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NEW, OR LITTLE-KNOWN NEW ZEALAND LECIDEOID LICHENS

by

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SUMMARY

Ten crustaceous, saxicolous lichens (*Carbonea phaeostoma*, *C. vorticosa*, *Fuscidea asbolodes*, *Lecidea endochlora*, *Poeltiaria corralensis*, *Porpidia athroocarpa*, *P. macrocarpa*, *Rhizocarpon disporum*, *Rimularia insularis*, *Sporastatia testudinea*), most of them formerly united under *Lecidea* are reported for New Zealand and its subantarctic islands for the first time. *Carbonea phaeostoma* is reported for the first time for Australia (Macquarie Island). *Porpidia athroocarpa* and *Rimularia insularis* were hitherto unknown from the Southern Hemisphere.
New records are given for fourteen other species formerly known from only very few localities in New Zealand.
Distribution maps are provided for *Carbonea phaeostoma* (world), *C. vorticosa* (world), *Lambiella psephota* (world), *Lecanora subcoarctata* (New Zealand), *Lecidea lapicida* (world), *Poeltiaria corralensis* (New Zealand), *P. turgescens* (New Zealand), *Porpidia albocaerulescens* (New Zealand), *Protoparmelia petraeoides* (New Zealand), *Rimularia insularis* (world), *Tremolecia atrata* (subantarctic and antarctic region).
Lecidea nigrocinnamomea Dodge is reduced to synonymy with *Porpidia athroocarpa*, and *Lecidea subtenebrosa* Nyl. and *L. myoplaca* Zahlbr. are both synonyms of *Protoparmelia petraeoides*.

ZUSAMMENFASSUNG

Zehn gesteinsbewohnende Krustenflechten überwiegend aus dem Bereich der ehemaligen Sammelgattung *Lecidea* werden für das Gebiet Neuseelands und seiner subantarktischen Inseln neu nachgewiesen: *Carbonea phaeostoma*, *C. vorticosa*, *Fuscidea asbolodes*, *Lecidea endochlora*, *Poeltiaria corralensis*, *Porpidia athroocarpa*, *P. macrocarpa*, *Rhizocarpon disporum*, *Rimularia insularis* und *Sporastatia testudinea*. *Carbonea phaeostoma* wird auch für den australischen Raum (Macquarie-Insel) gemeldet. *Porpidia athroocarpa* und *Rimularia insularis* sind Erstnachweise für die Südhemisphäre.
Von 14 weiteren lecideoiden Arten, die bislang nur durch die Originalaufsammlung oder durch wenige neuseeländische Funde belegt waren, werden zahlreiche Neufunde mitgeteilt. Die Verbreitung von *Carbonea phaeostoma* (Gesamtverbreitung), *C. vorticosa* (Gesamtverbreitung), *Lambiella psephota* (Gesamtverbreitung), *Lecanora subcoarctata* (Neuseeland), *Lecidea lapicida* (Gesamtverbreitung), *Poeltiaria corralensis* (Neuseeland), *P. turgescens* (Neuseeland), *Porpidia albocaerulescens* (Neuseeland), *Protoparmelia petraeoides* (Neuseeland), *Rimularia insularis* (Gesamtverbreitung), *Tremolecia atrata* (Antarktis und Subantarktis) wird in Karten dargestellt. *Lecidea nigrocinnamomea* Dodge erwies sich als Synonym von *Porpidia athroocarpa* und *Lecidea subtenebrosa* Nyl. sowie *L. myoplaca* Zahlbr. als Synonyme von *Protoparmelia petraeoides*.

Introduction

In his excellent "Flora of New Zealand" Lichens GALLOWAY (1985) discusses 966 species but regards this number as possibly only about 60% of the lichens to be found in New Zealand. Still very poorly known are a number of microlichen genera, e.g. the complex called "*Lecidea*" by ZAHLBRUCKNER, who in 1941 listed 47 species (including 29 new ones) of this "genus" for New Zealand, more than 60% being saxicolous.

Many of his saxicolous taxa were reduced to synonymy or transferred to other genera by HERTEL (1984), who gave a preliminary overview of saxicolous lecideoid lichens of the subantarctic area, including parts of New Zealand. Of the 84 subantarctic, saxicolous, lecideoid lichens keyed, 25 (treated as members of the genera *Diomedella*, *Lambiella*, *Lecanora*, *Lecidea*, *Lecidella*, *Micarea*, *Nothoporpidia*, *Poeltiaria*, *Porpidia*, *Rhizolecia*, *Trapelia*, *Tremolecia*, *Tylothallia*) were recorded from New Zealand, undoubtedly an under-estimate, but reflecting the relatively small number of specimens that the key was based on.

As a result of very successful fieldwork in Auckland, Canterbury, Otago and Southland, in early 1985, and after examining various additional collections, we now have a much better basis from which to evaluate the saxicolous Lecideas of New Zealand. Most of my own rich collections are still awaiting detailed analysis, especially those of critical groups. Here - as a first step - a number of new records are documented, increasing the number of lecideoid lichens considerably. In addition, various additional localities for species hitherto known only from a very small number of specimens are included.

Acknowledgements

I wish to express my thanks to the directors and curators of the following lichen herbaria, who kindly allowed me to examine their collections and who arranged loans of interesting material:
Auckland Institute and Museum, Auckland (AK), Australian National University Herbarium, Canberra (ANUC - collection J. A. ELIX), British Museum (Natural History), London (BM), Botany Department, University of Canterbury, Christchurch (CANU - herbarium B. A. FINERAN), Botany Division, D.S.I.R., Christchurch (CHR), Botanical Museum, Helsinki (H), Tasmanian Herbarium, University of Tasmania, Hobart (HO), National Herbarium of Victoria, South Yarra (MEL), Botany Department, University of Otago, Dunedin (OTA), Staatliches Museum für Naturkunde Stuttgart (STU - collection V. WIRTH), Herbarium, University of Uppsala (UPS - collections E. DU RIETZ and L. TIBELL). In addition material of the private collections of Mr. P. CHILD (Alexandra) and Dr. C. D. MEURK (Christchurch) was kindly offered for study. Dr. J. K. BARTLETT (Auckland) kindly donated many specimens of *Lecidea* s.l., many of which turned out to be of interest.

