



Australasian Lichenology

Number 65, July 2009 ISSN 1328-4401



Australasian Lichenology

Number 65, July 2009 ISSN 1328-4401

A deep orange, epruinose apothecial disc is *Haematomma hilare*'s most distinctive trait. The species grows on smooth bark, and is one of six species of the genus known to occur in New Zealand. Elsewhere it has been reported from southern Argentina.

CONTENTS

ARTICLES

- McCarthy, PM—New combinations of Australian *Collempsidium* Nyl. (Ascomycota, Xanthopyreniaceae) 3
- McCarthy, PM—A new foliicolous species of *Strigula* (Strigulaceae) from New South Wales 4
- Elix, JA; Øvstedal, DO—Lichen phytochemistry II: some species of *Calopadia* 7
- Elix, JA—New saxicolous species and new records of *Buellia sens. lat.* and *Rinodina* (Ascomycota, Physciaceae) in Australia 10
- Elix, JA—The *Megalospora melanoderma* complex (Ascomycota, Megalosporaceae) in Australia 20
- Archer, AW; Elix, JA—A new species, new combination, and new report in the Australian Graphidaceae 24
- Archer, AW; Elix, JA—New taxa and new reports of Australian *Pertusaria* (lichenized Ascomycota, Pertusariaceae) 30
- Archer, AW—*Platythecium nothofagi* (A.W.Archer) A.W.Archer, a new combination in the Australian Graphidaceae 40

ADDITIONAL LICHEN RECORDS FROM AUSTRALIA

- Elix, JA (71) 42

ADDITIONAL LICHEN RECORDS FROM THAILAND

- Papong, K; Boonpragob, K; Lumbsch, HT (1). *Loxospora lecanoriformis* (Sarrameanaceae) 50

- RECENT LITERATURE ON AUSTRALASIAN LICHENS 52

**New combinations of Australian *Collemopsidium* Nyl.
(Ascomycota, Xanthopyreniaceae)**

Patrick M. McCarthy

Australian Biological Resources Study
GPO Box 787, Canberra, A.C.T. 2601, Australia
email: Patrick.McCarthy@environment.gov.au

Abstract: The new combinations *Collemopsidium montanum* (P.M.McCarthy & Kantvilas) P.M.McCarthy and *C. tasmanicum* (P.M.McCarthy & Kantvilas) P.M.McCarthy are made for *Pyrenocollema montanum* P.M.McCarthy & Kantvilas and *P. tasmanicum* P.M.McCarthy & Kantvilas.

The genus name *Pyrenocollema* Reinke has been in common use over the past 30 years for certain pyrenocarpous lichens of soil and intertidal, freshwater and terrestrial rocks. These lichens have a cyanobacterial photobiont, a densely pigmented, cellular excipulum (with or without an involucrellum), anastomosing pseudoparaphyses, and obpyriform or obclavate, fissitunicate asci containing 1-septate ascospores. However, because the type species of *Pyrenocollema* was found to be a parasite of *Nostoc* with a different and distinctive ascomatal anatomy, *Collemopsidium* Nyl. was recognized as a more appropriate genus for the c. 10 species attributed to *Pyrenocollema* (Grube & Ryan, 2002).

Here, two endemic Tasmanian taxa, *P. montanum* (McCarthy & Kantvilas 1999) and *P. tasmanicum* (McCarthy & Kantvilas 2000) are transferred to *Collemopsidium*. A third species, *Porina insueta* (Nyl.) Müll. Arg., from Kerguelen Island and Heard Island, was tentatively listed under *Pyrenocollema* by McCarthy (2009). However, that lichen has 3-septate ascospores, and its identity remains in doubt.

Collemopsidium montanum (P.M.McCarthy & Kantvilas) P.M.McCarthy, *comb. nov.*
Basionym: *Pyrenocollema montanum* P.M.McCarthy & Kantvilas, *Lichenologist* **31**, 227 (1999)

Collemopsidium tasmanicum (P.M.McCarthy & Kantvilas) P.M.McCarthy, *comb. nov.*
Basionym: *Pyrenocollema tasmanicum* P.M.McCarthy & Kantvilas, *Herzogia* **14**, 39 (2000)

References

- Grube, M; Ryan, BD (2002): *Collemopsidium*. *Lichen Flora of the Greater Sonoran Desert Region* **1**, 162–164.
- McCarthy, PM (2009): *Checklist of the Lichens of Australia and its Island Territories*. Australian Biological Resources Study, Canberra. Version 5 January 2009. <http://www.anbg.gov.au/abrs/lichenlist/introduction.html>
- McCarthy, PM; Kantvilas, G (1999): *Pyrenocollema montanum*, a new species from Tasmania, *Lichenologist* **31**, 227–230.
- McCarthy, PM; Kantvilas, G (2000): A new terricolous *Pyrenocollema* (lichenized Ascomycotina, Xanthopyreniaceae) from Tasmania, *Herzogia* **14**, 39–42.

A new foliicolous species of *Strigula* (Strigulaceae) from New South Wales

Patrick M. McCarthy

Australian Biological Resources Study
GPO Box 787, Canberra, A.C.T. 2601, Australia
e-mail: Patrick.McCarthy@environment.gov.au

Abstract: The foliicolous *Strigula caerulensis* P.M.McCarthy sp. nov. (Strigulaceae) is described from cool-temperate montane rainforest in eastern New South Wales.

Strigula, a genus of c. 90 species, is predominantly foliicolous in the wet tropics and subtropics (Santesson 1952, Lücking, 2008). Twenty-five species are known from Australia, 19 of which are obligately foliicolous (McCarthy 2009). Here, *S. caerulensis* is described from a fern pinna in cool-temperate montane rainforest in eastern New South Wales.

Strigula caerulensis P.M.McCarthy sp. nov.

Fig. 1

Thallus foliicola, supracuticularis, griseoviridis vel viridis, circa 8–10 μm crassus. Algae ad *Phycopeltis* pertinentes, cellulis rectangularis vel oblongis, 12–20 \times 5–8 μm . Perithecia plerumque superficiales, (0.22–)0.30(–0.36) mm diametro. Involucrellum carbonaceum, 15–30 μm crassum, ad basim excipuli descendens, vix expansum. Asci anguste obclavati aut cylindrici, 41–58 \times 8–10 μm . Ascospores elongatae-ellipsoideae aut fusiformes, 1-septatae, biseriatae, (10–)12.5(–15) \times (3.5–)4.5(–5.5) μm . Macroconidia bacilliformes, 1-septatae, 10–12 \times 1.5–2.0 μm .

Type: Australia. New South Wales: Blue Mountains Natl Park, Mount Wilson, Waterfall Track, 33°30'31"S, 150°22'32", alt. 835 m, on *Blechnum patersonii* in cool-temperate rainforest, P.M.McCarthy 2780 & J.A.Elix, 5.v.2009 (holotype NSW).

Thallus crustose, epiphyllous, supracuticular, c. 8–10 μm thick, pale greyish green to bright green, dull, continuous, smooth, but closely following the contours of the rugulose substratum; prothallus not apparent. Photobiont *Phycopeltis*; cells rectangular to oblong, 12–20 \times 5–8 μm , forming a loose reticulum. Perithecia moderately numerous, almost superficial, \pm hemispherical to subconical, (0.22–)0.30(–0.36) mm diam. [$n = 45$], smooth or faintly radially furrowed, largely exposed, or overgrown almost to the apex by the very thin and inconspicuous thallus. Perithecial apex dull to glossy black, rounded to subacute, occasionally with a minute ostiolar papilla to 30 μm wide; ostiole inconspicuous. Involucrellum carbonaceous, extending to exciple base level, scarcely spreading laterally over the substratum, 15–30 μm thick. Exciple 10–15 μm thick, pale greyish brown externally, hyaline within. Centrum depressed-ovate, 0.13–0.26 mm diam. Paraphyses long-celled, unbranched, 1.0(–1.5) μm thick. Periphyses absent. Asci fissitunicate, 8-spored, narrowly obclavate to cylindrical, rarely \pm fusiform, 41–58 \times 8–10 μm [$n = 40$], thin-walled but with a thicker apex, a minute ocular chamber and a short well-defined stalk c. 5 μm long. Ascospores elongate-ellipsoidal to fusiform, 1-septate, biseriatae in the ascus, constricted at the septum, (10–)12.5(–15) \times (3.5–)4.5(–5.5) μm [$n = 50$]; cells 1(–2)-guttulate, not separating within the ascus or following release; distal cell often slightly shorter and broader. Conidiomata sparse, hemispherical to subconical, dull black, partly overgrown by the thallus, 0.08–0.12 mm diam.; macroconidia bacilliform, 1-septate, 10–12 \times 1.5–2.0 μm , most with thread-like apical gelatinous appendages 5–10 μm long; microconidia not seen.

Etymology: The epithet *caerulensis* alludes to the Blue Mountains National Park where the new lichen was collected.

Remarks

Strigula caerulensis is characterized by the very thin, greenish supracuticular thallus, small but rather prominent perithecia and comparatively large asci and broad biseriatae ascospores. In Australia, a supracuticular thallus and *Phylloporis*-type perithecial morphology are also seen in the pantropical *S. multipunctata* (G.Merr. ex R.Sant.) R.C.Harris, *S. obducta* (Müll.Arg.) R.C.Harris, *S. phyllogena* (Müll.Arg.) R.C.Harris, *S. platypoda* (Müll.Arg.) R.C.Harris and the recently described *S. austropunctata* P.M.McCarthy (Santesson 1952, Lücking 2008, McCarthy 2009). However, when *S. caerulensis* is compared to those and broadly similar taxa from other regions, discontinuously small perithecia without a thick thalline layer exclude all but *S. platypoda*, and that species has 0.3–0.5 mm diam. perithecia, 25–40 \times 4–6 μm asci and 2.0–3.5 μm wide, uniseriate to irregularly biseriatae ascospores.

Currently known only from the type locality, in cool-temperate rainforest in the Blue Mountains west of Sydney, New South Wales, *S. caerulensis* grows within and 0.5–1.5 mm on either side of the adaxial costal groove of pinnae of the Australasian fern *Blechnum patersonii*. The host is especially abundant near the bases of damp soil and rocky banks, and is often heavily shaded by shrubs, sedges and larger ferns. Other foliicolous lichens collected at this species-poor site are *Gyalectidium microcarpum* (Vězda) Lücking, Sérus. & Vězda, *Trichothelium alboatrum* Vain. and *T. assurgens* (Cooke) Aptroot & Lücking. Such a depauperate flora is noteworthy, being reminiscent of some montane rainforest localities in Victoria rather than the luxuriant foliicolous communities dominated by Porinaceae, Pilocarpaceae and Strigulaceae on the Southern Tablelands of New South Wales.

Acknowledgements

I thank Jack Elix for his company and assistance in the field.

References

- Lücking, R (2008): Foliiicolous lichenized fungi. *Fl. Neotropica Monogr.* **103**, 1–867 (2008).
McCarthy, PM (2009): Strigulaceae. *Fl. Australia* **57**, 570–601.
Santesson, R (1952): A revision of the taxonomy of the obligately foliicolous, lichenized fungi. *Symb. Bot. Upsal.* **12**(1), 1–590.

Lichen phytochemistry II: some species of *Calopadia*

John A. Elix

Research School of Chemistry, Building 33,
Australian National University, Canberra, A.C.T. 0200, Australia

Dag O. Øvstedal

Bergen Museum, DNS, Allégt. 41, N-5007 Bergen, Norway

Abstract: New chemical data are reported for 12 species of *Calopadia* (Pilocarpaceae). Chemical constituents were identified by thin-layer chromatography (Elix & Ernst-Russell 1993), high-performance liquid chromatography (Elix *et al.* 2003) and comparison with authentic samples.

1. *Calopadia foliicola* (Fée) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemistry: 2,7-dichlorolichexanthone [major], pannarin [trace].

SPECIMEN EXAMINED

Brazil. *Bahia*: • Chapada Diamantina, Serra do Tombador, between Mundo Novo and Morro do Chape, on leaves in dense rainforest, K. Kalb & M. Marcelli, 10.vii.1980 (CANB), det. A. Vězda.

2. *Calopadia fusca* (Müll.Arg.) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemistry: pannarin [major], dechloropannarin [trace], thiophanic acid [minor], asemone [trace], isoarthothelin [minor], 3-*O*-methylasemone [minor], 2,5-dichloro-3-*O*-methylnorlichexanthone [minor], 2,5,7-trichloro-3-*O*-methylnorlichexanthone [minor], 2,5,7-trichlorolichexanthone [minor], 2,7-dichlorolichexanthone [trace].

SPECIMEN EXAMINED

Australia. *Queensland*: • Brisbane area, Mistake Mountains, 28°19'S, 152°22'E, on leaves of *Lomandra* sp., R.W. Rogers & H.T. Lumbsch 5707a, 29.ix.1987 (CANB), det. H.T. Lumbsch.

3. *Calopadia isidiosa* Kalb & Vězda, *Folia Geobot. Phytotax.* **22**, 293 (1987)
Chemistry: atranorin [minor].

SPECIMEN EXAMINED

Brazil. *Matto Grosso*: • Between Jaciara and São Vicente, c. 100 km SE of Cuiaba, 750 m, on leaves in a cerrado, K. Kalb, 2.vii.1980 (CANB), det. A. Vězda.

4. *Calopadia lecanorella* (Nyl.) Kalb & Vězda, *Folia Geobot. Phytotax.* **22**, 296 (1987)
Chemistry: atranorin [major], 2,7-dichlorolichexanthone [minor].

SPECIMEN EXAMINED

Brazil. *São Paulo*: • Praia do Lázaro near Ubatuba, 3 m, on leaves in a dry and very open resting sand-dune forest, K. Kalb & G. Plöbst, 29.ix.1979 (CANB), det. K. Kalb.

5. *Calopadia lucida* (Nyl.) R.Sant. & Lücking, *Lichenologist* **33**, 111 (2001)
Chemistry: 3-*O*-methylasemone [minor], 5,7-dichloro-3-*O*-methylnorlichexanthone [major].

Previous reports: chodatol? (Kalb 2001); 2,7-dichlorolichexanthone (Lücking & Santesson 2001).

SPECIMEN EXAMINED

Tanzania. • Pwam Region, Rufiji District, Rufiji River delta, Nyamisati Village, 7°46'S, 39°17'E, 5 m, on leaves of tree and bark of mangrove, A. Frisch, 9.x.1999 (K. Kalb *Lichenes Neotropici* no. 538, CANB), det. R. Lücking.

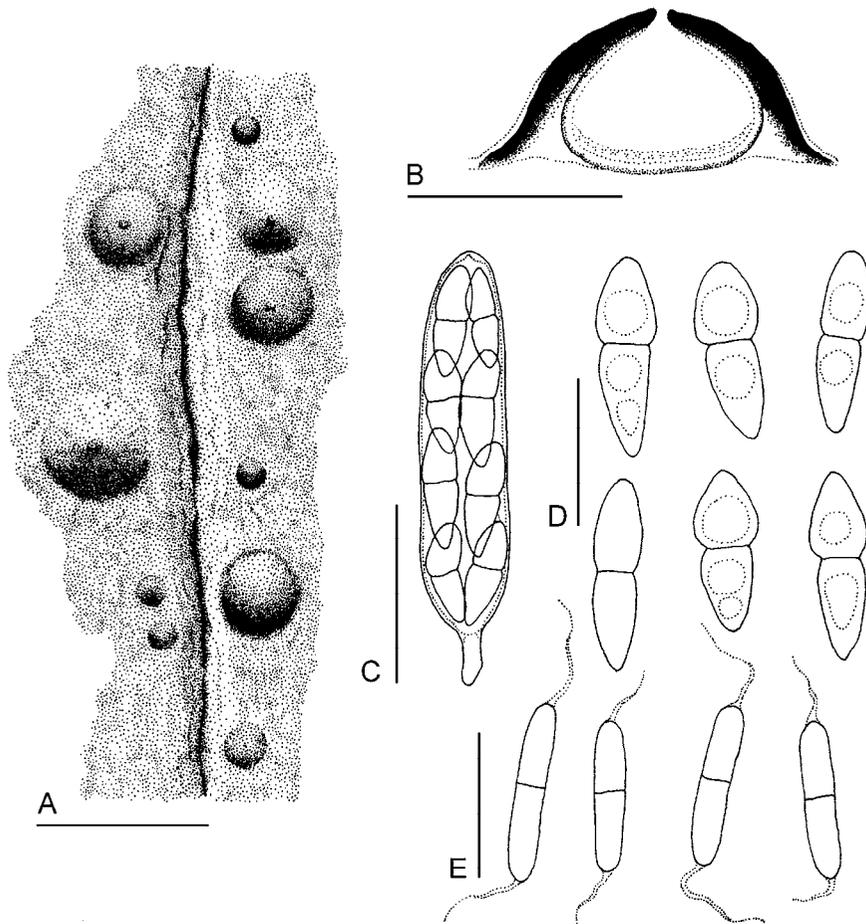


Figure 1. *Strigula caerulensis* (holotype). A, Thallus, perithecia and conidiomata near the costal groove of the host pinna. B, Sectioned perithecium (semi-schematic). C, Ascus. D, Ascospores. E, Macroconidia. Scales: A = 0.5 mm; B = 0.2 mm; C = 20 µm; D, E = 10 µm.

6. **Calopadia nymanii** (R.Sant.) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemistry: 2,7-dichlorolichexanthone [major].

SPECIMENS EXAMINED

Australian Commonwealth Territory. *Christmas Island*: • North-South Baseline Road, 1 km S of Airport, 10°28'S, 105°41'24"E, 230 m, on leaves in moderately dense primary forest, P.M. McCarthy 1670, 1674, 31.vii.2000 (CANB), det. P.M. McCarthy.

7. **Calopadia perpallida** (Nyl.) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemical race 1: chodatol [major], demethylchodatol [minor], isoarthothelin [minor], 2,4,7-trichloro-3-O-methylnorlichexanthone [minor], 5,7-dichloro-3-O-methylnorlichexanthone [minor], 2,5,7-trichloro-3-O-methylnorlichexanthone [minor], 3-O-methyl-asezone [minor], 3-O-methylthiophanic acid [minor], 2,7-dichloro-3-O-methylnorlichexanthone [minor], thiophanic acid [trace], arthothelin [trace], asezone [trace], 5,7-dichloronorlichexanthone [trace].

SPECIMENS EXAMINED

Cuba. • 'Ad corticem', C. Wright (H-NYL 18052, specimen to the right, lectotype).
Guadeloupe. • Basse-Terre, Mamelle de Petit-Burgh, 300 m, on bark of undetermined tree, D.O. Øvstedal, xi.1988 (BG).

Chemical race 2: atranorin [minor].

SPECIMEN EXAMINED

Malaysia. • Kuala Lumpur, Kepong Park, 15 km NE of Kuala Lumpur, 300 m, on leaves, F. Ceni & A. Vězda, 6.v.1997 (A. Vězda, *Lichenes Rariores Exsiccati* no. 301, CANB), det. A. Vězda.

8. **Calopadia phyllogena** (Müll.Arg.) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemistry: 4,5-dichlorolichexanthone [major].

SPECIMEN EXAMINED

Brazil. *São Paulo*: • Serra do Mar, Serra do Garrãozinho, between Mogi das Cruzes and Bertioiga, 850 m, on leaves in a very moist, shady, primary rainforest, K. Kalb, 28.x.1980 (K. Kalb *Lichenes Neotropici* no. 413, CANB), det. A. Vězda.

9. **Calopadia psoromoides** Kalb & Vězda, *Folia Geobot. Phytotax.* **22**, 301 (1987)
Chemistry: atranorin [minor].

SPECIMEN EXAMINED

Brazil. *Matto Grosso do Sul*: • Between Rio Verde do matto Grosso and Coxim, 400 m, on sandstone in a moist cerradão, K. Kalb, 28.vi.1980 (CANB), det. A. Vězda.

10. **Calopadia puiggarii** (Müll.Arg.) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemistry: 2,7-dichlorolichexanthone [major], 2-chlorolichexanthone [minor], usnic acid [minor].

SPECIMEN EXAMINED

Tanzania. • Ngorongoro region, Karatu, Humpai Forest, 1660-1700 m, on leaves, T. Pócs 89032 & S. Chuwa, 20.i.1989 (A. Vězda, *Lichenes Rariores Exsiccati* no. 1, CANB), det. A. Vězda.

11. **Calopadia subcoerulescens** (Zahlbr.) Vězda, *Lich. Sel. Exsicc.* **88**, [2185] (1988)
Chemical Race 1: atranorin [trace].

Previous report: atranorin [trace] (Kalb 2001).

SPECIMEN EXAMINED

Dominican Republic. • La Vega, 'Balneario Confluentia', a few km NE of Jarabacoa,

19°10'N, 70°38'W, 500 m, on bark of a broad-leaved tree in a small wood, K. & A. Kalb, 21.viii.1996 (K. Kalb *Lichenes Neotropici* no. 539, CANB), det. K. Kalb.

Chemical Race 2: 2,7-dichlorolichexanthone [major], di-O-methylthiophanic acid [major], 2-chlorolichexanthone [minor], arthothelin [minor], 6-O-methylarthothelin [minor].

