

Over 200 new lichen records from Sri Lanka, with three new species to science

Gothamie WEERAKOON^a & André APTROOT^{b*}

^aDepartment of Botany, Field Museum, 1400 South Lakeshore Drive,
Chicago, IL 60605-2496, U.S.A.

^bABL Herbarium, G.v.d.Veenstraat 107, NL-3762 XK Soest, The Netherlands

Abstract – Two hundred and seven lichen species are newly reported from Sri Lanka, eight of which were previously thought to be endemic in India; 91 species are new to the Indian subcontinent, and four to Asia, and three are described here as new to science: *Astrothelium nitidulum* which has 7-septate ascospores with diamond-shaped lumina, mostly simple ascomata in shiny olive pseudostromata and an inspersed hamathecium; *Heterodermia queensberryi* which is similar to *Heterodermia propagulifera* but with a corona of lobules around the apothecia; and *Malmidea papillosa*, which is similar to *Malmidea granifera* but has regular warts and lacks medulla in the excipulum.

Indian subcontinent / *Astrothelium* / *Heterodermia* / *Malmidea* / *Malmideaceae* / *Physciaceae* / *Trypetheliaceae*

INTRODUCTION

The lichen flora of Sri Lanka remains largely undescribed (Weerakoon *et al.*, 2012; Weerakoon & Aptroot, 2013).

This paper reports a large number of new records for the country and is primarily based on the private collection of C. Cloonan (a naturalist living in Chicago), which was recently donated to the first author. The specimens were mainly collected in the early 90s in the Central province of Sri Lanka. They are from the wet and dry zones as well as from the central mountains. Among these specimens were also three species new to science that are described and illustrated here.

One is a species of *Astrothelium* which has 7-septate ascospores with diamond-shaped lumina, mostly simple ascomata in shiny olive pseudostromata and an inspersed hamathecium.

The second new species found in the material is a *Heterodermia* resembling *H. propagulifera* but with a spectacular corona of lobules around the apothecia. It is somewhat surprising that a new species of *Heterodermia* was found shortly after publishing a key to the species of *Heterodermia* known from Sri Lanka (Weerakoon & Aptroot, 2013).

The last new species found is a species of *Malmidea* that resembles *Malmidea granifera* but has regular warts with yellow medulla, but lacks medulla

* Corresponding author: andreaptroot@gmail.com

in the excipulum. In this way it is somewhat intermediary between the two major groups within the genus, one with medulla in apothecium margin and thallus, and one without these.

It is especially striking that in a previous recent paper (Weerakoon & Aptroot, 2013), new species were described from Sri Lanka that belonged to two of the genera from which here additional species are described, viz. *Heterodermia* and *Malmidea*. Apparently, these genera are especially diverse in Sri Lanka.

MATERIAL AND METHODS

Identification and descriptive work was carried out in Soest (the Netherlands) using an Olympus SZX7 stereomicroscope and an Olympus BX50 compound microscope with interference contrast, connected to a Nikon Coolpix digital camera. All measurements have been made on sections mounted in tap water. The specimens from this study are primarily preserved in F, with some duplicates in PDA, and (only isotypes of the newly described species) in ABL (see table 1 for collecting numbers). The chemistry of the type specimen of each new species has been investigated by thin-layer chromatography (TLC) using solvent A and by observing extract recrystallization in acetone with a compound microscope (Orange *et al.*, 2001). Chemical reactions were applied directly on the medulla and on acetone extracts on filter paper.

TAXONOMY

Table 1 lists 207 lichen species that are all new reports for Sri Lanka. Of these, eight were previously thought to be endemic in India, 91 are new to the Indian subcontinent, whereas *Bulbothrix hypocraea* (Vain.) Hale, *Herpothallon fertile* Aptroot & Lucking, *Megalotremis lateralis* Aptroot, and *Pyrenula inframamillana* Aptroot & M. Cáceres are first records to Asia.

Table 1. New records for Sri Lanka

	No.	Status
<i>Anisomeridium albisedum</i> (Nyl.) R.C. Harris	6125	New record for Indian subcontinent
<i>Anisomeridium polycarpum</i> (Müll. Arg.) R.C. Harris	7003	New record for Indian subcontinent
<i>Anisomeridium subprostans</i> (Nyl.) R.C. Harris	9993	New record for Indian subcontinent
<i>Anisomeridium tarmugliense</i> (Makhija & Patw.) R.C. Harris	6007C	Not endemic to India
<i>Arthonia calcicola</i> Nyl.	6990	New record for Indian subcontinent
<i>Arthonia redingeri</i> Grube	9993G	New record for Indian subcontinent
<i>Arthopyrenia cinchonae</i> (Ach.) Müll. Arg.	6127	
<i>Arthopyrenia majuscula</i> (Nyl.) Zahlbr.	6871	
<i>Arthopyrenia planorbis</i> (Ach.) Müll. Arg.	6778	New record for Indian subcontinent
<i>Arthothelium confertum</i> (A.L. Sm.) Makhija & Patw.	6871B	Not endemic to India

Table 1. New records for Sri Lanka (*continued*)

