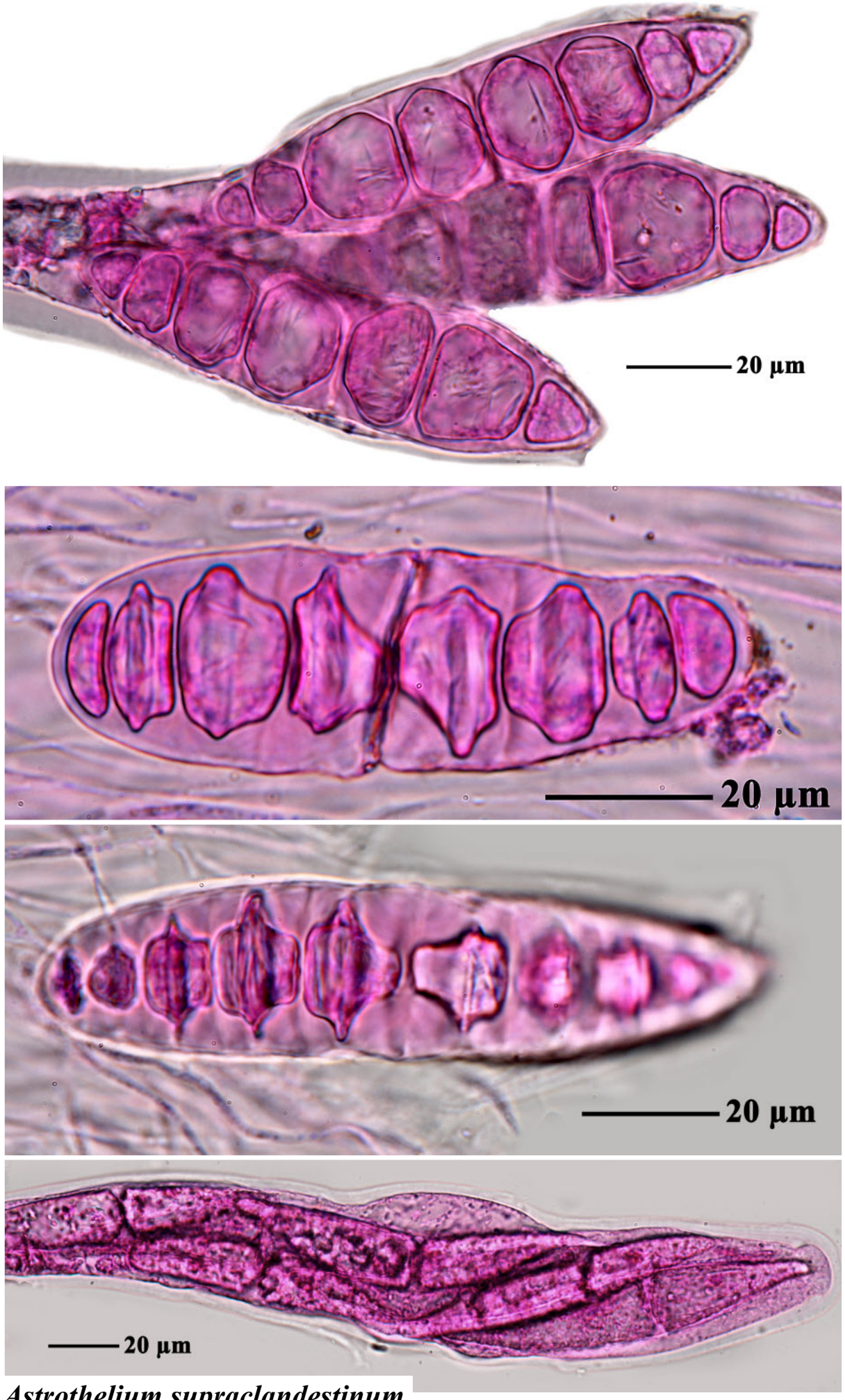








Astrothelium supraclandestinum



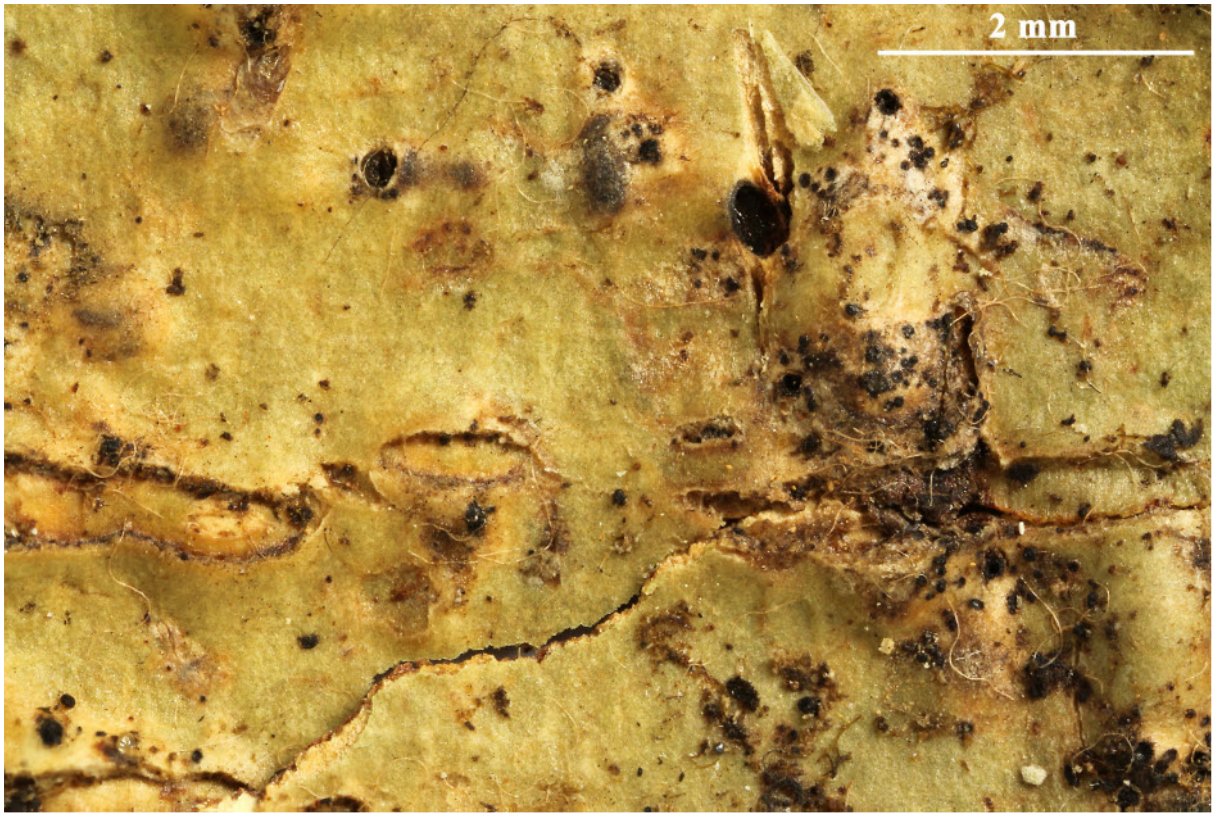
Astrothelium supraclandestinum

Astrothelium tenue (Aptroot) Aptroot & Lücking, Lichenologist 48(6): 891 (2016)

= *Campylothelium tenue* Aptroot, in Aptroot, Lücking, Sipman, Umaña & Chaves, Biblthca Lichenol. 97: 53 (2008)

Thallus corticate, olive-green, smooth to uneven. Ascomata pleurothelioid, with eccentric separate ostioles, 0.4–0.7 mm diam., erumpent, completely covered by thallus. Hamathecium clear. Ascospores 4-8/ascus, muriform, fusiform, 95–115 × 20–28 µm, with distinctly thickened median septum, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

[Bleij], Guyana, Upper Demerara-Berbice Distr., Mabura Hill, 180 km SSE of Georgetown, in evergreen forest. 5°21’ N, 58°40’ W, 0-50 m. Leg. B. Bleij & J.C. Biesmeijer, 11-12.1988, det. A. Aptroot 1990.





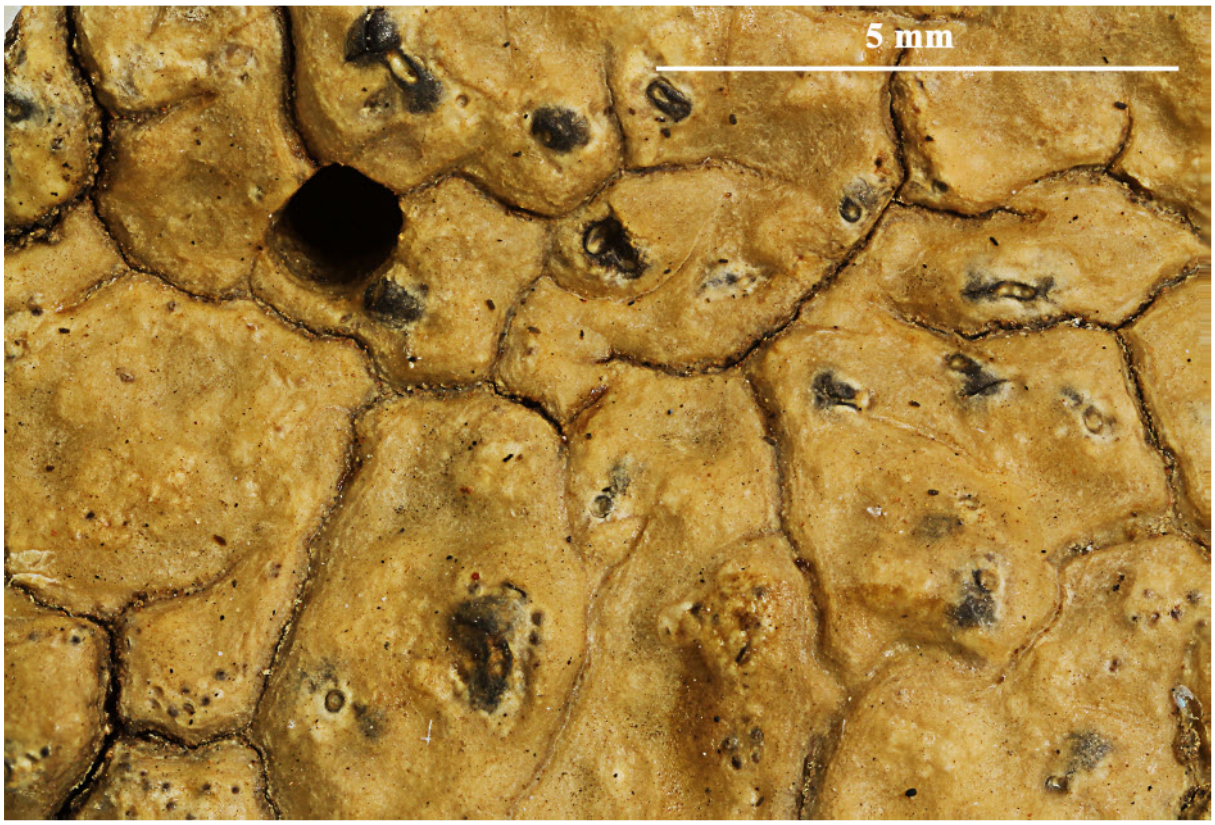


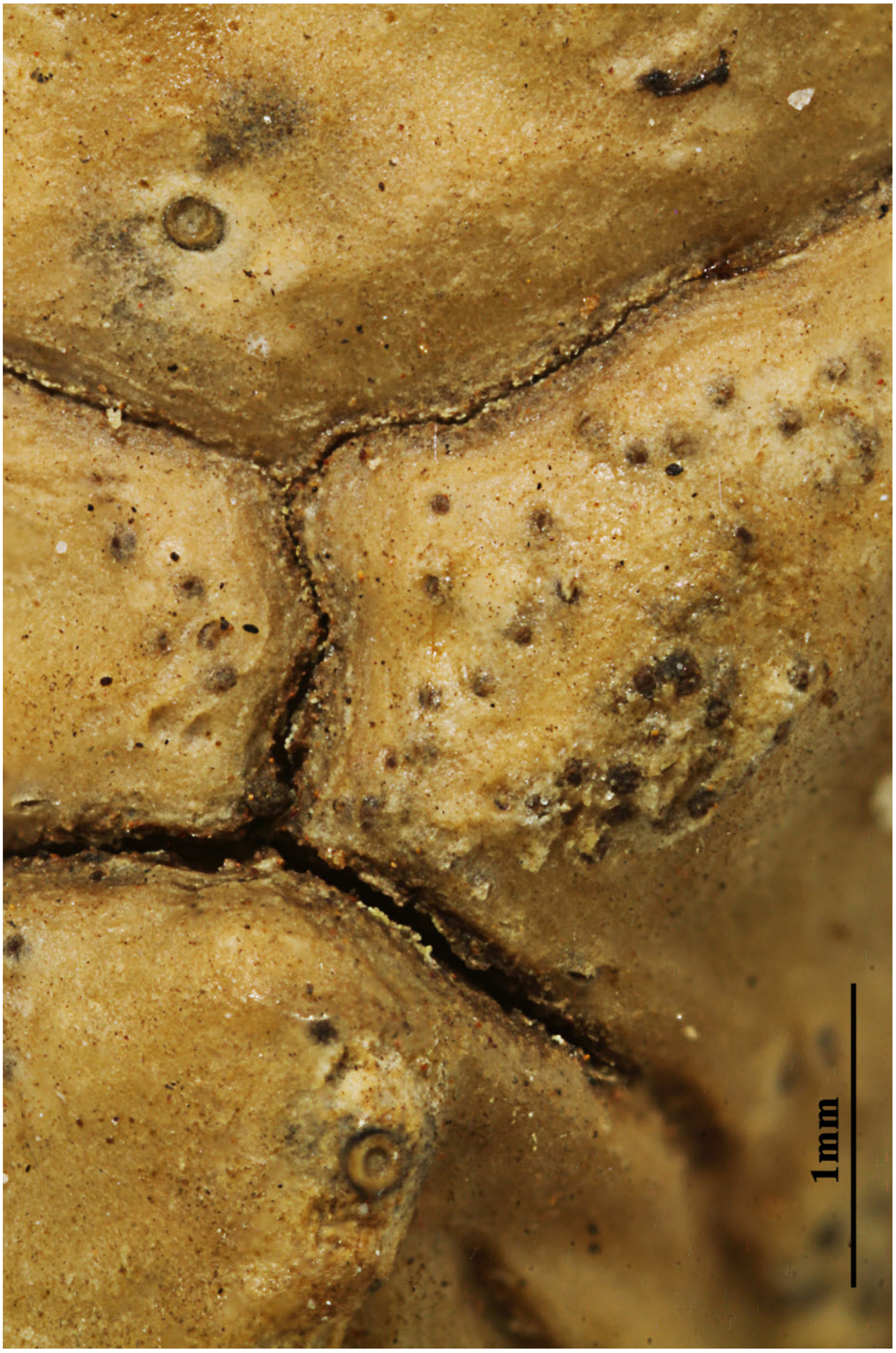
Astrothelium tenue

Astrothelium testudineum Aptroot & M. Cáceres, Lichenologist 48(6): 710 (2016)

Thallus thickly corticate, smooth, somewhat shiny, continuous, covering areas ≤ 5 cm diam., c. 0.2 mm thick, ochraceous, surrounded by a black prothallus line c. 0.1 mm wide, not inducing gall formation of the host bark. Ascomata pyriform, 0.5–0.9 mm diam., mostly 2–6 aggregated, immersed in the thallus, without pseudostroma, but occasionally with paler, lesser corticate areas around the ostioles. Wall carbonized all around, ≤ c. 70 µm thick. Ostioles eccentric, fused, flat, brown. Hamathecium densely inspersed with hyaline oil globules. Asci with 8 ascospores. Ascospores hyaline, densely muriform with many locules in straight rows and partly skewed septa, broadly ellipsoid, 50–65 × 23–27 µm, rounded, lumina angular, wall 2 µm thick. Pycnidia pale brown, immature but abundant, near the ostioles. Chemistry: Thallus surface UV−, thallus medulla K−. TLC: no secondary substances detected.

[ABL11448], 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 11448), 803.2012, det. A. Aptroot, 2012. ISOTYPE.





Astrothelium testudineum



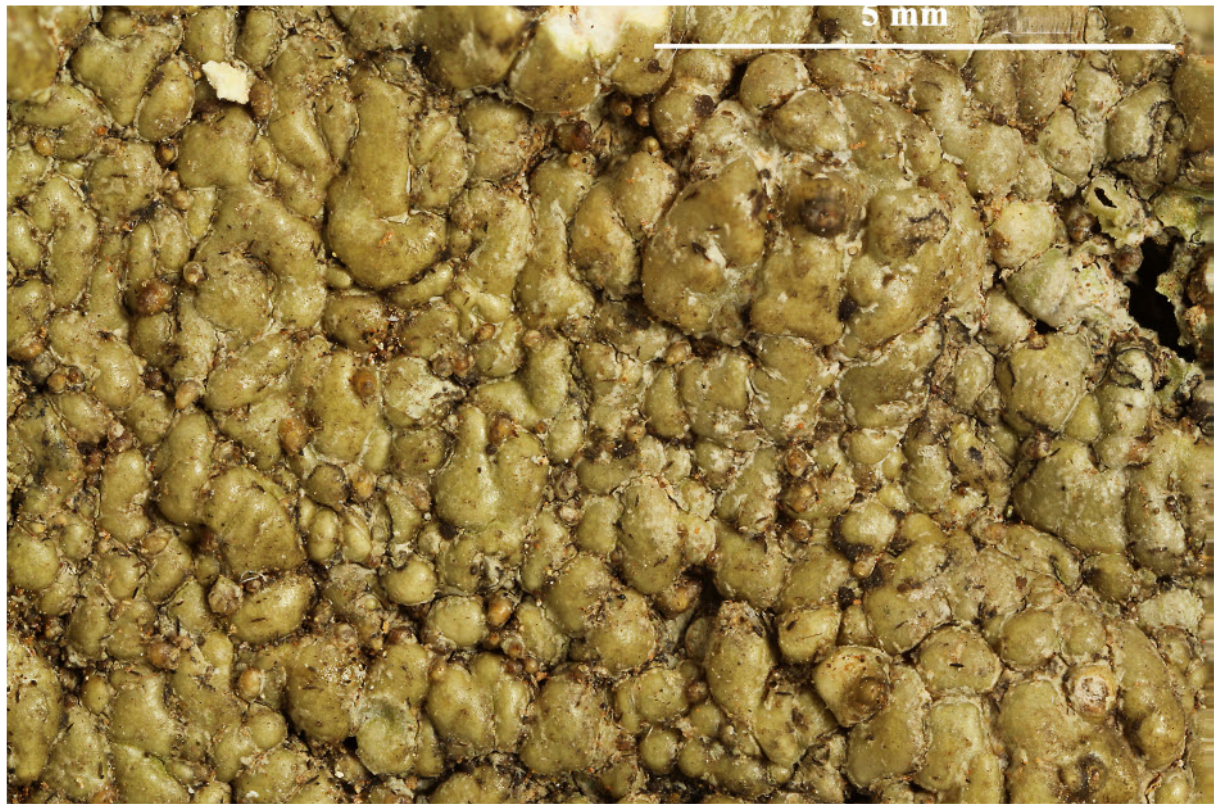
Astrothelium testudineum

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

Thallus corticate, discontinuous, consisting of sinuose to moniliform rows of globose to slightly flattened bullate areas that become locally almost like thick squamules, which mostly consist of a hyaline cortex of ≤ 230 µm, somewhat shiny, covering areas ≤ 10 cm diam., olive-green. Ascomata pyriform, 0.7–1.3 mm diam., single, immersed in the thallus. Wall carbonized, ≤ c. 70 µm thick. Ostioles apical to eccentric, not fused, erumpent, brown, chimney-like. Hamathecium not inspersed with oil globules. Asci with (often only) 4 ascospores. Ascospores hyaline, muriform, fusiform, 145–175 × 30–35 µm, ends rounded, when young with a markedly thickened median septum, with two c. 5 µm thick polar gelatinous caps. Pycnidia not observed. Chemistry: Thallus surface UV−, thallus medulla K−. TLC: no secondary substances detected.

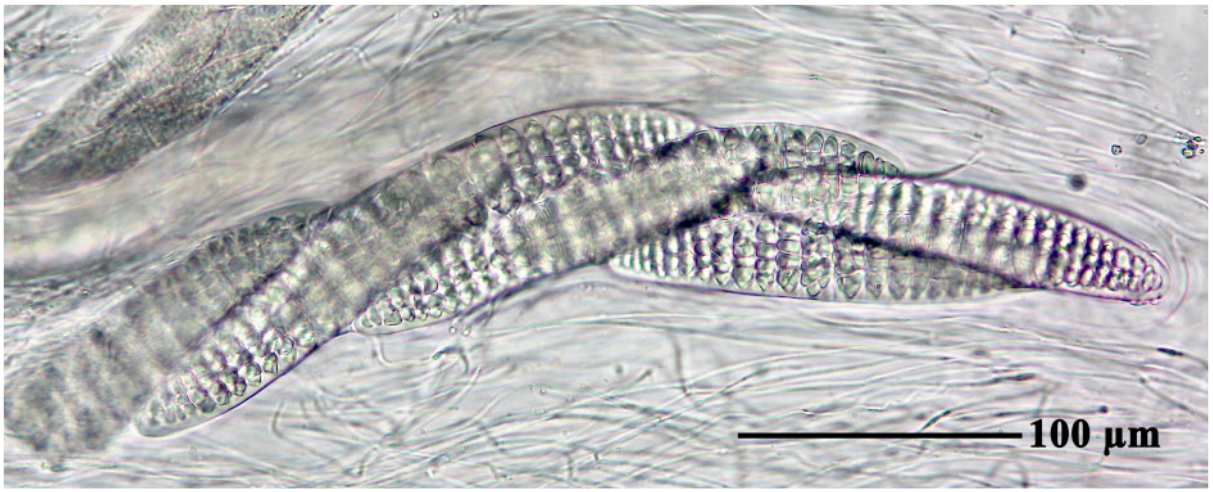
[ABL13562], Brazil, São Paulo, Botucatu, near Pousada Mandala on SP-254, on bark in cerrado forest. 22°52’45” S, 48°29’16” W, c. 850 m. Leg M. Cáceres & A. Aptroot (no13562), 9.09.2012, det. A. Aptroot, 2012. ISOTYPE.

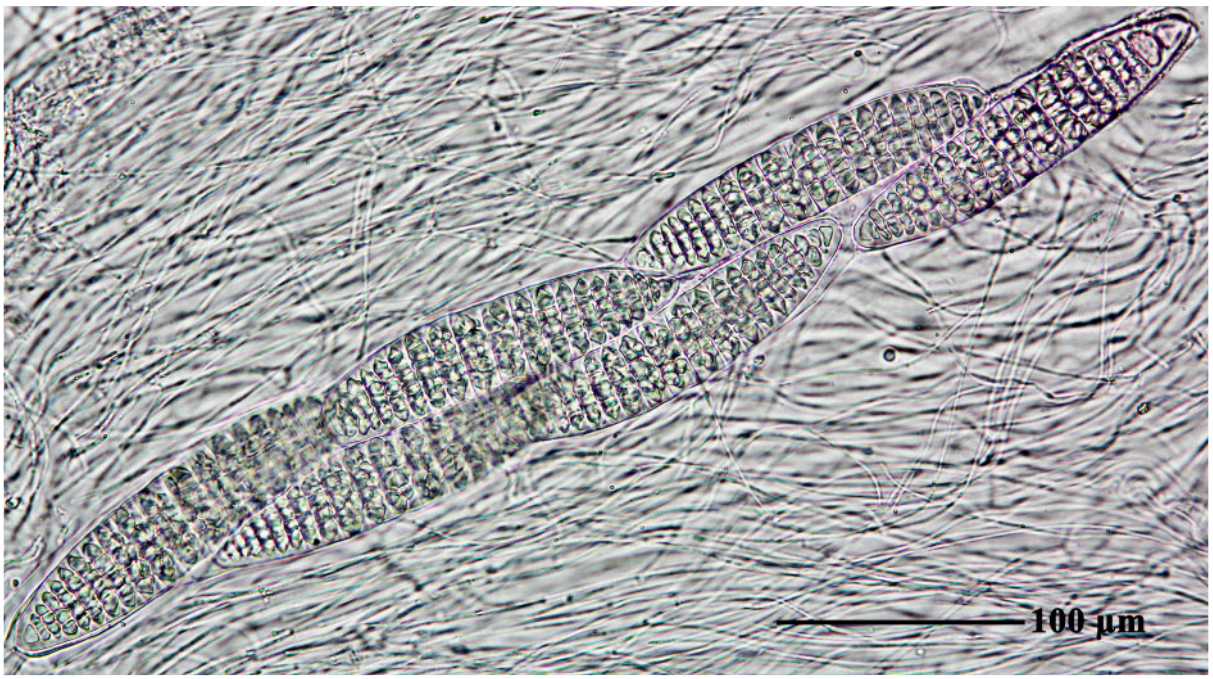


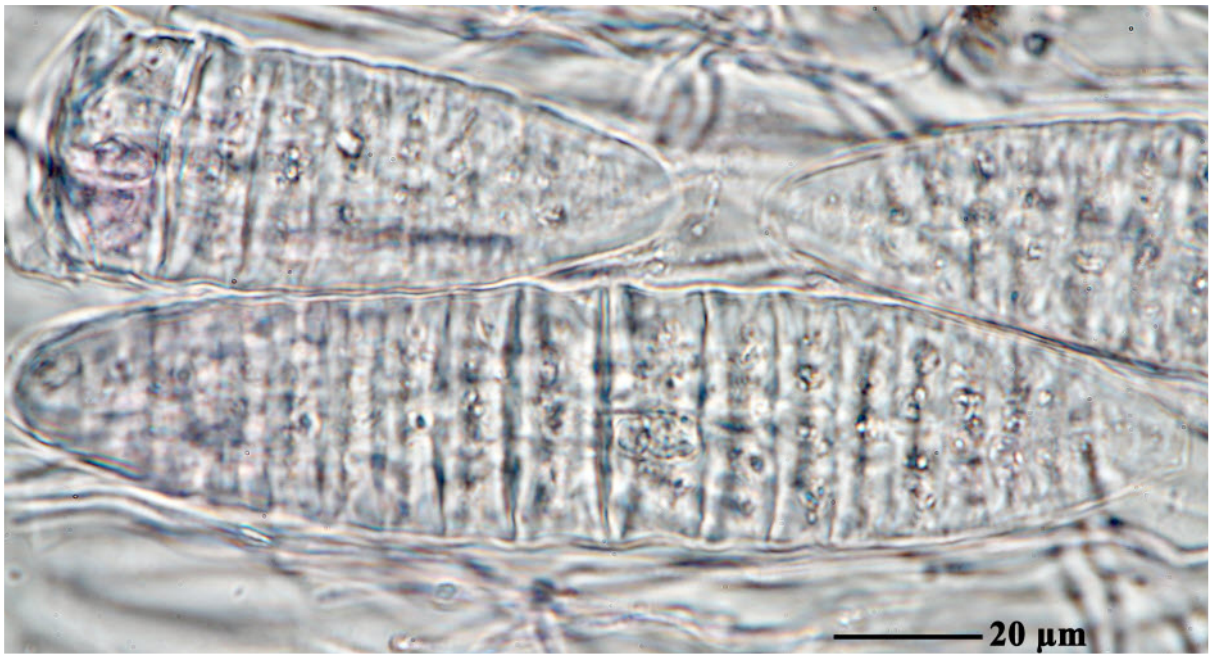




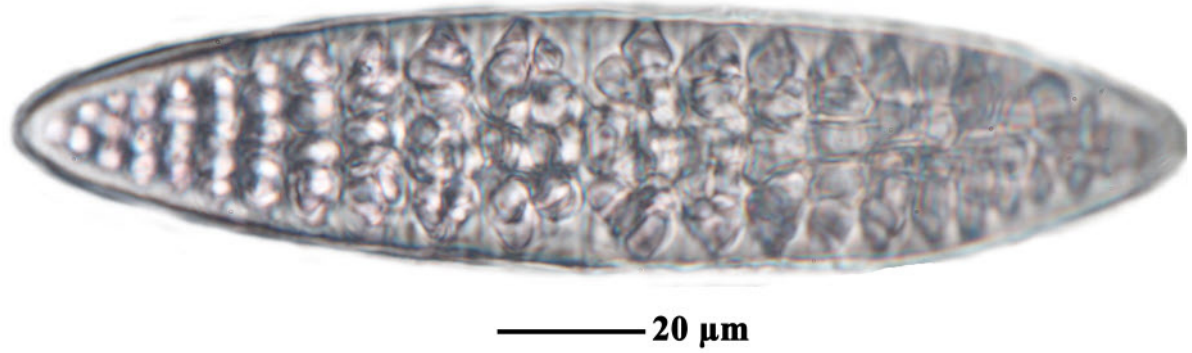
Astrothelium tetrasporum

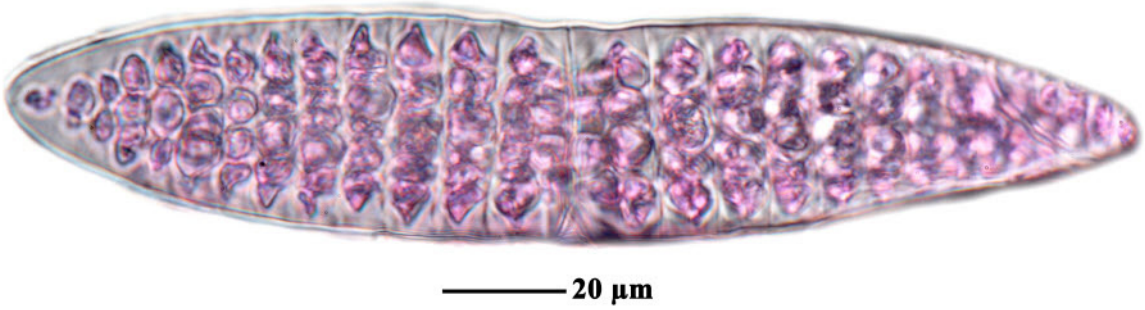


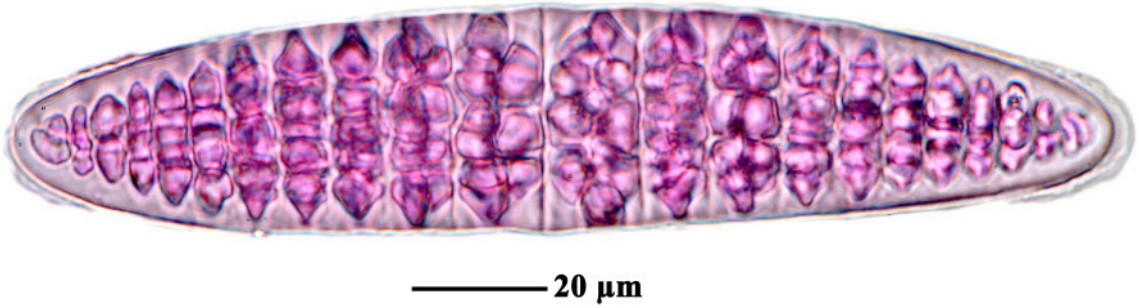




Astrothelium tetrasporum







Astrothelium tetrasporum

Astrothelium tuberculosum (Vain.) Aptroot & Lücking, Lichenologist 48(6): 893 (2016)

= *Pseudopyrenula annularis* var. *tuberculosa* Vain., Ann. Acad. Sci. fenn., Ser. A 6(no. 7): 196 (1915)

= *Trypethelium crassum* var. *tuberculosa* (Vain.) Zahlbr., Cat. Lich. Univers. 8: 128 (1931) [1932]

= *Trypethelium tuberculosum* (Vain.) R.C. Harris, Acta Amazon., Supl. 14(1-2): 76 (1986) [1984]

Thallus corticate, olive-green to brownish, strongly bullate. Ascomata trypethelioid, with apical ostioles, diffusely pseudostromatic; pseudostromata 1–2 mm diam., prominent to sessile, irregular, fully covered by thallus except dark ostioles surrounded by whitish rim. Hamathecium clear. Ascospores 8/ascus, 3-septate, fusiform, 48–65 × 17–20 µm, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

[ABL11800], Brazil, Amazonas, Fazenda São Francisco off BR319, 30 km north of Porto Velho, 8°24’33” S, 63°58’56” W, 100m, in primary rain forest on branches. Leg M. Cáceres & A. Aptroot (no11800), 15.03.2012, det. A. Aptroot 2012.

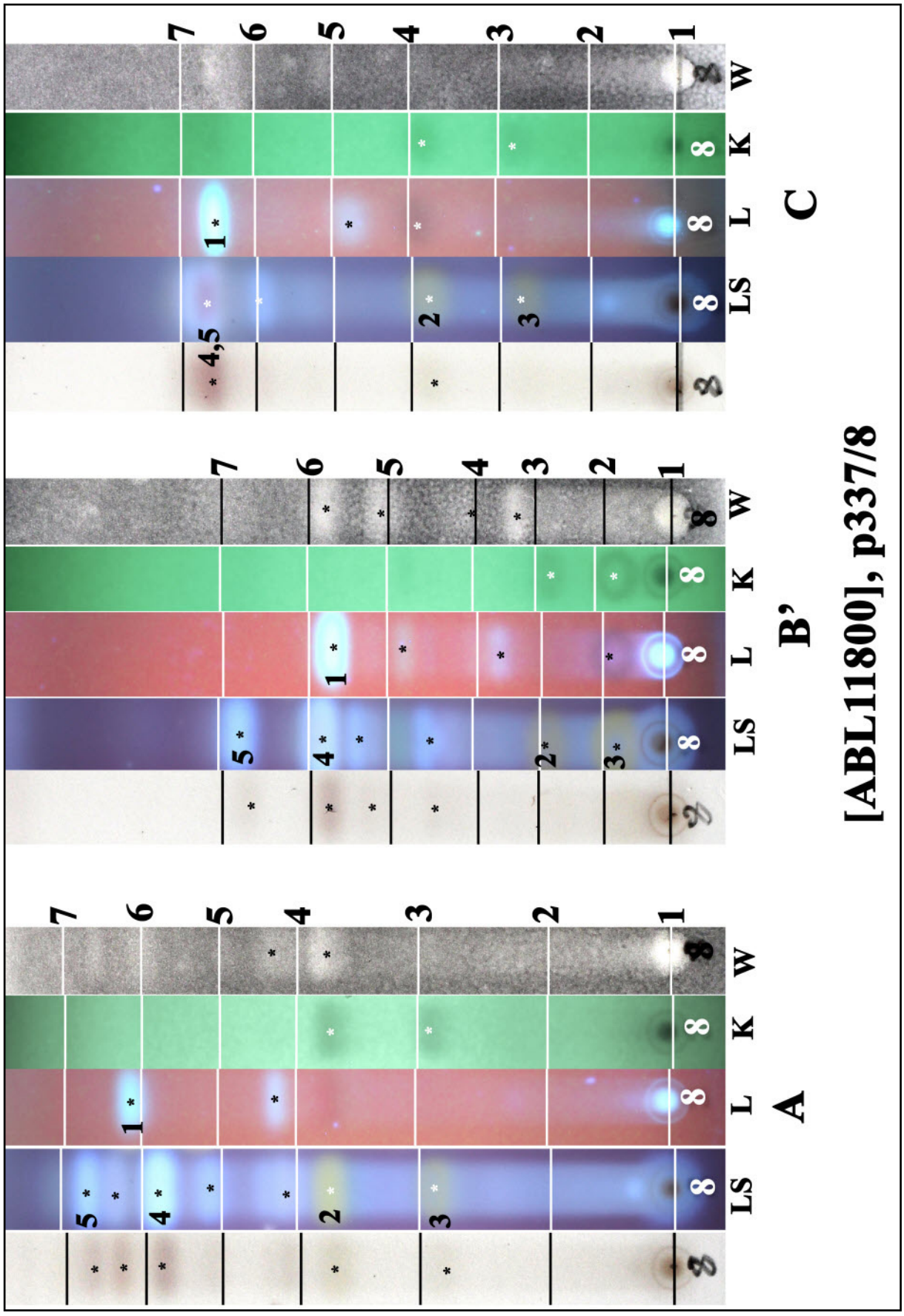




Astrothelium tuberculosum



Astrothelium tuberculosum



1,2,3,4,5: unknown until J.A. Elix can identify
(2,3 identical to 2,3 in ABL11672)

Astrothelium tuberculosum

Astrothelium tuberculosum (Vain.) Aptroot & Lücking, Lichenologist 48(6): 893 (2016)

= *Pseudopyrenula annularis* var. *tuberculosa* Vain., Ann. Acad. Sci. fenn., Ser. A 6(no. 7): 196 (1915)

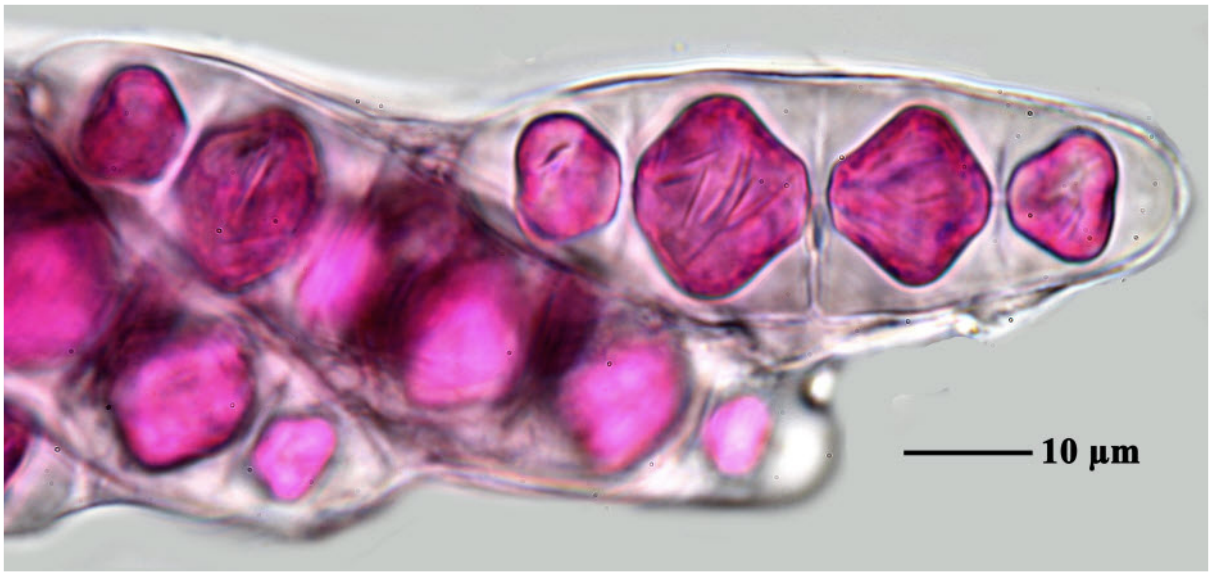
= *Trypethelium crassum* var. *tuberculosa* (Vain.) Zahlbr., Cat. Lich. Univers. 8: 128 (1931) [1932]

= *Trypethelium tuberculosum* (Vain.) R.C. Harris, Acta Amazon., Supl. 14(1-2): 76 (1986) [1984]

Thallus corticate, olive-green to brownish, strongly bullate. Ascomata trypethelioid, with apical ostioles, diffusely pseudostromatic; pseudostromata 1–2 mm diam., prominent to sessile, irregular, fully covered by thallus except dark ostioles surrounded by whitish rim. Hamathecium clear. Ascospores 8/ascus, 3-septate, fusiform, 48–65 × 17–20 µm, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

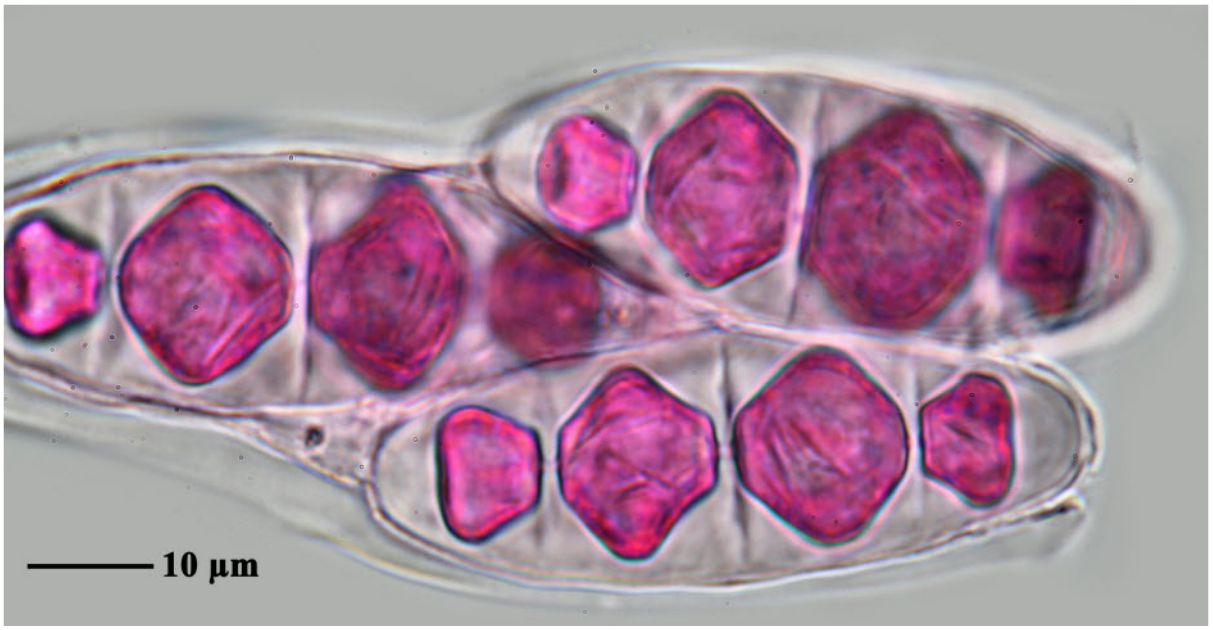
[ABL63147], Galapagos Islands, Santa Cruz Bellavista, near parling place fro trail to Media Luna Miconia. 0°40’10” S, 90°19’22” W, 400 m. Leg. A. Aptroot (no 63147), 27.05.2005, det. A. Aptroot.

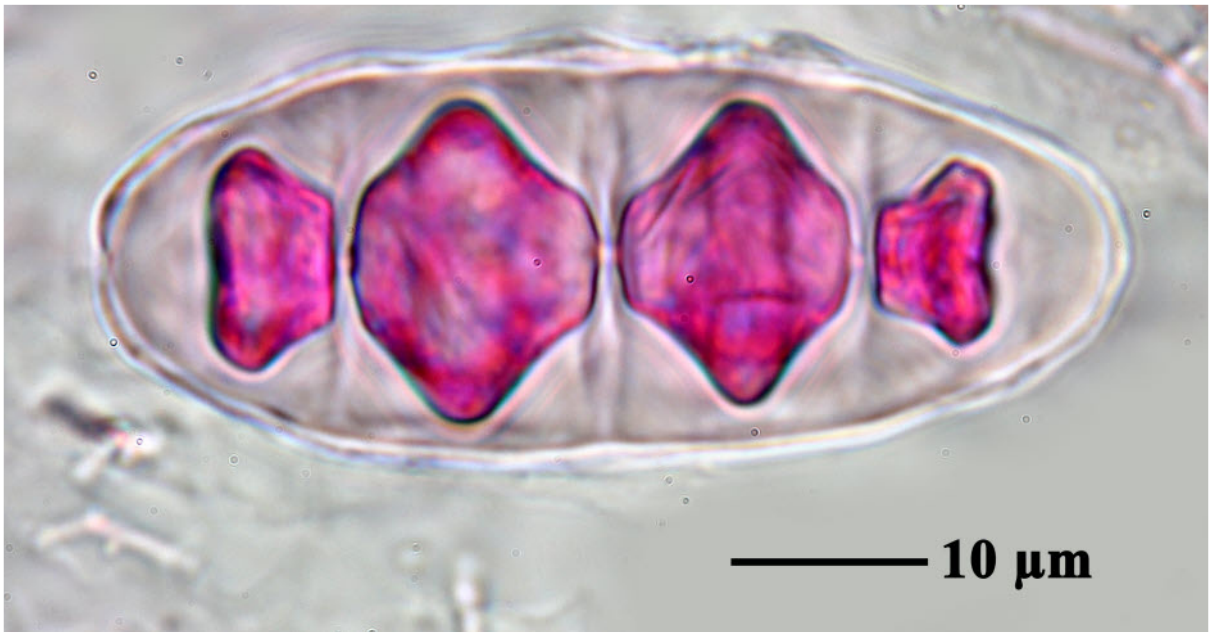


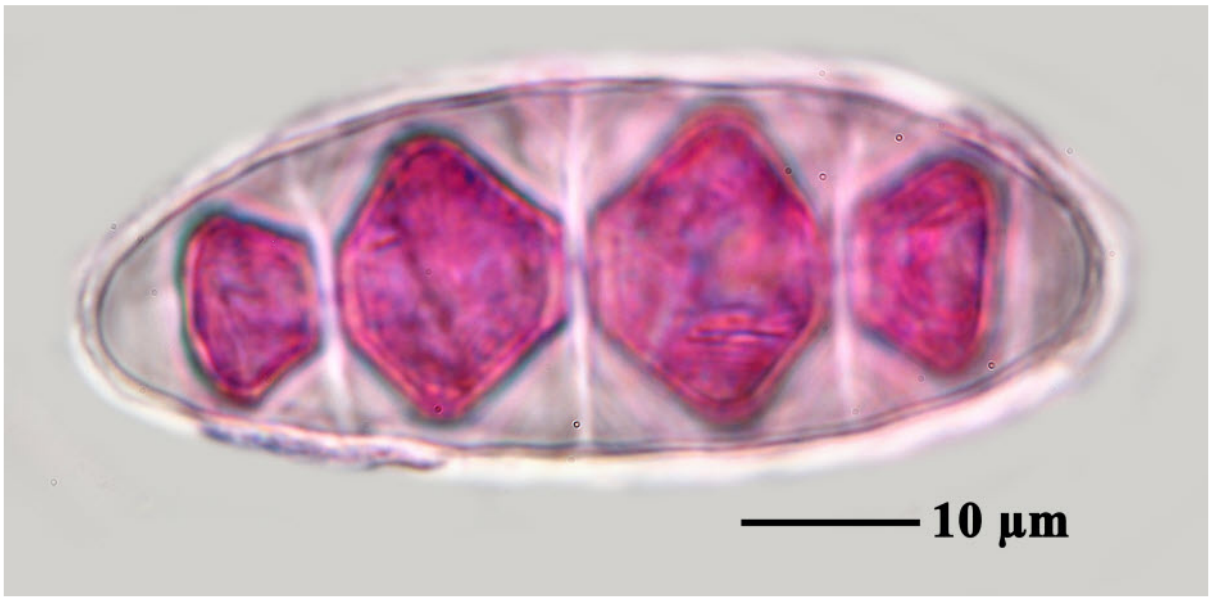




Astrothelium tuberculosum







Astrothelium tuberculosum

Astrothelium unisporum Aptroot & M. Cáceres, Bryologist 119(3): 257 (2016)

Thallus slightly shiny, ochraceous, thickly corticate (cartilaginous), not surrounded by a prothallus, not inducing gall formation of the host bark. Ascomata globose, 0.8–1.2 mm diam., superficial on the bark, but immersed in high pseudostroma warts, solitary or in groups of 2–4. Pseudostroma prominent, without pigment, fully covered by the cartilaginous thallus. Ostioles apical, brown, usually in a depression, always surrounded by a 0.2–0.4 mm wide whitish ring or rim (in case of a depression). Hamathecium not inspersed, IKI–. Ascospores 1/ascus, hyaline, muriform, 125–148 × 35–42 µm, ellipsoid, without distinctly thickened median septum. Pycnidia not observed. Chemistry: Thallus UV–, C–, P–, K–. TLC: No substances detected.

[ABL27511], Brazil, Amapá, Mazagão, NE of Reserva extrativista Maracá, Ramal do Rio Preto on BR 156, c. 30 m, 0°00' S, 51°40' W, on tree bark in cerrado. Leg M. Cáceres & A. Aptroot (no 27511), 21.08.2015, det. A. Aptroot, 2015. ISOTYPE.







Astrothelium unisporum

Astrothelium valsoides M. Cáceres & Aptroot, Bryologist 120(2): 174 (2017)

Thallus dull, olivaceous green, not surrounded by a prothallus. Ascomata globose to pyriform, 0.3–0.6 mm diam., deeply (up to 2 mm) immersed in the bark below pseudostromata, in groups of 3–15. Pseudostroma often not clearly differentiated from the thallus, flush or raised and somewhat bulbous, corticate, sometimes with extensive blackening, not pigmented. Ostioles eccentric, fused, surfacing in a black conical mount of c. 0.3 mm wide. Hamathecium not inspersed, IKI–. Ascospores 8/ascus, hyaline, (11–)13–15-septate, 69–80 × 15–17 µm, long-ellipsoid, surrounded by a 5–7 µm gelatinous sheath that extends to 13 µm at the tips. Pycnidia not observed. Chemistry: Thallus and pseudostroma UV–, C–, K–, KC–, P–. No lichen substances detected with TLC.

[ISE28072], Brazil, Amazonas, Manaus, Reserva Florestal Adolpho Ducke, along trails in vicinity of field station, on tree bark in primary rain forest, 80 m, 2°56’ S, 59°57’ W, leg. M. Cáceres & A. Aptroot (no ISE 28072), 3–8.06.2016, det. A. Aptroot, 2016. ISOTYPE.





Astrothelium valsoides







Astrothelium valsoides







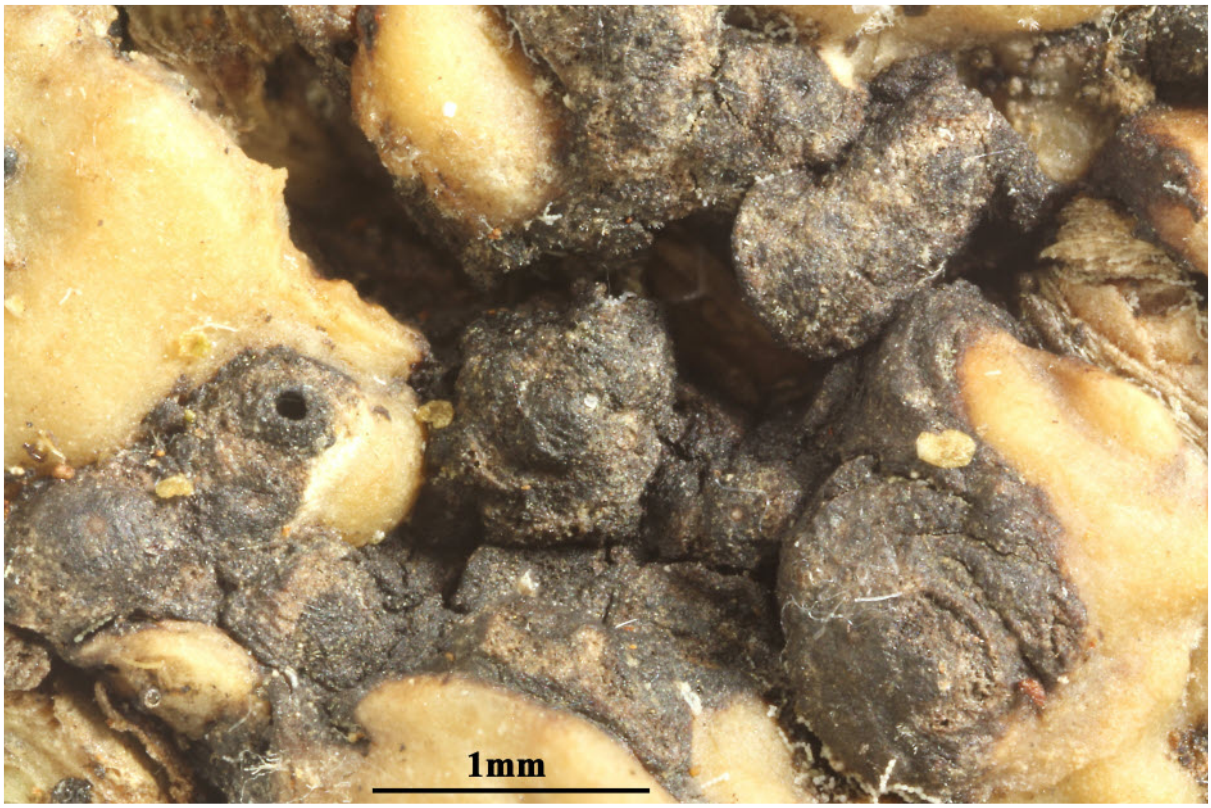
Astrothelium valsoides

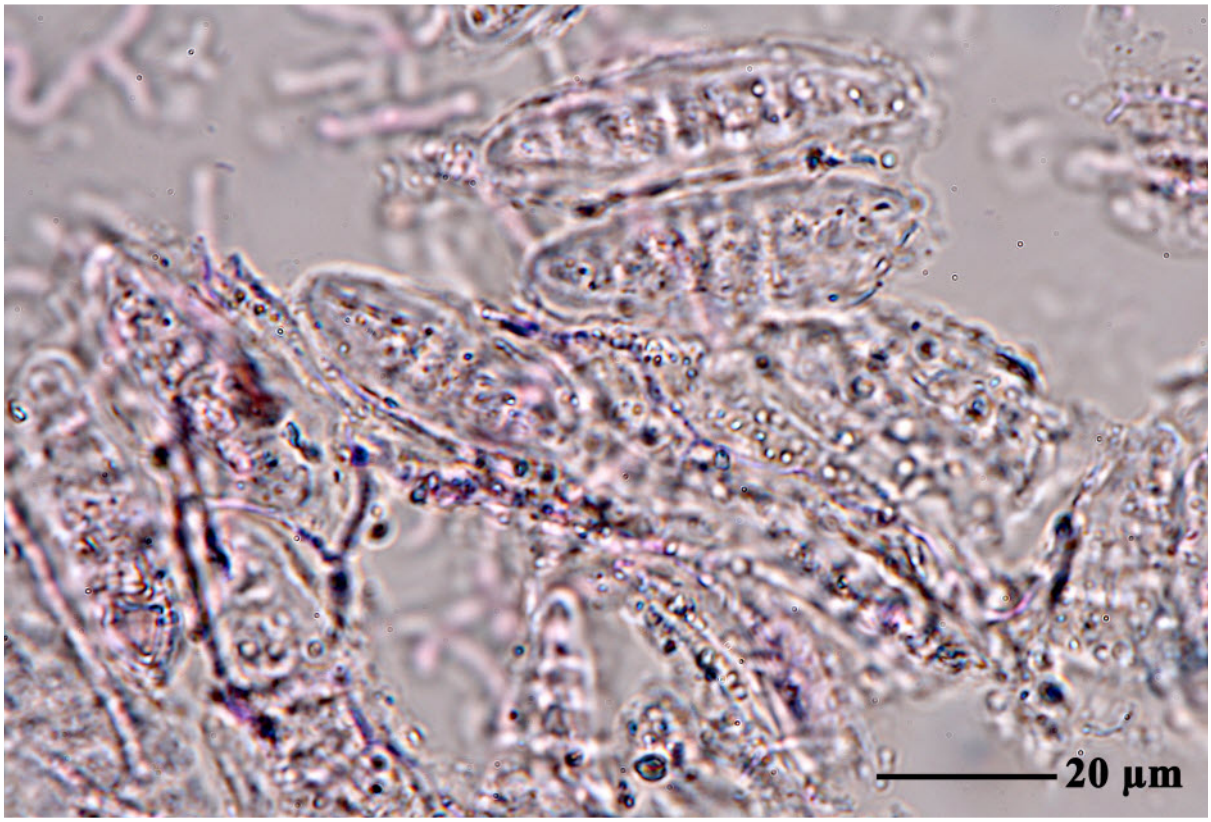
Astrothelium variatum (Nyl.) Aptroot & Lücking, Lichenologist 48(6): 893 (2016)
= *Laurera variata* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 507 (1922)
= *Trypethelium variatum* Nyl., Annls Sci. Nat., Bot., sér. 5 7: 347 (1867)

Thallus corticate, olive-green, smooth to uneven or shallowly rugose. Ascomata trypethelioid, with apical ostioles, diffusely pseudostromatic; pseudostromata 0.7–1.4 mm diam., prominent, irregular, covered by thallus except dark ostioles. Hamathecium clear. Ascospores 8/ascus, small, muriform, fusiform, 24–35 × 11–13 µm, without distinctly thickened median septum, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV-, K-. TLC: No substances detected.

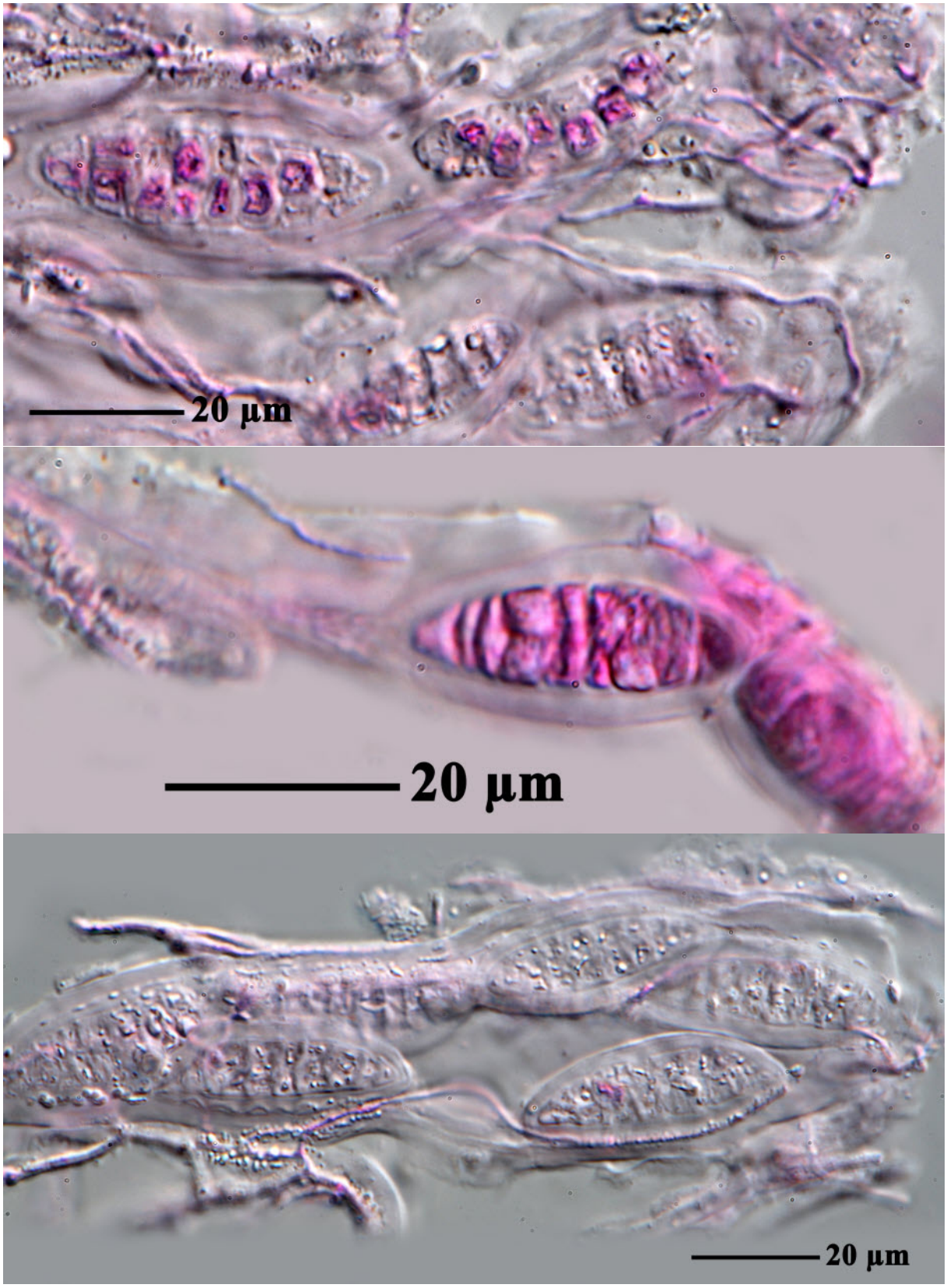
[Kirika2514], Kenya Coast Prov., Msabweni, Gononi Forest, Costal lowland forest, 40 m, on bark. Leg. P. Kirika (no 2514), 17.3.2013, det A. Aptroot, 2015.





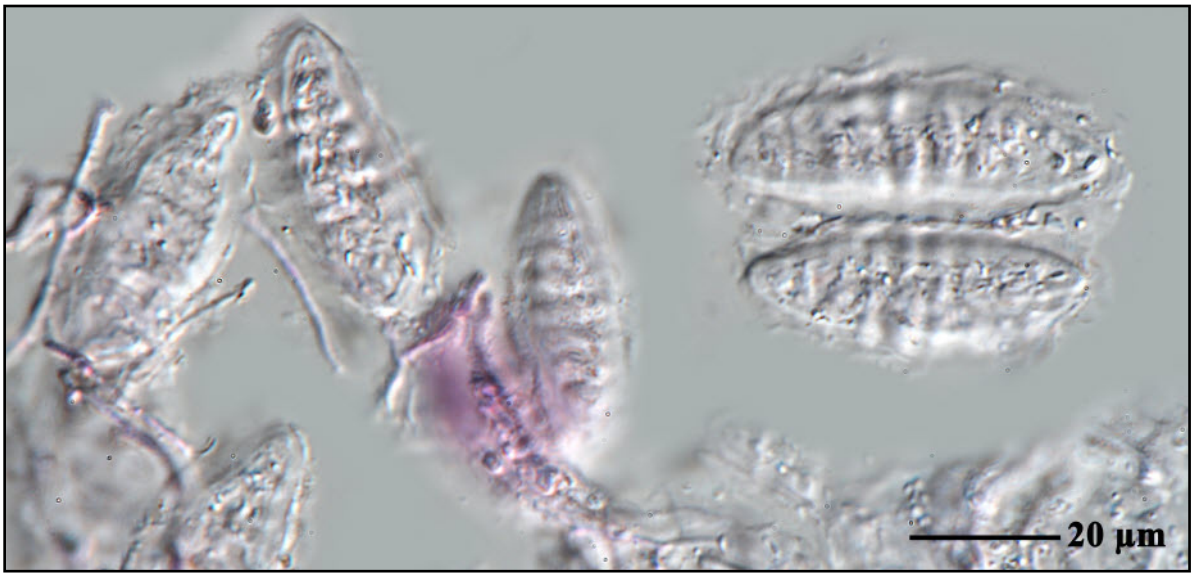


Astrothelium variatum



Astrothelium variatum





Astrothelium variatum

Astrothelium variolosum (Ach.) Müll. Arg., Flora, Regensburg 68(12): 255 (1885)
= *Trypethelium variolosum* Ach., Syn. meth. lich. (Lund): 104 (1814)
= *Pseudopyrenula catervaria* (Fée) Müll. Arg., Flora, Regensburg 66: 248 (1883)
= *Pyrenula catervaria* (Fée) A. Massal., Framm. Lichenogr.: 25 (1855)
= *Spermatodium catervarium* (Fée) Trevis., Conspect. Verruc.: 10 (1860)
= *Trypethelium catervarium* (Fée) Tuck., Gen. lich. (Amherst): 260 (1872)
= *Verrucaria catervaria* Fée, Essai Crypt. Exot. (Paris): 90 (1825) [1824]

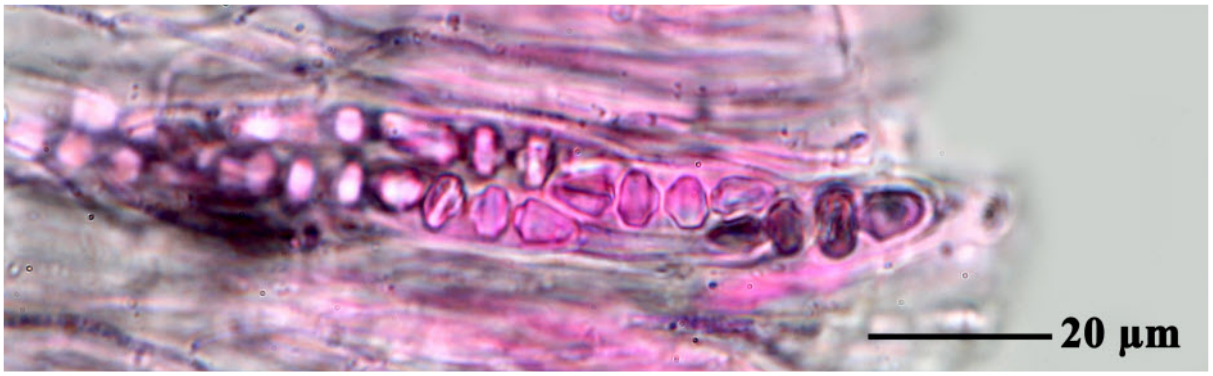
Thallus corticate, pale greenish grey to pale yellowish brown (lichexanthone colour), smooth to uneven. Ascomata astrothelioid, several chambers joined with eccentric, fused ostioles; joined ascomata pseudostromatic; pseudostromata 0.7–1.5 mm broad, erumpent to prominent, irregular in outline, covered by thallus but often paper to whitish with darl ostioles. Hamathecium clear. Ascospores 8/ascus, 3-septate, fusiform-ellipsoid, 20–26 × 7–9 µm, hyaline, IKI-. Chemistry: Thallus and pseudostromata UV+ yellow, K-, with lichexanthone (or 1,8-dihydroxy-3,6-dimethoxyxanthone).

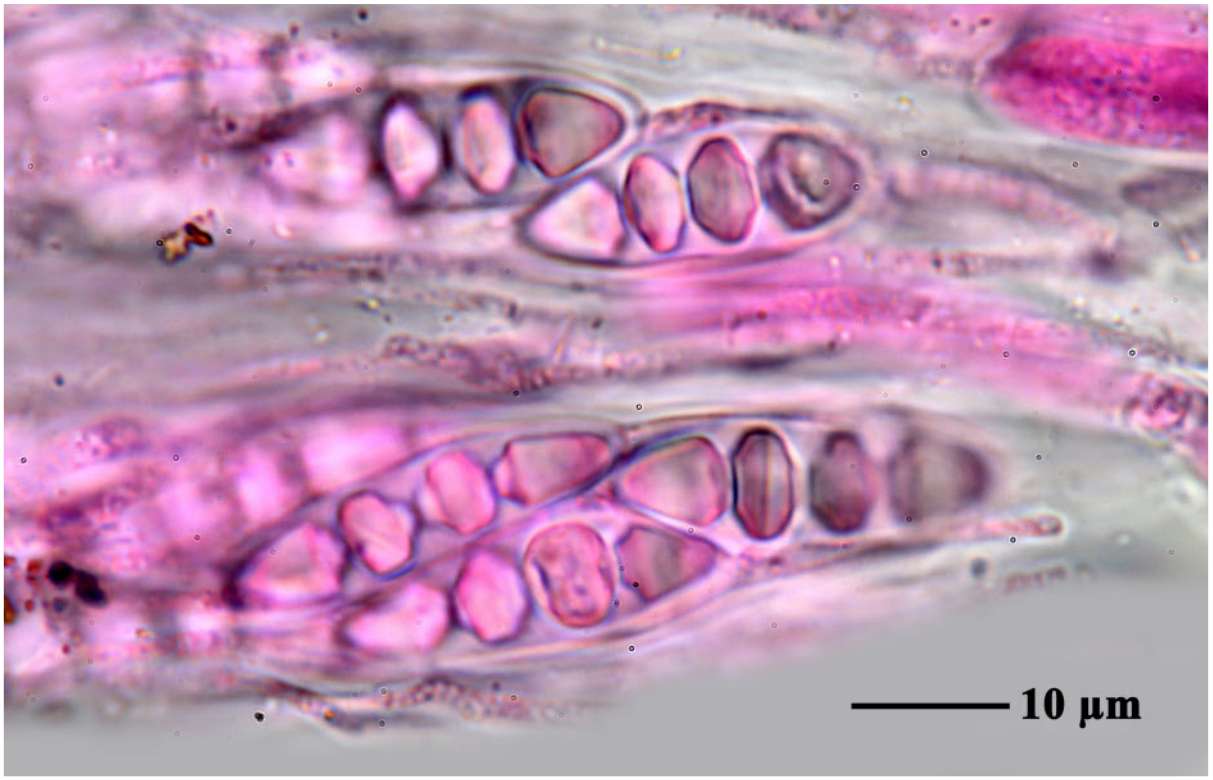
[ABL18057], Guyana, East Demerara District; Timehri, Dakara Creek, Thompson's farm. In cultivated, open area, on free-standing tree, on branch. 6°29' N, 58°15' W, 10 m. Leg. H. Sipman & A. Aptroot (no 18057), 2.2.1985, det. A. Aptroot, 1990.

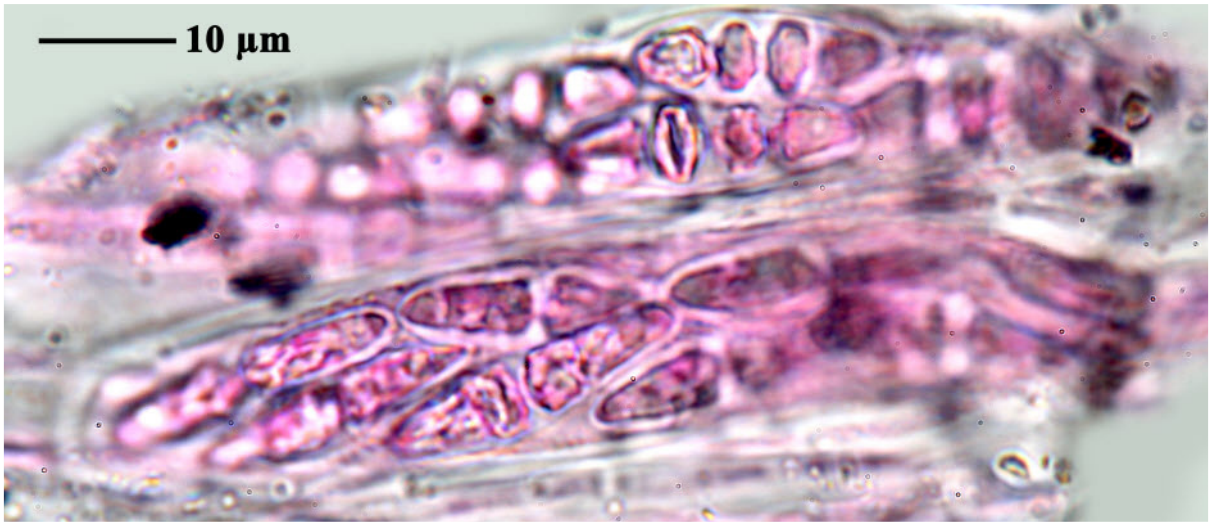


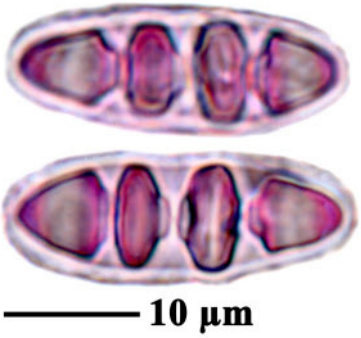


Astrothelium variolosum









Astrothelium variolosum

Astrothelium versicolor Müll. Arg., Flora, Regensburg 71: 495 (1888)

Thallus corticate, whitish to pale yellowish, strongly bullate-folded. Ascomata astrothelioid, several chambers joined with eccentric, fused ostioles; joined ascomata dispersed but dense, 0.2–0.4 mm diam., completely immersed in thallus folds and warts, visible only by their darker ostioles, thinly furnished with yellow-orange pigment. Hamathecium clear. Ascospores 8/ascus, fusiform-ellipsoid, 3-septate, 28–35 × 10–15 µm, hyaline, IKI-. Chemistry: Thallus UV+yellow, K- , with lichexanthone; ascomata apically K+red, UV+ red, with anthraquinone.

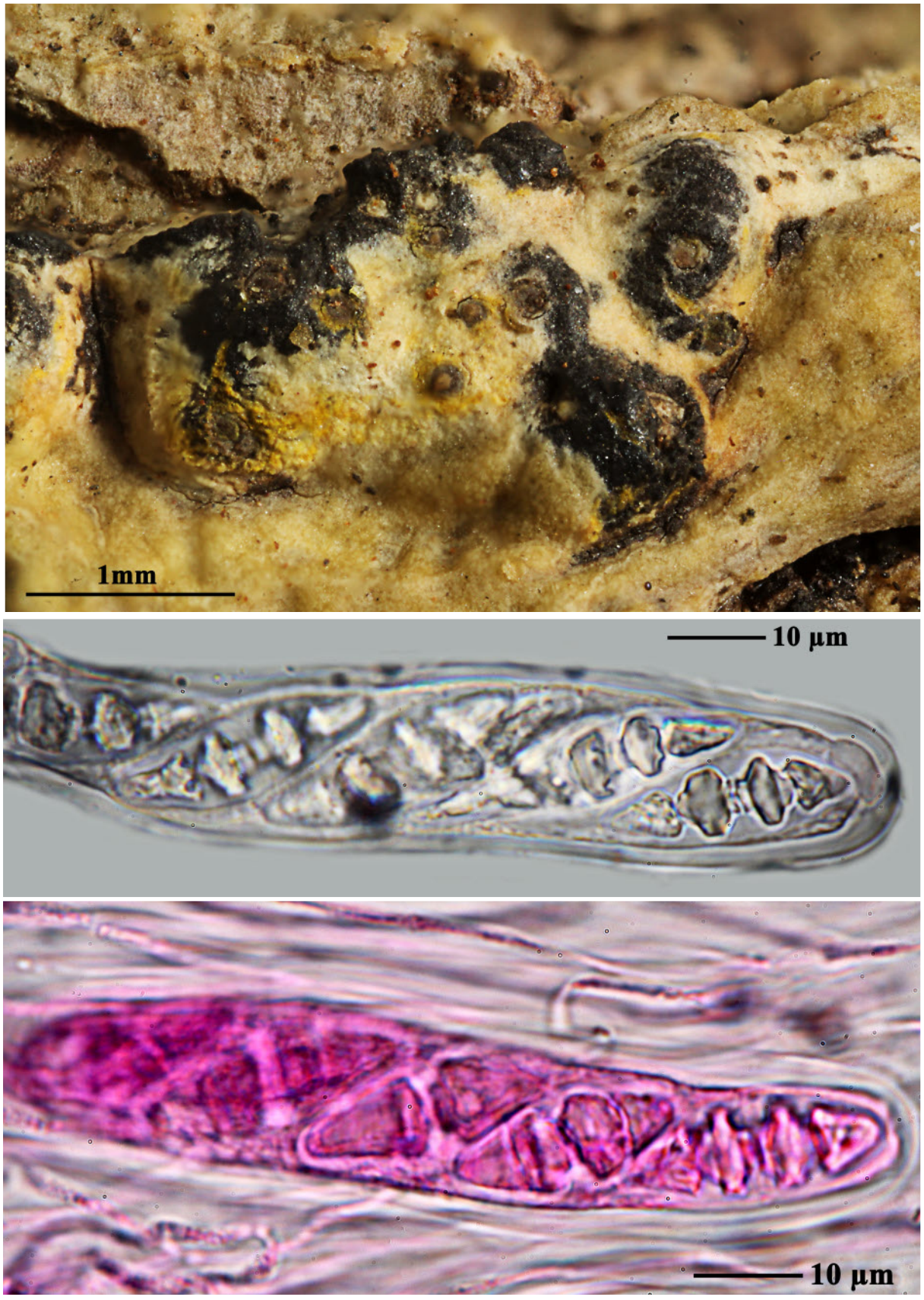
[ABL41477], Brazil, Minas Gerais, Catas Altas, Serra do Caraça, Parque Natural do Caraça, near Tanque Grande, 1270 m, 20°06’ S, 43°29’ W. In rain forest on tree. Leg. A. Aptroot (no41477), 19-20.09.1997, det. A. Aptroot, 1998.



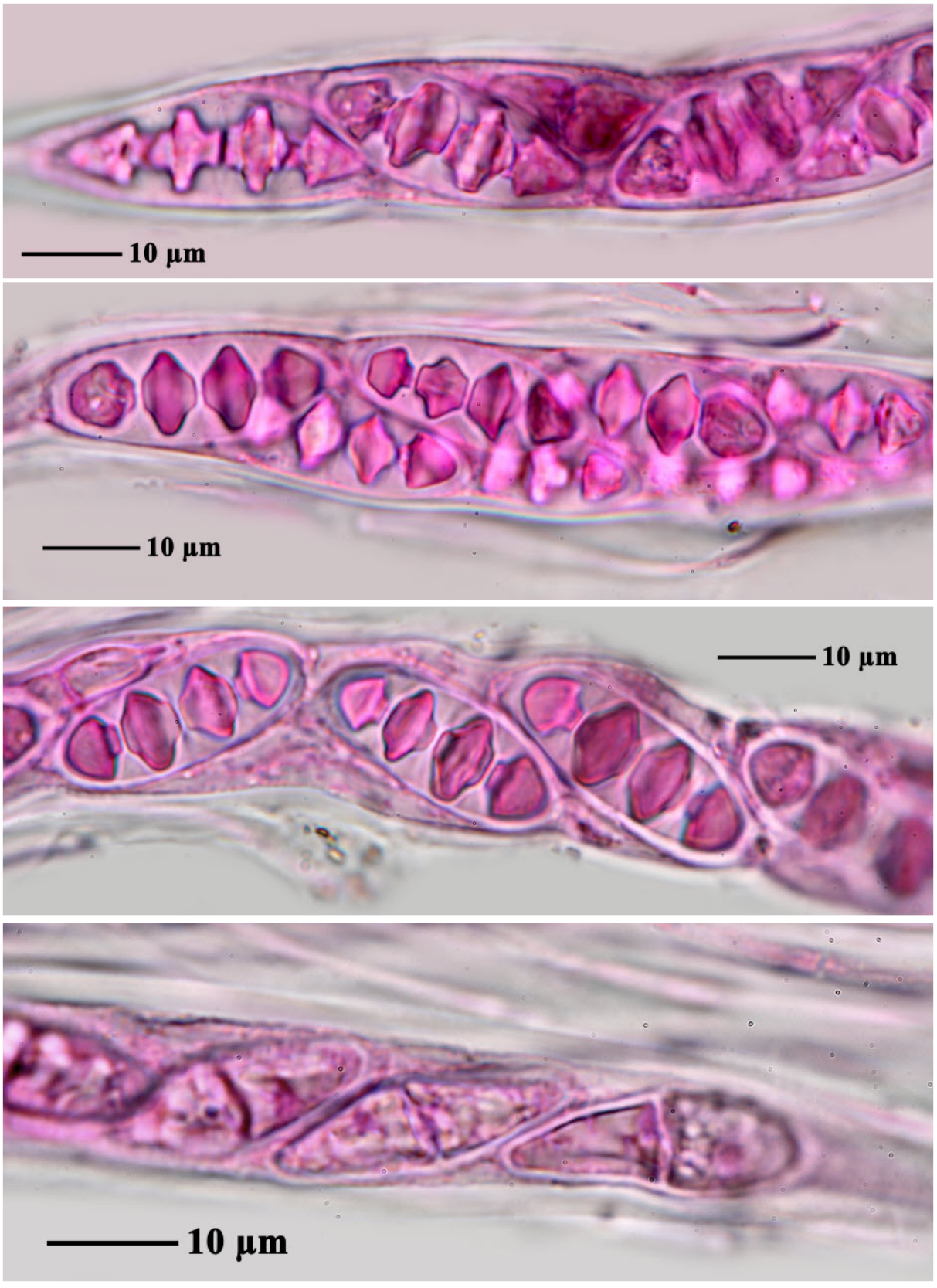




Astrothelium versicolor



Astrothelium versicolor



Astrothelium versicolor

Astrothelium vezdae (Makhija & Patw.) Aptroot & Lücking, Lichenologist 48(6): 894 (2016)
= *Laurera vezdae* Makhija & Patw., Mycotaxon 31(2): 587 (1988)

Thallus corticate, olive-green to brownish, uneven-rugulose. Ascomata trypethelioid to pleurothelioid, with apical to eccentric, separate ostioles, pseudostromatic; pseudostromata 1–1.3 mm diam., erumpent to prominent, covered by thallus but thinly covered by orange pigment. Hamathecium clear. Ascospores 2–4/ascus, muriform, ellipsoid, 80–175 × 25–50 µm, without distinctly thickened median septum, hyaline, IKI-. Chemistry: Thallus UV-, K-, pseudostromata UV+ reddish, K+ purple, with orange anthraquinone.

