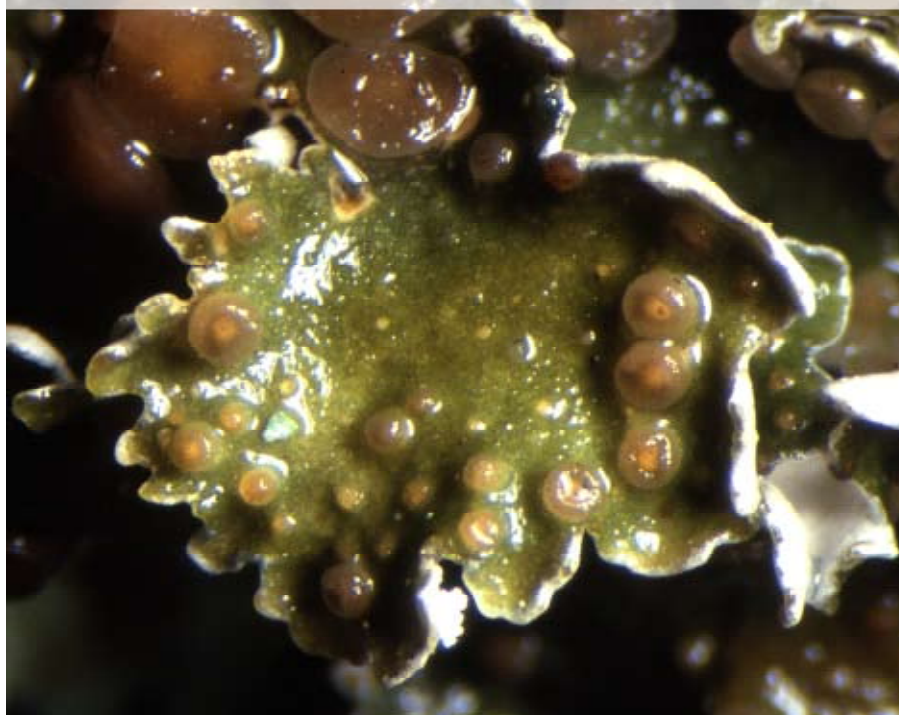


Australasian Lichenology

Number 63, July 2008 ISSN 1328-4401



Australasian Lichenology

Number 63, July 2008 ISSN 1328-4401

The austral *Leioderma pycnophorum* is a common “twig lichen” in humid, shady forest margins and disturbed areas. It’s known from Tasmania and southeast Australia and New Zealand as well as southern Chile and Tristan da Cunha.

CONTENTS

ADDITIONAL LICHEN RECORDS FROM AUSTRALIA	
Elix, JA (67).....	2
McCarthy, PM (68) Tropical pyrenolichens	10
ARTICLES	
McCarthy, PM—A new species and new combination of Australian Verrucariaceae	17
Elix, JA—Lichen phytochemistry: additions and amendments I	20
Archer, AW; Elix, JA—Three new species in the Australian Graphidaceae (lichenized Ascomycota)	26
Elix, JA; Kalb, K—Additional new lichen taxa (lichenized Ascomycota) from Australia	30
Kantvilas, G—Further notes on the distribution and nomenclature of some Australian species of the Megalosporaceae.....	37
Louwhoff, S—New and additional records and a new combination of Australian <i>Peltigera</i>	40
BOOK REVIEW	
Malcolm, WM— <i>Flora of New Zealand Lichens</i> (2nd edition) by D.J. Galloway	47
NEWS	
18th meeting of Australasian Lichenologists, Gippsland, 12–13 April, 2008	52
RECENT LITERATURE ON AUSTRALASIAN LICHENS	54

Additional lichen records from Australia 67

John A. Elix

Department of Chemistry, Faculty of Science,
Australian National University, Canberra, A.C.T. 0200, Australia

Abstract: *Byssoloma adpersum*, *Caloplaca chrysodeta*, *Cryptotheca faveomaculata*, *Gasscurtia catasema*, *Heterodermia subcitrina*, *Lecidella asema*, *Lepraria aurescens* and *Parmotrema sublatifolium* are reported as new to Australia. In addition, new State or Territory records are listed for 25 other taxa. The new combination *Hafellia metaphragmia* (C. Knight) Pusswald is made.

NEW RECORDS FOR AUSTRALIA

1. *Byssoloma adpersum* Malcolm & Vězda, *Mycotaxon* 55, 358 (1995)

This species was known previously from the South Island of New Zealand (Malcolm & Vězda 1995). It is characterized by the distinctly byssoid margin that lacks granular crystals. It is closely related to *B. subdiscordans* (Nyl.) P.James, but clearly differs in its 5-septate ascospores and a hymenium with copious granules. A detailed, illustrated description is given in Malcolm & Vězda (1995).

SPECIMENS EXAMINED

New South Wales: • Budderoo National Park, Minnamurra Falls Reserve, 5 km W of Jamberoo, 34°37'S, 150°44'E, 260 m, on CCA-treated timber edging the car park, W.M. Malcolm & P.M. McCarthy s.n., 17.vi.2004 (CANB).

Victoria: • Tarra-Bulga National Park, Tarra Falls, 38°27'17"S, 146°32'27"E, 225 m, on rocks in river bed, G. Kantvilas 195/08, P. McCarthy & J. Elix, 14.iv.2008 (HO, MEL).

2. *Caloplaca chrysodeta* (Vain.) Domb. & Flora 4, 131 (1866)

This species was known previously from North and South America, Europe, Asia and New Zealand (Galloway 1985). It is characterized by the yellow-orange to yellow-brown, leprose-soresiate granules originating from scattered brownish yellow to yellow-grey areolae, and the presence of parietin (major) and fallacinal (minor or trace). A detailed description is given in Galloway (1985, as *Leproplaca chrysodeta*).

SPECIMENS EXAMINED

Norfolk Island: • Emily Bay, Kingston, 29°03'37"S, 167°57'26"E, 5 m, on limestone in area with scattered shrubs and *Araucaria*, J.A. Elix 29112, 17.vi.1992 (CANB).

3. *Cryptotheca faveomaculata* Makhija & Patwardhan, *Current Res. Pl. Sci.* 1994, 64 (1994)

Cryptotheca faveomaculata is characterized by the greenish grey to grey byssoid thallus in which the white ascerigerous parts are distinct, delimited and faveolate and are spread throughout the thallus, and by the presence of confluent and gyrophoric acids. The hyaline, muriform spores (8 per ascus) are ovate, straight or curved, often broader in the centre, 50–75 × 20–25 µm. This species was known previously from India; a detailed description is given in Makhija & Patwardhan (1994).

SPECIMENS EXAMINED

Queensland: • Mossman-Mount Molloy road, 1 km S of Lions Lookout, 20 km N of Mount Molloy, 16°32'S, 145°23'E, alt. c. 390 m, on leaves of roadside treelet at rainforest margin, J.A. Elix 36917, 4.viii.2006 (CANB).

Northern Territory: • Howard Springs Nature Park, 37.5 km SE of Darwin, 12°28'03"S, 131°02'54"E, 15 m, on vine and treelet in monsoon vine forest along stream, J.A. Elix 36695, 36701, 36705, 36722, 3.viii.2005 (CANB, DNA); • Berry Springs Nature Park, 47 km S of Darwin, 12°42'06"S, 130°59'57"E, 35 m, on fallen canopy branch in monsoon vine forest along stream, J.A. Elix 37335, 37340, 37344, 4.viii.2005 (CANB).

4. *Gasscurtia catasema* (Tuck.) Marbach, *Biblioth. Lichenol.* 74, 218 (2000)

Gasscurtia catasema is characterized by the white to yellow-grey or yellow-brown, subgranular crustose thallus, the black, epruinose apothecia, the 8-spored asci, the olive to olive-brown or brown, 1-septate ascospores 9–13 × 4.5–6.0 µm, the fusiform conidia, 8–10 × 0.8–1.0 µm, and by the presence of barbatic acid (major), lichexanthone (minor) and obtusatic acid (minor or trace) and the absence of red pigment. This species was known previously from Africa, North, Central and South America and the Pacific (Hawai'i) (Marbach 2000). A detailed description is given in Marbach (2000).

SPECIMEN EXAMINED

Queensland: • Crediton State Forest, 16 km SW of Finch Hatton, 21°15'S, 148°31'E, 700 m, on dead log in *Eucalyptus grandis*-dominated woodland, J.A. Elix 21072 & H. Streimann, 1.vii.1986 (CANB).

5. *Heterodermia subcitrina* Moberg, *Symb. Bot. Upsal.* 34(1), 266 (2004)

This species is characterized by the presence of marginal, labriform, often confluent soralia, the concave lobes often showing the yellowish underside and yellow pigment (7-chloroemodin) on the ecorticate lower surface. *Heterodermia obscurata* (Nyl.) Trevis. is similar, but differs in having convex lobes, terminal, labriform soralia and a rusty brown pigment on the lower surface. *Heterodermia subcitrina* was known previously from South Africa. A detailed description is given in Moberg (2004).

SPECIMENS EXAMINED

New South Wales: • Mount Hyland Nature Reserve, 20 km N of Hernani, 30°10'44"S, 152°25'19"E, 1340 m, on *Doryphora sassafras* in temperate rainforest, J.A. Elix 36543, 30.iv.2005 (CANB); • Monga National Park, Mongarlowe River Picnic Area, 27 km SE of Braidwood, 35°35'55"S, 149°55'09"E, 655 m, on base of *Acacia* trunk in wet *Eucalyptus* forest, J.A. Elix 37247, 1.iii.2005 (CANB).

6. *Lecidella asema* (Nyl.) Knoph & Hertel, *Biblioth. Lichenol.* 36, 66 (1990)

Lecidella asema is characterized by the white, yellowish white or yellowish green thallus, with a smooth upper surface dissolving into soredia- or isidia-like structures, the black, epruinose apothecia, the 8-spored asci, the colourless, simple ascospores 9–16 × 5.5–8 µm, the filiform, strongly curved conidia, 20–30 × 0.8–1.0 µm and by the presence of thiophanic acid (major), isoarthothelin (minor) and asemone (minor). This species was known previously from Africa, Asia, Europe and North America (Knoph & Leuckert 2004). A detailed description is given in Knoph & Leuckert (2004).

SPECIMEN EXAMINED

Western Australia: • The Cascades, 4 km S of Pemberton, 34°29'S, 116°02'E, 180 m, on dead stump in disturbed wet sclerophyll forest (karri-dominated), J.A. Elix 41106, H. T. Lumbsch & H. Streimann, 13.ix.1994 (CANB).

7. *Lepraria aurescens* Orange & Wolseley, *Lichenologist* 37, 247 (2005)

Lepraria aurescens is characterized by a pale grey to pale yellowish grey leprose thallus, comprising relatively small granules 40–100 µm diam., marginal granules with long, ±downwardly projecting hyphae to 150(–300) µm long and by medullary thamnolic acid (major) and decarboxythamnolic acid (minor). This species was known previously from Thailand. A detailed description is given in Orange & Wolseley (2005).

SPECIMENS EXAMINED

Northern Territory: • Robin Falls, 15 km S of Adelaide River township, 13°21'08"S, 131°08'02"E, 140 m, on dead tree in remnant monsoon forest along stream, J.A. Elix 37827, 37828, 7.viii.2005 (CANB); • Robin Falls, on charred wood in gallery forest, G. Kantvilas 303/07, 23.ix.2007 (HO).

8. **Parmotrema sublatifolium** (Zhao, Hsu & Sun) Wei, *Enum. Lich. China*: 180 (1991)
This species is characterized by the ciliate lobes with dentate marginal laciniae, linear to subcapitate soralia, and the presence of alecatoronic and bourgeanic acids in the medulla. Previously this species was known only from China (Chen *et al.* 2005). A detailed description is given in Zhao *et al.* (1978).

SPECIMEN EXAMINED

Queensland: • Gillies Highway, 5.6 km from foot of range, 300 m, on rocks, *S. Kurokawa* 5603, 5.xi.1965 (CANB).

NEW STATE AND TERRITORY RECORDS

1. **Brigantiaea leucoxantha** (Spreng.) R.Sant. & Hafellner, in Hafellner & Bellemère, *Nova Hedwigia* 35, 246 (1981)

This species was known previously from Africa, North, Central and South America, Asia, Papua New Guinea (Hafellner 1997), Queensland and New South Wales (McCarthy 2008).

SPECIMEN EXAMINED

Norfolk Island: • Norfolk Island National Park, Filmy Fern Trail, off Selwyn Pine Road, 29°01'33"S, 167°57'33"E, 150 m, on guava stem on grassy roadside, *H. Streimann* 32186, 3.xii.1984 (CANB).

2. **Buellia australica** Räsänen, *Ann. Bot. Soc. Zool.-Bot. Fenn. "Vanamo"* 20(3), 14 (1944)

This species was previously known from Queensland (McCarthy 2008).

SPECIMEN EXAMINED

Norfolk Island: • Cascade Creek, Cascade Reserve, 29°01'20"S, 167°57'50"E, 20 m, on volcanic rock in grazed grassland, *J.A. Elix* 27443, 15.vi.1992 (CANB).

3. **Cryptothecia atropunctata** Thor, *Symb. Bot. Upsal.* 32, 275 (1997)

This endemic species was previously known from Queensland (Thor 1997, McCarthy 2008).

SPECIMEN EXAMINED

New South Wales: • Gibraltar Range, Washpool National Park, Hakea Walk, 78 km E of Glen Innes, 29°28'10"S, 152°21'01"E, 895 m, on sapling in mixed rainforest with scattered *Eucalyptus*, *J.A. Elix* 37289, 2.v.2005 (CANB).

4. **Dirinaria consimilis** (Stirt.) D.D.Awasthi, in Awasthi & Agarwal, *J. Indian Bot. Soc.* 49, 135 (1970)

In Australia this paleotropical-subtropical species was previously known from New South Wales and the Northern Territory (McCarthy 2008).

SPECIMEN EXAMINED

Queensland: • Ellis Beach, 27 km N of Cairns, 16°45'S, 145°38'E, 2 m, on tree along the foreshore, *J.A. Elix* 2571, 25.viii.1976 (CANB).

5. **Hafellia demutans** (Stirt.) Pusswald, in Marbach, *Biblioth. Lichenol.* 74, 259 (2000)

This species was known previously from South America, southern Africa, the Pacific (Hawai'i, New Caledonia), New South Wales, Western Australia and Queensland (Marbach 2000, McCarthy 2008).

SPECIMEN EXAMINED

Norfolk Island: • Rocky Point Reserve, 29°03'S, 167°55'E, 65 m, on stem of exposed *Melia* sp. in plantation of exotic trees, *H. Streimann* 31805 (CANB).

6. **Hafellia metaphragmia** (C.Knight) Pusswald, comb. nov.

Basionym: *Lecidea metaphragmia* C.Knight, *Trans. Linn. Soc. London*, ser. 2, 2, 44 (1882). Holotype: [Australia], New South Wales, [neighbourhood of Sydney], 'ad cortices arborum,' presumed holotype in WELT lost (P.W. Brownsey in litt. to H. Mayrhofer & W. Pusswald); a supposed duplicate in H is a mixture of *Hafellia tetrapla* and *Buellia* sp. In view of Knight's detailed protologue and excellent illustration, the latter is chosen as lectotype.

Lectotype here designated: the illustration in C. Knight, *Trans. Linn. Soc. London*, ser. 2, 2, pl. 8, fig. 22 (1882).

SPECIMENS EXAMINED

Western Australia: • Walebing, Quarrell Range, Moora–New Norcia road, 22 km S of Moora, 30°41'38"S, 116°12'19"E, on dead *Acacia* in remnant *Eucalyptus-Acacia* woodland with basalt outcrops along dry creek, 280 m, *J.A. Elix* 37541, 2.iv.2006 (CANB); • Dryandra Forest, a few km from Narrogin, 32°45'S, 116°56'E, 300 m, on tree, *A. & K. Kalb*, 17.viii.1994 (herb. Kalb 30829); • 30 km W of Hyden and c. 30 km E of Kondinin, 32°26'S, 118°30'E, 300 m, on tree, *A. & K. Kalb*, 18.viii.1994 (herb. Kalb 27725, 27946).

7. **Lecanora saligna** (Schrad.) Zahlbr., *Cat. Lich. Univ.* 5, 536 (1928)

In Australia this cosmopolitan species was previously known from Queensland and South Australia (McCarthy 2008).

SPECIMEN EXAMINED

Tasmania: • Site EE25, 2 km S of Howden, near Powder Jetty, 43°03'S, 147°18'E, 20 m, on *Eucalyptus* wood in dry sclerophyll forest, *G. Kantvilas* 210/97, 21.v.1997 (HO).

8. **Lecidella granulosa** (Nyl.) Knoph & Leuckert, in Knoph, *Herzogia* 14, 9 (2000)

= *Lecidella chodati* Knoph & Leuckert

This species was known previously from Europe, South Africa, North America, South America, New Zealand, New South Wales and Tasmania (Knoph 1990, McCarthy 2008).

SPECIMEN EXAMINED

Norfolk Island: • Phillip Island, Red Road Valley, 29°07'03"S, 167°56'42"E, 90 m, on dead wood on bare, westerly slope, *H. Streimann* 53904, 19.iv.1994 (CANB).

9. **Lepraria atlantica** Orange, *Lichenologist* 33, 462 (2001)

This species was previously known from northern Europe, New South Wales, the Australian Capital Territory and Western Australia (Orange 2001, McCarthy 2008).

SPECIMEN EXAMINED

Tasmania: • Arthur-Pieman Protected Area, 31 km NNE of Savage River, along pipeline road, 41°17'S, 145°19'E, 480 m, on trunk of *Phyllocladus* in horizontal scrub, *J.A. Elix* 40155 & *G. Kantvilas*, 8.xii.1993 (CANB).

10. **Lepraria eburnea** J.R.Laundon, *Lichenologist* 24, 332 (1992)

Lepraria eburnea was previously known from Europe and North America (Orange 1997) and in Australia from Victoria and New South Wales (Elix 2006b, 2007a).

SPECIMEN EXAMINED

Tasmania: • Mersey State Forest, 21 km WSW of Chudleigh, 41°33'S, 146°14'E, 300 m, on *Olearia* stem in wet sclerophyll forest, *H. Streimann* 59730, 12.v.1997 (CANB).

11. **Lepraria lobata** Elix & Kalb, *Mycotaxon* 94, 220 ('2005') [2006]

This Australian species was previously known from Western Australia and the Australian Capital Territory (Elix 2006a).

SPECIMEN EXAMINED

Tasmania: • Intersection of Elderslie Road and Black Brush Road, 9 km W of Pontville, 42°41'S, 147°10'E, on sheltered sandstone crevice in pasture, *J.A. Elix 40334* & *G. Kantvilas*, 11.xii.1993 (CANB).

12. *Lepraria lobificans* Nyl., *Flora* 56, 196 (1873)

In Australia this cosmopolitan species has previously been reported from Queensland, New South Wales, the Australian Capital Territory, Victoria and Tasmania (Elix 2007b, McCarthy 2008).

SPECIMENS EXAMINED

Lord Howe Island: • Along track to Mutton Bird Point, 31°32'45"S, 159°05'E, 60 m, on soil over basalt outcrops in dry lowland forest, *J.A. Elix 32809*, 21.vi.1992 (CANB).

South Australia: • Mount Lofty Ranges, "swingbridge", 10 km NE of Springton along the Marne River, 34°40'S, 139°12'E, 300 m, on soil over calcareous rocks, *J.A. Elix 26107*, 3.i.1991 (CANB); • Hindmarsh Falls, Hindmarsh River, 12 km NNW of Victor Harbour, 35°27'S, 138°35'E, 20 m, on mosses in steep valley with scattered *Eucalyptus* and exotic trees, *H.T. Lumbsch 10891a*, *A. Dickhäuser* & *H. Streimann*, 26.ix.1994 (CANB).

13. *Lepraria nigrocincta* Diederich, Sérusiaux & Aptroot in Aptroot *et al.*, *Biblioth. Lichenol.* 64, 78 (1997)

This species was known previously from Papua New Guinea, Africa (Aptroot *et al.* 1997), Queensland and New South Wales (Elix 2007a, b).

SPECIMEN EXAMINED

Tasmania: • Intersection of Elderslie Road and Black Brush Road, 9 km W of Pontville, 42°41'S, 147°10'E, on sheltered sandstone crevice in pasture, *J.A. Elix 40325* & *G. Kantvilas*, 11.xii.1993 (CANB).

14. *Leprocaulon pseudoarbuscula* (Asah.) Lamb & Ward, *J. Hattori Bot. Lab.* 38, 533 (1974)

This species was previously known from Asia and the Pacific (Papua New Guinea, Western Samoa) and in Australia from New South Wales (Lamb & Ward 1974, McCarthy 2008). It belongs to the barbatic acid race containing barbatic acid (major) and obtusatic acid (minor).

SPECIMEN EXAMINED

Tasmania: • Fern Glade Track, slopes of Mt Wellington, Hobart, 42°54'S, 147°14'E, 420 m, on dead wood in wet sclerophyll forest, *J.A. Elix 5594*, 17.i.1979 (CANB).

15. *Phyllopsora corallina* (Eschw.) Müll.Arg., *Bot. Jahrb. Syst.* 20, 264 (1894) var. *corallina*

This pantropical species was known previously from Queensland (McCarthy 2008).

SPECIMEN EXAMINED

Northern Territory: • Berry Springs Nature Park, 47 km S of Darwin, 12°42'06"S, 130°59'57"E, 35 m, on treelet in monsoon vine forest along stream, *J.A. Elix 37348*, 4.viii.2005 (CANB).

16. *Phyllopsora foliata* (Stirt.) Zahlbr., *Cat. Lich. Univ.* 4, 397 (1926) var. *foliata*

This endemic Australian species was known previously from Queensland (McCarthy 2008).

SPECIMENS EXAMINED

Lord Howe Island: • Track to Kims Lookout, 31°30'59"S, 159°03'12"E, 180 m, on basalt rocks in stunted, lowland forest, *J.A. Elix 42360*, 9.ii.1995 (CANB); • track from Smoking Tree Ridge to Rocky Run, 31°33'35"S, 159°05'09"E, 170 m, on base of tree in

lowland forest, *J.A. Elix 42445, 42451*, 10.ii.1995 (CANB); • Ridge to Malabar Hill above Catalina monument, 31°31'01"S, 159°03'36"E, 110 m, on shaded large basalt rock in low, shrubby forest, *H. Streimann 50047A*, 23.vi.1992 (CANB).

17. *Phyllopsora foliatella* Elix, *Australas. Lichen.* 58, 11 (2006)

In Australian this species was known previously from Queensland and New South Wales (Elix 2006a).

SPECIMENS EXAMINED

Lord Howe Island: • Max Nicholls Track, 31°31'08"S, 159°03'03"E, 50 m, on basalt rocks in dry lowland forest, *J.A. Elix 32759*, 20.vi.1992 (CANB); • along track to Mutton Bird Point, 31°32'45"S, 159°05'00"E, 60 m, on basalt rocks in dry lowland forest, *J.A. Elix 32834*, 21.vi.1992 (CANB); • along ridge to Malabar Hill, 31°31'16"S, 159°03'50"E, 80 m, on basalt rocks in dense, shrubby vegetation, *J.A. Elix 33002*, 23.vi.1992 (CANB); • track to Kims Lookout, 31°30'59"S, 159°03'12"E, 180 m, on basalt rocks in stunted lowland forest, *J.A. Elix 42369*, 9.ii.1995 (CANB).

