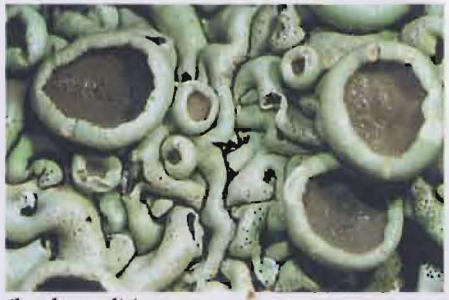
Australasian Lichenology

Number 46, January 2000

Menegazzia dielsii (Hillmann) R. Sant.

(hydrated) 5 mm



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Menegazzia pertransita (Stirton) R. Sant.

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ISSN 1328-4401 (formerly the *Australasian Lichenological Newsletter*)

Official publication of the Australasian Lichen Society

14th meeting of Australasian lichenologists—Melbourne, 2000

DATE CHANGED TO APRIL 29–30

The 14th meeting of Australasian lichenologists will be held in the Baracchi Room, Observatory Building, Royal Botanic Gardens, Birdwood Avenue, South Yarra, on April 29–30 (Saturday–Sunday), 2000. *The date has been changed to avoid any conflict with Easter.*

On Saturday, Alan Archer, Jennifer Bannister, John Elix, Sharon Ford, Gintaras Kantvilas, Simone Louwhoff, and Kathleen Ralston will give talks. A meeting will follow, then dinner with good food, wine, and conversation. On Sunday, we'll visit two lichen habitats near Melbourne.

If you wish to register and/or present a paper, or if you require further information, contact Kath Ralston by:

post: Kathleen Ralston, National Herbarium, Royal Botanic Gardens, Birdwood Avenue, South Yarra, Victoria 3141, Australia.
phone: +61–(0)3–9252–2381
fax: +61–(0)3–9252–2350
e-mail: kralst@rbgmelb.org.au

Australian lichen checklist on the Web

The checklist of Australian lichens (updated to November 1999) can now be viewed at the Australian Biological Resources Study website:

http://www.anbg.gov.au/abrs/lichenlist/introduction.html

The checklist includes publication details of 2820 accepted species and infraspecific taxa in 363 genera, as well as several thousand synonyms and misapplied names. In addition, basic information is provided on distribution in the eight Australian States and Territories plus Lord Howe Island and Norfolk Island (SW Pacific Ocean) and Macquarie Island (Subantarctic).

Pat McCarthy, ABRS

5th international Flora Malesiana Symposium—Sydney 2001

The 5th international Flora Malesiana Symposium will be held in September 2001 in Sydney, with associated workshops in Cairns. The first circular for the symposium is bundled with this issue of *Australasian Lichenology*. Address any further enquiries to Dr Barry Conn:

post:
Royal Botanic Gardens Sydney
Mrs Macquaries Road
Sydney, NSW 2000, Australia
e-mail: fmv@rbgsyd.gov.au

New book—Australian rainforest lichens

Lichens in Rainforest in Tasmania and south-eastern Australia
by G. Kantvilas & S.J. Jarman with photographs by B.A. Fuhrer
Published by Australian Biological Resources Study
Flora of Australia Supplementary Series, Volume 9

More than 200 macrolichens have been recorded in Tasmania's rainforest, and 127 are illustrated in this volume. Many also occur in the cool temperate rainforests of south-eastern Australia or New Zealand.

The book, beautifully illustrated in colour, provides introductory chapters on the nature of lichens, the composition of the lichen flora in Tasmania, and the distribution and ecology of lichens in rainforest. It includes notes on the genera and species, an identification key, and a glossary of technical terms.

Soft cover, 212 pages, approximately 240 colour photographs.

cost: A$39.95 plus A$4 postage (surface mail). A brochure/order-form is bundled with this issue of *Australasian Lichenology*. If you wish to receive further information by fax or e-mail, contact Pat McCarthy:

post:
ABRS
GPO Box 787
Canberra, A.C.T. 2601, Australia
e-mail:
patrick.mccarthy@ea.gov.au

Australasian cryptogams—2000 calendar

To raise funds for the Fungal Foray, Heino Lepp and Judith Curnow have printed an impressive and attractively priced 2000 calendar illustrating in full colour a wide variety of Australasian cryptogams—lichens, fungi, mosses, liverworts, and hornworts. The plates illustrate the **lichens** *Cladonia floerkeana, Peltigera* sp., *Usnea scabrida,* and *Rhizocarpon* spp. and other saxicoles, the **fungi** *Amanita* sp., *Anthracophyllum archeri, Chlorociboria aeruginascens, Dictyophora multicolor, Entoloma* sp., *Fistulina hepatica, Galerina* sp., *Hypholoma aurantiaca, Leotia lubrica, Mycena epipterygia, Mycena interrupta, Omphalotus nidiformis, Plectania campylospora, Polyporus arcularius, Schizophyllum commune, Tremella fuciformis,* and *Vibrissea dura,* the **mosses** *Bryum argenteum, Campylopus introflexus, Fissidens* sp., *Funaria hygrometrica, Leptostomum inclinans, Pleurophascum grandiglobum, Polytrichum juniperinum,* and *Ptychomnion aciculare,* the **liverworts** *Lepidozia obtusiloba, Plagiochila gigantea, Riccia bifurca,* and *Riccia crinita,* and the **hornwort** *Anthoceros laevis.* If you'd like to purchase a copy and/or see electronic samples of some of its pages, e-mail Judith at judith@canbg.gov.au

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Platygrapha albovestita C. Knight, an additional synonym for *Cyclographina platyleuca* (Nyl.) D.D. Awasthi & M. Joshi

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Platygrapha albovestita C. Knight was described from material collected "in the neighbourhood of Sydney" (Knight 1882), and additional specimens were later collected by F. Wilson in Southport (Queensland) and Manly (New South Wales). An examination of Knight's holotype from WELT and the Wilson specimens showed them to contain protocetraric acid and large, hyaline, muriform ascospores, and to be identical with *Cyclographina platyleuca* (Nyl.) D.D. Awasthi & M. Joshi.

Knight was uncertain as to the exact generic position of his new species, and published the name with a question mark: *Platygrapha*(?) *albovestita*. Wilson recognized the species as a *Graphina* species, and made the combination "*Graphina albovestita* (C. Knight) Wils." *in sched*, but this name was never published. Zahlbruckner placed the species in the genus *Schismatomma*, as *Schismatomma albovestitum* (C. Knight) Zahlbr. (Zahlbruckner 1923), but this combination is rejected in the current Australian checklist (Filson 1996).

Cyclographina platyleuca (Nyl.) D.D. Awasthi & M. Joshi
[additional synonyms and a detailed description are given elsewhere (Archer 1999)]
= *Platygrapha*(?) *albovestita* C. Knight, in *Trans. Linn. Soc. London, Bot.* **2**: 43 (1882). Type: AUSTRALIA. New South Wales: Sydney, *C. Knight no. 26,* no date; holotype: WELT (L5926A).
= *Graphina albovestita* (C. Knight) F. Wilson, *in sched.*
= *Schismatomma albovestitum* (C. Knight) Zahlbr.

SPECIMENS EXAMINED
Australia. *Queensland*: •Southport, *F. Wilson, s.n.,* no date (NSW). *New South Wales*: •Manly, *F. Wilson s.n.,* Oct. 1888 (NSW); *ibid., F. Wilson s.n.,* Nov. 1897 (NSW L-4992, L-153559).

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Contributions to a history of New Zealand lichenology 3*. The French

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Introduction

For the first half of the 19th century, the published record of New Zealand lichenology derives from visits of either British or French botanists to North Auckland, Cook Strait, Banks Peninsula, and the subantarctic islands. The French were first on the scene, and over four decades lichenological discoveries were closely linked with the name of Jules Sebastian Cesar Dumont d'Urville (1790–1842). For discussions of the background to French exploration in the South Pacific, subantarctic and antarctic regions and New Zealand, see Godley (1965), Dunmore (1969, 1993, 1997b), Ducker (1979) and Fogg & Smith (1990).

The Coquille expedition (1822–1824)

On 11 August, 1822, the corvette *Coquille* under the command of Louis-Isidor Duperrey (1786–1865) left Toulon on a round-the-world voyage to study terrestrial magnetism, meteorology, and natural history (Godley 1965; Dunmore 1969, 1992). Duperrey's second-in command was Dumont D'Urville, a botanist of some eminence, who was assisted by Rene Primiverre Lesson, elder brother of Pierre Adolphe Lesson (botanist with Dumont d'Urville on the *Astrolabe*, 1826–1829). The *Coquille* dropped anchor in the Bay of Islands on 20 March, 1824, remaining there until 17 April (Wright 1950, Godley 1965, Dunmore 1969, Dawson 1993). Specimens of *Pseudocyphellaria* collected by Lesson and Dumont d'Urville in the Bay of Islands were examined by D.F. Delise (Delise 1825a, 1825b) shortly after the expedition's return to France, and from this material he described *Sticta carpoloma* Delise [= *Pseudocyphellaria carpoloma* (Galloway *et al.* 1983: 138–139; Galloway & James 1986: 433, 466–467, fig. 15A, B; Galloway 1988: 80–83)], and recorded *S. aurata* and *S. angustata* [both referable to *Pseudocyphellaria aurata*]. The account of the lichens collected during the *Coquille* voyage was prepared by Bory de St-Vincent (1829), who recorded *Sticta aurata* and *S. corpoloma* [sic] from R.P. Lesson's Bay of Island collections.

Though brief, this period of three weeks was of great significance, as it inspired Dumont d'Urville to write a novel about the country and its inhabitants on the homeward voyage to France in 1825 (Dumont d'Urville 1992). D'Urville was fascinated by the Maori people and all aspects of their culture. His purpose in writing the novel was to inform readers in an accessible way about a people living diametrically opposite to France on the globe, and about whom little more than their name was then generally known (Legge 1997).

D'Urville's first *Astrolabe* expedition (1826–1829)

Dumont d'Urville's second expedition in the *Coquille*, renamed the *Astrolabe* in honour of the ill-fated La Perouse (whose ship, also named *Astrolabe*, was wrecked on the coast of Vanikoro in the Santa Cruz Islands), was a notable voyage and probably made the most important French contribution of all to New Zealand science (Dawson 1997). This was no doubt due in large part to Dumont d'Urville himself, who was renowned as both a scientist and a navigator. He assembled a well-equipped vessel and team of naturalists including the surgeons Quoy and Gaimard,

* Part 2 was published in *Australasian Lichenology* **45**, 28–35 (1999).

and the Lieutenants Lottin, Jacquinot and Pierre-Adolphe Lesson (younger brother of René Lesson). The *Astrolabe* spent from 11 January until 22 March, 1827, exploring parts of the coast that Cook had not earlier surveyed in detail (Wright 1950; Godley 1965; Dunmore 1969, 1992, 1997a, 1997b). Their landfalls produced many important botanical discoveries in New Zealand (Richard 1832, Godley 1965, Dawson 1993). Dumont d'Urville's major collecting sites were from Astrolabe Harbour on the Nelson shores of Cook Strait and the Hauraki Gulf in the vicinity of Auckland Harbour [noted by Richard (1832) as the Thames Estuary] (Richard 1832, Godley 1965, Dunmore 1969, Rosenman 1987). Achille Richard's account of lichens in his *Essai d'une Flore de la Nouvelle Zélande* (Richard 1832: 23–38) included descriptions of five new taxa (*Parmelia aurea, Sticta latifrons, S. cinnamomea, Nephroma australe,* and *Stereocaulon macrocarpum*), and recorded the following:

Alectoria crinalis [= ?*Cladia aggregata*] — "in Nova- Zeelandia".
Cenomyce ecmocyna [= ?*Cladonia* sp.] — "ad terram in Nova-Zeelandia".
Cenomyce furcata [= *Cladonia furcata*] — Astrolabe Harbour.
Cenomyce rangiferina [= ?*Cladonia scabriuscula*] — Astrolabe Harbour.
Cenomyce retipora [= *Cladia retipora*] — Astrolabe Harbour.
Cetraria glauca [= ?*Tuckermannopsis chlorophylla*] — Astrolabe Harbour.
Coenogonium linkii [= *Coenogonium implexum*] — Astrolabe Harbour.
Collema nigrescens [= ?*Collema* sp.] — Astrolabe Harbour.
Collema tremelloides [= *Collema subconveniens*] — Astrolabe Harbour.
Cornicularia aculeata [= *Cladia aggregata*] — Astrolabe Harbour.
Nephroma australe A. Rich. — Astrolabe Harbour.
Parmelia aurea A. Rich. [= *Xanthoria ligulata*] — Astrolabe Harbour.
Parmelia perlata [= *Parmotrema chinense*] — Astrolabe Harbour.
Parmelia pulverentula [= *Physcia adscendens*] — Cook Strait.
Ramalina farinacea [= *Ramalina pacifica* (Blanchon *et al.* 1996: 89)] — Astrolabe Harbour.
Stereocaulon macrocarpum A. Rich. [= *Stereocaulon ramulosum* (Galloway 1980: 271)] — Astrolabe Harbour.
Stereocaulon ramulosum — Thames estuary.
Sticta aurata [= *Pseudocyphellaria crocata*] — Astrolabe Harbour.
Sticta carpoloma [= *Pseudocyphellaria rufovirescens* (Galloway *et al.* 1983: 140, Galloway 1988: 235)] — Astrolabe Harbour.
Sticta cinnamomea A. Rich. [= *Pseudocyphellaria cinnamomea* (Galloway & James 1980: 294, Galloway 1988)] — Astrolabe Harbour.
Sticta filicina [= *Sticta filix* (Galloway 1997)] — "Nova Zeelandia ex Forster".
Sticta latifrons A. Rich. (Galloway 1985a: 557–558; 1997: 109, fig. 5) — Astrolabe Harbour.
Sticta mougeotiana [= *Pseudocyphellaria crocata* (Galloway 1998)] — Thames estuary.
Sticta variabilis [= *Pseudocyphellaria multifida* (Galloway 1988)] — Astrolabe Harbour.
Usnea ceratina [= ?*Usnea ciliifera*] — Astrolabe Harbour.
Usnea cornicularia [= *Ramalina australiensis* (Galloway 1985: 501; Blanchon *et al.* 1996: 68)] — "Nova-Zeelandia, Forster (ex Achario)".
Usnea florida [= ?*Usnea pusilla*] — Bay of Islands.