The great success in fieldwork we owe to the generous help of many New Zealand colleagues and friends, viz. Prof. P. BANNISTER (Dunedin), Prof. G. T. BAYLIS (Dunedin), Dr. J. E. BRAGGINS (Auckland), Dr. P. BUCHANAN (Auckland), Mr. P. CHILD (Alexandra), Dr. H. W. LINTOTT (Christchurch), Dr. C. D. MEURK (Christchurch), Dr. B. P. J. MOLLOY (Christchurch), Prof. A. F. MARK (Dunedin), Dr. G. J. SAMUELS (Auckland) and Mr. H. D. WILSON (Christchurch), who supported us in various ways. Dr. D. J. GALLOWAY (London) took an active part in planning and organizing this trip, which was financially supported by Deutsche Forschungsgemeinschaft (DFG). I am grateful for the revision of the English text by Dr. D. J. GALLOWAY. Last but not least I

want to thank my friend Dr. Helmut MAYRHOFER (Graz); he accompanied me during all the fieldwork, and did much to make these weeks so successful and pleasant.

A. Lichens new to the New Zealand flora

Carbonea phaeostoma (Nyl.) Hertel

HERTEL, Lecideaceae exs., fasc. VI, no. 104 (1984); HERTEL, Beih. Nova Hedwigia 79: 443-444 (1984) - *Lecidea phaeostoma* Nyl. in CROMBIE, J. Bot. 13: 334 (1875).

Thallus dingy whitish, irregularly areolate-cracked, often poorly developed, K+ yellowish, hypothallus usually indistinct. Apothecia to 2 mm diam., usually much smaller (0,3-0,8 mm diam.), frequent, sessile, with a ± thin, black, prominent and often crenulate margin, and a ± flat, rust-coloured, K+ red (2-chloroemodin) disc (thus resembling a species of *Caloplaca*). This reddish pruina may be lacking in old and/or damaged apothecia but is usually conspicuous on at least the younger ones. Excipulum and hypothecium very dark to almost black, ± confluent, K+ ± dark red-brown (quinoid reaction). Hymenium 55-80 µm, with a dark green epihymenium (more rarely olive green or very pale) overlain by a thin yellowish-orange pruina, discharging a tomato-red solution on addition of K. Asci of *Lecanora*-type (HERTEL 1984: 469, HERTEL & RAMBOLD 1985), spores ellipsoid, 7-15 x 4,5-8,5 µm. Paraphyses usually simple, conglutinated. Pycnospores filiform, often curved, 14-20 x ± 1 µm. Chemistry: atranorin, zeorin (thallus), 2-chloroemodin (pruina of apothecia).

Carbonea phaeostoma is a subantarctic species described from Kerguelen I., and common on Marion and Prince Edward Island (HERTEL 1984). The following records extend its range of distribution to southern South Island, the subantarctic islands of New Zealand, and Australia (see fig. 1). During my fieldwork on Marion Island I never thought of this species as a coastal one, (which it is in Southland and S. Otago), for it was present everywhere, including the high mountains. The differing ecological behaviour of this species in the Prince Edward Islands and New Zealand may be explained as an effect of the heavy and widespread salt-spray of these stormswept subantarctic islands, allowing coastal lichens (e.g. *Verrucaria maura*, *Buellia coniops*) to occur in localities remote from the coast.

Known distribution of *Carbonea phaeostoma*

Figure 1

New records:

Macquarie Island

Summit of Mt. Elder, wind tundra rocks, 22.I.1972, R. HNATIUK 11.839 (MEL 1.027.356).

Campbell Island

Smoothwater Bay, supralittoral rocks, 5 m, 19.I.1981, C. D. MEURK no. 45 (BM).

Auckland Islands

Auckland Island : on maritime rocks at end of Laurie Harbour, on basaltic rocks, 30.XII.1962, A. E. WRIGHT s.n. (BM). -- Waterfall Inlet, on conglomerate rocks in upper supralittoral 4.II.1973, D. S. HORNING SA-373 (CHR).

French's Island: off Crozier Point in grey zone at h.w.m. on basalt, 29.XII.1962, P. W. JAMES 763 (BM).

Ocean Island: maritime rocks at h.w.m., 30.XII.1962, P. W. JAMES 815 (BM).

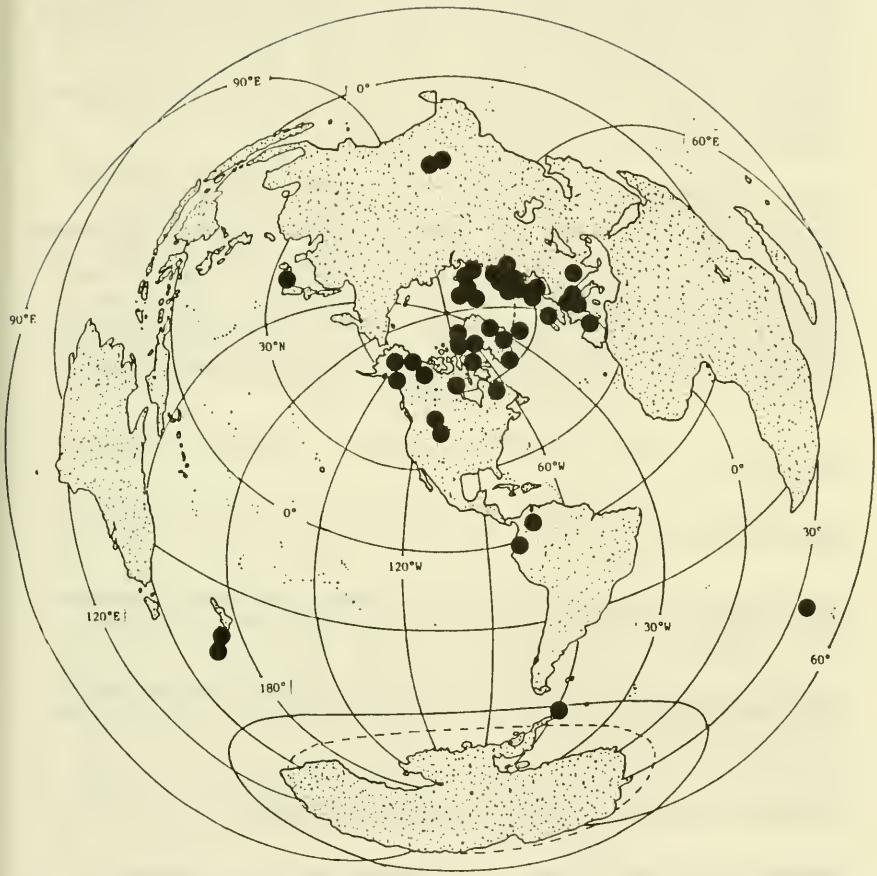
New Zealand: South Island

Southland: Bluff, coastal rocks south of Ocean Beach, 46° 36'S, 168°18'30"E, 12.II.1985, H. HERTEL (30.808) & H. MAYRHOFER (M, BM).

