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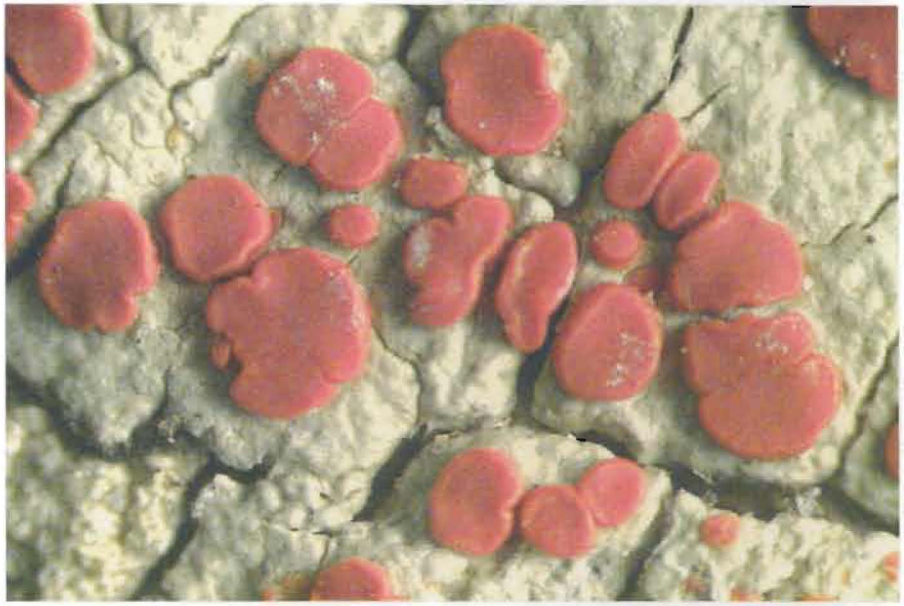

Six species of the genus *Pyrrhospora* (Lecanoraceae) are now known from Australia. They colonize rocks, dead wood, and twigs, and are characterized by a crustose thallus and prominent reddish lecideine apothecia with *Lecanora*-type asci and simple, colourless ascospores. The new species *Pyrrhospora queenslandica* has been collected on bark and dead wood from sea level to 700 m in scattered coastal and monsoon forests of southern and central Queensland. 1 mm

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Hertelidea aspera, an overlooked name for a common Australian lichen

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Abstract: The new combination *Hertelidea aspera* (Müll. Arg.) Kantvilas & Elix is introduced for the lichen previously known as *H. geophila* Kantvilas & Printzen. The distinguishing characteristics of the species are discussed briefly. The related species *H. pseudobotryosa* R.C. Harris, Ladd & Printzen is recorded from South Australia and Victoria for the first time.

Introduction

The genus *Hertelidea* was introduced by Printzen & Kantvilas (2004) to accommodate an assemblage of small, crustose lichens referred to generally as the *Lecidea botryosa* group. Four species were recognised: *Hertelidea botryosa* (Fr.) Printzen & Kantvilas from boreal regions, *H. eucalypti* Kantvilas & Printzen and *H. geophila* Kantvilas & Printzen from Tasmania and Victoria, and *H. pseudobotryosa* R.C. Harris, Ladd & Printzen, widespread in North America, Tasmania and the Australian mainland.

Hertelidea has the following diagnostic characters: a crustose thallus that is sometimes sorediate; lecideine apothecia, often in conspicuous clusters, typically with a thin, persistent proper margin; a cupular exciple, frequently inspersed with minute granules; weakly to moderately branched and anastomosing paraphyses with pigmented, capitate apices, separating readily in KOH; eight-spored *Micarea*-like asci with a prominent, amyloid tholus, ±lacking an ocular chamber but pierced by a more darkly staining tubular structure; and simple or rarely one-septate, colourless, non-halonate ascospores. One species, *H. eucalypti*, contains homosekikaic add, whereas the other three contain perlatolic acid. A full description and discussion of the genus, together with illustrations, is provided by Printzen & Kantvilas (2004). Species of *Hertelidea* are most commonly found on rotting, often charred wood. In the Australian environment, logs and stumps of eucalypts provide a particularly favoured substratum.

On-going chemical and anatomical investigation of type specimens of crustose lichens from Australia has revealed a previously overlooked name for one of the described *Hertelidea* species. The necessary new combination is proposed here.

Hertelidea aspera (Müll. Arg.) Kantvilas & Elix, comb. nov.
Basionym: *Lecidea aspera* Müll. Arg., *Bull. Herb. Boissier* **1**: 45 (1893).
Type: [Australia] corticola prope Cheltenham [1892], *F.R.M. Wilson n. 1340* (G–holotype); on dead tree, Cheltenham, Victoria, *Rev. F.R.M. Wilson* (MEL 7000!–isotype).
= *Hertelidea geophila* Kantvilas & Printzen, *Bibliotheca Lichenologica* **88**: 547 (2004).
Type: Australia, Tasmania, site EE22, 2 km W of New Norfolk along Glenora Road, 42°47'S 147°02'E, 90 m alt., on soil over Permian mudstone in dry sclerophyll forest, 19.ii.1997, *G. Kantvilas 39/97* (HO!–holotype, FR!–isotype).

Diagnosis

Thallus of irregular, knob-like to coralloid granules, lacking soredia, containing perlatolic (major) and 4-*O*-methylolivetoric (trace) acids; apothecia 0.15–0.5 mm diam., with reddish brown to dark brown, epruinose disc and margin; excipulum in section pale yellowish brown to colourless, with minute crystalline inclusions soluble in K; hypothecium greenish brown; paraphyses with distinctly pigmented, capitate apices; ascospores ellipsoid to elongate-ellipsoid, simple or rarely 1-septate, (8–)10–*10.9*–14.5(–15) x (3–)3.5–4–5 µm. For a full description, illustrations and discussion, see Printzen & Kantvilas (2004).

Ecology

This species, under the name *H. geophila*, was first recognised in collections from consolidated mudstone-derived soil, hence its specific epithet which means soil-loving. However, further study soon revealed that it is more abundant and better developed on wood or soft, thick bark, with the charred, rotting wood and fibrous bark of eucalyptus stumps and logs being an ideal habitat. There it grows as part of a diverse lichen community consisting of *Cladia schizopora* (Nyl.) Nyl., *Cladonia rigida* (Hook.f. & Taylor) Hampe, *Hypocenomyce australis* Timdal, *H. foveata* Timdal, *Trapeliopsis flexuosa* (Fr.) Coppins & P. James, species of *Micarea*, and *Neophyllis melacarpa* (F. Wilson) F. Wilson, as well as the superficially very similar and closely related *H. pseudobotryosa* R.C. Harris, Ladd & Printzen. On soil, *H. aspera* occurs on exposed banks in dry sclerophyll woodland, where it is typically associated with species of *Micarea* and *Porpidia* and with depauperate squamules of *Cladonia*. Such soils tend to have a high fossilised shell content and consequently rather high pH (c. 7–8).

