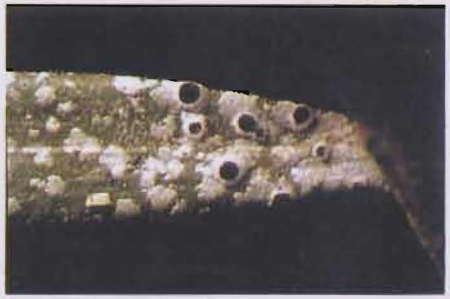
Australasian Lichenology

Number 45, July 1999

Byssoloma subundulatum 1 mm



Byssoloma subdiscordans 1 mm

Australasian Lichenology

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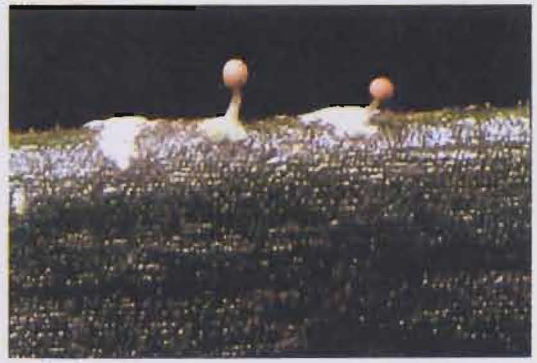
Badimiella serusiauxii
1 mm

Enterographa bella
1 mm

Calenia microcarpa
1 mm



Podotara pilophoriformis
1 mm

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Dampier 300, Biodiversity in Australia 1699–1999—Perth, 1999

The final biodiversity conference of the 1900s will be held in Perth, Western Australia, on 6–10 December 1999. It will commemorate the 300th anniversary of William Dampier's second visit to "New Holland", when he made the first authenticated collections of plant specimens from the continent. The major theme of the conference will be 300 years of Australian biodiversity—what have we learned and where do we go in the 21st Century? Sessions of particular interest to lichenologists include the systematics of cryptogams, arid zone biodiversity, interactive keys, and research priorities and funding. Sites of pre- and post-conference excursions will include the floristically rich kwongan region to the north and the Stirling Range to the south. For further information, contact: Alex George: **post**: 'Four Gables', 18 Barclay Road, Kardinya, Western Australia 6163, Australia, **phone**: (08)-9337-1655, **fax**: (08)-9337-9404, **e-mail**: alextris@opera.iinet.net.au, Mark Harvey: **phone**: (08)-9427-2737, **fax**: (08)-9427-2882, **e-mail**: mark.harvey@museum.wa.gov.au, or Jonathan Majer: **phone**: (08)-9266-7041, **fax**: (08)-9266-2495, **e-mail**: imajerj@info.curtin.edu.au

14th meeting of Australasian lichenologists—Melbourne, 2000

The 14th meeting of Australasian lichenologists will be held at the National Herbarium, Royal Botanic Gardens, Melbourne, on 22–23 April 2000. Talks on various aspects of lichenology will be given during Saturday 22 followed by dinner in the evening, with good food, wine, and conversation. A field trip to at least two different lichen habitats will be conducted on the Sunday. Please put the dates in your diary and make every effort to join us in our biennial get-together.

More detailed information will be given in the January 2000 edition of *Australasian Lichenology*. If you need further information or would like to offer to present a talk, please contact Dr Kathleen Ralston, National Herbarium, Royal Botanic Gardens, Birdwood Avenue, South Yarra, Victoria 3141, Australia, at:

phone: (03)-9252-2381, **fax**: (03)-9252-2350, **e-mail**: kralst@rbgmelb.org.au

4th IAL Symposium—Barcelona, 2000

The 4th International Association of Lichenologists' Symposium, entitled *Progress and Problems in Lichenology at the turn of the Millennium*, will be held in Barcelona on 3–8 September 2000. More detailed information is available at the website **http://www.bio.ub.es/ial2000.htm**, and the unofficial volunteer regional co-ordinator is Michael Thomas, Department of Biochemistry, University of Otago, PO Box 56, Dunedin, New Zealand, who can be reached by:

phone: (03)-479-5149, **fax**: (03)-479-7866, **e-mail**: mike.t@sanger.otago.ac.nz

If you are interested in attending, presenting a paper or poster, or taking part in any of the pre- or post-congress excursions, you should air-mail those intentions along with your name and address no later than September 1999 to: **IAL4**, AOPC, Edif. Colon, Av. Drassanes 6–8, E–08001 Barcelona, SPAIN.

The Southern Connection—Christchurch, 2000

The Third Southern Connection Congress will be held 17–22 January, 2000, at Lincoln University, 20 km south of Christchurch, New Zealand. Building on the first two highly successful meetings in Australia and Chile, the Congress will discuss research in the fields of biosystematics, ecology, and biogeography in temperate ecosystems across the Southern Hemisphere, and promote further collaboration among researchers.

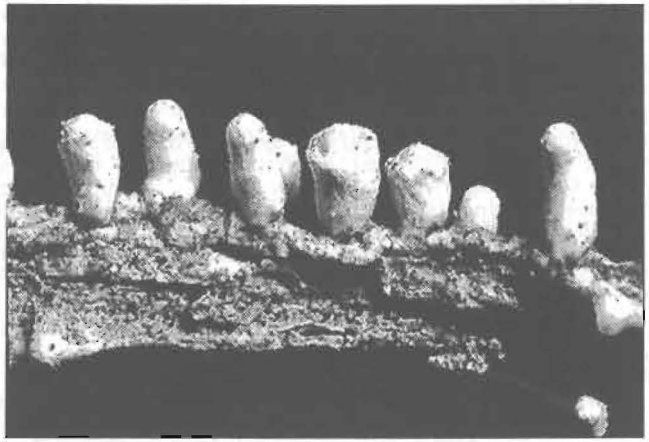
The Congress aims to •examine the influence of people on the structure and functioning of Southern Hemisphere temperate ecosystems, •compare the ecology and biogeography of *Nothofagus* forests, and •investigate Gondwanan biogeographical links in diverse groups such as lichens and invertebrates.

A half-day Symposium of six or so papers will be devoted to lichens on the theme "Southern Hemisphere lichen mycobiotas—what are the connections?" The Symposium will be co-chaired by Professor Wanda Quhilhot (University of Valparaiso, Chile) and Dr David Galloway (Landcare Research NZ Ltd, Dunedin), and speakers have been invited from New Zealand, Chile, the USA, and Australia. For further information, contact David Galloway by **post**: Landcare Research, Private Bag 1930, Dunedin, NZ, or **e-mail**: gallowayd@landcare.cri.nz

A post-Congress mini-bus lichen excursion from Christchurch to Dunedin *via* Arthur's Pass and the West Coast is being organized by Drs David Galloway and Mike Thomas (Dunedin). It will cater for up to eight participants on a first-come-first-served basis, and will be in addition to other post-Congress tours. If you are interested, reply as soon as possible to Mike Thomas by **post**: Department of Biochemistry, University of Otago, Box 56, Dunedin, NZ, or **e-mail**: mike.t@sanger.otago.ac.nz

For second circular and registration details, contact Helen Shrewsbury by **post**: Professional Development Group, Lincoln University, Box 84, Lincoln, Canterbury, NZ, **phone**: +61-3-325-3811, extension 8955, **fax**: +61-3-325-3840, or **e-mail**: shrewsbh@lincoln.ac.nz

For abstracts, proceedings, and the programme, contact Dr Glenn Stewart by **post**: Soil, Plant & Ecological Science, Lincoln University, Box 84, Lincoln, Canterbury, NZ, **phone**: +61-3-325-2811, extension 8174, **fax**: +61-3-325-3844, or **e-mail**: stewartg@lincoln.ac.nz



Pertusaria dactylina 1 mm

Additional lichen records from Australia 40. *Pertusaria knightiana* Müll. Arg.

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In a recent account of the lichen genus *Pertusaria* in Australia, *P. knightiana* Müll. Arg. was mentioned as a possible earlier name for *P. whinrayi* A.W. Archer (Archer 1997:165). It has now been possible to examine the holotype of *P. knightiana,* which proved to be identical to *P. whinrayi.*

Pertusaria knightiana Müll. Arg., *Bull. Soc. Roy. Belg.* **31**: 31 (1892).
Type: New Zealand, *s.loc., C. Knight 25* (G, holotype).
= *Pertusaria ceuthocarpa* *[var.] *crenulata* Stirton, *Proc. Phil. Soc. Glasg.* **10**: 296 (1877). Type: New Zealand, North Island, near Wellington, *J. Buchanan s.n.* (BM, holotype) [*fide* Galloway 1985: 380].
= *Pertusaria whinrayi* A.W. Archer, *Mycotaxon* **45**: 423 (1992). Type: Australia, Tasmania, Bass Strait, Furneaux Group, Badger Island, *ca.* 1.7 km ENE of the tip of Unicorn Point, on low quartzite outcrop, 10.x.1975, *J.S. Whinray s.n.* (MEL 1019470, holotype).

Description. *Thallus* fawn to pale brown, thick, areolate and cracked, saxicolous, surface smooth and dull, lacking isidia and soredia. *Apothecia* verruciform, sparse, usually confluent, subhemispherical to flattened hemispherical, concolorous with the thallus, constricted at the base, 0.8–2 mm wide. *Ostioles* black, conspicuous, distinctly sunken, 0.1–0.15 mm diam., 1 or 2 per verruca. *Ascospores* 2 per ascus, ellipsoid, rough, 140–200 µm long, 40–50 µm wide.

Chemistry. K+ yellow becoming red, KC–, C–, Pd+ yellow; 4,5–dichlorolichexanthone (major-minor), norstictic acid (major), and connorstictic acid (trace).

Illustration. A.W. Archer, *Mycotaxon* **45**: 419, Fig. 6 (1992) [as *P. whinrayi*].

Distribution and ecology. *Pertusaria knightiana* is a rare saxicolous species which in Australia is known only from the type of *P. whinrayi* from Bass Strait, but possibly also occurs along the east coast of Tasmania. It occurs in New Zealand as well.

SELECTED SPECIMENS EXAMINED
Australia. *vide supra.*
New Zealand. •*s.loc., C. Knight s.n.* (NSW 274383). *South Island*: •Damper Bay, Lake Wanaka, *P. Child 286*, 19.v.1970 (CHR 445412). •Kakanni, *B.W. Campbell s.n.,* viii.1959 (OTA 4540). •Pulpit Rocks, Silver Peak [Dunedin], *W. Martin s.n.,* iii.1959 (OTA 4209).

Remarks.
Pertusaria knightiana is characterised by asci with two rough ascospores and the presence of 4,5-dichlorolichexanthone and norstictic acid. It resembles the saxicolous New Zealand species *P. subverrucosa* Nyl., but differs from that species in its rough ascospores and its chemistry—*P. subverrucosa* has smooth ascospores and lacks 4,5-dichlorolichexanthone. The type specimen of *P. ceuthocarpa* **crenulata* has not been seen, but the protologue described ascospores with rough walls (Stirton 1877), and it is tentatively recorded here as a synonym of *P. knightiana.* Its chemistry has not been reported.

References
Archer, AW (1997): The lichen genus *Pertusaria* in Australia. *Bibliotheca Lichenologica* **69**, 1–249.
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Stirton, J (1877): On new genera and species of lichens from New Zealand. *Proceedings of the Philosophical Society of Glasgow* **10**, 285–306.

Additional lichen records from Australia 41. Parmeliaceae

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Heinar Streimann
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Hypogymnia pseudobitteriana and *Parmotrema crinitoides* are reported as new to Australia. In addition, new state records are listed for six other species.

1. **Canoparmelia raunkiaeri** (Vain.) Elix & Hale, *Mycotaxon* **27**, 278 (1986).
This species was previously known from Central America, the Caribbean and tropical Australia (Queensland, Northern Territory). It is characterized by the adnate, pustulate sorediate lobes and the presence of protocetraric acid in the medulla. A detailed description is given in Elix (1994).

SPECIMEN EXAMINED
New South Wales: •Lord Howe Island, NE of North Bay, on rock in forest, *J.H. Willis*, 30 Aug. 1981 (MEL).

2. **Hypogymnia pseudobitteriana** (D.D. Awasthi) D.D. Awasthi, *Geophytology* **1**, 101 (1971).
This species was previously known from India, Nepal, Taiwan, the Philippines and Papua New Guinea. A detailed description follows.
Thallus forming orbicular or irregular patches, to 10 cm wide. Lobes hollow, varying from loose and attenuate to moderately compact 1.0–3.0 mm wide; marginal lobes more compact, adhering to the substratum; laciniate, laciniae palmately branched, marginal and submarginal, 0.5–0.8 mm wide; margins of lobes ± lobulate, lobulae more or less perpendicular to lobes, 0.2–0.5 mm wide. Upper surface grey to off-white; farinose to granular soredia developing from erumpent, laminal soralia, spreading, becoming diffuse over the upper surface. Medulla thin to thick, black adjacent to lower surface, white or slightly discoloured adjacent to upper surface. Lower surface black, wrinkled, glossy, pale brown at the lobe apices, perforations ± prominent, 1.0–1.5 mm wide. Apothecia and pycnidia not seen.
Chemistry: cortex K+ yellow; medulla K–, C–, KC+ red, P–; containing atranorin, chloroatranorin, physodic acid (major), oxyphysodic acid (minor).
Although *Hypogymnia* was formerly considered to occupy a separate family (Hypogymniaceae), very recent molecular results have confirmed that this genus should be included within Parmeliaceae (Crespo & Cubero 1998).

SPECIMEN EXAMINED
Queensland: •Lamb Range near Mt Haig, 20 km SE of Mareeba, 17°05'S, 145°35'E, 1100 m, on shaded tree trunk in tropical forest on moderate slope, *H. Streimann 57663*, 25.x.1995 (CANB).