S. Otago: Waipati Beach E of Chaslands, Cathedral Caves, 46°36'35"S, 169°22'30"E, coastal rocks, 12.II.1985, H. HERTEL (30.822) & H. MAYRHOFER (CHR, M). -- Jack's Bay, E of Owaka, 46°30'S, 169°42'30"E, coastal rocks, 13.II.1985, H. HERTEL & H. MAYRHOFER (specimen lost?). -- Kaka Point, 46° 23'S, 169°48'E, SE of Balclutha, on coastal rocks, 13.II. 1985, H. HERTEL (30.888) & H. MAYRHOFER (to be distributed in "HERTEL, Lecideaceae exs.").

Carbonea vorticosa (Flk.) Hertel

HERTEL, Mitt. Bot. München, 19: 442 (1983); HERTEL, Beih. Nova Hedwigia 79: 444-445 (1984) -- *Lecidea vorticosa* (Flk.) Koerb. Syst. Lich. Germ. 251-252 (1855); HERTEL, Beih. Nova



Known distribution of *Carbonea vorticosa*

Figure 2

Hedwigia 24: 104-107 (1967); HERTEL, Khumbu Himal 6(3): 316-317 (1977).

This usually tiny and easily overlooked species is characterized by an often evanescent epilithic thallus (TLC: negative), small (rarely more than 0,7 mm diam., often much less), black, thin-margined, shining apothecia constricted at base and appearing to sit directly on the bare stone, a dark pigmented (almost black) excipulum, dark brown hypothecium, and a low (35-50 µm), bright blue-green to emerald hymenium, with asci of *Lecanora*-type and small, oblong-ellipsoid spores (8-10-12 x 3,5-4,5-6,0 µm).

It is a widespread oreophyte, well known from the Arctic and various mountain ranges of the Northern Hemisphere (see fig. 2). Southern Hemisphere records are from the Andes (HERTEL 1971), subantarctic islands (Marion I., HERTEL 1984), and antarctic islands (King George I., HERTEL 1984), while South African records are most likely based on misidentifications. *Carbonea vorticosa* is a plant of alpine habitats, collected in the Alps at altitudes to 4000 m (HERTEL 1970), in the Andes to 5300 m (HERTEL 1971) and in the Himalayas to 7400 m (HERTEL 1977).

New records:

South Island

Canterbury: Mt. Peel, rocks near summit, 43°51'S, 171°09'E, 1700 m, 16.I.1985, H. HERTEL (29.578) with H. MAYRHOFER, C. D. MEURK, B. P. J. MOLLOY (M).

Central Otago: Rock and Pillar Range, summit, schist tors, 1430-1445 m, 28.I.1985, H. HERTEL (32.299) with A. F. MARK & H. MAYRHOFER (M).

Fuscidea asbolodes (Nyl.) Hertel & V. Wirth

HERTEL, Beih. Nova Hedwigia 79: 454 (1984) -- *Lecidea asbolodes* Nyl. in CROMBIE, J. Bot. 14: 21 (1876).

Thallus very thin, dingy pale grey with a brownish tinge (at least after moistening), almost confluent to minutely rimose; hypothallus usually indistinct; medulla J-. Apothecia often a little irregular in shape, to 0,6 (rarely 0,8) mm diam., sessile (rarely slightly constricted at base or semiimmersed), black (discs here and there brownish), with a conspicous margin and a concave to flat disc. Excipulum well developed, black-brown to black. Hypothecium

unpigmented. Hymenium 55-80 µm with a brownish epihymenium. Spores 7,5-12 x 4,5-7 µm, bluntly ellipsoid. Pycnospores ellipsoid, 2,0-4,5 x 1,4-2,0 µm.

The species was hitherto known only from Kerguelen I. (type locality) and the Prince Edward Islands (HERTEL 1984) on basaltic rocks in both coastal and inland areas.

New record:

Auckland Islands

Auckland Island: Summit of Bivouac Hill, 532 m, very scarce on basaltic rock, 10.IV.1980, C. D. MEURK G 25 (BM).

It is of interest to note that although we looked carefully, both in the field and in herbaria, for saxicolous species of *Fuscidea* in New Zealand, we were not successful in finding even a single specimen.

"*Lecidea*" *endochlora* (Hook. f. & Tayl.) Tuck.

TUCKERMAN, Bull. Torrey Bot. Club 6: 59 (1875); HERTEL, Beih. Nova Hedwigia 79: 464 (1984) -- *Urceolaria endochlora* Hook. f. & Tayl. London J. Bot. 3: 640 (1844).

Thallus well developed, 0,4-1 mm thick, whitish to pale cream, rimose to areolate. Cortex K+ pale yellow (atranorin), medulla J-, P+ orange (protocetraric acid). Apothecia aspicilioid, immersed, 0,5-1 mm diam., without a distinct margin, discs black, sometimes brownish after moistening. Excipulum not developed (or not clearly separable from the pale brownish medulla), hypothecium unpigmented (forming a deep cone into the medullar tissue on central longitudinal sections). Hymenium 50-80 µm, colourless, with a dark green to pale olive-green epihymenium. Asci of *Lecanora* type; spores ellipsoid 8-11-14 x 3,5-5,3-6,5 µm.

This species does not belong in *Lecidea* s.str. and may be a member of the genus *Diomedella* Hertel. Unfortunately pycnidia were not found and therefore its generic position cannot be clearly ascertained at present.

Lecidea endochlora was described from Kerguelen I., and is known only from a few poor specimens. The following collections agree quite well with the type specimen.

New records:

Auckland Islands

Auckland Island: Summit of Mt. Eden, 420 m, on basaltic rock, 31.XII.1962, P. W. JAMES 830 (BM), 832 a (BM).

New Zealand: South Island

Central Otago: Old Man Range, Obelisk, near Fruitlands, 45°19'S, 169°13'E, in alpine *Celmisia-Raoulia* community on schist rock, 1690 m, 6.XI.1981, V. WIRTH (11.865) & C. D. MEURK (STU).

