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The Australasian *Hypogymnia turgidula* colonizes twigs and branches of mainly coastal trees and shrubs. Its marginal lobes are inflated, and the central thallus bears many pale to reddish brown apothecia measuring 2–8 mm in diameter. Secondary compounds in its cortex and medulla include atranorin and derivatives of physodic acid.

5 mm 

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Additional lichen records from Australia. 80.

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Baculifera entochlora (J.Steiner) Marbach, *Lecanora kauaiensis* H.Magn. and *Pyxine profallax* Kalb are reported as new to Australia. In addition, new state or territory records are listed for 22 other taxa.

NEW RECORDS FOR AUSTRALIA

1. *Baculifera entochlora* (J.Steiner) Marbach, *Biblioth. Lichenol.* **74**, 120 (2000)

This species was known previously from East Africa, Réunion, Central and South America (Marbach 2000). It is characterized by the grey to yellow-grey, smooth to weakly verruculose, crustose thallus containing norstictic and connorstictic acids (K+ red), epruinose or rarely pruinose apothecia, an olive-green to greenish black epihymenium (containing *micromera*-green pigment), *Buellia*-type ascospores, 12–18 × 6–9 µm, lacking wall-thickenings but with an ornamented outer spore wall, and bacilliform conidia 7–9 × 1–1.2 µm. A detailed description is given in Marbach (2000).

SPECIMENS EXAMINED

Queensland: • Millstream Falls, near Ravenshoe, 17°38'S, 145°23'E, on twigs in dry savannah woodland, *W.H. Ewers* 7813 *pr.p.*, 23.ix.1991 (CANB).

2. *Lecanora kauaiensis* H.Magn., in A.H. Magnusson & A. Zahlbruckner, *Ark. Bot.* **31A**(6), 66 (1944)

This species was known previously from Hawai'i and Easter Island (Guderley 1999). It is characterized by a yellowish grey to white, rimose-areolate, crustose thallus containing only atranorin, a white, arachnoid prothallus, small orange-brown to red-brown, epruinose apothecia, an amphithecium containing large crystals insoluble in K (*pulicaris*-type), a yellow-brown to brown epihymenium containing crystals, where both the pigment and crystals are soluble in K (*chlarotera*-type), and 8-spored asci with very narrowly ellipsoid ascospores, 13–20 × 3.5–5.5 µm. A detailed description is given in Guderley (1999).

SPECIMENS EXAMINED

Queensland: • Magnetic Island, Heritage Track, from Nelly Bay to Geoffrey Bay, 19°09'24"S, 146°51'31"E, c. 50 m alt., on trunk of trackside tree, *P.M. McCarthy* 4470, 17.viii.2014 (CANB); • Magnetic Island, Arcadia, near track to the "Sphinx" look-out, 19°08'35"S, 146°51'58"E, c. 100 m alt., on bark of tree, *P.M. McCarthy* 4471, 10.viii.2014 (CANB); • Magnetic Island, track to "The Forts", 19°07'46"S, 146°52'06"E, c. 90 m alt., on bark, *P.M. McCarthy* 4472, 29.viii.2014 (CANB); • Magnetic Island, track from Horseshoe Bay to Radical Bay, 19°07'56"S, 146°52'11"E, c. 90 m alt., on bark, *P.M. McCarthy* 4473, 27.viii.2014 (CANB).

3. *Pyxine profallax* Kalb, in K. Kalb *et al.*, *Biblioth. Lichenol.* **99**, 243 (2009)

This species was known previously from Papua New Guinea and Thailand (Mongkolsuk *et al.* 2012). It is characterized by the white, whitish grey to brownish grey adnate thallus, the absence of soredia, isidia and dactyls, the uniformly white medulla with norstictic acid and testacein, cortical atranorin, and *obscurascens*-type apothecia. It contains the same terpene array as does *Pyxine fallax* (Zahlbr.) Kalb. Detailed descriptions are given in Kalb *et al.* (2009) and Mongkolsuk *et al.* (2012).

SPECIMENS EXAMINED

Queensland: • Ravenshoe State Forest, along the Tully Falls Road, 18 km SE of Ravenshoe, 17°46'S, 145°33'E, 760 m alt., on *Schefflera* along the rainforest margin, *J.A.*

Elix 16141, 16154 & *H. Streimann*, 23.vi.1984 (CANB); • Walter Hill Range, 26 km SE of Ravenshoe, 17°46'S, 145°41'E, 800 m alt., on canopy of felled tree in rainforest, *J.A. Elix* 17072 & *H. Streimann*, 2.vii.1984 (CANB).

NEW STATE AND TERRITORY RECORDS

1. *Amandinea coniois* (Wahlenb.) M.Choisy ex Scheid. & H.Mayrhofer, *Lichenologist* **25**, 342 (1993)

This species was previously known from Europe, Iceland, North America, Antarctica and Tasmania (Elix & Kantvilas 2013).

SPECIMENS EXAMINED

Norfolk Island: • Rocky Point, Rocky Point Reserve, 29°03'S, 167°55'E, 40 m alt., on volcanic rocks along the cliff tops, *J.A. Elix* 18533, 18534, 18536 *pr.p.*, 18538 & *H. Streimann*, 5.xii.1984 (CANB).

2. *Amandinea isabellina* (Hue) Søchting & Øvstedal, *Biblioth. Lichenol.* **88**, 615 (2004)

This species was previously known from Antarctica and Tasmania (Elix & Kantvilas 2013).

SPECIMENS EXAMINED

New South Wales: • Mount Kosciuszko National Park, New Chums Hill, above old Kiandra cemetery, 35°52'S, 148°30'E, 1460 m alt., on exposed rocks in subalpine grasslands, *J.A. Elix* 19127 & *H. Streimann*, 10.iv.1985 (CANB); • Mount Canobolas State Conservation Area, just below summit of Mt Canobolas, c. 13 km SW of Orange, 33°20'40"S, 148°58'56"E, 1390 m alt., on weathered volcanic outcrop among scattered *Eucalyptus* and *Acacia*, *P.M. McCarthy* 4325, 1.iv.2014 (CANB).

Victoria: • Alpine National Park, Mt McKay, 16 km SSE of Mount Beauty, 36°52'S, 147°14'E, 1840 m alt., on granite rocks in exposed subalpine grasslands, *J.A. Elix* 40502 & *H. Streimann*, 18.ii.1994 (CANB).

3. *Amandinea pelidna* (Ach.) Fryday & L.Arcadia, *Graphis Scripta* **24**, 43 (2012)

In Australia this cosmopolitan species was previously known from South Australia, New South Wales, Victoria and Tasmania (McCarthy 2014).

SPECIMEN EXAMINED

Queensland: • Devils Kitchen, Noosa Heads National Park, 26°23'S, 153°06'E, 15 m alt., on rocks on exposed headland, *J.A. Elix* 10388, 2.ix.1982 (CANB).

4. *Amandinea stajscicii* Elix & Kantvilas, *Australas. Lichenol.* **72**, 11 (2013)

This Australian species was previously known from South Australia, Victoria and Tasmania (McCarthy 2014).

SPECIMEN EXAMINED

Norfolk Island: • Flat Rock Bay picnic area, 29°01'30"S, 167°55'E, 40 m alt., on old fence post in *Araucaria*-dominated grasslands, *J.A. Elix* 18708 & *H. Streimann*, 7.xii.1984 (CANB).

5. *Baculifera intermedioides* Marbach, *Biblioth. Lichenol.* **74**, 130 (2000)

This species was known previously from North, Central and South America and Hawai'i, and in Australia from Queensland (Elix & Kantvilas 2014).

SPECIMEN EXAMINED

New South Wales: • Northern Tablelands, base of Bald Rock, Bald Rock National Park, 30 km N of Tenterfield, 28°51'S, 152°03'E, on twigs in dry sclerophyll forest, *W.H. Ewers* 3890 *pr.p.*, 12.vii.1989 (CANB).