3. **Hypotrachyna sinuosa** (Sm.) Hale, *Smithsonian Contributions to Botany* **25**, 63 (1975).
This cosmopolitan species is known from Tasmania, but has not been recorded previously from the Australian mainland. It is characterized by the narrow, yellow-green, dichotomously branched lobes, capitate soralia and salazinic acid in the medulla. A detailed description is given in Elix (1994).

SPECIMEN EXAMINED
Victoria: •Johanna River, Melba State Park, Lavers Hill, 26 km WNW of Apollo Bay, 38°31'S, 143°22'E, 380 m, on dead tree branch in disturbed wet sclerophyll forest beside seasonal stream, *H. Streimann 58518*, 3 Dec. 1996 (CANB).

4. **Imshaugia aleurites** (Ach.) S.L.F. Meyer, *Mycologia* **77**, 338 (1985).
This species is widespread in North America, Europe and Asia, and has been collected previously in alpine and subalpine areas of Western Australia, New South Wales, Victoria and Tasmania. It is characterised by the granulose isidia, pale lower surface, and thamnolic acid in the medulla. A detailed description is given in Elix (1994).

SPECIMENS EXAMINED
Australian Capital Territory: •Blue Range, 27 km W of Canberra, 35° 17'S, 148°52'E, 1260 m, on dead *Acacia* in *Eucalyptus* woodland, *J.A. Elix 36002*, 9.ii.1989 (CANB); •Brindabella Range, summit of Mt Franklin, 45 km WSW of Canberra, 35°29'S, 148°47'E, 1644 m, on dead wood in *Eucalyptus pauciflora* woodland, *J.A. Elix 43016*, 15.xii.1998 (CANB).

5. **Neofuscelia subloxodella** Elix & Kantvilas, in G. Kantvilas & J.A. Elix, *Muelleria* **7**, 511 (1992).
This scattered Australian endemic was known previously from South Australia and Tasmania. It is characterized by the adnate to tightly adnate thallus, the lobes with a pale lower surface, inflated isidia with epicorticate apices, becoming erumpent or not so, and glomelliferic, glomellic and loxodellic acids in the medulla. It grows on calcareous rocks and soils, and appears to be the isidiate counterpart of *N. neodelisei* (Elix) Essl. A detailed description is given in Elix (1994).

SPECIMENS EXAMINED
New South Wales: •Travelling Stock Reserve, 8 km S of Mathoura, 35°49'S, 144°54'E, on soil in open *Eucalyptus* woodland, *D.J. Eldridge 3661, B & R. Oxley*, 24.x.1996 (CANB); •London Bridge, 18 km S of Queanbeyan, 35°30'S, 149°16'E, 670 m, on calcareous shale rocks in pasture, *J.A. Elix 42585*, 20.xii.1996 (CANB).

6. **Parmotrema crinitoides** C.J. Wei, *Enum. Lichens of China*: 177 (1991).
This *Parmotrema*, previously known from China, appears to be an eciliate morphotype of *Parmotrema crinitum* (Ach.) M. Choisy. A detailed description follows.
Thallus adnate, coriaceous, to 6 cm wide. Lobes imbricate, subirregular, 5–10 mm wide; margins crenate or irregularly incised; cilia absent. Upper surface pale grey to grey-green, flat, emaculate, smooth or becoming rugose; cortex fragile; isidia laminal and marginal, short cylindrical, becoming coralloid, granular, eciliate at apices. Medulla white. Lower surface black, with a brown erhizinate marginal zone; rhizines dense, simple, slender, to 1 mm long. Apothecia and pycnidia not seen.
Chemistry: cortex K+ yellow; medulla K+ yellow, C–, P+ orange; containing atranorin, chloroatranorin, stictic acid (major), constictic acid (minor), cryptostictic acid (trace), norstictic acid (trace), menegazziaic acid (trace).

SPECIMENS EXAMINED
New South Wales: •Old Macleay River Estuary, Stuarts Point, 30°49'S, 153°00'E, 1 m, on *Casuarina glauca* in strand vegetation, *J.A. Elix 21352, 21386*, 18–20.i. 1987 (CANB).
Norfolk Island: •At end of abandoned track (Marsh's road), Mt Pitt National Park, 29°00'48"S, 167°56'50"E, 180 m, on *Dodonea* twigs in subtropical forest on moderate slope near head of creek, *J.A. Elix 29152*, 17.vi.1992 (CANB); •Douglas Drive

(property of W.W. Sanders), 29°02'10"S, 167°55'44"E, 90 m, on vine in disturbed, exotic-infested dry forest on moderate slope, *J.A. Elix 29190*, 17.vi.1992 (CANB); Filmy Fern Trail, off Selwyn Pine Road, Mt Pitt National Park, 29°01'20"S, 167°57'40"E, 150 m, on *Lagunaria* stem on side of road, *H. Streimann 321818*, 3.xii.1984 (CANB).

7. **Xanthoparmelia boonahensis** Elix & J. Johnst., *Mycotaxon* **33**, 354 (1988).
This rare species was previously known only from the type collection from south-east Queensland. It is characterized by the small foliose, loosely adnate thalli with a brown lower surface, the lack of isidia and soredia, a yellow-orange pigmented lower medulla (skyrin) and the presence of barbatic acid. A detailed description is given in Elix (1994).

SPECIMEN EXAMINED
New South Wales: •Tooloom Creek, Upper Tooloom, 30 km SW of Woodenbong, 28°37'S, 152°25'E, 300 m, on rock along *Callistemon*-dominated creek-side, *H. Streimann 61014*, 23.iv.1998 (B, CANB).

8. **Xanthoparmelia yowaensis** Elix & J. Johnst., *Mycotaxon* **29**, 369 (1987).
This scattered endemic species was known previously from Queensland and Western Australia. It is characterized by the adnate to tightly adnate thallus, the black lower surface, the effigurate maculae on the upper surface and production of fumarprotocetraric acid in the medulla. A detailed description is given in Elix (1994).

SPECIMEN EXAMINED
New South Wales: • Florida Railway Siding, on hill on S side of Barrier Highway, 31°32'S, 146°20'E, 300 m, on granite outcrop in open *Eucalyptus* and *Callitris* woodland, *C.H. Miller 327A*, 25.ix.1985 (CANB).

References
Crespo, A; Cubero, OF (1998): A molecular approach to the circumscription and evaluation of some genera segregated from *Parmelia s. lat. Lichenologist* **30**, 369–380.
Elix, JA (1994): Lichens – Lecanorales 2, Parmeliaceae. *Flora of Australia* **55**, 21–360.

Additional lichen records from New Zealand 30. *Polycoccum galligenum* new to New Zealand and the Southern Hemisphere

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The genus *Polycoccum* Saut. ex Körb. [type species: *Polycoccum sauteri* Korb. = *Polycoccum trypethelioides* (Th.Fr.) R. Sant.] comprises 23 species of lichenicolous fungi (Hawksworth & Diederich 1988, Alstrup & Hawksworth 1990) mainly associated with saxicolous or terricolous lichen hosts. The genus is currently referred to the family Dacampiaceae (Eriksson & Hawksworth 1998). One species (*P. squamarioides* (Mudd) Arnold) is currently recorded from New Zealand (Galloway 1992, Malcolm & Galloway 1997), where it is a parasite on species of *Placopsis*. During a recent study of *Physcia* in New Zealand, DJG came across a characteristic, gall-forming fungus growing on specimens of *Physcia caesia* from four coastal localities, one in North Island (first collected in New Zealand from Mt Maunganui by the late Arthur Wade in 1966), two in South Island from recent collections of Peter Johnson and Allison Knight, and one in Port Pegasus, Stewart Island, collected by Bruce Hayward.

These galls proved to be the erumpent perithecia of *Polycoccum galligenum* Vězda known previously only from Czechoslovakia (Vězda, 1969) and the United Kingdom (Hawksworth 1975, Hawksworth & Diederich 1988), where it occurs as a parasite on both *Physcia dubia* and *P. caesia*. The senior author has examined many collections of *Physcia caesia* from North Auckland to Stewart Island—it is a very variable species in New Zealand, occurring on both natural and man-made substrata (it is particularly common on concrete and on gravestones), and from coastal sites to high-alpine situations at 2000 m in Canterbury and Otago. *Polycoccum galligenum* occurs only rarely on coastal populations of *Physcia caesia*, being unknown from inland localities or from richly developed communities on man-made substrata. In the two South Island collections, and in part of the Port Pegasus collection (in this collection the parasite is the most richly developed of the four collections seen), the specimens fail to develop soralia, an observation which is in accord with Hawksworth's claim that the development of galls of *Polycoccum galligenum* on *Physcia caesia* "almost completely inhibits the formation of soralia" in that lichen (Hawksworth 1975:199). However, the North Island collection is both copiously sorediate and fertile, an uncommon condition in *P. caesia* in New Zealand. *Polycoccum galligenum* is described below from New Zealand material.

Polycoccum galligenum Vězda, *Czech Mykologie* **23**, 107 (1969).

Description: Ascomata perithecoid, arising from the upper cortex of host lichen as erumpent, pustulate galls, not associated with host soralia, solitary or 2–4 together, rounded, 0.1–0.5 mm diam., 150–300 µm tall, ± bullate to hemispherical, at first rupturing the upper cortex of the host; surface of gall warted-areolate, visible at first as a network or crazing of fine black cracks, at length carbonized-black with small areolate white areas of host cortex persisting towards edges and base of ascomata. Hamathecial filaments 1.5–2.5 µm diam., colourless. Asci broadly cylindrical, 8-spored, 50–75 × 12–20 µm. Ascospores 1-septate, brown, the upper cell larger, surface verruculose, (16–)17–20(–21) × 7–9 µm.

Host: *Physcia caesia*.

Illustrations. Hawksworth (1975:199, fig. 11); Hawksworth & Diederich (1988:296, fig. 1G).

SPECIMENS EXAMINED
• *South Auckland*: Mount Maunganui, on coastal rocks, *A.E. Wade s.n.*, 24–26.v. 1966, (AK 192301—first collection from New Zealand). • *Marlborough*: first picnic spot south of Black Miller Stream, North Kaikoura Coast, sea level, on coastal rocks, littoral splash zone, *Allison Knight s.n.*, 24.xii.1998 (OTA). • *Otago*: Akatore River mouth, south of Dunedin, coastal rocks–mudstone, part shade, beside tidal river, *P.N. Johnson 1901*, 26.xii. 1995 (CHR). • *Stewart Island*: Port Pegasus, Islet Cove, on maritime rocks, *B.W. Hayward s.n.*, 3.ii.1989 (AK 204606).

Polycoccum galligenum is characterized by its distinctive laminal, erumpent galls on the upper cortex of *Physcia caesia*, and its brown, 1-septate ascospores (16–)17–20(–21) × 7–9 µm, the upper cell larger. The New Zealand collections agree with published descriptions of Northern Hemisphere material in all respects, except that the ascus length in the New Zealand material is somewhat shorter (50–75 µm rather than 75–100 µm). It occurs on coastal rocks together with *Caloplaca sublobulata* and *Verrucaria maura*.

Acknowledgments
We are grateful to Doug Rogan and Ewen Cameron (AK) for the loan of material. Funds for this research were provided to the senior author by the Foundation for Research Science and Technology (Wellington) under Contract C09310.

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Malcolm, WM: Galloway, DJ (1997): *New Zealand Lichens. Checklist, Key, and Glossary*. Museum of New Zealand Te Papa Tongarewa, Wellington.
Vězda, A (1969): Beiträge zur Kenntnis der flechtenbewohnenden Pilze in der Tschechoslowakei. II. Zwei neue Arten: *Opegrapha rinodinae* sp. nov. und *Polycoccum galligenum* sp. nov. *Czech Mykologie* **23**, 104–109.

Notes on some genera erroneously reported for Australia

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During the construction of a key to the crustose lichenized discomycetes for a forthcoming guide to Australian lichen genera (McCarthy *et al.* 2000), some dubious records of genera were re-examined. As a result, four genera listed in the recent checklist of Australian lichens (Filson 1996) were identified as being based on misidentifications or previously differing circumscriptions of genera. The following should be excluded from the list of Australian lichen genera.

1. **Bombyliospora**

Bombyliospora dolichospora var. ***obscurata*** Räsänen, *Suom. Elain-ja Kasvit. Sueran Van. Tiedon. Pöytäkirjat* **3**, 182 (1949).
Type: *Australia.* Queensland, Blackall Ranges, 1890, *F.R.M. Wilson* (H, holotype).
= *Cresponea lepreurii* (Mont.) Egea & Torrente

The type material of this variety described in *Bombyliospora* does not belong to *Megalospora*, as do most taxa formerly integrated in this genus. The bitunicate asci, ascospore type, and ascomatal structure show that it belongs in *Cresponea*, a genus recently described by Egea and Torrente (1993). *Cresponea lepreurii* is a pantropical species already known from Queensland.

2. **Biatora**

The circumscription of *Biatora* has recently been clarified and restricted to a small group of mostly corticolous and terricolous taxa (Printzen 1995a, b). From these studies, it was clear that the species formerly placed here required transfer to other genera. An examination of the two Australian species of *Biatora* revealed that one should be transferred to *Toninia* and the other to *Lecanora*. *Biatora sphaeroides* (Dicks.) Hornem., cited in Filson (1996), has not been checked, but it is almost certainly based on a misidentification. The genus *Biatora s. str.* does not occur in the Southern Hemisphere (Printzen, pers. comm.).

Biatora scorigena (Müll. Arg.) Rambold, *Bibliotheca Lichenologica* **34**, 73 (1989).
Type: *Australia.* Victoria, 1893, *F.R.M. Wilson 1435* (G, holotype).
= ***Toninia scorigena*** (Müll. Arg.) Lumbsch & Messuti comb. nov.
Bas.: *Lecidea scorigena* Müll. Arg., *Hedwigia* **34**, 30 (1895).