18. *Phyllopsora furfuracea* (Pers.) Zahlbr., in Engler & Prantl, *Nat. Pflanzenfam.* 1(1), 138 (1905)

This pantropical-pantemperate species was known previously from Queensland, New South Wales and Tasmania (Brako 1991, McCarthy 2008).

SPECIMEN EXAMINED

Lord Howe Island: • Track to Little Island, near Salmon Beach, 31°33'30"S, 159°04'30"E, 5 m, on basalt rocks in scrubby, partly disturbed lowland forest, *J.A. Elix 32693*, 20.vi.1992 (CANB).

19. *Porina leptosperma* Müll.Arg., *Flora* 66, 333 (1883)

This pantropical-pantemperate species was known previously from Christmas Island and Tasmania (McCarthy 2008).

SPECIMEN EXAMINED

New South Wales: • Cottan-Bimbang National Park, 4.8 km from W end of Myrtle Gully Road, c. 70 km E of Walcha, 31°21'45"S, 152°00'38"E, 980 m, on leaves in rainforest with isolated *Eucalyptus*, *J.A. Elix 36330*, 28.iv.2005 (CANB). Det. R. Lücking.

20. *Ramboldia arandensis* (Elix) Kalb, Lumbsch & Elix, in Kalb *et al.*, *Nova Hedwigia* 86, 31 (2008)

This species was known previously from the Australian Capital Territory, New South Wales and Western Australia (Elix 2004, 2007a; McCarthy 2008).

SPECIMENS EXAMINED

Victoria: • Reef Hills State Park, 7 km SSW of Benalla, 36°36'53"S, 145°56'03"E, 155 m, on *Eucalyptus* stump in open *Eucalyptus* woodland, *J.A. Elix 37171, 37174, 37175*, 5.v.2006 (CANB).

21. *Ramboldia blastidiata* Kantvilas & Elix, *Lichenologist* 38, 137 (2007)

This Australian species was previously known from Tasmania, New South Wales, the Australian Capital Territory, South Australia and Western Australia (Kantvilas & Elix 2007a).

SPECIMEN EXAMINED

Victoria: • Kalymna Falls, Grampians National Park, 28 km WSW of Ararat, 37°19'S, 142°37'E, 480 m, on semi-shaded rock in dry sclerophyll forest with dense vegetation near stream, *H. Streimann 55211*, 2.x.1994 (CANB).

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

This Australian species was known previously from New South Wales, Victoria and Tasmania (Kantvilas & Elix 2007a, McCarthy 2008).

SPECIMENS EXAMINED

Western Australia: • Gwambygine Nature Reserve, 11 km S of York, 31°58'24"S, 116°48'38"E, 245 m, on branches of *Acacia* in *Acacia acuminata* woodland with scattered *Melaleuca*, *J.A. Elix* 31743, 22.iv.2004 (CANB); • Yellowdine Nature Reserve, 56 km E of Southern Cross along the Great Eastern Highway, 31°16'23"S, 119°53'43"E, 410 m, on *Melaleuca* in *Eucalyptus-Melaleuca* woodland with shrub understorey, *J.A. Elix* 32383, 32386, 27.iv.2004 (CANB, PERTH); • Bullfinch-Evanston road, 24.7 km N of Bullfinch, 30°47'14"S, 119°09'28"E, 345 m, on *Acacia* in *Eucalyptus* woodland with saltbush and shrub understorey, *J.A. Elix* 32504, 32505, 28.iv.2004 (CANB, PERTH).

23. **Ramboldia crassithallina** Kalb, *Biblioth. Lichenol.* 78, 160 (2001)

This Australian species was known previously from Western Australia and Tasmania (Kantvilas & Elix 2007a, McCarthy 2008).

SPECIMENS EXAMINED

Queensland: • Baralaba–Woorabinda road, State Forest 212, 50 km S of Duaringa, 24°10'S, 149°38'E, 190 m, on charred wood in *Eucalyptus-Callitris*-dominated woodland, *J.A. Elix* 34938, 29.viii.1993 (CANB); • Mt Marley, 1 km NE of Stanthorpe, 28°39'S, 151°57'E, 900 m, on *Callitris* in *Eucalyptus-Callitris*-dominated woodland, *J.A. Elix* 35647, 5.ix.1993 (CANB); • Herberton–Petford road, 1 km SW of Herberton, 17°24'S, 145°22'E, 880 m, on dead *Eucalyptus* root in *Eucalyptus*-dominated slope with old tin workings, *H. Streimann* 29904, 27.vi.1984 (CANB). *Australian Capital Territory*: • Canberra Nature Park, Bruce Ridge, 35°15'S, 149°05'E, 640 m, on dead wood in dry *Eucalyptus* woodland, *J.A. Elix* 33373, 27.xi.1992 (CANB). *South Australia*: • Saunders Creek, 6 km E of Springton, 34°43'S, 139°09'E, 310 m, on dead wood in scattered shrubs and pasture, *J.A. Elix* 25768, 19.ix.1990 (CANB).

24. **Rinodina williamsii** H. Mayrh., *Beih. Nova Hedwigia* 79, 528 (1984)

This species was known previously from New South Wales, Queensland, Tasmania and the Juan Fernandez Islands (Kaschik 2006).

SPECIMEN EXAMINED

Western Australia: • South Coast Highway, 30 km W of Denmark, 34°57'S, 117°01'E, 30 m, on granite rocks in heathy, dry sclerophyll forest, *J.A. Elix* 41258, *H.T. Lumbsch & H. Streimann*, 15.ix.1994 (CANB).

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

This species was known previously from Tasmania (Kantvilas & Elix 2007b).

SPECIMEN EXAMINED

Western Australia: • Walebing, Quarrell Range, Moora–New Norcia road, 22 km S of Moora, 30°41'38"S, 116°12'19"E, 275 m, on deasol bank in remnant *Eucalyptus-Acacia* woodland with basalt outcrops along dry creek, *J.A. Elix* 37573, 2.iv.2006 (CANB).

Acknowledgements

I thank Professor Roland Moberg (Uppsala) for supplying an authentic specimen of *Heterodermia citrina*, Dr Klaus Kalb (Neumarkt) for the loan of key collections of *Hafellia metaphragmia* and Dr Gintaras Kantvilas (Hobart) for the loan of his collection of *Lepraria aurescens*.

References

Brako, L (1991): *Phyllopsora* (Bacidiaceae). *Flora Neotropica Monograph* 55, 1–66.

Chen, JB; Wang, SL; Elix, JA (2005): *Parmeliaceae* (Ascomycota) lichens in China's mainland. III. The genus *Parmotrema*. *Mycotaxon* 91, 93–113.

Elix, JA (2004): A new species of *Pyrrosopora* (Lecanoraceae, lichenized Ascomycota) from Australia. *Australasian Lichenology* 55, 26–28.

Elix, JA ('2005') [2006a]: New species of sterile crustose lichens from Australia, *Mycotaxon* 94, 219–224 [2005].

Elix, JA (2006b): Additional lichen records from Australia 56. *Australasian Lichenology* 58, 4–13.

Elix, JA (2007a): Additional lichen records from Australia 62. *Australasian Lichenology* 60, 6–12.

Elix, JA (2007b): Additional lichen records from Australia 64. *Australasian Lichenology* 61, 8–15.

Galloway, DJ (1985): *Flora of New Zealand Lichens*. Wellington: P.D. Hasselberg, New Zealand Government Printer.

Hafellner, J (1997): A world monograph of *Brigantiaea* (lichenized Ascomycotina, Lecanorales). *Symbolae Botanicae Upsalienses* 32(1): 35–74.

Kantvilas, G; Elix, JA (2007a): The genus *Ramboldia* (Lecanoraceae): a new species, key and notes. *Lichenologist* 38, 135–141.

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

Kaschik, M (2006): Taxonomic studies on saxicolous species of the genus *Rinodina* (lichenized Ascomycetes, Physciaceae) in the Southern Hemisphere with emphasis in Australia and New Zealand. *Bibliotheca Lichenologica* 93, 1–162.

Knoph, J-G (1990): Untersuchungen an gesteinsbewohnenden xanthonhaltigen Sippen der Flechtengattung *Lecidella* (Lecanoraceae, Lecanorales) unter besonderer Berücksichtigung von aussereuropäischen Proben exklusive Amerika. *Bibliotheca Lichenologica* 36, 1–183.

Knoph, J-G; Leuckert, C (2004): *Lecidella*. In: *Lichen Flora of the Greater Sonoran Desert Region* (eds. T.H. Nash III, B.D. Ryan, P. Diderich, C. Gréis & F. Bungartz, eds), vol. 2, 309–322. Lichens Unlimited, Tempe.

Lamb, IM; Ward, A (1974): A preliminary conspectus of the species attributed to the imperfect lichen genus *Leprocaulon* Nyl. *Journal of the Hattori Botanical Laboratory* 38, 499–553.

Makhija, U; Patwardhan, PG (1994): A contribution towards a monograph of the lichen genus *Cryptothecia* (family Arthoniaceae). *Current Researches in Plant Sciences* 1994: 57–72.

Malcolm, WM; Vězda, A (1995): Two new saxicolous species of the lichen genus *Byssoloma* from New Zealand. *Mycotaxon* 55, 357–362.

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

McCarthy, PM (2008): *Checklist of the Lichens of Australia and its Island Territories*. ABRIS: Canberra. **Version 13 June, 2008.**

<http://www.anbg.gov.au/abris/lichenlist/introduction.html>.

Moberg, R (2004): Notes on foliose species of the lichen family Physciaceae in southern Africa. *Symbolae Botanicae Upsalienses* 34(1), 257–288.

Orange, A (1997): Chemical variation in *Lepraria eburnea*. *Lichenologist* 29, 9–13.

Orange, A (2001): *Lepraria atlantica*, a new species from the British Isles. *Lichenologist* 33, 461–465.

Orange, A; Wolseley, P (2005): Two new thamnolic acid-containing *Lepraria* species from Thailand. *Lichenologist* 37, 247–250.

Pusswald, W (1995): *Die Gattung Hafellia* (lichenisierte Ascomyceten, Physciaceae) in Australien, Dissertation, Institut für Botanik, Graz.

Thor, G (1997): The genus *Cryptothecia* in Australia and New Zealand and the circumscription of the genus. *Symbolae Botanicae Upsalienses* 32(1), 267–289.

Zhao, JD; Xu, LW; Sun, ZM (1978): Species novae *Parmeliae* Sinicae. *Acta Phytotaxonomica Sinica* 16, 95–97.

Additional lichen records from Australia 68. Tropical pyrenolichens

Patrick M. McCarthy

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

Abstract: *Anisomeridium laevigatum* (P.M.McCarthy) R.C.Harris, *Arthopyrenia malaccitula* (Nyl.) Zahlbr., *Porina exserta* Müll.Arg. and *Strigula johnsonii* P.M.McCarthy are reported for the first time from Australia. *Anisomeridium pacificum* (P.M.McCarthy) R.C.Harris is synonymized with *A. laevigatum* (P.M.McCarthy) R.C.Harris. New State and Territory records are provided for 11 other lichens.

Introduction

Field-work by the author in the Northern Territory (2005) and north-eastern Queensland (2006) have resulted in new records of pyrenocarpous lichens from wet-tropical regions of Australia.

NEW RECORDS FOR AUSTRALIA

1. *Anisomeridium laevigatum* (P.M.McCarthy) R.C.Harris, *More Florida Lichens* 147 (1995)

Ditremis laevigata P.M.McCarthy, *Muelleria* 8: 1 (1993). Type: New Zealand, South Island, Dunedin, Bethune's Gully, 45°50'S, 170°33'E, on smooth siliceous rock, 4 feet above water level, *J. Murray*, ii.1957 (holotype OTA; isotype AK 192342).

Ditremis pacifica P.M.McCarthy, *Muelleria* 8: 3 (1993); *Anisomeridium pacificum* (P.M.McCarthy) R.C.Harris, *More Florida Lichens* 149 (1995). Type: United States of America, Hawaiian Islands, Oahu, Mokuleia, gulch NW of Peacock Flats, on shaded boulders in and near streambed, alt. 1200 feet, on siliceous rocks, *O. & I. Degener*, 5.iii.1966 (holotype B 049768), *syn. nov.*

This lichen has a rather thin pale grey to greyish green or slightly brownish thallus that ranges from effuse and sparingly rimose (to 60 µm thick) to forming extensive areolate patches that are, in places, up to 100(–140) µm thick. The largely immersed to semi-immersed perithecia are 0.20–0.44 mm diam., and the blackish 40–60(–80) µm thick involucrellum extends down to the base of the excipulum. The asci are 65–80 x 14–18 µm, and are surrounded by hamathecial filaments that are proximally free but distally anastomosing. The ascospores have one median or submedian septum and measure 12–23 x 5–10 µm.

McCarthy (1993a) described *A. pacificum* (as *Ditremis pacifica* P.M.McCarthy) from Oahu, Hawaiian Islands, and *A. laevigatum* (P.M.McCarthy) R.C.Harris (as *Ditremis laevigata* P.M.McCarthy) from southern New Zealand. The two were distinguished by the thicker thallus of *A. laevigatum* and somewhat smaller perithecia with a thinner involucrellum. However, the small suite of Queensland specimens (listed below) span almost the complete morphological breadth of the New Zealand and Hawaiian specimens, which now appear to represent the developmental extremes of a single taxon.

SPECIMENS EXAMINED

Queensland: • Girringun Natl Park, Wallaman Falls, 50 km W of Ingham, Jinda Track, 18°35'21"S, 145°48'20"E, on shaded siliceous rock in deep gorge, alt. 300–500 m, *P.M. McCarthy* 2554, 25.vii.2006, (CANB); • Atherton Tableland, Elinjaa Creek, below Elinjaa Falls, c. 5 km ENE of Millaa Millaa, 17°29'38"S, 145°39'20"E, on deeply shaded fine-grained siliceous rock in rainforest, alt. 705 m, *P.M. McCarthy* 2523, 29.vii.2006 (CANB); • Wooroonooran Natl Park, tributary of North Johnstone River, track to Wallicher Falls, 35 km W of Innisfail, 17°36'18"S, 145°46'21"E, on shaded siliceous rocks in rainforest, alt. 300–350 m, *P.M. McCarthy* 2611, 2613, 10.viii.2006 (CANB).

2. *Arthopyrenia malaccitula* (Nyl.) Zahlbr., *Cat. Lich. Univ.* 1, 284 (1921) Fig. 1

Verrucaria malaccitula Nyl., *J. Linn. Soc., Bot.* 20, 61 (1883)

Thallus endophloeodal, whitish to pale grey, UV–, with a sparse trentepohlioid photobiont. Ascomata numerous, perithecioid, largely immersed in the substratum, 0.3–0.55 mm diam.; in surface view occupying the centre of a 0.5–0.7 mm diam. greyish disc; involucrellum brownish black in thin section, incorporating bark cells; ostiole apical; ascomatal base brownish black. Hamathecium not interspersed; filaments rather sparse, anastomosing. Asci usually 2-spored, rarely 8-spored, short-cylindrical. Ascospores hyaline, usually 1-septate, the cells ±equal, 30–48 x 11–20 µm [c. 18–21 x 6–8 µm in a couple of 8-spored asci observed]; ascospore wall smooth to minutely ornamented, frequently with internal, ring-like thickenings that occasionally merge to form second and third septa. Pycnidia not numerous, immersed, c. 0.1 mm diam.; conidia filiform, straight, 6–8 x 0.5 µm.

This corticolous lichen is known from Peninsular Malaysia (the type locality), Sabah, Papua New Guinea and south-eastern U.S.A. (Louisiana, Alabama and Florida).

SPECIMENS EXAMINED

Northern Territory: • Stuart Highway to Howard Springs, 35 km SE of Darwin, edge of *Callitris* plantation, 12°28'37"S, 131°01'59"E, on bark, alt. 55 m, *P.M. McCarthy* 2439, 3.viii.2005 (CANB); • Charles Darwin Natl Park, Darwin, 12°26'37"S, 130°52'39"E, on bark in *Cryptocarya*-dominated mangrove, alt. 3 m, *P.M. McCarthy* 2444, 3.viii.2005 (CANB).

3. *Porina exserta* Müll.Arg., *Flora* 71, 548 (1888)

Porina exserta is known from siliceous rocks at several localities in southern Brazil. McCarthy (1993b) reported thalli lacking a dark basal layer, having hemispherical verrucae (0.35–)0.6(–0.96) mm diam. with a pale apex and containing ascospores measuring (44–)57(–70) x 3.5–5.5 µm, with (11–)15–17(–21) septa.

This lichen has a palaeotropical counterpart, *P. bellendenica* Müll.Arg., which grows on bark and on calcareous and siliceous rocks and is found in Thailand, Christmas Island, the Northern Territory, eastern Queensland, Taiwan and Tahiti. The thallus is subtended by a blackish basal layer, and the smaller perithecial verrucae (0.35–0.6 mm diam.) have a broad, blackish periostolar cap to 0.35 mm diam. The ascospores are 35–56 x 3–5 µm and have (9–)11–13(–15) septa (McCarthy 1993b, 2001).

A deeply shaded, saxicolous specimen collected at Mossman Gorge exhibits characters of both taxa; however, larger dimensions and the distinctive perithecial apex clearly indicate *P. exserta*. Although the thallus has the black basal layer characteristic of *P. bellendenica*, the perithecial verrucae are 0.4–0.85 mm diam., usually with only a minute, brownish c. 0.1 mm diam. ring around the ostiole. The ascospores are 45–72 x 3–5 µm, with (13–)15 septa at maturity. See McCarthy (1993b) for a detailed description, discussion and illustrations.

SPECIMEN EXAMINED

Queensland: • Mossman Gorge, 6 km W of Mossman, 16°28'21"S, 145°19'54"E, on deeply shaded siliceous rocks in rainforest, alt. 60 m, *P.M. McCarthy* 2625, 1.viii.2006 (CANB).

4. *Strigula johnsonii* P.M.McCarthy, *Muelleria* 8, 324 (1995)

One of the most distinctive saxicolous species of *Strigula*, this lichen was first described from two localities in southern New Zealand (McCarthy 1995a). The type specimens have a thin silvery grey thallus, semi-immersed to almost entirely immersed perithecia (0.42–)0.6(–0.8) mm diam. and muriform ascospores measuring (37–)49(–63) x (10–)15(–19) µm. While the Queensland and New Zealand specimens have very similar thalli, and ascospores that are almost identical in size and septation, the perithecia of the former are smaller, (0.38–)0.47(–0.61) mm diam.

Strigula muriformis Aptroot & Diederich, described from Papua New Guinea, is the only other saxicolous *Strigula* with fully muriform ascospores (Aptroot *et al.* 1997). However, the perithecia are discontinuously smaller (0.2–0.3 mm diam.) than those of *S. johnsonii*. See McCarthy (1995a) for a description and illustrations of *S. johnsonii*.

SPECIMENS EXAMINED

Queensland: • Murray Falls State Forest Park, 19 km WSW of Bilyana, 18°09'14"S, 145°48'58"E, deeply shaded siliceous rocks in rainforest, alt. 55 m, *P.M. McCarthy* 2598, 27.vii.2006 (CANB); • Tully Gorge Natl Park, Tully Gorge, below Kareeyah Power Station, 55 km NW of Tully, 17°46'03"S, 145°34'48"E, on shaded siliceous rocks in rainforest gorge, alt. 220 m, *P.M. McCarthy* 2583, 28.vii.2006 (CANB).

ADDITIONAL RECORDS

1. *Anisomeridium biforme* (Borrer) R.C.Harris, in A. Vězda, *Lich. Sel. Exsicc.* **61**, [1305] (1978)

This corticolous lichen is known from North America, Europe and East Asia (including Papua New Guinea) and the western Pacific. It has also been collected in eastern Queensland and Tasmania. See Coppins & James (1992) and Harris (1995).

SPECIMEN EXAMINED

Northern Territory: • Kakadu Natl Park, South Alligator, Gungarre Forest Walk, 12°40'36"S, 132°28'44"E, monsoon vine forest, on bark, alt. 30 m, *P.M. McCarthy* 2445, 10.viii.2005 (CANB).

2. *Anisomeridium consobrinum* (Nyl.) Aptroot, in A. Aptroot *et al.*, *Biblioth. Lichenol.* **57**, 21 (1995)

This lichen was previously known from New Caledonia, Papua New Guinea, islands in the south Pacific and eastern Queensland.

SPECIMEN EXAMINED

Northern Territory: • Charles Darwin Natl Park, Darwin, 12°26'37"S, 130°52'39"E, on bark in *Cryptocarya*-dominated mangrove, alt. 3 m, *P.M. McCarthy* 2443, 3.viii.2005 (CANB).

3. *Anisomeridium terminatum* (Nyl.) R.C.Harris, *More Florida Lichens* 130 (1995)

This pantropical species is known from Queensland and Norfolk Island.

SPECIMENS EXAMINED

Northern Territory: • Shoal Bay Jetty, 13 km from Darwin–Howard Springs road, 12°22'14"S, 131°02'00"E, on bark of *Rhizophora* stems in mangrove, alt. 2 m, *P.M. McCarthy* 2442, 13.viii.2005 (CANB); • Charles Darwin Natl Park, Darwin, 12°26'37"S, 130°52'39"E, on bark in *Cryptocarya*-dominated mangrove, alt. 3 m, *P.M. McCarthy* 2446, 13.viii.2005 (CANB); • Sandy Creek Track, Casuarina Coastal Reserve, 12 km NNE of Darwin, 12°21'19"S, 130°52'20"E, on bark of tree in strand vegetation, alt. c. 5 m, *P.M. McCarthy* 2447, 14.viii.2005 (CANB).

4. *Polymeridium catapastum* (Nyl.) R.C.Harris, *Acta Amazon.* (Suppl.) **14**, 70 ('1984') [1986]

The known distribution of this pantropical lichen includes eastern Queensland and New South Wales. See Harris (1993) and McCarthy (1995b).

SPECIMEN EXAMINED

Northern Territory: • Litchfield Natl Park, Florence Creek at Florence Falls, 48 km NW of Batchelor, 13°05'58"S, 130°47'05"E, on twig in monsoon vine forest, alt. 90 m, *P.M. McCarthy* 2435, 6.viii.2005 (CANB).

5. *Porina aenea* (Wallr.) Zahlbr., *Cat. Lich. Univ.* **1**, 363 (1922)

A common temperate lichen, especially in the Northern Hemisphere (McCarthy 2003). *P. aenea* is rarely seen in tropical regions. In Australia, it was previously known from Tasmania (McCarthy 2001).

SPECIMENS EXAMINED

Queensland: • Atherton Tableland, Theresa Creek, below Millaa Millaa Falls, 17°29'44"S, 145°36'41"E, on twig of rainforest tree, alt. 750 m, *P.M. McCarthy* 2529, 29.vii.2006 (CANB); • Atherton Tableland, Koombooloomba State Forest, Lake Koombooloomba, 37 km S of Ravenshoe, 17°50'25"S, 145°35'45"E, on moderately shaded *Cyathea* stipe in rainforest, alt. 700 m, *P.M. McCarthy* 2600, 7.viii.2006 (CANB).