The atlas of plates (Richard 1833) contained attractive coloured engravings of *Parmelia aurea, Stereocaulon macrocarpum, Sticta carpoloma, Sticta cinnamomea,* and *Sticta latifrons.*

D'Urville's second *Astrolabe* expedition (1837–1840)

This expedition with the ships *Astrolabe* and *Zélée* took Dumont d'Urville deep into Antarctic waters (Godley 1965, 1967; Dunmore 1969, 1992, 1997a, 1997b; Galloway 1985b; Rosenman 1987; Dawson 1993). Botanical collecting was the province of Jacques Hombron, senior surgeon of the *Astrolabe*, and Honoré Jacquinot, junior surgeon of the *Zélée*, with the senior surgeon of the latter vessel, E. Le Guillou, also making botanical collections. Dumont d'Urville, Hombron, Jacquinot, and Le Guillou all collected lichens. Their collections (see below) are preserved in Paris, the New Zealand specimens especially being particularly handsome, with elegantly printed labels giving details of habitat, locality, date and collector. In the New Zealand region, lichens were collected from the Auckland Islands, and (towards the end of the voyage) several anchorages were made in New Zealand, first in Hooper's Inlet, Otago Peninsula, then in the wooded harbour of Akaroa (Godley 1967), where rich gatherings of *Pseudocyphellaria* were made, and finally in the Bay of Islands. The lichens of the voyage were published by Montagne (1845) and included:

Cladonia aggregata [= *Cladia aggregata*] — Auckland Is.
Cladonia retipora [= *Cladia retipora*] — Bay of Islands.
Cladonia uncialis [= *C. capitellata*] — Auckland Is.
Parmelia conspersa [= ?*Xanthoparmelia australasica*] — Bay of Islands.
Parmelia physodes var. *vittata* [= *Hypogymnia lugubris*] — Auckland Is.
Sphaerophoron compressum [= *Bunodophoron australe* (Wedin 1995)] — Auckland Is.
Sphaerophoron tenerum [= *Leifidium tenerum* (Wedin 1993)] — Auckland Is.
Sticta delisea [= *Pseudocyphellaria glabra* (Galloway 1988)] — Auckland Is.
Sticta orygmaea [= *Pseudocyphellaria coronata* (Galloway 1988)] — Auckland Is.
Sticta richardii [= *Pseudocyphellaria rufovirescens* (Galloway 1988)] — Akaroa.
Sticta variabilis [= *Pseudocyphellaria multifida* (Galloway 1988)] — Auckland Is.

The Atlas contained a sumptuous hand-coloured plate devoted to lichens (including *Pseudocyphellaria coronata*), the production drawing from W.J. Hooker the comment "...six livraisons are before us, each containing five plates, of an atlas folio size, executed in line engraving, with a degree of luxury wholly unknown in the annals of the Voyages of the British nation, but which unfortunately prevents their being so widely useful, by the necessarily high price..." (Hooker 1844). The results of the expedition were outstanding. Dunmore (1997a: 170) summarized d'Urville's achievement "...Dumont d'Urville brought back thousands of natural history specimens and artists' drawings, detailed charts of little-known coastlines, and he could claim major discoveries in the Antarctic. He was promoted to rear-Admiral, received the Société de Géographie's gold medal, and was asked to start on the official account of the expedition, which the Government would print at its expense. His third voyage ensured for him the fame and recognition that he had yearned for, but he was not to enjoy it for long: he was killed in a railway accident on 8 May, 1842. With him died his wife and his only surviving son."

Raoul's lichens (1840–1843)

Etienne Fiacre Louis Raoul (1815–1852), a French naval doctor, was stationed at Akaroa from August, 1840, to January, 1843, on board the warships *Aube* and *Allier* (Godley 1967, 1998; Simpson 1976, 1984; Bulfin *et al.* 1998). A synopsis of the history of the association of the French with Akaroa is given by Tremewan (1997). During his time in Akaroa, Raoul collected a number of lichens. His published list of New Zealand plants (Raoul 1846) includes 79 lichens, of which 15

were his own collections from Banks Peninsula. The list incorporates taxa published earlier by Achille Richard (1832), and for the Bay of Islands collections of Allan Cunningham (Cunningham 1836) and Joseph Hooker (Hooker & Taylor 1844), together with species he collected himself, the collections being named for him by Joseph Hooker, who visited Paris to see Montagne and the lichen herbarium of the Jardin des Plantes in 1844. Raoul's Banks Peninsula lichens, subsequently studied by Babington (1855) and Hooker (1867), included:

Cenomyce aggregata [= *Cladia aggregata*]
Cenomyce fimbriata [= *Cladonia fimbriata*]
Cenomyce retipora [= *Cladia retipora*]
Collema tremelloides [= *Collema subconveniens*]
Parmelia perforata [= *Rimelia reticulata*]
Peltidea polydactyla [= *Peltigera dolichorhiza*]
Ramalina fraxinea [= *Ramalina celastri*]
Sticta carpoloma [= *Pseudocyphellaria rufovirescens*]
Sticta filicina [= *Sticta filix*]
Sticta flavicans [= *Pseudocyphellaria pickeringii*]
Sticta herbacea [= *Sticta cinereoglauca*]
Sticta latifrons
Sticta orygmaea [= *Pseudocyphellaria coronata*]
Usnea florida [? *Usnea pusilla*]
Usnea plicata [?]

This is the small but solid base upon which is founded the scientific study of lichens in Canterbury (Galloway 1998).

Filhol's lichens (1874)

The French Transit of Venus Expedition, a joint venture of the Academie des Sciences, Institut de France, and the French Navy, was despatched to Campbell Island in 1874. The expedition stayed on the island from mid October until the end of December (Godley 1970: 63–64). Dr Henri Filhol (1843–1902), then of the Ministry of Public Instruction, was surgeon, biologist and geologist. After leaving Campbell Island, the expedition called at Invercargill and Dunedin early in 1875 on their way back to France. Filhol collected lichens on Campbell Island in 1874 and also from the vicinity of Invercargill in 1875. Nylander's paper on Filhol's collections from Campbell Island (Nylander 1876) enumerated 39 taxa, with 13 being newly described (including one lichenicolous fungus, *Lecidea cladonioica*). Nylander's names are listed below, with modern equivalents (where applicable) placed in parenthesis with the relative supporting reference(s):

Argopsis megalospora Th. Fr. [Lamb 1974: 447; Galloway 1980: 263]
Cladia aggregata Eschw. [= *Cladia aggregata* (Sw.) Nyl. (Filson 1981: 14–20; Stenroos 1993:313)]
Cladia retipora Ach. [= *Cladia retipora* (Labill.) Nyl. (Filson 1981: 23)]
Cladina interhiascens Nyl. nov. sp. [= *Cladonia capitellata* (Hook.f. & Taylor) C. Bab. (Archer 1986a: 192)]
Cladonia bacillaris Ach. [= *C. weymouthii* F.Wilson ex A.W. Archer (Archer 1985: 94; Archer & Bartlett 1986: 583; Stenroos 1993: 317; 1995: 109)]
Cladonia carneopallida Flörke [according to Prof. T Ahti (in litt.) "Nylander used the name for pale-fruiting specimens of the *C. chlorophaea / pyxidata* complex"]
Cladonia cornuta f. *gracilentior* Nyl. [= *C. ochrochlora* (Ahti 1980: 238)]

Cladonia fimbriata f. *subcornuta* Nyl. [= *C. fimbriata* (L.) Fr. (Stenroos & Ahti 1990: 321; Stenroos 1993: 328; Jørgensen *et al.* 1994: 311)]
Cladonia pyxidata L. [= *C. pyxidata* (L.) Hoffm. (Jørgensen *et al.* 1994: 345–347; Stenroos 1993: 330)]
Cladonia rigida Tayl. [= *C. rigida* (Hook.f. & Taylor) Hampe (Dodge 1948: 125–126; Galloway 1985: 119; Ahti *et al.* 1990: 174–175). These latter authors synonymize *C. squamosula* Müll. Arg. (see Ahti & Kashiwadani 1984: 144; Galloway 1985: 121–122; Archer 1986b: 245, all as *C. squamosula*) in *C. rigida*. See also Stenroos (1995: 105)]
Cladonia scabriuscula Delise [= *C. scabriuscula* (Delise) Leight. See Stenroos (1993: 334; Stenroos 1995: 106)]
Cladonia subdigitata Nyl. nov. sp. [= *C. ustulata* (Hook.f. & Taylor) Leight. Discussed by Galloway (1985: 122) and Filson & Archer (1986: 231) as *C. subdigitata*, it was subsequently synonymized in *C. ustulata* by Stenroos (1993: 318)]
Cladonia subdigitata var. *polydactyloides* Nyl. [?= *C. ustulata*]
Cladonia subsubulata Nyl. nov. sp. [Archer & Bartlett (1986: 581) referred New Zealand material of *C. aueri* Räsänen (Galloway 1985: 104) and *C. carassensis* Vain. (Galloway 1985: 107) to *C. subsubulata*. Subsequently, Stenroos & Ahti (1990: 319) kept *C. aueri* and *C. subsubulata* as distinct species, but later Stenroos (1993) synonymized all austral material of *C. aueri*, and *C. subantarctica* Filson & A.W. Archer from Macquarie Island (Filson & Archer 1986: 230), under *C. subsubulata*. See also Stenroos (1995: 108)]
Cladonia verticillata Hoffm. [= *C. cervicornis* ssp. *mawsonii* (C.W. Dodge) Stenroos & Ahti (Filson & Archer 1986: 219, as *C. cervicornis* ssp. *verticillata* (Hoffm.) Ahti; Stenroos & Ahti (1990: 320); Stenroos (1993: 324; 1995: 97)]
Lecanora araneosa C. Bab. [= *Psoroma araneosum* (C. Bab.) Nyl. (Galloway 1985: 468)]
Lecanora pholidotoides f. *crispella* Nyl. [= *Psoroma sphinctrinum* (Mont.) Nyl. Originally described as *Psoroma sphinctrinum* var. *crispellum* Nyl. (Nylander 1869: 25) from a North Island specimen collected by Colenso (No. 4705 in BM)]
Lecanora sphinctrina Mont. [= *Psoroma sphinctrinum* (Mont.) Nyl. (Galloway 1985: 481)]
Lecanora sphinctrina var. *leproloma* Nyl. nov. var. [= *Psoroma leprolomum* (Nyl.) Räsänen (Galloway 1985: 476)]
Lecanora subgelida Nyl. nov. sp. [= *Placopsis subgelida* (Nyl.) Nyl. (Lamb 1947: 264)]
Lecanora xanthomelana Nyl. [= *Psoroma xanthomelanum* Nyl. (Galloway 1985: 482)]
Pertusaria thelioplaca Nyl. nov. sp. [= *Coccotrema cucurbitula* (Mont.) Müll. Arg. (Messuti 1996: 58)]
Pertusaria tyloplaca Nyl. nov. sp. [= *Ochrolechia xanthostoma* (Sommerf.) Lumbsch & Schmitz (Archer 1997: 227)]
Lecidea caesiopallens Nyl. sp. nov. [= *Catillaria melanotropa* (Nyl.) Zahlbr. (Galloway 1985: 77–78)]
Lecidea campelliana Nyl. sp. nov. [= *Mycoblastus campbellianus* (Nyl.) Zahlbr. (Galloway 1985: 297–298)]
Lecidea cladonioica Nyl. sp. nov.
Lecidea marginiflexa Tayl. [= *Megalospora gompholoma* (Müll. Arg.) Sipman ssp. *gompholoma* (Sipman 1983: 105)]
Parmelia pertusa Schrank. [= ?*Menegazzia neozelandica* (Zahlbr.) P. James]
Sphaerophoron australe Laurer [= *Bunodophoron australe* (Laurer) Wedin (Wedin 1993:232; 1995: 38)]

Sphaerophoron compressum Ach. [= *Bunodophoron australe* (Laurer) A. Massal. (Wedin 1995:38)]
Sphaerophoron tenerum Laurer [= *Leifidium tenerum* (Laurer) Wedin (Wedin 1993, 1995)]
Stereocaulon argodes Nyl. nov. sp. [= *Stereocaulon argus* Hook.f. & Taylor (Lamb 1977: 286, 319; Galloway 1980: 266)]
Stereocaulon ramulosum Nyl. nov. ssp. [= *S. ramulosum* (Lamb 1977: 285, as *Stereocaulon ramulosum* var. *submollescens* (Nyl.) Lamb; Galloway 1980: 272)]
Stereocaulon ramulosum (Ach.) Nyl. [= *S. ramulosum* (Sw.) Rauschel (Lamb 1977: 278; Galloway 1980: 271)]
Stereocaulon ramulosum [= *S. ramulosum* (Lamb 1977: 282n as *Stereocaulon ramulosum* var. *macrocarpum* (Rich.) Bab.; Galloway 1980: 271)]
Sticta freycinetii sensu Nyl. *non* Delise [= *Pseudocyphellaria glabra* (Hook.f. & Taylor) C.W. Dodge (Galloway 1988: 146–152)]
Sticta orygmaea Ach. [= *Pseudocyphellaria coronata* (Müll. Arg.) Malme (Galloway 1988:106–108)]
Sticta physciospora Nyl. [= *Pseudocyphellaria physciospora* (Nyl.) Malme (Galloway 1988: 213–218)]
Usnea xanthopoga Nyl. sp. nov. [Galloway (1985: 604); Stevens (1999: 114–117)]

Filhol himself later gave a list of 47 lichen species known from Campbell Island (Filhol 1885), comprising 13 taxa mentioned by Hooker in his Handbook (Hooker 1867), together with Nylander's names (Nylander 1876), and four names from Thomas Kirk's list of Campell Island plants (Kirk 1882), not mentioned by either Hooker or Nylander. Filhol's lichen collections on Campbell Island and Nylander's paper on these collections have had a considerable subsequent relevance in the annals of subantarctic island lichenology (see Lamb 1947; Ahti 1980; Stenroos 1993, 1995; Stenroos & Ahti 1990). As Godley (1970: 65) states "...The French will always be associated with Campbell Island, not only by their pioneer scientific observations but by the names which they left behind". As an example, Filhol's association with Campbell Island is honoured in Mt Filhol.

