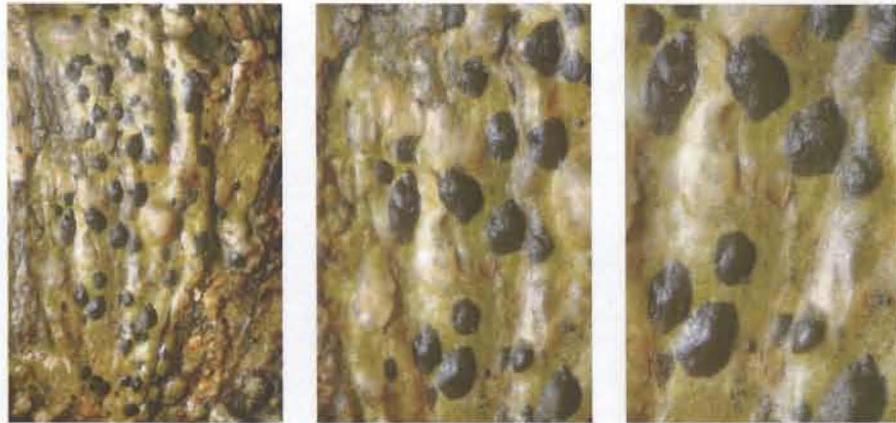


Australasian Lichenology Number 49, July 2001



2 mm 1 mm 0.5 mm
Pyrenula deliquescens (C. Knight) Müll. Arg. First described in the middle 1800s, *Pyrenula deliquescens* is widespread in New Zealand on the bark of trees and shrubs, especially smooth-barked introduced trees such as ash (*Fraxinus*) and oak (*Quercus*). The species is thought to be endemic, but that won't be known with any certainty until the entire genus has been monographed (see also bottom of page 3).

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Pyrenula is a genus of some 200 species, most of them tropical. About 50 species have been recorded from Australia and 10 from New Zealand. Those tallies are probably well short of the real figure, however, because *Pyrenula* species often are overlooked as a result of their being small and scattered, and only a few collectors routinely search for them anyway. The genus was established in 1852 by the prolific but short-lived Italian lichenologist A. Massalongo (1824–1860). It's characterized by a crustose, corticolous, and usually endophloeodal thallus; a *Trentepohlia* photobiont; immersed to erumpent, globose to applanate perithecia; a dark brown to black, often spreading involucrellum; a hamathecium of branched and anastomosing paraphysoids which are later replaced by mostly unbranched paraphyses; cylindrical, iodine-negative, fissitunicate, 8-spored asci; and usually 3-distoseptate, smooth, brownish, uniseriate spores lacking a perispore (see also back cover).

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**The genus *Lithothelium* (Pyrenulaceae)
in Christmas Island, Indian Ocean**

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Lithothelium Müll. Arg. (Pyrenulaceae) comprises about 20 mainly tropical, corticolous or saxicolous species with solitary or fused, black, perithecioid ascomata. Each perithecium has an apical, eccentric or lateral ostiole, an amyloid or non-amyloid hymenium and colourless to brown, 3(–9)-distoseptate or submuriform ascospores (Aptroot 1991, Harris 1995).

The Australian territory of Christmas Island is moderately high and densely forested and is located in the north-eastern Indian Ocean at latitude 10°25–34'S and longitude 105°32–46'E, about 340 km south of Java (DuPuy 1993). In July and August 2000, I collected the pantropical *L. obtectum* (Müll. Arg.) Aptroot and the more common *L. quiescens* newly described here.

***Lithothelium obtectum* (Müll. Arg.) Aptroot**

Thallus thinly epiphloeodal, medium to dark brown, smooth. Perithecia solitary or 2–3 fused, 0.3–0.7 mm wide; ostiole eccentric to lateral. Hymenium fleetingly Lugol's I+ blue or aeruginose, or I–. Ascospores 3-septate, narrowly ellipsoid, with subcylindrical lumina and a comparatively thin endospore, 10–16 × 5–7.5 µm, frequently with a thin, “ragged” perispore; terminal lumina are somewhat smaller than central lumina.

The distribution range of this lowland, pantropical, corticolous lichen includes southern India and the Andaman Islands (Aptroot 1991).

SPECIMENS EXAMINED

Christmas Island. •start of West White Beach walking track, 10°28.25'S, 105°34.76'E, alt. 270 m, in moderately dense primary forest, *P.M. McCarthy 1381*, 27.vii.2000 (CANB); •The Dales, boardwalk track to Hugh's Dale Waterfall, 10°27.71'S, 105°33.51'E, alt. 50–100 m, in moderately dense primary forest, *P.M. McCarthy 1446*, 1.vii.2000 (CANB).

***Lithothelium quiescens* P.M. McCarthy, sp. nov.**

Thallus endophloeodalis vel leviter epiphloeodalis, continuus, pallidogriseus vel griseoviridis aut olivaceofuscus. Ascomata perithecioida, 1/3–2/3-immersa, (0.55–)0.91(–1.1) mm lata. Ostiolium eccentricum vel lateralis. Paraphyses infra simplicia, supra parce ramosas et anastomosantia. Asci (4–)8-sporei, cylindrici, non-amyloidei, 100–148 × 16–25 µm. Ascosporeae hyalinae, 3-septatae, (18–)25(–331) × (10–)14(–20) µm. Conidiomata 0.08–0.12 mm diametro. Conidia filiformes, leviter aut valde curvata, 10–15 × c. 0.5 µm.

Type: Christmas Island, The Dales, track between No. 2 and No. 3 Dales, 10°28.78'S, 105°33.44'E, alt. 40 m, on tree trunk in moderately dense primary forest, *P.M. McCarthy 1478*, 1.viii.2000 (CANB—holotypus).

Figure 1.

Thallus crustose, endophloeodal to thinly epiphloeodal, inconspicuous, very thin, continuous, pale grey to pale greyish green or greenish brown, UV–. Algae *Trentepohlia*; cells 7–14 × 6–12 µm; interstitial hyphae 1–2 µm thick. Prothallus broad and black, or thin, or not apparent.

Ascomata perithecioid, dull black, usually numerous, 1/3–2/3 immersed, usually elliptical or pyriform in outline, less commonly circular, (0.55–)0.81(–1.1) mm wide [*n* = 40], solitary or 2–3 sharing a common ostiole. Centrum 0.3–0.8 mm wide. Ostiole eccentric to lateral, inconspicuous or in a concave depression that is often paler than the involucrellum and up to 100 µm diam. Ascomatal wall 50–160

μm thick, brown-black to black, becoming carbonised and brittle; surface at first smooth, becoming irregularly rugulose. Excipulum 20–35 μm thick, uniformly dark grey-brown. Paraphyses 0.7–1 μm thick, simple below, sparingly branched and anastomosing near the ostiole, not interspersed with granules or oil globules. Periphyses absent. Hymenial gel non-amyloid, Lugol's I+ orange-brown. Asci fissitunicate, (4–)8-spored, cylindrical, 100–148 \times 16–25 μm ; apex rounded, non-amyloid; ocular chambers of mature asci broadly tuberculate or not apparent, not sagittiform (see Aptroot 1991), never apparent at maturity; ascus stalk tapering. Ascospores hyaline, narrowly to broadly ellipsoid, with 3 distosepta, lacking any trace of eusepta, usually obliquely uniseriate to irregularly biseriata in the ascus, (18–)25 (–31) \times (10–)14(–20) μm [$n = 100$], those in 4-spored asci not appreciably larger; apices rounded to subacute; lumina usually broadly ellipsoid or subcylindrical; apical loculi usually distinctly smaller than central loculi; endospore 2–6 μm thick; perispore not apparent.

Conidiomata occasional, not numerous, 1/3–2/3 immersed, 0.08–0.12 mm diam., black above, hyaline at the base, with a simple to labyrinthine conidiogenous layer and short, unbranched conidiophores. Conidia filiform, weakly to strongly curved, 10–15 \times c. 0.5 μm .

Notes: *Lithothelium quiescens* is characterised by moderately large, partly immersed and usually solitary perithecia with a lateral ostiole, a non-amyloid hymenium and large ascospores (18–31 \times 10–20 μm). Other corticolous species of the genus with hyaline ascospores are *L. hyalosporum* (Nyl.) Aptroot, *L. illotum* (Nyl.) Aptroot and *L. paraguayense* Müll. Arg. (all in the range 14–24 \times 6–12 μm) and *L. albornii* R.C. Harris & Aptroot, with ascospores of 16–19 \times 5.5–6.5 μm . The ascospores of *L. obtectum* (see above) and *L. polysemum* (Nyl.) Aptroot are even smaller, while those of *L. microsporium* R.C. Harris are 10–12 \times 4–4.5 μm (Aptroot 1991, Harris 1995).

This lichen is rather common and locally abundant on tree trunks and thick branches in primary rainforest in Christmas Island.

The epithet *quiescens* (Latin, resting) alludes to the perithecia that appear to be lying on their sides as if in repose.

ADDITIONAL SPECIMENS EXAMINED

Christmas Island. •near Golf Course, 10°25.97'S, 105°42.20'E, alt. 40 m, in moderately dense primary forest, *P.M. McCarthy 1483*, 25.vii.2000 (CANB); •old track from Lily Beach to Ethel Beach, 10°27.92'S, 105°42.55'E, alt. 20 m, in moderately dense primary forest (below seabird roost), *P.M. McCarthy 1507*, 25.vii.2000 (CANB); •track to Greta Beach 500 m S of Ross Hill Gardens pump-house, 10°29.48'S, 105°40.64'E, alt. 80 m, in moderately dense primary forest, *P.M. McCarthy 1561*, 2.viii.2000 (CANB).

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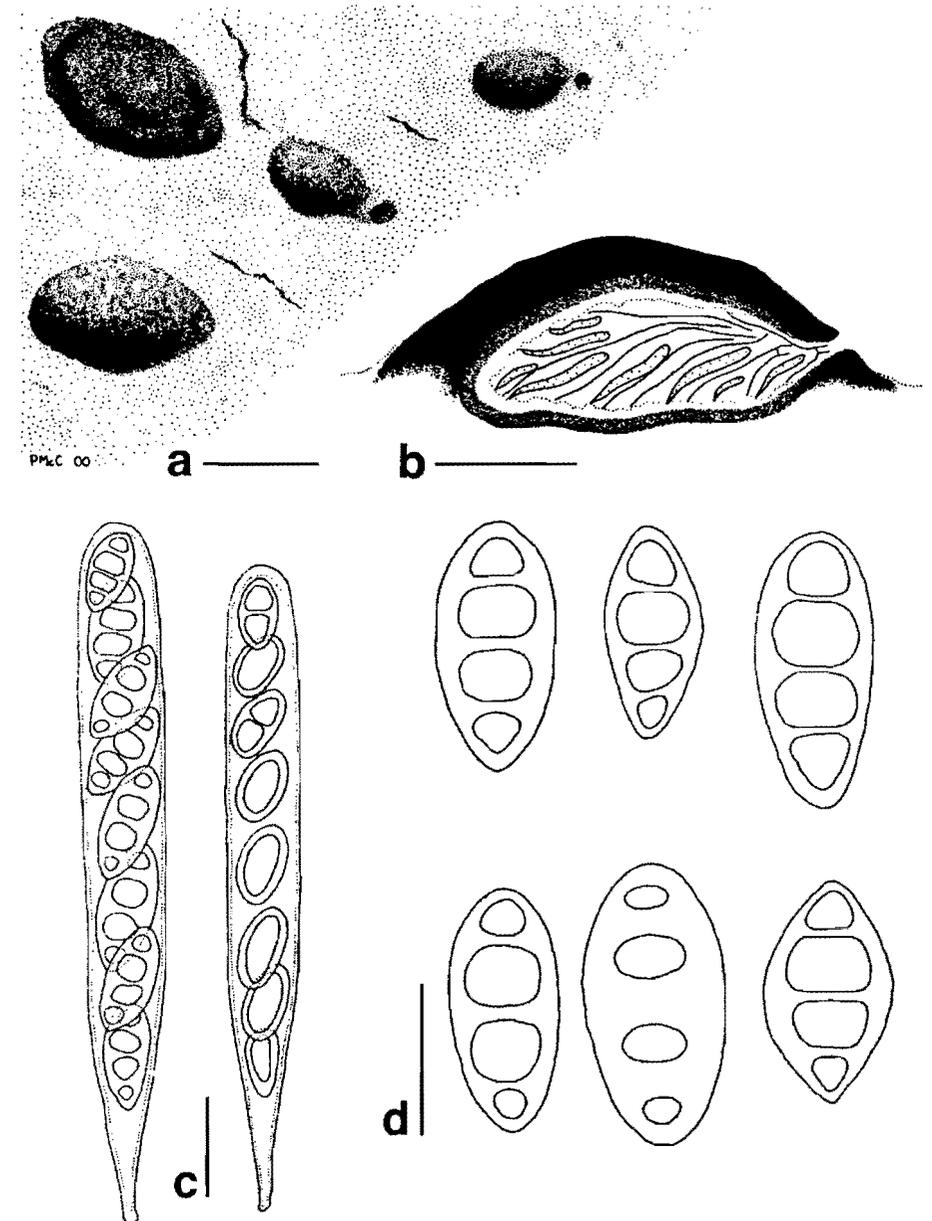