Discussion

Separation of *H. aspera* from *H. pseudobotryosa* can be rather difficult in some cases. Where the thalli are well-developed, the distinction is clear-cut; the latter is sorediate whereas the former is not. However, *H. aspera* can become very abraded, and the thallus can appear somewhat sorediate. That is the case for the type specimen, where the small fragments of bark also include granules of coarse sand, and the only other Victorian collection seen (*Filson 16838* in HO and MEL). In such cases, identification of the two taxa must be confirmed by the size and shape of the ascospores. In *H. pseudobotryosa*, those are (6–)7–*8.5*–10(–13) x 3–*3.8*–4.5(–5) µm and generally ovate to ellipsoid, whereas in *H. aspera* they are (8–)10–*10.9*–14.5(–15) x (3–)3.5–4–5 µm, and ellipsoid to elongate-ellipsoid. The measurements are slightly modified from those given by Printzen & Kantvilas (2004), having been augmented with further observations from more recent collections. Most important is that whereas the spores of *H. aspera* are clearly longer, there is some overlap, and so identification of the taxa must be based on multiple measurements.

ADDITIONAL SPECIMENS EXAMINED (see also Printzen & Kantvilas 2004)
Tasmania: •Wombat Moor, Mt Field NP, 42°41'S 146°37'E, 1060 m alt., *G. Kantvilas 754/03* (HO), 17.xii.2003; •Spring Hill Tier, 42°25'S 147°16'E, 560 m alt., *G. Kantvilas 209/04* (HO), 3.vii.2004; •near Nugent, 42°44'S 147°44'E, 320 m alt., *G. Kantvilas 42/03* (HO), 10.iii.2003.

ADDITIONAL RECORDS FOR *H. pseudobotryosa*
In Australia, *H. pseudobotryosa* was recorded by Printzen & Kantvilas (2004) from Tasmania, Queensland and Western Australia. Here we also record it from Victoria and South Australia. Those additional collections indicate that like *H. aspera*, *H. pseudobotryosa* can contain traces of 4-*O*-methylolivetoric acid in addition to perlatolic acid.
Victoria: •Spring Creek Gap, 110 km N of Orbost along the Bonang Hwy, 955 m alt., *J.A. Elix 5153* (CANB), 20.xi.1978. **South Australia:** •along South Para River at foot of Mt Crawford, 334 m alt., *J.A. Elix 3862* (CANB), 4.ix.1977. **Queensland:** •Callide Range, Dawson Hwy, 19 km ENE of Biloela, 24°14'S 150°34'E, 350 m alt., *J.A. Elix 34840* (CANB), 28.viii.1993.

Acknowledgment

We acknowledge with thanks the assistance of the curators at the National Herbarium of Victoria for the loan of the type of *Lecidea aspera*.

Reference

Printzen, C; Kantvilas, G (2004): *Hertelidea*, genus novum Stereocaulacearum (Ascomycetes lichenisati). *Bibliotheca Lichenologica* **88**: 539–553.

A new species of *Pyrrhospora* (Lecanoraceae, lichenized Ascomycota) from Australia, with notes on *Pyrrhospora laeta*

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Abstract: *Pyrrhospora queenslandica* Elix & Kantvilas is described as new to science. A detailed description of *P. laeta* (Stirt.) Hafellner, based on corticolous and saxicolous specimens, is provided.

The lichen genus *Pyrrhospora* Körb. is widely distributed in Australia, occurring on rocks, dead wood and twigs. Species are characterized by a crustose thallus, prominent orange, red, or red-brown lecideine apothecia with *Lecanora*-type asci and simple, colourless ascospores (Hafellner 1984, 1993). Five species have been recorded for Australia (Elix 2004, McCarthy 2005), and a further new species is described here. In addition, the limits of the common *Pyrrhospora laeta* (Stirt.) Hafellner are discussed, based on the inclusion of saxicolous specimens from Tasmania. Chemical constituents were identified by thin-layer chromatography (Culberson 1972, Culberson & Johnson 1982, Elix & Ernst-Russell 1993), high-performance liquid chromatography (Feige *et al.* 1993, Elix *et al.* 2003), and comparison with authentic samples.

Pyrrhospora queenslandica Elix & Kantvilas, sp. nov. Fig. 1

Pyrrhosporae sanguinolentae similis sed thallo corticola lignicolaque, tenui, acidum secalonicum A continenti et ascosporis elongatioribus angustatioribusque differt.

Type: Australia. Queensland, Pine Mountain State Forest, near Flutter Creek, 24 km SSW of Calliope, 24°12′S, 151°05′E, 100 m, on tree in "Dan Dan scrub", dry monsoon scrub on flats, 27 Aug. 1993, *J.A. Elix 34805*; holo: BRI.

Thallus crustose, superficial, grey-white to pale creamy white or creamy grey, continuous, areolate to rimose, 0.1–0.2 mm thick, up to 5 cm wide; areoles irregularly shaped to angular, 0.5–0.7 mm wide, upper surface smooth to rough and verruculose, lacking soredia and isidia. Prothallus not apparent. Cortex 25–30 µm thick, lacking an epinecral layer; medulla white, poorly developed; algal layer c. 20–40 µm thick; algal cells 6–10 µm wide. Apothecia common, dispersed to crowded, sessile, 0.1–1.5 mm wide, strongly convex to ±flat or concave, round to irregular in shape, orange-red to bright red or red-brown, shiny, epruinose; true exciple concolorous with the disc, thin, persistent or excluded with age; epithecium red or orange-red, inspersed with fine reddish granules, K+ reddish purple; hymenium colourless, I+ blue, 40–50 µm tall; hypothecium deep yellow to pale brown, 50–100 µm thick; paraphyses strongly conglutinated, mostly simple; apices not conspicuously swollen, 2–3 µm wide. Asci 8-spored, broadly clavate, c. 25 x 10 µm, *Lecanora-type*. Ascospores elongate-ellipsoid, colourless, smooth, lacking a distinct perispore, 9–11 x 3.0–3.5 µm. Pycnidia immersed; conidia filiform, curved, 20–25 x 0.8–1 µm.

Chemistry: Thallus K+ red, C–, P+ yellow-orange; containing norstictic acid (major), lichexanthone (major or minor), secalonic acid A (major or minor), connorstictic acid (trace), and unknown secalonic acid derivatives (minor or trace). Apothecia K+ reddish purple; containing russulone (major), norrussulone (trace).