Notes on collections:

By far the most numerous collections of New Zealand lichens made by French botanists are to be found in the cryptogamic collections of the Musée d'Histoire Naturelle, in the rue Buffon in Paris (PC). The lichen herbarium is very extensive and is one the world's major historical lichen collections. The bulk of its collections derive from the late 18th century and from the 19th century when France was an expansionist colonial power organizing many naval and scientific expeditions. In addition, the herbarium was the workplace of the important 19th century lichenologists Jean Pierre François Camille Montagne (1784–1866), William Nylander (1822–1899) and the Abbé Auguste-Marie Hue (1840–1917), all of whom published extensively on lichen collections in their care. Although Nylander's personal lichen herbarium, comprising some 51,066 specimens, is now housed in the University of Helsinki (H-NYL), the majority of specimens (including types) are very small and represent fragments of material sent to him by other collectors (Ahti 1990). In the case of material from PC, it is generally possible to find there ample collections studied by Nylander, from which he took his small "kleptotypes" now in H-NYl, and as Ahti (1990: xviii) suggests "...In some cases it is better to select lectotypes from his duplicates in other herbaria...e.g. in Paris, London and Stockholm". Many lichen herbaria in PC are maintained as separate collections apart from the Herb. Generale (PC-GÉNÉRALE), and New Zealand lichens are found in the following collections: Herbier R. Bonaparte, Herb. Émile Cosson, Herb.

Dumont-D'Urville (PC-DUMONT D'URVILLE), Herb. Hue (PC-HUE), Herb. Lenormand (PC-LENORMAND), Herb. Montagne (PC-MONTAGNE), and Herb. Thuret (PC-THURET).

An inventory of collectors and their lichen herbaria deposited in PC was recently published (Lerond *et al.* 1987). The following collectors of New Zealand lichens were located during three visits to PC (1982, 1983, 1988):

William Colenso: Material in PC-MONTAGNE of *Pseudocyphellaria* and *Sticta*, sent to Montagne by Churchill Babington, and by Joseph Hooker.

Dumont-D'Urville: Material in PC-GÉNÉRALE, in PC-MONTAGNE and PC-THURET and an extensive lichen herbarium of his own PC-DUMONT-D'URVILLE with many New Zealand specimens still in drying papers, unsorted and uncurated.

H. Filhol: Collections from "Invercargill, Detroit de Foveaux, 1875" *Sticta filix*, *S. latifrons* in PC-MONTAGNE and specimens also in PC Herb. E. Cosson — material from Campbell I. 1874, material also in PC-GÉNÉRALE: *Pseudocyphellaria coronata* (as *Sticta orygmaea*) from Campbell I., 1874, and Invercargill, 1875. Also *P. homoeophylla* and *P. subvariabilis* from Invercargill, 1875. A separate compartment of Filhol lichens is in PC GÉNÉRALE marked "Campbell Id — Filhol 1874" comprising: *Cladia aggregata* (six packets), *Cladonia scabriuscula* (seven packets), *Leifidium tenerum* (eight packets), *Stereocaulon "macrocarpum"* six packets, *Stereocaulon ramulosum* (22 packets), *Sticta physciospora* (two packets) and *Sticta coronata* (one packet).

Jacques Hombron: Material from Akaroa, the Bay of Islands, and the Auckland Islands in PC-GÉNÉRALE [including the type of *Sticta fossulata* ssp. *physciospora* (Galloway 1998: 213)], in PC-LENORMAND and in PC-MONTAGNE.

J.D. Hooker: Material in PC-LENORMAND and PC-MONTAGNE, from the Bay of Islands and from the Auckland Islands, sent by Hooker to Montagne after his visit to Paris in 1844.

E. Le Guillou: Material from the Bay of Islands and from the Auckland Islands in PC-MONTAGNE.

Honoré Jacquinot: Material from the Auckland Islands in PC-MONTAGNE.

Charles Knight: Material sent by Knight to Nylander in PC-HUE.

R.P. Lesson: Material from the Bay of Islands in PC-GÉNÉRALE, PC-LENORMAND and PC-THURET,

D. Lyall: Material of *Pseudocyphellaria* in PC-MONTAGNE, from New Zealand and the Auckland Islands.

E. Raoul: Material from Banks Peninsula in PC-GÉNÉRALE.

Achille Richard: Material in PC-THURET, including the types of *Sticta cinnamomea* (Galloway 1988: 91) and *S. latifrons* (Galloway 1997: 109)

Andrew Sinclair: Material of *Pseudocyphellaria* from the Bay of Islands and from Nelson in PC-MONTAGNE, deriving from material sent to Montagne by Joseph Hooker from Kew, after Hooker's Paris visit of 1844.

W.T.L. Travers: A small collection of lichens from New Zealand (?Nelson) and the Chatham Islands sent to Hue and preserved in PC-HUE, including the type of *Pilophoron cariosum* Hue (= *Metus conglomeratus*).

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A new species of *Karoowia* from Australia

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Abstract: *Karoowia brachinaensis*, collected in the Flinders Ranges, South Australia, is reported as new to science.

Karoowia Hale is a small lichen genus characterized by very tightly adnate, subcrustose thalli, the lack of well-developed cylindrical rhizines, the prevalence of aspicilioid apothecia, relatively long, bacilliform conidia, cortical usnic acid and fungal cell walls containing *Xanthoparmelia*-type lichenan (Brusse 1986, Elix 1994, Hale 1989). Some species were originally included in *Xanthoparmelia* but were segregated when Mason Hale (1989) erected this genus. South Africa is the centre of distribution of *Karoowia* (19 species), two species of which have also been reported from Australia (i.e. *K. ralla* (Brusse) Hale and *K. saxeti* (Stizenb.) Hale). Species of *Karoowia* occur on exposed rocks in semi-arid and arid areas. In this paper I am describing a new species from the Flinders Ranges in northern South Australia.

Karoowia brachinaensis Elix, sp. nov. Figs. 1–3

Thallus ut in *Karoowia ralla* sed lobis isidiatis et sporis minoris differt.

Type: **Australia**. *South Australia*: Flinders Ranges, Brachina Gap, S-facing side of gorge along watercourse with scattered *Eucalyptus, Callitris* and *Myoporum*, *ca.* 250 m, 31°20'S, 138°34'E, on sandstone, *H.T. & E. Lumbsch & J. Curnow 10713f*, 31.viii.1994 (holotype: CANB).

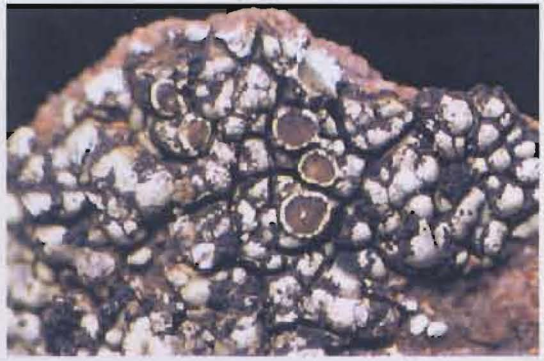
Thallus subcrustose, very tightly adnate, to 3 cm wide. *Lobes* contiguous, flat, subirregular, irregularly branched, 0.2–0.8 mm wide, apices placodiform; laciniae absent. *Upper surface* yellow-green, darkening with age, weakly convex, shiny, smooth, emaculate, commonly areolate towards thallus centre, lacking soredia, isidiate; isidia cylindrical, simple or sparingly branched, apices black-tipped, syncorticate. *Medulla* white. *Lower surface* flat, pale brown, erhizinate, with a well-developed layer of rhizohyphae and poorly developed lamella-like loose aggregations of rhizohyphae. *Apothecia* sessile, to 0.8 mm wide; disc concave then ± flat, dark brown; thalline exciple isidiate. *Ascospores* ellipsoid, 9–11 × 5–6 µm. *Pycnidia* not seen.

Chemistry: cortex K–, medulla K–, C–, KC+ rose, P–, containing usnic acid (major), norlobaridone (submajor), subnorlobaridone (minor).

Morphologically and chemically, this new species resembles *Karoowia ralla* (Brusse) Hale, as both species have subcrustose thalli which lack rhizines and contain norlobaridone in the medulla. However, *K. brachinaensis* is distinguished by the presence of cylindrical isidia and smaller spores (9–11 × 5–6 µm), whereas *K. ralla* lacks isidia and has larger spores (10–14 × 5–6 µm). *Karoowia brachinaensis* would appear to be the isidiate counterpart of *K. ralla*. At present the species is known only from the type collection.

Habit. 5 mm

Thallus margin. 1 mm



Mature apothecia. 1 mm

Figs. 1–3. *Karoowia brachinaensis* Elix sp. nov.

Key to *Karoowia* in Australia

1. Thallus lacking isidia; medulla KC+ rose, containing norlobaridone .. *K. ralla*
1. Thallus isidiate; medulla KC+ red or rose, containing norlobaridone or salazinic acid 2
2. Medulla K+ yellow then dark red, salazinic acid present ..... *K. saxeti*
2. Medulla K–, KC+ rose, norlobaridone present ..... *K. brachinaensis*

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Porina austropacifica (Trichotheliaceae), a new species from Norfolk Island

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Corticolous species of *Porina* Ach. (Trichotheliaceae) can be among the most diverse and abundant pyrenocarpous lichen genera in tropical and subtropical forests. Many have pale yellowish grey, pale brownish or pale green thalli, perithecia immersed in thalline verrucae and ascospores with seven or more transverse septa. While distribution is often localized, field work in remote and previously poorly studied regions has confirmed that an increasing number have much broader and often pantropical distributions. In this paper, *P. austropacifica*, a new and very distinctive species, is reported from Norfolk Island.

Porina austropacifica P.M. McCarthy, sp. nov.

Thallus epiphloeodalis, pallido olivaceobrunneus, adpressus, continuus vel leviter rimosus, verruculosus, 30–70 µm crassus. Perithecia in verrucis thallinis plerumque laevigatis, (0.45–)0.62(–0.82) mm diametro immersa. Centrum 0.25–0.35 mm diametro. Asci 120–138 × 15–18 µm. Ascosporae (9–)11(–13)-septatae, elongatae fusiformes, (48–)58.5(–70) × (7–)8.5(–10) µm, apicibus proximalibus gradatim protractis.

Thallus epiphloeodal, determinate, pale olive-brown, 30–70 µm thick, closely adpressed to the substratum, continuous to sparingly rimose, matt to slightly glossy, heavily impregnated with crystals that form a discontinuous layer below the algae or become aggregated and become the core of verruculae. Surface densely verruculose, K–, becoming more intensely green when wetted; verruculae applanate to shallowly convex, round to irregular, 60–120 µm wide. Cortex not apparent or an 8–12 µm thick, alga-free, ± parenchymatous layer. Algae *Trentepohlia*; cells subglobose to globose, 6–10 × 6–9 µm. Hyphae 2–3 µm wide. Prothallus not apparent. Basal layer absent.

Perithecia very numerous, immersed in thalline verrucae. Apex slightly concave, plane or slightly convex, with a concolorous apex or a pale orange-brown periostiolar area to 0.2 mm diam. Verrucae strongly convex to hemispherical, (0.45–)0.62(–0.82) mm diam. [n = 60]; wall to 0.2 mm thick at the base; surface smooth to slightly uneven. Involucrellum vestigial, dimidiate or extending to excipulum base level, orange-brown (thin section), K+ reddish. Excipulum pale to medium orange brown near the ostiole, pale yellowish brown at the base, c. 12–15 µm thick. Subhymenium 25–35 µm deep. Centrum depressed-ovate, 0.25–0.35 mm diam. Paraphyses unbranched, 0.7–1 µm thick. Periphyses absent. Asci elongate-cylindrical to elongate-obclavate, 8-spored, 120–138 × 15–18 µm [n = 10], with a rounded to subtruncate apex; apical ring not apparent. Ascospores colourless, (9–)11(–13) septate, elongate-fusiform, tapering gradually to the proximal end, straight, curved or faintly sigmoidal, irregularly biseriate in the asci, (48–)58.5(–70) × (7–)8.5(–10) µm [n = 60]; contents clear; immature spores with a 1–2 µm thick gelatinous sheath.