SPECIMEN EXAMINED

United States of America. *Florida*: • Hillsborough County, Lettuce lake Park, near Tampa, 28°05'N, 82°07'W, 15 m, on palm leaf in open *Quercus*-dominated woodland, H. Streimann 40177, 11.i.1984 (CANB), det. A. Vězda.

12. **Calopadia subfusca** Kalb & Vězda, *Folia Geobot. Phytotax.* **22**, 304 (1987)
Chemistry: atranorin [trace].

SPECIMEN EXAMINED

Australia. *New South Wales*: • Border Ranges National Park, Forest Tops, 26 km NNE of Kyogle, 28°23'S, 153°04'E, 700 m, on leaves of semi-shaded shrub in temperate forest, H. Streimann 61037A, 28.iv.1998 (CANB), det. A. Vězda.

Acknowledgements

We thank the curators of the following herbaria for their assistance with the loan of specimens: BG, CANB, H.

References

- Elix, JA; Ernst-Russell, KD (1993): *A Catalogue of Standardized Thin-Layer Chromatographic Data and Biosynthetic Relationships for Lichen Substances*, 2nd Edn, Australian National University, Canberra.
- Elix, JA; Giralt, M; Wardlaw, JH (2003): New chloro-depsides from the lichen *Dimelaena radiata*. *Bibliotheca Lichenologica* **86**, 1–7.
- Kalb, K (2001): *Lichenes Neotropici*. Fasc. 13 (526–575).
- Lücking, R; Santesson, R (2001): New species and interesting records of foliicolous lichens. VIII. Two new taxa from tropical Africa, with a key to sorediate *Fellhanera* species. *Lichenologist* **33**, 111–116.

New saxicolous species and new records of *Buellia sens. lat.*
and *Rinodinella* (Ascomycota, Physciaceae) in Australia

John A. Elix

Research School of Chemistry, Building 33,
Australian National University, Canberra, A.C.T. 0200, Australia
email: John.Elix@anu.edu.au

Abstract: The taxa *Buellia bogongensis* Elix, *B. kimberleyana* Elix, *B. psoromica* Elix and *Rinodinella halophila* var. *hypostictica* Elix are described as new to science. New state and territory records and synonyms are recorded for eight additional taxa. The new combination *Buellia spuria* (Schaer.) Anzi var. *amblyogona* (Müll.Arg.) Elix is made.

Buellia sens. str. [formerly *Hafellia* Kalb, H.Mayrhofer & Scheid.] is one of the few well-delimited groups within *Buellia sens. lat.* (Bungartz *et al.* 2007). It is characterized by the *Callispora*-type ascospores, bacilliform conidia, often by a strongly oil-inspersed hymenium and the presence of norstictic acid, diploicin and atranorin or 4,5-dichlorolichexanthone (Elix 2009b). For nomenclatural reasons, the generic name *Hafellia* must be regarded as a synonym of *Buellia sens. str.*, because *B. disciformis*, the listed type of *Buellia*, shares all the typical characters of "*Hafellia*". A proposal by Moberg *et al.* (1999) suggested changing the listed type of *Buellia* from *B. disciformis* to *B. aethalea*. However, *Buellia disciformis* was chosen as the type of *Buellia* when the generic name was conserved over *Gassicurtia*. That listing would have had to be changed if the proposal by Moberg *et al.* (1999) had been accepted, and would have been the first case in the history of the Botanical Code in which a conserved type was replaced by another type. Such a procedure was not recommended by the Committee for Fungi, which voted against it (Gams 2004). The decision to reject the proposal of Moberg *et al.* (1999) was accepted by general vote at the XVII Botanical Congress in Vienna in 2005. Therefore, the species formerly included in "*Hafellia*" must now be regarded as *Buellia sens. str.* Other species of *Buellia sens. lat.* which are not closely related must now be excluded from *Buellia sens. str.*, but precise generic circumscription must await the results of molecular investigations. The saxicolous species described in this paper belong to *Buellia sens. lat.* Chemical constituents were identified by thin-layer chromatography (Elix & Ernst-Russell 1993), high-performance liquid chromatography (Elix *et al.* 2003) and comparison with authentic samples.

The new taxa

Buellia bogongensis Elix, sp. nov.

Fig. 1

Sicut *Buellia mexicana* sed hypothecio brunneus, medulla amyloideus et ascosporis angustioribus differt.

Type: Australia. Victoria: Alpine National Park, Mt McKay, Bogong High Plains, 16 km SSE of Mt Beauty, 36°52'S, 147°14'E, 1840 m, on exposed gneiss boulders in exposed subalpine grassland, J.A. Elix 40609 & H. Streimann 18.ii.1994 (CANB – holotype).

Thallus crustose, thin to moderately thick, ±continuous, epilithic, areolate, whitish to grey-white or grey, up to 4 cm wide and 0.8 mm thick; hypothallus conspicuous, black, surrounding the thallus, c. 0.2 mm wide, also growing among the areoles; upper surface shiny or matt, epruinose, phenocorticate; areoles 0.2–2.0 mm wide, angular, ±flat; phenocortex 25–30 µm thick; algal layer 75–125 µm thick, algal cells 7–15 µm wide; medulla white, lacking calcium oxalate (H₂SO₄-), 95–400 µm thick, IKI+ intense blue-purple. *Apothecia* lecideine, 0.3–0.6 mm wide, numerous, crowded and agglomerated, round to angular-distorted, immersed within the thallus or among the areoles, level with the thallus or slightly protruding; proper margin thin, black, almost entirely reduced when immersed in the thallus; disc black, epruinose, flat.

Excipulum 50–75 µm thick, *aethalea*-type, differentiated into a broad, greenish black outer part (*cinereorufa*-green, N+ red-violet) and a paler central part which intergrades into the hypothecium. Epithymenium 7–10 µm thick, dark greenish blue to greenish black due to the pigmented caps of paraphyses, K– or weak blue-green, N+ red-violet (*cinereorufa*-green); hymenium not inspersed, 75–100 µm high, colourless in the central part, blue-green in the upper part and brown in the lower part; hypothecium 50–75 µm high, dark brown (*leptocloinoide*-brown, N+ orange-brown). Paraphyses simple to moderately branched, 1.7–2.0 µm wide, with slightly broadened, dark green pigmented caps 2.5–4 µm wide. Asci 8-spored, *Bacidia*-type. *Ascospores* soon brown, submuriform, with 3 transverse septa and usually one longitudinal septum on either side of the median septum, 4–6-celled, elongate-ellipsoid, 15–23 × 7–10 µm. *Pycnidia* not seen.

Chemistry: Cortex K+ yellow, P+ yellow, C–, UV–; medulla K+ yellow then red, P+ orange-red, C–, UV–; containing atranorin (minor), chloroatranorin (minor), norstictic acid (major), connorstictic acid (minor).

Etymology: The specific epithet is derived from the Latin *-ensis* (place of origin) and the type locality in the Bogong High Plains.

Notes: Chemically and anatomically, *B. bogongensis* closely resembles *B. mexicana* J. Steiner (Nordin 2000, Bungartz *et al.* 2007), both being characterized by areolate thalli, immersed and often angular apothecia, *cinereorufa*-green in the epithymenium and excipulum and in containing atranorin, norstictic and connorstictic acids. The two species differ in their medullary reactions with iodine (amyloid in *B. bogongensis* but non-amyloid in *B. mexicana*) and in the colour of the hypothecium (dark brown in *B. bogongensis* but dark blue-green and N+ red-violet in *B. mexicana*). Currently *B. mexicana* is only known from northern Mexico and Arizona (Bungartz *et al.* 2007).

At present *B. bogongensis* is known from only the type collection. Associated species include *Diploschistes scruposus* (Schreb.) Norman, *Lecanora polytropa* (Hoffm.) Rabenh., *Lecidea lapicida* (Ach.) Ach. var. *lapicida*, *L. lygomma* Nyl. ex Cromb., *Parmelia signifera* Nyl., *Rhizocarpon geographicum* (L.) DC., *Tephromela atra* (Huds.) Hafellner, *Toninia bullata* (Meyen & Flot.) Zahlbr., *Tremolechia atrata* (Ach.) Hertel and several *Umbilicaria* species.

Buellia kimberleyana Elix, sp. nov.

Fig. 2

Sicut *Buellia spuria* sed superfice ochraceus vel brunneus, medulla nonamyloideus et atranorinum deficiens differt.

Type: Australia. Western Australia: Lake Argyle Road, 31 km SE of Kununurra, 15°59'S, 128°56'E, 160 m, on sandstone rocks along escarpment with *Eucalyptus*, *Xanthostemon* and *Buchanania*, J.A. Elix 27791, H.T. Lumbsch & H. Streimann, 8.vii.1991 (PERTH – holotype).

Thallus crustose, thin, ±continuous, epilithic, areolate, yellowish grey to ochre or dark brown, up to 3 cm wide and 0.3 mm thick; hypothallus conspicuous or not, black, surrounding the thallus, c. 0.2 mm wide, rarely growing among the areoles; upper surface matt, epruinose, phenocorticate; areoles 0.3–0.8 mm wide, angular, ±flat to weakly convex; phenocortex 20–25 µm thick; algal layer 20–25 µm thick; algal cells 7–14 µm wide; medulla white, lacking calcium oxalate (H₂SO₄-), 95–170 µm thick, IKI–. *Apothecia* lecideine, 0.1–0.5 mm wide, scattered, round, immersed then adnate or rarely becoming ±sessile with age; proper margin thin, persistent, rarely excluded with age, black or masked by a necrotic thalline veil; disc brown-black to black, epruinose, flat, rarely becoming slightly convex with age. *Excipulum* 35–65 µm thick, poorly differentiated, *aethalea*-type. Epithymenium 7–20 µm thick, olive-brown due to the pigmented caps of paraphyses, K–, N+ weak red-brown (*elachista*-brown and *cinereorufa*-green); hymenium colourless, not inspersed, 50–55 µm high; hypothecium c. 40 µm high, pale brown to reddish brown (*leptocloinoide*-brown). Paraphyses simple

to weakly branched, 1.7–2.5 μm wide, with weakly broadened, brown-pigmented caps to 3.5 μm wide. Asci 8-spored, *Bacidia*-type. Ascospores brown, *Buellia*-type, ellipsoid, not constricted at the septum, 10–16 \times 4.5–5.5 μm . *Pycnidia* not seen.

Chemistry: Upper surface K+ yellow then red, P+ yellow, C–, UV–; medulla K+ yellow then red, P+ yellow, C–, UV–; containing norstictic acid (major), conorstictic acid (minor).

Etymology: The specific epithet refers to the Kimberley region of Western Australia where the species is common.

Notes: The development of the apothecia in this new species closely resembles that observed in *B. spuria* (Schaer.) Anzi, where the orbicular apothecia are immersed at first but then become sessile with age and have a proper margin commonly masked by the remains of necrotic thalline material (often termed a thalline veil). However, the upper surface is white to grey-white in *B. spuria* and the medulla amyloid, and the cortex contains atranorin, whereas in *B. kimberleyana* the thallus varies from yellow-brown to dark brown, the medulla is non-amyloid and the cortex lacks atranorin. Chemically *B. kimberleyana* is identical to *B. aethalea* (Ach.) Th.Fr., but the apothecia of the latter species are angular to deformed (comma-shaped) and remain immersed rather than being orbicular and becoming sessile as in *B. kimberleyana*, and the ascospores are broader (11–17 \times 6–10 μm versus 10–16 \times 4.5–5.5 μm). Whereas *Buellia aethalea* is a cosmopolitan species known from Europe, North America, South America, southern Africa, Australia and New Zealand (Bungartz *et al.* 2007, Galloway 2007), *B. kimberleyana* seems to be an Australian endemic.

At present this new species is known from a number of localities in the Kimberley region of Western Australia and adjacent areas of the Northern Territory where it is relatively common on sheltered sandstone rocks. Commonly associated species include *Australiaena streimannii* Matzer, H. Mayrhofer & Elix, *Buellia polyxanthonica* Elix, *B. spuria* (Schaer.) Anzi, *Caloplaca leptozona* (Nyl.) Zahlbr., *Dimelaena elevata* Elix, Kalb & Wippel, *D. tenuis* (Müll.Arg.) H. Mayrhofer & Wippel, *Diploschistes actinostomus* (Pers.) Zahlbr., *Lecanora austrosorediosa* (Rambold) Lumbsch, *Lepraria coriensis* (Hue) Sipman, *Parmotrema praesorediosum* (Nyl.) Hale, *Pertusaria remota* A.W.Archer and *Tephromela arafurensis* Rambold.

SPECIMENS EXAMINED

Western Australia: • King Leopold Range, 22 km NE of Lennard River Crossing on the Gibb River Road, 17°15'S, 124°54'E, 150 m, on metamorphic rocks in *Triodia*-dominated grassland, J.A. Elix 22160, 22162, H. Streimann & D.J. Galloway, 13.v.1988 (CANB, PERTH); • March Fly Glen, King Leopold Range, 66 km NE of Lennard River Crossing on the Gibb River Road, 17°10'S, 125°18'E, 370 m, on sheltered rocks with SW aspect in small gorge along *Melaleuca*-dominated stream, J.A. Elix 22229, 22263, H. Streimann & D.J. Galloway, 14–16.v.1988 (CANB, PERTH); • Along road to Mt Joseph Yard, 25 km E of Lennard River Crossing on the Gibb River Road, 17°23'S, 125°00'E, 100 m, on schistose rocks in *Triodia*-dominated grassland, J.A. Elix 22286, H. Streimann & D.J. Galloway, 17.v.1988 (CANB, PERTH); • Lake Argyle Road, 35 km SE of Kununurra, 16°01'S, 128°59'E, 140 m, on sandstone rocks on SW escarpment in savannah scrub with large shrubs, J.A. Elix 22476, 22477 & H. Streimann, 22.v.1988 (CANB); • Lake Argyle Road, 31 km SE of Kununurra, 15°59'S, 128°56'E, 160 m, on sandstone rocks along escarpment with *Eucalyptus*, *Xanthostemon* and *Buchanania*, J.A. Elix 27792, 27796, 27807, H.T. Lumbsch & H. Streimann, 8.vii.1991 (CANB); • Gibb River Road, 54 km NNE of Karunje Station, 15°51'S, 127°25'E, 270 m, on sandstone rocks in *Eucalyptus* woodland, J.A. Elix 27864, H.T. Lumbsch & H. Streimann, 10.vii.1991 (CANB); • Gibb River Road, 74 km SW of Wyndham, 15°49'S, 127°31'E, 300 m, on sandstone rocks in *Eucalyptus*-dominated grassland, J.A. Elix 27885, H.T. Lumbsch & H. Streimann, 11.vii.1991 (B, CANB); • Jacks Water Hole, Durack River, 55 km NE of Karunje Station, 15°50'S, 127°25'E, 260 m, on sandstone rocks along escarpment with *Eucalyptus*,

Xanthostemon, *Glochidion* and *Melaleuca*, J.A. Elix 27913, H.T. Lumbsch & H. Streimann, 12.vii.1991 (CANB); • Gibb River Range, Gibb River Road, 38 km NE of Gibb River Station, 16°06'S, 126°36'E, 480 m, on sandstone rocks in *Eucalyptus*-dominated grassland, J.A. Elix 27932, H.T. Lumbsch & H. Streimann, 13.vii.1991 (B, CANB); • King Edward River, 54 km NNW of King Edward River Station (Doongan Station), 14°54'S, 126°12'E, 280 m, on sandstone rocks in *Eucalyptus*-dominated grassland, J.A. Elix 27961, 27969, H.T. Lumbsch & H. Streimann, 14.vii.1991 (CANB); • Gibb River Road, 18 km W of Ellenbrae Station, 15°58'S, 126°54'E, 380 m, on sandstone rocks in *Eucalyptus*-dominated grassland, J.A. Elix 28044, 28055, H.T. Lumbsch & H. Streimann, 16.vii.1991 (B, CANB); • Gibb River Road, 45 km SSE of Wyndham, 15°53'S, 128°14'E, 140 m, on sandstone rocks in *Eucalyptus*-dominated grassland, J.A. Elix 28071, H.T. Lumbsch & H. Streimann, 16.vii.1991 (B, CANB).

Northern Territory: • Native Gap, Hann Range, 114 km N of Alice Springs, 22°49'S, 133°25'E, 700 m, on protected rock ledge with S aspect, J.A. Elix 11196 & L. Craven, 12.ix.1983 (CANB); • Pinkerton Range, Bullo River Road, 16 km NW of West Baines River Crossing on Victoria Highway, 15°49'S, 129°40'E, 200 m, on sheltered rocks on top of escarpment, J.A. Elix 22069 & H. Streimann, 9.v.1988 (CANB); • Victoria Highway, 37 km NE of Willaroo Homestead, between Timber Creek and Katherine, 15°01'S, 131°47'E, 200 m, on lateritic rocks on escarpment in dry sclerophyll forest, J.A. Elix 22504 & H. Streimann, 23.v.1988 (CANB).

Buellia psoromica Elix, sp. nov.

Sicut *Buellia spuria* sed ascosporis latioribus et acidum psoromicum, acidum subpsoromicum et acidum 2'-O-demethylpsoromicum continente differt.

Type: Australia. **Western Australia:** Beverley–Mawson road, 26 km NE of Beverley, 32°00'29"S, 117°08'38"E, 270 m, on laterite rocks in remnant *Eucalyptus* woodland, J.A. Elix 31780, 22.iv.2004 (PERTH — holotype).

Thallus crustose, thin, \pm continuous, epilithic, areolate, whitish to grey-white or grey, up to 5 cm wide and 0.4 mm thick; hypothallus conspicuous, black, surrounding the thallus, c. 0.2 mm wide, also \pm growing among the areoles; upper surface shiny or matt, epruinose, phenocorticate; areoles 0.3–1.1 mm wide, angular, \pm flat to weakly convex; phenocortex 20–25 μm thick; algal layer 20–25 μm thick; algal cells 5–13 μm wide; medulla white, lacking calcium oxalate (H_2SO_4 -), 95–110 μm thick, IKI+ intense purple. **Apothecia** lecideine, 0.2–0.6 mm wide, numerous, round, immersed to adnate or rarely becoming \pm sessile with age; proper margin thin, persistent, rarely excluded with age, black or masked by a necrotic thalline veil; disc black, epruinose, flat, rarely becoming slightly convex with age. **Excipulum** 45–55 μm thick, poorly differentiated, *aethalea*-type. **Ephymenium** 7–10 μm thick, dark greenish due to the pigmented caps of paraphyses, K–, N+ red-violet (*cinereorufa*-green); hymenium colourless, not interspersed, 35–45 μm high; hypothecium c. 50 μm high, reddish brown (*leptoclinoides*-brown). Paraphyses simple to weakly branched, 1.7–2.5 μm wide, with distinctly broadened, dark green-pigmented caps to 5 μm wide. Asci 8-spored, *Bacidia*-type. **Ascospores** brown, with apical wall thickenings when young, ellipsoid, \pm constricted at the septum, 11–16 \times 6–9 μm . *Pycnidia* not seen.

Chemistry: Cortex K+ yellow, P+ yellow, C–, UV–; medulla K–, P+ yellow, C–, UV–; containing psoromic acid (major), atranorin (major or minor), chloroatranorin (minor), 2'-O-demethylpsoromic acid (minor), subpsoromic acid (trace).

Etymology: The specific epithet refers to the presence of psoromic acid in this species.

Notes: Morphologically this new species closely resembles *B. spuria*, in that both are characterized by whitish to grey-white thalli, a conspicuous black hypothallus, an amyloid medulla, cortical atranorin and a dark green-pigmented ephymenium (*cinereorufa*-green) and a reddish brown hypothecium (*leptoclinoides*-brown). *Buellia spuria* differs in having somewhat narrower ascospores (9–15 \times 5–7 μm versus 11–16 \times

6–9 µm), and in containing stictic acid as a major secondary metabolite. Whereas *Buellia spuria* is a cosmopolitan species known from Europe, North America, South America, southern Africa, Australia and New Zealand (Bungartz *et al.* 2007, Galloway 2007), *B. psoromica* seems to be an Australian endemic.

At present, this new species is known from Western Australia, Northern Territory and the Australian Capital Territory where it is uncommon on various siliceous rocks. Associated species include *Buellia substellulans* Zahlbr., *Caloplaca cinnabarina* (Ach.) Zahlbr., *Diploschistes thumbergianus* Lumbsch & Vězda, *Lecanora farinacea* Fée, *L. pseudistera* Nyl., *Lecidea capensis* Zahlbr., *Paraporpidia leptocarpa* (C.Bab. & Mitt.) Rambold & Hertel, *Ramboldia petraeoides* (Nyl. ex C.Bab. & Mitt.) Kantvilas & Elix, *Xanthoparmelia subprolixa* (Nyl. ex Kremp.) O.Blanco, Crespo, D.Hawksw., Lumbsch & Elix, *X. taractica* (Kremp.) Hale and *X. tasmanica* (Hook.f. & Taylor) Hale.