Poeltiaria corralensis (Räs.) Hertel

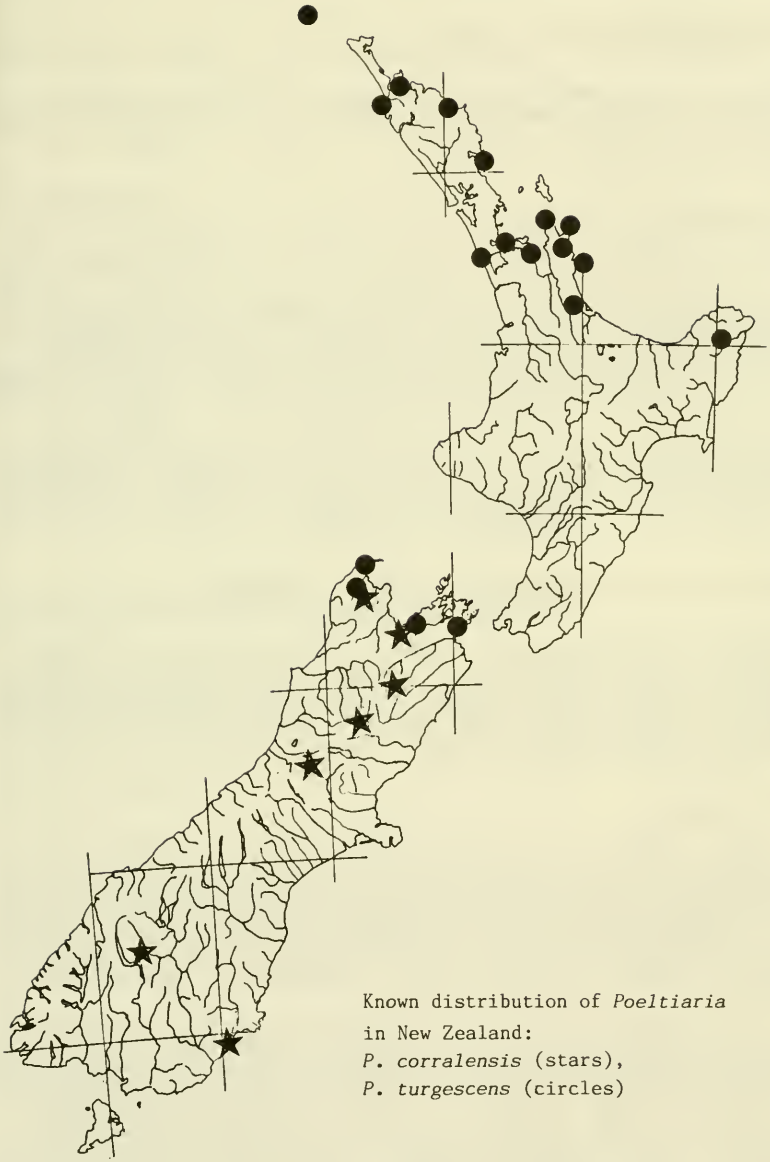
HERTEL, Beih. Nova Hedwigia 79: 431 (1984) -- *Lecidea corralensis* Räs. Revista Univ. (Santiago de Chile) 22: 211 (1937); HERTEL, Herzogia 2: 40 (1970).

Poeltiaria corralensis is a species having both the appearance and anatomical characters of *Porpidia*, but with internal pigmentation (as seen in section) as in *Lecidella stigmatea*.

Thallus white, dingy white or pale grey, rimose, K-, P-, C-, J-, without a distinct hypothallus. Apothecia to 3 mm diam., sessile, constricted at base, black, with a distinct margin which may disappear with age. The interior of the apothecia is (except a small, olive-green, epihymenium-like margin) unpigmented and clear-translucent. Excipulum large, well developed. Hymenium 80-135 µm high with an olive-green epihymenium. Spores 12,5-26 x 5,0-12,5 µm, halonate, ellipsoid.

Of eight specimens chemically tested by TLC, no lichen substances were found in five (including the type). In the three others (BARTLETT 27.022, FOLLMANN 11.307, HERTEL 29.943), a substance, possibly identical with porphyrilic acid, was found.

Poeltiaria corralensis was until recently known only from South America (Chile and Argentina, between 35°S and 41°S).



Known distribution of *Poeltiaria* in New Zealand:
P. corralensis (stars),
P. turgescens (circles)

Figure 3

New records (see fig. 3):

South Island

Nelson: Upper Cobb Valley, headwaters of Burgoo Stream, c. 1180 m, 16.XII.1983, J. K. BARTLETT 27.010 (M). -- Aniseed Valley, on rocks by roadside, 30.IX.1956, W. MARTIN 4179 (CHR 407.354 a).

Marlborough: Branch River, High Peaks, in head waters of Gordon Stream, c. 1300 m, 19.I.1984, J. K. BARTLETT 27.022 (M).

Canterbury: Nina River, Lewis Pass, 670 m, on stone, beech forest floor, 11.IX.1981, C. D. MEURK ML39 (herb. Meurk). -- Arthur's Pass National Park: Woolshed Hill, from Hawdon Shelter following the summit track, 42°59'S, 171°45'E, 650 m, rocks at a steep slope in beech forest, 24.I.1985, H. HERTEL (29.943) with H. LINTOTT, H. MAYRHOFER, C. D. MEURK (M).

Otago: Swampy Hill near Dunedin, 550 m, X.1958, on basalt, J. MURRAY 3624 (BM). -- Arrowtown, Central Otago, c. 1000 m, 15.IX.1976, J. K. BARTLETT 27.041 (M).

Porpidia athroocarpa (Ach.) Hertel & Rambold

HERTEL, Lecideaceae exs., fasc. VIII, p.8, no. 156 (1985) -- *Lecidea athroocarpa* (Ach.) Ach. Method. Lich. 41-42 (1803); ZAHLBRUCKNER, Catal. Lich. Univ. 3: 521-522 (1925); HERTEL, Khumbu Himal 6(3): 228-229 (1977); HERTEL & ZHAO, Lichenologist 14: 146 (1982).

New synonym:

Lecidea nigrocinnamomea Dodge, Nova Hedwigia 19: 476 (1971) Type: New Zealand, Canterbury, Phipps Peak, Arthur's Pass. Outer edge of exposed rock, western side of summit, 6250 ft. (= 1905 m), on metamorphosed sedimentary rock with thin quartz veins, 5.III.1966, B. A. FINERAN 2217 (CANU, holotype!).

Thallus small to very large, thin to moderately thick, regularly areolate, yellow-brown to dark grey-brown, ± glossy, K-, P-, C- (TLC: usually confluentic acid, 2'-O-methyl-perlatolic acid). Medulla J+ dark violet-blue. Apothecia ± immersed, often aspicilioid, to 1,8 mm diam., but often smaller, with usually distinct, thin margin and flat, black to weakly pruinose disc. Excipulum ± reduced, hypothecium

pale brown to brown. Hymenium 70-120 µm. Spores 13-24 x 6-12 µm.