	<i>No.</i>	<i>Status</i>
<i>Astrothelium cinnamomeum</i> Müll. Arg.	6039	New record for Indian subcontinent
<i>Astrothelium galbineum</i> Kremp.	6111	New record for Indian subcontinent
<i>Bacidia medialis</i> (Tuck.) Zahlbr.	6136	
<i>Bacidia millegrana</i> (Taylor) Zahlbr.	6456	
<i>Bacidiospora psorina</i> (Nyl.) Kalb	6458	
<i>Bathelium feei</i> (C.F.W. Meissn.) Aptroot	6459	New record for Indian subcontinent
<i>Buellia morehensis</i> Kr.P. Singh & S.R. Singh	6460	Not endemic to India
<i>Buellia tinctoria</i> H. Magn.	6461	New record for Indian subcontinent
<i>Bulbothrix goebelii</i> (Zenker) Hale	6236	
<i>Bulbothrix hypocraea</i> (Vain.) Hale	6237	New record for Asia
<i>Bulbothrix setschwanensis</i> (Zahlbr.) Hale	6504F	
<i>Bunodophoron macrocarpum</i> (Ohlsson) Wedin	6985C	
<i>Caloplaca crenularia</i> (With.) J.R. Laundon	6400	
<i>Canoparmelia owariensis</i> (Asahina) Elix	6530	New record for Indian subcontinent
<i>Catillaria leptocheiloides</i> (Nyl.) Zahlbr.	6698	
<i>Cladonia cartilaginea</i> Müll. Arg.	6402	
<i>Cladonia corniculata</i> Ahti & Kashiw.	6403	
<i>Cladonia fruticulosa</i> Kremp.	6271	
<i>Cladonia homchantarae</i> Ahti & Parmen	6949	New record for Indian subcontinent
<i>Cladonia humilis</i> (With.) J.R. Laundon	6995A	
<i>Cladonia kurokawae</i> Ahti & S. Stenroos	6955B	
<i>Cladonia mauritiana</i> Ahti & J.C. David	6955C	
<i>Cladonia mongkolsukii</i> Parmen & Ahti	6525	New record for Indian subcontinent
<i>Cladonia phyllopoda</i> (Vain.) S. Stenroos	6859	New record for Indian subcontinent
<i>Cladonia singhii</i> Ahti & P.K. Dixit	6859B	
<i>Cladonia subdelicatula</i> Vain. ex Asahina	6700	New record for Indian subcontinent
<i>Cladonia submultiformis</i> Asahina	6355	
<i>Coccocarpia stellata</i> Tuck.	6802	New record for Indian subcontinent
<i>Coenogonium isidiatum</i> (G. Thor & Vězda) Lücking, Aptroot & Sipman	6490	
<i>Coenogonium linkii</i> Ehrenb.	0025B	New record for Indian subcontinent
<i>Cratiria obscurior</i> (Stirt.) Marbach & Kalb	6703	
<i>Cratiria rutilans</i> Marbach	6918	New record for Indian subcontinent
<i>Cresponea plurilocularis</i> (Nyl.) Egea & Torrente	6920	
<i>Cresponea proximata</i> (Nyl.) Egea & Torrente	0003B	
<i>Crocynia gossypina</i> (Sw.) A. Massal.	6654	
<i>Crocynia pyxinoides</i> Nyl.	0004C	New record for Indian subcontinent
<i>Dictyonema thelephora</i> (Spreng.) Zahlbr.	0005A	New record for Indian subcontinent
<i>Dirinaria purpurascens</i> (Vain.) B.J. Moore	6006A	New record for Indian subcontinent
<i>Enterographa mesomela</i> Sparrius, Saipunk. & Wolseley	7008	

Table 1. New records for Sri Lanka (*continued*)