SPECIMENS EXAMINED

Australian Capital Territory: • along the Murrumbidgee River, 1 km downstream from Casuarina Sands, 35°19'S, 148°57'E, 530 m, on porphyry boulders on rocky hillside, *J.A. Elix 918 p.p.*, 13.vi.1975 (CANB).

Northern Territory: • MacDonnell Range, 1 km N of Glen Helen Tourist Camp near Alice Springs, 24°41'S, 132°41'E, 640 m, on sandstone rocks with a southerly aspect in mulga scrub, *J.A. Elix 11260 & L.A. Craven*, 16.ix.1983 (CANB).

Rinodinella halophila var. *hypostictica* Elix, var. nov.

Fig. 4

Sicut *Rinodinella halophila* sed acidum hyposticticum et acidum hyposalazinicum continente differt.

Type: Australia. *New South Wales*: Tuross Heads, 36°04'S, 150°08'E, 1 m, on rocks along the foreshore, *J.A. Elix 2086*, 24.iv.1976 (CANB – holotype).

Thallus crustose, thin to thick, ±continuous, epilithic, areolate, pale fawn to ochre, up to 3 cm wide, 0.3–1.0 mm thick, becoming chinky and then lifting off the substratum; hypothallus not apparent; upper surface matt, epruinose, granular, ±phenocorticate; areoles contiguous or scattered, 0.3–1.0 mm wide, ±subrectangular, flat to convex; algal layer 75–100 µm thick; algal cells 7–15 µm wide; medulla white, calcium oxalate present (H₂SO₄ +), 0.2–0.8 mm thick, IKI–. *Apothecia* lecideine, 0.1–0.6 mm wide, numerous, round, immersed but soon adnate to sessile; proper margin thin, persistent, rarely excluded with age, black; disc black, epruinose, flat or concave. *Excipulum* 50–70 µm thick, well-defined, not distinctly differentiated into an inner and outer part, dull black-brown throughout, becoming ±carbonized, *aethalea*-type. Epihymenium dark olive-green to brown due to the pigmented caps of paraphyses, 5–10 µm thick, K–, N+ purple-brown (*cinereorufa*-green); hymenium colourless, not inspersed, 45–60 µm high; hypothecium c. 50 µm high, medium brown to reddish brown (*leptoclinoides*-brown). Paraphyses simple to moderately branched, c. 2 µm wide, with distinctly broadened, brown-pigmented caps to 5–6 µm wide. Asci 8-spored, *Bacidia*-type. *Ascospores* olive-grey to brown, ellipsoid, *Rinodinella*-type, ±constricted at the septum, 10–15 × 5–8 µm. *Pycnidia* not seen.

Chemistry: Cortex K–, P–, C–, UV–; medulla K+ weak yellow then pale red, P–, C–, UV–; containing hypostictic acid (major), hyposalazinic acid (minor or trace).

Etymology: The varietal name derives from the occurrence of hypostictic acid in this taxon.

Notes: This taxon is characterized by the areolate, pale fawn to ochre thallus which ultimately becomes chinky and flakes off the substratum, the dark olive-green pigmented epihymenium that reacts N+ purple-brown (due to the *cinereorufa*-green pigment), the non-amyloid medulla containing calcium oxalate, the *Rinodinella*-type ascospores and the presence of hypostictic and hyposalazinic acids. This new variety is morphologically identical to *R. halophila* (Müll.Arg.) H.Mayrhofer var. *halophila*, but

the latter differs chemically in containing norstictic and connorstictic acids (Mayrhofer 1984a, b).

At present, *R. halophila* var. *hypostictica* is known from several coastal localities in New South Wales where it occurs on siliceous littoral rocks just above the high tide zone. Commonly associated species include *Buellia aeruginosa* A.Nordin, Owe-Larsson & Elix, *Caloplaca bermaguiana* S.Kondr. & Kärnefelt, *C. kiamae* S.Kondr. & Kärnefelt, *C. rexfilsonii* S.Kondr. & Kärnefelt, *Rinodina blastidiata* Matzer & H.Mayrhofer, *R. cacaotina* Zahlbr., *Parmotrema reticulatum* (Taylor) Hale, *Pertusaria xanthoplaca* Müll.Arg., *Rinodinella halophila* var. *halophila*, *Tylohallia pahiensis* (Zahlbr.) Hertel & Kiliyas, *Xanthoparmelia scabrosa* (Taylor) Hale and *Xanthoria ligulata* (Körb.) P.James.

SPECIMENS EXAMINED

New South Wales: • Broken Head Beach, Cocked Hat Rock, c. 5 km S of Byron Bay, 28°42'S, 153°37'E, 0–10 m, on coastal siliceous rocks in xeric supralittoral zone, *H.T. Lumbsch 11017a & A. Dickhäuser*, 26.x.1994 (CANB).

New State and Territory Records

1. *Buellia aethalea* (Ach.) Th.Fr., *Lichenogr. Scand.* 2, 604 (1874)

This species has been reported from Europe, North America, New Zealand, and Antarctica (Bungartz *et al.* 2007, Galloway 2007), and in Australia from Queensland (McCarthy 2009).

SPECIMENS EXAMINED

Western Australia: • Kalbarri National Park, Murchison River Gorge, Hawkshead Lookout, 42.5 km ENE of Kalbarri township, 27°47'20"S, 114°28'05"E, 150 m, on sandstone above rocky gorge with dwarf *Eucalyptus* and *Acacia*, *J.A. Elix 33737*, 3.v.2004 (CANB).

New South Wales: • Goobang National Park, Ten Mile Creek, 1.5 km SSW of Gingham Gap, on sandstone in *Eucalyptus-Callitris* woodland, *J.A. Elix 39357*, 4.viii.2008 (CANB).

South Australia: • Kangaroo Island, Scotts Cove Lookout, 3 km E of Cape Borda, on quartz rocks in cliff-top heath, *J.A. Elix 19724 & L.H. Elix*, 29.x.1985 (CANB).

2. *Buellia halonia* (Ach.) Tuck., *Lich. Californ.*, 26 (1866)

This species was previously known from North America, South America, and South Africa, and in Australia from South Australia (Bungartz *et al.* 2004, Bungartz *et al.* 2007).

SPECIMENS EXAMINED

New South Wales: • South Coast, Merimbula, 36°53'S, 149°54'E, 2 m, on rocks along foreshore, *J.A. Elix 238*, 12.v.1974 (CANB); • Camel Rock, 5 km N of Bermagui, 2 m, on rocks on seaside cliffs, *J.A. Elix 4569*, 4.iii.1978 (CANB); • Burrewarra Point, 13 km S of Batemans Bay, 35°50'S, 150°14'E, 1 m, on rocks along foreshore, *J.A. Elix 9142*, 5.x.1981 (CANB).

3. *Buellia mamillana* (Tuck.) W.A.Weber, *Mycotaxon* 27, 493 (1986)

Synonym: *Buellia australica* Räsänen, *Ann. Bot. Soc. Zool.-Bot. Fenn. "Vanamo"* 20, 14 (1944) *vide* Bungartz *et al.* (2007).

This species was previously known from North, Central and South America, and South Africa, and in Australia from Queensland and Norfolk Island (Bungartz *et al.* 2004, Bungartz *et al.* 2007, Elix 2008).

SPECIMENS EXAMINED

Northern Territory: • Wangi Falls, Litchfield National Park, 74 km SW of Batchelor, 13°09'48"S, 130°41'00"E, 60 m, on sandstone in monsoon forest at foot of falls, *J.A. Elix 38028*, 5.viii.2005 (CANB); • Tabletop Range, Litchfield National Park, 56 km SW of Batchelor, 13°11'54"S, 130°42'48"E, 140 m, on sandstone on rocky plateau with

Eucalyptus, *Terminalia*, *Ficus* and *Calytrix*, *J.A. Elix* 38713, 6.viii.2005 (CANB); • Umbrawarra Gorge, 22 km SW of Pine Creek, 13°57'56"S, 131°41'52"E, 210 m, on sheltered sandstone crevice in steep-sided rocky gorge, *J.A. Elix* 38851, 8.viii.2005 (CANB).
New South Wales: • Grassy Head, 5 km N of Stuarts Point, 30°48'S, 153°00'E, 6 m, on exposed coastal rocks, *J.A. Elix* 21819A, 24.i.1988 (CANB).

4. *Buellia marginulata* (Müll.Arg.) Zahlbr., *Cat. Lich. Univ.* 7, 464 (1931)

This endemic species was previously known from South Australia and Western Australia (McCarthy 2009).

SPECIMENS EXAMINED

Northern Territory: • MacDonnell Ranges, Wigleys Waterhole, 22 km N of Alice Springs, 23°37'S, 133°54'E, 620 m, on granite rocks on arid, grassy ridge with a southerly aspect, *J.A. Elix* 11137 & *L.A. Craven*, 11.ix.1983 (CANB); • MacDonnell Ranges, along the Stuart Highway, 10 km N of Alice Springs, 23°37'S, 133°53'E, 820 m, on granite rocks in mulga scrub, *J.A. Elix* 11344 & *L.A. Craven*, 18.ix.1983 (CANB).

5. *Buellia spuria* (Schaer.) Anzi var. *amblyogona* (Müll.Arg.) Elix, comb. nov.

Basionym: *Buellia amblyogona* Müll.Arg., *Bull. Herb. Boissier* 3, 641 (1895)

Type: Australia. Queensland: Thursday Island, *C. Knight s.n.* (G! – holotype).

Previously this taxon was included in *B. spuria sens. lat.* as the norstictic acid-containing race (Bungartz *et al.* 2007). However, in Australia *B. spuria sens. str.* (containing stictic acid) has a different distribution, and the two taxa are given varietal status here.

SPECIMENS EXAMINED

Western Australia: • Lake Argyle Road, 35 km SE of Kununurra, 16°01'S, 128°59'E, 140 m, on sandstone rocks on SW escarpment in savannah scrub with large shrubs, *J.A. Elix* 22470 & *H. Streimann*, 22.v.1988 (CANB); • Lake Argyle Road, 31 km SE of Kununurra, 15°59'S, 128°56'E, 160 m, on sandstone rocks along escarpment with *Eucalyptus*, *Xanthostemon* and *Buchanania*, *J.A. Elix* 27800, *H.T. Lumbsch* & *H. Streimann*, 8.vii.1991 (CANB).

Northern Territory: • Surprise Creek Falls, Litchfield National Park, 17 km N of Daly River Road, 13°24'17"S, 130°47'06"E, 210 m, on sandstone above remnant monsoon forest at head of falls, *J.A. Elix* 39255, 9.viii.2005 (CANB).

New South Wales: • Bare Bluff, 20 km N of Coffs Harbour, 30°09'S, 153°12'E, 4 m, on coastal rocks, *J.A. Elix* 3538, 3539, 1.vii.1977 (CANB).

6. *Buellia spuria* (Schaer.) Anzi var. *spuria*, *Cat. Lich. Sondr.*: 87 (1860)

Synonyms:

Buellia kremplhuberi Zahlbr., *Cat. Lich. Univ.* 7, 374 (1931)

= *Lecidea exilis* Kremp.

= *Buellia exilis* (Kremp.) Müll.Arg., *Flora* 70, 61 (1887) [*nom. illegit.*] *fide* Bungartz *et al.* (2007).

Buellia lactea (A. Massal.) Körb., *Parerga Lichenol.*, 183 (1860) *fide* Bungartz *et al.* (2007).

In Australia, this cosmopolitan species was previously reported from Queensland, South Australia and Western Australia (Bungartz *et al.* 2007, McCarthy 2009).

SPECIMENS EXAMINED

Northern Territory: • Umbrawarra Gorge, 22 km SW of Pine Creek, 13°57'56"S, 131°41'52"E, 210 m, on sheltered sandstone crevice in steep-sided rocky gorge, *J.A. Elix* 38848, 38866, 38871, 8.viii.2005 (CANB).

7. *Buellia vioxanthina* Elix, *Australas. Lichenol.* 64: 32 (2009)

This Australian endemic was previously reported from Queensland and the Northern Territory (Elix 2009a).

SPECIMEN EXAMINED

Western Australia: • King Edward River, 54 km NNW of King Edward River Station (Doongan Station), 14°54'S, 126°12'E, 280 m, on sandstone rocks in *Eucalyptus*-dominated grassland, *J.A. Elix* 27958, *H.T. Lumbsch* & *H. Streimann*, 14.vii.1991 (CANB).

8. *Rinodinella halophila* (Müll.Arg.) H.Mayrhofer var. *halophila*, *Lichenologist* 12, 301 (1980)

This species was previously known from southern Africa, and in Australia from Victoria and South Australia (Mayrhofer 1984, McCarthy 2009).

SPECIMEN EXAMINED

New South Wales: • Baragoot Point, 3.5 km S of Bermagui, 36°27'S, 150°04'E, 6 m, on rock and soil of coastal headland, *J.A. Elix* 4586, 4.iii.1978 (CANB); • Bermagui Bay, 36°24'S, 150°04'E, 2 m, on rock of coastal headland, *J.A. Elix* 28824, 22.vi.2005 (CANB).

Acknowledgments

I thank Neal McCracken (ANU Photography) for preparing the photographs.

References

- Bungartz, F; Elix, JA; Nash III, TH (2004): The genus *Buellia sensu lato* in the Greater Sonoran Desert Region: saxicolous species with one-septate ascospores containing xanthonenes. *Bryologist* 107, 459–479.
- Bungartz, F; Nordin, A; Grube, U (2007): *Buellia* De Not. In Nash III, TH; Gries, C & Bungartz, F (eds) *Lichen Flora of the Greater Sonoran Desert Region* 3, 113–179. University of Arizona, Tempe.
- Elix, JA (2008): Additional lichen records from Australia 67. *Australasian Lichenology* 63, 2–9.
- Elix, JA (2009a): New crustose lichens (lichenized Ascomycota) from Australia. *Australasian Lichenology* 64, 30–37.
- Elix, JA (2009b): *Buellia*. *Flora of Australia* 57, 495–507.
- Elix, JA; Ernst-Russell, KD (1993): *A Catalogue of Standardized Thin-Layer Chromatographic Data and Biosynthetic Relationships for Lichen Substances*, 2nd Edn, Australian National University, Canberra.
- Elix, JA; Giralt, M; Wardlaw, JH (2003): New chloro-depsides from the lichen *Dimelaena radiata*. *Bibliotheca Lichenologica* 86, 1–7.
- Galloway, DJ (2007): *Flora of New Zealand Lichens*. Revised 2nd Edn, Manaaki Whenua Press, Lincoln, New Zealand.
- Gams, W (2004): Report of the committee for fungi: 11. *Taxon* 53, 1067–1069.
- Mayrhofer, H (1984a): Die saxicolen Arten der Flachtengattung *Rinodina* und *Rinodinella* in der Alten Welt. *Journal of the Hattori Botanical Laboratory* 55, 327–493.
- Mayrhofer, H (1984b): The saxicolous species of *Dimelaena*, *Rinodina* and *Rinodinella* in Australia. *Beihefte zur Nova Hedwigia* 79, 511–536.
- McCarthy, PM (2009): *Checklist of the Lichens of Australia and its Island Territories*. ABRS, Canberra: <http://www.anbg.gov.au/abrs/lichenlist/introduction.html> (last updated 23 March 2009).
- Moberg, R; Nordin, A; Scheidegger, C (1999): Proposal to change the listed type of the name *Buellia* nom. cons. (Physciaceae, Ascomycota), *Taxon* 48, 143.
- Nordin, A (2000): *Buellia* species with pluriseptate spores and the Physciaceae (Lecanorales, Ascomycotina). *Symbolae Botanicae Upsaliensis* 33, 1–117.

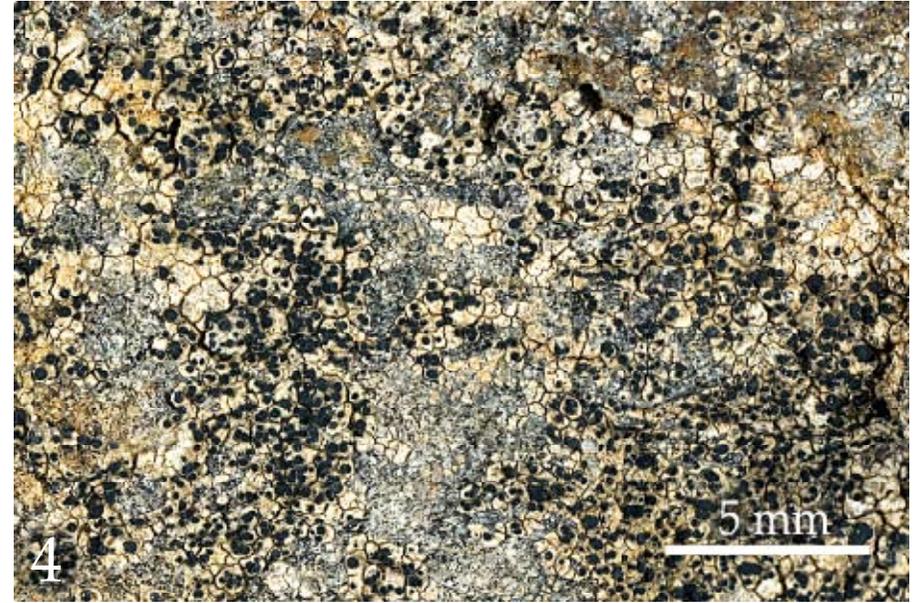
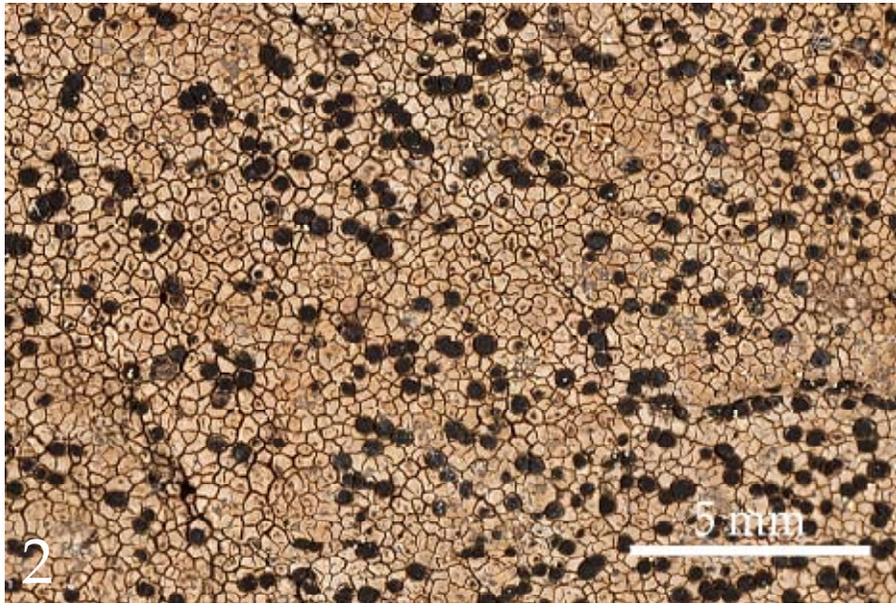
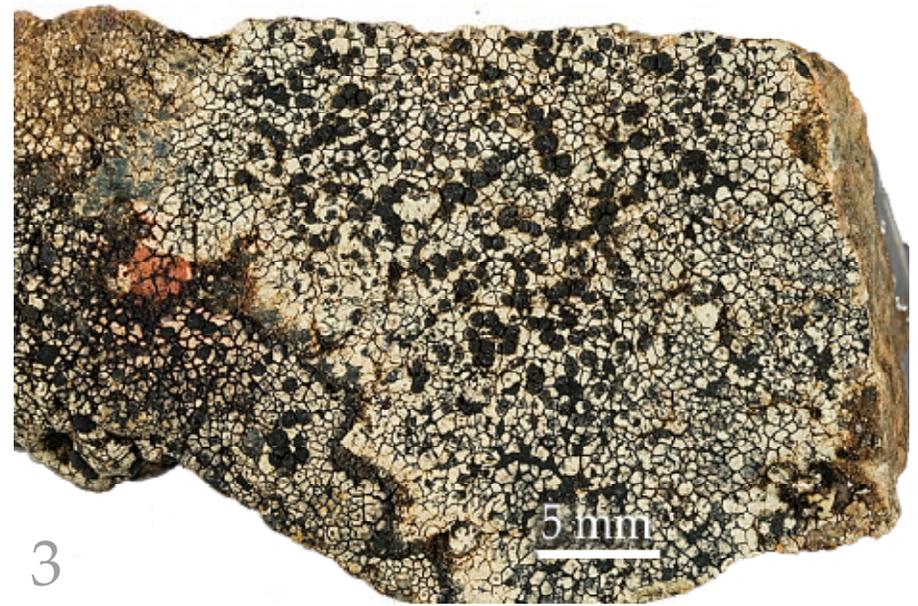
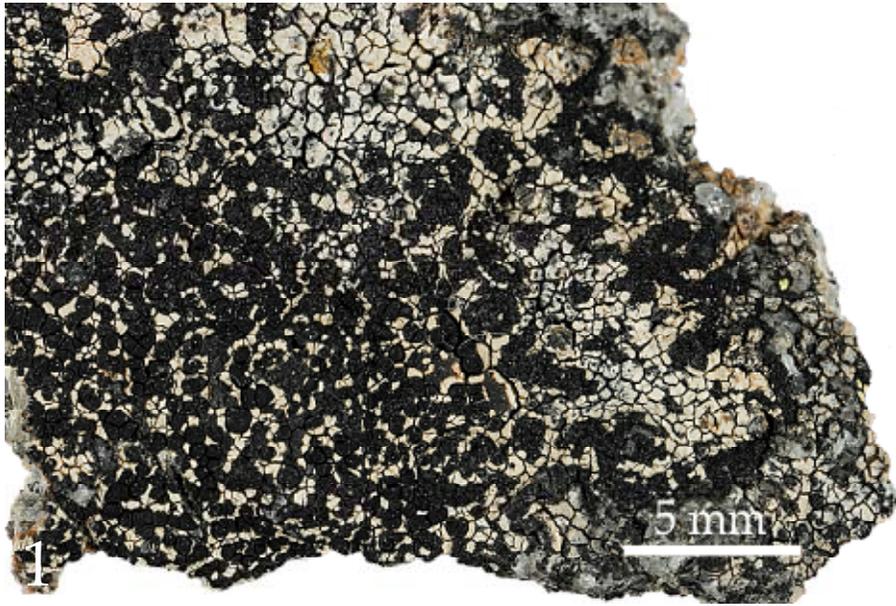


Fig. 1. *Buellia bogongensis* (holotype in CANB); Fig. 2. *Buellia kimberleyana* (J.A. Elix 27864 in CANB)

3. *Buellia psoromica* (J.A. Elix 918 p.p. in CANB); 4. *Rinodinella halophila* var. *hypostictica* (holotype in CANB).

