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Three new species and ten new records of *Trypetheliaceae* (Ascomycota) from Sri Lanka

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Abstract – The following three new species of *Trypetheliaceae* are described from Sri Lanka: *Astrothelium inspersoconicum*, *A. isohypocrellinum*, and *Polymeridium fernandoi*. Ten species are newly recorded from Sri Lanka: *Astrothelium flavoduplex*, *A. galligenum*, *A. scoria*, *A. straminicolor*, *Constrictolumina planorbis*, *C. porospora*, *Dictyomeridium proponens*, *Marcelaria cumingii*, *Polymeridium jordanii*, and *Pseudopyrenula media*.

Astrothelium / *Constrictolumina* / corticolous / *Dictyomeridium* / lichens / *Marcelaria* / *Polymeridium* / *Pseudopyrenula*

INTRODUCTION

The family *Trypetheliaceae* is an almost strictly tropical corticolous lichen family. The first members were encountered near the end of the 18th century on pieces of medicinal bark (mainly *Cinchona* for quinine) that were collected in South American forests (Zenker 1827). The conspicuous, often brightly coloured ascomata with complex structures intrigued the lichenologists of the time. Relatively few species were known for a long time, and from most species usually essentially the type was in existence. Recently, a monograph of the family was published (Aptroot & Lücking 2016), with which the number of known species doubled to 420. At the same time, based on regional levels of collecting intensity and variation in biomes, a further c. 380 species were predicted to exist in this family (Aptroot *et al.* 2016). Here we describe three of these, found during field work in 2017 in Sri Lanka, and we also report 10 already described species for the first time from Sri Lanka.

MATERIAL AND METHODS

Identification and descriptive work was carried out in Soest using an Olympus SZX7 stereomicroscope and an Olympus BX50 compound microscope with interference contrast, connected to a Nikon Coolpix digital camera. Sections have been mounted in tap water, in which also all measurements were taken.

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The chemistry of all specimens has been investigated by a UV bulb, and often a test with 10% K was made, generally on sections. The chemistry of many specimens, including many types of all newly described species, has been investigated by thin-layer chromatography (TLC) using solvent A (Orange *et al.* 2010).

RESULTS

New species

Astrothelium inspersoconicum Aptroot & Weerakoon, *sp. nov.*

Fig. 1A

Mycobank Number: MB827867

Etymology: The epithet refers to the inspersed hamathecium and the *conicum*-aggregate to which this species belongs.

Type: SRI LANKA, Roonakanda – Maguruganga, 6° 27' N and 80° 19' E, 249 m, site 7, 22 April 2017, G. Weerakoon 1394 (**holotype**: PDA; **isotype**: ABL and BM).

Diagnosis: *Astrothelium* similar to *A. cinnamomeum*, but hamathecium inspersed.

Description: **Thallus** corticate, smooth, somewhat shiny, continuous, covering areas up to 15 cm diam., *c.* 0.5 mm thick, pale greenish grey, with a *c.* 1 mm wide brown, glossy prothallus line, not inducing galls of the host bark. **Ascomata** pyriform, *c.* 0.4–0.7 mm diam., mostly aggregated with 4–10, mostly immersed (sometimes part of the black wall exposed) in the bark tissue in pseudostromata which are not or indistinctly raised above the thallus and partly whitish and decorticated, partly covered by thallus and up to 2 mm wide. Wall carbonized, up to *c.* 40 µm thick. Ostioles eccentric, fused, conical, black, covered by orange pruina.

Hamathecium inspersed with oil globules. **Asci** with 8 ascospores. **Ascospores** hyaline, 3-septate, 23–25 × 7–8 µm, fusiform, ends pointed, lumina diamond-shaped, not surrounded by a gelatinous layer. **Secondary chemistry**. Thallus UV–, K–; ostiole pruina K+ purple, UV+ red. TLC: A yellow to orange anthraquinone.

Distribution: Asia (Sri Lanka).