Fig. 1 *Lithothelium quiescens* (holotype). a, Habit of immature, mature and collapsing, post-mature (top left) perithecia; b, Vertical section of perithecium (semi-schematic); c, Mature (left) and immature asci; d, Ascospores. Scales: a = 0.5 mm, b = 0.2 mm, c & d = 20 μm .

Anhydrofusarubin lactol from lichen sources

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Abstract: The naphthazarins anhydrofusarubin lactol and the corresponding methyl ketal have been shown to be two of the major purple pigments present in the medulla of the lichens *Neofuscelia quinonella* and *Paraparmelia violacea*.

The so-called endomiltoides "anthraquinones" (Hale 1990) are a family of related purple or violet pigments found in the medulla of several South African species of *Neofuscelia*, *Paraparmelia* and *Xanthoparmelia*. Although the presence of these striking pigments has been accepted as a primary species character, the compound(s) responsible have not been separated from lichen sources, nor have their chemical structures been elucidated. We have now shown that the major pigment present in several species is the naphthazarin anhydrofusarubin lactol (1), first isolated from the pathogenic fungus *Fusarium solani* (Mart.) Sacc. (Tatum *et al.* 1989) and its teleomorph *Nectria haematococca* (Berk. & Br.) Wr. (Parisot *et al.* 1989).

In this paper we describe the natural occurrence of anhydrofusarubin lactol (1) and the corresponding methyl ketal (2) in the lichens *Neofuscelia quinonella* Elix and *Paraparmelia violacea* (Kurok.) Elix & J. Johnst.

Materials and methods

Authentic material of anhydrofusarubin lactol (1) was supplied by Dr Robert A. Baker and was obtained by extraction of *Fusarium solani* (Tatum *et al.* 1989).

The lichen-derived anhydrofusarubin lactol (1) was characterized by thin-layer chromatography (TLC), high performance liquid chromatography (HPLC) and ultraviolet spectroscopy (see below). It was also converted into the corresponding methyl ketal (2) by treatment with acidic methanol, as has been described previously (Parisot *et al.* 1989, Tatum *et al.* 1989).

Chromatography. The lichen pigments (1) and (2) 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 soloric acid controls (Elix & Wardlaw 2000, 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. In the present case, the correlation of ultraviolet spectra of the authentic pigments (1), (2) and lichen metabolites was greater than 99.9%.

Anhydrofusarubin lactol (1) exhibited standard TLC R_F values: R_F (A) 0.40; R_F (B) 0.11; R_F (C) 0.32. Standard HPLC: R_T 20.4 min.; R_I 0.13.

Anhydrofusarubin lactol methyl ketal (2) exhibited standard TLC R_F values: R_F (A) 0.54; R_F (B) 0.23; R_F (C) 0.45. Standard HPLC: R_T 25.6 min.; R_I 0.26.

Lichen material

Neofuscelia quinonella Elix

Republic of South Africa. Cape Province: •Waboomsberg summit, 33°38'S, 20°17'E, alt. 1200 m, D. Triebel & G. Rambold 7969, 31.iii.1990 (M—holotype).

Paraparmelia violacea (Kurok.) Elix & J. Johnst.

Republic of South Africa. Cape Province: •Cape District, slopes of Table Mountain, Blinkwater Ravine, on sandstone, O. Almborn 1771, 5.viii.1953 (LD—holotype); •Devil's Peak portion of Table Mountain, above the University of Capetown, 33°35'S, 19°09'E, alt. 600 m, T.H. Nash 23572, 22.i.1986 (CANB); •walking track along W slopes above Camps Bay, SW of Cape Town, 33°57'S, 18°23'E, alt. 250 m, D. Triebel & G. Rambold 8623, 9.viii.1990 (M).

Discussion and results

The natural occurrence of anhydrofusarubin lactol (1) and the corresponding methyl ketal (2) in the extracts of the lichens *Neofuscelia quinonella* and *Paraparmelia violacea* has now been confirmed. Comparisons were conducted between the authentic pigments (1) and (2), and the total acetone extracts of the above lichens by TLC in three independent solvent systems and by HPLC coupled to a photodiode array detector for ultraviolet spectroscopic comparisons.

Acknowledgement

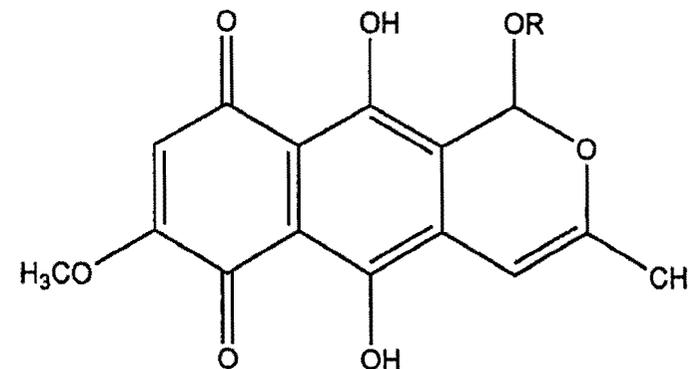
We thank Dr Robert A. Baker of the United States Department of Agriculture, Agricultural Research Service, South Atlantic Area Citrus & Subtropical Products Laboratory, Winter Haven, Florida, for a generous sample of authentic anhydrofusarubin lactol.

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(1) R = H

(2) R = CH₃



Two new species of Parmeliaceae
(lichenized Ascomycotina) from Tasmania

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Abstract: The following new taxa are described: *Parmelina pallida* Elix & Kantvilas and *Xanthoparmelia vicariella* Elix & Kantvilas. Two new combinations, *Parmelina whinrayi* (Elix) Kantvilas & Elix and *Punctelia pseudocoralloidea* (Gyelnik) Elix & Kantvilas, are also proposed.

The lichen family Parmeliaceae is particularly well represented in Australia, and has been investigated intensively over the past 25 years (see Orchard 1994). However, the lichens of some less accessible regions, as well as some difficult genera and species complexes, remain to be studied. We are currently undertaking a detailed survey of the family in Tasmania, work which has led to the discovery of several species new to science (Elix & Kantvilas 1995, 1999a, b); two further new species are described here. Chemical constituents were identified by thin layer chromatography (Culberson 1972, Culberson & Johnson 1982, Elix & Wardlaw 2000) and comparison with authentic samples.

Parmelina pallida Elix & Kantvilas, sp. nov.

Fig. 1

Thallus isidiosus, acidum lecanoricum atranorinumque continens et ergo *Parmelinae conlabrosae* similis, sed pagina inferiore pallida et isidiis granulatis epicorticatisque differt.

Type: Australia. Tasmania: South Arm, Fort Direction Road, 43°02'S, 147°25'E, alt. ca 50 m, on *Allocasuarina verticillata* in degraded dry, open woodland on roadside, *G. Kantvilas 165/01*, 12.ii.2001; holo: HO.

Thallus foliose, adnate, to 3 cm wide. Lobes contiguous to imbricate, sublinear to irregular and apically rounded, irregularly branched, 0.8–1.5 mm wide; cilia very sparse, 0.1–0.4 mm long, pale brown or darkening, marginal, mainly in the lobe axils. Upper surface pale grey, flat to convex, emaculate, rugulose, without soredia, black-margined at apices, ± pruinose subapically, with laminal isidia and lobules; isidia moderately dense, cylindrical, simple then coralloid and granular, apices syncorticate to epicorticate, intact, pale or darkening; lobules scattered, subrotund, 0.3–0.6 mm wide. Medulla white. Lower surface shiny, smooth or rugulose, ivory to pale brown, darker at apices; rhizines sparse, simple, concolorous with the lower surface. Apothecia and pycnidia not seen.

Chemistry: Cortex K+ yellow, medulla K–, C+ red, KC+ red, P–; containing atranorin (minor), chloroatranorin (minor), lecanoric acid (major), orsellinic acid (trace).

Parmelina pallida is very similar to the very common *P. conlabrosa* (Hale) Elix & J. Johnst., both species having pale grey, very sparsely ciliate to eciliate lobes and coralloid isidia, and containing lecanoric acid as the major medullary chemical compound. The new species differs in having an ivory to pale brown lower surface, a lobulate upper surface, and isidia that become rather gnarled and granular with epicorticate, eroded apices. In contrast, the lower surface of *P. conlabrosa* is jet black apart from a paler marginal zone, the upper surface is elobulate, and the isidia are invariably syncorticate and never granular.

Parmelina pallida appears to be an uncommon species, presently known only from the type collection. It is part of a rich assemblage of lichens that colonises the bark of understorey trees in open, dry sclerophyll, eucalypt-dominated woodland. Associated lichens include *Parmelina conlabrosa* (Hale) Elix & J. Johnst., *P. pseudorelicina* (Jatta) Kantvilas & Elix, *Flavoparmelia rutidota* (Hook. f. & Taylor) Hale, *Hypogymnia billardierei* (Mont.) Filson, *Usnea inermis* Motyka, *Candelariella xanthostigmoides* (Müll. Arg.) R. W. Rogers and numerous crustose species.

Xanthoparmelia vicariella Elix & Kantvilas, sp. nov.

Fig. 2

Species *Xanthoparmeliae vicariae* et *X. neotinctinae* similis, isidiis cylindricis, coralloideis syncorticatisque et pagina inferiore nigra, sed acidum salazanicum, acidum barbaticum et acidum norsticticum simultanei continente differt.

Type: Australia. Tasmania: Mt Direction, 3 km W of Risdon Vale, 42°49'S, 147°19'E, alt. 448 m, on dolerite rock in dry sclerophyll forest, *J.A. Elix 42634* & *G. Kantvilas 24.iv.1997*; holo: HO.

Thallus foliose, adnate, to 8 cm wide. Lobes imbricate, sublinear, irregularly branched, 1.0–2.0(–3.0) mm wide, occasionally with narrower laciniae along the margins or in the centre of the thallus. Upper surface yellow-green, darkening with age, flat to slightly concave, emaculate, rugulose, without soredia, isidiolate; lobe margins often blackened, particularly towards the apices; isidia often forming a dense mat in the thallus centre, cylindrical, simple then coralloid-branched, with apices syncorticate, intact, ± darkening. Medulla white. Lower surface flat, shiny, rugulose, mostly black but brown at the apices; rhizines moderately dense, slender, simple or occasionally tufted and branched, black. Apothecia and pycnidia not seen.