**The *Megalospora melanoderma* complex
(Ascomycota, Megalosporaceae) in Australia**

John A. Elix

Research School of Chemistry, Building 33
Australian National University, Canberra, A.C.T. 0200, Australia
email: John.Elix@anu.edu.au

Abstract: The morphology, anatomy and chemistry of the *Megalospora melanoderma* complex has been studied. The new variety *M. melanoderma* var. *purpurea* Elix is described and the new combination *M. galactocarpa* (Zahlbr.) Elix proposed.

In his monograph on the Megalosporaceae, Sipman (1983) considered *Megalospora melanoderma* (Müll.Arg.) Zahlbr. to be a morphologically variable species endemic to eastern Australia. Kantvilas (1994) subsequently recognized that two entities were involved, and proposed the combination *Megalospora melanoderma* var. *galactocarpa* (Zahlbr.) Kantvilas for the second taxon. According to both Sipman and Kantvilas, those taxa were restricted to coastal wet forests of northern New South Wales and south-eastern Queensland, but we have discovered a third related entity in the wet, montane forests of north Queensland, and it is the subject of this paper. Chemical constituents were identified by thin-layer chromatography (Elix & Ernst-Russell 1993), high-performance liquid chromatography (Elix *et al.* 2003), and comparison with authentic samples.

The new variety

***Megalospora melanoderma* var. *purpurea* Elix, var. nov.**

Fig. 1

Similis *Megalospora melanoderma* var. *melanoderma* sed epihymenium ex parte purpureus et K+ indigoticus differt.

Type: Australia. *Queensland:* Millaa Millaa Falls, 4 km S of Millaa Millaa, 17°29'34"S, 145°36'41"E, 750 m, on fallen branches in remnant rainforest, J.A. Elix 39303, 29.vii.2006 (BRI – holotype; CANB – isotype).

Thallus crustose, off-white or pale yellowish grey, rather thick, ±rugulose and irregularly cracked, lacking soredia and isidia. *Apothecia* 0.5–3.0 mm wide, 350–550 µm thick, black to brown-black, glossy or dull, epruinose; margin prominent, thin to thick, black to brown-black, slightly glossy, epruinose. Epihymenium brown-black to black, ±with a dark olive tinge, 7–15 µm thick, with scattered bright purple crystals or patches that penetrate the upper hymenium, K+ indigo. Hymenium 130–180 µm high, I+ blue in part. Excipulum yellow-brown to dark brown, ±with a brown-black outer layer; subhypotheicum red-brown to dark brown, K–. Asci 8-spored. Ascospores broadly ellipsoid, slightly curved or straight [*sulphurata*-type], 1-septate, 35–50 × 20–30 µm; spore wall c. 2.5 µm thick, epispore c. 1.0 µm thick, usually warted. *Pycnidia* not seen.

Chemistry: Thallus K–, C–, KC–, P–; containing usnic acid [major], zeorin [major]. Apothecia K+ red, C–, KC–, P–; containing demethylvioxanthin [major], vioxanthin [minor].

Etymology: The varietal name derives from the purple pigment present in the epihymenium.

Remarks. This taxon is characterized by the thick, off-white to pale yellow-grey thallus, the black or rarely brown-black, glossy apothecia, the 8-spored asci with 1-septate ascospores and the presence of usnic acid and zeorin. The new variety is morphologically identical to *M. melanoderma* var. *melanoderma*, but the latter differs

in having a brown to olive-brown epihymenium that reacts K– or with the colour intensifying somewhat and a smooth epispore. *Megalospora melanoderma* var. *purpurea*, by contrast, has a brown-black to black epihymenium ±with a dark olive tinge, with scattered bright purple crystals or patches that react K+ indigo and a warted epispore. The two taxa also exhibit quite distinct distributions, *M. melanoderma* s. str. being restricted to New South Wales and south-eastern Queensland, whereas var. *purpurea* occurs only in north-eastern Queensland.

This new variety occurs on branches of trees in and at the margins of montane tropical rainforests in north-eastern Queensland. Associated species include *Haematomma africanum* (J.Steiner) C.W.Dodge, *Heteroderma japonica* (Sato) Swinscow & Krog, *Hypotrachyna ossealba* (Vain.) Y.S.Park & Hale, *Lecanora achroa* Nyl., *Lobaria discolor* (Bory) Hue, *Pertusaria velata* (Turner) Nyl., *P. verdonii* A.W.Archer & Elix, *Pseudocyphellaria pickeringii* (Tuck.) D.J.Galloway, *P. rigida* (Müll.Arg.) D.J.Galloway, *P. sayeri* D.J.Galloway and *Usnea rubicunda* Stirt.

SPECIMENS EXAMINED

Queensland: • Kirrima State Forest, Kirrima Road, 32 km WNW of Cardwell, 18°11'S, 145°44'E, 580 m, on *Timonius* in *Eucalyptus* woodland along margin of rainforest, J.A. Elix 15768, 15774 & H. Streimann, 20.vi.1984 (CANB); • North Wallaman Logging Area, 36 km WNW of Ingham, 18°36'S, 145°50'E, 600 m, on fallen branch in logged rainforest, H. Streimann 28798, 21.vi.1984 (CANB); • Kennedy Highway, 17 km SSE of Atherton, 17°25'S, 145°31'E, 880 m, on semi-exposed tree trunk in remnant tropical rainforest beside road, H. Streimann 54089, 8.vii.1994 (B, CANB, H, NY).

The new combination

***Megalospora galactocarpa* (Zahlbr.) Elix, comb. nov.**

Basionym: *Psorothecium taitense* var. *galactocarpa* Zahlbr., *Ann. Mycol.* 2, 270 (1904)

Type: Australia, New South Wales, on bark of tree in Stanwell Park, E. Cheel & J.L. Boorman (A. Zahlbruckner: *Lichenes Rariores Exsiccati* Nr 48) (W–holotype; G–isotype, not seen).

Synonyms: *Patellaria melacloides* Müll.Arg., *Bull. Herb. Boissier* 4: 94 (1896); *Catillaria melacloides* (Müll.Arg.) Zahlbr., *Cat. Lich. Univ.* 4: 20 (1926); *Megalospora sulphurata* var. *galactocarpa* (Zahlbr.) Zahlbr., *Cat. Lich. Univ.* 4, 90 (1926); *Megalospora melanoderma* var. *galactocarpa* (Zahlbr.) Kantvilas, *Lichenologist* 26, 362 (1994).

This taxon is distinguished from *Megalospora melanoderma* s. str. by the slightly smaller ascospores (28–40 × 16–24 µm versus 35–50 × 20–30 µm) with a smooth to weakly warted epispore and the pruinose or partly pruinose apothecia. In *M. galactocarpa*, the apothecial disc is dark reddish brown to brown-black and grey-pruinose at least in part or in some apothecia (particularly younger apothecia). Furthermore, although the epihymenium of *M. galactocarpa* is coloured similarly to that of *M. melanoderma* s. str., it contains colourless, elongate to ±isodiametric crystals 10–15 µm long that penetrate into the hymenium up to 70 µm and are K– (such crystals are absent in *M. melanoderma* s. str.). The chemistry of the apothecia of *M. galactocarpa* differs from that of *M. melanoderma* s. str. and *M. melanoderma* var. *purpurea*. Whereas the apothecia of *M. galactocarpa* contain galactocarpin [major], vioxanthin [minor] and demethylvioxanthin [trace], the apothecia of *M. melanoderma* s. str. and *M. melanoderma* var. *purpurea* contain demethylvioxanthin [major], vioxanthin [minor] (Sipman's compounds A and C, respectively; Sipman 1983) and norvioxanthin [trace]. Given the fact that *M. galactocarpa* is distinguished by the size of the ascospores, the pruinosity of the discs, and the chemistry of the apothecia, I consider that it warrants recognition at species level, and it is combined as such above.

The pigment vioxanthin was initially isolated from the microfungi *Trichophyton violaceum* Sabouraud ex Bodin (Blank *et al.* 1966) and *Penicillium citreo-viride* Biourge (Zeeck *et al.* 1979) and subsequently detected in the lichen *Hypotrachyna ossealba*

(Vain.) Park & Hale (Elix 2004). More recently, viioxanthin and demethylviioxanthin have been detected in *Buellia viioxanthina* Elix (Elix 2009). Galactocarpin is a colourless lichen metabolite of unknown structure whose ultraviolet spectrum most closely resembles that of pannarin. This compound is probably responsible for the elongate to isodiametric crystals present in the epihymenium and upper hymenium of *M. galactocarpa*.

SPECIMENS EXAMINED

[i]. **Megalospora galactocarpa**. *New South Wales*: • Cambewarra Road [Highway 79], 13 km N of Nowra, 34°47'S, 150°34'E, 380 m, on tree trunk in rainforest, *J.A. Elix 1841*, 13.iii.1976 (CANB); • below Tianjara Falls, 33 km NNW of Ulladulla, 35°07'S, 150°20'E, 380 m, on rainforest tree and mossy rocks in river bed, *J.A. Elix 5966*, 5971, 21.vi.1979 (CANB), *H. Streimann 7876* (CANB); • Sugarloaf Creek, Misty Mountain Road, Currowan State Forest, 35°35'S, 150°03'E, 100 m, on dead log in wet sclerophyll forest beside creek, *J.A. Elix 21570*, 14.vii.1987 (B, CANB); • Misty Mountain Road, Currowan State Forest, 23 km NW of Batemans Bay, 35°34'S, 159°59'E, 400 m, on trunk of *Atherosperma moschatum* in remnant rainforest, *J.A. Elix 22026*, 14.vii.1987 (B, CANB), on *Acmena* stem, *H. Streimann 42541*, 8.vi.1989 (B, CANB); • O'Sullivan's Gap Nature Reserve, Wang Wauk State Forest, 10 km NE of Bulahdelah, 32°19'S, 152°16'E, 200 m, on *Cryptocarya* in disturbed wet sclerophyll forest, *J.A. Elix 33850*, 16.viii.1993 (CANB); • Washpool National Park, Gibraltar Range, Hakea Walk, 78 km E of Glen Innes, 29°28'10"S, 152°21'01"E, 895 m, on dead tree in mixed rainforest with scattered *Eucalyptus*, *J.A. Elix 37282*, 37283, 2.v.2005 (CANB); • Sugarloaf Creek, Currowan State Forest, 19 km NW of Batemans Bay, 35°55'S, 150°03'E, 100 m, on vine in wet sclerophyll forest, *H. Streimann 37822*, 5.x.1986 (CANB); • Wauchope-Walcha road, Doyles River State Forest, 50 km W of Walcha, 31°25'S, 152°11'E, 800 m, on treelet stem in wet sclerophyll forest, *H. Streimann 38530*, 30.viii.1987 (B, CANB); • Gibraltar Range National Park, 56 km SE of Tenterfield, 29°29'S, 152°21'E, 870 m, on treelet stem in wet sclerophyll forest, *H. Streimann 43565*, 10.i.1990 (B, CANB); • Northern tablelands, Cattle Creek State Forest, Briggsvale, 12 km NNE of Dorrigo, 30°15'S, 152°03'E, 700 m, on *Banksia integrifolia* at rainforest margin, *D. Verdon 3836*, 3841A, 13.x.1978 (CANB); • North coast, Toonumbar Forest Way, 26 km NW of Kyogle, 28°30'S, 152°45'E, 45 m, on branch of fallen tree in *Eucalyptus* forest, *D. Verdon 3984A*, 18.x.1978 (CANB); • North coast, Mt Boss State Forest, Cockerawombeeba Creek, 46 km NW of Wauchope, 31°15'S, 152°20'E, 700 m, on branch of *Quintinia* in rainforest, *D. Verdon 4068*, 21.x.1978 (CANB).

[ii]. **Megalospora melanoderma** var. **melanoderma**. *New South Wales*: • Bruxner Park, 9 km NW of Coffs Harbour, 30°15'S, 153°07'E, 180 m, on tree trunk in rainforest, *J.A. Elix 3501*, 1.vii.1977 (CANB); • below Tianjara Falls, 33 km NNW of Ulladulla, 35°07'S, 150°20'E, 380 m, on mossy sandstone rocks in rainforest gully, *J.A. Elix 5993*, 21.vi.1979 (CANB); • Gloucester Tops, 32°04'S, 151°34'E, 1150 m, on *Nothofagus moorei* in rainforest, *G. Kantvilas 371/88*, 2.vii.1988 (HO); • Cascade Creek near Wrights Look-out, New England National Park, 30°30'S, 152°25'E, 1300 m, on *Nothofagus moorei* in rainforest, *G. Kantvilas 539/88*, 706/88, 6.viii.1988 (HO); • Weeping Rocks, New England National Park, 72 km E of Armidale, 30°30'S, 152°24'E, 1400 m, on *Elaeocarpus* trunk in rainforest, *H. Streimann*, 5.iv.1991 (B, CANB); • Northern tablelands, Barrington Tops National Park, Gloucester Tops, 34 km WSW of Gloucester, 32°04'S, 151°39'E, 1300 m, on tree trunk in *Nothofagus* rainforest, *D. Verdon 3747*, 3756, 3757, 10.x.1978 (CANB, H); • Northern tablelands, Cattle Creek State Forest, Briggsvale, 12 km NNE of Dorrigo, 30°15'S, 152°03'E, 700 m, on *Banksia integrifolia* at rainforest margin, *D. Verdon 3841*, 13.x.1978 (CANB); • Northern tablelands, Chaelundi Mountain, 37 km N of Ebor, 30°04'S, 152°21'E, 1376 m, on *Dysoxylum* trunk in rainforest, *D. Verdon 3881*, 14.x.1978 (CANB, M); • North coast, Mt Boss State Forest, Cockerawombeeba Creek, 46 km NW of Wauchope, 31°15'S, 152°20'E, 700 m, on branch of *Sloanea* in rainforest, *D. Verdon 4065*, 21.x.1978 (CANB, M).

Acknowledgements

I thank Neal McCracken (ANU Photography) for preparing the photograph, and the curators of CANB and HO for the loan of specimens.

References

- Blank, F; Ng, AS; Just, G (1966): Metabolites of Pathogenic Fungi V. Isolation and tentative structures of viioxanthin and viopurpurin, two coloured metabolites of *Trichophyton violaceum*. *Canadian Journal of Chemistry* **44**, 2873–2879.
- Elix, JA (2004): Viioxanthin from a lichen source. *Australasian Lichenology* **55**, 14–15.
- Elix, JA (2009): New crustose lichens (lichenized *Ascomycota*) from Australia. *Australasian Lichenology* **64**, 30–37.
- Elix, JA; Ernst-Russell, KD (1993): *A Catalogue of Standardized Thin-Layer Chromatographic Data and Biosynthetic Relationships for Lichen Substances*, 2nd Edn, Australian National University, Canberra.
- Elix, JA; Giralt, M; Wardlaw, JH (2003): New chloro-depsides from the lichen *Dimelaena radiata*. *Bibliotheca Lichenologica* **86**, 1–7.
- Kantvilas, G (1994): Additions to the family Megalosporaceae in Tasmania and mainland Australia. *Lichenologist* **26**, 349–366.
- Sipman, H (1983): A monograph of the lichen family Megalosporaceae. *Bibliotheca Lichenologica* **18**, 1–241.
- Zeeck, A; Russ, P; Laatsch, H; Loeffler, W; Wehrle, H; Zähner, H; Holst, H (1979): Isolierung des Antibiotiums *semi-Viioxanthin* aus *Penicillium citreo-viride* und Synthese des Xanthomegins. *Chemische Berichte* **112**, 957–978.

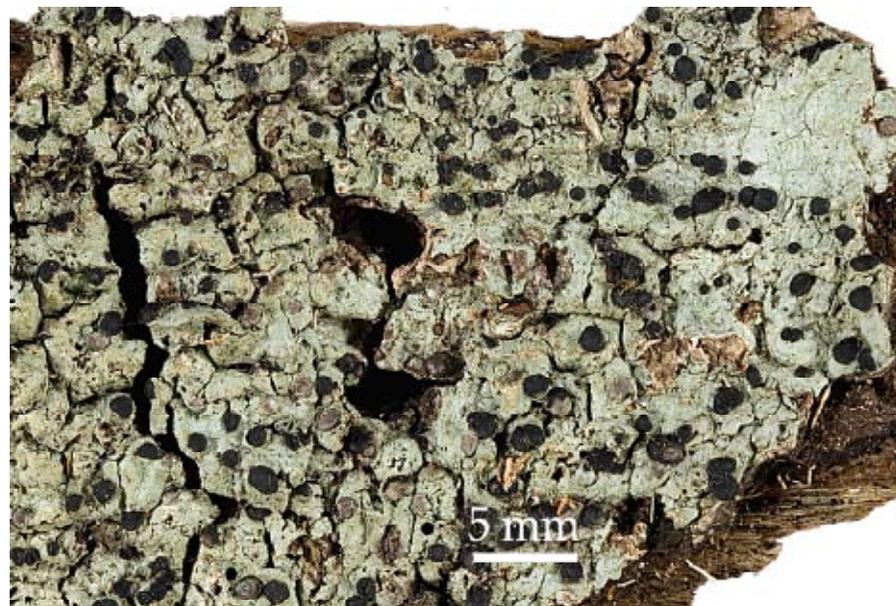


Fig. 1. *Megalospora melanoderma* var. *purpurea* (holotype in BRI).

**A new species, new combination, and new report
in the Australian Graphidaceae**

Alan W. Archer

National Herbarium of New South Wales
Mrs Macquaries Road, Sydney, N.S.W. 2000, Australia

John A. Elix

Research School of Chemistry, Building 33
Australian National University, Canberra, A.C.T. 0200, Australia

Abstract: *Phaeographis neutriconica* A.W.Archer & Elix is described as new to science, the new combination *Diorygma australasicum* (Elix) Lücking, Elix & A.W.Archer is made for *Leprocaulon australasicum* Elix, and *Acanthothecis abaphoides* (Nyl.) Staiger & Kalb is reported for the first time from Australia.

Australian Graphidaceae have been the subject of a monograph (Archer 2006), supplemented by additional new species and records (Archer 2007; Archer & Elix 2007a, 2007b, 2008a, 2008b), and most recently by a *Flora of Australia* treatment of the family (Archer 2009). A new species, new combination, and new record are documented here. The chemistry of the specimens was studied by thin-layer chromatography (Elix & Ernst-Russell 1993) and high-performance liquid chromatography (Elix *et al.* 2003).

Phaeographis neutriconica A.W.Archer & Elix, sp. nov. Figs 1 & 2
Similis *Phaeographis neutricosa* Redinger sed ascosporis majoribus et muriformibus, et lirellae marginibus thallinis conspicuis.

Type: *Northern Territory*: Litchfield National Park, below Florence Falls, 42 km SW of Batchelor, 13°05'58"S, 130°47'05"E, alt. 75 m, on *Ficus* twigs in monsoon forest with *Syzygium* and *Gordenia*, J.A. Elix 39419, 9.viii.2005 (holo: CANB).

Thallus pale olive-green, smooth and glossy, somewhat cracked, lacking soredia and isidia, corticolous. Apothecia lirelliform, sessile, scattered, simple or branched, 1–3 mm long, 0.15–0.30 mm wide, with conspicuous thalline margins. Epithecium black, white-pruinose; proper exciple non-carbonized, inconspicuous; hymenium 80–100 µm tall, not inspersed. Ascospores 8 per ascus, brown, elongate-ellipsoid, muriform, 24–30 µm long, 9–11 µm wide, with 6 transverse and 2 longitudinal locules; terminal locules usually undivided.

