

New species and new records of Australian lichens

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Abstract

Leucodecton granulorum Sipman and *Myriotrema protofrustillatum* Sipman (Graphidaceae) are described as new from New South Wales. *Bellemeria cinereorufescens* (Ach.) Clauzade & Cl.Roux and *Mazosia carnea* (Eckfield) Aptroot & M.Cáceres are new records for Australia. New State, Territory and oceanic island records are provided for 33 other taxa.

Introduction

Toward the end of the 20th century, the exploration of the lichens of Australia was greatly accelerated by Australian researchers. Their efforts resulted in five splendid lichen volumes for the *Flora of Australia*. That increase in knowledge was based mainly on the collecting activities of John A. Elix and Heinar Streimann. Within a few decades they had collected and curated some 100,000 lichen specimens from all over Australia. They also prepared many thousands of duplicates of those specimens, which they then sent to various lichen specialists abroad. Thanks especially to Heinar Streimann, some 7000 of them arrived in the Botanical Museum in Berlin. Unfortunately, that number exceeded the Museum's capacity to study them, and many specimens remained unstudied for years. Only recently have they been investigated and curated. During their processing, numerous species proved to be new records for Australia or its States, Territories, or oceanic islands, and two new species were also discovered. The new taxa and records are reported here.

Material and methods

Morphology and anatomy of the specimens were investigated in the usual way using a Wild M7 stereomicroscope and a Zeiss Axioskop compound microscope. The chemistry was investigated by TLC (Orange *et al.* 2001), and compared with extracts from lichens with known chemical composition. For the identifications, the *Flora of Australia* was used unless otherwise indicated. The results were compared with the online checklist (McCarthy 2017) and the ANHSIR database of herbarium specimens in CANB (<http://www.anbg.gov.au/cgi-bin/ahsir>). Duplicates of all specimens studied are in CANB. Some packets containing more than one species were separated in B and denoted by the low-case letter "a" following the collection number.

New species

1. *Leucodecton granulorum* Sipman sp. nov.
Mycobank No. **MB 824679**

Figs 1–3

Similar to *Leucodecton glaucescens* (Nyl.) Frisch, but the thallus is thin and largely granular, and the ascospores are 2–4 per ascus and *c.* 19–25 µm long.

Type: Australia, New South Wales, Moppy Lookout, Barrington Tops State Forest, 40 km WNW of Gloucester, 31°53'S, 151°32'E, alt. 1200 m, *Nothofagus*-dominated forest on gentle slope, on *Nothofagus*, *J.A. Elix 24817*, 26.iv.1990 (holotype – B 60 0198154, isotype – CANB).

Thallus epiphloeodal, *c.* 0.1 mm thick, more than 10 cm diam., greenish grey, dull to slightly glossy, continuous or somewhat fissured, smooth to verrucose; protocortex thin, *c.* 5 µm; algal layer continuous, occupying most of the thallus, filled with tiny crystals; medulla scarce, whitish; vegetative propagules covering most of the thallus, granular, *c.* 50 µm diam., produced initially on top of pustule-like thallus warts. Ascomata aggregated in *c.* 2–5 mm wide patches, apothecoid, with *c.* 100 µm wide, roundish, greyish, white-rimmed discs separated by a fissure from the slightly raised, gaping, thalline margin, with an externally free, thin, lateral

excipulum lacking periphyses; hymenium *c.* 100 µm thick, hyaline; hypothecium pale brown; ascospores oblong-elliptic, submuriform, hyaline when young, turning brown when old, 2–4 per ascus, *c.* 19–25 × 6–8 µm, 8 × 2-loculate, with thin septa and angular lumina, non-amyloid. Pycnidia not seen.

Chemistry: hypostictic acid (trace), stictic, hyposalazinic and constictic acids (TLC).

Etymology: Named after the numerous granular propagules that cover most of the thallus.

Remarks

The glaucescentoid apothecia (*sensu* Rivas-Plata *et al.* 2010) and the stictic acid chemosyndrome place this species clearly in the genus *Leucodecton*. Among congeneric species with these characters related to *L. glaucescens* (Nyl.) Frisch, its propagules are unique (Rivas Plata *et al.* 2010; Sipman *et al.* 2012; Lendemer & Harris 2014; Lücking 2015). As is often the case in lichen species with predominantly vegetative reproduction, the ascospores are not well developed, and possibly the description will have to be modified when better material becomes available. The hyaline ascospores could be juvenile and possibly turn greyish with age before the brownish, shriveled stage seen in our material.

The vegetative propagules seem to be of a distinctive type. They originate from cracks in pustules. The prominent pustule parts alongside the cracks continue growing, but divide finely into pieces 50–100 µm wide, which remain more or less connected to each other in somewhat cylindrical structures, and do not have a felt-like surface as do true soredia. The initially roundish pustular spots coalesce and cover most of the ascoma-free parts of the thallus.

The propagules appear similar to those of *L. sorediiferum* Frisch, which however were called soredia and were said to be produced in soralia (Frisch 2006). That species also differs in having larger ascospores, 35–50 × 13–19 µm, 9–13 × 3–4-loculate, and emergent, elongate ascomata.