	<i>No.</i>	<i>Status</i>
<i>Fuscopannaria coeruleascens</i> P.M. Jørg.	6285A	
<i>Fuscopannaria dissecta</i> P.M. Jørg.	6284F	New record for Indian subcontinent
<i>Haematomma accolens</i> (Stirt.) Hillmann	6924B	
<i>Haematomma flexuosum</i> Hillmann	0044F	New record for Indian subcontinent
<i>Hafellia curatellae</i> (Malme) Marbach	0055C	
<i>Hafellia parastata</i> (Nyl.) Kalb	6918A	New record for Indian subcontinent
<i>Herpothallon albidum</i> (Fée) Aptroot, Lücking & G. Thor	6931	New record for Indian subcontinent
<i>Herpothallon fertile</i> Aptroot & Lücking	9976B	New record for Asia
<i>Herpothallon philippinum</i> (Vain.) Aptroot & Lücking	6665A	New record for Indian subcontinent
<i>Heterodermia circinalis</i> (Zahlbr.) W.A. Weber	6019	New record for Indian subcontinent
<i>Heterodermia dactyliza</i> (Nyl.) Swinscow & Krog	0025C	
<i>Heterodermia pseudospeciosa</i> (Kurok.) W.L. Culb.	0038F	
<i>Hypogymnia fragillima</i> (Hillmann) Rass.	8017	
<i>Hypotrachyna awasthii</i> Hale & Patw.	8020	Not endemic to India
<i>Hypotrachyna brevirhiza</i> (Kurok.) Hale	8037	
<i>Hypotrachyna infirma</i> (Kurok.) Hale	8040	
<i>Hypotrachyna physcioides</i> (Nyl.) Hale	8047	
<i>Hypotrachyna rockii</i> (Zahlbr.) Hale	8050	
<i>Laurera meristospora</i> (Mont. & Bosch) Zahlbr.	6895	
<i>Lecanora helva</i> Stizenb.	6631B	
<i>Lecanora leprosa</i> Fée	9993C	
<i>Lecanora tropica</i> Zahlbr.	0035A	
<i>Lepraria atrotomentosa</i> Orange & Wolseley	9990B	New record for Indian subcontinent
<i>Lepraria nigrocincta</i> Diederich, Sérus. & Aptroot	9980B	New record for Indian subcontinent
<i>Lepraria sipmaniana</i> (Kümmerl. & Leuckert) Kukwa	9983B	New record for Indian subcontinent
<i>Leptogium austroamericanum</i> (Malme) C.W. Dodge	6622A	
<i>Leptogium azureum</i> (Sw. ex Ach.) Mont.,	8060	
<i>Leptogium cochleatum</i> (Dicks.) P.M. Jørg. & P. James	6705	
<i>Leptogium corticola</i> (Taylor) Tuck.	8067A	
<i>Leptogium marginellum</i> (Sw.) Gray	8002A	
<i>Leptogium milligranum</i> Sierk	0022A	
<i>Leptogium streimannii</i> Verdon	9991B	New record for Indian subcontinent
<i>Letrouitia parabola</i> (Nyl.) R. Sant. & Hafellner	9005A	New record for Indian subcontinent
<i>Letrouitia sayeri</i> (Müll. Arg.) Elix	6529A	New record for Indian subcontinent
<i>Letrouitia transgressa</i> (Malme) Hafellner & Bellem	6994F	
<i>Lithothelium obtectum</i> (Müll. Arg.) Aptroot	9994	
<i>Lobothallia alphoplaca</i> (Wahlenb.) Hafellner,	8000	
<i>Malmidea aurigera</i> (Fée) Kalb, Rivas Plata & Lumbsch	8600	New record for Indian subcontinent
<i>Malmidea badimoides</i> (M. Cáceres & Lücking) M. Cáceres & Kalb	6128F	New record for Indian subcontinent

Table 1. New records for Sri Lanka (*continued*)

	<i>No.</i>	<i>Status</i>
<i>Malmidea bakeri</i> (Vain.) Kalb, Rivas Plata & Lumbsch	6676D	New record for Indian subcontinent
<i>Malmidea duplomarginata</i> (Papong & Kalb) Kalb & Papong	7105B	New record for Indian subcontinent
<i>Malmidea gyalectoides</i> (Vain.) Kalb & Lücking	6516A	New record for Indian subcontinent
<i>Malmidea hypomela</i> (Nyl.) Kalb & Lücking	0033F	
<i>Malmidea leptoloma</i> (Müll. Arg.) Kalb & Lücking	8021C	New record for Indian subcontinent
<i>Malmidea sorsogona</i> (Vain.) Kalb, Rivas Plata & Lumbsch	6969B	New record for Indian subcontinent
<i>Malmidea subgranifera</i> (Kalb & Elix) Kalb & Elix	9979B	
<i>Malmidea vinosa</i> (Eschw.) Kalb, Rivas Plata & Lumbsch	6193C	New record for Indian subcontinent
<i>Mazosia carnea</i> (Eckfeldt) Aptrot & M. Cáceres	6855P	New record for Indian subcontinent
<i>Mazosia phyllosema</i> (Nyl.) Zahlbr.	9979	
<i>Megalotremis biocellata</i> Aptroot	6896D	New record for Indian subcontinent
<i>Megalotremis lateralis</i> Aptroot	6896E	New record for Asia
<i>Megalotremis pustulata</i> Aptroot	6673	New record for Indian subcontinent
<i>Mycomicrothelia conothelena</i> (Nyl.) D. Hawksw.	0032F	Not endemic to India
<i>Mycoporum eschweileri</i> (Müll. Arg.) R.C. Harris	8500	New record for Indian subcontinent
<i>Ochrolechia africana</i> Vain.	8564	
<i>Opegrapha subvulgata</i> Nyl.	8539	
<i>Opegrapha viridis</i> Pers.	8547	
<i>Parmeliella brisbanensis</i> (C. Knight) P.M. Jørg. & D.J. Galloway	8004A	
<i>Parmeliella isidiophora</i> Zahlbr.	8090	New record for Indian subcontinent
<i>Parmeliella mariana</i> (Fr.) P.M. Jørg. & D.J. Galloway	7890	New record for Indian subcontinent
<i>Parmeliella stylophora</i> (Vain.) P.M. Jørg.	0007B	
<i>Parmelinella simplicior</i> (Hale) Elix & Hale	0008C	
<i>Parmelinopsis spumosa</i> (Asahina) Elix & Hale	8096A	
<i>Parmotrema abessinicum</i> (Nyl. ex Kremp.) Hale	0054D	
<i>Parmotrema andinum</i> (Müll. Arg.) Hale	0053D	
<i>Parmotrema cetratum</i> (Ach.) Hale	0063A	
<i>Parmotrema claviferum</i> (Räsänen) Streimann	0053B	New record for Indian subcontinent
<i>Parmotrema cooperi</i> (J. Steiner & Zahlbr.) Sérus.	0052B	
<i>Parmotrema durumae</i> (Krog & Swinscow) Krog & Swinscow	0055A	New record for Indian subcontinent
<i>Parmotrema grayanum</i> (Hue) Hale	8096A	
<i>Parmotrema latissimum</i> (Fée) Hale	8077B	
<i>Parmotrema mellissii</i> (C.W. Dodge) Hale	8054A	
<i>Parmotrema poolii</i> (C.W. Dodge) Krog & Swinscow	0045A	New record for Indian subcontinent
<i>Parmotrema praesorediosum</i> (Nyl.) Hale	0034A	
<i>Parmotrema subinctorium</i> (Zahlbr.) Hale	0065C	New record for Indian subcontinent
<i>Parmotrema uberrimum</i> (Hue) Hale	0045B	New record for Indian subcontinent
<i>Parmotrema zollingeri</i> (Hepp) Hale	0042A	
<i>Pertusaria commutata</i> Müll. Arg.	6865	New record for Indian subcontinent