This species agrees in ascomatal characters, such as ascus and excipulum type, with *Toninia* (Timdal 1992). Formerly, crustose taxa were not placed in *Toninia*, but Timdal (1992) showed that thallus organization can not be used in this group of lichens, and he consequently included crustose and squamulose species.

Biatora sorediosa Rambold, *Bibliotheca Lichenologica* **34**: 75 (1989).
Type: *Australia.* Northern Territory, Robins Falls, 13 km SSE of Adelaide River, *G. Rambold 5155* (M. holotype, not seen).
= ***Lecanora austrosorediosa*** (Rambold) Lumbsch comb. nov., non *Lecanora sorediosa* (De Lesd.) Gyeln.

This species is quite common in western parts of northern Australia. Since its description, further well-developed fertile specimens have been collected. A re-examination of the ascus type in this rich material (e.g. Elix, *Lich. Australas. Exs. 226,* hb. Lumbsch) shows that it can be assigned to the *Lecanora*-type. The species is best placed in *Lecanora s. lat.* at least for the time being.

3. **Phlyctis**

Phlyctis macquariensis C.W. Dodge, *Nova Hedwigia* **15**: 292 (1968).
Type: *Australia.* Macquarie Island, plateau above Gadget Gully, 600 ft, 6.xi.1956, *D.A. Brown M-56-Li-182* (FH, holotype).
= *Rhizocarpon obscuratum* (Ach.) A. Massal.

The poorly developed material clearly belongs to the genus *Rhizocarpon* and falls within the variation of *R. obscuratum* in the wide circumscription of Feuerer (1991). Dodge (1968) mentioned that the species could not be assigned to *Rhizocarpon* since it lacked halonate ascospores and the ascospores remain hyaline. However, the type material examined shows very obvious and thick epispores, and hyaline ascospores are not unusual for *Rhizocarpon* species.

4. **Thamnolecania**

Thamnolecania macquariensis C.W. Dodge & Rudolph, *Annals of the Missouri Botanical Garden* **42**: 141 (1955).
Type: *Australia.* Macquarie Island, Wireless Hill, from cliff subject to water seepage, *ANARE s.n.* (FH, holotype).
= *Amandinea petermannii* (Hue) Matzer, H. Mayrhofer & Scheidegger

The type material of *Thamnolecania macquariensis* is a well-developed, subfruticose specimen of *Amandinea petermannii*. The 2-celled, brown ascospores with diffuse torus clearly show that the specimen is unrelated to *Thamnolecania*. *Amandinea petermannii* was recently discussed in detail by Matzer *et al.* (1994), and this species has not yet been recorded from Australia.

Acknowledgments

I wish to thank Philippe Clerc (Geneva), Scott LaGreca (Cambridge, Mass.), and Orvo Vitikainen (Helsinki) for sending me type material on loan for examination. Helmut Mayrhofer (Graz) kindly helped with the correct classification of *Thamnolecania macquariensis*. Patrick McCarthy (Canberra), Maria Ines Messuti (Bariloche), and Imke Schmitt (Essen) are thanked for helpful discussions and comments.

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Three new tridepsides in the lichen *Pseudocyphellaria billardierei*

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Abstract: The new tridepsides methyl ovoate (1), methyl 2"-*O*-methylgyrophorate (2), and methyl 2',2"-di-*O*-methylgyrophorate (3) have been detected in extracts of *Pseudocyphellaria billardierei* together with methyl gyrophorate and five other known tridepsides.

The lichen *Pseudocyphellaria billardierei* (Delise) Räsänen is a particularly prolific species when the elaboration of secondary metabolites is considered—with two depsides (methyl evernate and methyl lecanorate), six tridepsides (gyrophoric acid; methyl gyrophorate; tenuiorin; 2'-*O*-methyltenuiorin; 2"-*O*-methyltenuiorin, and 2',2"-di-*O*-methyltenuiorin), five depsidones (stictic acid, norstictic acid, constictic acid, cryptostictic acid, and α-acetylconstictic acid), and five triterpenes (zeorin; 6α,16β-diacetoxyhopane-22-ol; 6α-acetoxyhopane-16β,22-diol; 6α-acetoxy-22-hydroxyhopan-23-oic acid; and 6α,22-dihydroxyhopan-23-oic acid) having been reported for this species (Elix & Lajide 1981, Elix 1988, Wilkins & James 1979).

In this paper, we describe the identification of a further three new tridepsides from this species, namely methyl ovoate (1), methyl 2"-*O*-methylgyrophorate (2), and methyl 2',2"-di-*O*-methylgyrophorate (3) (Figure 1).

Materials and methods

The synthesis of authentic samples of methyl ovoate (Huneck *et al.* 1980), methyl 2"-*O*-methylgyrophorate (2), and methyl 2',2"-di-*O*-methylgyrophorate (3) (Elix *et al.* 1998) has been described previously. The natural esters (1), (2), and (3) were characterized by thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC) according to the methods standardized for lichen products (Culberson 1972, Elix & Ernst-russell 1993, Elix *et al.* 1997, Feige *et al.* 1993).

Lichen material

Australia. *Victoria*: •Errinundra River (West Branch), 20 km S of Bendoc, 37°19'S, 148°50'E, 960 m, on dead *Atherosperma moschatum* in cool temperate forest, *J.A. Elix 19822 & H. Streimann*, 9.iv.1986 (Lichenes Australasici Exsiccati no. 166) (CANB); •Donna Buang-Healesville road, 7 km NW of Warburton, 37°42'S, 145°39'E, 1000 m, on base of *Eucalyptus* in wet sclerophyll forest, *H. Streimann 36269*, 3.i.1986 (Lichenes Australasici Exsiccati no. 118) (CANB).
New Zealand. •*South Island*: Canterbury, Greyney's Flat, 6 km S of Arthur's Pass, 690 m, on mossy floor of *Nothofagus* forest, *J.A. Elix 7081,* 10.ii.1980 (CANB).

Results and discussion

We have now confirmed the natural occurrence of the three new tridepsides methyl ovoate (1), methyl 2"-*O*-methylgyrophorate (2), and methyl 2',2"-di-*O*-methylgyrophorate (3) in extracts of *Pseudocyphellaria billardierei* in the following manner.

The total aceton extract obtained from *P. billardierei* (5 g) was concentrated, and the residue subjected to preparative-layer chromatography over slilica gel using 15% acetic acid/toluene as eluant. The broad band of R_F 0.30–0.40 was removed, extracted into acetone, and analyzed chromatographically. Comparisons were conducted between this acetone extract and the authentic (synthetic) esters (1)–(3) by TLC in four independent solvent systems, and by HPLC coupled to a photodiode array detector for ultraviolet spectroscopic comparisons. The HPLC of this extract is shown in Figure 2.

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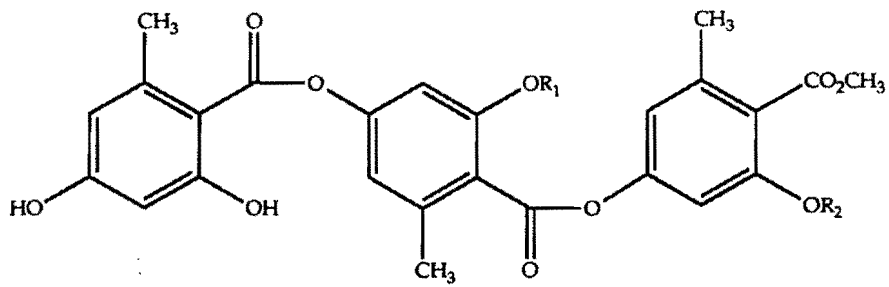

(1) $R_1 = CH_3$; $R_2 = H$

(2) $R_1 = H$; $R_2 = CH_3$

(3) $R_1 = R_2 = CH_3$

Figure 1. Structure of new tridepsides.

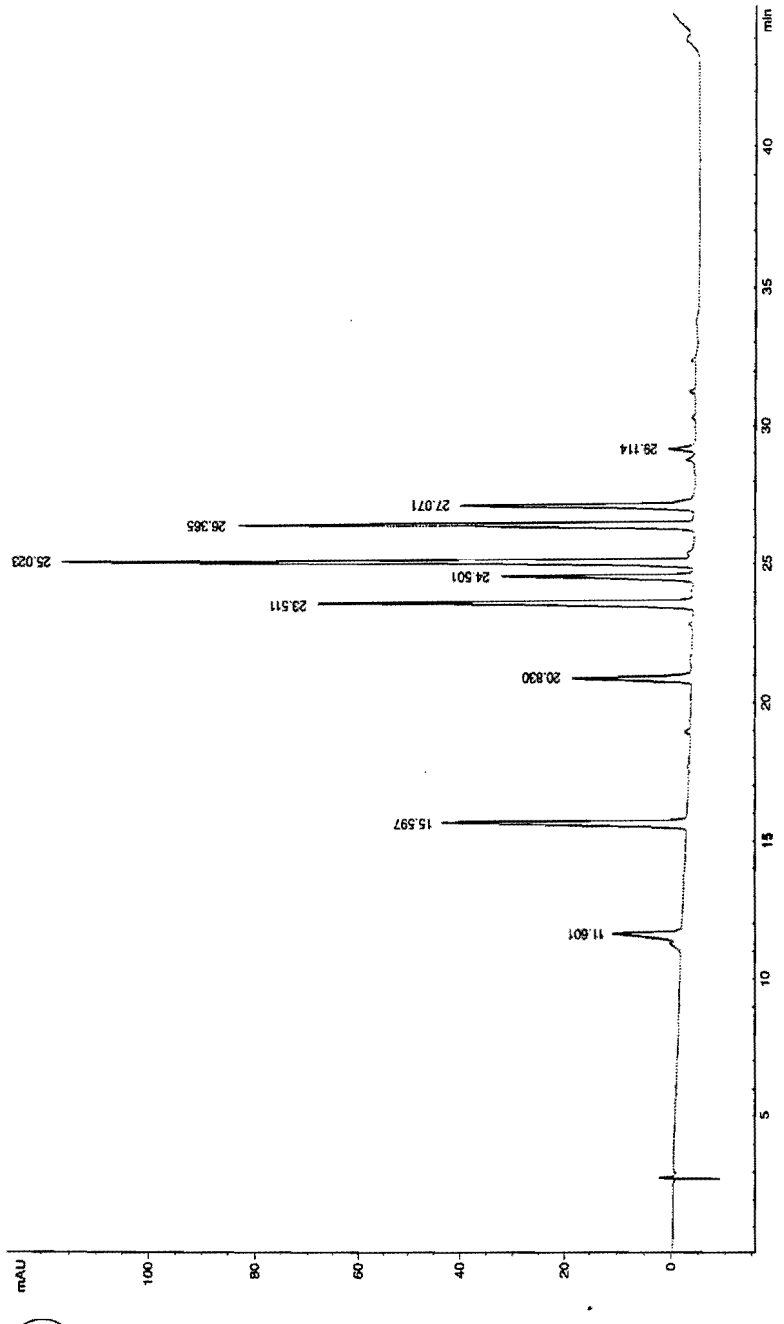

Figure 2. HPLC of acetone extract of *Pseudocyphellaria billardierei* (*J.A. Elix 7081*). R_T 11.601 = orsellinic acid; R_T 15.597 = orcinol; R_T 20.830 = methyl 2'-*O*-methyllecanorate; R_T 23.511 = methyllecanorate; R_T 24.502 = methyl 2',2''-di-*O*-methylgyrophorate; R_T 25.023 = methyl 2''-*O*-methylgyrophorate; R_T 26.365 = methyl ovoate; R_T 27.071 = methylgyrophorate; R_T 29.114 = tenuiorin.

Rinodina gennarii (Physciaceae), a widespread species in the temperate regions of the Southern Hemisphere

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While in Chile in November and December 1994, the third author collected *Rinodina gennarii* from three coastal localities near Puerto Montt and on the island of Chiloé. These are the first records from South America of this mainly saxicolous species that is widespread in temperate regions of both Northern and Southern Hemispheres. Since the publication of the first records from the Southern Hemisphere (Anonymous 1989; Matzer & Mayrhofer 1996; Mayrhofer 1983, 1984a, 1984b, 1985), several additional, noteworthy collections have been made during field work by the second author in Australasia in 1985 and 1992. These are presented here, including a more detailed description of the species.

Rinodina gennarii Bagl., *Comment. Soc. Critt. Ital.* **1**, 17 (1861).

Thallus thin, occasionally inconspicuous, crustose, areolate or ± effuse, smooth, whitish, grey, ochraceous; prothallus absent. *Chemistry*: no lichen substances detectable by t.l.c. Apothecia to 0.5 mm diam., often numerous, crowded, lecanorine or rarely biatorine, adnate to sessile; disc dark brown, plane to strongly convex, sometimes with a narrow, brown border adjacent to the thalline margin (Figs 1–5). Epihymenium 10–15 µm tall, brown. Hymenium 60–80 µm tall. Hypothecium to 150 µm deep, hyaline. Paraphyses 1–4 µm thick, with apices 3–6 µm wide. Asci corresponding to the *Lecanora*-type, 8-spored. Ascospores (11–)12–17(–18.5) × (6–)7–10(–11) µm, of the *Dirinaria*-type (Mayrhofer 1982, Matzer & Mayrhofer 1996), with mature septal and apical wall thickenings well-developed and similar to the *Physcia*-type, and septum in young spores inserted after the formation of apical wall thickenings; torus usually absent or rarely indistinct; wall smooth or finely scabrid, with or without septal swellings in KOH. Spermogonia not observed in material from the Southern Hemisphere, but present in a specimen from Greece [Attika, W Lavrion unweit Kap Sunion, 07.04.1971, J. Poelt (GZU)], immersed in the thallus. Spermatia bacilliform, 4–6 × 1 µm.