6. *Buellia albula* (Nyl.) Müll.Arg., *Bull. Herb. Boissier* 2, App. 1, 71 (1894)

This species was previously known from New Zealand, and in Australia from Western Australia, the Northern Territory, South Australia, New South Wales, the Australian Capital Territory, Victoria and Tasmania (McCarthy 2014).

SPECIMENS EXAMINED

Norfolk Island: • Point Hunter, Emily Bay, 29°04'S, 167°58'E, 3 m alt., on calcareous sandstone on cliff face, *J.A. Elix 18543 & H. Streimann, H. Streimann 34215*, 5.xii.1984 (B, CANB).

7. *Buellia cranfieldii* Elix, *Australas. Lichenol.* 66, 45 (2010)

This endemic species was previously known from Western Australia and Tasmania (McCarthy 2014).

SPECIMENS EXAMINED

Victoria: • Near Silverband Falls, Grampians, on rock, *W.H. Ewers pr.p.*, 29.viii.1986 (CANB); • Mt Ida, 6 km NNW of Heathcote, 36°53'S, 144°42'E, 420 m alt., on semi-shaded rock outcrop in dry sclerophyll forest on rocky ridge, *H. Streimann 60198*, 15.i.1998 (B, CANB).

8. *Buellia demutans* (Stirt.) Zahlbr., *Cat. Lich. Univ.* 7, 348 (1931)

In Australia this species is known from Western Australia, South Australia, Queensland, New South Wales, Victoria, Tasmania and Lord Howe Island (McCarthy 2014). It also occurs in South Africa, South America, New Zealand and the Pacific (Hawai'i and New Caledonia).

SPECIMENS EXAMINED

Norfolk Island: • Anson Bay Reserve, 29°00'30"S, 167°55'E, 40 m alt., on *Araucaria* stump in *Araucaria*-dominated grasslands, *J.A. Elix 18715 & H. Streimann*, 7.xii.1984 (CANB); • Bloody Bridge, 20°03'21"S, 167°58'E, 35 m alt., on old fence post in grasslands on steep slope with scattered *Araucaria heterophylla*, *J.A. Elix 27334 & H. Streimann*, 14.vi.1992 (CANB).

9. *Buellia homophylla* (C.Knight) Zahlbr., *Cat. Lich. Univ.* 7, 366 (1931)

This Australian endemic is known from all States, the Northern Territory, the Australian Capital Territory and Lord Howe Island (McCarthy 2014).

SPECIMENS EXAMINED

Norfolk Island: • "The Cockpit", Cascade Creek Valley, 29°01'S, 167°58'E, 35 m alt., on volcanic rocks in open pasture, *J.A. Elix 18796 & H. Streimann*, 9.xii.1984 (CANB).

10. *Buellia kimberleyana* Elix, *Australas. Lichenol.* 65, 11 (2009)

This endemic Australian species was previously known from Western Australia, the Northern Territory, South Australia, Queensland, New South Wales and Victoria (McCarthy 2014).

SPECIMENS EXAMINED

Norfolk Island: • Philip Island, Upper Long Valley, 29°07'30"S, 167°57'E, 80 m alt., on volcanic rock in African olive-dominated valley, *H. Streimann 32259 pr.p.*, 4.xii.1984 (B, CANB).

11. *Buellia poimena* Elix & Kantvilas, *Australas. Lichenol.* 73, 29 (2013)

This endemic species was previously known from New South Wales, Victoria and Tasmania (McCarthy 2014).

SPECIMENS EXAMINED

Western Australia: • Eyre District, SW slopes of Mt Ragged, two-thirds of the way up, 33°28'S, 123°28'E, 400 m alt., on sloping schist rock with W aspect, in open mallee, *B. Barnsley 304A*, 6.i.1979 (CANB).

12. *Buellia spuria* var. ***amblyogona*** (Müll.Arg.) Elix, *Australas. Lichenol.* 65, 16 (2009)

This endemic taxon was previously known from Western Australia, the Northern Territory, South Australia, Queensland, New South Wales, the Australian Capital Territory, Victoria and Lord Howe Island (McCarthy 2014).

SPECIMENS EXAMINED

Norfolk Island: • Cascade Creek, Cascade Creek Reserve, 29°01'20"S, 167°57'50"E, 20 m alt., on volcanic rocks in grazed grassland, *J.A. Elix 27454*, 15.vi.1992 (CANB); • Duncombe Bay, 29°00'S, 167°55'30"E, 50 m alt., on rock ledge of cliffs with grasses and low shrubs, *H. Streimann 34735*, 9.xii.1984 (CANB).

13. *Buellia subarenaria* Müll.Arg., *Bull. Herb. Boissier* 1, 52 (1893)

This endemic species was previously known from Western Australia, Queensland, Victoria and Tasmania (McCarthy 2014).

SPECIMENS EXAMINED

New South Wales: • Mount Canobolas State Conservation Area, W face of Mt Canobolas, 13 km SW of Orange, 33°20'17"S, 148°58'37"E, 1250 m alt., on weathered trachytic-rhyolite in heath with scattered *Eucalyptus*, *J.A. Elix 46008*, 1.iv.2014 (CANB).

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

In Australia this species is known from Western Australia, the Northern Territory, Queensland and New South Wales (McCarthy 2014). It has also been reported from Asia, North, Central and South America, Papua New Guinea, New Caledonia and Vanuatu.

SPECIMENS EXAMINED

Norfolk Island: • Douglas Drive (property of W.W. Sanders), 29°02'10"S, 167°55'44"E, 90 m alt., on vine in disturbed, exotic-infested, dry forest, *J.A. Elix 29193*, 17.vi.1992 (CANB).

15. *Diploschistes euganeus* (A.Massal.) J.Steiner, *Verh. Zool.-Bot. Ges. Wien* 69, 96 (1919)

In Australia this subcosmopolitan species is known from Western Australia, South Australia, New South Wales, the Australian Capital Territory and Victoria (McCarthy 2014).

SPECIMENS EXAMINED

Norfolk Island: • Philip Island, Upper Long Valley, 29°07'30"S, 167°57'E, 40 m alt., on volcanic rocks in the open, *J.A. Elix 18495 pr.p. & H. Streimann*, 4.xii.1984 (CANB).

16. *Lecidella enteroleucella* (Nyl.) Hertel, *Khumbu Himal* 6, 330 (1977)

This species was previously known from Africa, Asia, and North and South America, and in Australia from Queensland and Lord Howe Island (McCarthy 2014).

SPECIMENS EXAMINED

Western Australia: • Couchman Range, 16 km NW of King Edward River Station (old Doongan Station), 15°17'S, 126°12'E, 400 m alt., on semi-exposed basalt outcrop in *Eucalyptus*-dominated grasslands with *Erythrophleum*, *H. Streimann 48467*, 14.vii.1991 (CANB).

South Australia: • South Flinders Ranges, Rawlings Ferntree Waterfall, 31°37'S, 138°35'E, on sandstone on S-facing cliff face in grazing land with remnant *Callitris*, *H.T. Lumbsch 10727h, E. Lumbsch & J.A. Curnow*, 3.ix.1994 (CANB).

Norfolk Island: • Cemetery Road, 1 km E of Kingston, 29°03'30"S, 167°58'E, 10 m alt., on volcanic rocks along roadside in open pasture, *J.A. Elix 18183 & H. Streimann, H. Streimann 31751*, 2.xii.1984 (CANB); • Philip Island, Upper Long Valley, 29°07'30"S, 167°57'E, 100 m alt., on volcanic rock on weedy, grassy slope, *J.A. Elix 18483 & H. Streimann, H. Streimann 32239*, 4.xii.1984 (CANB).