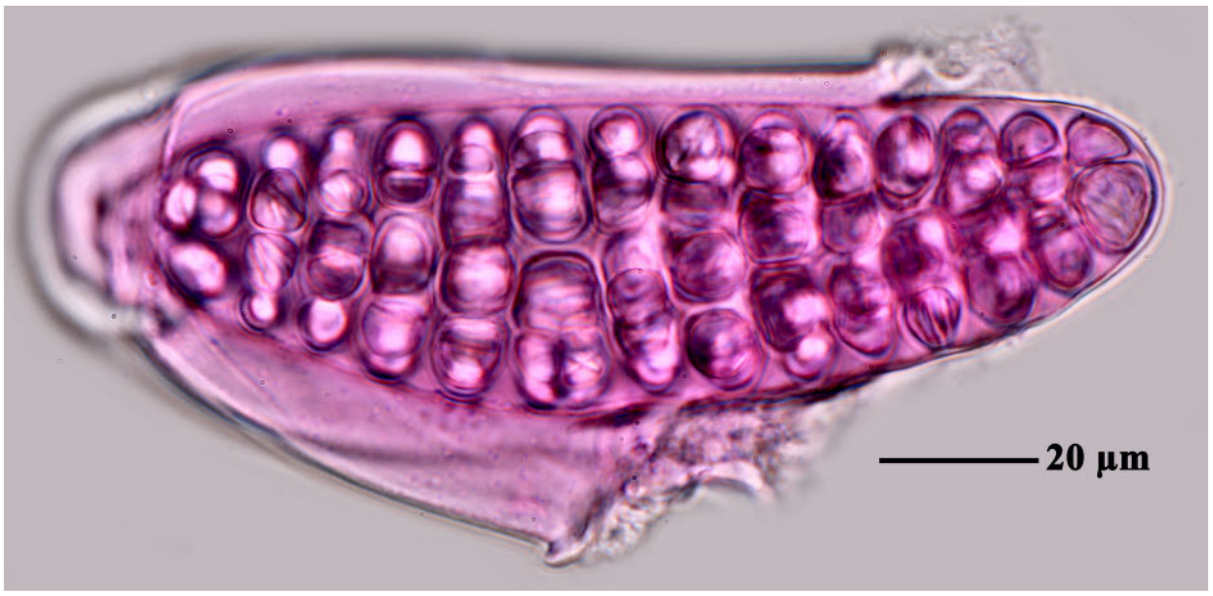
[AMH742183], India, Maharashtra, Vishalgarh, Amba-Gajapur Road 6. Leg. Nagarkar (no 742183) & Prabhu, 12.1974. ISOTYPE of *Laurera vezdae.*





Astrothelium vezdae







Astrothelium vezdae

Astrothelium xanthosuperbum Aptroot & M. Cáceres, Lichenologist 48(6): 711 (2016)

Thallus corticate, smooth, shiny, continuous, covering areas ≤ 3 cm diam., under 0.1 mm thick, olive-green, surrounded by a dark black prothallus line c. 0.3 mm wide, inducing gall formation of the host bark in the form of making the bark pieces become slightly concave and thickened along the cracks so that they are almost flaking off. Ascomata globose, 0.4–0.7 mm diam., solitary, mostly 2–6 aggregated, immersed in pseudostroma. Pseudostromata black, raised above the thallus, irregular in outline or usually in lines, ≤ 2 mm wide and ≤ 7 mm long. Wall black all around, ≤ c. 50 µm thick. Ostioles apical, not fused, flat, dark brown, often surrounded by a pale brown ring. Hamathecium not inspersed with oil globules. Asci with 8 ascospores. Ascospores hyaline, muriform, ellipsoid, 130–160 × 28–35 µm, ends rounded, lumina angular, not surrounded by a gelatinous layer. Pycnidia young, abundant, in the pseudostroma. Chemistry: Thallus surface UV+ yellow, thallus medulla K−. TLC: lichexanthone.

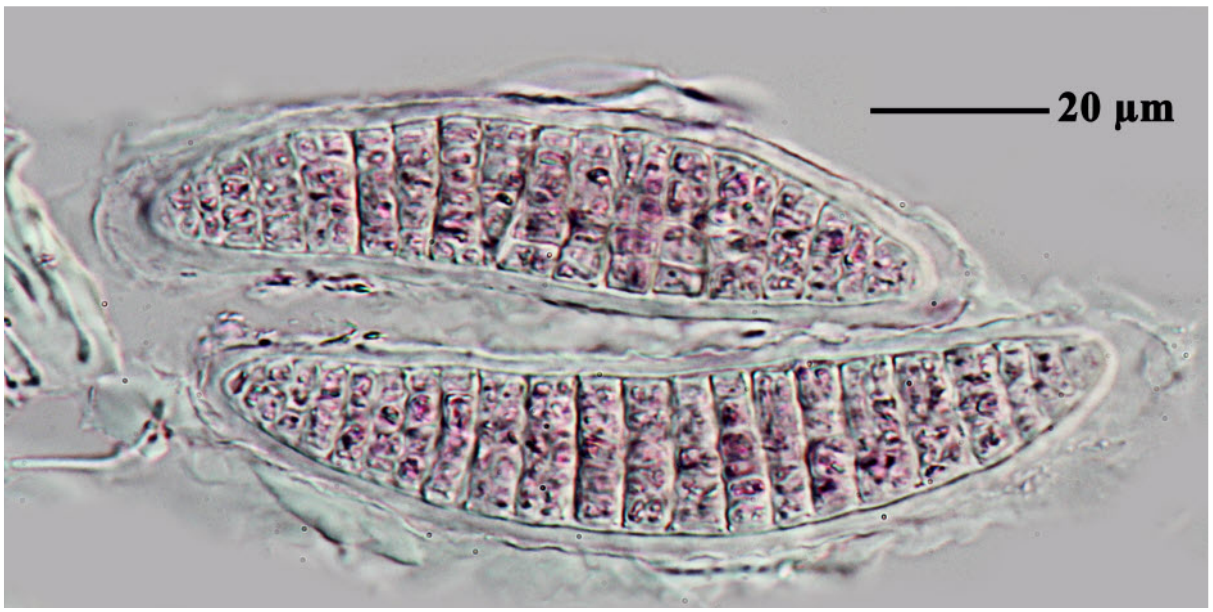
[ABL15441], Brazil, Rondônia, Sítio Ecológico Buriti on Lago Cujubim E of Porto Velho, 8°35'17" S, 63°40'40" W, c. 100 m, on tree bark in disturbed rainforest. Leg. M. Cáceres & A. Aptroot (no 15441), 18.11.2012, det. A. Aptroot, 2012. ISOTYPE.





Astrothelium xanthosuperbum





Astrothelium xanthosuperbum

Bathelium albidoporum (Makhija & Patw.) R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 116 (1995)
= *Trypethelium albidoporum* Makhija & Patw., Int. J. Mycol. Lichenol. 5(3): 238 (1992)

Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary to irregularly confluent, 0.6–1.0 mm diam., prominent to sessile, blackish brown, often with white pruinose ostioles, internally with orange-brown, dusty granular pigment. Hamathecium clear. Ascospores 8/ascus, 5–7-septate, fusiform, 25–32 × 6–9 µm, hyaline, IKI-. Chemistry: Thallus UV-, K-; ascomata UV-, internally K+ red, with anthraquinone.

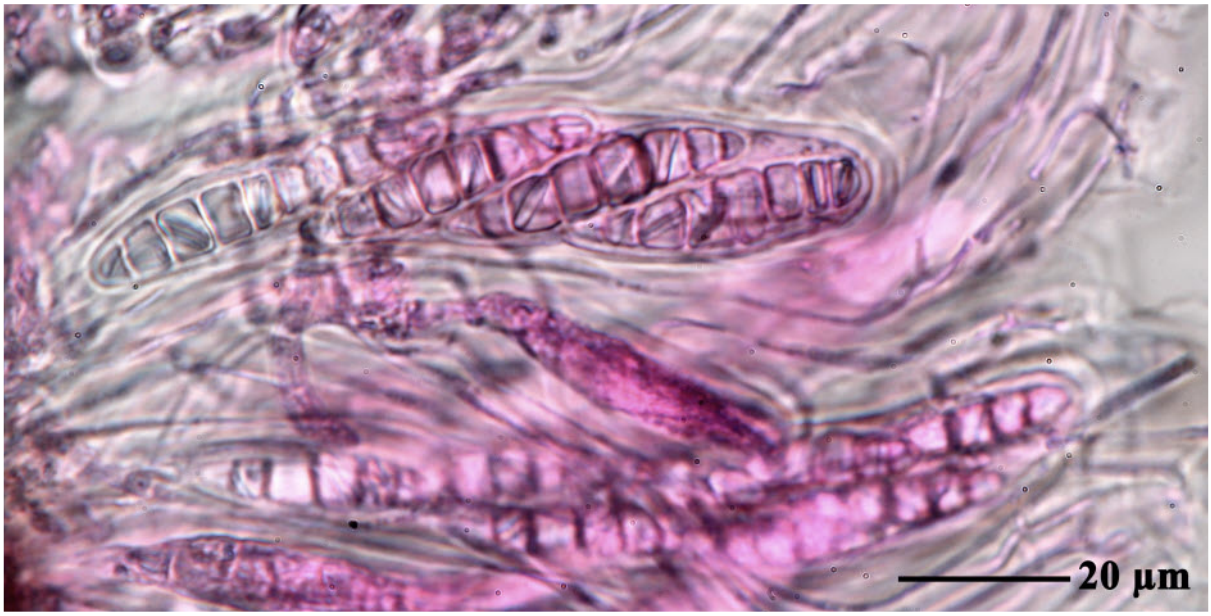
[ABL32903], Papua New Guinea, Madang Prov., Gogol valley, Tgubi logging side, 30 km W of Madang. Virgin floodplain forest along Gogol river, on tree. 145°28’ E, 5°08’ S, 125 m. Leg. A. Aptroot (no 32903), 13.08.1992, det. A. Aptroot, 1992.





Bathelium albidoporum









Bathelium albidoporum



Bathelium albidoporum

Bathelium carolinianum (Tuck.) R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 116 (1995)
= *Trypethelium carolinianum* Tuck., Amer. J. Sci. Arts, Ser. 2 25: 429 (1858)

Thallus corticate, olive-green, to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, pseudostromatic; pseudostromata 0.8–1.5 mm diam., prominent to sessile, blackish brown, internally with yellow, dusty granular pigment. Hamathecium clear. Ascospores 8/ascus, 3-septate, fusiform, 18–28 × 6–9 µm, hyaline, IKI-. Chemistry: Thallus UV-, K-; pseudostromata UV-, internally K+ yellow, with anthraquinone.

[Florschuetz5824], USA, Florida State, Madison County, Greenville, Tree-farm Pocosin Pines, on various trees in garden. Leg. J Florschuetz (no 5824), 3.1988, det. A. Aptroot, 1988





Bathelium carolinianum

Bathelium madreporiforme (Eschw.) Trevis. , Spighe Paglie: 20 (1852)
= *Laurera madreporiformis* (Eschw.) Riddle, in Howe, Torreya 16: 50 (1916)
= *Thelenella madreporiformis* (Eschw.) Vain., Bolm Soc. broteriana, Coimbra, sér. 2 6: 175 (1930) [1929-30]
= *Trypethelium madreporiforme* Eschw., Syst. Lich.: 26 (1824)

Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, pseudostromatic; pseudostromata 1–2 mm broad (individual ascomata 0.7–1.0 mm diam., prominent to sessile, blackish brown, internally with yellow-orange, dusty granular pigment. Hamathecium clear. Ascospores 8/ascus, small muriform, fusiform-ellipsoid 40–55 × 11–17 µm, central septum not strongly thickened, hyaline, IKI-. Chemistry: Thallus UV-, K-; pseudostromata UV-, internally K+ purple, with anthraquinone. TLC also revealed terpenoid-like spots but these are probably from the bark.

[ABL60782], Costa Rica, Prov. Guanacaste, Monte Alto Forest Reserve, near Hojancha, 10 km SSE of Nicoya, on tree along entrance road, 85°24’ W, 10°02’ N, 450-550 m: Leg. A. Aptroot (no 60782), 21.03.2004, det. A. Aptroot, 2004.



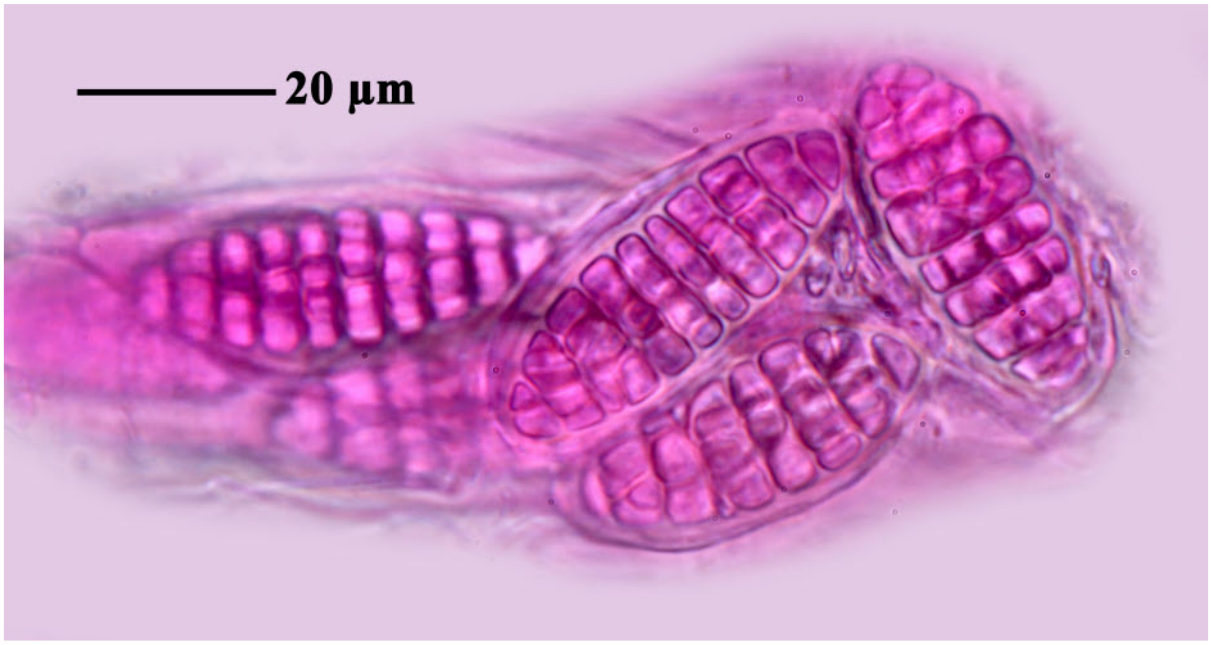


Bathelium madreporiforme



Bathelium madreporiforme





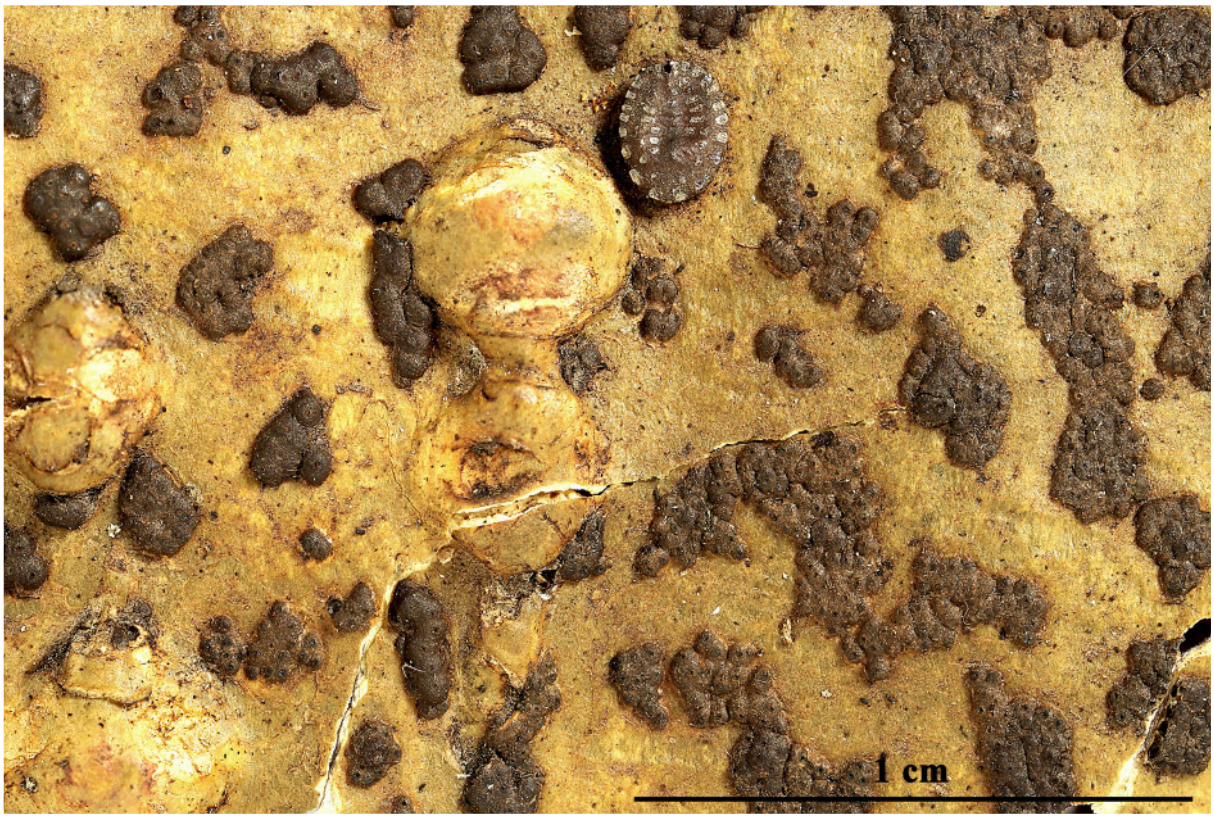


Bathelium madreporiforme

Bathelium madreporiforme (Eschw.) Trevis. , Spighe Paglie: 20 (1852)
= *Laurera madreporiformis* (Eschw.) Riddle, in Howe, Torreya 16: 50 (1916)
= *Thelenella madreporiformis* (Eschw.) Vain., Bolm Soc. broteriana, Coimbra, sér. 2 6: 175 (1930) [1929-30]
= *Trypethelium madreporiforme* Eschw., Syst. Lich.: 26 (1824)

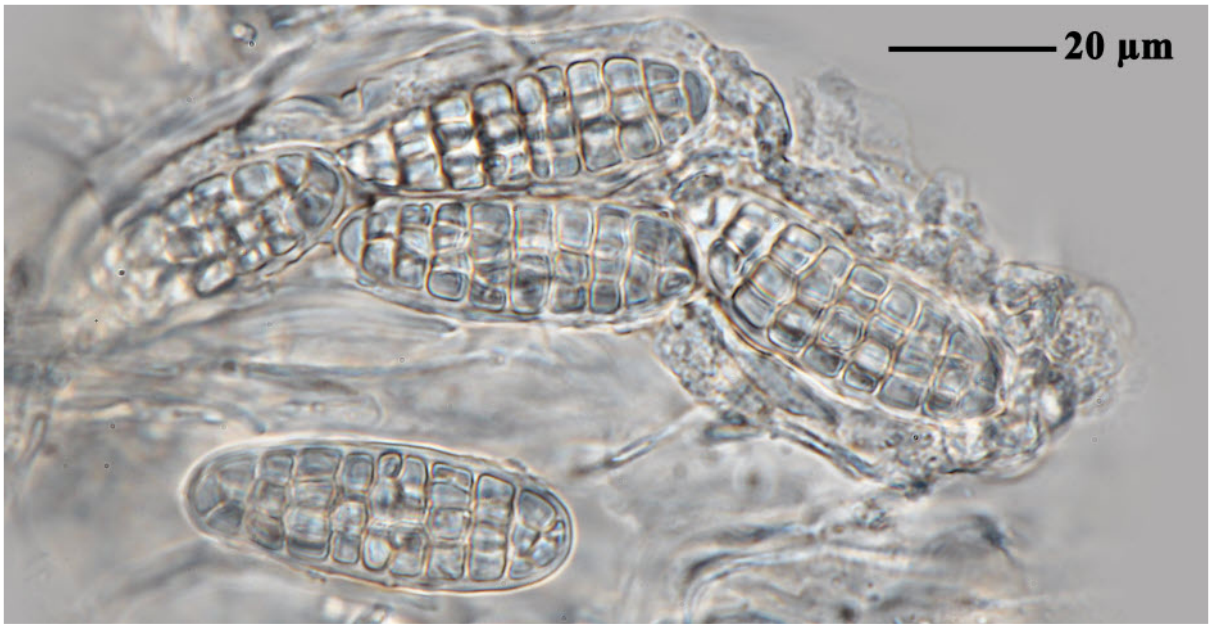
Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, pseudostromatic; pseudostromata 1–2 mm broad (individual ascomata 0.7–1.0 mm diam., prominent to sessile, blackish brown, internally with yellow-orange, dusty granular pigment. Hamathecium clear. Ascospores 8/ascus, small muriform, fusiform-ellipsoid 40–55 × 11–17 µm, central septum not strongly thickened, hyaline, IKI-. Chemistry: Thallus UV-, K-; pseudostromata UV-, internally K+ purple, with anthraquinone. TLC also revealed terpenoid-like spots but these are probably from the bark.

[ABL Johnson 6057], USA, Florida, Polk County, 2 mi NW of Forst-proof. Leg. G.T. Johnson (no 6057), 27.1.1965, det. G.T. Johnson.



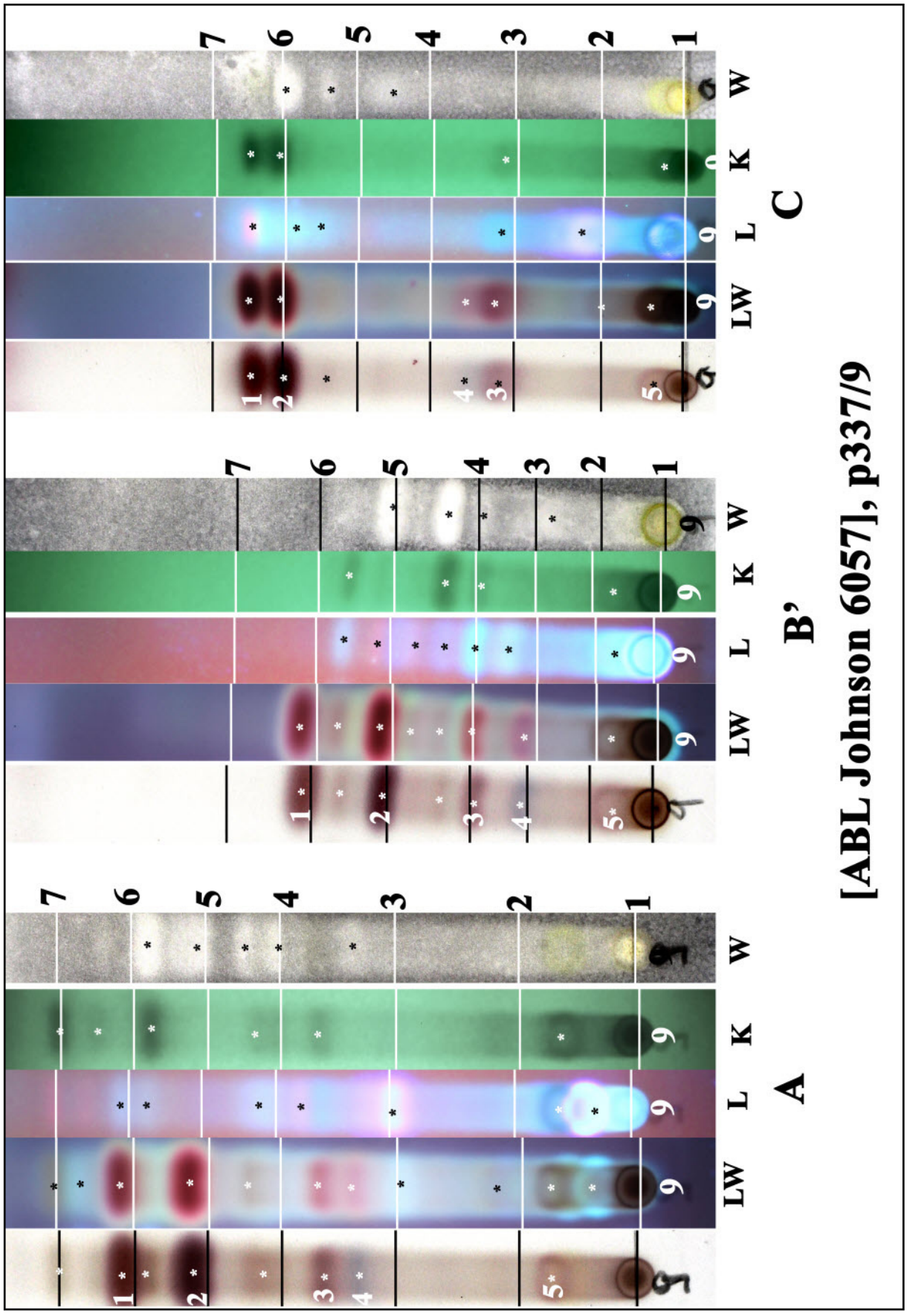


Bathelium madreporiforme





Bathelium madreporiforme



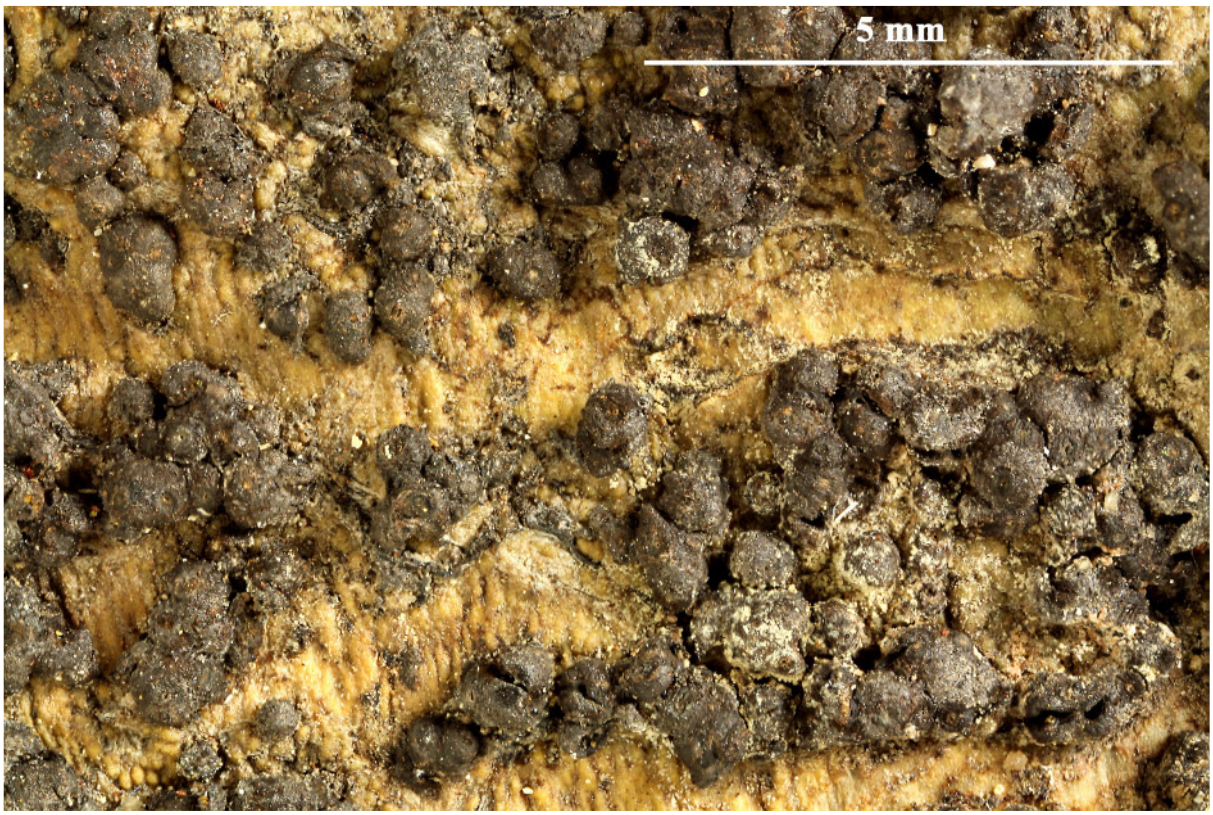
1,2,3,4,5: ??.
No Zeorin which has the position (5| 4.8| 5.9) on this plate

Bathelium madreporiforme

Bathelium mastoideum Afzel. ex Ach., Methodus, Sectio prior (Stockholmiæ): 111 (1803)
= *Trypethelium mastoideum* (Afzel. ex Ach.) Ach., Lich. univ.: 307 (1810)

Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, pseudostromatic; pseudostromata 1–2(–3) mm broad (individual ascomata 0.8–1.2 mm diam.), prominent to sessile, blackish brown, internally with yellow-orange, dusty granular pigment. Hamathecium clear. Ascospores 8/ascus, muriform, fusiform, 50–80 × 13–20 µm, central septum not strongly thickened, hyaline, IKI-. Chemistry: Thallus UV-, K-; pseudostromata UV-, internally K+ purple, with anthraquinone.

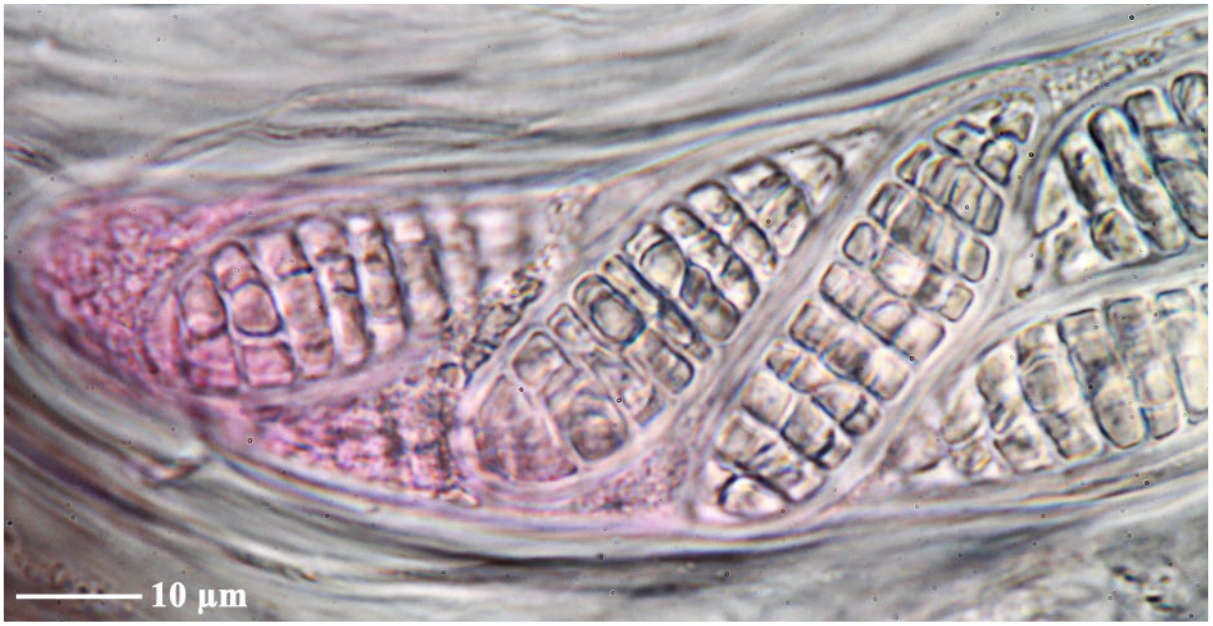
[ABL57033], China, Yunnan Prov., Xishuangbanna, Menglun, Tropical Botanical Garden, on Anacardium occidentale, 21°55’42” N, 101°15’37” E, 550 m. Leg. A. Aptroot (no 57033), 31.10.2002, det. A. Aptroot, 2003.



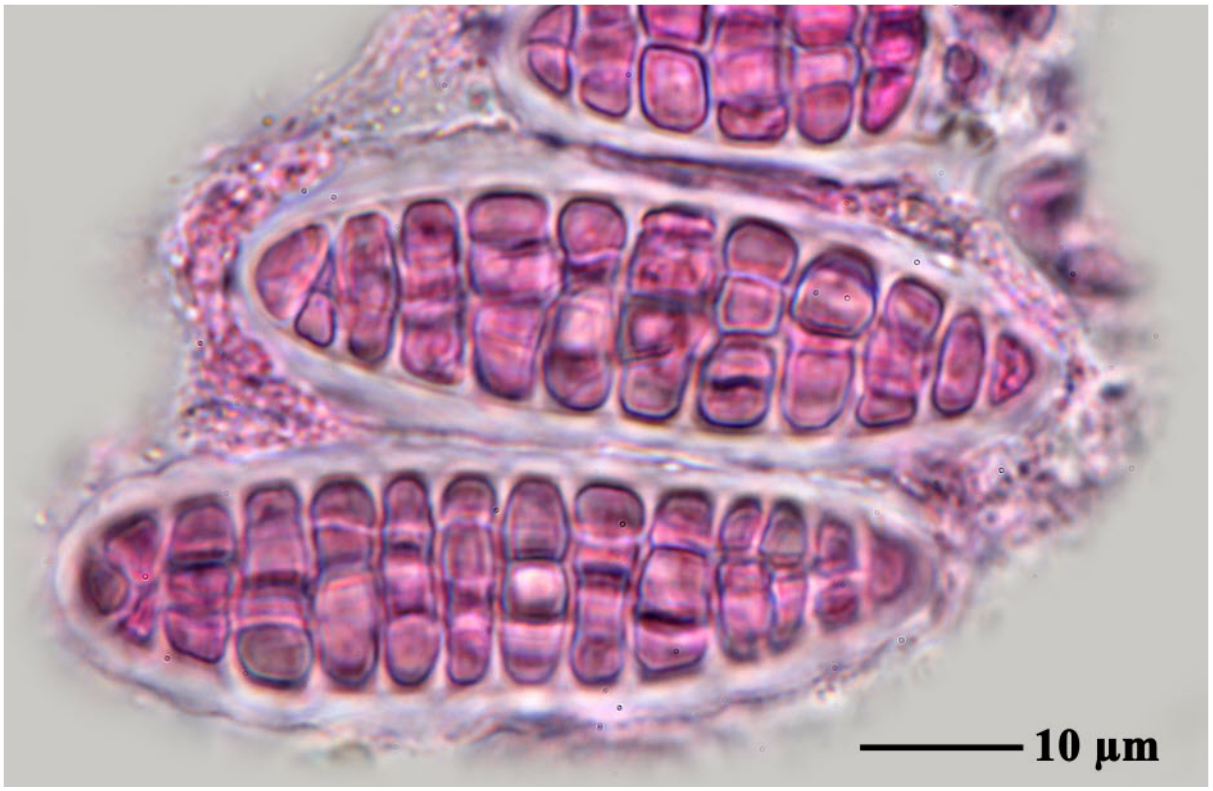


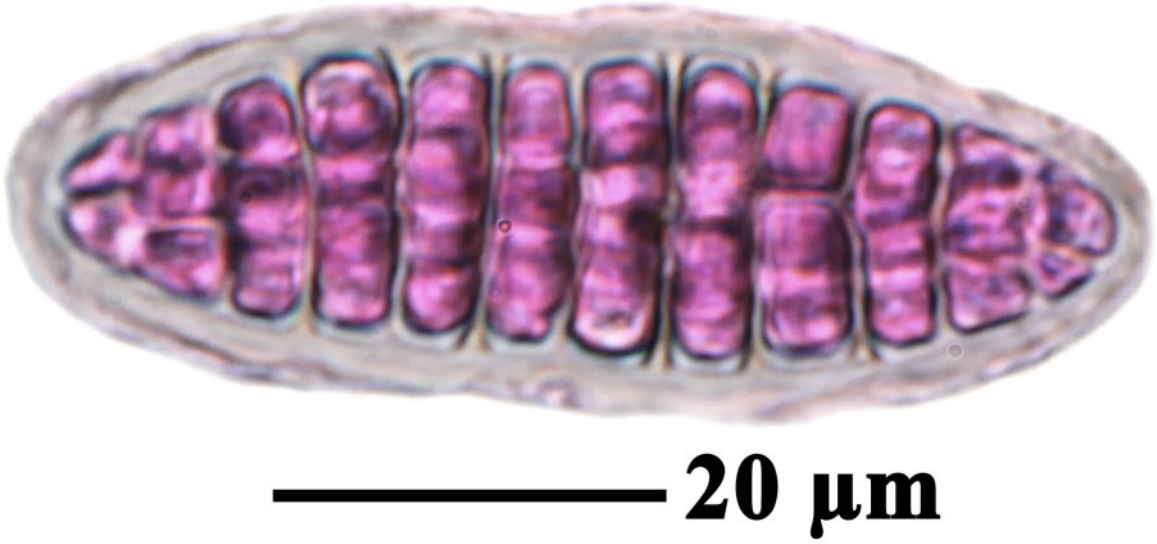
Bathelium mastoideum

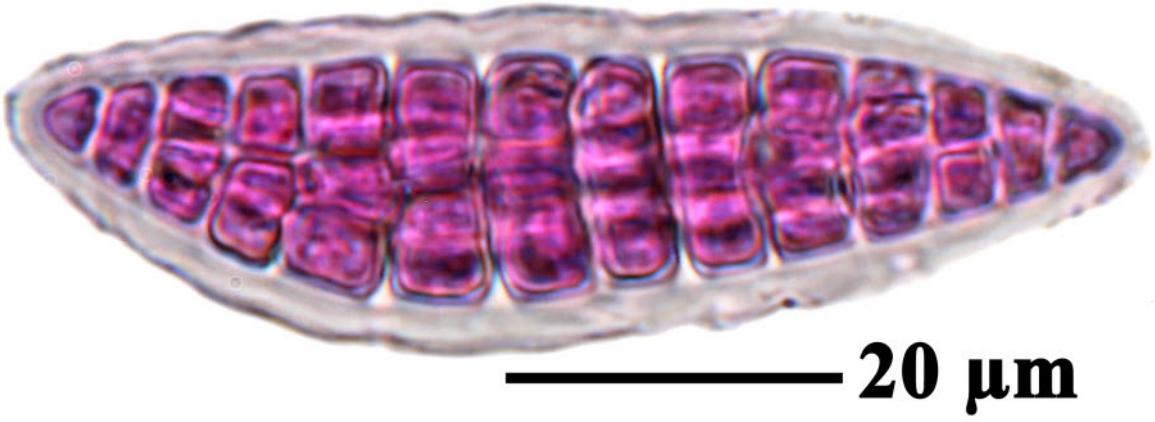




Bathelium mastoideum







Bathelium mastoideum

Bathelium nigroporum (Makhija & Patw.) Aptroot & Lücking, Lichenologist 48(6): 900 (2016)

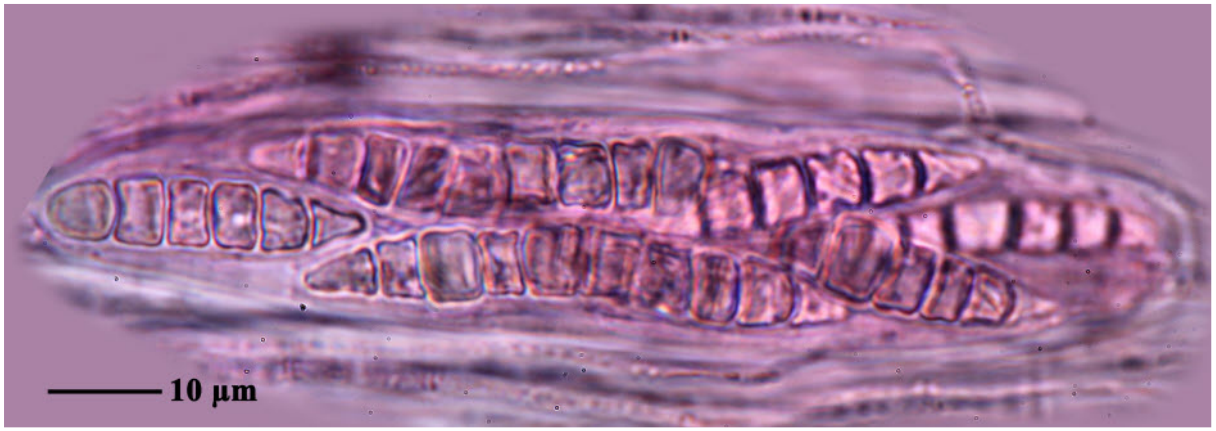
= *Trypethelium nigroporum* Makhija & Patw., J. Hattori bot. Lab. 73: 202 (1993)

Thallus corticate, olive-green to yellowish brown, smooth to uneven. Ascomata trypethelioid, with apical ostioles, solitary to irregularly confluent, 0.7–1.0 mm diam., prominent to sessile, blackish brown, internally with orange-brown, dusty granular pigment. Hamathecium clear. Ascospores 8/ascus, 5–9-septate, fusiform, 30–40 × 6–9 µm, hyaline, IKI-. Chemistry: Thallus UV-, K-; ascomata UV-, internally K+ red, with anthraquinone.

[AMH77], India, Nagaland, Dimapur-Kohima Road. Leg. Padwardhan (no 77) & Nagarkar, 7.11.1977. ISOTYPE of *Trypethelium nigroporum.*









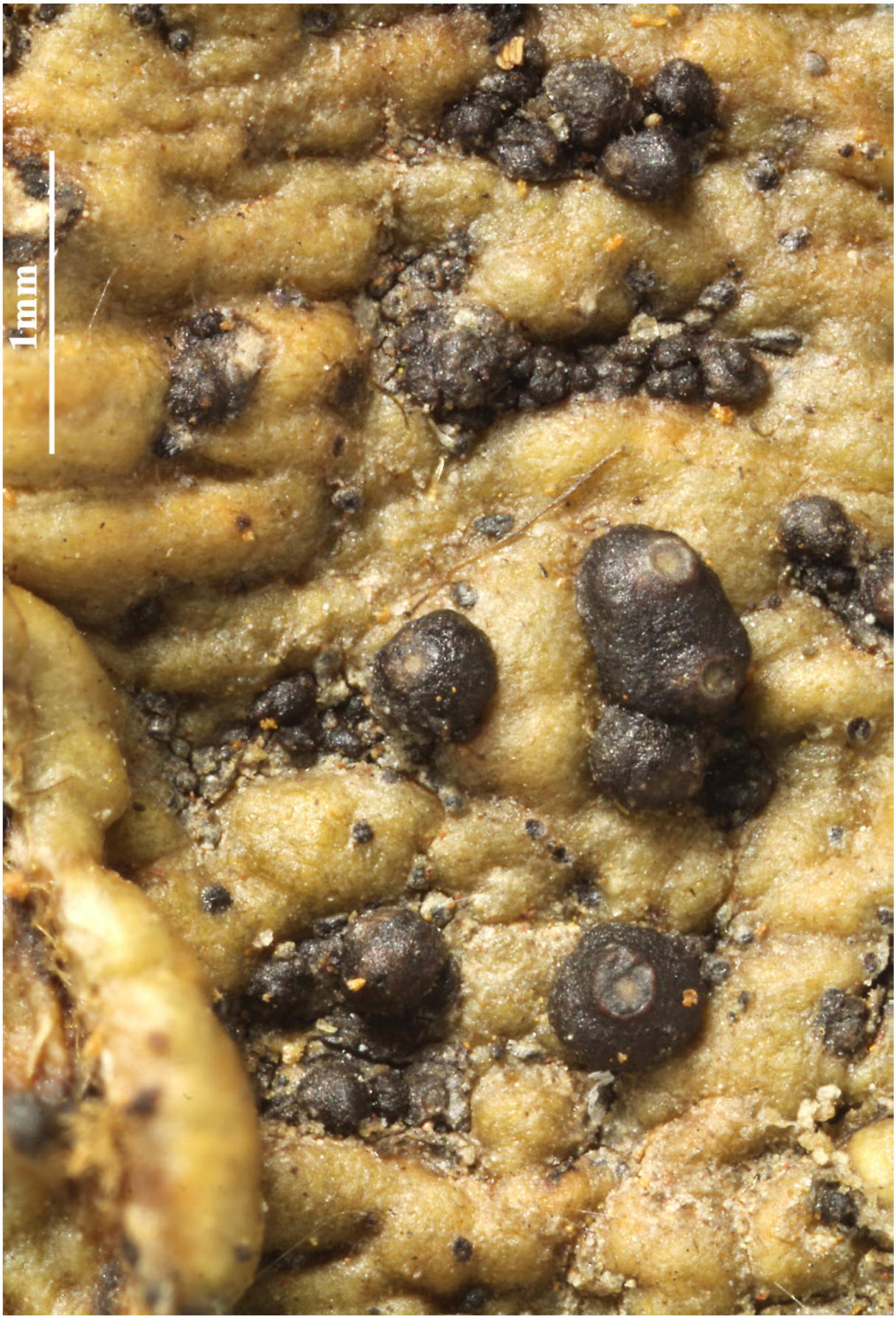
Bathelium nigroporum

Bathelium porinosporum Lücking, M.P. Nelsen & Gueidan, in Lücking, Nelsen, Aptroot, Benatti, Binh, Gueidan, Gutiérrez, Jungbluth, Lumbsch, Marcelli, Moncada, Naksuwankul, Orozco, Salazar-Allen & Upreti, Lichenologist 48(6): 655 (2016)

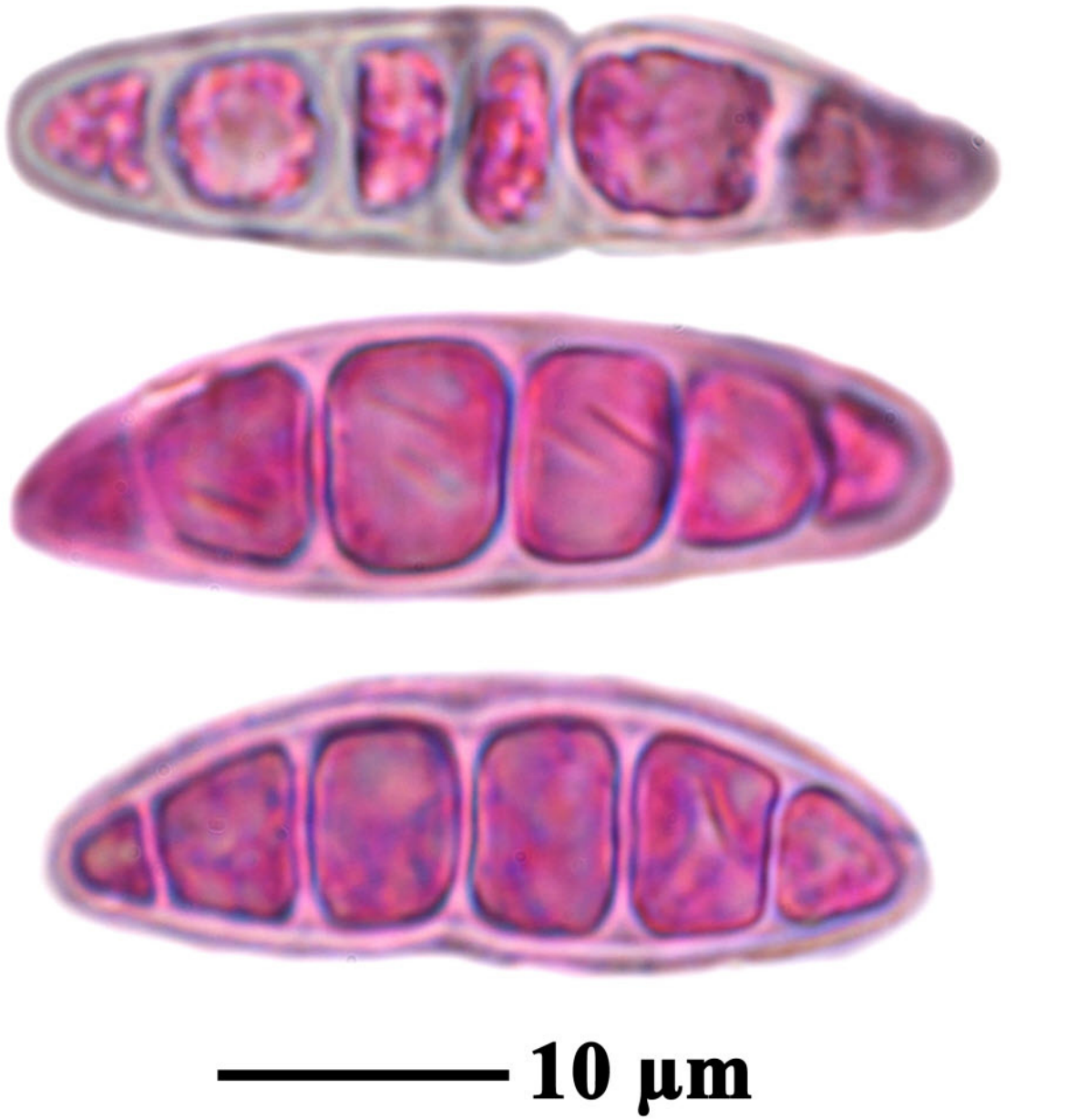
Thallus crustose, corticolous, continuous, smooth to uneven, light olive; in section with thick, cartilagineous cortex and irregular photobiont layer immersed in the periderm. Ascomata solitary, sessile with constricted base, with apical ostiole, lacking thalline cover, applanately subglobose, dark reddish brown, 0.4–0.5 mm wide and 0.25–0.30 mm high; ostiolar area flattened, appearing as a grey-brown spot often separated by a thin slit. Hamathecium composed of densely anastomosing, 0.5 µm thick, net-like paraphyses embedded in a gelatinous matrix, clear, IKI-; ostiolar channel clear. Ascospores 8/ascus, fusiform, 3–5-septate (eusepta only), 20–30 × 6–7 µm, hyaline, IKI-.

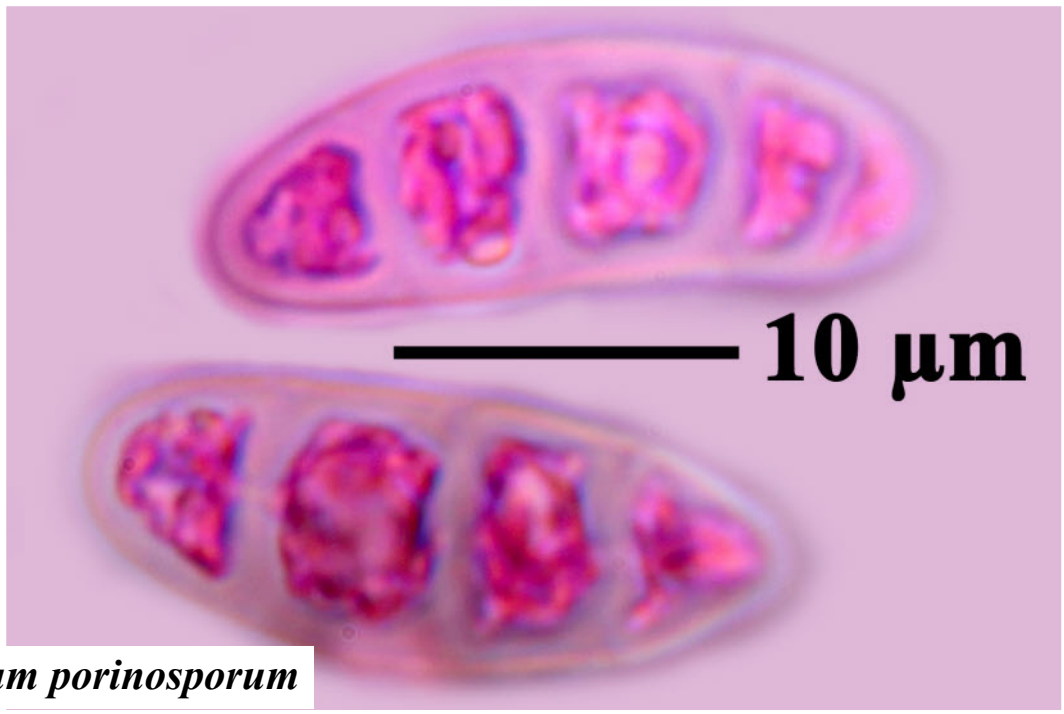
[CG3018], Vietnam, Western Highlands, Dong Nai province, Cát Tiên National Park, on small road heading South of the accomodation area (5), on *Dipterocarps* planted along the road. Leg. C. Gueidan (no CG3018, dupl. of BM000980119), 11.2.2012, det. A. Aptroot, 2019.





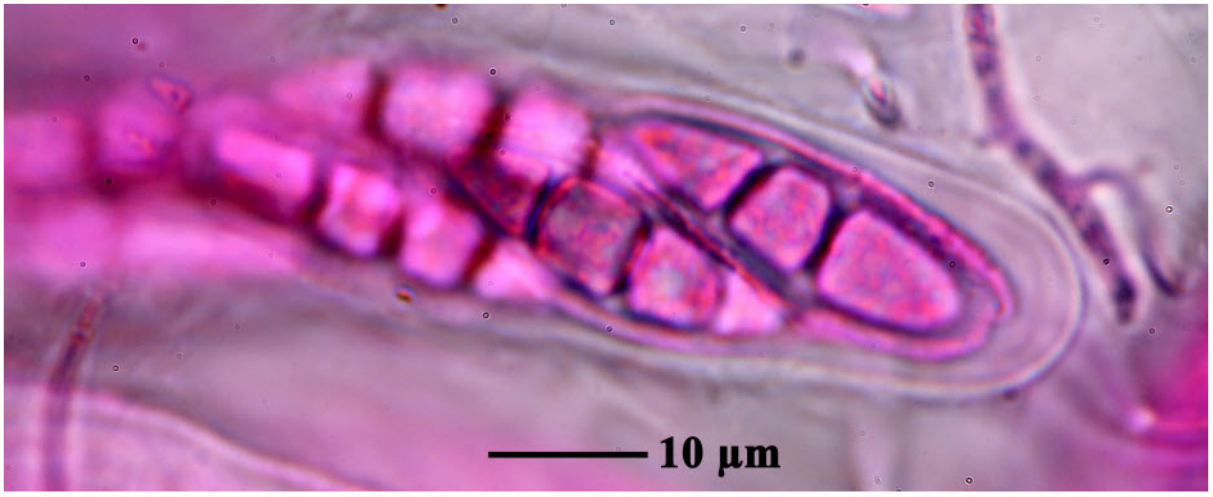
Bathelium porinosporum





Bathelium porinosporum





Bathelium porinosporum

Bathelium porinosporum Lücking, M.P. Nelsen & Gueidan, in Lücking, Nelsen, Aptroot, Benatti, Binh, Gueidan, Gutiérrez, Jungbluth, Lumbsch, Marcelli, Moncada, Naksuwankul, Orozco, Salazar-Allen & Upreti, Lichenologist 48(6): 655 (2016)

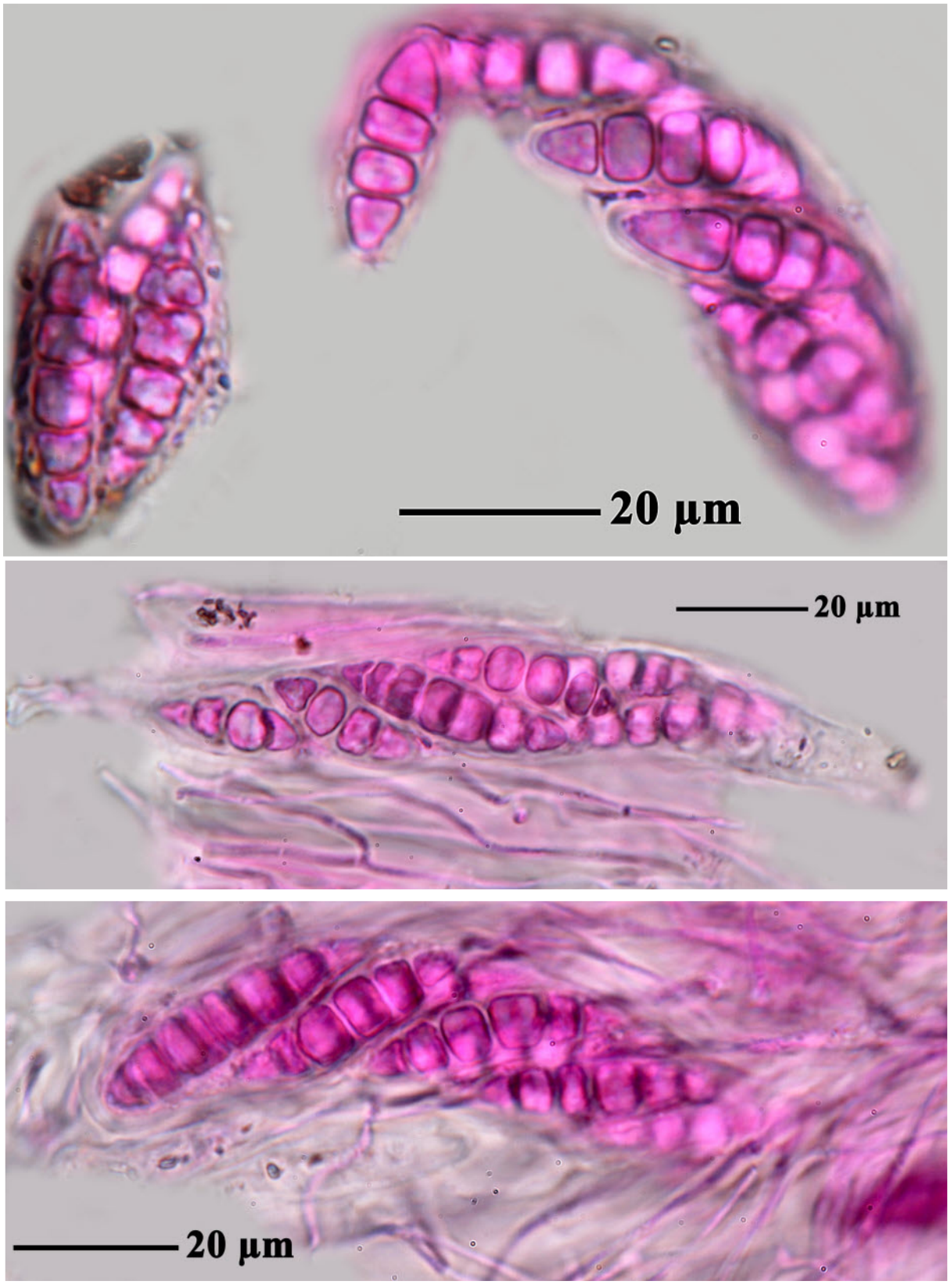
Thallus crustose, corticolous, continuous, smooth to uneven, light olive. Perithecia solitary, sessile with constricted base, with apical ostiole, lacking thalline cover, applanately subglobose, dark reddish brown. 0.4–0.5 mm wide, grey-brown spot often separatedby a thin slit. Excipulum in section 30–50 µm thick, carbonized, laterally covered by amorphous, orange-brown tissue and what appears to be a carbonized cortex. Hamathecium composed of densely anastomosing, 0.5 µm thick, net-like paraphyses embeded in a gelatinous matrix, clear, IKI-; ostiolar channel clear. Ascospores 8/ascus, fusiform, 3–5-septate (eusepta only), 20–30 × 6–7 µm, hyaline, IKI-. Chemistry: Perithecial wall with a thinly dispersed, reddish brown pigment that bleeds first deep yellow, then deep orange to cinnabar red.

[Gueidan3055], Vietnam, Tuyen Quang prov., Na Hang nature reserve, on trees in the forest. Leg. C. Gueidan (no 3055), 26. 02.2011, det. A. Aptroot, 2013. (Duplicate ex BM000980112)





Bathelium porinosporum

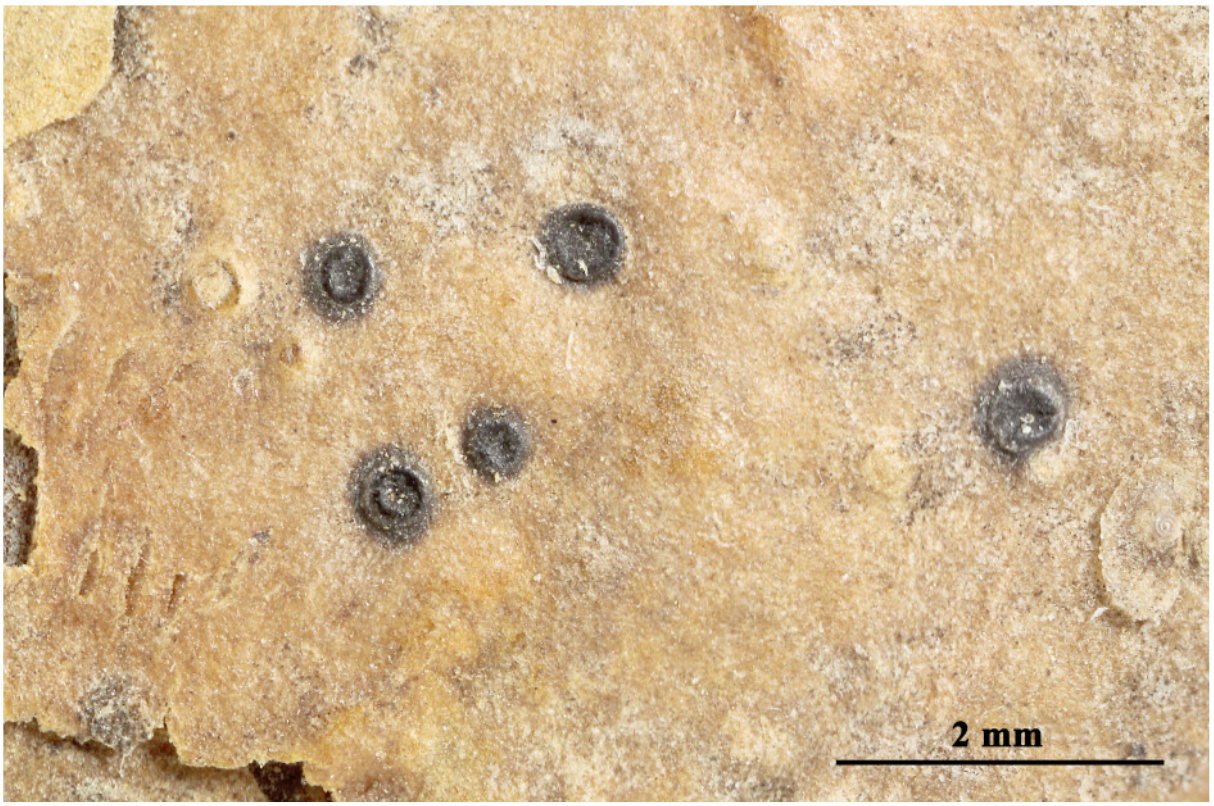


Bathelium porinosporum

Blastodesmia nitida A. Massal., Ric. auton. lich. crost. (Verona): 180 (1852).
= *Arthopyrenia epidermidis* var. *pluriseptata* (Nyl.) Boistel, Nouv. Fl. Lich. 2: 279 (1903).
= *Arthopyrenia pluriseptata* (Nyl.) Arnold, Ber. bayer. bot. Ges. 1(Anhang): 118 (1891).
= *Cercidospora pluriseptata* (Nyl.) Arnold, Flora, Regensburg 57(10): 154 (1874).
= *Metasphaeria pluriseptata* (Nyl.) Sacc. & D. Sacc., Syll. fung. (Abellini) 17: 707 (1905).
= *Polyblastia nitida* (A. Massal.) Trevis., Spighe Paglie: 15 (1853).
= *Verrucaria massalongoi* Garov. [as 'massalongii'], Tentam. Dispos. Lich. Langob.: 134, tab. VIII, fig. 3 (1865).
= *Verrucaria pluriseptata* Nyl., Act. Soc. linn. Bordeaux 21(4): 436 (1857) [1856].

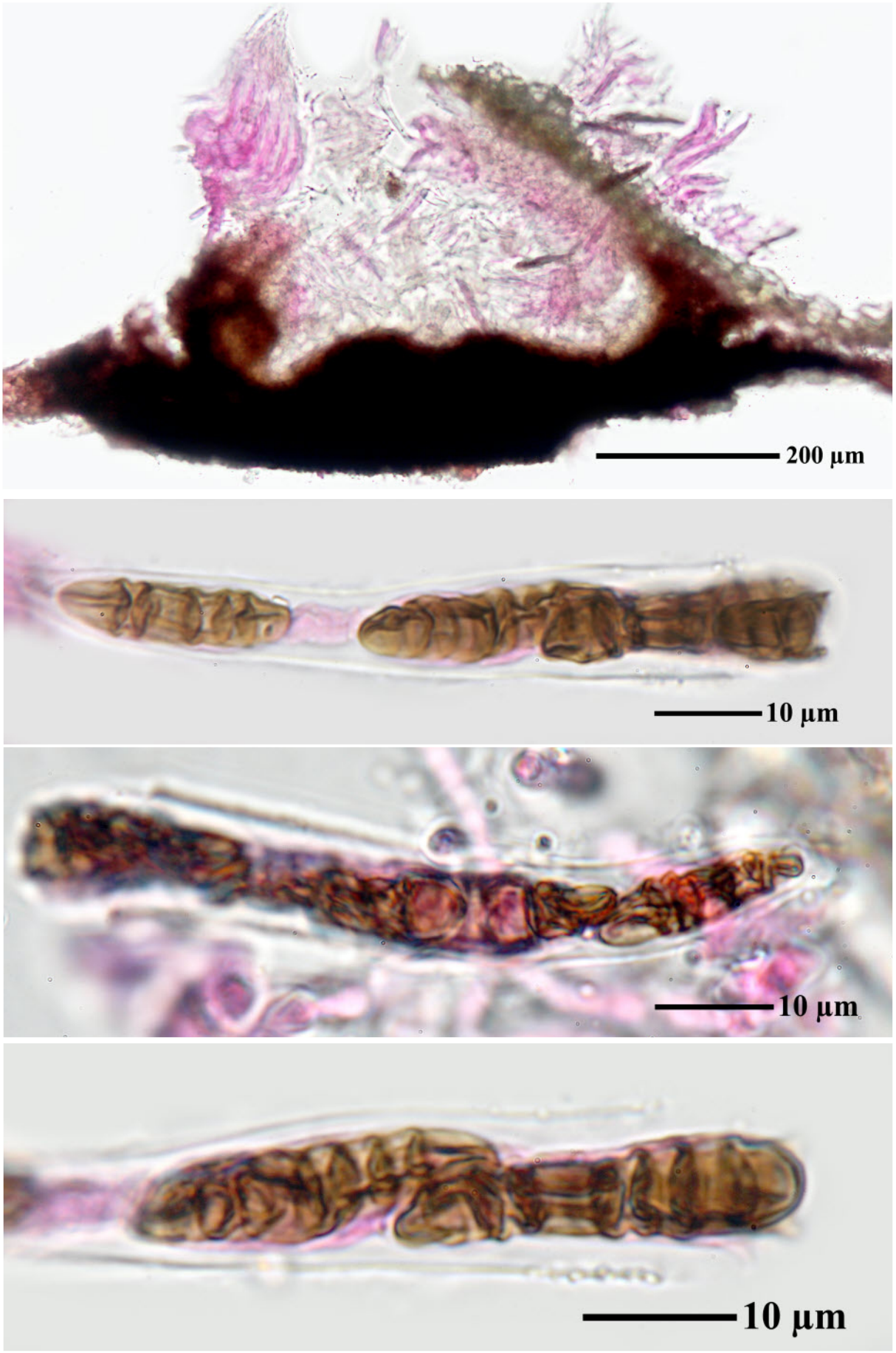
Thallus immersed, at most slightly decolouring the bark. Perithecia prominent, 0.3–0.5 mm diam., black, usually with caved in, concave top. Hamathecium filaments unbranched, 2–3 µm wide. Asci cylindrical. Ascospores brown, 5–7-euseptate, (25–)35–47 × 5–8 µm.

[Lettau], Italia, Gardasee, Sanico oberhalb Maderno, an Fraxinus, 250 m. Leg,. G. Lettau (Lettau s. nr.), 11.04.1905.

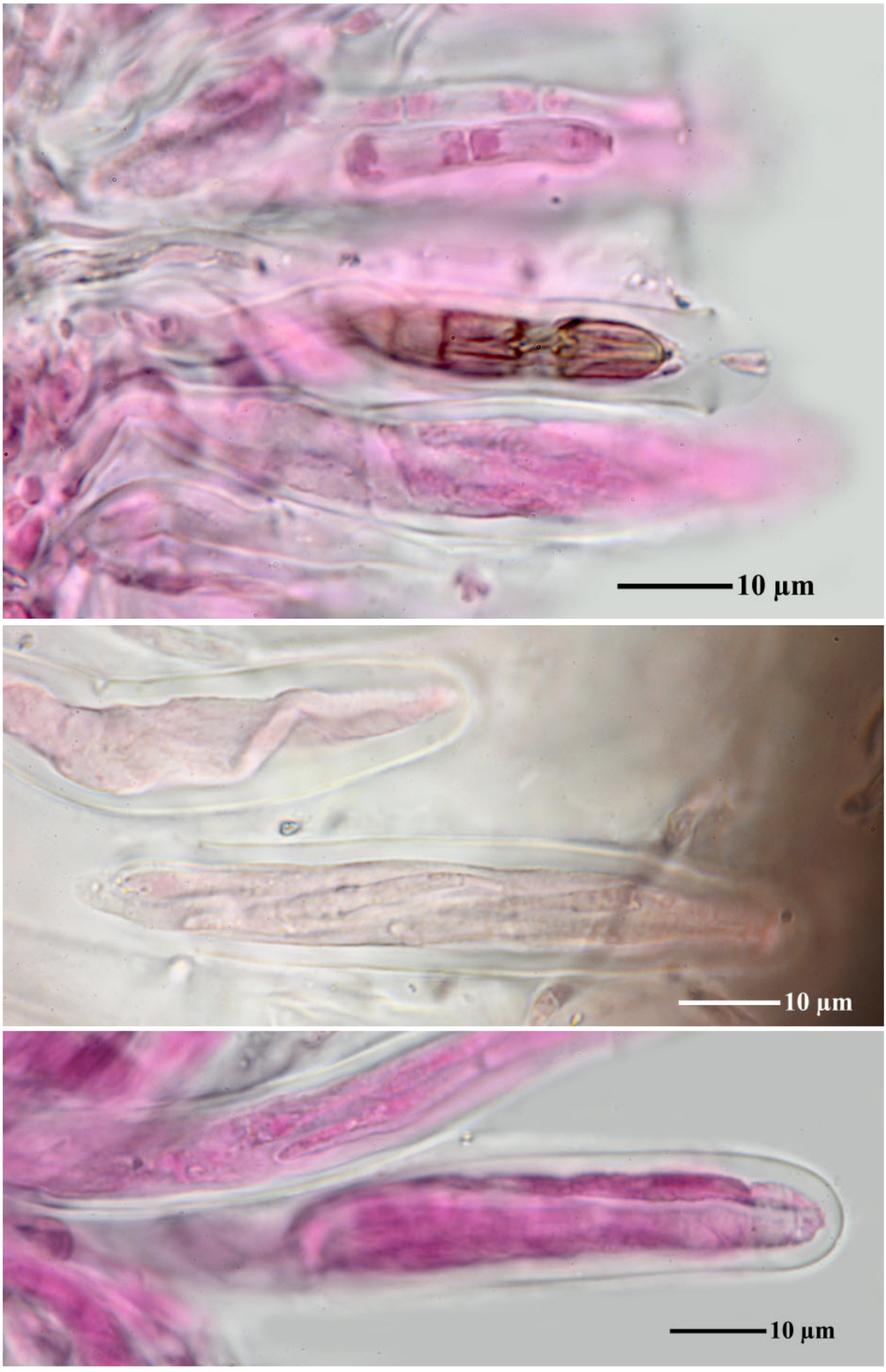




Blastodesmia nitida



Blastodesmia nitida



Blastodesmia nitida

Bogoriella apposita (Nyl.) Aptroot & Lücking, Lichenologist 48(6): 908 (2016)
= *Arthopyrenia apposita* (Nyl.) H. Olivier, Expo. Syst. Descr. Lich. Ouest Fr. 2: 258 (1902)
= *Microthelia apposita* (Nyl.) Müll. Arg., Flora, Regensburg 66: 272 (1883)
= *Mycomicrothelia apposita* (Nyl.) D. Hawksw., Bull. Br. Mus. nat. Hist., Bot. 14(2): 68 (1985)
= *Verrucaria apposita* Nyl., Annls Sci. Nat., Bot., sér. 4 20: 254 (1863)

Thallus whitish, without prothallus lines. Ascomata with apical ostioles, solitary, c. 0.4 mm diam and 0.15–0.20 mm high, erumpent. Wall 40–80 µm thick. Hamathecium clear. Ascospores (22–)24.0–28.0(–29.5) × (8.5–)9.0–11.5(–12.5) µm, 1(–3) septate, with larger upper locule, with attenuated ends, verruculose, reddish brown. Pynidia absent. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[Flakus19188], Bolivia, Santa Cruz, Cordillera, Pn Kaa-Iya del Gran Chaco, gasoducto Bolivia-Brasil, between Tucavaca colony and National Park border, Chiquitano forest, 18°31'40'' S, 60°41'26'' W, 314 m. Leg. A. Flakus (no 19188) & J. Quisbert, 4.12.2010, det. A. Aptroot.





Bogoriella apposita



Bogoriella apposita

Bogoriella collospora (Vain.) Aptroot & Lücking, Lichenologist 48(6): 908 (2016)
= *Melanotheca collospora* (Vain.) Zahlbr., Cat. Lich. Univers. 1: 479 (1922)
= *Mycomicrothelia collospora* (Vain.) Aptroot, in Kashiwadani, Aptroot & Moon, Biblthca Lichenol. 99: 249 (2009)
= *Pyrenula collospora* Vain., Bot. Mag., Tokyo 32: 162 (1918)

Thallus dark olive-brown, nearly absent. Ascomata with lateral, fused ostioles, 2–10 together in dense groups, exposed an black. Ascospores 8/ascus, brown, ellipsoid to clavate with rounded ends, granularly ornamented, 3-septate, 34–38 × 11–13 µm, wall not thickened but surrounded by a hyaline gelatinous sheath. Pycnidia absent. Chemistry: Thallus and ascomata UV-, K-. TLC: no substances detected.

[Tsunoda], Japan, Honshu, Mt. Akagisan. Leg. A. Tsunoda, det. A. Aptroot, 2007.



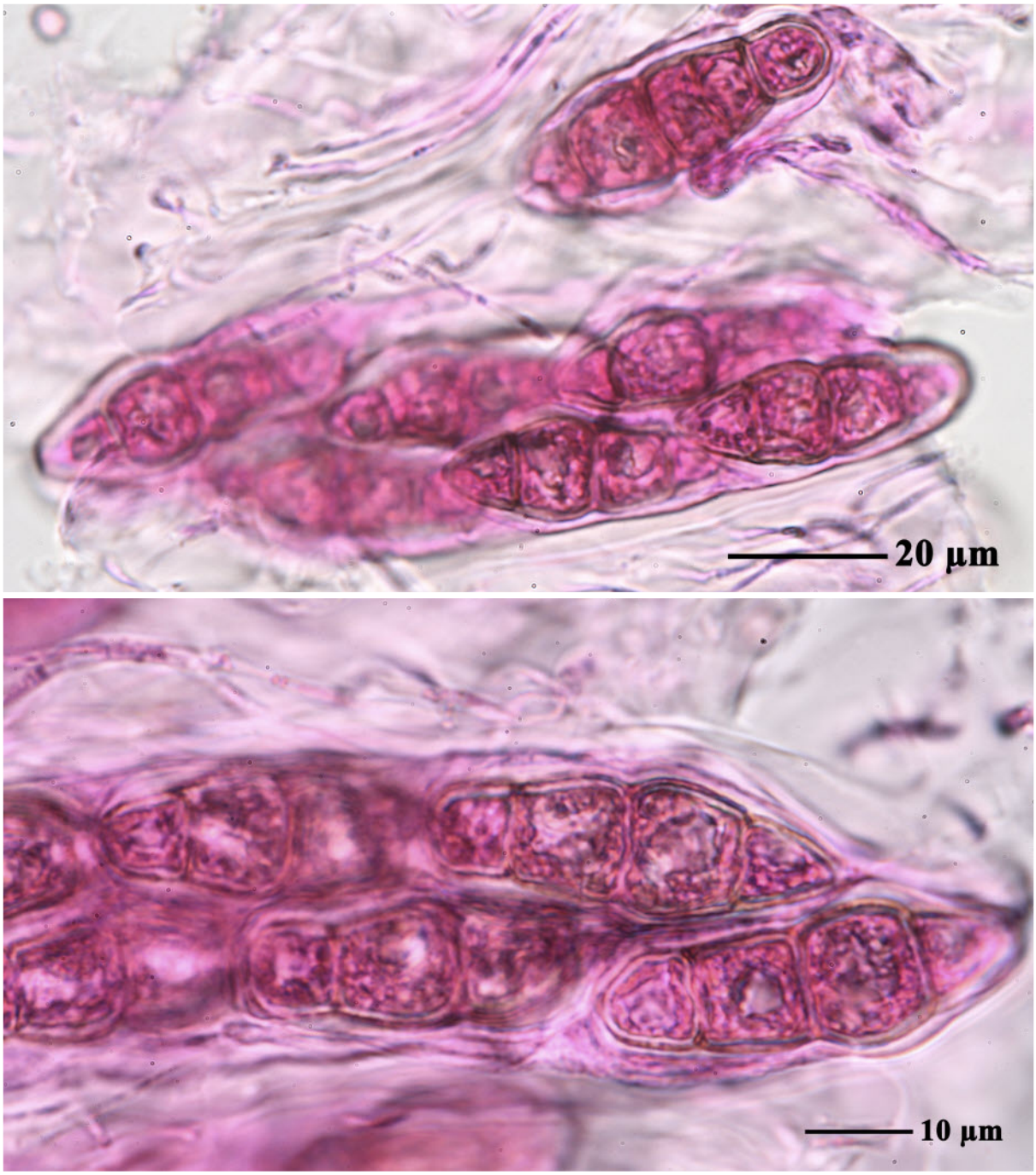


Bogoriella collospora





Bogoriella collospora

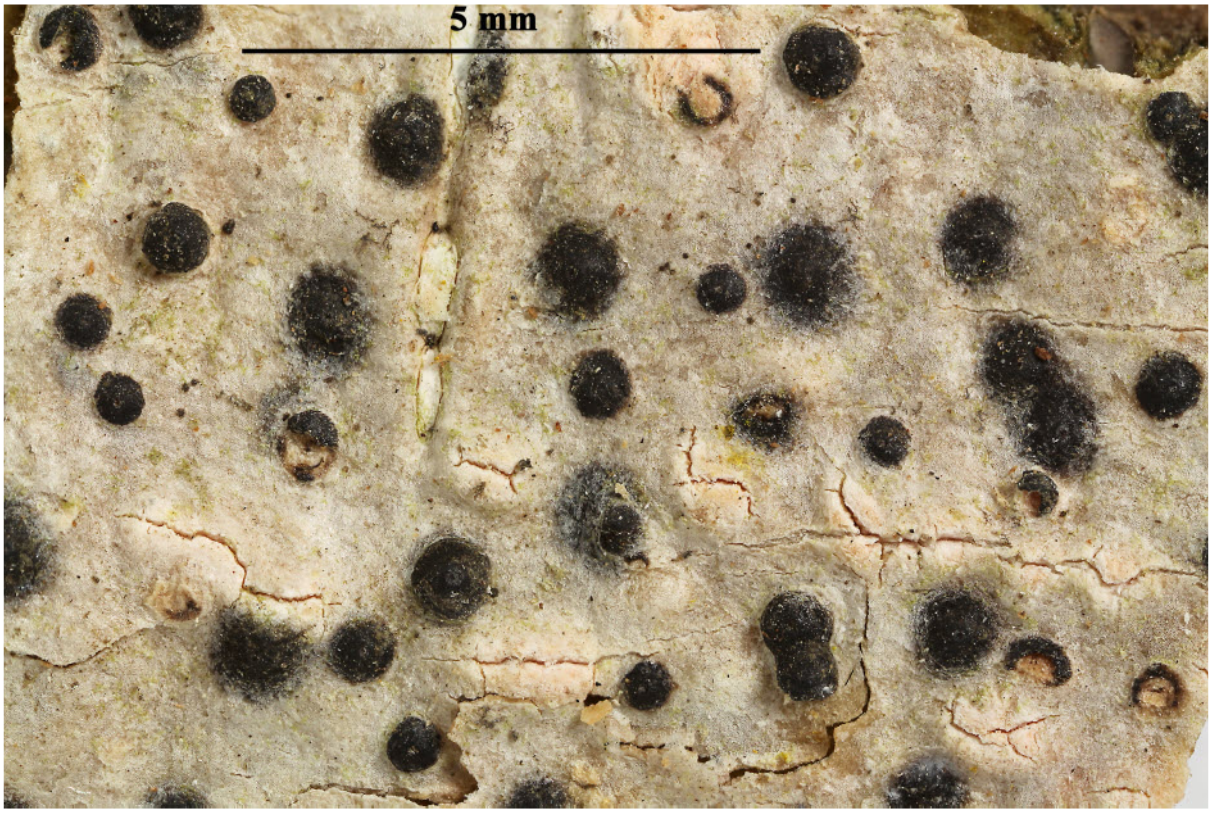


Bogoriella collospora

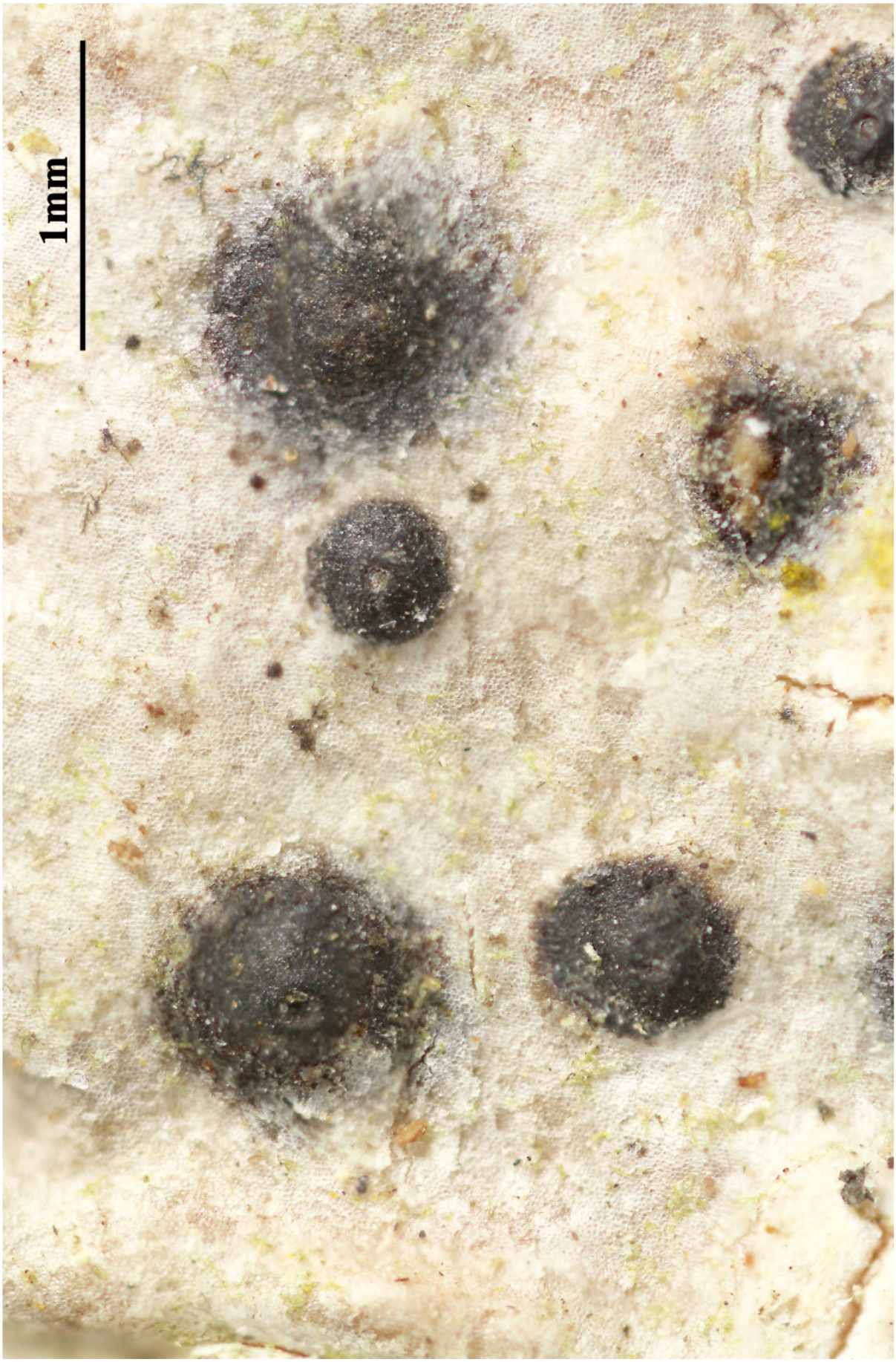
Bogoriella conothelena (Nyl.) Aptroot & Lücking, Lichenologist 48(6): 909 (2016)
= *Microthelia conothelena* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 258 (1921) [1922]
= *Mycomicrothelia conothelena* (Nyl.) D. Hawksw., Bull. Br. Mus. nat. Hist., Bot. 14(2): 81 (1985)
= *Verrucaria conothelena* Nyl., Annls Sci. Nat., Bot., sér. 5 7: 180 (1873)

Thallus pale brown, with dark prothallus lines. Ascomata with apical ostioles, solitary. c. 0.4 mm diam. and 0.20–0.25 mm high. Wall 30–50 (–70 below) µm thick. Ascospores 19–23(–27) × (7.5–)9.0-11.0(–12.0) µm, with larger upper locule, with rounded ends, verruculose, golden brown. Pycnidia absent. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[Weerakoon], Sri Lanka, Eastern Province, Ampara, leg. G. Weerakoon (s.n.), 2013, det. A. Aptroot, 2013.