Chemistry: neutricone [major].

ADDITIONAL SPECIMENS EXAMINED

Northern Territory: • type locality, on *Ficus* twigs, J.A. Elix 39416, 9.viii.2005 (DNA); • on fallen branches, J.A. Elix 39443, 9.viii.2005 (CANB).

Phaeographis neutriconica is characterized by the brown, muriform ascospores, the simple to branched lirellae with conspicuous thalline margins, and the presence of neutricone. It is distinguished from the chemically similar *P. neutricosa* Redinger by the larger, muriform ascospores (24–30 × 9–11 µm versus 17–25 × 6–8 µm) and the simple to branched lirellae. In *P. neutricosa* the lirellae branch radially and form substelate clusters. A specimen of *P. neutricosa* (Elix 39429) collected at the same locality had brown, 4-locular ascospores (Fig. 3).

Etymology: The epithet *neutriconica* refers to the depsidone neutricone present in this new species.

This new species is known only from the type locality. Associated species include *Buellia rechingeri*, *Chrysothrix xanthina* (Vain.) Kalb, *Coccocarpia palmicola* (Spreng.) Arv.

& D.J.Galloway, *Coenogonium luteum* (Dicks.) Kalb & Lücking, *Cratiria lauricassiae* (Fée) Marbach, *Cryptothecia faveomaculata* Makhija & Patw., *Dirinaria consimilis* (Stirt.) D.D.Awasthi, *D. picta* (Sw.) Schaer. ex Clem., *Fellhanera tropica* Elix, *Letrouitia leprolytoides* S.Kondr. & Elix and *Pertusaria velata* (Turner) Nyl.

Acanthothecis abaphoides (Nyl.) Staiger & Kalb, *Mycotaxon* 73, 93 (1999) Fig. 4
Type: United States of America. *Florida*: Jacksonville, on *Persea*, Eckfeldt & Calkins 107; holotype: H-NYL 6862 *n.v.*, *vide* Staiger & Kalb, *loc. cit.*

Thallus off-white to pale grey; surface minutely subtuberculate, corticolous. Apothecia lirelliform, white, scattered, sessile, simple, straight or curved, 1–2 mm long, 0.3–0.5 mm wide, with swollen thalline margins; lips closed. Exciple non-carbonized, indistinct. Hymenium 150–170 µm tall, not inspersed. Ascospores 1–2 per ascus, ellipsoid, long-tapering, hyaline, muriform, the terminal locules becoming somewhat enlarged, 80–105 µm long, 18–22 µm wide, 1–

Chemistry: protocetraric acid [major].

SPECIMENS EXAMINED

Northern Territory: • Litchfield National Park, below Florence Falls, 42 km SW of Batchelor, 13°05'58"S, 130°47'05"E, alt. 75 m, on fallen branches in monsoon forest with *Syzygium* and *Gordenia*, J.A. Elix 39435, 39452, 39458, 9.viii.2005 (CANB).

Acanthothecis abaphoides is characterized by the non-amyloid, muriform ascospores, the non-carbonized exciple, and the presence of protocetraric acid. The ascospores have somewhat enlarged terminal locules, which distinguishes this species from the similar *A. hololeucooides* (Nyl.) Staiger & Kalb (Staiger & Kalb 1999). The chemically identical and morphologically similar *A. borealis* A.W.Archer & Elix (Archer & Elix 2007b) has smaller (40–56 µm long), 16–18-locular ascospores. *Acanthothecis abaphoides* is also known from Brazil and Paraguay. The genus *Acanthothecis* now contains 21 species (Lücking & Rivas Plata 2008), seven of which occur in Australia.

Diorygma australasicum (Elix) Lücking, Elix & A.W.Archer, comb. nov. Figs 5 & 6
Basionym: *Leprocaulon australasicum* Elix, *Mycotaxon* 94, 221 (2005)

Type: *Norfolk Island*: • Norfolk Island National Park, West Palm Glen Track, 29°01'06"S, 167°56'33"E, alt. 140 m, on base of *Cyathea* in subtropical forest, J.A. Elix 29042, 16.vi.1992 (holo: CANB).

When this species was first described (Elix 2005), only ecorticate, isidiate specimens were available. More recently, a partially pseudocorticate specimen with immature lirellae (Fig. 5) was discovered, and although the lirellae contained no mature asci, their morphology (exciple non-carbonized, hymenium not inspersed) as well as that of the ecorticate isidia (Fig. 6) and the chemistry were entirely consistent with the genus *Diorygma* Eschw. (Kalb *et al.* 2004). This species contains protocetraric acid [major], salazinic acid [minor], norstictic acid [minor] and atranorin [minor]. It is distinguished from the chemically identical *D. rufopruinosum* (A.W.Archer) Kalb, Staiger & Elix by the presence of ecorticate isidia. The isidia are initially globose, but they become elongate-cylindrical, delicate, fragile, simple or coralloid-branched and entangled, erect or ±decumbent, 0.1–1.0 mm high, 0.10–0.15 mm thick, bearing small, leprose-arachnoid granules, 20–70 µm wide, often with dense, projecting hyphae up to 20 µm long.

ADDITIONAL SPECIMENS EXAMINED

Queensland: • Paluma Rainforest Walk, Paluma, 19°00'27"S, 146°12'24"E, alt. 830 m, on tree trunk at margins of rainforest, J.A. Elix 37587, 24.vii.2006 (CANB); • Broadwater

State Forest Park, 45 km NW of Ingham, 18°25'01"S, 145°56'38"E, alt. 50 m, on base of *Eucalyptus* at margins of rainforest along the Herbert River, J.A. Elix 38604, 26.vii.2006 (CANB); • Tully River State Forest Park, 45 km NW of Tully, 17°46'24"S, 145°39'00"E, alt. 80 m, on *Eucalyptus* trunk in storm-damaged rainforest, J.A. Elix 39057, 28.vii.2006 (CANB).

Norfolk Island: • Track between Mt Pitt and Mt Bates, Mount Pitt National Park, 29°00'50"S, 167°56'05"E, alt. 270 m, on dead *Cyathea* in disturbed subtropical forest, J.A. Elix 27357, 27367, 15.vi.1992 (CANB).

Acknowledgements

We thank Dr Robert Lücking (Chicago) for his suggestions regarding the identity of *Diorygma australasicum*, and Dr Christine Cargill and Ms Judith Curnow (CANB) for their assistance with the loan of specimens.

References

- Archer, AW (2006): The lichen family Graphidaceae in Australia. *Bibliotheca Lichenologica* **94**, 1–191.
- Archer, AW (2007): Additional lichen records from Australia 63. *Graphis cleistoblephara* Nyl. and *G. plagiocarpa* Fée. *Australasian Lichenology* **61**, 6–7.
- Archer, AW (2009): Graphidaceae. *Flora of Australia* **57**, 84–194.
- Archer, AW; Elix, JA (2007a): New species and new reports in the Australian Graphidaceae. *Telopea* **11**, 451–462.
- Archer, AW; Elix, JA (2007b): Two new species in the Australian Graphidaceae (lichenised Ascomycotina). *Australasian Lichenology* **61**, 18–20.
- Archer, AW; Elix, JA (2008a): Two new species in the Australian Graphidaceae (lichenised Ascomycotina). *Australasian Lichenology* **63**, 26–29.
- Archer, AW; Elix, JA (2008b): Additional lichen records from Australia 66. Graphidaceae. *Australasian Lichenology* **62**, 9–13.
- Elix, JA (2005): New species of sterile crustose lichens from Australasia. *Mycotaxon* **94**, 219–224.
- Elix, JA; Ernst-Russell, KD (1993): *A Catalogue of Standardized Thin-Layer Chromatographic Data and Biosynthetic Relationships for Lichen Substances*, 2nd Edn, Australian National University, Canberra.
- Elix, JA; Giralt, M; Wardlaw, JH (2003): New chloro-depsides from the lichen *Dimelaena radiata*. *Bibliotheca Lichenologica* **86**, 1–7.
- Kalb, K; Staiger, B; Elix, JA (2004): A monograph of the lichen genus *Diorygma* — a first attempt. *Symbolae Botanicae Upsalienses* **34**, 133–181.
- Lücking, R; Rivas Plata, E (2008): Clave y gu' a iustrada para géneros de Graphidaceae. *Glalia* **1**, 1–41.



Fig. 1. *Phaeographis neutriconica*, holotype (CANB). Fig. 2. *Phaeographis neutriconica*, ascospores.



Fig. 3. *Phaeographis neotricosa* Redinger, Elix 39429 (CANB). Fig. 4. *Acanthothecis abaphoides*, Elix 39435 (CANB).



Fig. 5. *Diorygma australasicum*, isidia, Elix 27367 (CANB). Fig. 6. *Diorygma australasicum*, lirellae, Elix 27357 (CANB).

**New taxa and new reports of Australian *Pertusaria*
(lichenized Ascomycota, Pertusariaceae)**

Alan W. Archer

National Herbarium of New South Wales
Mrs Macquaries Road, Sydney, N.S.W. 2000, Australia

John A. Elix

Research School of Chemistry, Building 33,
Australian National University, Canberra, A.C.T. 0200, Australia

Abstract: *Pertusaria albopunctata* A.W.Archer & Elix, *P. alectoronica* var. *thiophanica* Kantvilas, Elix & A.W.Archer, *P. georgeana* var. *methylstenosporica* A.W.Archer & Elix, *P. georgeana* var. *occidentalis* Elix & A.W.Archer, *P. minispora* A.W.Archer & Elix and *P. tjaetabensis* A.W.Archer & Elix are described as new to science. The new name *Pertusaria malmei* A.W.Archer & Elix is proposed for *Pertusaria quassiae* (Fée) Nyl. var. *sordida* Malme. *Pertusaria subradicans* Müll.Arg. and *P. malmei* are reported for the first time from Australia.

As part of a continuing study of the genus *Pertusaria* in Australia (Archer & Elix 2009; Elix & Archer 2007a, 2007b; Elix *et al.* 2008; Kantvilas & Elix 2008), a number of specimens from various regions of Australia have been examined and found to include several new taxa or new records for Australia.

The chemistry of the species was studied by thin-layer chromatography (Elix & Ernst-Russell 1993), high-performance liquid chromatography (Elix *et al.* 2003) and comparison with authentic samples.

The new taxa

Pertusaria albopunctata A.W.Archer & Elix, *sp. nov.*

Fig. 1

Similaris *Pertusaria scaberula* sed acidum sticticum continens vice acidum thamnolicum.

Type: Australia. *Queensland:* Zillie Falls, 12 km by road NE of Millaa Millaa, 17°28'29"S, 145°39'22"E, alt. 705 m, on fallen tree in remnant rainforest near falls, *J.A. Elix* 39499, 29.vii.2006 (BRI – holotype).

Thallus pale olive-green, thin, somewhat discontinuous, surface smooth and dull, lacking isidia, sorediate, the soredia in well-defined soralia, corticolous. *Soralia* white, scattered, sessile, becoming subhemispherical, sometimes forming sterile, sorediate discs, 0.3–0.8 mm diam. *Apothecia* not seen.

Chemistry: Stictic acid (major), constictic acid (minor), peristictic acid (trace), cryptostictic acid (trace), ± substictic acid (trace), ± hypostictic (trace) and norstictic acid (trace).

Etymology: The specific epithet is derived from the Latin *albus*, white, and *punctatus*, dotted, in reference to the scattered white soralia.

Remarks:

The new species is characterized by the sorediate thallus, the absence of apothecia and the presence of the stictic acid chemosynthetic syndrome. It resembles *P. scaberula* A.W.Archer in morphology, but that species contains thamnolic acid.

This new species occurs on branches of trees in and at the margins of montane tropical and subtropical rainforest in eastern Queensland. Associated species include *Haematomma africanum* (J.Steiner) C.W.Dodge, *Heterodermia japonica* (Sato) Swinscow & Krog, *Hypotrachyna osseocalba* (Vain.) Y.S.Park & Hale, *Lecanora achroa* Nyl., *Lobaria discolor* (Bory) Hue, *Megalospora melanodermia* var. *purpurea* Elix, *Pertusaria velata* (Turner) Nyl., *P. verdonii* A.W.Archer & Elix, *Pseudocyphellaria pickeringii* (Tuck.) D.J.Galloway, *P. rigida* (Müll.Arg.) D.J.Galloway, *P. sayeri* D.J.Galloway and *Usnea rubicunda* Stirt.

SPECIMENS EXAMINED

Queensland: • Bunya Mountains National Park, Cherry Plains Picnic Area, along track to Westcott Picnic Area, 26°51'03"S, 151°33'43"E, alt. 1025 m, on exposed root in margin of rainforest, *J.A. Elix* 38810, 7.v.2005 (CANB); • Millaa Millaa Falls, 4 km S of Millaa Millaa, 17°29'44"S, 145°36'41"E, alt. 750 m, on fallen branches in remnant rainforest near falls, *J.A. Elix* 39311, 29.vii.2006 (CANB).

Pertusaria alectoronica* var. *thiophanica Kantvilas, Elix & A.W.Archer, *var. nov.* Fig. 2
Similaris *Pertusaria alectoronica* var. *alectoronica* sed acidum thiophanicum continens differt.

Type: Australia. *Tasmania:* Flinders Island, summit of Mt Killiecrankie, 39°49'S, 147°52'E, alt. 310 m, on *Banksia marginata* in sheltered scrub among large boulders, *G. Kantvilas* 28/06, 22.i.2006 (HO – holotype).

Thallus pale grey-green to grey-white, thick, cracked-areolate, corticolous, surface verrucose, dull to slightly shiny, lacking soredia, isidiate. *Isidia* numerous, simple and cylindrical at first, ultimately becoming densely coralloid-branched, dark grey-green, the apices ±swollen and becoming dark brown to black-tipped, 0.2–2.0 mm tall, 0.08–0.18 mm diam. *Apothecia* and *pycnidia* not seen.

Chemistry: Alectoronic acid (major), thiophanic acid (minor), methyl pseudoalectoronate (trace), and beta-alectoronic acid (trace).

Etymology: The varietal name refers to the occurrence of thiophanic acid in this taxon.

Remarks:

This taxon is characterized by the pale grey-green to grey-white thallus, the isidiate upper surface and the presence of alectoronic and thiophanic acids. It is morphologically identical to *P. alectoronica* var. *alectoronica* Elix & A.W.Archer, but the latter differs chemically in containing 4,5-dichlorolichexanthone (minor) in addition to alectoronic acid (major), and it occurs on lignin rather than bark (Elix & Archer 2007a).

At present this distinctive new variety is known from only the type locality, where it occurs on the bark of *Banksia marginata*. Commonly associated species include *Hypogymnia lugubris* (Pers.) Krog, *H. mundata* (Nyl.) Oxner ex Rassad., *Menegazzia pertransita* Stirt., *Maronea constans* (Nyl.) Hepp, *Mycoblastus coniophorus* (Elix & A.W.Archer) Kantvilas & Elix, *Pannoparmelia wilsonii* (Räsänen) D.J.Galloway, *Tasmidella variabilis* Kantvilas, Hafellner & Elix, *Usnea oncodes* Stirt., and *U. rubrotincta* Stirt.

Pertusaria georgeana* var. *methylstenosporica A.W.Archer & Elix, *var. nov.* Fig. 3
Similaris *Pertusaria georgeana* var. *georgeana* sed acidum 2-O-methylstenosporicum continens.

Type: Australia. *New South Wales:* Goonoo State Forest, Denmire Creek, 32 km ESE of Gilgandra, 31°55'43"S, 148°59'32"E, alt. 370 m, on dead branch of *Eucalyptus* in open *Eucalyptus* woodland, *J.A. Elix* 38214, 12.x.2005 (CANB – holotype).

Thallus crustose, greyish white to pale olive-green, corticolous, thin, sometimes discontinuous, somewhat shiny, isidiate, lacking soredia. *Isidia* numerous, inconspicuous, often abraded and present only in sheltered cavities in the substratum, concolorous with the thallus, 0.1–0.2 mm tall, 0.05 mm diam., becoming coarsely sorediate with age. *Apothecia* not seen.

Chemistry: 4,5-dichlorolichexanthone (minor), 2-O-methylperlatolic acid (major) and 2-O-methylstenosporic acid (submajor).

Etymology: The name is derived from 2-O-methylstenosporic acid, a major compound in this new variety.

Remarks:

Pertusaria georgeana var. *methylstenosporica* is characterized by the isidiate thallus and the chemistry (see discussion under var. *occidentalis*).

At present it is known from only the type locality on the central-western slopes of New South Wales, where associated species include *Hypogymnia billardierei* (Kremp.) Filson, *Pannoparmelia wilsonii* (Räsänen) D.J.Galloway, *Parmelia pseudotenuirima* Gyeln., *Parmelina conlabrosa* (Hale) Elix & J.Johnst., *Punctelia subalbicans* (Stirt.) D.J.Galloway & Elix, *Pyrrhospora arandensis* Elix, *Ramboldia brunneocarpa* Kantvilas & Elix and *Tephromela alectronica* Kalb.

Pertusaria georgeana* var. *occidentalis Elix & A.W.Archer, *var. nov.* Fig. 4
Similis *Pertusaria georgeana* var. *georgeana* sed acidum 2-*O*-methylconfluenticum continens differt.

Type: Australia. *Western Australia:* Brookton Highway Nature Reserve, Darling Plateau, 25 km W of Brookton, 32°23'50''S, 116°44'03''E, alt. 285 m, on dead wood in open *Eucalyptus* woodland, J.A. Elix 38727, 5.iv.2006 (PERTH – holotype; CANB – isotype).

Thallus crustose, off-white to dull fawn or pale olive-green, corticolous or lignicolous, surface dull, smooth or subtuberculate, somewhat shiny, isidiate. *Isidia* inconspicuous, numerous, concolorous with the thallus, 0.1–0.2 mm tall, 0.05 mm diam., globose at first, proliferating or becoming blastidiate and coarsely sorediate with age. *Apothecia* and *pycnidia* not seen.

Chemistry: 4,5-dichlorolichexanthone (minor) and 2-*O*-methylconfluentic acid (major), planaic acid (minor or trace).

Etymology: The name refers to the occurrence of this variety in Western (Latin, *occidentalis*) Australia.

Remarks:

This taxon is characterized by the off-white to dull fawn or pale olive-green thallus, the isidiate-blastidiate upper surface, and the presence of 4,5-dichlorolichexanthone, 2-*O*-methylconfluentic acid and minor or trace amounts of planaic acid. It is morphologically identical to *P. georgeana* var. *georgeana* A.W.Archer & Elix, but the latter differs chemically in containing 4,5-dichlorolichexanthone (minor) and 2-*O*-methylperlatolic acid (major), and it has a broader distribution (Queensland, New South Wales and the Australian Capital Territory) (Archer 2004, Elix & Archer 2007b).

Pertusaria georgeana var. *occidentalis* occurs on dead wood or on the bases of *Eucalyptus* trees in open *Eucalyptus* woodland. At present this new variety is known from only the type locality, where associated species include *Hertelidea pseudobotryosa* R.C.Harris, Ladd & Printzen, *Hypocenomyce australis* Timdal, *H. isidiosa* Elix, *Ochrolechia africana* Vain., *Parmelina pseudorelicina* (Jatta) Kantvilas & Elix, *Ramboldia subnexa* (Stirt.) Kantvilas & Elix and *Usnea inermis* Motyka.

SPECIMEN EXAMINED

Western Australia: • Type locality, on dead wood, J.A. Elix 38720, 5.iv.2006 (CANB, HO, PERTH).

Pertusaria minispora A.W.Archer & Elix, *sp. nov.* Fig. 5
Similis *Pertusaria pertractata* sed acidum perlatolicum continens vice acidum 2'-*O*-methylperlatolicum.

Type: Australia. *Victoria:* Bemm River Scenic Reserve, 45 km E of Orbost, 37°37'30''S, 148°53'12''E, alt. 65 m, on *Pomaderris* in margin of warm-temperate rainforest and *Eucalyptus* woodland, J.A. Elix 38692, 15.iv.2008 (MEL – holotype).

Thallus off-white to pale olive-green, thin, surface smooth and dull, lacking isidia and soredia, corticolous. *Apothecia* verruciform, scattered, flattened-hemispherical, 0.5–1.0 mm diam. *Ostioles* pale, inconspicuous, 1–2 per verruca. *Ascospores* 8 per ascus, hyaline, ellipsoid, smooth, 36–46 µm long, 14–17 µm wide.

Chemistry: 4,5-dichlorolichexanthone (major) and perlatolic acid (major).

Etymology: The epithet is derived from the Greek *minys* (little) and *spora* (seed), a reference to the small ascospores.

Remarks:

This new species is characterized by the small ascospores and the presence of perlatolic acid and 4,5-dichlorolichexanthone. It resembles the common *P. pertractata* Stirt. in appearance and ascospore morphology, but is distinguished by the presence of perlatolic rather than 2'-*O*-methylperlatolic acid. Perlatolic acid derivatives are common in the genus *Pertusaria*, but the parent compound is rarely found as a major substance (although it can occur in minor or trace amounts). Perlatolic acid is found as a major compound together with norstictic acid (in *P. hartmannii* Müll.Arg. from Australia and *P. subobductans* Nyl. from Japan), with glomelliferic acid (in *P. corrugata* Kremp. from Brazil) and with thiophaninic acid (in *P. injuneana* A.W.Archer & Elix from Australia).