17. Monerolechia badia (Fr.) Kalb, *Biblioth. Lichenol.* **88**, 312 (2004)

In Australia this cosmopolitan species is known from Western Australia, Queensland, New South Wales and Tasmania (McCarthy 2014).

SPECIMEN EXAMINED

New South Wales: • Lord Howe Island, Mt Eliza, 31°30'52"S, 159°02'20"E, 130 m alt., on exposed boulder in steeply SE sloping grasslands, *H. Streimann* 55784, 6.ii.1995 (CANB).

18. Parmotrema mellissii (C.W.Dodge) Hale, *Phytologia* **28**, 337 (1974)

In Australia this pantropical to pantemperate species is known from Queensland, New South Wales, Victoria and Tasmania (McCarthy 2014).

SPECIMEN EXAMINED

Australian Capital Territory: • Tidbinbilla, 30 km SW of Canberra, 35°28'S, 148°54'E, 1000 m alt., on bark, *E. Dahl s.n.*, 15.iii.1970 (CANB).

19. Physcia verdonii Elix, *Australas. Lichenol.* **68**, 34 (2011)

This endemic Australian species was previously known from New South Wales, Victoria and Tasmania (McCarthy 2014).

SPECIMEN EXAMINED

Australian Capital Territory: • Kambah Pool, 35°24'S, 149°00'E, 600 m alt., on stones, *E. Dahl s.n.*, 28.vi.1970 (CANB 231279).

20. Rinodina blastidiata Matzer & H.Mayrhofer, *Acta Bot. Fennica* **150**, 110 (1994)

This species is known from New Zealand, South America and the Falkland Islands, and in Australia from South Australia, New South Wales, Victoria and Tasmania (McCarthy 2014).

SPECIMEN EXAMINED

Norfolk Island: • Cascade Creek, Cascade Creek Reserve, 29°01'20"S, 167°57'50"E, 20 m alt., on volcanic rocks in grazed grassland, *J.A. Elix* 27440, 15.vi.1992 (CANB).

21. Rinodina reagens Matzer & H.Mayrhofer, *Acta Bot. Fennica* **150**, 116 (1994)

This species is known from New Zealand and South Africa, and in Australia from South Australia (McCarthy 2014).

SPECIMEN EXAMINED

New South Wales: • Central Western Slopes, Grove Creek, near Canowindra-Orange road, 12 km NE of Canowindra, 33°28'26"S, 148°45'22"E, 400 m alt., on water-eroded limestone in pasture, *J.A. Elix* 46103, 3.iv.2014 (CANB).

22. Tephromela promontorii (Zahlbr.) Kalb, *Biblioth. Lichenol.* **95**, 315 (2007)

In Australia this species was previously known from the Northern Territory and South Australia (McCarthy 2014). It also occurs in South Africa.

SPECIMEN EXAMINED

Victoria: • Mt Korong, 13 km SE of Wedderburn, 36°28'S, 143°45'E, 220 m alt., on exposed boulder in disturbed *Eucalyptus* woodland with large granite outcrops, *H. Streimann* 59070, 6.xii.1996 (CANB).

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Three new taxa and a new record in the lichen genus *Pertusaria* from Fiji

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Abstract

Pertusaria athrocarpa Elix & A.W.Archer, *Pertusaria athrocarpa* var. *deficiens* Elix & A.W.Archer and *Pertusaria cisalbescens* Elix & A.W.Archer from Fiji are described as new to science. *Pertusaria commutata* Müll.Arg. is reported from Fiji for the first time.

Introduction: Fiji is an archipelago of more than 300 islands, with a total land area of approximately 18,000 square kilometres but occupying a total area of about 194,000 square kilometres, located 15°42', 20°02'S and 176°53', 178°12'E. The two largest islands are Viti Levu and Vanua Levu, where the majority of the population lives. The islands are mountainous, with peaks up to 1324 m high, and they are covered with thick tropical forests. The climate is tropical and warm all year round with variable rainfall. Annual rainfall on the main islands is 2000–3000 mm on the coast and up to 6000 mm in the mountains.

Lichens were first described from Fiji by Krempelhuber (1873), but he did not refer to *Pertusaria*. The Australian lichenologist F.R.M. Wilson (1832–1903) visited Fiji in 1892 (Ralston 2001), but his collections were mainly Graphidaceae and did not contain any *Pertusaria* specimens (Archer 2004). Zahlbruckner (1896) gave an account of some lichens collected by Charles Moore, Director of the Royal Botanic Gardens, Sydney, and although he included some specimens from Fiji, he did not discuss any *Pertusaria* species.

Seven species of *Pertusaria* were reported from Fiji by Elix & McCarthy (1998), viz. *P. cicatricosa* Müll.Arg., *P. elliptica* Müll.Arg., *P. irregularis* Müll.Arg., *P. lacerans* Müll.Arg., *P. leioplacella* Nyl., *P. montpittensis* A.W.Archer and *P. velata* (Turner) Nyl. *Pertusaria velata* has now been transferred to *Varicellaria* (Schmitt *et al.* 2012). None of those species is endemic to Fiji, and indeed all of them occur in Australia as well. *Pertusaria* was not mentioned in a recent report of lichens from Fiji (Lumbsch *et al.* 2011), despite Fiji's reputation as a biodiversity hotspot. The present paper describes two new species and a new variety of *Pertusaria* from Fiji, and *P. commutata* Müll.Arg. is reported from the country for the first time.

Materials and methods

Specimens were collected on the island of Viti Levu in August, 1983, and later examined microscopically. The chemistry of the species was studied by thin-layer chromatography (Elix 2014) and comparison with authentic samples.

Pertusaria athrocarpa Elix & A.W.Archer, sp. nov. var. *athrocarpa* Fig. 1
MB 810930

Similar to *Pertusaria microstoma* Müll.Arg., but with larger, smooth-walled ascospores.

Type: Fiji, Viti Levu: Nausori Highlands, Nadi-Sigatoka road, 13 km E of Vanturu Dam turnoff, 17°50'S, 177°25'E, on trees in regrowth forest along roadside, J.A. Elix 15233, 27.viii.1983 (holotype – CANB).

Thallus pale fawn, epiphloedal, surface smooth and subnitid, becoming fissured, the margin not zonate, soredia and isidia absent. *Apothecia* verruciform, numerous, conspicuous, flattened-hemispherical, constricted at the base, single or commonly confluent, irregular in outline, 2–4 × 1–3 mm, with 5–12 conspicuous, black, puncti-

form ostioles; individual ostioles c. 0.01 mm diam. *Ascospores* (2–)3–4 per ascus, 1-seriate, ellipsoid, inner spore wall smooth, (125–)130–152(–165) × 37–50 µm. *Chemistry*: 4,5-dichlorolichexanthone (minor), 2'-*O*-methylperlatolic acid (major), stictic acid (major) and constictic acid (minor).

Etymology: from the Greek *athroisma*, a gathering, and *carpus*, a fruit, in reference to the fused apothecia.

Notes

The new species is characterized by the flattened, commonly confluent, verruciform apothecia, asci usually with 3 or 4 smooth-walled ascospores and the presence of 4,5-dichlorolichexanthone, 2'-*O*-methylperlatolic and stictic and constictic acids. It grows on the bark of trees in regrowth submontane forest. *Pertusaria athrocarpa* is chemically identical to *P. microstoma* Müll.Arg. (Müller 1882), described from Indonesia, but that species has smaller ascospores (82–135 µm long) with rough inner walls.

Pertusaria rarotongensis A.W.Archer & Elix (Archer & Elix 2015), described recently from the Cook Islands, is morphologically similar to *P. athrocarpa* in having flattened, confluent apothecia and asci with 4 ascospores, but the former contains 4,5-dichlorolichexanthone and 2-*O*-methylconfluent acid.

At present the new species is known from only the holotype.