Rinodina gennarii is characterized mainly by ascospores of *Dirinaria*-type and the numerous, often crowded, small apothecia. Although Giralt & Mayrhofer (1995) did not observe marked differences between *R. gennarii* and the corticolous/lignicolous *R. oleae* Bagl., in accordance with Matzer & Mayrhofer (1996), we refrain from putting *R. gennarii* into synonymy with *R. oleae*. Further observations including studies of molecular characters are necessary to clarify the relationships between these taxa.

Ecology: *Rinodina gennarii* is found on a wide variety of substrata including basalt, concrete, greywacke, granite, limestone, mudstone, quartzite, sandstone, schist, and slate [see also Mayrhofer & Poelt (1979) and Mayrhofer (1984a) for Northern Hemisphere localities]. It occurs on flat pebbles, large boulders, and rocks close to the seashore but also, more rarely, in inland localities. At coastal sites, it grows not far from the high tide mark but predominantly in sheltered bays, and only very rarely on exposed promontories. Rarely, *R. gennarii* has been found associated with the maritime *Rinodina peloleuca* (Matzer *et al.*1998) or *Rinodina blastidiata* (Matzer & Mayrhofer 1994). Other species accompanying *R. gennarii* include *Amandinea lecideina*, *Amandinea otagensis*, species of *Buellia* including *B. rorida*, species of *Caloplaca* including *C. cribrosa*, species of *Lecanora* including *L. dispersa s.l.*, *Pertusaria subverrucosa*, *Physcia adscendens*, *Rinodina tibellii*, *Verrucaria* sp., *Xanthoria ligulata* and *X. parietina*. The two lichenicolous fungi *Endococcus rugulosus* and *Muellerella lichenicola* have also been detected growing on *R. gennarii*.

Distribution: A number of different biogeographical elements can be recognized in Southern Hemisphere lichens. *R. gennarii* belongs to the pan-temperate element (Kantvilas 1996). The species is widely distributed throughout Europe and Northern Africa (map in Mayrhofer 1984a) and is also present in North America (Esslinger & Egan 1995). The first records from the Southern Hemisphere were from the South Island (Canterbury, Otago) of New Zealand (Mayrhofer 1983, 1985), with further reports noted from South Australia, Victoria and Tasmania (Mayrhofer 1984b), the island St Paul in the Indian Ocean (Mayrhofer 1984a), and South Africa (Matzer & Mayrhofer 1996). In this paper, we are able to record the species (Figs 6–8) from South America (Chile), and from the following regions of New Zealand (North Auckland, South Auckland, Hawkes Bay, Wellington, Nelson, Marlborough) and Australia (Western Australia, Queensland) for the first time. In addition, several new localities are provided from regions where *R. gennarii* is already known.

Specimens examined and not cited before

Australia. *Western Australia*: •66 km SW Bunbury, Yallingup, 09.10.1983, *L. Tibell 13938* (GZU), *13941* (GZU, PERTH, UPS). *Queensland*: •Cunninghams Gap National Park, south exposed ridge of Mt Cordeaux, on basaltic rocks, c. 1000 m, 17.09.1986, *J. Hafellner 15340, 15363 & R. Rogers* (GZU). *Victoria*: •Trentham Falls about 20 km E of Daylesford, NW of Melbourne, c. 450 m, 18.07.1986, *J. Hafellner 15755a & R. Filson* (Hafellner); •Great Dividing Range, Hanging Rock, E of Woodend, about 70 km NW of Melbourne, c. 500 m, 18.07.1986, *J. Hafellner 15744 & R. Filson* (Hafellner); •Port Phillip Bay, Black Rock, 20.07.1986, *J. Hafellner 15785 & R. Filson* (GZU); •Melbourne, Port Phillip Bay, Beaumaris Bay, 20.07.1986, *J. Hafellner 15769 & R. Filson* (GZU), *15770, 15778* (Hafellner); •Barham R. Rd, Apollo Bay, 11.04.1986, *W. Ewers* (MEL). *Tasmania*: •Mayfield Bay Coastal Reserve, Mayfield Beach c. 14 km S of Swansea, 04.08.1992, *H. Mayrhofer 12049 & E. Hierzer* (GZU, HO, UPS); •Kempton Sugarloaf, 350 m, 20.02.1991, *G. Kantvilas 17/91* (HO); •Hobart, Cascades, old concrete in suburban garden, 06.09.1998, *G. Kantvilas 166/98* (GZU, HO).

New Zealand. *North Island. North Auckland*: •Leigh, Goats Island Beach to Cape Rodney, 07.01.1985, *H. Mayrhofer 6735 & G.J. Samuels* (GZU). *South Auckland*: •Marokopa, coastal rocks SW of Marokopa, 12.08.1992, *H. Mayrhofer 12157 & E. Hierzer* (GZU). *Hawkes Bay*: •Between Whirinaki Beach and Tangoio, N of Napier, 16.08.1992, *H. Mayrhofer 12193 & E. Hierzer* (AK, GZU, M, UPS, WELT); •4 km NW of Pourerere, E of Waipukurau, 17.08.1992, *H. Mayrhofer 11575& E. Hierzer* (GZU, WELT). *Wellington*: •Manurewa Point W of Tora, S of Martinborough, 19.08.1992, *H. Mayrhofer 13278 & E. Hierzer* (GZU, WELT); •Cape Palliser, Rocky Point, S of Cape Palliser Lighthouse, 18.08.1992, *H. Mayrhofer 10884, 10885* (sub *Endococcus rugulosus*) *& E. Hierzer* (GZU); •Miramar Peninsula, E of Wellington, Kau Bay, 22.08.1992, *H. Mayrhofer 12281, D. Glenny, W. Nelson, B. Polly & C. West* (GZU); •Miramar Peninsula, E of Wellington, Waser Bay, 22.08.1992, *H. Mayrhofer 12246, D. Glenny, W. Nelson, B. Polly & C. West* (GZU, sub *Rinodina blastidiata*); •Island Bay, S of Wellington, 22.08.1992, *H. Mayrhofer 10706, D. Glenny, W. Nelson, B. Polly & C. West* (GZU, HO, MEL, WELT), *10707, 12280* (GZU); •Titahi Bay, N of Porirua, 23.08.1992, *H. Mayrhofer 12255, D. Glenny, W. Nelson, B. Polly & C. West* (UPS), 12260 (WELT), *12261* (GZU, sub *Rinodina peloleuca*); •Te Rewarewa Point, Hongoeka Bay, NW of Plimmerton, 23.08.1992, *H. Mayrhofer 12290, D. Glenny, W. Nelson, B. Polly & C. West* (GZU). *South Island. Nelson*: •Pepin Island, NE of Nelson, Cable Bay, 29.08.1992, *H. Mayrhofer 10771* (GZU); •Cable Bay, NE of Nelson, Ataata Point, 25.08.1992, *H. Mayrhofer 10731, 10736* (sub *Endococcus rugulosus*), *10744, N. & W. Malcolm & B. Polly* (GZU), *10743* (GZU, HO, WELT); •Boulder Bank, N of Nelson, 25.08.1992, *H. Mayrhofer 13124, N. & W. Malcolm & B. Polly* (GZU), *13122* (CHR, GZU, WELT); •Kaiteriteri, N of Motueka, 27.08.1992, *H. Mayrhofer 12313, N. & W. Malcolm* (GZU, WELT);

•Stephens Bay, S of Kaiteriteri, N of Motueka, 28.08.1992, *H. Mayrhofer 10754* (AK, BM, CHR, GZU, HO, WELT). *Marlborough Sounds*: •Wellington Ecological Region, Sounds Ecological District, Queen Charlotte Sound, Long Island, 03.01.1992, *A.E. Wright 11816, 11817* (AK); •Whites Bay, NE of Rarangi, NE of Blenheim, 30.08.1992, *H. Mayrhofer 10827* (GZU); •S of Waipapa Bay, SW of Clarence, 30.08.1992, *H. Mayrhofer 12184* (GZU); •Ward Beach, E of Ward, SW of Cape Campbell, 30.08.1992, *H. Mayrhofer 12198* (CHR, GZU); •Goose Bay, SW of Kaikoura, 01.09.1992, *H. Mayrhofer 12144 & C.D. Meurk* (GZU), *12140* (WELT), *12151* (CHR); •Kaikoura Peninsula, SE of Kaikoura, W of Whaler's Bay, 31.08.1992, *H. Mayrhofer 12175 & C.D. Meurk* (GZU); •NE of Kaikoura, NE of Irongate Stream, 31.08.1992, *H. Mayrhofer 10875 & C.D. Meurk* (GZU). *Canterbury*: •Limestone outcrops E of Coringa Station, NW of Motunau Beach, 02.09.1992, *H. Mayrhofer 12114 & C.D. Meurk* (GZU); •Motunau Beach, 01.09.1992, *H. Mayrhofer 12103 & C.D. Meurk* (GZU), 12100 (CHR); •Taylors Mistake, SE of Christchurch, 04.09.1992, *H. Mayrhofer 10806* (CHR, GZU), *10807* (M, WELT), *10809* (UPS); •Lyttelton Harbour, Cass Bay, W of Lyttelton, 04.09.1992, *H. Mayrhofer 10796* (CHR, GZU, M, MEL); •Banks Peninsula, Tumbledown Bay on the road to Te Oka, 19.01.1985, *H. Mayrhofer 6840* (sub *Rinodina peloleuca*), 6849, *H. Hertel, C.D. Meurk & H.D. Wilson* (GZU), *6847* (CHR, GZU with *Endococcus rugulosus*, UPS). *Otago*: Otago Peninsula, St Clair, 09.04.1927, *G.E. & G. Du Rietz 2617:5* (UPS); •Jacks Bay, E of Owaka, 13.02.1985, *H. Mayrhofer 6903 & H. Hertel* (GZU, OTA, UPS), 6900 (GZU); •Waipati Beach, E of Chaslands, Cathedral Caves, 12.02.1985, *H. Mayrhofer 6866 & H. Hertel* (GZU, Mayrhofer), without collection number distributed in Plantae Graecences Lichenes 431 (GZU, with *Muellerella lichenicola*).

Chile. *Lake District*: •X Region, about 55 km SW of Puerto Montt, Pargua, beach near the landing place of the ferry boat, 26.11.1994, *M. Matzer 1675 & B. Pelzmann* (GZU). *Chiloé*: •Castro, Puntilla de Ten Ten NE of Castro, 24.11.1994, *M. Matzer 1672 & B. Pelzmann* (GZU); •North coast, Quetalmahue W of Ancud, c. 1.5 km W of Quetalmahue, 22.11.1994, *M. Matzer 1673, 1674 & B. Pelzmann* (GZU).

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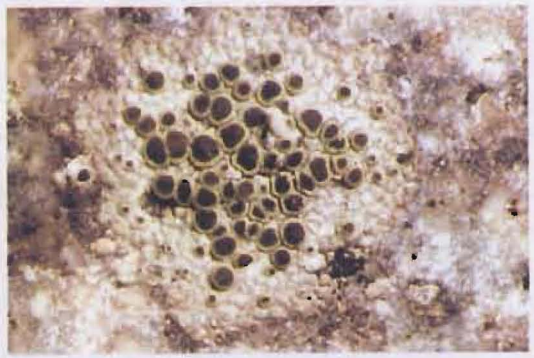
Fig. 1. 10 mm

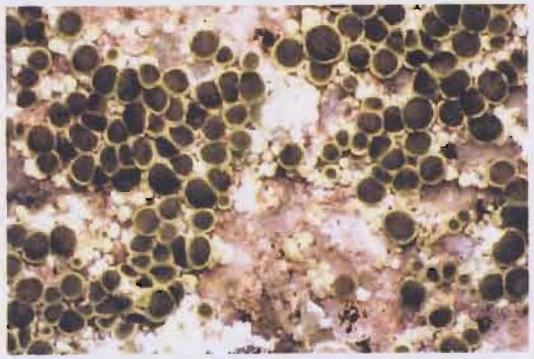
Fig. 2. 10 mm


Fig. 3. 10 mm


Fig. 4. 5 mm

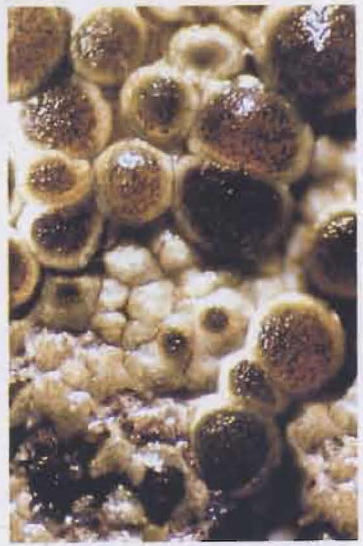
Fig. 5. (hydrated) 5 mm

Figs. 1–5. *Rinodina gennarii* fertile thalli (Boulder Bank north of Nelson, NZ). Scales as noted.