Known from only the type specimens, which were collected in montane *Nothofagus* forest in the Central Tablelands, New South Wales, Australia.

2. *Myriotrema protofrustillatum* Sipman, sp. nov.
Mycobank No. **MB 824681**

Figs 4, 5

Similar to *Myriotrema frustillatum* Mangold, from which it differs by its saxicolous habit and the absence of isidia.

Type: Australia, New South Wales, Urumbilum River, Jersey Bull Forest Road, Orara West State Forest, 15 km WNW of Coffs Harbour, 30°17'S, 152°57'E, alt. 160 m, wet sclerophyll forest beside a rocky stream, dominated by *Tristaniopsis* and *Casuarina*, on shady rock face, *H. Streimann 63736*, 16.vi.1999 (holotype – B 60 0201606, isotypes – CANB, NY, H, TU).

Thallus epilithic, *c.* 100–200 µm thick, pale yellowish grey (after 18 years of herbarium storage), slightly glossy, smooth to rugulose, rimose-areolate, the areoles of very variable size, *c.* 0.3–1 mm wide; pseudocortex *c.* 10 µm thick; algal layer occupying the rest of the thallus, with small crystals and scattered large crystals that can in part originate from the substratum; vegetative propagules absent. Ascomata abundant, perithecioid, immersed in hemispherical thalline warts when fully developed, with an apical pore that is depressed and *c.* 50 µm wide; proper exciple fused with thallus and hymenium, pale brown, *c.* 50 µm thick, near the pore to 100 µm thick, subglobose, *c.* 600 µm diam.; hymenium clear; ascospores 1 per ascus, muriform, oblong-elliptic, *c.* 160 × 30 µm, *c.* 50 × 8-loculate, non-amyloid, with thin septa, angular lumina and thin outer wall, with *c.* 20 primary septa, which are thin but visible in fully mature spores. Pycnidia not seen.

Chemistry: norstictic acid (TLC).

Etymology: Named after the related species *M. frustillatum*, from which it differs by the absence of vegetative propagules.

Remarks

The new species resembles *M. frustillatum* with its large, emergent, perithecioid ascocarps, the monosporous asci, large, muriform, hyaline, non-amyloid ascospores with thin septa and wall, a fused, apically orange proper exciple, and the presence of norstictic acid. It differs in the absence of isidia, the numerous ascocarps and the rock substratum. The discussion by Mangold *et al.* (2009) on the taxonomic position of *M. frustillatum* applies equally to *M. protofrustillatum*, which also has a proper excipulum lacking substratum inclusions.

Known from only the type collection on shaded rock along a stream in lowland wet sclerophyll forest in New South Wales.

New records for Australia

1. *Bellemeria cinereorufescens* (Ach.) Clauzade & Cl.Roux, *Bull. Soc. Bot. Centre-Ouest, nouv. sér.* **15**, 129 (1984) Fig. 6

This species was found in a sample with *Lecidea sens. latu.* Its generic placement is easily confirmed by the *Porpidia*-type asci and the simple, halonate, I+ blue ascospores. Within this small, alpine genus the species is set apart by the combination of a grey, K– thallus, dark brown apothecia and rather small ascospores (c. $13 \times 6 \mu\text{m}$ in our specimen) (Clauzade & Roux 1985). The species is widespread in the Northern Hemisphere, and is also known from North America, Europe and Asia (Stenroos *et al.* 2016). *Bellemeria alpina* (Sommerf.) Clauzade & Cl.Roux, the only species of the genus reported previously from Australia, forms much larger, *Aspicilia*-like thalli, and its thallus contains norstictic acid (thallus K+ yellow turning red). The specimen of *B. cinereorufescens* was too small for TLC, and the absence of norstictic acid was demonstrated only by the K– reaction of the apothecium section. For an English description and another illustration, see Stenroos *et al.* (2016).

SPECIMEN EXAMINED

Victoria: ● Mt Hotham, 32 km SE of Bright, 36°59'S, 147°8'E, alt. 1800 m, subalpine meadow on moderate slope with small rock outcrops, on scattered stones, *H. Streimann 49419a*, 2.v.1992 (B 60 0107907).

2. *Mazosia carnea* (Eckfeldt) Aptroot & M.Cáceres, *Lichenologist* **46**, 564 (2014) Fig. 7

Pantropical. Species of *Mazosia* usually grow on leaves in rainforest understorey, but a few species are known from bark (Aptroot *et al.* 2014). Thus the discovery of a specimen on rock in Australia is surprising. However, many normally corticolous lichens are known to grow on rock occasionally, and the specimen is a good match for one of the corticolous species. The Australian specimen, collected in rainforest in north-eastern Queensland, was found in a community on a flat stone dominated by *Porina*, evidently from a humid spot. It is easily recognized by its rounded ascocarps with reduced exciple and transversely 3-septate ascospores with swollen suprasedian cells.

SPECIMEN EXAMINED

Queensland: ● Home Rule Falls, Slaty Creek, 22 km SSE of Cooktown, 15°44'S, 145°19'E, alt. 250 m, tropical forest dominated by *Tristaniopsis*, beside permanent creek in gorge, on exposed boulder, *H. Streimann 64552*, 29.viii.1999 (B 60 0198155).