Remarks:
This corticolous and lignicolous species is characterized by its grey-white to pale creamy yellow or creamy grey, areolate thallus containing lichexanthone, secalonic acid A, norstictic and connorstictic acids, by its orange-red to red or reddish brown, lecideine apothecia, mostly c. 0.1–1.0 mm wide, and its ellipsoid ascospores, 9–11 x 3–3.5 µm. It resembles the common saxicolous *P. sanguinolenta* (Kremp.) Rambold & Hafellner, but *P. queenslandica is* restricted to corticolous or lignicolous substrata, and is distinguished by its thinner thallus (0.1–0.2 mm cf. 0.3–0.5 mm thick), its narrower, more elongate-ellipsoid ascospores (9–11 x 3–3.5 µm cf. 8–9 x 3–4.5 µm), and the presence of additional secalonic acid A. In addition, the apothecia are larger (0.8–3.0 mm cf. 0.1–1.5 mm wide) and often subimmersed in *P. sanguinolenta*, but are sessile and constricted at the base in *P. queenslandica*. *Pyrrhospora queenslandica* differs from the well-known, chemically similar Northern Hemisphere *P. russula* (Ach.) Hafellner by its grey-white to creamy yellow thallus (green to greenish-grey in *P. russula)* and by the production of secalonic acid A (Brodo *et al.* 2001, Ryan *et al.* 2004). The most common chemotype of *P. russula* contains fumarprotocetraric acid, the norstictic acid chemotype being much rarer. Both chemotypes of *P. russula* lack secalonic acid A.

At present this new species is known from scattered localities in southern and central Queensland, where it occurs on bark and dead wood in coastal and monsoon forests from sea level to 700 m. Commonly associated species include *Hafellia demutans* (Stirt.) Pusswald, *Hypotrachyna osseoalba* (Vain.) Y.S. Park & Hale, *Lecanora helva* Stizenb., *Pertusaria thiospoda* C. Knight and *Usnea rubicunda* Stirt.

ADDITIONAL SPECIMENS EXAMINED

Queensland: •Crediton State Forest, 16 km SW of Finch Hatton, 21°15′S, 148°31′E, 700 m, on dead log in *Eucalyptus grandis*–dominated woodland, *J.A. Elix 21067 & H. Streimann*, 1.vii.1986 (CANB); •Hurdle Gully, Coominglah State Forest, 14 km WSW of Monto, 24°54′S, 157°01′E, 310 m, on canopy branches in monsoon forest with dense shrubby understorey, *J.A. Elix 35452*, 3.ix.1993 (CANB); •Bribie Island, 11 km E of Highway 1, 27°01′S, 153°08′E, 10 m, on *Alphitonia* in remnant coastal *Eucalyptus* woodland, *J.A. Elix 35491*, 4.ix.1993 (CANB), on dead *Acacia*, *J.A. Elix 35500*, 4.ix.1993 (CANB); •Bunya Mountains, Saddle Tree Creek, 26°52′S, 149°17′E, 660 m, on twigs at edge of grassy woodland, *G. Kantvilas 181/95*, 24.xi.1995 (BRI, HO).

Pyrrhospora laeta (Stirt.) Hafellner
Herzogia **9**: 86 (1992); *Lecidea (Miltidea) laeta* Stirt., *Trans. Proc. N.Z. Inst.* **30**: 384 (1898). *Type:* Australia. Tasmania, *Mrs Heywood MacEwen*, rec'd May 1892 (holo: GLAM; iso: BM!).

Thallus crustose, superficial, whitish grey to pale grey, greenish grey or dark brownish grey, dull or slightly glossy, 20–300 µm thick, to 10 cm wide, ±smooth or irregularly areolate and rimose, scabrid, minutely papillose to verruculose, often eroding with age but lacking soredia and isidia, ecorticate or with a poorly differentiated cortical layer 20–30 µm thick. Prothallus typically not apparent. Photobiont *Trebouxia*; cells globose, 8–15 µm wide, in a continuous or patchy layer 20–50 µm thick. Apothecia lecideine, bright orange-red to red-brown, glossy, dispersed to crowded, adnate or basally constricted, round to ±irregular in shape; disc ±plane to strongly convex, epruinose; margin thin, often flexuose, soon excluded. Exciple in section 30–60 µm thick, open at the base, composed of radiating, heavily conglutinated hyphae 2–5 µm thick, densely inspersed with an orange-red, K+ magenta pigment. Hypothecium colourless or more typically inspersed with the same orange, K+ magenta pigment to at least some degree, 40–100 µm thick. Hymenium 35–60 µm thick, likewise inspersed with orange, K+ magenta pigment, densely so in the upper part, faintly pigmented to colourless in the lower part. Asci 8-spored, broadly clavate, 25–38 x 9–12 µm, of the

Lecanora-type, with a well-developed amyloid tholus and a prominent *masse axiale* with parallel or slightly divergent flanks; paraphyses rather robust, simple or occasionally branched, 2–3 µm thick, separating readily in K, with apices tapered or rounded, not noticeably expanded, extending up to 30 µm above the height of the asci and overlain by a hyaline gel to c. 10 µm thick. Ascospores ellipsoid to ellipsoid-fusiform, colourless, non-halonate, (6–)7–10(–14.5) x (2–)2.5–3(–4) µm. Pycnidia abundant, immersed, visible as scattered, minute, blackish specks; conidia thread-like, 10–20 x 0.5 µm, almost invariably curved or hook-shaped.

Chemistry: Thallus K–, C–, KC–, P–, UV–; sometimes containing protolichesterinic and lichesterinic acids, or lacking any lichen substances. Apothecia K+ reddish purple; containing russulone (major), norrussulone (trace).

Remarks:

Pyrrhospora laeta is one of the most conspicuous and easily identified crustose lichens in the Australasian lichen flora, readily recognized by its vivid red, abundant lecideine apothecia. It is commonly found in open woodland and dry sclerophyll forest on *Acacia* and other tree species, on small twigs on shrubs in heathland, and on canopy twigs in closed rainforest. It ranges from lowland to alpine elevations and has been recorded from all States of Australia except Northern Territories (McCarthy 2005) and from New Zealand (Galloway 1985).

As an epiphyte, the species has been relatively well known by lichenologists. However, at the same time, a taxon of *Pyrrhospora* has also been known from dolerite rocks in Tasmania, occurring mainly at higher elevations in the drier central and eastern parts of the island. The unusual habitat and relatively narrow geographic distribution suggested that this species could be an undescribed taxon, but a lack of collections hampered detailed study. Although extremely common, the species invariably grew on the largest and hardest rocks, making collection a difficult and energy-demanding task!

A recent investigation of the saxicolous specimens has prompted the detailed description of *P. laeta* presented above. Despite the unusual habitat and distinctive superficial appearance, no differences could be found between "typical" corticolous *P. laeta* and the saxicolous material. The thallus of corticolous specimens is usually smooth, thin and rather pale grey, whereas in saxicolous specimens, the thallus is thicker, coarser and dark-coloured. Saxicolous thalli are also frequently overgrown by colonies of cyanobacteria and unidentifiable growth. With respect to chemical composition, the saxicolous specimens lack any medullary compounds, whereas protolichesterinic and lichesterinic acids are sometimes detected in corticolous material, but no consistent correlation between habitat and chemistry has been observed at this stage.