6. *Porina chlorotica* (Ach.) Müll.Arg., *Revue Mycol.* **6**, 20 (1884)

The Australian distribution of this cosmopolitan lichen includes Queensland, New South Wales, Victoria, Tasmania, Christmas Island, Lord Howe Island and Macquarie Island (McCarthy 2001, 2003).

SPECIMEN EXAMINED

Northern Territory: • 29 km NE of Pine Creek, 13°40'49"S, 131°59'05"E, in shaded and sheltered crevices of large granite tors in open woodland, *G. Kantvilas* 297/07, 298/07, 23.ix.2007 (HO 545671, 545672).

7. *Porina guentheri* (Flotow) Zahlbr., *Cat. Lich. Univ.* **1**, 384 (1922)

In recent years, this common pantemperate lichen has been collected in several tropical and subtropical localities (McCarthy, 2003). In Australia, it has already been reported from New South Wales, Tasmania and Western Australia (McCarthy 2001).

SPECIMENS EXAMINED

Queensland: • Mossman Gorge, 6 km W of Mossman, 16°28'21"S, 145°19'54"E, on deeply shaded siliceous rocks in rainforest, alt. 60 m, *P.M. McCarthy* 2622, 1.viii.2006 (CANB); • Atherton Tableland, Mount Hypipamee Natl Park, track to Dinner Falls, 25 km S of Atherton, 17°25'42"S, 145°29'10"E, on moderately shaded siliceous rocks, alt. 980 m, *P.M. McCarthy* 2590, 5.viii.2006 (CANB); • Atherton Tableland, Danbulla State Forest, Danbulla Forest Drive, Kauri Creek, 24 km E of Tolga, 17°08'02"S, 145°35'55"E, on deeply shaded siliceous rocks in rainforest, alt. 660 m, *P.M. McCarthy* 2563, 6.viii.2006 (CANB); • Atherton Tableland, Koombooloomba State Forest, Lake Koombooloomba, 37 km S of Ravenshoe, 17°50'25"S, 145°35'45"E, on moderately shaded siliceous rocks in rainforest, alt. 700 m, *P.M. McCarthy* 2599, 7.viii.2006 (CANB).

8. *Porina internigrans* (Nyl.) Müll.Arg., *Rep. Meetings Australas. Assoc. Advancem. Sci.* **1895**, 452 (1895)

This is a rather common lichen in eastern Queensland, and it is also known from India, Thailand, Papua New Guinea, New Caledonia, the Solomon Islands and Vanuatu (McCarthy 2003). Although *P. internigrans* was previously thought to be exclusively corticolous (McCarthy 2001), several saxicolous collections were made recently in north-eastern Queensland. These have somewhat larger perithecial verrucae (0.68–1.1 mm diam.) than those of earlier corticolous collections (0.5–0.98 mm diam.), but this disparity is not thought to be significant.

The dimensions of the perithecial verrucae begin to approach those of *P. tijucana* Vain. from Central and South America (McCarthy 1993b, 2003). That saxicolous and corticolous lichen is very similar to *P. internigrans* in its thallus and ascomal anatomy, in the shape and dimensions of the asci and the size and septation of the ascospores. However, the perithecial verrucae of the former are 0.8–1.6 mm diam.

SAXICOLOUS SPECIMENS EXAMINED

Queensland: • Girringun Natl Park, Wallaman Falls, 50 km W of Ingham, Jinda Track, 18°35'21"S, 145°48'20"E, on shaded siliceous rocks in deep gorge, alt. 300–500 m, *P.M. McCarthy* 2550, 25.vii.2006 (CANB); • Murray Falls State Forest Park, 19 km WSW of Bilyana, 18°09'14"S, 145°48'58"E, on deeply shaded rocks in rainforest, alt. 55 m, *P.M. McCarthy* 2593, 27.vii.2006 (CANB); • Wooroonooran Natl Park, Josephine Falls, 20 km NW of Innisfail, 17°26'16"S, 145°51'33"E, on shaded granite boulder in rainforest, alt. 80 m, *P.M. McCarthy* 2509, 31.vii.2006 (CANB); • Mossman Gorge, 6 km W of Mossman, 16°28'21"S, 145°19'54"E, on deeply shaded siliceous rocks, alt. 60 m, *P.M. McCarthy* 2521, 1.viii.2006 (CANB); • Atherton Tableland, Danbulla State Forest, Danbulla Forest Drive, Kauri Creek, 24 km E of Tolga, 17°08'02"S, 145°35'55"E, on deeply shaded siliceous rocks in rainforest, alt. 660 m, *P.M. McCarthy* 2566, 6.viii.2006 (CANB).

9. *Porina leptalea* (Durieu & Mont.) A.L.Sm., in J.M.Crombie & A.L.Smith, *Monogr. Brit. Lich.* **2**, 333 (1911)

The known distribution of this cosmopolitan lichen includes New South Wales, Victoria, Tasmania, Christmas Island, Lord Howe Island and Macquarie Island (McCarthy 2001, 2003).

SPECIMEN EXAMINED

Queensland: • Paluma Range Natl Park, Jourama Falls, 18°51'50"S, 145°07'40"E, sheltered rockface receiving runoff, alt. 134 m, *P.M. McCarthy* 2571 (part), 24.vii.2006 (CANB).

10. *Porina mastoidella* (Nyl.) Müll.Arg., *Bot. Jahrb. Syst.* **6**, 401 (1885)

Previously known from India, Christmas Island, Vanuatu, the Solomon Islands and Taiwan, the following are the first records from mainland Australia. For a description and illustrations, see McCarthy (2000).

SPECIMENS EXAMINED

Queensland: • Djina-wu Trail from Speerwah Camping Ground to Barron Falls Natl Park, Stoney Creek Rd, 15 km S of Kuranda, 16°52'57"S, 145°37'53"E, on bark in rainforest, alt. 350 m, *P.M. McCarthy* 2547, 2.viii.2006 (CANB); • 27 km S of Cape Tribulation, on siliceous rocks near steep roadside creek in rainforest, 16°14'52"S, 145°25'55"E, alt. 195 m, *P.M. McCarthy* 2650, 3.viii.2006 (CANB); • Rykers Creek, c. 2.3 km N of Cape Tribulation, 16°04'16"S, 145°27'41"E, on deeply shaded, fine-grained, semi-aquatic rocks in rainforest, alt. 16 m, *P.M. McCarthy* 2524, 3.viii.2006 (CANB).

11. *Porina papuensis* P.M.McCarthy, *Biblioth. Lichenol.* **52**, 86 (1993)

This species is known from Papua New Guinea, Christmas Island, the Solomon Islands, Taiwan and Micronesia. It is locally abundant on siliceous rocks in north-eastern Queensland. For a description and illustrations, see McCarthy (1993b).

SELECTED SPECIMENS EXAMINED

Queensland: • Girringun Natl Park, Yamanie Section, 14 km WNW of Abergowrie, 18°24'49"S, 145°46'18"E, on shaded siliceous rocks in rainforest, alt. 55 m, *P.M. McCarthy* 2585 (part), 2586; 26.vii.2006 (CANB); • Atherton Tableland, Elinjaa Creek, below Elinjaa Falls, c. 5 km ENE of Millaa Millaa, 17°29'38"S, 145°39'20"E, on deeply shaded fine-grained siliceous rock in rainforest, alt. 705 m, *P.M. McCarthy* 2513, 29.vii.2006 (CANB); • Wooroonooran Natl Park, tributary of North Johnstone River, track to Tchupala Falls, 34 km W of Innisfail, 17°36'25"S, 145°46'44"E, on deeply shaded siliceous rocks in rainforest, alt. 300–350 m, *P.M. McCarthy* 2536; 29.vii.2006 (CANB); • Mossman Gorge, 6 km W of Mossman, 16°28'21"S, 145°19'54"E, on deeply shaded siliceous rocks in rainforest, alt. 60 m, *P.M. McCarthy* 2623, 1.viii.2006 (CANB); • 27 km S of Cape Tribulation, on siliceous rocks near steep roadside creek in rainforest, 16°14'52"S, 145°25'55"E, alt. 195 m, *P.M. McCarthy* 2617, 2619 (part), 2620, 2629, 3.viii.2006 (CANB).

Acknowledgements

I am grateful to Jack Elix for company and assistance in the field, Judith Curnow for organizing collecting permits for Queensland, and Gintaras Kantvilas for the loan of specimens of *Porina chlorotica*.

References

- Aptroot, A; Diederich, P; Sérusiaux, E; Sipman, HJM (1997): Lichens and lichenicolous fungi from New Guinea. *Biblioth. Lichenol.* **64**, 1–220.
- Coppins, BJ; James, PW (1992): *Anisomeridium* (Müll.Arg.) M.Choisy (1928). In *The Lichen Flora of Great Britain and Ireland* (Purvis, OW; Coppins, BJ; Hawksworth, DL; James, PW; Moore, DM, eds): 72–73. Natural History Museum Publications, London.
- Harris, RC (1975): *A Taxonomic Revision of the Genus Arthopyrenia Massal. s. lat. (Ascomycetes) in North America*. Ph.D. dissertation, Michigan State University, East Lansing.
- Harris, RC ('1991') [1993]: A revision of *Polymeridium* (Müll.Arg.) R.C.Harris (Trypetheliaceae). *Bol. Mus. Paraense Emílio Goeldi* **7**, 619–644.
- Harris, RC (1995): *More Florida Lichens including the 10¢ Tour of the Pyrenolichens*. Privately published, New York.
- McCarthy, PM (1993a): New saxicolous species of *Ditremis* Clements (lichenized Ascomycotina, Monoblastiaceae) from New Zealand and Hawaii. *Muelleria* **8**, 1–4.
- McCarthy, PM (1993b): Saxicolous species of *Porina* Müll.Arg. (Trichotheliaceae) in the Southern Hemisphere. *Biblioth. Lichenol.* **52**, 1–134.
- McCarthy, PM (1995a): New saxicolous species of *Strigula* Fr. (lichenized Ascomycotina, Strigulaceae) in Australia and New Zealand. *Muelleria* **8**, 323–329.
- McCarthy, PM (1995b): Additional lichen records from Australia 20. *Australas. Lichenol. Newslett.* **36**, 11–19.
- McCarthy, PM (2000): Additional lichen records from Oceania 6. Some corticolous pyrenolichens in Vanuatu. *Australas. Lichenol.* **47**, 26–29.
- McCarthy, PM (2001): Trichotheliaceae. *Fl. Australia* **58A**, 105–157.
- McCarthy, PM (2003): Catalogue of the lichen family Porinaceae. *Biblioth. Lichenol.* **87**, 1–164.
- McCarthy, PM (2008): *Checklist of the Lichens of Australia and its Island Territories*. Australian Biological Resources Study, Canberra. <http://www.anbg.gov.au/abrs/lichenlist/introduction.html>. Version 17 March, 2008.

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

Abstract: *Verrucaria corallensis* sp. nov. is described from intertidal rocks in north-eastern Queensland, and the endemic *V. operculata* P.M.McCarthy is transferred to *Bagliettoa* A.Massal.

NEW SPECIES

Verrucaria corallensis P.M.McCarthy, sp. nov.

Thallus epilithicus, effusus vel determinatus, continuus, griseoviridis vel viridiater aut griseoater, nigropunctatus vel jugatus, 20–40(–50) μm crassus, madefactus gelatinosus. Perithecia convexa, hemisphaerica vel subglobosa, (0.17–)0.23(–0.30) mm diametro. Involucrellum 35–60 μm crassum. Centrum 0.10–0.17 mm diametro. Periphyses 15–20 \times 1.0–1.5 μm . Asci 35–44 \times 10–16 μm . Ascospores elongatae-ellipsoideae vel fusiformes, (13–)16.5(–20) \times (3.5–)4.2(–5.0) μm .

Type: Australia, Queensland, 13 km NE of Mossman, Rocky Point, 16°23'06"S, 145°25'01"E, alt. 0 m, on wave-splashed (at high-water) intertidal sandstone, P.M.McCarthy 2651, 1.viii.2006 (holotype CANB; isotypes BRI, CANB).

Thallus crustose, epilithic, effuse to determinate, c. 5–20 mm wide, medium greyish green to greenish black or greyish black, \pm smooth, continuous or very sparingly rimose, 20–40(–50) μm thick, becoming greener and gelatinous when wetted, with sparse to very numerous black orbicular to oval punctae 15–40 μm wide, or the punctae coalescing to form simple, branched or anastomosing jugae, these 25–50 μm wide and acutely ridged or flat-topped. Cortex absent; mycobiont cells hyphal or paraplectenchymatous, 2–3 μm wide. Algal cells green, in irregular columns, vertically slightly elongate, 4–8 \times 3–5(–6) μm . Prothallus absent; blackened basal layer discontinuous (punctae and jugae) or absent. Perithecia very numerous, semi-immersed to almost superficial, usually solitary, mostly hemispherical, occasionally convex, subglobose or moderately to grossly distorted, (0.17–)0.23(–0.30) mm diam. [$n = 40$], usually dull black, occasionally glossy, not overgrown by the thallus. Perithecial apex smooth and rounded, or with an uneven surface. Ostiole inconspicuous or, commonly, a crater-like 20–40 μm diam. depression. Involucrellum greenish black in thin section, extending down to excipulum-base level, 35–60 μm thick at the base. Centrum globose to depressed-ovate, 0.10–0.17 mm diam. Subhymenium 10–15 μm thick. Excipulum 10–15 μm thick, with a greenish black outer zone and a hyaline to pale greenish inner zone. Periphyses 15–20 \times 1.0–1.5 μm , simple to sparingly branched. Paraphyses absent. Hymenial gel Lugol's I+ red-brown. Asci 8-spored, clavate to cylindroclavate, 35–44 \times 10–16 μm . Ascospores simple, hyaline, narrowly ellipsoid to short-fusiform, or more elongate and with the distal or both ends rounded, massed in the ascus, (13–)16.5(–20) \times (3.5–)4.2(–5.0) μm [$n = 92$]; contents usually finely granulate and frequently guttulate. Conidiomata absent.

Etymology: From the Latin *corallum* (coral) and the suffix *-ensis* (denoting place, locality), in reference to the new species being collected on the Australian coast of the Coral Sea.

Remarks

Marine and maritime species of *Verrucaria* are especially diverse and abundant at cool-temperate and even colder latitudes. Six intertidal species are known from Australia: *V. halizoa* Leight., *V. maura* Wahlenb., *V. meridionalis* P.M.McCarthy, *V. microsporoides* Nyl., *V. striatula* Wahlenb. and *V. subdiscreta* P.M.McCarthy (McCarthy

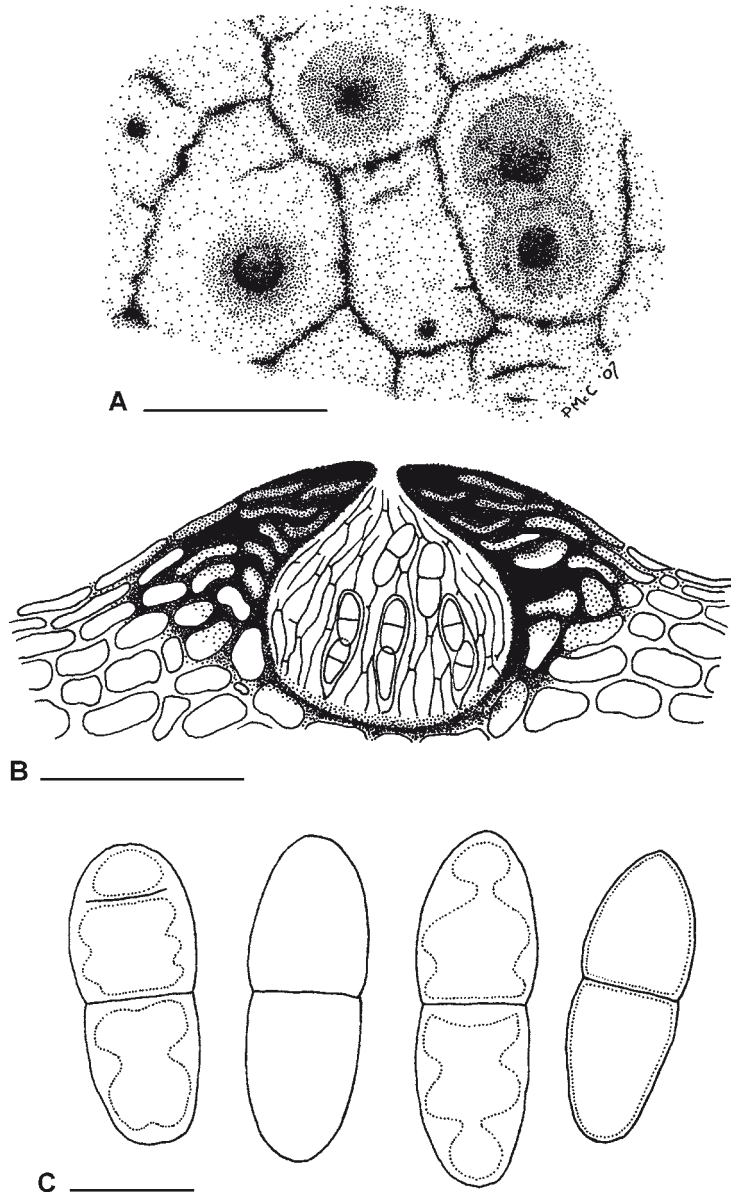


Figure 1. *Arthopyrenia malaccitula* (P.M. McCarthy 2439). A, Ascomata largely immersed in bark. B, Sectioned ascoma (semi-schematic). C, Ascospores. Scales: A = 1 mm; B = 0.2 mm; C = 20 μm .

2001). These are commonly subjected to wave or splash action, but they are rarely if ever submerged for longer periods. Intertidal species of *Verrucaria* appear to be very uncommon in the tropics, presumably due to their inability to tolerate the extremes of saturation and desiccation on tropical coasts, possibly further complicated by daily wet-season downpours of rainwater. Only one species was known previously from coastal Queensland, i.e. *V. halizoa*, which was collected by R.W. Rogers from coral at Heron Island on the southern Great Barrier Reef.

Verrucaria corallensis is characterized by a very thin, green to blackish thallus with minute, carbonaceous dots (punctae) and ridges (jugae) and prominent perithecia and unusually elongate ascospores. The pantemperate *V. striatula* is the only other Australian taxon with thallic ridges. However, that species has a continuous to rimose thallus, and its ascospores are ellipsoid to subglobose and 7–11 x 4–7 µm (McCarthy 2001). The thallus of *V. subdiscreta* is usually areolate and minutely punctate, the ascomata are smaller, and the ascospores, although often rather elongate, are significantly smaller than those of *V. corallensis* (9–15 x 4.0–6.5 µm; McCarthy 2001). *Verrucaria halizoa*, the other marine species known from Queensland, lacks punctae and jugae, and produces ascospores measuring 7.5–12.0 x 4.5–6.5 µm (McCarthy 2001), while the European *V. amphibia* R.Clem. has a thallus and carbonaceous ridges rather similar to those of *V. corallensis*, but the former has 0.4–0.5 mm diam. perithecia and 7–10 µm wide ascospores (Hawksworth *et al.* 1992). The new lichen is known only from the type locality in north-eastern Queensland, where it was abundant on a large sandstone outcrop on a beach near Rocky Point; the outcrop was partly inundated and heavily splashed at high tide. Although no other lichens were found at this site, the new species grew on moderately shaded surfaces adjacent to blackish, crustose Rhodophyta, crustose Corallinaceae (Rhodophyta) and a species of *Ralfsia s. lat.* (Phaeophyta). Several barnacles were also seen at the same vertical level on the outcrop.

NEW COMBINATION

Bagliettoa operculata (P.M. McCarthy) P.M. McCarthy, comb. nov.

Basionym: [HYPERLINK "http://www.anbg.gov.au/abrs/lichenlist/VERRUCARIACEAE/Verrucaria_operculata.html"](http://www.anbg.gov.au/abrs/lichenlist/VERRUCARIACEAE/Verrucaria_operculata.html) *Verrucaria operculata* P.M. McCarthy, *Muelleria* 7, 324 (1991). Type: South Australia, Eyre Peninsula, 17 km S of Cowell, by the Lincoln Highway, on limestone, R.B. Filson 11794, 23.x.1970 (holotype: MEL).

The genus *Bagliettoa* A.Massal. (Verrucariaceae) is characterized by a lid-like involucrellum with fissures radiating from the ostiole. Until very recently, the genus was subsumed under *Verrucaria*, usually more out of convenience than conviction. However, a recent molecular investigation has confirmed its distinctiveness (Gueidan *et al.* 2007). *Bagliettoa* is represented in Australia by two limestone-inhabiting species, the almost cosmopolitan *B. baldensis* (A.Massal.) Vězda (Syn.: *Verrucaria baldensis* A.Massal.) and the endemic *B. operculata* (McCarthy 1991, 2001). Because the latter has the perithecial morphology and anatomy of *Bagliettoa*, a new combination is made here.

References

- Gueidan, C; Roux, C; Lutzoni, F (2007): Using a multigene phylogenetic analysis to assess generic delineation and character evolution in *Verrucariaceae* (*Verrucariales*, *Ascomycota*). *Mycological Research* 111, 1145–1168.
- Hawksworth, DL; McCarthy, PM; Fletcher, A (1992): *Verrucaria* Schrader (1794). In *The Lichen Flora of Great Britain and Ireland* (O.W. Purvis *et al.* eds): 630–644. Natural History Museum Publications, London.
- McCarthy, PM (1991): Notes on Australian Verrucariaceae (Lichenes): 2. *Muelleria* 7, 317–332.
- McCarthy, PM (2001): *Verrucaria*. *Flora of Australia* 58A, 176–196.