New State, Territory and island records

1. *Brigantiaea tricolour* (Mont.) Trevis., *Spighe Paglie*: 9 (1853)

This species is widespread in the Palaetropics, and in Australia was previously reported from the Northern Territory, Queensland and New South Wales. See Hafellner (1997) and Elix, *Flora of Australia* **57** (2009).

SPECIMEN EXAMINED

Norfolk Island: ● Track east of Mount Bates, Mount Pitt National Park, 29°0.7'S, 167°56.3'E, alt. 280 m, subtropical forest on ridge, on *Nestigia*, *J.A. Elix 27471*, 15.vi.1992 (B 60 0201313).

2. *Buellia reagenella* Elix, *Fl. Australia* **57**, 660 (2009)

This species has a rather southerly distribution in Australia, and the new record extends its range to south-eastern Queensland. The collection was identified in 2012 by J.A. Elix (in ANHSIR database), but the record has not been published previously.

SPECIMEN EXAMINED

Queensland: ● Carnarvon Highway, 4 km S of Bullaroo River Bridge, 68 km N of Injune, 25°14'S, 148°36'E, alt. 380 m, monsoon forest with *Denhamia* and *Brachychiton* on flats, on fallen twigs, *J.A. Elix 34072*, 19.viii.1993 (B 60 0103633).

3. *Bunodophoron formosanum* (Zahlbr.) Wedin, *Pl. Syst. Evol.* **187**, 233 (1993)

In Australia, this widespread species was previously reported from Queensland, New South Wales and Lord Howe Island. The presence of sphaerophorin, stictic acid and traces of cryptostictic and constictic acids was demonstrated by TLC.

SPECIMEN EXAMINED

Victoria: ● Coast Range Road, 18 km SSE of Bendoc, 37°17'S, 148°58'E, alt. 900 m, in *Atherosperma moschatum* and *Elaeocarpus holopetalus* forest on slope, with tree ferns, on tree fern stem, *H. Streimann 36662*, 10.iv.1986 (B 60 0201467).

4. *Coccotrema cucurbitula* (Mont.) Müll.Arg., *Nuovo Giorn. Bot. Ital.* **21**, 51 (1889)

The species is widespread in the temperate Southern Hemisphere, and it occurs in eastern Australia from Tasmania to Queensland. The specimens contain stictic, menegaziac, cryptostictic and constictic acids (TLC).

SPECIMENS EXAMINED

Lord Howe Island: ● Track to Goat House Cave, at base of Mt Lidgebird escarpment, 31°33.8'S, 159°5.2'E, alt. 380 m, moist, subtropical forest with *Dracophyllum* and *Cyathea*, on buttress roots, *J.A. Elix 42101*, 7.ii.1995 (B 60 0201630); ● *loc. id.*, alt. 420 m, on *Cyathea* stump, *J.A. Elix 42260*, 7.ii.1995 (B 60 0201631); ● *loc. id.*, *J.A. Elix 42263*, 7.ii.1995 (B 60 0201446).

5. *Coenogonium luteum* (Dicks.) Kalb & Lücking, in Lücking & Kalb, *Bot. Jahrb.* **122**, 32 (2000)

New to Norfolk Island. The species has a worldwide distribution, and in Australia was previously reported from Queensland, New South Wales, Victoria and Tasmania.

SPECIMEN EXAMINED

Norfolk Island: ● West Palm Glen Track, Mount Pitt National Park, 29°01.1'S, 167°56.5'E, alt. 140 m, subtropical forest on moderate slope, on dead *Cyathea* stump, *J.A. Elix 29081*, 16.vi.1992 (B 60 0201424).

6. *Collema glaucophthalmum* Nyl., *Flora* **41**, 377 (1858)

The species is widespread in the tropics and the temperate Southern Hemisphere (Degelius 1974), and has a rather southerly distribution in Australia. The new record extends its range to south-eastern Queensland.

SPECIMEN EXAMINED

Queensland: ● Fraser Island, Kingfisher-Eurong Road, near Eurong, 25°29'S, 153°06'E, alt. 60 m, on sandy flats in forest dominated by *Syncarpia*, *Eucalyptus*, *Acmena* and *Agathis*, on semi-shaded *Acacia* stem, *H. Streimann 64098*, 17.viii.1999 (B 60 0201538).

7. *Collema rugosum* Kremp., in Fenzl, *Reise Österr. Novara Bot.* **1**, 128 (1870)
The species is widespread in the Palaeotropics (Degelius 1974), and in Australia it has previously been reported from the Northern Territory, Queensland and New South Wales.

SPECIMEN EXAMINED

Norfolk Island: ● “Old Stables”, near airstrip, 29°02.7'S, 167°56.5'E, alt. 85 m, cultivated grassland area with some regrowth shrubs, on planted exotic cypress pines, *H. Streimann 53711*, 14.iv.1994 (B 60 0201532).

8. *Cratiria lauricassiae* (Fée) Marbach, *Biblioth. Lichenol.* **74**, 160 (2000)

This species is widely distributed in the tropics (Nordin 2000), and is known throughout the wet-tropics and subtropics of Australia. The collection was identified in 2014 by J.A. Elix (in the ANHSIR database), but it has not been published.