Chemistry: Cortex K–, medulla K+ yellow then red, KC+ red, C–, P+ yellow-orange; containing usnic acid, barbatic acid (major), 4-O-demethylbarbatic acid (minor), salazinic acid (major), norstictic acid (major), and consalazinic acid (minor/trace).

Xanthoparmelia vicariella is closely related to *X. neotinctina* and *X. vicaria*, and shares with those species a moderately to tightly adnate thallus, irregular, relatively broad lobes, a black lower surface and densely coralloid, cylindrical isidia with syncorticate apices. The three species are morphologically indistinguishable, and can be separated only by their medullary chemistry: *X. vicaria* contains barbatic acid, *X. neotinctina* contains norstictic acid, usually together with salazinic acid, whereas *X. vicariella* contains all three compounds together. Although these taxa are sympatric in south-eastern Tasmania, *X. neotinctina* has a much wider distribution in mainland Australia (all States and Territories except Northern Territory) and both islands of New Zealand. A similar range of chemical variation is displayed by taxa of the *X. lineola* group.

Xanthoparmelia vicariella is known only from south-eastern Tasmania, where it occurs on dolerite and basalt boulders in dry sclerophyll forest and degraded rough grazing ground.

SPECIMENS EXAMINED (paratypes)

Australia. Tasmania: •Summit of Gunners Quoin, 16 km ENE of Mt Wellington, 42°46'S, 147°19'E, alt. 440 m, on dolerite rocks in dry sclerophyll forest, *J.A. Elix 27421, 27422, 27427* & *G. Kantvilas, 28.iv.1992* (CANB); •near Pontville ford, along road to Tea Tree, 42°42'S, 147°16'E, alt. 45 m, on basalt boulders in a degraded paddock, *G. Kantvilas 112/01, 28.i.2001* (HO).

Parmelina whinrayi (Elix) Kantvilas & Elix, comb. nov.

Basionym: *Canoparmelia whinrayi* Elix, *Mycotaxon* 47: 105 (1993)

Type: **Australia. Tasmania:** W of the road from Marrawah to the Arthur River, SSE of West Point, 1.ii.1969, J.S. Whinray (MEL!—holotype).

This uncommon Tasmanian endemic taxon is characterised by grey, very sparsely marginally ciliate or eciliate lobes, pustular marginal and laminal soredia, a pale brown undersurface and the presence of lecanoric acid as the major medullary compound. Additional collections have confirmed its close relationships with *P. labrosa*, a species that differs only by its jet black lower surface. Hence its inclusion in the genus *Parmelina* appears to be more appropriate.

Punctelia pseudocoralloidea (Gyelnik) Elix & Kantvilas, comb. nov.

Basionym: *Parmelia pseudocoralloidea* Gyelnik, *Repert. Spec. Nov. Regni Veg.* 29: 288 (1931)

Type: **Australia.** Lower Murray River, 1887, C. French 7 (G!—holotype).

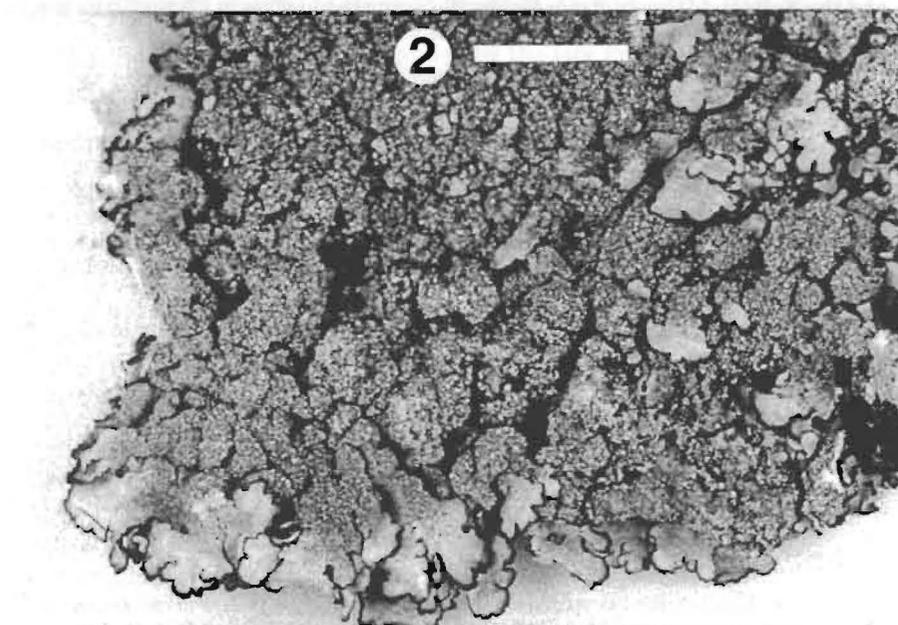
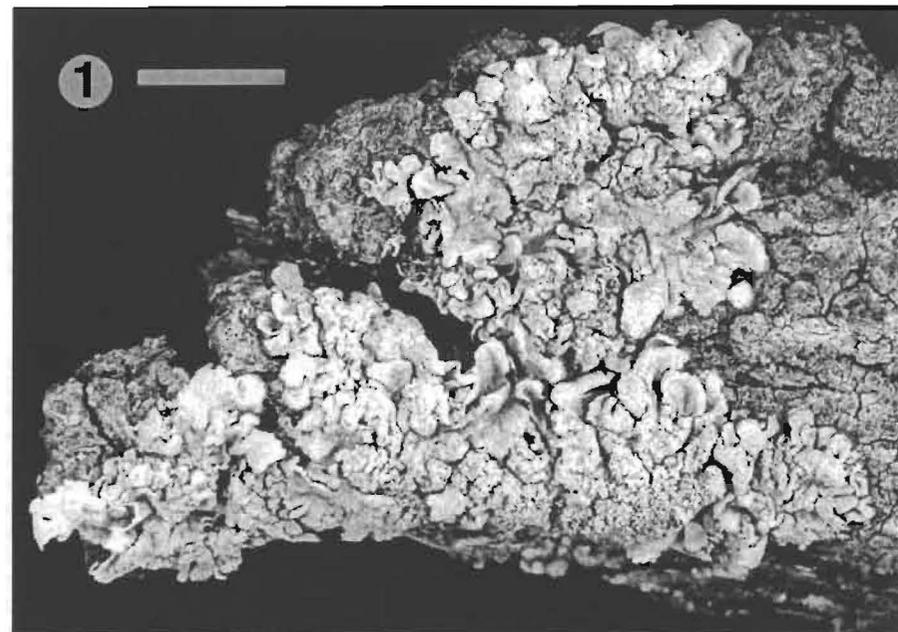
This Australasian species is a member of the *Punctelia subrudecta* (Nyl.) Krog-P. *perreticulata* (Räsäsen) G. Wilh. & Ladd complex, and has previously been included under the former species name (Orchard 1994).

Acknowledgements

We thank Stuart Hay and Neal McCracken of the Photographic Unit, ANU, for preparing the photographs.

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Figures 1–2. New species of Parmeliaceae: 1, *Parmelina pallida* (holotype in HO); 2, *Xanthoparmelia vicariella* (holotype in HO). Scale bar = 5 mm.

Thelotrema macrocarpum C.W. Dodge belongs in *Chroodiscus*

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Abstract: A corticolous lichen described by C.W. Dodge as *Thelotrema macrocarpum* from the bark of southern rata in coastal forest on Ewing Island (Auckland Islands group) is shown to be referable to *Chroodiscus*, and accordingly the new combination *C. macrocarpus* (C.W. Dodge) D.J. Galloway is here proposed. The recently published *C. australis* Kantvilas & Vězda is a synonym of this earlier name. The taxon *C. australis* ssp. *tasmanicus* Kantvilas & Vězda is transferred to *C. macrocarpus* as its ssp. *tasmanicus*.

Introduction

As part of research for the Supplement to *Flora of New Zealand Lichens* (Galloway 1985), the new lichen names introduced by the late Prof. Carroll W. Dodge in 1971 for a variety of New Zealand and subantarctic island lichens collected in the 1960s, mainly by Dr Brian A. Fineran (Dodge 1971), were searched for in the herbarium of Canterbury University (CANU), where the bulk of Fineran's lichens are held. Among these was the holotype specimen of *Thelotrema macrocarpum* C.W. Dodge, collected from rata bark on Ewing Island, part of the Auckland Islands group. Investigation of this specimen, including its secondary chemistry (for methods, see Culberson 1972, White & James 1985) showed it to contain stictic acid and associated metabolites, and to be indistinguishable from *Chroodiscus australis*, recently described (Kantvilas & Vězda 2000) from material collected in 1971 by Prof. Henry Imshaug and Karl Ohlsson from *Nothofagus-Drumys* forest on Staten Island (Argentina) and the Falkland Islands. Accordingly, the new combination in *Chroodiscus* is made below, with *C. australis* becoming a synonym of *C. macrocarpus*.

Chroodiscus macrocarpus (C.W. Dodge) D.J. Galloway, comb. nov.
Basionym: *Thelotrema macrocarpum* C.W. Dodge, *Nova Hedwigia* 19, 457 (1971) ["1970"]

Type: **New Zealand. Auckland Islands:** Ewing Island on rata bark, 17.i.1966, B.A. Fineran 1434b (CANU!-holotype).
= *Chroodiscus australis* Kantvilas & Vězda, *Lichenologist* 32, 331 (2000).

Type: **Argentina.** Isla de los Estados [Staten Island], Puerto Basil Hall, in open *Nothofagus-Drumys* forest on Punta Passalacqua Peninsula, north of Perto Abrigado, 54°45'S, 64°10'W, 11.x.1971. H.[A.] Imshaug 51381, A. & K. Ohlsson (HO-holotype; Hb Vězda, MSC-isotypes).

Illustration: Kantvilas & Vězda 2000: 333, fig. 3 (as *Chroodiscus australis*).

Description: A detailed description (as *Chroodiscus australis* Kantvilas & Vězda ssp. *australis*) is given by Kantvilas & Vězda (2000: 331–332). Dodge's anatomical measurements of the Auckland Island material vary somewhat from those given by Kantvilas & Vězda, but not to a marked degree: the Auckland Island material has a hymenium 220 µm tall (Staten Island material has a hymenium height of 150–200 µm); asci are monosporous in Auckland Island, Staten Island and Falklands material; the Auckland Island ascospores are 175 × 33 µm (Dodge 1971: 457), while those from the Staten Island type are 70–150 × 26–45(–56) µm (Kantvilas & Vězda 2000: 333).

Chemistry: Thallus K+ brownish red, C–, KC+ red, Pd+ yellow; containing stictic acid (major), constictic (minor), cryptostictic (tr.) and connorstictic (tr.) acids.

SPECIMEN EXAMINED

The holotype specimen of *Thelotrema macrocarpum* from Ewing Island, mentioned above.

Notes

Chroodiscus macrocarpus is an austral lichen characterized by the very large, muriform ascospores (the largest of any species in the genus) and the presence of stictic acid and associated metabolites. On Ewing Island, it grows amongst bryophytes on the bark of southern rata (*Metrosideros umbellata*). It is known also from Staten Island (Argentina) and the Falkland Is. (Kantvilas & Vězda 2000), and is a southern circumpolar taxon with a distribution range similar to that of other lichens recently noted, viz.: *Leptogium australe* (Galloway & Knight 1999, Galloway 1999), *Pannaria dichroa* (Jørgensen 2000), *Placopsis dusenii* and *P. macrophthalma* (Galloway 2001).

Material from Tasmania with 2-spored asci was distinguished by Kantvilas & Vězda (2000: 334) as ssp. *tasmanicus* Kantvilas & Vězda. This taxon is accordingly combined in *C. macrocarpus*.

Chroodiscus macrocarpus* ssp. *tasmanicus (Kantvilas & Vězda) D.J. Galloway, comb. nov.