Bogoriella conothelena

Bogoriella decipiens (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 909 (2016)
= *Anthracothecium decipiens* Müll. Arg., Bot. Jb. 6: 415 (1885)
= *Mycomicrothelia decipiens* (Müll. Arg.) R.C. Harris, Mem. N. Y. bot. Gdn 49: 78 (1989)
= *Ornatopyrenis muriformis* Aptroot, in Aptroot et al., Biblioth. Lichenol. 64: 123 (1997). B! Holotype.

Thallus brownish to whitish, with dark prothallus lines. Ascomata with apical ostioles, solitary, 0.7–0.9 mm diam., with wide fringe. Asci 100 × 28 µm. Ascospores 4–8 × 2– loculate, 25–35 × 12–15 µm, with rounded ends, smooth, grey. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[Sipman35978], Papua New Guinea, Madang prov., Gogol valley, c. 30 km W of Madang. Tgubi logging site, floodplain forest along Gogol river,145°28’ E, 5°08’ S, 125 m. Leg. H. Sipman (no 35978), 13.08.1992, det. A. Aptroot.





Bogoriella decipiens







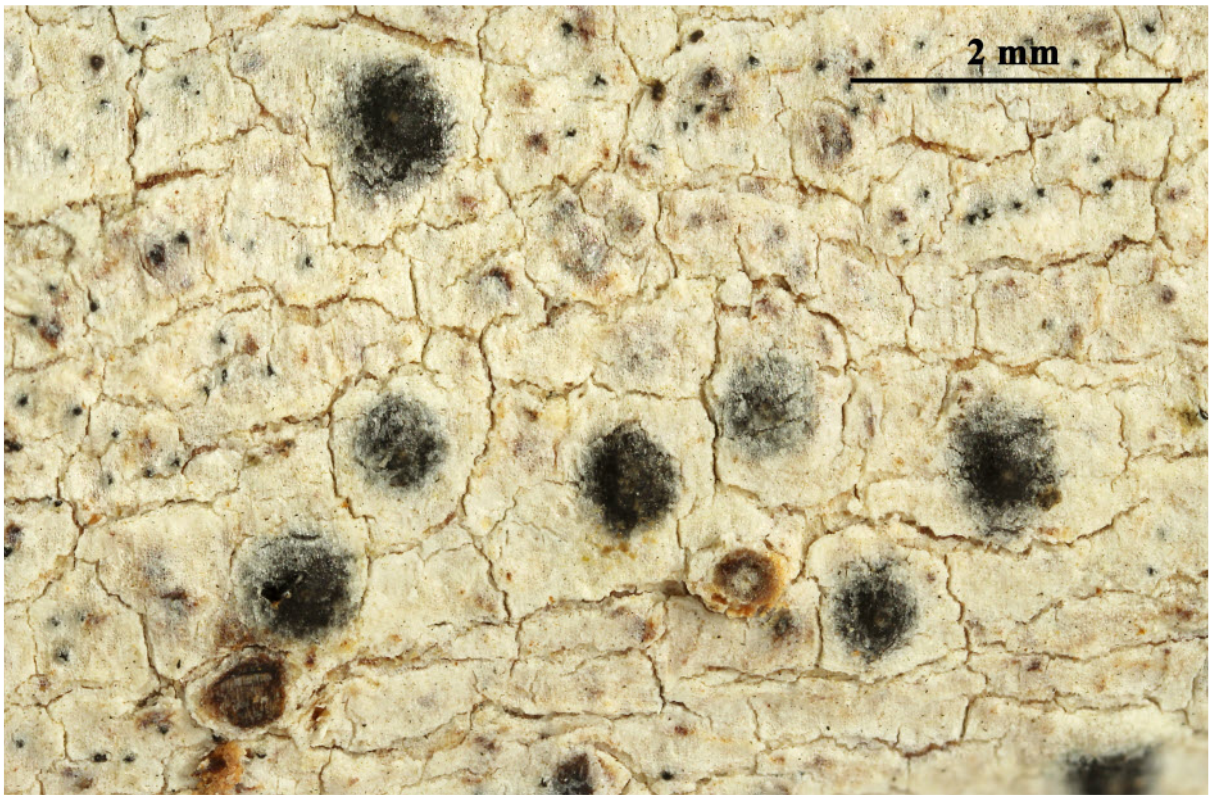
Bogoriella decipiens

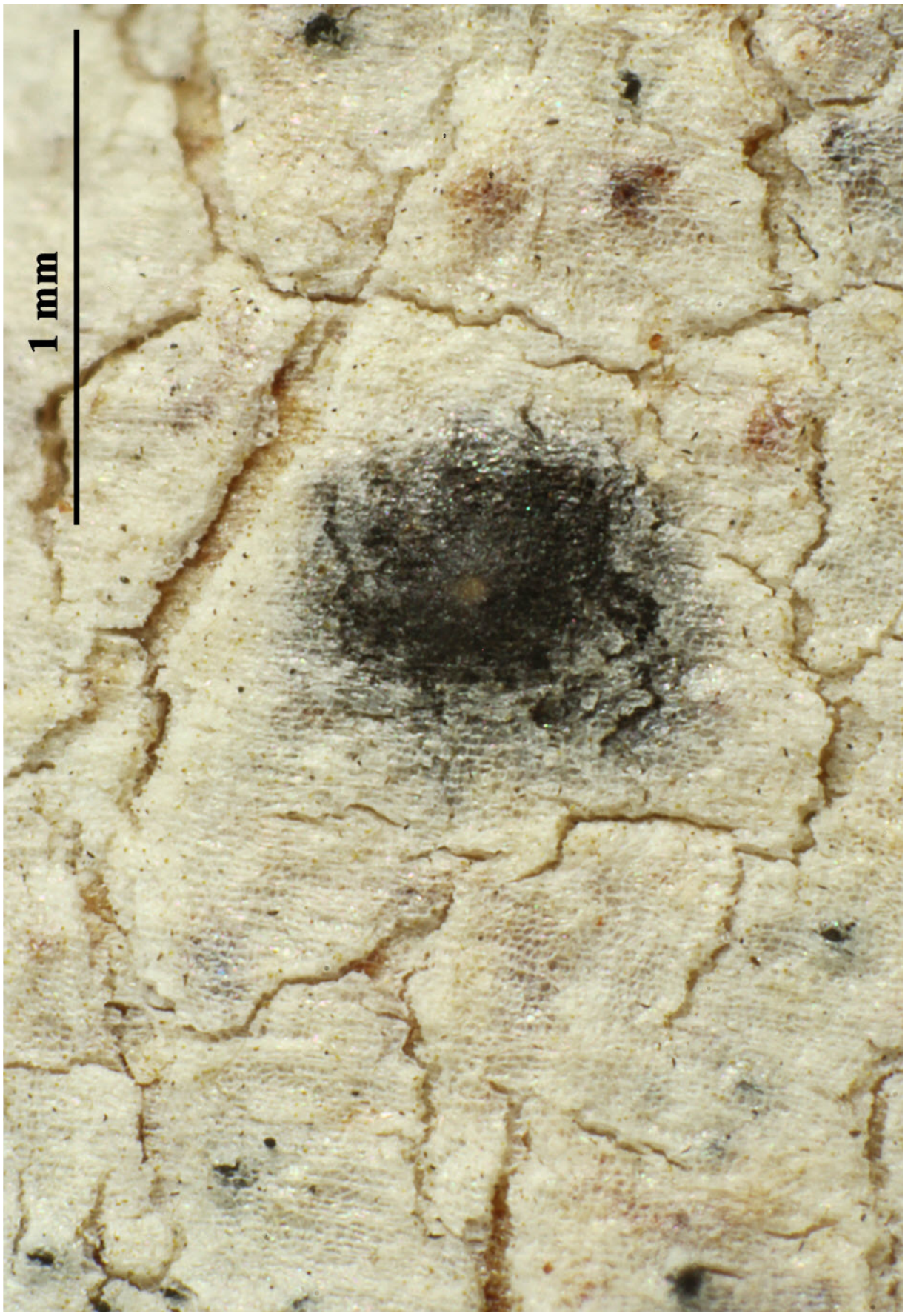
Bogoriella megaspora (Aptroot & M. Cáceres) Aptroot & Lücking, Lichenologist 48(6): 912 (2016)

= *Mycomicrothelia megaspora* Aptroot & M. Cáceres, Lichenologist 45(6): 768 (2013)

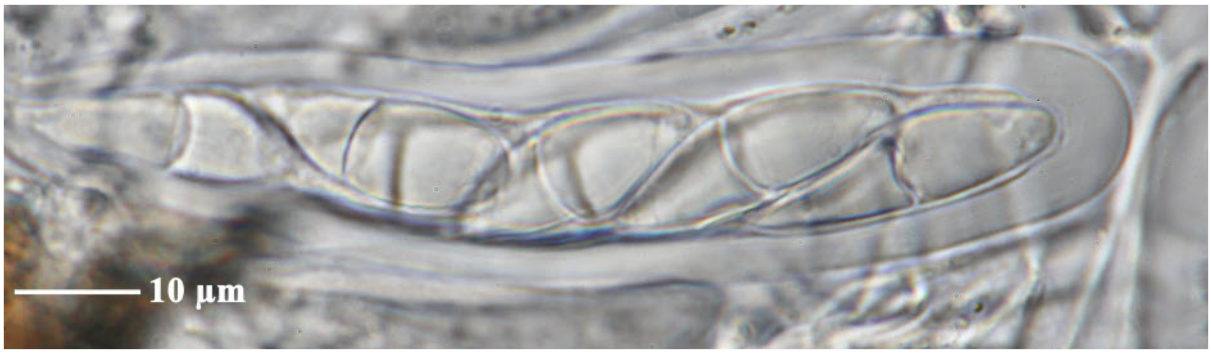
Thallus pinkish to whitish grey, smooth to uneven, surrounded by a black prothallus line. Ascomata with apical ostioles, solitary, 0.5–0.9 mm diam., erumpent to prominent, conical, exposed and black. Hamathecium clear, hyaline. Ascospores 8 per ascus, 1-septate, clavate, often constricted at the septum, 27–40 × 8–12 µm, brown, often surrounded by a gelatinous layer 6–15 µm thick. Pycnidia not observed. Chemistry: Thallus and ascomata UV−, K−. TLC: no substances detected.

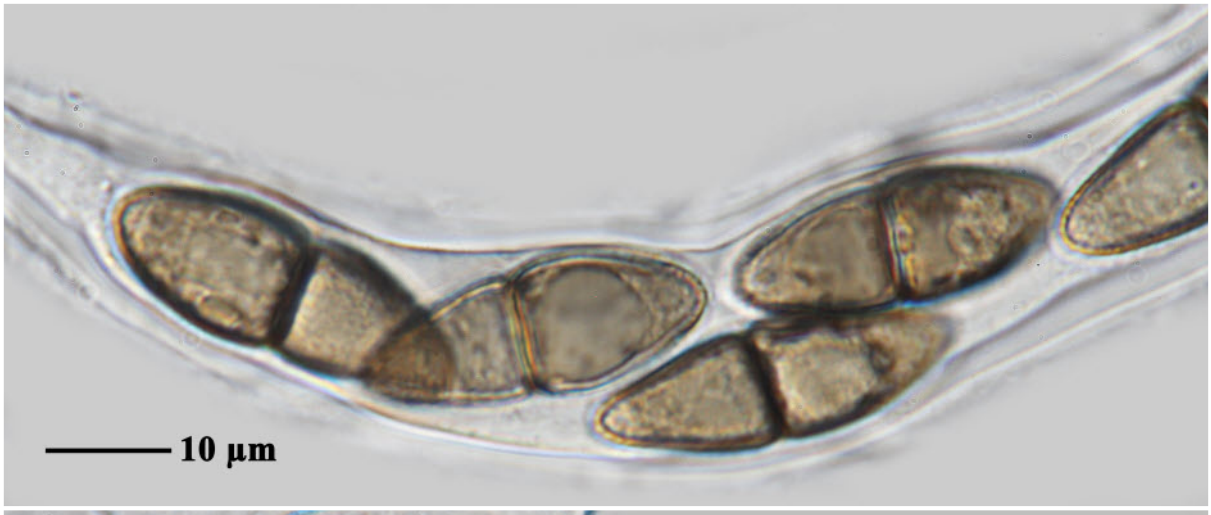
[ABL11920], Brazil, Amazonas, Fazenda São Francisco off BR319, 30 km N of Porto Velho, 8°24’33’’ S, 63°58’,56’’ W, c. 100 m, on tree bark in primary rain forest. Leg. M. Cáceres & A. Aptroot (no 11920), 15.3.2012, det. A. Aptroot 2012.



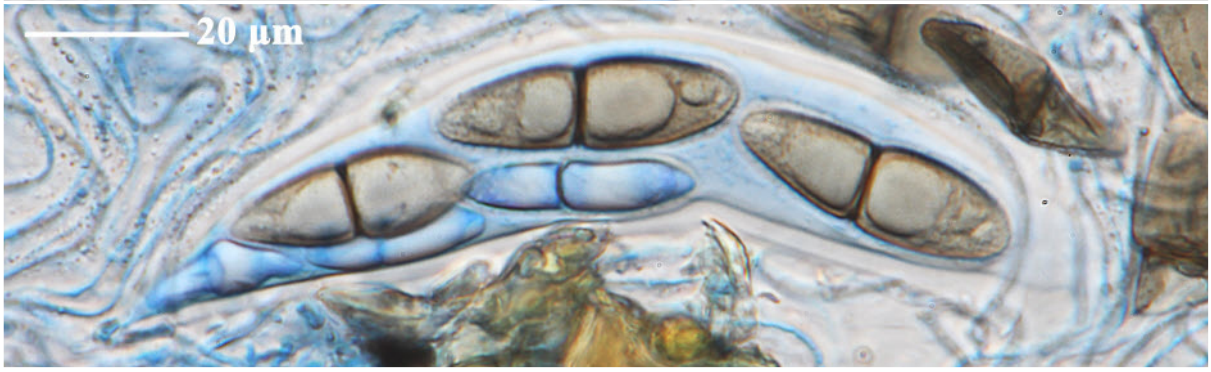


Bogoriella megaspora









Bogoriella megaspora



Bogoriella megaspora

Bogoriella megaspora (Aptroot & M. Cáceres) Aptroot & Lücking, Lichenologist 48(6): 912 (2016)

= *Mycomicrothelia megaspora* Aptroot & M. Cáceres, Lichenologist 45(6): 768 (2013)

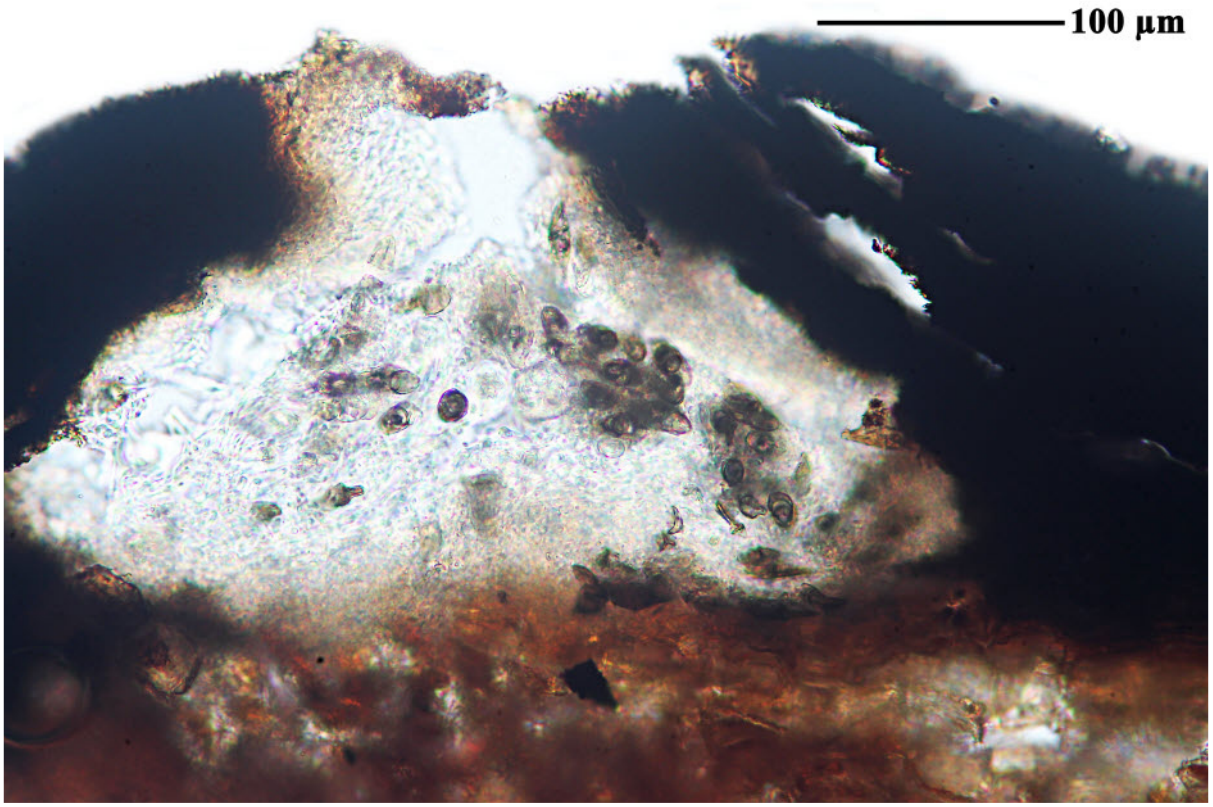
Thallus pinkish to whitish grey, smooth to uneven, surrounded by a black prothallus line. Ascomata with apical ostioles, solitary, 0.5–0.9 mm diam., erumpent to prominent, conical, exposed and black. Hamathecium clear, hyaline. Ascospores 8 per ascus, 1-septate, clavate, often constricted at the septum, 27–40 × 8–12 µm, brown, often surrounded by a gelatinous layer 6–15 µm thick. Pycnidia not observed. Chemistry: Thallus and ascomata UV−, K−. TLC: no substances detected.

[ABL15747], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 NNE of Porto Velho. Leg. M. Cáceres & Aptroot (no 15747), det. A. Aptroot. 2012. ISOTYPE.





Bogoriella megaspora





Bogoriella megaspora

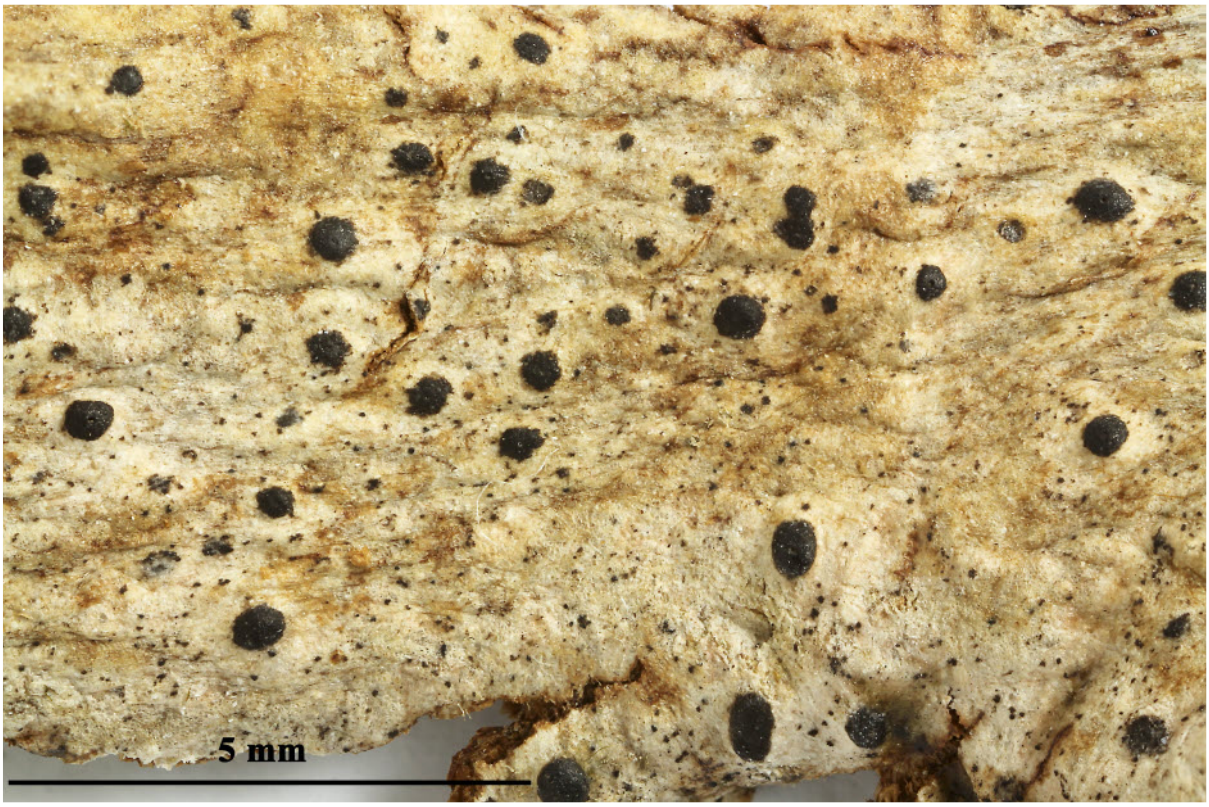


Bogoriella megaspora

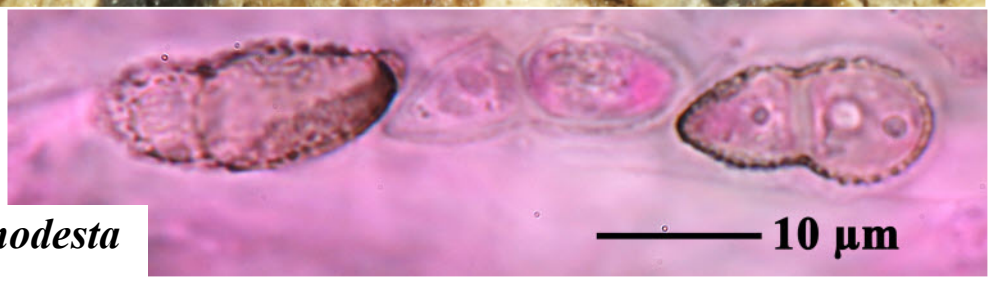
Bogoriella modesta (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 913 (2016)
= *Microthelia modesta* Müll. Arg., Bull. Herb. Boissier 2: 93 (1894)
= *Mycomicrothelia modesta* (Müll. Arg.) D. Hawksw., Bull. Br. Mus. nat. Hist., Bot. 14(2): 104 (1985)

Thallus olivaceous, without prothallus lines. Ascomata with apical ostioles, solitary, 0.2–0.4 mm diam. Asci 63–67 × 17–20 µm. Ascospores (17.5–)19.0–22.0(–23.0) × (8.0–)8.5–10.0(–10.5) µm, with equal locules or slightly larger upper locule, with rounded ends, verruculose, olive brown. Pycnidia absent. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

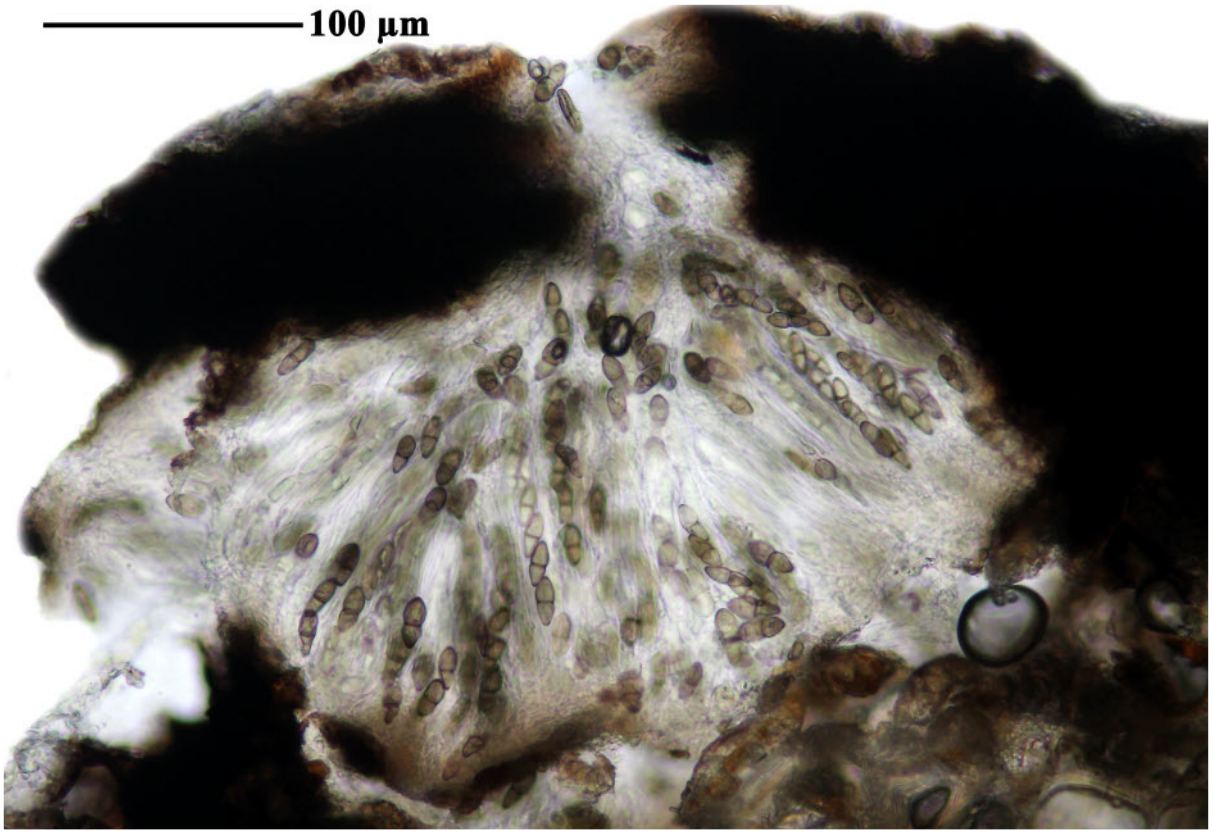
[ABL60600], Costa Rica, Prov. Guancaste, Volcán Tenerio National Park, 15 km NNW of Tilarán, Alto Maso, 85°00’ W, 10°37’ N, 950-1000 m. On tree in disturbed elfin forest near Tierras Morenas. Leg. A. Aptroot (no 60600), 17.03.2004, det. A. Aptroot, 2004.

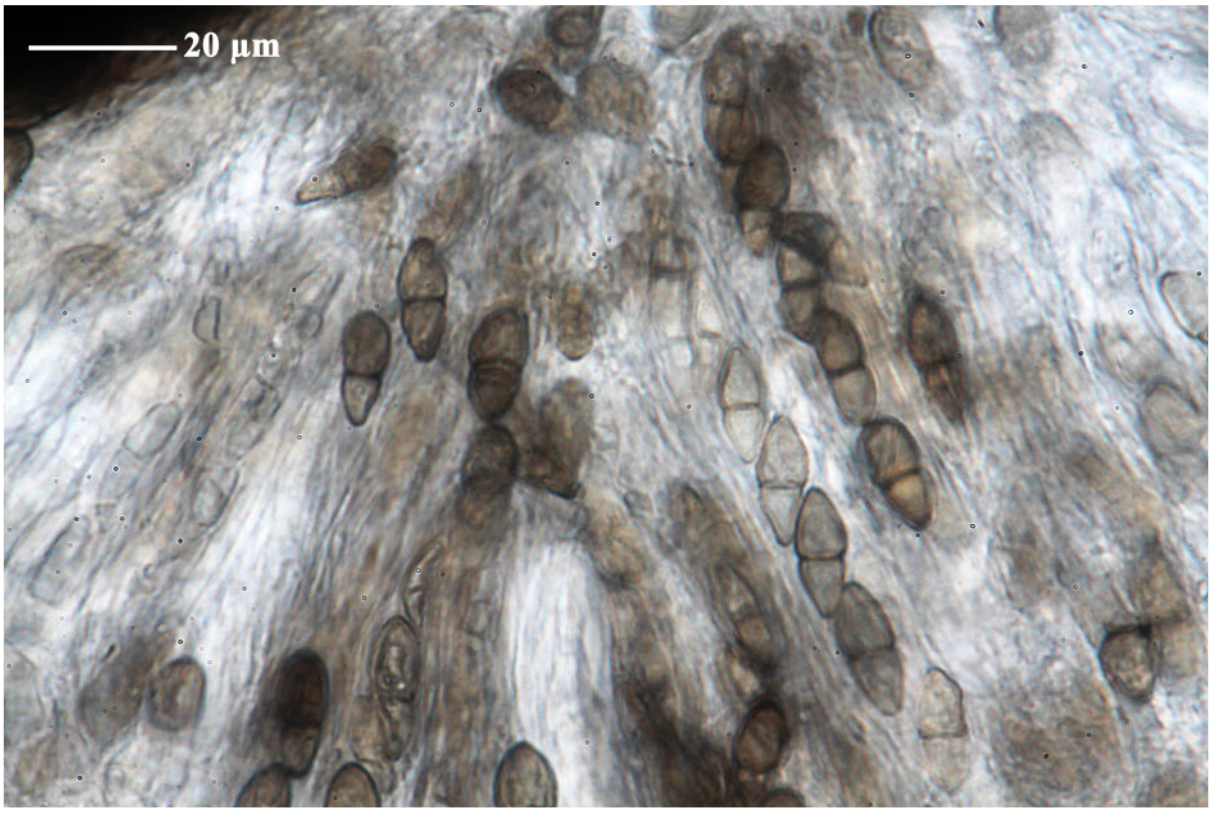






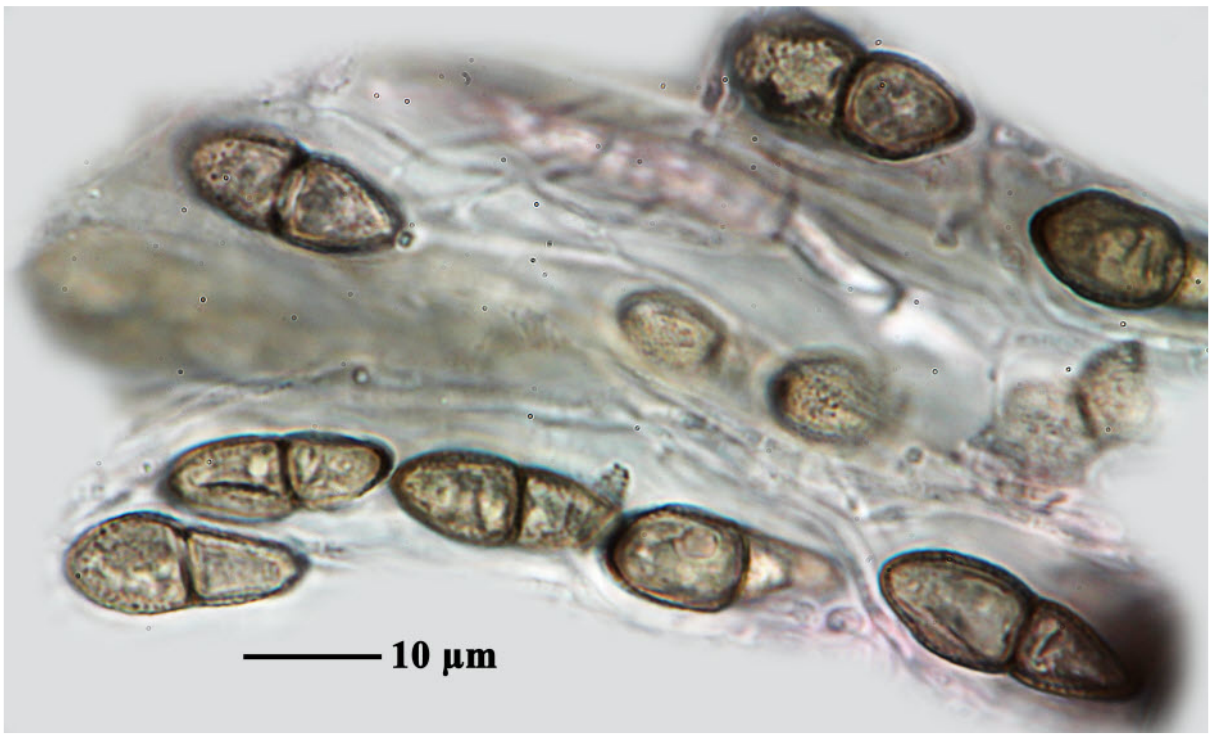
Bogoriella modesta





Bogoriella modesta





Bogoriella modesta

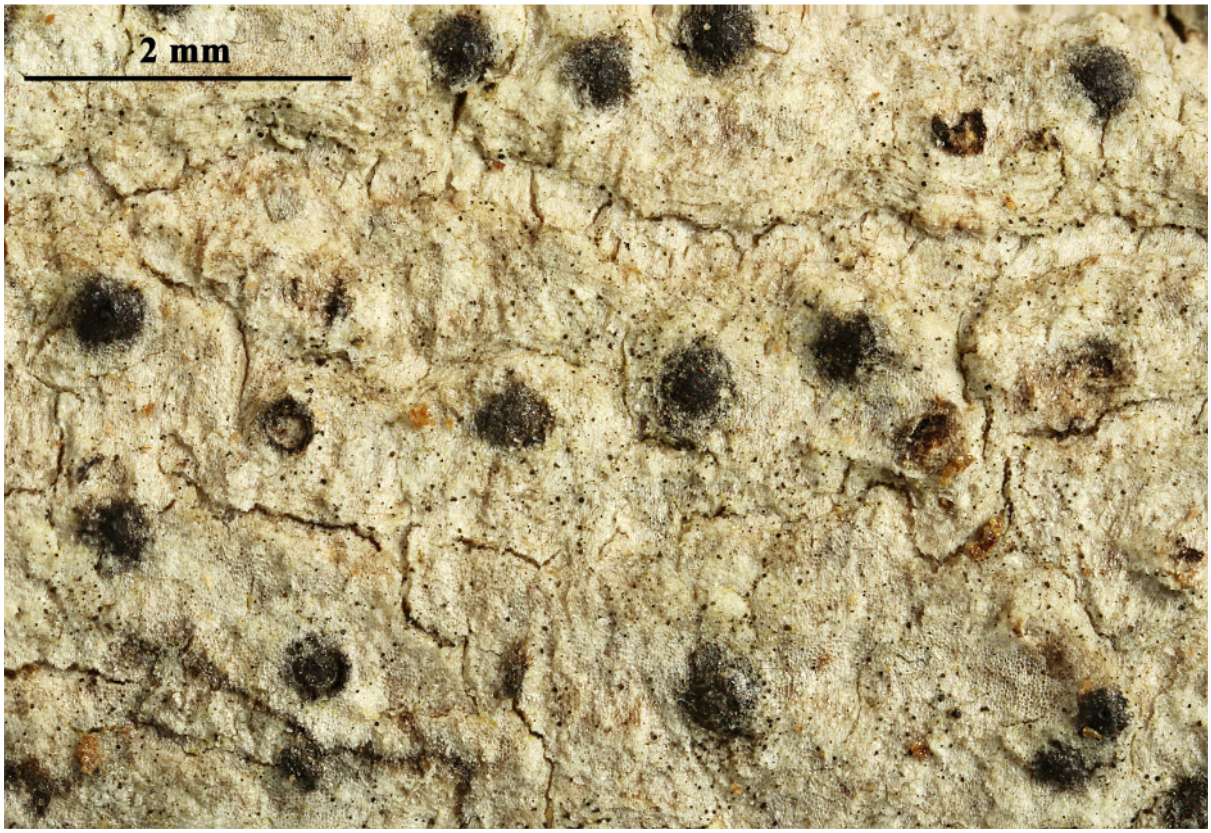
Bogoriella oleosa (Aptroot) Aptroot & Schumm comb. nov. Mycobank no. 841223

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

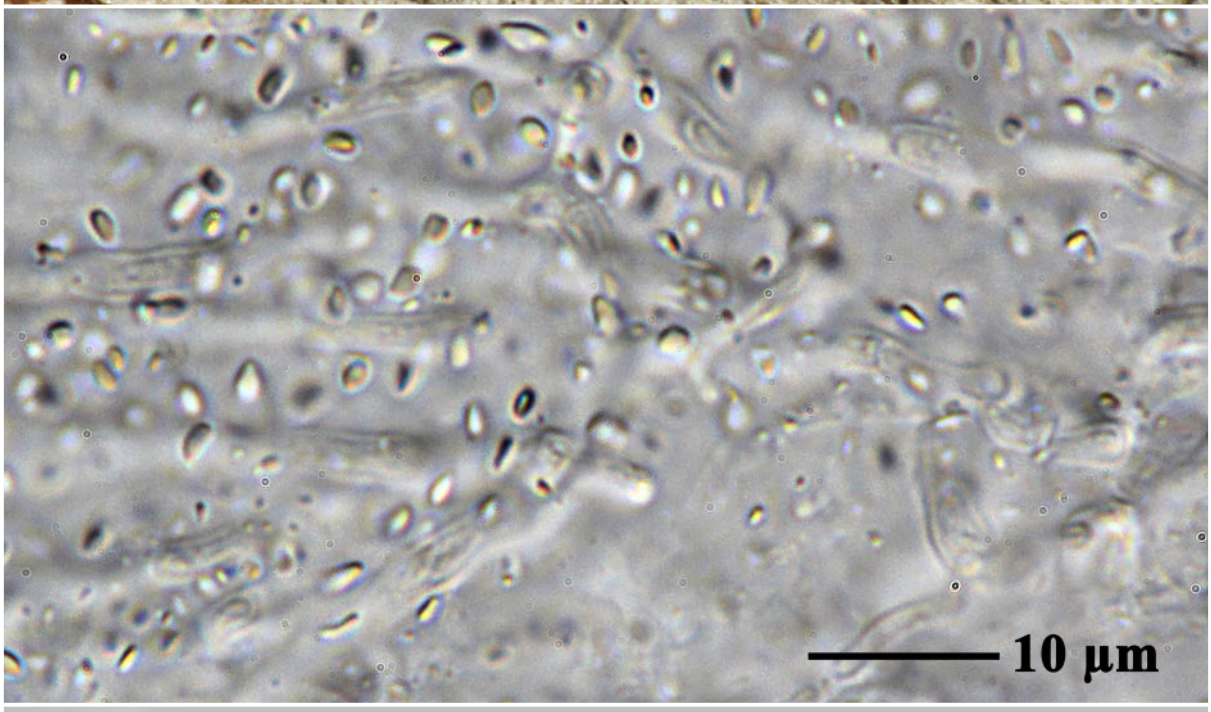
= *Mycomicrothelia oleosa* Aptroot, Biblthca Lichenol. 44: 133 (1991)

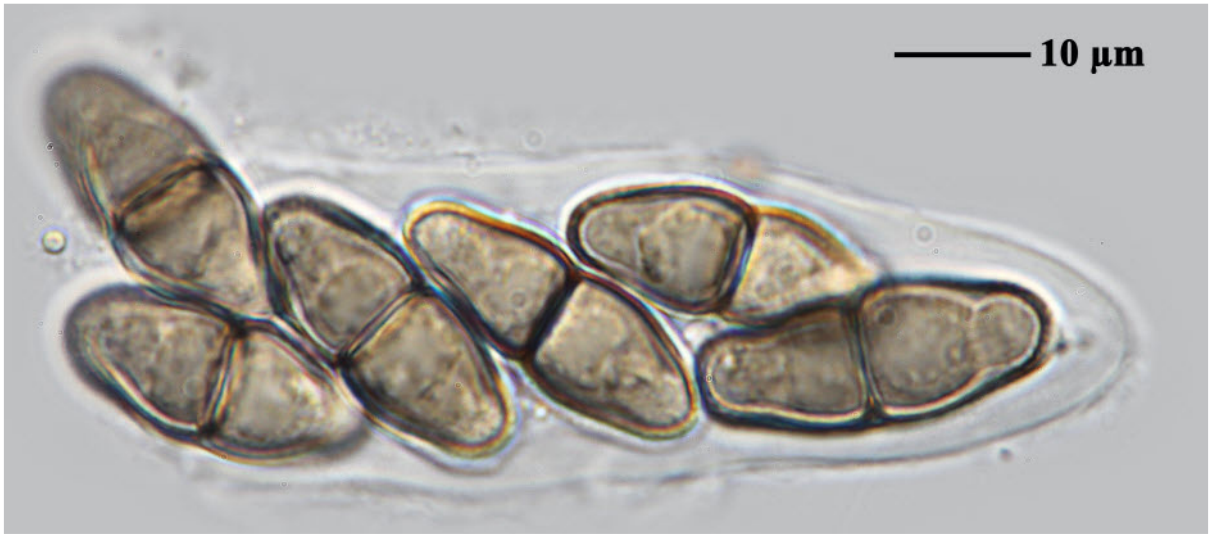
Thallus whitish grey, without border lines. Ascomata single, with fringe, 0.3–0.5 mm wide and 0.1–0.3 mm tall, wall to 100 ìm thick. Hamathecium with oil droplets. Asci 80–100 × 12–15 µm. Ascospores not constricted, 24–27 × 8–10.5 µm, with nearly equal locules, with rounded ends, verruculose. Pycnidia absent. Chemistry. No substances detected.

[ABL15812], Brazil, Rondônia, Estação Ecológica de Cuniã, km 760 on road BR 319 N of Porto Velho, 8°02’44” S, 63°29’11” W, c. 100 m, on tree bark in primary rain forest. Leg. M. Cáceres & A. Aptroot (no 15812), 20.11.2012, det. A. Aptroot 2012.









Mycomicrothelia oleosa



Mycomicrothelia oleosa

Bogoriella queenslandica (Müll. Arg.) Aptroot & Lücking, Lichenologist 48(6): 914 (2016)

= *Microthelia queenslandica* Müll. Arg., Rep. Meetings Australs. Assoc. Advancem. Sci.: 455 (1895)

= *Mycomicrothelia queenslandica* (Müll. Arg.) Sipman & Aptroot, Lichenologist 37(4): 309 (2005)

= *Ornatopyrenis queenslandica* (Müll. Arg.) Aptroot, Biblthca Lichenol. 44: 128 (1991)

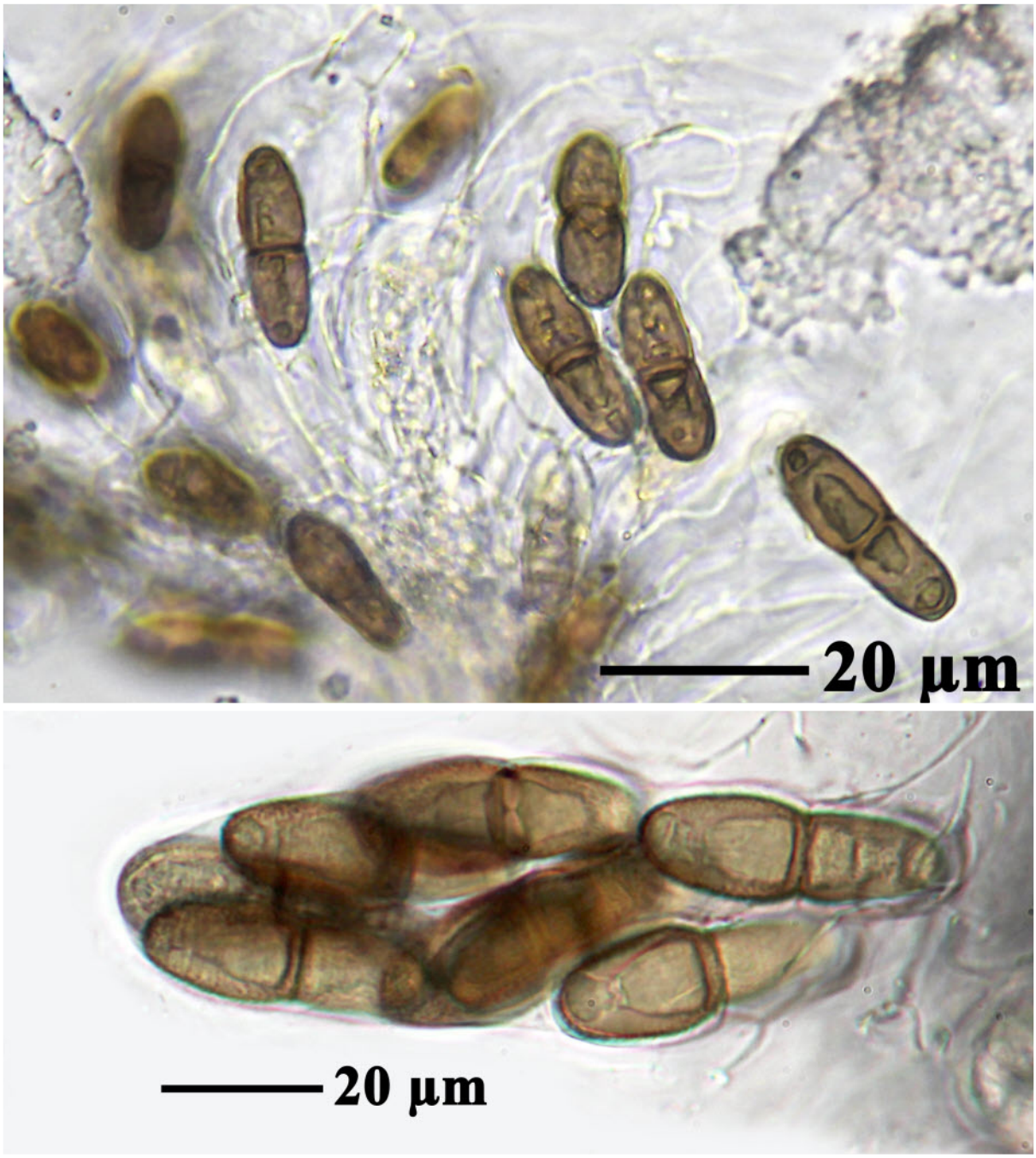
Thallus whitish, with dark prothallus lines. Ascomata with apical ostioles, solitary, 0.8–1.1 mm diam. Asci 110–130 µm. Ascospores 35–45 × 13–15 µm, with equal locules or slightly larger upper locule, with rounded ends, often with 2 pseudosepta and seemingly3-septate, verruculose, grey to brown. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[ABL39766], Papua New Guinea, Central Province, c. 22 km E of Port Moresby, Varirata National Park, near Variratra Lookout. 9°26’ S, 147°21’ E, 800 m. Dry secondary forest and conglomerate rock outcrops. Leg. A. Aptroot (no 39766), 23.10.1995, det. A. Aptroot, 1996.



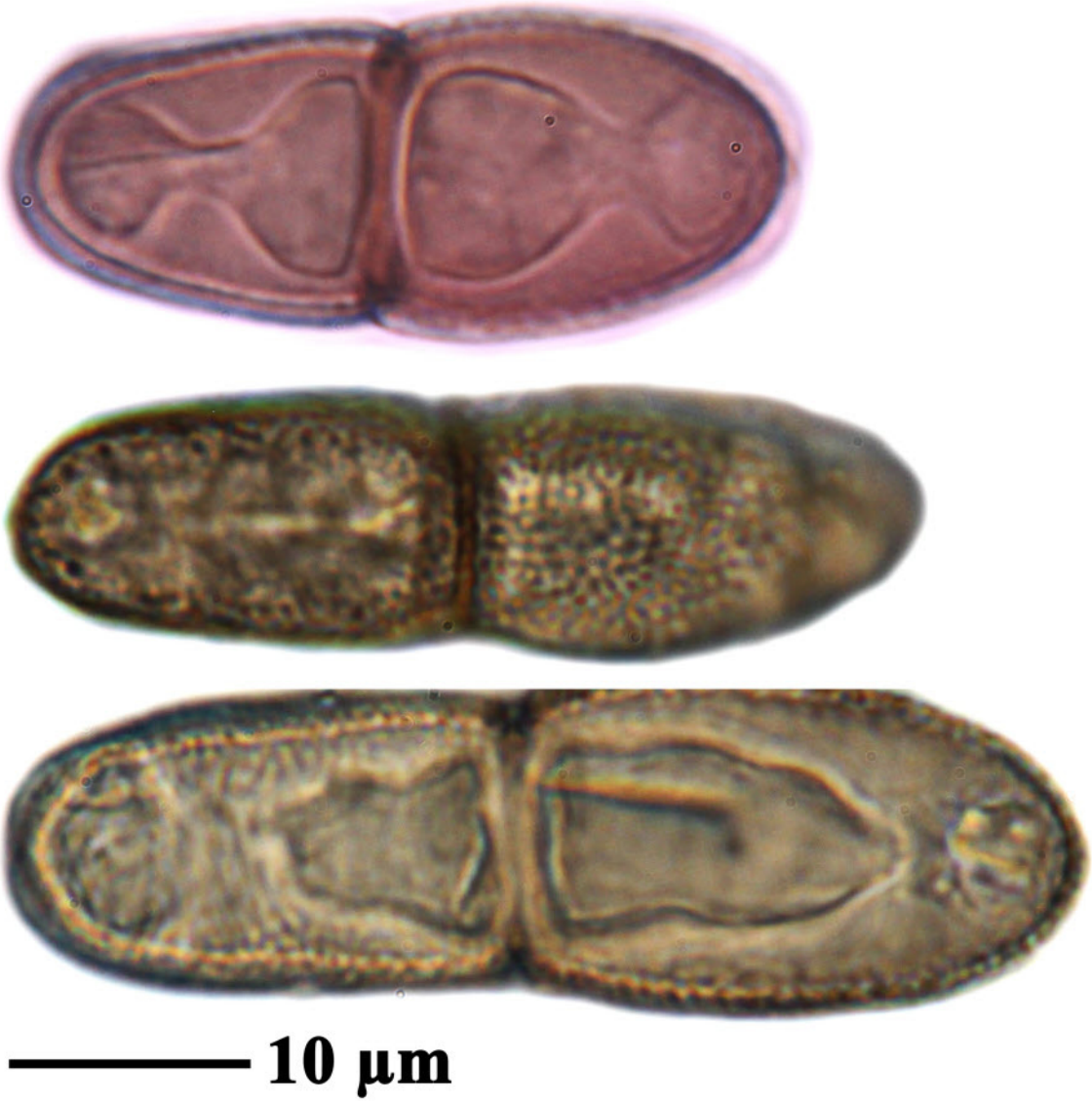


Bogoriella queenslandica



Bogoriella queenslandica





Bogoriella queenslandica

Bogoriella thelena (Ach.) Aptroot & Lücking, Lichenologist 48(6): 916 (2016)
= *Microthelia thelena* (Ach.) Trevis., Conspect. Verruc.: 10 (1860)
= *Mycomicrothelia thelena* (Ach.) D. Hawksw., Bull. Br. Mus. nat. Hist., Bot. 14(2): 112 (1985)
= *Pyrenula thelena* (Ach.) Trevis., Spighe Paglie: 17 (1853)
= *Verrucaria thelena* Ach., Syn. meth. lich. (Lund): 92 (1814)

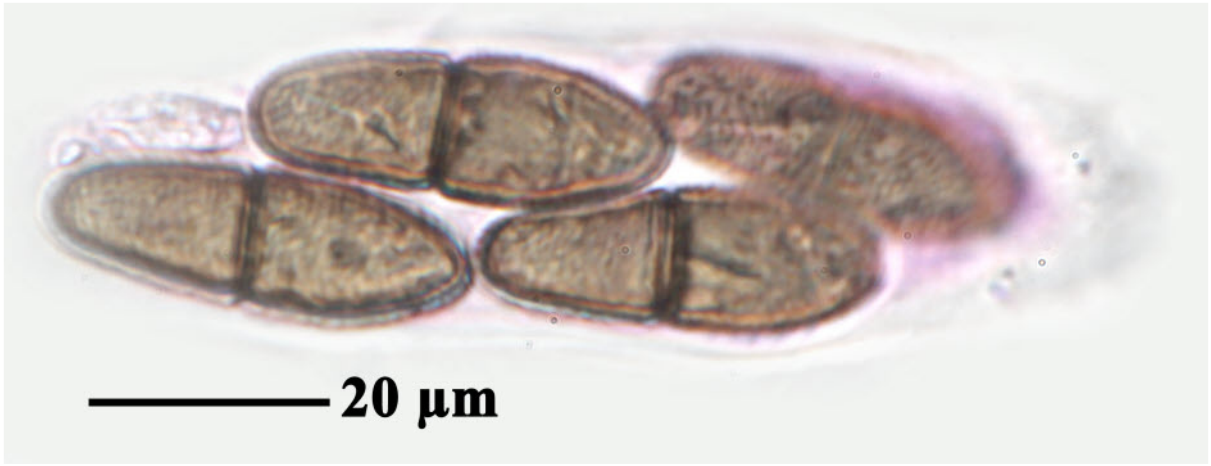
Thallus creamy or whitish or indistinct, with dark prothallus lines. Ascomata with apical ostioles, solitary, with or without fringe, c. 0.5 mm diam. Asci 80–90(–100) × (23–)26–31 µm. Ascospores (17.5–)21.0–24.0(–26) × (7.5–)9.0–11.5(–13) µm, with larger upper locule, with rounded ends, verruculose, deep golden brown. Pycnidia absent. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[ABL60459], 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 60459), 15.03.2004, det. A. Aptroot 2004.





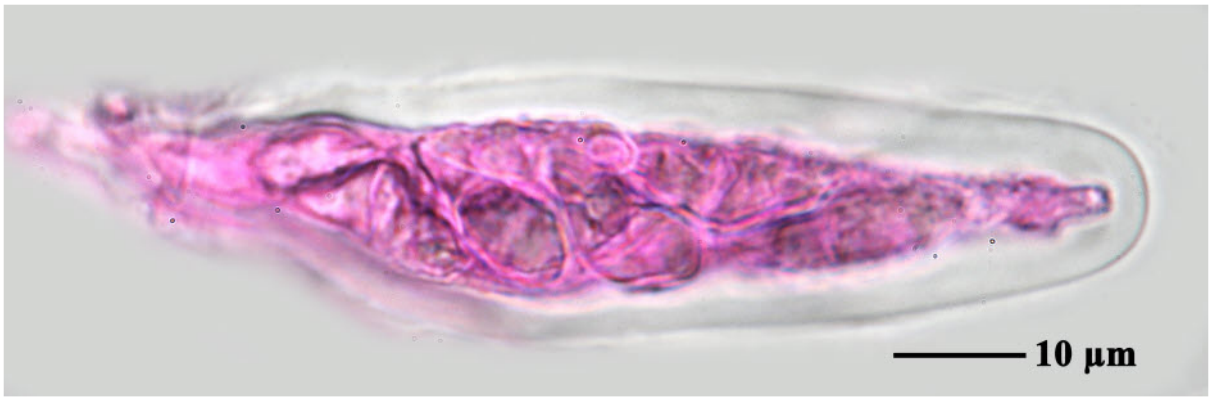
Bogoriella thelena

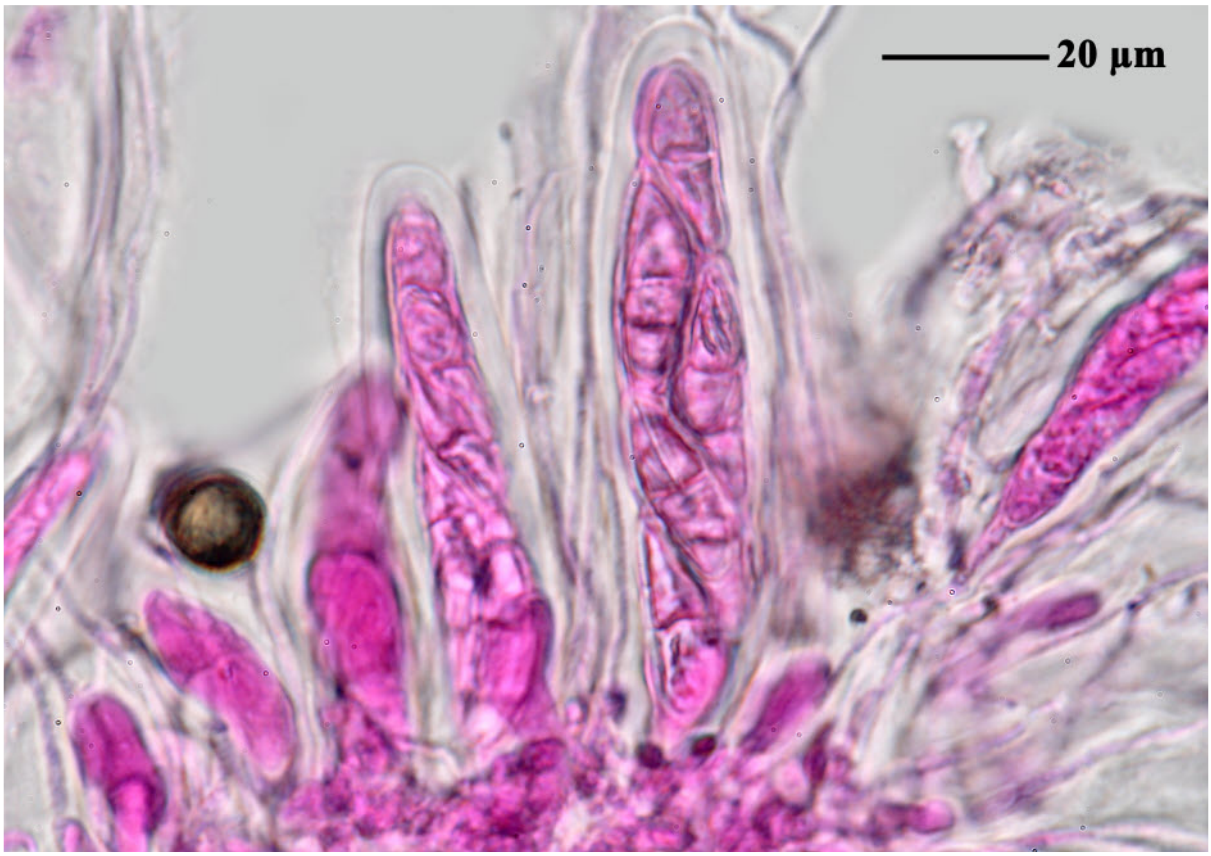






Bogoriella thelena



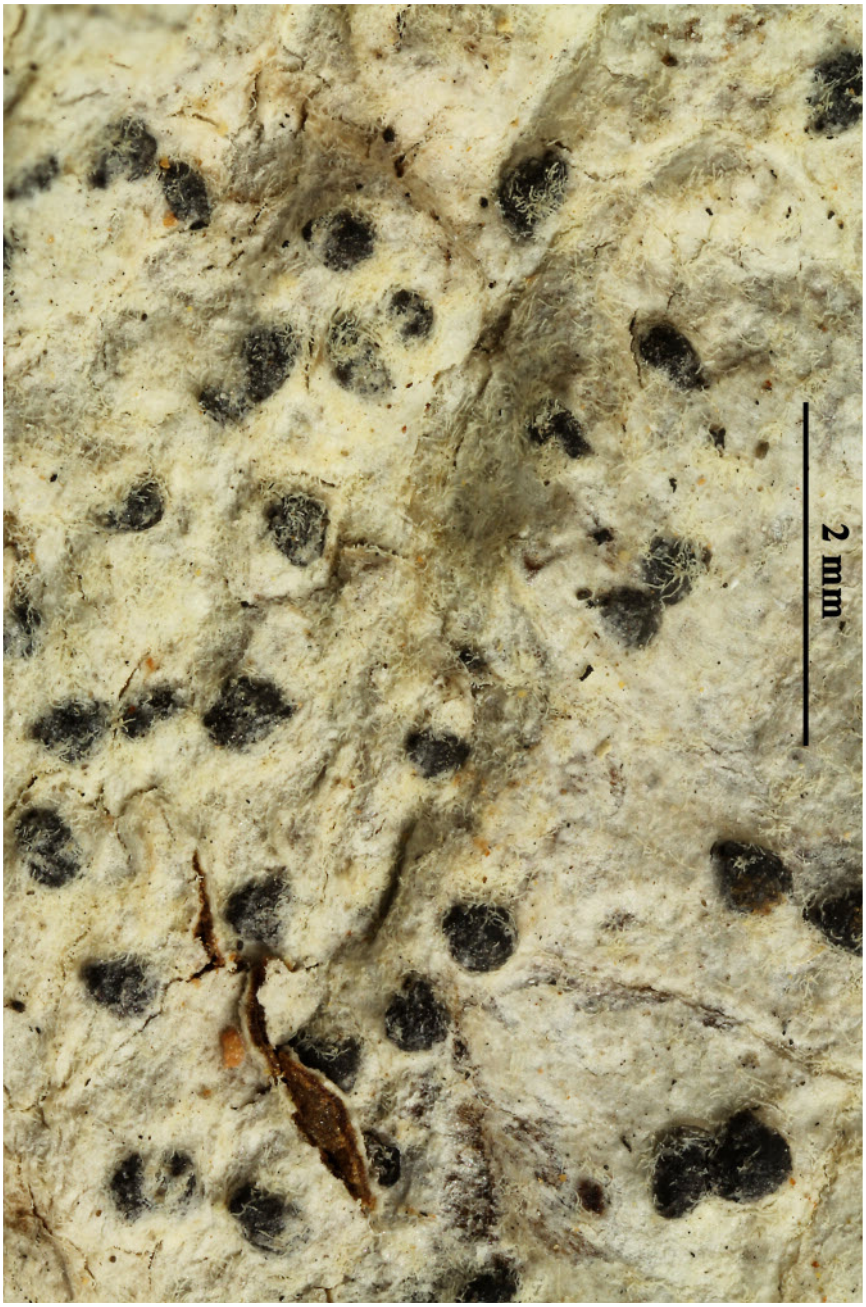


Bogoriella thelena

Bogoriella triangularis (Aptroot) Aptroot & Lücking, Lichenologist 48(6): 916 (2016)
= *Mycomicrothelia triangularis* Aptroot, Lichenologist 37(4): 309 (2005)

Thallus whitish, with dark prothallus lines. Ascomata with apical ostioles, solitary, usually oval to triangular, with conspicuous fringe, 0.4–0.5 mm diam. Asci c. 120 × 15 µm, Ascospores brown, 25–37 × 7–10 µm, with equal locules or slightly larger upper locule, with rounded ends, roughly verruculose with warts sometimes in lines. Pycnidia near the border lines, c. 0.1 mm wide, conidia not observed.

[ABL24949], U.S.A., Puerto Rico, Distr. Mayagüez, Reserva forestal Mariaco, along road 120, km 16-17. Low mountain forest on dry serpentine, on tree. 18°09’ N, 66°59’ W, 800 m. Leg. A.& M. Aptroot (no 24949), 21-31.05.1989, det A. Aptroot 1989. ISOTYPE.







Bogoriella triangularis



Bogoriella triangularis

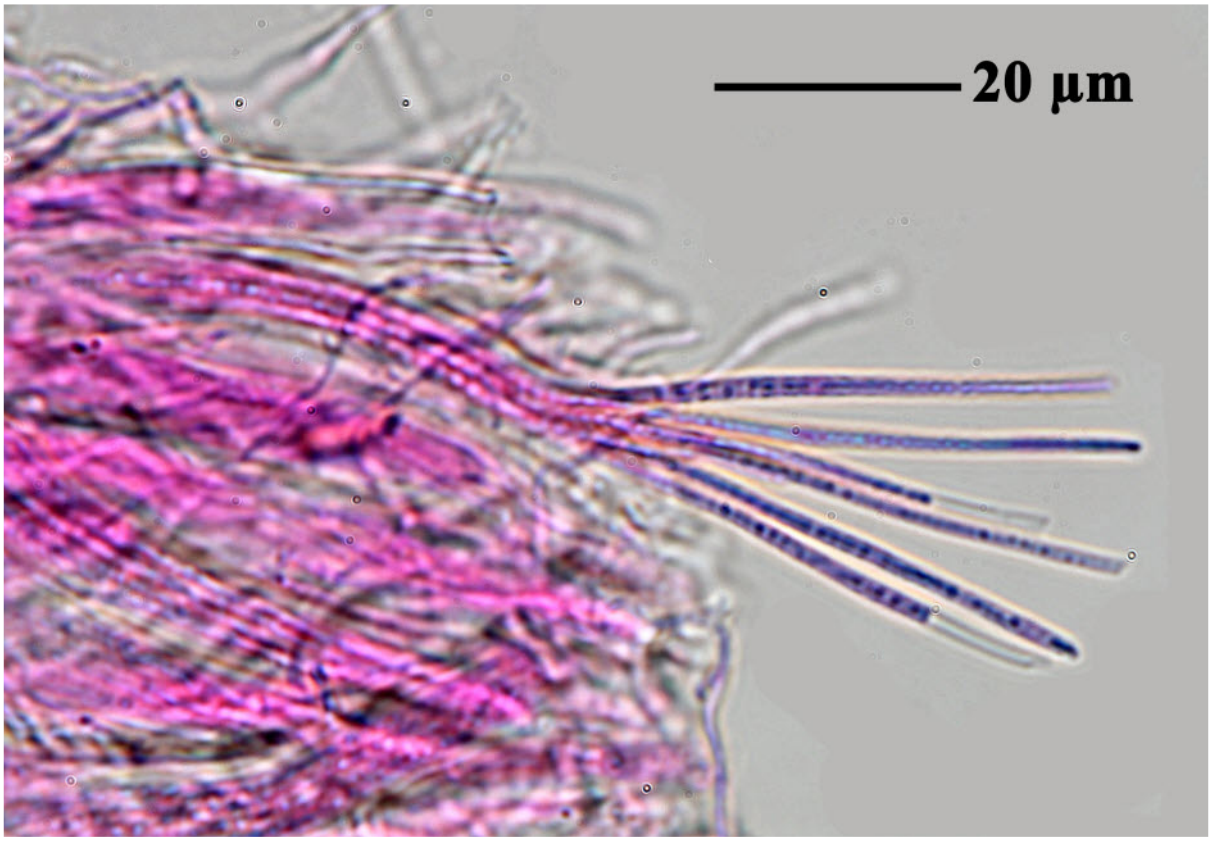
Celothelium cinchonarum (Müll. Arg.) Vain., Ann. Acad. Sci. fenn., Ser. A 6(no. 7): 209 (1915)
= *Tomasellia cinchonarum* Müll. Arg. (1885)

Thallus ecorticate, white, UV-. Perithecia 0.3–0.6 mm diam., laterally grouped in large, often linear groups, without joint ostioles. Ostiole apical. Hamathecium filaments thin and anastomosing above the asci. Ascospores hyaline, filiform, 7–15-septate, 85–100 × 1.5–2 µm.

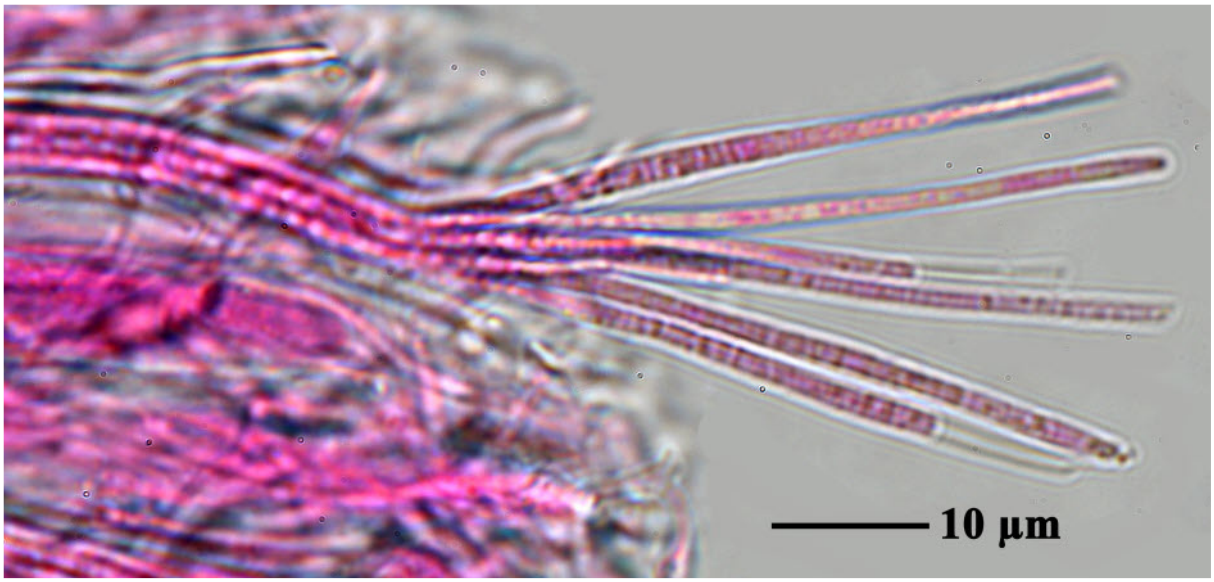
[ABL13533], Brazil, Sergipe, Parque Nacional Serra da Itabaiana, 10°44’35” S, 37°20’25” W, on bark in transitional forest. Leg. M. Cáceres & A. Aptroot (no 13533), 6.9.2012, det. A. Aptroot, 2012.

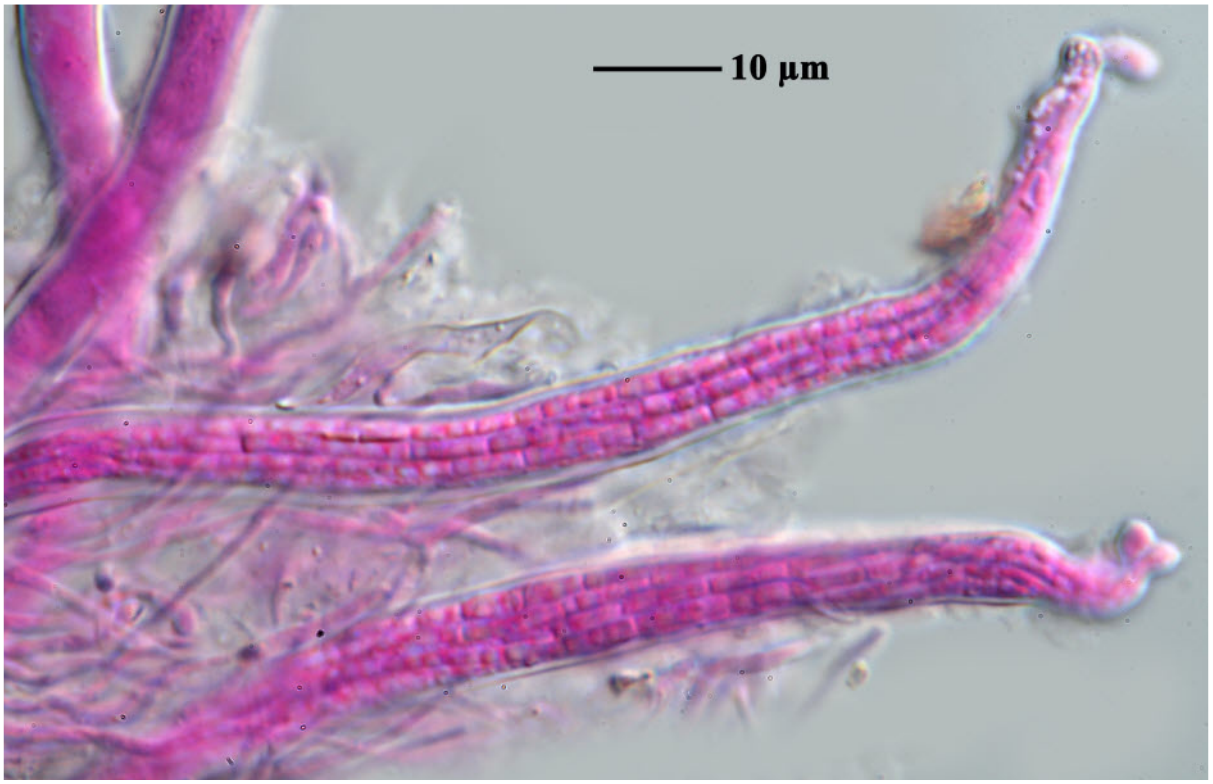


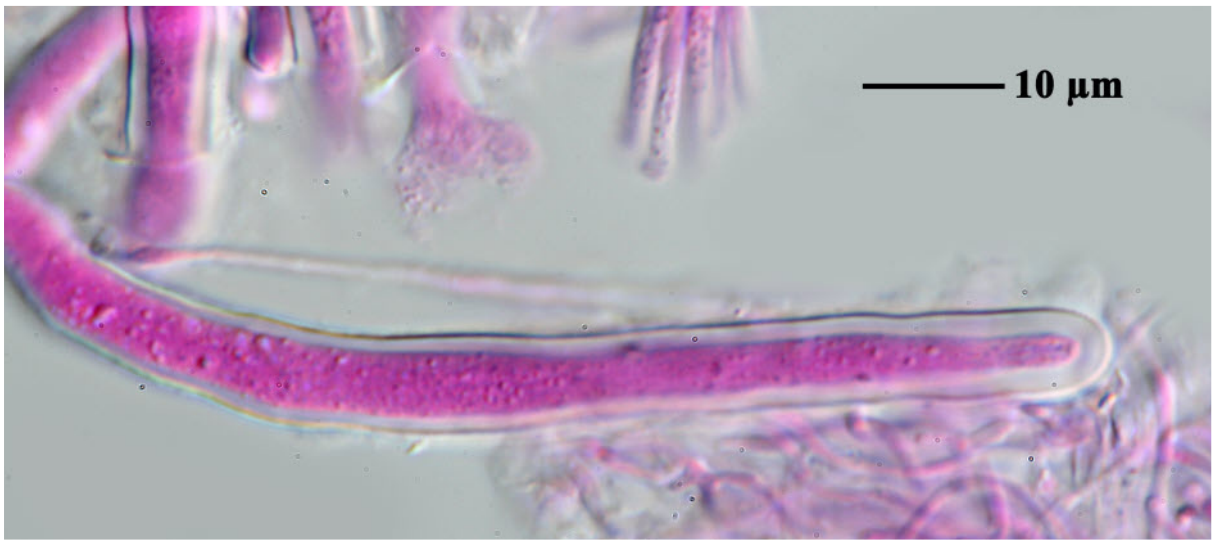




Celothelium cinchonarum







Celothelium cinchonarum

Celothelium dominicanum (Vain.) M.B. Aguirre, Bull. Br. Mus. nat. Hist., Bot. 21(2): 139 (1991)
= *Leptorhaphis dominicana* Vain. (1915)

Thallus ecorticate, white, UV-. Perithecia 0.2–0.4 mm diam., single. Ostiole apical. Hamathecium filaments thin and anastomosing above the asci. Ascospores hyaline, 7–15 septate, filiform, 70–100 × 1.5–2 µm.

[Alves1526], Brazil, Ceará, Chapada do Araripe, on tree bark. Leg. M.M.E. Alves (no 1526), 1.05.2013, det. A. Aptroot 2013.



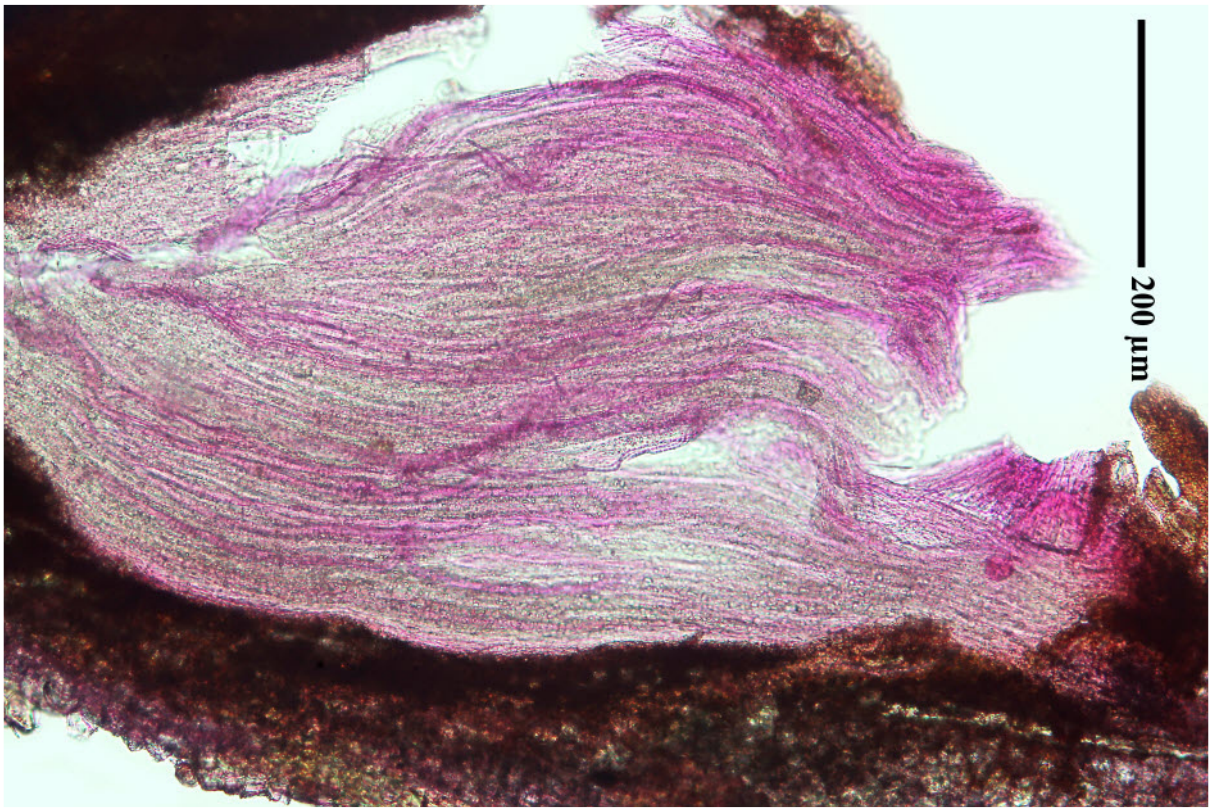
Celothelium longisporum K.H. Moon & Aptroot, J. Jap. Bot. 88(5): 310 (2013)

Thallus whitish, mealy, inapparent in most places but clearly visible around the ascomata where it partly covers the clypeus and the sides of the ascomata. Associated algae not observed. Ascomata dispersed on the thallus, nearly superficial, ellipsoid, black, 0.5–0.8 × 1.5–2.7 mm in size, 0.3–0.6 mm high, surrounded by a 0.2–0.5 mm wide blacked clypeus (widest at the non-ostiolate side). Ascoma wall c. 100 µm thick above the hamathecium and at the sides, c. 25 µ thick below the hamathecium, brown, only the outer c. 25 µm above and at the sides carbonized. Ostiole lateral, positioned on top of the ascoma but at one extreme end, brown, surrounded by a ochraceous yellowish 0.2 mm wide circular zone. Hamathecium horizontal in the ascoma, hyaline, densely inspersed with oil droplets. Asci 8-spored, linear, c. 300 × 10 µm, tips thickened, with rounded ocular chamber. Hamathecium filaments unbranched, c. 1 µm wide. Ascospores acicular, hyaline, c. 45–65-septate, c. 175–260 × 2.5–3 µm, lumina cubical to unusually c. 2 times as long as wide, ends rounded.