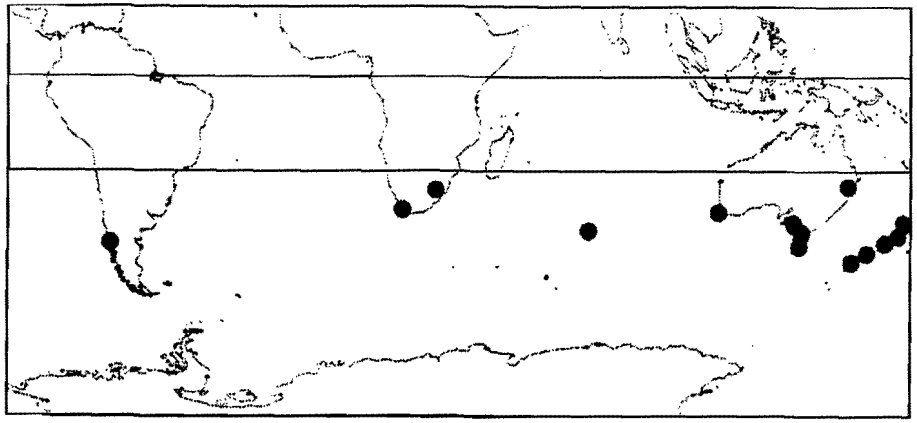

Fig. 6. Distribution of *Rinodina gennarii* in the Southern Hemisphere

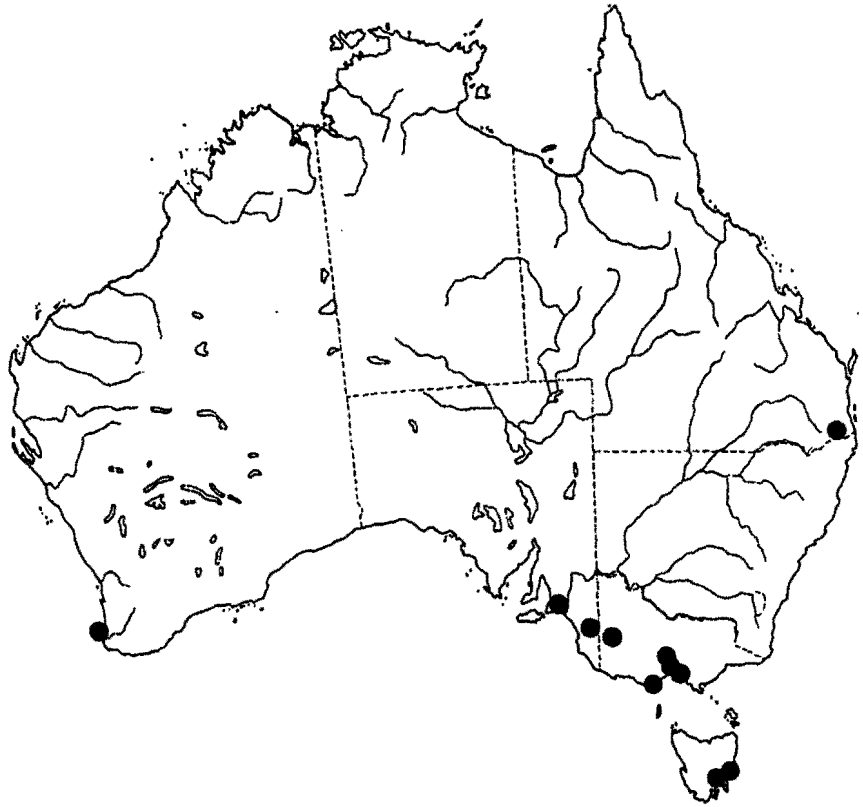

Fig. 7. Distribution of *Rinodina gennarii* in Australia

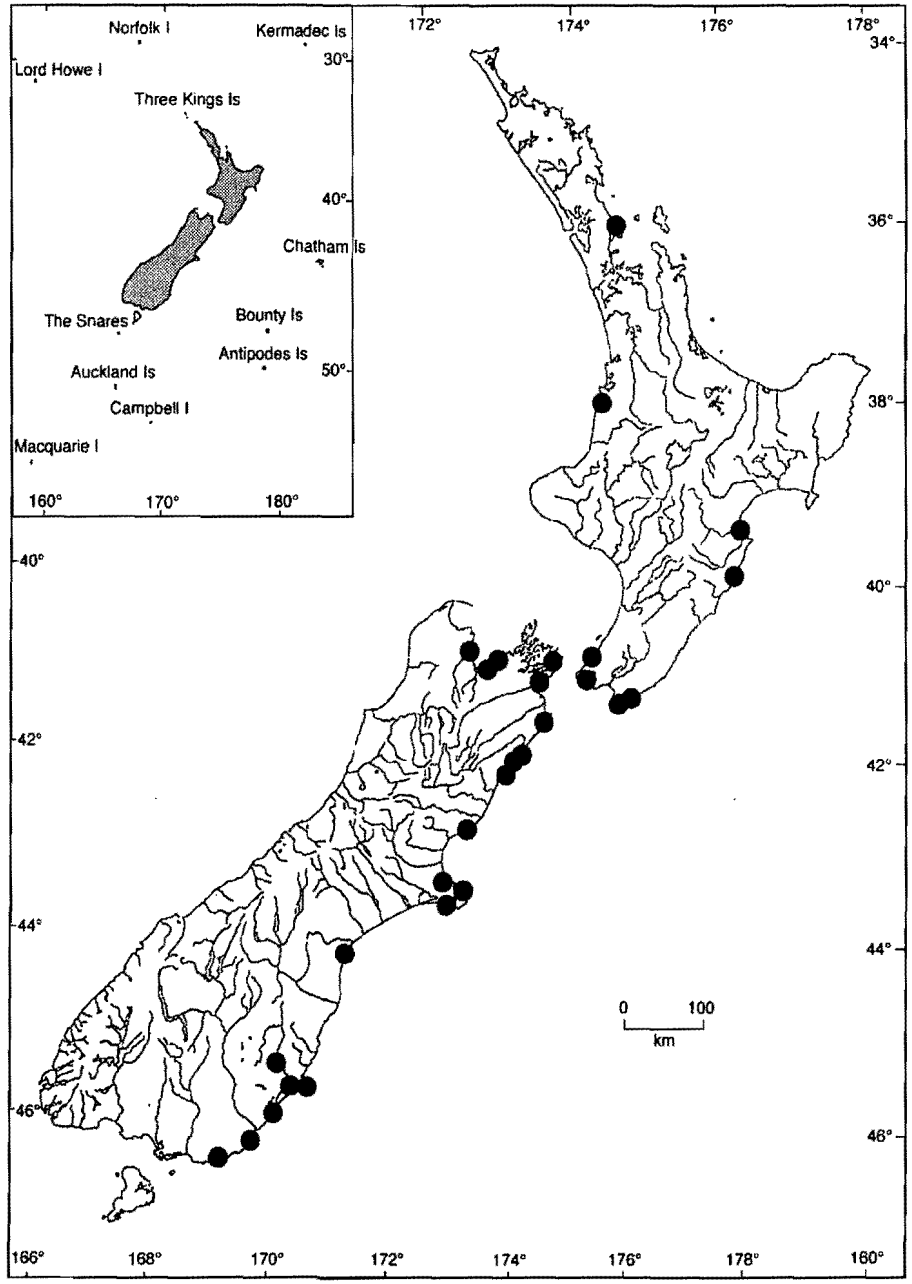

Fig. 8. Distribution of *Rinodina gennarii* in New Zealand

Porina subapplanata, a new species from New Zealand and Australia

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Foliicolous and corticolous specimens from New Zealand's South Island were determined as *Porina applanata* Vain. (Lücking & Malcolm 1997) and reported in the most recent checklist of New Zealand lichens (Malcolm & Galloway 1997). However, a re-examination has shown that they represent an undescribed taxon. Similarly, corticolous specimens from Tasmania were determined as *Porina impolita* P.M. McCarthy and reported by Malcolm *et al.* (1995), but further collection and a re-examination of what is now a large suite of specimens has shown them to represent an undescribed taxon. As a result of an exchange of specimens, these two putative new taxa are regarded as conspecific.

Porina subapplanata sp. n. inhabits bark, foliage-bearing twigs, fern fronds, and the leaves of shrubs and trees in temperate to submontane forest and cool-temperate rainforest. In New Zealand it occurs in the South Island, and in Australia it occurs in the high rainfall areas of Tasmania, mainly in the western half of the island, with an outlier in a similar habitat in southern Victoria.

Porina subapplanata Malcolm, Vězda, P.M. McCarthy & Kantvilas sp. nov. (Trichotheliaceae)

Thallus crustaceus, subepiphloeodalis vel foliicola, tenuis vel fere indistinctus, cinereo-viridis aut pallido griseoviridis aut pallido vel medio viridis, 15–30 µm crassus, continuus vel parce rimosus, vulgo impolitus sed interdum nitidus, laevigatus vel minute inaequalis, ecorticatus, crystallis nullis, K–. Prothallus nullus. Stratum basale nullum. Alga ad *Phycopeltem* pertinens, laxe filamentosa, cellulis irregularibus, vulgo rectangularibus, 10–20 × 5–7 µm, autem plagas continuas, concatenatas radiantesque formantibus. Perithecia dispersa, applanata, (0.25–)0.5(–0.75) mm diametro, pallide fuscolutea vel flavobrunnea, aurantiacobrunnea vel thallo ± concolora, interdum dilute albo-pubescens, vulgo circum ostiolum nuda. Centrum 0.15–0.26 mm diametro. Involucrellum dimidiatum, fuscoluteum, parte basali in thallo late decumbens, extus thallo algifero tenuiter tectum. Excipulum clausum, hyalinum; periphyses non evolutae; paraphyses 0.5–0.8 µm crassae. Ascosporae elongatae-fusiformes vel oblongae, 7-septatae, (25–)34(–45) × (6–)7.5(–10) µm.

Thallus crustose, subepiphloeodal on smooth bark or epicuticular on leaves and fern pinnae, thin to nearly indistinct, ashen green or pale greyish green or pale to medium green, 15–30 µm thick, continuous to rimose, usually matt but occasionally ± glossy, smooth or minutely to irregularly uneven, ecorticate, lacking crystals. K-negative. *Alga Phycopeltis*-like, loosely filamentous with irregular but mostly rectangular cells, 10–20 × 5–7 µm, or forming continuous linked radiating plates,

or intermediate between the two forms. Hyphae 2–3.5 µm wide. *Prothallus* not apparent. *Basal layer* absent.

Perithecia scattered, slightly immersed to ± superficial, applanate, convex or hemispherical, pale brownish yellow to yellowish brown or orange-brown to ± concolorous with the thallus, (0.25–)0.5(–0.75) mm diam. [n = 135], sometimes weakly white-pubescent (hyphae hyaline and 2–4 µm thick), naked around the ostiole. *Apex* usually plane to convex, occasionally slightly concave, concolorous with the lower part of the perithecium or pale reddish brown. *Ostiole* inconspicuous. *Involucrellum* yellowish brown to orange-brown in thin section, 30–55 µm thick, with a thin alga-containing thalline covering, dimidiate, extending to excipulum base level, K+ reddish; space between involucrellum and excipulum occupied by a loose reticulum of hyaline, 2–3.5 µm wide hyphae (especially noticeable in applanate or shallowly convex perithecia). *Excipulum* closed, hyaline to pale yellowish brown, 14–20 µm thick. *Centrum* moderately to strongly depressed-ovate, 0.15–0.26 mm diam. *Periphyses* absent. *Paraphyses* unbranched, 0.7–0.9 µm thick. *Asci* elongate-cylindrical or oblong, 8-spored, 82–124 × 14–20 µm [n = 50], with a subtruncate apex containing a chitinoid ring turning orange-red in Congo Red. *Ascospores* colourless, 7-septate (<1% are 8- or 9-septate or have a single longitudinal septum), elongate-fusiform to oblong, mostly straight, occasionally curved or faintly sigmoid, irregularly biseriate in the ascus, (25–)34(–45) × (6–)7.5(–10) µm [n = 306]; contents clear to granulose-guttulate; immature spores often with a *c.* 1 µm thick perispore.

Conidiomata not seen. The abundant conidiomata seen on some New Zealand specimens (conidia filiform, 23–35 × 0.5 µm) do not resemble those known from other *Porina* species, and most likely belong to a lichenicolous fungus.

Illustrations: Figures 1–6; Malcolm & Galloway pp. 105 & 145 (as *P. applanata*).

Type: NEW ZEALAND, South Island, Lewis Pass, Waterfalls Track, 42°21.9'S, 172°15.1'E, alt. 680 m, NZMS 1 S46:676984, on leaves of *Pseudowintera colorata* in mixed *Nothofagus*–podocarp submontane forest, *W. Malcolm 1335*, 13.xi.1993 (CHR, isotypes herb. Vězda and Exsicc. Vězda *Lichenes Rariores* 395).

Notes: *Porina subapplanata* is characterized by a thin, greyish-green to green thallus with a *Phycopeltis*-like photobiont, perithecia that are essentially rather small but which can appear much broader as a result of their wide-spreading and applanate involucrellum, and comparatively broad, 7-septate ascospores.

The new species superficially resembles several obligately foliicolous taxa, but differs in important diagnostic characters. It can be distinguished from the pantropical *P. epiphylla* (Fée) Fée by its longer and broader ascospores (Lücking & Vězda 1998). *P. lucida* R. Sant, also pantropical, has mostly larger perithecia and 4–5.5 µm wide ascospores, while *P. lucida* var. *australiensis* R. Lücking & Vězda, from north-eastern Queensland, has 5–6 µm wide ascospores (Lücking & Vězda 1998). *P. applanata* Vain. has applanate perithecia similar to those of *P. subapplanata*, but it differs in having a black ostiole surrounded by a dark field, perithecia that are never white-pubescent, asci formed from only the periphery of the perithecium, and somewhat longer ascospores (38–52 × 4–9 µm) (Santesson 1952). *P. plana* R. Sant. also resembles the new species in general appearance, but differs in having ascospores that are 11-septate, halonate (2–3 µm thick), and much larger (80–94 × 7–13 µm including the halo). *P. planiuscula* Vězda is another species with applanate perithecia, but is readily distinguished by its 3-septate ascospores.

Some specimens were previously misidentified as *P. impolita* P.M. McCarthy (Malcolm *et al.* 1995); however, *P. impolita* has a *Trentepohlia* photobiont with short filaments of broadly ellipsoidal cells, more prominent perithecia with a thicker involucrellum, larger asci, and longer ascospores (McCarthy 1994). It is now known

with certainty from a single locality in Tasmania [W of Tahune Bridge, Warra SST, "Big Coupe", 43°06'S, 146°41'E, alt. 120 m, on bark of *Melaleuca squarrosa* in *Eucalyptus obliqua*-dominated wet-sclerophyll forest, *Kantvilas 217/98*, 1998 (HO 328847)].