Basionym: *Chroodiscus australis* ssp. *tasmanicus* Kantvilas & Vězda, *Lichenologist* 32, 334 (2000).

Type: **Australia. Tasmania:** Mt Geikie, 41°58'S, 145°35'E, over bryophytes in sheltered recesses in alpine heathland-rock scree, 1080 m altitude, 5.x.1998, G. Kantvilas 196/98 (HO-holotype).

Acknowledgements

I am particularly grateful to Manfred Ingerfeld, Curator of the Herbarium of the Department of Plant and Microbial Sciences at Canterbury University (CANTU) for the provision of specimens identified by the late Prof. C.W. Dodge. Funds for this research were provided by the Foundation for Research Science and Technology (FRST, Wellington, New Zealand) under Contract C09618.

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Additional lichen records from Australia 47.

Pocsia septemseptata

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Pocsia Vězda is a tropical pyrenocarpous genus of uncertain systematic position and circumscription currently comprising seven obligately foliicolous species. Two species, *P. borhidii* (Farkas & Vězda) Lücking & Kalb and the endemic *P. triseptata* Kalb & Vězda, are known from tropical and subtropical rainforest in eastern Australia (Vězda & Kalb 1991, Lücking *et al.* 2001); a third, *P. austropacificum* P.M. McCarthy, is endemic to Lord Howe Island (McCarthy 1999). An additional species, the pantropical *P. septemseptata* Vězda, is reported here from rainforest in north-eastern Queensland.

Pocsia septemseptata Vězda, *Folia Geobot. et Phytotax.* 17, 388 (1982)

Thallus crustose, foliicolous, continuous, effuse to determinate, very thin, pale grey to pale grey-green, matt, \pm smooth to minutely uneven, epicuticular; prothallus not apparent. Algae unicellular or in short filaments of 2–4 cells; cells 4–10 \times 4–8 μ m.

Ascomata perithecioid, superficial, hemispherical to subglobose, then only slightly attenuated at the base, (0.14–)0.2(–0.26) mm diam. (52 measured), covered almost to the apex by a 20–30 μ m thick layer of thallus, usually uniformly pale yellow-green to pale orange, rarely medium orange-brown; apex translucent, rounded, not collapsing at maturity (as in some other species of *Pocsia*); ostiole inconspicuous. Involucellum distinct in thin section, c. 20 μ m thick, comprising outer, elongate, periclinal hyphae subtended by more rounded or angular, thick-walled cells interspersed with and/or enclosing algae. Excipulum 15–20 μ m thick, hyaline. Centrum 0.1–0.19 mm wide. Subhymenium 20–40 μ m thick. Paraphyses absent. Periphyses simple to sparingly branched, 20–40 μ m long, 0.5–0.8 μ m wide. Asci 8-spored, clavate to cylindroclavate, 65–85 \times 16–25 μ m, non-amyloid apex with or without a broad and rather flat ocular chamber. Ascospores 7-septate, usually cylindrical and slightly curved, (32–)40(–51) \times (6–)7.5(–9) μ m (44 measured); apices rounded, some with a minute mucro; perispore absent. Conidiomata not seen. (Fig. 1).

Pocsia septemseptata is a minute and very inconspicuous species that was previously reported from East Africa (Vězda 1982) and the Neotropics (Lücking & Kalb 2000). It is characterised by the very small and rather pale perithecia with a usually darker translucent apex, and by the dimensions and septation of the ascospores (Vězda 1982). Superficially the perithecia of the Australian specimen appear to grow singly on 0.3–0.5 mm wide thalli that are 20–30 μ m thick. However, these "islands" of thallus are joined by a c. 10 μ m thick covering of 1.5–2.5 μ m thick hyphae with scattered and clustered algae. Globose and discoid isidia were reported from some Costa Rican specimens by Lücking & Kalb (2000); however, those structures do not occur in the Australian specimen or in the Tanzanian type. The foregoing description is based on the Australian specimen.

SPECIMEN EXAMINED

Queensland: •Eungella Natl Park, 2 km SE of Eungella, Palm Track, 21°90'S, 148°30'E, alt. 739 m, on leaves of semi-shaded shrub in tropical forest with numerous large palms, *H. Streimann* 64177 (part), 19.viii.1999, (CANB, Herb. R. Lücking).

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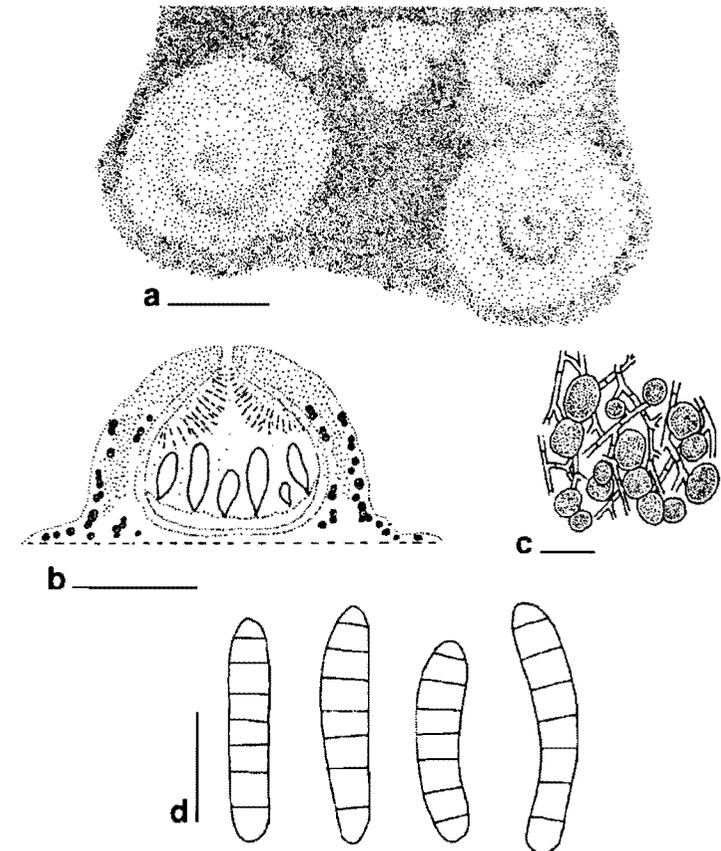


Fig. 1. *Pocsia septemseptata* (CANB). a, Habit; b, Vertical section of perithecium (semi-schematic); c, Thalline algae and hyphae; d, Ascospores. Scales: a = 0.5 mm, b = 0.1 mm, c = 10 μ m, d = 20 μ m.

Additional lichen records from the Philippines 1.
Pertusaria remota A.W. Archer

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Abstract: *Pertusaria remota*, previously known from Australia, is reported from the Philippines for the first time.

The crustose genus *Pertusaria* includes numerous sterile sorediate taxa which can easily be confused with species of other genera. However, since the revision of tropical and subtropical Australian taxa by Archer (1997), *Pertusaria* species collected in other Palearctic regions can now be identified more easily. In a survey of lichens of the Cordillera region in the Philippines (Bawingan *et al.* 2001), the sorediate species *P. remota* was collected. This species is characterized by a dull yellowish to greenish yellow thallus with disc-like to hemispherical soralia and a chemistry including hypostictic, stictic, and thiophanic acids (Archer 1991, 1997).

Morphologically *P. remota* is similar to *P. xanthoplaca* Müll. Arg. (syn. *P. persulphurata* Müll. Arg.), which is common in eastern Australia. However, the latter is characterized by the absence of hypostictic acid and the bright yellow thallus colour. The Philippine specimen contains thiophanic acid as a major constituent and 2-chloro-6-*O*-methylnorlichexanthone, hypostictic acid and stictic acid as minor substances, plus cryptostictic acid in traces, according to a HPLC analysis.

Pertusaria remota was described from Western Australia and the Northern Territory (Archer 1991), where it is common on siliceous rocks in open woodlands and gallery forests. In the Philippines it occurs in open woodland.

SPECIMEN EXAMINED

Philippines. Benguet Province: •Nangalisan Tuba, Benguet, 16°13'S, 120°39'E, alt. 1000 m, on siliceous rocks, 27.ii.2000, P. Bawingan (CL-0193).

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Additional lichen records from New Zealand 34.
Caloplaca tornuensis H. Magn., *Umbilicaria grisea* Hoffm.,
and *Umbilicaria krascheninnikovii* (Savicz) Zahlbr.,
three bipolar lichens.

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Abstract: Herbarium and fieldwork undertaken over the past 5 years in connection with preparation of a Supplement to *Flora of New Zealand Lichens* (Galloway 1985), revealed additional bipolar taxa in the high-alpine lichen mycobiota of South Island, New Zealand. The existence of a distinctive bipolar element in the New Zealand lichen mycobiota is already well-known and discussed in several papers (Du Rietz 1929b, 1940; Galloway 1985, 1998, 1999; Galloway & Bartlett 1986; Galloway & Aptroot 1995; Galloway *et al.* 1998). Three additional bipolar taxa are discussed below, being recorded from New Zealand for the first time. *C. tornuensis* and *U. grisea* appear also to be first records for the Southern Hemisphere.

Caloplaca tornuensis H. Magn., *Göteborgs Kungl. Vetensk.-och Vitterh.-Samh. Handl. Sjätte Följden. Ser. B*, 3(1), 17 (1944)

ILLUSTRATION: Hansen *et al.* (1987: 47, fig. 7).

DESCRIPTION: Thallus 0.5–1.5 cm diam., greyish white or fawnish grey, granular-papillate to somewhat indistinct, on ± moribund *Andreaea*. Apothecia scattered to crowded, rounded, 0.1–0.5(–0.8) mm diam., disc orange-brown, plane to subconvex, surface matt to minutely granular; margins persistent, thin, black to grey-black, glossy. Epithecium dense, orange-brown or yellow-brown, granular (10–)12.5–15(–20) µm thick. Hymenium colourless, 70–80(–85) µm tall. Hypothecium opaque, pale yellow-brown, 25–37.5 µm thick. Asci cylindrical, 50–55 × 15–17.5 µm. Ascospores 1-septate, (15–)17.5–20(–22.5) × 7.5–9 µm; septum to 2.5 µm thick.

Chemistry: Thallus K–; epithecium K+ reddish violet; ?containing parietin. The specimen was too small and fragmentary for TLC.

NOTES: *Caloplaca tornuensis* is a bipolar lichen only recently discovered in high-alpine tundra vegetation on the exposed summit of the Old Man range in Central Otago (Galloway 2000). It is characterized by the indeterminate, spreading thallus parasitizing colonies of *Andreaea*; the small, scattered, orange-brown apothecia with thin, shining grey-black to black margins; 1-septate ascospores, (15–)17.5–20(–22.5) × 7.5–9 µm. It occurs on the leaves of the moss *Andreaea* on small schist rocks at the base of large schist tors, in very exposed, wind-excavated hollows which are free of snow early and subject to extreme freeze-thaw episodes. Associated lichen taxa include: *Aspicilia cinerea*, *Bartlettella fragilis*, *Caloplaca cinnamomea*, *Cetrariella delisei*, *Lecidea fuscoatrula*, *Ochrolechia xanthostoma*, *Pertusaria dactylina*, *Rhizocarpon* spp., and *Rinodina olivaceobrunnea*. It is known from Scandinavia, Svalbard, Greenland, Siberia, Europe and North America (Magnusson 1944, Poelt 1986, Hansen *et al.* 1987, Schindler 1990, Türk & Poelt 1993, Santesson 1993, Esslinger & Egan 1995, Søchting & Olech 1995, Talbot *et al.* 2001). A related species, also parasitic on *Andreaea*, *C. siphonospora*, is known from King George Island and Livingston Island in Antarctica (Olech & Søchting 1993, Øvstedal & Lewis Smith 2001), but it has ± simple ascospores reminiscent of but smaller than those of *C. nivalis*. Neither of these latter taxa has so far been recorded in New Zealand.