[Kashiwadani50446], Cambodia, Prov. Siem Reap, around Ta Nei Temple, Angkor Wats complex, Siem Reap. On bark. 13°27' N, 103°54' E, 30 m. Leg. H. Kashiwadani (no 50446), det. A. Aptroot. ISOTYPE.

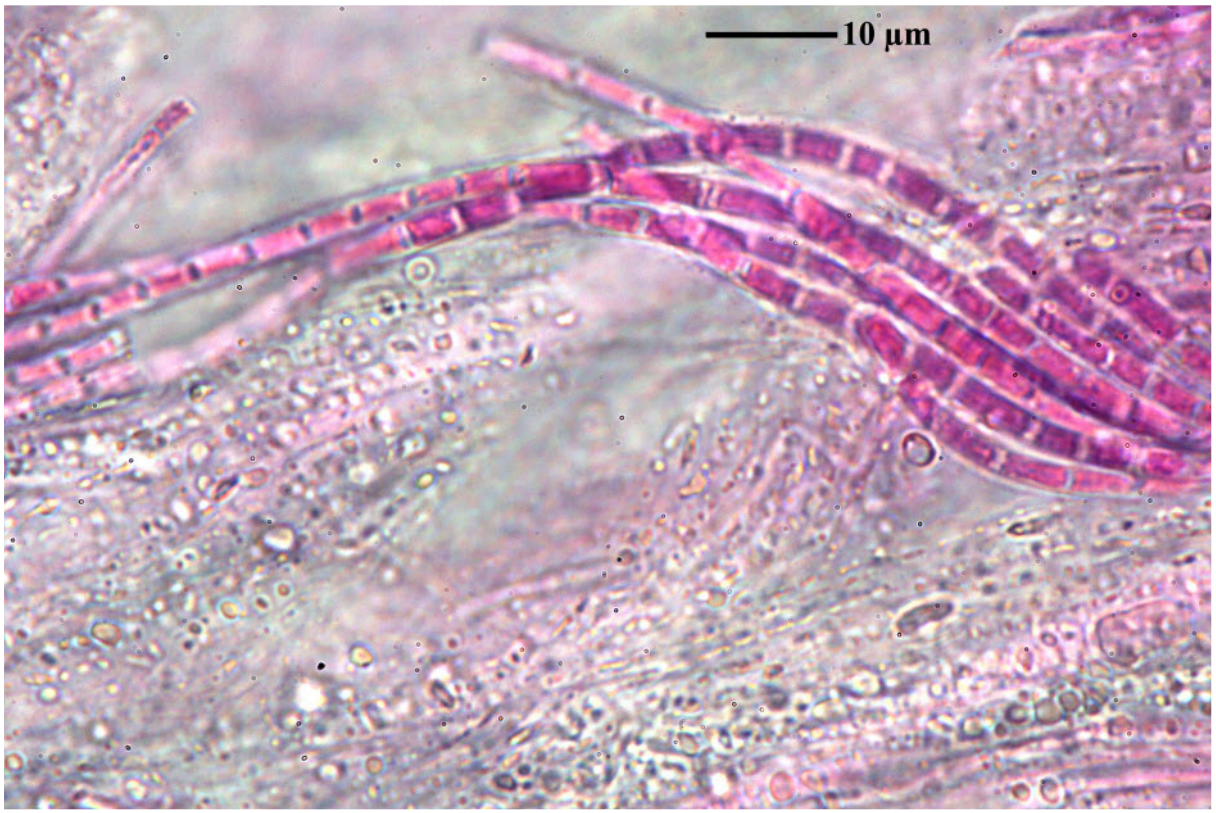






Celothelium longisporum





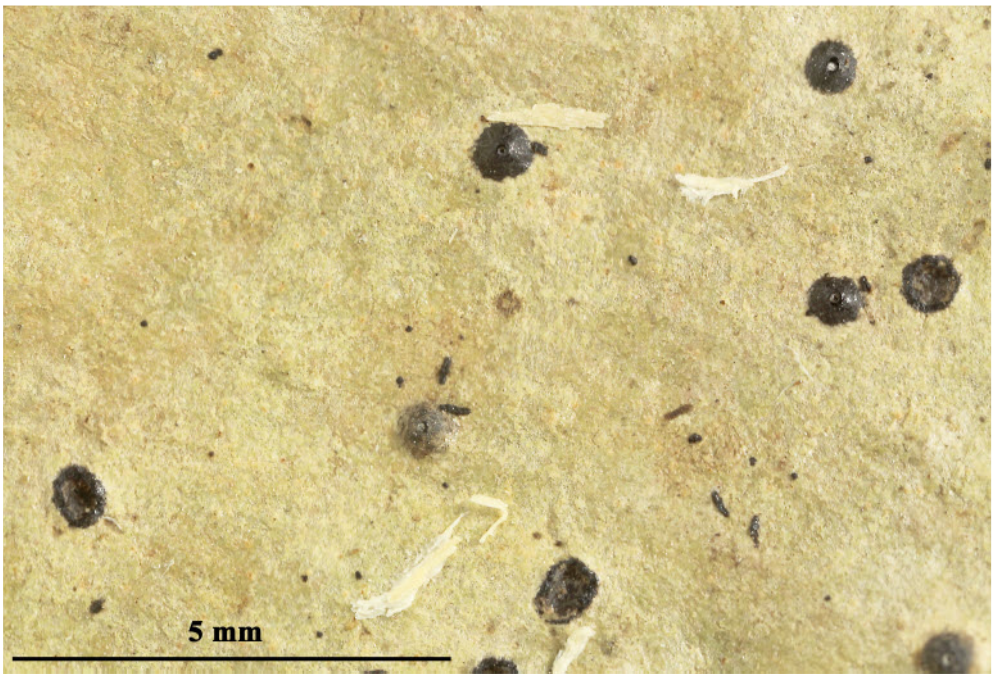
Celothelium longisporum

Clypeopyrenis microsperma (Müll. Arg.) Aptroot, Biblthca Lichenol. 44: 40 (1991).

= *Microthelia microsperma* Müll. Arg., Bull. Soc. R. Bot. Belg. 32(2): 171 (1894) [1893].

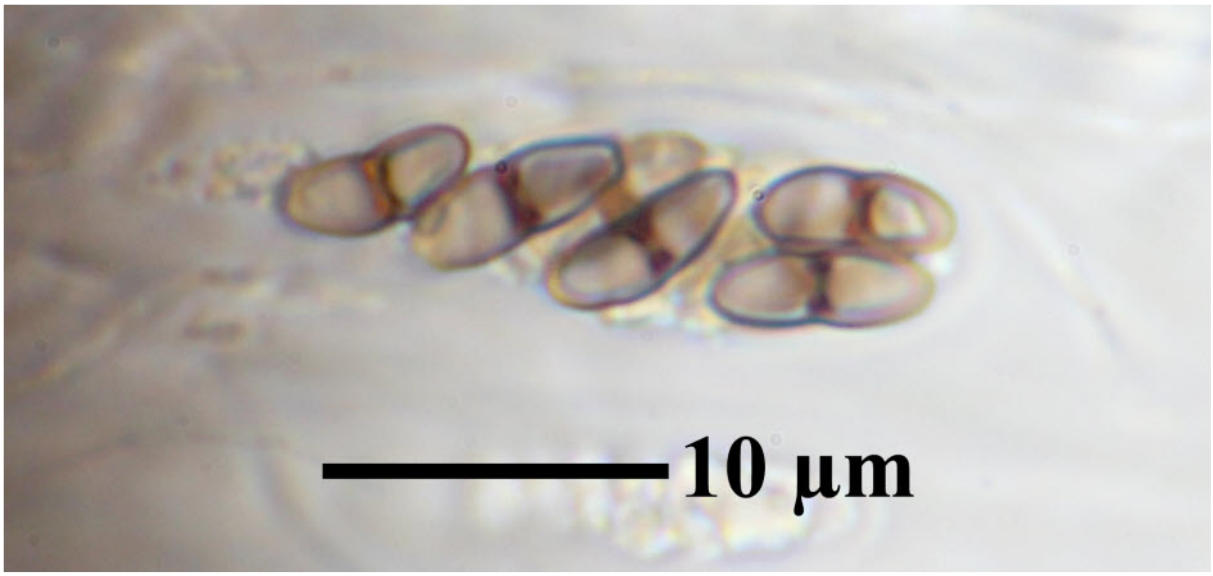
Thallus brownish green, not blackened around the ascocarps, smooth, superficial on the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with Trentepohlia algae. Ascocarps simple, black, without pseudostromatic tissues, without crystals, conical, not distinctly flattened, superficial on the substratum, exposed, 0.6–1.2 mm diam, 0.3–0.8 mm high. Ascocarp wall completely carbonized, with distinct clypeus, up to 300 µm thick. Ostiole black, obconical, apical, 50–100 µm diam. Hamathecium not inspersed with oil droplets, not gelatinized, IKI negative. Interthecial hyphae true paraphyses, simple, not branched at the tips, 0.5–1 µm thick. Periphyses absent. Asci rather thin-walled but probably bitunicate, with small, rounded ocular chamber, 50–70 × 6–9 µm. Ascospores 8 in the ascus, often sticking together after degradation of the ascus wall, irregularly arranged, brown to black, ellipsoidal with rounded ends, symmetrically septate, constricted at the septa, 6–8 × 2–2.5 µm; with 1 median relatively thick and irregular euseptum, 0.6–0.9 µm thick. Endosporium up to 0.5 µm thick. Spore wall smooth, without granules, without gelatinous sheath, c. 0.3 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC.

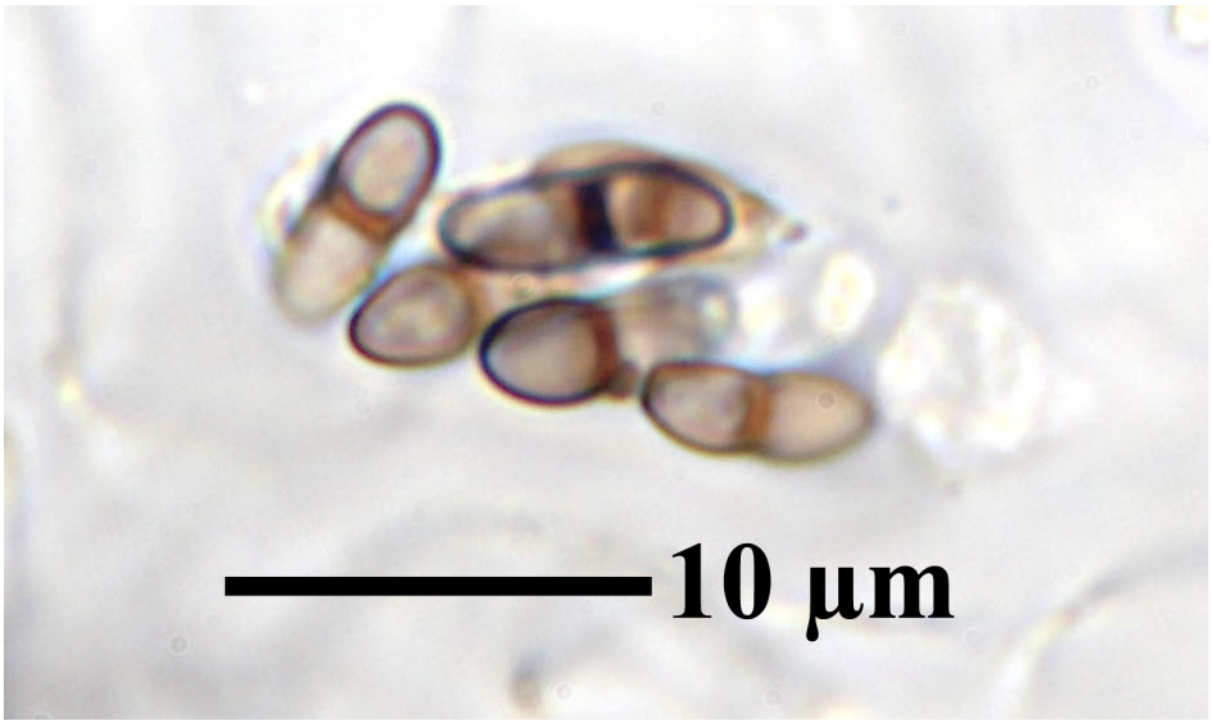
[ABL10601], Ecuador, pr. Napo, 5 km N of Santa Rosa, 400 m, prim. tropical rainforest. Leg. A. Aptroot (no 10601) & R. Hensen, 20.08.1982, det. A. Aptroot.

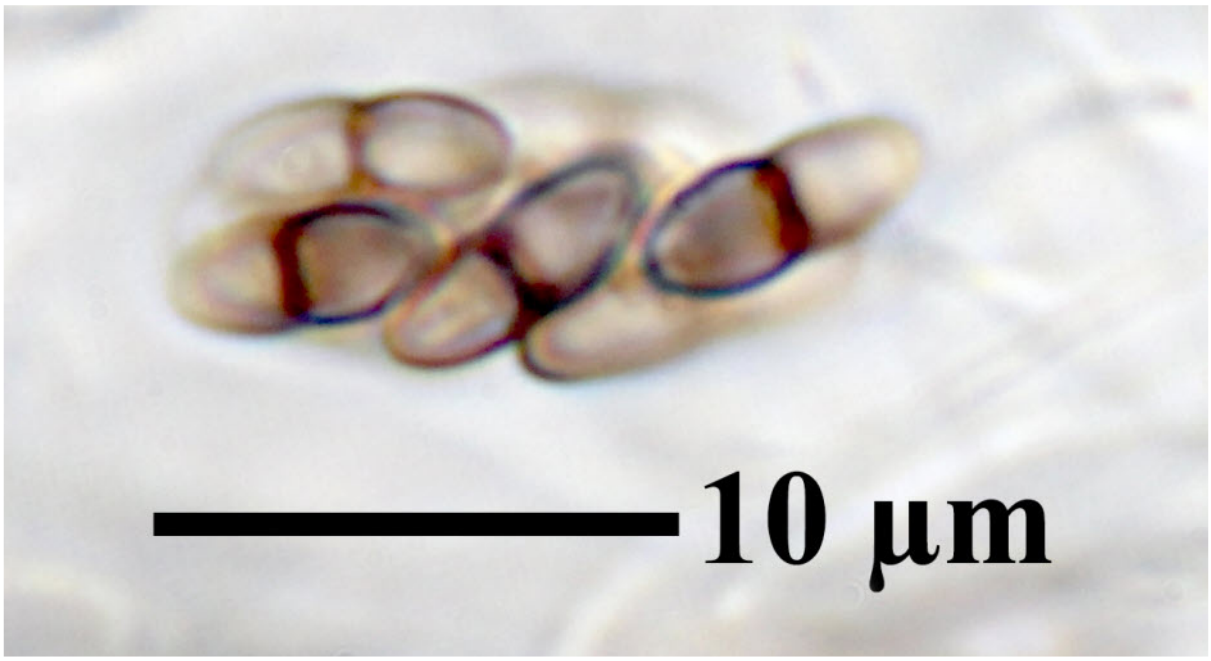




Clypeopyrenis microsperma





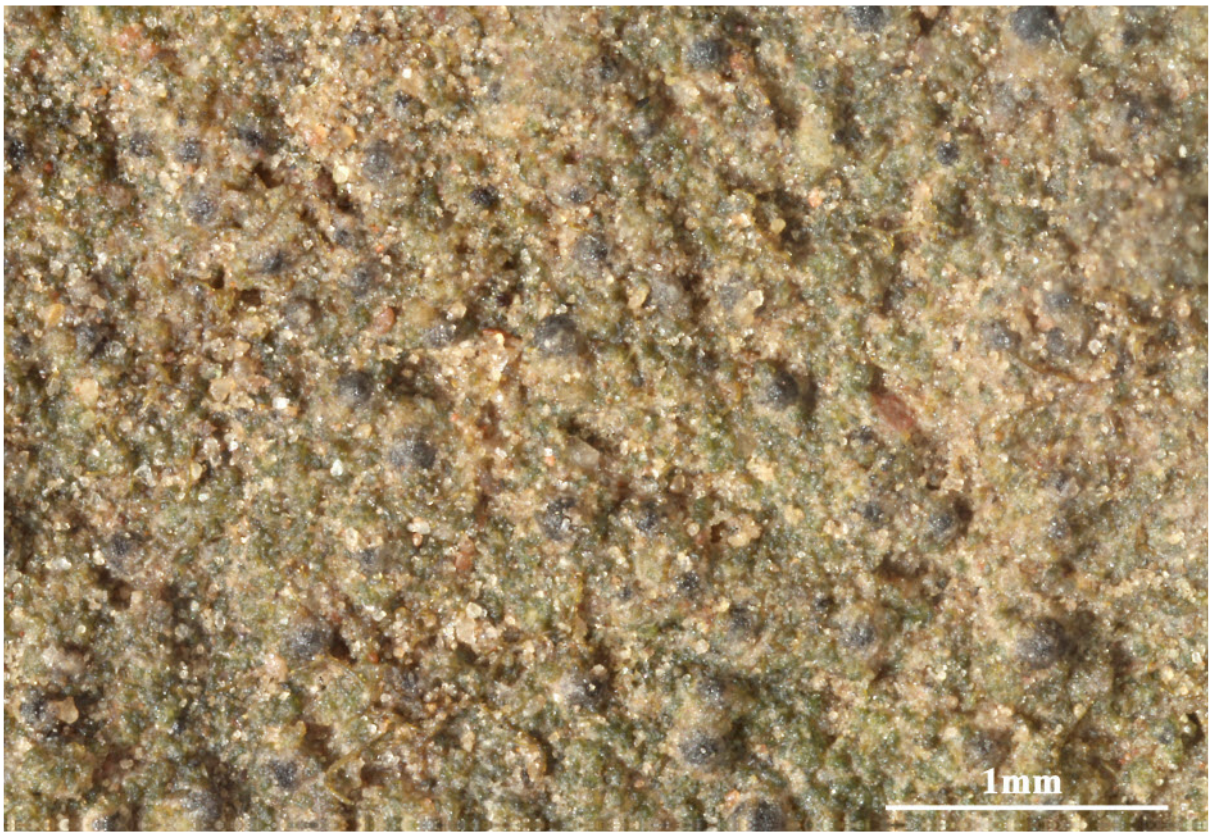


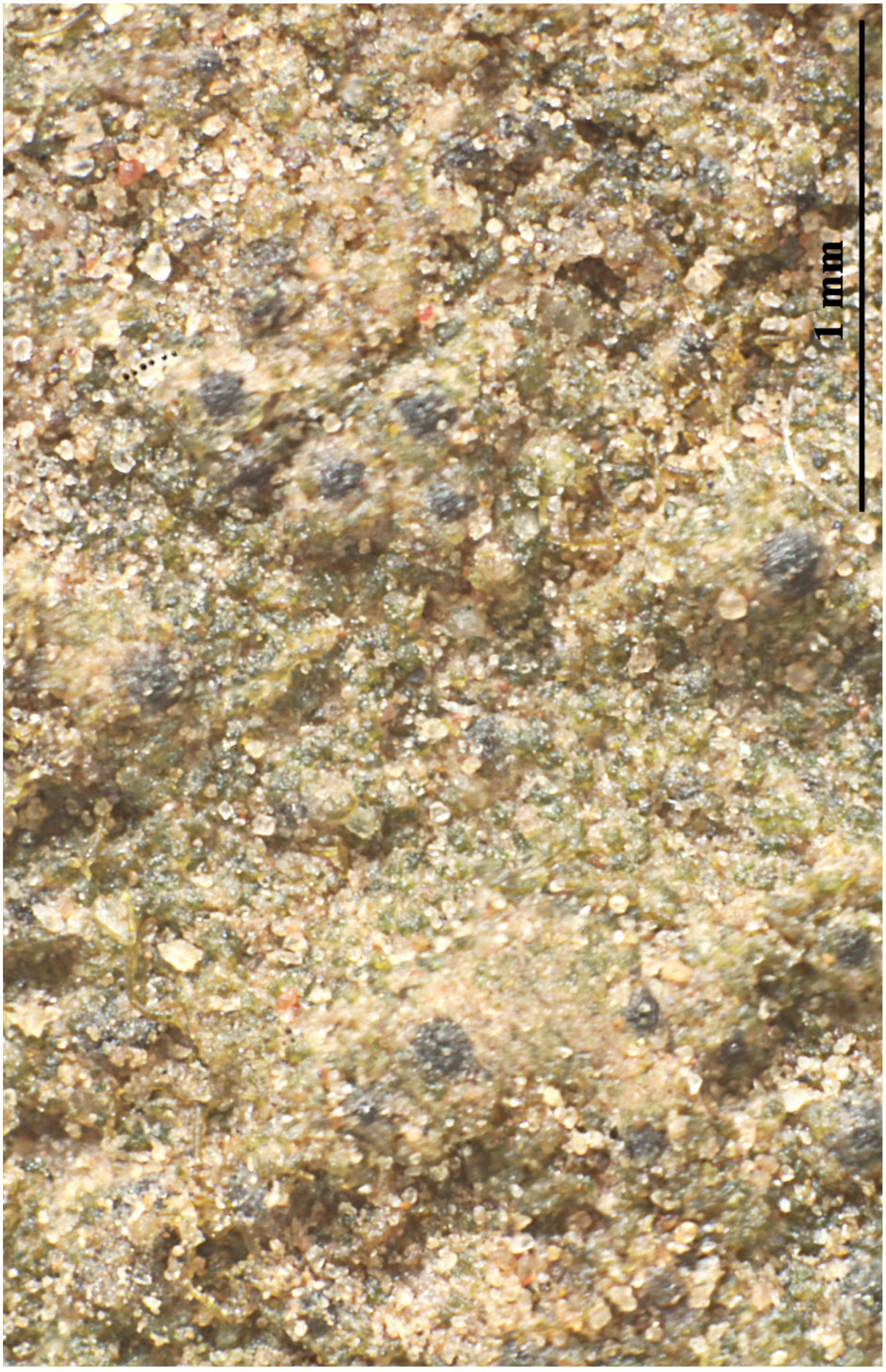
Clypeopyrenis microsperma

Collemopsidium argilospilum (Nyl.) Coppins & Aptroot, Lichenologist 40(5): 368 (2008)
= *Magmopsis argilospila* (Nyl.) Nyl., in Crombie (1886)
= *Arthopyrenia arenicola* (Leight.) A.L. Sm., Monogr. Brit. Lich. 2: 323 (1911)
= *Arthopyrenia argilospila* (Nyl.) A.L. Sm., Monogr. Brit. Lich., Edn 2 1: 485 (1918)
= *Pyrenocollema argilospilum* (Nyl.) Coppins [as 'argilosporum'], Lichenologist 24(4): 368 (1992)
= *Thelidium argilospilum* (Nyl.) Blomb. & Forssell, Enum. Pl. Scand.: 98 (1880)
= *Verrucaria arenicola* Leight., Grevillea 5(no. 36): 155 (1877)
= *Verrucaria arenicola* Leight., Lich.-Fl. Great Brit., Edn 3: 470 (1879)
= *Verrucaria argilospila* Nyl., Flora, Regensburg 57(1): 15 (1874)

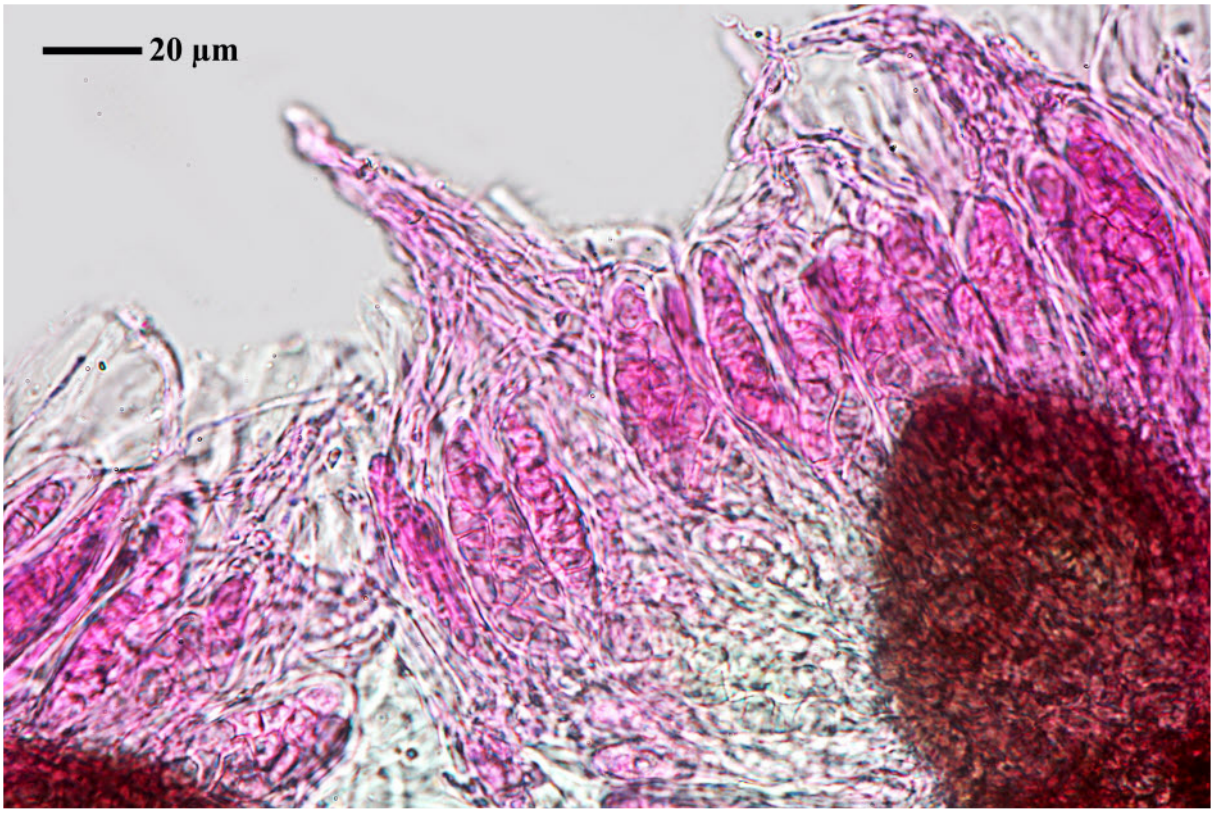
Thallus dull olive-green, gelatinous when wet; photobiont cells blue-green. Ascomata ±globose, semi-immersed. Ascospores hyaline, 1-septate, 21–22 × 8 µm, oblong-ovoid.

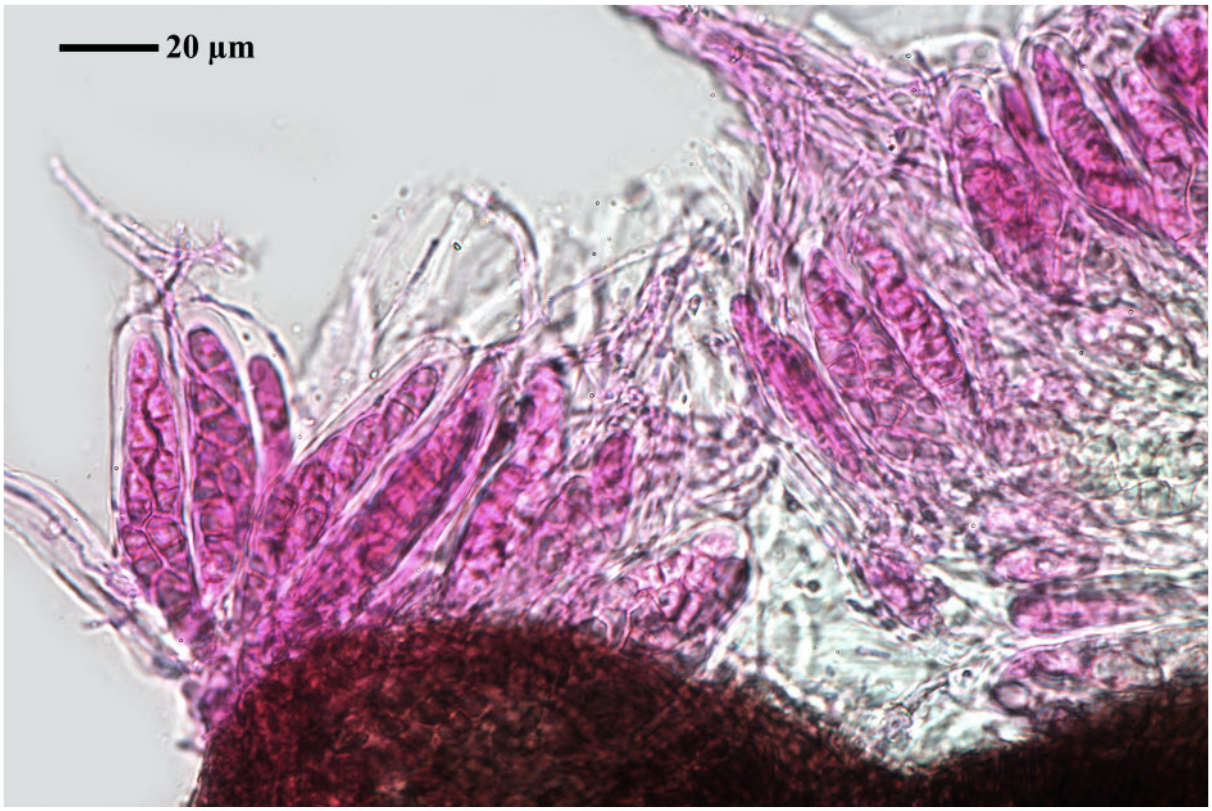
[Ferraro10713], Argentina, Prov. Chaco, Parque Pampa del Indio, 110 m, 26°16’20’’ S, 59°58’40’’ W. On soil on path in semi-deciduous subtropical forest. Leg. L.I. Ferraro (no 10713), A. Aptroot, M. Cáceres, 26.02.2013, det. A. Aptroot, 2013.



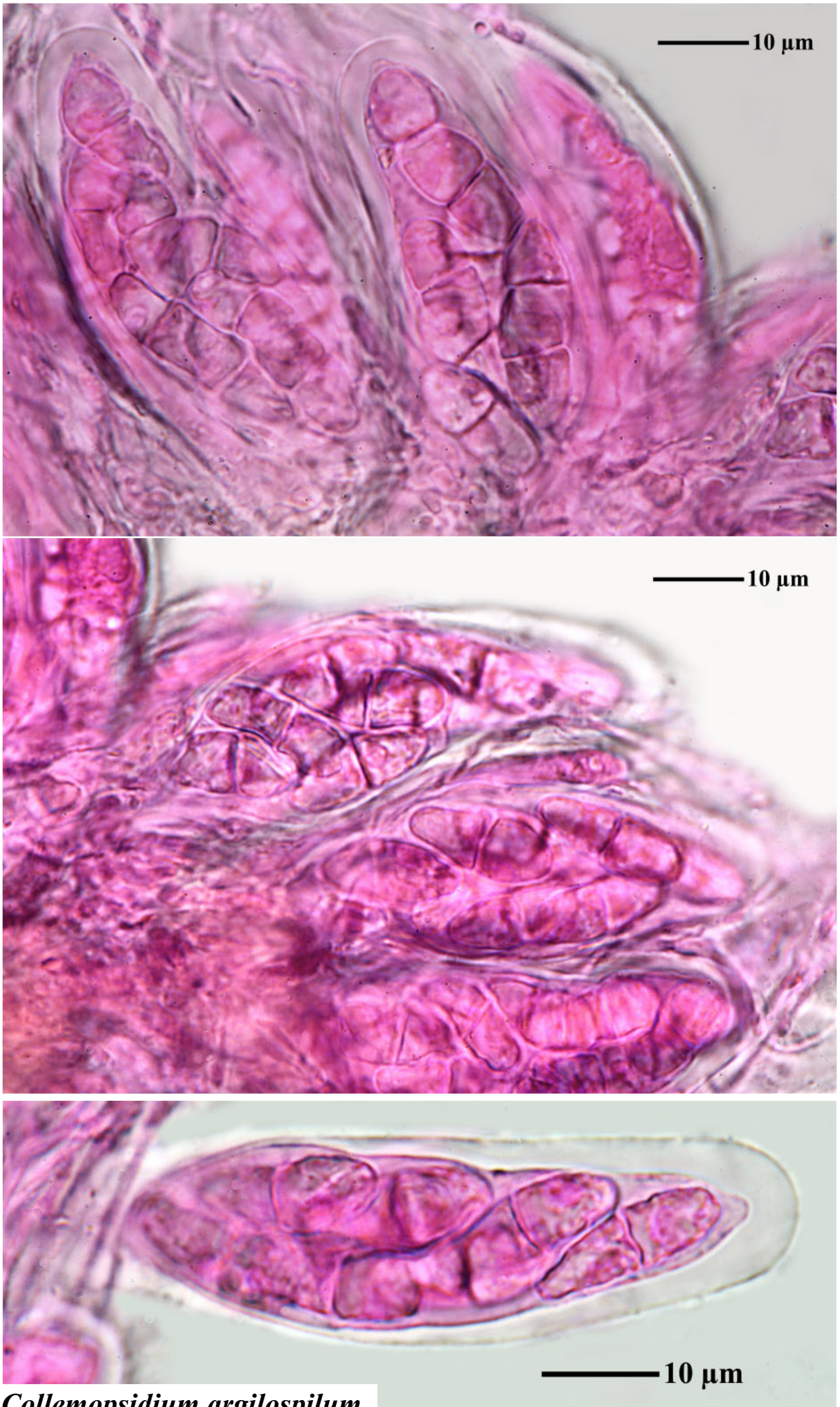


Collemopsidium argilospilum





Collemopsidium argilospilum

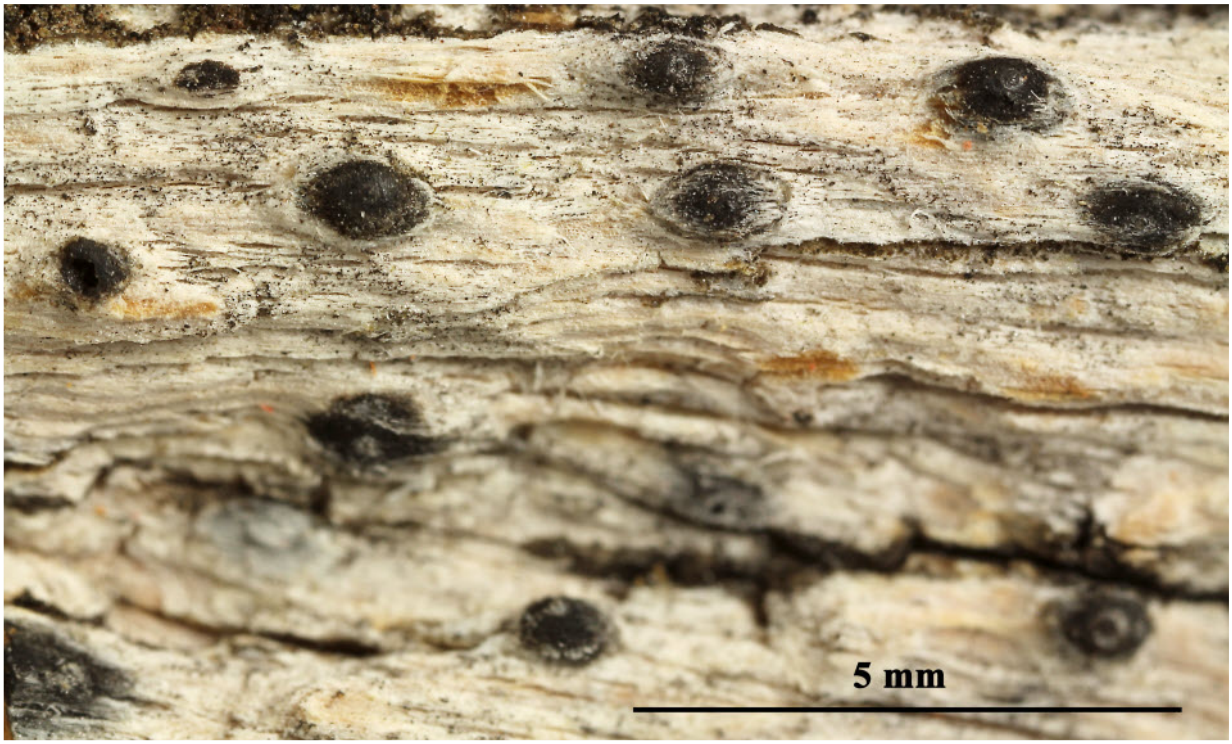


Collemopsidium argilospilum

Constrictolumina chiquitana Flakus, Kukwa & Aptroot, Lichenologist 48(6): 681 (2016)

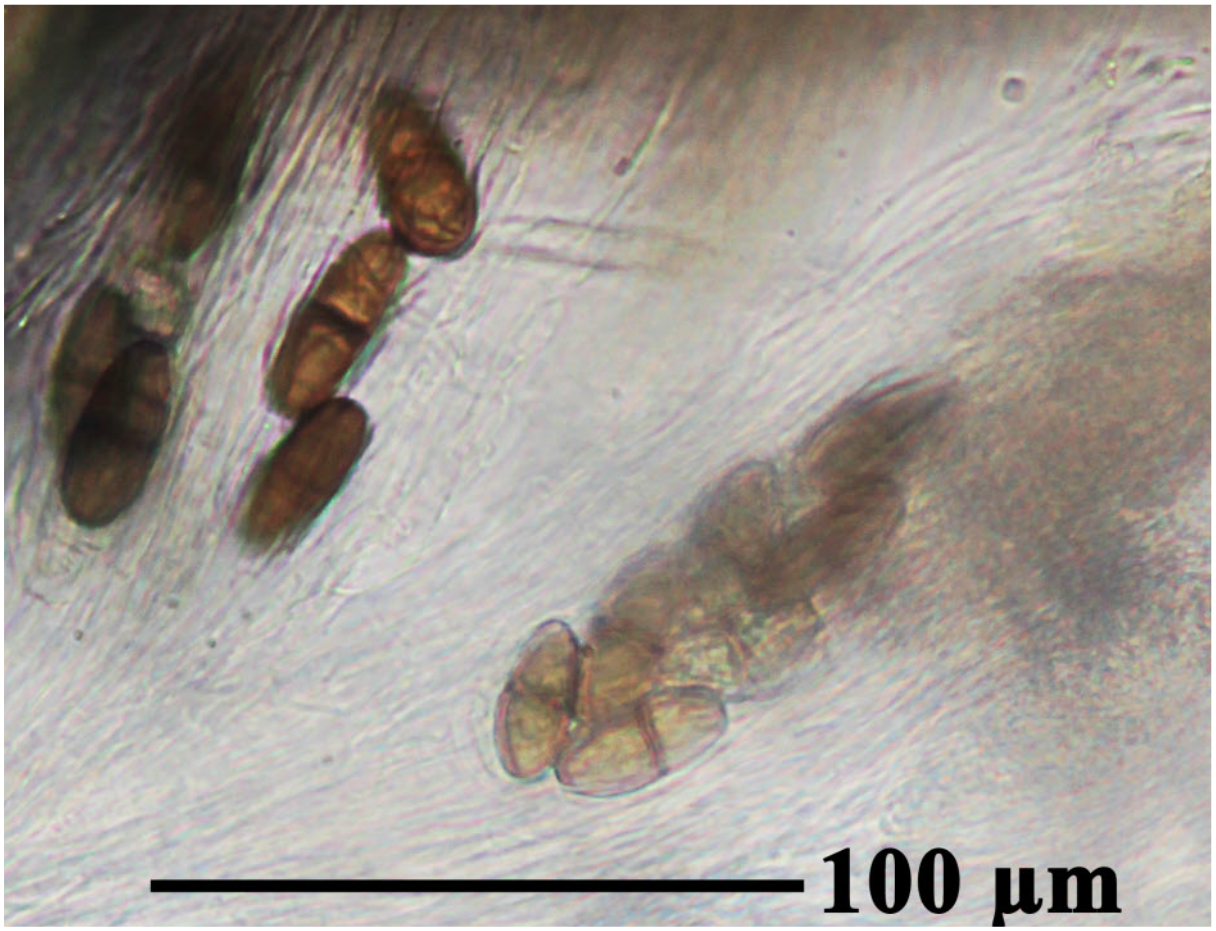
Thallus ecorticate, endophloeodal, smooth, continuous, greyish white, not surrounded by a black prothallus.Ascomata subglobose, 0.4–0.5 mm diam., single, ascomatal verrucae usually elongate in outline, almost flat to hemispherical emergent from the thallus to superficial with a surface different from the thallus, greyish black, covered by an extending clypeus 0.6–1.4 mm wide. Ostioles apical not fused. Hamathecium clear. Ascospores 8/ascus, brown, K+ grey, 1-septate, lumina pseudomuriform, 26–48 × 12–17 µm. Chemistry: Thallus surface, medulla and ascomata K-, UV-. TLC: No secondary substances detected.

[kukwa10621], Bolivia, Dept. Santa Cruz, Prov. Cordillera, Parque National y Área Natural de Manejo Integrado Kaa-Iya del Gran Chaco, near Peto Blanco (park guard´s, station, 18°56'26" S, 60°22'39" W, 340 m. Chiquitano forest. Leg. M. Kukwa (no 10621), 5.12.2011, det. A. Aptroot. ISOTYPE.





Constrictolumina chiquitana





Constrictolumina chiquitana

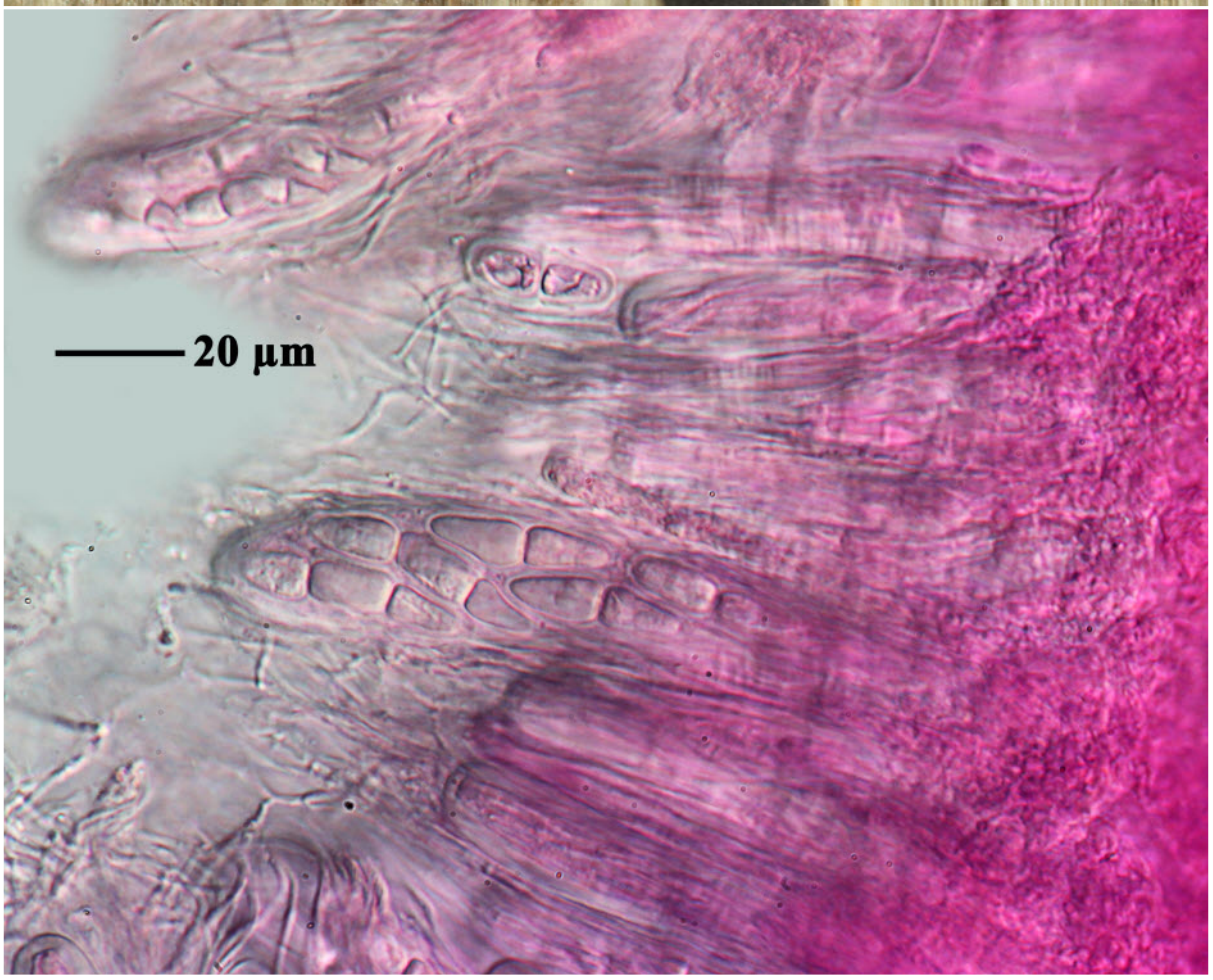
Constrictolumina cinchonae (Ach.) Lücking, M.P. Nelsen & Aptroot, in Lücking et al., Lichenologist 48(6): 756 (2016)
= *Arthopyrenia cinchonae* (Ach.) Müll. Arg., Flora, Regensburg 66: 289 (1883)
= *Didymella cinchonae* (Ach.) Vain., Bot. Tidsskr. 29: 150 (1909)
= *Leiophloea cinchonae* (Ach.) Riedl, in Riedl & Schiman, Sydowia 17(1-6): 82 (1964) [1963]
= *Pyrenula cinchonae* (Ach.) Tuck., Proc. Amer. Acad. Arts & Sci. 7: 233 (1868) [1866]
= *Spermatodium cinchonae* (Ach.) Trevis., Conspect. Verruc.: 11 (1860)
= *Verrucaria cinchonae* Ach., Syn. meth. lich. (Lund): 90 (1814)

Ascocarps black, superficial, hemisphaerical to flattened, 0.4–0.6 mm diam.; ascocarp wall lacking below. Paraphyses slender, regular and thread-like, c. 1 µm thick. Asci mostly narrowly obovate, rarely almost cylindrical; ocular chamber mostly not evident, (85–)100–125 × 17–22 µm. Ascospores (4–)8/ascus, hyaline, 1-septate,18–30 × 6–9(–11) µm

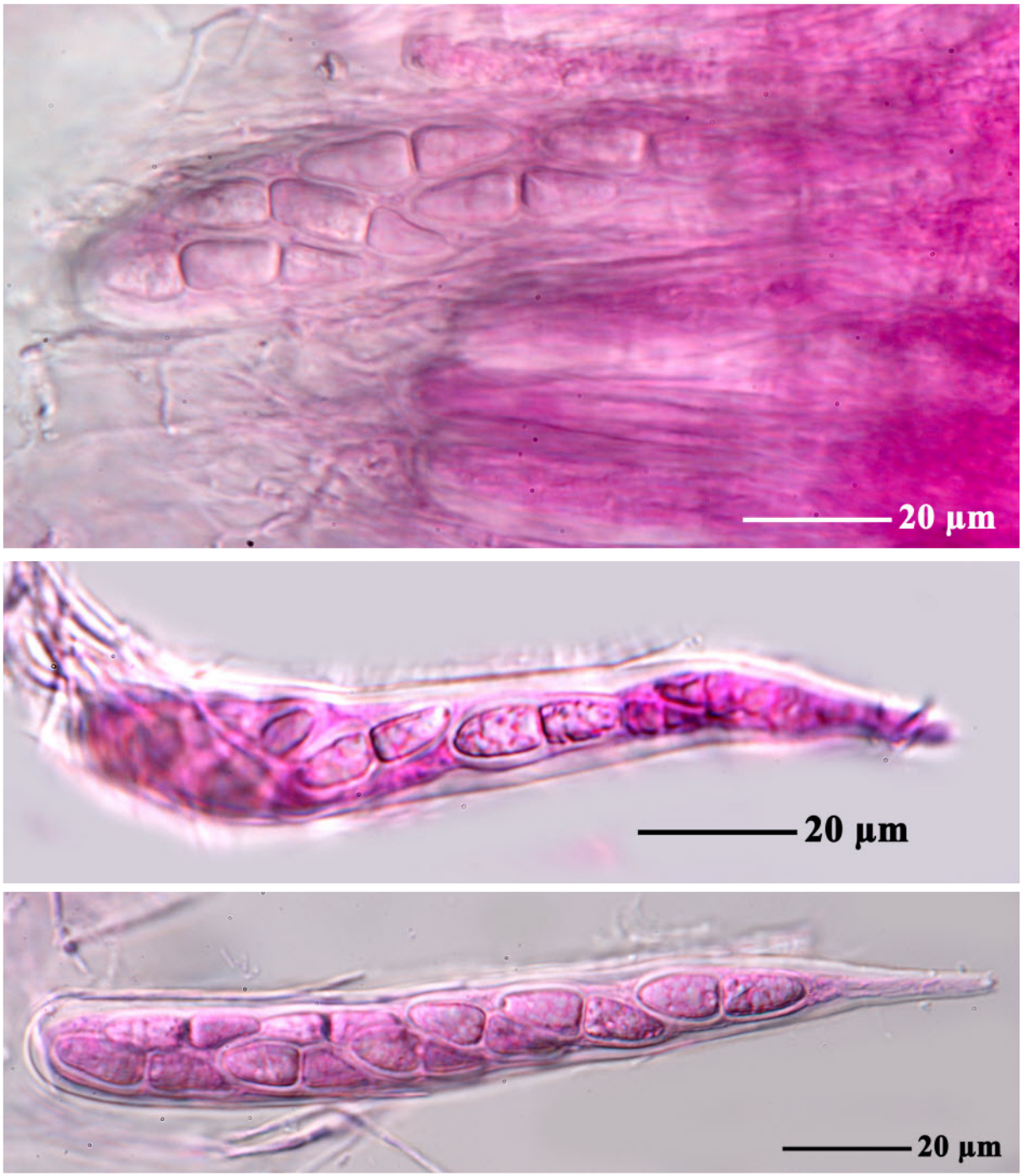
[ABL20382], Philippines, island of Luzon, prov. Benguet, Baguio, Mt. Santa Tomas, cloud forest, on tree. 120°35’ E, 16°18’ N, 2200 m. Leg. A. Aptroot (no 20382), 02.1987, det. A. Aptroot 1987.







Constrictolumina cinchonae

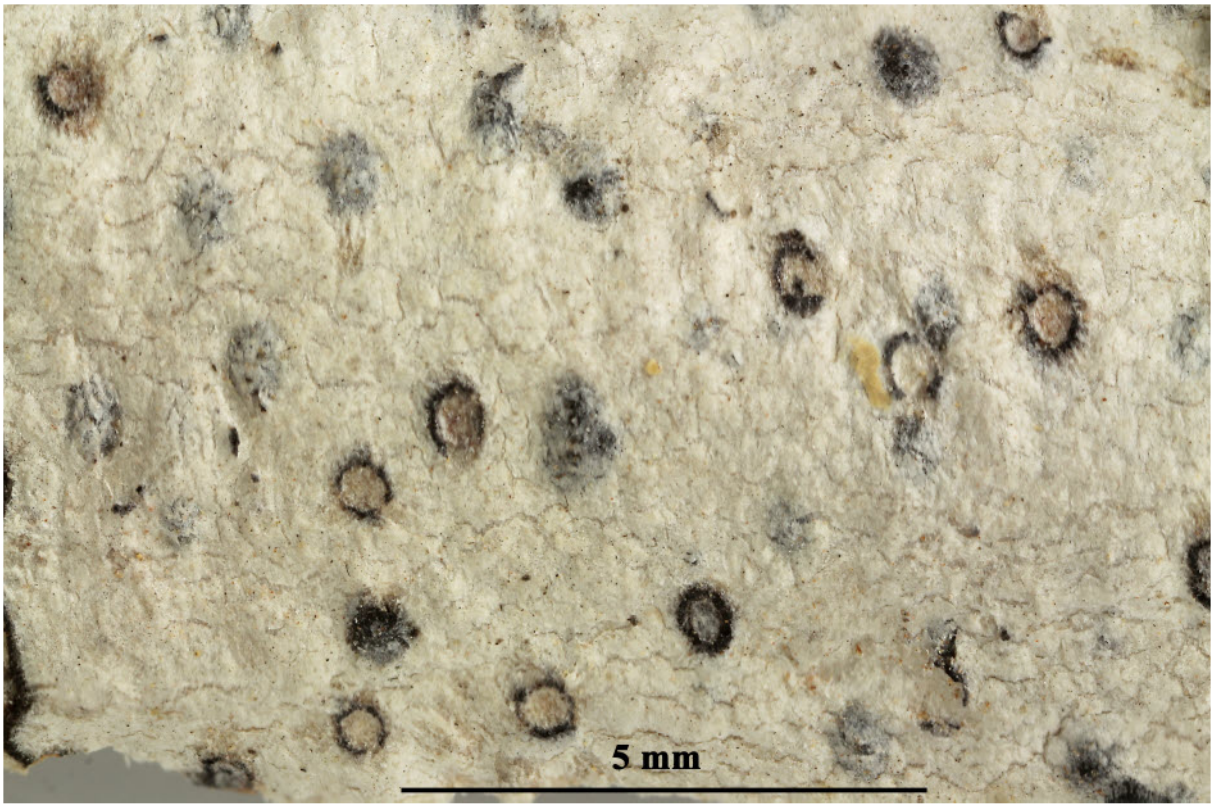


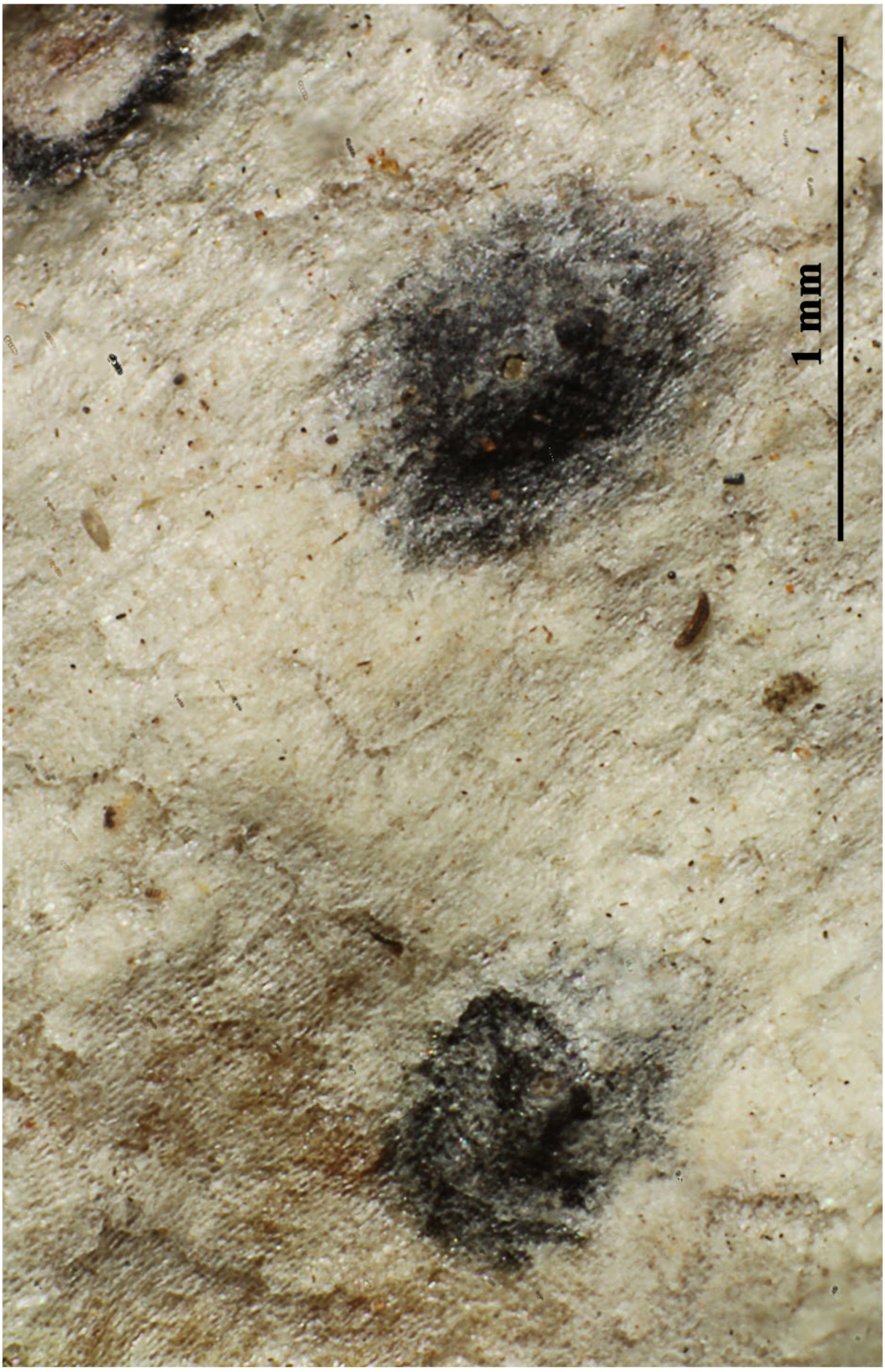
Constrictolumina cinchonae

Constrictolumina cinchonae (Ach.) Lücking, M.P. Nelsen & Aptroot, in Lücking et al., Lichenologist 48(6): 756 (2016)
= *Arthopyrenia cinchonae* (Ach.) Müll. Arg., Flora, Regensburg 66: 289 (1883)
= *Didymella cinchonae* (Ach.) Vain., Bot. Tidsskr. 29: 150 (1909)
= *Leiophloea cinchonae* (Ach.) Riedl, in Riedl & Schiman, Sydowia 17(1-6): 82 (1964) [1963]
= *Pyrenula cinchonae* (Ach.) Tuck., Proc. Amer. Acad. Arts & Sci. 7: 233 (1868) [1866]
= *Spermatodium cinchonae* (Ach.) Trevis., Conspect. Verruc.: 11 (1860)
= *Verrucaria cinchonae* Ach., Syn. meth. lich. (Lund): 90 (1814)

Ascocarps black, superficial, hemisphaerical to flattened, 0.4–0.6 mm diam.; ascocarp wall lacking below. Paraphyses slender, regular and thread-like, c. 1 µm thick. Asci mostly narrowly obovate, rarely almost cylindrical; ocular chamber mostly not evident, (85–)100–125 × 17–22 µm. Ascospores (4–)8/ascus, hyaline, 1-septate,18–30 × 6–9(–11) µm

[ISE48591], Brazil, Bahia, Itamarajú, Monte Pascual, 130 m, on tree bark in cerrado forest. Leg. M. Cáceres & A. Aptroot (no ISE 48591), 19.2.2019, det. A. Aptroot, 2019.

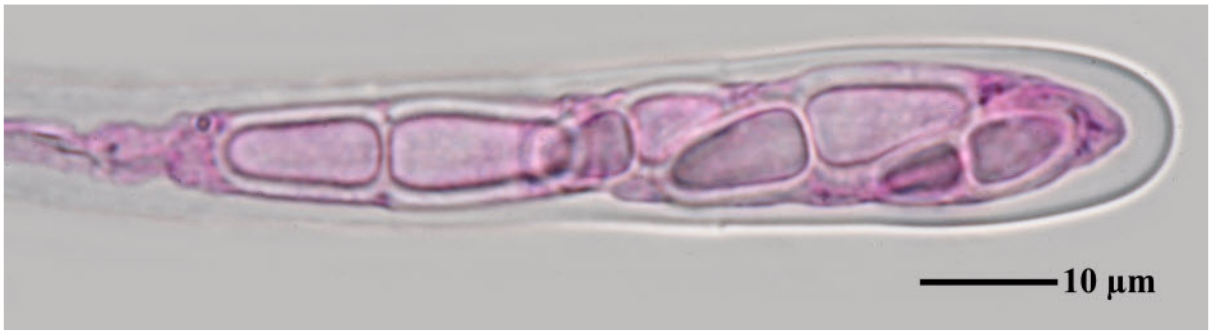




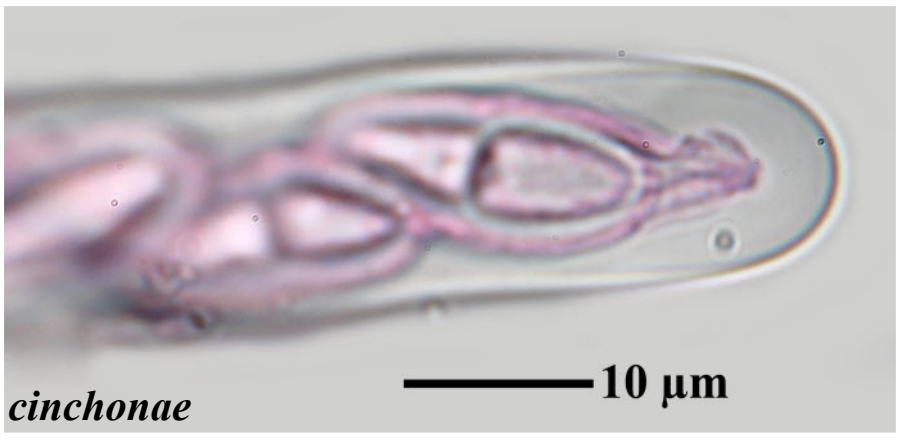
Constrictolumina cinchonae









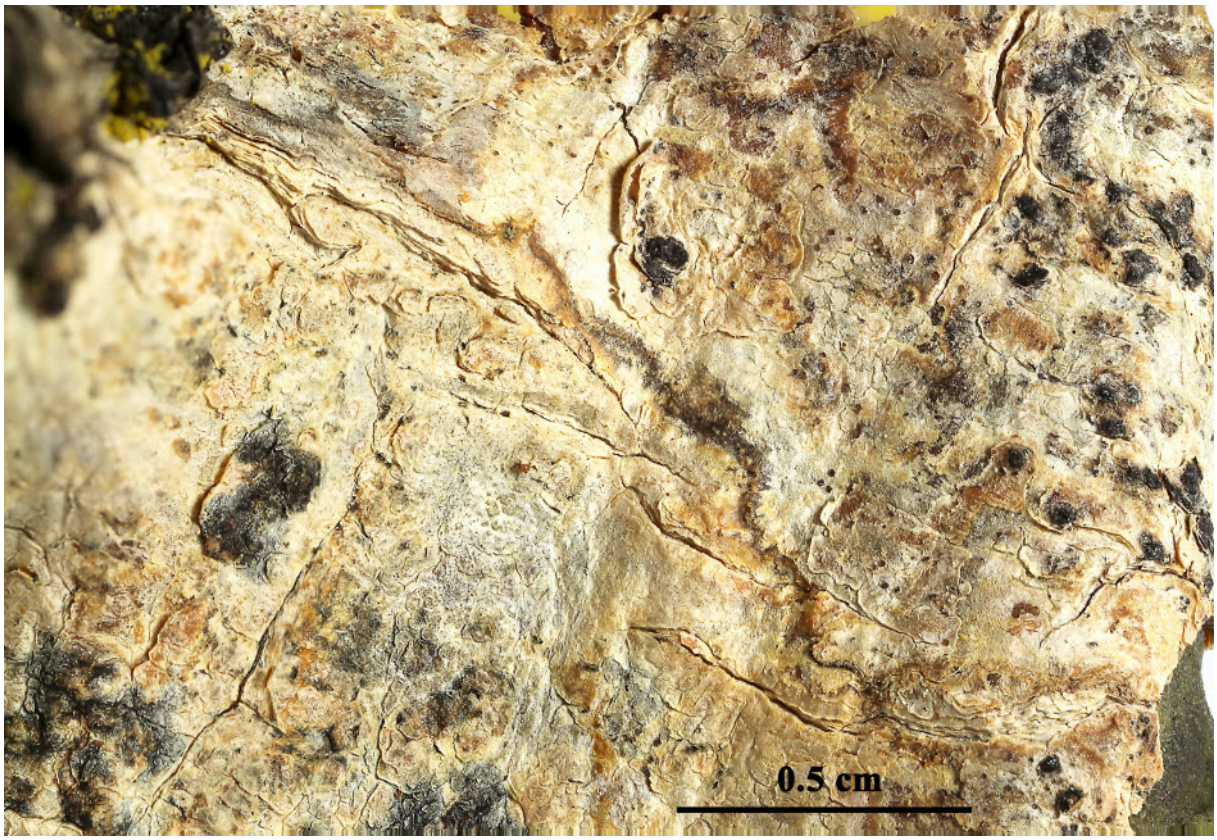


Constrictolumina cinchonae

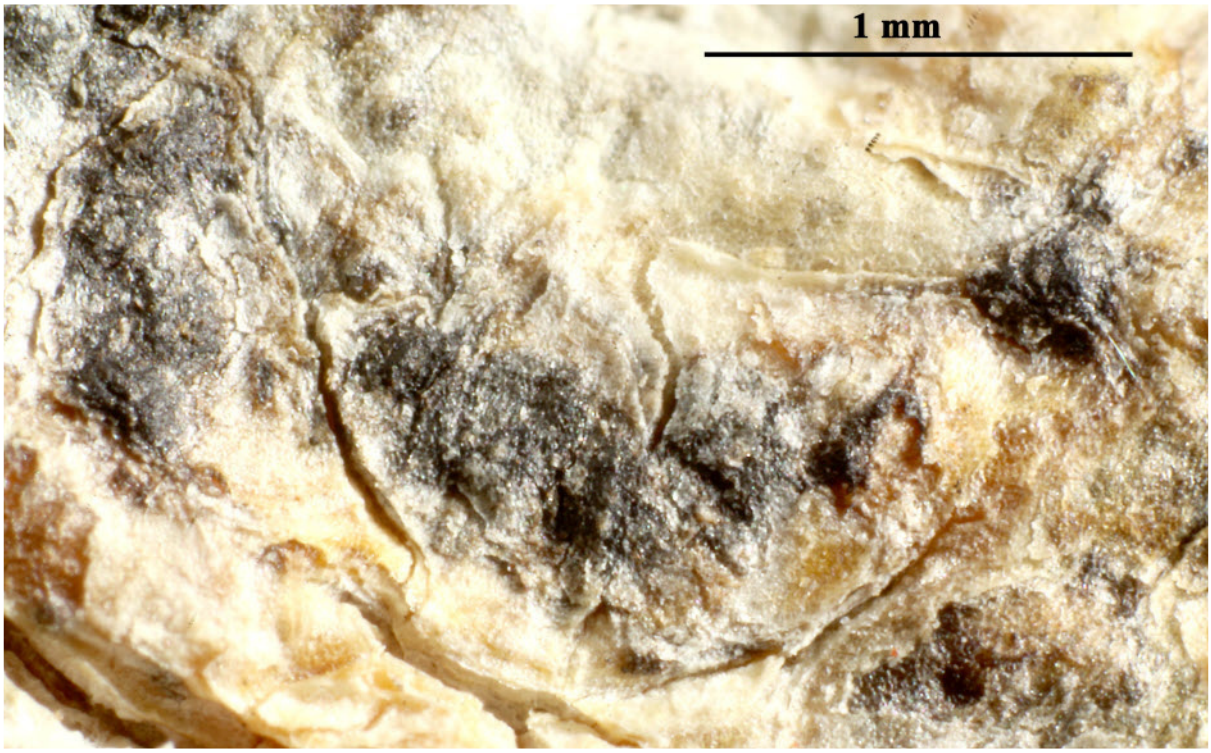
Constrictolumina leucostoma (Müll. Arg.) Lücking, M.P. Nelsen & Aptroot, in Aptroot & Lücking, Lichenologist 48(6): 920 (2016)
= *Arthopyrenia confluens* R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 80 (1995)
= *Tomasellia leucostoma* Müll. Arg., Flora, Regensburg 68: 257 (1885)

Thallus thin, whitish. Ascomata with apical ostioles, solitary or grouped, 0.1–0.2 mm diam., erumpent; tip of ascocarp surrounded by a broad, thin, black ring, 0,2–0.3 mm in width, often confluent with the rings of other ascomata forming groups of 2–10. Ostioles often depressed, surrounded by a witish ring. Asci mostly norrowly ovate, rarely almost narrowly cylindrical, Ascospores 8/ascus, irregularly arranged to biseriate, 3(–5)-septate, 17–22 × 6–9 µm. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

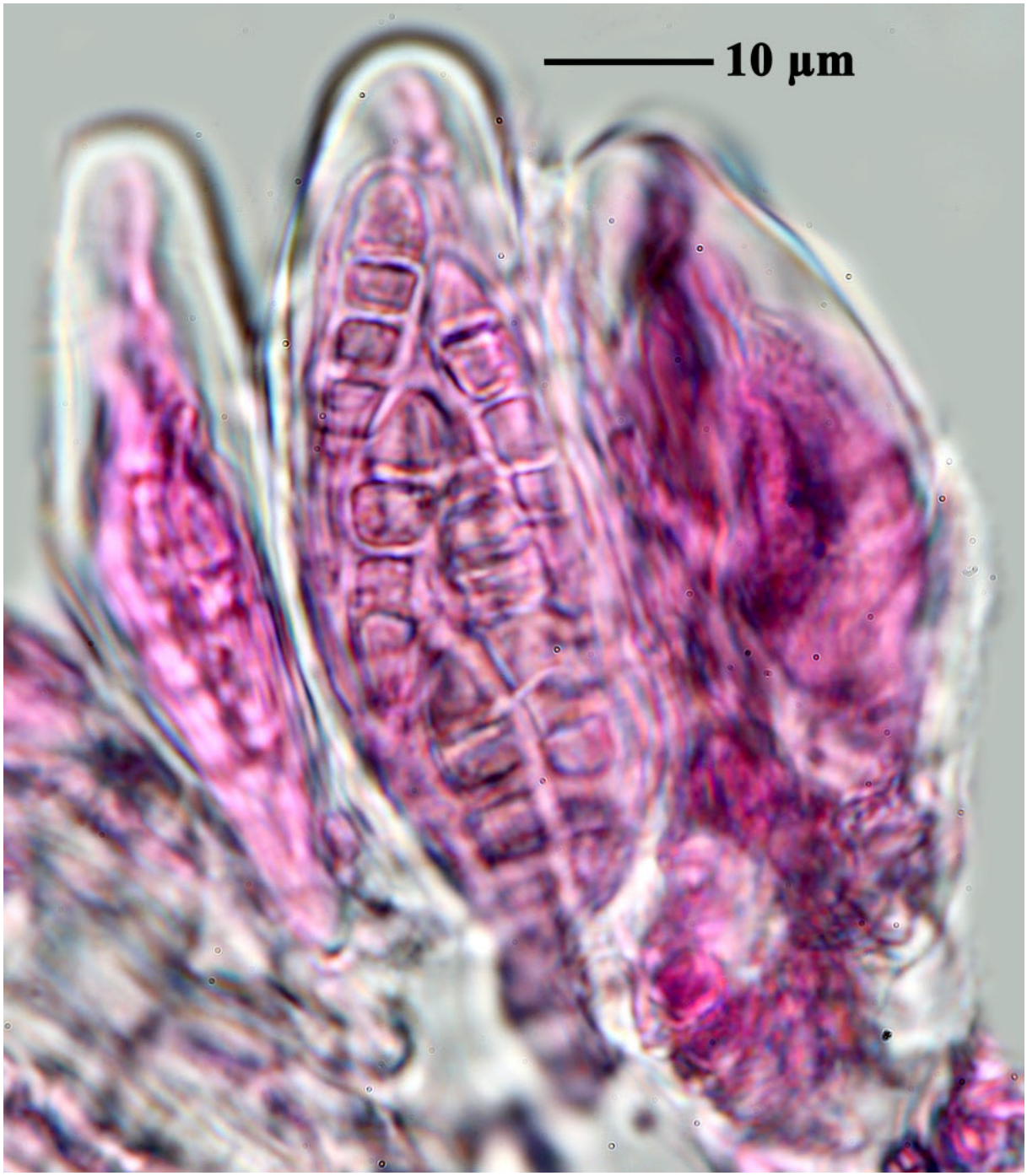
[ABL12568], Madagascar, Ankilibe, 10 km SE of Tulear, coastal area with mangrove and dry bush, 43°46’ E, 23°25’ S, 0 m, on Didiera madagascariensis. Leg. A Aptroot (no 12568) & R. Hensen, 22.4.1984, det. A. Aptroot.







Constrictolumina leucostoma



Constrictolumina leucostoma



Constrictolumina leucostoma

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

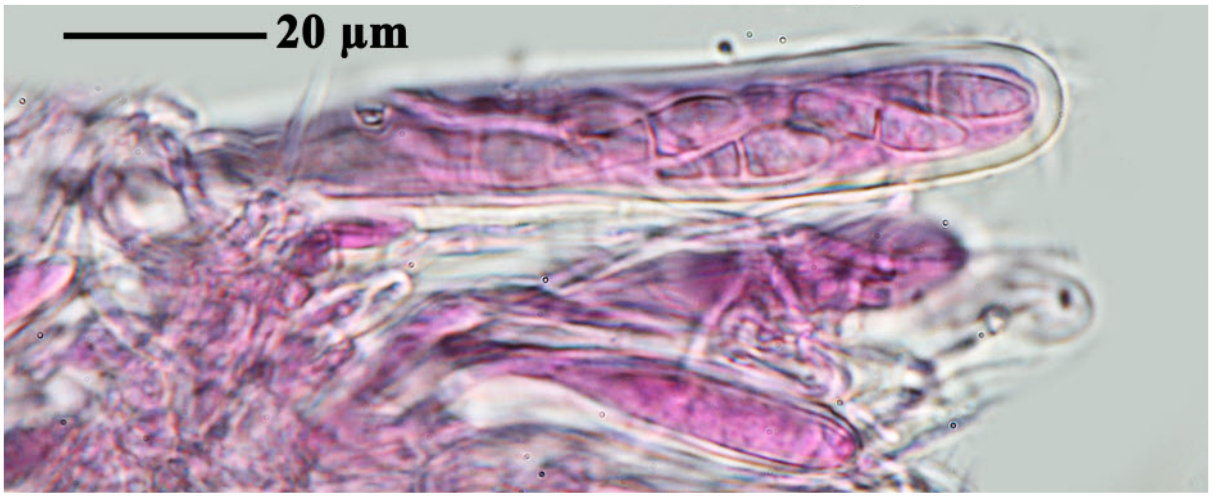
= *Arthopyrenia lyrata* R.C. Harris, in Tucker & Harris, Bryologist 83(1): 6 (1980)

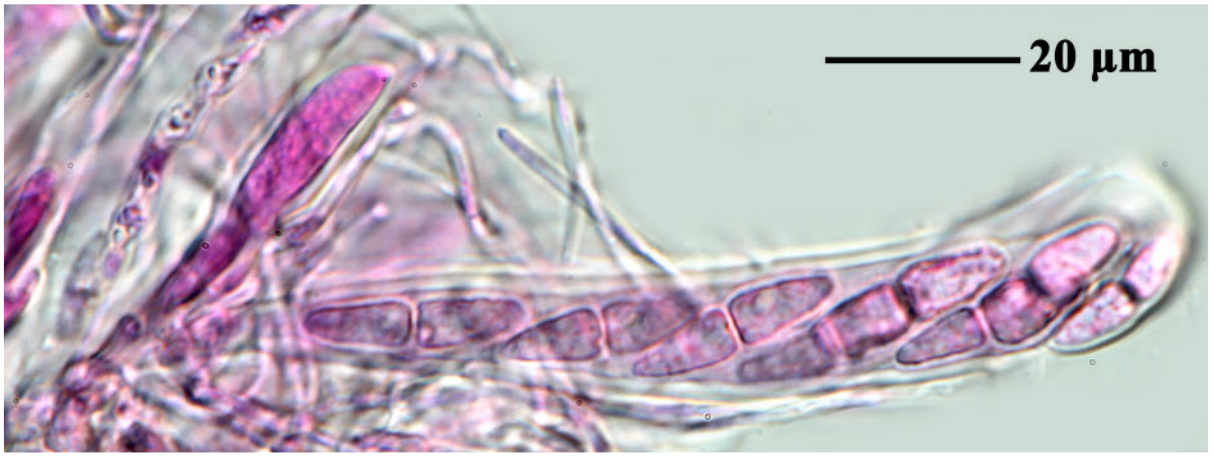
Thallus thin, whitish. Ascomata with apical ostioles, solitary, 0.3–0.5 mm diam., erumpent to prominent, less commonly immersed, hemispherical. Wall usually lacking below. Asci 75–120(–130) × 20–30 µm. Ascospores (4–)8/ascus, 1-septate, rarely becoming 3-septate, wall weak granular ornamented, 18–30 × 7–12 µm. Chemistry:Thallus and Ascomata UV-, K-. TLC: No substances detected.

[Nash31078], Mexico, Sinaloa, Sierra Madre Occidental, 1 km S of Barranca Lierre near route 40, 2 km W of Burango border. Mixed pine-oak forest vascular epiphytes; on Quercus, 23°28'0" N, 105°50'0" W, 2300 m. Leg. T.H. Nash III (no 31078), 27.05.1992, det. A. Aptroot.









Constrictolumina lyrata



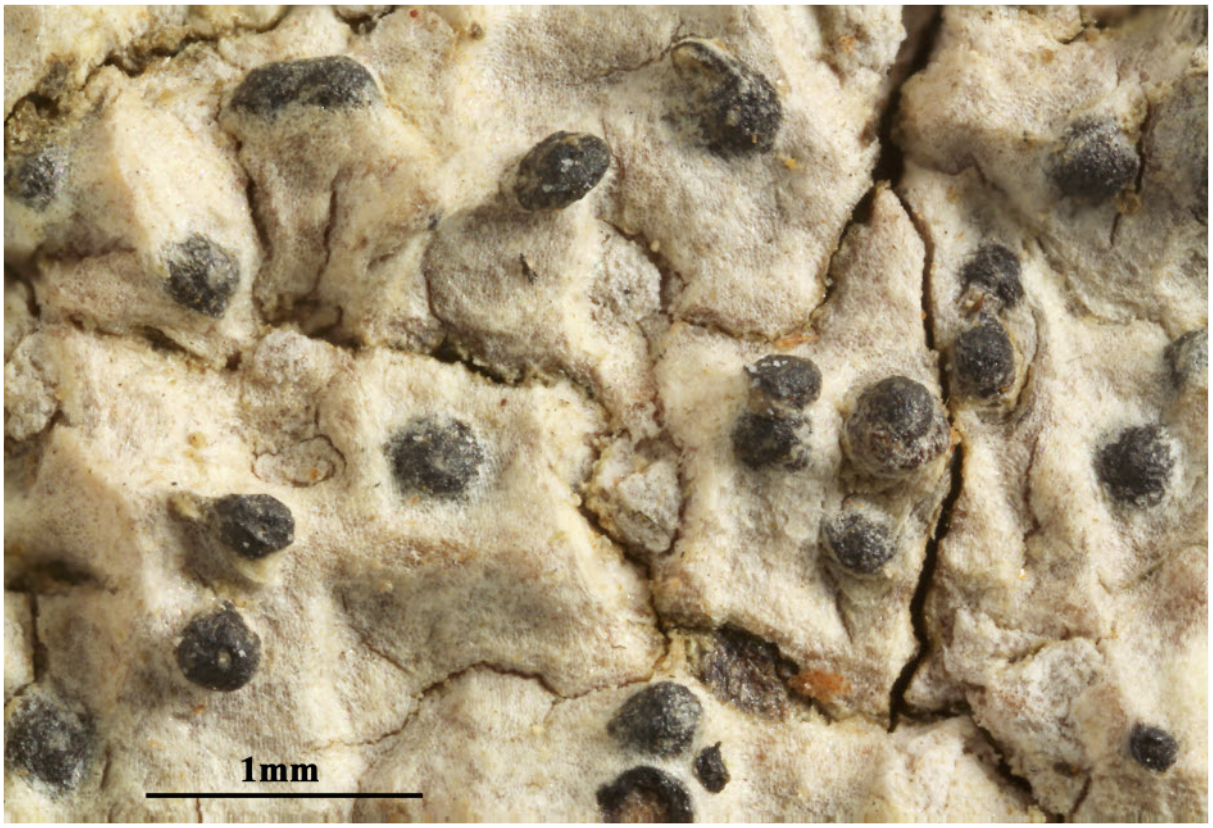
Constrictolumina lyrata

Constrictolumina planorbis (Ach.) Lücking, M.P. Nelsen & Aptroot, in Lücking et al., Lichenologist 48(6): 756 (2016)
= *Arthopyrenia planorbis* (Ach.) Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 30(no. 3): 27 (1888)
= *Pyrenula planorbis* (Ach.) Trevis., Spighe Paglie: 17 (1853)
= *Sagedia planorbis* (Ach.) A. Massal., Ric. auton. lich. crost. (Verona): 161 (1852)
= *Spermatodium planorbis* (Ach.) Trevis., Conspect. Verruc.: 11 (1860)
= *Verrucaria planorbis* Ach., Syn. meth. lich. (Lund): 92 (1814)

Ascocarps superficial to slightly immersed, hemispherical, 0.3–0.4 mm in diam.; ascocarp wall thinner or lacking below. Paraphyses slender, regular and thread-like. Asci narrowly elliptical, narrowly ovate or narrovly obovate, 75–110 × 12–18 µm. Ascospores uniseriate to biseriate, narrowly elliptical to narrowly ovate, with one or both ends pointed, 2-celled, rarely 4-celled in old age, cells approximately equal in size, cells constricted near the middle or rarely two constrictions per cell; perispore well developed, (13–)15–20 × 4.5–6.5 µm. Microconidia linear, 10–12(–15) × 1 µm.