Pertusaria athrocarpa var. *deficiens* Elix & A.W.Archer, var. nov. Fig. 2
MB 810932

Similar to *Pertusaria athrocarpa* var. *athrocarpa*, but containing skyrin and lacking 2'-*O*-methylperlatolic acid.

Type: Fiji, Viti Levu: Nausori Highlands, Nadi-Sigatoka road, 13 km E of Vanturu Dam turnoff, 17°50'S, 177°25'E, on trees in regrowth forest along roadside, J.A. Elix 15214, 27.viii.1983 (holotype: CANB).

Pertusaria athrocarpa var. *deficiens* is morphologically similar to var. *athrocarpa* in having asci containing (2–)3–4-spored asci, 1-seriate, similarly sized, ellipsoid ascospores (100–)112–142(–150) × 37–50 µm, with smooth inner spore walls.

Chemistry: 4,5-dichlorolichexanthone (minor), stictic acid (major), constictic acid (minor) and skyrin (minor).

Etymology: from the Latin *deficiens*, lacking, in reference to the absence of 2'-*O*-methylperlatolic acid in this variety.

Notes

The new variety is characterized by the flattened, confluent, verruciform apothecia and asci with 2–4 smooth-walled ascospores. It is distinguished from var. *athrocarpa* by the presence of skyrin and the absence of 2'-*O*-methylperlatolic acid. Other species of *Pertusaria* with asci containing 4 smooth-walled ascospores, 4,5-dichlorolichexanthone and stictic acid include *P. quartans* Nyl. (Nylander 1890), a muscicolous species from Japan with scattered apothecia, ascospores 93–140 × 70–100 µm (Oshio 1969); *P. glauca* Zahlbr., also from Japan (Zahlbruckner 1916) with ascospores 100–177 × 50–85 µm (Oshio 1969) and *P. marcellii* A.W.Archer & Elix, from Brazil (Archer & Elix 2014) with ascospores 100–125 µm long. Although chemically similar to *P. athrocarpa* var. *deficiens*, none of those species possesses the conspicuous, confluent apothecia of the new variety, nor do they contain skyrin. The new variety grows on the bark of trees in regrowth submontane forest.

ADDITIONAL SPECIMEN EXAMINED

Viti Levu: • Nausori Highlands, Nadi-Sigatoka road, 3.6 km W of Vanturu Dam turnoff, on trees in regrowth forest along roadside, J.A. Elix 15132, 26.viii.1983 (CANB).

Pertusaria cisalbescens Elix & A.W.Archer, sp. nov.
MB 810931

Fig. 3

Similar to *Pertusaria albescens* (Huds.) M.Choisy & Werner, but differs in containing lichexanthone and chlorinated lichexanthone derivatives and in lacking *allo*-pertusaric acid.

Type: Fiji, Viti Levu: Nausori Highlands, Nadi-Sigatoka road, 3.6 km W of Vanturu Dam turnoff, on trees in regrowth forest along roadside, *J.A. Elix 15123*, 26.viii.1983 (holotype: CANB).

Thallus pale fawn, epiphloedal, surface smooth and subnitid, conspicuously fissured; isidia absent; *soredia* granular, conspicuous, white, confined to elevated disc-like soralia, 0.6–1.0 mm diam. Asci and ascospores not seen.

Chemistry: lichexanthone (minor), 5-chlorolichexanthone (minor), 2,5-dichlorolichexanthone (minor), 2,4-dichlorolichexanthone (trace), 2,4,5-trichlorolichexanthone (trace) and dihydropertusaric acid (major).

Etymology: from the Greek *cis*, lying near or close, in reference to the similarity to *Pertusaria albescens*.

Notes

The new species is characterized by conspicuous white soralia and the presence of dihydropertusaric acid, lichexanthone, 5-chlorolichexanthone and 2,5-dichlorolichexanthone. It is distinguished from the morphologically similar Northern Hemisphere species *P. albescens* by the presence of lichexanthone and the absence of *allo*-pertusaric acid; *Pertusaria albescens* contains *allo*-pertusaric and dihydropertusaric acids as major lichen compounds, but it lacks lichexanthone derivatives (Lumbsch & Nash 2002, p. 344).

The new species grows on the bark on trees in regrowth submontane forest. It is known only from the type locality.

ADDITIONAL SPECIMEN EXAMINED

Viti Levu: • type locality, on trees in regrowth forest along roadside *J.A. Elix 15112*, 26.viii.1983 (CANB).

New record

Pertusaria commutata Müll.Arg., *Flora* 67, 269 (1884)

This circumtropical to subtropical species is known from Australia, North and South America and China, and in the Pacific from the Galápagos and Rarotonga (Archer & Elix 2015).

Pertusaria commutata Müll.Arg. is characterized by disciform apothecia with 1-spored asci and the presence of haemathamnolic acid.

SPECIMEN EXAMINED

Viti Levu: • Nausori Highlands, Nadi-Sigatoka road, 13 km E of Vanturu Dam turnoff, 17°50'S, 177°25'E, on trees in regrowth forest along roadside, *J.A. Elix 15221*, 27.viii.1983 (CANB).

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Fig. 1. *Pertusaria athrocarpa* var. *athrocarpa*, holotype; bar = 1 mm.



Fig. 2. *Pertusaria athrocarpa* var. *deficiens*, holotype; bar = 1 mm



Fig. 3. *Pertusaria cisalbensis*, holotype; bar = 1 mm

***Pannaria reflectens*, a misunderstood lichen of Australian mangroves,
with an annotated key to the Australian species of the *Pannaria lurida* group**

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Charles Knight described a mangrove lichen named *Pannaria sorediata* (in Bailey 1884), and although it was subsequently mentioned in Shirley's *Lichen Flora of Queensland* (1889), it was soon forgotten and later misunderstood, because it had been mis-determined by Knight. It is not a sorediate species, but Knight interpreted its many incipient marginal apothecia as soralia. Jørgensen & Galloway (1992) regarded it as a form of *Pannaria lurida* (Mont.) Nyl., but Jørgensen (2001) accepted it as a separate species. Later, by chance, he discovered an older name for it, *Pannaria reflectens* Nyl. (Jørgensen 2011). The older name was *Collema reflectens* Nyl., which Jørgensen recombined as *Pannaria reflectens* (Nyl.) P.M.Jørg. based on a specimen described from New Caledonia, where it was recently re-collected growing with *P. lurida* (Jørgensen & Gjerde 2012).

While going through an old loan, I found several additional specimens (recorded below), which show that *P. reflectens* is rather common and widespread in the mangroves of eastern Queensland, most commonly growing on *Avicennia*, *Excoecaria* and *Rhizophora*. It has also been recorded from one similar locality in north-eastern New South Wales (Hastings Point). In New Caledonia, it is not restricted to mangroves, and there is a very disjunct record of it (as *Pannaria involuta* Vain.) from montane forest in Mindanao in the Philippines (Jørgensen 2001). Its apparent confinement to mangroves on the eastern coast of Australia is hard to explain, but it is surely an old element in the Australian flora.

Pannaria reflectens (Fig. 1) is best recognized by its upturned lobe margins and rather dissected thallus. It was described in detail, as *P. sorediata*, by Jørgensen (2001), but because it is a member of the regionally remarkably species-rich *Pannaria lurida* group, an annotated key to the Australian members of that is presented below as well. The species are characterized by their swollen gelatinous thalli, a result of their photobiont being a tropical, small-celled *Nostoc* species with sheaths that swell markedly when moist. Indeed, *Pannaria lurida* was first described as a species of *Collema*, even though its spores are simple, it has a distinct cellular upper cortex, and it contains pannarin (PD+ orange), characters shared by all members of the group and not at all suggestive of *Collema*.