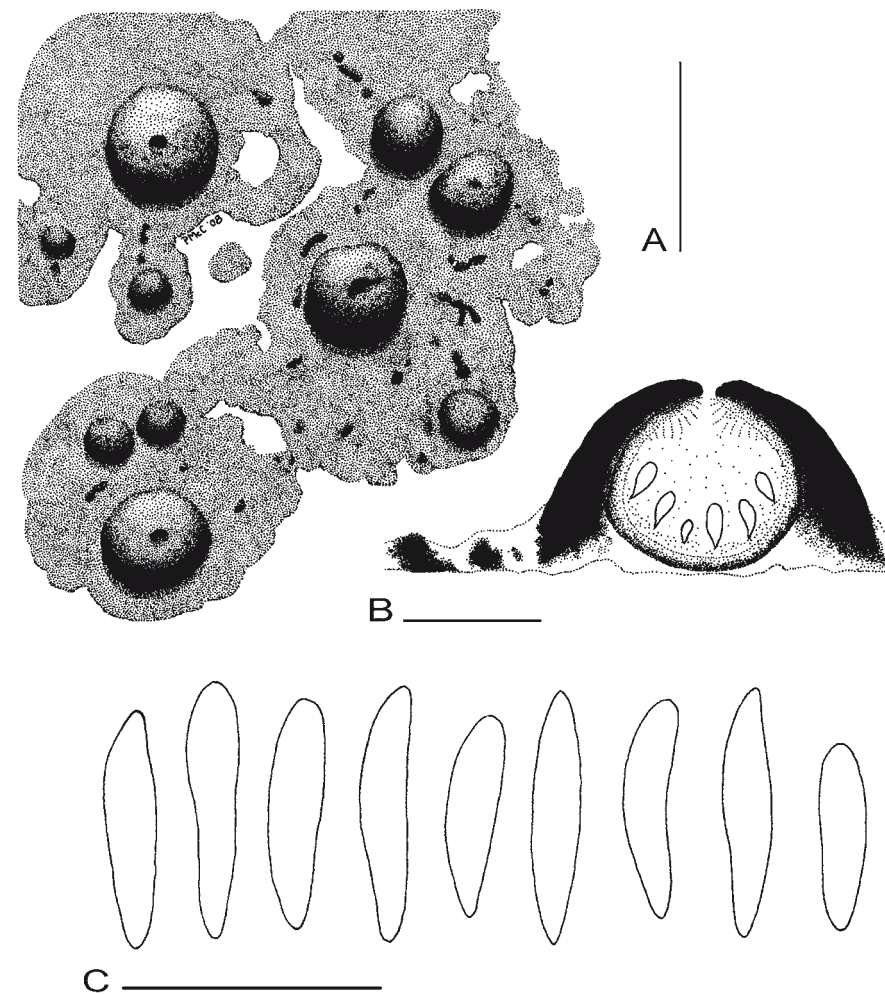


Figure 1. *Verrucaria corallensis* (holotype). A. Habit of thalli and perithecia, with scattered punctae and jugae. B. Sectioned perithecium and adjacent thallus (semi-schematic). C. Ascospores. Scales: A = 0.5 mm; B = 0.1 mm; C = 20 µm.

Lichen phytochemistry: additions and amendments I

John A. Elix

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

Abstract: New chemical data are reported for 25 lichen species.

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. **Brigantiaea chrysostricta** (Hook.f. & Taylor) Hafellner & Bellem., *Nova Hedwigia* **35**, 246 (1982)

Chemistry: thallus containing atranorin (major), zeorin (major), 6 α -acetoxyhopane-16 β ,22-diol (major), leucotylin (minor), 16 β -acetoxyhopane-6 α ,22-diol (trace), 6 α ,16 β -diacetoxyhopane-22-ol (trace); apothecia containing parietin.

Previous report: thallus containing atranorin, zeorin, unidentified triterpenoids; apothecia containing unidentified anthraquinones (Hafellner 1997).

SPECIMENS EXAMINED

New Zealand. *South Island*: • Canterbury, Prices Valley, Banks Peninsula, *J.A. Elix* 7092 (CANB); • Canterbury, Summit Road, Montgomery Reserve, Banks Peninsula, *J.A. Elix* 26230 (CANB).

2. **Brigantiaea ferruginea** (Müll.Arg.) Kashiw. & Kurok., *Mem. Natn. Sci. Mus. Tokyo* **18**, 96 (1985)

Chemistry: thallus containing atranorin (major), zeorin (major), 6 α -acetoxyhopane-16 β ,22-diol (minor), leucotylin (minor); apothecia containing parietin (trace).

Previous report: thallus containing atranorin, zeorin; apothecia containing unidentified anthraquinones (Hafellner 1997).

SPECIMEN EXAMINED

Russia. • Primor'e, Lazo, Lazo Reserve, Petrov Island (Pad Nazgou), c. 8 km WSW of Preobrazhenie, *R. Moberg* 9928 (Lich. Selecti Exsicc. Upsaliensis no. 155 – CANB).

3. **Brigantiaea fuscolutea** (Dicks.) R.Sant., in J. Poelt & A. Vězda, *Biblioth. Lichenol.* **16**, 363 (1981)

Chemistry: thallus containing atranorin (major), caloploicin (minor), vicanicin (minor), \pm isofulgidin (trace), \pm fulgidin (trace); apothecia containing parietin (minor).

Previous reports: atranorin, chloroatranorin, parietin (Culberson & Culberson 1969, Santesson 1970); thallus containing atranorin, unknown (6/6/6); apothecia containing unknown anthraquinones (Hafellner 1997).

SPECIMEN EXAMINED

New Zealand. *South Island*: • Nelson, Peel Ridge, North West Nelson Forest Reserve, 32 km W of Motueka, *J.A. Elix* 29583 (CANB).

4. **Brigantiaea leucoxantha** (Spreng.) R.Sant. & Hafellner, in J. Hafellner & A. Bellemère, *Nova Hedwigia* **35**, 246 (1982)

Chemistry: thallus containing atranorin (major), zeorin (major), \pm 6 α -acetoxyhopane-16 β ,22-diol (trace), \pm leucotylin (trace), \pm 16 β -acetoxyhopane-6 α ,22-diol (trace), \pm 6 α ,16 β -diacetoxyhopane-22-ol (trace); apothecia containing parietin (major), \pm emodin (minor), \pm simonyellin (minor).

Previous report: thallus containing atranorin, zeorin, \pm further triterpenoids; apothecia containing unidentified anthraquinones (Hafellner 1997).

SPECIMENS EXAMINED

Australia. *Queensland*: • Tully Gorge, 49 km NW of Tully, *J.A. Elix* 37000 (CANB); • Clarke Range, 46 km SSW of Proserpine, *H. Streimann* 37496 (CANB).

Brazil. *Sao Paulo*: • Serra do Mar, Serra do Peruipe, near Ana Dias, 120 km SW of Sao Paulo, *K. Kalb & G. Plöbst* (CANB).

5. **Brigantiaea lobulata** F.J.Walker & Hafellner, in J. Hafellner, *Lichenologist* **15**, 263 (1983)
Chemistry: thallus containing atranorin (minor), caloploicin (major), vicanicin (major), chloroatranorin (trace), \pm isofulgidin (trace), \pm fulgidin (trace); apothecia containing parietin (major).

Previous report: thallus containing atranorin, unknown (6/6/6); apothecia containing unidentified anthraquinones (Hafellner 1997).

SPECIMENS EXAMINED

Australia. *Queensland*: • O'Reilly's Guesthouse, Lamington National Park, *K. & A. Kalb*, 16.viii.1988 (Herb. Kalb).

6. **Brigantiaea microcarpa** (Räsänen) Hafellner, *Symb. Bot. Upsal.* **32**(1), 56 (1997)

Chemistry: thallus containing atranorin (major), zeorin (major), leucotylin (minor), \pm 16 β -acetoxyhopane-6 α ,22-diol (trace), \pm 6 α -acetoxyhopane-16 β ,22-diol (trace), \pm 6 α ,16 β -diacetoxyhopane-22-ol (trace); apothecia containing parietin (major).

Previous report: thallus containing atranorin, zeorin; apothecia containing unidentified anthraquinones (Hafellner 1997).

SPECIMENS EXAMINED

Australia. *New South Wales*: • Cedar Park, Tambar Forest Drive, 30 km NW of Kempsey, *J.A. Elix* 21812 (CANB); • Big Hill, between Jeogla and Georges Creek, on Kempsey Road, SE of Armidale, *W.A. Weber & D. McVean* L-50039 (CANB).

7. **Brigantiaea phaeomma** (Nyl.) Hafellner, *Symb. Bot. Upsal.* **32**(1), 61 (1997)

Chemistry: thallus containing atranorin (major), caloploicin (minor), vicanicin (minor), \pm isofulgidin (trace), \pm fulgidin (trace); apothecia containing parietin (major).

Previous report: thallus containing atranorin, unknown (6/6/6); apothecia containing unidentified anthraquinones (Hafellner 1997).

SPECIMEN EXAMINED

Australia. *Queensland*: • Binna Burra, Beechmont Range, Lamington National Park, *K. & A. Kalb*, 17.viii.1988 (Herb. Kalb).

8. **Brigantiaea tricolor** (Mont.) Trevis., *Caratteri di dodici nuovi generi di lichini* **5** (1853)

Chemistry: thallus containing atranorin (major), zeorin (major), leucotylin (minor), \pm 16 β -acetoxyhopane-6 α ,22-diol (trace), \pm 6 α -acetoxyhopane-16 β ,22-diol (trace), \pm 6 α ,16 β -diacetoxyhopane-22-ol (trace); apothecia containing parietin (major), ligastroquinone (minor), \pm simonyellin (trace).

Previous report: thallus containing atranorin, zeorin; apothecia containing unidentified anthraquinones (Hafellner 1997).

SPECIMENS EXAMINED

Australia. *Queensland*: • Coochiemudlo Is., Moreton Bay, *J.A. Elix* 10216 (CANB); • Tully Gorge, 49 km NW of Tully, *J.A. Elix* 36996, 37001 (CANB); • Gillies Hwy, 17 km SW of Gordonvale, *J.A. Elix* 16745 & *H. Streimann* (CANB). *New South Wales*: • Cambridge Plateau Drive, near Pawpaw Skids Road, 25 km WSW of Kyogle, *H. Streimann* 61314 (CANB).

9. **Buellia subnexa** (Nyl.) Vain., *Bot. Tidskr.* **29**, 115 (1909)

Basionym: *Lecidea subnexa* Nyl., *Lichenes Japoniae*: 77 (1890)

Synonym: *Hafellia subnexa* (Nyl.) Marbach, *Biblioth. Lichenol.* **74**, 285 (2000)

Chemistry: atranorin (major), norstictic acid (trace).
Previous report: not determined for the holotype, but chemical variation in the species is discussed by Marbach (2000).

SPECIMEN EXAMINED

Japan. • Inter Mourayame et Oumagayéshi, *E. Almqvist*, 1879 (H-NYL 10651 – holotype).

10. **Caloplaca aliciae** S.Kondr., Kärnefelt & Elix, *Biblioth. Lichenol.* **95**, 342 (2007)

Chemistry: parietin (major), fallacinal (submajor), teloschistin (minor), parietinic acid (minor).

SPECIMEN EXAMINED

Australia. *Northern Territory*: • Native Gap, Hann Range, 114 km N of Alice Springs, 22°49'S, 133°25'E, 700 m, on protected rock ledges with S aspect, *J.A. Elix 11190 & L.N. Craven*, 12.ix.1983 (CANB – holotype).

11. **Caloplaca astoniae** S.Kondr. & Kärnefelt, *Biblioth. Lichenol.* **95**, 344 (2007)

Chemistry: parietin (major), erythroglaucon (minor).

SPECIMEN EXAMINED

Australia. *New South Wales*: • c. 13.3 km SSW of Kayrunners, c. 50 km W of White Cliffs, common on stones of a dry, quartz stone plain, *H. Aston*, 6.ix.1966 (CANB – isotype).

12. **Caloplaca australiensis** S.Kondr., Kärnefelt & Filson, *Biblioth. Lichenol.* **95**, 346 (2007)

Chemistry: parietin (major), fallacinal (submajor), teloschistin (submajor), parietinic acid (minor), erythroglaucon (minor).

SPECIMEN EXAMINED

Australia. *Western Australia*: • Merredin, Merredin Peak, 31°28'27.6"S, 118°17'30.5"E, on exposed rocks in scrub on shallow soils of granite monolith, *Kärnefelt 20042701 (Kondratyuk 20434) & Cranfield*, 8.i.2004 (CANB – holotype).

13. **Caloplaca bermaguiana** S.Kondr. & Kärnefelt, *Biblioth. Lichenol.* **95**, 348 (2007)

Chemistry: arthothelin (major), 4,5-dichloronorlichexanthone (trace), parietin (trace), atranorin (trace).

SPECIMEN EXAMINED

Australia. *New South Wales*: • Bermagui township, Beares Beach, at the northern part of beach, 36°26'2"S, 150°4'38.7"E, on rock/sandy outcrops, *Kondratyuk 20487*, 30.i.2004 (CANB – holotype).

14. **Caloplaca bellemerei** Hafellner, *Biblioth. Lichenol.* **36**, 66 (1990)

Chemistry: parietin (submajor), fragilin (submajor), 8-O-methylfragilin (major), 7-chloroparietic acid (minor).

Previous report: anthraquinone[s] (Hafellner 1982).

SPECIMEN EXAMINED

Australia. *South Australia*: • Flinders Ranges, Moralana Gorge Road, 34 km N of Hawker, *J.A. Elix 17844 & L.H. Elix* (CANB). Det. S. Kondratyuk.

15. **Caloplaca conranii** S.Kondr. & Kärnefelt, *Biblioth. Lichenol.* **95**, 350 (2007)

Chemistry: parietin (major).

SPECIMEN EXAMINED

Australia. *Victoria*: • Cape Conran, West Cape, SE of Orbost, on coastal rocks, *Kärnefelt 20046804*, 10.ii.2004 (CANB – holotype).

16. **Caloplaca elixii** S.Kondr. & Kärnefelt, *Biblioth. Lichenol.* **88**, 256 (2004)

Chemistry: fragilin (submajor), 8-O-methylfragilin (major), 7-chloroparietic acid (minor).
Previous report: thallus and epihymenium K+ red, C-, I- (Kärnefelt & Kondratyuk 2004).

SPECIMEN EXAMINED

Australia. *New South Wales*: • Willandra National Park, Halls Lake, 54 km NW of Hillston, 33°13'S, 145°03'E, 100 m, on live *Eucalyptus* and dead wood, *J.A. Curnow 1567*, 3.x.1987 (holotype – CANB).

17. **Caloplaca eos** S.Kondr. & Kärnefelt, *Biblioth. Lichenol.* **95**, 355 (2007)

Chemistry: parietin (major), erythroglaucon (minor), fallacinal (trace), parietinic acid (trace), teloschistin (trace).

SPECIMEN EXAMINED

Australia. *New South Wales*: • S of Anna Bay, Tomaree National Park, 32°47'16"S, 152°4'48"E, on rock (rhyolite) outcrops along the coast, *Kärnefelt 20044701, Filson & Kondratyuk 20475*, 24.i.2004 (CANB – holotype).

18. **Caloplaca erythrostickta** (Taylor) Zahlbr., *Cat. Lich. Univ.* **7**, 116 (1931).

Chemistry: parietin (major), emodin (minor), parietinic acid (minor), fallacinal (minor), teloschistin (minor), vioxanthin 2 (minor).

Previous report: thallus and epihymenium K+ red, C-, I- (Kärnefelt & Kondratyuk 2004).

SPECIMENS EXAMINED

Australia. *Western Australia*: • 10 km SE of Corrigan on road to Kulin, *J.A. Elix 21649 & M.V. Sargent* (CANB); • Pumphreys Bridge, 21 km SW of Pingelly, *J.A. Elix 40923, H.T. Lumbsch & H. Streimann* (CANB). Det. S. Kondratyuk.

19. **Caloplaca gallowayi** S.Kondr. & Kärnefelt, *Biblioth. Lichenol.* **95**, 358 (2007)

Chemistry: parietin (major), erythroglaucon (minor), fallacinal (trace), parietinic acid (trace), teloschistin (trace).

SPECIMEN EXAMINED

Australia. *Tasmania*: • West of Wynyard, Boat Harbour Beach, on coastal rocks, locally abundant, 40°55.57'S, 145°37.07'E, *Kärnefelt 997501*, 29.i.1999 (CANB – holotype).

20. **Caloplaca hanneshertelii** S.Kondr. & Kärnefelt, *Biblioth. Lichenol.* **88**, 262 (2004)

Chemistry: parietin (major), parietinic acid (trace), fallacinal (trace), teloschistin (trace).
Previous report: thallus and epihymenium K+ red, C-, I- (Kärnefelt & Kondratyuk 2004).

SPECIMEN EXAMINED

Australia. *New South Wales*: • Willandra National Park, Halls Lake, 54 km NW of Hillston, *J.A. Curnow 1566* (CANB). Det. S. Kondratyuk.

21. **Caloplaca leptozona** (Nyl.) Zahlbr., *Cat. Lich. Univ.* **7**, 154 (1930)

Chemistry: atranorin (major or minor), caloploicin (major or minor), vicanicin (major or minor), parietin (minor or trace), ±chloroatranorin (trace), ±diploicin (trace), ±fulgidin (trace), ±norcanesolide (trace).

SPECIMENS EXAMINED

Australia. *Queensland*: • Jourama Falls, Paluma Range National Park, 23 km S of Ingham, *J.A. Elix 37210, 37217* (CANB). *Western Australia*: • Erskine Range, Great Northern Highway between Derby and Fitzroy Crossing, *J.A. Elix 22328 & H. Streimann* (CANB); • Kimberley Region, Couchman Range, 16 km NW of King Edward River (Doongan) Station, *J.A. Elix 27983* (CANB).

22. **Eremothecella cyaneoides** Lücking, in R. Lücking, H. Streimann & J.A. Elix, *Lichenologist* **33**, 203 (2001)
Chemistry: cyclographin (minor), norcyclographin (major).

SPECIMEN EXAMINED

Australia. *Queensland*: • Wrights Creek, Lake Eacham National Park, 16 km E of Atherton, 17°16'S, 145°38'E, H. Streimann 54014 B, vii.1994 (holotype – CANB).

23. **Eremothecella macrocephala** (R.Sant.) Thor, Sérus., Lücking & Matsumoto, *Symb. Bot. Upsal.* **32**(3): 39 (2000)

Chemistry: cyclographin (minor), norcyclographin (major).

SPECIMEN EXAMINED

Australia. *Queensland*: • Jumrum Creek, Kuranda, H. Streimann 61661 p.p. (CANB).
Det. R. Lücking.

24. **Phyllopsora dolichospora** Timdal & Krog, *Mycotaxon* **77**, 76 (2001)

Chemistry: methyl furfuraceiate (major), methyl homofurfuraceiate (major), furfuraceic acid (minor).

Previous report: furfuracin [= furfuraceic acid] (major) and a series of unknown compounds (Timdal & Krog 2001).

SPECIMEN EXAMINED

Mauritius. • Plaines Wilhems, Macchabee Forest, 0.5–1 km ESE of Macchabee kiosk, 20°24'S, 57°26'E, 600 m, Krog & Timdal MAU65/22, 1991 (CANB – isotype).

25. **Ramboldia aurea** (Kalb & Elix) Kalb, Lumbsch & Elix, in K. Kalb, B. Staiger, J.A. Elix, U. Lange & H.T. Lumbsch, *Nova Hedwigia* **86**, 31 (2008)

Chemistry: russulone (major), norussulone (minor or trace), \pm O-methylhaematommone (minor or trace) and haematommone (minor or trace).

Previous reports: thuringione (major), arthothelin (minor), 4,5-dichloro-3-O-methyl-norlichexanthone (trace), russulone (submajor), norussulone (submajor), haematommone (trace) (Elix 2004, Kalb *et al.* 2008). The reports of xanthonones occurring in this species are in error.

SPECIMEN EXAMINED

Australia. *Northern Territory*: • Litchfield National Park, c. 100 km S of Darwin, in a light monsoon forest with mighty sandstone boulders, on thin branches of dead shrubs, 13°07'S, 130°45'E, 200 m, K. & A. Kalb, 8.ix.1992 (K. Kalb, Lichenes Neotropici 570: CANB – holotype).

Acknowledgements

I thank Dr Christine Cargill and Ms Judith Curnow, curators at the CANB cryptogamic herbarium, for their assistance. I also thank Dr E. Timdal (Oslo) for generously supplying an isotype of *Phyllopsora dolichospora*, Dr Roland Skytén (H) for the loan of the holotype of *Buellia subnexa*, and Dr K. Kalb (Neumarkt) for supplying fragments of *Brigantiaea lobulata* and *B. phaeomma*.

References

- Culberson, CF; Culberson, WL (1969): First reports of lichen substances from seven genera of lichens. *Bryologist* **72**, 210–214.
Elix, JA (2004): *Ramboldia*. *Flora of Australia* **56A** (Lichens 4), 63–68.
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.

Hafellner, J (1982): *Caloplaca bellemeri*, eine weitere pluriloculäre *Caloplaca*-Art (Lichenes, Lecanorales) aus Australien. *Herzogia* **6**, 283–287.

Hafellner, J (1997): A world monograph of *Brigantiaea* (lichenized Ascomycotina, Lecanorales). *Symbolae Botanicae Upsalienses* **32**(1), 35–74.

Kalb, K; Staiger, B; Elix, JA; Lange, U; Lumbsch, HT (2008): A new circumscription of the genus *Ramboldia* (Lecanoraceae, Ascomycota) based on morphological and molecular evidence. *Nova Hedwigia* **86**, 23–42.

Kärnefelt, I; Kondratyuk, SY (2004): New species of *Caloplaca* (Teloschistaceae) from Australia. *Bibliotheca Lichenologica* **88**, 255–265.

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

Santesson, J (1970): Neuere Probleme der Flechtenchemie. *Vorträge aus dem Gesamtgebiet der Botanik, N.F.* **4**, 5–21.

Timdal, E; Krog, H (2001): Further studies on African species of the lichen genus *Phyllopsora* (Lecanorales). *Mycotaxon* **77**, 57–89.

Three new species in the Australian Graphidaceae (lichenized Ascomycota)

Alan W. Archer

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

John A. Elix

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

Abstract: *Acanthothecis aquilonia* A.W.Archer & Elix, *Diorygma wallamanensis* A.W.Archer & Elix and *Phaeographis girringunensis* A.W.Archer & Elix are described as new to science.

A recent report describing new species in the Australian Graphidaceae (Archer & Elix 2007) included the new species *Acanthothecis borealis* A.W.Archer & Elix from the Northern Territory, and a subsequent report (Archer & Elix 2008) described *A. tetraphora* (Nyl.) Staiger & Kalb from New South Wales. This note describes an additional new *Acanthothecis* species from the Northern Territory, which brings the total number of species in Australia to six. In addition, an examination of recent collections from northern Queensland indicated the presence of two new species, one in *Diorygma* and the other in *Phaeographis*, which are described here. The chemistry of the new species was studied by thin-layer chromatography (Elix & Ernst-Russell 1993).

Acanthothecis aquilonia A.W.Archer & Elix, sp. nov.

Figs 1 & 2

Similis *Acanthothecis clavulifera* (Vain.) Staiger & Kalb sed acidum protocetraricum deficiens.

Type: Australia: *Northern Territory*: Kakadu National Park, Gungarre Forest Walk, South Alligator, 12°40'36"S, 132°28'44"E, alt. 30 m, on tree trunk in lowland monsoon forest, *J.A. Elix 37858*, 10.viii.2005 (holotype—CANB).

Thallus off-white to pale ash-grey, flaky; surface smooth and somewhat glossy, corticolous. Apothecia irregularly disciform, inconspicuous, scattered, immersed with an irregular raised thalline margin, 0.5–1 mm diam. Proper exciple pale, indistinct, non-carbonized, surface of disc white-pruinose. Hymenium 100–130 μm tall, I–, not in-spersed. Ascospores 8 per ascus, very elongate-ellipsoid, sometimes tapering at one end, hyaline, 80–100 \times 8–10 μm wide, 28–35-locular, the locules cylindrical, I–. *Chemistry*: no lichen compounds detected.

Etymology: the epithet *aquilonia* is derived from the Latin *aquilonius* (north, northern), a reference to the type locality in northern Australia.

The new species is characterized by the disciform apothecia, the long, narrow ascospores reacting I–, and the absence of lichen compounds. The disciform apothecia resemble those of *A. obscura* Staiger & Kalb (Staiger & Kalb 1999), but the new species differs in lacking a weakly carbonized exciple, an in-spersed hymenium and muriform ascospores. The ascospores in *A. aquilonia* resemble those of *A. clavulifera*, which are 85–117 \times 8–13 μm and 36–47-locular (Staiger & Kalb 1999).