P. subapplanata varies morphologically in the arrangement of its photobiont cells, the extent to which the involucrellum is overgrown by or otherwise incorporates the thallus, and how far the involucrellum diverges laterally from the excipulum. By contrast, the colour and thickness of the thallus remain ± constant, and the dimensions of the perithecial centrum, the anatomy of the perithecial wall, and the dimensions of the asci and ascospores lie within comparatively narrow ranges. Although this lichen is as often corticolous as foliicolous, its substratum preference is not linked in any clear-cut way to the morphological variation.

The photobiont sometimes has the appearance of typical *Phycopeltis*, viz. tightly packed, elongate, angular cells in branching filaments that radiate towards the margin of the colony. In other thalli, however, adjacent filaments separate slightly to markedly, and whereas most cells are rectangular, some are shorter and more rounded.

The perithecia vary in their colour (orange-brown to almost concolorous with the thallus) as a result of the level of overgrowth by the thallus, the diameter of the involucrellum (inside which the centrum is far less variable), and the extent (or absence) of a downy indumentum (which can extend to adjacent parts of the thallus).

A pilose indumentum on perithecia and thalli has been used as a diagnostic character for the foliicolous Paleotropical species *P. virescens* (Kremp.) Müll. Arg. (Santesson 1952, Lücking & Vězda 1998). In *P. subapplanata*, however, this occurs sporadically among corticolous and foliicolous thalli, and it is deemed to be taxonomically insignificant. Indeed, in Tasmania at least, this attribute is likely to be a manifestation of some physiological stress, perhaps comparable to the rampant, extra-thalline growth of the *Trentepohlia* photobiont occasionally seen in some tropical species and sometimes mistaken for isidia (McCarthy 1993).

The level of perithecial variation outlined here seems to span some of the formal and informal subgeneric groupings proposed for *Porina* at one time or another. More prominent perithecia with a negligible or very limited thalline component tend to be more distinctly orange and are reminiscent of *Segestria* (*sensu* Harris (1995), and including the *P. rufula* group of Santesson (1952), Lücking (1995), and others). On the other hand, convex to applanate perithecia overgrown by the thallus, and consequently more similar to it in colour, could be accommodated without difficulty in *Porina sensu stricto* (*fide* Harris (1995) and including the *P. rufula* group of Santesson (1952), Lücking & Vězda (1998) and others) were it not for the absence of a thin layer of colourless crystals between the involucrellum and its thalline covering.

Distribution and ecology:

In Tasmania, *P. subapplanata* is known mainly from *Nothofagus*-dominated cool-temperate rainforests, from *Atherosperma*-dominated rainforest relicts, restricted mainly to wet gullies, and from some eucalypt-dominated wet sclerophyll forests. Corticolous individuals are found on foliage-bearing twigs of *Atherosperma moschatum* (Atherospermataceae) and *Nothofagus cunninghamii* (Fagaceae) in the forest understorey. In this habitat, it colonizes the undersurface of the twigs, often forming very narrow bands little more than a few millimetres wide, together with other species of the genus, for example *P. hyperleptalea, P. leptalea,* and *P. constrictospora*, and with *Opegrapha viridis*.

Foliicolous specimens are especially common on the upper pinna surface of the fern *Blechnum wattsii* (Blechnaceae). It also occurs on *Hymenophyllum* sp. (Hymenophyllaceae), and *Microsorum pustulatum* (Polypodiaceae). Associated lichens include *Arthonia cyanea, A. trilocularis, Badimiella serusiauxii, Byssoloma subundulatum, Dimerella* sp., *Fellhanera* sp., *Mazosia phyllosema, Porina rufula*, and *Trichothelium nanum*.

A good example of how this species is able to span both corticolous and foliicolous habitats is provided by the conifer *Phyllocladus aspleniifolius*, which supports it on foliage-like cladodes as well as twigs.

In New Zealand, *P. subapplanata* has been found on the leaves of *Pseudowintera colorata* (Winteraceae), the leafless climbing stems of *Ripogonum scandens* (Ripogonaceae), the fronds of *Rhopalostylis sapida* (Arecaceae), and the twigs and needles of *Podocarpus totara* (Podocarpaceae), but not on any ferns. It reaches only slightly higher elevations than in Australia (680 m *versus* 480 m), and associates with three of the same lichens: *Byssoloma subundulatum, Trichothelium nanum,* and *Badimiella serusiauxii*. Other associated lichens include *Porina leptosperma, P.* aff. *rubentior, Byssoloma leucoblepharum, Polycornum rubrofuscum, Dimerella queenslandica, Mazosia* sp., and two undetermined graphids. A lejeuneoid liverwort also commonly co-colonizes *Pseudowintera colorata* leaves and *Ripogonum* stems.

SELECTED SPECIMENS EXAMINED

New Zealand: *South Island*: •Nelson, Brook waterfalls, 41°19.3'S, 173°17.5'E, alt. 160 m, *Malcolm 1368*, 1993 (herb. Malcolm); •Nelson, Miner's Creek near Hackett junction, 41°24.6'S, 173°14.0'E, alt. 170 m, *Malcolm 1841*, 1994 (herb. Malcolm); •Westland, Lake Kaniere, 42°52'S, 171°10'E, alt. 200 m, *Malcolm 2801*, 1996 (herb. Malcolm); •Golden Bay, Kaihoka Lakes, 40°33.0'S, 172°36.3'E, alt. 70 m, *Malcolm 2912*, 1997 (herb. Malcolm).

Australia: *Tasmania*: •Between Pyengana and Weldborough, *W.H. Ewers 923* (part), 1987 (CANB 9605593); •SE slope of McGregor Peak, 42°59'S, 147°57'E, alt. c. 400 m, *Kantvilas 356/89*, 1989 (HO 321104); •Anthony Road, Site 474, 41°49'S, 145°38'E, alt. 480 m, *Kantvilas 227/93*, 1998 (HO 330209); •Bermuda Road, Scotts Divide, 43°04'S, 148°08'E, alt. 500 m, *Kantvilas 44/99*, 1999 (HO 0145); •W of Tahune Bridge, Warra SST, "Big Coupe", 43°06'S, 146°41'E, alt. 120 m, *J. Jarman & G. Kantvilas s.n.*, 1999 (HO 443642); •Douglas-Apsley NP, Myrtle Creek headwaters, 41°48'S, 148°08'E, alt. 450 m, *Kantvilas 206/99*, 1999 (HO 444927). *Victoria*: •Near Warburton, Cement Creek, 37°42'S, 145°44'E, *Kantvilas 111/93*, 1993 (HO 307585).

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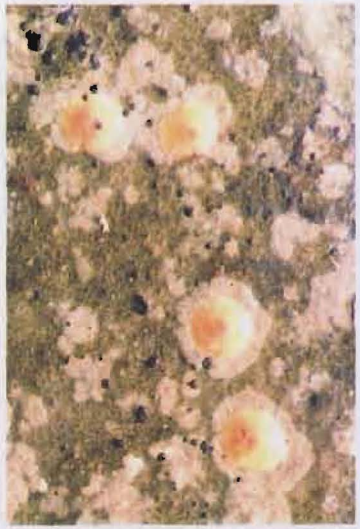

Fig. 1. Habit. 1 mm

Fig. 2. Habit. 0.5 mm

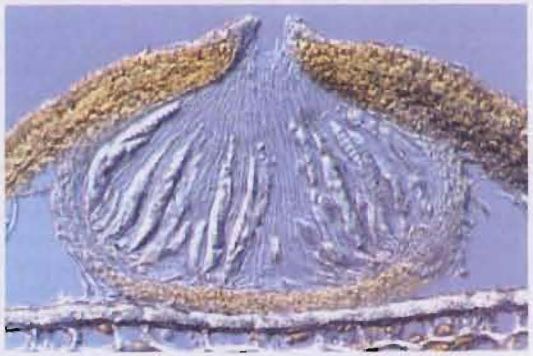

Fig. 3. Vertical section through perithecium at ostiole. 50 µm

Fig. 4. Vertical section through involucrellum. 50 µm

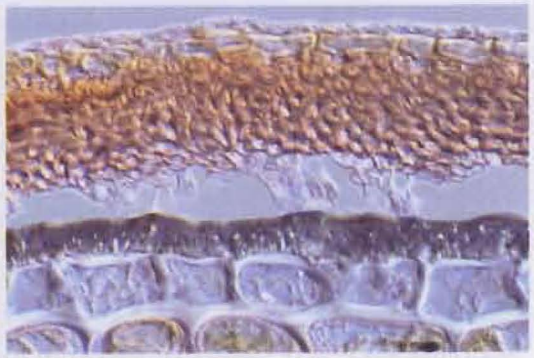

Fig. 4. Vertical section through involucrellum close to its edge. 50 µm

Figs. 1–5. *Porina subapplanata* (holotype). Scales as noted.

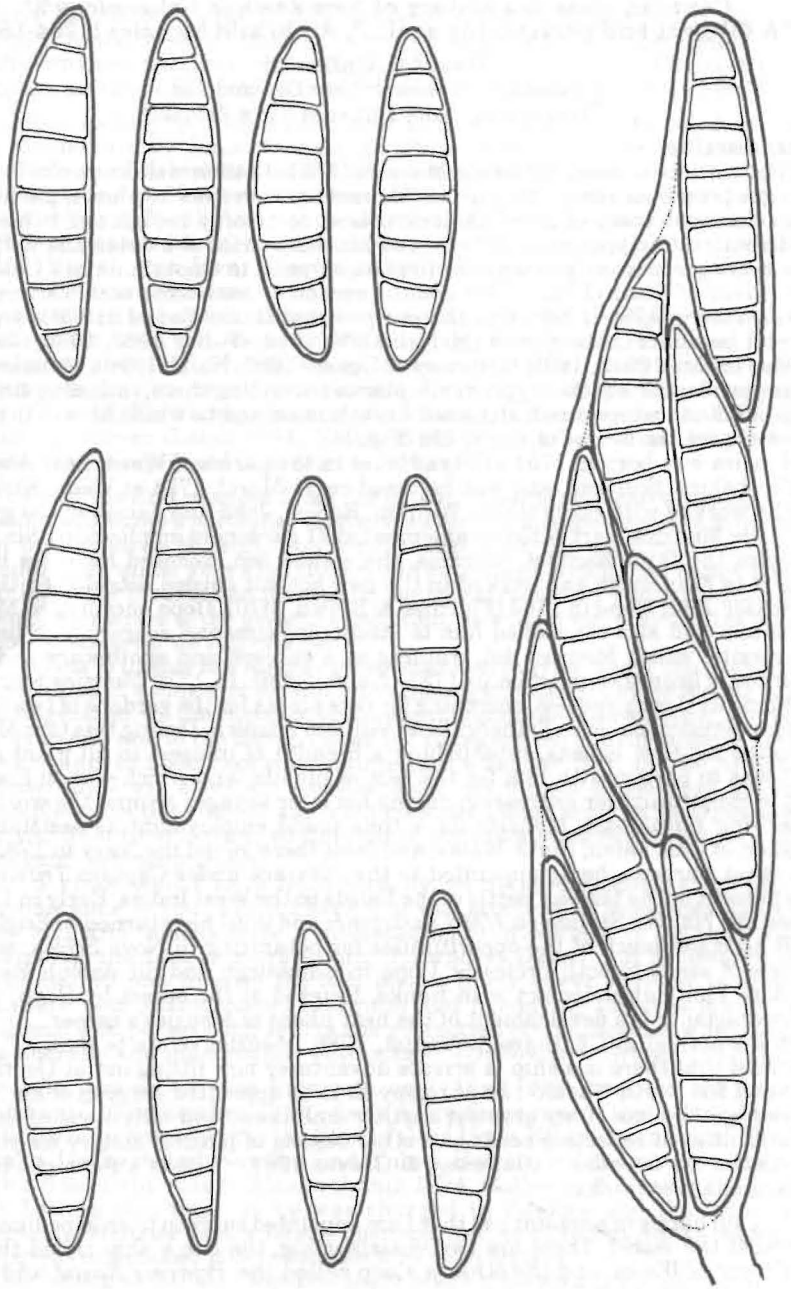

Fig. 6. *Porina subapplanata* (holotype). Ascospores and ascus. 10 µm

Contributions to a history of New Zealand lichenology 2*. "A diligent and persevering zeal...", Archibald Menzies (1754-1842).

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Introduction

The Scottish botanist Archibald Menzies (1754–1842) is well-known to botanists and gardeners as one of the great 18th century collectors of plants, particularly from the west coast of North America. Less commonly recognized is his major contribution to cryptogamic botany and his discoveries of mosses and lichens on two major circumnavigations, the first as surgeon to Captain James Colnett on the *Prince of Wales* (1786–1789) and the second as naturalist with Vancouver on the *Discovery* (1791–1795). The *Discovery* visited Dusky Sound in 1791, and from several landfalls in the Sound (McNab 1908, 1914; Godley 1960, 1965; Galloway 1985a, 1985b, 1991b, 1995; Galloway & Groves 1987; Naish 1996), Menzies made copious collections of the cryptogamic plants abounding there, including lichens, a field of botany which much attracted his attention and to which he was to remain devoted over the course of a long life (Fig. 1).