[ABL18897], Papua New Guinea, Eastern Highlands, prov. Mount Kiss-Kiss, 1 km E of Goroka. On cultivated tree in open area. 145°24’ E, 6°04’ S, 1700 m. Leg. A. Aptroot (no 18897), 03.1987, det. A. Aptroot 1987.







Constrictolumina planorbis

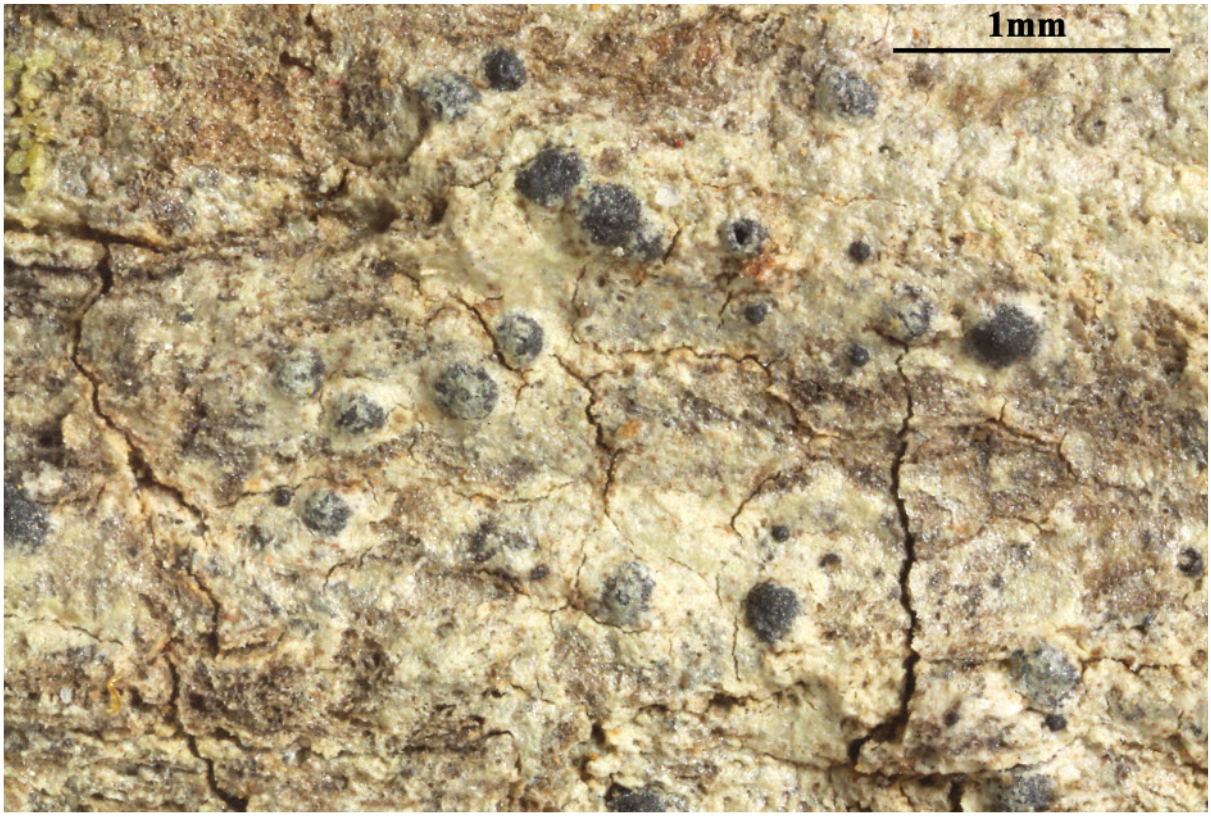


Constrictolumina planorbis

Dichoporis phaea (Ach.) S.H. Jiang, Lücking & Sérus., in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [129] (2020)
= *Strigula phaea* (Ach.) R.C. Harris, in Tucker & Harris, Bryologist 83(1): 18 (1980)
= *Porina phaea* (Ach.) Müll. Arg., Flora, Regensburg 68(12): 261 (1885)
= *Strigula diederichiana* Etayo, Cl. Roux & Sérus., Bull. Soc. linn. Provence 44: 129 (1993)
= *Verrucaria phaea* Ach., Syn. meth. lich. (Lund): 88 (1814)

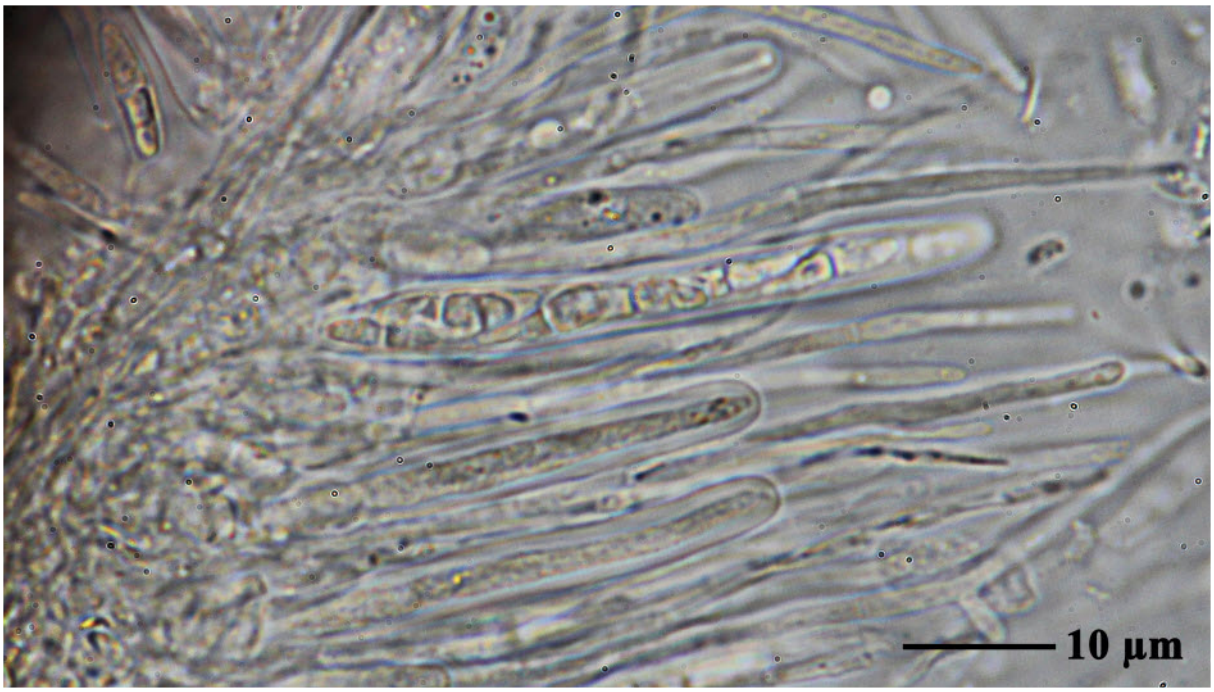
Thallus light green to dark green or dark olive or brown, at least in part epiphloedal. Ascocarps hemispherical or conical, 0.2–0.3 mm in diam., ascocarp wall usually thinner or lacking below. Asci narrowly elliptical to dactyloid, 40–44(–65) × 5–8 µm. Ascospores uniseriate to biseriate, narrowly ovate or narrowly elliptical, 1-septate, slightly constricted at the septum, 9–11(–13) × 2.5–4 µm

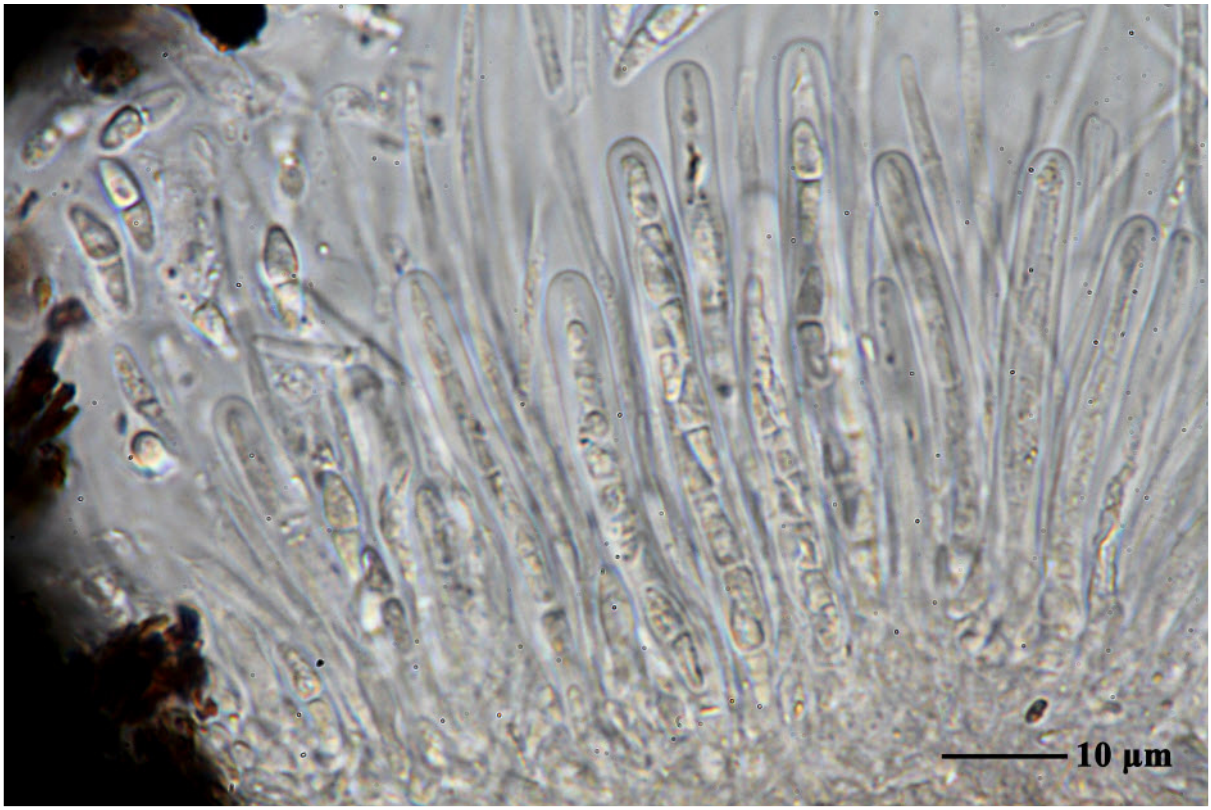
[ABL18983], Brazil, Sergipe, Santa Luzia do Itanhy, Mata do Crasto, on tree bark in Atlantic rainforest.10 m, 11°22’ S, 37°25’ W. Leg. M. Cáceres & A. Aptroot (no 18983), 26.03.2014, det. A. Aptroot 2014.



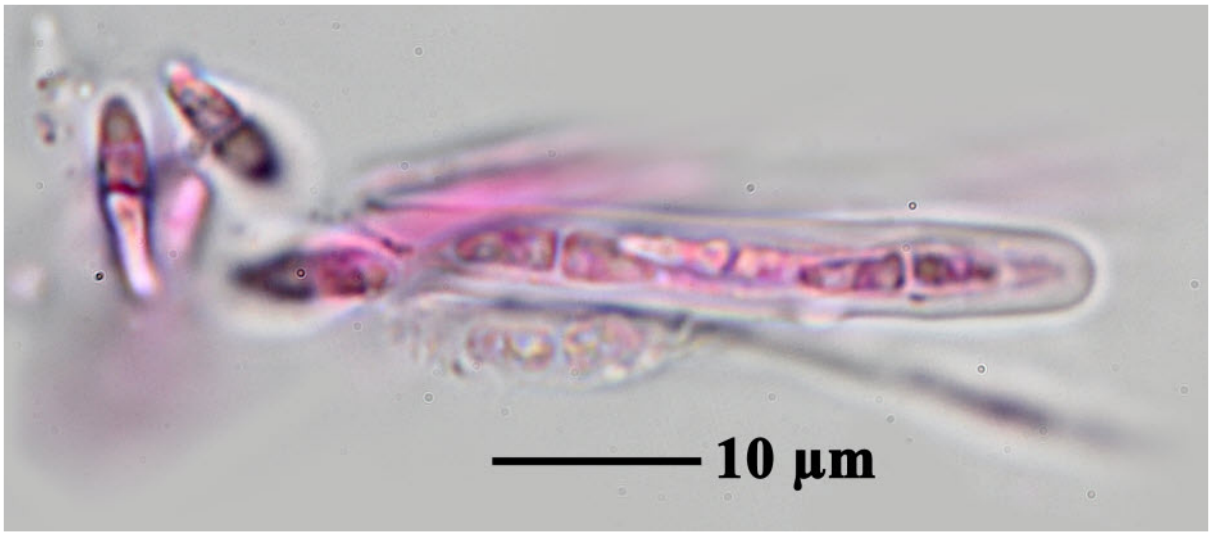


Dichoporis phaea

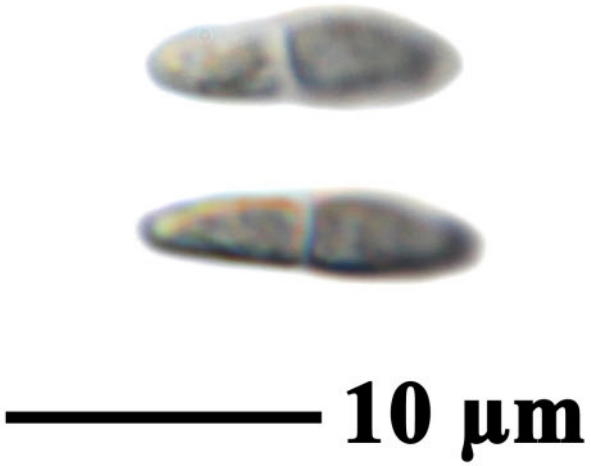




Dichoporis phaea







Dichoporis phaea

Dichoporis tenuis (R.C. Harris) S.H. Jiang, Lücking & Sérus., in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [129] (2020)

= *Strigula americana* R.C. Harris, in Tucker & Harris, Bryologist 83(1): 18 (1980)

= *Arthopyrenia tenuis* R.C. Harris, Michigan Bot. 12: 16 (1973)

Thallus endophloeodal, pale grey, smooth. Ascocarps scattered or crowded and occasionally 2–3 fused, black, usually shiny, hemispherical to slightly conical, c. one-third immersed, 0.4-0.5 mm diam., 0.2–0.35 mm in height. Ascocarp wall entire or lacking below, brown above, 30–60 µm thick, thinner and colourless below. Hymenium IKI-. Interthecial hyphae 1–2 µm thick, septate, occasionally branched but not anastomosed. Asci narrowly cylindrical, slightly thickened at the tip, inner surface often with an indistinct indentation, 80–135 × 8–12 µm. Spores 8/ascus, obliquely uniseriate to biseriate, fusiform, 1-septate, with equal or unequal cells, slightly constricted at the septum, occasionally slightly bent, without a gelatinous sheath, 17–27 × 4–5.5 µm.

[ABL11544], Brazil, Rondônia, Porto Velho, Parque Natural Municipal, on tree bark in primary rain forest. 100 m, 8°41’10” S, 63°52’05” W. Leg. M. Cáceres & A. Aptroot (no 11544), 9-12.03.2012, det. A. Aptroot, 2012.





Dichoporis tenuis

Dichoporis viridiseda (Nyl.) S.H. Jiang, Lücking & Sérus., in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [129] (2020)
= *Strigula viridiseda* (Nyl.) R.C. Harris, in Tucker & Harris, Bryologist 83(1): 18 (1980)
= *Leiophloea viridiseda* (Nyl.) Trevis., Conspect. Verruc.: 10 (1860)
= *Porina viridiseda* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 409 (1922)
= *Verrucaria viridiseda* Nyl., Expos. Synopt. Pyrenocarp.: 55 (1858)

Thallus green, without hypothallus. Perithecia conical, black, superficial on the thallus, 0.2–0.4 mm diam. Perithecial wall black above, furthermore pale, up to 20 µm thick. Hamathecium not inspersed, filaments branched. Ostiole black. Ascospores 8/ascus, uniseriate, hyaline, fusiform, 1-septate, 12–17 × 4.5–5.5 µm, ends pointed. Conidiomata black pycnidia, conidia hyaline, ellipsoid, 7–9 × 2–2.5 µm, with gelatinous caps.

[ABL21934], Brazil, Pernambuco, Caruaru, Brejo dos Cavalos, on tree bark in mountain forest. Leg. M. Cáceres & A. Aptroot (no 21934), 16.9.2014, det. A. Aptroot, 2014.



Dichoporis wilsonii (Riddle) S.H. Jiang, Lücking & Serus., in Hongsanan et al., Fungal Diversity https://doi.org/10.1007/s13225-020-00462-6 (2019)

= *Strigula wilsonii* (Riddle) R.C. Harris, in Egan, Bryologist 90(2): 164 (1987)

= *Porina wilsonii* Riddle, in Britton & Millspaugh 1920

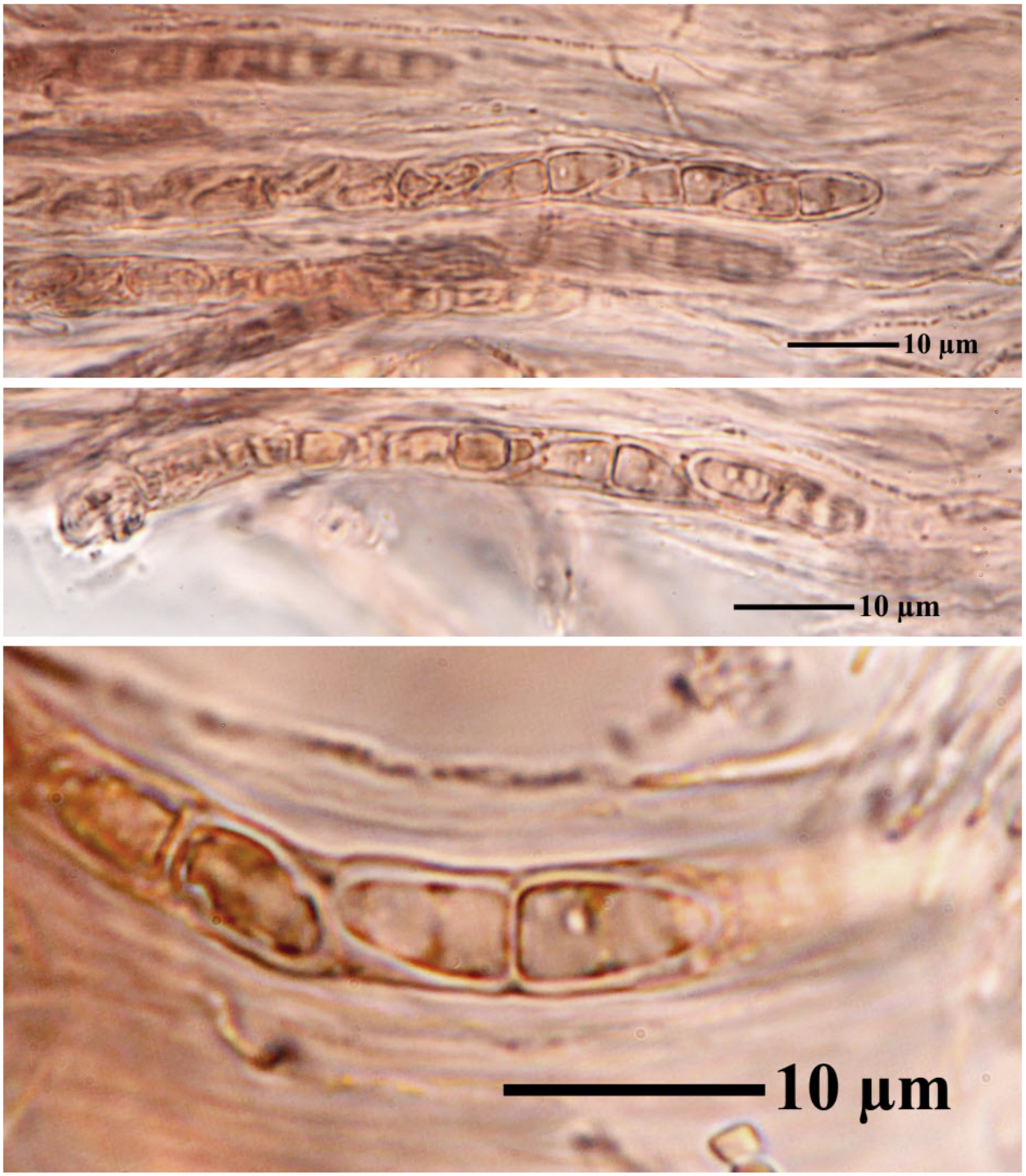
Thallus immersed, white, at most with a blackish prothallus. Perithecia prominent, 0.4–0.9 mm diam. Ascospores 1-septate, hyaline, 18–22 × 5–7.5 µm.

[ABL72327], Puerto Rico, Utuado, Bosque Estatal Rio Abajo, on mogote peak. 18°20’ N, 66°43’ W, 420 m. Lower montane seasonal evergreen and semideciduous moist forest on karst, shrub on summit, on limestone. Leg. A. Aptroot (no 72327), 20.02.2014, det. A. Aptroot, 2014





Strigula wilsonii

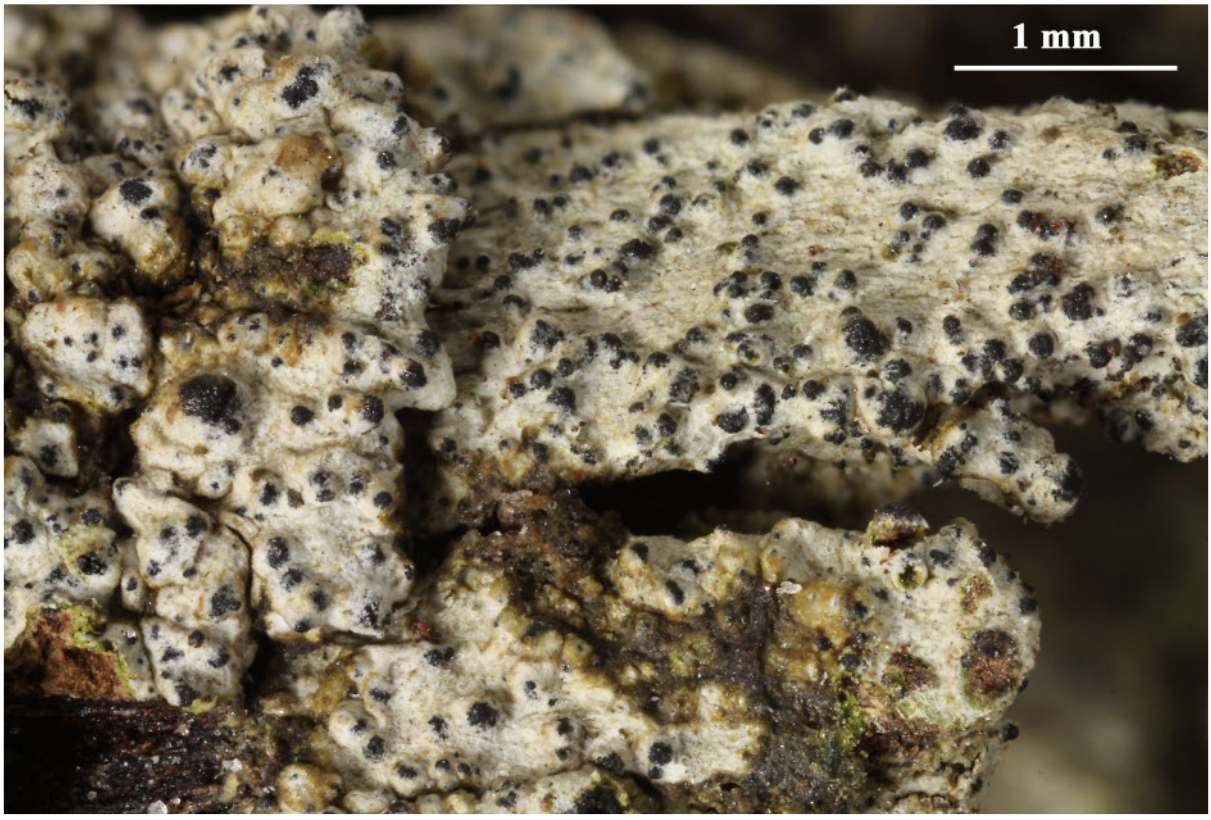


Strigula wilsonii

Dichoporis ziziphi (A. Massal.) S.H. Jiang, Lücking & Sérus., in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [130] (2020)
= *Strigula ziziphi* (A. Massal.) Cl. Roux & Sérus., in Roux, Sérusiaux, Bricaud & Coppins, Biblthca Lichenol. 90: 55 (2004)
= *Porina ziziphi* (A. Massal.) Zahlbr., Cat. Lich. Univers. 1: 410 (1922)
= *Sagedia ziziphi* A. Massal., Miscell. Lichenol.: 30 (1856)
= *Spermatodium ziziphi* (A. Massal.) Trevis., Conspect. Verruc.: 12 (1860)

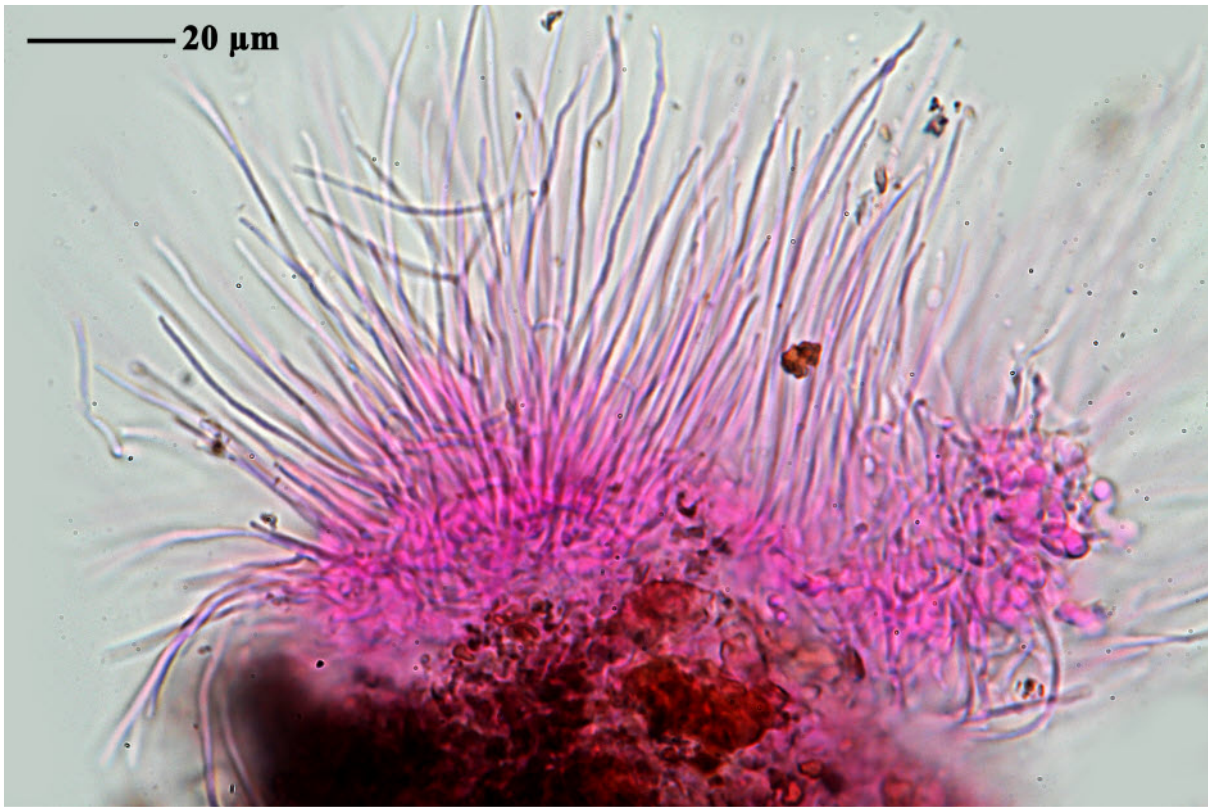
Thallus pale grey, brownish grey, brownish, olive brownish or greenish, continuous , most part endophloeodic. Ascomata (0.2–)0.3–0.4(–0.5) mm. Asci 53–72 × 8–12 µm. Ascospores 18–28 × 3.5–5.5 µm, hyaline, 1-septate.

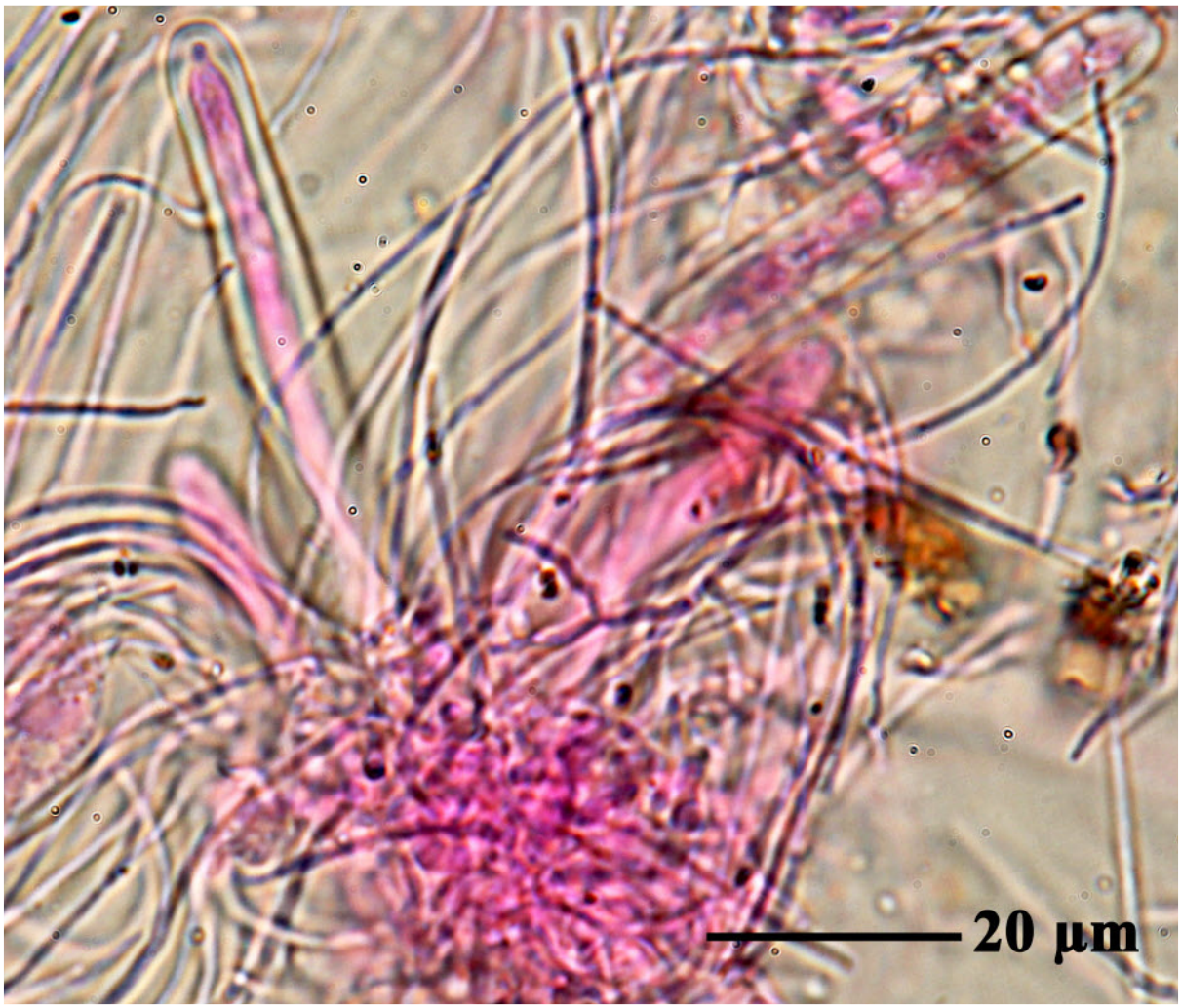
[ABL21567], Brazil, Sergipe, Aracaju, São Cristóvão, UFS campus, on tree bark in university campus. 10 m, 10°55’ S, 37°06’ W. Leg. M. Cáceres & A. Aptroot (no 21567), 7.4.2014, det. A. Aptroot, 2014





Dichoporis ziziphi





Dichoporis ziziphi

Dictyomeridium amylosporum (Vain.) Aptroot, M.P. Nelsen & Lücking, in Aptroot & Lücking, Lichenologist 48(6): 923 (2016)

= *Campylothelium amylosporum* (Vain.) R.C. Harris, in Tucker & Harris, Bryologist 83(1): 7 (1980)

= *Polyblastiopsis amylospora* (Vain.) Zahlbr., Cat. Lich. Univers. 1: 347 (1922)

= *Polymeridium amylosporum* (Vain.) Aptroot, Nova Hedwigia 98(1-2): 10 (2013) [2014]

= *Thelenella amylospora* Vain., Acta Soc. Fauna Flora fenn. 7(no. 2): 218 (1890)

Thallus ecorticate, white, UV-. Ascomata pleurothelioid, with lateral ostioles, solitary, 0.4–0.6 mm diam., erumpent to prominent, black. Hamathecium clear, filaments profusely anastomosing. Ascospores 8/ascus, IKI+ violet, muriform, 44–55 × 12–21 µm, with partly oblique septa, not ornamented, wall not thickened. Chemistry: Thallus and ascomata UV-, K-. TLC: No substances detected.

[ABL41150], Brazil, Minas Gerais, Catas Atlas, Serra do Caraça, Parque National do Caraça, near Banho do Belchior, 20°06’ S, 43°20’ W, 1250 m. Leg. A. Aptroot (no 41150), 17.09.1997, det. A. Aptroot, 1998.





Dictyomeridium amylosporum

Dictyomeridium campylothelioides (Aptroot & Sipman) Aptroot, M.P. Nelsen & Lücking, in Aptroot & Lücking, Lichenologist 48(6): 924 (2016)
= *Polymeridium campylothelioides* Aptroot & Sipman, in Aptroot, Diederich, Sérusiaux & Sipman, Biblthca Lichenol. 57: 37 (1995)

Thallus ecorticate, white, UV–. Ascomata solitary or 2 aggregated with common ostiole. Ostioles lateral. Hamathecium not inspersed, filaments profusely anastomosing. Ascospores 8/ascus, IKI–, muriform, 55–80 × 17–25 µm, with partly oblique septa, not ornamented, wall not thickened. Chemistry: no substances.

[Groenhart5796], Indonesia, East Java, Bay of Tapen, S. of Wlingli. Leg. P. Groenhart (no 5796), 14.5.1939, det. A. Aptroot.







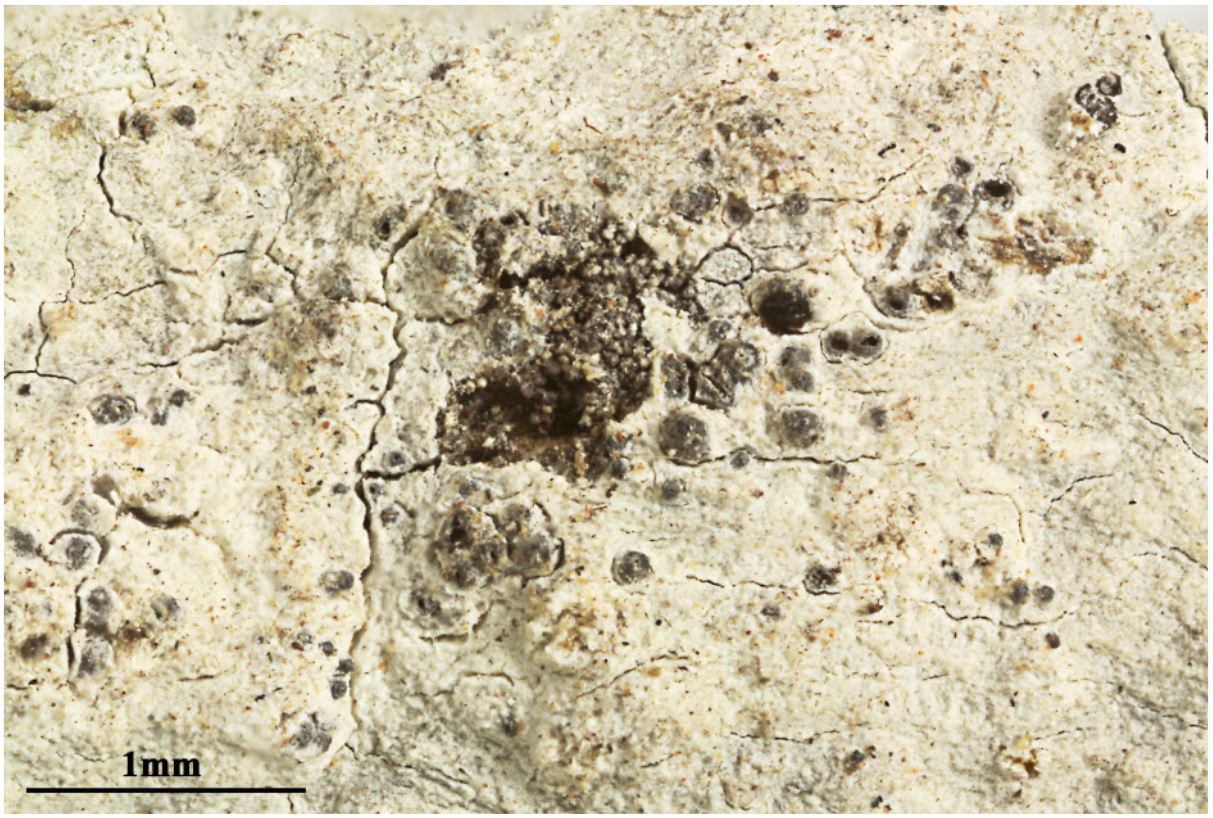
Dictyomeridium campy-

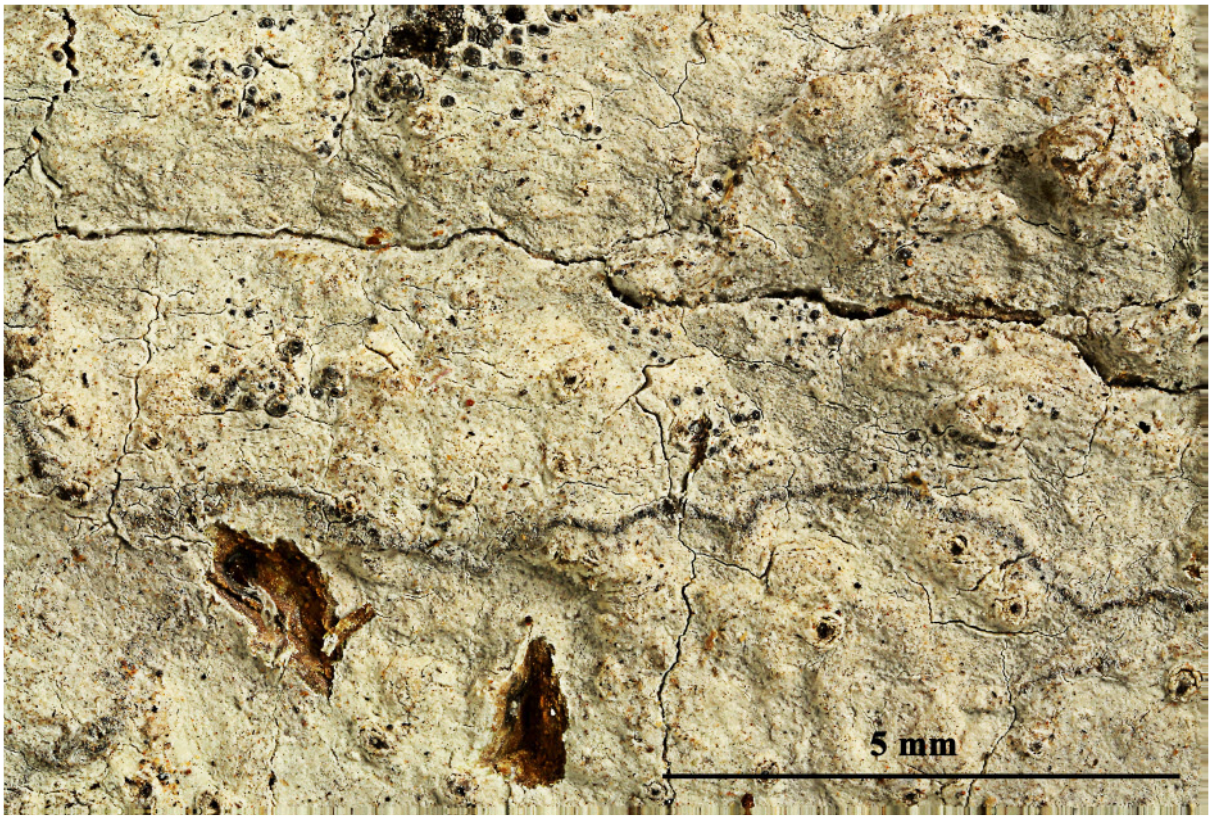
Dictyomeridium immersum Aptroot, M.P. Nelsen & Lücking, in Aptroot & Lücking, Lichenologist 48(6): 925 (2016)
= *Polymeridium immersum* Aptroot, A.A. Menezes & M. Cáceres, Lichenologist 45(4): 546 (2013)

Thallus ecorticate, pale pinkish white, surrounded by a brown prothallus line. Ascomata pleurothelioid, with lateral ostioles, solitary, 0.3–0.5 mm diam., immersed-erumpent, whitish. Hamathecium clear. Ascospores muriform, 2 per ascus, hyaline, IKI–, 9–15(–19) × 1–4-septate, ellipsoidal to fusiform, (45–)60–70 × 17–25 µm, outer wall generally constricted at the medium septum. Chemistry: Thallus UV+ yellow, K–. TLC: lichexanthone.

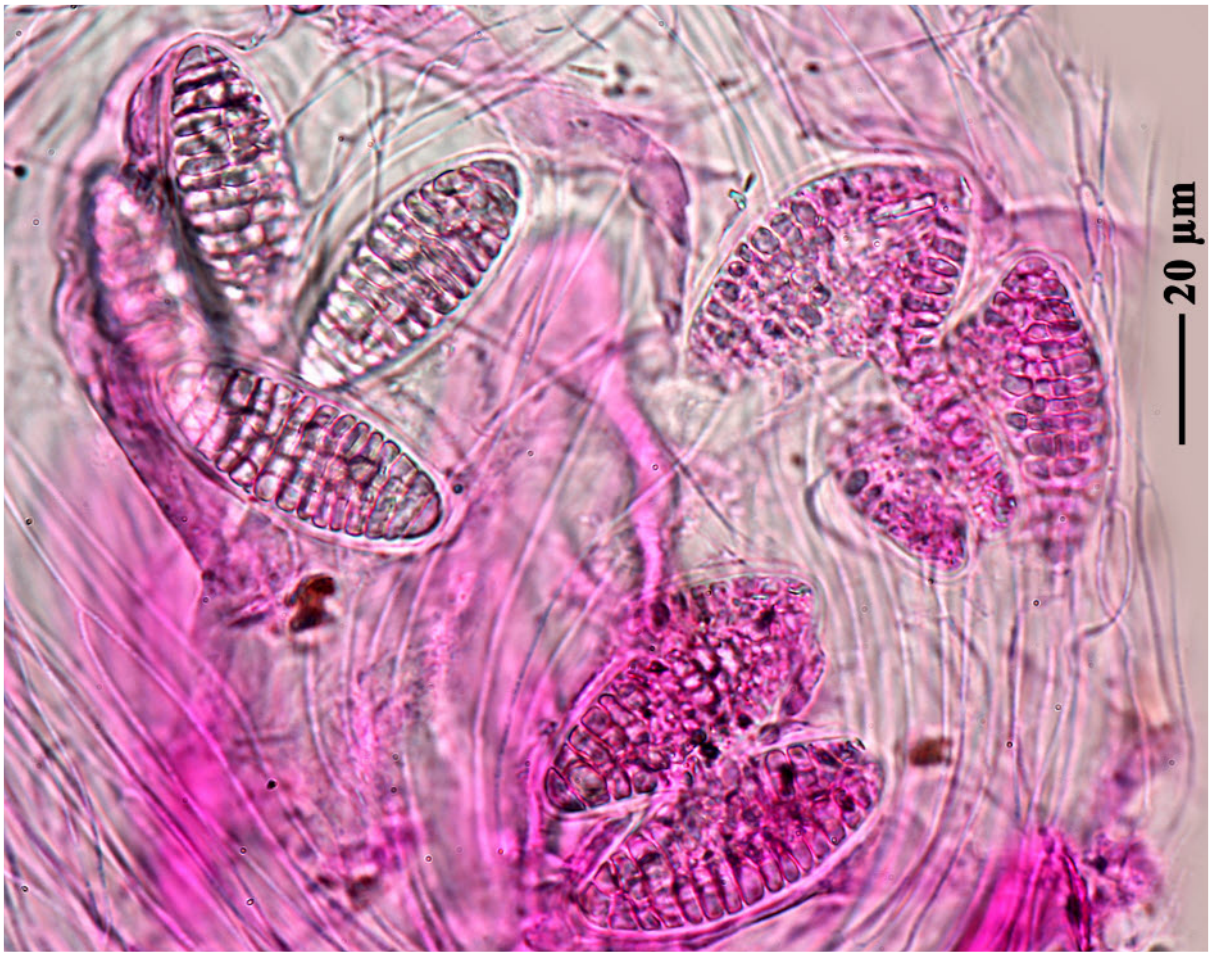
[ABL11138], Brazil, Rondônia, Porto Velho, UNIR Federal University campus S of city, on bark of tree, 100 m, 8°50’14” S, 63°56’25”. Leg. M. Cáceres & Aptroot (no 11138), 8.03.2012, det. A. Aptroot, 2012. ISOTYPE.

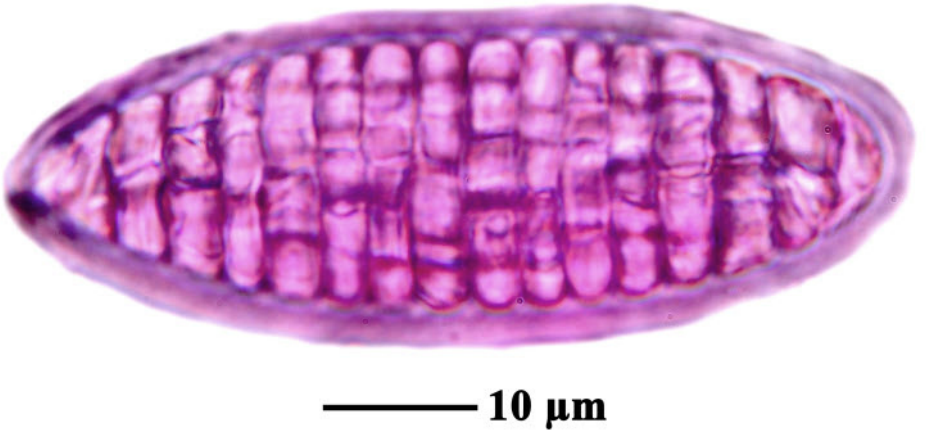


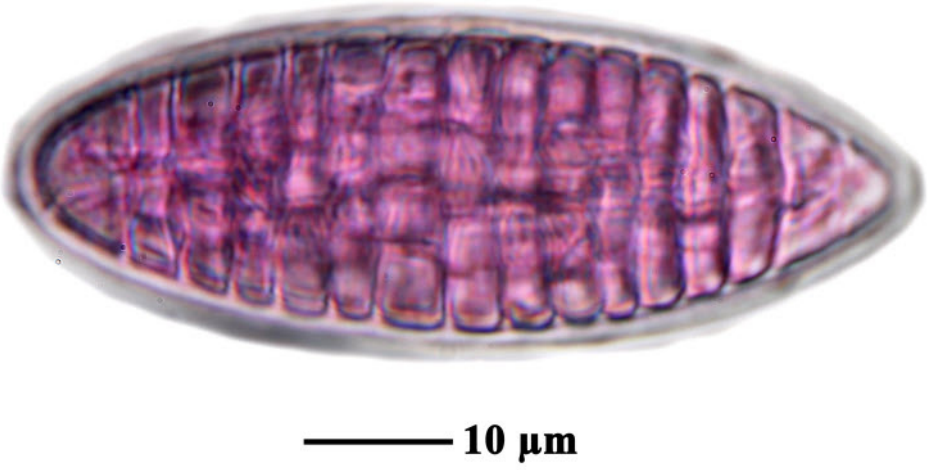




Dictyomeridium immersum







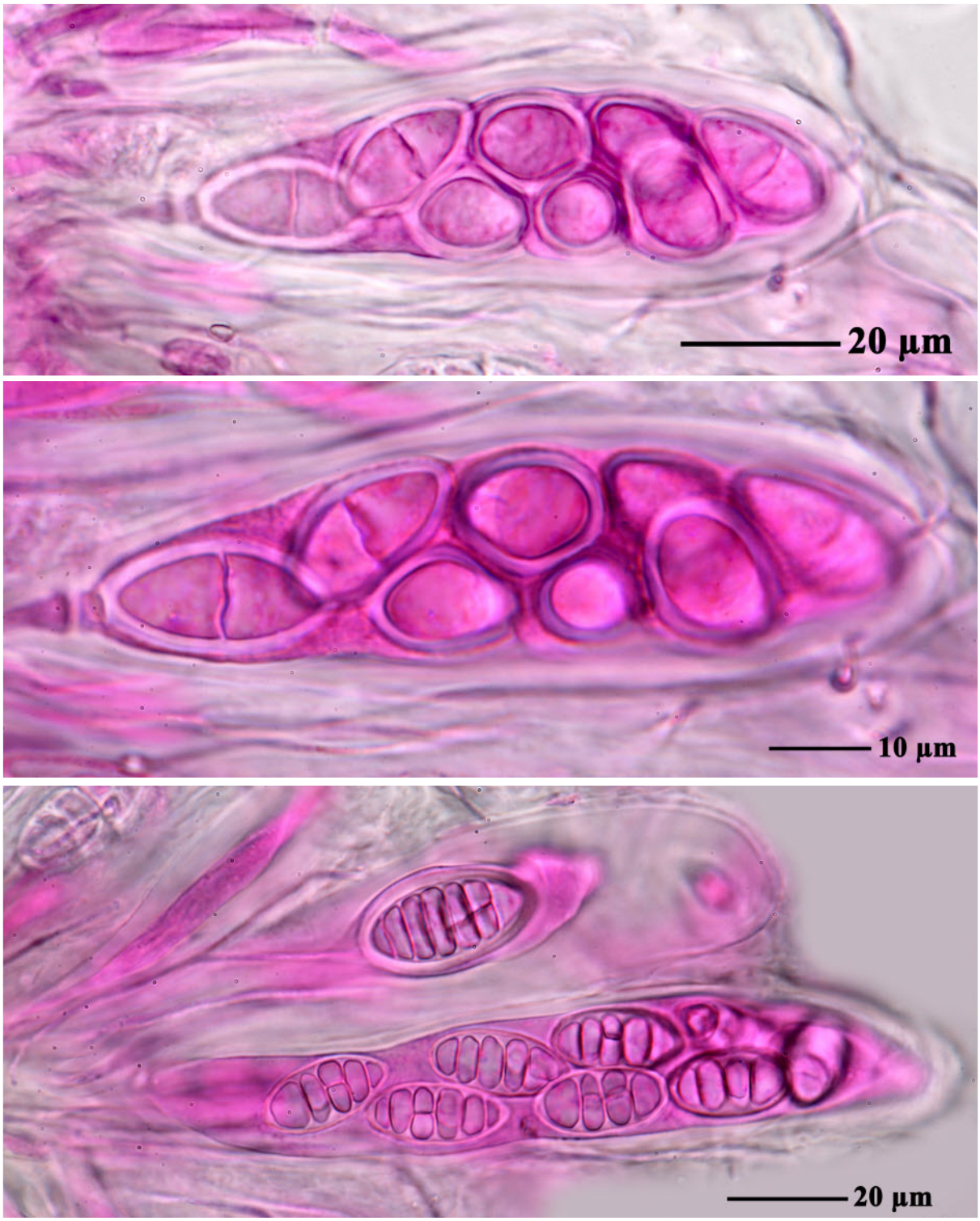
Dictyomeridium immersum

Dictyomeridium lueckingii Flakus & Aptroot, in Flakus, Kukwa & Aptroot, Lichenologist 48(6): 681 (2016)

Thallus ecorticate, smooth, cracked, matt, somewhat white pruinose, continuous, c. 0.2 mm thick, white, not surrounded by a black prothallus. Ascomata pyriform, 0.2–0.4 mm diam., single, half immersed, with a surface different from the thallus, ascomatal verrucae distinctly raised above the thallus. Wall fully carbonized, not differentiated into excipulum and involucrellum, ≤ 80 µm wide. Ostioles excentric, not fused, beaked, black, surrounded by a greyish spot. Hamathecium clear. Ascospores 8/ascus, hyaline, I+ violet, submuriform, with 5–6 transverse and 1–2 longitudinal septa, 8–13 celled, broadly ellipsoid, 25–35 × 12–17 µm, ends rounded, lumina rounded, surrounded by a gelatinous layer ≤4 µm thick. Chemistry: Thallus and ascomata surface UV+ yellow, medulla K-. TLC: Lichexanthone (major) detected.

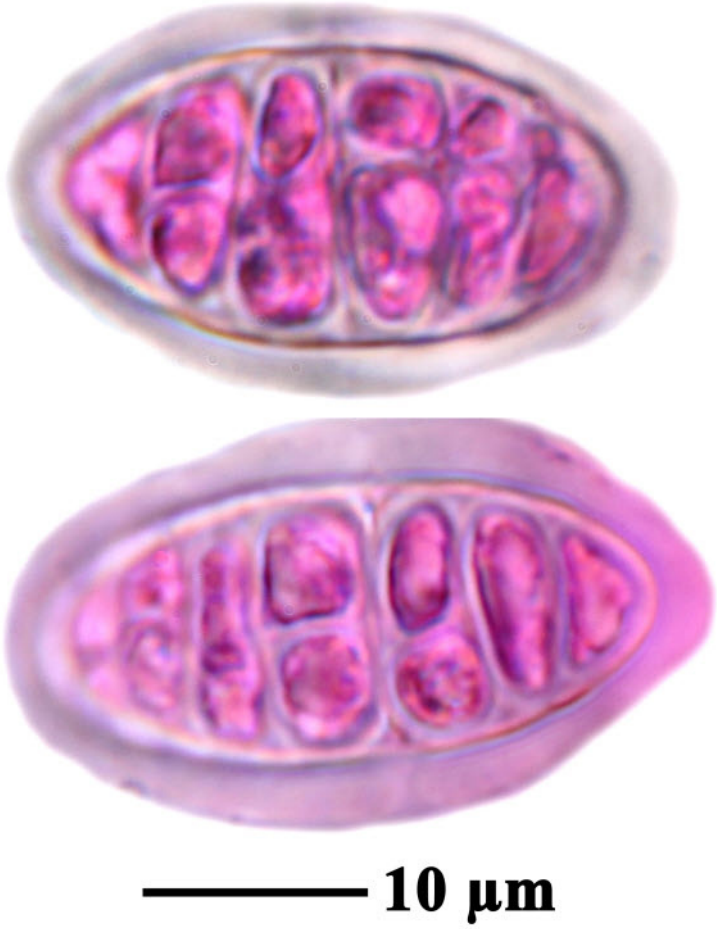
[Flakus24211], Bolivia, Tarija, Burnet O'Connor, 24 km from Entre Rios, near Soledad, Tucumano-Boliviano montano forest. 21°39'45" S, 63°07'29" W, 1700 m. Leg. A. Flakus (no 24211), 11.08.2012, det. A. Aptroot. ISOTYPE





Dictyomeridium lueckingii





Dictyomeridium lueckingii

Dictyomeridium parapropponens (Aptroot, M. Cáceres & E.L. Lima) Aptroot, M.P. Nelsen & Lücking, in Aptroot & Lücking, Lichenologist 48(6): 926 (2016)

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

Thallus ecorticate, pale pinkish white, sometimes flaking off, surrounded by a broad brown prothallus line. Ascomata pleurothelioid, with lateral ostioles, grouped together by two or three, 0.3–0.5 mm diam., erumpent to prominent, mostly covered by thallus, grey-black. Hamathecium clear. Ascospores muriform, 8 per ascus, hyaline, IKI−, 15–25 × 1–3-septate, long ellipsoidal, 55–75 × 19–21 µm, not constricted, surrounded by a gelatinous sheath 3 µm wide. Chemistry: Thallus UV+ yellow, K−. TLC: lichexanthone.

[ABL11162], Brazil, Rondônia, Porto Velho, UNIR Federal University campus S of city, on bark of tree in forest remnant, 100 m, 8°50’14” S, 63°56’25” W. Leg. M. Cáceres & A. Aptroot (no 11162), 8.03.2012, det. A. Aptroot, 2012. ISOTYPE.





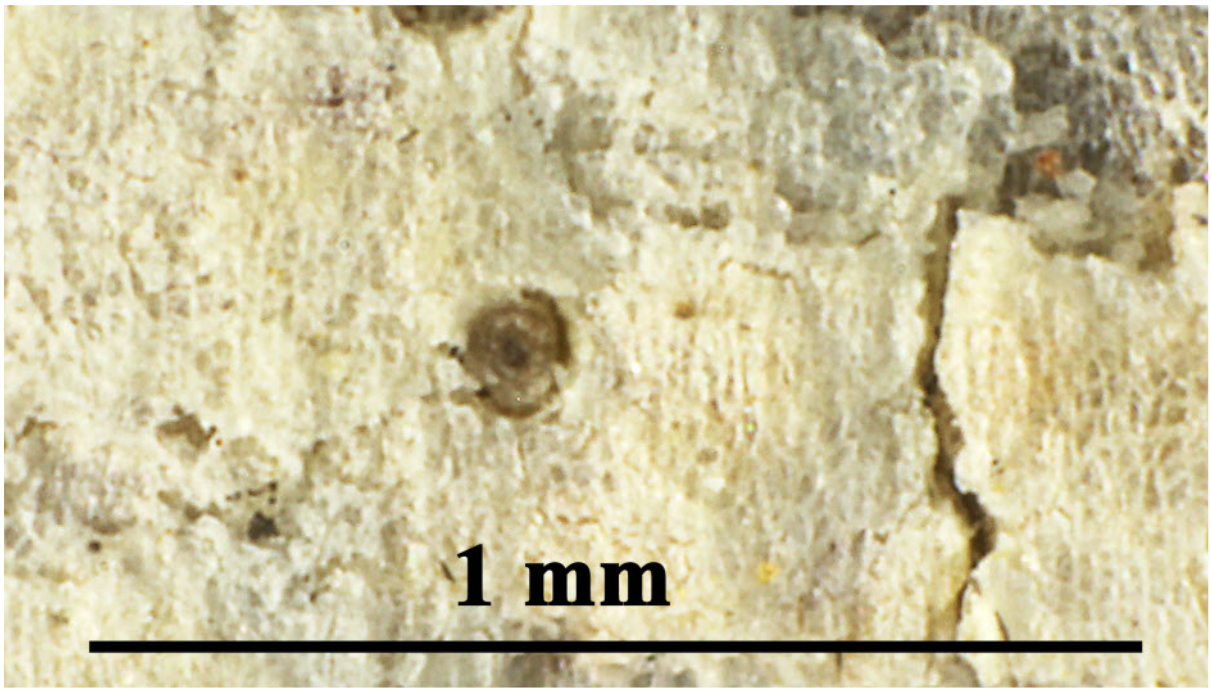
Dictyomeridium parapropонens

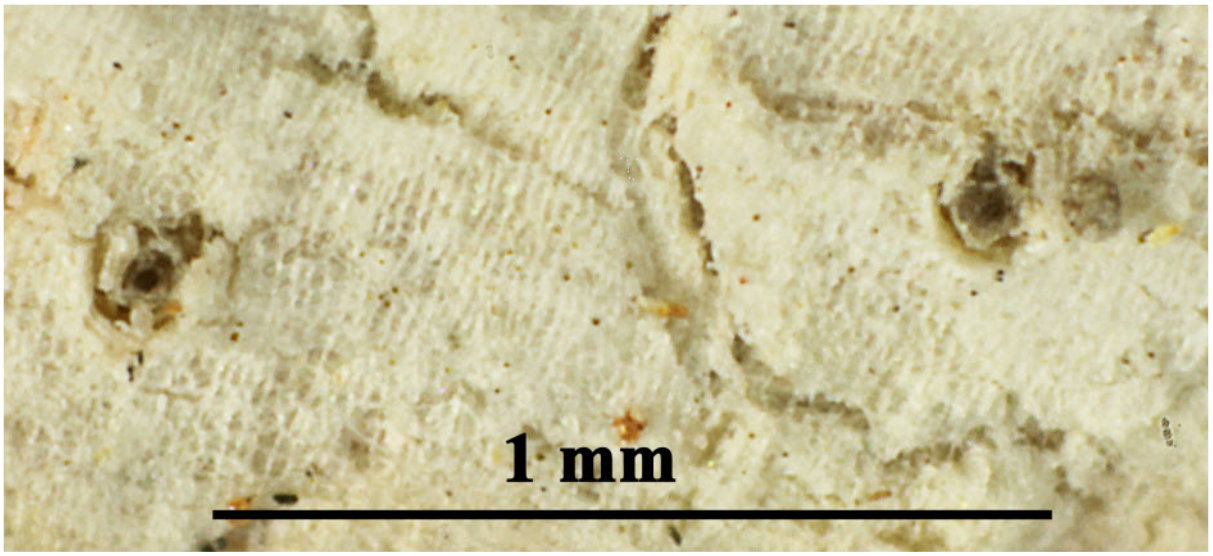
Dictyomeridium parapropponens (Aptroot, A.A. Menezes & M. Cáceres) Aptroot, M.P. Nelsen & Lücking, in Aptroot & Lücking, Lichenologist 48(6): 925 (2016)

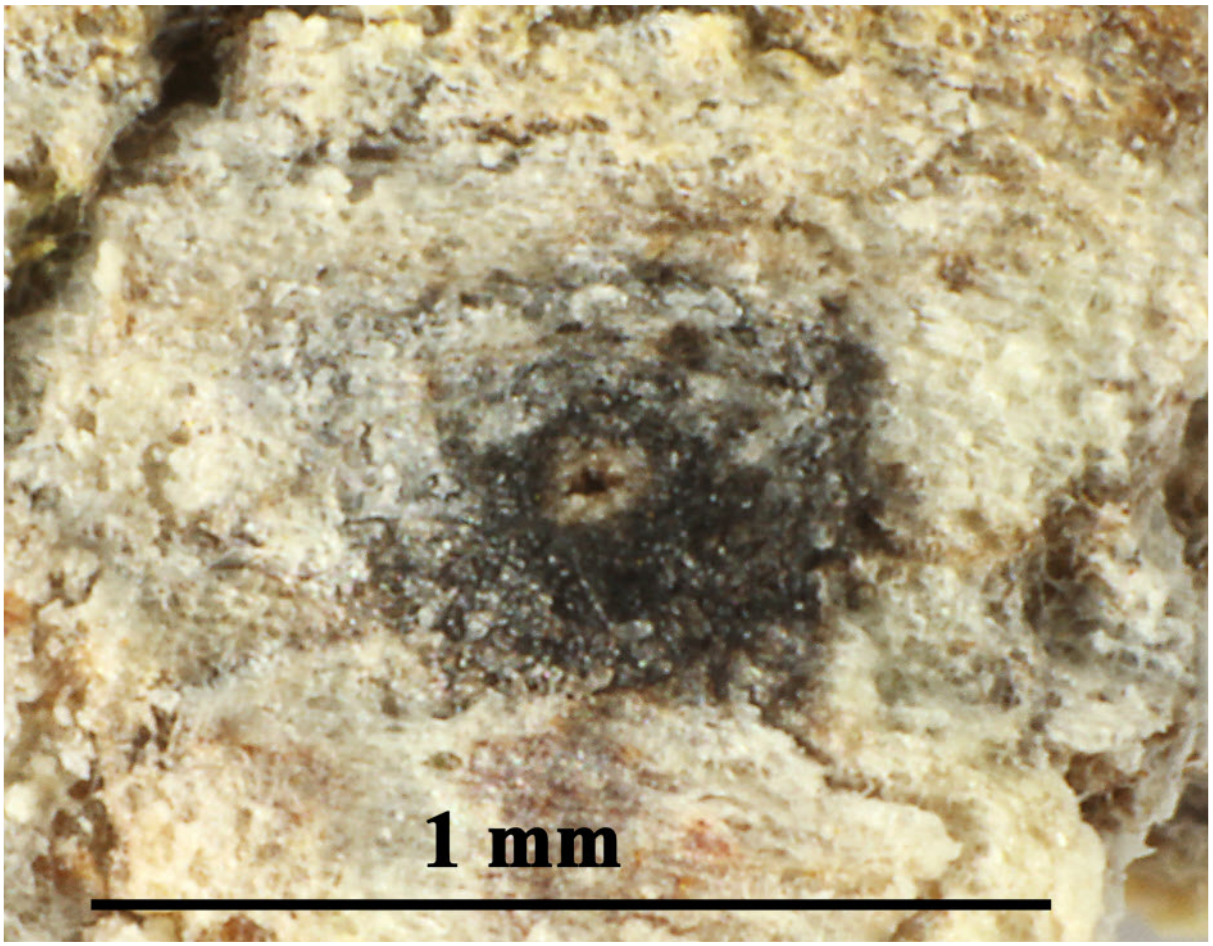
= *Polymeridium parapropponens* Aptroot, A.A. Menezes & M. Cáceres, Lichenologist 45(4): 546 (2013)

Thallus crustose, continuous, not corticate, dull, pale pinkish white, very thin and closely following the bark surface, surrounded by a brown prothallus line. Peritheca pyriform, deeply (up to 3 mm) immersed in the bark below the thallus, 0.3–0.5 mm wide, wall black, only visible from above by the pale ostioles. Ostioles pale, lateral, single or 2 fused, connected with long and often curved necks with the ascomal chamber. Hamathecium not inspersed. Ascospores muriform, 2/ascus, hyaline, IKI–, 9–15(–19) × 1–4-septate, ellipsoidal to fusiform, (45–)60–70 × 17–25 µm, outer wall generally constricted at the median septum. Chemistry. Thallus UV+ yellow, K–. TLC: Lichexanthone.

[ABL11943], Brazil, Amazonas, Fazenda São Francisco off BR319 30 km N of Porto Velho, 8°24’33” S, 63°58’56” W, c. 100 m, on tree bark in primary rain forest. Leg. M. Cáceres & A. Aptroot (no 11943), 15.3.2012, det. A. Aptroot.

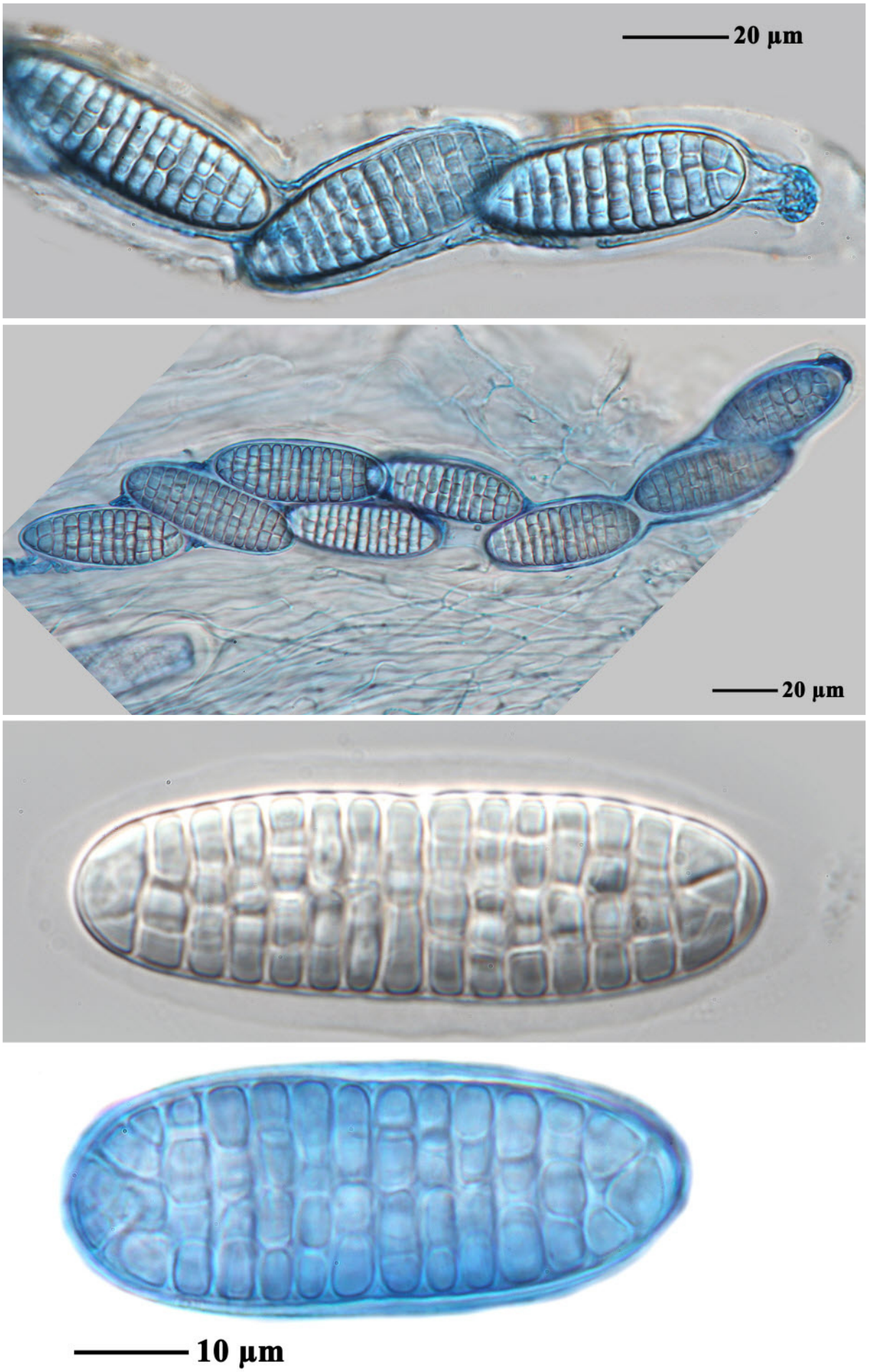








Dictyomeridium paraproponens



Dictyomeridium paraproponens

Dictyomeridium proponens (Nyl.) Aptroot, M.P. Nelsen & Lücking, in Lücking et al., Lichenologist 48(6): 757 (2016)
= *Campylothelium proponens* (Nyl.) Müll. Arg., Hedwigia 31: 286 (1892)
= *Polyblastia proponens* (Nyl.) Müll. Arg., Flora, Regensburg 65: 402 (1882)
= *Polyblastiopsis proponens* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 351 (1922)
= *Polymeridium proponens* (Nyl.) R.C. Harris, Bolm Mus. paraense 'Emílio Goeldi', sér. bot. 7(2): 637 (1993) [1991]
= *Verrucaria proponens* Nyl., Bull. Soc. linn. Normandie, sér. 2 2: 130 (1868)

Thallus ecorticate, white. Ascomata pleurothelioid, with lateral ostioles, solitary, 0.4–0.6 mm diam., erumpent, grey black. Hamathecium clear, filaments profusely anastomosing. Ascospores 8/ascus, IKI+ violet, muriform, 33–54 × 12–19 µm, with partly oblique septa, not ornamented, wall not thickened. Chemistry: Thallus UV+ yellow, K-. TLC: Lichexanthone.

[ABL41223], Brazil,Minas Gerais, Catas Atlas, Serra do Caraça, Parque Natural do Caraça near Funil, 1 km NW of monastery Santuário do Caraça, in *Eremanthus* shrub on tree. 20°06’ S, 43°29’ W c. 1250 m. Leg. A. Aptroot (no 41223), 18.09.1997, det. A. Aptroot 1998.



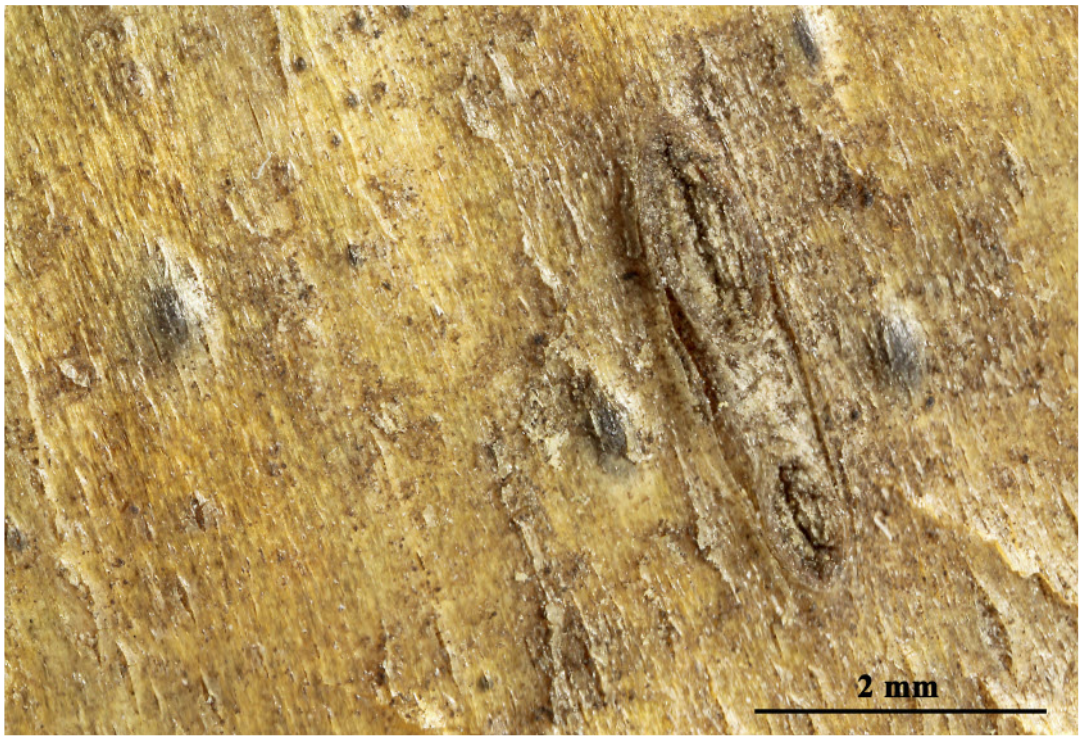


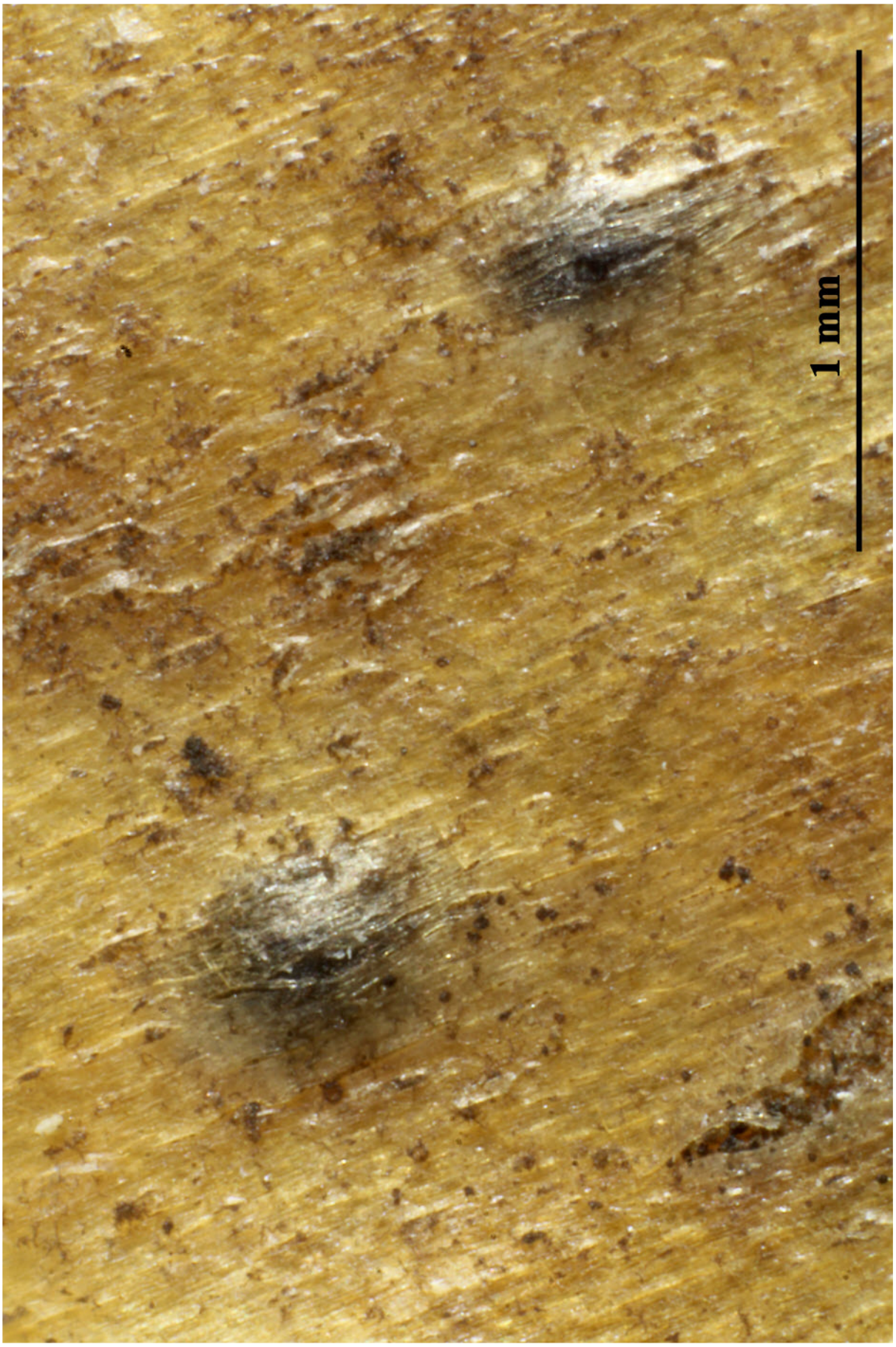
Dictyomeridium proponens

Distopyrenis americana Aptroot, Biblthca Lichenol. 44: 42 (1991)

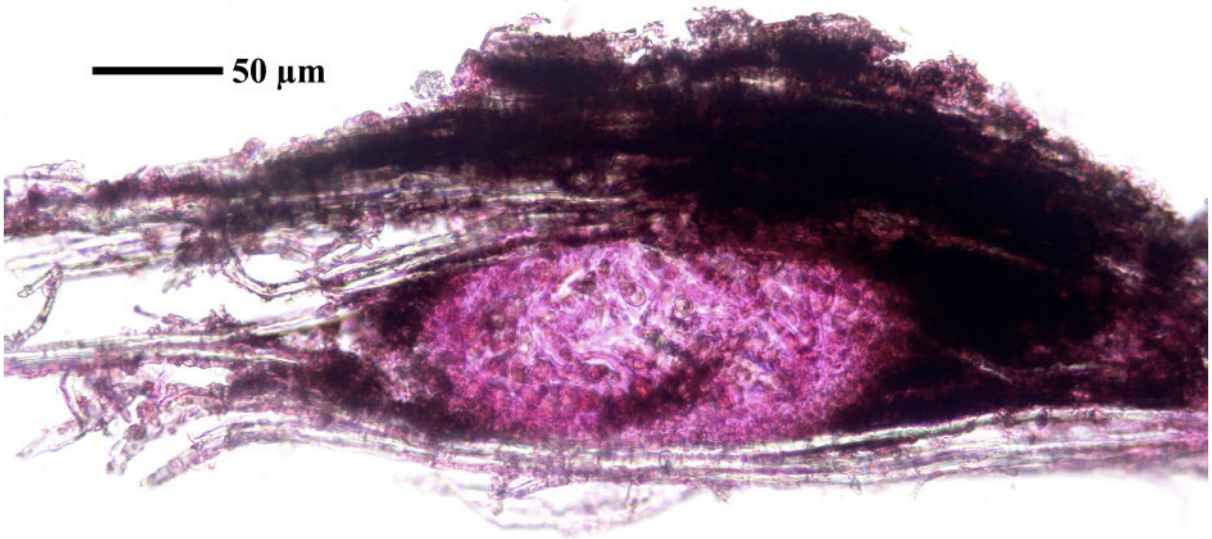
Thallus whitish-grey to absent, not blackened around the ascocarps, dull, immersed in the substratum, continuous, without crystals, without hypothallus. Apparently not lichenized. Ascocarps without crystals, hemispherical, distinctly flattened, erumpent from the substratum, partly covered by the thallus, 0.3–0.4 mm diam, 0.1–0.2 mm high. Ascocarp wall completely carbonized, with distinct clypeus, up to 60 µm thick. Ostiole black, obconical, apical, 30–50 µm diam. Hamathecium not inspersed with oil droplets, gelatinized, IKI+ blue. Interthecial hyphae true paraphyses, only branched at the tips, 1–1.5 µm thick. Periphyses absent. Asci with rounded ocular chamber, 50–60 × 7–9 µm. Ascospores 8 in the ascus, irregularly arranged, brown, fusiform with subacute ends, symmetrically septate, not constricted at the septa, (12–)14–17 × 5–7(–9) µm; with 1 median euseptum, 1.5–2 µm thick. Endosporium up to 3 µm thick. Lumina angular. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph black pycnidia, 80–140 µm diam. Wall carbonized in upper part only, up to 20 µm thick. Conidia acrogenous, filiform, 6–10 × 0.2–0.4 µm. Chemistry: UV negative, no substances detected with TLC.