Key to the Australian species of the *Pannaria lurida* group

- 1. Thallus with marginal soredia or isidia/phyllidia, rarely fertile..... 2
- 1: Thallus lacking such structures, often fertile..... 4
- 2 Upturned lobe margins with coarse-grained, bluish soredia..... **P. fulvescens**
- 2: Upturned lobe margins with isidia/phyllidia, lacking bluish soredia..... 3
- 3 With terete, digitiform, whitish isidia..... **P. elatior**
- 3: With aggregated, flattened to globiform phyllidia, often bluish grey.....
- **P. globuligera**
- 4 Thallus distinctly lacinate with diverging side lobes on a distinct, blackish prothallus..... 6
- 4: Thallus at most weakly subdivided with flabellate lobes (to 5 mm wide), marginally showing blackish rhizohyphae at the margins..... 5
- 5 Lobe margins upturned, often bearing many small apothecia; on mangroves.....
- **P. reflectens**
- 5: Lobe margins plane, the apothecia few, large, and mostly laminal; in montane rainforest..... **P. lurida**

- 6 Thallus margins fimbriate, distinctly ridged, not maculate; apothecia unknown; on the ground (mossy boulder) in rainforest.....**P. fimbriata**
 6: Thallus margins entire, often white-lined, maculate; often richly fertile; corticolous in montane rainforest.....**P. dissecta**

The core species of the group is the fertile *Pannaria lurida*, described as a *Collema* by Montagne (1842) from a Hawai'ian collection by Gaudichaud. It is the most widespread of the fertile species, variable but easily recognized by the spreading fawn-coloured thallus with its broad, seldom divided but often imbricate, flat-margined lobes that are distinctly wrinkled when dry, and its large (to 2 mm diameter), mostly laminal apothecia.

The much rarer *P. reflectens* is thinner, smoother and more dissected, with distinctly revolute margins on its more divided lobes. It often has numerous, small (to 1 mm diameter) apothecia (Fig. 1). In Australia, it occurs mostly in Queensland, and seems to be confined to mangroves in the subtropical parts of the eastern coast, whereas the other fertile species are found in tropical forest.

Pannaria dissecta P.M.Jørg., also with a deeply lacerate thallus, appears to be endemic to montane forest in the Atherton Tableland, north-eastern Queensland. It is readily recognized by its thick thallus and strongly maculate upper surface.

Another local endemic, *P. fimbriata*, is known only from the type, collected from the Bobbin Bobbin Falls on Mt Bartle Frere, Atherton Tableland. It is best recognized by its lacerate marginal lobules and habitat of mossy rock. The only non-corticolous species in the group, it has never been seen with apothecia, and probably reproduces mainly by means of its fragile lobules.

Pannaria fulvescens (Mont.) Nyl. is the sorediate counterpart of *P. lurida*, and has a similarly broad subtropical distribution. The type is from Tahiti, and it readily recognized by the bluish soredia (often rather coarse-grained) on the underside of its upturned lobes. However, it has been misunderstood (Jørgensen & Kashiwadani 2001), and has been altered to include the mainly warm-temperate *P. globuligera* Hue, described from Korea. *Pannaria globuligera* bears corticate grains/lobules on its lobe margins. It is more common and widespread in Australia than *P. fulvescens*, ranging as far south as Tasmania, whereas *P. fulvescens* has a more restricted range in Queensland, and reaches only the northern tip of New Zealand (Galloway 2007).

Pannaria elatior Stirt. is the only truly isidiate species in the group. It was described from Queensland, but is also known from some of the subtropical Pacific islands (e.g. Norfolk Island). It is easily recognized by its finger-like (not globular) marginal isidia. It is rare, and appears to occur mainly in coastal Queensland.

ADDITIONAL SPECIMENS EXAMINED

Pannaria reflectens

Queensland: • Coochiemudlo Island, G.N. Stevens 1616, 11.iv.1977 (BRI); • Hinchinbrook Island on side cat-walk, G.N. Stevens 3390, no date (BRI); • Mackay, Elmeo Creek (Sunset Beach), G.N. Stevens 1857, no date (BRI); • Moreton Bay, Mud Island, G.N. Stevens 2285, no date (BRI); • Rockingham Bay, Murray River, G.N. Stevens 4988, no date (BRI).

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Fig. 1. *Pannaria reflectens* from Coochiemudlo Island. Photo: K. Kongshavn.

New taxa and new records of crustose lichens in the family Physciaceae (Ascomycota) in Australia

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Abstract

Endohyalina arachniformis Elix & Kantvilas, *Gassicurtia gallowayi* Elix & Kantvilas and *Gassicurtia victoriana* Elix & Kantvilas are described as new to science. In addition, *Gassicurtia coccinea* Fée, *G. pseudosubpulcella* Marbach and *G. vaccinii* (Vain.) Marbach, Elix & Kalb are reported for the first time from Australia, and new State records are reported for *Diploptomma venustum* Körb. and *Rinodinella fertilis* (Körb.) Elix var. *fertilis*.

Introduction

We continue our investigation of *Buellia*-like lichens in Australia, following the first account of the family (Elix 2011) and our additions and revisions to *Amandinea* (Elix & Kantvilas 2013a), *Buellia sens. lat.* (Elix & Kantvilas 2013b), *Buellia sens. str.* (Elix & Kantvilas 2014a) and *Baculifera* (Elix & Kantvilas 2014b). In this paper, we deal with several new taxa we have encountered in other "buelliod" genera, describing a new species of *Endohyalina* and two new species of *Gassicurtia* as well as two new records for Australia. Materials and methods are the same as given in our earlier publications (*op. cit.*).

The new taxa

1. *Endohyalina arachniformis* Elix & Kantvilas, sp. nov.

Fig. 1

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Endohyalinae interjectae similis sed prothallo prominenti, arachnoidi, ad marginem radiati, ascosporis magnioribus, 13–19(–23) μm longis, 6–8(–12) μm latis, et excipulo bene evoluto differt.

Type: Australia, Tasmania, track to Clear Hill, 42°41'S, 146°17'E, c. 750 m alt., on sheltered faces and in crevices of conglomerate boulders in buttongrass moorland, *G. Kantvilas 10/00*, 12.i.2000 (holotype – HO; isotype – CANB).

Thallus autonomous, crustose to areolate-subsquamous, smooth, esorediate, yellow to pale yellow-brown, 2–4 cm wide; individual areoles 0.1–0.4 mm wide, to 0.15 mm thick, scattered or contiguous, plane to convex; prothallus conspicuous, dark brown to black, spidery and spreading thinly between the areoles, radiate at the margins; medulla white, lacking calcium oxalate (H_2SO_4 -), I-, K+ yellow solution, with the formation of colourless, needle-like crystals; photobiont cells 8–13 μm diam. *Apothecia* 0.2–0.6 mm wide, scattered or crowded, lecideine, broadly adnate at first but soon sessile and basally constricted; disc black, epruinose, plane then markedly convex; proper excipulum distinct, reduced with age, in section 75–150 μm thick, outer zone dark brown to black-brown, K-, N+ red-brown, inner zone paler brown. *Epithymenium* 8–13 μm thick, mostly brown-black, rarely aeruginose in part, K-, N- or N+ purple-brown. *Hypothecium* 40–75 μm thick, dark brown, K-, N+ pale red-brown. *Hymenium* 55–70 μm thick, colourless, finely interspersed; paraphyses 1.5–2.5 μm wide, simple to branched, capitate, with apices 3–4 μm wide, aeruginose-brown; asci of the *Bacidia*-type, 8-spored. *Ascospores* mainly of the *Dirinaria*-type grading into *Mischoblastia* or *Physcia*-type, 1-septate, brown, broadly fusiform, 13–19(–23) \times 6–8(–12) μm , not constricted at the septum, often with paler spore-ends; ontogeny of type-B (apical internal

wall-thickenings appearing before insertion of the septum); outer spore-wall smooth. *Pycnidia* pyriform, immersed, black; conidia bacilliform, 4–7 \times 1–1.4 μm .