Anatomically, the specimens from the two substratum types are inseparable, although saxicolous specimens tend to have more heavily pigmented apothecia, presumably due to their harsher, more exposed habitat. Initially we considered that there could be a difference in spore size, but extensive sampling of a wide range of specimens proved that the spores of saxicolous and corticolous individuals do not differ significantly. Indeed, the spores among individual specimens and even single apothecia can be quite variable, and whereas one specimen or apothecium can yield fusiform-ellipsoid spores 10–14 µm long, another can have mainly ellipsoid spores only 7.5–10 µm long. However, an extensive investigation of large numbers of specimens indicated that such variation is continuous and random, and not correlated with any ecological, chemical or anatomical character. It is noteworthy that no spores of the dimension cited by Stirton (1898) in his original description, or by Galloway (1985), (i.e. 13–19 x 3–3.5 µm) have been observed, neither in the present study nor previously by Kantvilas (1985).

The anthraquinone pigment in this taxon can be very dense or, occasionally in thalli with rather brownish red apothecia, rather sparse. All apothecial tissues can be pigmented or only the exciple and an "epihymenial" layer. The pigment fluoresces bright

orange in polarized light. With the addition of KOH, the pigment reacts magenta and gradually dissolves, but minute, fleck-like, insoluble magenta granules remain which do not fluoresce in polarized light. This investigation has also reinforced the clearly very close relationship between *Pyrrhospora* and *Ramboldia* Kantvilas & Elix (Kantvilas & Elix 1994). The anatomy and morphology of the exciple, paraphyses, spores and conidia in the two genera are identical. Furthermore, in both genera, the asci have a *masse axiale* with mostly divergent flanks, and the ascoplasm is rounded at the apex and does not extend into a beaked ocular chamber. Indeed *Pyrrhospora* and *Ramboldia* appear to differ solely in the presence of anthraquinone pigments in the apothecia of *Pyrrhospora*.

SELECTED SPECIMENS EXAMINED

Saxicolous specimens: *Tasmania:* •near Barren Tier, 6 km SE of Miena, 42°00'S, 146°47'E, 1100 m, on dolerite rocks in open *Eucalyptus* woodland, *J.A. Elix 29000* (CANB), 24.iv.1992; •Central Plateau, 4.5 km W of Liawenee, 41°54'S, 146°37'E, 1140 m, on dolerite rocks in subalpine heath, *J.A. Elix 40049 & G. Kantvilas*, 07.xii.1993 (CANB); •South Sister, near summit, 4.3 km NNW of St. Marys, 41°32'S, 148°10'E, 800 m, on exposed dolerite boulder, *J.A. Elix 28751 & G. Kantvilas*, 10.xi.2004 (CANB); •Wombat Moor, Mt Field National Park, 42°41'S, 146°37'E, 240 m, on dolerite rocks in subalpine woodland, *G. Kantvilas 767/81*, 13.x.1981 (HO); •c. 1 km E of Goat Hills, 42°19'S, 147°54'E, 240 m, on dolerite rocks in dry sclerophyll forest, *G. Kantvilas 19/97*, 07.i.1997 (HO); •St Pauls Dome, N slopes and summit, 41°46'S, 147°50'E, 900–1020 m, on dolerite boulders in dry sclerophyll woodland, *G. Kantvilas 249/97*, 23.xi.1997 (HO); •Mt Foster, 41°44'S, 147°53'E, 1010 m, on dolerite boulders in open *Eucalyptus* forest, *G. Kantvilas 198/99*, 17.v.1999 (HO); •summit of Mt St John, 41°47'S, 148°05'E, 778 m, on dolerite rocks of exposed NW facing cliff, *G. Kantvilas 316/99*, 31.vii.1999 (HO); •western slope of Table Mountain, 42°14'S, 147°08'E, 1050 m, on dolerite boulders on scree slope, *G. Kantvilas 924/01*, 06.x.2001 (HO); •ridge E of Ouse River, 7 km SE of Lake Augusta, 41°54'S, 146°37'E, 1140 m, on dolerite rocks in alpine heathland, *G. Kantvilas 212/93 & J.A. Elix*, 07.xii.1993 (HO).

Corticolous specimens: *Queensland*: •Mt Marley, 1 km NE of Stanthorpe, 28°39'S 151°57'E, 900 m, on *Leptospermum* in *Eucalyptus–Callitris*-dominated woodland, *J.A. Elix 35654*, 5.ix.1993 (CANB); •Lake Bellinger, Fraser Island, 25°04'S 153°08'E, 100 m, on dead shrub in open forest, *J.A. Elix 19329 & M.J. Elix*, 4.ix.1985 (CANB). New South Wales: •Koszciusko National Park, Johnnies Plain, 1 km E of Charlottes Pass, 36°25'S 148°21'E, 1750 m, on dead shrubs in alpine grassland, *J.A. Elix 33252 & G. Kantvilas*, 2.xii.1992 (CANB, HO, MEL). *Victoria:* •Alpine National Park, Basalt Hill, Bogong High Plains, 20 km SE of Mt Beauty, 36°53'S 147°181, 1650 m, on twigs of shrubs in alpine grassland, *J.A. Elix 40460 & H. Streimann*, 17.ii.1994 (CANB). *Tasmania:* •Cherry Tree Hill, 41°59'S 148°09'E, 180 m, on *Leptospermum grandiflorum* in sclerophyll woodland, *G. Kantvilas 27/95*, 2.vi.1995 (HO); •Mt Rufus Weir, 700 m, on twigs *of Baeckea gunniana* in sedgeland heath, *G. Kantvilas 117/85*, 14.ii.1985 (BM, HO); •Howells Bluff, 41°47'S 146°14'E, 1240 m, on dead twigs *of Coprosma nitida* in subalpine woodland *G. Kantvilas 58102*, 5.ii.2002 (HO); •Lake Eos, 41°56'S 146°02'E, 1180 m, on *Nothofagus gunnii*, *A.M. Buchanan 12164*, 3.iii.1991 (HO); •Lake Fenton, 42°40'S 146°37'E, 1000 m, on *Orites revoluta* in subalpine woodland, *G. Kantvilas & P. James 668/81*, 13.vii.1981 (BM, HO); •Sumac Road, Spur 2, 170 m, on *Nothofagus cunninghamii* in rainforest, *G. Kantvilas 317/81*, 16.v.1981 (BM, HO); •near Bismarck, 42°51'S 147°12'E, on *Pomaderris apetala*, *L. Rodway*, v.1891 (HO); •Ringarooma Tier, 40°49'S 147°59'E, 100 m, on *Allocasuarina verticillata*, *G. Kantvilas 48/95*, 05.vii.1995 (HO). *South Australia:* •Mt Lofty Ranges, Forest Range Road, 5 km W of Carey Gully, 34°58'S 138°47'E, 460 m, on *Exocarpus cupressiformis* in dry sclerophyll forest, *J.A. Elix 2837*, 21.xii.1976 (CANB). *Western Australia*: •Charles Gardner Flora Reserve, north track, 18 km SW of Tammin on old York Road, 31°46'38"S 117°28'26"E, 300 m, on dead shrub in mallee *Eucalyptus*