Conidiomata not seen.

Illustration: Figure 1.

Type: Norfolk Island, Mt Pitt Reserve, track leading west from Mt Bates, 29°0.5'S, 167°56.5'E, 280 m, on lemon stem in poor forest on ridge, *H. Streimann 34261*, 6.xii.1984 (Holo: CANB).

Notes: *Porina austropacifica* is characterized by its densely verruculose thallus, medium-sized, thallus-dominated perithecial verrucae with concolorous to pale orange-brown apices, and elongate, multiseptate ascospores that taper gradually towards the proximal end.

Many corticolous *Porina* species in tropical regions have pale sandy or olivaceous brown thalli, concolorous perithecial verrucae and elongate, 7- to multiseptate ascospores. Examination of many types and other authentic specimens by me and the comparative reliability of descriptions provided by J. Müller (Argoviensis), E. A. Vainio and G.O.A. Malme confirm the novelty of *P. austropacifica*.

Some of the most abundant tropical species are broadly similar in appearance to *P. austropacifica*, but have mostly or entirely 7-septate ascospores; these include *P. africana* Müll. Arg., *P. mastoidea* (Ach.) Müll. Arg., *P. nucula* Ach., *P. rudiuscula* (Nyl.) Müll. Arg. and *P. tetracerae* (Ach.) Müll. Arg.

Many other tropical species have many or all spores with more than 7 septa, and it is appropriate to review these taxa and compare them with *P. austropacifica*.

- *Porina americana* Fée, first reported from the Caribbean, is one of a number of species from the Neotropics with large (mostly 10–20 µm wide), multiseptate spores. All species in this poorly understood group require revision; they include *P. depressula* Müll. Arg., *P. gibbosa* Müll. Arg., *P. glauca* Müll. Arg., *P. mastoidiza* Müll. Arg., *P. plicatula* Müll. Arg. and *P. rhodostoma* Müll. Arg. (Müller 1885, 1888).
- *Porina belanospora* (Nyl.) Müll. Arg., first described from Colombia and recently reported from India, has a smooth thallus and fusiform ascospores, and the perithecia are 0.2–0.3 mm diam. (Makhija *et al.* 1994).
- *Porina bellendenica* Müll. Arg., from the eastern Paleotropics and the South Pacific, has smaller perithecial verrucae (0.35–0.6 mm diam.), each with a dark brown to black periostiolar cap, and more elongate, 9–15-septate ascospores (McCarthy 1993).
- *Porina conspersa* Malme, from southern Brazil, has a thick, papillate-isidiate thallus and larger perithecial verrucae, and the ascospores are mainly 9-septate (Malme 1929).
- *Porina dolichophora* (Nyl.) Müll. Arg., from the Neotropics, has perithecial verrucae 0.52–1.1 mm diam., and 13–21-septate ascospores 62–109 × 5–7 µm (McCarthy 1993).
- *Porina erawanensis* P.M. McCarthy & Vongshewarat, from Thailand, also has smaller verrucae (0.34–0.55 mm diam.), each with a dark brown to black periostiolar cap, and broader, 11–15-septate ascospores (Vongshewarat *et al.* 1999).
- *Porina exasperatula* Vain., from the Neotropics, has a smooth to slightly rugulose thallus, 0.8–1.3 mm diam. perithecial verrucae, and filiform, 25–35-septate ascospores measuring 70–160 × 3–4.5 µm (Aptroot & Sipman 1993).
- *Porina exserta* Müll. Arg., a predominantly saxicolous species from Brazil, has similar perithecial morphology and dimensions; however, the ascospores are more elongate and have 11–21 septa (McCarthy 1993).
- *Porina guaranitica* Malme, from the Neotropics and temperate and subtropical areas of the eastern Atlantic, has mostly subglobose perithecial verrucae, as well as much larger ascospores (50–102 × 7–14 µm) (McCarthy 1993).
- *Porina internigrans* (Nyl.) Müll. Arg., a rather common lowland species in the eastern Palaeotropics, has a smoother thallus, perithecial verrucae with a broad, dark brown to black periostiolar area, and longer and broader ascospores (51–92 × 9–17 µm) (McCarthy 1994a).

- *Porina isidiata* Kalb & Hafellner, from Macaronesia, has an isidiate thallus and mostly 7–9-septate ascospores that are 11–14 µm wide (Kalb & Hafellner 1992).
- *Porina limitata* C. Knight, from Queensland, has a much smoother thallus, smaller perithecial verrucae (although with similarly pale apices) and shorter, 7–9-septate ascospores (38–58 × 8–12 µm) (McCarthy 1994b).
- *Porina podocycla* Müll. Arg., from the Neotropics, has 0.3–45 mm diam. perithecial verrucae and acicular, 15–21-septate ascospores 60–80 × 3–4 µm (Malme 1929).
- *Porina simulans* Müll. Arg., from the Neotropics, has a habitat strikingly similar to that of *P. austropacifica*. However, the perithecial verrucae are smaller (0.29–0.55 mm diam.), and the mainly 7–9-septate spores are shorter (28–51 × 5.5–9.5 µm) (McCarthy 1993).
- *Porina tijucana* Vain., from Brazil and Colombia, has 0.8–1.6 mm diam. perithecial verrucae, each with a blackish, 0.2–0.7 mm diam. periostolar cap (McCarthy 1993).
- *Porina viridinigricans* Vain., *P. acicularis* Vain. and *P. diplotypa* Vain., from the Philippines, have multiseptate, acicular or narrowly fusiform ascospores (Vainio 1921). The protologues of these species suggest the possibility of some conspecificity, and all need to be critically compared with *P. bellendenica*, *P. dolichophora* and *P. exserta* (see above). Vainio (1921) also described *P. decamera*, *P. gigantospora*, *P. novemseptata* and *P. polymera* from the Philippines, and in all cases the perithecia and ascospores are much larger than those of *P. austropacifica*. As with the acicular-spored species, careful comparison with older Neotropical taxa is necessary.

The new lichen is known only from the type locality in Norfolk Island in the south-western Pacific Ocean.

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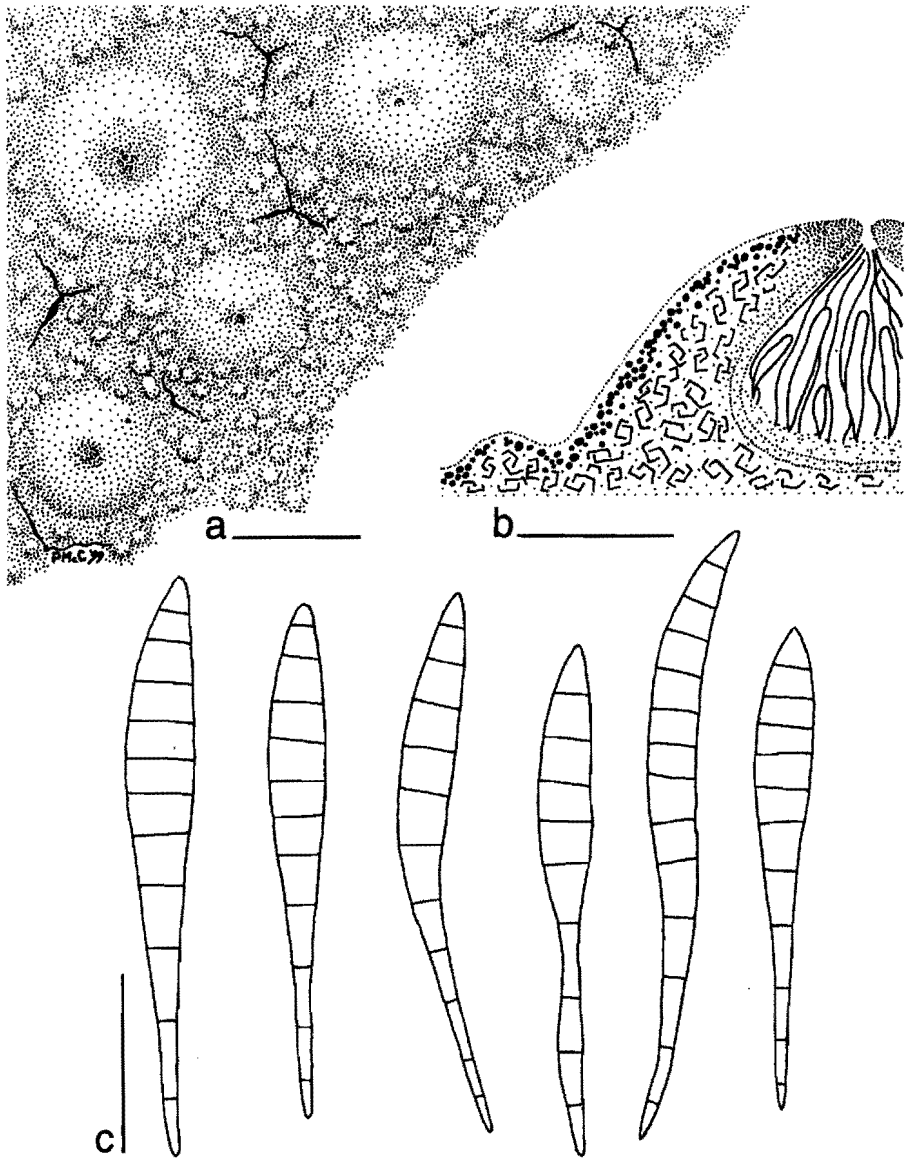

Fig. 1. *Porina austropacifica* (holotype). **a**, habit of thallus and perithecia; **b**, part of vertical section of perithecium and adjacent thallus (semi-schematic); **c**, ascospores. Scales a = 0.5 mm, b = 0.2 mm, c = 20 μm.

Norbaeomycesic acid, a new depside from the lichen *Hypotrachyna orientalis*

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Abstract: The new depside norbaeomycesic acid has been detected in extracts of *Hypotrachyna orientalis* together with barbatic acid, 4-*O*-demethylbarbatic acid, obtusatic acid, norobtusatic acid, and the cortical depsides atranorin and chloroatranorin.

The depsides (Fig. 1) barbatic acid (1) and 4-*O*-demethylbarbatic acid (2) are common, widely distributed in many lichen genera (Huneck & Yoshimura 1996). Several minor metabolites which co-occur with them in various species have yet to be identified. In this paper we describe the natural occurrence of norbaeomycesic acid (3) together with (1), (2), obtusatic acid (4), norobtusatic acid (5), atranorin (6), and chloroatranorin (7) in extracts of *Hypotrachyna orientalis* (Hale) Hale collected in New Caledonia.

Materials and methods

Authentic (synthetic) material of norbaeomycesic acid (3) was prepared from 3-formyl-2,4,dihydroxy-6-methylbenzoic acid (8). (St. Pfau 1933) and benzyl 2,4-dihydroxy-3,6-dimethylbenzoate (9) (Elix & Norfolk 1975) as follows: (Fig. 2).

3-Formyl-2,4-dihydroxy-6-methylbenzoic acid (8) (0.41 g, 2.1 mmol) and benzyl 2,4-dihydroxy-3,6-dimethylbenzoate (9) (0.57 g, 2.1 mmol) were dissolved in a solution of toluene (7 ml) and trifluoroacetic anhydride (2.5 ml) and stirred at room temperature for 5.5 h. The solvent was then evaporated and the residue applied to a silica gel column and eluted with 5–20% ethyl acetate–light petroleum. The faster moving band afforded benzyl norbaeomycesate (10) (37%), which crystallized from the eluant in colourless crystals, m.p. 125–126° (Found: C, 66.7; H, 4.8. $C_{25}H_{22}O_8$ requires C, 66.7; H, 4.9%). ^{1}Hn.m.r. ($CDCL_3$) δ 2.09, 2.53, 2.68, 3s, Me; 5.43, s, CH_2; 6.40, 6.50. 2s, ArH; 7.40, m, Ph.; 10.36, s, CHO. Mass spectrum *m/z* 272 (4%), 91 (100). A solution of benzyl norbaeomycesate (10) (0.35 g, 0.8 mmol) in ethyl acetate (20 ml) containing a suspension of 10% palladium on carbon (0.1 g) was stirred in an atmosphere of hydrogen for 30 min. The mixture was then filtered, the excess solvent evaporated under reduced pressure and the residue crystallized from ethyl acetate–light petroleum to give norbaeomycesic acid (3) (19%) as fine, colourless needles, m.p. 191–192°. ^{1}Hn.m.r. (CD_3COCD_3) δ 2.20, 2.74, 2.82, 3s, Me; 6.63 6.87, 2s, Arh; 10.46, s, CHO; 12.65, s, OH. Mass spectrum *m/z* 316 (M-CO_2, 0.14%), 196 (5), 194 (6), 182 (25), 179 (19), 164 (59), 151 (100). The natural norbaeomycesic acid was characterized by thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC).

Chromatography

Natural compounds were characterized by thin-layer chromatography (TLC) according to the methods standardized for lichen products (Culberson 1972, Elix & Ernst-Russell 1993) and by high-performance liquid chromatography (HPLC), with retention index values (R_I) calculated from benzoic acid and solorinic acid controls (Elix *et al.* 1997, Feige *et al.* 1993). The HPLC was coupled to a photodiode array detector for ultraviolet spectroscopic comparisons. By this means, the ultraviolet spectra observed for the various components eluting in the HPLC

chromatogram were recorded and computer-matched against a library of ultraviolet spectra recorded for authentic metabolites under identical conditions. For each substance, the correlation of ultraviolet spectra of the synthetic and natural material was greater than 99.9%.