At present this new species is known from only the type locality in eastern-coastal Victoria, where associated species include *Chrysothrix sulphurella* (Räsänen) Kantvilas & Elix, *Hypogymnia pulverata* (Nyl.) Elix, *Lepraria lobificans* Nyl., *Megalaria grossa* (Pers. ex Nyl.) Hafellner, *Parmelina pseudorelicina* (Jatta) Kantvilas & Elix, *Phlyctis subuncinata* Stirt., *Phyllopsora foliata* (Stirt.) Zahlbr. and *Usnea rubrotincta* Stirt.

Pertusaria tjaetabensis A.W.Archer & Elix, *sp. nov.* Fig. 6
Similis *Pertusaria ceylonica* sed ascoporis minoribus et acidum 2-*O*-methylperlatolicum continens.

Type: Australia. *Northern Territory:* Litchfield National Park, Greenant Creek, trail to Tjaetaba Falls, 60 km SW of Batchelor, 13°12'04''S, 130°42'03''E, alt. 60 m, on dead wood in monsoon vine forest, with *Carallia* and *Calophyllum*, J.A. Elix 38407, 5.viii.2005 (CANB – holotype).

Thallus off-white to pale olive-green, thin, the surface subtuberculate and shiny, cracked, lacking isidia and soredia, corticolous. *Apothecia* verruciform, scattered, rarely confluent, flattened-hemispherical, 0.3–1.2 mm diam. *Ostioles* inconspicuous, black, 1(–2) per verruca. *Ascospores* ellipsoid, hyaline, smooth, (2–)3(–4) per ascus, 70–88(–100) × 26–34 µm.

Chemistry: 2,4,5-trichlorolichexanthone (minor), 2,5-dichlorolichexanthone (minor), 2,4-dichlorolichexanthone (trace), 2-*O*-methylperlatolic acid (major), 2-*O*-methylhyperlatolic acid (minor), planaic acid (minor), methyl planaiate (minor), stictic acid (major), constictic acid (minor), cryptostictic acid (trace) and peristictic acid (trace).

Etymology: The epithet *tjaetabensis* is derived from Tjaetaba Falls, the type locality.

Remarks:

This new species is characterized by asci with predominantly 3 ascospores, and the presence of 2,4,5-trichlorolichexanthone, 2-*O*-methylperlatolic and stictic acids as major compounds. It is distinguished from the somewhat similar *P. ceylonica* Müll.Arg. (Müller 1884a) by its shorter ascospores [(75–)95–125(–135) µm long in *P. ceylonica*] and the presence of 2-*O*-methylperlatolic acid and other perlatolic acid derivatives, substances that are absent in *P. ceylonica*. The new species is also morphologically and chemically similar to *P. aquilonia* A.W.Archer & Elix (Archer 1997), a species with 3(–4) ascospores per ascus and containing 2,4,5-trichlorolichexanthone (minor), 2,5-dichlorolichexanthone (minor), 2-chlorolichexanthone (minor), 2,4-dichlorolichexanthone (trace), 2-*O*-methylperlatolic acid (major), 2'-*O*-methylperlatolic acid (trace), and planaic acid (trace), but lacking stictic acid and its derivatives. Whereas *P. aquilonia* occurs in Queensland and *P. ceylonica* in Queensland, the Northern Territory, Sri Lanka, Indonesia and Papua New Guinea, this new species is known from only the type locality in the Northern Territory.

Commonly associated species include *Chrysothrix xanthina* (Vain.) Kalb, *Coccocarpia palmicola* (Spreng.) Arv. & D.J.Galloway, *Coenogonium luteum* (Dicks.) Kalb & Lücking, *Cratiria lauricassiae* (Fée) Marbach, *Cryptothecia faveomaculata* Makhija & Patw., *Dirinaria consimilis* (Stirt.) D.D.Awasthi, *D. picta* (Sw.) Schaer. ex Clem., *Fellhanera tropica* Elix, *Hafellia rechingeri* (Zahlbr.) Marbach, *Letrouitia leprolytoides* S.Kondr. & Elix and *Pertusaria velata* (Turner) Nyl.

SPECIMEN EXAMINED

Northern Territory: • Type locality, on dead wood, J.A. Elix 38410, 5.viii.2005 (CANB).

New Records for Australia

Pertusaria malmei Elix & A.W.Archer, *nom. nov.*

Fig. 7

Basionym: *Pertusaria quassiae* (Fée) Nyl. var. *sordida* Malme, *Ark. Bot.* **28A**, 13 (1936)

Type: Brazil. *Matto Grosso*: Cuyabá, G. Malme 2086, 7.xii.1895 (S – holotype).

Thallus off-white to greyish green, surface smooth and dull, cracked, lacking isidia and soredia, corticolous. *Apothecia* verruciform, numerous, rarely confluent, flattened-sub-spherical to flattened-hemispherical, 0.5–1 mm diam. *Ostioles* inconspicuous, pale grey, translucent, 1 per verruca. *Ascospores* 4 per ascus, elongate-ellipsoid, hyaline, smooth, 80–94 × 25–36 µm.

Chemistry: 4,5-dichlorolichexanthone (major), 4-chlorolichexanthone (trace) and 2-*O*-methylperlatolic acid (major).

Etymology: The epithet *malmei* honours the original collector, the Swedish botanist G.O.A. Malme.

Remarks:

Pertusaria malmei is morphologically similar to *P. quassiae* var. *quassiae*, but is chemically distinct. Whereas *P. quassiae* var. *quassiae* contains arthothelin, 6-*O*-methylarthothelin, stictic and constictic acids as major compounds (K. Kalb *in litt.*), *P. malmei* (*P. quassiae* var. *sordida*) contains 4,5-dichlorolichexanthone and 2-*O*-methylperlatolic acid. As a consequence, we have raised var. *sordida* to species level under the name *P. malmei* (the epithet *sordida* is already taken as *P. sordida* A.W.Archer (1991), hence the need for a new name). Malme himself suggested that his variety might be a new species, “Forsan species autonoma” (Malme *loc. cit.*)

Pertusaria malmei is chemically and morphologically similar to the Australian *P. doradorensis* Elix & A.W.Archer, but that species has longer ascospores [(82–)95–125 µm] and contains additional planaic acid (Elix *et al.* 1997).

Pertusaria malmei was previously known from Brazil, but it is new to Australia.

SPECIMEN EXAMINED

New South Wales: • Cookamidgera State Forest, 3.5 km SSW of Cookamidgera, 33°13'43"S, 148°16'54"E, alt. 345 m, on dead stump in *Eucalyptus* woodland, J.A. Elix 39075, 4.viii.2008 (CANB).

Pertusaria subradians Müll.Arg., *Flora* **67**, 463 (1884)

Fig. 8

Ceylon [Sri Lanka], *s. loc.*, G. Thwaites *s.n.*, 1876 (G – holotype).

Thallus greyish green, surface smooth and shiny, cracked, lacking isidia and soredia, corticolous. *Apothecia* verruciform, inconspicuous, scattered, sometimes confluent, very flattened-hemispherical 0.5–1.0(–1.5) mm diam. *Ostioles* inconspicuous, pale grey, translucent, 1 per verruca. *Ascospores* 2 per ascus, elongate-ellipsoid, hyaline, smooth, 100–115 × 24–30 µm.

Chemistry: 4,5-dichlorolichexanthone (minor), 2'-*O*-methylperlatolic acid (major), stictic acid (major), constictic acid (minor) and traces of peristictic, cryptostictic and substictic acids.

Remarks:

This species is characterized by asci with 2 smooth-walled ascospores per ascus, and a distinctive chemistry. It is morphologically similar to *P. pseudococcodes* Müll. Arg. (Müller 1884b), which also occurs in Sri Lanka, but the ascospores in the latter are shorter and wider [82–105 × 30–37 µm], and it differs chemically in lacking 2'-*O*-methylperlatolic acid. *Pertusaria subradians* is also morphologically similar to *P. pycnothelia* Nyl. from New Caledonia (Nylander 1868), but the ascospores in that species are larger [95–125 × 30–37 µm], and it differs in lacking stictic acid.

SPECIMEN EXAMINED

Queensland: • Girringun National Park, Yamanie Section, 14 km WNW of Abergowrie, 18°24'49"S, 145°46'18"E, alt. 55 m, on dead branch in remnant rainforest along Herbert River, J.A. Elix 38500, 26.vii.2006 (CANB).

Acknowledgements

We thank Neal McCracken (ANU Photography) for preparing the photographs of *P. alectoronica* var. *thiophanica* and *P. georgeana* var. *occidentalis*.

References

- Archer AW (1997): The lichen genus *Pertusaria* in Australia. *Bibliotheca Lichenologica* **69**, 1–249.
- Archer, AW (2004): *Pertusaria*. *Flora of Australia* **56A**, 116–172.
- Archer, AW; Elix, JA (2009): New species and new reports in the lichen genus *Pertusaria* (Ascomycota: Pertusariaceae) from Australasia. *Nova Hedwigia* **88**, 1–10.
- Elix, JA; Ernst-Russell, KD (1993): *A Catalogue of Standardized Thin-Layer Chromatographic Data and Biosynthetic Relationships for Lichen Substances*, 2nd Edn. Australian National University, Canberra.
- Elix, JA; Aptroot, A; Archer, AW (1997): The lichen genus *Pertusaria* (lichenised Ascomycotina) in Papua New Guinea and Australia: twelve new species and thirteen new reports. *Mycotaxon* **64**, 17–35.
- Elix, JA; Archer, AW (2007a): Four new species of *Pertusaria* (lichenised Ascomycota) from Australia. *Australasian Lichenology* **60**, 20–25.
- Elix, JA; Archer, AW (2007b): A new variety of *Pertusaria georgeana* (lichenised Ascomycota) containing a new depside. *Australasian Lichenology* **61**, 26–29.
- Elix, JA; Giralt, M; Wardlaw, JH (2003): New chloro-depsides from the lichen *Dimelaena radiata*. *Bibliotheca Lichenologica* **86**, 1–7.
- Elix, JA; Jariangpraesert, S; Archer, AW (2007b): New *Pertusaria* (lichenised Ascomycota) from Australia and Thailand. *Telopea* **12**, 263–272.
- Kantvilas, G; Elix, JA (2008): Additions to the lichen genus *Pertusaria* in Tasmania. *Sauteria* **15**, 249–263.
- Müller, J (1884a): Lichenologische Beiträge XIX. *Flora* **67**, 349–354.
- Müller, J (1884b): Lichenologische Beiträge XIX. *Flora* **67**, 283–289.
- Nylander, W (1868): Synopsis Lichenum Novae Caledoniae. *Bulletin de la Société Linnéenne de Normandie*, sér. 2, **2**, 38–140.

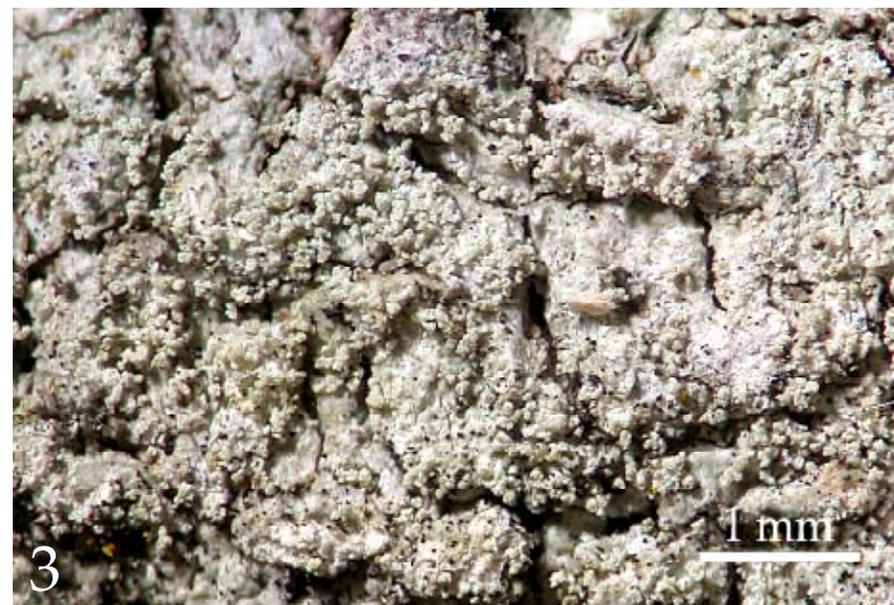


Figure: 1. *Pertusaria albopunctata* (holotype in BRI); 2. *Pertusaria alectoronica* var. *thiophanica* (holotype in HO).

3. *Pertusaria georgeana* var. *methylstenosporica* (holotype in CANB); 4. *Pertusaria georgeana* var. *occidentalis* (holotype in PERTH).



5. *Pertusaria minispora* (holotype in MEL); 6. *Pertusaria tjaetabensis* (holotype in CANB).



7. *Pertusaria malmei* (J.A. Elix 39075 in CANB); 8. *Pertusaria subradians* (J.A. Elix 38500 in CANB).

***Platythecium nothofagi* (A.W.Archer) A.W.Archer,
a new combination in the Australian Graphidaceae**

Alan W. Archer

National Herbarium of New South Wales
Mrs Macquaries Road, Sydney, N.S.W. 2000, Australia
e-mail: alanw.archer@bigpond.com

Abstract: The Australian endemic species *Diorygma nothofagi* (A.W.Archer) A.W.Archer is transferred to the genus *Platythecium* as *P. nothofagi* (A.W.Archer) A.W.Archer.

Diorygma nothofagi (A.W.Archer) A.W.Archer, based on *Graphina nothofagi* A.W.Archer (Archer 2001), was included in a recent account of the Australian Graphidaceae (Archer 2009). Although not specifically excluded from *Diorygma* in a recent monograph of the genus, *D. nothofagi* was not listed as an accepted species of that genus (Kalb *et al.* 2004). Now the examination of additional specimens suggests that this taxon was incorrectly placed in *Diorygma*. In particular, the well-developed thallus, the small ascospores, the simple, unbranched paraphyses and the epruinose disc are incompatible with *Diorygma*, and the species is better accommodated in *Platythecium*. *Platythecium* was erected by Staiger (Staiger 2002) to accommodate species with small, c. 20 µm long ascospores (which can be transversely locular or muriform), simple or rarely branched paraphyses, open, epruinose discs and a well-developed thallus.

Platythecium nothofagi (A.W.Archer) A.W.Archer, *comb. nov.*
Basionym: *Graphina nothofagi* A.W.Archer, *Mycotaxon* 77, 172 (2001)
Diorygma nothofagi (A.W.Archer) A.W.Archer, *Australasian Lichenology* 56, 10 (2005)

Type: *New South Wales*: • Tweed Range, Wiangaree Forest Drive, Antarctic Beech Walk, G. *Kantvilas* 644/88, 3.viii.1988 (holotype – NSW 219582; isotype – HO).

Thallus pale fawn to pale olive-green, well-developed, 80–100 µm thick, corticolous, surface smooth and glossy. Apothecia lirelliform, with well-developed thalline margins, numerous, sessile, straight, curved or sinuous, often branched, 2–6 mm long, 0.3–0.5 mm wide, lips initially closed, opening to reveal the reddish brown to brown, epruinose epithecium. Proper exciple inconspicuous, yellowish brown, not carbonized. Hymenium 75–100 µm tall, not interspersed, I–. Paraphyses simple. Ascospores 8 per ascus, irregularly 2-seriate, narrowly ellipsoid, hyaline, 18–23 × 6–8 µm, 5–6 × 2–3-locular, I+ blue.

Chemistry: norstictic acid (major), connorstictic acid (trace to minor), ± subnorstictic acid (minor).

Illustration: A.W. Archer, *Mycotaxon* 77, 175, Fig. 32 (2001), as *Graphina nothofagi*.

Platythecium nothofagi is a rare, endemic corticolous species found in Queensland and New South Wales in rainforest at altitudes of 700–1050 m; reported substrata include *Nothofagus* and *Doryphora*.

SPECIMENS EXAMINED

Queensland: • Springbrook, track to Purlingbrook Falls, 28°10'S, 153°16'E, alt. c. 800 m, A.W. Archer G635, x.2001 (NSW); • Millaa Millaa Falls, 4 km S of Millaa Millaa, 17°30'S, 145°37'E, alt. 750 m, J.A. Elix 39288, vii.2006 (CANB); • Ellinja Falls, c. 5 km ENE of Millaa Millaa, 17°30'S, 149°32'E, alt. 705 m, J.A. Elix 39608, vii.2006 (CANB).
New South Wales: • 1 km W of Mount Banda Banda, alt. 1050 m, G. *Kantvilas* 499/88, vii.1988 (HO, NSW).

Remarks:

This species is characterized by the long, thin lirellae with conspicuous, raised thalline margins, the absence of a carbonized exciple and the presence of norstictic acid. It is distinguished from the chemically similar *Diorygma erythrellum* (Mont.) Kalb, Staiger & Elix by the smaller ascospores.

Platythecium nothofagi resembles *P. grammitis* (Fée) Staiger (cf. Lücking & Rivas Plata 2008, p. 10, Fig. 2M), but is distinguished from that species by the presence of norstictic acid. The chemically similar *P. dimorphodes* (Nyl.) Staiger (Staiger 2002, p. 505, Fig. 256) has very conspicuous thalline margins but smaller ascospores which measure 9–16 × 5–8 µm. This species is distinguished from the chemically similar *P. suberythrellum* (M.Wirth & Hale) Staiger & Kalb (Kalb *et al.* 2004) from Dominica, which has immersed lirellae that lack raised thalline margins, and somewhat larger ascospores (17–28 × 10–14 µm).

References

- Archer, AW (2001): The lichen genus *Graphina* (Graphidaceae) in Australia: new reports and new species. *Mycotaxon* 77, 153–180.
Archer, AW (2009) Graphidaceae. *Flora of Australia* 57, 84–194.
Lücking, R; Rivas Plata, E (2008): Clave y guía ilustrada para géneros de Graphidaceae. *Glalia* 1, 1–41.
Kalb, K; Staiger, B; Elix, JA (2004): A monograph of the lichen genus *Diorygma*—a first attempt. *Symbolae Botanicae Upsalienses* 34, 133–181.
Staiger, B (2002): Die Flechtenfamilie Graphidaceae. *Bibliotheca Lichenologica* 85, 3–526.

Additional lichen records from Australia 71

John A. Elix

Research School of Chemistry, Building 33,
Australian National University, Canberra, A.C.T. 0200, Australia

Abstract: *Calicium laevigatum* Tibell, *Lecanora epibryon* (Ach.) Ach. subsp. *epibryon*, *Lepraria multiacida* Aptroot, *Ochrolechia blandior* (Nyl.) Darb., and *Solenopsora holophaea* (Mont.) Samp. are reported as new to Australia. In addition, new state or territory records are listed for 24 other taxa.

NEW RECORDS FOR AUSTRALIA

1. *Calicium laevigatum* Tibell, *J. Hattori Bot. Lab.* **100**, 826 (2006)

This species is known from Bhutan and India (Tibell 2006). It is characterized by the well-developed, verrucose, greenish grey thallus, the large apothecia which have brown pruina on the lower side of the capitulum when young, and by containing alectorialic acid as the major secondary substance. A detailed description is given in Tibell (2006).

SPECIMENS EXAMINED

Western Australia: • Rooneys Bridge, Warren River, 20 km S of Manjimup, 34°25'02"S, 116°12'54"E, 115 m, on base of *Eucalyptus* in *Eucalyptus* woodland with understorey of *Agonis* and *Trymalium*, *J.A. Elix* 39266, 39267, 39270, 39271, 8.iv.2006 (CANB); • Donnelly Well, along the Donnelly River, 21 km N of Manjimup, 34°04'16"S, 116°10'37"E, 285 m, on base of dead *Banksia* in swampy area with *Banksia* and *Melaleuca*, *J.A. Elix* 39459, 39460, 7.iv.2006 (CANB, PERTH).

2. *Lecanora epibryon* (Ach.) Ach. subsp. *epibryon*, *Lichenogr. Universalis*: 396 (1810)

This bipolar subspecies was known previously from Europe, northern Asia, North America and the southern tip of South America (Lumbsch *et al.* 1994). It is characterized by the *allophana*-type amphithecium, the relatively large apothecia with flexuose margins, the inspersed hymenium, simple, ellipsoid ascospores 12.5–17.5 × 6.5–9.5 µm and the presence of atranorin as the only major lichen substance. Two other subspecies previously recorded from Australia differ in thallus chemistry (Lumbsch & Elix 2004). A detailed description is given in Lumbsch & Elix (2004).

SPECIMENS EXAMINED

Western Australia: • Mt Chudalup, 34°46'01"S, 116°05'E, on dead bryophytes over granite, *R.J. Cranfield* 13290a, 8.vii.1999 (PERTH).