Porpidia athroocarpa hitherto unknown from the Southern Hemisphere, seems a not uncommon species in New Zealand.

New records:

South Island

Canterbury: Mt. Peel: Lynn Stream Valley, above Acland's Hut, 43°50'30"S, 171°11'E, 1000 m, on a big boulder in *Chionochloa* grassland, 15.I.1985, H. HERTEL (29.406) with H. MAYRHOFER & B. P. J. MOLLOY (M and various other herbaria - HERTEL, Lecid. exs. 156). -- Mt. Peel summit, 1600 m, 43°51'S, 171°09'30"E, 16.I.1985, H. HERTEL (29.512) with H. MAYRHOFER, C. D. MEURK, B. P. J. MOLLOY (M, CHR).

Central Otago: Rock and Pillar Range: on schist tors below summit, 1160-1190 m, 18.IX.1981, F. J. WALKER & C. D. MEURK s.n. (BM). -- Rock and Pillar Range, summit rocks, 1430-1445 m, 28.I.1985, H. HERTEL 32.250 (M, CHR), 32.257 (M), 32.277 (M) with A. F. MARK & H. MAYRHOFER.

Porpidia macrocarpa (DC.) Hertel & Schwab

HERTEL, Beih. Nova Hedwigia 79: 437 (1984); HERTEL & KNOPH, Mitt. Bot. München 20: 473, 475 (1984) -- *Lecidea macrocarpa* (DC.) Steud. Nomenclat. Bot. 245 (1824) -- *Huilia macrocarpa* (DC.) Hertel, Herzogia 3: 372 (1975). HERTEL, Khumbu Himal 6(3): 219-222 (1977); INOUE, J. Japan. Bot. 58: 225-228 (1983).

In the genus *Porpidia*, characterized by its usually inconspicuous thallus, rather large apothecia (1,2-4 mm diam.) with a broad margin, not too dark pigmented, a sometimes K+ reddish reacting excipulum with rather thick hyphae (4-9 µm diam. in inner parts of excipulum), by a relatively high hymenium (75-100-130 µm) and large spores (15-22-33 x 7-10-14 µm), and with stictic acid as the main lichen acid.

Porpidia macrocarpa in the strict sense is an often misunderstood species and all literature records need re-examination. It has a wide distribution in North America, Europe and Asia but I have not before seen typical Southern Hemisphere material.

New record:

South Island

Otago: Mt. Maungatua, Taieri, 750 ft. (= 230 m), on schist, 15.I.1954, W. MARTIN s.n. (BM).

Rhizocarpon disporum (Hepp) Müll. Arg.

FEUERER, Ber. Bayer. Bot. Ges. 49: 66-67 (1978); HAWKSWORTH, JAMES & COPPINS, Lichenologist 12: 88 (1980); POELT & VĚZDA, Bibliotheca Lichenol. 16: 275 (1981); SANTESSON, The Lichens of Sweden and Norway, 270 (1984).

Thallus grey to grey-brown, bullate-areolate, areolae constricted at base, convex, smooth, K+ pale yellow (stictic acid), C-, J-. Apothecia black, to 0,8 mm diam. Excipulum unpigmented to pale brown. Hypothecium dark (often reddish) brown to almost black. Hymenium 100-140 µm, with a red brown, K+ red epihymenium. Asci with a single spore only (the epithet "disporum" is unfortunately misleading). Spores muriform, green-brown to dark-brown, 50-75 x 20-30 µm.

Rhizocarpon disporum (syn. *Rh. montagnei* Koerb.) is a lichen of exposed sunny, dry siliceous rocks, often in semi-arid areas. It has a very wide distribution in the Holarctic region, but literature records need careful checking, because of confusion with *Rhizocarpon geminatum* Koerb., a very similar (or identical) looking species with two-spored asci and a preference for cooler and more humid localities.

New record:

South Island

Central Otago: Clutha River Valley, c. 1 km SE of Roxburgh East, 100 m, schist outcrops on a steep, dry and sunny slope (in this area of very low precipitation), 1.II.1985, H. HERTEL (30.150) & H. MAYRHOFER (M, AK, BM, CHR).

Rimularia insularis (Nyl.) Rambold & Hertel

HERTEL, Lecideaceae exs., fasc. VIII, p.9, no. 159 (1985) -- *Lecidea insularis* Nyl., Bot. Not. 177 (1852); HERTEL, Herzogia 1: 421-423 (1970), 2: 487-489 (1973).

Known distribution of *Rimularia insularis*

Figure 4

Thallus medium to dark glossy brown, ± bullate-areolate, forming small islands (3-30 mm ø) on the thallus of its host *Lecanora rupicola*, K-, P-, C- (or C+ red), J-. Apothecia numerous, black, to 0,9 mm diam., sessile, not constricted at base, between areolae, and often evertopped by them, disc flat, margins thin. Excipulum to 40 µm broad, brown-black, Hymenium 45-70 µm, with a greyish olive epihymenium. Spores ellipsoid, 8-10-15 x 4,5-5,5-6,5 µm. Hypothecium black-brown with a ± unpigmented, 35-50 µm high subhymenial part.

Rimularia insularis is an obligate parasite of *Lecanora rupicola* (L.) Zahlbr., and the closely related *Lecanora subplanata* Nyl. and *L. sulphurata* (Nyl.) Zahlbr. (but not found on *Lecanora blanda* Nyl., which is so common in New Zealand). It is widespread in Europe (HERTEL 1970, where it becomes rare to the north of 63°N, although reaching 78°N in Spitsbergen (HERTEL unpubl.)) and is known from Canada (Alberta, Newfoundland), from various localities of western U.S.A. and from the Macaronesian Islands (Madeira, Tenerife) (HERTEL 1970, 1973) - see fig. 4.

New records:

South Island

Canterbury: Banks Peninsula, Devil's Gap, 43°49'30"S, 172° 49'30"E, 700 m, on *Lecanora rupicola* over basaltic rock, 19.I.1985, H. HERTEL (29.705) with H. MAYRHOFER, C. D. MEURK, H. D. WILSON (M, CHR).

Central Otago: Old Man Range SW of Alexandra, summit plateau near Hyde Rock, alpine tundra, 1640 m, on *Lecanora rupicola* over schist rock, 3.II.1985, H. HERTEL (30.366) with P. CHILD & H. MAYRHOFER (M). -- Little Valley Road, 6 km from Alexandra, 45°17'S, 169°27'E, 460 m, on *Lecanora rupicola* growing on boulders in an area of low precipitation (c. 250 mm/year), 2.II.1985, H. HERTEL (30.231) with P. CHILD and H. MAYRHOFER (HERTEL, Lecid. exs. 159).