Norbaeomycesic acid (3) exhibited standard TLC R_F values: R_F (A) 0.38; R_F (B) 0.35; R_F (C) 0.30; R_F (G) 0.57. Standard HPLC: R_T 27.4 min.; R_I 0.26.

Lichen material

NEW CALEDONIA. *Grande Terre*: •Mt Koghis, Malaoui Peak walk, 22°13'S, 166°32'E, 600 m, 5.vii.1999, *S. Louwhoff 1031 & J-M. Porigneaux* (CANB).

Discussion and results

The natural occurrence of norbaeomycesic acid (3) in the extracts of *Hypotrachyna orientalis* has now been confirmed. Comparisons were conducted between the synthetic ester (3), the total acetone extracts of *H. orientalis* by TLC in four independent solvent systems, and by HPLC coupled to a photodiode array detector for ultraviolet spectroscopic comparisons. The HPLC of such an extract is shown in Fig. 3. By these means *H. orientalis* was shown to contain atranorin (6) (minor), chloroatranorin (7) (minor), barbatic acid (1) (minor), 4-*O*-demethylbarbatic acid (2) (major), norbaeomycesic acid (3) (trace), obtusatic acid (4) (trace), and norobtusatic acid (5) (trace).

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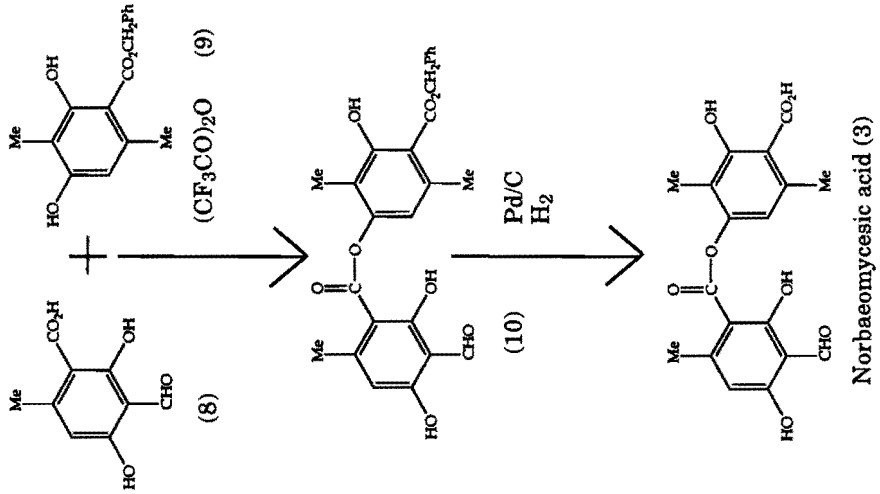

Fig. 2. Synthesis of norbaeomycesic acid.

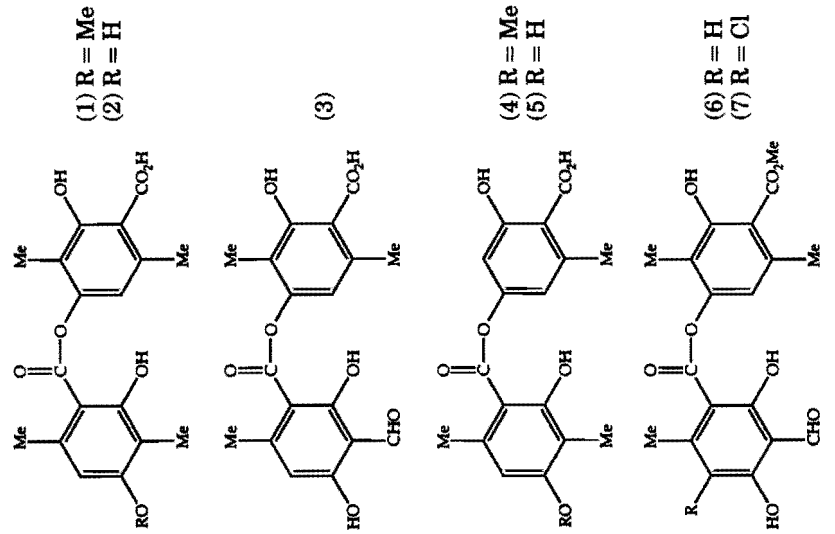

Fig. 1. Structure of depsides.

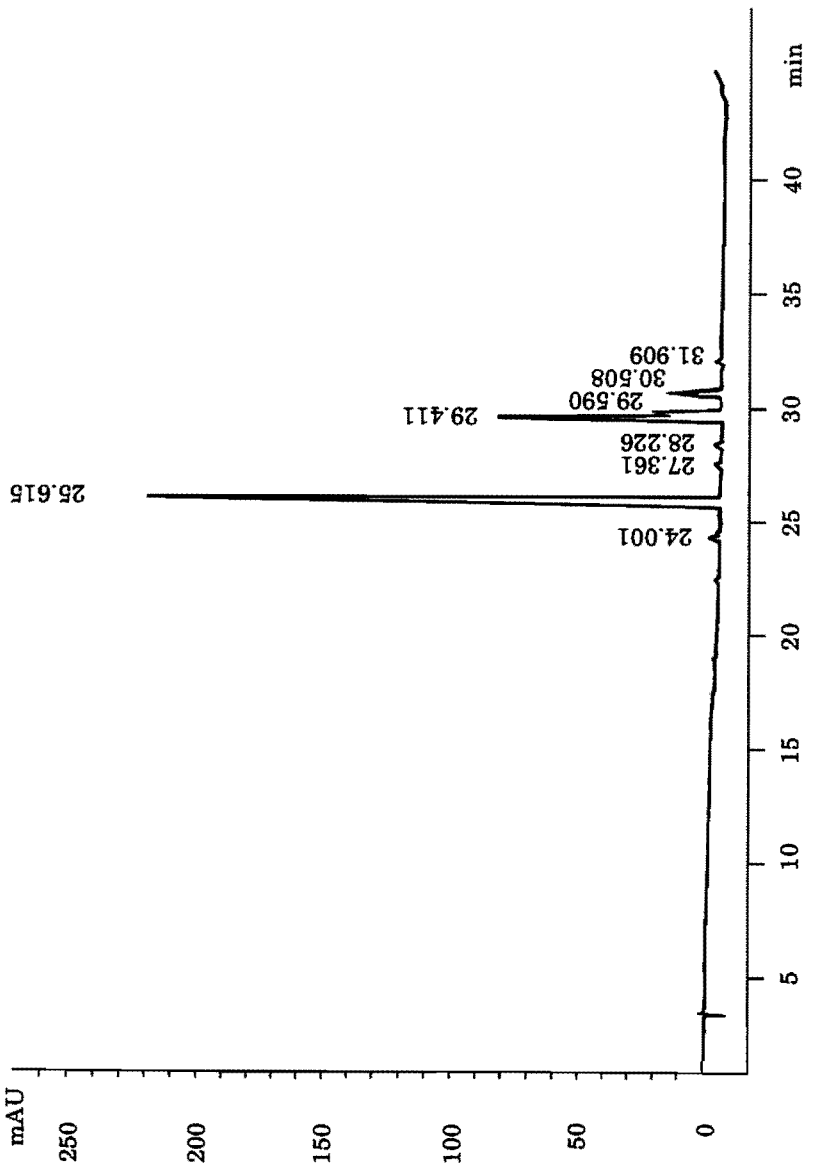

Fig. 3. HPLC of acetone extract of *Hypotrachyna orientalis* (*S. Louwhoff 1031 & J.M. Porigneaux*). R_T 24.001 = norobtusatic acid; R_T 25.615 = 4-*O*-demethylbarbatic acid; R_T 27.361 = norbaeomycesic acid; R_T 28.226 = obtusatic acid; R_T 29.411 = barbatic acid; R_T 29.590 = atranorin; R_T 30.508 = chloroatranorin.

Additional lichen records from Australia 42. *Paulia caespitosa*, new to Australia and the Southern Hemisphere

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Abstract: *Paulia caespitosa*, previously known from North America, is reported from Australia for the first time.

Species of the genus *Paulia* (Lichinaceae) inhabit limestone and siliceous rocks in arid, semi-arid, and coastal areas over a broad biogeographical range of the tropical regions of America, Africa, Australasia, and some western Pacific islands. Isolated and disjunctive distributions are typical of *Paulia* species (Schultz *et al.* 1999), and we report a further example here. *Paulia caespitosa* Tretiach & Henssen, previously known from only Chihuahua, Mexico, was collected on coastal rocks on Lord Howe Island, New South Wales (Fig. 1).

Paulia caespitosa is characterized by small, subfruticose, black thalli, 3–7 mm high. The thalli in turn are composed of terete, branched lobules which are ovoid or irregularly cylindrical in shape and densely aggregated. Young thalli form small, regular, spherical cushions, but these become elongated and more obviously fruticose at maturity. The apothecia are rare, immersed, to 0.15 mm wide, and surrounded by a thick thalline margin, with a reddish brown disc. The ascospores are simple, colourless, spherical or broadly ellipsoid, 11–16 × 9–14 µm. Pycnidia are common and immersed, and contain cylindrical conidia, 3–4 × 1 µm. No lichen substances could be detected by thin-layer or high-performance liquid chromatography. A detailed description of this species is given in Tretiach & Henssen (1996).

This lichen was collected at the foot of a vertical rock face on seaside basalt rocks, above the high tide splash zone. Common associated species included *Dirinaria applanata* (Fée) D.D. Awasthi, *Pertusaria subventosa* Malme, *P. xanthoplaca* Müll. Arg. and *Rimelia reticulata* (Taylor) Hale & A. Fletcher. *Paulia caespitosa* is the second *Paulia* species known from Australia. *P. aldabrensis* Henssen was recently collected by Büdel and Lumbsch from coastal rocks in north Queensland (Schultz *et al.* 1999).

SPECIMENS EXAMINED

Australia. *New South Wales*: •Lord Howe Island, Boat Harbour, 31°33'40"S, 159°05'50"E, 3 m, on basalt rocks along the foreshore in disturbed lowland vegetation with palms, 10.ii.1995, *J.A. Elix 42467* (CANB, HO).

Mexico. *SW Chihuahua*: •Mpio. Bocoyna, valley of Basiguare, 21 km S of Cusarare, on dripping ledges above stream in pine-oak forest, 2000 m, Lich. Exs. Distr. Univ. Col. Mus. Boulder No. 576, 1.viii.1977, *W.A. Weber & R. Bye* (B186), as *Peccania* sp. indet.

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5 mm

5 mm

Fig. 1. *Paulia caespitosa* habit.

Additional lichen records from Australia 43. *Verrucaria fusconigrescens* and *V. prominula* in Tasmania, with notes on the habitats and biogeographical affinities of Tasmanian Verrucariaceae

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We report the first Australian collections of *Verrucaria fusconigrescens* Nyl. and *V. prominula* Nyl. These lichens occur on siliceous seashore rocks in Tasmania, and both are also known from Europe and boreal North America. The habitats and biogeographical affinities of Tasmanian Verrucariaceae are discussed.

Verrucaria fusconigrescens Nyl., *Bull. Soc. Linn. Normandie,* sér. 2, **6**, 313 (1873) ["1872"].

Thallus epilithic, determinate, rimose to areolate, medium greenish grey to dark grey-grown, not becoming gelatinous when wetted, ± smooth, matt, to 60 µm thick, ecorticate; areolae angular, plane to slightly convex, 0.1–0.5 mm wide. Algae chlorococcoid. Prothallus black, subtending the thallus and extending well beyond its margins. Perithecia semi-immersed to almost superficial, numerous, solitary, convex, hemispherical or subconical. Perithecial apex rounded or a little flattened; ostiole usually inconspicuous. Involucrellum black, (0.2–)0.31(–0.4) mm diam. (50 measured), smooth, brown-black to black in thin section, extending to the base of the excipulum, 40–60 µm thick near the apex, 60–80 µm thick at the base, contiguous with the excipulum, scarcely overgrown by the thallus at maturity (then only near the base). Centrum subglobose to obpyriform, 0.15–0.25 mm diam. Excipulum brown-black, 15–20 µm thick. Periphyses simple or sparingly branched, 15–30 × *c.* 2 µm. Asci 8-spored, cylindroclavate, *c.* 70–80 × 18–25 µm. Ascospores simple, colourless, elongate-ellipsoid or narrowly clavate, irregularly biseriate in the asci, (16–)21(–26) × (7–)10(–12) µm (44 measured) (Fig. 1).

This lichen has a dark, areolate, non-gelatinous thallus on a conspicuous prothallus as well as prominent, medium-sized perithecia and rather elongate, moderately large ascospores. In the Northern Hemisphere it is known from France, Germany, Scandinavia, the British Isles and eastern and western North America (Clauzade & Roux 1985, Hawksworth *et al.* 1992). The Tasmanian specimen was collected on a quartzite boulder above the seashore in the north-west of the State.

Hawksworth *et al.* (1992) correctly noted that the status of *V. fusconigrescens* requires further study. They reported the occurrence of sessile perithecia and ascospores 10–15 µm wide; by contrast, other descriptions agree with that of the Tasmanian specimen (Fletcher 1975, Clauzade & Roux 1985, McCarthy & Mitchell 1988).