[Harris13755], U.S.A., North Carolina, Macon/Jackson County, Whiteside Mountain, c. 5.5 miles E of Highlands, 4400–4930 ft. Oak forest with birch - Rhododendron at lower levels, wet rock faces and dry outcrops. Leg. R. C. Harris (no 13755), 10.06.1981, det. A. Aptroot 1990. ISOTYPE. (holotype in NY).





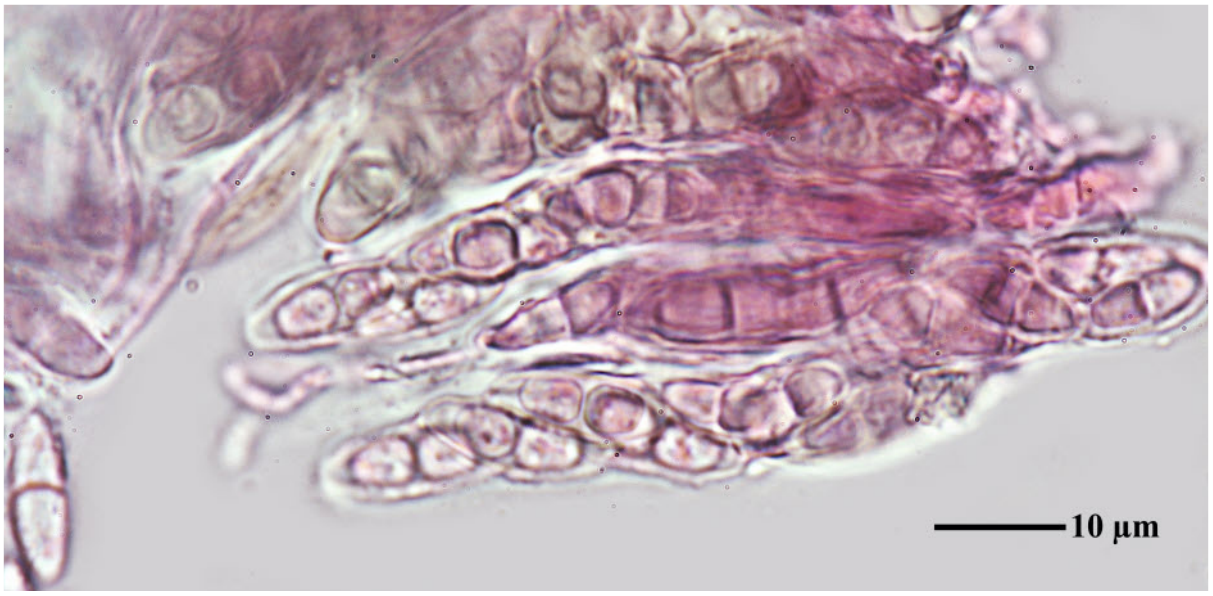
Distopyrenis americana



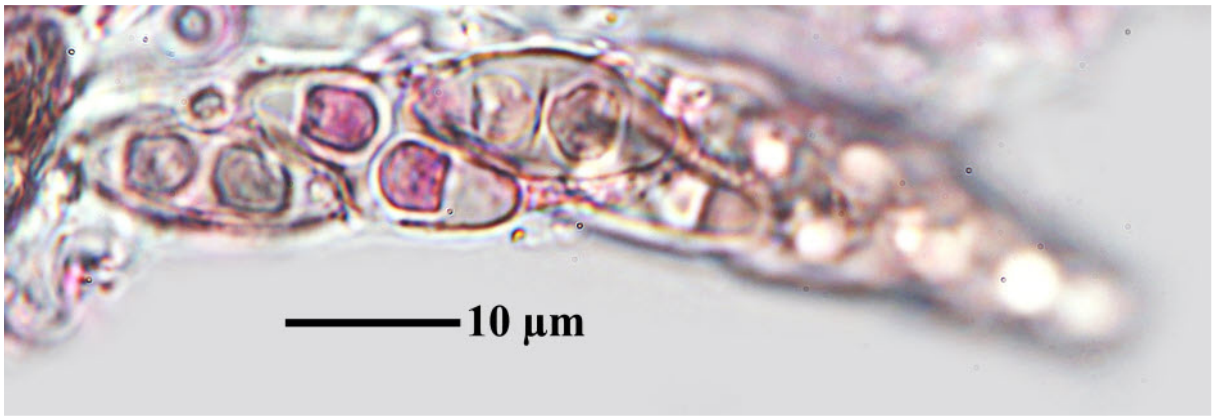




Distopyrenis americana









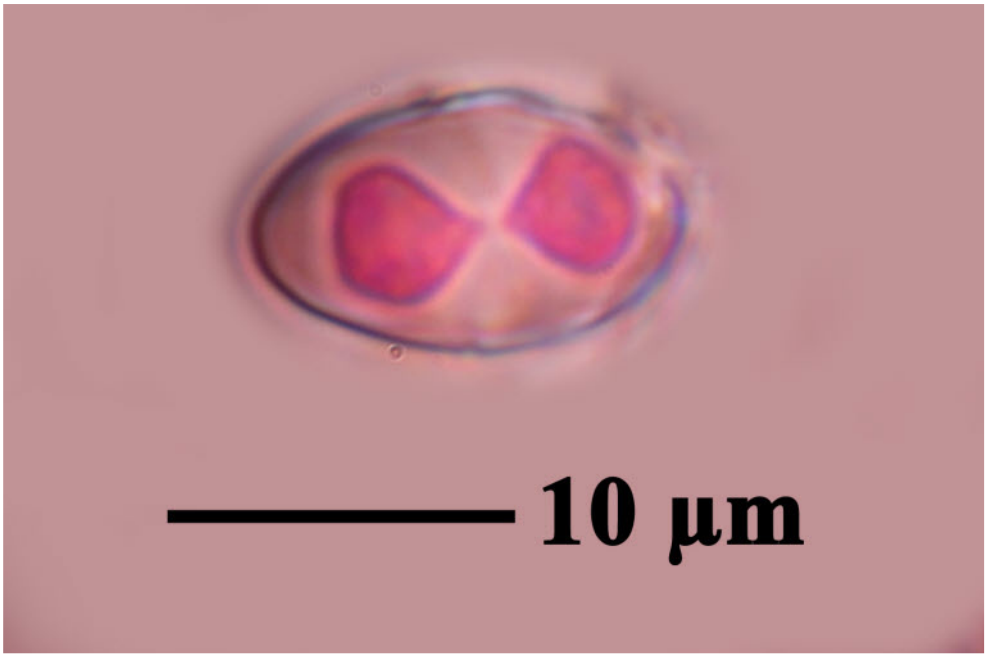
Distopyrenis americana

Distopyrenis composita R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 95 (1995)

Thallus indicated by slight discoloration of bark and black lines when in contact with other thalli. Ascomata flattened, often somewhat lumpy, orbicular to irregular, usually compound, rarely simple, 0.2–0.5 mm diam., clypeus usually covering several hymenia. Ascospores broadly ellipsoidal with rounded to somewhat angular lumina, 11.5–13.5 × 8–9.5 µm.

[Koch], Brazil, Rio Grande do Sul, Maquiné, Atlantic forest, on tree bark. Leg. N.M. Koch, 11.2010, det. A. Aptroot, 2013.





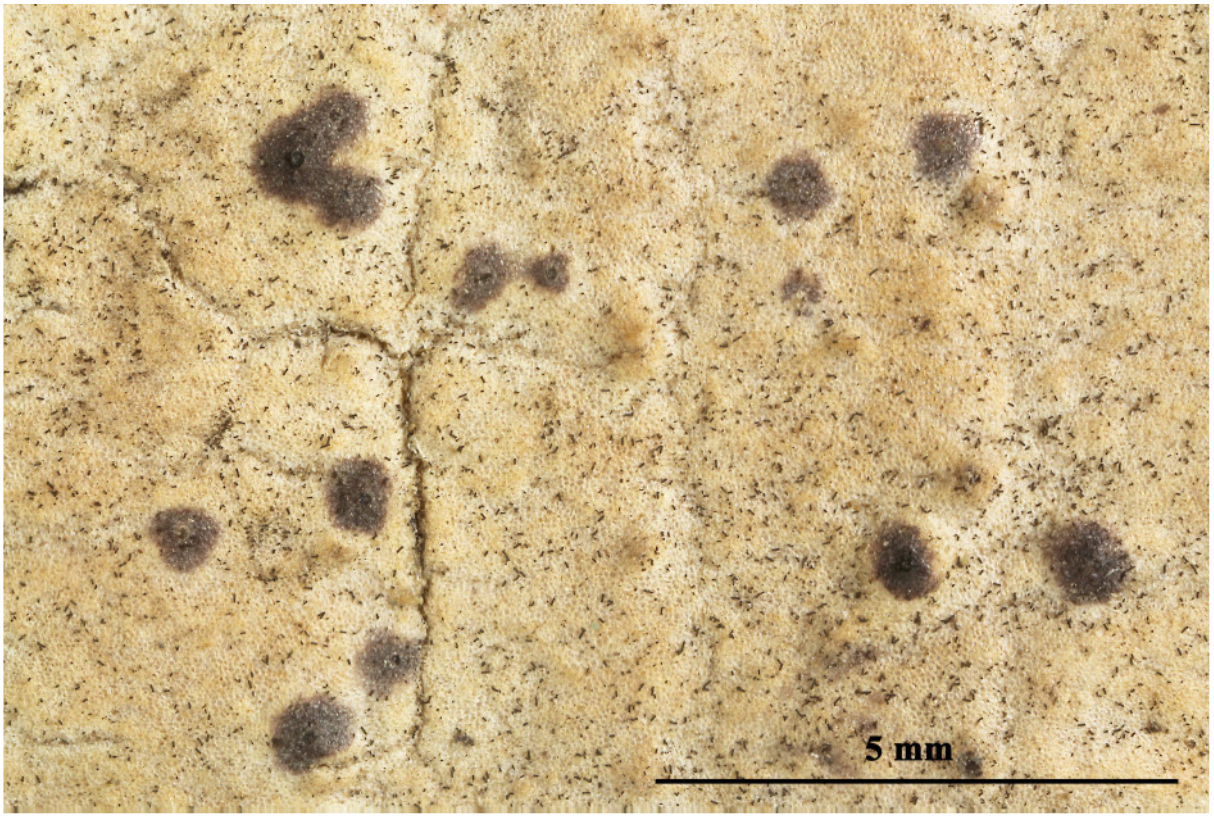


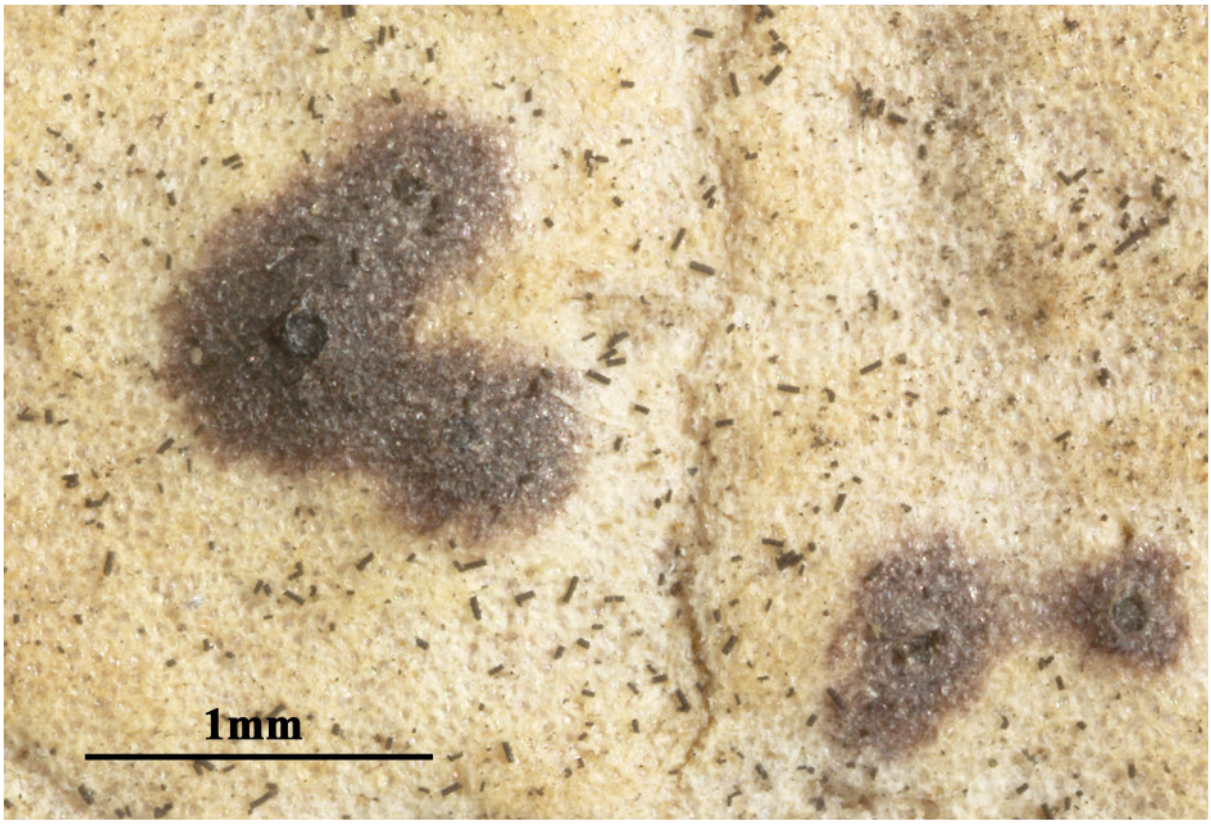
Distopyrenis composita

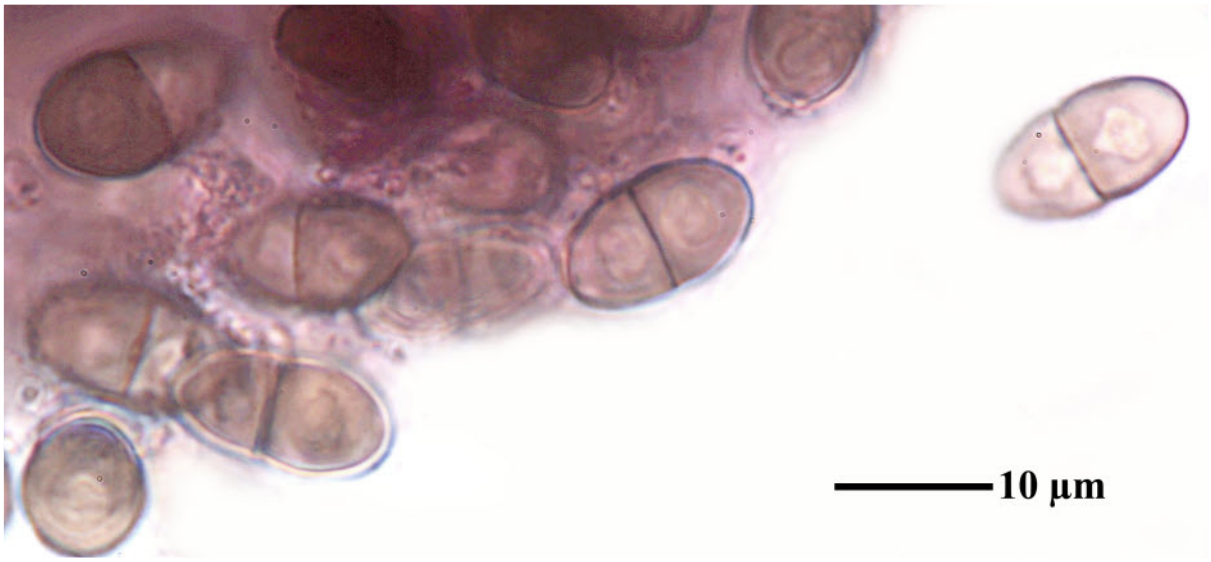
Distopyrenis fuliginosa Aptroot, Biblthca Lichenol. 44: 43 (1991)

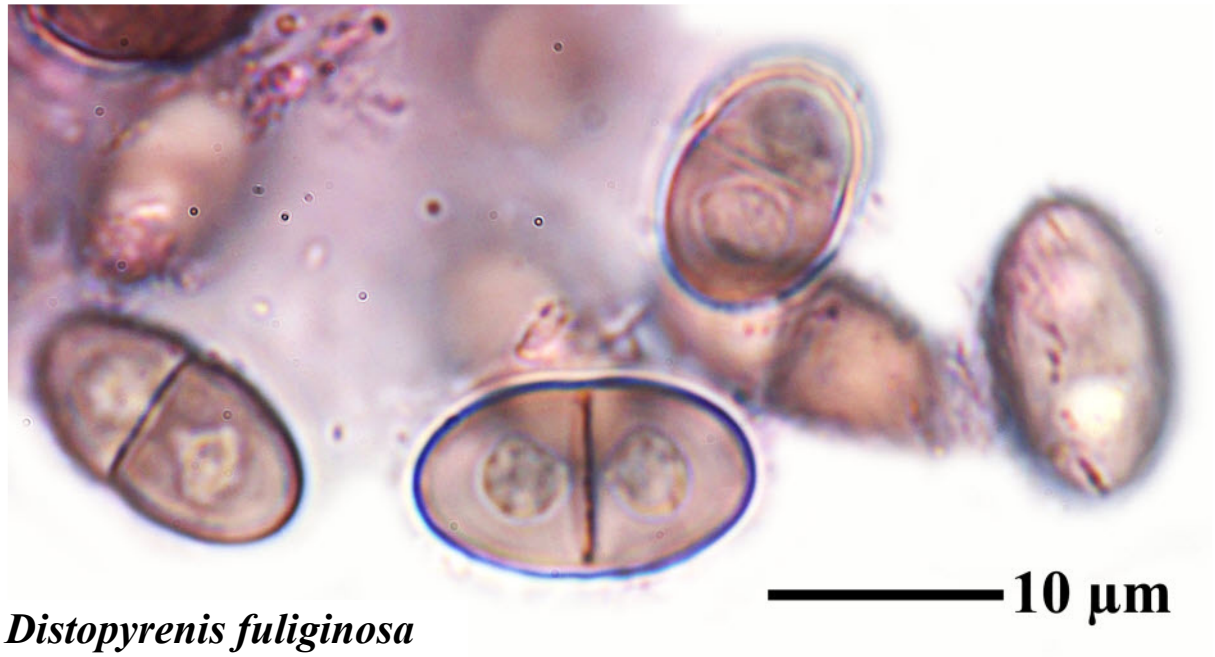
Thallus pinkish-grey, blackened around the ascocarps, dull, immersed in the substratum, continuous, without crystals, without or with an inconspicuous black hypothallus. Apparently not lichenized. Ascocarps without crystals, hemispherical, not distinctly flattened, erumpent from the substratum, exposed, 0.6–0.8 mm diam, 0.2–0.4 mm high. Ascocarp wall hyphal completely carbonized, without distinct clypeus, up to 25 µm thick. Ostiole black, obconical, apical, 40–50 µm diam. Hamathecium not inspersed with oil droplets, gelatinized, IKI+ blue. Interthecial hyphae true paraphyses, only branched at the tips, 1–1.5 µm thick. Periphyses absent. Asci with rounded ocular chamber, 40–50 × 7–9 µm. Ascospores 8 in the ascus, irregularly arranged, brown, ellipsoidal with subacute ends, symmetrically septate, not constricted at the septa, 13–16 × 7–9 µm; with 1 median euseptum, 1 µm thick. Endosporium up to 4 µm thick. Lumina rather rounded. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC.

[ABLsnr], Mexico, San Luis Potosi, on *Beaucarnea recurvata* intercepted by APHIS at U.S. border as a presumed plant disease on *Beaucarnea*, 06.1982, det. A. Aptroot, 1990. ISOTYPE.

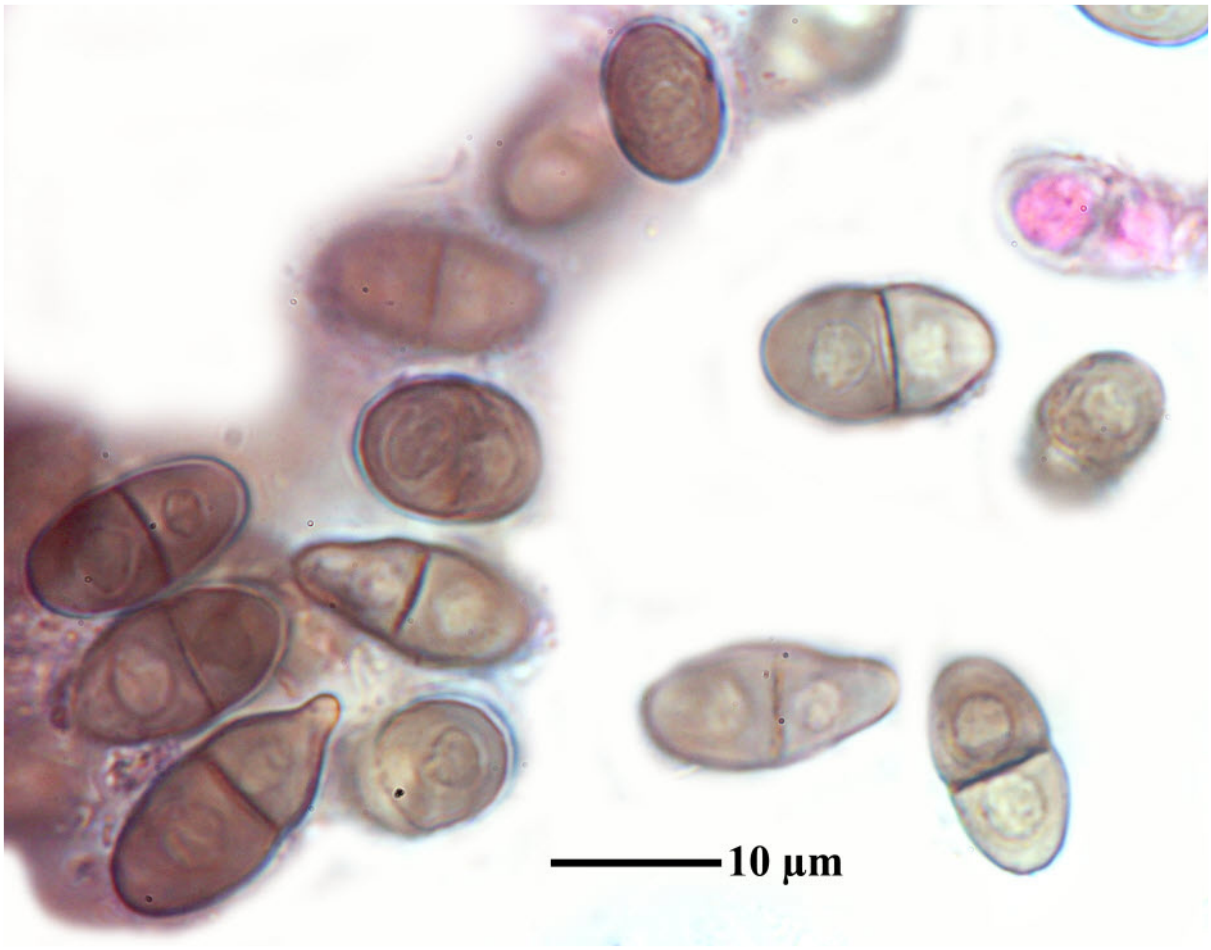


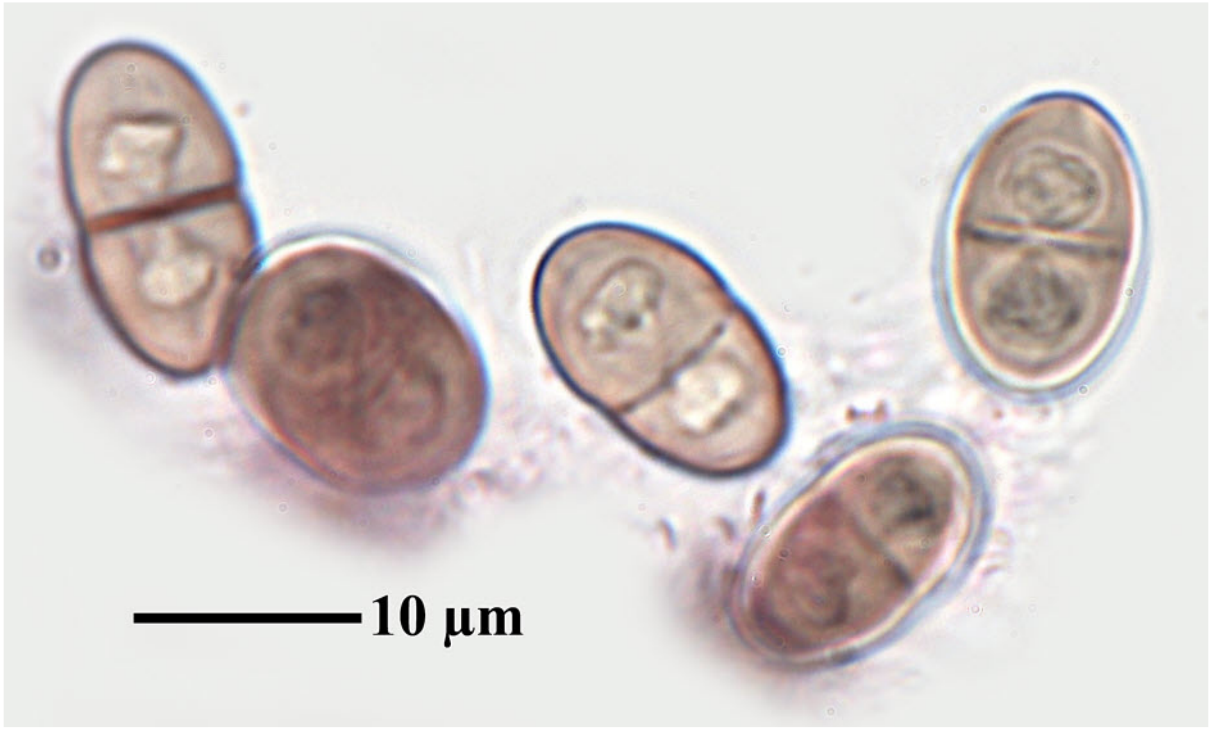


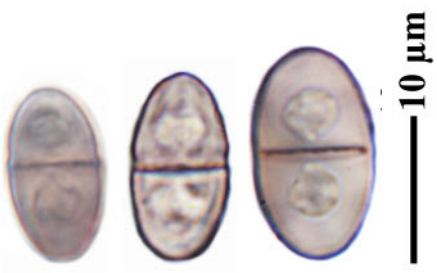




Distopyrenis fuliginosa







Distopyrenis fuliginosa

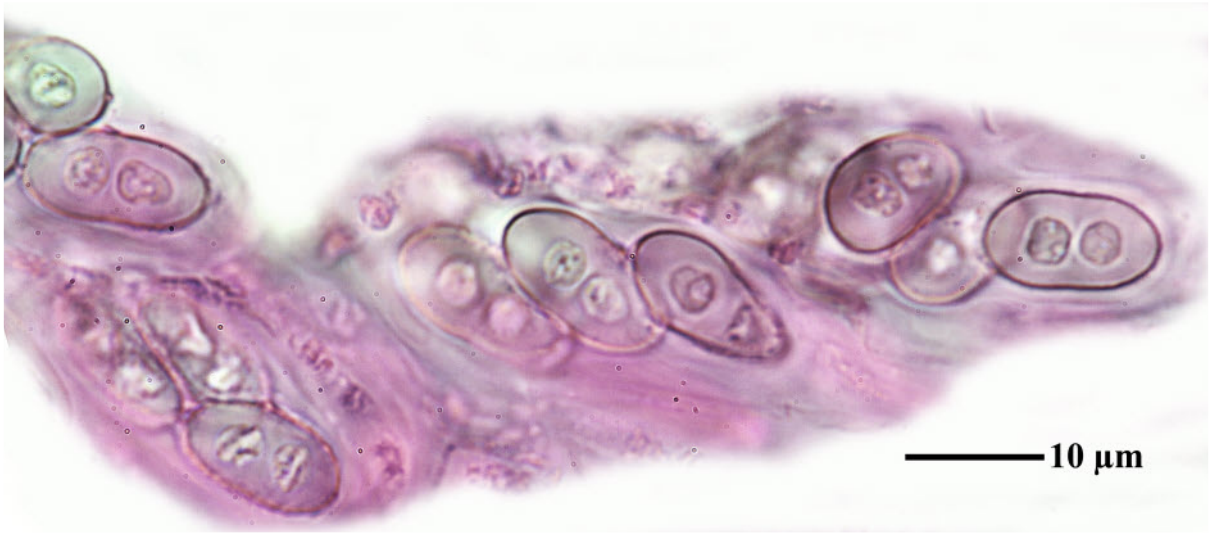
Distopyrenis pachyspora Aptroot, Biblthca Lichenol. 44: 45 (1991)

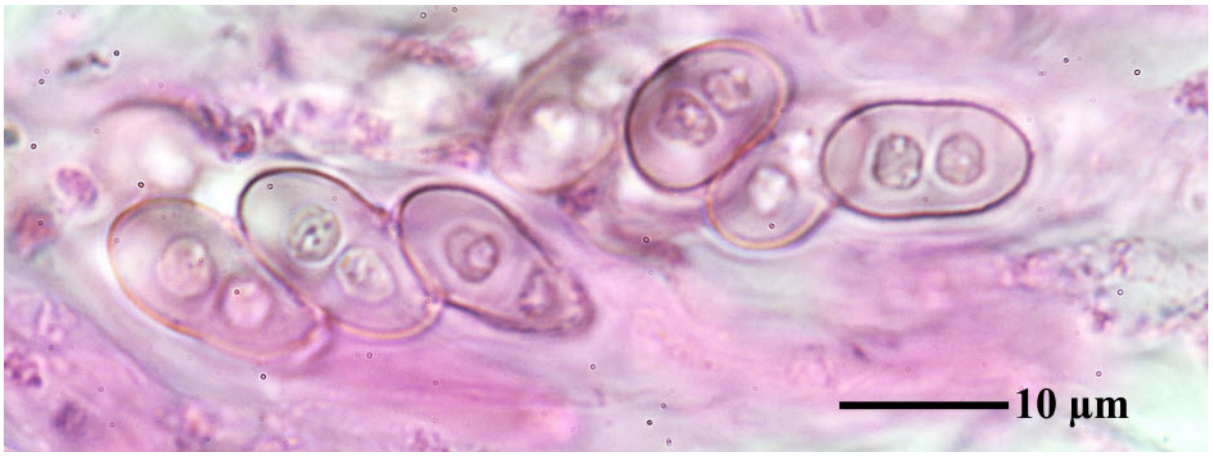
Thallus brownish, oily shimmering, not blackened around the ascocarps, smooth, immersed in the substratum, continuous, without crystals, with a 0.1 mm broad black hypothallus. Apparently not lichenized. Ascocarps without crystals, conical, distinctly flattened, erumpent from the substratum, exposed, 0.5–1.0 mm diam, 0.1–0.2 mm high. Ascocarp wall only upper part carbonized, with distinct clypeus, up to 200 µm thick. Ostiole black, conical, apical, 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 absent. Asci with rounded ocular chamber, 60–80 × 10–15 µm. Ascospores 8 in the ascus, uniseriate, brown, ellipsoidal with rounded ends, symmetrically septate, not constricted at the septa, 12–15 × 6–7 µm; with 1 distoseptum, 1 µm thick. Endosporium up to 4 µm thick. Lumina small, often rounded. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC. This species is unique by the small ascospore lumina and the brownish, oily thallus. It can be confused with *Distopyrenis americana*, which is separated e.g. by the euseptum formation.

[Montfoort312], French Guiana, Saül, 2 km SW of the village, “sentier Limonade”, 180–210 m, 03°32’ N, 053°12’ W. Mixed forest on lateritic soil. Epiphytic in lower canopy of *Ceiba pentandra.* Leg. D. Montfoort (no 312) & R. C. Ek, 20.08.1986, det. A. Aptroot. ISOTYPE.



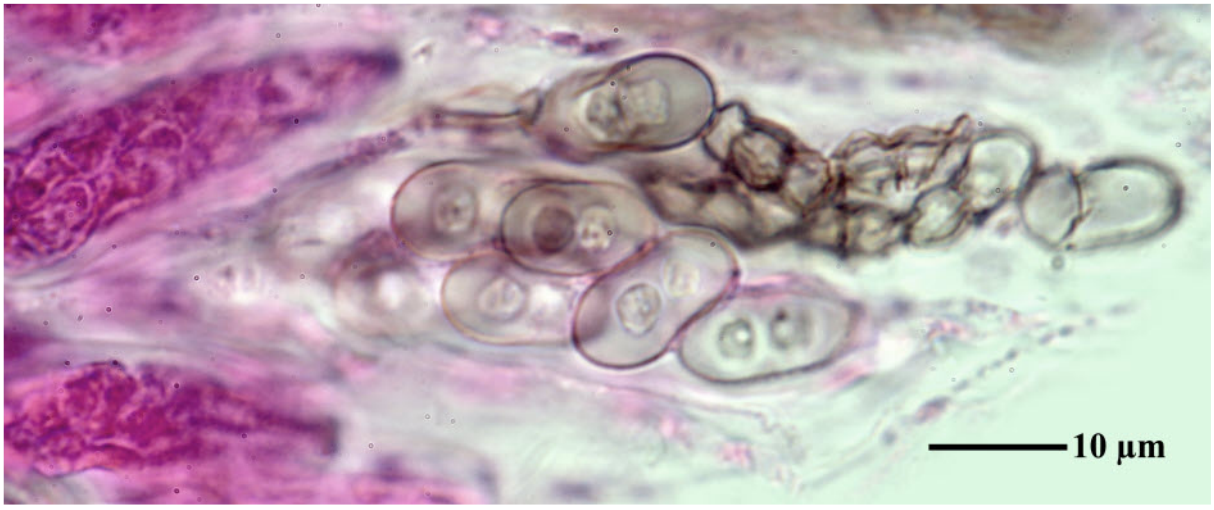


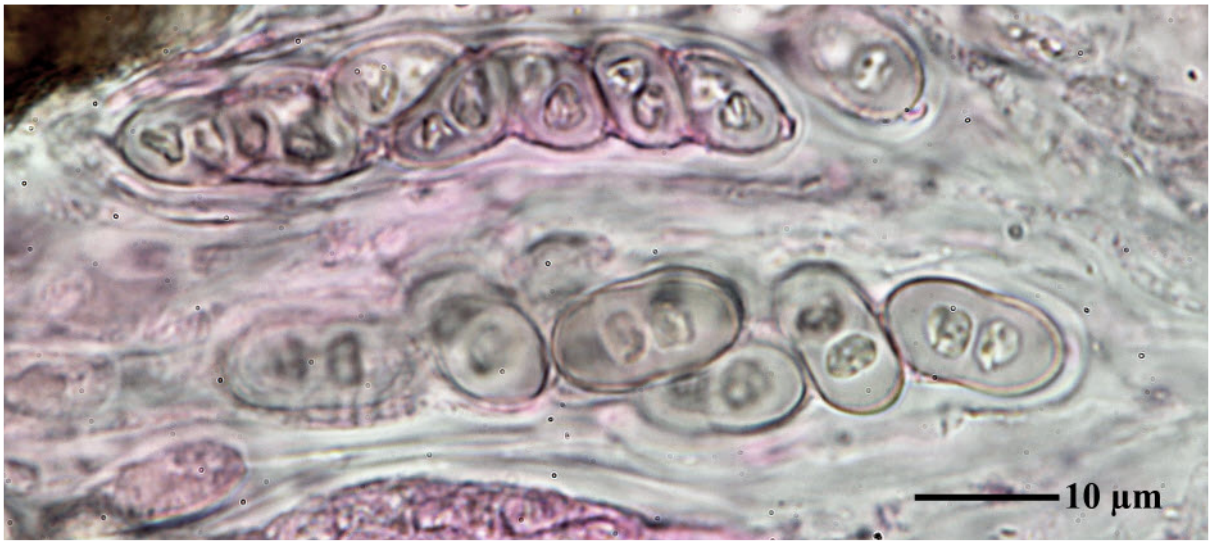




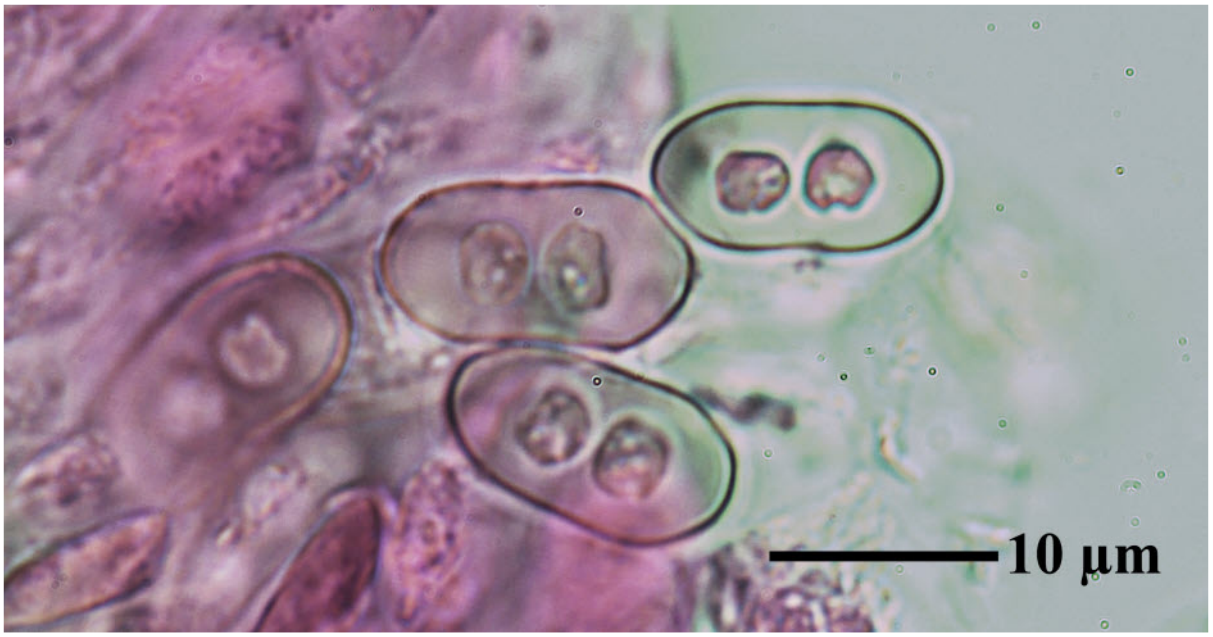
Distopyrenis pachyspora

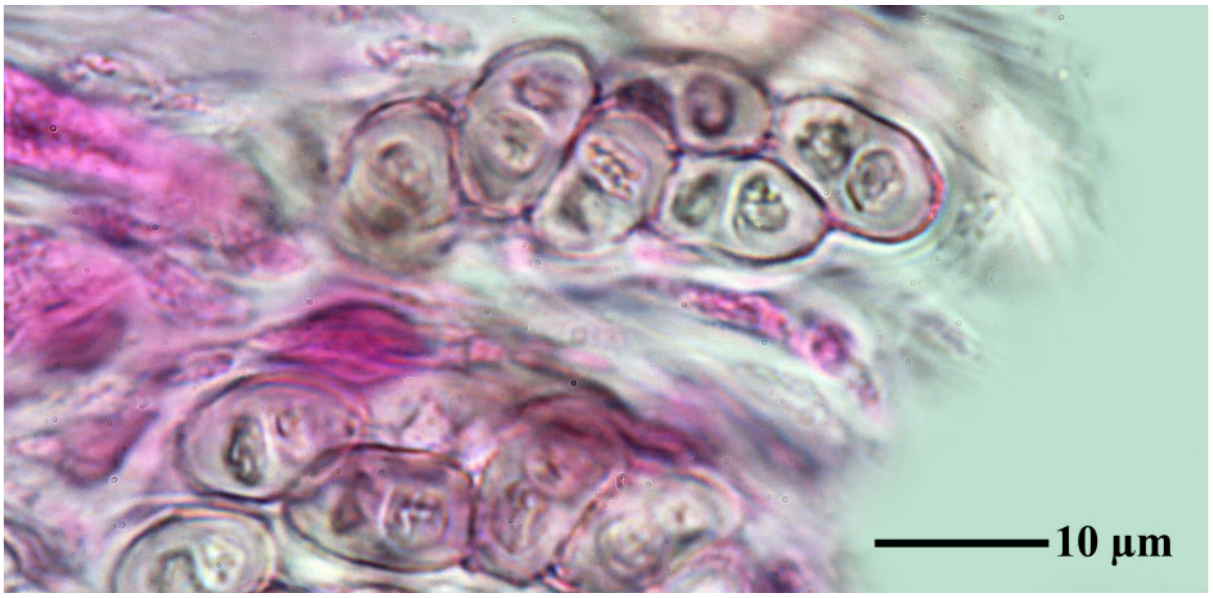






Distopyrenis pachyspora





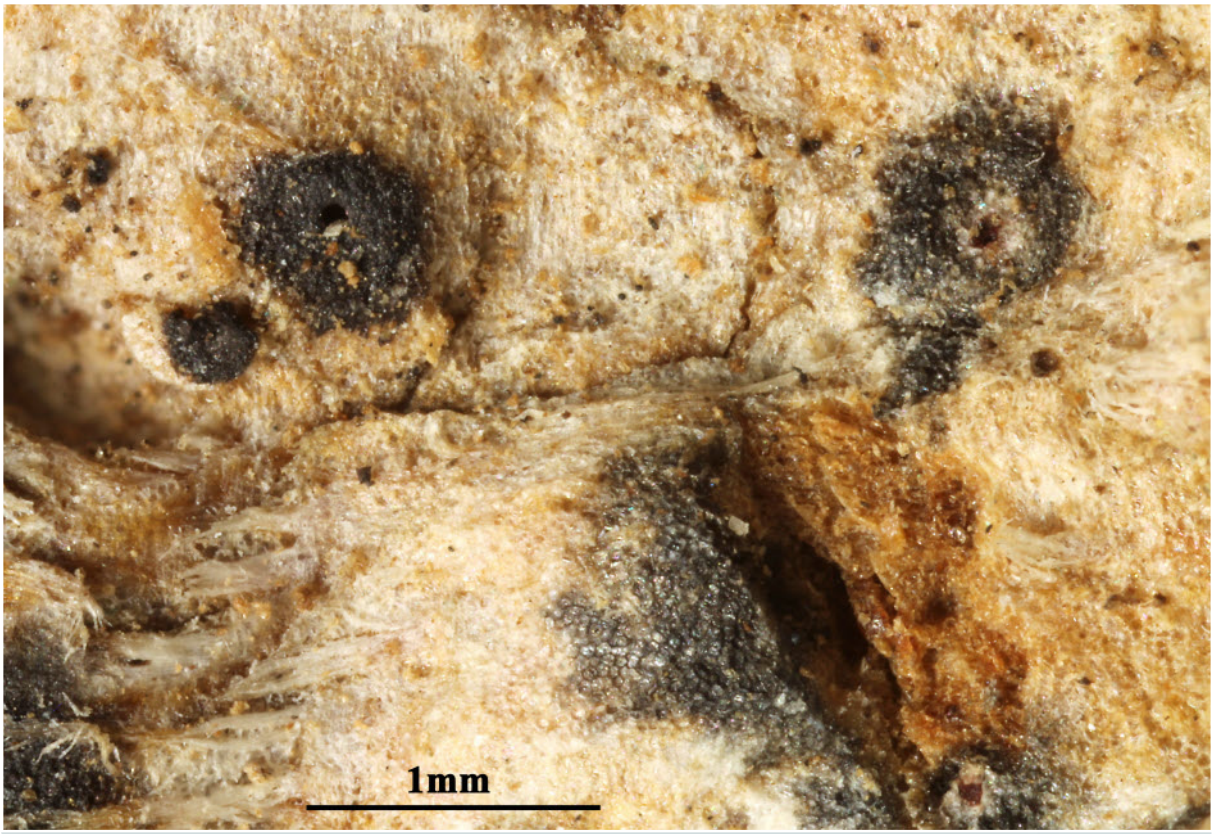
Distopyrenis pachyspora

Distothelia rubrostoma (Aptroot) Aptroot & Lücking, Lichenologist 48(6): 927 (2016)
= *Mycomicrothelia rubrostoma* Aptroot, Biblthca Lichenol. 44: 135 (1991)

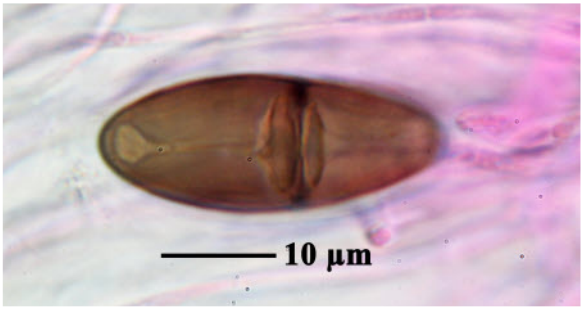
Thallus pinkish grey, without prothallus lines. Ascomata single, with fringe, 1.0–1.3 mm wide and 0.2–0.6 mm high, young ostiole with red, K+ purple anthraquinone. Wall completely carbonized, to 80 µm thick. Ascospores 23–29 × 11–14 µm, with equal locules, with rounded ends, walls much thickened with a halter-sharped endospore formation, verruculose.

[Culberson14551], Guadeloupe, Basse-Terre, Vieux Fort. On bark of living tree beside trail above the town. Leg. W.L. Culberson (no 14551), 25.12.1969, det. A. Aptroot 1990. ISOTYPE.











Distothelia rubrostoma

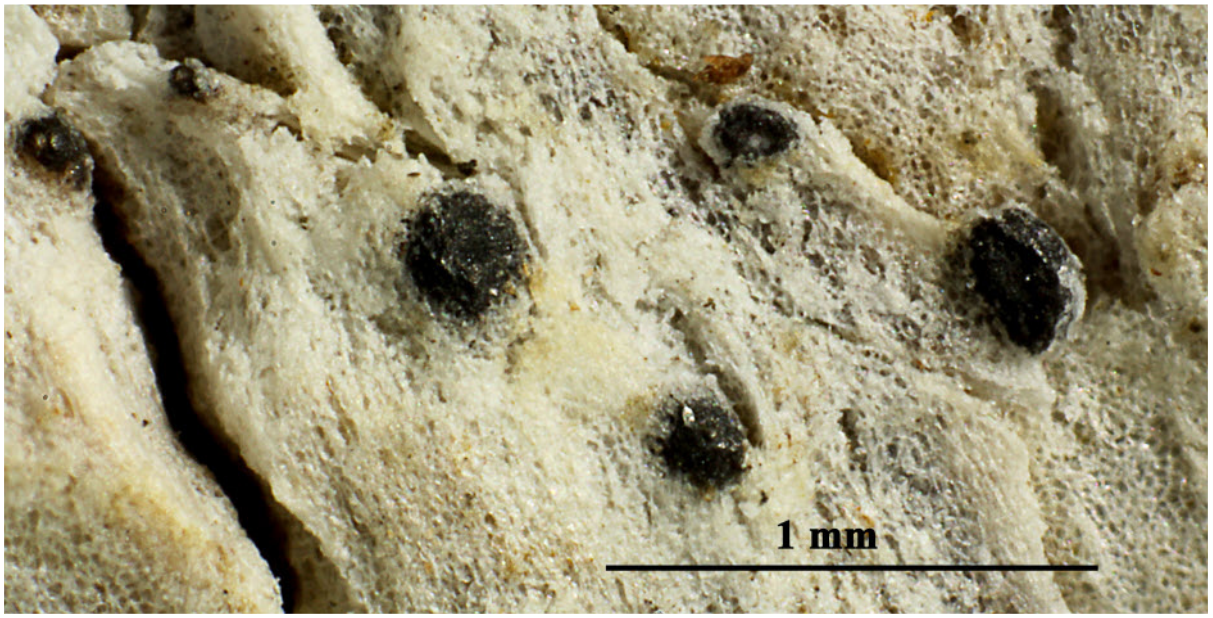
Eopyrenula intermedia Coppins, in Aptroot, Biblthеca Lichenol. 44: 111 (1991)

Thallus white, UV- (bluish white), matt, cortex absent, nearly not lichenized (no photobiont seen!). Perithecium dimidiate. Hymenium J+ red-brown, not inspersed, paraphyses lax not branched. Asci J- (not blue). Ascospores brown, 3-5 septate, 15–22 × 7.1 µm, lacking special thickened walls, 8/ascus.

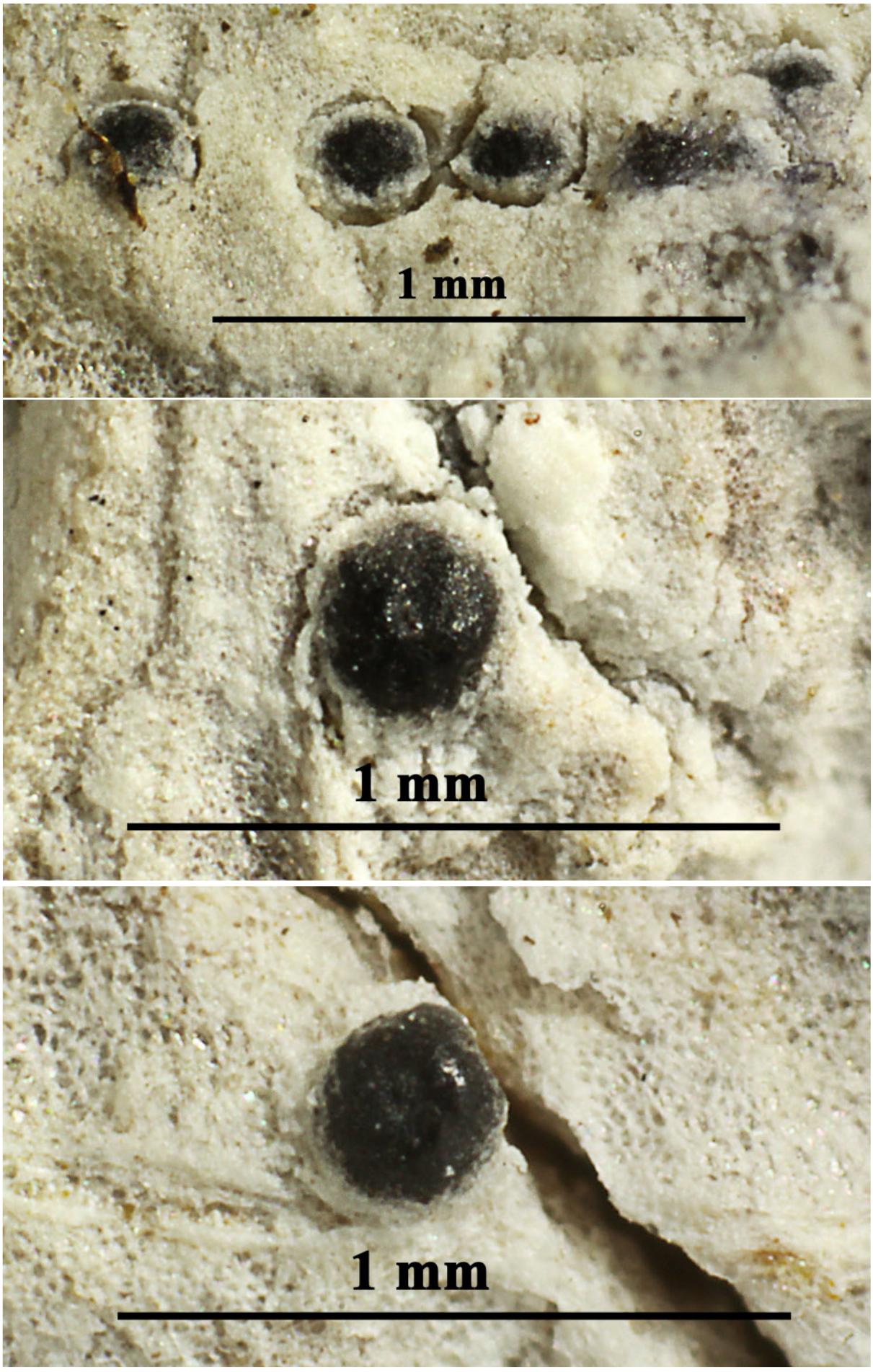
[19372], Russia, Rogatka river, Yuzhno-Sakhalinsk city suburbs, the Sakhakhalin Island, Far East of Russia, 46°58'00.4" N, 142°46'13.0" E, 111 m, deciduous forest, on bark of *Populus maximowiczii*. Leg. A.K. Ezhkin, 04.05.2015 (P5, No. 131), det. A. Aptroot 2015. Herbarium Institute of Marine Geology and Geophysics FEB RAS (IMGG).



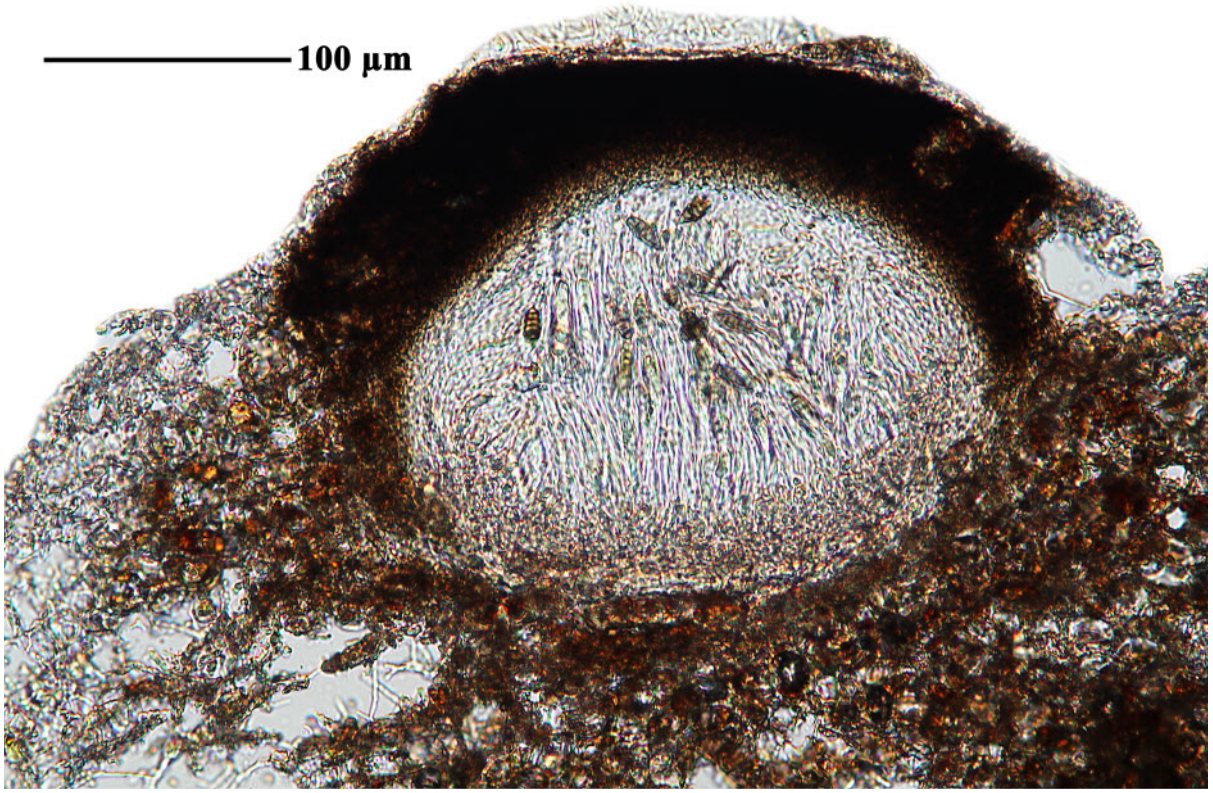




Eopyrenula intermedia



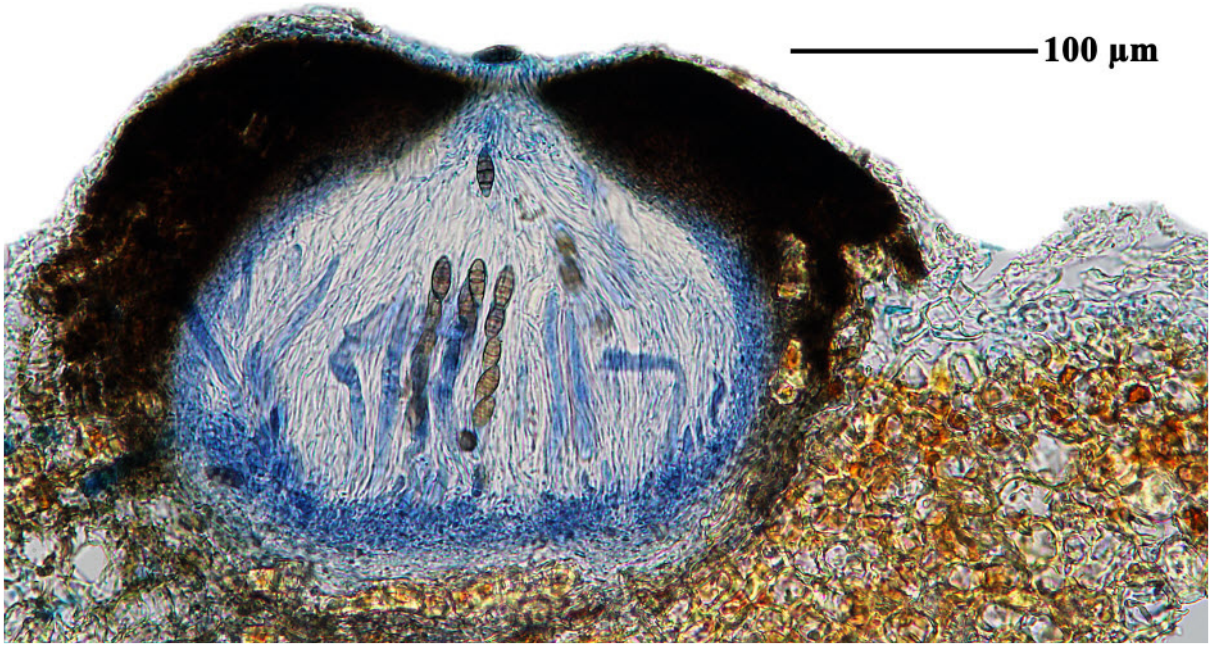
Eopyrenula intermedia

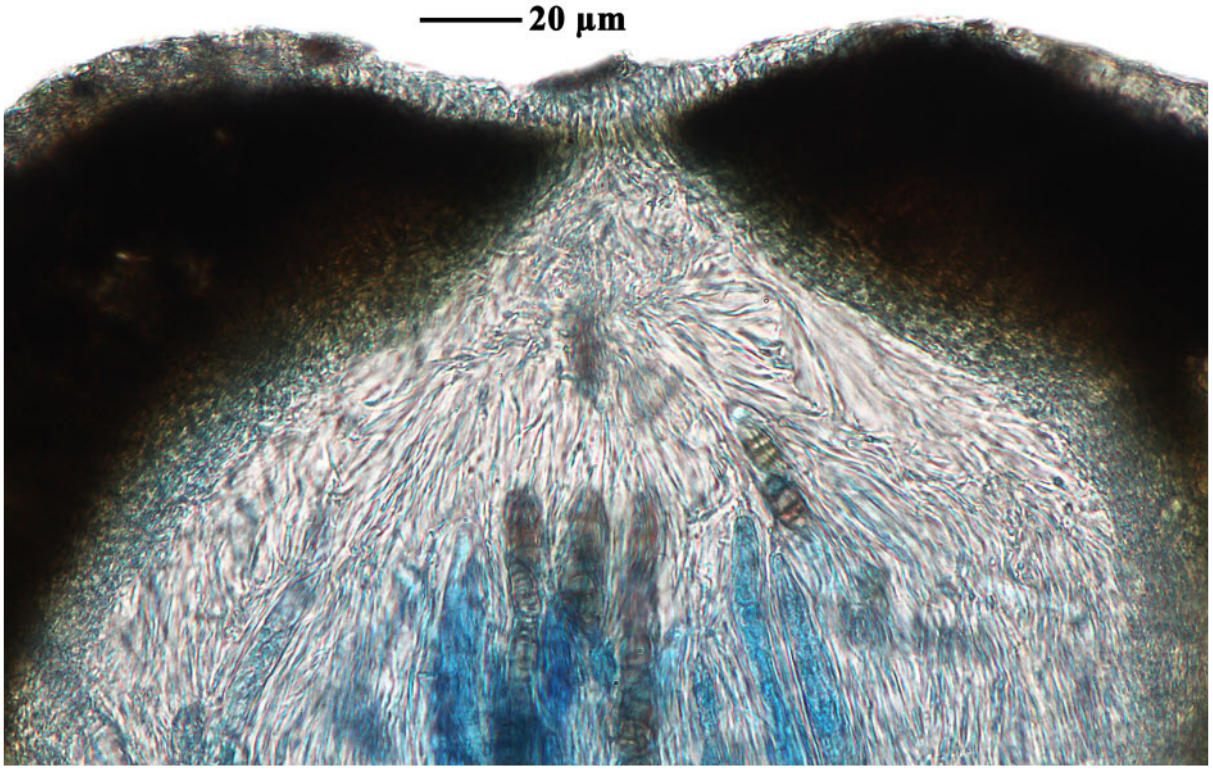




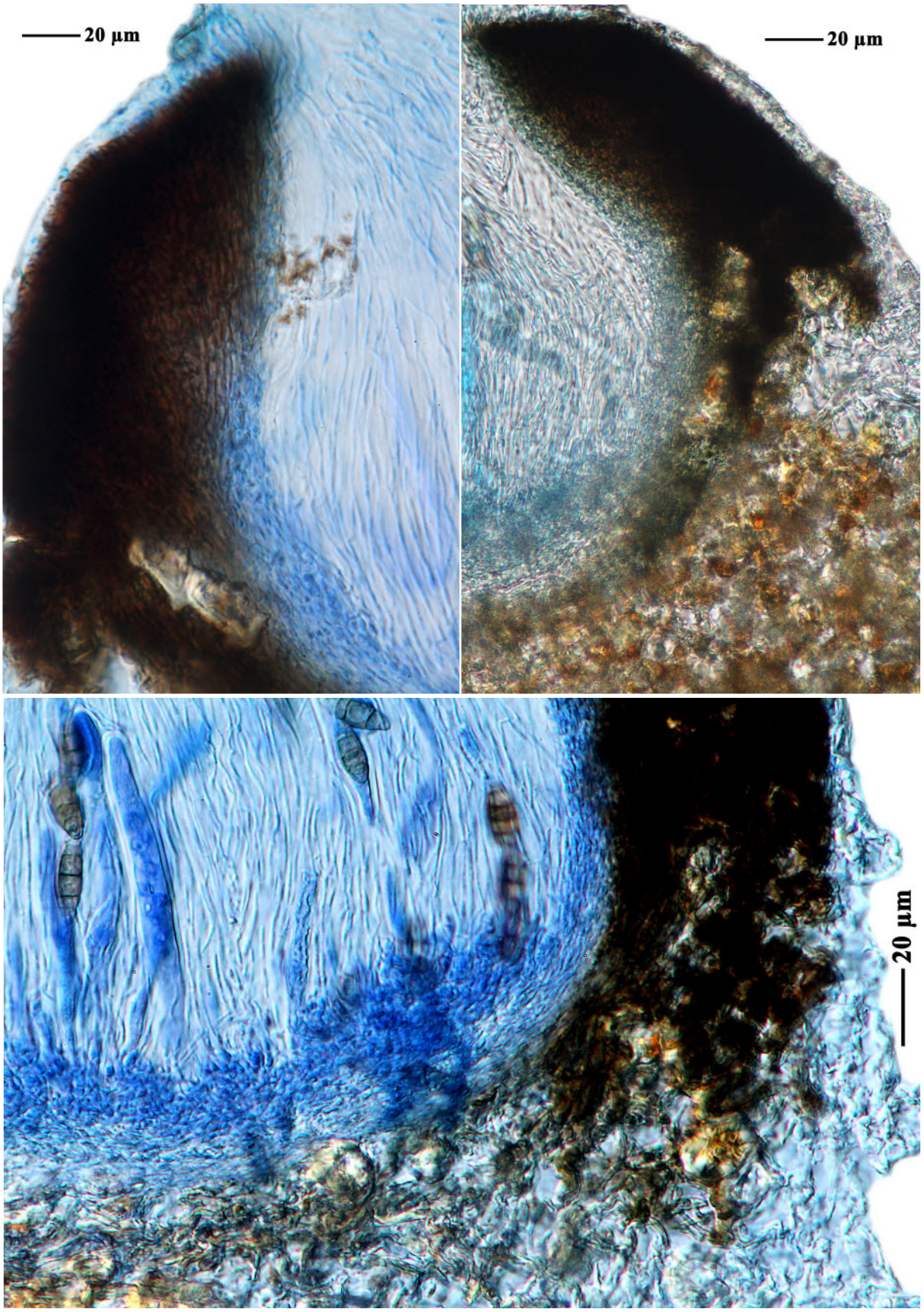


Eopyrenula intermedia

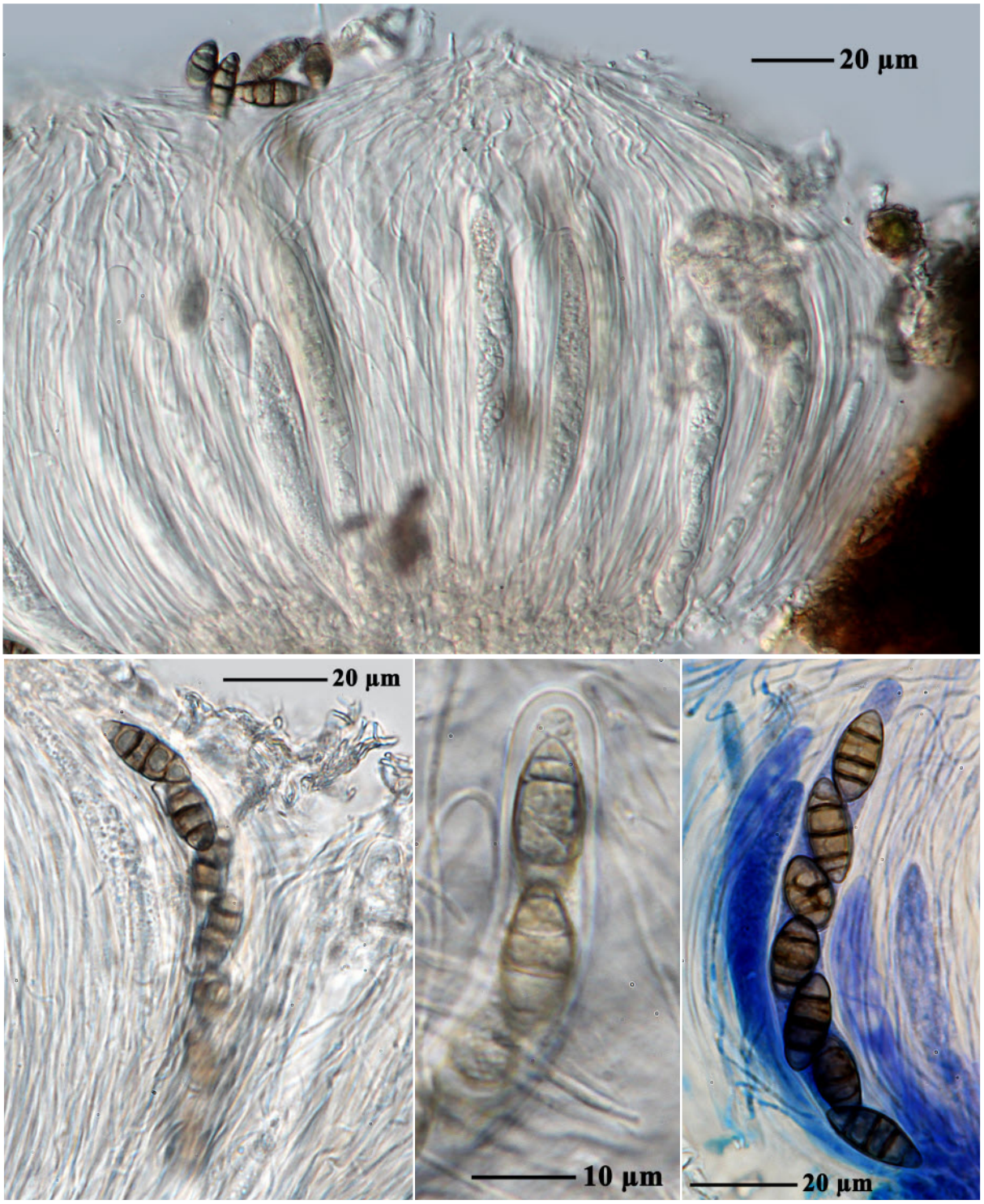




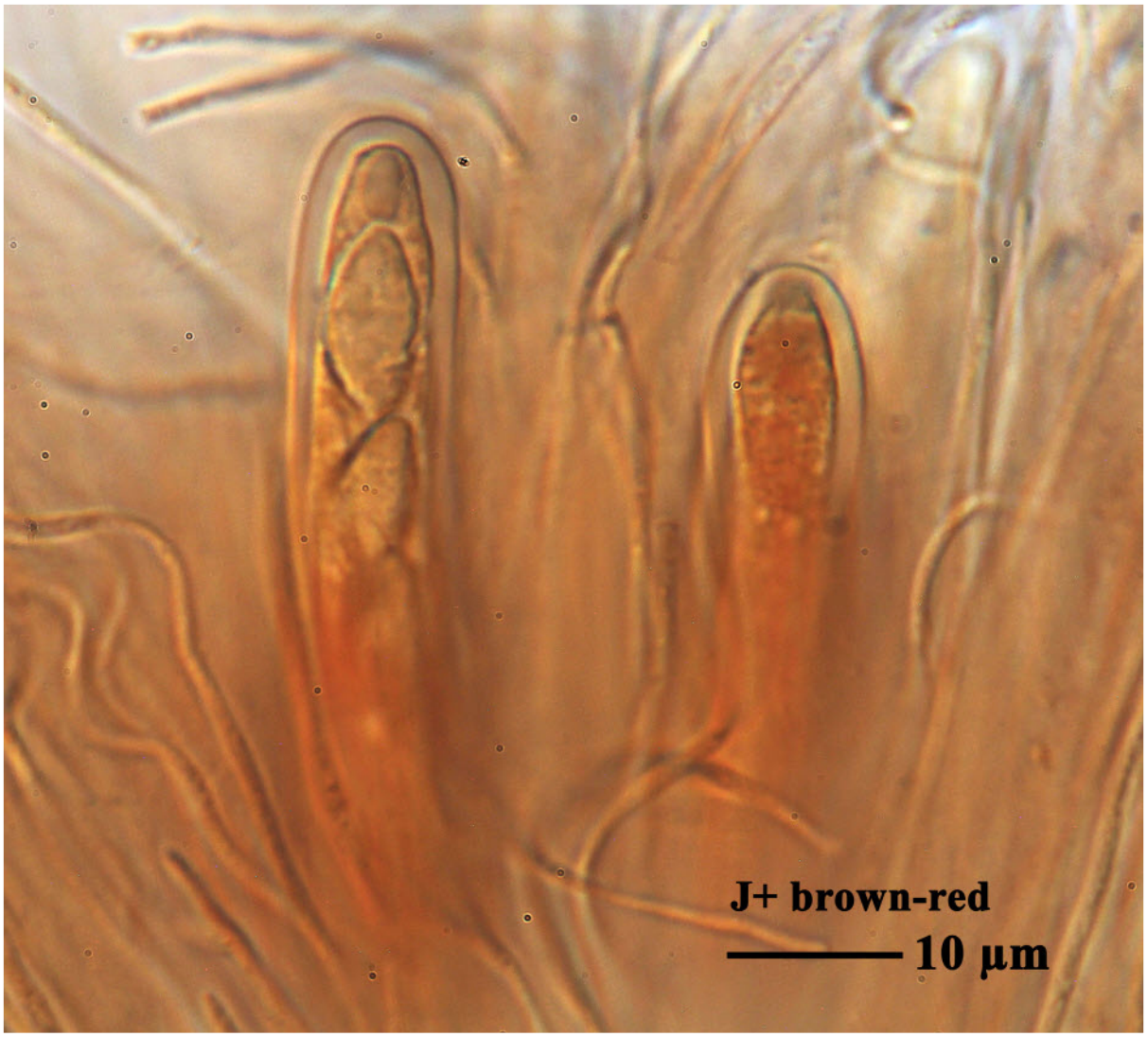
Eopyrenula intermedia

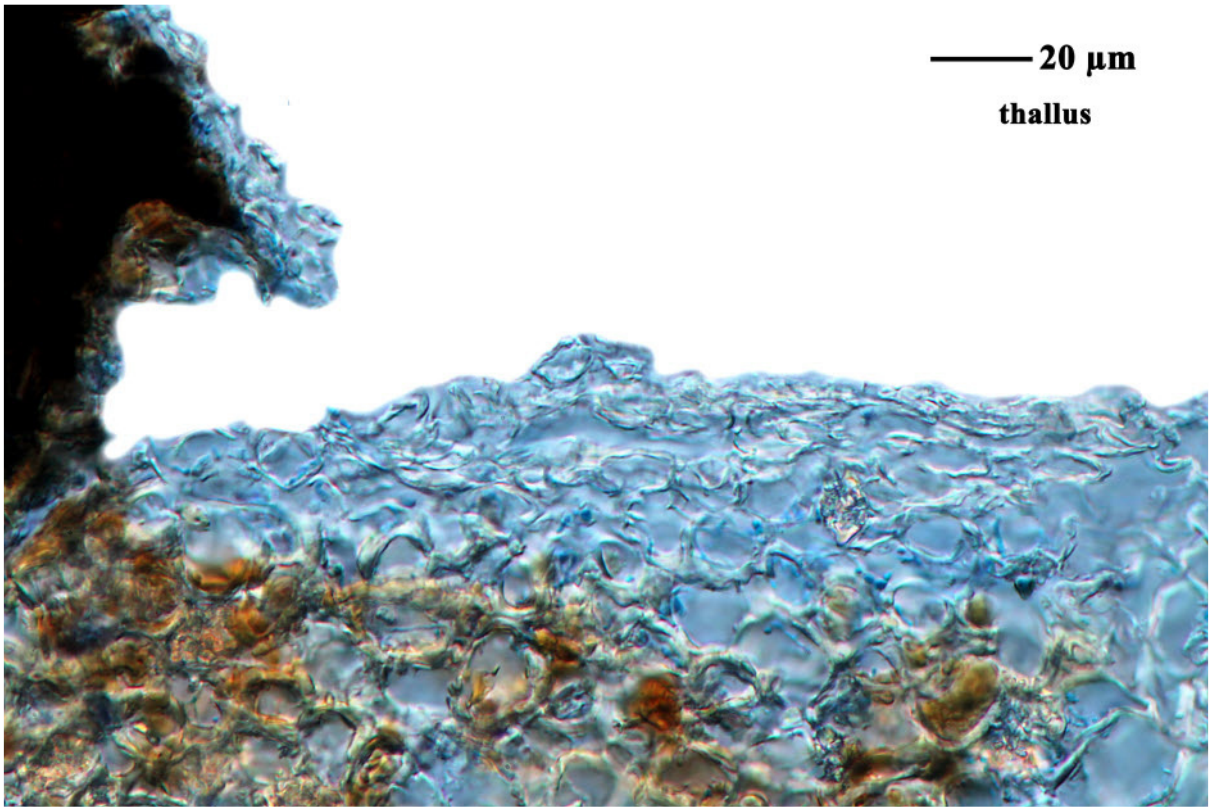


Eopyrenula intermedia



Eopyrenula intermedia





Eopyrenula intermedia

Eopyrenula intermedia Coppins, in Aptroot, Biblthеca Lichenol. 44: 111 (1991)

Thallus white, UV- (bluish white), matt, cortex absent, nearly not lichenized (no photobiont seen!). Perithecium dimidiate. Hymenium J+ red-brown, not inspersed, paraphyses lax not branched. Asci J- (not blue). Ascospores brown, 3-5 septate, 15–22 × 7.1 µm, lacking special thickened walls, 8/ascus.

[Weerakoon201], USA; Missouri; Ozark mountains, on Acer. Leg. G. Weerakoon (no 201), 14.08.2015, det. A. Aptroot, 2015.