woodland with *Casuarina* understorey, *J.A. Elix 31817*, 22.iv.2004 (CANB); •S side of Kokerbin Rock, 34 km E of Quairading, 31°53'29"S 117°42'11"E, 290 m, on *Casuarina* in *Casuarina–Eucalyptus* shrubland, *J.A. Elix 31875*, 23.iv.2004 (CANB); •Nature Reserve (unnamed), 46 km E of Merredin along the Great Eastern Highway, 31°22'30"S 118°43'02"E, 380 m, on dead shrub in *Eucalyptus–Melaleuca* woodland, *J.A. Elix 31970*. 23.iv.2004 (CANB); •Yellowdine Nature Reserve, 56 km E of Southern Cross along the Great Eastern Highway, 31°16'23"S, 119°53'43"E, 410 m, on *Melaleuca* in *Eucalyptus–Melaleuca* woodland, *J.A. Elix 32379*, 27.iv.2004 (CANB, PERTH).

Acknowledgments
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Figure 1. *Pyrrhospora queenslandica* (*J.A. Elix 35500* in CANB). Scale bar = 1 mm.

A new species of *Punctelia* (Parmeliaceae, lichenized Ascomycota) from Tasmania and New Zealand

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Abstract: *Punctelia transtasmanica* Elix & Kantvilas is described as new to science. The new species closely resembles *Punctelia borreri* (Sm.) Krog, but differs in medullary chemistry and geographic distribution.

The lichen genus *Punctelia* Krog is widely distributed in Australia and New Zealand, occurring on rocks, trees, shrubs, dead wood and fence posts. Species are characterized by a foliose thallus with punctiform pseudocyphellae on the upper surface and/or lobe margins, medullary orcinol depsides and/or fatty acids, moderately large (10–27 x 6–18 µm) ellipsoid ascospores and unciform or filiform conidia (Elix 1994, Krog 1982). Six species have been recorded for Australia (McCarthy 2003) and five for New Zealand (Galloway 1985, Malcolm & Galloway 1997); a further new species is described here. Chemical constituents were identified by thin-layer chromatography (Culberson 1972, Culberson & Johnson 1982, Elix & Ernst-Russell 1993), high performance liquid chromatography (Feige *et al.* 1993, Elix *et al.* 2003) and comparison with authentic samples.

Punctelia transtasmanica Elix & Kantvilas, sp. nov. Fig. 1

Punctelia borreri similes sed acidum lecanoricum continenti praecipue differt.
Type: Australia: Tasmania, South Sister near summit, 41°32'S, 148°10'E, 800 m, on *Tasmannia lanceolata* in wet scrub, 10.xi.2004, *G. Kantvilas 413/04*; holo: HO.

Thallus foliose, adnate to loosely adnate, 5–7 cm wide. Lobes often crowded, loosely imbricate, 1–4 mm wide, irregularly branched, lacking lobules and cilia with the apices subrotund or dissected. Upper surface pale grey to blue-grey or grey-green, smooth, rugose centrally, shiny, white-maculate near the apices, lacking isidia but with pseudocyphellae and soredia. Pseudocyphellae laminal and ± marginal, punctiform, c. 0.1 µm wide, becoming sorediate. Soralia originating from pseudocyphellae, laminal, submarginal or marginal, ±spreading and/or associated with minute, partially corticate pseudoisidia which ultimately become sorediate; soredia farinose, white to grey-white. Lower surface wrinkled, brown-black to jet-black, densely rhizinate; rhizines simple, fasciculate, black to brown. Apothecia not seen. Pycnidia subapical, immersed; conidia unciform, 4–6 x 0.8–1 µm.

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

Etymology. The specific epithet refers to the occurrence of this species along the eastern and western shores of the Tasman Sea.

Remarks

Punctelia transtasmanica is characterized by the black lower surface, punctiform pseudocyphellae which become sorediate, and by the presence of lecanoric acid in the medulla. This new species closely resembles and has previously been confused with the common and widespread species *P. borreri* (Sm.) Krog. Primarily *P. borreri* differs in its medullary chemistry, containing gyrophoric acid (major) and orcinyl lecanorate (minor). Methods for distinguishing gyrophoric and lecanoric acids have been described by Orange *et al.* (2001). In addition, the minute pseudoisidia which are commonly observed associated with the soredia in *P. transtasmanica* are absent *in P. borreri*. Whereas *P. borreri* is cosmopolitan, occurring on all continents except Antarctica, *P. transtasmanica* appears restricted to Tasmania and New Zealand. *Punctelia subrudecta* (Nyl.) Krog is chemically identical and morphologically similar to *P. transtasmanica*, but differs in having an ivory to pale tan lower surface.

At present this new species is known from north-east Tasmania, Flinders Island and the north island of New Zealand where it occurs on small trees, shrubs and rocks in temperate forests and woodland from 500 to 800 m elevation. Commonly associated species include *Hypogymnia lugubris* (Pers.) Krog, *H. mundata* (Nyl.) Oxner ex Rassad., *Lecanora farinacea* Nyl., *Menegazzia pertransita* Stirt., *Maronea constans* (Nyl.) Hepp, *Parmelia protosignifera* Elix & J.Johnst., *Parmelia signifera* Nyl., *Tasmidella variabilis* Kantvilas, Hafellner & Elix, *Usnea oncodes* Stirt. and *U. rubrotincta* Stirt.

ADDITIONAL SPECIMENS EXAMINED

Australia: *Tasmania*: •Type locality, on *Bedfordia salicina*, *J.A. Elix 28632 & G. Kantvilas*, 10.xi.2004 (CANB), •Flinders Island, western slopes of Strzelecki Peaks, 40°12'S, 148°04'E, 500 m, on *Pomaderris apetala* in scrubby woodland, *G. Kantvilas 299/97*, 27.xii.1997 (HO), •Flinders, Island, Mt Leventhorpe summit, 40°04'S, 148°06'E, 500 m on granite boulders in dry scrub, *G. Kantvilas 304/97*, 29.xii.1997 (HO).
New Zealand: North Island: •Tongariro National Park, Mangawhero Forest Walk, Ohakune, 39°20'S, 175°31'E, 650 m, on fallen branches in mixed *Podocarpus* forest, *J.A. Elix 18908*, 14.i.1985 (CANB).