Table 1. New records for Sri Lanka (*continued*)

	<i>No.</i>	<i>Status</i>
<i>Pertusaria lacerans</i> Müll. Arg.	6521	New record for Indian subcontinent
<i>Pertusaria nigrata</i> Kremp.	6534A	New record for Indian subcontinent
<i>Pertusaria porinella</i> Nyl.	8932	New record for Indian subcontinent
<i>Pertusaria substerecens</i> Zahlbr.	8278	New record for Indian subcontinent
<i>Pertusaria tropica</i> Vain.	6322	
<i>Pertusaria truncata</i> Kremp.	0038C	New record for Indian subcontinent
<i>Phaeocalicium curtisii</i> (Tuck.) Tibell	0039C	New record for Indian subcontinent
<i>Phlyctis brasiliensis</i> Nyl.	6589	New record for Indian subcontinent
<i>Phlyctis himalayensis</i> (Nyl.) D.D. Awasthi	6064E	
<i>Phlyctis monosperma</i> S. Joshi & Upreti	8087A	
<i>Phyllopsora borbonica</i> Timdal & Krog	9012A	New record for Indian subcontinent
<i>Phyllopsora breviuscula</i> (Nyl.) Müll. Arg.	6927D	
<i>Phyllopsora confusa</i> Swinscow & Krog	9013A	
<i>Phyllopsora corallina</i> (Eschw.) Müll. Arg.	9017B	
<i>Phyllopsora dolichospora</i> Timdal & Krog	6402B	New record for Indian subcontinent
<i>Phyllopsora foliata</i> (Stirt.) Gotth. Schneid.	6938	New record for Indian subcontinent
<i>Phyllopsora furfuracea</i> Zahlbr.	8307	New record for Indian subcontinent
<i>Phyllopsora küiensis</i> (Vain.) Gotth. Schneid.	9013B	New record for Indian subcontinent
<i>Physcia alba</i> (Fée) Müll. Arg.	0039E	
<i>Physcia atrostriata</i> Moberg	0048A	New record for Indian subcontinent
<i>Physcia dimidiata</i> (Arnold) Nyl.	0030B	
<i>Physcia integrata</i> Nyl.	6219	
<i>Physcia poncinsii</i> Hue	8267	New record for Indian subcontinent
<i>Physcia solediosa</i> (Vain.) Lyngé	8268	
<i>Physcia verrucosa</i> Moberg	8271	New record for Indian subcontinent
<i>Polychidium dendriscum</i> (Nyl.) Henssen	9035C	New record for Indian subcontinent
<i>Polymeridium quinqueseptatum</i> (Nyl.) R.C. Harris	0021A	
<i>Porina africana</i> Müll. Arg.	0008A	
<i>Porina americana</i> Fée	0011A	
<i>Porina bellendenica</i> Müll. Arg.	0015A	New record for Indian subcontinent
<i>Porina conspersa</i> Malme	0017C	New record for Indian subcontinent
<i>Porina internigrans</i> (Nyl.) Müll. Arg.	6623	
<i>Porina mastoidella</i> (Nyl.) Müll. Arg.	0911A	
<i>Porina nucula</i> Ach.	6830	
<i>Porina nuculastrum</i> (Müll. Arg.) R.C. Harris	8021B	New record for Indian subcontinent
<i>Pseudopyrenula subgregaria</i> Müll. Arg.	8026B	New record for Indian subcontinent
<i>Pseudopyrenula subnudata</i> Müll. Arg.	6300	
<i>Pyrenula acutispora</i> Kalb & Hafellner	8511	New record for Indian subcontinent
<i>Pyrenula anomala</i> (Ach.) A. Massal.	6400A	
<i>Pyrenula bahiana</i> Malme	6774	New record for Indian subcontinent

Table 1. New records for Sri Lanka (*continued*)