SPECIMEN EXAMINED: *Otago*: •Old Man Range, at base of schist tors on exposed summit plateau, 1692 m, 7.ii.1999, *D.J. Galloway 2518* (CHR, OTA).

Umbilicaria grisea Hoffm., *Dtschl. Fl.*, 111 (1796)

ILLUSTRATIONS: Wirth (1980: 494, pl. 58Aa); Jahns (1982: 221, pl. 534, as *Umbilicaria murina*); Wirth (1987: 483); Codogno *et al.* (1989: 61, fig. 5C; 62, fig. 613); Wirth (1995: 935); Arup *et al.* (1997: 237, fig. 88D); Thor & Arvidsson (1999: 334).

DESCRIPTION: Thallus monophyllous, \pm orbicular, (2–)3–15(–25) mm diam., attached by a central umbilicus, pliable when wet, very fragile, brittle when dry. Umbilicus compressed, 2–3 mm diam., concolorous with lower surface or darker. Margins of lobes entire to torn, notched, incised to irregularly lobulate here and there, commonly reflexed and thinly to thickly parasorediate. Parasoredia dark olive-green to dark brownish or brown-black, coarsely granular to minutely lobulate, isolated parasoredia sometimes becoming distinctly phyllidiate when developed centrally above umbilicus. Upper surface shallowly undulate to rarely convex, pale to dark olive-greenish when moist, pale grey to grey-black when dry, distinctively pale grey-white, minutely scabrid-areolate centrally (10 \times lens), darkening to grey-black towards margins. Lower surface smooth, minutely scabrid-areolate (10 \times lens), pale creamish or whitish tan to brownish or grey, to brown-black, sometimes distinctively grey- or white-pruinose (10 \times lens) in patches at margins, with or without rhizines. Rhizines rather infrequent, concolorous with lower surface, to 1 mm long and 0.01–0.02 mm diam., simple or sparingly branched towards tips, when present developed below reflexing parasorediate margins and often obscured by these. Apothecia and pycnidia not seen.

Chemistry: gyrophoric acid (major), lecanoric and umbilicinic acids (minor) (Narui *et al.* 1996: 200).

NOTES: New Zealand material of *Umbilicaria grisea* is characterized by monophyllous, rounded thalli with reflexed margins; a distinctive marginal zone of dark olive-green to brown-black parasoredia [derived from the upper cortex and not from medullary layers (Codogno *et al.* 1989)]; a characteristic, pale grey-white, minutely scabrid-areolate (10 \times lens) central area of the upper surface which contrasts with the darker, parasorediate, marginal zone; a pale tan to dark brown, to grey or blackened lower surface which is generally also minutely scabrid-areolate (10 \times lens), and commonly distinctively grey- or white-pruinose at or near the margins; an absence of apothecia; and sparse or absent rhizines. Some collections of *U. grisea* from New Zealand approach forms of *U. hirsuta* (Sw. ex Westr.) Hoffm., and further work is needed to clarify this point. In the meantime, the material seen is maintained as *U. grisea*. *U. hirsuta* differs from *U. grisea* in having thinner, less robust thalli, a noticeably thinner upper cortex (Valladares 1994), different parasoredia, and generally a well-developed covering of rhizines on the lower surface (Purvis *et al.* 1992).

New Zealand specimens of *Umbilicaria grisea* grow closely attached to the substratum, on flat, steeply sloping to \pm vertical faces of schist outcrops and tors, or on greywacke boulders in full sun, generally but not always N-facing, in or near water runnels and drainage or seepage cracks, or on the top of schist tors and rock outcrops in tussock grassland. Occasional to locally common, sometimes forming swards of small individuals developing from waterborne propagules. Associated in New Zealand with the lichens *Aspicilia cinerea*, *Caloplaca amylicia*, *Cladia aggregata*, *Coccocarpia palmicola*, *Collema durietzii*, *Flavoparmelia haysomii*,

Immersaria athrocarpa, *Lecanora farinacea*, *L. rupicola*, *Massalongia carnosa* (in pads and tufts of moss), species of *Neofuscelia*, *Physcia tribacia*, *Ramboldia petraeoides*, *Rhizocarpon geographicum*, *Teloschistes velifer*, *Toninia bullata*, *Umbilicaria cylindrica*, *U. vellea* and species of *Xanthoparmelia*.

Umbilicaria grisea was not formerly known from the Southern Hemisphere, and is an addition to the bipolar element in the New Zealand lichen mycobiota. In the Northern Hemisphere it has a mainly western, temperate distribution in Europe, from Jersey in the Channel Islands (Purvis *et al.* 1992), southern Sweden (Degelius 1932, Llano 1950, Dahl & Krog 1973, Santesson 1993, Arup *et al.* 1997), southern Finland (Hakulinen 1962), France, Germany, Spain, Portugal, Italy, the Ukraine, Macedonia, Rumania and Greece (Frey 1933, Poelt 1969, Ozenda & Clauzade 1970, Poelt & Vězda 1981, Jahns 1982, Wirth 1987, Nimis & Poelt 1987, Codogno *et al.* 1989, Codogno & Sancho 1991, Nimis 1993, Kondratyuk *et al.* 1998, Scholz 2000). It is not known from North America (Esslinger & Egan 1995), South America, Asia or Australia [but *U. hirsuta* is recorded from three states in Australia (Filson 1996)].

SPECIMENS EXAMINED

Canterbury: •Near Godley Glacier, on E and S aspect of rock, 3400 ft, 19.i.1958, *D. Scott 275* (OTA); •Head of Lake Tekapo, S aspect of large rock, 2400 ft, 16.viii.1958, *D. Scott 190* (OTA); •Lake Tekapo, on side of rocks, 750 m, i.1935, *H.H. Allan ZA 3230* (CHR 160547); •Lake Tekapo, steeply sloping to vertical, N-facing aspect of greywacke boulders above lake shore, 720 m, 8.iv.2001, *D.J. Galloway 2655* (CHR, OTA); •S of Tekapo, greywacke rock at roadside in frost-heaved soil, 740 m, 4.iv.2001, *D.J. Galloway 2654* (OTA); •E of Pukaki, vertical NE-facing aspect of large greywacke rock at roadside, 630 m, 8.iv.2001, *D.J. Galloway 2656* (OTA). *Otago*: •Mt Sutton, Lake Ohau, 2200 ft, v.1958, *J. Murray 1787* (OTA); •Rough Ridge, Trig W north of Old Dunstan Road, on sloping to vertical face at base of large schist tor, N-facing, 953 m, 1.v.2000, *D.J. Galloway 5202* (CHR 533383); •Poolburn Reservoir, on flat or sloping ledges of schist outcrops in full sun, N-facing, in or near water runnels and drainage cracks, 844 m, 30.iv.2000, 2.v.2000, *D.J. Galloway 5200, 5201* (CHR 533381, 533382); •Poolburn Reservoir, schist tors; on N side of reservoir, sheltered, steeply sloping, N-facing, ledges and water channels of schist tor, 860 m, 20.i.2001, *D.J. Galloway 2653 & S Hammer* (CHR, OTA); •Poolburn Reservoir, schist rocks S of Teviot Angling Club Hut, on sloping to vertical N-facing ledges on schist tor in grassland, 845 m, *D.J. Galloway 2652* (OTA); •West of gravel pits, Lake Onslow Road, vertical face of overhanging schist tor (N facing) in grassland on top of ridge above water race and old gold workings, 760 m, 21.ii.2001, *D.J. Galloway 2651* (CHR, OTA); •N slopes of Rock & Pillar Range, schist tors in grassland above Loganburn Reservoir, E of dam, 840 m, 15.iv.2001, *D.J. Galloway 2657* (CHR, OTA); •Flagstaff [Dunedin], *J.S. Thomson 1711* (OTA 048283). *Southland*: •N end of S Mavora Lake, on dry vertical, southern face of dusty, roadside rock in grassland, 625 m, 25.i.2000, *D.J. Galloway 2650 & S. Hammer* (CHR, OTA).

Umbilicaria krascheninnikovii (Savicz) Zahlbr., *Cat. Lich. Univ.* 10 (3), 405 (1939)

Basionym: *Gyrophora krascheninnikovii* Savicz, *Bull. Jard. Imp. Bot. Pierre Grande* 14, 117 (1914).

ILLUSTRATIONS: Du Rietz (1929a: pl. 2, fig. 1, as *Gyrophora hultenii*); Llano (1950: 255 pl. 17, fig. 3, as *Omphalodiscus polaris*); Hale & Cole (1988: 119, fig. 49A); Sancho *et al.* (1992: 193, fig. 3D-F); Wei & Jiang (1993: 88, fig. 49; 89, fig. 50); McCune & Geiser (1997: 295); St. Clair (1999: 201).

DESCRIPTION: Thallus monophyllous, ± rounded to irregularly lobate, (1.5–)2–4(–5.5) cm diam. Sometimes lobes proliferate from the umbilicus, becoming folded and congested and giving the lichen an appearance of being polyphyllous; closely attached at the umbilicus but marginal parts somewhat raised and free of substratum, thick, flabby and pliable when wet, brittle when dry. Umbilicus compressed, thick, 5–8(–12) mm diam., dark brown to black. Margins of lobes entire to lacinate, incised, fissured or fenestrate, without soredia, isidia or rhizines. Upper surface pale to dark olive-green to reddish brown when moist, pale to dark grey to grey-white when dry, dull, slightly to strongly areolate-scabrid (10× lens), crystalline white-pruinose to granular in places, especially in spaces between ridges (10× lens), smooth to strongly rugose and deeply folded; surface ridges white, sharply elevated and reticulate, to broad and rounded or compressed into strong ridges. Lower surface glabrous, smooth to minutely roughened-microcrystalline (10× lens), irregularly and shallowly bullate centrally, undulate towards margins, pale ivory, whitish to pinkish or pale tan, slightly darkening around umbilicus, often white-pruinose in a marginal zone; thalloconidia absent; rhizines absent. Apothecia widely scattered to densely crowded on lamina and ridges from margins to centre, sessile to subpedicellate, constricted below, 0.5–1.5(–2.2) mm diam., concave at first, soon becoming plane and then convex at maturity; thalline margins persistent, black, glossy; disc black, matt to glossy, epruinose, plane at first, becoming irregularly gyrose and/or fissured, gyri raised, black, glossy. Epithecium pale to dark brown, 5–8.5 µm thick. Hymenium colourless to pale straw, 65–80(–85) µm tall. Hypothecium yellow-brown to brownish, opaque, densely interwoven. Asci clavate 37.5–45(–50) × 10–15 µm. Ascospores simple, colourless, broadly ellipsoid, apices rounded, 8.5–12 × 5.–6.5 µm. Pycnidia occasional to common and crowded, marginal and laminal, immersed, uni- to multi-loculate, ostiole brown-black to black, raised, thick, round to somewhat irregular, 0.1–0.5 mm diam. Conidia bacilliform, 3–4.5 × 0.5–1 µm.

Chemistry: gyrophoric acid (major) and lecanoric acid (minor) and atranorin (trace) (Narui *et al.* 1996: 200).

NOTES: *Umbilicaria krascheninnikovii* is distinguished from the related *U. decussata* by the absence of thalloconidia on the lower surface (Hestmark 1990: 560–561, Sancho *et al.* 1992), which is smooth, pale pinkish, fawn or greyish with white-pruinose marginal areas, in contrast to the sooty, black lower surface of *U. decussata*. *U. krascheninnikovii* throughout its known range is commonly fertile, whereas *U. decussata* is only occasionally fertile. New Zealand material seen is richly fertile, while sympatric *U. decussata* is frequently without apothecia. In New Zealand, *U. krascheninnikovii* is characteristic of vertical or overhanging exposed rock faces, where it grows with *Bryoria austromontana*, *Pseudophebe pubescens*, *Umbilicaria decussata* and *Usnea torulosa*. It is locally common on exposed schist tors on high western slopes of the Old Man Range, whereas on southern and eastern aspects of the same mountain range it is replaced entirely by *U. decussata*.