Chemistry: Thallus K-, P-, C-, UV-; medulla with a K+ yellow solution and crystals, diploicin (major or minor), xantholepinone A (major), \pm xantholepinone C (minor), \pm atranorin (trace).

Etymology: The species name derives from the Greek *arakhne* (pertaining to spiders) in reference to the prominent prothallus that forms a spidery pattern between thallus areoles.

Remarks

Endohyalina arachniformis is a very distinctive species, readily recognized by its conspicuous dark brown to black, arachnoid prothallus with radiate margins. In some respects, it resembles *Endohyalina interjecta* (Müll.Arg.) Giralt, but the two species differ in the development of their thalli, in the size of their ascospores and the thickness of the proper exciple. In *E. interjecta* the subsquamulose thallus consists of thick, scattered areoles with no apparent prothallus, whereas in *E. arachniformis* the crustose thallus is thin, smooth and continuous with intermittent subsquamulose areoles, and the conspicuous prothallus has prominent, radiate margins. The ascospores of the two species are superficially similar, but those of *E. arachniformis* are larger [10–12(–14) \times 4.5–5.5 μm in *E. interjecta*], and lack a torus (present in *E. interjecta*). The well-developed proper exciple of *E. arachniformis* contrasts with the very narrow exciple present in *E. interjecta* (10–20 μm thick). The new species also resembles some forms of the common *Australiaena streimannii* Matzer, H.Mayrhofer & Elix, but the latter differs in having *Lecanora*-type asci, filiform conidia and alternative chemistry (lobaric acid, 4,5-dichlororolichexanthone, gyrophoric acid or perlatolic acid).

This is an uncommon species, known from only two widely separated locations. At the type locality, it grew on very hard, quartzitic cobbles within a conglomerate matrix on a rather dry, sheltered rock face in subalpine heathland. That relatively unusual habitat supported very few lichens, and then only depauperate thalli. However, associated with the new species was another remarkable and uncommon member of the Physciaceae, *Buellia claricollina* Elix & Kantvilas. The second collection is from the sheltered faces of littoral boulders, a starkly different habitat.

SPECIMEN EXAMINED

Tasmania. • Rocky Cape, Burgess Cove, 40°52'S, 145°30'E, sea level, on coastal quartzite rocks above the splash zone, *G. Kantvilas 294/99*, 28.vi.1999 (HO).

2. *Gassicurtia gallowayi* Elix & Kantvilas, sp. nov.

Fig. 2

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Gassicurtiae vaccinii similis sed apotheciis discis nigris, epihymenio in kalio non-reacti, ascosporis 12–18 μm longis, 6–8 μm latis et ergo latioribus, et acidum 3-O-methylthiophanicum deficienti differt.

Type: Australia, Tasmania, Tasman National Park, track to Mt Fortescue, 43°10'S, 147°59'E, 350 m alt., on old *Banksia marginata* in wet forest, *G. Kantvilas 244/11*, 28.viii.2011 (HO – holotype).

Thallus crustose, \pm continuous, rimose-areolate to verruculose, esorediate, pale yellow to greenish yellow, to 3.5 cm wide and 0.1 mm thick; individual areoles rounded, plane to weakly convex, 0.05–0.1 mm wide; prothallus usually absent or black, marginal and to 0.5 mm wide; photobiont cells 7–12 μm wide; medulla mostly white, in places with small patches of dull purple-brown pigment (K-, H_2SO_4 + blue-violet), I-. *Apothecia* 0.2–1.2 mm wide, lecideine, scattered, round, sessile, basally constricted; disc black, epruinose, plane to weakly convex; proper excipulum persistent, glossy, black, in section 25–60 μm thick, mostly opaque dark brown to brown-black throughout, occasionally paler reddish brown in the inner part. *Hypothecium* 40–100 μm thick, olive-brown, K+ intensifying yellowish olive, interspersed with minute oil droplets.

Epithymenium c. 5–8 µm thick, dark brown to brown-black, K–, N–. *Hymenium* 45–60 µm thick, colourless, not interspersed; paraphyses 1.5–2.0 µm wide, simple to sparsely branched, capitate, with apices dark brown, 4.5–5.5 µm wide; asci of the *Bacidia*-type, 8-spored, 40–55 × 12–18 µm. *Ascospores* of the *Buellia*-type, 1-septate, olive-green to brown, broadly ellipsoid, 12–18 × 6–8 µm, rarely slightly constricted at the septum, when young with slight median wall thickenings and then of the *Physconia*-type; outer spore-wall smooth. *Pycnidia* very rare, immersed to subemergent; conidia elongate-fusiform, 6–7 × 1–1.2 µm.

Chemistry: Cortex K–, KC–, C+ orange, P–, UV+ orange; containing thiophanic acid (major), arthothelin (minor), eumitrin F (minor), atranorin (trace) and 4,5-dichloro-norlichexanthon (trace).

Etymology: This lichen is named in honour of our friend and colleague, the late David J. Galloway, who also provided the sole record of this species from New Zealand.

Notes

Morphologically this new species resembles *Gassicurtia vaccinii* (Vain.) Marbach, a corticolous montane-tropical species known from Asia (the Philippines), Central and South America, Reunion (Marbach 2000) and Australia (see below). Both species are characterized by a yellow-brown to greenish yellow, granular-verruculose thallus and ascospores that are relatively large, at least for the genus *Gassicurtia*. However, *G. gallowayi* differs in having somewhat broader ascospores (5.5–6.5 µm wide in *G. vaccinii*), a partially pigmented medulla (*G. vaccinii* lacks pigments) and a K– epihymenium (K+ intense red-brown in *G. vaccinii*). The two lichens also differ chemically in that *G. vaccinii* contains 3-*O*-methylthiophanic acid in addition to thiophanic acid and arthothelin.

The new species is known from a single collection from Stewart Island, New Zealand, and from Tasmania where it is locally abundant on Tasman Peninsula in the island's south-east. There it has been recorded from *Banksia marginata* and *Hakea lissosperma* in tall, dense, moist coastal scrub, colonizing mature trunks as well as smaller branches. One very poorly developed specimen is from the trunk of *Atherosperma moschatum* in a small patch of relict rainforest in the same general area. The species is part of a rich assemblage of epiphytic lichens that includes *Austroparmelina conlabrosa* (Hale) A. Crespo, Divakar & Elix, *Bactrospora metabola* (Nyl.) Egea & Torrente, *Fuscidea lightfootii* (Sm.) Coppins & P. James, *Hypogymnia tasmanica* Elix, *H. mundata* (Nyl.) Oxner ex Rass., *Hypotrachyna revoluta* (Flörke) Hale, *Menegazzia confusa* P. James, *M. subpertusa* P. James & D. J. Galloway, *Mycoblastus coniothorus* (Elix & A. W. Archer) Kantvilas & Elix, *Pertusaria novaezelandiae* Szatala and *Usnea molliuscula* Stirt. In the field, *Gassicurtia gallowayi* can easily be confused with *Lecidella flavovirens* Kantvilas & Elix, in that both species have a similarly coloured yellowish thallus and black lecideine apothecia, and can occur in very similar habitats. In addition to obvious anatomical differences, they can be easily distinguished by the fact that the *Lecidella* is sorediate. Also superficially similar (and sometimes occurring in the same habitats) is *Tasmidella variabilis* Kantvilas, Hafellner & Elix var. *variabilis*, which has a yellowish, C+ orange thallus and black, lecideine apothecia, but differs in having blue-green apothecial pigments and simple, hyaline ascospores.