SPECIMEN EXAMINED

New South Wales: ● Lord Howe Island, near junction of tracks to Mutton Bird Point and Intermediate Hill, 31°32.57'S, 159°04.8'E, alt. 60 m, on dead palm in dry lowland forest with basalt outcrops, *J.A. Elix 32744A*, 21.vi.1992 (B 60 0120173).

9. *Cresponea plurilocularis* (Nyl.) Egea & Torrente, *Mycotaxon* **48**, 322 (1993)

This species was previously known in Australia from Queensland, Victoria and Tasmania. For a key, see Egea & Torrente (1993).

SPECIMEN EXAMINED

New South Wales: ● Tooloom National Park, 23 km WSW of Woodenbong, 28°29'S, 152°23'E, alt. 630 m, temperate forest on moderate slope, on semi-exposed treelet stem, *H. Streimann 60932*, 23.iv.1998 (B 60 0201413).

10. *Dendriscoaulon dendriothamnodes* Dughi ex D.J.Galloway, *New Zealand J. Bot.* **21**, 192 (1983)

This entity, probably the cyanobacterial phycotype of several *Sticta* species, is known from southern temperate latitudes and, in Australia, from Victoria and Tasmania.

SPECIMEN EXAMINED

New South Wales: ● Devil's Lookout, Barrington Tops National Park, 44 km WNW of Gloucester, 31°55'S, 151°29'E, alt. 1400 m, wet sclerophyll forest on escarpment with *Banksia*, on semi-shaded *Nothofagus* trunk, *H. Streimann & T. Pocs 65198*, 12.ix.1999 (B 60 0201521).

11. *Endocarpon simplicatum* (Nyl.) Nyl. var. ***simplicatum***, in Hue, in Hue, *Rev. Bot. Courrensan* **6**, 104 (1888)

This very distinctive species with its strong, black rhizomorphs, blackish squamule margins and monosporous asci is widespread in southern Australia, and was previously known from Tasmania, Victoria, South Australia, Western Australia and New South Wales.

SPECIMEN EXAMINED

Australian Capital Territory: ● Gudgenby River Gorge, 27 km S of Canberra, 35°37'S, 149°05'E, alt. 700 m, open *Eucalyptus-Callitris endlicheri* woodland on NW slope, on damp soil amongst *Leptospermum* shrubs, *J. Johnston 2686*, 27.x.1989 (B 60 0201505).

12. *Enterographa subgelatinosa* (Stirt.) Redinger, *Rep. Nov. Spec. Regni Veg.* **43**, 66 (1938)

This species is known only from a few collections from New Zealand and Western Australia (Sparris 2004). TLC: psoromic acid. The ANHSIR database gives the name *Sclerophyton circumscriptum* for this collection, but the specimen in B deviates clearly from that species by its hyaline, not grey to brown ascospores and its elongate, rather than punctiform, ascomata.

SPECIMEN EXAMINED

Lord Howe Island: ● between Little Island and The Cross, 31°34.3'S, 159°4.5'E, alt. 120 m, large boulders with scattered large *Ficus*, small shrubs and ferns, on basalt rocks, *J.A. Elix 42310*, 7.ii.1995 (B 60 0191076).

13. *Eschatogonia marivelensis* (Vain.) Kalb, *Biblioth. Lichenol.* **88**, 310 (2004)

This species is widespread in tropical Asia, and in Australia it was reported previously from the Northern Territory and Queensland. The ANHSIR database gives the name *Phyllopsora confusa* for this collection, but the specimen in B has squamules with a corticate lower side, which places it in *Eschatogonia*.

SPECIMEN EXAMINED

Norfolk Island: ● Mount Pitt Reserve, track leading W from Mt Bates, 29°00.5'S, 167°56.7'E, alt. 240 m, poor forest on ridge, base of *Araucaria heterophylla*, *H. Streimann 34332*, 6.xii.1984 (B 60 0069965).

14. *Graphis cincta* (Pers.) Aptroot, *Fl. Australia* **57**, 651 (2009)

The species is widespread in the tropics and subtropics worldwide, and in Australia it was known previously from the Northern Territory, Queensland and New South Wales. The specimen is on a twig fragment with a mixture of several *Graphis* species, probably including *G. librata*, which is listed in the ANHSIR database. The thallus contains norstictic acid (TLC).

SPECIMEN EXAMINED

Lord Howe Island: ● Anderson Road, 31°31.7'S, 159°4.2'E, alt. 40 m, disturbed lowland forest beside road, on dead bark of treelet (*Erythrina*). *H. Streimann 49973*, 22.vi.1992 (B 60 0191088).

15. *Heterodermia obscurata* (Nyl.) Trevis., *Nuovo Giorn. Bot. Ital.* **1**, 114 (1869)

This species is very widespread in tropical to warm-temperate regions worldwide, and in Australia was known previously from all states and territories, except for the Northern Territory and oceanic islands. The specimen contains atranorin and zeorin (TLC).