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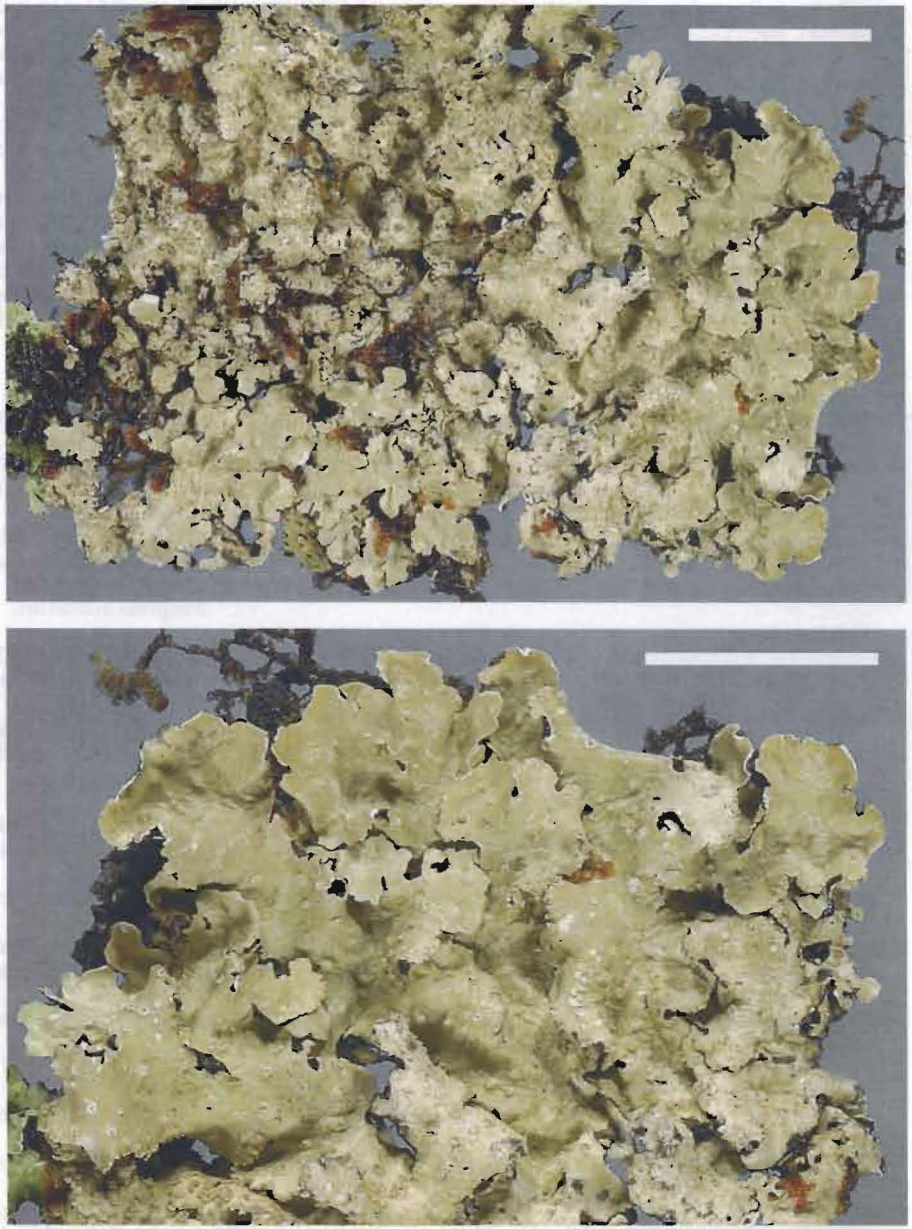

Figure 1. *Punctelia transtasmanica* (*G. Kantvilas 299/97* in HO). Scale bar = 10 mm.

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Placopsis fusciduloides (Ascomycota: Agyriaceae), a new lichen from Aotearoa New Zealand, British Columbia, and Bolivia

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Abstract: *Placopsis fusciduloides* D.J. Galloway, is newly described from New Zealand, with collections of it known also from British Columbia and Bolivia.

During preliminary work towards a monograph of the lichen genus *Placopsis* (Nyl.) Linds. in New Zealand (Galloway 2001a, 2001b, 2004a, 2004b), an undescribed species having a characteristically pruinose upper surface (reminiscent of *P. fuscidula*), and often prominent, erose soralia was encountered, especially in collections from the mountains of southern New Zealand. Material of this unnamed species was subsequently found in North American material labelled as *P. gelida* (L.) Linds., in the Bergen herbarium (BG), and also in a small collection of alpine specimens from Bolivia sent to me for identification by Prof. Arve Elvebakk (TROM). *Placopsis gelida*, which is the generitype of *Placopsis* (Jørgensen *et al.* 1994), has a very wide distribution, especially in the Northern Hemisphere (Galloway 2002), but it is a somewhat misunderstood taxon (see Moberg & Carlin 1996), and material so recorded from the Southern Hemisphere in particular (Lamb 1947: 202) comprises several different sorediate taxa quite distinct from *P. gelida s. str.* One of those is described below as *P. fusciduloides* sp. nov.

Placopsis fusciduloides D.J. Galloway, nov. sp. Fig. 1

Diagnosis: Specie *Placopsis fuscidula* similis, sed thallo soredioso; apothecia sessilia, 0.5–1.5(–2) mm diam., inter cephalodia dispersa; hymenium 115–140(–160) µm altum; ascosporae late ellipsoideae vel subglobosae, 15–20 x 8.5–11.5(–15) µm; conidia filiformia, subarcuata, 15–22 x 0.5 µm.

Type: New Zealand: *South Island:* Otago, Humboldt Mountains, around Lake Nerine, Mt Aspiring National Park, on rock and moss in open alpine herbfield with *Celmisia*, *Aciphylla*, and *Anisotome*, 1500 m, 6.ii.1999, *A. Knight s.n.* (OTA 058063!—holotype; CHR 528307!—isotype).