At present, this new species is known only from the type specimen. Commonly associated species included *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., *Hafellia rechingeri* (Zahlbr.) Marbach, *Letrouitia leprolytoides* S.Kondr. & Elix and *Pertusaria velata* (Turner) Nyl.

Diorygma wallamanensis A.W.Archer & Elix, sp. nov.

Figs 3 & 4

Similis *Diorygma erythrellum* (Mont.) Kalb, Staiger & Elix sed ascosporis septatis et acidum sticticum continens differt.

Type: Australia. *Queensland*: Girringun National Park, Jinda Track to Wallaman Falls, 50 km W of Ingham, 18°35'21"S, 145°48'20"E, alt. 540 m, on vine in rainforest in river gorge, *J.A. Elix 38058*, 25.vii.2006 (holotype—CANB, isotype—BRI).

Thallus off-white to pale fawn; surface smooth and glossy, corticolous. Apothecia lirelliform, concolorous with the thallus, conspicuous, sessile, straight, curved or sinuous, sometimes branched, 1–4(–5) mm long, 0.2–0.3 mm wide; lips initially closed, opening to reveal a narrow, reddish-brown epruinose disc. Exciple non-carbonized, indistinct. Hymenium 100–120 μm tall, not in-spersed, I–. Ascospores 8 per ascus, 2-seriate, hyaline, narrowly ellipsoid, 40–50 μm \times 8–10 μm , 10–12-locular, I+ blue-violet.

Chemistry: stictic acid (major) and peristictic acid (minor).

Etymology: the epithet *wallamanensis* is derived from the Latin *-ensis* (place of origin) and the type locality, the Wallaman Falls.

The species is characterized by the conspicuous lirellae, the septate (*Graphis*-like) ascospores and the presence of stictic acid. It is distinguished from the superficially similar *Diorygma erythrellum* (Mont.) Kalb, Staiger & Elix (Kalb *et al.* 2004) by the septate ascospores and the presence of stictic acid. *Diorygma erythrellum* has muriform ascospores and contains norstictic acid.

At present this new species is known only from the type locality.

Phaeographis girringunensis A.W. Archer & Elix, sp. nov.

Figs 5 & 6

Similis *Phaeographis submarcescens* (Leight.) Zahlbr. sed excipulo atrato et hymenio non in-sperso.

Type: Australia. *Queensland*: Girringun National Park, Stoney Creek, above Wallaman Falls, 51 km W of Ingham, 18°35'54"S, 145°47'51"E, alt. 545 m, on dead tree in rainforest margin along creek, *J.A. Elix 38114*, 25.vii.2006 (holotype—CANB).

Thallus pale green to pale fawn; surface somewhat glossy and subtuberculate, corticolous. Apothecia lirelliform, off-white, conspicuous, scattered or sometimes clustered and confluent, with a conspicuous thalline margin, straight, curved or sinuous, sometimes branched, 1–4 mm \times 0.3–0.6 mm, initially closed, becoming open to reveal a black, weakly white-pruinose disc. Exciple completely carbonized, thin. Hymenium 120–140 μm tall, not in-spersed, I–; subhymenial layer reddish-brown. Ascospores 8 per ascus, irregularly 2-seriate, elongate-ellipsoid, terminally rounded, initially hyaline, becoming pale brown, 26–30 \times 6–8 μm , 6-locular (rarely 7- or 8-locular), I+ brown.

Chemistry: stictic acid (major) and peristictic acid (minor).

Etymology: The epithet *girringunensis* is derived from the Latin *-ensis* (place of origin) and Girringun National Park, the type locality.

The new species is characterized by the sessile lirellae with weakly pruinose discs, the thin carbonized exciple, the predominantly 6-locular ascospores and the presence

of stictic acid. Those features differentiate it from *Phaeographis submarcescens* (Leight.) Zahlbr., which has a pale yellow to brown exciple and an inspersed hymenium (Awasthi 1991). Leighton reported the ascospores in *Graphis submarcescens* to be "small, brown and 4–5-locular" (Leighton 1869), and Singh & Awasthi (1979) described the ascospores as "8/ascus, brown, 4–6-celled, oblong-ellipsoid, 20–30 × 9–11 μm", and the hymenium as being "inspersed with granular mist". Patwardhan and Kulkarni (*in sched.* 1976) reported the presence of stictic acid in the lectotype. At present, the new species is known only from the type specimen.

References

- Archer, AW; Elix, JA (2007): Two new species in the Australian Graphidaceae. *Australasian Lichenology* **61**, 18–20.
- Archer, AW; Elix, JA (2008): Additional lichen records from Australia 66. Graphidaceae. *Australasian Lichenology* **62**, 9–13.
- Awasthi, DD (1991): A key to the microlichens of India, Nepal and Sri Lanka. *Bibliotheca Lichenologica* **40**, 1–320.
- Elix, JA; Ernst-Russell, KD (1993): *A Catalogue of Standardised Thin-Layer Chromatographic Data and Biosynthetic Relationships for Lichen Substances*, 2nd. Edn, Australian National University, Canberra.
- Kalb, K; Staiger, B; Elix, JA (2004): A monograph of the lichen genus *Diorygma*—a first attempt. *Symbolae Botanicae Upsalienses* **34**(1), 133–181.
- Leighton, WA (1869): The lichens of Ceylon. *Transactions of the Linnean Society, London* **27**, 161–185.
- Singh, KP; Awasthi, DD (1979): Lichen genus *Phaeographis* from India and Sri Lanka. *Bulletin of the Botanical Survey of India* **21**, 97–120.
- Staiger, B; Kalb, K (1999): *Acanthothecis* and other graphidioid lichens with warty periphysoids or paraphysis tips. *Mycotaxon* **73**, 69–134.



Fig. 1. *Acanthothecis aquilonia* holotype (CANB), bar = 1 mm
 Fig. 2. *Acanthothecis aquilonia* ascospore with iodine, bar = 50 μm



Fig. 3. *Diorygma wallamanensis* holotype (CANB)
 Fig. 4. *Diorygma wallamanensis* ascus and ascospores with iodine

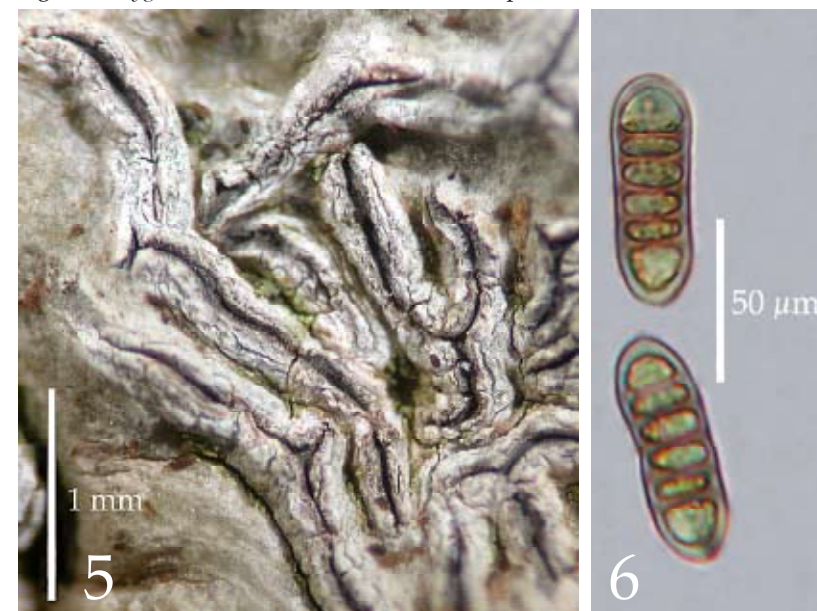


Fig. 5. *Phaeographis girringunensis* holotype (CANB)
 Fig. 6. *Phaeographis girringunensis* ascospores with iodine

Additional new lichen taxa (lichenized Ascomycota) from Australia

John A. Elix

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

Klaus Kalb

Lichenologisches Institut Neumarkt, Im Tal 12, D-92318 Neumarkt, Germany
email: klaus.kalb@t-online.de

Abstract: *Lepraria dibenzofuranica* Elix, *L. methylbarbatica* Elix and *Tephromela territori-ensis* Elix & Kalb are described as new to science. The new combination *Tephromela australitoralis* (Zahlbr.) Kalb & Elix is made, and its characteristics described.

The examination of various collections of lichens in preparation for a further lichen volume of the *Flora of Australia* has led to the identification of several undescribed species. Three such new taxa are described in the present paper: *Lepraria dibenzofuranica* Elix, *L. methylbarbatica* Elix and *Tephromela territori-ensis* Elix & Kalb. 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

Lepraria dibenzofuranica Elix, sp. nov.

Figs 1, 2

Sicut *Lepraria humida* sed consorediis magnis et strepsilinum, di-*O*-methylstrepsilinum, 3-*O*-methylstrepsilinum, 7-*O*-methylstrepsilinum, acidum usnicum et dibenzofuranicum incognitum continente differt.

Type. Victoria: Chiltern-Mount Pilot National Park, 2 km N of Chiltern, 36°07'47"S, 146°36'42"E, 200 m, on soil bank in open *Eucalyptus* woodland, J.A. Elix 36945, 5.v.2006 (holotype—CANB; isotype—MEL).

Thallus leprose-soediate, powdery, whitish green to greenish or bluish grey, usually delimited but lacking well-defined lobes, forming extensive, irregularly spreading patches to 30 cm wide, or in small, irregularly rounded colonies 0.5–1 cm wide which eventually coalesce; thin or thick (up to 250 µm), medulla white, distinct only in patches; hyphae 1.6–3.0 µm thick; soredia farinose, dispersed or forming a thick, continuous layer, ±roundish, 20–50 µm wide, commonly aggregated in roundish clumps (consoredia) up to 350 µm wide, with or without short projecting hyphae to 20 µm long; photobiont chlorococcoid, with individual cells 6–8(–10) µm wide. Hypothallus not apparent.

Chemistry: Thallus surface K+ yellow, C–, P–; containing atranorin (major), rangiformic/jackinic acid (major), usnic acid (minor or trace), norrangiformic/norjackinic acid (minor or trace), stepsilin (minor or trace), di-*O*-methylstrepsilin (minor or trace), 3-*O*-methylstrepsilin (trace), 7-*O*-methylstrepsilin (minor or trace), unknown dibenzofurans (major/minor), fragilin (minor), 7-chloroemodin (trace), flavo-obscurin C (trace).

Etymology: The specific epithet refers to the chemosyndrome of dibenzofurans present in this species.

Notes

The observed combination of secondary metabolites present in *L. dibenzofuranica*, namely the rangiformic/jackinic acid complex, usnic acid, dibenzofurans and anthraquinones, is unique in the genus *Lepraria*. *Lepraria bergensis* Tønsberg contains atranorin, the rangiformic/jackinic acid complex, and anthraquinones (Tønsberg 2004), but it lacks the chemosyndrome of dibenzofurans, and differs morphologically in having prominent, raised lobate margins (see front-page photograph in *Graphis Scripta* 16(2), 2004). *Lepraria humida* Slaviková-Bayerová & Orange contains the rangiformic/jackinic acid complex and anthraquinones, but has much smaller consoredia (to 160 µm wide), and it lacks dibenzofurans (Slaviková-Bayerová & Orange 2006) while *L. neojackii* Flakus & Kukwa has even smaller soredia (20–40 µm wide), and although it contains porphyric acid as well as fatty acids and anthraquinones, it lacks atranorin (Flakus & Kukwa 2007). *Lepraria goughensis* Elix & Øvstedal (Elix *et al.* 2005) contains stepsilin and anthraquinones, but differs in containing lecanoric and gyrophoric acids as major medullary substances, and in having a much thinner thallus. The dibenzofuran strepsilin has also been detected in *L. multiacida* Aptroot and *L. xerophila* Tønsberg (Elix & Tønsberg 2004, Tønsberg 2004), while anthraquinone derivatives have been found in *L. bergensis*, *L. sipmaniana* (Kümmerl. & Leuckert) Kukwa, and a chemotype of *L. incana* (L.) Ach. (Tønsberg 1992, 2002). However, all those taxa differ chemically from *L. dibenzofuranica*. *Lepraria multiacida* contains additional atranorin, zeorin, and the stictic acid chemosyndrome, and *L. xerophila* contains additional atranorin and pannaric acid 6-methyl ester or norascomatic acid as major substances, but both species lack anthraquinone pigments. Of the anthraquinone-containing species, *L. sipmaniana* differs in containing pannaric acid 6-methyl ester, and *L. incana* differs in containing atranorin, zeorin and divaricatic acid.

At present, this new species is known from several localities in southern Australia, where it occurs on soil and the base of shrubs in *Eucalyptus* forests from 100 m to 650 m. Commonly associated species on terricolous substrata include various *Cladonia* species, *Fuscopannaria subimixta* (C.Knight) P.M.Jørg. and *Baeomyces heteromorphus* Nyl. ex C.Bab. & Mitt., and on corticolous substrata *Candelariella xanthostigmoides* (Müll.Arg.) R.W.Rogers, *Parmelia pseudotenuirima* Gyeln., *Parmelia endoleuca* (Taylor) Hale, *Parmotrema reticulatum* (Taylor) M.Choisy and *Usnea inermis* Motyka.

ADDITIONAL SPECIMENS EXAMINED

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 *Leptospermum* along ephemeral creek in moist gully in open *Eucalyptus* woodland, J.A. Elix 31542, 22.ii.2004 (CANB), and on soil of uprooted tree, J.A. Elix 28823, 18.vi.2005 (CANB).

New South Wales: • Goonoo State Forest, Cashels Dam Road, 31 km SE of Gilgandra, 31°55'57"S, 148°52'17"E, 390 m, on soil in sheltered sandstone ledge in open *Eucalyptus* woodland, J.A. Elix 37977, 37978, 37981, 12.x.2005 (CANB).

Victoria: • type locality, on soil bank in open *Eucalyptus* woodland, J.A. Elix 36943, 36944, 36946, 5.v.2006 (CANB, HO).

Western Australia: • Beedelup Falls National Park, 20 km W of Pemberton, 34°25'S, 115°52'E, on soil and detritus along walk track near falls, N. Sammy 830705, 11.iv.1982 (PERTH).

Lepraria methylbarbatica Elix, sp. nov.

Fig. 3

Sicut *Lepraria multiacida* sed thallo saxicola et methylum barbaticum continente differt.

Type: Queensland: Murray Falls State Forest Park, 19 km WSW of Bilyana, 18°09'14"S, 145°48'58"E, 85 m, on granite rocks at rainforest margins, J.A. Elix 37596, 27.vii.2006 (holotype—BRI; isotype—CANB).

Thallus leprose-sorediate, powdery, creamy white, pale yellow-grey or pale yellow-green, forming extensive, irregularly spreading patches to 7 cm wide, or in small, irregularly rounded colonies 0.5–2.0 cm wide which eventually coalesce; usually delimited, well-defined lobes absent but sublobes often present, 0.2–1.0 mm wide; thin or thick (up to 250 μm), medulla present or not, white, distinct only in patches; hyphae 2–4 μm thick; soredia granular, dispersed or forming a thick, continuous layer, \pm roundish, 20–50 μm wide, commonly aggregated in roundish clumps (consoredia) up to 100–225 μm wide; with long projecting hyphae at the base and along the margins (up to 0.2 mm long), and shorter projecting hyphae within (50–125 μm long); photobiont chlorococcoid, \pm spherical, with individual cells 5–12 μm diam., sometimes with autospores visible inside. Hypothallus pale brown to black or not apparent. *Chemistry*: Thallus surface K–, C–, KC–, P–; containing methyl barbatate (major), barbatate (trace), and methyl 2'-O-methylbarbatate (trace).

Etymology: The specific epithet derives from the presence of methyl barbatate in this species.

Notes

Morphologically, this species resembles *Lepraria multiacida* Aptroot in that both have relatively thick, creamy white thalli, often with lobed or sublobed margins and long protruding hyphae (Aptroot 2002). However, they can be readily distinguished chemically, because *L. multiacida* contains atranorin (major), stictic acid (minor/trace), constictic acid (major/minor), salazinic acid (trace), cryptostictic acid (trace), norstictic acid (trace), di-O-methylstrepilsin (minor), strepilsin (trace), 7-O-methylstrepilsin (trace), zeorin and unknown triterpenes (Elix & Tønsberg 2004) rather than the methyl barbatate that is present in *L. methylbarbatata*. This is the first reported occurrence of the last substance in the genus *Lepraria*.

At present, this new species is known only from the type collection. Commonly associated species include *Caloplaca cupulifera* (Vain.) Zahlbr., *C. leptozona* (Nyl.) Zahlbr., *Coccocarpia palmicola* (Spreng.) Arv. & D.J. Galloway, *Lecanora subimmersa* (Fée) Vain., *Lepraria usnica* Sipman, *Pertusaria hypoxantha* Malme, *P. remota* A.W. Archer, *P. subventosa* Malme var. *subventosa* and *Phyllopsora corallina* (Eschw.) Müll. Arg.

Tephromela territoriensis Elix & Kalb, sp. nov.

Fig. 4

Tephromelae atrae similis, sed thallo angustiore, ascosporis minoribus et acidum physodicum continente differt.

Type. Northern Territory: Robin Falls, 15 km S of Adelaide River township, 13°21'08"S, 131°08'02"E, 140 m, on sandstone rocks in remnant monsoon forest along stream, J.A. Elix 37834, 7.viii.2005 (holotype—CANB).

Thallus saxicolous, crustose, superficial, pale fawn to ochre-brown, continuous, areolate to rimose, 0.05–0.13 mm thick, up to 3 cm wide; areoles angular, irregularly shaped to rounded, 0.3–1.0 mm wide, upper surface flat and smooth, lacking isidia and soredia. Prothallus not apparent. Cortex 25–30 μm thick, algal layer c. 25–50 μm thick, the cells 5–12 μm wide; medulla well developed, c. 0.3–0.9 mm thick. *Apothecia* common, dispersed, sessile, 0.8–1.6 mm wide; disc \pm flat, undulate or weakly concave, round, black, matt, epruinose; thalline exciple prominent, persistent, smooth, crenulate, 0.1–0.25 mm wide; true exciple not apparent; epihymenium violet-brown to black, 10–15 μm thick; hymenium violet-brown to red-brown, 25–40 μm tall; hypothecium yellow to yellow-brown, 40–50 μm thick; paraphyses branched and anastomosing; apices not conspicuously swollen, 4–5 μm wide. *Asci* 8-spored, c. 50–60 \times 10–15 μm , *Bacidia*-type. *Ascospores* broadly ellipsoid, colourless, thick-walled, 7.5–8.0 \times 5.0–6.5 μm . *Pycnidia* not seen.

Chemistry: Cortex K+ yellow, C–, KC–, P+ pale yellow; medulla KC+ pink, P–, UV+ blue-white; containing atranorin (minor), physodic acid (major).

Notes

This saxicolous species is characterized by its pale fawn to ochre-brown, areolate thallus containing atranorin and physodic acid, by its large (0.8–1.6 mm wide), black apothecia with a very prominent thalline margin, and its small, broadly ellipsoid ascospores, 7.5–8.0 \times 5.0–6.5 μm . It resembles some saxicolous specimens of *T. atra* (Huds.) Hafellner ex Kalb, but can be distinguished by its thinner thallus (0.05–0.13 mm vs. 0.3–0.5 mm thick), its smaller ascospores (7.5–8.0 \times 5.0–6.5 μm vs. 9–11 \times 5.5–7 μm), and in containing physodic acid rather than alectoronic and α -collatolic acids. In addition, the apothecia in *T. territoriensis* have a prominent and persistent thalline exciple, whereas in *T. atra* the thalline exciple is thin and \pm persistent, but occasionally older apothecia are immarginate. Chemically, *T. territoriensis* resembles *T. physodica* Kalb (Kalb 2008). However, *T. physodica* is restricted to corticolous and lignicolous substrata, has a white or rarely pale grey thallus (rather than pale fawn to ochre-brown), and much larger ascospores (8–12 \times 6.0–8.5 μm vs. 7.5–8.0 \times 5.0–6.5 μm).

At present, this new species is known from the type locality. Associated species include *Australiaena streimannii* Matzer, H. Mayrhofer & Elix, *Caloplaca leptozona* (Nyl.) Zahlbr., *Dimelaena elevata* Elix, Kalb & Wippel, *D. tenuis* (Müll. Arg.) H. Mayrhofer & Wippel, *Diploschistes actinostomus* (Pers.) Zahlbr., *Dirinaria consimilis* (Stirt.) D.D. Awasthi, *Lecanora austrosorediosa* (Rambold) Lumbsch, *Lepraria coriensis* (Hue) Sipman, *Parmotrema praesorediosum* (Nyl.) Hale, *P. saccatilobum* (Taylor) Hale, *Pertusaria remota* A.W. Archer and *Tephromela arafurensis* Rambold.

The New Combination

Tephromela austrolitoralis (Zahlbr.) Kalb & Elix, comb. nov. Figs 5, 6
Basionym: *Lecanora austrolitoralis* Zahlbr., *Meddel. Göteborgs Bot. Trädg.* 2, 14 (1926)

Type. Chile: Coquimbo: Loma Frei Jorge, auf Gestein, C. Scottsberg (holotype—W!).
Chemistry: atranorin (minor), α -collatolic acid (major), 4-O-methylphysodic acid (minor), alectoronic acid (minor), physodic acid (trace) (TLC and HPLC).

Thallus saxicolous, crustose, bullate or areolate, off-white, pale grey to pale yellow-brown, 0.5–0.9 mm thick, up to 5 cm wide. *Areolae* irregularly shaped, 0.5–1.5 mm wide, congested, at length fissured and separate, rarely cerebriform; upper surface smooth or roughened, glossy or matt, \pm flat to convex, lacking isidia and soredia. Prothallus not apparent. *Apothecia* common, scattered to crowded, sessile, constricted at the base, 1.0–2.5 mm wide; disc weakly concave at first, then flat or weakly convex, roundish, black, glossy, epruinose; thalline exciple usually prominent, persistent, smooth, rarely reduced; proper exciple colourless, 100–200 μm thick; epithecium dark violet-brown to black; hymenium red-brown to purple-brown, finely inspersed, 50–60 μm tall; hypothecium brown to yellow-brown, 100–150 μm thick. *Ascospores* simple, ellipsoidal to ovoid-ellipsoidal, thick-walled, 10–14(–17) \times 5–8 μm . *Conidia* filiform, straight, 10–20 \times 1.0–1.5 μm .

Chemistry: Thallus K+ yellow, C–, KC+ pink, P–, UV+ blue-white; containing atranorin (minor), α -collatolic acid (major), 4-O-methylphysodic acid (minor), alectoronic acid (minor), physodic acid (trace).

Notes

This species has not been reported since Zahlbruckner's original description of it (Zahlbruckner 1926). *Tephromela austrolitoralis* is a saxicolous species characterized by the presence of atranorin and α -collatolic acid, the lack of soredia, and the inspersed, purple-brown to red-brown pigmented hymenium. Saxicolous specimens of *T. atra*

differ in having a non-inspersed hymenium and somewhat larger conidia (15–20 x 1–1.5 μm vs. 10–20 x 0.8–1 μm). The brownish colour of the thallus observed in the type specimen has probably been caused by environmental factors, and is not accorded any taxonomic significance here.

