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Additional lichen records from Australia 68. Tropical pyrenolichens

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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 ascomatal 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).

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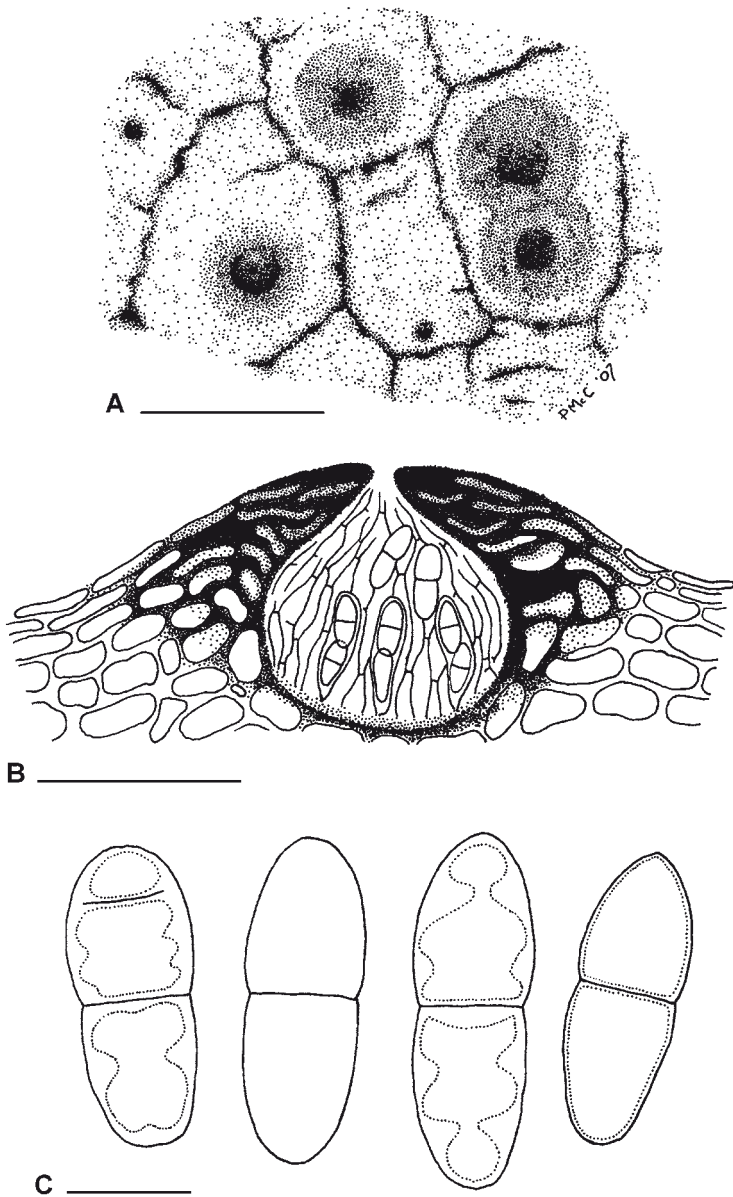


Figure 1. *Arthopyrenia malaccitula* (P.M. McCarthy 2439). A, Ascomata largely immersed in bark. B, Sectioned ascoma (semi-schematic). C, Ascospores. Scales: A = 1 mm; B = 0.2 mm; C = 20 μ m.