Discussion: This is only the second member of the core group of the genus, the *Astrothelium conicum*-group, with inspersed hamathecium. Species of the group are very numerous and often abundant (we examined almost a 1000 specimens), and they are almost never inspersed. The new species is closest to *A. cinnamomeum*, which was for a long time known as *A. conicum*. It would key out in Aptroot & Lücking (2016) in *Astrothelium* group 3 in couplet 38: Hamathecium inspersed (the two other taxa in couplet do not have an inspersed hamathecium).

Astrothelium isohypocrellinum Aptroot & Weerakoon, *sp. nov.*

Figs 1B–D

Mycobank Number: MB827868

Etymology: The epithet refers to the the substance isohypocrellin.

Type: SRI LANKA, Kitulgala rain forest, site 41, 6° 58' N and 80° 24' E, 189 m, 11 May 2017, G. Weerakoon 723 (**holotype**: PDA; **isotype**: ABL and BM).

Diagnosis: *Astrothelium* similar to a *Pyrenula* with hamathecium inspersed with red, K+ grass green pigment (isohypocrellin).

Description: **Thallus** corticate, smooth, somewhat shiny, continuous, covering areas up to 5 cm diam., *c.* 0.2 mm thick, olivaceous brown, with a *c.* 1 mm wide black prothallus line, not inducing galls of the host bark. **Ascomata** almost globose, *c.* 0.4–0.7 mm diam., single, immersed in hemispherical black pseudostromata which are single or occasionally two fused sideways, covered by translucent thallus cortex when young and exposed when older, distinctly raised above the thallus and *c.* 1 mm diam. Wall carbonized, up to *c.* 60 μm thick. Ostioles central, apical, flat, black, usually surrounded by a whitish zone. **Hamathecium** interspersed with red oil globules, which are not washing out in water, but react strongly KOH+ grass green (isohypocrellin); in addition, a yellowish pigment is present in the hamathecium which is washing out in water. **Asci** with 8 ascospores. **Ascospores** hyaline, 3-septate, 24–26 \times 6–7 μm , fusiform, ends pointed, lumina diamond-shaped, not surrounded by a gelatinous layer. **Secondary chemistry.** Thallus UV–, K–; hamathecium K+ grass green. TLC: isohypocrellin.

Distribution: Asia (Sri Lanka).

Discussion: This new species superficially resembles a *Pyrenula*. It is described here in *Astrothelium* because of the corticate thallus and the occasionally aggregated ascomata, but it might turn out to belong to *Pseudopyrenula*, in which also one species with corticate thallus is known. It is only the fifth member of the Trypetheliaceae with isohypocrellin, and the first one where this substance is interspersed in the hamathecium; the other species have the substance on the thallus, in the medulla of the pseudostromata or only in the ostiole (Aptroot *et al.* 2013; Aptroot & Lücking 2016). It would key out in Aptroot & Lücking (2016) in *Astrothelium* group 1 in couplet 18: Pigment in hamathecium, K+ grass green due to isohypocrellin.

Polymeridium fernandoi Aptroot & Weerakoon, *sp. nov.*

Figs 1E–G

Mycobank Number: MB827870

Etymology: This new species honours the founder of Dilmah Conservation Mr. Meril J. Fernando who has funded lichen research projects conducted in Sri Lanka in 2015 and 2017, including the publication of “Fascinating Lichens of Sri Lanka”.

Type: SRI LANKA, Sinharaja rain forest, Mulawella trail, 6° 25' N and 80° 25' E, 576 m, site 53, 16 May 2017, G. Weerakoon 890 (**holotype:** PDA; **isotype:** ABL).

Diagnosis: *Polymeridium* similar to *P. fl avotheicum*, but ascospores 6–8-septate, 35–39 \times 7.5–8 μm , hamathecium K+ violet and ostioles apical.