Sporastatia testudinea (Ach.) Massal.

MASSALONGO, Geneac. Lich. 9 (1854) -- *Lecidea cechumena* var. *testudinea* Ach. Kongl. Vetensk. Akad. Nya Handl. 232 (1808).

This very characteristic and easily recognized lichen, common and widespread in various montain ranges of the Northern Hemisphere, and also known from Venezuela, Bolivia

(HERTEL 1971), Australia (WEBER & WETMORE 1972), and South Georgia (DARBISHIRE 1912) is a member of Acarosporaceae and is not a lecideoid lichen at all, although there exist Lecideas (e.g. on Marion Island), with a very similar habitus (probably LINDSAY's report (1976) is based on those species). It is included here, for it is, according to GALLOWAY (1985) not known from New Zealand, and a high altitude specimen in B. FINERAN's herbarium, named *Lecidea subtenebrosa* Nyl. by C. W. DODGE, is *Sporastatia testudinea*.

New records:

South Island

Westland: Mt. Haast, High Peak, 2950 m, exposed rock on ridge, 4.I.1967, R. G. CUNNINGHAME (CANU, herb. FINERAN 2445).

Canterbury: Summit of Mt. Peel, 43°51'S, 171°09'E, 1730 m, summit rocks, 16.I.1985, H. HERTEL (29.580) with H. MAYRHOFER, C. D. MEURK, B. P. J. MOLLOY (M).

B. Rarely recorded lecideoid lichens in New Zealand

Descriptions of these taxa will usually be found both in GALLOWAY's Flora (1985) and in HERTEL's paper on saxicolous, subantarctic lecideoid lichens (1984). Five of the following species until now were known only from type collections or from a single New Zealand record, while the rest are recorded from a few New Zealand localities only.

Lambiella psephota (Tuck.) Hertel

HERTEL, Beih. Nova Hedwigia 79: 460 (1984) -- *Lecidea psephota* Tuck. Proceed. Acad. Arts Sci. 12: 181 (1877); GALLOWAY, Fl. New Zealand Lich. 236 (1985).

Erroneously called an New Zealand endemic in GALLOWAY's Flora, but the type is from Patagonia and it is known also from Kerguelen I. (see fig. 5). Until now the only known New Zealand collection was the type specimen of *Lecidea petrina* Nyl. a synonym of *Labiella psephota* (HERTEL 1984), probably from Wellington. TLC: norstictic acid (thallus).

There is now no doubt that *Lambiella* Hertel is a member of Rimulariaceae, closely related to *Rimularia* Nyl.

Known distribution of *Lambiella psephota*

Figure 5

New records (often very small thalli only):

North Island

Wellington: Otupai Range, N. W. Ruahine, western slopes, 39°32'S, 176°11'E, c. 1100 m, on greywacke outcrops, 10.XI. 1983, J. K. BARTLETT 26.993 (M).

South Island

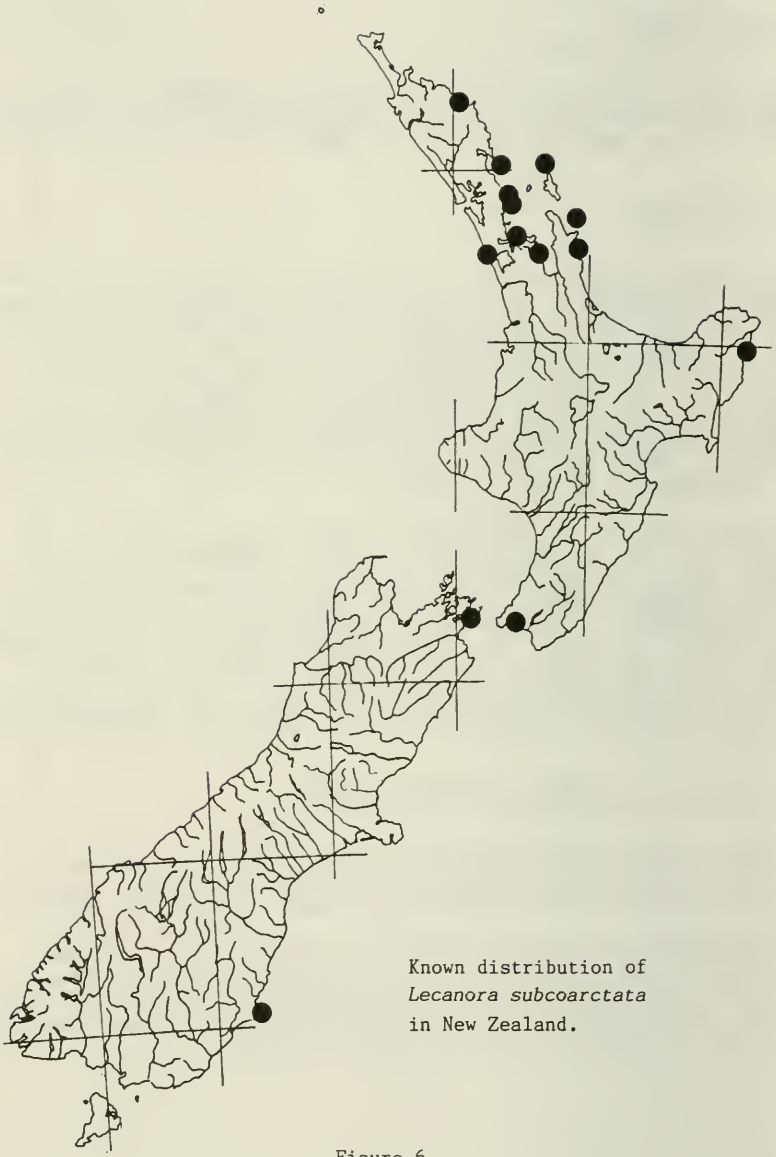
Canterbury: Foggy Peak above Porter's Pass, 43°18'S, 171° 45'E, 1300-1400 m, 22. and 25.I.1985, H. HERTEL 32.177 (M), 32.193 (M), 32.197 (M), 32.211 (M) with H. MAYRHOFER & C. D. MEURK. - Banks Peninsula, Devil's Gap, 43°49'30"S, 172°49'30"E, on basaltic rock near summit, 670-710 m, 19.I.1985, H. HERTEL (29.712) with H. MAYRHOFER, C. D. MEURK & H. D. WILSON (M). - Mt. Peel: Lynn Stream Valley, Long Spur above Acland's Hut, 43°50'30"S, 171°11'E, c. 800 m, boulder, 15.I.1985, H. HERTEL 29.440 (M), 29.451 (M) with H. MAYRHOFER & B. P. J. MOLLOY.