SPECIMEN EXAMINED

Tasmania. *Boat Harbour*: •10 km NW of Wynyard, 40°57'S, 145°38'E, alt. *c.* 2 m, *J.A. Elix 23785*, 10.i.1990 (CANB).

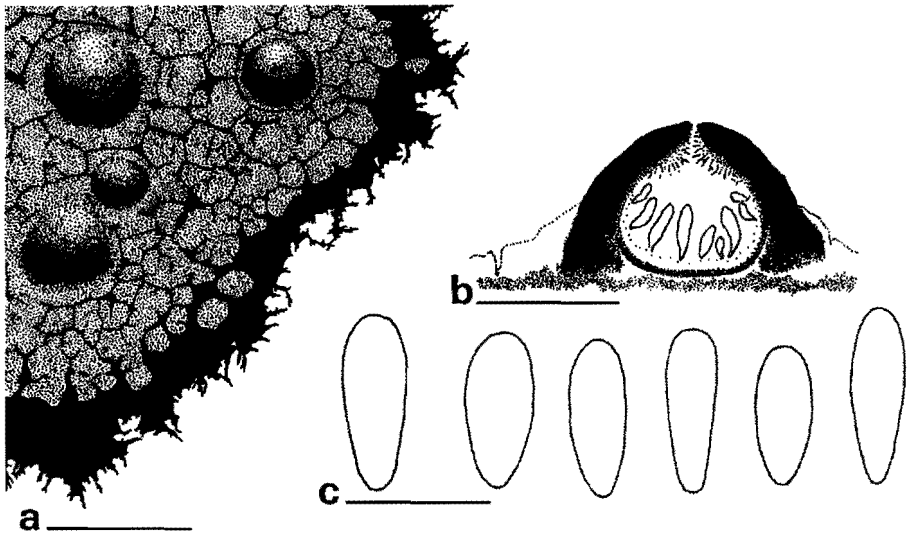

Fig. 1. *Verrucaria fusconigrescens* (CANB). **a**, habit of thallus and perithecia. **b**, sectioned perithecium. **c**, ascospores. Scales: a = 0.5 mm; b = 0.2 mm; c = 20 µm.

Verrucaria prominula Nyl., *Bull. Soc. Bot. France* **8**, 758 (1861).

Thallus subepilithic to epilithic, diffuse to determinate (mainly around perithecia), continuous to rimose, not becoming gelatinous when wetted, smooth to uneven, matt, pale pinkish grey, 40–80 µm thick, heavily impregnated with minute rock fragments and crystals, ecorticate. Algae chlorococcoid. Prothallus and basal layer not apparent. Perithecia semi-immersed to almost superficial, moderately numerous, solitary, paired or in groups of three, hemispherical, subglobose or subconical. Perithecial apex rounded or, more commonly, excavate. Involucrellum black, (0.4–)0.55 (–0.72) mm diam. (43 measured), smooth or, more commonly, slightly to grossly uneven, brown-black to black in thin section, extending to the base of the excipulum or completely enclosing the excipulum, 50–100 µm thick near the apex, 100–200 µm thick at the base, contiguous with the excipulum, not overgrown by the thallus at maturity. Centrum subglobose to obpyriform, 0.22–0.35 mm diam. Excipulum brown-black, 20–30 µm thick. Periphyses simple or sparingly branched, 30–60 × *c.* 2 µm. Asci 8-spored, clavate to cylindroclavate, *c.* 45–65 × 18–25 µm. Ascospores simple, colourless, usually broadly ellipsoid, massed or irregularly biseriate in the asci, (11–)15.5(–20) × (7–)8.5(–10.5) µm (50 measured) (Fig. 2).

Verrucaria prominula has a very pale thallus and rather large prominent perithecia that are frequently clustered and have an excavate apex. Previously reported from France, Norway, the British Isles and North America (Clauzade & Roux 1985, Hawksworth *et al.* 1992), it is further characterized by its occurrence on soft maritime rocks in comparatively dry, shaded situations. The Tasmanian specimen is part of a moderately large population on very soft, friable shale.

SPECIMEN EXAMINED

Tasmania. *Hobart*: •Estuary of Derwent R., Alum Cliffs, 42°58'S, 147°20'E, alt. *c.* 10 m, *P.M. McCarthy 1340 & G. Kantvilas*, 9.v.1997 (CANB, HO).

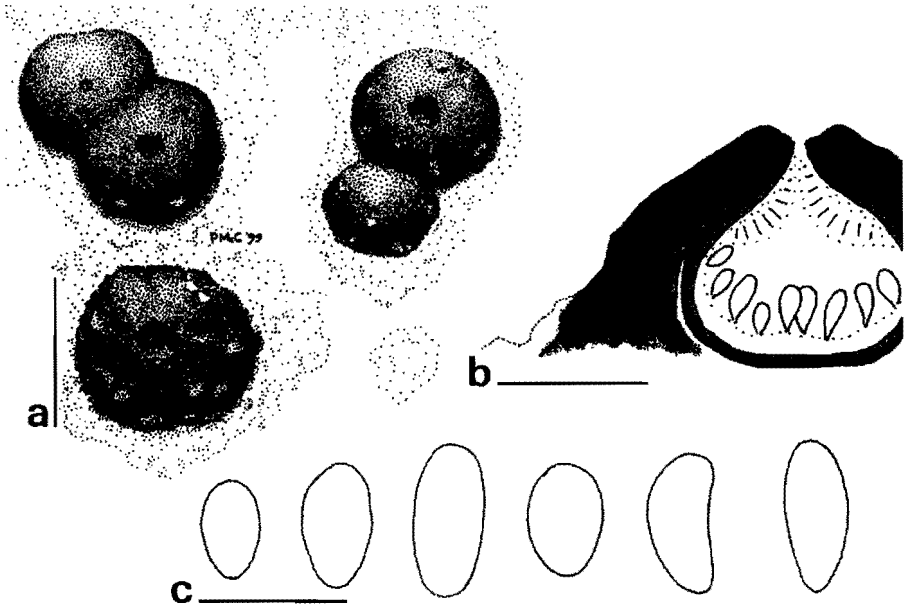

Fig. 2. *Verrucaria prominula* (HO). **a**, habit of thallus and perithecia. **b**, sectioned perithecium. **c**, ascospores. Scales: a = 0.5 mm; b = 0.2 mm; c = 20 µm.

Tasmanian Verrucariaceae

The Verrucariaceae is among the largest lichen familes with *c.* 40 genera and 600–700 mostly obligately saxicolous species. These are especially diverse in temperate and arctic-alpine regions of the Northern Hemisphere, with fewer than 3% of species restricted to subtropical and tropical regions.

The Tasmanian representatives show a strong similarity with those of southern New Zealand, but this overlap diminishes very quickly towards more tropical parts of Australia where the family at best forms a minor component of the lichen flora (Table 1). Currently, 28 taxa are known from the State; however, given their often inconspicuous appearance and a significant number of undetermined collections, the true diversity is probably in excess of 40 taxa.

The Verrucariaceae of Tasmania and southern New Zealand include a strong pantemperate component, and *c.* 60% of Tasmanian species also occur in the British Isles or elsewhere at northern-temperate to boreal latitudes (Table 1). This overlap contrasts with that seen in other large families of pyrenocarpous lichens such as Pyrenulaceae and Trichotheliaceae, both of which are mainly tropical with little similarity in species composition at their boreal and austral extremes.

The distribution of Verrucariaceae in Tasmania is, in all cases, largely determined by a single, overriding habitat factor. Thus, nine species occur on rocks in creeks and rivers, where their success is determined principally by favourable levels of clear, unpolluted water, usually regardless of whether the substratum is siliceous or calcareous. Eight others occur only on intertidal or supralittoral seashore rocks where immersion, wave action and/or salinity are paramount, and a further seven are confined to limestone or calcareous sandstone in terrestrial habitats.

The five terricolous taxa are primarily responsive to the physical and chemical attributes of the substratum (Table 2). The species of *Endocarpon* and *Placidium* belong to a tiny but ecologically significant group of rather xerophilic lichens that occupy a very narrow and fragile niche in the Tasmanian environment. These lichens, which include *Collema coccophorum, Trapelia coarctata*, species of *Psora* and several terricolous *Caloplaca* species, grow in remnant native grassland and uncultivated rough grazing ground in very low rainfall areas where their persistence in the face of poor land-use practices and pasture improvement is tenuous.

As pointed out by Galloway & Aptroot (1995), antitropical ("bipolar") lichens usually occupy the same habitats in both hemispheres, and only rarely are they found in forests; this is certainly the case with antitropical Verrucariaceae in southern temperate regions. As our understanding of Tasmanian and Australasian species gathers pace, it is likely that this component of the flora will remain highly significant.

We thank Dr Othmar Breuss (Vienna) for identifying specimens of *Placidium squamulosum*.

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Table 1. Occurrence of Tasmanian Verrucariaceae in some other regions of eastern Australasia and in the British Isles. Taxa known only from Tasmania are in **bold** print.

1 = Tasmania — 29 taxa
2 = South Island, New Zealand — *c.* 40 taxa
3 = north-east New South Wales and south-east Queensland — *c.* 15 taxa
4 = north-east Queensland — <10 taxa
5 = British Isles — *c.* 100 taxa

1	2	3	4	5
Endocarpon helmsianum		+		
Endocarpon simplicatum var. *bisporum*				
Endocarpon simplicatum var. *simplicatum*	+	+		
Placidium squamulosum	+	+		+
Polyblastia australis				
Polyblastia cruenta				+
Polyblastia dermatodes				+
Staurothele fissa	+			+
Thelidium papulare	+			+
Thelidium pluvium				+
Verrucaria aucklandica	+			
Verrucaria australiensis				
Verrucaria baldensis	+			+
Verrucaria dufourii				+
Verrucaria fusconigrescens				+
Verrucaria hydrela	+	+		+
Verrucaria inconstans	+			
Verrucaria maura	+			+
Verrucaria microsporoides	+			
Verrucaria mundula		+	+	
Verrucaria muralis				+
Verrucaria nigrescens				+
Verrucaria papillosa				+
Verrucaria phaeoderma	+	+		
Verrucaria prominula				+
Verrucaria striatula	+			+
Verrucaria subdiscreta	+			
Verrucaria tasmanica				
Verrucaria tholocarpa				

Table 2. Substrata/habitats of Verrucariaceae in Tasmania.

intertidal and maritime rocks — *Verrucaria aucklandica, V. australiensis, V. fusconigrescens, V. maura, V. microsporoides, V. prominula, V. striatula, V. subdiscreta.*

aquatic rocks — *Polyblastia cruenta, Staurothele fissa, Thelidium pluvium, Verrucaria hydrela, V. inconstans, V. mundula, V. phaeoderma, V. tasmanica, V. tholocarpa.*

dry calcareous rocks — *Polyblastia dermatodes, Thelidium papulare, Verrucaria baldensis, V. dufourii, V. muralis, V. nigrescens, V. papillosa.*

soil — *Endocarpon helmsianum, E. simplicatum* var. *simplicatum, E. simplicatum* var. *bisporum, Placidium squamulosum, Polyblastia australis.*

Additional lichen records from New Zealand 31.

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Henry A. Imshaug collected lichens from the South Island of New Zealand on three occasions: February, 1970, January, 1971 (accompanied by Richard C. Harris), and December, 1972–January, 1973. His principle interest lay with the subantarctic island groups, and on each occasion his main destination lay elsewhere (Kerguelen Is., Auckland Is., Campbell I.), but he spent a total of about three weeks on the South Island, making over 1800 collections. Many of the macrolichen collections have been identified and accessioned into the Michigan State University Herbarium (MSC), but the collections of microlichens, especially those from saxicolous substrata, have remained largely unexamined. A recent grant from the National Science Foundation of America (Award No. DBI–9808735) has resulted in Imshaug's herbarium being re-activated, and a preliminary examination of the specimens collected from the South Island has resulted in the following species being added to the New Zealand lichen flora (Malcolm & Galloway 1997, D. Galloway pers. comm). Many of these species exhibit a bipolar distribution—that is, they are present in the temperate/polar zones of both the Northern and Southern Hemispheres, but apparently are absent from the tropics.

Many other collections have been identified to only genus level, and the extensive collections from Campbell I. and the Auckland Is. have yet to be examined, so further additions to the New Zealand flora are predicted.

Lecidea swartzioidea Nyl., *Not. Sällsk. Fauna Fl. Förh.* **4**: 240 (1859)
Lecidea lapicida (Ach.) Ach. var. *swartzioidea* (Nyl.) Nyl., *Not. Sällsk. Fauna Fl. Förh.* **5**: 226 (1861).
Lecidea lithophiloides Müll. Arg., *Flora* **57**: 188 (1874).
Lecidea swartzioidea var. *lithophiloides* (Müll. Arg.) Clauzade & Roux, *Bull. Soc. Bot. Centre-Ouest, n. sér., Num. Spéc.* **7**: 826 (1985).

Otago: •Heath, outcrops and shingle at summit of Mt Sebastopol, Mt Cook NP, alt. 1500 m, 8.ii.1970, *H.A. Imshaug 47540, 47538* (MSC); •Rainforest along Morrison Ck, Leith Valley Rd, N side of Dunedin, Waikouaiti County, alt. 150–250 m, 5.xii.1972, *H.A. Imshaug 55951* (MSC); •Wet seepage slope in alpine zone, near Museum Rock, Rock and Pillar Ra., W of Middle March, Taieri County, 6.xii.1972, *H.A. Imshaug 56108* (MSC); •Rock tors on alpine ridge, summit of Coronet Peak, near Arrowtown, Lake County, alt. 1650 m, 18.i.1973, *H.A. Imshaug 58107* (MSC).