Menzies was born in 1754 at Styx House in the parish of Weem near Aberfeldy in Perthshire, Scotland, and was baptised on 15 March 1754 at Weem Kirk. As a boy he worked with his brothers William, Robert, John and James in the gardens of Castle Menzies, part of the complement of 21 gardeners employed by Sir Robert Menzies the third Baronet. Menzies, the second son, followed his elder brother Robert to Edinburgh and worked in the new botanic garden established there by Professor John Hope in 1763 (Fletcher & Brown 1970). Hope encouraged Menzies in botany and also counselled him to study medicine and surgery at Edinburgh University, which Menzies did, training as a surgeon and apothecary and being awarded a license to practice in 1781 (Naish 1996). In 1778 Menzies toured the highland at Hope's request, searching for rare plants for the gardens of two notable London physicians, John Fothergill and William Pitcairn. During this tour Menzies collected his first lichens, establishing a breadth of interest in all plant groups that was to persist with him for the rest of his life, and which was to find such ample opportunity for expression during his later voyages around the world.

Leaving Edinburgh, Menzies for a time found employment as assistant to a surgeon in Caernafon, North Wales, and from there joined the Navy in 1782 as an Assistant Surgeon, being appointed to the *Nonsuch* under Captain Truscott. He was present at the famous Battle of the Saints in the West Indies. Early in 1783 he joined the Halifax Station on *HMS Assistance* and until he returned to England in 1786 he made much of the opportunities for botanizing in Nova Scotia, sending parcels of seeds to both Professor Hope in Edinburgh and Sir Joseph Banks in London. This initial contact with Banks, fostered at the outset by Hope, was to prove crucial to the development of the next phase of Menzies's career.

On his arrival at Chatham in August, 1786, Menzies wrote to Banks "...I am informed that there is a ship, a private adventurer now fitting out at Deptford to go round the world. Should I be so happy as to be appointed surgeon of her, it will at least gratify one of my greatest earthly ambitions, and afford one of the best opportunities of collecting seeds and other objects of natural history for you and the rest of my friends..." (Galloway & Groves 1987). Within a fortnight he was writing again to Banks:

> "...I am happy to acquaint you that I am appointed surgeon to an expedition round the world. There are two vessels going, the one a ship called the *Prince of Wales*, and the other a sloop called the *Princess Royal*: and I have care of both vessels. Their general route I am informed is round South America—from thence to the west coast of North America and by the Japanese islands to China; from thence round the Cape of Good Hope home; and their chief object the fur trade..." (Galloway & Groves 1987:8).

The ships, trading for Richard Cadman Etches Company of 69 Watling Street, were commanded by James Colnett, an officer of the Royal Navy. Colnett sailed with Cook as midshipman on the *Resolution*, had risen to the rank of First Lieutenant, and had been granted leave on half pay to command the expedition to the west coast of North America in search of sea otter and fur seal skins. From landfalls at Staten Island, the west coast of North America (British Columbia to Alaska), Hawaii, and Java, Menzies gathered a large and varied range of lichens, many of them new to science (Galloway 1995).

On his return to London, Menzies was busily occupied arranging his extensive collections made on the *Prince of Wales* voyage, but he was still eager for more adventuring and sought Banks's help in securing a Royal Navy appointment for this purpose. In due course, and through Banks's patronage, he was appointed Naturalist to the Pacific expedition in the *Discovery* under the command of Captain George Vancouver (Lamb 1984, Naish 1996). Menzies's obvious delight at this appointment is expressed in a letter to Banks:

> "...From the first moment I had the honour of being your correspondent, I found within me a particular desire of traversing unknown regions in quest of my favourite pursuit, and fondly looked for the enjoyment of that indulgence under your kind tuition and patronage, which I am happy now to have the pleasure to possess, in being entrusted by you with such a particular share of the present expedition, as will I hope, afford a free and liberal scope for its full exercise.
>
> This principle has already borne me cheerfully up under the peculiar hardships of a long and tedious circumnavigation and is by no means yet extinguished: on the contrary, the present opposition it meets with, serves only to add fuel to the flame. I need not therefore tell you Sir Joseph, how ready I am to undertake your instructions whatever they may be; or how cheerfully I will exert, on every occasion my utmost endeavours to the completion of their object; and what pleasure I shall enjoy in transmitting to you from time to time, an Epitome of our proceedings by a faithful and diligent correspondence.
>
> I know well I have been already on many occasions extremely troublesome to you, which I hope you will attribute in some measure to my long and tedious state of suspense more intolerable to me than the hardship and fatigue of traversing the wildest Desert: but be assured, I will not fail now to exert the only means in my power to repay in some meaure your disinterested attention and friendship towards me by a diligent and persevering zeal in the promotion of that Science which you so liberally and indefatigibly patronize..." (Galloway & Groves 1987:15).

The *Discovery* sailed from Falmouth on 1 April, 1791, and did not return to England until 13 September, 1795, after a magnificent voyage that allowed Menzies opportunities for botanising at the Cape of Good Hope, King George Sound, Western Australia, Dusky Sound, New Zealand, Tahiti, Hawaii, and the west coast of North America from California to Alaska (Lamb 1984, Galloway & Groves 1987, Naish 1996). During this time, as he was charged in Banks's and the Admiralty's instructions, Menzies kept a detailed journal, and he also kept Banks informed of his progress in detailed letters sent back to Soho Square.

On his return to Britain, Menzies spent much time arranging and curating his large collections of plants and other natural history and anthropological specimens. Over a period of three years, he compared his plant specimens with those in the

* Part 1 was published in *Australasian Lichenology* **43**, 20–26 (1998).

Banksian Herbarium, under the guidance of Jonas Dryander (Banks's Librarian and Herbarium Keeper) and no doubt of Banks himself, and also with the Linnean Herbarium under the care of its then owner James Edward Smith. Menzies distributed duplicates of his large botanical collections to colleagues in Britain and in Europe, establishing as a result a wide reputation as a knowledgeable plant collector. Indeed, it seems that Menzies was much happier in allowing others access to his collections (as was Banks before him) than publishing on them himself.

After a short period of service as a naval surgeon in the West Indies, Menzies married and set up practice as a surgeon in London at 6 Chapel Place, Oxford Street, where he remained until moving in 1826 to Notting Hill (then more or less in the country) and a retirement house at 2 Ladbroke Terrace. He lived on there alone, after the death of his wife Janet in 1836, until his own death on 15 February, 1842, at the age of 88 years. He was buried the following day in All Soul's Cemetery, Kensal Green, in plot 706 next to his wife Janet, the funeral being arranged by Cluttenden Brothers, Soho, at a cost of £60.15.0. His estate was valued at £8,084.7.10 (Galloway & Groves 1987:34). The headstone on Menzies's grave records "...many years a surgeon in the Royal Navy in which station he served in the fleet commanded by Admiral Rodney on the 12th April 1782. He afterwards twice circumnavigated the globe first with Captain Colnett, and again in the voyage of *Discovery* under the orders of Captain Vancouver as the naturalist to that expedition. He added greatly to the knowledge then possessed of the natural productions, especially the plants, of the various countries visited. After practising his profession for many years in London, he retired to Notting Hill where he died on the 15th February 1842 aged 88 years. Sincerely respected and deeply regretted by his numerous friends..." (Galloway & Groves 1987: 34).

Menzies made many important botanical discoveries, especially from the west coast of North America, and was the first botanist to bring back specimens and seeds of the Douglas Fir (*Pseudotsuga menziesii*), Nootka cypress (*Cupressus nootkaensis*), Coast Redwood (*Sequoia sempervirens*), Hemlock Spruce (*Tsuga canadensis*), Oregon Cedar or Lawson's Cypress (*Chaemacyparis lawsoniana*) and the White Fir (*Abies grandis*) amongst many examples that could be cited. Indeed, few other botanists have had their name bestowed on so many plants, and there are many garden plants, from North America particularly, in which Menzies's name is commemorated. As a field botanist, Menzies was driven by "a diligent and persevering zeal" to use his own words, and in the two major circumnavigations of his career as well as in the earlier time in Nova Scotia and on the eastern American seaboard, he collected all plant groups, including cryptogams which were his special favourites. On his death he left his herbarium of cryptogams, Cyperaceae and grasses to the Royal Botanic Gardens in Edinburgh, and of these the most important and diverse group are the lichens (Galloway 1995).

Menzies's New Zealand lichens

Joseph Hooker wrote of Menzies's New Zealand and Southern Hemisphere collections "...The exertions of the late Mr. Menzies during Vancouver's voyage, brought to light so many new and interesting species of Cryptogamic Plants from the southern extreme of the American Continent, and from the New Zealand islands in the opposite hemisphere, that the attention of Botanists has always been directed to these countries as probably affording a richer harvest, especially of Mosses and Jungermanniae, than any other part of the world. Before leaving England, when paying my farewell visit to that lamented and then venerable naturalist, he particularly advised should our expedition touch at his favourite botanical ground, Dusky Bay, New Zealand, or any adjacent party, that I should diligently search for such plants, and requested me to send him at once a few specimens, adding that no collector had visited that spot since himself, then nearly half a century ago, and that if I did not rediscover some of his favourites, he was too near his ninetieth year to expect to receive them from any one else. Unfortunately, it was

out of our Commander's power to visit Dusky Bay; but during the stay of our ships at Lord Auckland's Islands, four degrees further south, and in the Bay of Islands, ten degrees to the northward of where Mr. Menzies had collected, most of his specimens were found. A few specimens were sent at different times in the hopes that the admirable health in which I had left him might have been continued, through Providence, until those of *Hypnum Menziesii* amongst others, should have reached him. It was, however, ordered otherwise; and the, to me, peculiarly melancholy account of his decease found our expedition at the Falkland Islands, on our return from Tierra del Fuego, where I had been again endeavouring, *longo post intervallo*, to follow his footsteps..." (Hooker & Wilson 1844).

Menzies's botanising at Dusky Sound (November 2–22, 1791) is discussed in Godley (1960) and Galloway (1985a, 1985b, 1991). In Menzies's own words in a letter to Banks "...the following day entered Dusky Bay, N. Zealand, on the 2nd Nov., where we remained twenty days, and where I was particularly entertained among a vast variety of cryptogamic plants, of which I have made a tolerable good collection..." (McNab 1908:144); and in his journal for 4 November, 1791 "...I made an excursion into the woods & met with a vast variety of Ferns and Mosses I had never before seen. They are two tribes of plants of which I am particularly fond, therefore no one can conceive the pleasure I enjoyed unless placed under similar circumstances. I returned on board in the afternoon loaded with my treasures..." (McNab 1914:485). The lichens he collected there are as follows:

1. **Coenogonium implexum** Nyl. (E). Sheet labelled by Menzies "Coenogonium linkii Nees ?? Hook.: in Humb. Syn.".
2. **Collema subconveniens** Nyl. (E).
3. **Leifidium tenerum** (Laurer) Wedin (E). Sheet labelled by Menzies "Sphaerophoron clavigerum Menz.".
4. **Leptogium coralloideum** (Meyen & Flot.) Vain. (E).
5. **Pseudocyphellaria billardierei** (Delise) Räsänen (BM, LINN-SM 1705.17). BM sheet labelled by Menzies in ink "Sticta Sp. Nov: N. Zeeland". Thomas Taylor has annotated the specimen "Sticta impressa Tayl.", and Churchill Babington has added "Sticta faveolata accedit var. β cellulifera Bab.". The species is discussed in Galloway (1988a).
6. **Pseudocyphellaria cinnamomea** (A. Rich.) Vain. (E). Sheet labelled by Menzies "Sticta cinnamomea D'Urville Pl.8 f. 3". This species is discussed in Galloway (1988a).
7. **Pseudocyphellaria coronata** (Müll. Arg.) Malme (BM, E). The E sheet is annotated by Menzies "Sticta orygmaea" and has five specimens attached, three of which are *P. coronata*, the other two being *P. billardierei*. The BM material comprises two collections both annotated by Menzies "Sticta orygmaea Ach: N: Zeeland", one of which has attached also a specimen of *P. berberina*, this latter being annotated by Churchill Babington "This is L. ochraceus Menzies = Sticta D'Urvillei Del. Is it from N.Z.? C.B.". This species is discussed in Galloway (1988a).
8. **Pseudocyphellaria faveolata** (Delise) Malme (E.). This species is discussed in Galloway (1988a).
9. **Pseudocyphellaria lividofusca** (Kremp.) D.J. Galloway & P. James (E). This species is discussed in Galloway (1988a).
10. **Pseudocyphellaria multifida** (Nyl.) D.J. Galloway & P. James (BM, E). This species is discussed in Galloway (1988a).
11. **Stereocaulon ramulosum** (Sw.) Rauschel (BM, LINN-SM 1711.2). BM material is labelled in ink by Menzies "Stereocaulon ramulosum Ach: N. Zeeland".
12. **Sticta filix** (Sw.) Nyl. (BM, E, LINN-SM 1705.12). E sheet labelled by Menzies "Sticta filicina Ach.". This species is discussed in Galloway (1985a, 1985b,1991, 1997).
13. **Sticta latifrons** A.Rich. (BM, E, LINN-SM 1705.13). The E material consists of two sheets, each with three specimens attached, on each sheet of which is

annotated by Menzies "Sticta latifrons Flor. Zeeland: D'Urville pl. 8 f. 2". This species is dicussed in Babington (1855) and Galloway (1997).

14. **Sticta subcaperata** (Nyl.) Nyl. (E). The sheet is annotated by Menzies "Sticta tomentosa Ach." and contains three specimens—the upper one has a cyanobacterial photobiont and does not appear to be from New Zealand; while the two lower specimens have green photobionts and are the species mentioned.

A sheet in E containing *Pseudocyphellaria aurata, P. episticta, Collema subconveniens, Leptogium* sp., and *Usnea* sp. is annotated "Sticta aurata Ach." by Menzies in a failing hand. An additional hand has added "(A. Menzies) New Zealand Fl. N.Z. II. 273", but since the locality at which Menzies collected, i.e. Dusky Sound, is not mentioned, these records cannot be added to Menzies's New Zealand lichens. Further, *P. aurata* is not known to occur as far south in New Zealand as Dusky Sound (Galloway 1988a:71).