Thallus closely attached in neat, flat rosettes when growing on rock, becoming somewhat irregular and noticeably thicker and more convex-swollen when overgrowing mosses, 1–3(–6) cm diam., 100–400(–500) µm thick, thicker when overgrowing bryophytes; margins entire to delicately notched or shallowly incised, flabellate, flat to subconvex, without a marginal prothallus. Lobes flattish or subconvex, to distinctly swollen when overgrowing bryophytes, contiguous, parallel, radiating from near centre or from cephalodia, to periphery, or complexly interlocking, 0.2–1 mm wide, expanding to 2.5 mm at margins, ±discrete to contiguous and neatly pleated at margins or with a pattern of radiating cracks from centre to margins, the cracks narrow to deeply gaping, commonly divided into discrete, angular areolae, 0.5–1.5 mm diam., submarginally and centrally. Upper surface smooth, pale to dark olive-greenish to brownish when moist, often paler in a narrow, marginal zone, grey-brown, olive-brown, brown-pink to brownish or pale purplish brown when dry, with a thin, velvety concolorous to pale grey-brown pruina evenly developed over the entire thallus (10x lens), or with a thicker more crystalline white band of pruinosity developed at or near the lobe tips; without isidia, maculae or pseudocyphellae; sorediate. Soralia round to irregular, (0.1–) 0.2–1.2(–2) mm diam., discrete to ±confluent and eroding larger areas, most noticeable in central and submarginal parts, rarely or never close to margins, with a distinct, narrow, raised whitish border; soredia pale greenish white or white, contrasting with the thallus, efflorescent, coarsely granular to pseudoisidiate (10x lens), loosely clustered, readily dislodged and commonly eroding and leaving extensive, naked, whitish or creamish excavate areas with a prominent and well-delimited margin. Medulla white. Photobiont green, protococcoid, cells rounded 5–8.5(–10) µm diam. Cephalodia central in young thalli, and then often solitary, in larger thalli developing in concentric lines or bands near the centre and generally absent from the margins, orbicular, spreading over thallus surface, 2–5(–10) mm diam., hemispherical and smooth at first, becoming plicate-ridged and with deep, radiating cracks at maturity, at length becoming deeply eroded centrally, grey-blue when moist, pale pinkish brown to red-brown or somewhat blackened in old, erose parts when dry, with or without a thin, white pruina, occasionally obscured by regenerating superficial rosettes of thallus; cyanobiont *Scytonema*, in chains, cells compressed, rounded, cylindrical to fabiform, 3.5–7 µm diam. Apothecia prominent when present, though rather rare, occasional to absent, scattered centrally amongst cephalodia, though sometimes well-developed and crowded centrally, sessile, constricted at base, mainly solitary and rounded, or clustered in small groups (2–4) and then somewhat compressed and deformed through mutual pressure, 0.5–1.5(–2) mm diam. Disc plane to shallowly concave, slightly uneven to wrinkled-papillate, bright rose-pink to reddish when moist, and contrasting strongly with the thallus, dull red-brown to yellow-brown when dry, with or without a thin to thick, whitish or creamish pruina (10x lens). Thalline exciple massive at first and obscuring disc, concolorous with thallus or paler, smooth to shallowly wrinkled or warted, thin (0.2 mm wide) to thick and swollen (to 0.5 mm wide), slightly pruinose, without soredia. Proper exciple prominent and obvious in mature fruits, persistent, thin, noticeably raised above disc, entire to crenulate, slightly paler than disc. Epithecium granular on upper surface, yellow-brown, 15–20 µm thick. Hymenium colourless, not inspersed with oil droplets, 115–140(–160) µm tall. Hypothecium densely opaque, colourless, 130–180 µm thick. Asci cylindrical with a tapering foot, 105–115 x 12–16.5 µm. Ascospores uniseriate in ascus, colourless, coarsely vacuolate, broadly ellipsoidal to subglobose, 15–20 x 8.5–11.5(–15) µm. Pycnidia occasional to moderately common in central, areolate areas, generally 1 per areole, widely scattered or absent in marginal areas near lobe apices, immersed, 100–350 µm wide and deep, ostiole red-brown or black, 0.01–0.2 mm wide, round, irregularly stellate or sigmoid, surrounded by a slightly raised, pale "halo". Conidia filiform, shallowly arcuate, 15–22 x 0.5 µm.

Chemistry: Thallus K–, C+ red, KC+ red, Pd–; containing gyrophoric acid (major), ±cryptostictic acid (major), lecanoric acid (minor), 5-*O*-methylhiascic acid (minor or trace), hiascic acid (minor or trace), ±2′-*O*-methylhiascic acid (trace), ±stictic acid (minor) and ±connorstictic acid (minor) (for methods see Culberson 1972, Feige *et al.* 1993).

Diagnostic features

Placopsis fusciduloides is characterized by an orbicular to spreading, closely attached thallus with neatly pleated, flat to subconvex, flabellate margins, without a marginal prothallus; flattish to subconvex lobes, areolate-cracked centrally but discrete to contiguous at or near the margins; a ±continuous, thin, velvety pruina (10x lens), concolorous with upper surface or pale grey-brown; distinctively eroding soralia with a well-defined, raised margin and pale greenish white or white, coarsely granular to pseudoisidiate soredia; spreading, plicate-ridged to deeply eroded cephalodia developed in concentric lines or bands near thallus centre; scattered, often rather rare, sessile apothecia, 0.5–1.5(–2) mm diam., scattered (when present) amongst cephalodia; hymenium 115–140(–160) µm tall; ascospores broadly ellipsoidal to subglobose, 15–20 x 8.5–11.5(–15) µm; filiform, shallowly arcuate conidia, 15–22 x 0.5 µm; and a secondary chemistry containing gyrophoric acid (major), ±cryptostictic acid (major), lecanoric acid (minor), 5-*O*-methylhiascic acid (minor or trace), hiascic acid (minor or trace), ±2′-*O*-methylhiascic acid (trace), ±stictic acid (minor) and ±connorstictic acid (minor). *Placopsis fusciduloides* differs from *P. centrifuga* (Galloway 2004) in the character of the surface pruina, the entire thallus that shows no tendency to die centrally and thus

form concentric bands of thallus on the substratum, a lower hymenium, shorter ascospores and a different thallus chemistry [*P. centrifuga* has gyrophoric acid (major), lecanoric acid (minor) and methyl lecanorate (minor)]; from *P. fuscidula* (Galloway 2002) in the presence of soralia, a slightly lower hymenium, shorter ascospores and a more complex secondary chemistry [*P. fuscidula* has gyrophoric acid (major) with smaller amounts of lecanoric and orsellinic acids and an unidentified compound (Follmann *et al.* 1991)]; from *P. gelida* (Moberg & Carlin 1996) in the surface pruina, the scattered cephalodia [solitary and central in *P. gelida*], and a more complex chemistry [*P. gelida* has gyrophoric acid (major) and hiascic acid (minor)]; and from *P. lambii* (Moberg & Carlin 1996, Galloway 2001b) in the surface pruina; the pale soredia (soredia in *P. lambii* are distinctively olive-green to brown-black), the slightly longer and rather wider ascospores; and a more complex chemistry [*P. lambii* has gyrophoric acid (major), 5-*O*-methylhiascic acid (major) and hiascic acid (minor)].

Notes

Placopsis fusciduloides is an austral species known in New Zealand from subalpine to high-alpine habitats from Mt Taranaki (lat. 43°49'S) in North Island to near the Borland Saddle (lat. 45°45'S) in South Island, though it is still rather poorly collected, and could well have a wider distribution than records at present show. *Placopsis fusciduloides* grows on rock outcrops or on peaty soil or over mosses on soil in exposed subalpine to high-alpine grassland and in open alpine herbfield. It has an altitudinal range of 610–2002 m in New Zealand, where it associates with the following lichens: *Acarospora* sp. (yellow), *Brigantiaea fuscolutea, Carbonea vorticosa, Catillaria chalybeia, Digitothyrea rotundata* (in dry sites), *Hypogymnia lugubris, Lecidea fuscoatrula, Lepraria neglecta, Opegrapha devia, Placopsis cribellans, P. dennanensis, P. fuscidula, P. illita, P. lateritioides, P. perrugosa, P. subgelida, Porpidia macrocarpa, Pseudocyphellaria degelii, Rhizocarpon geographicum*, and *Steinera polymorpha*. Bolivian material seen from a roadside site at 4350 m co-occurred with *Placopsis lambii* and *P. rhodocarpa*.