SPECIMEN EXAMINED

Lord Howe Island: ● between Little Island and The Cross, 31°34.3'S, 159°4.5'E, alt. 10 m, on steep slope with very large basalt boulders, dominated by *Ficus*, on shaded boulder, *H. Streimann 50114*, 24.vi.1992 (B 60 0198167).

16. *Jackelixia elixii* (S.Y.Kondr. & Kärnefelt) S.Y.Kondr., Fedorenko, S.Stenroos, Kärnefelt & A.Thell, in Fedorenko *et al.*, *Biblioth. Lichenol.* **100**, 77 (2009)

The world distribution of this member of the *Xanthoria parietina* aggregate is poorly understood because of changing taxonomic concepts. In Australia it appears to be common and widespread, and has been reported from all states and territories, except for the Northern Territory and oceanic islands.

SPECIMEN EXAMINED

Norfolk Island: ● picnic area, end of Martins Road, 29°03'S, 167°59'E, alt. 80 m, open *Araucaria* woodland, on base of *Araucaria heterophylla*, *J.A. Elix & H. Streimann 18130*, 1.xii.1984 (B 60 0198161).

17. *Lobaria hartmannii* (Müll.Arg.) Zahlbr., *Cat. Lich. Univ.* **3**, 302 (1925)

This endemic species previously was known only from Queensland. The specimen is rather scrappy, but the dense lobuli and C+ red underside are diagnostic.

SPECIMEN EXAMINED

Lord Howe Island: ● Mt Gower track, between The Saddle and Mt Gower, 31°35.1'S,

159°4.8'E, alt. 700 m, shrubs with few trees on steep escarpment, on exposed dead shrub branches, *H. Streimann* 56086, 11.ii.1995 (B 60 0109043).

18. *Megalaria subintermixta* (Müll.Arg.) Kantvilas, *Herzogia* **29**, 429 (2016)

This endemic species was described and illustrated by Kantvilas (2016), and is easily recognized by its schizidiate thallus surface, ascospores *c.* 20 µm long, and its dark brown hypothecium. It is already known from Tasmania, southern Victoria and south-eastern New South Wales. The specimen contains no lichen substances (TLC).

SPECIMENS EXAMINED

Queensland: ● Track to top of Mt. Cordeaux, Cunninghams's Gap, 90 km SW of Brisbane, 28°03'S, 152°24'E, alt. *c.* 1000 m, on bark, *A.W. Archer* 1163, 17.x.1981 (B 60 0012918); ● Conway State Forest, 18 km E of Proserpine, 20°21'S, 148°45'E, alt. 180 m, on tree trunk in lowland rain forest, *J.A. Elix* 20198, 28.vi.1986 (B 60 0104963).

19. *Mycoblastus coniphorus* (Elix & A.W.Archer) Kantvilas & Elix, in Kantvilas, *Lichenologist* **41**, 163 (2009)

When sterile, this species can be recognized by its dense cover of slender, branched, fragile isidia which give it a sorediate look, in addition to its whitish colour and the presence of perlatolic, confluent and 2-*O*-methylconfluent acids (Elix *et al.* 1997, sub *Pertusaria*). The species appears to be restricted to but widespread in southern Australia, and so far has been reported from New South Wales, Victoria and Tasmania, as well as Macquarie Island. Determination of the specimens as belonging to *Mycoblastus* is confirmed by their ascocarps. TLC: perlatolic and secalonic acids (major).

SPECIMENS EXAMINED

Western Australia: ● The Cascade, 4 km S of Pemberton, 34°29'S, 116°02'E, alt. 180 m, in disturbed wet sclerophyll forest (karri-dominated), on dead *Leptospermum*, *J.A. Elix* 41113, 13.ix.1994 (B 60 0108834); ● Big Brook Arboretum, off Tramway Trail, 6 km NNW of Pemberton, 34°24'S, 116°00'E, in *Pinus*-dominated plantation on gentle slope, on dead branches of *Pinus*, *J.A. Elix* 41132, 13.ix.1994 (B 60 0108837); ● Warren National Park, 11 km SW of Pemberton, 34°30'S, 115°56'E, alt. 100 m, dry heathy sclerophyll forest beside stream, on dead branch, *J.A. Elix* 41234, 14.ix.1994 (B 60 0108835, B 60 0108836); ● Trail to Toolbrunup Peak, Stirling Ranges, Stirling Range National Park, 40 km SW of Borden, 34°23'S, 118°3'E, alt. 700 m, dry sclerophyll forest with pockets of denser shrub vegetation, on dead wood, *J.A. Elix* 41456, 17.ix.1994 (B 60 0109278); ● Ravensthorpe Range, South Coast Highway, 9 km E of Ravensthorpe, 33°35'S, 120°8'E, alt. 160 m, dry sclerophyll forest with scattered *Callitris*, on base of *Eucalyptus*, *J.A. Elix* 41572, 18.ix.1994 (B 60 0109279).

20. *Pannaria elatior* Stirt., in Bailey, *Queensland Agric. J.* **5**, 486 (1899)

A widespread species in the tropics worldwide, and in Australia known from eastern Queensland, New South Wales and Norfolk Island. The Victorian specimen had been mis-identified before as *P. elixii* P.M.Jørg. & D.J.Galloway, but it differs clearly by the presence of pannarin (TLC) and by the coralloid-branched isidia. The isidia have a smooth surface, but their cortex looks thinner than in specimens from Queensland and Norfolk Island.