SPECIMENS EXAMINED

Tasmania: • Bun Hill, Forestier Peninsula, 42°58'S, 147°56'E, 320 m alt., on *Atherosperma* in rainforest, *G. Kantvilas* 376/89, 10.xii.1989 (HO); • Cape Pillar at Lunchtime Creek, 43°12'S, 147°57'E, 180 m alt., on *Hakea* in scrubby eucalypt woodland, *G. Kantvilas* 265/05, 27.viii.2005 (HO); • Cape Pillar, c. 2 km W of Chasm Lookout, 43°13'S, 148°00'E, 210 m alt., on *Banksia marginata* in low closed woodland, *G. Kantvilas* 282/12, 5.iv.2012 (CANB, HO); • Cape Pillar, The Blade, 43°14'S, 148°00'E, 250 m alt., on stunted, windswept *Banksia marginata* along cliff edge, *G. Kantvilas* 279/12, 5.iv.2012 (CANB, HO).

New Zealand: • Stewart Island, Port Pegasus, 10–20 m alt., on *Weinmannia racemosa* in coastal forest below Bald Cone, D. J. Galloway 9296, 1.ix.1998 (CHR).

3. *Gassicurtia victoriana* Elix & Kantvilas, sp. nov.

MB811509

Gassicurtiae catasemae similis sed epihymenio rubro, kalio amplificanti, hypothecio kalio nonreagenti, acidum chiodectonicum continenti et lichexanthonicum deficienti differt.

Type: Australia, Victoria, Drummer Rainforest Walk, 10 km E of Cann River township, 37°34'05"S, 149°16'26"E, 80 m alt., on fallen canopy twigs at margin of warm temperate rainforest and *Eucalyptus* woodland, J. A. Elix 43573, 11.ix.2008 (CANB – holotype).

Thallus crustose, ±continuous, verruculose to granular, white to whitish grey, to 10 mm wide; individual granules rounded, plane to weakly convex, 0.05–0.08 mm wide; prothallus diffuse, black, in part surrounding the thallus; photobiont cells 7–12 µm wide; medulla white, I–. *Apothecia* 0.1–0.5 mm wide, lecideine, scattered, round, broadly adnate; disc black, epruinose, plane to weakly convex; proper excipulum persistent, glossy, black, in section 25–35 µm thick, in the outer part dark olive-brown to brown-black, K–, paler to colourless within. *Hypothecium* 25–60 µm thick, olive-brown to dark brown, K–. *Epithymenium* 10–14 µm thick, dull red to deep red, K+ crimson. *Hymenium* 40–50 µm thick, colourless, interspersed with small oil droplets; paraphyses 1.5–2.0 µm wide, simple to sparsely branched, capitate, with apices red-black, 3–4 µm wide; asci of the *Bacidia*-type, 3–8-spored. *Ascospores* of the *Buellia*-type, 1-septate, olive-green to brown, broadly ellipsoid, 10–18 × 5–7 µm, rarely constricted at the septum; outer spore wall smooth. *Pycnidia* not seen.

Chemistry: Cortex K–, C–, KC+ orange, P–, UV–; containing barbatic acid (major), obtusatic acid (trace), lichexanthon (trace) and chiodectonic acid (minor).

Etymology: The specific epithet reflects the distribution of the species.

Notes

Chemically this new species closely resembles *Gassicurtia catasema* (Tuck.) Marbach, a corticolous montane-tropical species known from Central and South America (Marbach 2000) and Queensland (Elix 2011). Both species are characterized by the presence of barbatic and obtusatic acids, but *G. victoriana* contains the red pigment chiodectonic acid concentrated in the epihymenium. Furthermore, *G. catasema* differs in having an olive to olive-brown, K– epihymenium (deep red, K+ crimson in *G. victoriana*), somewhat shorter ascospores (9–13 µm long in *G. catasema*), and a brown-black excipulum that gives a yellow-orange solution in K (K– in *G. victoriana*).

At present, this new species is known only from the type locality. Associated species include *Chrysothrix sulphurella* (Räsänen) Elix & Kantvilas, *Graphis aperiens* Müll. Arg., *Heterodermia hybocarponica* Elix, *Pertusaria barbatica* A. W. Archer & Elix, *P. novaezelandiae* Szatala and *Phlyctis subuncinata* Stirt.

New records for Australia

1. *Gassicurtia coccinea* Fée, *Essai Exot. Offin.*, 100 (1824)

This species was known previously from East Africa and South America (Marbach 2000). It is characterized by the grey or white, granular to verrucose thallus with an intensely red-pigmented medulla, epruinose apothecia with an intensely red, C– excipulum, *Buellia*-type ascospores 8–15 × 4.5–5.5 µm, with a moderately to strongly ornamented outer surface and the presence of thiophanic and chiodectonic acids.

SPECIMEN EXAMINED

Queensland: • Slopes of Mt Fox, 43 km SW of Ingham, 18°50'S, 145°42'E, 740 m alt., on dead log in dry sclerophyll forest, J. A. Elix 20364 p.p., 19.vi.1986 (CANB).

2. *Gassicurtia pseudosubpulcella* Marbach, *Biblioth. Lichenol.* 74, 239 (2000)

This species was known previously from Central and South America (Marbach 2000). It is characterized by the grey-white, verruculose thallus that fluoresces salmon-orange under UV light, grey-brown pruinose or epruinose apothecia with a red-pigmented excipulum that leaches an intense magenta solution with K, small *Buellia*-type ascospores, 11–14 × 4.5–5.5 µm, with a moderately to strongly ornamented outer surface, and the presence of thiophanic, 3-*O*-methylthiophanic and chiodectonic acids.

SPECIMEN EXAMINED

Queensland: • Clarke Range, 46 km S of Proserpine, 20°50'S, 148°32'E, 800 m alt., on dead log on edge of escarpment in *Eucalyptus*–*Casuarina*-dominated woodland, *J.A. Elix* 20941 & *H. Streimann*, 29.vi.1986 (CANB).

3. *Gassicurtia vaccinii* (Vain.) Marbach, *Elix & Kalb*, in *B. Marbach, Biblioth. Lichenol.* 74, 247 (2000)

This species was known previously from the Philippines, Reunion, Central and South America (Marbach 2000). It is characterized by the grey, white or ochre, granular-verrucose thallus, epruinose apothecia, *Buellia*-type ascospores, 11–17 × 5–7.5 µm, with a moderately to strongly ornamented outer wall, and the presence of thiophanic acid (major), arthothelin and ± 3-*O*-methylthiophanic acid.

SPECIMENS EXAMINED

Queensland: • Broadwater State Forest, Canoe Creek, 35 km NW of Ingham, 18°27'04"S, 146°00'07"E, 40 m alt., on *Pinus caribea* at margin of rainforest and *Pinus caribea* plantation, *J.A. Elix* 38961, 26.vii.2006 (CANB).

Lord Howe Island: • Goat House Cave, at base of Mt Lidgebird escarpment, 31°33'50"S, 159°05'15"E, 420 m alt., on dead wood in moist subtropical rainforest with *Dracophyllum* and *Cyathia*, *J.A. Elix* 42266, 7.ii.1995 (CANB).

New State and Territory Records

1. *Diplotomma venustum* Körb., *Parerga Lichenol.* 179 (1860)

This globally widespread species was previously known in Australia only from South Australia and the Bass Strait islands, Tasmania (Elix 2011, McCarthy 2014). It occurs on limestone and is characterized by a white, chalky thallus (like that of *Buellia albula*), an absence of lichen substances, and 3-septate ascospores.

SPECIMENS EXAMINED

New South Wales: • Kyalite-Moulamein road, 17 km E of Kyalite, 34°58'30"S, 143°37'55"E, 50 m alt., on limestone rocks in remnant *Acacia-Eucalyptus* woodland with saltbush, *J.A. Elix* 45082, 19.vi.2010 (CANB).