Otago: Rock and Pillar Range, summit rocks, 1430-1445 m, 28.I.1985, H. HERTEL (32.270) with H. MAYRHOFER & A. F. MARK (M). - Old Man Range: Hyde Rock, 1610 m, schist tors, 3.II.1985, H. HERTEL 30.356 (M), 30.370 (M) with P. CHILD & H. MAYRHOFER. - Old Man Range: Obelisk, 1650 m, schist tors, 3.II.1985, H. HERTEL (30.382) with P. CHILD & H. MAYRHOFER (M). - Mt. Maungatua, SW of Dunedin, 45°54'S, 170°08'E, scattered rocks on swampy summit plateau, 850-900 m, 31.I. 1985, H. HERTEL (30.080) with A. F. MARK & H. MAYRHOFER (M).

Lecanora subcoarctata (Knight) Hertel

HERTEL, Beih. Nova Hedwigia 79: 448 (1984) -- *Lecidea subcoarctata* Knight, Transact. Proceed. New Zeal. Inst. 8: 316-317 (1876); GALLOWAY, Fl. New Zeal. Lich. 238 (1985).

This species, described from New Zealand also under the names *Lecidea circumdiluens* Nyl. 1888, *Lecidea gallinarum* Zahlbr. 1941 and *Lecidea allanii* Zahlbr. 1941 and hitherto known only from these type collections, is a common coastal lichen, at least in northern North Island.



Known distribution of *Lecanora subcoarctata* in New Zealand.

Figure 6

New records (see fig. 6):

North Island

Auckland: Mangonni Co., Whale Island in the Moturoa Island group, on maritime rocks, 10.V.1976, A. E. WRIGHT 110 (AK 161.457).-- Mokohinau Islands: Fanal Island, maritime rocks, eastern landing, 35°57'S, 175°11'E, 26.V.1979, A. E. WRIGHT (Auckland University Field Club Scientific Expedition May 1979) (AK 154.077).-- Great Mercury Island, on maritime rocks, V.1975, B. W. & Glenys C. HAYWARD H 40.229 (AK 155. 071). - 1,5 km NE of Leigh, Cape Rodney, 36°17'S, 174°49'E, just S of Leigh Biological Station, on epilittoral sea-shore rocks, 27.V.1981, L. TIBELL 13.316 (UPS), 13.322 (UPS).-- Tawharanui Peninsula, 17,5 km ENE of Warkworth, 3,5 km W of Tokau Point, 36°22'S, 174°50'E, on seashore rocks, 25.V. 1981, L. TIBELL 13.197 (UPS), 13.189 (UPS, M).-- Coromandel Peninsula, 14 km SE of Whitianga, Hot Water Beach, 36°53'S, 175°49'E, on precipitous rocks facing the sea, 5 m, 22.V. 1981, L. TIBELL 13.140 (UPS, M).-- Kawakawa Bay, Papanui Point, 36°56'S, 175°13'E, on coastal volcanic rocks immediately above sea-level, 12.I.1985, H. HERTEL (29.135) with H. MAYRHOFER & G. J. SAMUELS (Hertel, Lecid. exs. 146).-- Waitakere Coast: Whatipu, 37°04'S, 174°30'E, 25 m, volcanic andesitic rock, 27.X.1983, J. K. BARTLETT 27.001 (M).

Gisborne: Waihau Bay, 106 km E of Opotiki, Bay of Plenty, along foreshores on rocks at sea-level, 12.I.1982, J. A. ELIX 10.057 (ANUC).

South Island

Marlborough: Island Bay, on rocks, VI.1904, W. A. SETCHELL (H).

Otago: Nugget Point, Otago Peninsula, on coastal rocks, 6.II.1967, D. J. GALLOWAY (BM).

The two South Island specimens differ somewhat in a weaker C-reaction of the excipulum, and less distinctly pruinose to epruinose apothecia.

Lecidea atromorio Knight

KNIGHT, Transact. Proceed. New Zealand. Inst. 8: 315-316 (1876); HERTEL, Beih. Nova Hedwigia 79: 417, 485, 489 (1984).

This species, not mentioned in GALLOWAY's Flora, was hitherto known only from it's type collection, probably from Wellington (no locality given in the original description).

New records:

North Island

Wellington: Otupai Range, N. W. Ruahine, Western slopes, 39°32'S, 176°11'E, c. 1110 m, 10.XI.1983, J. K. BARTLETT 26.988 (M).

South Island

Canterbury: Lowry Peaks Range, 1,5 km SW of Mt. Palm, 200 m, sandstone rocks, 24.I.1980, J. A. ELIX 6870 (ANUC). - Bankside Scientific Reserve, Canterbury Plains, between Selwyn and Rakaia River, c. 6 km SSW Dunsandel, 65 m, pebbles (hard siliceous rock) on ground in Short-tussock grassland with scattered shrubs of *Leptospermum ericoides*, 14.I.1985, H. HERTEL (29.218) with H. MAYRHOFER, C. D. MEURK & B. P. J. MOLLOY (M, CHR).

Otago: Mopanui, 1500' (=460 m), basalt-rock, I.1959, J. MURRAY 3768 (OTA).

Lecidea coromandelica Zahlbr.

ZAHLBRUCKNER, Denkschr. Akad. Wiss. Wien, math.-nat. Kl., 104: 311 (1941); GALLOWAY, Fl. New Zeal. Lich. 229 (1985).

GALLOWAY (l.c.) gives five New Zealand localities of this conspicuous, yellow-thalline (usnic acid found in five specimens by TLC) lichen.

New records:

South Island

Westland: Mt. Rochfort, Denniston Coal Plateau, 880 m, 9.IX.1978, J. K. BARTLETT 24.573 b (M).-- Denniston Plateau, 41°44'S, 171°48'E, 600 m, on acid rock amongst coaliferous waste by road, 21.IX.1981, F. Joy WALKER (BM).-- Denniston Plateau, on sandstone pavement, common, 22.IX.1981, D. J.

GALLOWAY (CHR 407.367).