Lecidea swartzioidea is a member of the *L. lapicida* group. It is chemically identical to *L. lapicida* var. *pantherina* Ach. (syn. *L. lactea* Flörke ex Schaer.) in that it contains norstictic acid, but differs from that taxon in having a dark brown hypothecium.

The specimen from Dunedin (*Imshaug 55951*) has densely pruinose apothecia and is referable to *L. lithophiloides* Müll. Arg. Hertel (1995) considered it to be a synonym of *L. swartzioidea* Nyl., differing only in its pruinose apothecia.

L. swartzioidea is a common species of upland siliceous rocks in the Northern Hemisphere. However, its exact distribution is difficult to determine because it has rarely been recorded separately from *L. lapicida* var. *pantherina*. Hertel (1995) cites specimens from northern and central Europe, and in the British Isles it appears to be more frequent than *L. lapicida* var. *pantherina* (Fryday 1997). It has also been recorded from North America (Brodo 1995). The only previous record of this species from the Southern Hemisphere appears to be a record from Tierra del Fuego (as *L. lithophiloides*) which Hertel (1997) mentions as needing confirmation.

Miriquidica deusta (Stenh.) Hertel & Rambold, *Mitt. Bot. Staatssamml. München* **23**: 383 (1987)
Lecidea fuscoatra var. *deusta* Stenh., *Novae Schedul. Crit. Lich. Suec., fasc. XIV*, 9 (1833). For additional synonymy see Hertel & Rambold (1987).

Otago: •Rock tors in alpine zone, summit of Museum Rock, Rock and Pillar Ra., 24 km W of Middle March, Taieri County, alt. 1280 m, 6.xii.1972, *H.A. Imshaug 56076, 56084* (fertile) (MSC).

Rambold (1989) reported *Miriquidica deusta* for the first time from the Southern Hemisphere, from SE Australia. The species is easily recognized by its shiny, brown thallus composed of discrete areoles. The genus is new to New Zealand.

In the Northern Hemisphere, *M. deusta* has been recorded from both Europe and North America. Santesson (1993) gives it as more frequent in Sweden than Norway, and its absence from the British Isles (Purvis *et al.* 1994) suggests it is not a strongly oceanic species.

There are a number of other Imshaug collections at MSC referable to this genus, but they mostly lack apothecia and these are the only specimens I have been able to identify to species level.

Polyblastia cruenta (Körb.) P. James & Swinscow, *Lichenologist* **5**: 94 (1971)
Segestrella cruenta Körb., *Denkschr. Feier Fünfzigjäh. Best. Herausg. Schles. Gesellsch. Vaterl. Kult., Breslau* (1853). For additional synonymy, see Swinscow (1971).

Westland: •South Island, Malvern–Westland County Border: region of scattered scrub and bogs above the forest on N side of road at Arthur's Pass NP, 20.i.1971, *R.C. Harris 6130* (MSC).

Polyblastia cruenta is characterized by its thin thallus, large, prominent perithecia, pale brown muriform ascospores (50–80 × 25–40 µm) and its habitat of damp, siliceous rocks.

In the Northern Hemisphere, *P. cruenta* is known from northern and central Europe and North America (Thomson 1997).

Rhizocarpon copelandii (Körb.) Th. Fr., *Lich. Scand. II*: 615 (1874)
Buellia copelandii Körb., *Zweite Deutsch. Polar. Exped. II*: 79 (1874).

Otago: •Rock tors in alpine zone, summit of Museum Rock, Rock and Pillar Ra., 24 km W of Middle March, Taieri County, alt. 1280 m, 6.xii.1972, *H.A. Imshaug 56096* (MSC).

Rhizocarpon copelandii is separated from all other species of *Rhizocarpon* by the combination of the presence of norstictic acid in its thallus (K+ red crystals) and dark, 1-septate ascospores (Fryday 1996). Other authors (e.g. Timdal & Holtan-Hartwig 1988) have a broader concept of this species including specimens with a thallus containing stictic acid.

Ascospore dimensions in the New Zealand specimens are 20.5–22 × 9–12 µm. This is somewhat smaller than those of the holotype and other Northern Hemisphere collections (24–27 × 12–14 µm). This has been noted in unrelated genera (e.g. Smith & Øvstedal 1994). The phenomenon merits further investigation. In other respects the New Zealand specimens match those from the Northern Hemisphere.

R. copelandii is a widespread Northern Hemisphere species (Thomson 1997, Santesson 1993) that was reported from the Southern Hemisphere by Øvstedal & Gremmen (1995).

Rhizocarpon geminatum Körb., *Syst. Lich. Germ.* 259 (1855)

Canterbury: •Grazed grassland, 10.5 km E of Hanmer Springs junction, along Route 7, 4.xii.1972, *H.A. Imshaug 55904, 55915* (MSC); *Otago*: •Rock tors on alpine ridge, summit of Coronet Pk, near Arrowtown, Lake County, alt. 1650 m, 18.i.1973, *H.A. Imshaug 58115* (MSC); •Dry pasture 22.2 km W of junction of Routes 6 & 8, along Route 6, W of Cromwell, 18.i.1973, *H.A. Imshaug 58147* (MSC).

This taxon is closely related to *Rhizocarpon disporum* (Naeg. ex Hepp) Müll. Arg., *R. disporum* having 1-spored asci whereas in *R. geminatum* they are 2-spored. Although most collections can be placed in one or the other taxon, it is not unusual to find both 1-spored and 2-spored asci in the same apothecium. It has been suggested that *R. geminatum* occurs in damper habitats than *R. disporum*, but judging by Imshaug's habitat notes, this does not appear to be the case in New Zealand.

R. geminatum is widespread in the Northern Hemisphere.

Rhizocarpon hochstetteri (Körb.) Vain., Ac*ta Soc. Fauna Fl. Fenn.* **53**: 280 (1922)
Catillaria hochstetteri Körb., *Parerga Lich.* 195 (1861).

Westland: •Malvern–Westland County Border: in scattered scrub and bogs above the forest on N side of road at Arthur's Pass NP, 20.i.1971, *R.C. Harris 6095* (MSC); *Southland*: •Subalpine scrub in basin at E portal of Homer Tunnel, Lake County, 17.i.1973, *H.A. Imshaug 57995* (MSC).

Previously (Fryday 1996), I considered that the name *R. hochstetteri* should be applied to a small-spored entity common in oceanic areas of the Northern Hemisphere, and that it would be necessary to make the new combination *R. colludens* (basionym *Lecidea colludens* Nyl.) for the larger-spored upland species. I have since seen the holotype of *R. hochstetteri* (Granitischen Feldsteinen, Würtemberg, Hochstetteri, (L-herb. Körber)), and the name should clearly be applied to the larger-spored entity. The correct name for the smaller-spored entity, which has yet to be recorded from New Zealand but may well occur there, is unclear but is probably *R. infurnulum* (Nyl.) Lynge (Fryday *in prep.*)

The New Zealand collections of this species often have an orange (oxydated) thallus and a more carbonacous exciple than is normal for specimens from the Northern Hemisphere. Specimens from Campbell I. also have more contorted apothecia. I do not think these differences warrant taxonomic recognition, although further investigation of the New Zealand collections may show this to be necessary. This appears to be the first record of *R. hochstetteri* from the Southern Hemisphere, although it is a common widespread species in the Northern Hemisphere. Collections from high altitude in the Northern Hemisphere have a thicker, red-brown thallus containing stictic acid, but all the New Zealand specimens lack this substance.

Rhizocarpon polycarpum (Hepp) Th. Fr., *Lich. Scand. I*: 617 (1874)
Lecidea confervoides var. *polycarpa* Hepp, *Flecht. Eur.* no. 35 (1853).

Otago: •Wet seepage slope in alpine zone, near Museum Rock, Rock and Pillar Ra., W of Middle March, Taieri County, 6.xii.1972, *H.A. Imshaug 56108* (MSC); •Rock tors in alpine zone, summit of Museum Rock, Rock and Pillar Ra., 24 km W of Middle March, Taieri County, alt. 1280 m, 6.xii.1972, *H.A. Imshaug 56096* (MSC); •Rock outcrops on ridge in alpine zone, SE of Rock and Pillar Ra., 20 km W of Middle March, Taieri County, 6.xii.1972, *H.A. Imshaug 56135* (MSC).

Characterized by a combination of large, usually hyaline, 1-septate ascospores, and I+ blue medulla and a K+ purple epihymenium. *R. polycarpum* is a common widespread species in the Northern Hemisphere, where the separation from the closely related *R. richardii* (Nyl.) Zahlbr. is clouded by intermediates (Fryday 1996).

A full revision of the non-yellow *Rhizocarpon* taxa occurring in New Zealand is currently in preparation by the author.

Rhizocarpon pusillum Runemark, *Opera Bot.* **2**: 63 (1956)

Otago: •South Island: Heath, outcrops and shingle at summit of Mt Sebastopol, Mt Cook NP, alt. 1500 m, 8.ii.1970, *H.A. Imshaug 47538* (MSC).

This is a small species (less than 1 cm diam.) with a thallus containing rhizocarpic acid, and is parasitic on the lichen *Sporastatia tesudinea*. In the Northern Hemisphere, it has been recorded from northern and central Europe and North America (Thomson 1997).

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Additional lichen records from Oceania 4. Some pyrenolichens in Fiji

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A recent survey of the lichenological literature of the smaller Pacific islands identified 118 taxa reported from Fiji (Elix & McCarthy 1998). However, given the great age of these islands (they are remnants of Gondwana), their size and elevation, the broad range of available habitats and the lack of intensive field investigations, the true diversity is certain to be at least twice that number. In this paper we report the first Fijian records of seven taxa of *Anisomeridium* (Monoblastiaceae), *Julella* (Arthopyreniaceae), *Pseudopyrenula* (Trypetheliaceae) and *Pyrenula* (Pyrenulaceae); all were collected by one of us (JAE) in Viti Levu in 1983.

1. **Anisomeridium biforme** (Borrer) R.C. Harris, in Vězda, *Lich. Sel. Exsicc.*, Fasc. **61**, 1305 (1978)
This lichen has a thin, pale to medium grey, UV– thallus, and black, convex, semi-immersed perithecia (0.3–0.6 mm diam.), with an apical ostiole and a spreading involucrellum. The pseudoparaphyses are weakly anastomosing, the asci are elongate-cylindrical, and the uniseriate ascospores are broadly ellipsoid to ovoid, 11–16 × 5.5–7 µm, with a single median or submedian septum. Macroconidia are broadly ovoid, ellipsoid or subglobose and 3.5–5.5 × 2.5–3.5 µm. Although this lichen is common in many temperate and tropical regions, it has not been recorded previously from any of the smaller Pacific islands (Elix & McCarthy 1998). For a fuller description and further information, see Coppins & James (1992) and Harris (1995).

SPECIMEN EXAMINED
Fiji. *Viti Levu*: •Coral Coast, Tagaque Village, 20 km E of Sigatoka, on mangrove in estuary, *J.A. Elix 15372*, 31.viii.1983 (CANB).

2. **Anisomeridium consobrinum** (Nyl.) Aptroot, *in* Aptroot *et al.*, *Bibliotheca Lichenologica* **57**, 21 (1995)
The thin, whitish, continuous to rimose-areolate thallus is ecorticate and UV+ yellow-orange, and the 0.25–0.45 mm diam. perithecia are black and almost completely immersed. The 20–30 × 8–12 µm ascospores have a single median or submedian septum. Conidia were not seen. This species is already known from Papua New Guinea, Queensland, New Caledonia and the Cook Islands. For more detailed descriptions, see Aptroot *et al.* (1997) and McCarthy (2000).

SPECIMEN EXAMINED
Fiji. *Viti Levu*: •Coral Coast, Tagaque Village, 20 km E of Sigatoka, on bark of *Cocos nucifera* on foreshore, *J.A. Elix 15386*, *15387*, 31.viii.1983 (CANB).

3. **Julella geminella** (Nyl.) R.C. Harris, *More Florida Lichens* 87 (1995)
Thallus greyish, endophloeodal, UV–. Perithecia convex, semi-immersed, round to elliptical in outline, 0.4–0.65 mm diam., with a spreading, black involucrellum and a whitish periostiolar area. Pseudoparaphyses anastomosing, not inspersed with granules or globules. Asci 2-spored, without an obvious ocular chamber; ascospores muriform-euseptate, 32–48 × 13–21 µm. Although this is usually reported as a non-lichenized fungus, the Fijian specimen seems to form at least a loose association with trentepohlioid algae. This is a pantropical species which, in the Pacific region, is known from Hong Kong, Papua New Guinea, Queensland and Western Samoa (Harris 1995).

SPECIMEN EXAMINED
Fiji. *Viti Levu*: •Nasori Highlands, Nadi–Sigatoka road, western scarp, on bark of shrub in grassland, *J.A. Elix 15072*, 26.viii.1983 (CANB).