	<i>No.</i>	<i>Status</i>
<i>Pyrenula breutelii</i> (Müll. Arg.) Aptroot	8731	New record for Indian subcontinent
<i>Pyrenula circumfiniens</i> Vain.	8456	
<i>Pyrenula dermatodes</i> (Borrer) Schaer.	9062	New record for Indian subcontinent
<i>Pyrenula fetivica</i> (Kremp.) Müll. Arg.	6877	New record for Indian subcontinent
<i>Pyrenula globifera</i> (Eschw.) Aptroot	7556	
<i>Pyrenula inframamillana</i> Aptroot & M. Cáceres	7558	New record for Asia
<i>Pyrenula leucotrypa</i> (Nyl.) Upreti	7553	Not endemic to India
<i>Pyrenula massariospora</i> (Starbäck) R.C. Harris	7554	New record for Indian subcontinent
<i>Pyrenula micheneri</i> R.C. Harris	7568	New record for Indian subcontinent
<i>Pyrenula microcarpa</i> Müll. Arg.	6728	New record for Indian subcontinent
<i>Pyrenula nitidula</i> (Bres.) R.C. Harris	7569	New record for Indian subcontinent
<i>Pyrenula parvinuclea</i> (Meyen & Flot.) Aptroot	7536	
<i>Pyrenula quassiaecola</i> Fée	6774A	
<i>Pyrenula submastophora</i> Ajay Singh & Upreti	7543	Not endemic to India
<i>Pyxine meissnerina</i> Nyl.	8774	
<i>Pyxine retirugella</i> Nyl.	8444	
<i>Pyxine subcinerea</i> Stirt.	8358	
<i>Ramalina conduplicans</i> Vain.	6339	
<i>Ramalina inflata</i> (Hook. f. & Taylor) Hook. f. & Taylor	6349	
<i>Ramboldia haematites</i> (Fée) Kalb, Lumbsch & Elix	0001B	
<i>Ramboldia russula</i> (Ach.) Kalb, Lumbsch & Elix	0002C	
<i>Remototrachyna costaricensis</i> (Nyl.) A. Crespo <i>et al.</i>	0008D	
<i>Siphula decumbens</i> Nyl.	9349	New record for Indian subcontinent
<i>Sporopodium flavescens</i> (R. Sant.) Vězda	9125	New record for Indian subcontinent
<i>Stereocaulon foliolosum</i> Nyl.	0027B	
<i>Sticta limbata</i> (Sm.) Ach.	6354	
<i>Sticta platyphylloides</i> Nyl.	8423	
<i>Tephromela atra</i> (Huds.) Hafellner	0050C	
<i>Thysanothecium scutellatum</i> (Fr.) D.J. Galloway	6910	New record for Indian subcontinent
<i>Topeliopsis muscigena</i> (Stiz.) Kalb	1413	Not endemic to India
<i>Trypetheliopsis gigas</i> (Zahlbr.) Aptroot	6340B	New record for Indian subcontinent
<i>Trypethelium eluteriae</i> Spreng.	6147A	
<i>Trypethelium epileucodes</i> Nyl.	6148	New record for Indian subcontinent
<i>Tylophoron moderatum</i> Nyl.	6128	
<i>Usnea bismolliuscula</i> Zahlbr.	6254U	
<i>Usnea complanata</i> (Müll. Arg.) Motyka	6234U	
<i>Usnea cornuta</i> Körb.	8265U	New record for Indian subcontinent
<i>Usnea pangiana</i> Stirt.	8010U	New record for Indian subcontinent
<i>Usnea steineri</i> Zahlbr.	8011U	New record for Indian subcontinent
<i>Vainionora flavovirens</i> (Fée) Kalb	8882	New record for Indian subcontinent

The three new species are described below:

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

Figs 1-2

Mycobank: MB808083

Thallus crustose, corticate, shiny, olivaceous brown, surrounded by a black prothallus line. Algae trentepohlioid. **Ascomata** pyriform, 0.6-0.9 mm diam, immersed single or with 2-3 aggregated in rather undifferentiated shiny olive brown hemispherical pseudostromata of 0.9-1.9 mm diam.; ascomata only visible from above by a black ostiole with a whitish centre; upper half of pseudostromata filled with whitish medulla. Hamathecium interspersed with hyaline oil droplets. **Ascospores** 8/ascus, hyaline, 7-septate, fusiform, 40-49 × 12-15 µm, lumina diamond-shaped, ends pointed. **Pycnidia** not observed.

Chemistry: Thallus UV-, C-, K-, KC-, P-. TLC: no substances detected.