Description: **Thallus** not corticate, smooth, dull, continuous, covering areas up to at least 5 cm diam., *c.* 0.2 mm thick, whitish grey. **Ascomata** hemispherical, *c.* 0.3–0.5 mm diam., single, black, erumpent to distinctly raised above the thallus. Wall carbonized, up to *c.* 80 μm thick. Ostioles central, apical, flat, dark brown. **Hamathecium** interspersed with yellow oil globules that are KOH+ violet. **Asci** with 8 ascospores. **Ascospores** hyaline, 6–8-septate, 35–39 \times 7.5–8 μm (swelling to 42 μm long in KOH), slightly clavate, ends rounded, surrounded by a *c.* 1.5 μm thick gelatinous layer. **Secondary chemistry.** Thallus UV–, K–. No TLC performed.

Distribution: Asia (Sri Lanka).

Discussion: This would key out in Aptroot & Lücking (2016) in the *Polymeridium* key in couplet 38: Hamathecium yellow; ascospores 6–8-septate, 35–39 \times 7.5–8 μm ; ostioles apical. It is closest to *P. fl avotheicum* R.C. Harris, that differs in all these characters, except the yellow interspersion, which is however due to another substance it is reacting K+ red (Aptroot & Lücking 2016), not violet.

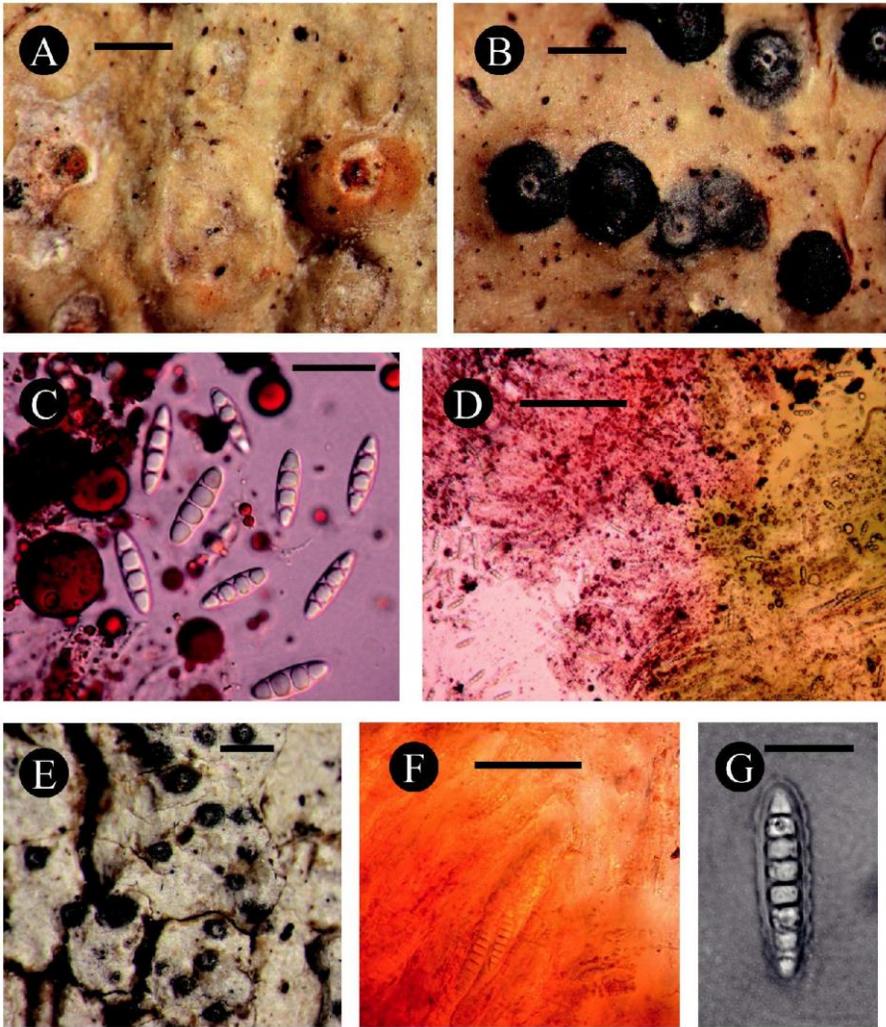


Figure 1. A *Astrothelium inspersoconicum*, Habitus, B-C *A. isohypocrellinum*, B Habitus C Ascospores and inspersion gel globules D Hamathecium in water (left) and in KOH (right) E-G *Polymeridium fernandoi*, E Habitus F Hamathecium in water G Ascospore (all from isotypes in ABL). Scale bars: 1 mm (A, B & E), 25 μ m (C, G), 50 μ m (D, F)