3. *Lepraria multiacida* Aptroot, *Fungal Diversity* **9**, 20 (2002)

This species was known previously from South America (Aptroot 2002). It is characterized by the very thick (up to 2 mm), creamish white thallus with lobate margins, coarse granular consordia (to 200 µm diam.), protruding hyphae up to 100 µm long and an extensive array of secondary metabolites including atranorin (major), zeorin (major), roccelic or angardianic acid (minor or trace), stictic acid (minor), constictic acid (minor), salazinic acid (minor), cryptostictic acid (trace), norstictic acid (trace), 3,7-di-*O*-methylstrepilsin (minor), strepilsin (trace), 7-*O*-methylstrepilsin (trace), and several minor unknown triterpenes. In some respects *L. multiacida* resembles the very common *L. lobificans* Nyl., but is distinguished by the much thicker thallus (1–2 mm *versus* 0.5 mm thick) and the presence of dibenzofurans. A detailed description is given in Aptroot (2002).

SPECIMENS EXAMINED

New South Wales: • London Bridge, 18 km S of Queanbeyan, 35°30'S, 149°16'E, 670 m,

on calcareous soil in sheltered rock ledge, *J.A. Elix* 33115, 26.vii.1992 (CANB).
South Australia: • "Swingbridge" along the Marne River, 15 km E of Springton, 34°40'S, 139°14'E, 350 m, on moss over calcareous soil in pasture with rock outcrops, *J.A. Elix* 26107, 3.i.1991 (CANB).

4. *Ochrolechia blandior* (Nyl.) Darb., *Wiss. Ergebn. Schwedisch Sudpolarexpedit.* 1901–1903, **4**, 50 (1912)

This species was known previously from South America (Brodo 1994). It is a corticolous member of the *O. parella* (L.) A.Massal. group, but it has a very thin, almost membranaceous thallus. The apothecial discs resemble those of *O. pallescens* (L.) A. Massal. and can vary from being orange and epruinose to yellow-pink and lightly pruinose-scabrose and, indeed, Messuti & Lumbsch (2000) considered these species to be synonymous. However, whereas *O. pallescens* invariably contains variolaric acid, *O. blandior* lacks that substance and has somewhat narrower ascospores (27–34 µm *versus* 25–50 µm wide). A detailed description is given in Verseghe (1962).

SPECIMEN EXAMINED

Victoria: • Baw Baw National Park, Mount Erica Trail, 34 km N of Morwell, 37°53'35"S, 146°21'18"E, 1050 m, on base of *Eucalyptus regnans* in montane *Eucalyptus* forest, *J.A. Elix* 39203, 13.iv.2008 (CANB).

5. *Solenopsora holophaea* (Mont.) Samp., *Brotéria, sér. bot.*, 19, 26 (1921)

This species was known previously from Europe and Macaronesia (Purvis & James 1992). It is characterized by numerous, overlapping, pale to deep red-brown squamules, sessile, lecanorine apothecia with a red-brown to blackish brown disc and 1-septate, elongate-ellipsoid ascospores, 11–15 × 3.0–4.5 µm. It contains atranorin and an unknown terpene. A detailed description is given in Purvis & James (1992).

SPECIMEN EXAMINED

New South Wales: • Moruya Heads, 35°54'S, 150°09'E, 2 m, on rocks along the foreshore, *J.A. Elix* 1177, 5.xi.1975 (CANB).

NEW STATE AND TERRITORY RECORDS

1. *Amandinea diorista* var. *hypopelidna* Marbach & Kalb, in Marbach, *Biblioth. Lichenol.* **74**, 60 (2000)

Previously this species was known from New Caledonia and Asia (Marbach 2000) and in Australia from Queensland and the Northern Territory (Elix 2007).

SPECIMEN EXAMINED

Western Australia: • Couchman Range, 16 km NW of King Edward River Station (Doongan Station), 15°17'S, 126°12'E, 400 m, on *Erythrophleum* in *Eucalyptus*-dominated grassland, *J.A. Elix* 27975A, *H.T. Lumbsch & H. Streimann*, 14.vii.1991 (CANB).

2. *Amandinea punctata* (Hoffm.) Coppins & Scheid., *Lichenologist* **25**, 343 (1994)

In Australia this cosmopolitan species has been reported from Queensland, Victoria, Tasmania and Western Australia (McCarthy 2009).

SPECIMEN EXAMINED

Australian Capital Territory: • Aranda Primary School, 5 km W of Canberra, 35°16'S, 149°05'E, 650 m, on old treated pine wood in cultivated park, *J.A. Elix* 38833, 28.vi.2008 (CANB, HO), det. G. Kantvilas.

3. *Buellia bahiana* Malme, *Ark. Bot.* **21A**, 17 (1927)

Synonym: *Hafellia bahiana* (Malme) Sheard, *Bryologist* **95**, 82 (1992).

Previously this species was known from the Pacific (Hawaiian Islands, Tahiti, New Caledonia), Africa, South, Central and North America and in Australia from

Queensland, Western Australia and Tasmania (Marbach 2000, Elix 2009a, McCarthy 2009). Interestingly, this species invariably contains norstictic acid (major) and connorstictic acid (minor) but often contains accessory 4,5-dichlorolichexanthone (minor).

SPECIMENS EXAMINED

Victoria: • Tarra Bulga NP. Lyrebird – Ash Tracks, 26 km ESE of Traralgon, 38°26'S, 146°34'E, 500 m, on fallen *Acacia* in disturbed *Eucalyptus* forest with *Acacia* and *Pomaderris* understorey, *J.A. Elix* 29723A, 14.iv.1993 (CANB); • Baw Baw National Park, Mount Erica Trail, 34 km N of Morwell, 37°53'35"S, 146°21'18"E, 1050 m, on *Acacia dealbata* in montane *Eucalyptus* forest, *J.A. Elix* 39203, 13.iv.2008 (CANB); • Morwell National Park, Fosters Gully Nature Walk, 16 km S of Morwell, 38°21'24"S, 146°23'27"E, 230 m, on twigs of *Pomaderris* in wet *Eucalyptus* forest with *Pomaderris* understorey, *J.A. Elix* 39326, 12.iv.2008 (CANB).

4. **Buellia xanthonica** (Elix) Elix, *Fl. Australia* 57, 660 (2009)

Synonym: *Hafellia xanthonica* Elix, *Australas. Lichenol.* 59, 36 (2006).

This endemic species was previously known from New South Wales, Tasmania and Western Australia (Elix 2009a).

SPECIMENS EXAMINED

Victoria: • Baw Baw National Park, Mount Erica Trail, 34 km N of Morwell, 37°53'35"S, 146°21'18"E, 1050 m, on *Nothofagus cunninghamii* in montane *Eucalyptus* forest, *J.A. Elix* 39183, 13.iv.2008 (CANB).

5. **Caloplaca kalbiorum** S.Kondr. & Kärnefelt, *Biblioth. Lichenol.* 96, 158 (2007)

This endemic species was previously known from Western Australia (Kondratyuk *et al.* 2007).

SPECIMENS EXAMINED

South Australia: • Aldinga Beach Conservation Park, Aldinga Beach, 35°17'27"S, 138°27'04"E, 9 m, on *Casuarina* in coastal *Eucalyptus* woodland with *Acacia* and *Casuarina*, *J.A. Elix* 33480, 12.iv.2005 (CANB); • Murray Park Flora and Fauna Reserve, Murray Bridge, 35°07'S, 139°15'E, 30 m, on dead wood in remnant mallee scrub with *Callitris* and *Eucalyptus*, *J.A. Elix* 36803, 31.xii.2005 (CANB).

6. **Carbonea latypizodes** Knoph & Rambold, *Lichen Flora of the Greater Sonoran Desert Region* 2, 55 (2004)

This species was previously known from North America, South America, South Africa and, in Australia, from South Australia, Queensland, New South Wales, the Australian Capital Territory and Victoria (McCarthy 2009).

SPECIMENS EXAMINED

Tasmania: • Lower Marshes Road, c. 1 km SW of Northumbria Hill, 42°23'S, 147°15'E, 450 m, on sandstone in pasture, *J.A. Elix* 28772 & *G. Kantvilas*, 9.xi.2004 (CANB).

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

This species was previously known from Asia, Queensland and the Northern Territory (Marbach 2000, McCarthy 2009).

SPECIMENS EXAMINED

Western Australia: • Couchman Range, 16 km NW of King Edward River Station (Doongan Station), 15°17'S, 126°12'E, 400 m, on *Erythrophleum* in *Eucalyptus*-dominated grassland, *J.A. Elix* 27975B, *H.T. Lumbsch* & *H. Streimann*, 14.vii.1991 (CANB).

8. **Dimelaena australensis** H.Mayrhofer & Sheard, *Bryologist* 87, 247 (1984)

This species was previously known from South America, South Africa and, in

Australia, from Queensland, New South Wales, Victoria, Tasmania, Western Australia and the Northern Territory (Mayrhofer *et al.* 1996, McCarthy 2009).

SPECIMENS EXAMINED

South Australia: • Mount Lofty Ranges, Borthwick Road, 6.5 km E of Tungkillo, 34°50'S, 139°09'E, 470 m, on granite rock in pasture, *J.A. Elix* 9486, 30.x.1981 (CANB).

9. **Endocarpon pusillum** Hedw., *Desc. Micr.-Anal. Musc. Frond.* 2, 56 (1789)

In Australia this cosmopolitan species was previously known from all mainland states and the Australian Capital Territory (McCarthy 2009).

SPECIMENS EXAMINED

Northern Territory: • Northern Simpson Desert, Hay River region on Atnetye land, Mt Tietkens, 23°03'18"S, 136°59'07"E, 300 m, on soil beneath gidgee in *Acacia aneura* sparse shrubland, *J. Milne s.n.*, 10.vii.2007 (MEL 2314786).

10. **Hertelidea wankaensis** Kantvilas & Elix, *Australas. Lichenol.* 59, 30 (2006)

This endemic species was previously known from Queensland (Kantvilas & Elix 2006).

SPECIMENS EXAMINED

Western Australia: • Wallaby Hills Nature Reserve, 20 km E of York on the Goldfield Road, 31°50'48"S, 116°59'16"E, 280 m, on dead wood in *Eucalyptus salmonophloia* woodland, *J.A. Elix* 38586, 38587, 4.iv.2006 (CANB).

11. **Lecanora placodiolica** Lumbsch & Elix, *Mycotaxon* 67, 399 (1998)

This Australian endemic was previously known from the Australian Capital Territory and South Australia (Lumbsch & Elix 2004, Elix 2007).

SPECIMENS EXAMINED

New South Wales: • Cookamidgera State Forest, 3.5 km SSW of Cookamidgera, 33°14'43"S, 148°16'54"E, 345 m, on base of *Eucalyptus* in *Eucalyptus* woodland, *J.A. Elix* 39072, 39077, 39084, 4.viii.2008 (CANB).

12. **Lepraria squamatica** Elix, *Australas. Lichenol.* 58, 20 (2006)

This species was previously known from the Northern Territory, New South Wales and Western Australia (Elix 2009b).

SPECIMENS EXAMINED

Victoria: • Tarra Bulga National Park, Cyathea Falls Rainforest Walk, 17 km NW of Yarram, 38°26'47"S, 146°32'20"E, 250 m, on base of *Atherosperma* in temperate rainforest with *Cyathea* understorey, *J.A. Elix* 39540, 39541, 14.iv.2008 (CANB).

13. **Lepraria yunnaniana** (Hue) Zahlbr., in Handel-Mazzetti, *Symbolae Sinicae* 3, 244 (1930)

This species was known from Asia, central Africa, Papua New Guinea and, in Australia, from Queensland, New South Wales and Tasmania (Elix 2009b).

SPECIMENS EXAMINED

Victoria: • Baw Baw National Park, Mount Erica Trail, 34 km N of Morwell, 37°53'35"S, 146°21'18"E, 1050 m, on *Nothofagus cunninghamii* in montane *Eucalyptus* forest, *J.A. Elix* 39197, 13.iv.2008 (CANB).

14. **Menegazzia norstictica** P.James, *Fl. Australia* 54, 313 (1992)

This endemic Australian species was previously known from Victoria and Tasmania (McCarthy 2009).

SPECIMEN EXAMINED

New South Wales: • 55 km W of Dorrigo along the Armidale road, 30°32'S, 150°01'E, 950 m, on *Banksia* in montane *Eucalyptus* forest, *J.A. Elix* 2390, 17.viii.1976 (CANB).

15. *Mycoblastus leprarioides* Kantvilas & Elix, *Lichenologist* 41, 171 (2009)

This Australian endemic was previously known from Victoria (Kantvilas 2009).

SPECIMEN EXAMINED

New South Wales: • Great Dividing Range, 2 km N of Parkers Gap, 10 km E of Captains Flat, 35°38'S, 149°31'E, 1260 m, on twigs of *Tasmannia* in wet *Eucalyptus* forest, *J.A. Elix* 33065B, 12.vii.1992 (CANB).

16. *Ochrolechia africana* Vain., *Ann. Univ. Fenn. Aboensis*, ser. A, 2(3), 3 (1926)

This species was known previously from Africa, North America, South America (Brodo 1991) and, in Australia, from Queensland and the Australian Capital Territory (McCarthy 2009).

SPECIMENS EXAMINED

Western Australia: • Brookton Highway Nature Reserve, Darling Plateau, 25 km W of Brookton, 32°23'50"S, 116°44'03"E, 285 m, on base of shrub in *Eucalyptus* woodland with laterite outcrops, *J.A. Elix* 38742, 5.iv.2006 (CANB).

Lord Howe Island: • End of Andersons Road, 31°31'46"S, 159°04'20"E, 25 m, on fallen *Cryptocarya* branch in disturbed lowland forest, *J.A. Elix* 32838, 22.vi.1992 (CANB); • Valley of Shadows, 31°31'45"S, 159°04'45"E, 40 m, on canopy of *Cryptocarya* in dry lowland forest, *J.A. Elix* 32845, 22.vi.1992 (CANB).

17. *Pertusaria georgeana* var. *victoriana* Elix & A.W.Archer, *Telopea* 12, 266 (2008)

This endemic variety was known previously from Victoria (Elix *et al.* 2008).

SPECIMENS EXAMINED

New South Wales: • Shingle Ridge, 5 km N of Molong along road to Yeoval, 33°04'22"S, 148°49'45"E, 595 m, on dead wood in remnant *Eucalyptus* woodland, *J.A. Elix* 38542, 13.x.2005 (CANB); • Goobang National Park, Spring Creek Track, 30 km NE of Parkes, 32°57'18"S, 148°25'16"E, 495 m, on dead wood and base of *Eucalyptus* in *Eucalyptus-Callitris* woodland, *J.A. Elix* 39216, 39230, 4.viii.2008 (CANB).

Australian Capital Territory: • Canberra Nature Park, Aranda Bushland, 4 km W of Canberra, 35°16'14"S, 149°04'34"E, 580 m, on base of *Eucalyptus* in moist gully in open *Eucalyptus* woodland, *J.A. Elix* 38800, 38804, 21.vi.2008 (CANB).

18. *Protoparmelia isidiata* Diederich, Aptroot & Sérusiaux, *Biblioth. Lichenol.* 64, 146 (1997)

This species was known previously from Papua New Guinea (Aptroot *et al.* 1997) and the Northern Territory (Elix 2007).

SPECIMEN EXAMINED

Queensland: • Bunya Mountains State Forest, 46 km S of Kingaroy, 26°48'13"S, 151°33'44"E, 765 m, on dead wood in mixed *Eucalyptus-Araucaria* forest, *J.A. Elix* 38634, 7.v.2005 (CANB).

19. *Pseudocyphellaria multifida* (Nyl.) D.J.Galloway & P.James, *Lichenologist* 12, 301 (1980)

This species is known from Malesia, New Zealand and, in Australia, from New South Wales, Victoria and Tasmania (Galloway *et al.* 2001).

SPECIMENS EXAMINED

Queensland: • Millaa Millaa Falls, 4 km S of Millaa Millaa, 17°29'34"S, 145°36'41"E, 750 m, on fallen branches in remnant rainforest, *J.A. Elix* 39317, 29.vii.2006 (CANB);

• Zillie Falls, 12 km NE of Millaa Millaa, 17°28'29"S, 145°39'42"E, 705 m, on fallen branches in remnant rainforest, *J.A. Elix* 39511, 29.vii.2006 (CANB).

20. *Ramboldia soreidiata* Kalb, *Biblioth. Lichenol.* 78, 161 (2001)

This Australian endemic was known from Western Australia and Victoria (Elix 2009c, McCarthy 2009).

SPECIMEN EXAMINED

New South Wales: • Golden Highway, 12 km SW of Dunedoo, 32°03'18"S, 149°17'02"E, 350 m, on dead wood in remnant *Eucalyptus-Callitris* woodland, *J.A. Elix* 39556, 5.viii.2008 (CANB).

21. *Trapelia crystallifera* Kantvilas & Elix, *Biblioth. Lichenol.* 95, 324 (2007)

This endemic species was known previously from Tasmania (Kantvilas & Elix 2007) and Western Australia (Elix 2008). A detailed description is given in Kantvilas & Elix (2007).

SPECIMENS EXAMINED

New South Wales: • Pulletop Nature Reserve, 36 km N of Griffiths, 33°58'S, 146°04'E, 160 m, on soil in mallee *Eucalyptus* woodland, *J.A. Curnow* 1866, 3.x.1988 (CANB); • Central-west Slopes, Murderers Hole (on Forbes-Bogan Gate road), c. 22 km SE of Bogan Gate, 33°15'00"S, 147°58'23"E, 240 m, on soil in open *Eucalyptus* woodland, *J.A. Curnow* 5470, 7.xi.2001 (CANB); • 29 km N of Dubbo along Highway 39, on soil in *Eucalyptus* woodland, *J.A. Elix* 2677, 3.ix.1976 (B, CANB); • Weddin State Forest, 25 km WSW of Grenfell, 34°01'S, 148°01'E, on soil in *Callitris* forest, *J.A. Elix* 4745, 14.vii.1978 (CANB); • 24 km N of Grenfell along the Forbes road, 33°43'S, 148°04'E, on soil in dry sclerophyll forest, *J.A. Elix* 4817, 15.vii.1978 (CANB); • Mountain Creek, Jimberoo State Forest, 14 km NNE of Rankins Springs, 33°43'S, 146°20'E, on consolidated soil in *Eucalyptus* and *Callitris*-dominated creek flats, *J.A. Elix* 25311, 13.vi.1990 (CANB); • Shingle Ridge, 5 km N of Molong along road to Yeoval, 33°04'22"S, 148°49'45"E, 595 m, on sandstone in remnant *Eucalyptus* woodland along ridge, *J.A. Elix* 38565, 13.x.2005 (CANB).

South Australia: • Yorke Peninsula, Moonta Mines, on soil, *J.A. Elix* 3764, 1.ix.1977 (CANB).

Victoria: • Northern Plains, Sunset Country, Raak, 26 km from Mildura, 34°35'S, 141°57'E, on sandy soil in open shrubland, *D.J. Cummings* 243, 13.x.1977 (CANB).

22. *Trapelia lilacea* Kantvilas & Elix, *Biblioth. Lichenol.* 95, 327 (2007)

This endemic species was known previously from Tasmania (Kantvilas & Elix 2007). A detailed description is given in Kantvilas & Elix (2007).

SPECIMENS EXAMINED

Western Australia: • Sullivan Rock, Monadnocks Nature Reserve, 18 km ESE of Jarrahdale, 32°23'S, 116°15'E, on granite rock of exposed monadnock in dry *Eucalyptus* woodland, *J.A. Elix* 40867, *H.T. Lumbsch* & *H. Strömann*, 11.ix.1994 (CANB); • Darling Range, John Forrest National Park, 25 km E of Perth, 31°53'19"S, 116°05'14"E, 250 m, on laterite rocks in *Eucalyptus* woodland, *J.A. Elix* 36061, 8.v.2004 (CANB, PERTH); • Brookton Highway Nature Reserve, Darling Plateau, 25 km W of Brookton, 32°23'50"S, 116°44'03"E, 285 m, on laterite rocks in *Eucalyptus* woodland with laterite outcrops, *J.A. Elix* 38737, 38738, 5.iv.2006 (CANB, PERTH).

New South Wales: • Peckmans Plateau, Katoomba, 33°43'S, 150°19'E, 980 m, on sandstone rocks in heath scrub, *J.A. Elix* 3221, 24.iv.1977 (CANB); • Mount Kosciuszko National Park, along Diggers Creek, 1.5 km S of Island Bend, 36°15'S, 148°31'E, 1500 m, on granite rocks in subalpine *Eucalyptus* forest, *J.A. Elix* 4381, 9.ii.1978 (CANB); • Mountain Creek, 15 km SSE of Holbrook, 35°52'S, 147°20'E, 530 m, on rocks in dry sclerophyll forest, *J.A. Elix* 23060, 15.xi.1989 (CANB); • Mount Ulandra, 30 km ENE of

Junee, 34°49'S, 147°55'E, 700 m, on granite rocks in *Callitris*-dominated dry sclerophyll forest, *J.A. Elix* 23169, 16.xi.1989 (CANB); • Grove Creek Falls, 45 km SSE of Blaney, 33°56'S, 142°22'E, 550 m, on volcanic rocks in dry sclerophyll forest with scattered *Callitris*, *J.A. Elix* 25560, 12.ix.1990 (CANB).