Umbilicaria krascheninnikovii occurs widely in the Northern Hemisphere, where it is known from Siberia, Spitzbergen, Greenland, North America, the Himalaya and Japan (Du Rietz 1929a, as *Gyrophora hultenii*; Frey 1933; Llano 1950; Poelt 1969, 1977; Poelt & Vězda 1981; Thomson 1984; Hale & Cole 1988; Wei & Jiang 1993; Hansen 1995; Esslinger & Egan 1995; McCune & Gieser 1997; St. Clair 1999). It is also present in Antarctica, being recorded from the South Shetland Islands and the Antarctic Peninsula to Lat. 70°S and up to 1900 m (Sancho *et al.* 1992, Øvstedal & Lewis-Smith 2001).

SPECIMENS EXAMINED:

Otago: •Old Man Range, exposed, west-facing schist tors, W of Obelisk, on vertical faces and overhanging ledges, 1690 m, 28.i.2001, *D.J. Galloway* (CHR, OTA); •Whitecoomb Range, on N faces of tors, 1448 m, 8.iii.1986, *P. Child* 2816 pr. min. p. (CHR 423127).

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**Additional lichen records from New Zealand 35.
Seven corticolous species of *Lecanora*, with notes
on *L. caesiorubella* Ach. and *L. carpinea* (L.) Vain.**

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Abstract: We report the first New Zealand collections of the following corticolous species of *Lecanora*: *L. achroa* Nyl., *L. elatinoidea* Räsänen, *L. expallens* Ach., *L. helva* Stizenb., *L. interjecta* Müll. Arg., *L. intumescens* (Rebent.) Rabenh. and *L. queenslandica* C. Knight, and add notes on *L. caesiorubella* Ach. and *L. carpinea* (L.) Vain.

Introduction:

Knowledge of the species of *Lecanora* present in the New Zealand lichen mycobiota has expanded considerably since a preliminary treatment was published in *Flora of New Zealand Lichens* (Galloway 1985). Largely through the researches of Lumbsch and co-workers (Lumbsch 1994; Lumbsch & Feige 1992, 1994; Lumbsch & Elix 1993; Lumbsch *et al.* 1994a, 1994b, 1995, 1996, 1997; Dickhäuser *et al.* 1995; Guderley *et al.* 1998), we now have a much clearer view of Southern Hemisphere taxa and of their distributions and relationships. The systematic position of *Lecanora sensu stricto* is now also much more closely defined to include taxa sharing the following characters: a crustose thallus; a trebouxoid photobiont; red-brown to orange or carneous, epruinose to subpruinose apothecial discs; a hyaline hymenium; an amphithecial cortex; crystals in the amphithecial medulla; \pm ellipsoid, simple, colourless ascospores; filiform conidia; containing atranorin, \pm usnic acid (Lumbsch *et al.* 1996, Guderley *et al.* 1998). The variable occurrence of photobiont cells in the apothecial margin is not regarded as an important taxonomic character (Poelt & Wunder 1967, Guderley *et al.* 1998).

Between 1996 and 1998 through the aegis of the Ministry for the Environment, DJG and PJ participated in a New Zealand-wide project investigating biological indicators of atmospheric pollution (Johnson *et al.* 1998). During this study of a range of urban and industrial sites from Whangarei in the north to Tiwai Point in the south, many collections of corticolous species of *Lecanora* were made, a number of which did not accurately fit any of the names mentioned in either Galloway (1985, 1992) or in Malcolm & Galloway (1997). They are referable to the following species which are briefly discussed below.

Lecanora achroa Nyl., *J. Bot.* 14, 263 (1876)

Illustrations: Lumbsch *et al.* (1995: 564, fig. 1); Guderley (1999: 175, fig. 13A)
Description: Thallus continuous to rimose, yellowish grey to greenish grey, epruinose, without soredia. Prothallus blackish brown. Apothecia sessile, 0.3–0.8 mm diam.; disc orange-brown, epruinose to slightly grey-pruinose. Margin concolorous with thallus, thin to thick, smooth, entire to verruculose, persistent to excluded. Cortex hyaline, interspersed with small crystals, 15–25 μ m thick. Amphithecium with large crystals, not dissolving in K (*L. pulicaris*-type). Parathecium hyaline, with crystals, 10 μ m thick. Epithecium yellowish brown, colour rapidly dissolving in K, with crystals (*L. chlorotera*-type) rapidly dissolving in K, 10–15 μ m thick.

Subhymenium hyaline. Paraphyses slightly swollen apically. Ascospores ellipsoid to broadly ellipsoid, 10.5–16.5 \times 6.5–8.5 μ m.

Chemistry: Major compounds: \pm atranorin, \pm 2'-*O*-methylperlatolic acid and usnic acid. Minor compounds: \pm atranorin, chloroatranorin, \pm arthothelin and unidentified triterpenoids.

Notes: *Lecanora achroa* is a Palaeotropical species which differs from *L. helva* in having relatively small apothecia with orange-brown discs, by the more greenish colour of the thallus, the rougher thallus surface and the presence of usnic acid. *Lecanora helva* contains the 2'-*O*-methylperlatolic acid chemisynndrome, while *L. achroa* often contains no other phenolic substances apart from atranorin and usnic acid, or more rarely 2'-*O*-methylperlatolic acid or arthothelin as minor compounds (Lumbsch *et al.* 1995: 565). First collected in New Zealand by P.N. Johnson from the bark of ash trees in an urban park, it is known also from North and South America, Oceania and Australia (Lumbsch *et al.* 1995, Guderley 1999).

SPECIMENS EXAMINED

New Zealand. Auckland: •Auckland City, Victoria Park, on bark of plane trees, 18.1.1996, D.J. Galloway 1022 & J. Paterson, A32 (CHR). **Canterbury:** •Hagley Park, Christchurch, on tree trunk (ash), 5.viii.1993, P.N. Johnson 803 (CHR).

Lecanora caesiorubella Ach., *Lichenogr. Univ.*: 366 (1810)

Illustrations: Lumbsch *et al.* (1997: 141, figs 5E, F; 144, figs 5A–F)

Description: Thallus thin to thick, rimose-areolate or continuous to verrucose-areolate, whitish grey to greyish green, epruinose. Soredia absent. Prothallus whitish grey or absent. Apothecia sessile, 0.8–3 mm diam.; disc carneous to pinkish, heavily grey-white-pruinose, plane to convex. Margin prominent, thick, persistent, smooth, entire or flexuose, concolorous with thallus. Cortex absent; pseudocortex interspersed with small crystals, 45–105 μ m thick; photobiont-containing part of amphithecium with numerous small crystals, 25–75 μ m thick. Parathecium with small crystals, c. 15 μ m thick. Epithecium 10–15 μ m thick, grey-brown-granular with small crystals. Hymenium hyaline, 55–95 μ m tall. Ascospores ellipsoid to broadly ellipsoid, 9–15 \times 5.5–9.5 μ m.

Chemistry: Major compounds: atranorin, \pm norstictic, \pm protocetraric and \pm virensic acids. Minor compounds: chloroatranorin, \pm connorstictic, \pm conprotocetraric, \pm norstictic, \pm protocetraric, \pm salazinic, \pm stictic and \pm virensic acid (Lumbsch *et al.* 1997).

Notes: *Lecanora caesiorubella* is a cosmopolitan species that is common in tropical and subtropical regions of the world, extending also into warm-temperate areas (Lumbsch *et al.* 1997). It is a rather variable species, especially with regard to its secondary chemistry, where five distinct chemodemes are known, three of which are recorded from New Zealand (Lumbsch *et al.* 1997: 147–148). *Lecanora caesiorubella* is characterized by large apothecia with thick, flexuose margins; it is distinguished from *L. carpinea* by the lack of chromones (C+ yellow) in the apothecial discs.

In New Zealand, it is known from Arthur's Pass, Hanmer Springs, Lake Lyndon (Lumbsch *et al.* 1997) on the bark of both native and introduced trees. Elsewhere it is known from Africa, North and South America, South and East Asia and Australia (Lumbsch *et al.* 1997).

SPECIMEN EXAMINED

New Zealand. Canterbury: •Hanmer State Forest, on larch, 5.i.1971, P. Child 1286 (CHR 487847).

Lecanora carpinea (L.) Vain., *Medd. Soc. Faun. Fl. Fenn.* 14: 23 (1888)

= *Lichen carpineus* L., *Sp. Pl.* 2: 1141 (1753).

Illustrations: Wirth (1987: 229; 1995: 463); Foucard (1990: fig. 127); Jørgensen *et al.* (1994: 288, fig. 13); Lumbsch *et al.* (1997: 134, figs 1A–E; 150, figs 8A, B). For details of typification, see Jørgensen *et al.* (1994: 287).

Description: Thallus white or grey-white, continuous, smooth, somewhat cracked with age centrally, delimited by a marginal white prothallus. Apothecia 0.5–1(–1.5) mm diam., sessile, constricted at base, crowded centrally; thalline exciple prominent, persistent, entire, occasionally excluded with age; disc pale reddish brown to creamish or purplish, plane to convex, densely grey-white-pruinose. Epithecium granular, pale yellow-brown, the granules dissolving in K. Hymenium colourless, 45–65 µm tall. Hypothecium colourless. Asci clavate, 55–70 × 14–18 µm. Ascospores subglobose to ellipsoid, (9–)10–12(–14) × (5–)6–8 µm.

Chemistry: Thallus K+ yellow, C–, Pd–; apothecial disc C+ yellow to orange; containing atranorin and the chromone sordidone (C+ yellow) as major compounds, and chloroatranorin and eugenitol as minor compounds (Lumbsch *et al.* 1997).

Notes: *Lecanora carpinea*, a cosmopolitan species, is characterized by the grey-white thallus and the crowded apothecia with grey-white-pruinose discs which react yellow-orange with C. It has a wide distribution in temperate Europe, reaching the southern part of the boreal zone. It is also known from Asia and North America. It is a very common pioneer lichen on the smooth bark of deciduous trees and shrubs and one of the earliest colonizers of young twigs (Nimis 1993: 346). *Lecanora pallida* has a similarly pale-coloured thallus and pruinose apothecia, and occurs in the same habitat, but the apothecial discs react Pd+ red and C–, and the thallus is Pd+ yellow-red. The account of *L. pallida* from New Zealand (Galloway 1985: 217) refers to *L. carpinea*. It is distinguished from *L. caesiorubella* by the smaller, more crowded apothecia with thinner apothecial margins, and the C+ yellow reaction of the apothecial discs. In New Zealand it is one of the most common crustose epiphytes in urban and rural areas from North Auckland to Stewart Island. It is extremely common and widespread on twigs and branches of lowland, mainly deciduous, introduced trees in parks, gardens, orchards, and riverbanks, and is often the dominant crustose lichen on willows, poplars and fruit trees. Associated lichens include *Amandinea punctata*, *Caloplaca inclinans*, *Candelaria concolor*, *Haematomma babingtonii*, *Parmelina labrosa*, *Physcia adscendens*, *P. poncinsii*, *Punctelia borrieri*, *P. subrudecta*, *Ramalina celastri*, *R. glaucescens*, *Teloschistes chrysophthalmus*, *T. velifer*, *Xanthoria novozelandica*, *X. parietina* and *X. polycarpa*. In urban habitats, it appears to be able to withstand moderate to heavy pollution loads (Johnson *et al.* 1998).

SELECTED SPECIMENS EXAMINED

New Zealand. *Canterbury*: •Lincoln, Landcare Research, kowhai grove, epiphytic on young trunk, 2.viii.1993, P.N. Johnson 785 (CHR). *Otago*: •Dunedin, Anzac Avenue, on trunk of *Ulmus*, 27.iii.1996, D.J. Galloway 0118 & B. Lee (CHR). *Southland*: •Tiwai Point, bark of pine tree exposed to wind, close to aluminium smelter, 20.xi.1996, P.N. Johnson 3196 (CHR).