4. **Pseudopyrenula diluta** (Fée) Müll. Arg. var. **degenerans** Vain. *in* Schmidt, *Bot. Tidsskr.* **29**, 148 (1909)
Thallus thin, endophloeodal, whitish, pale grey or pale grey-green, UV–. Perithecia black, ± superficial, hemispherical to subconical, 0.38–0.62 mm diam., with a thick, spreading, black and brittle involucrellum and a minute, slightly paler and/or excavate ostiole. Pseudoparaphyses anastomosing, inspersed with a yellow-orange, granular material that is K+ reddish. Asci 8-spored, clavate-cylindrical, with a broad, shallow ocular chamber; ascospores biseriate, 3-septate, 18–26 × 5.5–7.5 µm; medial cells appearing hexagonal or octagonal. Conidia not seen. A lowland, pantropical species; in the Pacific, it is known from the Philippines and the Hawaiian Islands. For a more detailed description, see Harris (1998).

SPECIMENS EXAMINED
Fiji. *Viti Levu*: •Nasori Highlands, Nadi–Sigatoka road, 4 km E of Vanturu Dam turn-off, on bark in regrowth forest, *J.A. Elix 15168*, 26.viii.1983 (CANB), •Nasori Highlands, Nadi–Sigatoka road, 13 km E of Vanturu Dam turn-off, on bark in regrowth forest, *J.A. Elix 15225*, 27.viii.1983 (CANB).

5. **Pyrenula** aff. **citriformis** R.C. Harris, *Memoirs of the New York Botanical Garden* **49**, 87 (1989)
Reported from Rarotonga, Cook Islands, by McCarthy (2000), this taxon is one of a group of poorly known and unresolved Paleotropical and Pacific species, all of which have 4-locular ascospores with the apical locules contiguous with the exospore or seeming to protrude. The thallus is smooth, thinly corticate and pale greyish brown, and the prominent, 0.5–0.9 mm diam. perithecia contain masses of minute granules and produce 14–22 × 9–12 µm ascospores. The Fijian and Rarotongan specimens are certainly conspecific. For a more detailed description of this entity, see McCarthy (2000).

SPECIMEN EXAMINED
Fiji. *Viti Levu*: •Nasori Highlands, Nadi–Sigatoka road, 4 km E of Vanturu Dam turn-off, on bark in regrowth forest, *J.A. Elix 15142*, 26.viii.1983 (CANB).

6. **Pyrenula macularis** (Zahlbr.) R.C. Harris, *Memoirs of the New York Botanical Garden* **49**, 94 (1989)
The thallus is corticate, smooth, pale yellowish brown and dotted with whitish pseudocyphellae, and the perithecia are almost completely immersed and 0.25–0.5 mm diam. The muriform ascospores have (5–)7 transverse divisions separating ranks of 3–4 locules and are 30–40 × 15–19 µm. This more or less pantropical lichen is also known from the Cook Islands (McCarthy 2000). For a more detailed description, see Harris (1989).

SPECIMEN EXAMINED
Fiji. *Viti Levu*: •Nadi–Lautoka road, 5 km N of Nadi Airport, on bark of *Leucaena leucocephala* in roadside scrub, *J.A. Elix 15070*, 25.viii.1983 (CANB).

7. **Pyrenula ochraceoflava** (Nyl.) R.C. Harris var. **ochraceoflava**, *Memoirs of the New York Botanical Garden* **49**, 96 (1989)
This widespread, lowland tropical species has a whitish, grey or patchily yellow-orange thallus (then K+ purple), brownish to black, semi-immersed perithecia (0.28–0.5 mm diam.) with a K+ purple involucrellum, and 14–20 × 7.5–11 µm ascospores that are submuriform, with four tiers of (1–)4 locules. In the Pacific, it is known from the Caroline Islands, New Caledonia, Western Samoa, the Cook Islands, Tuamotu and the Galapagos Islands. For more detailed descriptions, see Harris (1989) and McCarthy (2000).

SPECIMEN EXAMINED
Fiji. *Viti Levu*: •Coral Coast, Tagaque village, 20 km E of Sigatoka, on bark of *Cocos nucifera* on foreshore, *J.A. Elix 15316*, 29.viii. 1983 (CANB).

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BOOK REVIEW

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Nordic Lichen Flora. Volume 1 Introduction, Calicioid lichens and fungi, by Tuevo Ahti, Gunnar Carlin, Per Magnus Jørgensen, Roland Moberg, Ulrik Søchting, Göran Thor and Leif Tibell, with photographs by Svante Hultengren. 94 pp. Bohuslän '5, Uddevalla, Sweden. 1999. ISBN 91-972863-3-8. Available from: Svenska Botaniska Föreningen, C/- Museum of Evolution, Botany Section (Fytoteket), Norbyvägen 16, S–75236 Uppsala, Sweden. Price 380 Swedish kronor including post and packaging. FAX: +46–18–471–2794.

It is a pleasure to welcome the first part of a multi-volume series on the lichens of the Nordic countries [Denmark (including the Faeroe Islands and Greenland), Finland, Iceland, Norway (including Svalbard, Bear Island and Jan Mayen) and Sweden] sponsored by the Nordic Lichen Society with an Editorial Board comprising Teuvo Ahti, Per Magnus Jørgensen, Hördur Kristinsson, Roland Moberg, Ulrik Søchting and Göran Thor, responsible for the concept of this new regional lichen flora; and an advisory committee comprising Gunnar Carlin (with special responsibility for chemistry), Rolf Santesson, Tor Tønsberg. and Brian Coppins. This is a heavyweight assemblage of Northern Hemisphere lichenological expertise which guarantees that the series will be produced from strength.

Scandinavian lichenology has a long and venerable history that proceeds in a virtually unbroken line from Linnaeus's *Species Plantarum* of 1753 to the present day. Although Linnaeus (1753) is the official starting date for lichen names, Linnaeus was never greatly interested in lichens, and it was the work of his students [Erik Acharius (1757–1819); Olof Swartz (1760–1818); Johan Peter Westring (1753–1833); Martin Vahl (1749–1804)], especially Acharius, who placed modern lichenology on a firm taxonomic foundation (Galloway 1981, Jørgensen *et al.* 1994, Jørgensen 1999). This foundation was consolidated by many subsequent lichenologists in Scandinavia throughout the 19th and 20th centuries, although the only previous attempt at a regional Nordic lichen flora was the unfinished account of T.M. Fries (1871–1874). Thus a new lichen flora for the region is both necessary and timely. The last 25 years have seen a number of regional lichen floras produced viz., New Zealand (Galloway 1985), East Africa (Swinscow & Krog 1988), the United Kingdom (Purvis *et al.* 1992), and Australia (Grgurinovic 1992, 1994—a further volume is expected from the press this year), and in response to current awareness of regional biodiversity and its conservation, an accelerated interest in documenting regional lichen mycobiotas can be expected, even though the workforce of available and qualified lichen systematists is small and declining (Hawksworth 1999). Increasingly, checklists and floras are becoming routinely available through the Internet (Nimis 1996, Hawksworth 1999, see for example McCarthy 1999). However, it is still good to see and read a well-produced case-bound book as the vehicle for dissemination of information.

The new *Nordic Lichen Flora* series has considerable relevance to most existing lichen floras and also to others yet to be written, both from the considerable resource of taxonomic expertise presently existing in Nordic institutions (libraries, herbaria and lichen systematists), as well as from the highly diverse and well-studied lichen vegetation known from the region (see for example Santesson 1993). If this first volume is anything to go by, then we can expect the series to speak with an authority and a relevance far beyond the geographical limits of the region it relates to. Hence

a review in this journal.

Introductory accounts deal with lichen habitats, biogeography (Ahti); lichens as bioindicators of air pollution (Søchting); red-listed lichens, dealing with threats and habitats (Thor); lichen chemistry, dealing with identification (a useful table presents information on spot tests and UV reactions of a wide range of lichen compounds), use of lichen compounds in taxonomy, biological role, biosynthesis, and studies of biochemical macromolecules (Carlin); scientific and vernacular names (Jørgensen & Ahti); and provinces and maps (Moberg).

The major part of the book (pp. 20–72) is devoted to Leif Tibell's account of "Calicioid lichens and fungi" (given on the contents page as Caliciales only!) which deals with: *Calicium* (13 species), *Chaenotheca* (17 species), *Chaenothecopsis* (16 species), *Cybele* (1 species), *Cyphelium* (8 species), *Microcalicium* (3 species), *Mycocalicium* (1 species), *Phaeocalicium* (8 species), *Sclerophora* (5 species), *Sphaerophorus* (2 species), *Sphinctrina* (4 species), *Stenocybe* (2 species), *Thelomma* (1 species), and *Tholurna* (1 species). Leif Tibell's interest in the Caliciales extends over some 25 years. In 1984 he concluded that mazediate lichens and similar fungi referred to Caliciales are actually a biological group and not a monophyletic entity (Tibell 1984). He has shown that the development of a mazedium and passive ascospore dispersal are convergent features in both lichenized and non-lichenized fungi. Subsequent investigations of the anamorphs (asexual stages) and of molecular biology of these fungi have supported the view that calicioid lichens and fungi (referred to in the earlier literature as Caliciales) are a phylogenetically diverse, ecological grouping, and that the families Caliciaceae and Sphaerophoraceae should be referred to the Lecanorales (Tibell 1997, Wedin & Tibell 1997, Wedin *et al.* 1998, Eriksson & Hawksworth 1998, Eriksson 1999).

Tibell's work centres on identifying monophyletic groups within Caliciales *s. lat.* and finding their relationships, and includes monographs on mazediate lichens, field studies (he has made several extended visits to New Zealand since 1980) and production of regional revisions of mazediate lichens (e.g. Tibell 1987, 1996, 1998). He has cultivated the mycobionts of mazediate lichens and described anamorphs obtained in these (Tibell 1997). He seeks a wide spectrum of data from morphological, ultrastructural, secondary chemistry, and DNA studies, and he has investigated the importance of long-distance dispersal *versus* vicariance as an explanation of extant mazediate lichen distributions (Tibell 1994). His account of the Nordic taxa of calicioid lichens and fungi thus presents the most up-to-date overview of the genera mentioned above, with a concise key to the genera and within each genus, a key to species and details of morphology, chemistry, habitat and distribution, supplemented with taxonomic or explanatory notes where necessary in an arrangement which is similar, but rather more detailed, to that in the *Lichen Flora of Great Britain and Ireland* (Purvis *et al.* 1992). Each accepted taxon has a full bibliographic citation, as do the basionyms, all of which are accurately typified (lectotypes and neotypes of taxa requiring typification are made on p. 72).

Since calicioid lichens and fungi are widely distributed, the accounts of *Calicium abietinum, C. adspersum, C. glaucellum, C. salicinum, C. trabinellum, Chaenotheca brachypoda, C. brunneola, C. chlorella* [the correct name for *Chaenotheca carthusiae*], *C. chrysocephala, C. ferruginea, C. gracillima, C. hispidula, C. hygrophila, C. stemonea, C. trichialis, C. xyloxena, Chaenothecopsis debilis, C. haematopus, C. nana, C. nigra, C. pusilla, C. pusiola* [the correct name for *Chaneothecopsis lignicola*], *C. savonica, C. viridireagens, Cyphelium inquinans, Microcalicium arenarium, Mycocalicium subtile, Sclerophora amabilis* and *Thelloma ocellatum* are of direct relevance to the New Zealand lichen mycobiota, which will ensure the book's utility in studies on Australasian lichens. Tibell's treatment is masterly, and sets a very high standard for other Flora writers to aspire to.

The book is very attractively produced, featuring one of Acharius's lichen drawings (of *Cetraria islandica*) from Westring's *Svenska lavfarnas färghistoria* (Westring 1805–1809) as logo on the cover and title page, which is a very nice touch [on page 4 this is dated as 1805, but page 205 of Westring's text (which appeared in eight parts) was not in fact published until 1808 (Stafleu & Cowan 1988: 218)]. The print is clear and easy to read, and opened pages stay open. The systematic text is supported by 81 distribution maps and by 82 colour photographs, very skilfully taken by Svante Hultengren. Given the tiny size and often insignificant nature of many calicioid taxa, Hultengren's colour plates will be an absolute boon in confirming identifications. His contribution is vital to the success of this book.

In summary, this book is a major and important resource in contemporary lichenology, and all the authors and the Nordic Lichen Society are to be warmly congratulated on such a successful collaboration. I look forward with impatience and great anticipation to further volumes in the series.

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COVER ILLUSTRATIONS

The mainly austral genus *Menegazzia* includes about 50 species, nearly half of them in New Zealand and most of the others in Chile, Tasmania, and Australia. *M. pertransita* are both thought to be New Zealand endemics, occurring in the South island and lower North Island. *M. dielsii* is the only New Zealand species with psoromic acid and ± pruinose apothecial discs.

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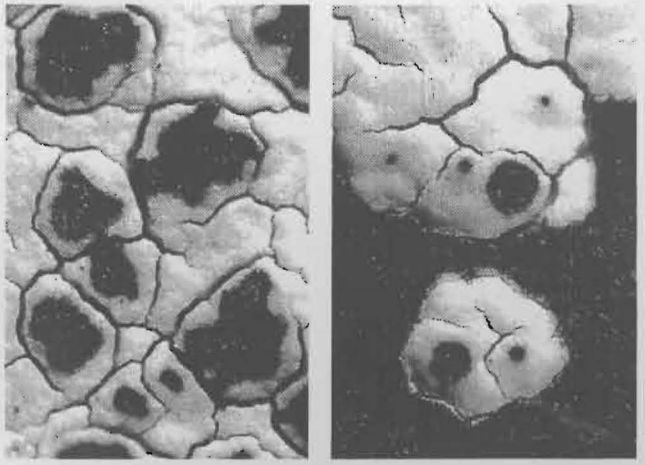

Lecanora demersa 1 mm