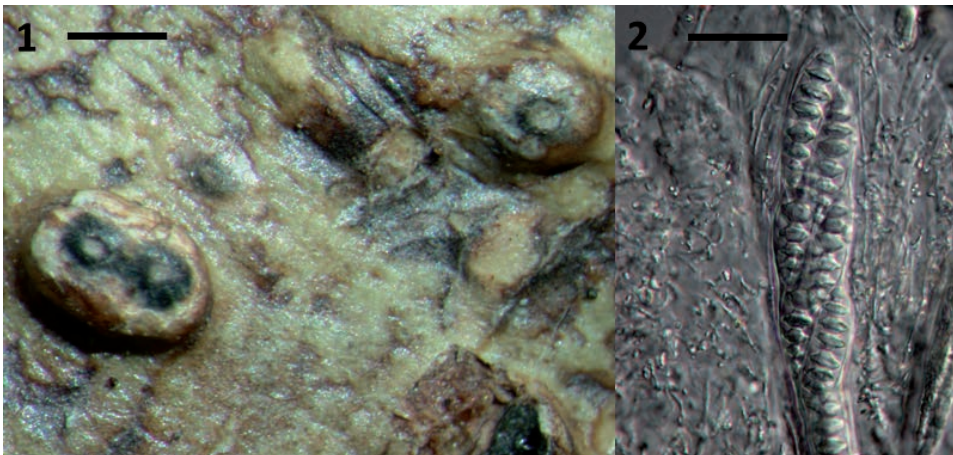
Type: SRI LANKA. **Central Province**, Coolbone tea estate Matala, 7°01' N, 80°28' E, C. Cloonan 083/53, 1982 (F-holotypus).

Etymology: After the shiny ascomata

Ecology and distribution: On smooth bark. Known only from Sri Lanka.

Discussion: This species is characterized by 7-septate ascospores with diamond-shaped lumina, simple black, shiny ascomata and an interspersed hamathecium. This species is much closer to the type of *Astrothelium* (*A. conicum* Eschw.) than to the type of *Trypethelium* (*T. eluteriae* Spreng.) even though it has pseudostromata with simple ascomata with apical ostioles. Therefore it is here described in the genus *Astrothelium*, just as e.g. *A. inspersaeneum* (Lima *et al.*, 2013).

Also, recent phylogenetic studies (Nelsen *et al.*, 2014) of the family Trypetheliaceae show that only species with rounded (not diamond-shaped) lumina cluster around the type of *Trypethelium*, while species with ascospores with diamond-shaped lumina form another cluster around the *Astrothelium conicum*-group, regardless of their ascoma organization.



Figs 1-2. *Astrothelium nitidulum* (holotype); **1**. habitus; **2**. hamathecium with asci and scospores. Scales: 1 = 0.5 mm; 2 = 50 µm.

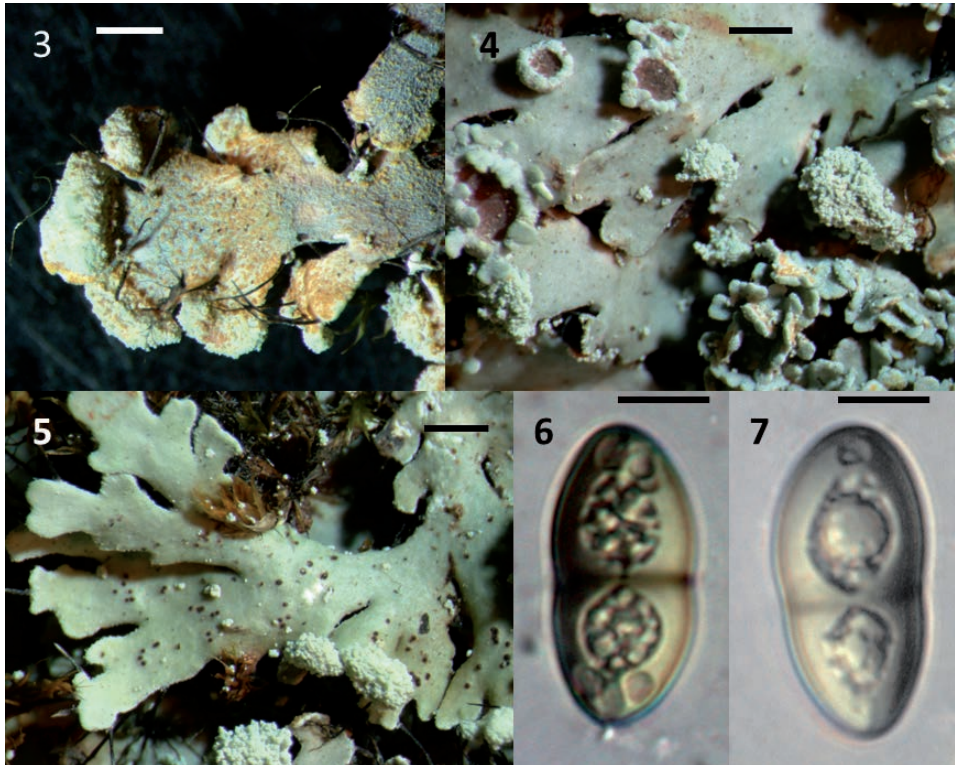
So far about 60 species are known in the genus, a number that will undoubtedly rise with the anticipated wider, more natural circumscription of the group. The centre of diversity is and will remain South America.