ADDITIONAL SPECIMENS EXAMINED

Queensland: • Rainbow Beach Road, just W of Cooloola National Park, 12.5 km S of Tin Can Bay, 26°02'S, 153°02'E, 100 m, on granite rocks in dry sclerophyll forest, *J.A. Elix* 22794, 1.vii.1989 (CANB); • Leichhardt Highway, Isla Gorge National Park, 26 km NNE of Taroom, 25°10'S, 150°01'E, 320 m, on sandstone rocks in *Eucalyptus* woodland, *J.A. Elix* 35202, 31.viii.1993 (CANB); • c. 1 km SE of Wivenhoe Dam, 8 km NW of Fernvale, on rock in open *Eucalyptus* forest with sandstone outcrops, 27°25'S, 152°38'E, 90 m, *K. Kalb & R. W. Rogers*, 14.viii.1988 (hb. Kalb 18788).

New South Wales: • 0.5 km S of Kings Beach, Broken Head Nature Reserve, 9 km S of Byron Bay, 28°43'S, 153°36'E, 2 m, on rocks of coastal cliff, *J.A. Elix* 21282, 2.ix.1986 (CANB); • Mount Alum, Bulahdelah, 32°25'S, 152°12'E, 100 m, on shaded rock face in dry sclerophyll forest with massive rhyolite outcrops, *H. Streimann* 44189, 24.iv.1990 (B, CANB, NSW, NY).

Acknowledgements

We thank Bill Malcolm (Nelson) and Neal McCracken (ANU Photography) for preparing the photographs.

References

- Aptroot, A (2002): New and interesting lichens and lichenicolous fungi from Brazil. *Fungal Diversity* **9**, 15–45.
- 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.
- Elix, JA; Tønsberg, T (2004): Notes on the chemistry of some lichens, including four species of *Lepraria*. *Graphis Scripta* **16**, 43–45.
- Elix, JA; Øvstedal, DO; Gremmen, NJM (2005): A new *Lepraria* species from Gough Island, South Atlantic Ocean. *Mycotaxon* **93**, 273–275.
- Flakus, A; Kukwa, M (2007): New species and records of *Lepraria* (Stereocaulaceae, lichenized Ascomycota) from South America. *Lichenologist* **39**, 463–474.
- Kalb, K (2008): New or otherwise interesting lichens IV. *Bibliotheca Lichenologica*, in press.
- Slaviková-Bayerová, S; Orange, A (2006): Three new species of *Lepraria* (Ascomycota, Stereocaulaceae) containing fatty acids and atranorin. *Lichenologist* **38**, 503–513.
- Tønsberg, T (1992): The sorediate and isidiate, corticolous crustose lichens in Norway. *Sommerfeltia* **14**, 1–331.
- Tønsberg, T (2002): Notes on non-corticolous *Lepraria* s. lat. in Norway. *Graphis Scripta* **13**, 45–51.
- Tønsberg, T (2004): *Lepraria*. In: *Lichen Flora of the Greater Sonoran Desert Region* (eds T.H. Nash III, B.D. Ryan, P. Diederich, C. Greis & F. Bungartz), vol. **2**, 322–329. Lichens Unlimited, Tempe.
- Zahlbruckner, A (1926): Chilenische Flechten. *Meddelanden Fran Göteborgs Botaniska Trädgård* **2**, 1–26.



Figs 1–2. *Lepraria dibenzofuranica* (*J.A. Elix* 28823 in CANB)



Fig. 3. *Lepraria methylbarbatica* (holotype in BRI), Fig. 4. *Tephromela territoriensis* (holotype in CANB).

Further notes on the distribution and nomenclature of
some Australian species of the Megalosporaceae

Gintaras Kantvilas

Tasmanian Herbarium, Private Bag 4, Hobart, Tasmania, Australia 7001

Abstract: The following extensions of distribution are reported: *Megaloblastenia marginiflexa* (Hook.f. & Taylor) Sipman and *M. pulverata* Kantvilas from New South Wales; *Megalospora subtuberculosa* (C.Knight) Sipman from Victoria; *Megalospora disjuncta* Sipman from Tasmania (Flinders Island); and *Megalospora lopadioides* Sipman from Macquarie Island. *Catillaria melacloinoides* (Müll. Arg.) Zahlbr. is lectotypified; this name is an overlooked synonym for *Megalospora melanoderma* (Müll. Arg.) Zahlbr. var. *melanoderma*.

Introduction

The Australian species of the family Megalosporaceae have been studied relatively intensively (Sipman 1983, 1986; Kantvilas 1994). However, because of their prominence and relatively easy recognition, mainly as a result of their conspicuous crustose or granular thalli, large apothecia, simple thallus chemistry and typically very large ascospores, species of the family readily catch the eye in the field and are frequently collected. In this paper, some interesting extensions of the geographical range of several species are reported. In addition, further overlooked synonyms, discovered as a result of routine study of Australasian type specimens, are noted.

Material and methods

The study is based mainly on collections by the author, housed in the Tasmanian Herbarium (HO), on exsiccata distributed by other herbaria, and reference material in other herbaria cited. Nomenclature of ascospore types follows Sipman (1983). Routine chemical analyses were undertaken using standard methods (Orange *et al.* 2001).

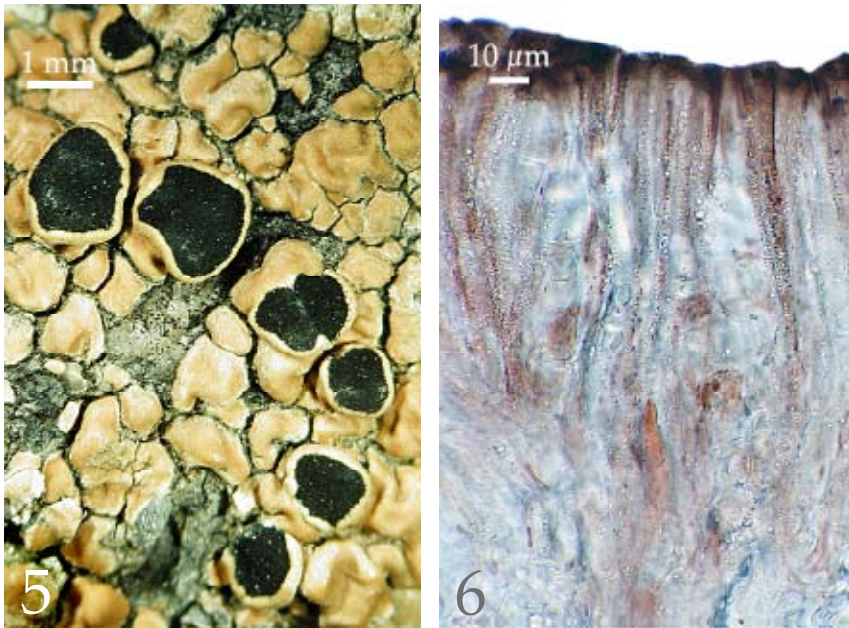
The species

1. *Megaloblastenia marginiflexa* (Hook.f. & Taylor) Sipman
Bibliotheca Lichenologica 18, 89 (1983); *Lecidea marginiflexa* Hook.f. & Taylor, *Lond. J. Bot.* 3, 638 (1844). Type: New Zealand, Kawakawa, Hooker, iv.1843 (K in BM! – lectotype, *vide* Sipman 1983).

The genus *Megaloblastenia* is separated from *Megalospora* chiefly by having a hymenium not interspersed with oil droplets, and by its bicellular, polarilocular ascospores ("albidula"-type). *Megaloblastenia marginiflexa* is a very distinctive species, easily recognized by its pale grey to greenish thallus containing pannarin and zeorin (P+ orange), apothecia with a dark brown to purple, grey-pruinose disc, and a prominent, inrolled, pale to dark brown margin that is characteristically yellowish on the lowermost parts of the outer edge. Ascospores are 8 per ascus and 24–40 × (11–)14–24 μm. Occasional specimens have roundish soralia with fine to coarse soredia, but that is not considered a taxonomically important feature. See Sipman (1983) for further data.

This species is widespread in the Southern Hemisphere, occurring in south-eastern Australia, Tasmania, New Zealand, Chile, tropical America and Madagascar (Sipman 1983, 1986). Specimens from tropical provenances are ascribed to variety *dimota* (Malme) Sipman. In Australia, *M. marginiflexa* shows a remarkable predilection for the bark of *Pomaderris* in wet forests, although it can occur on other host trees as well. This is the first report of the species from New South Wales.

The other species of the genus, *M. flavidoatra* Sipman, differs by having a yellowish thallus containing usnic acid and zeorin, and black, epruinose apothecia (Sipman 1983). It occurs in Tasmania, where it is exceedingly rare, and in New Zealand.



Figs 5–6. *Tephromela austrolitoralis* habit, interspersed hymenium (holotype in W).

SPECIMEN EXAMINED

New South Wales: • Brown Mountain, Rutherfords Creek, 18 km SE of Nimmitabel, 36°35'22"S, 149°26'44"E, 815 m altitude, G. Kantvilas 106/08, J. Elix & P. McCarthy, 17.iv.2008 (HO, NSW).

2. *Megalospora disjuncta* Sipman

Willdenowia 15, 559 (1986). Type: New Zealand, South Island, Kaihoka, near Puponga, sea-level, J.K. Bartlett 21220, 9.xii.1982 (B! – lectotype, *fide* Kantvilas 1994).

This species is characterized by the yellowish, esorediate, coarsely granular thallus containing usnic acid and zeorin, the generally reddish brown, epruinose apothecia, and the single-spored asci with bicellular ascospores of the "*atrorubicans*"-type, 100–145 x 30–48 µm. See Kantvilas (1994) and Sipman (1986) for further data. Hitherto known from New Zealand and the moist, coastal forests of northern New South Wales and south-eastern Queensland, this species is reported here from the Bass Strait Islands, Tasmania, a considerable geographical and ecological extension of its range. There it is locally abundant on the shrubs *Leptospermum scoparium* and *Spyridium gunnii* in moist scrubby woodland near the summit of Mt Strzelecki, a low, coastal mountain subject to sea mists.

SPECIMENS EXAMINED

Tasmania: • Flinders Island: upper catchment of Fotheringate Creek, Strzelecki NP, 40°12'S, 148°04'E, 670 m altitude, A.C. Rozefelds, 1.xii.1997 (HO); • Strzelecki Peaks, near summit, 40°12'S, 148°04'E, 680 m altitude, G. Kantvilas 292/97, 27.xii.1997 (HO).

3. *Megalospora lopadioides* Sipman

Bibliotheca Lichenologica 18, 165 (1983). Type: Australia, Tasmania, Lake Judd Forest, 640 m, G.C. Bratt 73/917, 28.iii.1973 (HO! – holotype). = "*Bombyliospora monospora*" Imsh. & Comm. *ined.*

This species is characterized by an esorediate, thick, grey, crustose thallus containing pannarin and zeorin, glossy, black apothecia, and single-spored asci with muriform ascospores of the '*lopadioides*' type, 60–90 x 25–35 µm. See Kantvilas (1994) and Sipman (1983) for further data. It is known from Tasmania and Campbell Island, and is here recorded for Macquarie Island for the first time. Whereas in Tasmania *Megalospora lopadioides* occurs in a wide range of habitats, including the bark of trees and shrubs in wet forest, scrub and heathland, and on rocks in buttongrass moorland and alpine vegetation, in the Subantarctic islands it appears to be restricted to soil and rocks (see also West & Polly 1999). Although abundantly covered with well-developed apothecia, the Macquarie Island specimen appears to possess no asci or ascospores. The unpublished name '*Bombyliospora monospora*' was attached by Henry Imshaug, prolific collector and researcher of Subantarctic and austral lichens, to exsiccata distributed by the Michigan State University Herbarium (MSC).

SPECIMENS EXAMINED

Macquarie Island: • S of Scoble Lake, 54°30'S, 158°57'E, 230 m altitude, R.D. Seppelt 4209, 21.xi.1975, (HO). Campbell Island: • northwest slope of Mt Honey, 1000–1400 ft altitude, R.C. Harris 4889, 31.xii.1969 (HO, MSC).

4. *Megalospora melanodermia* (Müll. Arg.) Zahlbr. var. *melanodermia*

Catal. Lich. Univ. 4, 89 (1926); *Patellaria melanodermia* Müll. Arg., *Nuovo Giorn. Bot. Ital.* 23, 392 (1891). Type: Australia, Queensland, F.M. Bailey 579 (G! – holotype). = *Catillaria melacloinoides* (Müll. Arg.) Zahlbr., *Catal. Lich. Univ.* 4, 20 (1926); *Patellaria melacloinoides* Müll. Arg., *Bull. Herb. Boissier* 4, 94 (1896). Type: Australia, Queensland, Brisbane, F.M. Bailey 1551, 1891 (G! – lectotype, here selected); syntypes: Queensland, J. Shirley 1762, 1893 (G!); Queensland, Brisbane, F.M. Bailey 1536 (G!).

This taxon is characterized by the esorediate, yellowish, crustose thallus containing usnic acid and zeorin, the blackish, ± glossy, epruinose apothecia, and the 3–8-spored asci with bicellular ascospores of the "*sulphurata*"-type, (32–)36–48(–54) x 20–30 µm. See Kantvilas (1994) and Sipman (1983) for further data. It is a widespread epiphyte in the moist coastal forests of northern New South Wales and south-eastern Queensland. The name *Catillaria melacloinoides* is a previously overlooked synonym.

5. *Megalospora pulverata* Kantvilas

Lichenologist 26, 355 (1994). Type: Tasmania, Douglas River, 41°46'S, 148°12'E, on *Pomaderris apetala* in wet scrub on river bank, 80 m altitude, G. Kantvilas 734/84, x.1984 (HO! – holotype).

This species is recognized by its greyish white, entirely coarsely granular-sorediate thallus containing pannarin and zeorin, the scattered apothecia with pale greyish to purple-grey, pruinose discs, the typically 2-spored asci, and the bicellular ascospores of the "*sulphurata*"-type, 54–98 x 22–38 µm. See Kantvilas (1994) for further data. The species occurs on the bark of various shrubs and trees in moist, sheltered, lowland gullies; it has previously been recorded only from Tasmania.

SPECIMEN EXAMINED

New South Wales: • Brown Mountain, Rutherfords Creek, 18 km SE of Nimmitabel, 36°35'22"S, 149°26'44"E, 815 m altitude, G. Kantvilas 109/08, J. Elix & P. McCarthy, 17.iv.2008 (HO).

6. *Megalospora subtuberculosa* (Knight) Sipman

Bibliotheca Lichenologica 18, 123 (1983); *Lecidea versicolor* var. *subtuberculosa* C.Knight, *Trans. Proc. New Zealand Inst.* 7, 358, Tab. 23, Fig. 8 (1874). Type not seen.

This taxon is characterized by a yellowish crustose thallus containing usnic acid and zeorin, the scattered round soralia to 2.5 mm diam., glossy black to brown-black, epruinose apothecia, and usually 6–8-spored asci with bicellular ascospores of the "*sulphurata*" type, 32–42 x 19–25 µm. See Kantvilas (1994) and Sipman (1983) for further data. It is the sorediate counterpart of *M. melanodermia* var. *melanodermia*, and is most frequently encountered as sterile thalli, easily recognized by the large, prominent soralia. The Victorian specimen is from *Pomaderris* bark in a sheltered, *Nothofagus*-dominated rainforest gully. It is also known from Queensland, New South Wales, Tasmania and New Zealand.

SPECIMEN EXAMINED

Victoria: • Tarra-Bulga NP, Cyathea Falls, 38°26'47"S, 146°32'19"E, 250 m altitude, G. Kantvilas 87/08, J. Elix & P. McCarthy, 14.iv.2008 (HO, MEL).

Acknowledgements

I thank Philippe Clerc for arranging the loan of specimens from Geneva. The companionship of Jack Elix, Pat McCarthy and Arve Elvebak during field work in Victoria and New South Wales is warmly appreciated.

References

- Kantvilas, G (1994): Additions to the family Megalosporaceae in Tasmania and mainland Australia. *Lichenologist* 26, 349–366.
Orange, A; James, PW; White, FJ (2001): *Microchemical Methods for the Identification of Lichens*. British Lichen Society, London.
Sipman, HJM (1983): A monograph of the lichen family Megalosporaceae. *Bibliotheca Lichenologica* 18, 1–241.
Sipman, HJM (1986): Additional notes on the lichen family Megalosporaceae. *Willdenowia* 15, 557–564.
West, CJ; Polly, B (1999): Additional lichen records from New Zealand 29. *Megalospora lopadioides* from Campbell Island. *Australasian Lichenology* 44, 8.

New and additional records and a new combination of Australian *Peltigera*

Simone Louwhoff

National Herbarium of Victoria,
Birdwood Avenue, South Yarra, Victoria, 3141, Australia.

Abstract: Seven *Peltigera* species new to Australia, and two additional state and territory records are presented, and a key to all Australian *Peltigera* species is provided. *Peltigera polydactyla* var. *conjungens* Müll.Arg is lectotypified and synonymized with *P. dolichorhiza* (Nyl.) Nyl.

Introduction

The genus *Peltigera* includes foliose species, typically with a leaden-grey upper surface (Australian species), which lack a lower cortex and are attached to the substratum by distinct rhizines. The appearance of the latter, as well as that of the veins on the lower surface, is important in distinguishing among species. Although readily recognizable in the field, *Peltigera* is a taxonomically complex group, and many species remain poorly understood (Goffinet & Hastings 1994, Goffinet *et al.* 2003, Goward *et al.* 1995, Miadlikowska & Lutzoni 2000, Miadlikowska *et al.* 2003). *Peltigera* includes bipartite and tripartite members, but Australian species are all bipartite, with the photobiont cyanobacterial (*Nostoc*). The genus is cosmopolitan, with estimates of 60 to 75 taxa (Goffinet & Hastings 1994, Kirk *et al.* 2001, Vitikainen 2004a), the greatest diversity occurring in the Northern Hemisphere (Miadlikowska & Lutzoni 2004). Sixteen species have been reported from New Zealand (Galloway 2007), and fifteen are known from Australia.

Key to the Australian species of *Peltigera*

- 1 Thallus with soredia, isidia or phyllidia2
- 1: Thallus lacking soredia, isidia and phyllidia.....13

- 2 Thallus sorediate3
- 2: Thallus isidiate or phyllidiate, lacking soredia6

- 3 Upper surface tomentose4
- 3: Upper surface lacking tomentum**P. ulcerata**

- 4 Rhizines dense and fibrillose, forming a thick cottony mat below; veins dark brown**P. lambinonii**
- 4: Rhizines not dense and fibrillose, not forming a thick cottony mat below; veins pale brown to tan5

- 5 Rhizines fasciculate to fibrillose, brush-like at the tips**P. extenuata**
- 5: Rhizines simple to loosely branched, not brush-like at the tips..... **P. didactyla**

- 6 Thallus with button-like isidia**P. lepidophora**
- 6: Thallus phyllidiate.....7

- 7 Upper surface lacking tomentum8
- 7: Upper surface tomentose10

- 8 Upper surface not pruinose **P. polydactylon**
- 8: Upper surface pruinose.....9

- 9 Pruina restricted to lobe margins; apothecia subhorizontal; no chemistry detected by tlc..... **P. tereziana**
- 9: Pruina submarginal to laminal; apothecia erect; terpenoids detected by tlc.....
.....**P. pruinosa**

- 10 Lobe margins pruinose..... **P. tereziana**
- 10: Lobe margins not pruinose 11

- 11 Upper surface grey-brown or olive-brown (when dry); tomentum covering the upper surface only; rhizines simple at margins **P. praetextata**
- 11: Upper surface grey or grey-brown (when dry); tomentum covering the upper and lower surfaces; rhizines fibrillose or confluent at margins.....12

- 12 Lobe margins undulating, frequently with secondary lobules, upturned at the apices; rhizines forming confluent lines at the margins**P. rufescens**
- 12: Lobe margins entire to phyllidiate-incised, flat, upturned or somewhat inflexed at the apices; marginal rhizines fibrillose, not forming confluent lines at the margins **P. fibrilloides**

- 13 Upper surface smooth14
- 13: Upper surface sparsely to densely tomentose15

- 14 Thallus thin and somewhat papery; rhizines simple to fasciculate, not confluent at the margins, 5–10 mm long; lacking marginal phyllidia **P. dolichorhiza**
- 14: Thallus somewhat brittle but not papery; rhizines simple to fasciculate, confluent at the margins, sometimes tufted at tips, 2–4 mm long; marginal phyllidia sparse or common..... **P. polydactylon**

- 15 Tomentum sparse, generally confined to lobe apices; lobes elongate; margins irregularly torn..... **P. dilacerata**
- 15: Tomentum dense, particularly at lobe apices, sparse laminally; lobes not elongate; margins not irregularly torn.....16

- 16 Lobe margins ruffled and frilled, upturned at apices, frequently with secondary squamules or lobules **P. rufescens**
- 16: Lobe margins entire, notched or phyllidiate-dissected, not ruffled or frilled, upturned at apices or not.....17

- 17 Veins and rhizines covered by flattened woolly, interwoven tomentum; rhizines small-tufted at margins, becoming densely tangled and matted centrally.....
.....**P. lairdii**
- 17: Veins and rhizines covered by erect tomentum; rhizines simple, fasciculate or fibrillose, not densely tangled and matted.....18

- 18 Lobe margins entire or scalloped, flat or downturned at the apices; rhizines simple or fasciculate, not fibrillose **P. membranacea**
- 18: Lobe margins entire to phyllidiate-incised, flat, upturned or somewhat inflexed at the apices; rhizines fibrillose **P. fibrilloides**

LECTOTYPIFICATION

Peltigera dolichorhiza (Nyl.) Nyl., *Lich. Nov.-Zel.* 43 (1888)
Peltigera polydactyla var. *conjungens* Müll.Arg., *Flora* 66: 22 (1883). T: Toowoomba, Qld, C.H. Hartmann s.n.; [lectotype (here designated, as selected by O. Vitikainen 1973) G!], *syn. nov.*

NEW RECORDS FOR AUSTRALIA

Peltigera extenuata (Nyl. ex Vain.) Lojka, *Lichenoth. Univ.* 5: No. 222 (1886)

This species is characterized, and separated from *P. didactyla* (With.) J.R.Laundon (of which it was once considered a variety), by the densely tomentose and sorediate upper surface and by the pale flocculent (paintbrush-like) rhizines on the lower surface, which resemble matted hair. It belongs to the *P. didactyla* complex, which includes *P. ulcerata* and *P. lambinonii* (Vitikainen 1994, Goffinet *et al.* 2003). *P. extenuata* contains methylgyrophorate, \pm gyrophoric acid, mostly in the sorediate lobes. It is predominantly a Northern Hemisphere species (North America, Europe and China). In the Southern Hemisphere it occurs in Papua New Guinea and Australia. Here it occurs in Queensland, New South Wales, the Australian Capital Territory, Victoria and Tasmania, where it is found on and among mosses on trees, over rocks and soil banks, mostly in moist and/or shaded habitats at rainforest margins or in wet forest, or in disturbed environments, at elevations to 1600 m. The species is discussed in more detail in Goffinet *et al.* (2003) and Goffinet & Hastings (1995), and it will be treated in the next *Flora of Australia* lichen series.