Lecanora elatinoides Räsänen, *Arch. Soc. Zool.-Bot. Fenn. Vanamo* 3: 179 (1948)

Illustration: Lumbsch *et al.* (1995: 564, fig. 4).

Description: Thallus continuous or rimose, yellowish grey to greenish grey, epruinose, visible only at thalline margins. Soredia present. No distinct soralia formed, but thallus dissolving into soredia and often the whole surface becoming granular-pulverulent. Soredia granular, yellowish green to yellowish grey.

Prothallus lacking or, if present, grey-white. Apothecia rare, sessile, 0.5–1.4 mm diam.; disc red-brown to orange-brown, epruinose. Margin concolorous with thallus, thin, rough, entire to verruculose, often dissolving into soredia. Cortex hyaline, 10–25 µm thick, interspersed with small crystals. Amphithecium with large crystals, not dissolving in K (*L. pulicaris*-type). Parathecium hyaline, 15 µm thick, with crystals. Epithecium dark brown, 10–12 µm thick, pigmentation dissolving in K, with crystals (*L. chlorotera*-type). Hypothecium yellowish, paraphyses slightly thickened apically. Ascospores ellipsoid to broadly ellipsoid, 11.0–15.5 × 8.5–10.5 µm.

Chemistry: Major compounds: arthothelin, pannarin and ± usnic acid. Minor compounds: asemone, atranorin, chloroatranorin, ± usnic acid and unidentified triterpenoids.

Notes: *Lecanora elatinoides* is an Australasian species, characterized by a thallus that rapidly dissolves into soredia, and the presence of pannarin and arthothelin. It is a rather uniform species, although the structure of the soralia may vary from completely covering the thallus surface to remaining relatively distinct and only rarely coalescing in some morphodemes. In New Zealand it is a northern species, occurring on coastal trees and shrubs, especially mangrove (*Avicennia marina*) and pohutukawa (*Metrosideros excelsa*) from Auckland City northwards in urban parks and roadside plantings (on *Pinus pinaster*). It is also known from eastern Australia (Lumbsch *et al.* 1995).

SPECIMEN EXAMINED

New Zealand. *Auckland*: •Auckland City, One Tree Hill, on trunk of *Pinus pinaster*, P.N. Johnson 1039 (CHR).

Lecanora expallens Ach., *Lichenogr. Univ.*: 374 (1810)

Illustrations: Dobson (1992: 175); Wirth (1995: 474).

Description: Thallus effuse, granular-scurfy, abundantly sorediate, pale yellow-green, spreading in irregular patches, 2–5(–10) cm diam. Apothecia crowded to sparse or absent, in small groups of 6–8(–12) when present, solitary to crowded, 0.2–0.5(–0.8) mm diam.; disc plane to subconvex, yellow to yellowish fawn, matt to slightly waxy, epruinose. Margins thin to thick, warty, sorediate, concolorous with thallus. Epithecium pale yellowish to brownish, granular; granules dissolving in K. Hymenium 35–55 µm tall, colourless. Hypothecium distinct, colourless, 90–120(–140) µm thick. Ascospores broadly ellipsoid, 9–15 × 3–6(–9) µm.

Chemistry: Soralia and apothecial margins K+ yellow, C+ orange, Pd–; containing usnic acid, zeorin, thiophanic acid and two unidentified xanthenes (Sliwa & Wetmore 2000: 480).

Notes: *Lecanora expallens* is a cosmopolitan species characterized by the effuse, granular-scurfy, abundantly sorediate, pale yellow-green thallus which is C+ orange (thiophanic acid). Apothecia may be present or absent. When present, the disc is waxy yellow, epruinose, the thalline margin being thin to thick, verruculose, sorediate and concolorous with the thallus. In New Zealand it is known from the bark of native and introduced trees from South Auckland (Huntly, Te Kuiti) to Auckland City and as far north as Whangarei. Associated lichens include *Dirinaria appanata* and *Rimelia reticulata*. It probably occurs more widely in urban habitats in New Zealand, but is still very much under-collected here. Elsewhere it is known from Britain, Scandinavia, Europe, North America and Australia (Purvis *et al.* 1992, Tønsberg 1992, Nimis 1993, Santesson 1993, Filson 1996, Sliwa & Wetmore 2000).

SPECIMEN EXAMINED

New Zealand. North Auckland: • Whangarei, FERNZ fertiliser plant, on *Dacrycarpus dacrydioides* in grass reserve, 10.xii.1996, *D.J. Galloway & L.E. Burrows W3* (CHR).

Lecanora helva Stizenb., *Ber. Thätigk. St. Gall. Naturw. Ges.* 1888/1889: 218 (1890)
Illustrations: Lumbsch (1994: 99, figs 60C–F); Guderley (1999: 204, figs 18C, D).
Exsiccatae: Lumbsch & Feige, *Lecanoroid Lichens*, Fasc. 2, No. 30 (1993).

Description: Thallus crustose, in small, irregular patches or bands on smooth bark, 5–10 mm diam., thin to thick, continuous in parts to areolate-cracked verrucose, or occasionally here and there sorediate, pale yellowish white or pale greenish or pale grey-white; margin effuse, without a delimiting prothallus. Apothecia crowded, 0.1–0.5(–1) mm diam.; disc plane at first, soon becoming noticeably convex to conglomerate, yellowish, waxy to matt, epruinose. Thalline margin concolorous with the thallus, verrucose, most noticeable in young fruits, becoming ± excluded with age. Amphithecium with large crystals not dissolving in K (*L. pulicaris*-type). Parathecium 15 µm thick, colourless, with many small crystals, not dissolving in K. Epithecium yellow-brown, to 15 µm thick. Hymenium hyaline, 55–65 µm tall. Hypothecium colourless. Ascospores ellipsoid, 8.5–15 × 5–7 µm.

Chemistry: Thallus and apothecial margins: K+ yellow, C–, KC–, Pd+ yellow-orange; containing atranorin and 2'-O-methylperlatolic acid (major); chloroatranorin, 2'-O-methylhyperlatolic, 2'-O-methylisohyperlatolic and 2'-O-methylsuperlatolic acids, ± arthothelin (minor).

Notes: *Lecanora helva* is a pantropical species characterized by the small, irregular, pale yellow-white to grey-green, minutely warted thalli; the crowded apothecia with convex-conglomerate, waxy yellow discs and a verrucose thalline margin concolorous with the thallus. Morphologically it is similar to *L. leprosa*. Chemically they are easily distinguished; *L. leprosa* contains the gangaleoidin and atranorin chemosyndromes (Lumbsch & Elix 1993: 72), while atranorin and 2'-O-methylperlatolic acid are major compounds in *L. helva*, with chloroatranorin, 2'-O-methylhyperlatolic, 2'-O-methylisohyperlatolic, and 2'-O-methylsuperhyperlatolic acids as minor compounds. It is known in New Zealand from northern coastal localities where it occurs on mangrove (*Avicennia marina*) and on the smooth bark of introduced plane trees in parks in Auckland. However, it is still very much under-collected and poorly known here. It is known also from the West Indies, Central and South America, Oceania and Australia (Lumbsch 1994: 100–103, Guderley 1999: 207).

SPECIMENS EXAMINED

New Zealand. Auckland: • Western Springs Park, on exfoliating bark of plane tree in park, 15.i.1996, *D.J. Galloway & J. Paterson 1021* (CHR); • The Domain, on bark of plane tree, 23.i.1996, *J. Paterson 1023* (CHR).

Lecanora interjecta Müll. Arg., *Nuov. Giorn. Bot. Ital.* 23: 390 (1891)

Illustrations: Lumbsch *et al.* (1995: 568, figs 11, 12).

Description: Thallus warted-lumpy in congested warts or hummocks, yellowish grey to greenish grey, without soredia or marginal prothallus. Apothecia sessile, 0.1–0.3(–1) mm diam., crowded, congested, when young almost gyalectiform; thalline margin persistent, thick, entire or warted, concolorous with thallus; disc pinkish brown, yellow-brown to red-brown, plane epruinose. Amphithecium with large crystals not dissolving in K (*L. pulicaris*-type). Parathecium hyaline, with crystals, 15 µm thick. Epithecium reddish brown with crystals, pigments and

crystals dissolving in K (*L. pulicaris*-type), 10–15 µm thick. Hymenium colourless. Ascospores ellipsoid to broadly ellipsoid, (10.5–)12–14 × 8–10 µm.

Chemistry: Arthothelin, usnic acid (major); atranorin, chloroatranorin, 2,5-dichloronorlichexanthone and 4,5-dichloronorlichexanthone (minor).

Notes: *Lecanora interjecta* is an Australasian species characterized by the small, warted-lumpy, greenish or yellow-grey thallus without soredia. Apothecia are clustered, the disc plane, yellow-brown darkening to red-brown, epruinose, the thalline margin thick, warty, concolorous with the thallus. The presence of arthothelin, and the *pulicaris*-type epithecium are also characteristic. It is distinguished from *L. queenslandica* on chemical and spore characters, *L. queenslandica* containing psoromic acid and having smaller spores. The species is still very poorly collected in New Zealand. In Australia, it is known from tropical rain-forest and mangroves in northern New South Wales and Queensland (Lumbsch *et al.* 1995).

SPECIMEN EXAMINED

New Zealand. North Auckland: • Kenington Park, Whangarei, on bark of *Pseudopanax arboreus*, 11.xii.1996, *D.J. Galloway & L.E. Burrows s.n.* (CHR).

Lecanora intumescens (Rebent.) Rabenh., *Deutsch. Krypt.-Fl.* 2: 34 (1845)

= *Parmelia intumescens* Rebent., *Prodr. Fl. Neomarch.*: 301 (1804)

Illustrations: Foucard (1990: pl. 150); Wirth (1995: 478); Lumbsch *et al.* (1997: 150, fig. 8D).

Description: Thallus thin to thick, continuous to areolate-cracked, 2–5(–10) mm diam., greyish white to greyish green, minutely papillate or irregular, irregular mosaics delimited by a thin, wavy, marginal prothallus, without soredia. Apothecia sessile, scattered, solitary to occasionally in small groups, 0.1–1(–1.2) mm diam.; disc pale brown to reddish brown, lightly white-pruinose in young fruits, the pruina persisting in patches or absent at maturity. Thalline margin prominent, 0.1–0.15 mm thick, white, smooth to roughened or pruinose, entire to crenate or flexuose. Amphithecium with numerous small crystals 50–90 µm thick. Parathecium 15 µm thick, without crystals. Epithecium granular, yellow-brown, 10–15 µm thick, with small crystals. Hymenium colourless, 50–80 µm tall. Ascospores ellipsoid to broadly ellipsoid, 10.5–15 × 5–9 µm.

Chemistry: Thallus K+ yellow, C–; thalline margin of apothecia Pd+ deep yellow-orange; containing atranorin, psoromic acid and unidentified compound 1 (major); chloroatranorin and 2'-O-demethylpsoromic acid and unidentified compound 2 (minor) (Lumbsch *et al.* 1997: 152).

Notes: *Lecanora intumescens* is characterized by a pale grey-green, minutely papillate or irregular, esorediate thallus, forming irregular mosaics delimited by a thin, wavy, marginal, black prothallus. Apothecia are prominent, scattered, sessile, the discs plane, yellow-brown to dark brown, white-pruinose or epruinose at maturity, and with prominent, white Pd+ orange thalline margins. In New Zealand it occurs on the smooth bark of coastal shrubs and hedges (*Berberis*) in Taranaki, but is still very much under-collected and poorly known here. It is a widespread Northern Hemisphere species growing on the bark of conifers and deciduous trees in temperate areas (Lumbsch *et al.* 1997: 152). This is the first record of the species from the Southern Hemisphere.