SPECIMEN EXAMINED

Victoria: ● Mouth Yeerung River, 29 km SE of Orbost, 37°59'S, 148°45'E, alt. 10 m, on large sand dune in vegetation dominated by *Leptospermum*, on *Casuarina* stem, *H. Streimann* 39689, 2.x.1988 (B 60 0079322).

21. *Pertusaria clarkeana* A.W.Archer, in Elix, Malcolm & Archer, *Mycotaxon* **53**, 280 (1995)

The species is found mainly on mangroves in New South Wales and Queensland. The present specimen was collected at high elevation in Victoria, and lacks ascospores. It contains lichexanthone and picrolichenic acid (TLC), which is highly atypical. However, the

combination of discoid ascocarps and picrolichenic acid and lichexanthone excludes other taxa. The collection was identified previously as *P. truncata* Kremp. (in ANHSIR database), a species that lacks lichexanthone.

SPECIMEN EXAMINED

Victoria: ● Mt Donna Buang, 4.5 km NNW of Warburton, 37°42'S, 145°41'E, alt. 1150 m, regrowth *Nothofagus* in moist depression, on *Nothofagus* stem, *H. Streimann* 36278, 3.i.1986 (B 60 0079430).

22. *Pertusaria erubescens* (Hook.f. & Taylor) Nyl., *Mém. Soc. Imp. Sci. Nat. Cherbourg* **5**, 117 (1858)

This species is widespread in the temperate Southern Hemisphere, and in Australia it has previously been reported from Victoria and New South Wales. The South Australian specimen contains norstictic acid (TLC). It has a very similar counterpart in the temperate Northern Hemisphere, *P. chiodectionoides* Bagl. ex A.Massal., which is also *Aspicilia*-like, with 8 small spores per ascus, and the presence of norstictic acid without xanthonones.

SPECIMEN EXAMINED

South Australia: ● Kangaroo Island, mouth of De Male River, 18 km SSE of Cape Borda, 35°43'S, 136°46'E, alt. 20 m, dry sclerophyll forest with *Casuarina* on rocky slopes, on semi-shaded boulder on side of track, *H. Streimann* 55081, 30.ix.1994 (B 60 0110795).

23. *Pertusaria trimera* (Müll.Arg.) A.W.Archer, *Telopea* **4**, 179 (1991)

Because this species is so far known only from southern Australia, the identification is provisional. The specimen contains thiophaninic and 2-*O*-methylperlatolic acid (TLC). The collection had been identified as *P. pertusella* Müll.Arg. earlier (in ANHSIR database), but our specimen has 4 spores per ascus and contains a depside instead of the stictic acid agg.

SPECIMEN EXAMINED

Queensland: ● Forty Mile Scrub National Park, 53 km E of Mount Surprise, 18°18'S, 144°49'E, alt. 770 m, in basalt-flow scrub dominated by *Brachychiton* and *Pleiogonium*, on dead treelet, *H. Streimann* 46812, 18.xii.1990 (B 60 0088145).

24. *Placopsis argillacea* (C.Knight) Malcolm & Vězda in A. Vězda, *Lichenes Rariores Exsiccati* Fasc. **34**, No. 340 (1997)

Galloway (2013) reported this species from New Zealand and Tasmania.

SPECIMENS EXAMINED

Victoria: ● Grey River Road, Angahook-Lorne State Forest, 28 km NE of Apollo Bay, 38°39'S, 143°49'E, alt. 300 m, regrowth of *Acacia* and *Pomaderris* on semi-exposed rocky road cutting, *H. Streimann* 58924A, 5.xii.1996 (B 60 0198242, B 60 0131351, B 60 0198241).

25. *Poeltidea perusta* (Nyl.) Hertel & Hafellner, in Hertel, *Beih. Nova Hedwigia* **79**, 463 (1984)

The species is widely distributed in the austral zone, and is readily recognized by its brown, areolate thallus with raised apothecia. For a description, see Rambold (1989).

SPECIMEN EXAMINED

Victoria: ● Mt McKay, Alpine National Park, 16 km SSE of Mt Beauty, 36°52'S, 147°14'E, alt. 1840 m, exposed subalpine grasslands with gneiss outcrops, growing on exposed rocks, *J.A. Elix* & *H. Streimann* 40595, 18.ii.1994 (B 60 0198232).

26. *Pyrenula balia* (Kremp.) R.C.Harris, *Lichenogr. Thomsoniana* 141 (1998)

A widespread pantropical species; in Australia previously reported from only Tasmania and Queensland, under the name *Pyrenula santensis* (Nyl.) Müll.Arg. (Aptroot 2009).

SPECIMEN EXAMINED

Victoria: ● Head of Franklin River, Thora-Gunyah Gunyah Road, 16 km NE of Foster, 38°33'S, 146°19'E, alt. 440 m, *Nothofagus cunninghamii*-dominated forest in shallow broad valley with *Atherosperma* and tree ferns, on partly shaded *Nothofagus* stem, *H. Streimann* & *T. Pocs* 65293, 29.ix.1999 (B 60 0190254).