New records of Trypetheliaceae to Sri Lanka

Astrothelium flavoduplex Aptroot & M. Cáceres: Hurulu forest reserve, 8° 04' N and 80° 46' E, 213 m, site 67, 30 May 2017, G. Weerakoon 1353 (PDA, ABL, BM).

Astrothelium galligenum (Aptroot) Aptroot & Lücking: Kitulgala rain forest, 6° 27' N and 80° 19' E, 249 m, site 7, 22 April 2017, G. Weerakoon 1393 p.p. (PDA, ABL, BM). So far only known from Papua New Guinea.

Astrothelium scoria (Fée) Aptroot & Lücking: Home garden adjacent to Kitulgala rain forest, 7° 31' N and 80° 44' E, 1188 m, site 12, 25 April 2017, *G. Weerakoon* 1396 (PDA, ABL, BM); Knuckles mountain range, 6° 27' N and 80° 19' E, 249 m, *G. Weerakoon* 114 (PDA, ABL, BM); Home garden in Uduwela - Matugama, 6° 32' N and 80° 08' E, 68 m, 21 April 2017, *G. Weerakoon* 403 (PDA, ABL, BM).

Astrothelium straminicolor (Nyl.) Aptroot & Lücking: Kitulgala rain forest, 6° 27' N and 80° 19' E, 249 m, site 7, 22 April 2017, *G. Weerakoon* 1393 p.p. (PDA, ABL, BM).

Constrictolumina planorbis (Ach.) Lücking, M.P. Nelsen & Aptroot: Hurulu forest reserve, 8° 07' N and 80° 48' E, 140 m, site 68, 30 May 2017, *G. Weerakoon* 1339 (PDA, ABL, BM).

Constrictolumina porospora (Vain.) Lücking, M.P. Nelsen & Aptroot: Queensberry tea estate- Nawalapitiya, 6° 58' N and 80° 35' E, 1686 m, site 36, 9 May 2017, *G. Weerakoon* 1257 p.p. (PDA, ABL, BM); Single Tree Hill – Nuwaraeliya, 6° 57' N and 80° 45' E, 2088 m, site 48, 15 May 2017, *G. Weerakoon* 911 (PDA, ABL, BM). **New to Asia.**

Dictyomeridium proponens (Nyl.) Aptroot, M.P. Nelsen & Lücking: Leveland tea estate, 7° 08' N and 8° 41' E, 408 m, site 8, 24 April 2017, *G. Weerakoon* 168 (PDA, ABL, BM).

Marcelaria cumingii (Mont.) Aptroot, M.P. Nelsen & Parmen: Hurulu forest reserve, 8° 18' N and 80° 51' E, 128 m, site 62, 29 May 2017, *G. Weerakoon* 194 (PDA, ABL, BM); site 63, 30 May 2017, *G. Weerakoon* 1280 (PDA, ABL).

Polymeridium jordani (C.W. Dodge) Aptroot: Sinharaja rain forest, Mulawella trail, 6° 25' N and 80° 25' E, 757 m, site 58, 19 May 2017, *G. Weerakoon* 1209 (PDA, ABL, BM).

Pseudopyrenula media Aptroot & Diederich: Knuckles mountain range, 7° 31' N and 80° 43' E, 1344 m, site 17, 26 April 2017, *G. Weerakoon* 3 (PDA, ABL, BM); Sinharaja rain forest, Mulawella trail, 6° 25' N and 80° 24' E, 483 m, site 53, 18 May 2017, *G. Weerakoon* 703 (PDA, ABL).

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