***Heterodermia queensberryi* Weerakoon & Aptroot, sp. nov.**

Figs 3-7

Mycobank: MB808084

Thallus foliose, forming tufts up to 7 cm diam., divided into linear, grey lobes up to 1 cm long and 0.7-1.2 mm wide, at tips tapering slightly recurved, mostly dichotomously branched every 2 mm; upper surface smooth, not shiny, flat; tips with white spotted pruina; lower surface without cortex or rhizines, arachnoid, spotted yellow-orange, blackening towards the centre of the thallus. Cilia black, dull, marginal, simple or with many perpendicular branchlets, 0.1 mm thick and up to 3 mm long; soredia granular, grey, at upturned lobed tips, both in the centre of the thallus and on the margins; soralia confluent in up to 5 mm long marginal groups; rhizines, isidia and pseudocyphellae absent. **Apothecia** common, 1-4 mm diam., laminal on the upper surface of the thallus lobes, not terminal, at their margins developing tapering lobes similar to the normal thallus lobes in morphology; these lobes up to 1 mm wide and up to 2 mm long, much incised, grey, white pruinose and with yellow-orange arachnoid lower surface; disc 1-3 mm



Figs 3-7. *Heterodermia queensberryi* (holotype); **3**, lower surface with pigment; **4-5**, upper surface with apothecia with phyllidia; **6-7**, ascospores with sporoblastidia. Scales: 3-5 = 0.5 mm; 6-7 = 10 μ m.

diam., brown, not pruinose. **Hymenium** 120-160 μm high, not inspersed; Epihymenium fuscous brown, granular; hypothecium hyaline, c. 30 μm high. **Ascospores** 8 per ascus, brown, 1-septate, constricted at the septum, with 0-3 sporoblastidia at each apex, 30-35.5 \times 14-17.5 μm . **Pycnidia** not seen.

Chemistry: cortex K+ yellow, medulla K+ faintly yellow, yellow-orange pigment on lower surface K+ blood red; TLC: atranorin in the cortex, zeorin in the medulla, red anthraquinone (probably emodin) on the lower surface.

Type: SRI LANKA. **Sabaragamuwa Province**, Queensberry tea estate-Dilmah Co. Pvt, 6°59' N, 80°35' E, G. Weerakoon 8880, 2 January 2014, (PDA-holotypus; F, ABL-isotypus).

Etymology: After the collecting locality.

Ecology and distribution: On smooth bark in high mountain forest. Known only from Sri Lanka.

Discussion: The genus *Heterodermia* is often common and species-rich in tropical mountain regions (Elix 2010, 2011a, 2011b). Sri Lanka is no exception in this regard and *Heterodermia* may even be the most speciose genus of foliose lichens in the country. A key to all species known from Sri Lanka is given by Weerakoon & Aptroot (2013). We apply the now often accepted restricted species concept in the genus (Elix 2010, 2011a, 2011b), accepting species that are morphologically and chemically rather uniform. This accounts for the findings by Lücking *et al.* (2008) that the presence or absence of norstictic acid is phylogenetically informative within at least part of the genus *Heterodermia*.

The new species is closely related to *Heterodermia propagulifera* (Vain.) J.P. Dey, but with a spectacular corona of lobules around the apothecia. Such structures were so far only reported from two non-soresiate species in the genus, *viz.* *Heterodermia coronata* (Kurok.) D.D. Awasthi and *H. lamelligera* (Kurok.) Follmann & Redón. The structures differ from the crenate apothecium margins which more commonly occur in the genus, because the lobules do originate from the thallus, not from the apothecium margin.

***Malmidea papillosa* Weerakoon & Aptroot, sp. nov.**

Figs 8-9

Mycobank: MB808085

Thallus thin, dull to almost shiny, seemingly thickly corticated, olive brown, with numerous corticate grey warts of 0.1 mm diam. of which the medulla is pale yellow, surrounded by a thin dark brown prothallus. Warts hemispherical to somewhat higher than wide, sometimes abraded at the top, but not developing into soralia. **Apothecia** sessile, 0.4-2.2 mm diam.; disc flat, smooth, dull, fuscous brown. Margin dull, c. 0.1 mm wide, mottled greyish and pale brownish, overall darker than the disc, somewhat translucent, without medulla. **Hymenium** hyaline, not inspersed, 75-95 μm high; epihymenium pale brownish in an irregular layer of 4-10 μm high; hypothecium dark brown, radiating into the inner excipulum, 35-50 μm thick, up to 100 μm thick at the sides; excipulum not corticate, cellular, hyaline, with some extruding hyphae, without medulla or crystals. Paraphyses unbranched, not thickened at the tips, c. 1 μm wide. **Ascospores** hyaline, IKI-, simple, ellipsoid, 15.5-17.5 \times 9-10.5 μm , ends rounded, not thickened. **Pycnidia** not observed.

Chemistry: Thallus UV-, C-, K-, KC-, P-. Thallus medulla K+ orange. TLC: xantholepinone in thallus medulla.

Type: SRI LANKA. **Central Province**. Coolbone tea estate Matale, 7°01' N, 80°28' E, C. Cloonan 145, 1982 (F-holotypus, ABL-isotypus).

Etymology: After the papillae on the thallus.



Figs 8-9. *Malmidea papillosa* (holotype), 8. habitus; 9. section through apothecium. Scales: 8 = 0.5 mm; 9 = 50 μ m.

Ecology and distribution: On smooth bark of trees in primary montane forest. Known only from Sri Lanka.