27. Pyrenula pyrenuloides (Mont.) R.C.Harris, *Mem. New York Bot. Gard.* **49**, 99 (1989)

A widespread, pantropical species; in Australia previously reported from Queensland, Victoria and Tasmania (Aptroot 2009).

SPECIMEN EXAMINED

Northern Territory: ● Melville Island: Conder Point, 11°44'S, 131°17'E, alt. 2 m, strand vegetation dominated by *Acacia auriculaeformis*, *Gyrocarpus*, *Thespesia* and *Diospyros maritima*, on *Heritiera littoralis* stem, *H. Streimann* 42484a, 27.iv.1989 (B 60 0079176).

28. Pyrenula ravenelii (Tuck.) R.C.Harris, *Mem. New York Bot. Gard.* **49**, 99 (1989)

A widespread, pantropical species (Aptroot 2012); in Australia reported previously from Queensland, Victoria and Tasmania, sub *Pyrenula santensis* (Nyl.) Müll.Arg. (Aptroot 2009). The collection has been identified as *Anthracotheecium toowoombense* (Müll.Arg.) Aptroot (in ANHSIR database), but the specimen in B has *Pyrenula*-type ascospores with rounded lumina.

SPECIMEN EXAMINED

Lord Howe Island: ● Track to Goat House Cave, base of Mt Lidgebird escarpment, 31°33.8'S, 159°05.2'E, alt. 380 m, moist, semi-tropical forest with *Dracophyllum* and *Cyathea*, on trunk of fallen tree, *J.A. Elix* 42132, 7.ii.1995 (B 60 0190259).

29. Ramboldia brunneocarpa Kantvilas & Elix, *Bryologist* **97**, 297 (1994)

This Australian endemic was reported previously from West Australia, New South Wales, Victoria and Tasmania.

SPECIMEN EXAMINED

Queensland: ● Mt Marley, 1 km NE of Stanthorpe, 28°39'S, 151°57'E, alt. 900 m, woodland with large granite outcrops, dominated by *Eucalyptus* and *Callitris*, on *Callitris*, *J.A. Elix* 35640, 5.ix.1993 (B 60 0198274).

30. Sarcogyne hypophaea (Nyl.) Arnold, *Flora, Regensburg* **53**, 475 (1870)

In Australia, this widespread species was known previously from Western Australia.

SPECIMEN EXAMINED

South Australia: ● South Mt Lofty Ranges, along Saunders Creek, 6.5 km E of Springton, 34°42'S, 139°10'E, alt. 300 m, pasture and dry *Eucalyptus* woodland, with numerous rock outcrops, on schist rocks, *J.A. Elix* 23501, 2.i.1990 (B 60 0116262).

31. Scultolumina japonica (Tuck.) Marbach, *Biblioth. Lichenol.* **74**, 296 (2000)

This widespread tropical lichen was known previously in Australia from Queensland.

SPECIMEN EXAMINED

Northern Territory: ● Green Ant Creek, 35 km SSE of Adelaide River Settlement, 13°31'S, 131°15'E, alt. 160 m, on charred wood in remnant forest in gully with permanent water, containing *Calophyllum* and *Carallia*, *J.A. Elix* 28171, 19.vii.1991 (B 60 0115760).

32. Septotrapelia usnica (Sipman) Kalb & Bungartz, *Phytotaxa* **150**, 11 (2013)

A widespread tropical lichen, in Australia previously reported from Queensland, the Northern Territory and Western Australia.

SPECIMEN EXAMINED

New South Wales: ● Careys Cave, 4.5 km NNE of Wee Jasper, 35°5'S, 148°39'E, alt. 380 m, grazing lands with scattered *Brachychiton*, on soil, *J.A. Elix* & *H. Mayrhofer* 22726, 10.viii.1988 (B 60 0201584).

33. Trapelia coarctata (Sm.) Choisy, in Werner, *Bull. Soc. Sci. Nat. Maroc* **12**, 160 (1932)

A cosmopolitan lichen in temperate to tropical regions, and reported in Australia from all States and Territories.

SPECIMEN EXAMINED

Norfolk Island: ● Ilwyn Pine Road, 29°01.3'S, 167°56.7'E, alt. 65 m, olive- and guava-infested roadside, on semi-exposed road bank, *H. Streimann* 53717, 14.iv.1994 (B 60 0198349).

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Fig. 1. *Leucodecton granuloseum*, type specimen: ascomata and granules. Scale bar = 2 mm.