Victoria: • 2 km E of Murray Town along the Mallee Highway, 35°15'55"S, 141°12'43"E, 55 m alt., on small limestone rocks in remnant mallee scrub, *J.A. Elix* 45120, 45121, 45122, 18.vi.2010 (CANB); • Neds Corner Station, c. 2 km SE of homestead, 34°08'56"S, 141°20'34"E, 27 m alt., on small limestone rocks in open chenopod shrubland, *V. Stajsic* 6054, 27.xi.2011 (HO, MEL).

2. *Rinodinella fertilis* (Körb.) Elix, *Australas. Lichenol.* 66, 46 (2010) var. *fertilis*

This species was previously known in Australia from South Australia, New South Wales and Victoria, and from South Africa (Elix 2011, McCarthy 2014). It is characterized by a rather thick, whitish thallus containing norstictic acid and by the uniformly thin-walled ascospores, 10–15 × 5–8 µm. The Tasmanian records are from coastal rocks, where the species forms neat roundish thalli to c. 1 cm wide within a community of orange *Caloplaca* species.

SPECIMENS EXAMINED

Western Australia: • Bank of Blackwood River, near Augusta, 34°17'S, 115°12'E, on

exposed coastal granite outcrop, *M.F. Day s.n.*, x.1992 (CANB).

Tasmania: • Croppies Point, 40°51'S, 147°35'E, 2 m alt., on low, littoral dolerite rocks, *A. Moscal* 4298 p.p., 22.xi.1983 (HO); • Point Hibbs, 42°37'S, 145°16'E, 20 m alt., on rock headland, *A. Moscal* 5575, 14.i.1984 (HO).

Norfolk Island: • Duncombe Bay, cliffs at north-west point, 29°00'S, 167°55'30"E, 50 m alt., on volcanic rocks of coastal cliffs, *J.A. Elix* 18766 & *H. Streimann*, 9.xii.1984 (CANB); • Duncombe Bay, 29°00'S, 167°55'30"E, 50 m alt., on top of a flat boulder of cliffs with grasses and low shrubs, *H. Streimann* 34747, 9.xii.1984 (CANB).

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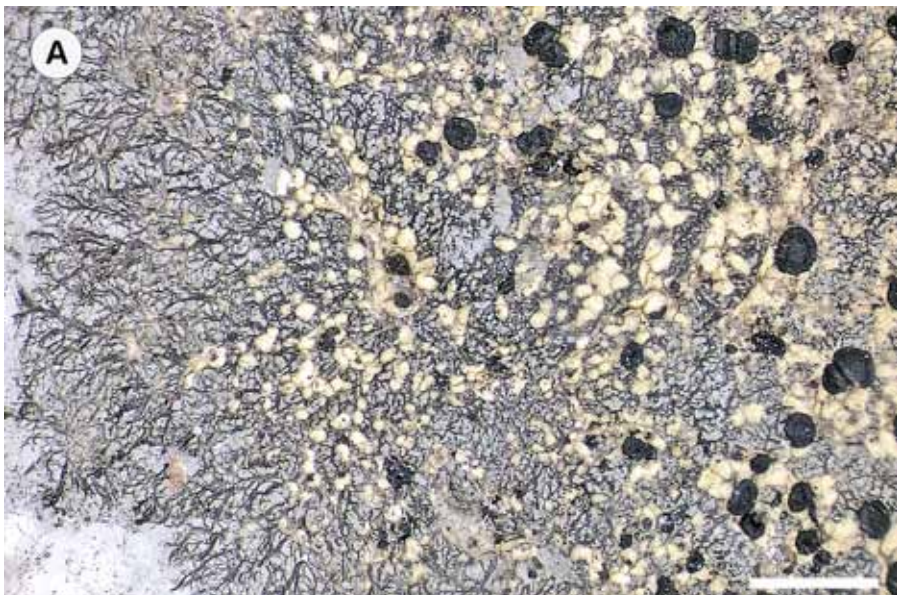


Figure 1A. *Endohyalina arachniformis* (holotype in HO). Margin of thallus showing the spiderly black prothallus, thallus areoles and lecideine apothecia; scale = 1 mm.

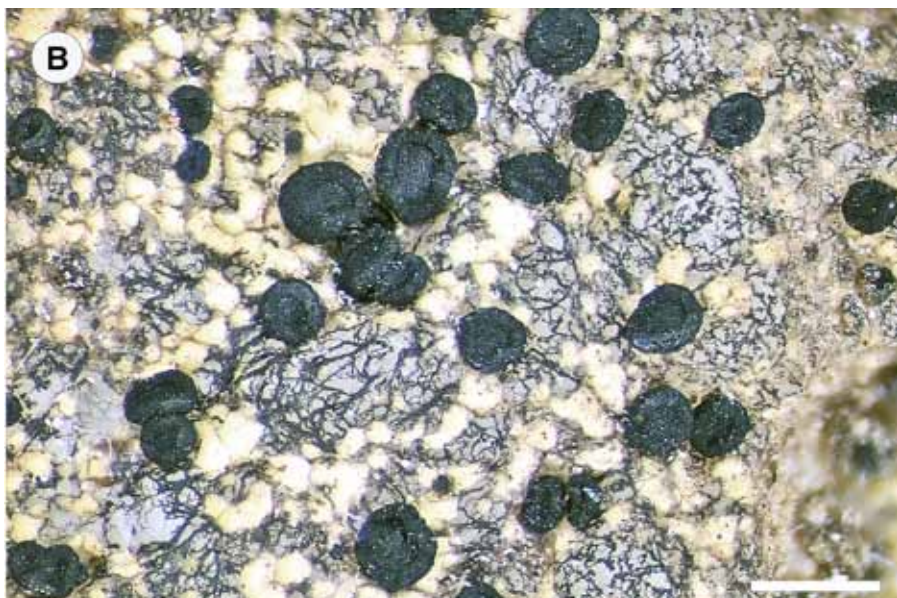


Figure 1B. *Endohyalina arachniformis* (holotype in HO). Detail of apothecia and thallus areoles, showing the underlying black spiderly prothallus; scale = 500 μ m.

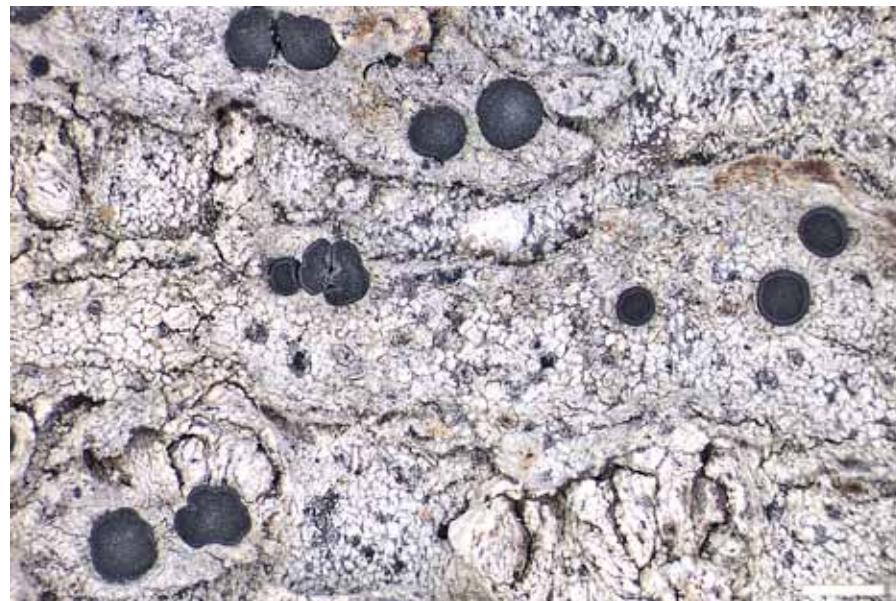


Figure 2. *Gassicurtia gallowayi* (holotype in HO); scale = 1 mm.



Figure 3. *Gassicurtia victoriana* (holotype in CANB); scale = 1 mm.

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