Eopyrenula intermedia



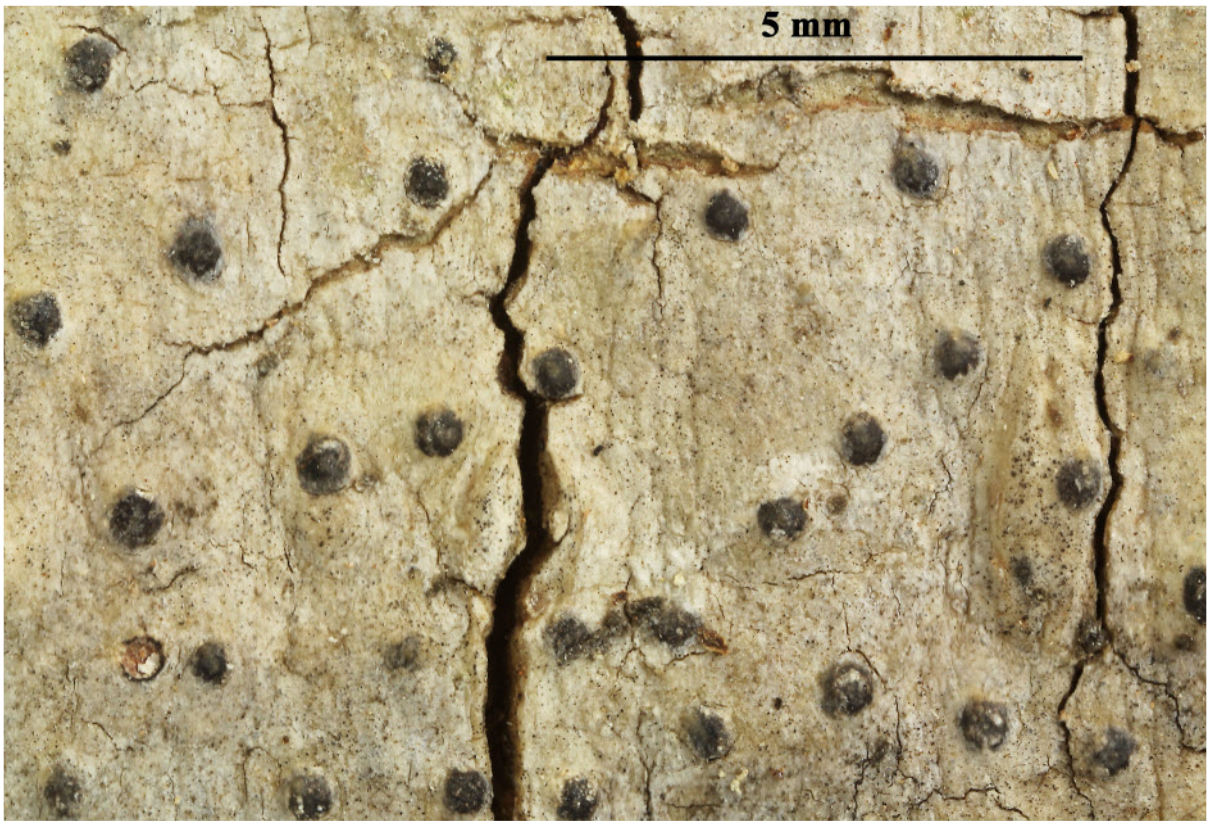
Eopyrenula intermedia

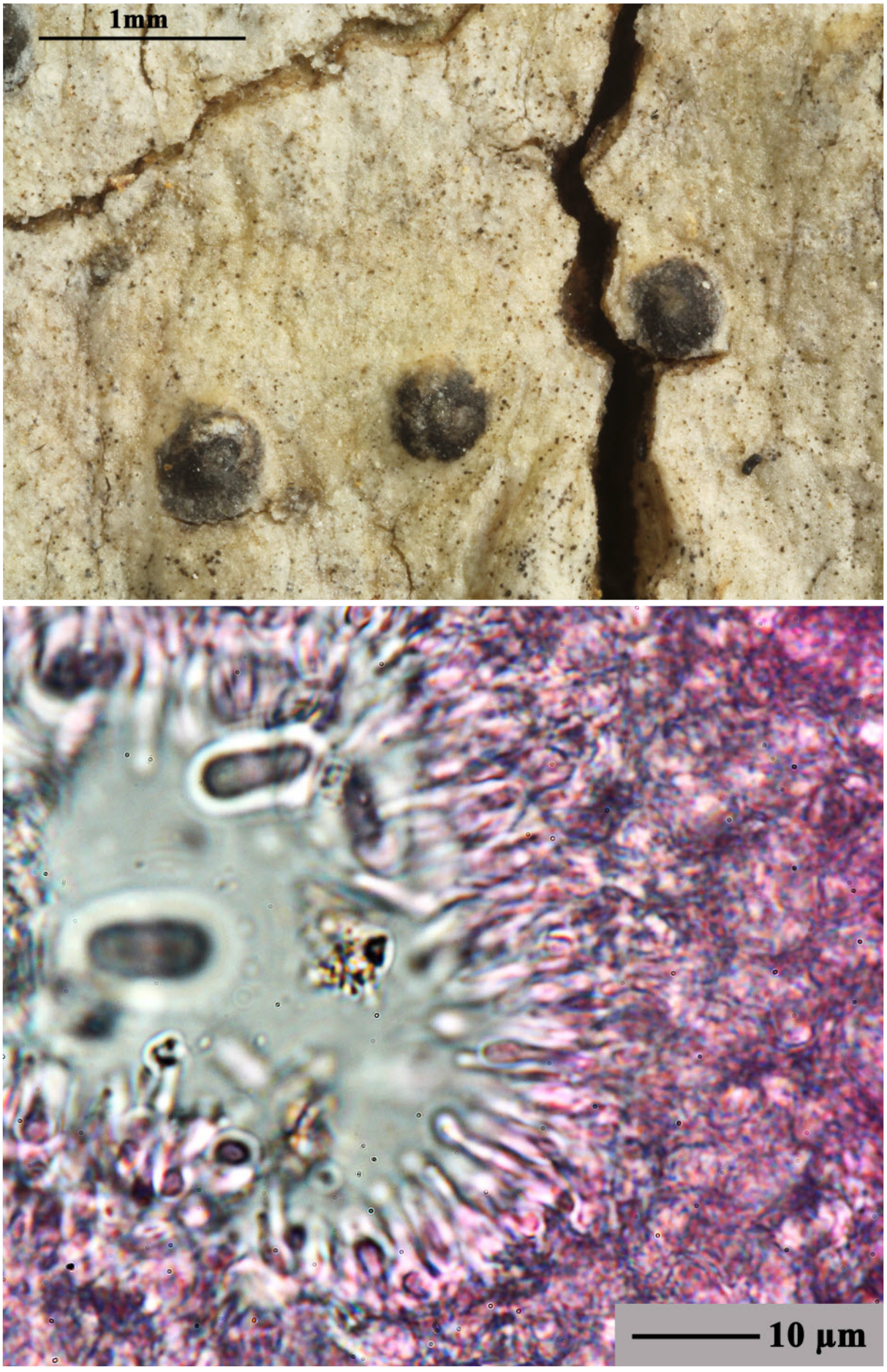
Flagellostrigula laureriformis (Aptroot & Lücking) Lücking, S.H. Jiang & Sérus., in Hongsanan et al., Fungal Diversity: 10.1007/s13225-020-00462-6, [131] (2020)

= *Strigula laureriformis* Aptroot & Lücking, in Aptroot, Lücking, Sipman, Umaña & Chaves, Biblthca Lichenol. 97: 131 (2008)

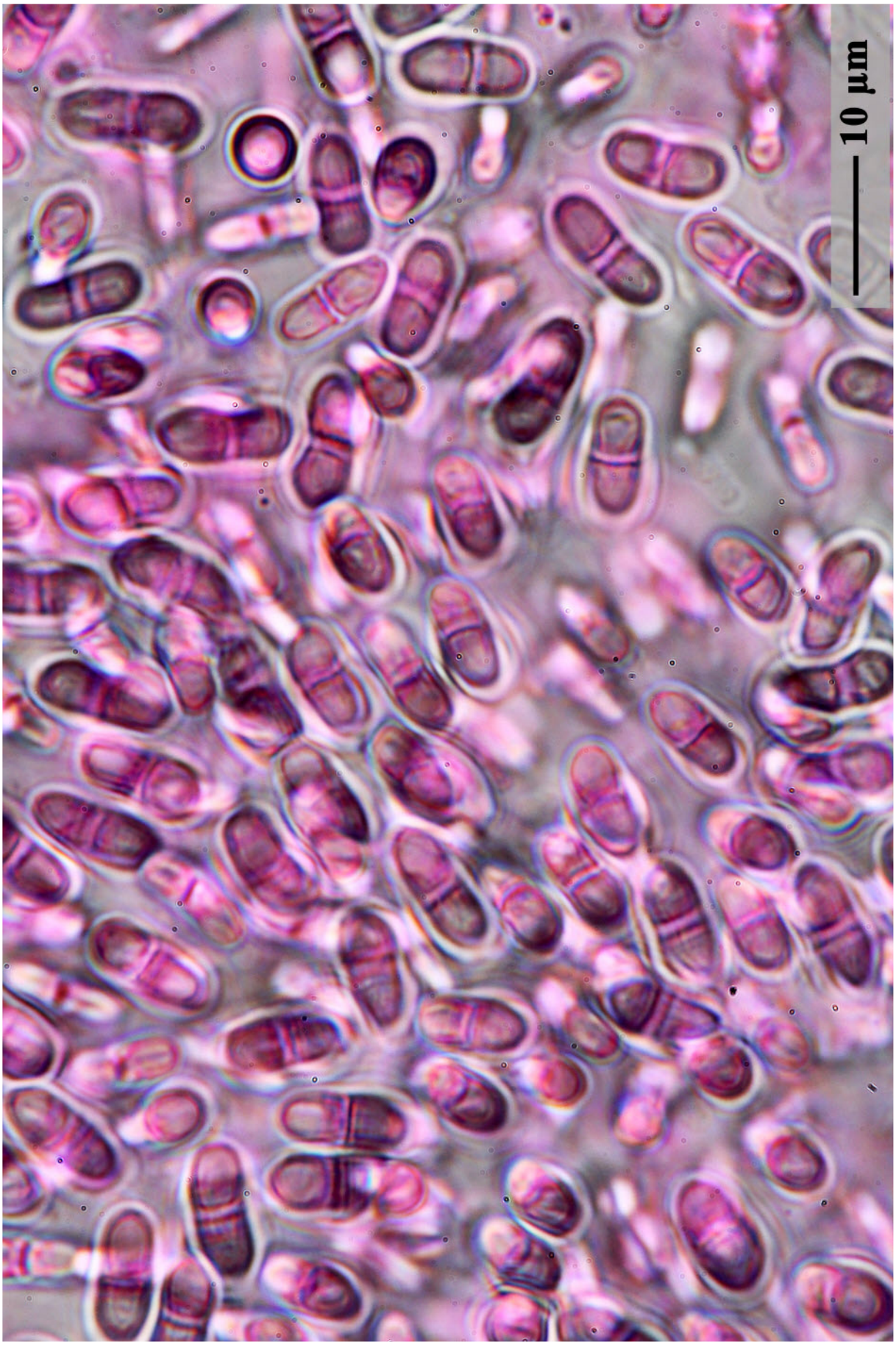
Thallus olivaceous green, thickly corticate, with white pseudocyphellae, covering an area up to 1 cm diam., without hypothallus. Perithecia not observed. Conidiomata pycnidia, immersed in hemispherical thallus warts of 0.4–0.9 mm diam., wall carbonized above, c. 25 µm thick, ostiole flush, c. 0.2 mm diam., black but covered by a thin cortex, surrounded by a pale annulus. Conidia formed inside the pycnidia acrogenously on hyaline, 10 × 1 µm conidiogenous cells which are aranged in a lobed stroma, 1-septate, hyaline, 7–10 × 3–4 µm, sometimes with a flagellar appendage of 30–35 × 0.5 µm at one end.

[ABL21346], Brazil, Ceará, Quixadá. Açude Ceró, trilha da Galinha, on tree bark in caatinga. Leg. M. Cáceres & A. Aptroot (no 21346), 31.03.2014, det. A. Aptroot 2014.





Flagellostrigula laureriformis

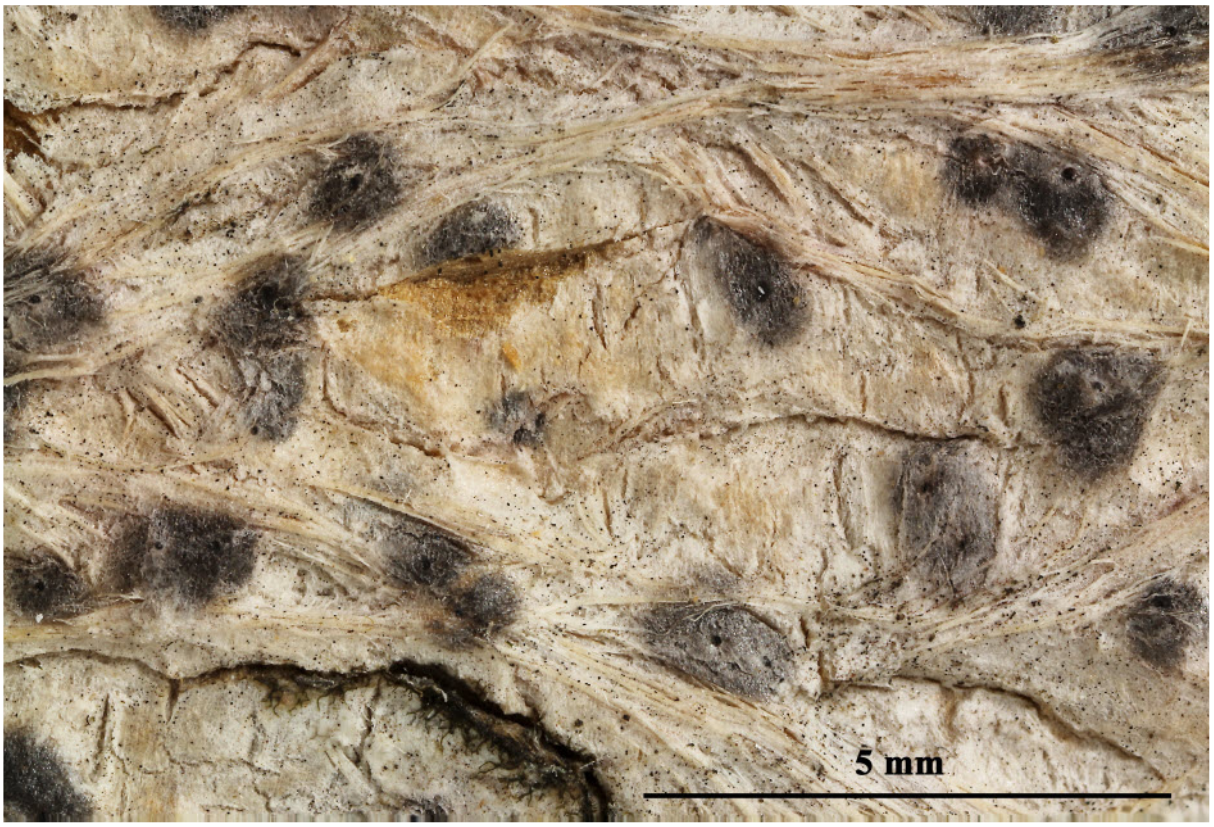


Flagellostrigula laureriformis

Granulopyrenis antillensis Aptroot, Biblthca Lichenol. 44: 91 (1991)

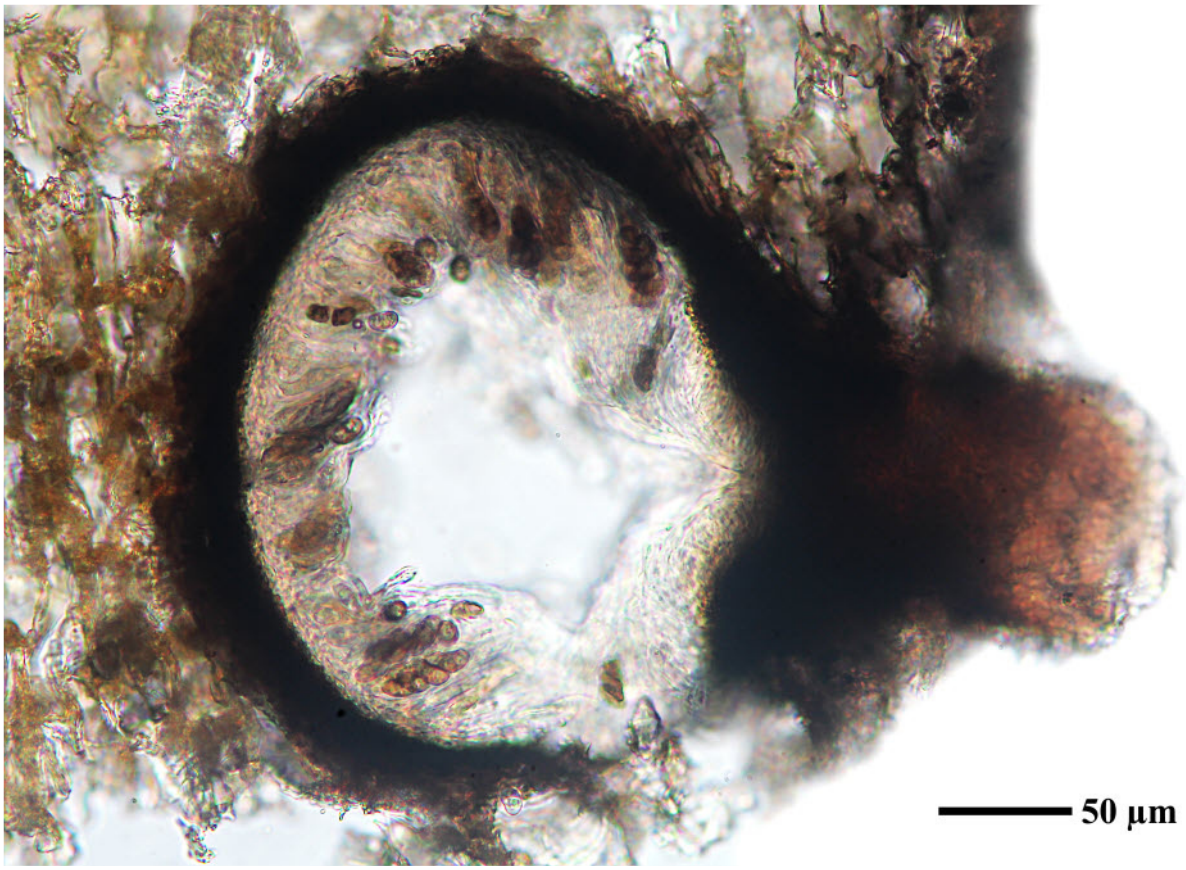
Thallus pinkish-grey, blackened around the ascocarps, dull, immersed in the substratum, continuous, without crystals, without hypothallus. Apparently not lichenized. Ascocarps without non-carbonized pseudostromatic tissues, without crystals, hemispherical, distinctly flattened, immersed in the substratum, exposed, 0.8–1.3 mm diam, 0.2–0.5 mm high. Ascocarp wall completely carbonized, without distinct clypeus, but the blackened area around the ascomata often giving the impression of a clypeus, up to 150 µm thick. Ostiole black, conical, apical or often skewed, 50–100 µm diam. Hamathecium not inspersed with oil droplets, gelatinized, IKI+ blue. Interthecial hyphae cellular pseudoparaphyses, only branched at the tips, up to 3 µm thick. Periphyses present, c. 1 µm thick, branched. Asci without ocular chamber, 60–90 × 12–18(–25) µm. Ascospores 8 in the ascus, irregularly arranged, brown, ellipsoidal with rounded ends, symmetrically septate, not constricted at the septa, 11.5–14 × 6–9 µm; with 1 median euseptum, 1 µm thick. Endosporium up to 3 µm thick. Spore wall smooth, with granules, without gelatinous sheath, 2–3 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC.

[Degelius], Antilles, Guadeloupe, Marie-Galante, Grand Bourg, road to Ballet, on Tabebuia pallida, 1-100 m. Leg. G. Degelius (s.n.), 28.06.1958, det. A. Aptroot. ISOTYPE.

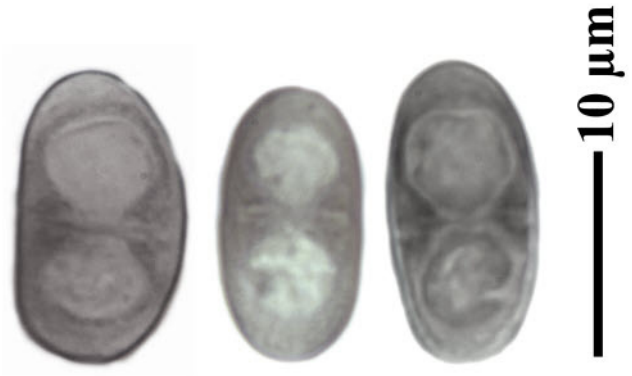




Granulopyrenis antillensis







Granulopyrenis antillensis

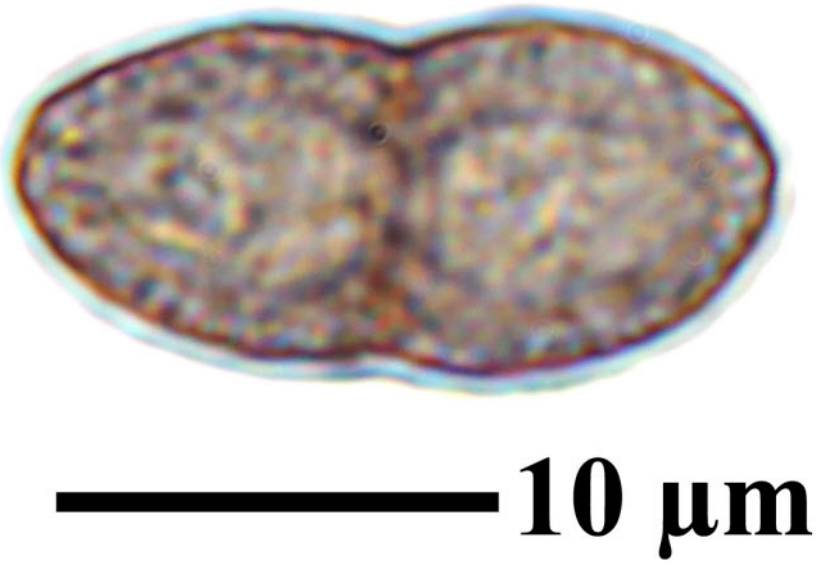


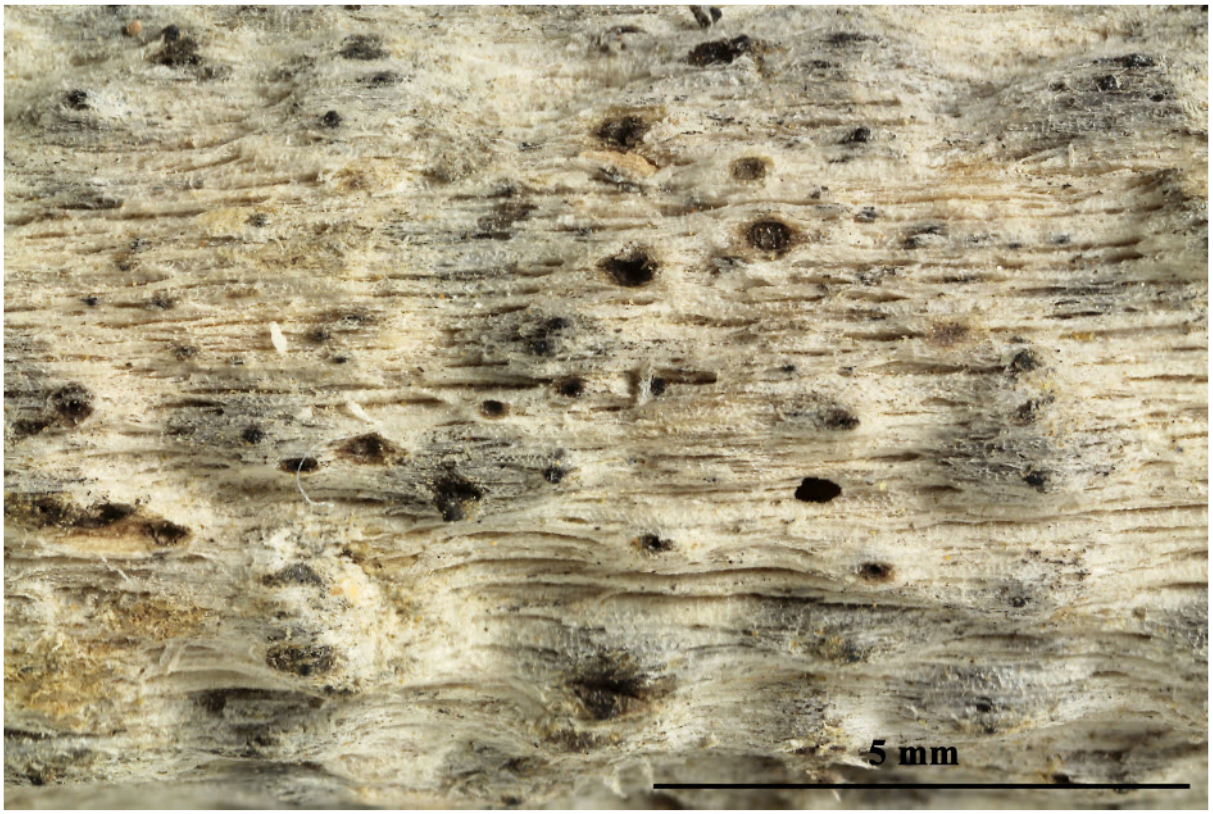
Granulopyrenis antillensis

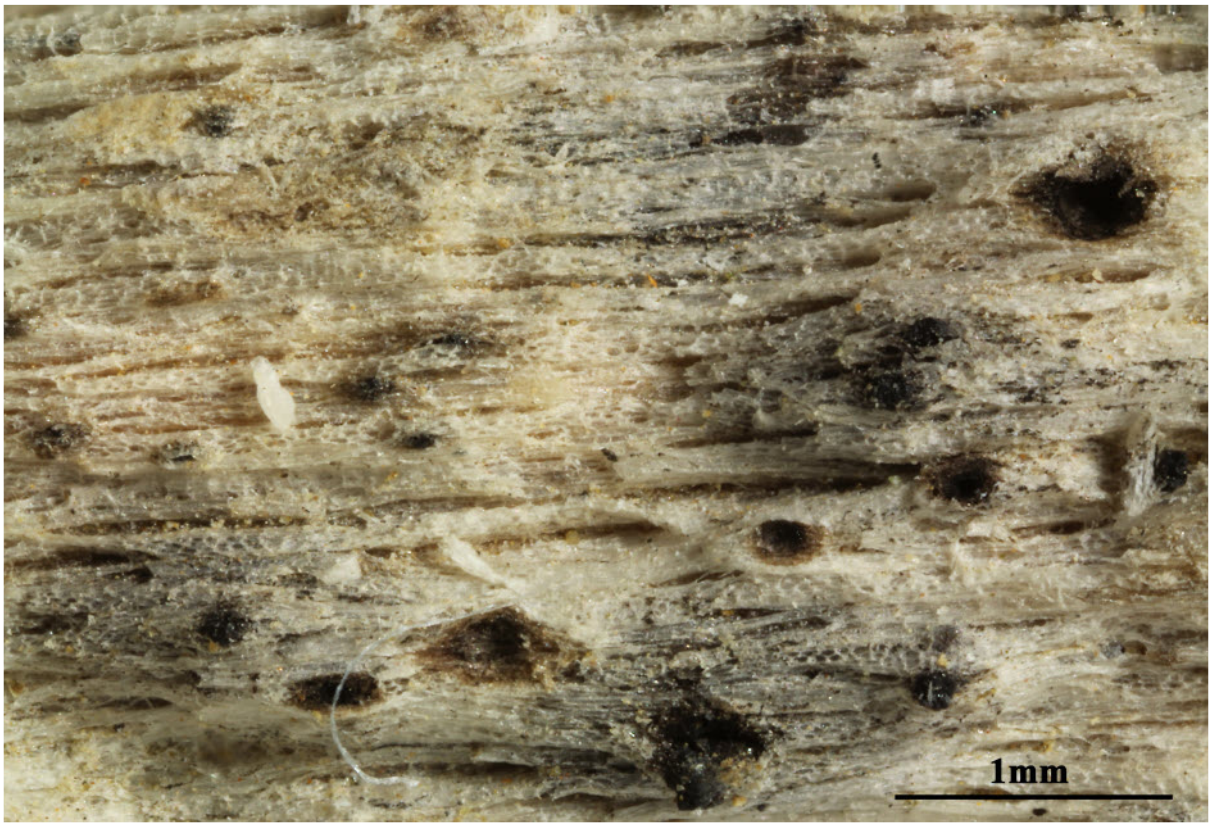
Granulopyrenis seawardii Aptroot & Sipman, J. Hattori bot. Lab. 91: 326 (2001)

Thallus endoxylic, covering areas of up to 4 cm diam., whitish to pale pinkish, dull, not corticate, continuous, without a conspicuous hypothallus, not associated with algae. Ascomata hemispherical, black, 0.2–0.4 mm diam., not surrounded by stromatic tissue, superficial, but the sides immersed. Ascomatal wall densely carbonized on all sides, c. 30– 80 µm thick. Ostiole apical, black, c. 50 µm diam. Asci cylindrical, bitunicate, 8-spored, 60– 80 × 12-17 µm, with an angular (annulate) ocular chamber, unchanged in IKI. Hamathecium consisting of c. 3–5 µm wide filaments, regularly septate but not anastomosing, surrounded by hemiamyloid gel, which in IKI (without pretreatment with KOH) is blue in low concentrations and red in high concentrations, both colours often visible at the same time in one section. Ascospores irregularly biseriate, ellipsoid, pale to medium brown, with one median or slightly sub-median septum, constricted at the septum, 13–20 × 7–8 µm, wall c. l–2 µm thick, smooth at the outside, but with a granular, warty to spinulose (outwardly pointed, not foveate) ornamentation between the outer and inner wall layer, surrounded by a 5–7 µm wide (in water), continuous gelatinous sheath. Pycnidia unknown. No secondary substances detected.

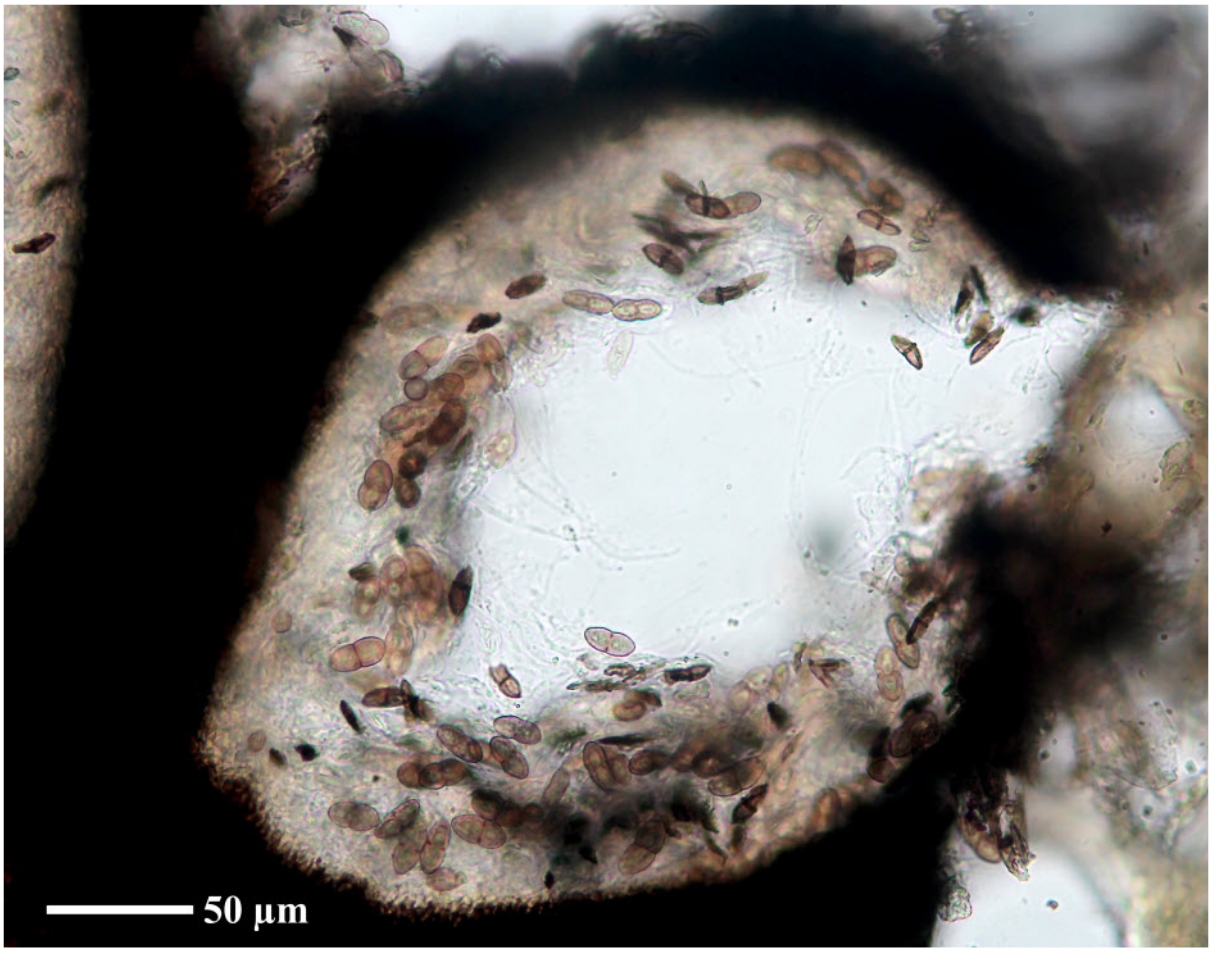
[ABL48920], China, Hong Kong, Hong Kong Island, Cape d' Aguilar, 1- 50m alt., 22°12’5” N, 114°15’6” E, on weathered wood of a tree trunk and decorticated branches on a rocky slope at the coast. Leg. A. Aptroot (no 48920) & H. Sipman, 11.07.2000, det. A. Aptroot, 2000. ISOTYPE.







Granulopyrenis seawardii





Granulopyrenis seawardii

Julella geminella (Nyl.) R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 87 (1995).

= *Verrucaria geminella* Nyl., Expos. syn. pyrenocarp. 40. 1858.

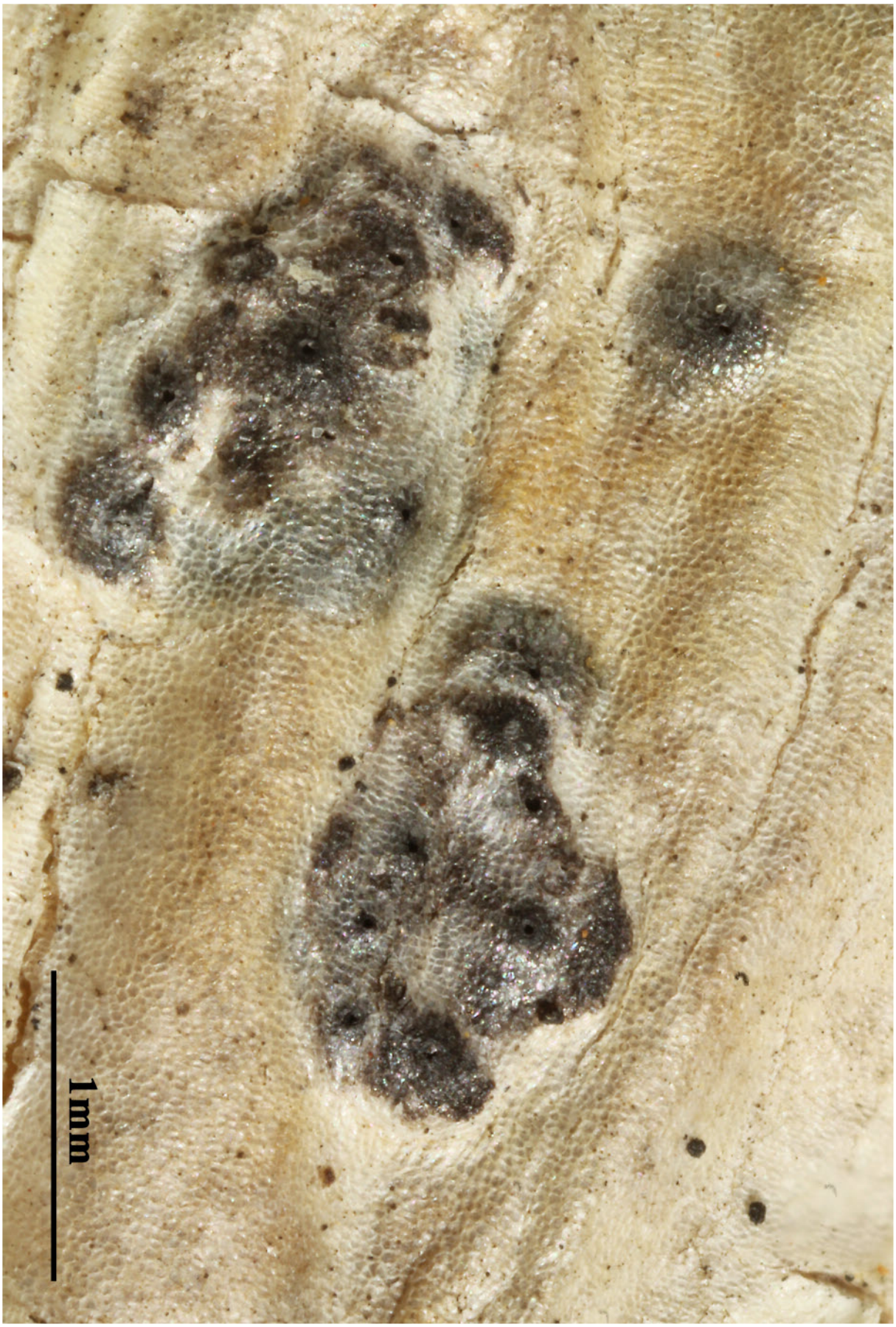
= *Polyblastiopsis geminella* (Nyl.) Zahlbr., Cat. lich. univ. 1: 349. 1922.

= *Polyblastiopsis rappii* Zahlbr., Ann. Mycol. 33: 36. 1935.

Ascoma not strongly immersed; clypei often fused; ostioles often surrounded by a whitish ring. Ascospores 2/ascus, 40–51 × 17–21 µm, with 9–11 rows of cells.

[Menezes], Brazil, Rio Grande do Norte, Apodi. Leg. A. A. Menezes, 2013, leg. A. Aptroot, 2014.





Julella geminella

Julella lactea (A. Massal.) M.E. Barr, Sydowia 38: 13 (1986) [1985]
= *Blastodesmia lactea* A. Massal. 1852

Ascomata ± superficial, with narrow hyphal ring. Ostioles apical, colourless. Ascospores 1–4/ascus, colourless, muriform, 30–36 × 12–15 µm, with 7–9 rows of cells. Microconidia 15–18 × 0.5 µm.

[ABL26077], USA, Florida, Dade County Homestead, along 248 street, 187 ave, on tree along road. 25°30’ N, 80°30’ W, 10 m. Leg. A. & M. Aptroot (no 26077), 2-7.06.1989, det. A. Aptroot, 1989.



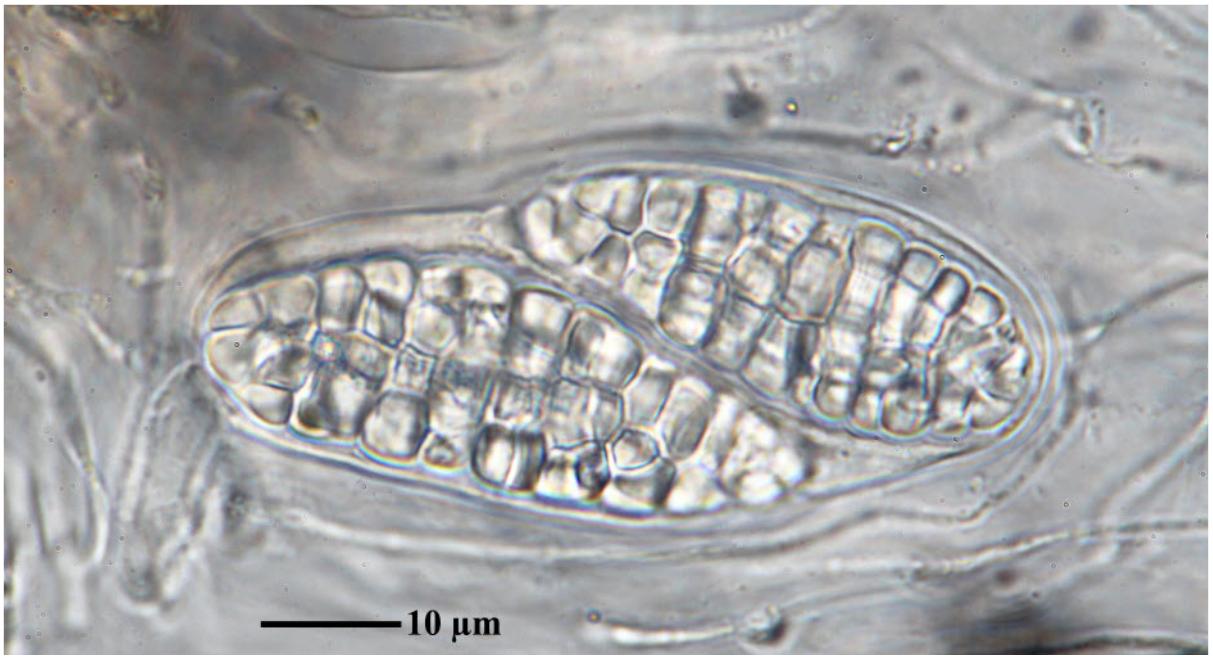


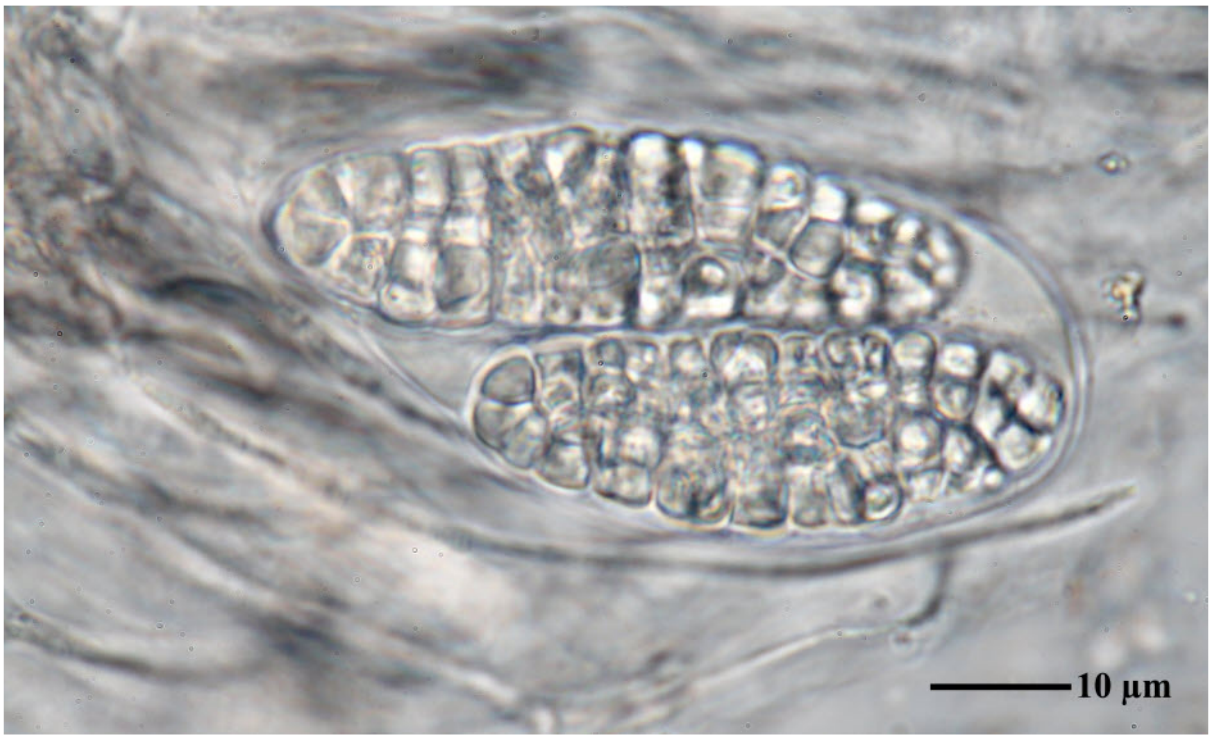
Julella lactea





Julella lactea







Julella lactea

Julella lactea (A. Massal.) M.E. Barr, Sydowia 38: 13 (1986) [1985]
= *Blastodesmia lactea* A. Massal. 1852

Ascomata ± superficial, with narrow hyphal ring. Ostioles apical, colourless. Ascospores 1–4(–8)/ascus, colourless, muriform, 30–36 × 12–15 µm, with 7–9 rows of cells. Microconidia 15–18 × 0.5 µm.

[ABL57293], China, Yunnan Prov., Xishuangbanna, Menglun, Tropical Botanical Garden, Hevea plantation, on *Hevea brasiliensis*, 550 m, 21°55’321” N, 101°16’06” E. Leg. A. Aptroot (no 57293), 1.11.2002, det. A. Aptroot, 2003.







Julella lactea

Julella sericea (A. Massal.) Coppins, Lichenologist 24(4): 367 (1992)
= *Microglaena sericea* (A. Massal.) Lönnr., Flora, Regensburg 41: 634 (1858)
= *Polyblastia sericea* A. Massal., Symmict. Lich.: 99 (1855)
= *Polyblastiopsis sericea* (A. Massal.) Zahlbr., in Engler & Prantl, Nat. Pflanzenfam., Teil. I (Leipzig) 1(1*): 65 (1907)
= *Sporodictyon sericeum* (A. Massal.) Trevis., Conspect. Verruc.: 13 (1860)
= *Verrucaria sericea* (A. Massal.) Garov., Tentam. Dispos. Lich. Langob.: 161 (1865)

Thallus effuse, pale grey or yellowish grey, smooth. immersed in the substrate, often inconspicuous; true exiple 200–400 µm diam. Perithecia 0.3–0.6 mm diam., flattened-hemispherical, 20–50 % immersed, blackish, but covered by a thin layer of bark cells; involucrellum dark brown. Ascospores 15–25 × 10–15 µm (excluding gelatinous perispore), muriform, with 5–7 transverse septa and 1–2 longitudinal septa.

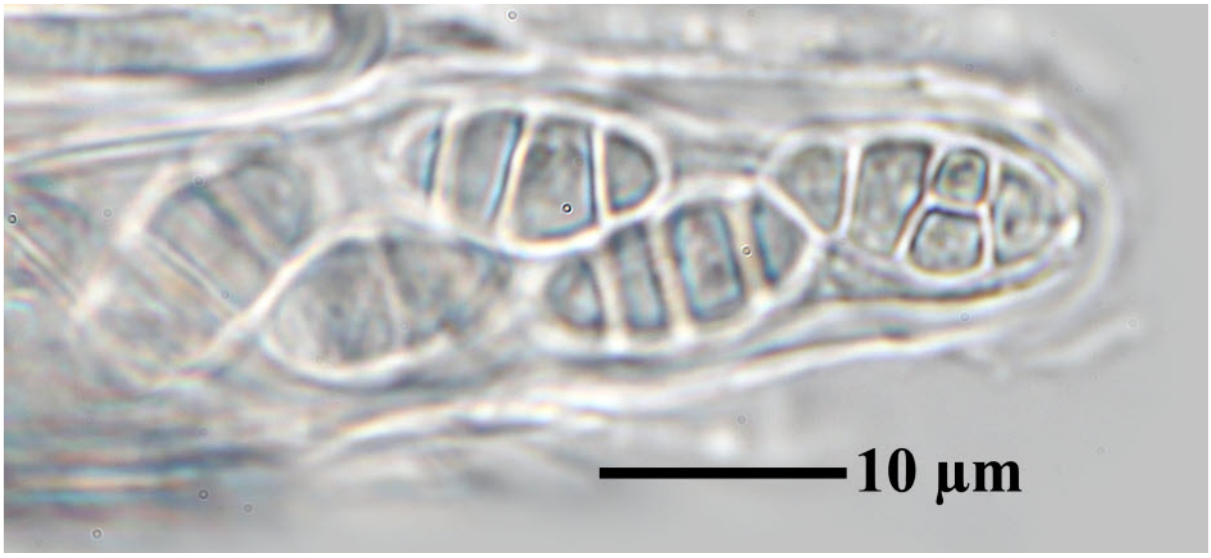
[ABL24216], USA, Arizona, Santa Cruz County, Santa Rita Mountains, Madera Canyon, trail to Josephine Saddle, evergreen oak (*Q. hypoleucoides, Q. emoryi*) – deciduous oak (*Q. arizonica*) and pine (*P. latifolia*) forest, 1700-1100 m, intrusive igneous rocks, 31°43’ N, 110°52’ W. Leg. A. & M. Aptroot (no 24216), 31.12.1988, det. A. Aptroot, 1989.

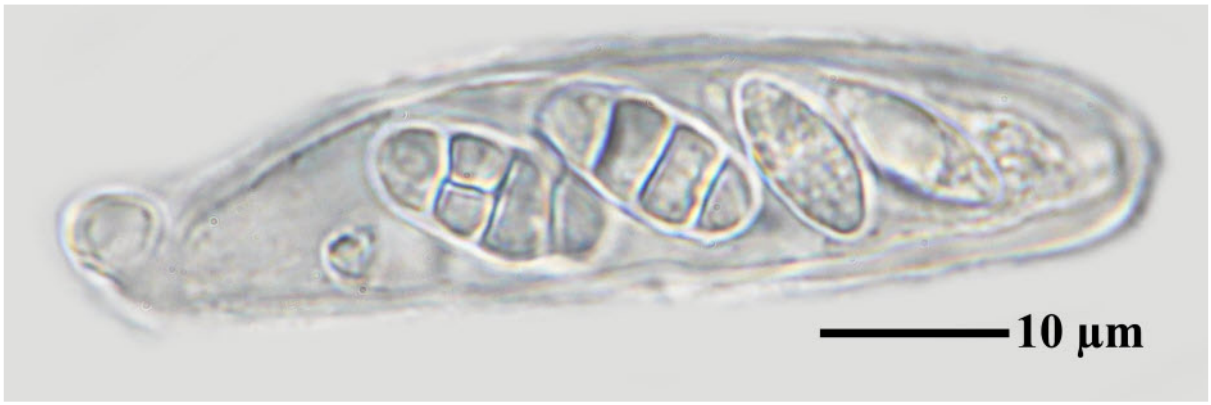


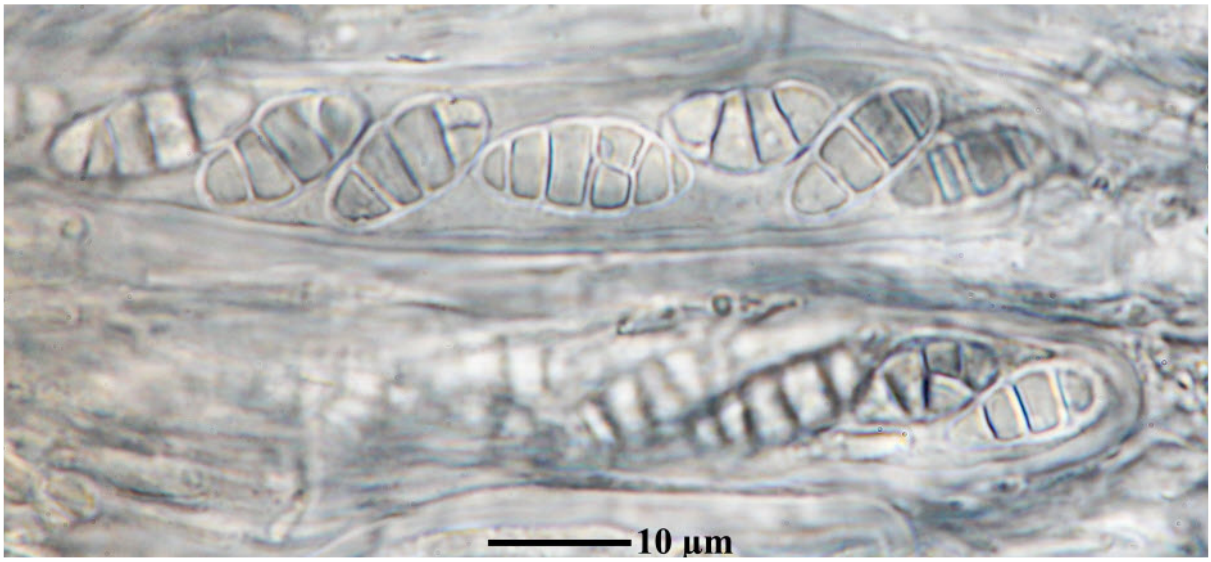


Julella sericea







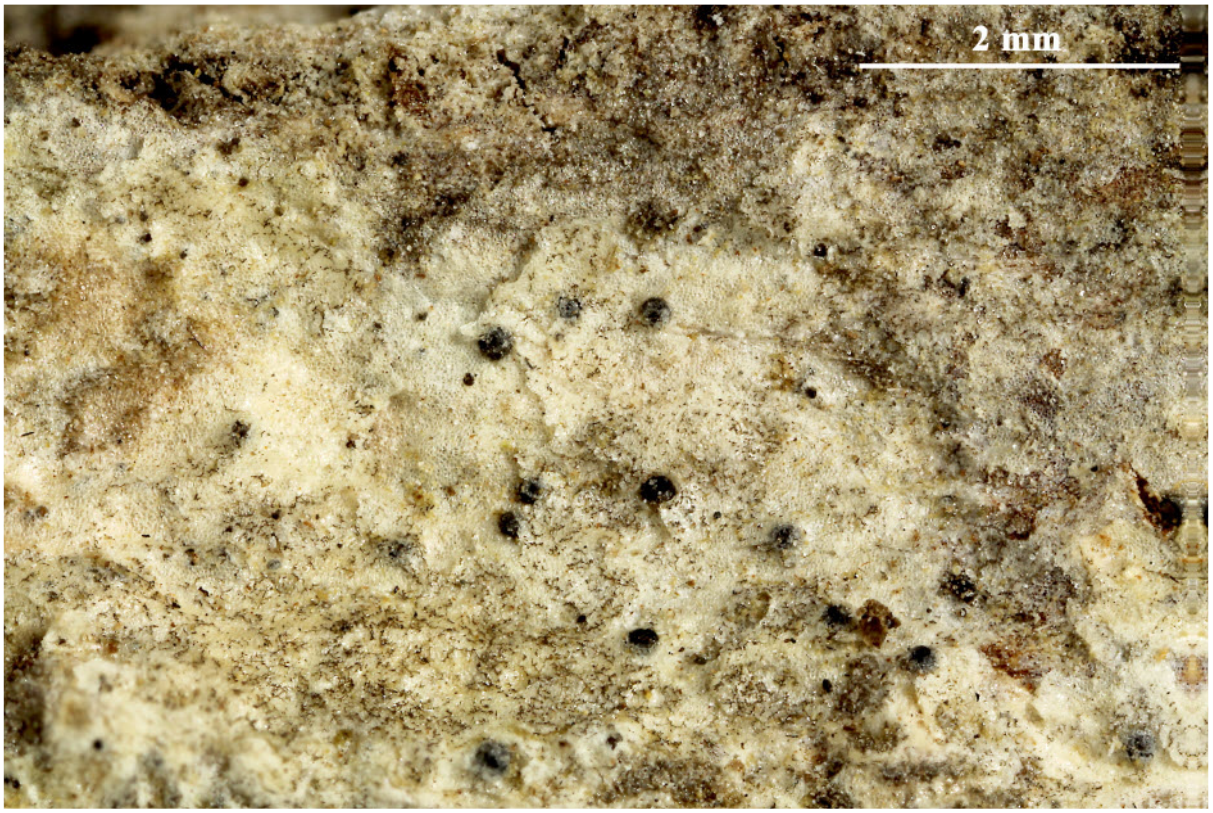


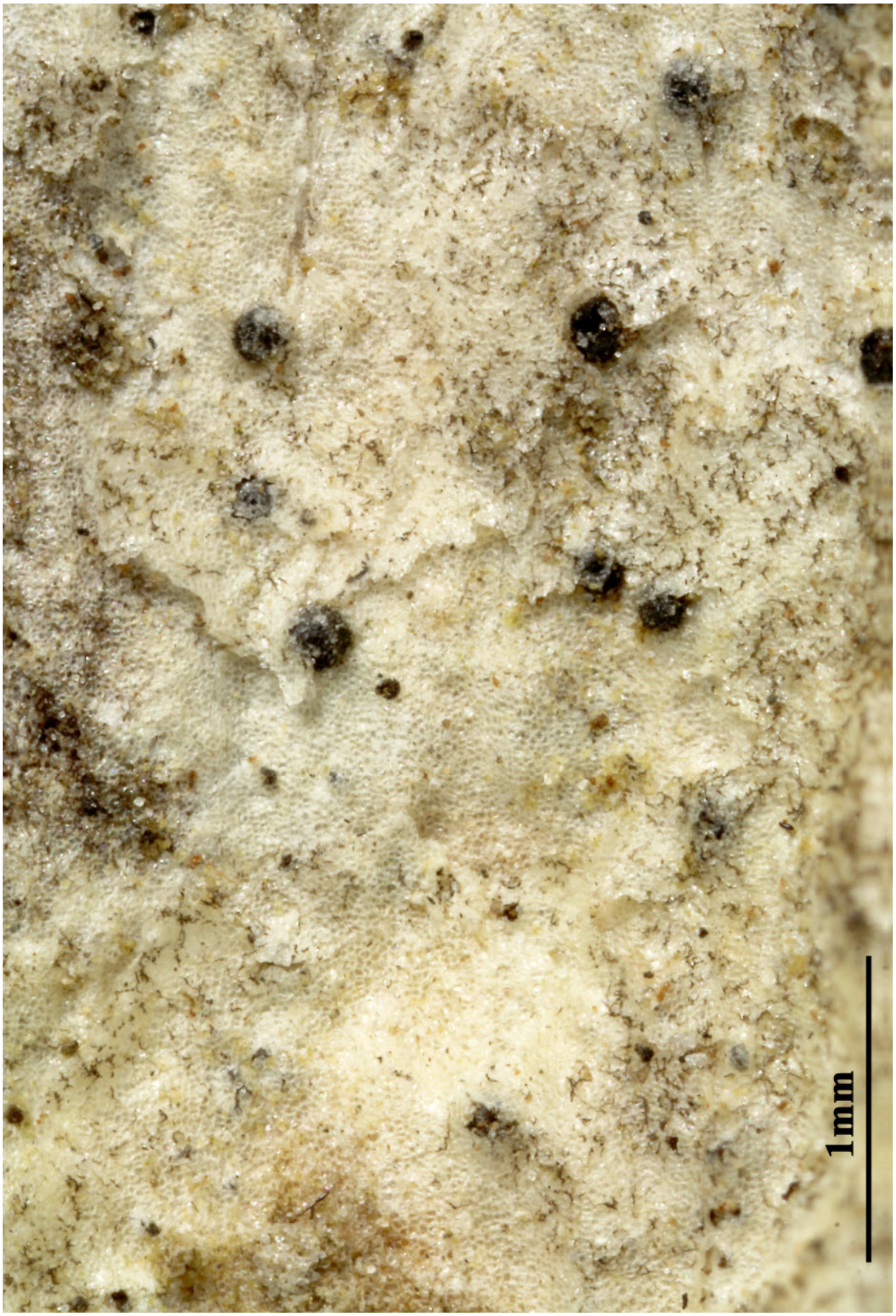
Julella sericea

Julella sericea (A. Massal.) Coppins, Lichenologist 24(4): 367 (1992)
= *Microglaena sericea* (A. Massal.) Lönnr., Flora, Regensburg 41: 634 (1858)
= *Polyblastia sericea* A. Massal., Symmict. Lich.: 99 (1855)
= *Polyblastiopsis sericea* (A. Massal.) Zahlbr., in Engler & Prantl, Nat. Pflanzenfam., Teil. I (Leipzig) 1(1*): 65 (1907)
= *Sporodictyon sericeum* (A. Massal.) Trevis., Conspect. Verruc.: 13 (1860)
= *Verrucaria sericea* (A. Massal.) Garov., Tentam. Dispos. Lich. Langob.: 161 (1865)

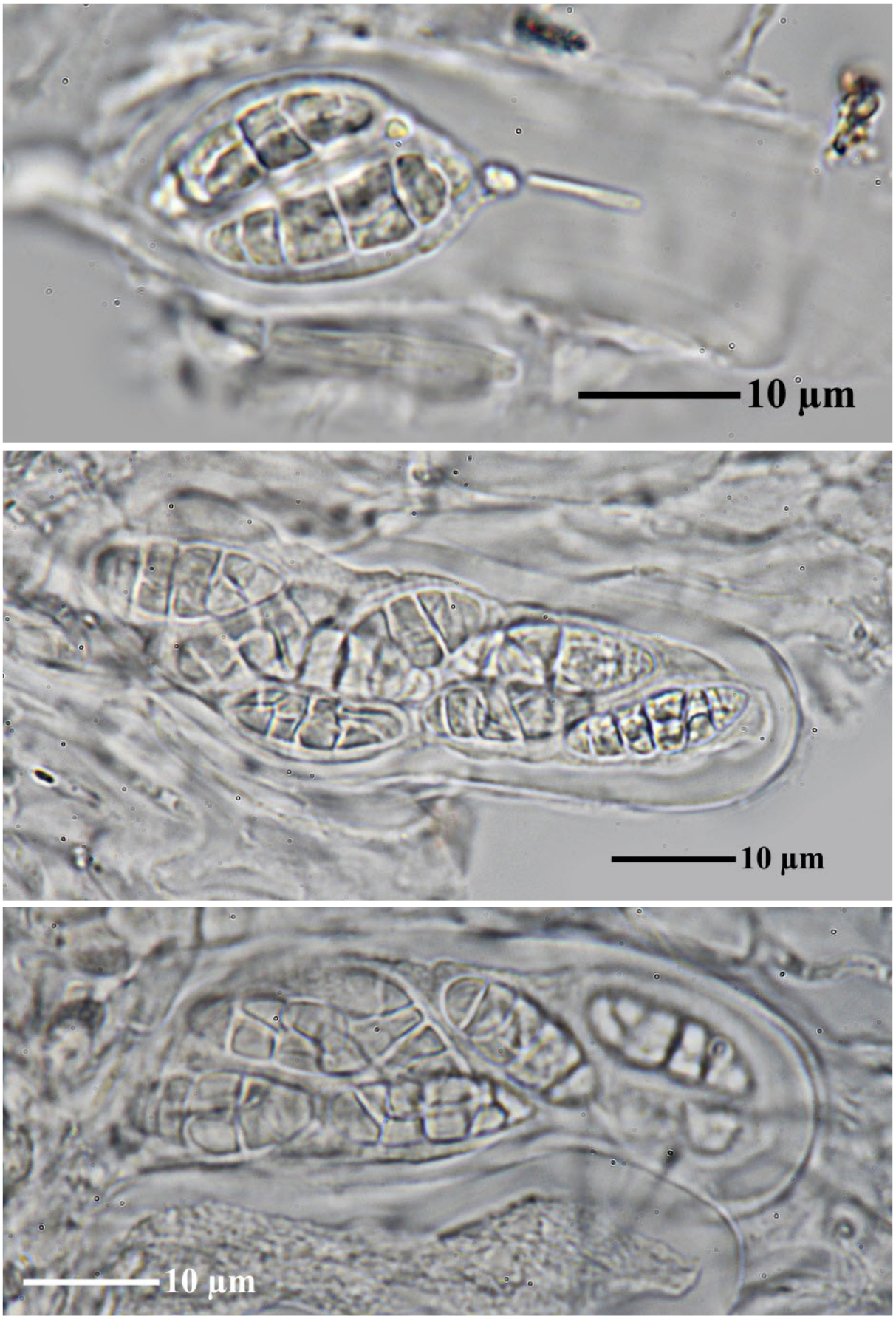
Thallus effuse, pale grey or yellowish grey, smooth. immersed in the substrate, often inconspicuous; true exiple 200–400 µm diam. Perithecia 0.3–0.6 mm diam., flattened-hemispherical, 20–50 % immersed, blackish, but covered by a thin layer of bark cells; involucrellum dark brown. Ascospores 15–25 × 10–15 µm (excluding gelatinous perispore), muriform, with 5–7 transverse septa and 1–2 longitudinal septa.

[ABL215981], USA, Pensylvania state, Centre County, State College Garden, on Quercus. 100 m, 40°48’ N, 77°50’ W. Leg. A. Aptroot (no 215981), 11.1987, det. A. Aptroot, 1988.

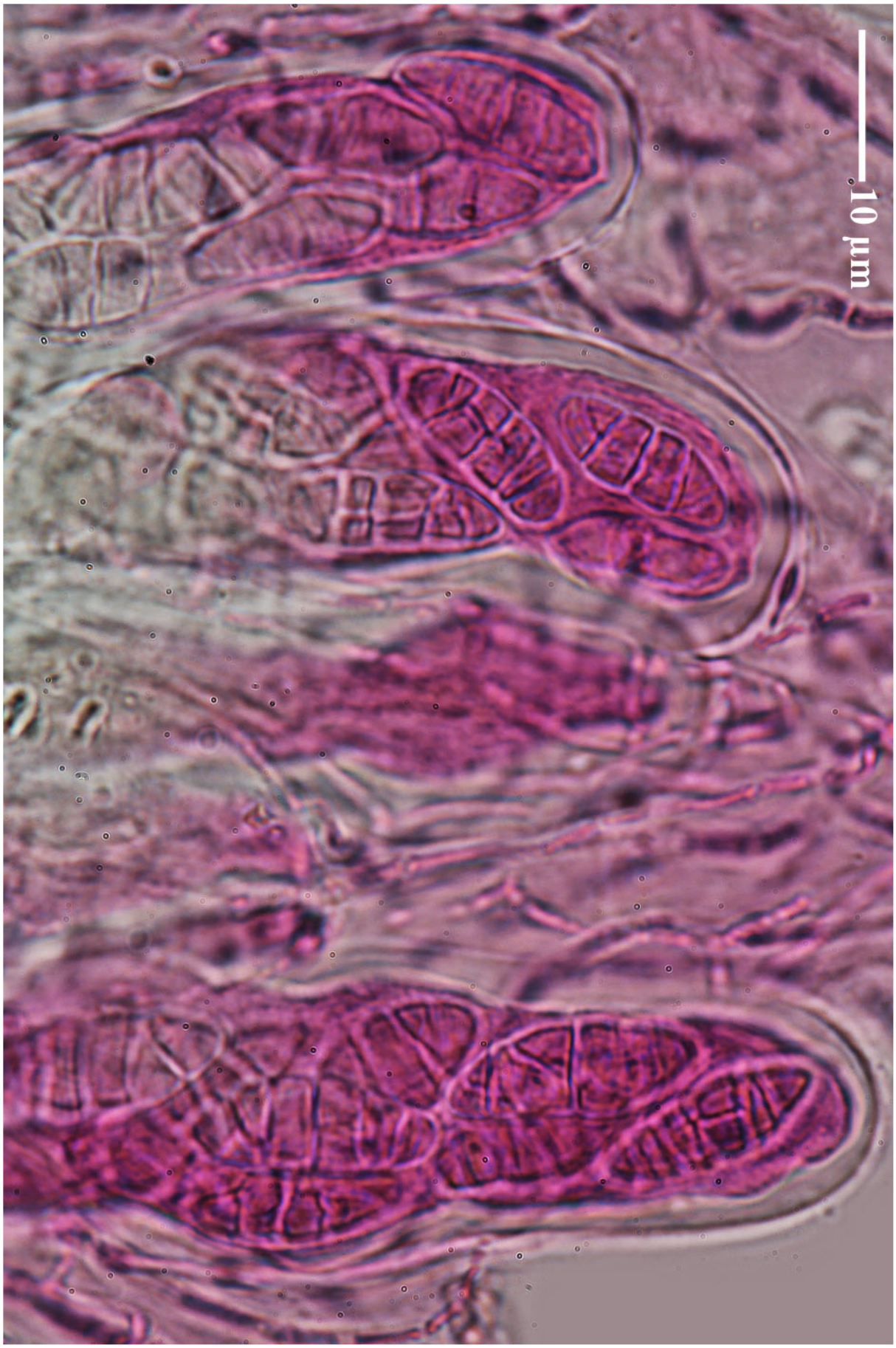




Julella sericea



Julella sericea



Julella sericea

Julella vitrispora (Cooke & Harkn.) M.E. Barr, Sydowia 38: 13 (1986) [1985]

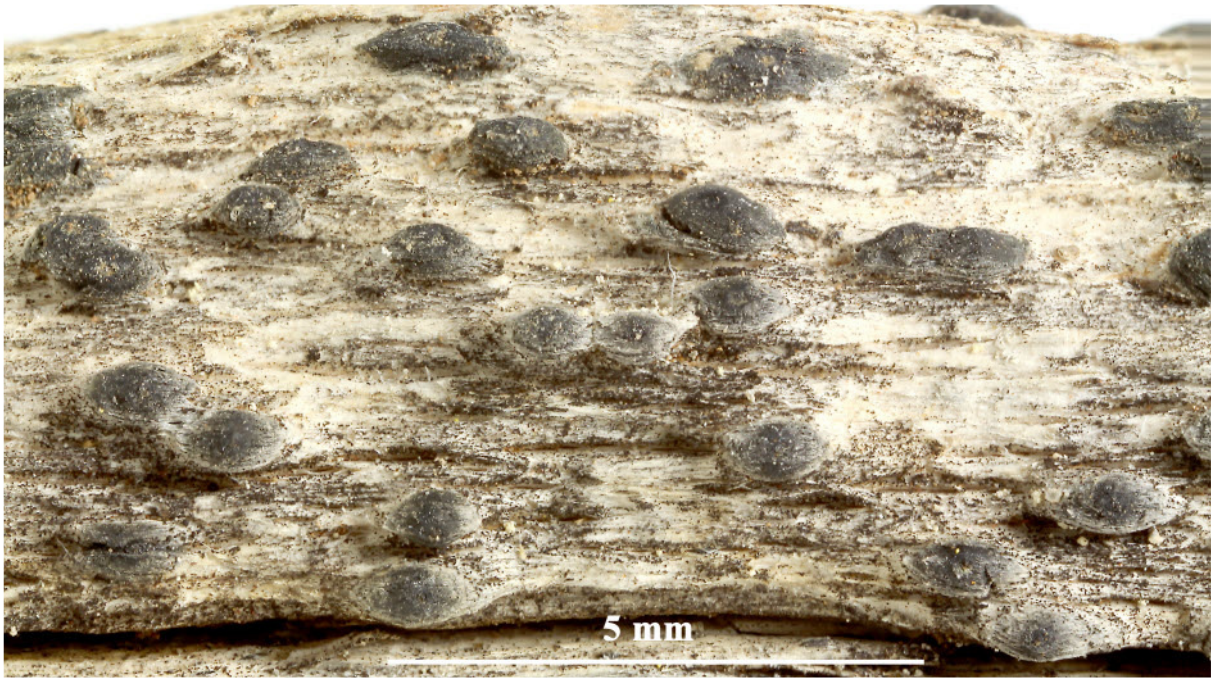
= *Peltosphaeria vitrispora* (Cooke & Harkn.) Berl., Revue mycol., Toulouse 10(no. 37): 18 (1888)

= *Pleospora vitrispora* Cooke & Harkn., Grevillea 9(no. 51): 86 (1881)

= *Julella taxodii* R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 88 (1995)

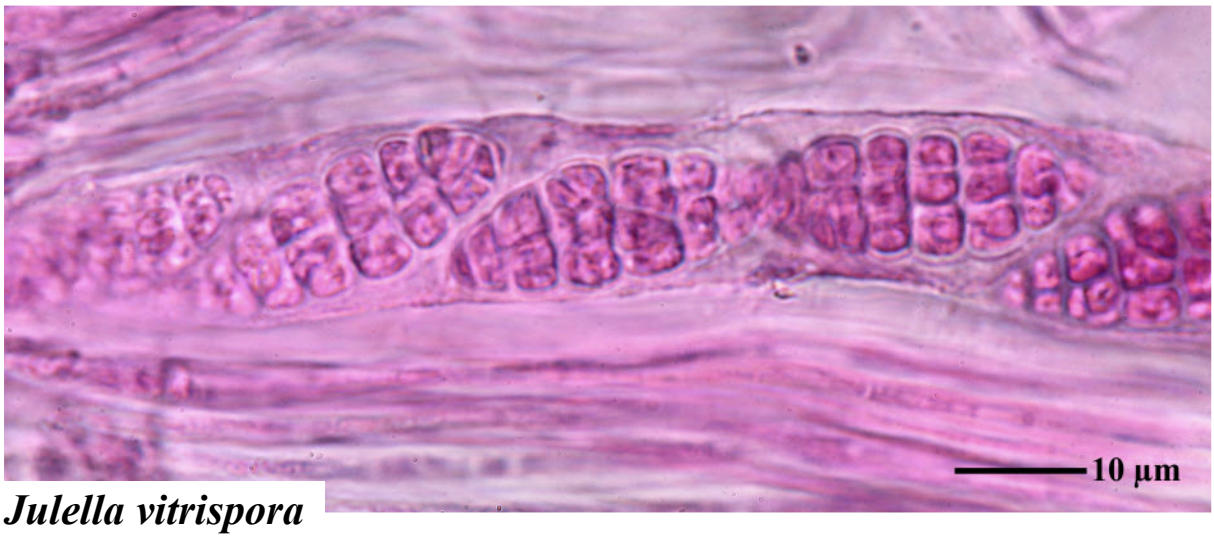
Thallus not evident or whitish discoloration of the bark. Ascomata immersed to somewhat emergent with age, ± spherical, 0.45–0.7 mm diam., usually with a broad clypeus, 0.6–1.8 mm diam. Asci narrowly cylindrical, 200–300 × 20–25 µm, often with a long stipe, with 8 uniseriate ascospores. Ascospores fusiform, rather irregularly 9–10 × 1–2 septate, with large cells, 36–46 × 12–13(–15) µm, often with an obvious gel sheath. Microconidia rod-shaped, 5–7 × 0.5 µm.

[ABL24455], Mexico, Baja California, Cerro Kenton between Bahia Falso and Bahia San Quintin, coastal scrub community (*Aesculus californica, Ambrosia, Euphorbia misera, Jatropha, Lycium* etc.). 20-100 m, basalt area, 30°28’ N, 116°00’ W. Leg. A. & M. Aptroot (no 24455), 04.01.1989, det. A. Aptroot 1989.









Julella vitrispora

Julella vitrispora (Cooke & Harkn.) M.E. Barr, Sydowia 38: 13 (1986) [1985]

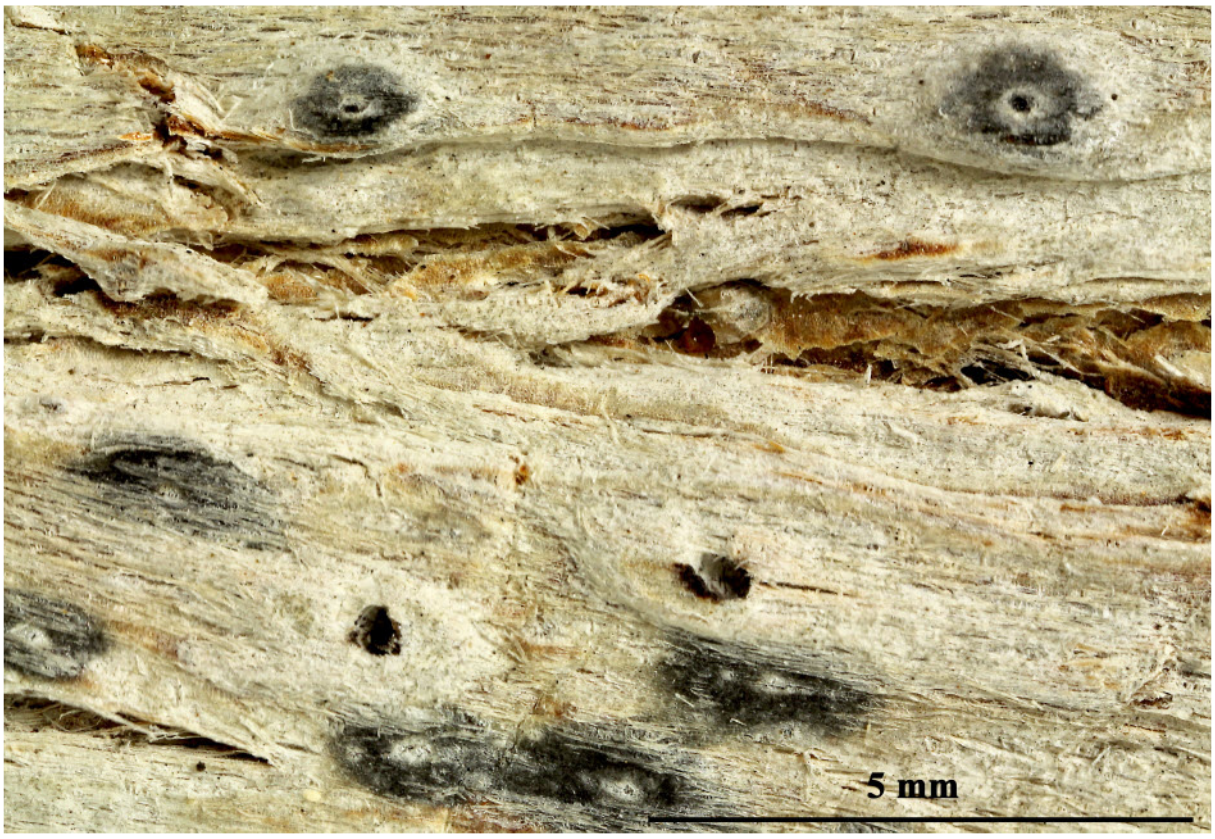
= *Peltosphaeria vitrispora* (Cooke & Harkn.) Berl., Revue mycol., Toulouse 10(no. 37): 18 (1888)

= *Pleospora vitrispora* Cooke & Harkn., Grevillea 9(no. 51): 86 (1881)

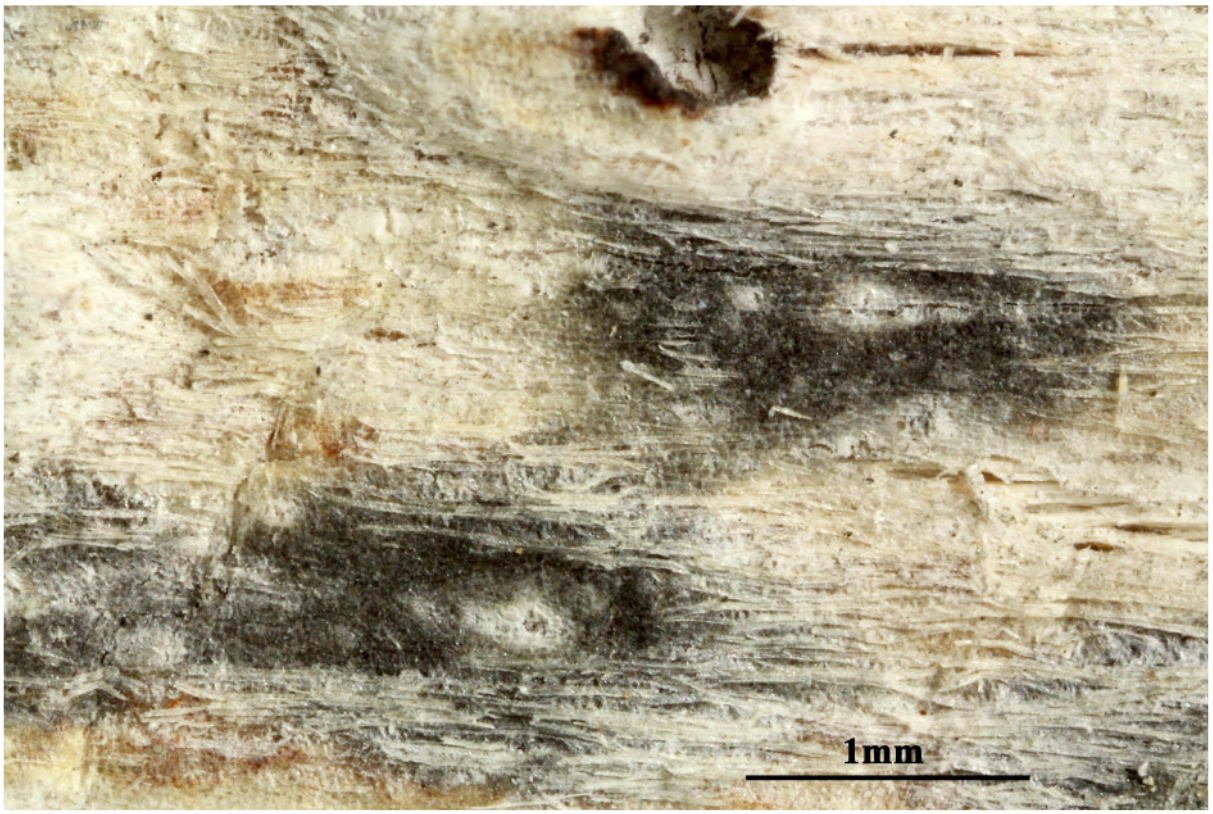
= *Julella taxodii* R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 88 (1995)

Thallus not evident or whitish discoloration of the bark. Ascomata immersed to somewhat emergent with age, ± spherical, 0.45–0.7 mm diam., usually with a broad clypeus, 0.6–1.8 mm diam. Asci narrowly cylindrical, 200–300 × 20–25 µm, often with a long stipe, with 8 uniseriate ascospores. Ascospores fusiform, rather irregularly 9–10 × 1–2 septate, with large cells, 36–46 × 12–13(–15) µm, often with an obvious gel sheath. Microconidia rod-shaped, 5–7 × 0.5 µm.

[Harris2947A], USA, Florida, Dade County, Everglades National Park, cypress dome between Mahogany and, P-hay-okee Overlook. Leg. R.C. Harris (no 2947A), 16.05.1967, det. A. Aptroot, 1992. ISOTYPE of *Julella taxodii*.