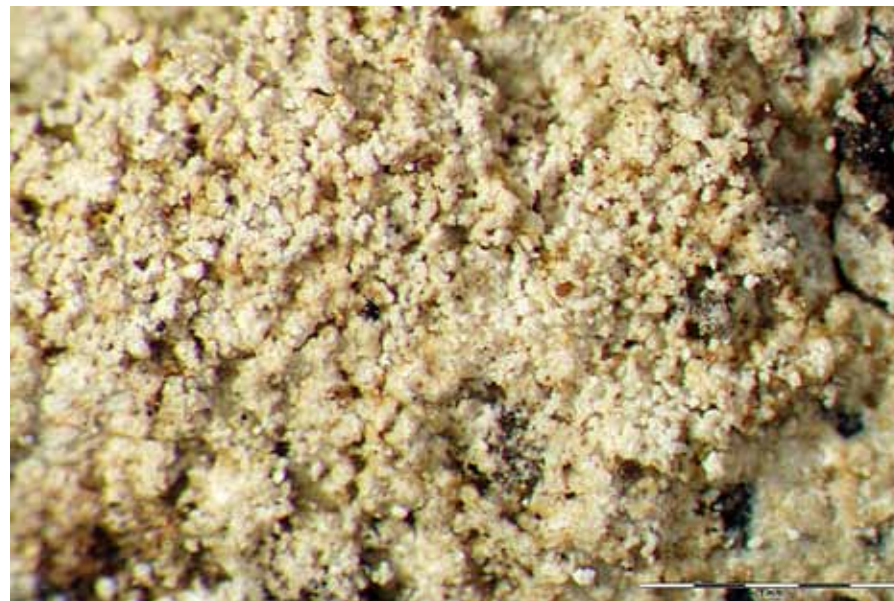


Fig. 2. *Leucodecton granuloseum*, type specimen: granular thallus surface. Scale bar = 1 mm.



Fig. 3 *Leucodecton granuloseum*, ascus with two spores, plus free overmature degenerated brownish spore to the right. Magnification: middle spore length = 23 μm .

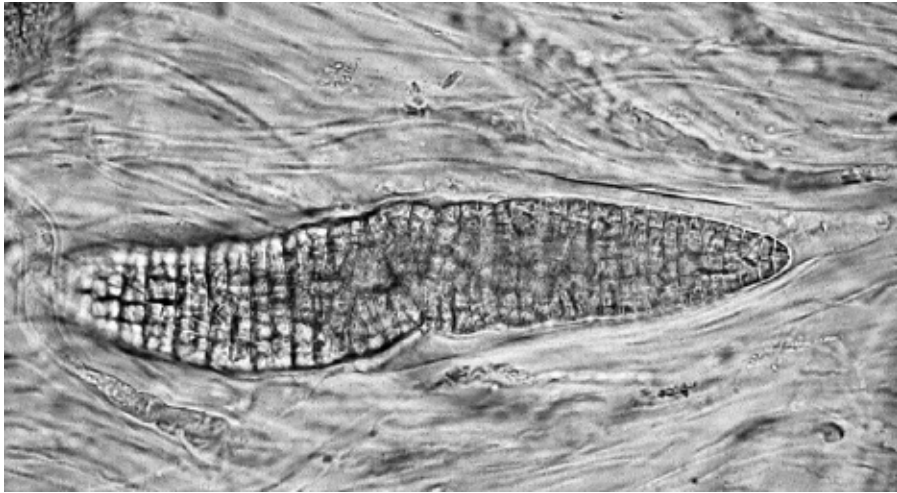


Fig. 4 *Myriotrema protofrustillatum*, ascospore in ascus. Magnification: spore length = 160 μ m.

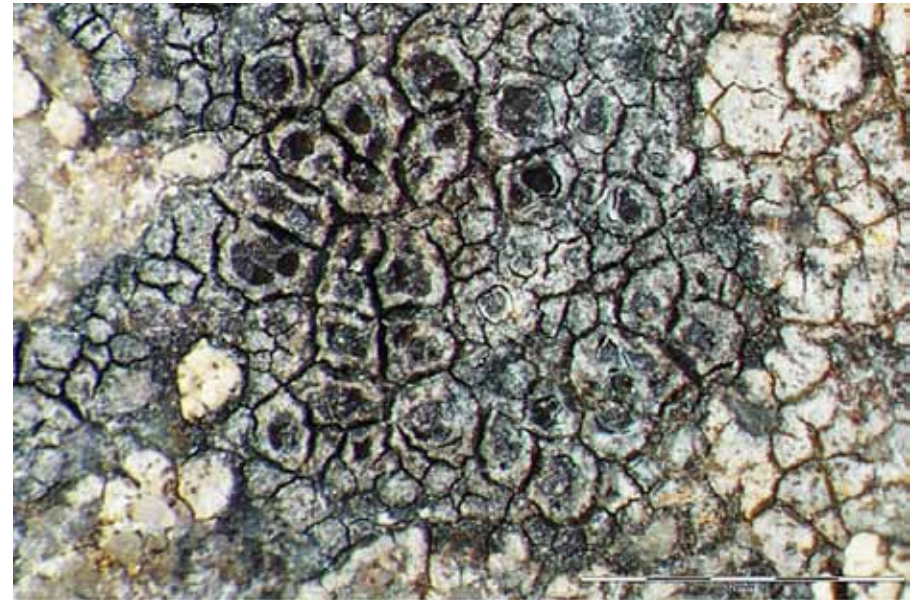


Fig. 6 *Bellemerea cinereoatra* (Streimann 49419a). Scale bar = 2 mm.



Fig. 5 *Myriotrema protofrustillatum*, type specimen. Ascomata. Scale bar = 2 mm.



Fig. 7 *Mazosia carnea* (Streimann 64552). Scale bar = 1 mm.