Australian Capital Territory: • Along Kangaroo Creek near Corin Dam, 35°32'S, 148°53'E, on granite rocks in dry sclerophyll forest, *J.A. Elix* 1339, 25.xi.1975 (CANB). *Victoria*: • Three Sisters, Three Sisters Track, 23 km NNE of Cann River, 37°23'S, 149°06'E, 920 m, on sandstone rocks in dry sclerophyll forest, *J.A. Elix* 19546 & *H. Streimann*, 27.ix.1985 (CANB).

23. *Trapelia macrospora* Fryday, *Biblioth. Lichenol.* **88**, 144 (2004)

This austral species was previously recorded for Campbell Island (Fryday 2004), the South Island of New Zealand (Galloway 2007) and Tasmania (Kantvilas & Elix 2007). Detailed descriptions can be found in Fryday (2004) and Galloway (2007).

SPECIMENS EXAMINED

New South Wales: • Mount Kosciuszko National Park, just S of Rawsons Pass, 37°27'S, 148°15'E, 2130 m, on granite rocks in alpine heath, *J.A. Elix* 4265, 9.ii.1978 (CANB); • Mount Kosciuszko National Park, 1 km N of Mt Kosciuszko along the Lakes Trail, 36°27'S, 148°16'E, 2120 m, on granite rocks in alpine grassland, *J.A. Elix* 5738, 14.iii.1979 (CANB); • Mount Kosciuszko National Park, N slopes of Mt Stilwell, 36°26'S, 148°19'E, 1950 m, on granite rocks in alpine herbfield, *J.A. Elix* 11670, 23.i.1984 (CANB).

24. *Trapeliopsis flexuosa* (Fr.) Coppins & P.James, *Lichenologist* **16**, 258 (1984)

In Australia this cosmopolitan species was previously known from Queensland, Victoria and Tasmania (McCarthy 2009).

SPECIMENS EXAMINED

Western Australia: • Darling Range, John Forrest National Park, 25 km E of Perth, 31°53'19"S, 116°05'14"E, 250 m, on dead wood in *Eucalyptus* woodland with *Xanthorrhoea*, *Macrozamia* and low shrubs, *J.A. Elix* 36043, 8.v.2004 (CANB, PERTH); • Wallaby Hills Nature Reserve, 20 km E of York on the Goldfield Road, 31°50'48"S, 116°59'16"E, 280 m, on dead wood in *Eucalyptus salmonophloia* woodland, *J.A. Elix* 38589, 38590, 38592, 4.iv.2006 (CANB).

Acknowledgements

I thank Dr Christine Cargill and Ms Judith Curnow, curators at the CANB cryptogamic herbarium, for their assistance.

References

- Aptroot, A (2002): New and interesting lichens and lichenicolous fungi in Brazil, *Fungal Diversity* **9**, 15–45.
Aptroot, A; Diederich, P; Sérusiaux, E; Sipman, HJM (1997): Lichens and lichenicolous fungi from New Guinea. *Bibliotheca Lichenologica* **64**, 1–220.
Brodo, IM (1991): Studies in the lichen genus *Ochrolechia*. 2. Corticolous species in North America. *Canadian Journal of Botany* **69**, 733–772.
Elix, JA (2007): Additional lichen records from Australia 64. *Australasian Lichenology* **61**, 8–15.
Elix, JA (2008): Additional lichen records from Australia 67. *Australasian Lichenology* **63**, 2–9.
Elix, JA (2009a): *Buellia*. *Flora of Australia* **57**, 495–507.
Elix, JA (2009b): *Lepraria*. *Flora of Australia* **57**, 61–73.
Elix, JA (2009c): *Ramboldia*. *Flora of Australia* **57**, 19–31.
Elix, JA; Jariangpraesert, S; Archer, AW (2008): New *Pertusaria* (lichenized Ascomycota) from Australia and Thailand. *Telopea* **12**, 263–272.

Fryday, AM (2004): New species and records of lichenized fungi from Campbell Island and the Auckland Islands, New Zealand. *Bibliotheca Lichenologica* **88**, 127–146.
Galloway, DJ (1993): *Pseudocyphellaria halei* sp. nov. from New Zealand, *Bryologist* **96**, 345–348.

Galloway, DJ (2007): *Flora of New Zealand Lichens*. Revised 2nd Edn., Manaaki Whenua Press, Lincoln, New Zealand.

Galloway, DJ; Kantvilas, G; Elix, JA (2001): *Pseudocyphellaria*. *Flora of Australia* **58A**, 47–77.

Kantvilas, G (2009): The genus *Mycoblastus* in the cool temperate Southern Hemisphere, with species reference to Tasmania. *Lichenologist* **41**, 151–178.

Kantvilas, G; Elix, JA (2006): Further notes on the genus *Hertelidea*, with a description of a new species. *Australasian Lichenology* **59**, 30–33.

Kantvilas, G; Elix, JA (2007): Additions to the lichen family *Agyriaceae* Corda from Tasmania. *Bibliotheca Lichenologica* **95**, 317–333.

Kondratyuk, SY; Kärnefelt, J; Elix, JA; Thell, A (2007): Contributions to the Teloschistaceae of Australia. *Bibliotheca Lichenologica* **96**, 157–174.

Lumbsch, HT; Elix, JA (2004): *Lecanora*. *Flora of Australia* **56A**, 12–61.

Lumbsch, HT; Feige, GB; Elix, JA (2004): Chemical variation in two species of the *Lecanora subfusca* group (Lecanoraceae, lichenized Ascomycotina). *Plant Systematics and Evolution* **191**, 227–236.

Marbach, B (2000): Corticole und lignicole Arten der Flectengattung *Buellia* sensu lato in den Subtropen und Tropen. *Bibliotheca Lichenologica* **74**, 1–384.

Mayrhofer, H; Matzer, M; Wippel, A; Elix, JA (1996): The genus *Dimelaena* (lichenized Ascomycetes, Physciaceae) in the Southern Hemisphere. *Mycotaxon* **58**, 293–311.

McCarthy, PM (2009): *Checklist of the Lichens of Australia and its Island Territories*. ABRIS: Canberra. <http://www.anbg.gov.au/abrs/lichenlist/introduction.html> (last updated 23 March 2009).

Messuti, MI; Lumbsch, HT (2000): A revision of the genus *Ochrolechia* in southern South America. *Bibliotheca Lichenologica* **75**, 33–46.

Tibell, L (2006): *Calicium* in the Indian Himalayas. *Journal of the Hattori Botanical Laboratory* **100**, 809–851 (2006).

Purvis, OW; James, PW (1992): *Solenopsisora*. In Purvis, OW; Coppins, BJ; Hawksworth, DL; James, PW; Moore, DM (eds), *The Lichen Flora of Great Britain and Ireland*, pp. 564–566, Natural History Museum Publications, London.

Verseghy, K (1962): Die Gattung *Ochrolechia*. *Beihefte zur Nova Hedwigia* **1**, 1–146.

Additional lichen records from Thailand 1.
***Loxospora lecanoriformis* (Sarrameanaceae)**

Khwanruan Papong

Department of Biology and Natural Medicinal Mushroom Museum,
Faculty of Science, Maharakham University, Kantarawichai,
Maha Sarakham Province, 44150 Thailand
e-mail: khwanruan.p@msu.ac.th

Kansri Boonpragob

Department of Biology, Faculty of Science
Ramkhamhaeng University, Bang Krabi, Bangkok, 10240 Thailand
e-mail: kansri@ru.ac.th

H. Thorsten Lumbsch

Department of Biology, The Field Museum
1400 South Lake Shore Drive, Chicago, Illinois 60605–2496 USA
e-mail: tlumbsch@fieldmuseum.org

Abstract: *Loxospora lecanoriformis* Lumbsch, A.W.Archer & Elix, recently described from New South Wales, is reported from two localities in Thailand.

Introduction

As part of a revision of Lecanoraceae in Thailand and adjacent areas, the first author studied material of a lecanoroid lichen that differed from *Lecanora* in having larger ascospores (50–65 μm long) and a different ascus type and hymenial structure. These specimens belong to *Loxospora lecanoriformis* Lumbsch, A.W.Archer & Elix, recently described from a single locality in New South Wales (Lumbsch *et al.* 2007).

Loxospora lecanoriformis Lumbsch, A.W.Archer & Elix, *Lichenologist* 39, 514 (2007)
Fig. 1.

A full description is in Lumbsch *et al.* (2007). *Loxospora lecanoriformis* is characterized by a pale grey-green to olive-green, crustose thallus, and lecanorine apothecia with a hemiangiocarpous development. Young apothecia have rather ragged and scabrid thalline margins (Fig. 1a), while older apothecia have a smooth and a \pm excluded margin (Fig. 1b). The apothecial discs are medium to dark red-brown and epruinose. The hymenium is interspersed with sparse oil droplets, and the paraphyses are simple and have unpigmented tips. The asci are claviform to obovate, 6–8-spored, and non-amyloid; only damaged asci show a faint amyloid reaction. The ascospores are broadly ellipsoid and 50–65 \times 18–24 μm . Pycnidia were not seen in the Thai material, but the type from Australia contains bacilliform conidia.

Chemistry (Thai material): Cortex K–, C–, KC–, P–; medulla K–, C–, KC–, P–; containing 2'-O-methylperlatolic acid (major) detected by HPTLC.

The species possibly has been overlooked and is more common in Australia and south-east Asia. It is easily confused with a *Lecanora* species, but it is readily distinguished by the larger ascospores. *Loxospora cyamidia* (Stirt.) Kantvilas, a New Zealand endemic, is similar in overall morphology, but differs in having grey-pruinose discs and smaller ascospores (20–36 \times 6–11 μm), and by the presence of thamnolic acid.

The Thai collections were made in open situations in montane rainforest.

SPECIMENS EXAMINED

Thailand: • Phu Kradueng National Park, Loei Province, Phu Kradueng district, 985 m, *Papong* 6521, 6543, 11.xi.2007 (MSUT); • Phu Lung Wildlife Sanctuary, from Pha Chang Pan to Pha Ta Len, 17°16'N, 101°31'E, 1535 m, *Pornpom* 39, 30.viii.2005 (RAMK).

Acknowledgments

This study was financially supported by the Thailand Research Fund and the Research Division at Maharakham University and a NSF grant (DEB-0516116) to The Field Museum (PI: HTL).

Reference

Lumbsch, HT; Archer, AW; Elix, JA (2007): A new species of *Loxospora* (lichenised Ascomycota: Sarrameanaceae) from Australia. *Lichenologist* 39, 509–517.

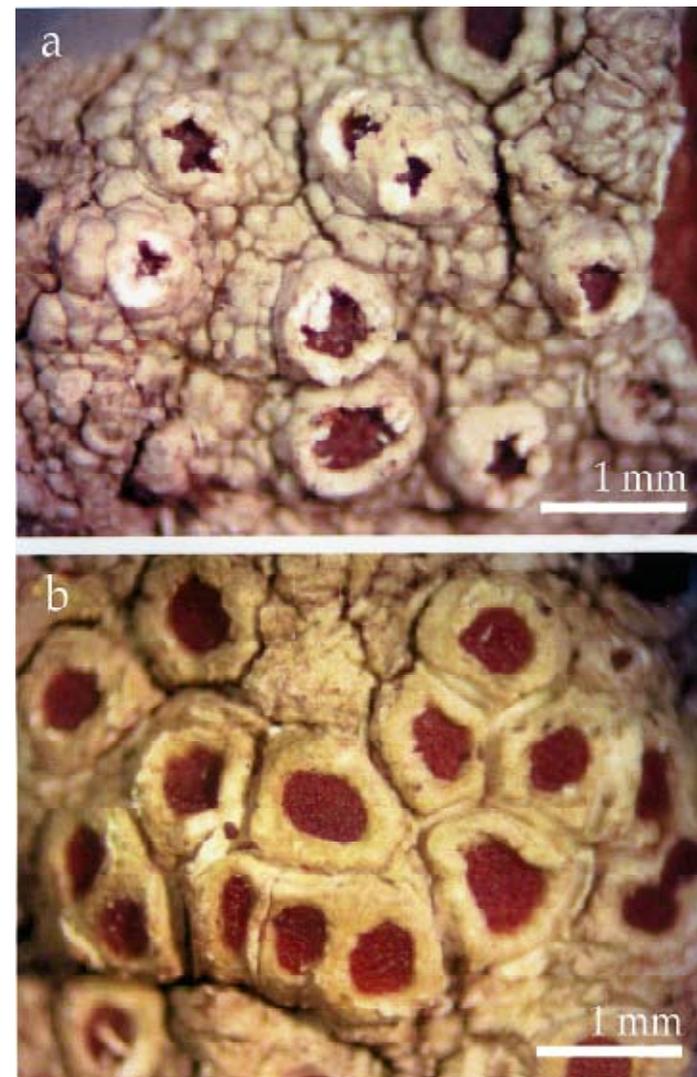


Fig. 1. *Loxospora lecanoriformis* (*Papong* 6521, MSUT), habit. (a) young apothecia, (b) older apothecia.

- Affeld, K; Sullivan, J; Worner, SP; Didham, RK (2008): Can spatial variation in epiphyte diversity and community structure be predicted from sampling vascular epiphytes alone? *Journal of Biogeography* **35**, 2274–2288.
- Aptroot, A (2008): *Stictia alpinotropica*, a new saxicolous lichen species from the alpine zone of Mt Wilhelm, Papua New Guinea. *Lichenology* **40**, 419–422.
- Aptroot, A; Thor, G; Lücking, R; Elix, JA; Chaves, JL (2009): The lichen genus *Herpothallon* reinstated. *Bibliotheca Lichenologica* **99**, 19–66.
- Archer, AW (2009): *Platythecium nothofagi* (A.W.Archer) A.W.Archer, a new combination in the Australian Graphidaceae. *Australasian Lichenology* **65**, 40–41.
- Archer, AW; Elix, JA (2009): A new species, new combination, and new report in the Australian Graphidaceae. *Australasian Lichenology* **65**, 24–29.
- Archer, AW; Elix, JA (2009): New taxa and new reports of Australian *Pertusaria* (lichenized Ascomycota, Pertusariaceae). *Australasian Lichenology* **65**, 30–39.
- Elix, JA; Jariangprasert, S; Archer, AW (2008): New *Pertusaria* (lichenized Ascomycota) from Australia and Thailand. *Telopea* **12**, 263–272.
- Elix, J (2009): Additional lichen records from Australia 71. *Australasian Lichenology* **65**, 42–49.
- Elix, J (2009): New saxicolous species and new records of *Buellia sens. lat.* and *Rinodinnella* (Ascomycota, Physciaceae) in Australia. *Australasian Lichenology* **65**, 10–19.
- Elix, J (2009): The *Megalospora melanoderma* complex (Ascomycota, Megalosporaceae) in Australia. *Australasian Lichenology* **65**, 20–23.
- Elix, J; Øvstedal, DO (2009): Lichen phytochemistry II: some species of *Calopadia*. *Australasian Lichenology* **65**, 7–9.
- Fryday, AM (2008): Three new species of lichenized fungi with cephalodia from the southern New Zealand shelf islands (Campbell Plateau). *Lichenologist* **40**, 283–294.
- Galloway, DJ (2008): Austral lichenology: 1690–2008. *New Zealand Journal of Botany* **46**, 433–521.
- Hawksworth, DL (2009): Review of Galloway's *Flora of New Zealand Lichens*, second edition. *Lichenologist* **41**, 109–110.
- Hawksworth, DL (2009): Review of Archer's *The Lichen Family Graphidaceae in Australia* (*Bibliotheca Lichenologica* **94**). *Mycotaxon* **107**, 520–521.
- Kalb, K; Archer, AW; Sutjaritturakan, J; Boonpragob, K (2009): New or otherwise interesting lichens V. *Bibliotheca Lichenologica* **99**, 225–246.
- Kantvilas, G; McCarthy, P; Stuckey, B (2008): A remarkable new species of *Rimularia* Nyl. (lichenized fungi: Trapeliaceae) from tropical Australia. *Austrobaileya* **7**, 659–663.
- Kantvilas, G (2009): An Antipodean odyssey—the lichens of Tasmania. The Swinscow Lecture 2009. *British Lichen Society Bulletin* **104**, 86–96.
- Kantvilas, G (2009): The genus *Mycoblastus* in the cool temperate Southern Hemisphere, with special reference to Tasmania. *Lichenologist* **41**, 151–178.
- Kantvilas, G; Lumbsch, HT (2009): *Meridianelia*, a new genus in the Elixiaceae (Ascomycota) from Tasmania. *Lichenologist* **41**, 261–270.
- Kantvilas, G (2009): Review of Galloway's *Flora of New Zealand Lichens*, second edition. *New Zealand Journal of Botany* **46**, 387–389.
- Kondratyuk, SY; Kärnefelt, I; Elix, JA; Thell, A (2009): New *Caloplaca* species from Australia. *Bibliotheca Lichenologica* **99**, 259–278.
- Laundon, JR (2009): Review of Galloway's *Flora of New Zealand Lichens*, second edition. *Mycotaxon* **107**, 518–520.
- Lücking, R; Mangold, A; Martín, MP; Elix, JA (2008): species recognition and phylogeny of *Thelotrema* species in Australia (Ostropales, Ascomycota). *Australian Systematic Botany* **21**, 217–227.
- Lücking, R; Papong, K; Thammathaworn, A; Boonpragob, K (2008): Historical biogeography and phenotype-phylogeny of *Chroodiscus* (lichenized Ascomycota: Ostropales: Graphidaceae). *Journal of Biogeography* **35**, 2311–2327.
- McCarthy, PM (2009): New combinations of Australian *Collempsidium* Nyl. (Ascomycota, Xanthopyreniaceae). *Australasian Lichenology* **65**, 3.
- McCarthy, PM (2009): A new foliicolous species of *Strigula* (Strigulaceae) from New South Wales. *Australasian Lichenology* **65**, 4–6.
- Papong, K; Boonpragob, K; Lumbsch, HT (2009): Additional lichen records from Thailand (1). *Loxospora lecanoriformis* (Sarrameanaceae). *Australasian Lichenology* **65**, 50–51.
- Thell, A; Elix, JA; Søchting, U (2009): *Xanthoparmelia lineola* s.l. in Australia and North America. *Bibliotheca Lichenologica* **99**, 393–404.
- Tønsberg, T (2008): Review of Galloway's *Flora of New Zealand Lichens*, second edition. *Graphis Scripta* **20**(2), 64.

Australasian Lichenology

Number 65, July 2009 ISSN 1328-4401

INFORMATION FOR SUBSCRIBERS

Australasian Lichenology is published twice a year, in January and July. Because of steadily rising printing and postage costs, copies are e-mailed to most subscribers as electronic .pdf files. Such files can be opened and read on either an IBM or Macintosh computer using Adobe's Acrobat® Reader (version 5.0 or later). You can download a free copy of Acrobat Reader from Adobe's website (www.adobe.com). An electronic journal offers the advantages of being machine-searchable and requiring no shelf space, but any subscriber who nonetheless prefers hard copies can print them out.

The journal is sent free to all electronic subscribers. Only a few selected library and herbaria subscribers will continue to get printed hard copies, to meet the requirements of the nomenclatural Code that printed descriptions of new taxa be lodged in internationally recognized libraries and herbaria.

If you wish to subscribe electronically, simply e-mail your current e-mail address to the journal editor at nancym@clear.net.nz, and if you change your address, be sure to inform the editor.

Volumes 58 and later can now be downloaded free from the website Recent Lichen Literature (RLL). The directory is <http://www.nhm.uio.no/botanisk/lav/RLL/AL/>

INFORMATION FOR AUTHORS

Research papers submitted to *Australasian Lichenology* must be original and on some aspect of Australasian lichens or allied fungi, and they are refereed. The journal also welcomes newsworthy items on lichenologists who are studying Australasian lichens or who are visiting the region. A manuscript can be posted as a single hard-copy to W.M. Malcolm at Box 320, Nelson, New Zealand 7040 (no computer disks, please), or e-mailed (nancym@clear.net.nz) as a text file saved in cross-platform "rich text format" (.rtf). See a recent issue for a guide to text formatting and reference citations.

Drawings should be inked originals, and photographs should be sharp and clear (prints will do but negatives or transparencies are preferred). Drawings and photographs can be air-mailed or else scanned at 600 dpi and then e-mailed as TIFF (.tif) or highest-quality JPEG (.jpg) files. *Australasian Lichenology* provides electronic off-prints as .pdf files. The journal does not ordinarily provide hard-copy off-prints, but off-prints of papers with colour plates can be purchased for NZ\$1.50 per copy per A5 plate if they're ordered when the manuscript is accepted for publication.

Australasian Lichenology is the official publication of the Australasian Lichen Society, and formerly was named the *Australasian Lichenological Newsletter*. Its Editorial Board is W.M. Malcolm, J.A. Elix, G. Kantvilas, S.H.J.J. Louwhoff, and P.M. McCarthy.