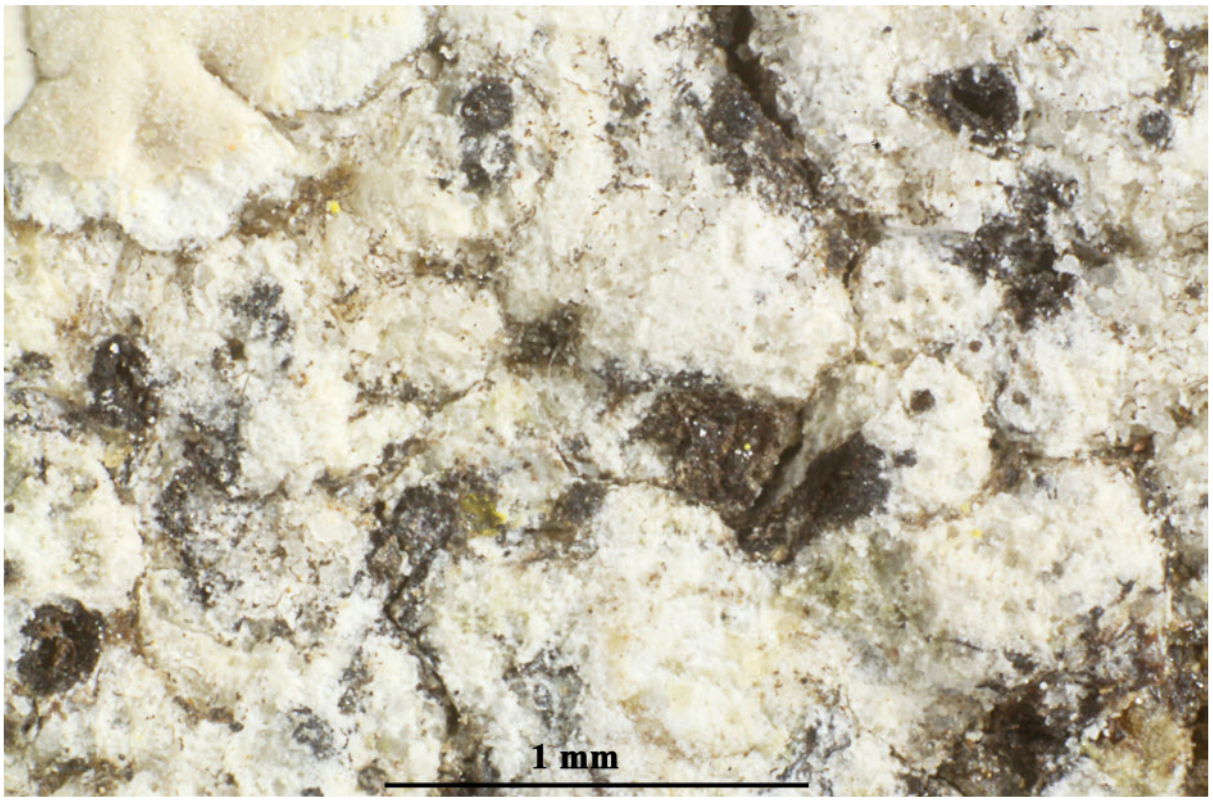
Julella vitrispora

Lacrymospora parasitica Aptroot, Biblthca Lichenol. 44: 95 (1991)

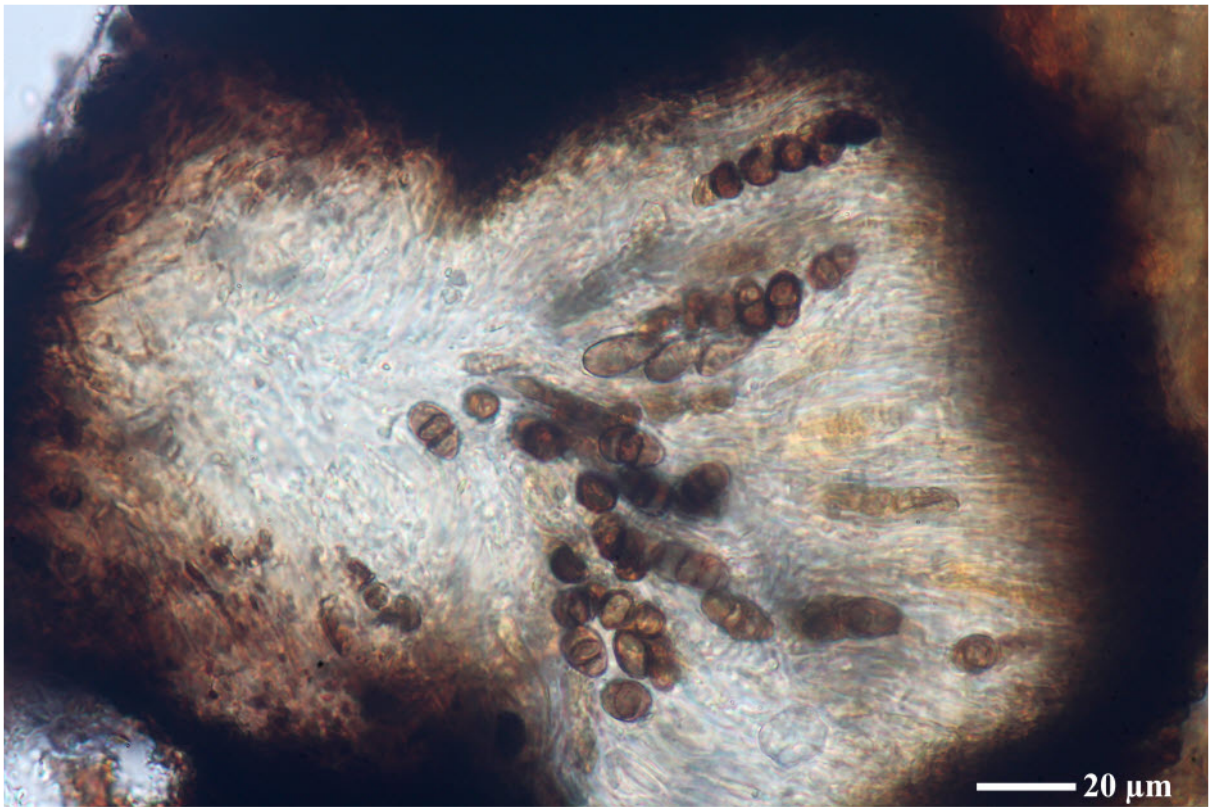
Thallus invisible, parasitic on the thallus of a lichenized ascomycete (Myriotrema sp. ?). Description of the thallus of the host: thallus whitish grey, not blackened around the ascomata, dull, superficial on the substratum, 80–140 µm thick, continuous, with colourless crystals of 20–80 µm diam., without hypothallus. Lacrymospora itself is apparently not lichenized. Ascocarps without pseudostromatic tissues, without crystals, hemispherical, not distinctly flattened, erumpent from the substratum, exposed, 0.2–0.4 mm diam, 0.1–0.3 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 60 µm thick. Ostiole black, obconical, apical, 30–40 µm diam. Hamathecium not inspersed with oil droplets, gelatinized, IKI+ orange. Interthecial hyphae cellular pseudoparaphyses, only branched at the tips, 2 µm thick. Periphyses absent. Asci with rounded ocular chamber, 70–80 × 8–10 µm. Ascospores 8 in the ascus, uniseriate, brown, bicolorous, ellipsoidal with rounded ends, asymmetrically septate, the upper cell much larger than the lower cell, not constricted at the septa, 13–16 × 8–10 µm; with 1 distoseptum, 1–2 µm thick. Some additional septa are indicated by granules only. Endosporium with angular lumina, up to 6 µm thick. Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph black pycnidia, 30–50 µm diam, wall carbonized only in upper part, up to 20 µm thick. Conidia acro-pleurogenous, filiform, 10–15(–20) × 0.3–0.5 µm. Chemistry: UV negative, no substances detected with TLC; host species also neg.

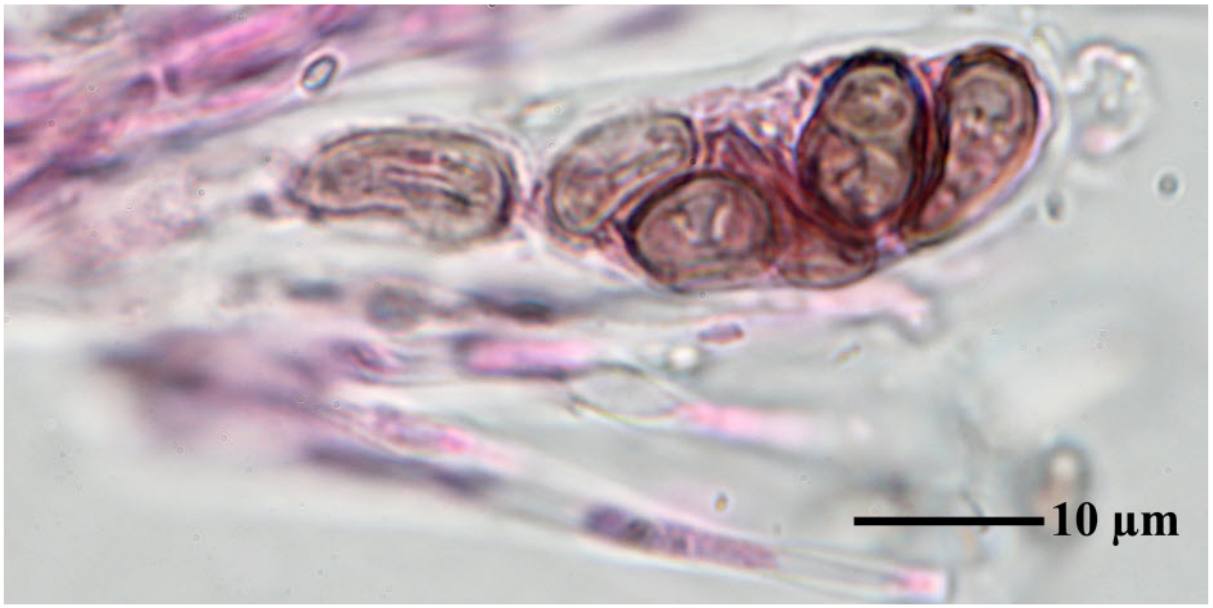
[ABL12613], Madagascar, Ifaty, 25 km N of Tulear, coastal area with Didiera-bush, 43°38’ E, 23°11’ S, 0 m, on dry shrubs. Leg. A. Aptroot (no 12613) & R. Hensen, 27.4.1984, det. A. Aptroot, 1990. HOLOTYPE.





Lacrymospora parasitica





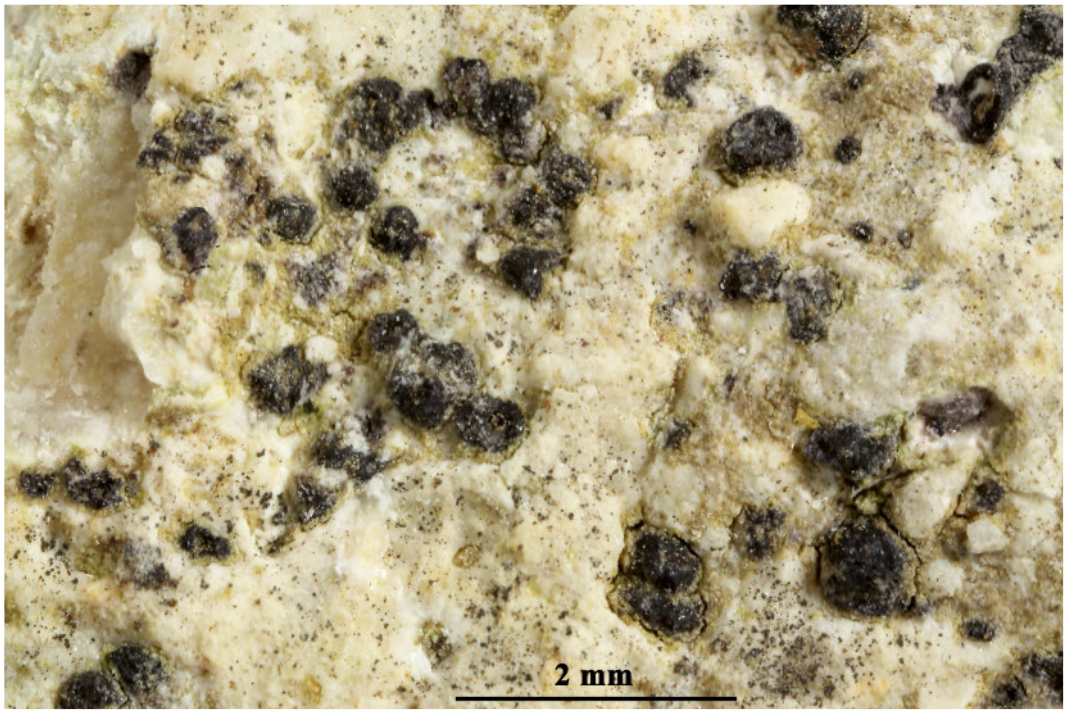


Lacrymospora parasitica

Lithothelium australe Aptroot & H. Mayrhofer, Mycotaxon 41(1): 219 (1991)

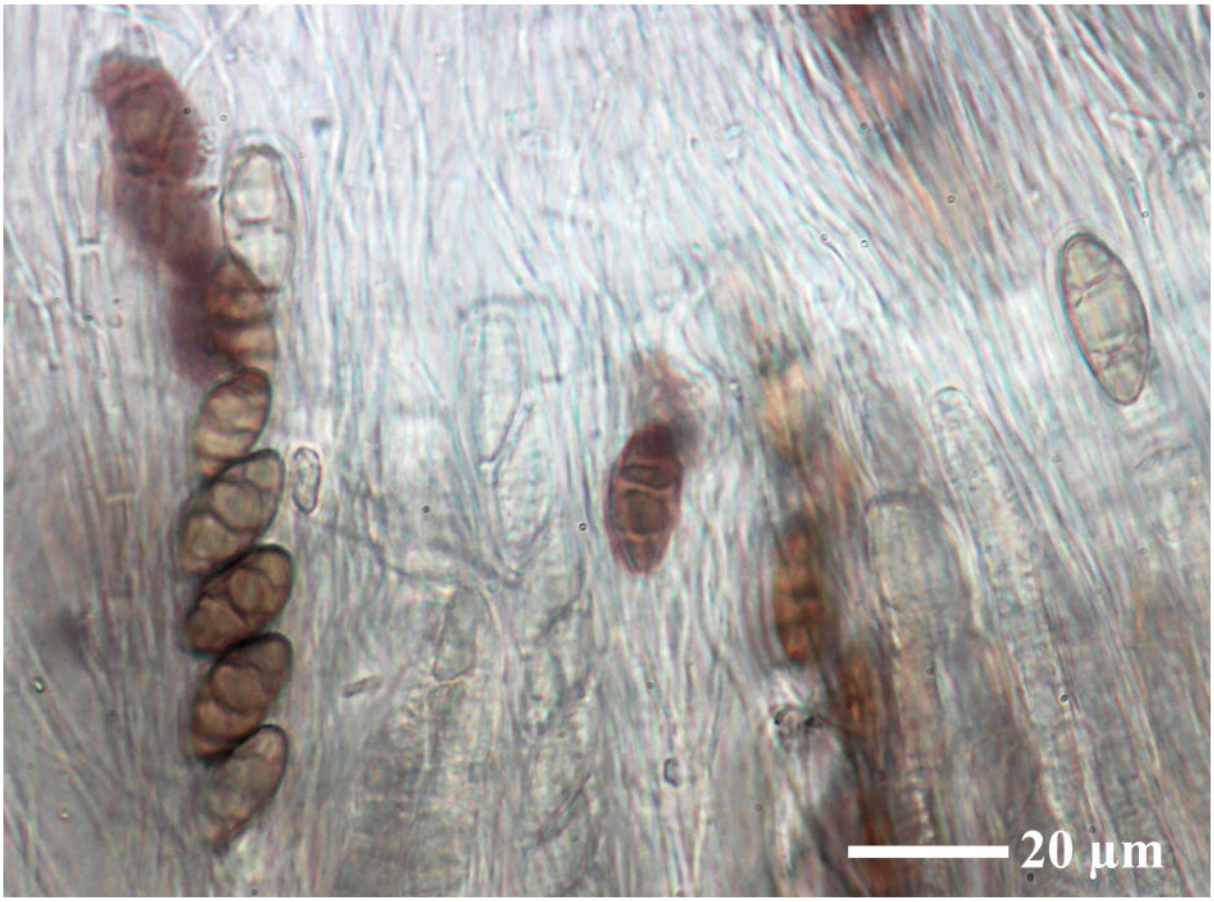
Thallus greenish-white, not blackened around the ascocarps, dull, immersed in the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with *Trentepohlia* algae. Ascocarps simple or with fused ostioles and fused walls (astrothelioid), without pseudostromatic tissues, without 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 150 µm thick. Ostiole brown, obconical, skewed, 100–200 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 with sagittiform ocular chamber, 80–110 × 12–15 µm. Ascospores 8 in the ascus, uniseriate, red-brown, fusiform with subacute ends, symmetrically septate, not constricted at the septa, 20–26 × 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 black pycnidia, 100–200 µm diam, wall completely carbonized, up to 40 µm thick. Conidia acrogenous, colourless, filiform, 6–10 × 0.2–0.4 µm. Chemistry: UV negative, no substances detected with TLC.

[Molloy], New Zealand, Chatham Island, „Big Bush“, on loose bryozoan limestone outcrops near quarry, 40 m. Leg. B.P.J. Molloy, 02.1985, det. A. Aptroot. ISOTYPE.





Lithothelium australe



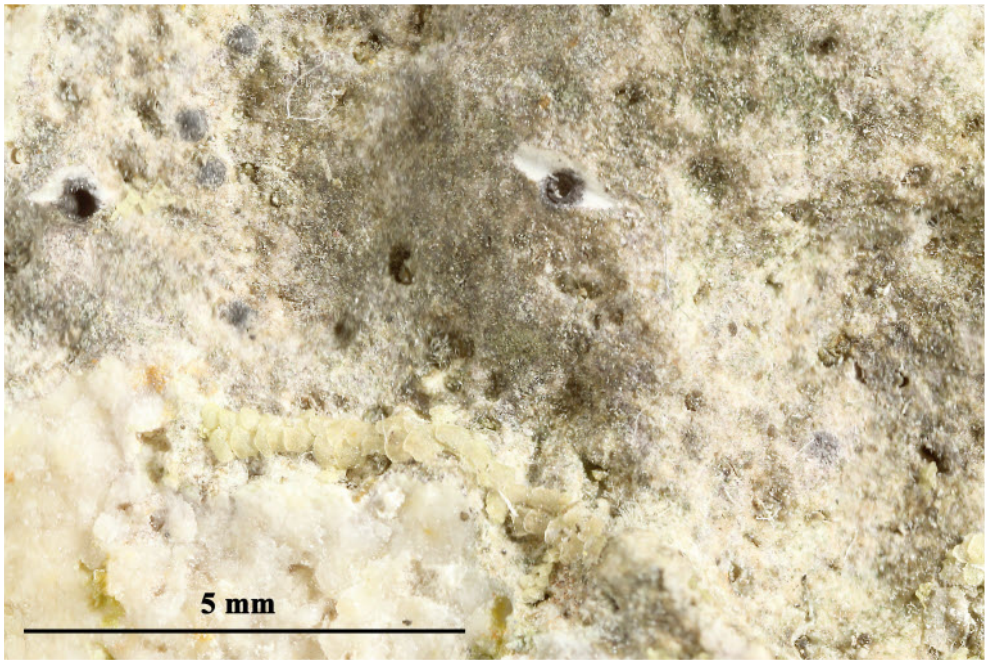


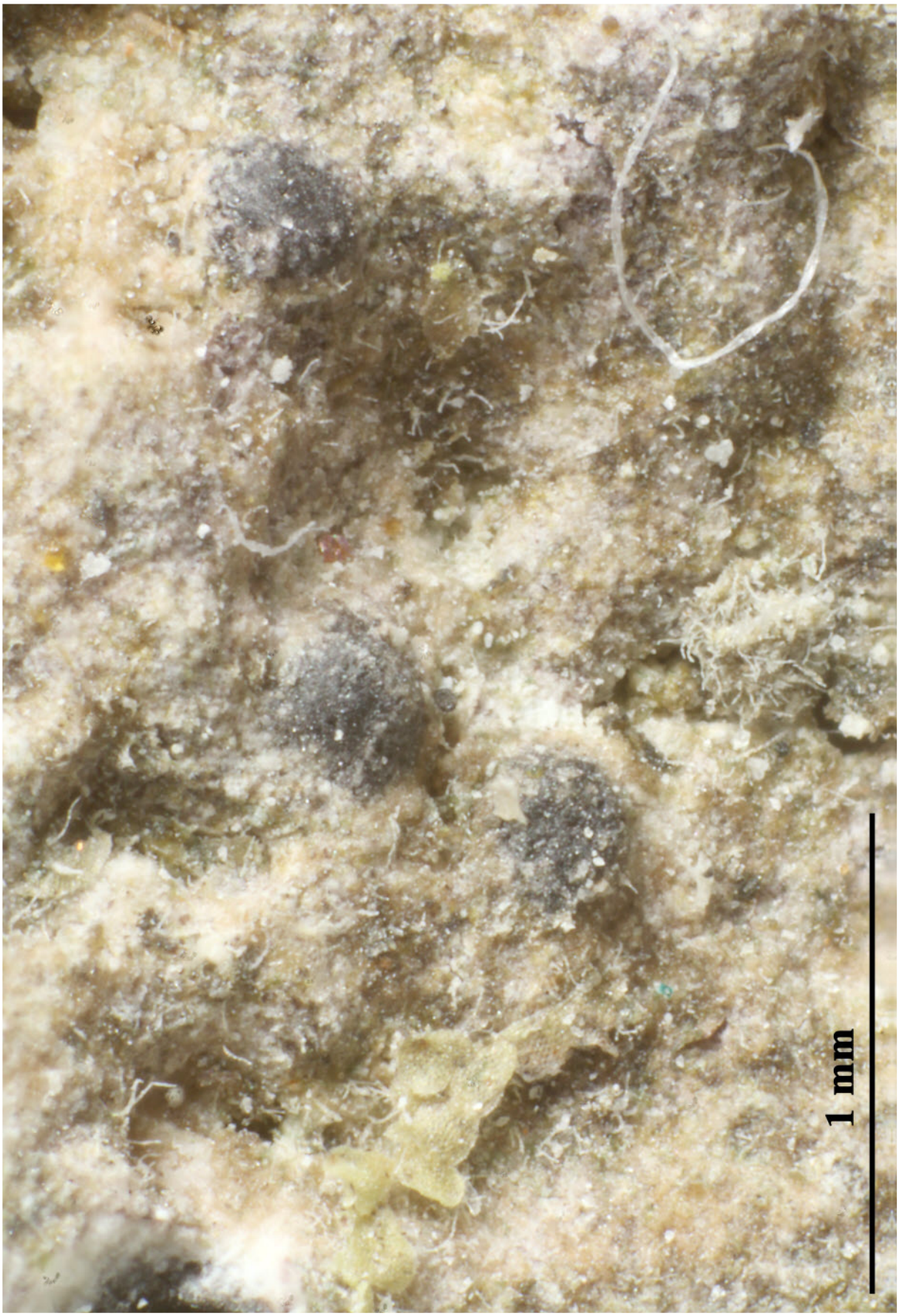
Lithothelium australe

Lithothelium bermudense F. Berger, LaGreca & Aptroot, Mycotaxon 131(3): 528 (2016)

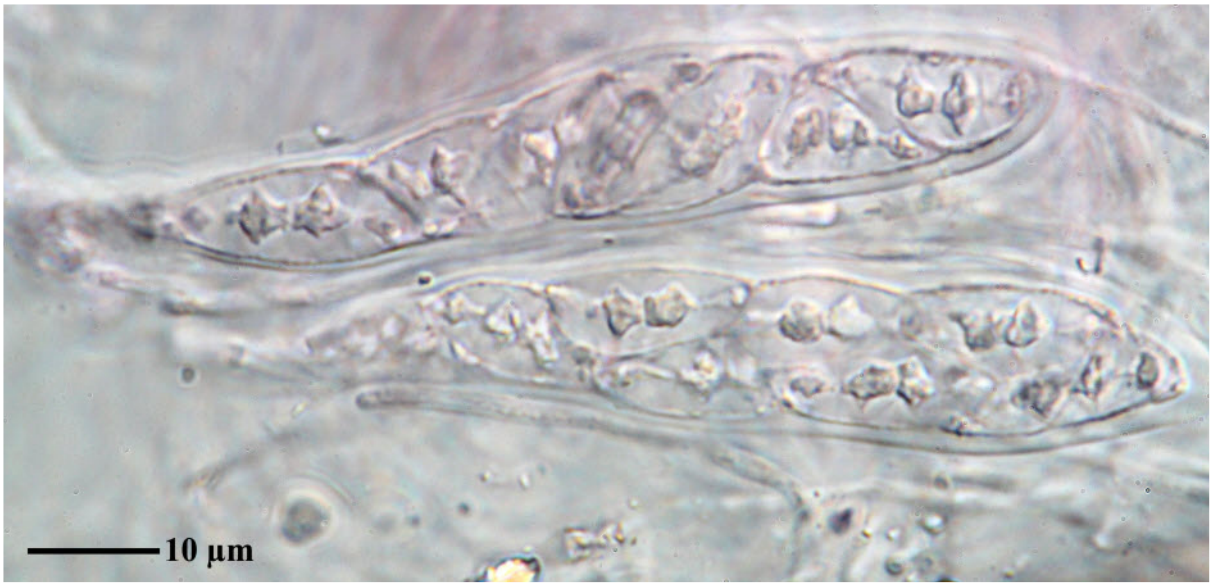
Thallus endolithic, appearing as a pink to pale brownish spot on calcareous rock, up to 2 cm diam., prothallus absent; algae *Trentepohlia*, cells c. 8 µm diam. Ascomata solitary, black, closed, conical, immersed, leaving black pits, smooth, 0.4–0.6 mm diam; walls brittle like charcoal; excipulum and involucrellum fully integrated, the latter throughout carbonized, combined wall c. 150–00 µm thick above and at the sides, c. 100 µm thick below the asci, KOH–. Ostiolum central, apical, inconspicuous, hymenium not inspersed with oil globules, gel IKI– Paraphyses unbranched, slender, c. 1–0.5 µm wide, no periphyses. Asci subcylindrical to clavate, 110 × 25–30 µm, fissitunicate, with a rounded ocular chamber (at least when the ascospores are mature), wall to 5 µm thick, containing 6–8 ascospores. Ascospores biseriate, fusiform with protruding brighter tips, reddish-brown, darkening in KOH, initially with 1 euseptum, later with 2 additional, incomplete eusepta and always with 3 distosepta, endospore c. 2 µm thick, terminal lumina distinctly smaller, and protruding into the apical exospore, inner lumina diamondshaped, 20–25 × 7–8 µm, with an open tubulus between the outer and inner lumina which is present until maturity, gelatine coat (perispore) absent, spore wall not ornamented, spores becoming dark brown and finally shrinking (when over-mature). Pycnidia not observed.

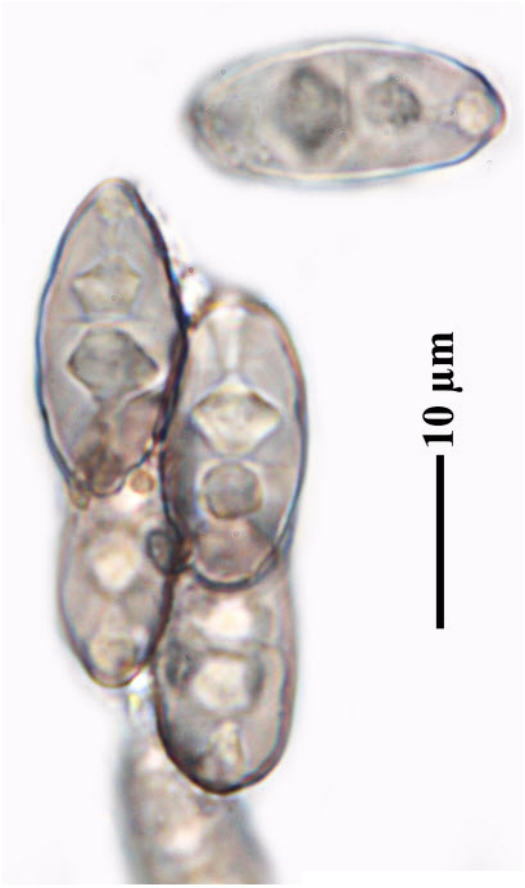
[Berger22300], Bermuda, Hamilton Parish, Walsingham Nature Reserve, Tom Moore Trail, 32°20.7’ N, 64°72,75’ W, alt. 3 m, on hard limestone. Leg. F. Berger (no 22300) & LaGreca, 4.11.2007, det. A. Aptroot. ISOTYPE.





Lithothelium bermudense







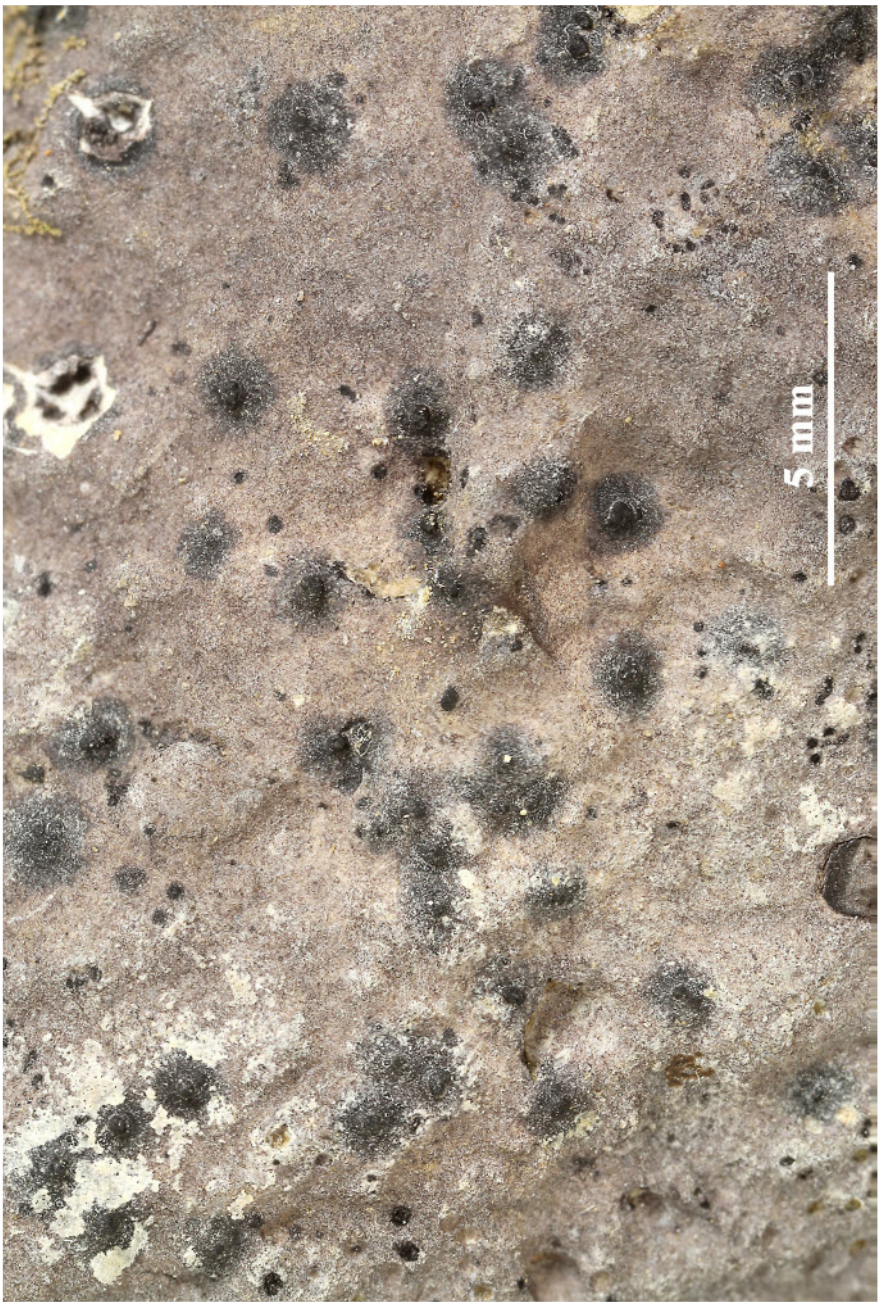


Lithothelium bermudense

Lithothelium cubanum Müll. Arg., Bot. Jb. 6: 386 (1885)

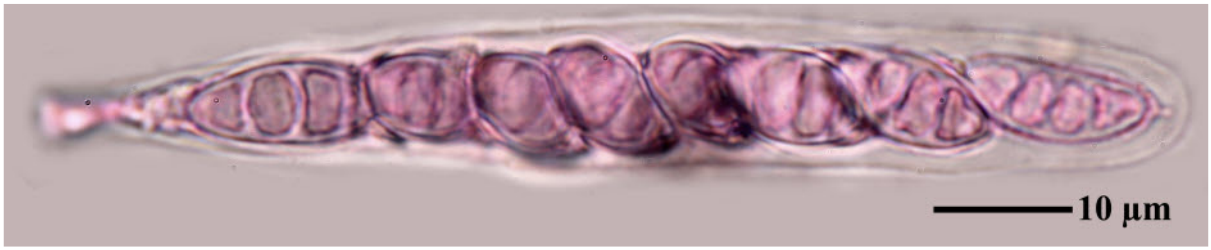
Thallus lichenized. Ascocarps perithecioid, black, often with fused ostioles and/or walls, often with non-carbonized pseudostromatic tissues. Ascocarp wall carbonized. Hamathecium colourless, often IKI+ blue or partly blue, partly orange. Asci with or without a rounded or sagittiform (annular) ocular chamber, the latter found nowhere else within the Melanommatales. Ascospores with 3 or more distosepta, without a trace of eusepta.

[ABL72072], Puerto Rico, Arecibo, Mata do Plátano field station. 18°25’ M, 66°44’ W, 150 m. Lowland seasonal evergreen and semi-deciduous moist forest on karst, old growth secondary forest. On limestone. Leg. A. Aptroot (no 72072), 16-21.02.2014, det. A. Aptroot, 2014.

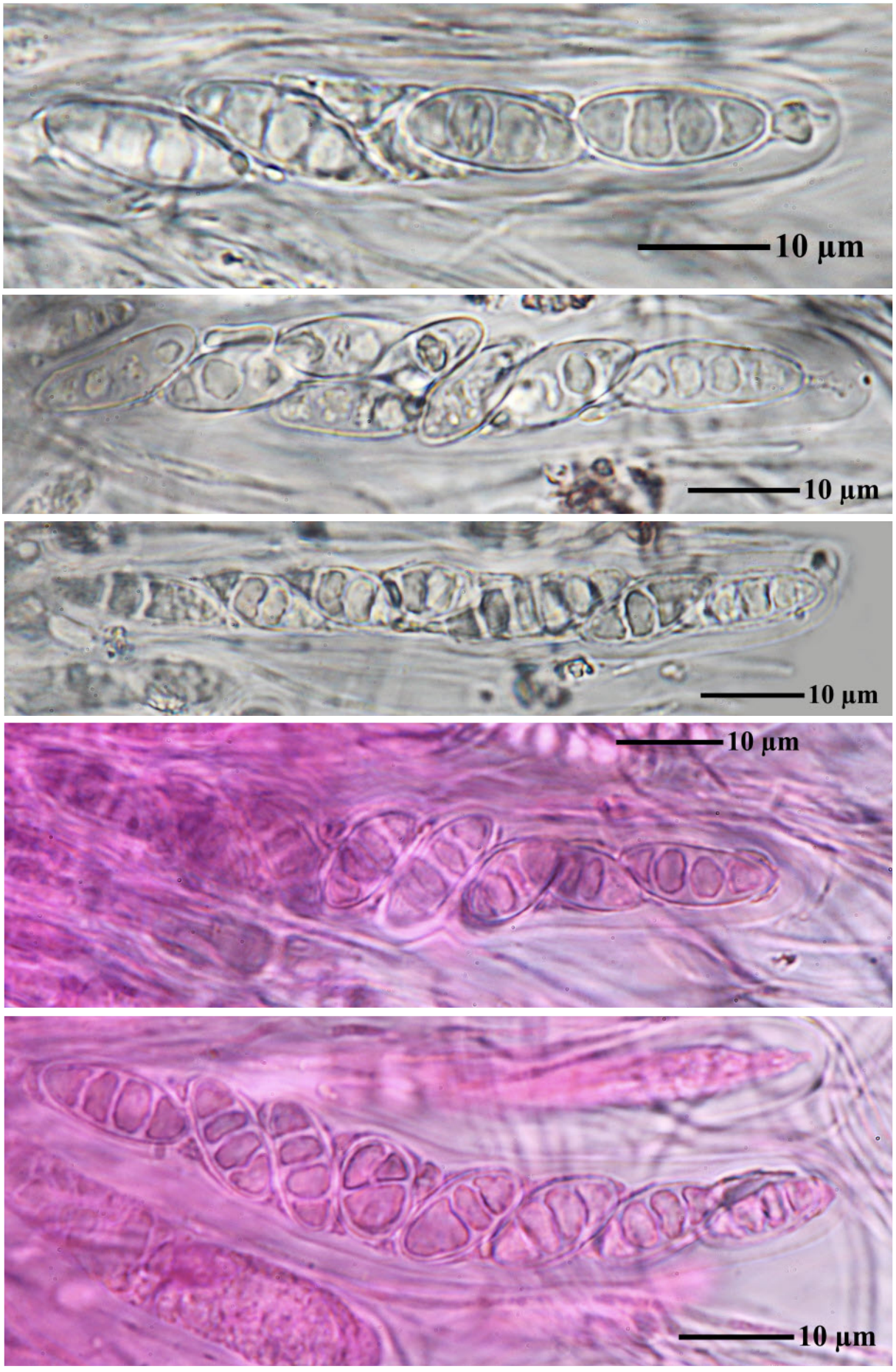








Lithothelium cubanum



Lithothelium cubanum

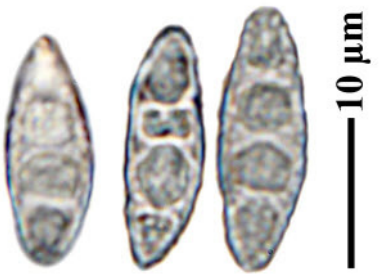
Lithothelium decumbens (Müll. Arg.) Aptroot, Australas. Lichenol. 60: 36 (2007)
= *Pyrenula decumbens* (Müll. Arg.) Upreti, Nova Hedwigia 66(3-4): 568 (1998)
= *Parathelium decumbens* Müll. Arg., Hedwigia 32: 134 (1893)

Thallus greyish green, corticate. Ascomata solitary, subglobose, c. 0.4–0.7 mm diam., erumpent from the substratum, the sides often partly covered by the thallus; ostiole pale, lateral. Hamathecium IKI-. Asci 40–60 × 10–12 µm, with rounded ocular chamber. Ascospores 8 per ascus, irregularly uniseriate, 3-septate, fusiform, with rounded ends, 15–20 × 7–10 µm, red-brown; lumina rounded, the terminal lumina often elongated and separated from the exospore only by a thin endospore layer. Pycnidia unknown.

[ABL21897], Australia, Queensland, Lamington National Park, 100 km S of Brisbane, near Lost World, on tree in subtropical rainforest. 300 m, 153°07' E, 28°16' S. Leg. A. & M. Aptroot (no 21897), 02.1988, det. A. Aptroot, 1988.





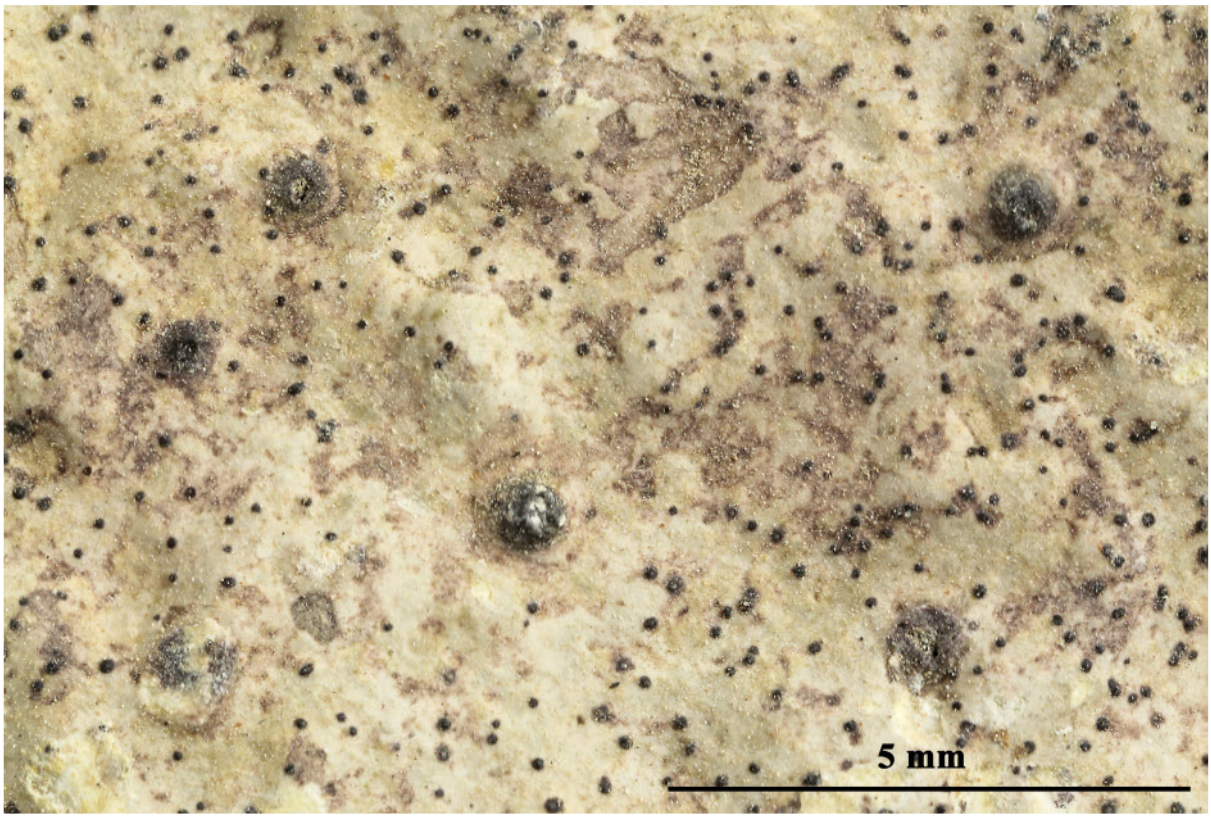


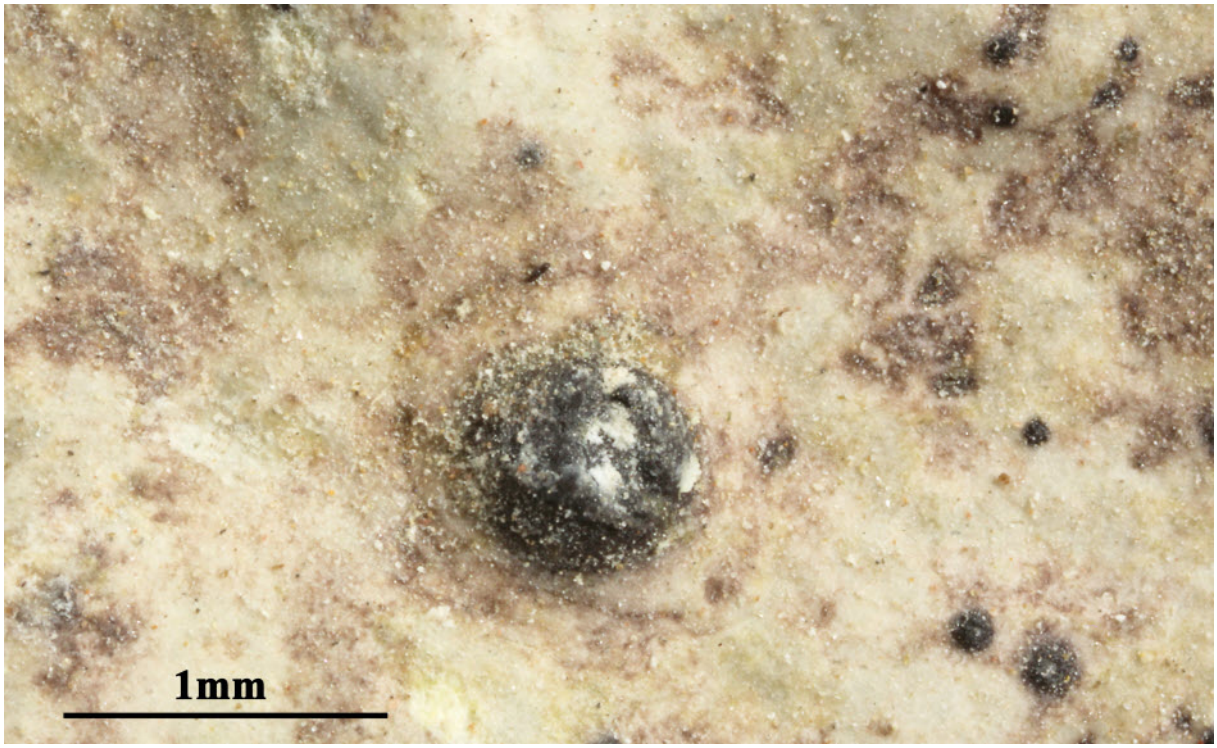
Lithothelium decumbens

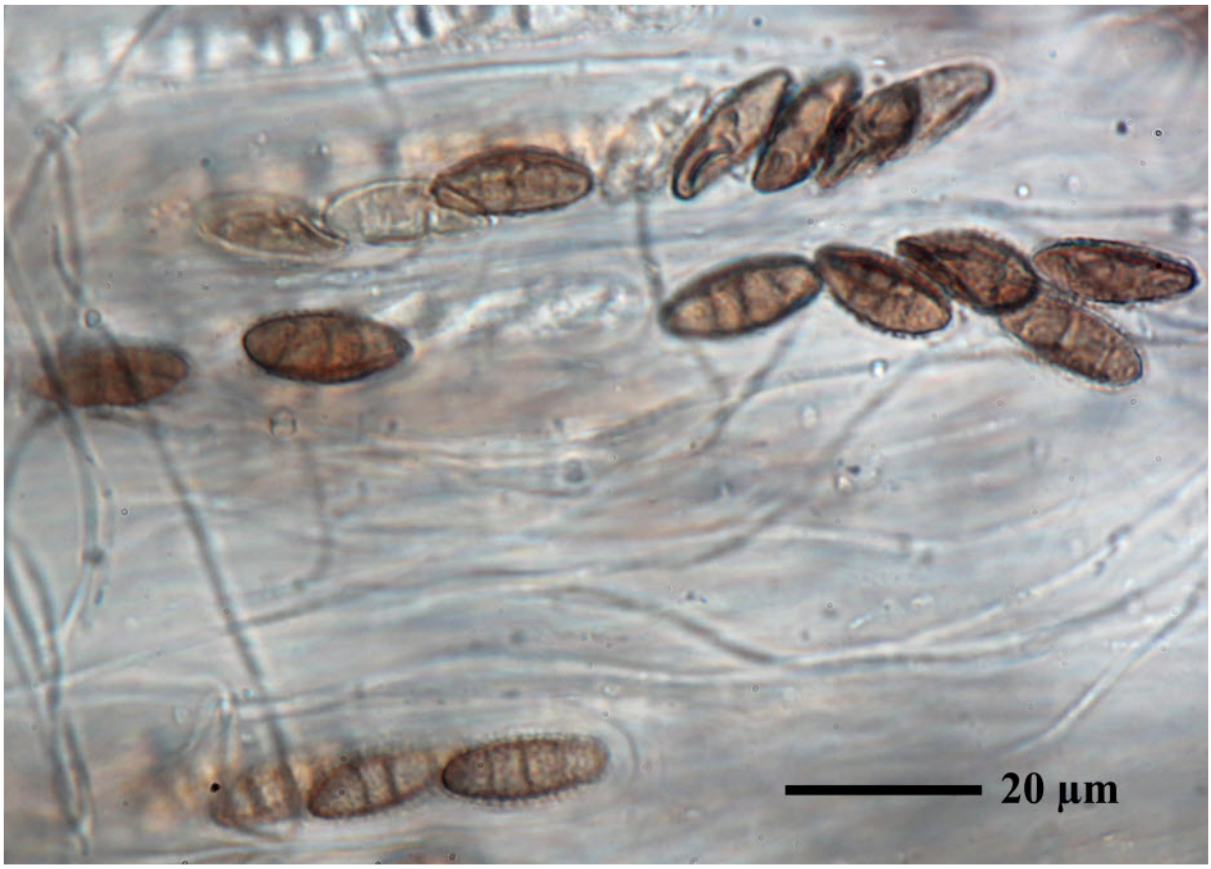
Lithothelium echinatum Aptroot, Lichenologist 38(6): 542 (2006)

Thallus epilithic, pale green, thin (c. 50 µm), dull, not corticated, smooth, continuous, up to 5 cm diam., without prothallus. Alga trentepohlioid, cells c. 4–8 µm diam. Ascomata solitary, closed, hemispherical, semi-immersed, leaving black pits, black, 0.6–0.9 mm diam. Walls of exciple and involucrellum fully integrated; combined wall c. 150–200 µm thick above and at the sides, c. 100 µm thick below the asci. Ostiole apical. Hymenium not inspersed with oil globules, gel IKI+ blue. Paraphyses unbranched, c. 1–1.5 µm wide. Asci cylindrical, with a sagittiform ocular chamber (at least when the ascospores are mature), containing 8 ascospores. Ascospores reddish brown, with 3 distosepta, endospore c. 1 µm thick, lumina rounded, 14–19 × 6–7.5 µm, perispore absent, but ornamented with numerous, c. 0.5 µm high spines. Pycnidia numerous, c. 0.1 mm diam., visible as black dots between the ascomata. Pycnospores hyaline, non-septate, curved, filiform, 10–13 × 0.5–1 µm.

[ABL57123], China, Yunnan Prov., Xishuangbanna, Menglun, Tropical Botanical Garden, on limestone, 550 m, 21°55’42” N, 101°15’37” E. Leg. A. Aptroot (no 57123), 31.10.2002, det. A. Aptroot, 2003. ISOTYPE.







Lithothelium echinatum





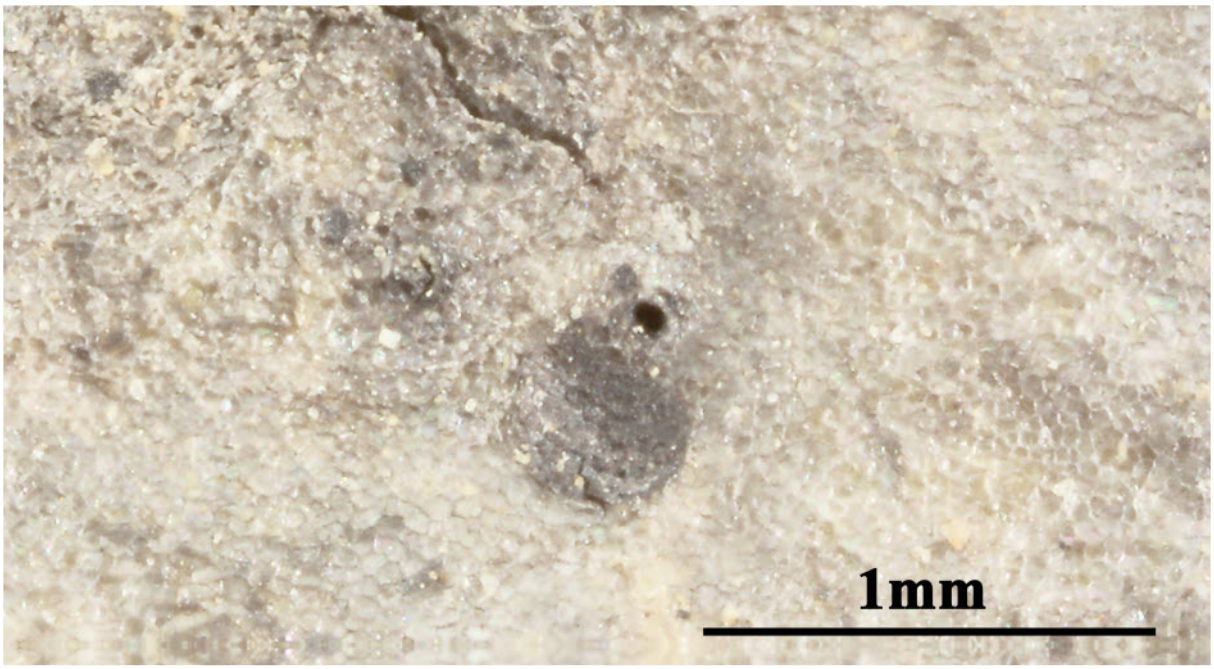
Lithothelium echinatum

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

Thallus epiphloeodic, pale green, thin (c. 50 µm), dull, not corticated, smooth, continuous, 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, closed, ovoid, semi-immersed, leaving black pits, black, 0.3–0.,5 mm diam. Walls of exciple and involucrellum fully integrated; combined wall c. 100 µm thick above and at the sides as well as below the asci. Ostiole lateral. Hymenium not inspersed with oil globules. Paraphyses unbranched, c. 1–1.5 µm wide. Asci cylindrical, with a rounded ocular chamber, containing 8 ascospores. Ascospores hyaline, with 3(–4) distosepta, endospore c. 2µm thick, lumina rounded, 27–37 ×12–17 µm, perispore gelatinous, c. 1 µm thick or absent, not ornamented. (becoming brown and warted when old). Pycnidia not seen.

[ABL57127], China, Yunnan Prov., Xishuangbanna, Menglun, Tropical Botanical Garden, alt. 550 m, on tree trunk., 21°55’42” N, 101°15’37” E. Leg. A. Aptroot (no 57127), 31.10.2002, det. A. Aptroot, 2003. TOPOTYPUS.





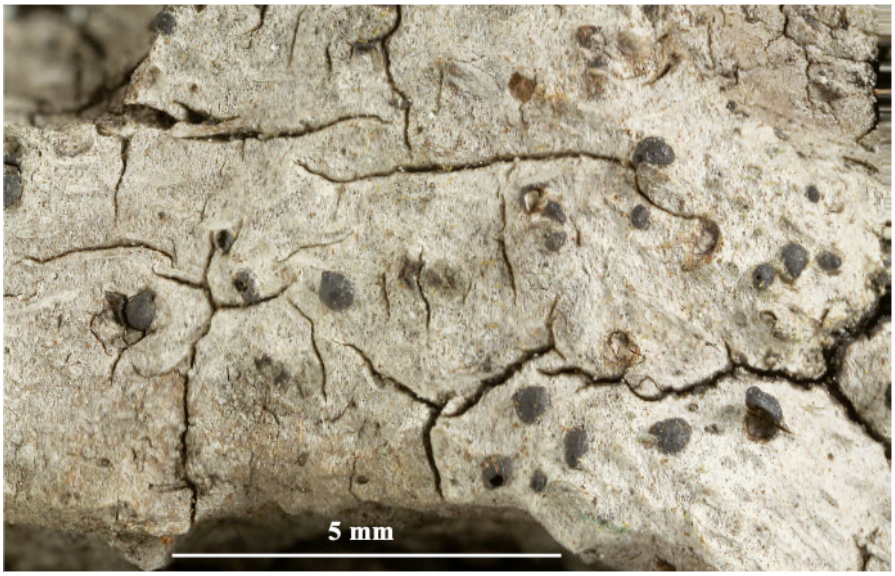


Lithothelium grossum

Lithothelium hyalosporum (Nyl.) Aptroot, Biblthca Lichenol. 44: 58 (1991)
= *Arthopyrenia hyalospora* (Nyl.) Fink, Lich. Fl. U.S.: 50 (1935)
= *Plagiocarpa hyalospora* (Nyl.) R.C. Harris, Michigan Bot. 12(1): 34 (1973)
= *Pyrenula hyalospora* (Nyl.) Tuck., Gen. lich. (Amherst): 273 (1872)
= *Spermatodium hyalosporum* (Nyl.) Trevis., Conspect. Verruc.: 11 (1860)
= *Verrucaria hyalospora* Nyl., Expos. Synopt. Pyrenocarp.: 48 (1858)

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, 0.3–0.5 mm diam, 0.2–0.4 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 120 µm thick. Ostiole black, conical, skewed, 80–100 µm diam. Hamathecium inspersed with oil droplets or not, gelatinized, IKI negative. Interthecial hyphae true paraphyses, simple, not branched at the tips, 1 µm thick. Periphyses absent. Asci with rounded ocular chamber, 60–80 × 10–14 µm. Ascospores 8 in the ascus, irregularly arranged, colourless, fusiform with subacute ends, symmetrically septate, not constricted at the septa, 14–20(–24) × 6–8(–12) µm; with 3 distosepta, 1 µm thick. Endosporium up to 2 µm thick. Terminal lumina much smaller than the central lumina (less than half their diameter). Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC.

[ABL24832], Maledives, South Male Atoll, Velassaru, 1 m, 3°50’ N. 73°18’ E. Leg. A. & M. Aptroot (no 24832), 03.07.1989, det. A. Aptroot, 1989.



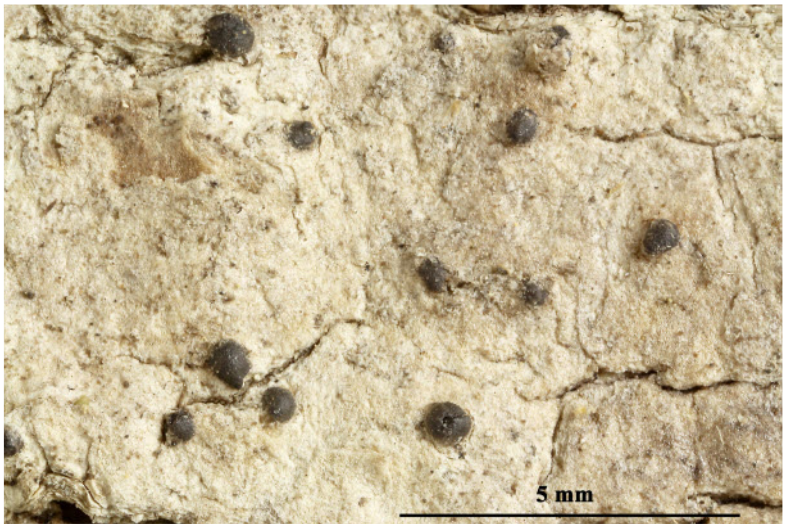


Lithothelium hyalosporum

Lithothelium hyalosporum (Nyl.) Aptroot, Biblthca Lichenol. 44: 58 (1991)
= *Arthopyrenia hyalospora* (Nyl.) Fink, Lich. Fl. U.S.: 50 (1935)
= *Plagiocarpa hyalospora* (Nyl.) R.C. Harris, Michigan Bot. 12(1): 34 (1973)
= *Pyrenula hyalospora* (Nyl.) Tuck., Gen. lich. (Amherst): 273 (1872)
= *Spermatodium hyalosporum* (Nyl.) Trevis., Conspect. Verruc.: 11 (1860)
= *Verrucaria hyalospora* Nyl., Expos. Synopt. Pyrenocarp.: 48 (1858)

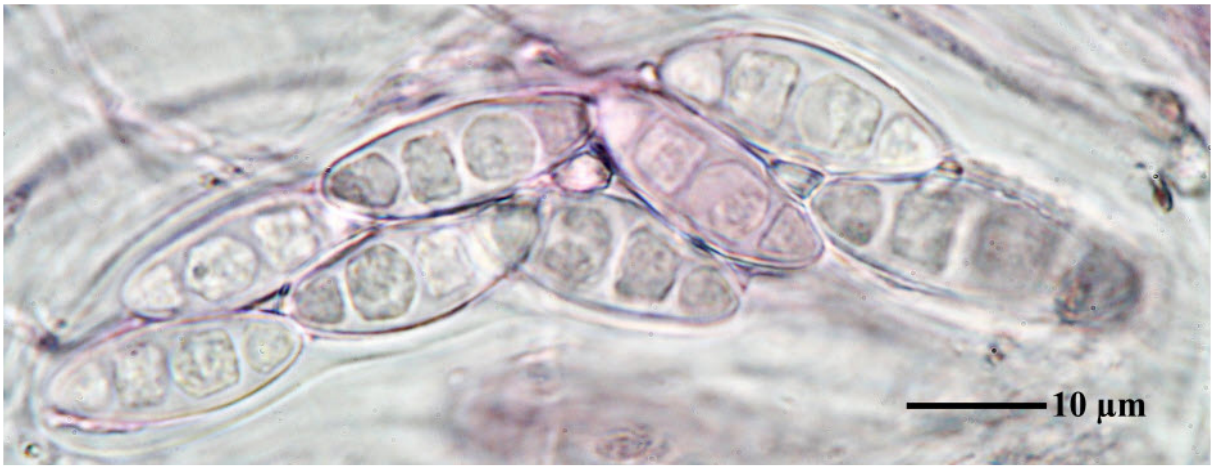
Thallus whitish-grey, not blackened around the ascocarps, dull, immersed in the substratum, continuous, without crystals, without hypothallus. Lichenized, probably with Trentepohlia algae. Ascocarps simple, without pseudostromatic tissues, without crystals, conical, not distinctly flattened, erumpent from the substratum, exposed, 0.3–0.5 mm diam, 0.2–0.4 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 120 µm thick. Ostiole black, conical, skewed, 80–100 µm diam. Hamathecium inspersed with oil droplets or not, gelatinized, IKI negative. Interthecial hyphae true paraphyses, simple, not branched at the tips, 1 µm thick. Periphyses absent. Asci with rounded ocular chamber, 60–80 × 10–14 µm. Ascospores 8 in the ascus, irregularly arranged, colourless, fusiform with subacute ends, symmetrically septate, not constricted at the septa, 14–20(–24) × 6–8(–12) µm; with 3 distosepta, 1 µm thick. Endosporium up to 2 µm thick. Terminal lumina much smaller than the central lumina (less than half their diameter). Spore wall smooth, without granules, without gelatinous sheath, <1 µm thick. Anamorph unknown. Chemistry: UV negative, no substances detected with TLC.

[Harris16308], U.S.A., Warren County, Black ash swamp, Pack Demonstration Forest, c. 5 miles NNBW of Warrensburg. On black ash. Leg. R. C. Harris (no 16308), 11.08.1982.



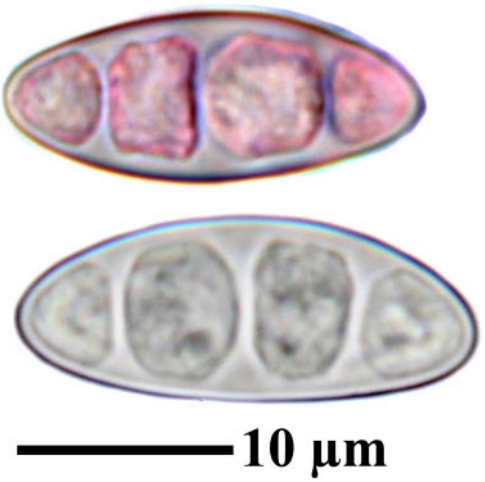


Lithothelium hyalosporum









Lithothelium hyalosporum

Lithothelium illotum (Vain.) Aptroot, Biblthca Lichenol. 44: 60 (1991)
= *Plagiocarpa illota* (Vain.) R.C. Harris, in Egan, Bryologist 90(2): 164 (1987)
= *Pseudopyrenula illota* Vain., Bot. Tidsskr. 29: 149 (1909)
= *Verrucaria diluta* Nyl., Bull. Soc. linn. Normandie, sér. 2 3: 280 (1869)
= *Verrucaria illota* Nyl., Flora, Regensburg 59: 364 (1876)

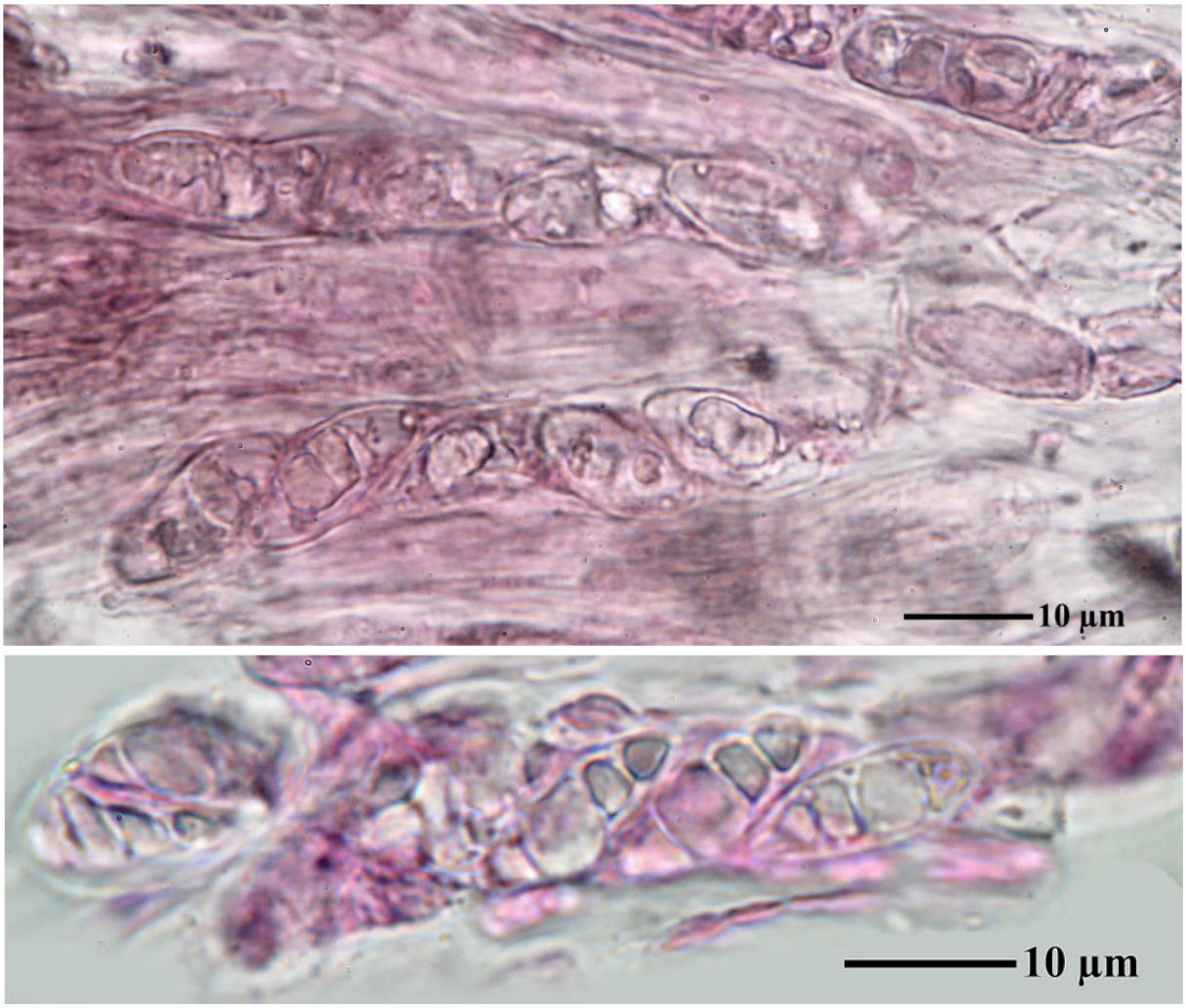
Thallus brownish to grey, not blackened around the ascocarps, dull, immersed in the substratum, continuous, without crystals, without hypothallus,. Lichenized probably with Trentepohlia algae. Ascocarps simple, or with fused ostioles and fused walls (astrothelioid), without pseudostromatic tissues, hemispherical, not distinctly flattened, erumpent from the substratum, exposed, 0.4–1 mm diam., 0.2–0.5 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 150 µm thick. Ostiole black, conical, skewed, 50–100 µm. Hamathecium not inspersed with oil droplets, IKI+ blue. Interthecial hyphae true paraphyses, simple, not branched at the tips, 1 µm thick. Ascospores 4–8/ascus, uniseriate, colourless, fusiform with subacute ends, symmetrically septate, not constricted at the septa, 18–23 × (6–)7–10 µm; with (2–)3 distosepta, 1–2 µm thick. Endosporium up to 3 µm thick. Terminal lumina little smaller than the central lumina. Spore wall smooth, without granules, without gelatinous sheat, < 1 µm thick. Pycnidia black, 150- 200 µm diam., wall carbonized. Conidia filiform 10–17 × 0.2–0.4 µm. Chemistry: UV-, no substances detected with TLC.

[Johnson], U.S.A., Mississippi, Sharkey County, Delta National Forest, along road 717, 4 miles NW of Holy Bluff. Leg. G. T. Johnson, 28.12.1978.





Lithothelium illotum

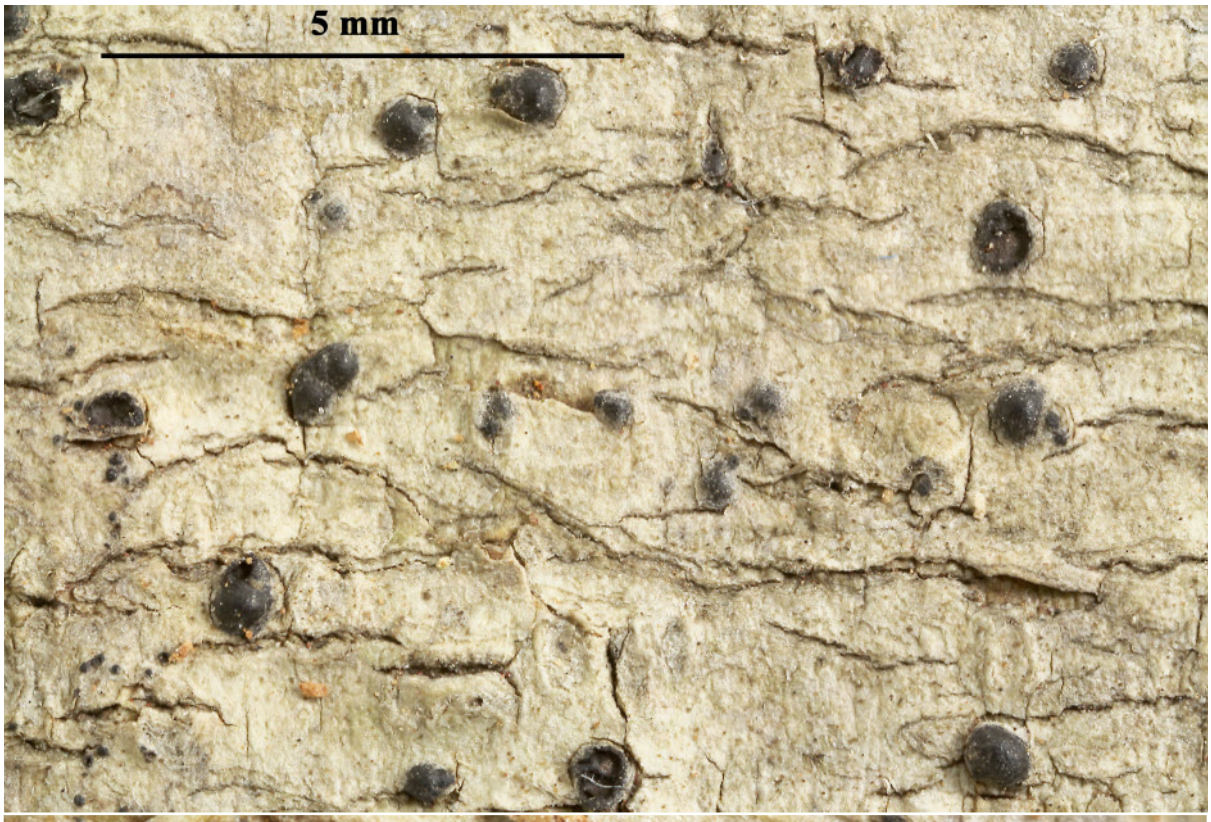


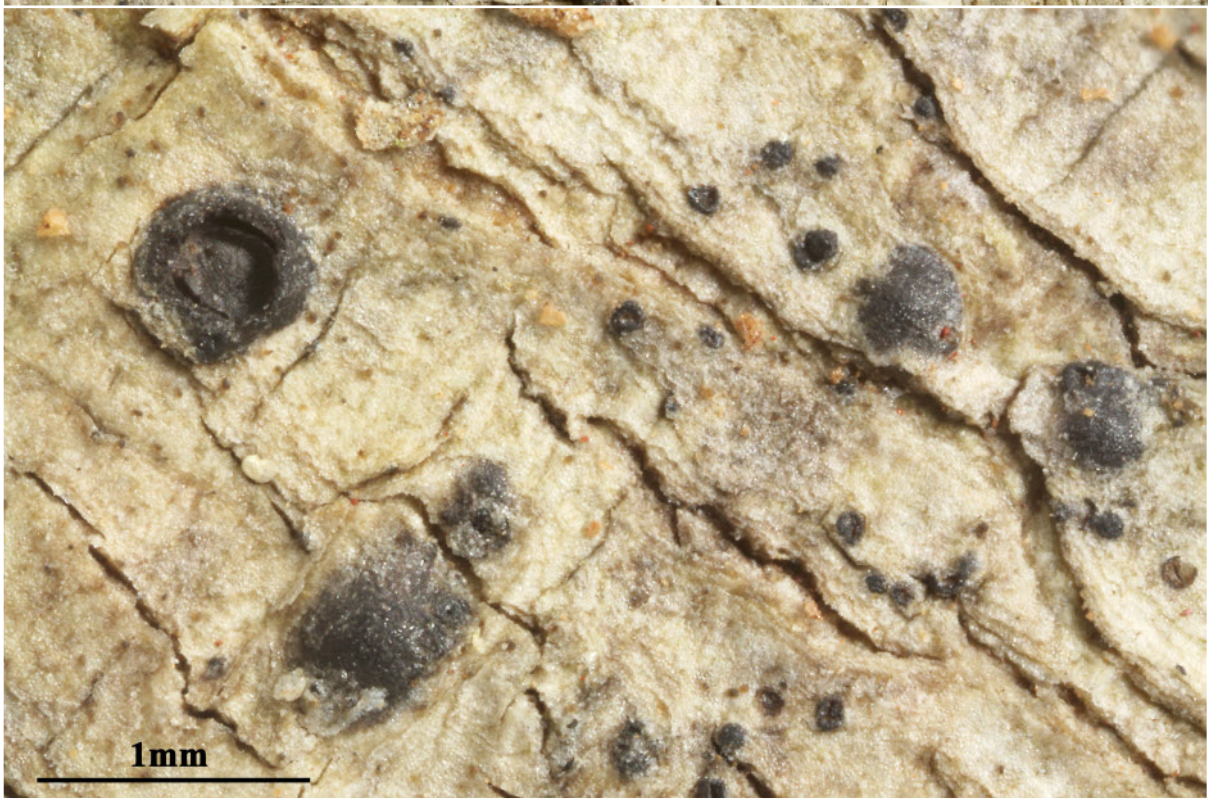
Lithothelium illotum

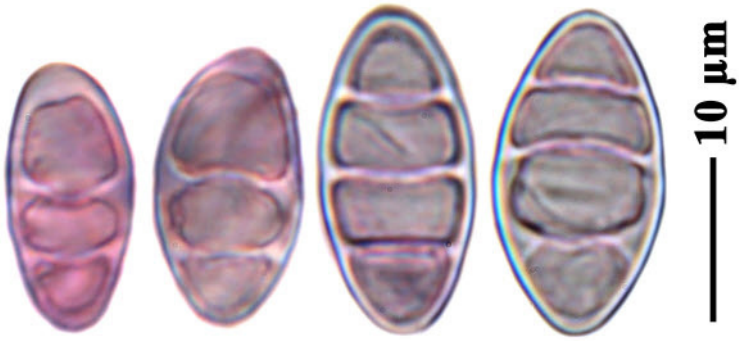
Lithothelium illotum (Vain.) Aptroot, Biblthca Lichenol. 44: 60 (1991)
= *Plagiocarpa illota* (Vain.) R.C. Harris, in Egan, Bryologist 90(2): 164 (1987)
= *Pseudopyrenula illota* Vain., Bot. Tidsskr. 29: 149 (1909)
= *Verrucaria diluta* Nyl., Bull. Soc. linn. Normandie, sér. 2 3: 280 (1869)
= *Verrucaria illota* Nyl., Flora, Regensburg 59: 364 (1876)

Thallus brownish to grey, not blackened around the ascocarps, dull, immersed in the substratum, continuous, without crystals, without hypothallus,. Lichenized probably with Trentepohlia algae. Ascocarps simple, or with fused ostioles and fused walls (astrothelioid), without pseudostromatic tissues, hemispherical, not distinctly flattened, erumpent from the substratum, exposed, 0.4–1 mm diam., 0.2–0.5 mm high. Ascocarp wall completely carbonized, without distinct clypeus, up to 150 µm thick. Ostiole black, conical, skewed, 50–100 µm. Hamathecium not inspersed with oil droplets, IKI+ blue. Interthecial hyphae true paraphyses, simple, not branched at the tips, 1 µm thick. Ascospores 4–8/ascus, uniseriate, colourless, fusiform with subacute ends, symmetrically septate, not constricted at the septa, 18–23 × (6–)7–10 µm; with (2–)3 distosepta, 1–2 µm thick. Endosporium up to 3 µm thick. Terminal lumina little smaller than the central lumina. Spore wall smooth, without granules, without gelatinous sheat, < 1 µm thick. Pycnidia black, 150- 200 µm diam., wall carbonized. Conidia filiform 10–17 × 0.2–0.4 µm. Chemistry: UV-, no substances detected with TLC.

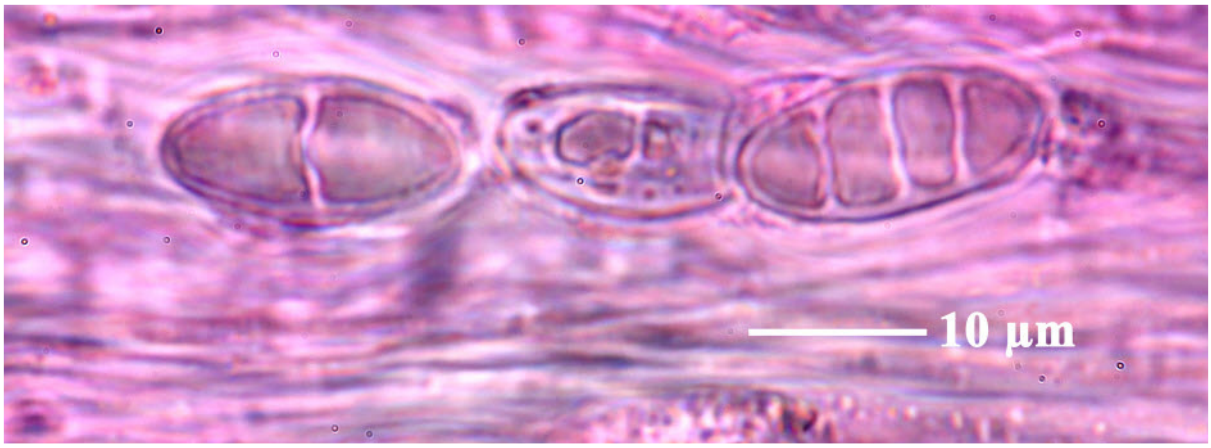
[Menezes], Brazil, Rio Grande do Norte, Mossoró, Povoada Juremal, Parque national de Furna Feia. Leg. A.A. Menezes, 2013, det. A. Aptroot, 2014.

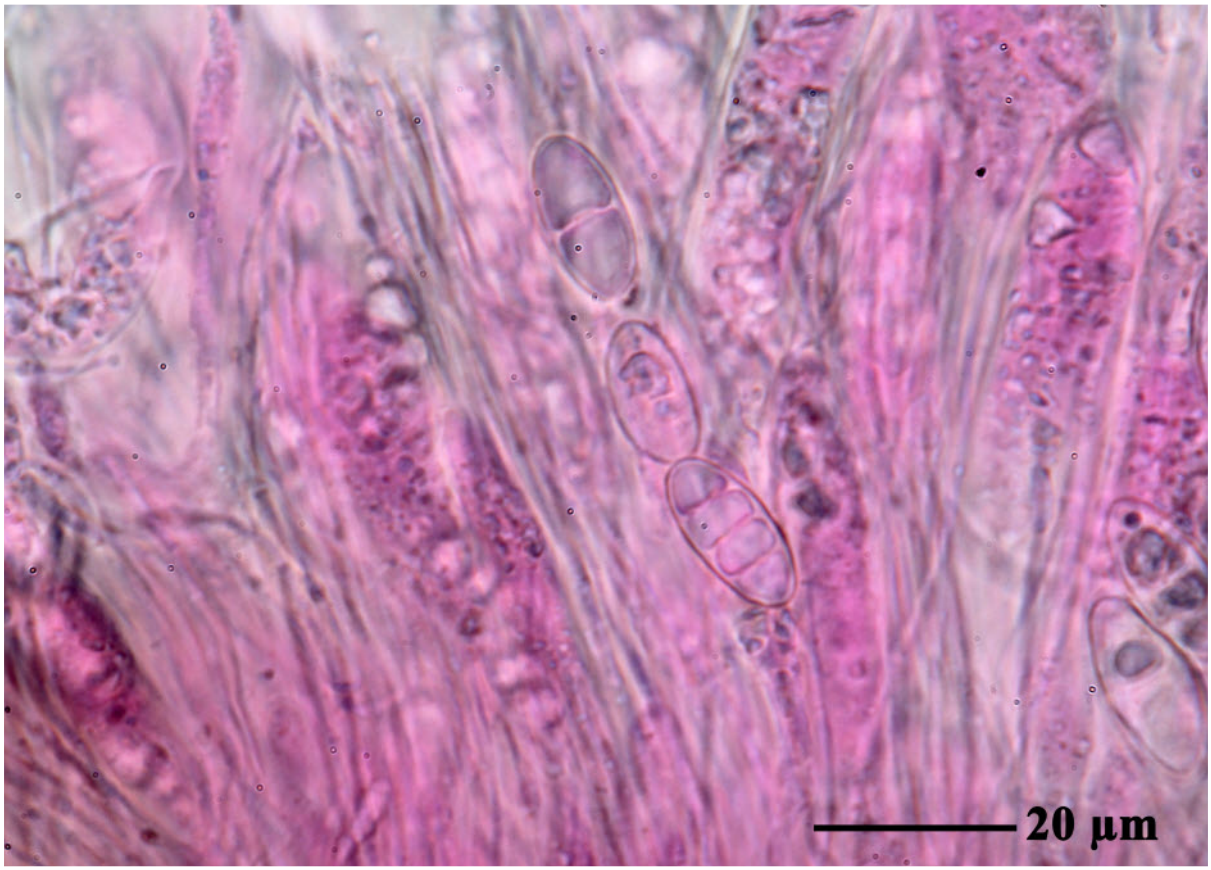






Lithothelium illotum





Lithothelium illotum

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.