The Dusky Sound lichens collected by Menzies in 1791 (14 taxa in 7 genera) are the largest extant 18th century gatherings from this country, and were first drawn attention to by Churchill Babington in his account of New Zealand lichens published in the second part of Joseph Hooker's *Flora Novae Zelandiae* (Babington 1855). Menzies's lichen collections have an added significance too, for it was at the end of the 18th century that studies by the Swedish lichenologist Erik Acharius (1757–1819), one of the great Linnaeus's last students, resulted in the segregation of the old collective genus *Lichen*, in use since Linnaeus's *Species Plantarum* of 1753, into smaller independent genera, thereby laying the foundations of modern lichen taxonomy (Galloway 1981, Arvidsson 1999, Jørgensen 1999). Menzies's lichens were sent to Acharius by James Edward Smith (the founder of the Linnean Society of London) and by Olof Swartz (Secretary of the Royal Swedish Academy of Sciences), both friends of Menzies and recipients of his duplicates (Galloway 1981, 1988b). Through them he was able to contribute a number of new names to the rapidly growing list of lichens known worldwide, and even though Acharius saw only a fraction of Menzies's lichens, from these he described 15 new taxa, which give Menzies's collections from North America and the Southern Hemisphere a lasting importance.

Menzies's lichen collections have today, therefore, considerable relevance in studies on lichen genera and floras in the Southern Hemisphere (see for example Galloway 1985a, 1988a, 1992, 1997, 1998), and he is the major pioneer (though still unjustly unrecognized) of North American field lichenology. Menzies kept his lichen collection intact for the duration of his long life, always hoping that he would have time to publish a Prodromus to Southern Hemisphere lichens. In the event this was not to be, and we must be grateful that 130 years of subsequent neglect in the Edinburgh Herbarium and in the herbaria of the Linnean Society of London, the Natural History Museum in London, the Farlow Herbarium at Harvard, and in the herbarium of the Smithsonian Institution in Washington, has preserved this wonderful collection pretty much in the state of its original preparation, awaiting its due recognition 200 years after its collection (Galloway 1995).

Notes on sources

Copies of letters written by Archibald Menzies are preserved in the following institutions: Banks Correspondence and W.J. Hooker Correspondence (Archives of the Royal Botanic Gardens, Kew); Dawson Turner transcripts of the Joseph Banks Correspondence (Botany Library, the Natural History Museum, London); Professor John Hope's papers (Scottish Record Office, Register House, Edinburgh); J.E. Smith Correspondence (Archives of the Linnean Society of London); Banks papers (Sutro Library, San Francisco); Menzies's papers and Menziesiana (University of Washington Libraries, Seattle); Ministry of the Provincial Secretary and Travel Industry Archives (Victoria, British Columbia); O.P. Swartz Correspondence (Library of the Royal Swedish Academy of Sciences, Stockholm, & Carl Gustaf von Brinkmann Collection, Trolle Ljungby Castle, Bäckaskog, Sweden); Dawson Turner Correspondence (Trinity College Library, Cambridge).

The Archives of the Library of the Royal Botanic Garden, Edinburgh contain documents relating to the A. Menzies bequest of 1842, and several plant lists relating to the Menzies herbarium.

James Colnett's journal of the *Prince of Wales* is held in the Admiralty Records of the Public Record Office in London (ADM/16) [see Howay 1940, Cowan 1954, Godley 1960]. Colnett's log of the *Prince of Wales* is held in the India Office Library and Records, London (L/MARJB/404 0) [see Godley 1960].

Archibald Menzies's journal kept during the *Discovery* voyage is in the British Library, London (Add Ms 32641), with a copy in the Archives of the Linnean Society of London. Although this journal was never published in its entirety, parts of it have been published from time to time and deal with the following regions: New Zealand (McNab 1908, 1914); Hawaii (Wilson 1920); British Columbia (Newcombe 1923), California (Eastwood 1924); Alaska (Olson & Thilenius 1993), and Menzies himself published his own accounts of experiences in Hawaii (Menzies 1828, 1829). Kaye Lamb's scrupulously edited account of Vancouver's *Discovery* voyage (1791–1795), details Menzies's correspondence with Banks, now preserved in the Brabourne Papers, Mitchell, Library, Sydney (Lamb 1984:1614–1632) and gives a very full treatment of Menzies's contributions to that voyage.

Menzies was generous in distributing duplicates of his lichen collections to contemporary botanists, and his specimens are found in the herbaria of William Aiton (BM), Joseph Banks (BM), William Borrer (BM, US), Erik Acharius (BM-ACH, H-ACH, UPS-ACH), William Jackson Hooker (BM), James Edward Smith (LINN-SM), Olof Swartz (S), Dawson Turner (BM), J.G. Baker (US), and Edward Tuckerman (FH-TUCK). In turn, Menzies received lichens from Acharius, Schleicher, Swartz, Zeir, and from his colleagues and friends in Britain. James Edward Smith was instrumental in sending many of Menzies's lichens to Acharius, who also received them from Swartz in Stockholm. Fifteen of Menzies's lichens sent to Acharius were new to science, 12 being described in the *Methodus* (Acharius 1803), and 3 in *Lichenographia Universalis* (Acharius 1810), with Smith providing names and preliminary descriptions for Acharius to use (Galloway 1988b).

Lichens collected by Menzies, many annotated by him in his own hand, are located in the following herbaria: BM, BM-ACH, E, FH, H-ACH, LINN-SM, LIV, S, UPS-ACH, and US (nomenclature follows Holmgren *et al.*, 1990). In the Edinburgh herbarium, where the greatest number of Menzies's lichens are kept, lightly pressed lichens are neatly arranged on octavo sheets with, in most cases, both upper and lower surfaces of the lichens adequately displayed. Systematic or herbarium names are written in pencil above the lower front edge of each sheet (in a few cases Menzies appended his own MS names; however, most names are from the works of Acharius, which Menzies knew well), and the localities of the specimens in ink on the upper edge of the reverse (Galloway 1995).

Acknowledgements

I am grateful to the Keepers and Curators of herbaria (BM, E, LINN-SM) for permission to study specimens in their care; to Phil Hurst (BM) for photographic assistance; and to Gina Douglas, Librarian and Archivist, and to the President and Council of the Linnean Society of London, for permission to publish a detail of the Eddis portrait of Archibald Menzies which hangs in the Society's Meeting Room at Burlington House, Piccadilly. For permission to study archival material and to publish extracts from it, I am grateful to: the late Dr. Wilhelm Odelberg, formerly Librarian of the Royal Swedish Academy of Sciences (Stockholm); the Librarian & Archivist, Royal Botanic Gardens, Kew; The Librarian & Archivist, Linnean Society of London; and the Botany Librarian, The Natural History Museum, London. Funds for this research were provided by the Foundation for Research Science and Technology (Wellington, New Zealand) under contract C09310.

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Fig. 1. Detail from the Eddis portrait of "Archibald Menzies Esq. F.L.S. Presented by subscription Nov. 14, 1836", which hangs in the Meeting Room of the Linnean Society of London, Burlington House, Piccadilly. At the time of the portrait Menzies was aged 82. (Published with permission of the President and Council of the Linnean Society of London).

Growth rates of *Xanthoparmelia reptans* in a mesic grassland in eastern Australia

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Introduction

We studied the dynamics of cryptogamic soil crusts in a temperate grassland in eastern Australia in an area receiving about 780 mm annual rainfall (Eldridge *et al.*, in press). The study demonstrated that strategies which disturb the soil surface (e.g. grazing and cultivation) stimulate the abundance and cover of soil crust organisms by increasing the availability of bare microsites. One of the lichens present at the site was the foliose species *Xanthoparmelia reptans.*

Little is known about growth rates of *Xanthoparmelia* species, although they are known to be very slow (Elix 1994). In the present study, conducted in June, 1997, *Xanthoparmelia reptans* occurred within one of the plots which had been cultivated in September, 1991, allowing us the opportunity to calculate growth rates for this species. Within this cultivated plot, we recorded the density and size of the *Xanthoparmelia reptans* population by measuring the longest diameter plus the diameter at a right angle to that for all lichen thalli growing in the plot. Mean diameter was used as an indicator of lichen growth.

Size and density of *Xanthoparmelia reptans*

Xanthoparmelia reptans was restricted to the largest patches of bare soil, which were generally greatest in the grazed and cultivated treatments. Lichen size (mean of the longest diameter and the diameter at a right angle to that) ranged from 5.5 to 35.0 mm, with a mean (±sem) size of 18.8 ± 1.65 mm. Lichen growth rate, assessed as the increase in mean thallus diameter, ranged from 0.9 to 5.8 mm year^{-1} for the total population, and up to 5.5 mm yr^{-1} for the largest 10% of the population. These values are estimates only, and assume that lichens have grown *in situ* after cultivation and have not been dispersed intact by wind or water from adjacent aras (Eldrige 1996). The growth rates are of a magnitude similar to values of 1–4(–7) mm/yr for foliose *Parmelia* species reported by Hale (1974). Mean density was 6.3 lichens per m^2 of bare soil.

Xanthoparmelia reptans is common over much of eastern Australia, ranging from higher rainfall areas on the tablelands (Elix 1994) to the semi-arid shrub steppe (Eldridge 1996). In semi-arid and arid rangelands, *Xanthoparmelia* species are regarded as useful bio-indicators of well-managed surfaces with moderate pasture cover (Eldrige & Tozer 1996, Eldridge and Koen 1998), because they are facultatively vagrant, i.e. they spend some of their life unattached to the soil surface, even though they possess rhizines for anchorage (Elix 1994). Like other terricolous members of their family, sexual reproduction by apothecia is episodic and rare (J.A. Elix, personal communication), and they rely on fragmentation for dispersal to new sites (Perez 1997). Excessive trampling and/or cultivation, whilst providing fragments for dispersal, rapidly destroy the lichens, which become too small to re-attach to the soil, and upon landing inverted on the soil are probably consumed by invertebrates.

Our results for this study site, in a mesic area of eastern Australia, indicate that *Xanthoparmelia* species have very high growth rates (up to 5.8 mm year^{-1}), unlike the situation in semi-arid areas. We conclude therefore that in mesic areas the presence of *Xanthoparmelia* species is a poor indicator of landscape health, although this should be tested by further field survey and experimentation.

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Dr Michael Thomas, Marsden Fellow at Otago University, NZ

Dr Michael Allen Thomas has recently arrived at New Zealand's University of Otago, Department of Biochemistry, as a three-year Marsden Fund Post-Doctoral Fellow, working with Drs Julian J. Eaton-Rye, Kevin J.F. Farnden, and David J. Galloway. He is investigating the biochemical role that cyanolichens play in adding nitrogen to New Zealand ecosystems.

Born in 1959 in Ohio, USA, he received his B.Sc. in 1990 from Bowling Green State University. There he worked with Dr. Candace Galen, currently of the University of Missouri, Columbia, investigating isoenzyme variation in a population of *Ranunculus adoneus*.

He completed his M.Sc. at Arizona State University working with Dr Jeffrey Klopatek, studying the effects of cryptogamic cover on the nutrient pools in interspace soils of a pinyon-juniper woodland. He continued his studies at ASU with Dr. Thomas Nash, completing his Ph.D. in Botany in 1999, studying the responses in antioxidant enzyme activity in lichens following exposure to sulphur dioxide and ozone. Although he considers his expertise to be in the areas of ecology and ecophysiology, he is an avid lichen enthusiast.

He and his wife Carol have two daughters. Currently his family is in the States, but is expected to arrive in New Zealand in the near future.

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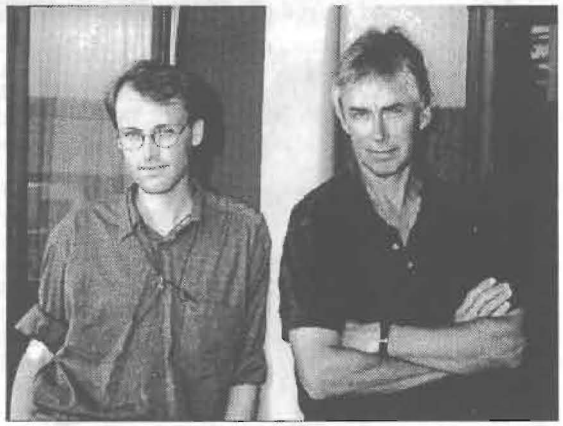
Collecting visit by Dr Ingvar Kärnefelt and Patrik Frödén (Lund)

During January and February, Ingvar Kärnefelt and Patrik Frödén (both from Lund, Sweden), spent four weeks in Australia and another two in New Zealand studying and collecting members of the Teloschistaceae—*Caloplaca, Xanthoria,* and *Teloschistes*. After four weeks in Australia where they were hosted by Jack Elix (Canberra), Rex Filson (Booral, NSW), and Gintaras Kantvilas (Tasmania), they spent a fortnight in New Zealand hosted by David Galloway in Central Otago and Bill Malcolm in Nelson. Several of their collections appear to be new records.



Patrik Frödén (left) and Ingvar Kärnefelt in Nelson (photo Nancy Malcolm).

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Collecting visit to New Zealand by Dr Sam Hammer (Boston)

Early in the year, Sam Hammer of Boston University toured New Zealand's South Island searching for Cladoniaceae as part of his on-going studies of developmental morphology in that family. In little over a fortnight, he visited many of the island's most notable lichen-rich areas, including Denniston Plateau (Westland), Mt. Arthur (Nelson), Lewis and Haast passes in the Southern Alps, and Central Otago, collecting specimens of *Cladonia, Cladia, Cladina, Metus, Pycnothelia,* and *Thysanothecium.* Several of his collections appear to be new records, and a few are possibly new to science. He was shown around the dry basins near Wanaka and Hawea by David Galloway, and toured the Nelson area with Bill Malcolm.

Sam Hammer in Nelson (photo Nancy Malcolm).

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