REPRESENTATIVE SPECIMENS EXAMINED

Australian Capital Territory: • Aggie Gap, Brindabella Ra., 42 km WSW of Canberra, J.A. Elix 9537 (CANB); • Molonglo Gorge Reserve, J.A. Elix 1263 (MEL). *New South Wales*: • Mt Exmouth, 32 km WSW of Coonabarabran, Warrumbungle National Park, J. Eurrell 79/12 (CANB); • Apsley Falls, 12 km E of Walcha on the Walcha-Wanchape Rd, R.B. Filson 7239 (MEL). *Queensland*: • Mt Cordeaux-Cunninghams Gap, G.N. Stevens s.n. (BRI). *Tasmania*: • Colebrook, Lovely Banks Rd, near Little Quoin Branch Rd, G.C. Bratt 70/714 (MEL); • Little Fisher R., G. Kantvilas 220/82 (HO); • Tanina, c. 14 km N of New Norfolk, G.C. Bratt & J.A. Cashin 70/754 (HO). *Victoria*: • Floating Island Reserve, Pirron Yallock, Otway Plain, J. Sago s.n. (MEL).

Peltigera fibrilloides (Gyeln.) Vitik., in M.P. Marcelli & M.R.D. Seaward, *Lich. Latin Amer.* 136 (1998)

Australian specimens included under this name are characterized by a tomentose upper and lower surface, phyllidiate lobe margins and fibrillose rhizines. Tomentum on the lower surface has not been reported for South American specimens (Vitikainen 2004a), hence the name *Peltigera fibrilloides* should be applied with some caution in Australia, where it potentially represents a new species. No chemistry was detected by tlc. *Peltigera membranacea* (Ach.) Nyl. is separated by a larger, thin, fragile thallus (generally > 10 cm cf. < 8 cm wide), lack of phyllidia, and by simple to flocculent (paintbrush-like) rhizines. *Peltigera praetextata* lacks the fibrillose rhizines and tomentose lower surface that characterizes the Australian specimens to which the name *P. fibrilloides* is applied. Galloway (2007) considered New Zealand material of *P. membranacea* to resemble European specimens of that species, but Australian collections generally are better accommodated under *P. fibrilloides*. *Peltigera dilacerata* is distinguished by the thick, brown ropey rhizines to 15 mm long and by the narrower lobes and the torn margins. *Peltigera lairdii* has strongly upturned lobe apices, and the lower surface is covered by a flattened woolly rather than an erect tomentum. *Peltigera fibrilloides* is reported from Central and South America (Vitikainen 2004b). In Australia, it is uncommon in Victoria and Tasmania, on and among mosses growing over bark and soil in sheltered environments and disturbed dry sclerophyll forest (to 1010 m altitude). Additional details on this species are given in Vitikainen (1998), and it will be treated in the next *Flora of Australia* lichen series.

SPECIMENS EXAMINED

Tasmania: • Liaweenee-Oonah road junction, G.C. Bratt & J.A. Cashin 75/145 (HO); • Selma, G.C. Bratt & J.A. Cashin 74/716 (HO). *Victoria*: • Corner Inlet Viewing Area, Grand Ridge Rd, 26 km S of Traralgon, H. Streimann 50493 (CANB); • Road W2 Tyers to Walhalla Rd, c. 6 km N of Tyers, R.B. Filson 15283 (MEL).

Peltigera lairdii C.W.Dodge & E.D.Rudolph, *Ann. Missouri Bot. Gard.* 42: 138 (1955)

This species is characterized by the tomentose upper surface, the upturned or occasionally inrolled lobe apices with dark grey-brown, \pm glossy margins, and by the flattened woolly-arachnoid lower surface. Faint traces of two unidentified substances with high Rf values (~80 and ~85) were detected by tlc. *Peltigera membranacea* is distinguished by flat lobes, lacks the upturned lobe apices, and has erect-tomentose rather than arachnoid veins, while *P. praetextata* and *P. fibrilloides* are both commonly phyllidiate and also lack the upturned or inrolled lobe apices. Although some marginally tomentose specimens of *P. tereziiana* Gyeln. (mainly from Tasmania) can be mistaken for *P. lairdii*, the former is pruinose at the margins, lacks the flattened tomentum on the lower surface, and has no secondary chemistry detected by tlc. The relationship among *Peltigera lairdii*, *P. fibrilloides*, and *P. membranacea* requires further investigation. *Peltigera lairdii* was previously known only from Subantarctic Macquarie Is., where it was reported as common on soil over decaying grasses, mosses and hepatics (Dodge & Rudolph 1955). In Victoria and Tasmania, it is uncommon on soil and rocks in wet sclerophyll forest and rainforest at 170–1270 m, mainly growing over mosses. A detailed description is given in Dodge & Rudolph (1955), and it will be treated in the next *Flora of Australia* lichen series.

REPRESENTATIVE SPECIMENS EXAMINED

Tasmania: • near Junction Cabin, Mt Wellington, A.V. Ratkowsky L203 (HO); • Tarraleah, S.J. Jarman 293/80 (HO). *Victoria*: • Tarra Bulga Natl Park, J.A. Elix 29672 (CANB).

Peltigera lepidophora (Vain.) Bitter, *Ber. Deutsch. Bot. Ges.* 22: 251 (1904)

This species is readily distinguished by its small, slightly sunken, \pm cochleate growth habit (also seen in juvenile specimens of *P. didactyla*) and the button-like to peltate isidia growing on the upper surface. No chemistry was detected by tlc. *Peltigera didactyla* is separated by the presence of soredia instead of isidia, and methylgyrophorate and gyrophoric acid can be present in the sorediate lobes. *Peltigera lepidophora* is circumpolar in the Northern Hemisphere, but scattered in the Southern Hemisphere (including South America and New Zealand). It is rare in New South Wales and Victoria, occurring on soil or growing over terricolous mosses at c. 1250 m altitude. A detailed description is given in Vitikainen (1994), and it will be treated in the next *Flora of Australia* lichen series.

REPRESENTATIVE SPECIMENS EXAMINED

New South Wales: • Coolemon Plain, D. McVean 6491 (CANB); • Apsley Falls, 12 km E of Walcha on the Walcha-Wauchope road, R. Filson 7239 (MEL). *Victoria*: • Traawool, Tallerook Ra., F.R.M. Wilson 2268 (NSW).

Peltigera praetextata (Flörke ex Sommerf.) Zopf., *Ann. Chem.* 364: 299 (1909)

This species is characterized by the simple to elaborately branched phyllidia that grow along the lobe margins and from tears in the upper surface. The upper surface can be somewhat tomentose. No chemistry was detected by tlc. Non-phyllidiate or sparsely phyllidiate specimens of *Peltigera praetextata* can be confused with *P. membranacea* and *P. canina* (L.) Willd., but are separated from the latter two species by the darker, flatter, non-tomentose veins in the central parts of the thallus underside and by the simple rhizines. *Peltigera fibrilloides* has fibrillose rhizines and a tomentose lower (and upper) surface, while *P. lairdii* is distinguished by a lack of phyllidia, a densely tomentose upper surface, and an arachnoid-tomentose lower surface. *Peltigera*

praetextata is widespread in the Northern Hemisphere, and has also been reported for New Zealand (Galloway 2007). In Australia, it is known from a single site in New South Wales, where it grows over and among mosses together with *P. polydactylon* (Neck.) Hoffm. A detailed description is given in Vitikainen (1994), and it will be treated in the next *Flora of Australia* lichen series.

SPECIMEN EXAMINED

New South Wales: • 1 mile [1.6 km] from Mount Wilson, Mount Wilson-Kurrajong road, Blue mountains, *R. Filson* 7541 (MEL).

Peltigera pruinosa (Gyeln.) Inumaru, *Acta Phytotax. Geobot.* 12: 11 (1943)

The name is here applied to Australian specimens that resemble *P. polydactylon* but are separated from that species by scattered to dense clusters of pruina on the upper surface. Kurokawa *et al.* (1966) considered *Peltigera pruinosa* to be more closely related to *P. microphylla* (Anders) Gyeln., not known from Australia. Those authors also noted that *P. pruinosa* lacks zeorin, but this triterpenoid has been detected in the type material (Vitikainen, pers. comm. 2007), and was also present in Australian specimens. Other substances detected by tlc included tenuiorin, methyl gyrophorate, dolichorhizin (major/minor), \pm peltidactylin (major/minor), \pm traces of hopane-6 α ,7 β , 22-triol, hopane-7 β ,22-diol and hopane-15 α ,22-diol.

Several specimens from Mt Cordeaux, Queensland, resemble *P. neopolydactylon* (Gyeln.) Gyeln., in that they had slightly broader than typical veins (up to 1.8 mm *cf.* up to 1.5 mm wide), longer rhizines (up to 10 mm *cf.* up to 7 mm long) and a glabrous upper surface with or without pruina. However, *P. neopolydactylon* is separated from both *P. pruinosa* and *P. polydactylon* by a larger thallus (to 40 cm wide) with broader lobes (to 4 cm wide), broad, flat veins and large spores (generally 70–90 μ m long). Although it has been reported for New Zealand (Galloway 2007), it cannot be confirmed for Australia.

One Tasmanian collection has indistinct pale buff to ochraceous veins and very short (< 2 mm long), tufted rhizines. It resembles *P. hymenina* (Ach.) Delise ex Duby, but the latter is not reported to be pruinose. Other *Peltigera* species with which *P. pruinosa* could be confused are *Peltigera malacea* (Ach.) Funck with a pruinose but tomentose upper surface, and *P. neckeri* Hepp with a pruinose upper surface and a blackened, diffuse venation and rhizines on the lower surface, and black tubular apothecia. The aforementioned species (*P. hymenina*, *P. neckeri* and *P. malacea*) have bipolar distributions and are reported from New Zealand (Galloway 2007), but they could not be confirmed for Australia. *Peltigera tereziana* is distinguished by the lack of medullary substances and pruina that are restricted to the lobe margins. *Peltigera pruinosa* is reported for Japan, China and Taiwan. In Australia, it occurs in Queensland, New South Wales, the Australian Capital Territory, Victoria and Tasmania, in wet forests where it grows on earth/sandbanks, soil, and burnt or dead wood, or on rock, on and among mosses, up to 1100 m altitude. A detailed description of this species is given in Kurokawa (1966), and it will be treated in the next *Flora of Australia* lichen series.

REPRESENTATIVE SPECIMENS EXAMINED

Australian Capital Territory: • Kangaroo Ck, 2.5 km E of Corin Dam, 36 km SW of Canberra, *J.A. Elix* 10179 (CANB). *Queensland*: • Picnic Rock, Lamington National Park, *P. Merrottsy* 178 (BRI). *New South Wales*: • Paddys River Falls, 13 km SE of Tumarumba P.O., Southern Tablelands, *R.G. Coveny* 17606 *et al.* (NSW); • Barrington Tops, on the road to Caregs Peak, just below the Corker, *R.B. Filson* 8010 (MEL). *Tasmania*: • Bermuda Rd, Huon Valley, *G. Kantvilas* 420/81 (HO); • 3.2 km NW of Arthur River, on forestry road from Trowutta, *G.C. Bratt* 70/519 (HO); • Mt Dromedary-Dean Brook, *W.A. Weymouth* s.n. (HO); • Clyde River, *G.C. Bratt* 72/331 (HO); • Murchison Rail Crossing, *G.C. Bratt* 70/68 (HO); • Surprise Valley, *G.C. Bratt* & *J.A. Cashin* 1746 (HO). *Victoria*: • Cement Ck, near historical toilet facility, Yarra Ranges

National Park, *S. Louwhoff* & *B. Fuhrer* s.n. (HO); • Gembrook, *R.A. Bastow* s.n. (MEL); Western Tyers, Gippsland, *J. Sago* s.n. (MEL); • c. 2 miles SW of Mt Tamboritha, Bennison Plains Rd, *J.H. Willis* s.n. (MEL); • Gippsland Highlands, Mt Eccles, *W.H. Ewers* 100 (MEL); • Grampians National Park, Silverband Falls Track, 12 km SW of Halls Gap, *K. Ralston* 2773 (MEL).

Peltigera ulcerata Müll. Arg., *Flora* 63: 261 (1880)

This species is distinguished from other members of the sorediate *P. didactyla* complex (see under *P. extenuata*) by the glabrous rather than tomentose upper surface. It is most likely to be confused with the sorediate morphotype of *P. didactyla*, which also has cochleate lobes and can lack tomentum on the upper surface. However, it is separated from that species by the mainly submarginal soralia and the short stumpy rhizines. *Peltigera extenuata* has a tomentose thallus and a lower surface with white to pale veins and flocculent (paintbrush-like) rhizines. No lichen substances were detectable by tlc for the cortex and non-exposed medulla; however, the soralia were found to contain \pm methyl gyrophorate (major), \pm gyrophoric acid (minor/trace).

The relationships among species in the *Peltigera didactyla* complex, which includes *P. ulcerata*, *P. lambinonii*, *P. extenuata* and *P. didactyla*, are discussed in detail by Vitikainen (1994) and Goffinet *et al.* (2003). *Peltigera ulcerata* is known from Brazil, Chile, Costa Rica, East Africa, China, Papua New Guinea and New Zealand. In Australia it occurs in New South Wales, the Australian Capital Territory, Victoria and Tasmania, growing on and among mosses overgrowing granite rocks, in subalpine woodland and in dry sclerophyll forest, at altitudes of 600–1300 m. A detailed description is given in Galloway (2007) and Swinscow & Krog (1988), and it will be treated in the next *Flora of Australia* lichen series.

SELECTED SPECIMENS EXAMINED

Australian Capital Territory: • trail to Booroomba Rocks, 11 km SW of Tharwa, *J.A. Elix* 6216 (CANB). *New South Wales*: • Murphys Track, Dora Dora State Forest, 18 km SE of Holbrook, *J.A. Elix* 23002 (CANB); • Mt Kaputar National Park, along the nature trail, Dawson Spring, *R.B. Filson* 15765 (MEL). *Tasmania*: • Lake St Clair Weir, *G.C. Bratt* 72/1056 (HO); • Meadowbanks Rd, northern side, *G.C. Bratt* & *J.A. Cashin* 70/809 (HO); • Colebrook-Lovely Banks Rd, near Little Quoin Branch Rd, *G.C. & M.H. Bratt* 70/614 (HO). *Victoria*: • c. 6 km N of Tyers, Tyers-Walhalla road, *R. Filson* 15284 (MEL); • Lysterfield Hill, *R.B. Filson* 16092 (MEL).

NEW STATE AND TERRITORY RECORDS

Peltigera dilacerata (Gyeln.) Gyeln., *Rev. Bryol. Lichénol.* 5: 70 (1932)

Peltigera dilacerata was previously reported from Western Australia, South Australia and the Australian Capital Territory (McCarthy 2008), but those could not be confirmed. It is known with certainty only from the Northern Territory, New South Wales and Tasmania, and the species is a new record for those states. Also in Taiwan and New Zealand, but its global distribution remains uncertain (Vitikainen 2004b).

SELECTED SPECIMENS EXAMINED

New South Wales: • locality unknown, *F.W.L. Leichhardt* (MEL). *Northern Territory*: • “Falkeswood” coll. unknown (BRI). *Tasmania*: • Mt Wellington, *T. & B. Gulliver* s.n. (MEL); • Coal River Gorge between Colebrook and Tunnack, *M. Gilbert* s.n. (HO).

Peltigera membranacea (Ach.) Nyl., *Bull. Soc. Linn. Normandie*, sér. 4, 1: 74 (1887)

Earlier reports from Tasmania could not be confirmed (*J.M. Crombie*, *J. Linn. Soc. Bot.* 17: 390–401, 1880; *F.R.M. Wilson*, *Pap. & Proc. Roy. Soc. Tasmania* 1892: 133–178, 1893), and the species is known with certainty only from New South Wales. Also circumpolar to temperate (North America, western Europe, Asia and New Zealand).

Acknowledgements

Many sincere thanks are extended to Orvo Vitikainen for his advice and many enlightening discussions on this genus. Acknowledgments are also extended to Patrick McCarthy for comments, to David Galloway for providing literature, and to the following herbaria for preparing loan material: BM, BRI, CANB, H, HO, NSW and PERTH. This work was funded by a grant from the Australian Biological Resources Study.

References

- Dodge, W; Rudolph, ED (1955): Lichenological notes on the flora of the Antarctic Continent and the Subantarctic Islands. I-IV. *Ann. Missouri Bot. Gard.* **42**, 138.
- Galloway, DJ (2007): *Flora of New Zealand Lichens*, second revised edition. Government Printer.
- Goffinet, B; Hastings, RI (1994): *The Lichen Genus Peltigera (lichenized Ascomycetes) in Alberta*. Provincial Museum of Alberta, Edmonton, Natural History Occasional Paper **21**, 1–54.
- Goffinet, B; Hastings, RI (1995): Two new sorediate taxa of *Peltigera*. *Lichenologist* **27**, 43–58.
- Goffinet, B; Miadlikowska, J; Goward, T (2003): Phylogenetic inferences based on nrDNA sequences support five morphospecies within the *Peltigera didactyla* complex (lichenized Ascomycota). *Bryologist* **106**, 349–364.
- Goward, T; Goffinet, B; Vitikainen, O (1995): Synopsis of the genus *Peltigera* (lichenized Ascomycetes) in British Columbia, with a key to the North America species. *Canad. J. Bot.* **73**, 91–111.
- Kirk, PM; Cannon, PF; David, JC; Stalpers, JA (2001): *Dictionary of the Fungi*, 9th edn. CAB International, Wallingford.
- Kurokawa, S; Jinzenji, Y; Shibata, S; Chiang, H-C (1966): Chemistry of Japanese *Peltigera* with some taxonomic notes. *Bull. Natl. Sci. Mus. Tokyo* **9**, 101–114.
- McCarthy, PM (2008): *Checklist of the Lichens of Australia and its Island Territories*. Australian Biological Resources Study, Canberra. March 2008. <http://www.anbg.gov.au/abrs/lichenlist/introduction.html>
- Miadlikowska, J; Lutzoni, F (2000): Phylogenetic revision of the genus *Peltigera* (lichen-forming Ascomycota) based on morphological, chemical and large subunit nuclear ribosomal DNA data. *Int. J. Pl. Sci.* **161**, 925–958.
- Miadlikowska, J; Lutzoni, F; Goward, T; Zoller, S; Posada, D (2003): New approach to an old problem: incorporating signal from gap-rich regions of ITS and rDNA large subunit into phylogenetic analyses to resolve the *Peltigera canina* complex. *Mycologia* **95**, 1181–1203.
- Swinscow, TDV; Krog, H (1988): *Macrolichens of East Africa*. British Museum of Natural History, London.
- Vitikainen, O (1994): Taxonomic revision of *Peltigera* (lichenized Ascomycotina) in Europe. *Acta Bot. Fenn.* **152**, 1–96.
- Vitikainen, O (1998): Taxonomic notes on Neotropical species of *Peltigera*, pp. 465–467, in M.P. Marcelli & M.R.D. Seaward (eds). *Lichenology in Latin America: history, current knowledge and applications*. Campanhia de Tecnologia de Saneamento Ambiental—Estado de Sao Paulo, Sao Paulo.
- Vitikainen, O (2004a): *Peltigera*, in T.H. Nash III, B.D. Ryan, P. Diederich, C. Gries & F. Bungartz (eds). *Lichen Flora of the Greater Sonoran Desert Region* **2**, 389–399.
- Vitikainen, O (2004b): Two New Zealand species of *Peltigera* revisited. *Symb. Bot. Ups.* **34**(1), 465–467.

Galloway, DJ (2007): *Flora of New Zealand Lichens* (revised second edition). Manaaki Whenua Press, Lincoln, New Zealand. 2261 + cxxx pages + 16 colour plates, hardback in two volumes. ISBN 9780478093766. NZD79.99 + shipping (for addresses in New Zealand NZD15, in Australia NZD30, and elsewhere NZD80). Copies can be ordered by **e-mail** at <MWPpress@landcareresearch.co.nz>, or **on-line** from Manaaki Whenua Press' web-site <www.mwpress.co.nz>, by **post** at Manaaki Whenua Press, Landcare Research Ltd, P.O. Box 40, Lincoln 7640, New Zealand, by **phone** at +64–3–321–9747 or +64–3–321–9662, or by **fax** at +64–3–321–9997.

In the 1985 first edition of his *Flora of New Zealand Lichens*, David Galloway treated 210 genera and described 966 taxa. In his revised second edition, published late last year, he treats 354 genera and describes 1706 taxa, a dramatic 70% increase. For anybody studying New Zealand's lichens, the epic new second edition is likely to be "the only show in town" for years to come, just as the first edition was during the previous two decades.

The sheer bulk of the second edition is testimony to David's yeoman efforts in compiling what's known about New Zealand's lichen mycobiota. The pages run to just shy of 2400, 3.6 times as many as the 1985 edition, forcing the publisher not only to bind it in two volumes, but also to abandon any attempt to weave the 1985 first edition into its pages. As a result, anybody trying to key out New Zealand lichens must spread out all three *Flora* volumes on the benchtop. However, in generous compensation, the publisher is giving a free copy of the first edition to buyers of the second. As well, the *Flora* is now being placed on-line, and in its final version, the two editions will be spliced together seamlessly. Users will also be able to mouse-click on links to colour illustrations, a welcome improvement on the hard-copy version, which illustrates a mere 16 of the 1706 taxa.

Among the watershed changes since the first edition are David's new accounts of *Placopsis* (the species count has nearly tripled from 13 to 36) and *Peltigera* (the count has doubled from 8 to 16), Sam Hammer's treatment of *Cladonia* (from 41 to 74), and the treatment of *Xanthoparmelia* (from 48 to 81, partly because *Chondropsis*, *Neofuscelia*, and *Paraparmelia* have been sunk into synonymy with *Xanthoparmelia*).

The more than 80 introductory pages begin with a foreword by Pier Luigi Nimis, and include a long preface, an essay on the recent history (1985–2005) of lichenology in New Zealand, a list of collectors, the names of authors, annals of the heightened taxonomic research on lichens in New Zealand since 1981, acknowledgements, colour plates, and 17 keys to genera.

For most users of the *Flora*, those 17 keys are the portal to the nearly 2000 pages that follow. Surprisingly, five of the keys suffer from dead ends and missing couplets, and as a result they don't work. The on-line versions don't work either, because they're just copies of the flawed originals. Of course, on-line keys can easily be fixed, but so far they haven't been, and the *Flora* was launched over seven months ago.

Several keys in the main body of the *Flora's* text are flawed as well. Two examples: (1) in the *Rhizocarpon* key starting on page 1530, the user can get to couplets 8 and 18 by two routes, but never to couplets 7 or 17, and (2) on page 1229 in the *Placopsis* key, couplet 30 is missing altogether. Those errors create frustrating dead ends in the keys. Such flaws are mystifying because they're easy to spot after you've built a key—just check that the couplets are numbered sequentially and that each destination (starting with 2) along the right-hand side of the key occurs once and only once.