Discussion: The genus *Malmidea* in family *Malmideaceae* was only recently described and groups presently 44 known species worldwide (Lücking, 2008; Kalb *et al.*, 2011; 2012; Cáceres *et al.*, 2012; 2013; Schumm & Aptroot, 2012; Weerakoon & Aptroot, 2013), yet, some additional species in this group genus may still hidden under *Lecidea* and new species are now described quite regularly (see above).

The new species resembles *Malmidea granifera* (Ach.) Kalb, Rivas Plata & Lumbsch, but has regular warts with yellow medulla, but lacks medulla in the excipulum. In this way it is somewhat intermediary between the two major groups within the genus, one with medulla in apothecium margin and thallus, and one without these.

Acknowledgements. A Scholarship from the Field Museum, Chicago, USA enabled the first author to work on material at the Field Museum. The NSF-funded project “ATM – Assembling a taxonomic monograph: The lichen family Graphidaceae” (DEB-1025861 to The Field Museum; PI T. Lumbsch, CoPI R. Lücking) as well as the Dilmah tea company funded travel expenses of the first author, which she gratefully acknowledges. Thorsten Lumbsch and Robert Lücking are warmly thanked for some identifications, and for helping to make the stay of the first author at the Field Museum pleasant and productive. Ms. Pat Wolseley is warmly thanked for some identifications, and for all her help over the years. Dan Blanchon, Kong Parnmen, Dr. Ohmura, Alan Orange, and Matt Nelsen are also thanked for various identifications. The first author likes to thank Mr. C. Cloonan for donating many specimens from their private family collection.

REFERENCES

- CÁCERES M. E. S., 2007 — Corticolous crustose and microfoliose lichens of northeastern Brazil. *Libri Botanici* 22: 1-168.
- CÁCERES M.E.S., SANTOS VIEIRA T. DOS, JESUS L.S. DE & LÜCKING R., 2012 — New and interesting lichens from the Caxiuana National Forest in the Brazilian Amazon. *Lichenologist* 44: 807-812.

- CÁCERES M.E.S., SANTOS V.M. DOS, GÓES D.T., MOTA D.A. & APTROOT A., 2013 — Two new species of *Malmidea* from north-eastern, Brazil. *Lichenologist* 45: 619-622.
- ELIX J.A., 2010 — Two new species, a new combination and new data for *Heterodermia* (Physciaceae: Ascomycota). *Australasian Lichenology* 67: 3-9.
- ELIX J.A., 2011a — Three new species of *Heterodermia* (Physciaceae: Ascomycota) from Australia. *Australasian Lichenology* 68: 16-21.
- ELIX J.A., 2011b — Further new species and new records of *Heterodermia* (Physciaceae: Ascomycota) from Australia. *Australasian Lichenology* 69: 12-24.
- KALB K., RIVAS PLATA E., LÜCKING R. & LUMBSCH H.T., 2011 — The phylogenetic position of *Malmidea*, a new genus for the *Lecidea piperis*- and *Lecanora granifera*-groups (Lecanorales, Malmideaceae), inferred from nuclear and mitochondrial ribosomal DNA sequences, with special reference to Thai species. *Bibliotheca Lichenologica* 106: 143-168.
- KALB K., BUARUANG K., MONGKOLSUK P. & BOONPRAGOB K., 2012 — New or otherwise interesting lichens VI, including a lichenicolous fungus. *Phytotaxa* 42: 35-47.
- LIMA E.L., MAIA L.C., APTROOT A. & CÁCERES M.E.S., 2013 — New lichen species from Vale do Catimbao, Pernambuco, Brazil. *The Bryologist* 116: 327-329.
- LÜCKING R., PRADO R. DEL, LUMBSCH H.T., WILL-WOLF S., APTROOT A., SIPMAN H.J.M., UMAÑA L. & CHAVES J.L., 2008 — Phylogenetic patterns of morphological and chemical characters and reproductive mode in the *Heterodermia obscurata* group in Costa Rica (Ascomycota, Physciaceae). *Systematics and Biodiversity* 6: 31-41.
- NELSEN M.P., LÜCKING R., APTROOT A., ANDREW C.J., CÁCERES M.E.S., RIVAS PLATA E., GUEIDAN C., DA SILVA CANEZ L., KNIGHT A., LUDWIG L.R., MERCADO-DIAZ J., PARNMEN S. & LUMBSCH H.T., 2014 — Elucidating phylogenetic relationships and genus-level classification within the fungal family Trypetheliaceae (Dothideomycetes: Ascomycota). *Taxon* (submitted)
- ORANGE A., JAMES P.W. & WHITE F.J., 2001 — *Microchemical Methods for the Identification of Lichens*. London: British Lichen Society.
- SCHUMM F. & APTROOT A., 2012 — *A microscopical atlas of some tropical lichens from SE-Asia*. 2 vols. Norderstedt: Books on Demand. 881 p.
- WEERAKOON G., WIJEYARATNE S.C., WOLSELEY P.A., RIVAS PLATA E., LÜCKING R. & LUMBSCH H.T., 2012 — Six new species of Graphidaceae from Sri Lanka. *The Bryologist* 115: 74-83.
- WEERAKOON G. & APTROOT A., 2013 — Some new lichen species from Sri Lanka, with a key to the genus *Heterodermia* in Sri Lanka. *Cryptogamie, Mycologie* 34: 321-328.