SPECIMENS EXAMINED

New Zealand: North Island: *Taranaki*: •Mt Taranaki, alpine rock, *B. Enting 28* (WELT), 30.iii.1994. South Island: *Canterbury*: •Hawdon River, 6 km N of Cass, on outcropping rocks 610 m, *L. Tibell 9498n* (UPS), 11.xi.1980; •Mt Misery near Cass, rocks in upper subalpine (*Podocarpus nivalis)* belt, *G. Einar & Greta DuRietz 1468:13* (S), 9.i.1927; [identified by I.M. Lamb as *Placopsis gelida* f. *subreagens*], •Herbert Peak summit, Banks Peninsula, rock in tussock grassland, 920 m, *H.A. Imshaug 58201* (MSC), 21.i.1973. *Otago*: •*Cosmos* Range, head of Bride Burn, 1850 m, *D.J. Galloway s.n.* (CHR 528571), ii.1968; •Bedford Valley, below Mt Earnslaw, 1680 m, *D.J. Galloway s.n.* (CHR 528507), 26.xii.1970; •Park Pass, 1176 m, *D.J. Galloway s.n.* (CHR 528541, 528577, 528592), 19.ii.1968; •Humboldt Mountains, Mt Minos, 2002 m, *D.J. Galloway 68427* (CHR 528589), 1.i.1970; •Between Lake Nerine and Park Pass, rock outcrops in snowgrass, 1500 m, *A. Knight s.n.* (OTA), 6.ii.1999; •Emily Pass, boulders on cirque below Pass, 1500 m, *D.J. Galloway s.n.* (OTA), v.1963; •Key Summit, loose rock, *B.H. Macmillan s.n.* (CHR 528530), 16.xii.1962; •Old Man Range, E face just below summit plateau, on damp, mossy soil in schist crevices, 1620 m, *D.J. Galloway 5325* (CHR 533724), 28.i.2001; •Old Man Range, Hyde Rock, exposed soil in fellfield, 1673 m, *D.J. Galloway 1820* (CHR 533409), 16.iv.2000; •N end of Lake Onslow above iron gate, on schist outcrop in grassland, S-facing, 720 m, *D.J. Galloway 2269, 2270* (CHR 528399, 528400), 28.ix.2000. *Southland*: • Above Borland Saddle, ridgetop between Tussock 2 and Tussock 3, Alpine mammal project, on rock outcrops in tussock grassland, 1000 m, *R. Peach* (CHR 528306), 13.iv.2004.

Canada: *British Columbia*: •Garibaldi Mountains, 6 miles S of Pemberton, close to Green River, 50°13'N, 122°52'W, talus slope, on vertical face of cliff, 460 m, *I.M. Brodo 8286* (CANL 101721, BG), 10.vi.1966.

Bolivia: *Depto la Paz*: •4 km N of La Cumbre, 16°19,0315'S, 68°02,157'W, on gravel and soil on a roadside slope, 4350 m, *A. Elvebakk 00:340, 00:341* (TROMS).

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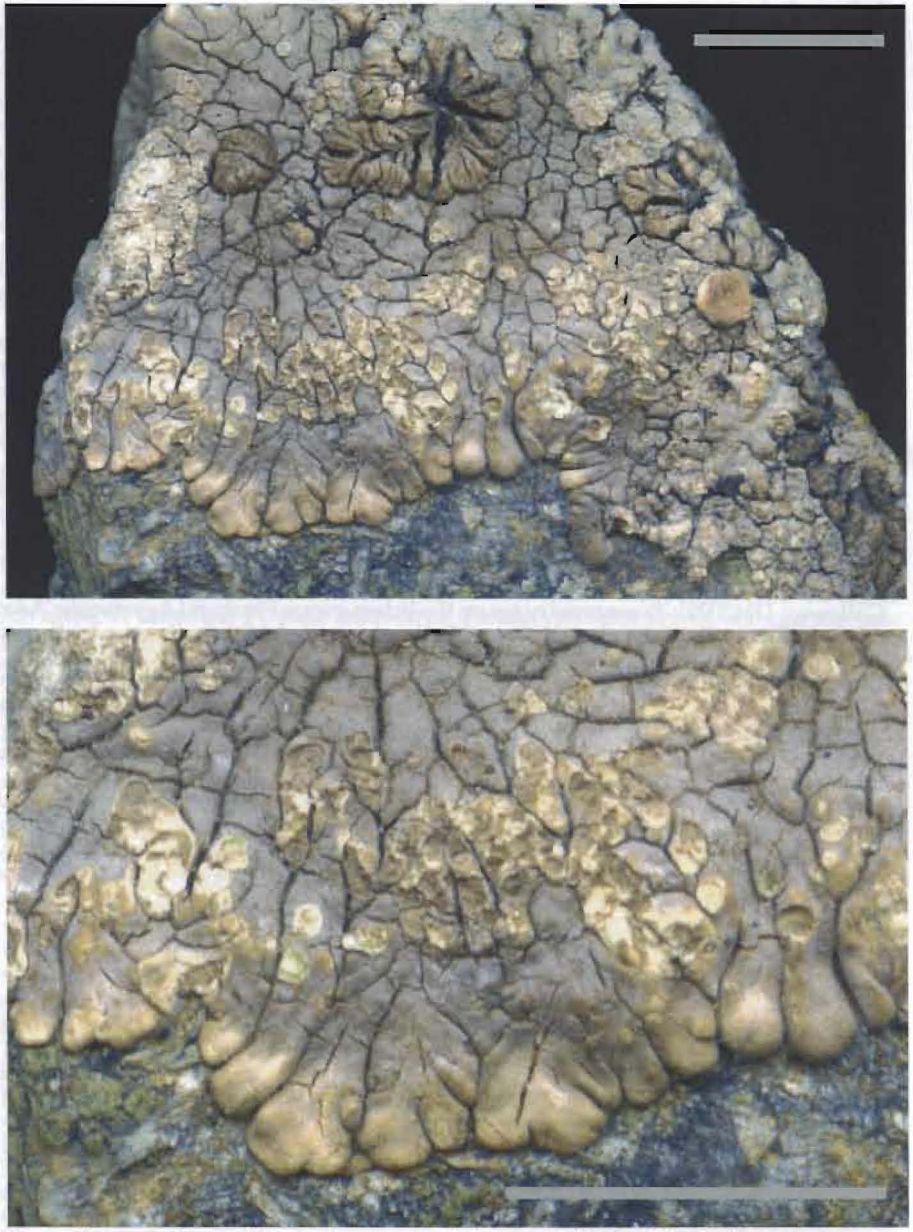

Fig. 1 *Placopsis fusciduloides* holotype, *A. Knight s.n.* OTA 058063. Scale bar = 5 mm.

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