Some of the errors in the entry-level keys and elsewhere in the *Flora* can be fixed by a user who's prepared to spend the time, but a vexing few can be reliably fixed only by David himself. For example, in key 7a on page civ, two of the in-key destinations are 7s, yet no other number is missing, so seemingly the fix for the error is to substitute a generic name for one of those two 7s, but only David could readily say what that genus should be and which of the two 7s it should replace.

Such errors in a key's *structure* are easy enough to spot, but errors in its *content* are not, nor are they easy to fix. For example, the ten corticolous species of *Bacidia* (out of a New Zealand total of 16 species) don't key out unless the user falsely declares that they're saxicolous rather than corticolous. That error is all but invisible to a casual user, and it can be fixed only by re-writing the key. However, it might well have been spotted before publication if the key had been peer-reviewed rigorously. Users of course can write their own replacement keys using the *Flora's* detailed descriptions, but few will gladly spend the necessary time.

Although the second edition adds an impressive number of genera and species to the New Zealand lichen checklist, it also deletes some, and all references to those rejects should have been stripped from the text. That job is only a few seconds' work for a computer, but apparently it wasn't done for at least some of the rejects, because (for example) on line 3 of page 406 we read that *Cladonia rigida* "...is similar to...*C. squamosa*", but on lines 6–7 of page 380, we learn that *Cladonia squamosa*, although included in the first edition of the *Flora*, "...is now known not to occur in New Zealand". Similarly, on line 10 of page 288, *Dimerella* is described as having *Lecidea*-like ascomata and 1-septate ascospores, but *Dimerella* has been reduced to a synonym of *Coenogonium* (page 434), and is no longer even in the checklist.

The second edition of the *Flora* was eagerly awaited as a reliable compilation of 22 years of name changes, but those changes aren't always adopted in the *Flora* itself, most notably in the lists of "associated species" scattered here and there throughout the text. As examples, on page 821 *Omphalina alpina* should be *Lichenomphalia alpina*, on page 1895 *Melanelia inactiva* should be *Melanohalea inactiva*, and on page 1844 *Usnea xanthophana* should be *Usnea ciliifera*.

The *Flora* suffers from a startling number of misspellings, too, not just the names of genera, species, and lichenologists, but also ordinary English words. Such typos are as mystifying as the flaws in the keys, because they could easily have been winkled out with a spell-checker, and then fixed by unleashing a computer's search engine on find-and-change missions. Nowadays a spell-checker is bundled with every word-processor, and using it demands no more effort than a few keystrokes. Of course, you can't expect it to check out arcane lichen terminology or Latin binomials, but that doesn't matter, because you can readily cobble all such terms and phrases into a so-called user dictionary. To avoid having to type in a depressingly long list all at once, you can painlessly type them in one at a time while you're working on the manuscript, just by making a habit of launching the spell-checker each morning.

Evidently, the *Flora* manuscript wasn't run past a spell-checker, even after it was finished. How else to explain the misspelled names of genera (at least four, among them *Chrysothrix* for *Chrysothrix*) and species (at least eight, among them *bicincta* for *bicincta*) and the names of lichenologists (Magnusson, Eriksson, and Santesson spelled with a triple *s*). At least 15 words are spelled with a triple *s* (words with triple *e, f, l, m, o, and r* were missed, too), and among other misspellings of common English words, *occurring* is spelled four times with only one *r*, and *illustration* five times with only a single *l*.

In spite of such flaws, David Galloway's monumental revised second edition of his *Flora of New Zealand Lichens* will be indispensable for anybody who's working on New Zealand's lichens. As Peter Scholz has admirably remarked in his recent review of it (2008), the *Flora* will remain for a long time to come the only single-author account of the lichen flora of such a large and diverse area.

On the next pages, fixes are suggested for some of the known flaws in the *Flora's* keys and typographical errors in its text. With few exceptions, the list of typos doesn't include misspellings of common English words or trivial slip-ups such as punctuation, and were chosen instead for how helpful they'd be to serious users of the *Flora*. Nor is the list being touted as complete—it was compiled by just a small number of users working only when they could find a few spare moments, so it's likely to grow as the number of users climbs. Eventually, you should be able to find fixes on the New Zealand flora website <www.floraseries.landcareresearch.co.nz>

KNOWN ERRORS (note: the symbol → means "should be")

- lxxxvi** (key 1, couplets 3 and 19) — among the destinations are two 20s but no 22; the resulting dead end can be fixed by changing the destination of lead 2 of couplet 3 from 20 to 22.
- xcvii** (key 5, couplets 21 and 23) — among the destinations are two 27s but no 29; the resulting dead end can be fixed by changing the destination of lead 2 of couplet 21 from 27 to 29.
- xcviii** (key 6, couplet 1) — *Lithographa* keys out in the first couplet as the only genus of crustose/lirellate lichens with saxicolous species, but in fact *Enterographa subgelatinosa* is saxicolous, so to get to it in the key, the user must falsely declare that it's corticolous instead. Three species of *Opegrapha* are also saxicolous—*rupestris*, *diaphoriza*, and *spodopolia*. Compounding the error, couplet 13 asks the user a second time if the specimen being keyed out is saxicolous.
- xcviii** (key 6, couplet 3, lead 2) — lead 2 should include the muriform species of the genus *Fissurina*, but it doesn't—instead, the user is given the choice of 3-septate or muriform in lead 2 of couplet 8, after having chosen trans-septate.
- xcviii** (key 6, couplets 4 and 7) — among the destinations are two 7s but no 8; the resulting dead end can be fixed by changing the destination of lead 1 of couplet 7 from 7 to 8.
- civ** (key 7a) — among the destinations are two 7s, yet all of the other numbers are present, so the error can be fixed only by changing one of those 7s to the name of a genus. *Rhizocarpon* (part) is a possibility.
- cvi** (key 7c) — because all ten of New Zealand's corticolous species of *Bacidia* have multi trans-septate spores (3 or more septa), they must appear in the key between couplets 26 and 40, but they don't—as a result, they can't be keyed out.
- cxix** (key 11, couplet 29) — couplet 29 is missing; the resulting dead end can be fixed by changing the destination of lead 1 of couplet 28 from 29 to 30.
- 0049** (three-quarters down the page) — *A. indisticta* → *A. indistincta*.
- 0061** (line 3) — *Wienmannia* → *Weinmannia*. **note:** *Weinmannia* is similarly misspelled on page 672, fourth line from the bottom of the page.
- 0088** (two-thirds down the page) — Malcolm & Malcom → Malcolm & Malcolm. **note:** Malcolm is similarly misspelled without the second *l* on pages 122 (line 12) and 1354 (line 9), and in the generic name *Malcolmiella* on page 863 (mid-page).
- 0091** (line 7) — *sordia* → *soredia*.
- 0096** (couplets 7 and 8) — *Bacidia wellingtonii* keys out as having apothecia that are black as opposed to red-brown (among other colours), but on page 113 the apothecia are described as "red-brown to brown-black".
- 0102** (third line from bottom) — Boissier → Boissier.
- 0119** (line 12) — *m* → μ . The same error appears on page 506 (sixth line from bottom), 669 (just below mid-page), and 1875 (eleventh line from bottom).
- 0133** (halfway down the page) — *Bartlettiella* → *Bartlettiiella*. **note:** *Bartlettiiella* is similarly misspelled on page 1733, line 1.
- 0136** (fourth line from bottom) — μ → μ m. **note:** the same error appears on page 1010 (fifth line from bottom) and 1577 (line 10).
- 0140** (just below mid-page) — *Sporostatia* → *Sporastatia*.
- 0142** (line 6) — Eriksson → Eriksson. **note:** Eriksson is similarly misspelled with a triple *s* on pages 1741 (line 12), 1973 (last paragraph, line 1), and 1989 (first line of *Zahlbrucknerella* discussion).
- 0157, 0158** (*Buellia* key, couplets 1 and 10) — among the destinations are two 11s but no 12; the resulting dead end can be fixed by changing the destination of lead 2 of couplet 1 from 11 to 12.
- 0181** (two-thirds down the page) — *ohlssonii* → *ohlssonii*. **note:** Ohlsson is again misspelled with a triple *s* on page 779 (seventh line from bottom).
- 0210** (couplet 7, lead 2) — 3(-5)-septate → 3-locular.

0234 (line 4) — *Rinodina murrayii* → *Rinodina murrayi*. **note:** *murrayi* is misspelled as *murrayii* in another three of its many occurrences in the *Flora*, on pages 268 (just below mid-page), 1565 (couplet 4, lead 2), and 1579 (fifth line from bottom).

0240 (bottom two lines) — plurilocular 3(–5)-septate → 3-locular.

0288 (line 10) — *Dimerella* → *Coenogonium*.

0288 (couplet 1, lead 1) — lowland → lowland to subalpine. **note:** the change is needed because lead 2 of couplet 2 reads “...lowland to subalpine”.

0335 (page heading) — *Chyrysothrix* → *Chrysothrix*.

0335 (genus) — *Chyrysothrix* → *Chrysothrix*. **note:** *Chrysothrix* is similarly misspelled on the heading of page 336.

0358 (line 1) — *verticillata* is correctly ranked as a subspecies at the top of the page, but incorrectly as a variety in the summary description three-quarters down the page.

0376 (last line of *Cladonia floerkeana* summary description) — *C. baillarisi* → *C. bacillaris*.

0406 (line 3) — in the discussion of *Cladonia rigida*, we read “...It is similar to thamnolic-acid-containing specimens of *C. squamosa*, which generally has wider, more well-developed, open axils”, but that statement should have been deleted, because although *C. squamosa* was in the first edition, it was dropped from the second, as evidenced by lines 6–7 on page 380 in the discussion of *C. gallowayi* “...Recorded earlier as *C. squamosa* (Martin 1958; Galloway 1985a: 121), a species now known not to occur in New Zealand”.

0443, 0444 (*Collema* key) — couplets 4 and 10 are not numbered.

0450 (mid-page) — Magnusson → Magnusson.

0462 (line 7 from bottom of page) — *Parmotrema chinense* → *Parmotrema perlatum*. **note:** the same error occurs on page 1731, just below mid-page.

0464 (line 1) — Santesson → Santesson. **note:** Santesson is again misspelled with a triple *s* on line 2, and on page 784 (line 10).

0505 (first line) — *D. gryphoricus* → *D. gyrophoricus*.

0505 (line 9 from the bottom of the page) — *D. hensseniae* → *D. hensseniae*.

0692 (just below mid-page) — *bicinta* → *bicincta*.

0729 (last line) — 5.7.5 must be missing a hyphen—probably it should read 5–7.5 μm .

0743 (couplet 19) — the user isn’t offered the option of *lignicolous*, yet the species *subsericea* in couplet 22 is described as *lignicolous* on page 765.

0743 (couplet 21, lead 1) — *Dracophyllum* → *Dracophyllum* or *Dacrydium*. **note:** *Dracophyllum* is not cited as a host in the description of *Lecidea subsericea* (page 765), whereas *Dacrydium* is.

0743 (couplet 22, lead 1) — 6–5–10.2 → 6.5–10.2.

0799 (*Leptogium* key) — lead 2 of couplet 1 reads “Thallus without... phyllidia”, but that’s seemingly contradicted later on in couplet 18, which reads “Lobe margins phyllidiate”.

0888 (last two couplets of the key) — the last two couplets are both numbered 7; the second one should be numbered 8 instead, and the destination of lead 1 in the first couplet 7 should be 8, not 7.

0973 (line 11) — “*Nephroma plumbeum* is distinguished from other species of *Nephroma* in New Zealand by the cyanobacterial photobiont” contradicts the fact that six of the seven New Zealand *Nephroma* taxa (which include two varieties) have cyanobacterial photobionts, and *Nephroma australe* is the odd one out, because only it has a chlorococcoid photobiont.

0985 (*Ochrolechia* key, couplet 3) — there’s no pathway in the key for getting to couplet 5; the resulting dead end can be fixed by changing the destination of lead 2 of couplet 4 from *xanthostoma* to 5.

1012 (line 1) — *gomerulate* → *glomerulate*.

1075 (halfway down the page) — *pyllidiate* → *phyllidiate* **note:** *phyllidia* is misspelled *pyllidia* on page 1434 (halfway down the page) and *phyllidia* on page 808 (line 12).

1131, 1132 (*Pertusaria* key) — among the couplet destinations in the key are two 55s (one is in lead 2 of couplet 36, and the other is in lead 1 of couplet 54), but no 54;

the resulting dead end in the key can be fixed by changing the destination of lead 2 of couplet 36 from 55 to 54. Also, lead 2 should read not just “muscolous” but “muscolous and/or corticolous or terricolous”.

- 1176 (*Phaeophyscia* key) — lead 2 of couplet 4 is numbered 5, but in fact it shouldn’t have any number at all.
- 1185 (two-thirds down the page) — *Phylctis* → *Phlyctis*.
- 1229 (close to the bottom of the page) — couplet 30 is missing from the key; the resulting dead end can be fixed by changing the destination of the first lead of couplet 29 from 30 to 31.
- 1304 (*Podotara*, eighth line from the bottom) — N: Nelson should be S: Nelson.
- 1326 (*Porina* key) — lead 1 of couplet 2 reads “Thallus on aquatic rocks”, which many users will assume means attached to rocks *in water*, but that pathway in the key leads to seven species (*P. ahlesiana*, *P. aptrootii*, *P. chlorotica*, *P. fluminea*, *P. guentheri*, *P. leptalea*, and *P. otagensis*), not all of which can be considered aquatic according to their descriptions in the *Flora*—for example, *P. ahlesiana* (page 1329) is found “on lakeshore boulders”, *P. chlorotica* (page 1332) is found “...on coastal slate... siliceous rocks [and] elsewhere in its range it is a pioneer species colonising small, siliceous pebbles in shaded, humid habitats”, *P. guentheri* (page 1342) grows “on shady rocks beside streams”, and *P. leptalea* (page 1345) occurs “on shaded streamside rocks, coastal rocks, and rocks in grassland”.
- 1326 (*Porina* key) — the key has two pathways for getting to couplet 8 (lead 2 of couplet 2, and lead 1 of couplet 7), but no pathway for getting to couplet 9; the resulting dead end can be fixed by changing the destination of lead 2 of couplet 2 from 8 to 9.
- 1328 (bottom of the page) — In the *Porina* key, *Porina exacta* keys out only once (couplet 33) in the foliicolous section (couplets 26–38), but the only collection of the species in New Zealand is saxicolous, as noted on page 1339 (mid-page).
- 1363 (*Porpidia* key, couplet 4) — the two leads have identical apothecial diameters—judging from the description of *Porpidia skottsbergiana*, lead 1 should read 1.5–2.5 mm, not 0.2–1.2 mm.
- 1451 (line 11) — white-priunose → white-pruinose.
- 1457 (mid-page) — *Flora* (1985: 468–479) should be *Flora* (1985: 468–469).
- 1489 (just below mid-page) — *Pyrenula* Ach. → *Pyrenula* A.Massal. **note:** according to Hawksworth *et al.* (1995), *Pyrenula* Ach. (1809) is a rejected name.
- 1519 (line 6) — *Flora* (1965): → *Flora* (1985):
- 1530 (couplets 1, 2, 7, and 17) — among the destinations are two 8s and two 18s, but no 7 or 17; the resulting dead ends can be fixed by changing the destination of lead 2 of couplet 1 from 18 to 17, and the destination of lead 2 of couplet 2 from 8 to 7.
- 1531 (couplet 20, lead 2) — *geographicum* → *geographicum*.
- 1638 (just below mid-page) — *S. mayerhoferi* → *S. mayrhoferi*.
- 1702 (*Strigula* key) — there’s no pathway in the key for getting past couplet 10, because there’s no 11 among the couplet destinations; the resulting dead end can be fixed by changing lead 2 of couplet 6 to read “Thallus foliicolous...11.; and lead 2 of couplet 8 to read “Ascospores 1-septate...10”.
- 1713 (two-thirds down the page) — *S. melanobapha*... (1925) → (1952).
- 1735 (line 3) — *poculifera* *Psoroma* → *poculifer*, *Psoroma*.
- 1844 (mid-page) — *Usnea xanthophylla* should be *Usnea ciliifera*.
- 1868 (last line) — *speces* → *species*.
- 1895 (three-quarters down the page) — *Melanelia inactiva* → *Melanohalea inactiva*.

Literature cited

Hawksworth, DL; Kirk, PM; Sutton, BC; Pegler, DN (1995): *Ainsworth & Bisby’s Dictionary of the Fungi (8th edition)*. CAB International, Wallingford.

Scholz, P (2008): (BOOK REVIEW) Galloway, D.J. (2007): *Flora of New Zealand Lichens* (revised second edition). *International Lichenological Newsletter* 41(1), 9–10.

On Saturday, we all gathered at the Department of Sustainability and Environment (DSE) office in Traralgon. After some enthusiastic greetings (many of us see each other only every two years, at these get-togethers), we got busy with the morning program, which consisted of three talks and an informal discussion. Arve Elvebakk spoke about his ongoing revision of the genus *Psoroma s.l.*, a group of lichens that many of us have had experience with. Arve shed new light on the systematic position of many species, and proposed a more natural subdivision of the group. Simone Louwhoff presented an overview of the Australian *Peltigera* by discussing some of the problems the groups poses in Australasia, and tabled eight new records. Tom May talked about FungiMap, a project for recording the distribution of fungi. He proposed that lichens be added to the project to improve our understanding of their habitat and distribution in Australia.

The future of Australasian Lichenologists was discussed informally, in particular how we can attract new members. It was suggested that the two-yearly meetings continue, with the 19th meeting tentatively sited on the southern coast of NSW. It was also suggested that Australasian lichenologists should attend FungiMap workshops to help train members to identify lichens and to record distributions.

We spent the afternoon in Morwell National Park looking at lichens and fungi in a fern gully and damp forest and along a drier ridge at 200–300 m altitude. In the evening, we gathered at the Lion City, a local Chinese/Malay restaurant. Everybody enjoyed the food and company, with much talking, lichenological and otherwise.

On Sunday, we met at the Mount Erica carpark (about 1200 m altitude) in Baw Baw National Park. Some climbed to the top of Mount Erica (about 1500 m altitude) with herb-rich foothills, or to Mushroom Rocks (about 1300 m altitude), which are granite outcrops in montane wet forest. Others explored the tracks closer to the carpark, where the vegetation is montane wet forest and cool-temperate rainforest. During the photographing and collecting of particular species, there was much discussion and exchange of information. We met back at the carpark for lunch and a group photo (although Gintaras and Arve had to be photoshopped in later!), and continued our lichenizing afterwards. In the afternoon, we met for our final goodbyes, and went our separate ways, with plans to meet again in April, 2010.

Simone Louwhoff



Participants (left to right): Neville Scarlett (LaTrobe University), Val Stajsic (MEL), Helen Rommelaar (MEL), Geoff Lay (FungiMap), Ian Davidson (University of Technology, Sydney), Pat McCarthy (ABRS), Gintaras Kantvilas (HO, inserted into photograph), Pat Archer, Tom May (MEL), Alan Archer (NSW), Ken Harris (Friends of Morwell National Park), Arve Elvebakk (University of Tromso, Norway, inserted into photograph), Simone Louwhoff (MEL), and Jack Elix (Australian National University). **Apologies:** Rod Rogers, Nell and Neville Stevens, Sharon Morlee, and Susan and Gary Clark.

- Aptroot, A (2008): Additional lichen records from Australia (65). Pyrenulaceae from Lord Howe Island, Norfolk Island and the Cocos (Keeling) Islands. *Australasian Lichenology* **62**, 6–8.
- Archer, AW (2008): Additional lichen records from Australia (66). Graphidaceae. *Australasian Lichenology* **62**, 9–13.
- Archer, AW; Elix, JA (2008): Three new species in the Australian Graphidaceae (lichenized Ascomycota). *Australasian Lichenology* **63**, 26–29.
- Din, LB; Latiff, A; Said, IM; Elix, JA (2008): Additional lichen records from Indonesia and Malaysia (6). Lichens from Maliau Basin, Sabah, Malaysia. *Australasian Lichenology* **62**, 3–5.
- Elix, JA; Kondratyuk, SY (2008): Two new species of *Letrouititia* (Letrouitiaceae: Ascomycota) from Australia. *Australasian Lichenology* **62**, 16–19.
- Elix, JA; McCarthy, PM (2008): A further new species of *Hafellia* (Physciaceae, lichenized Ascomycota) from Australia. *Australasian Lichenology* **62**, 20–22.
- Elix, JA (2008): Four new lichens from tropical and subtropical Australia. *Australasian Lichenology* **62**, 35–40.
- Elix, JA (2008): Additional lichens records from Australia 67. *Australasian Lichenology* **63**, 2–9.
- Elix, JA (2008): Lichen phytochemistry: additions and amendments I. *Australasian Lichenology* **63**, 20–25.
- Elix, JA; Kalb, K (2008): Further new lichen taxa (lichenized Ascomycota) from Australia. *Australasian Lichenology* **63**, 30–36.
- Jørgensen, PM; Kashiwadani, H (2008): *Leptogium loriforme* P.M.Jørg. & Kashiw., a new hairy species from Papua New Guinea. *Lichenologist* **40**, 123–125.
- Kantvilas, G (2008): Observations on the genus *Scoliciosporum* in Australia, with the description of a second species of *Jarmania*. *Lichenologist* **40**, 213–219.
- Kantvilas, G (2008): Further notes on the distribution and nomenclature of some Australian species of the Megalosporaceae. *Australasian Lichenology* **63**, 37–39.
- Louwhoff, SHFF (2008): Notes on some Australian species of *Umbilicaria*. *Australasian Lichenology* **62**, 45–50.
- Louwhoff, S (2008): New and additional records and a new combination of Australian *Peltigera*. *Australasian Lichenology* **63**, 40–46.
- Malcolm, WM (2008): (BOOK REVIEW) Galloway, DJ (2007): *Flora of New Zealand Lichens*, revised second edition. Manaaki Whenua Press, Lincoln. *Australasian Lichenology* **63**, 47–51.
- Mangold, A; Lumbsch, HT; Kalb, K (2008): *Hemithecium rimulosum* comb. nov. (Ostropales, Graphidaceae), a widespread species in eastern Australia. *Australasian Lichenology* **62**, 32–34.
- McCarthy, PM (2008): *Verrucaria pluviosilvestris* sp. nov., a common lichen of rainforest in north-eastern Queensland. *Australasian Lichenology* **62**, 23–25.
- McCarthy, PM (2008): A new species of *Melanophloea* (Thelocarpaceae) from north-eastern Queensland. *Australasian Lichenology* **62**, 26–28.
- McCarthy, PM (2008): A new species of *Porina* (Porinaceae) from Queensland. *Australasian Lichenology* **62**, 29–31.
- McCarthy, PM (2008): Foliicolous lichens in the Northern Territory. *Australasian Lichenology* **62**, 41–44.
- McCarthy, PM (2008): Additional lichen records from Australia 68. Tropical pyrenolichens. *Australasian Lichenology* **63**, 10–16.
- McCarthy, PM (2008): A new species and new combination of Australian Verrucariaceae. *Australasian Lichenology* **63**, 17–19.

Australasian Lichenology

Number 63, July 2008 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. Colour plates cost NZ\$150 per A5 page. *Australasian Lichenology* provides electronic off-prints as .pdf files if authors request them. 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.