SPECIMEN EXAMINED

New Zealand. Taranaki: • Coast at Waipapa, Manu Stream, on *Coprosma repens* stems at top of coastal boulder beach, 29.x.1993, *P.N. Johnson 885* (CHR).

Lecanora queenslandica C. Knight, in Bailey, *Syn. Queensland Fl. Suppl.*: 85 (1888)
Illustrations: thallus crustose, verrucose to verruculose, yellowish grey to greenish grey, epruinose, without soredia. Prothallus blackish brown or absent. Apothecia sessile, 0.4–1.0 mm diam.; disc orange-brown to pale red-brown, epruinose. Margins concolorous with thallus, thin, smooth, entire. Cortex hyaline, indistinct, interspersed with small crystals, 10–20 µm thick. Amphithecium with large crystals not dissolving in K (*L. pulicaris*-type). Parathecium hyaline, with crystals, 15 µm thick. Epithecium reddish brown, colour disappearing in K, with crystals, 10–15 µm thick. Subhymenium hyaline. Paraphyses slightly thickened apically. Ascospores ellipsoid to broadly ellipsoid, 0.5–12.5 × 5.5–7.5 µm.

Chemistry: Major compounds psoromic and usnic acids. Minor compounds atranorin, chloroatranorin, 2'-O-demethylpsoromic acid and unidentified triterpenoids (Lumbsch *et al.* 1995: 573).

Notes: *Lecanora queenslandica* is an Australasian species characterized by the pale yellow-grey to pale yellow-green, verrucose to verruculose thallus, without soredia, delimited by a black wavy prothallus. Apothecia sessile, the disc orange-brown to pale red-brown and epruinose; thalline margins are prominent, entire to crenate, concolorous with the thallus. Psoromic acid in the thallus and apothecial margin gives a characteristic vivid yellow K⁺ reaction. *Lecanora chlorotera* (which does not occur in New Zealand or Australia) is morphologically somewhat similar to *L. queenslandica*, but differs in containing gangaleoidin and in lacking usnic acid, and in spore size and other characters (Lumbsch 1994). In New Zealand the species is known from northern coastal habitats from Rangitoto to Whangarei, on the bark of trees and shrubs. It also occurs in north-western Australia (Lumbsch *et al.* 1995: 573–574).

SPECIMEN EXAMINED

New Zealand. North Auckland: •George Point Road, Sherwood, Whangarei, on bark of *Metrosideros excelsa*, 11.xii.1996, D.J. Galloway & L.E. Burrows W36 (CHR).

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Additional lichen records from New Zealand 36
Placopsis lambii Hertel & V. Wirth

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Abstract: *Placopsis lambii* Hertel & V. Wirth is recorded from New Zealand and the Southern Hemisphere for the first time. The morphology, chemistry, distribution and ecology of New Zealand specimens are discussed.

Introduction

During recent fieldwork undertaken for a revision of the lichen genus *Placopsis* (Nyl.) Linds. (Agyriaceae) in New Zealand, a few specimens were collected of a small, rather insignificant, rosette-forming species with dark olive-green to blackish soralia. Its thalli often grow amongst closely overlapping mosaics of other larger species such as *P. illita* and *P. ferrugosa*, and are not readily distinguishable without closer examination (10× lens). However, study of the material showed this to be *Placopsis lambii* Hertel & V. Wirth (Wirth 1987, 1995a, 1995b; Moberg & Carlin 1996, 1999), a boreal species until now unrecorded from the Southern Hemisphere. In New Zealand, *P. lambii* grows on acid rocks in open riverine to alpine fellfield habitats in high-rainfall areas mainly west of the Main Divide in South Island. It is not at present known from North Island. *P. lambii* is most readily recognized in the field by its small, shallowly excavate soralia, and its dark, greenish brown to blackish soredia. It is described below.

***Placopsis lambii* Hertel & V. Wirth** in V. Wirth, *Die Flechten Baden-Württembergs*: 511 (1987)

Type: FRANCE, Elsass, Vogesen, 1969, V. Wirth 1652 (STU—holotype—not seen). Illustrations: Wirth (1987: 378); Wirth (1995a: 743); Moberg & Carlin (1996: 321, Fig. 1B).

Thallus rosette-forming, generally orbicular to somewhat irregularly spreading, closely attached from margins to centre, (1–)3–30(–40) mm diam., (200–)225–300(–375) µm thick, pale lettuce-green to grey-green or pale olive-green; apices tinged brownish when wet, pale creamish to fawnish buff (darkening in high-alpine specimens), to greyish or greenish white when dry, never rusty red centrally or elsewhere, sometimes developing small tufts of reddish *Trentepohlia* between cracks of thallus centrally and/or folds and cracks of cephalodia (10× lens), distinctly lobate at margins, ± areolate centrally, without a projecting, marginal prothallus. Additional young thalli sometimes developing on over-mature, central cephalodia, and spreading in a second thalline layer. Photobiont green, trebouxoid; cells spherical, 7–8.5 µm diam. Lobes discrete to contiguous at margins, 0.5–1.5(–2) mm diam., 1–4(–8) mm long, noticeably convex (especially in high-alpine specimens) to plane, separated by fine to deep cracks, areolate-cracked centrally, the areolae separated by fine to deep cracks, sometimes individual areolae widely separated as distinct islands at centre near old cephalodia; apices flat, not swollen or in-rolled, rounded to slightly incised to minutely lobulate. Surface smooth to minutely pitted in places, matt to burnished or glossy (reminiscent of ivory), here and there minutely maculate (10× lens—best seen in fresh, moist material), sorediate, without isidia, pruina, pseudocyphellae or pustules. Soralia round to irregular, developing early on even very tiny thalli, 0.1–1.0 mm diam., occasionally coalescing to form larger structures (to 2 mm diam.), scattered to somewhat crowded and with a tendency to develop in concentric bands on the thallus, shallowly to deeply concave-excavate, with a pale, well-defined margin. Soredia coarsely granular, 20–32.5 µm diam., olive-green to brown-black when wet, dirty greenish or brownish black when dry (10× lens). Cephalodia solitary and ± central in immature thalli, rarely more

widely scattered, developing in a broad concentric band between margins and centre with a large, often confluent deeply lobed cephalodium at centre, round to irregularly rosette-forming (0.5–)1–5(–8) mm diam., smoothly hemispherical at first, becoming radially fissured with deeply gaping cracks at maturity, pale grey-purple or bluish when wet, pale yellowish pink to pink or warm ivory when dry, occasionally with small, irregular patches of glistening white pruina on both young and mature cephalodia; photobiont *Scytonema*, in chains; cells compressed, cylindrical to fabiform, 10–15 µm diam. Apothecia rare, but when present numerous, crowded, developed in concentric, ring-like zones between margins and centre, subimmersed at first, then sessile, constricted at base, rounded to slightly contorted through mutual pressure, 0.2–1(–1.5) mm diam.; thalline exciple entire, prominent at first, 0.2–0.3 mm thick, pale creamish or fawnish, becoming much thinner to almost disappearing at maturity, then concolorous with thallus or paler to ± whitish, glossy at first, matt at maturity, never pruinose; proper exciple narrow, persistent, pale yellow-brown to pale red-brown, projecting slightly above thalline exciple; disc slightly concave at first, ± plane or irregular at maturity, noticeably roughened-papillate (10× lens), pinkish to reddish when wet, dull red-brown when dry, epruinose or very lightly white-pruinose in immature discs. Epithecium densely granular, olive-brown, 15–25 µm thick, unchanged in K. Hymenium very pale pinkish to hyaline, 100–135(–140) µm tall. Hypothecium densely interwoven, brown-pink at base, rose-pink in upper parts, 150–175 µm thick. Asci 8-spored, cylindrical, tapering at foot, contents appearing pinkish in fresh material, (100–)110–125(–135) × 12.5–15 µm. Ascospores uniseriate in ascus, broadly ellipsoid with rounded to slightly pointed apices, contents minutely granular, commonly with 1 large (central) and several smaller, rose-coloured oil droplets, 15–16.5(–18.5) × 6.5–8.5 µm. Pycnidia rather rare, immersed in thallus at margins of central areolae, solitary or clustered in groups of 2–6, 180–250 µm diam.; ostiole red-brown to blackened, flat to slightly sunken, the margins slightly puckered, pale whitish. Conidia numerous, colourless, thread-like, 20–26.5 × 0.5 µm.

Chemistry: K–, C+ red, KC–; containing 5-O-methylhiascic acid, gyrophoric acid and hiascic acid (Moberg & Carlin 1996).

Notes: *Placopsis lambii* is characterized by small, closely attached rosettes, distinctly lobate at margins, ± areolate-cracked centrally; with scattered, laminal, excavate soralia sometimes arranged in concentric lines in the thallus, and containing dark green to brown-black granular soredia; with hemispherical, plicate or rugose cephalodia containing *Scytonema*; and subimmersed to sessile apothecia, arranged in concentric rings on the thallus, with persistent creamish to whitish thalline margins and pinkish to red-brown, distinctly roughened-papillate discs which are white-pruinose only in immature fruits. The asci are 8-spored, and the ascospores uniseriately arranged, and 15–16.5(–18.5) × 6.5–8.5 µm. Variation in Northern Hemisphere populations of *P. lambii* was discussed by Moberg & Carlin (1996).

In New Zealand, *P. lambii* occurs in alpine areas of high rainfall from Nelson to Fiordland, but because of its small size and the fact that it appears to grow in interlocking mosaics with other, more prominent species of *Placopsis*, it is easily overlooked. In the few New Zealand specimens so far seen, *P. lambii* associates with the following lichens: *Placopsis clavifera*, *P. cribellans*, *P. elixii* (Galloway 2001), *P. illita*, *P. ferrugosa*, two additional species of *Placopsis* (at present undescribed), *Stereocaulon ramulosum*, as well as species of *Trentepohlia*. New Zealand material of *P. lambii* is similar in all respects to material seen from the Northern Hemisphere and to published photographs of the species.

Elsewhere, *P. lambii* is known from western Europe (Wirth 1987, 1995a, 1995b), Sweden, Norway, Iceland, the Faeroes and Jan Mayen (Santesson 1993, Moberg &

Carlin 1996) and the United Kingdom (Purvis *et al.* 1992) in the Northern Hemisphere. It is also present in Kenya and Tanzania in East Africa and Lesotho in southern Africa (Moberg & Carlin 1999).

SPECIMENS EXAMINED

Norway. *Sør Trøndelag*: •Stjörna pr., Västsidan av Lila Gjöljavand, 63°47'N, 10°00'E, Klippa vid Vägen (riklig), 28.vii.1946, Gunnar Degelius s.n. (UPS (L-57273) 96697); *Møre og Romsdal*: •Nordal par., Gudbrandsjuvet, 62°19'N, 07°27'E, by a waterfall, 300 m, 7.vii.1947, A.H. Magnusson 20615 (UPS (L-56540) 95918); •Nordal par., Tafjord, along the road to Tafjordssaetra, 62°15'N, 07°25'E, on a big boulder in a dry waterfall, 17.viii.1971, R. Moberg & P.M. Jørgensen 1565a (UPS (L-56457) 95835).

New Zealand. *Nelson*: •Arthur Range, Mt Arthur Track, on small stones and slatey rock outcrops in rockfall at side of track, c. 0.5 km from car-park, 950 m, 11.iii.2001, D.J. Galloway 5145 (OTA). *Canterbury*: •Phipps Peak, Arthur's Pass, rock ridge near summit, 1890 m, iii.1966, B.A. Fineran 2227, 2239 (CANU). *Southland*: •Gertrude Valley, near NZAC Hut, on small, water-worn stones and pebbles on old consolidated river terrace close to silver beech forest, 800 m, 24.i.2001, D.J. Galloway 5146 & S. Hammer (CHR, OTA).

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