Canterbury: Arthur's Pass, 42°55'S, 171°32'E, c. 940 m, small boulder on the pass, 12.I.1927, G. E. & Greta DU RIETZ 1523 (UPS); 30.X.1981, V. WIRTH 10.011 (STU), 11.417 (STU) with A. ROSE & L. KAPPEN; 23.I.1985, H. HERTEL (specimen probably lost).-- Arthur's Pass National Park: track to Temple Basin, 42°55'S, 171°34'E, c. 1200 m, 23.I.1985, H. HERTEL 29.848 (M), 29.858 (M) & H. MAYRHOFER.

Fiordland: Key Summit (7 km SE of Mt. Christina, near Routeburn Track), 44°47'S, 168°10'E, 850-950 m, subalpine region, 11.XI.1981, V. WIRTH 11.534 (STU).

Stewart Island

Mt. Rakeahua summit, 670 m, on small pebbles in fellfield on exposed SW slope, 6.II.1980, C. D. MEURK A 93 (OTA).

Lecidea lapicida (Ach.) Ach.

HERTEL, Khumbu Himal 6(3): 256-262 (1977); HERTEL, Beih. Nova Hedwigia 79: 419-420 (1984); GALLOWAY, Fl. New Zeal. Lich. 634 (1985).

Lecidea lapicida is a widespread oreophyte (see fig. 7), known from various parts of the Holarctic region, from the northern Andes (HERTEL 1971), South Georgia, Prince Edward Islands, and Antarctica (HERTEL 1984). Until now there was only a single record from New Zealand (C. Otago).

The specimens listed here represent typical *Lecidea lapicida*, characterized by a distinctly amyloid medulla, a not too dark-brown hypothecium and a rather pale excipulum and with stictic acid as the major lichen substance.

New records:

South Island

Canterbury: Phipps Peak summit, c. 42°54'S, 171°E, 1905 m, on rock, 5.III.1966, B. A. FINERAN 2276 (CANU, named "*Lecidea* (*Biatora*) *Allanii* Zahlbr." by C. W. DODGE - see FINERAN & DODGE 1970: 403).

Otago: St. Mary's Range, 6000' (= 1830 m), on siliceous rock with *Buellia* sp. and juvenile *Umbilicaria*, 1955, F. B.

Known distribution of *Lecidea lapicida*

Figure 7

FITZGERALD (OTA, herb. Murray 3465).-- Rock and Pillar Range, on schist tors below summit, 1160-1190 m, 18.IX. 1981, F. Joy WALKER & C. D. MEURK R. P. 15 (BM).-- Old Man Range, near Obelisk, 45°19'S, 169°12'E, 1670 m, schist rocks in alpine tundra, 3.II.1985, H. HERTEL (30.339) with P. CHILD & H. MAYRHOFER (M).

Lecidella stigmatea (Ach.) Hertel & Leuckert

HERTEL & LEUCKERT, Willdenowia 5: 375 (1969); HERTEL, Beih. Nova Hedwigia 79: 451 (1984); GALLOWAY, Fl. New Zeal. Lich. 636 (1985) - *Lecidea stigmatea* Ach. Lich. Univ. 161 (1810).

A very widespread and rather polymorphic species, from New Zealand known only from the type collection of *Lecidea imitatrix* Zahlbr.

After having studied recent collections from the locus classicus of *Lecidea imitatrix* and additional New Zealand specimens I no longer doubt that ZAHLBRUCKNER's taxon must be included in *Lecidella stigmatea*.

New records:

South Island

Canterbury: Castle Hill above Thom's River, 43°13'S, 171°43'E, 750-780 m, limestine rocks on a steep grass-covered slope, 25.I.1985, H. HERTEL 29.955 (M, AK, CHR), 29.962 (M, BM) with H. W. LINTOTT, H. MAYRHOFER & C. D. MEURK.-- Lowry Peaks Range, 1 km SW of Mt. Palm, on greywacke rocks in pasture land, 200 m, 24.I.1980, J. A. ELIX 6873 (ANUC - a specimen with relatively small spores: 10-12,6-15 x 4-6,2-7 µm).-- Rangitata River Co.: Coal Creek, 43°45'S, 171°09'E, limestone outcrops on a NE slope with heavily grazed vegetation dominated by *Discaria toumatou*, 17.I.1985, H. HERTEL 29.599 (M), 29.605 (M, BM, CHR), 29.609 (M, CHR), 29.615 (M) with H. MAYRHOFER, C. D. MEURK & B. P. J. MOLLOY.

Southland: Clifden, 46°02'S, 167°41'E, limestone rocks in pasture land, (locus classicus of *Lecidea imitatrix*), 11.II.1985, H. HERTEL 30.782 (M), 30.783 (M), 30.787 (M, CHR, BM) with H. MAYRHOFER.-- Forest Hill near Winton, on limestone, VIII.1954, J. MURRAY 0501 (OTA).

Poeltiaria turgescens (Koerb.) Hertel

HERTEL, Beih. Nova Hedwigia 79: 431 (1984) - *Lecidella turgescens* Koerb. Abhandl. Schles. Ges. vaterl. Cultur 2: 34 (1862).

Poeltiaria turgescens is based on a specimen from New South Wales. *Lecidea littoralis* Knight, described from New Zealand (no exact locality given in the original description) is regarded as a synonym (see HERTEL 1984).

HERTEL (l.c.) mentions five New Zealand localities of this conspicuous lichen which ecologically resembles *Porpidia albocaerulescens* in many respects.

The thallus always contains (17 specimens tested by TLC) confluentic acid and 2'-O-methylperlatolic acid.

New records (see fig. 3):

Three King Islands

Great Island: Tasman Valley, rocks in stream bed, 15.XI. 1970, D. J. GALLOWAY (BM).

North Island

Auckland: Chuch Road Scenic Reserve, near Kaitaia, c. 200 m, 15.II.1976, J. K. BARTLETT 27.035 (M).-- 17,5 km ENE of Warkworth, Tawharanui Peninsula, 3,5 km W of Tokatu Point, 36°22'S, 174°50'E, on seashore rocks, 25.V.1981, L. TIBELL 13.184 (UPS).-- Coromandel Co., Great Mercury Island, Urututu, V.1975, B. W. & Glenys C. HAYWARD H 40.223 (AK 160.764).-- Rangitoto Island, at entrance to Auckland Harbour, 11.II.1962, J. H. WILLIS (MEL 1.048.281).-- Waitakere Coast, Whatipu, 37°04'S, 174°30'E, on volcanic andesitic rock, c. 25 m, 27.X.1983, J. K. BARTLETT 26.975 (M).-- Kawakawa Bay, Papanui Point, 36°56'S, 175°13'E, coastal cliffs, 12.I.1985, H. HERTEL (29.136) with H. MAYRHOFER & G. J. SAMUELS (HERTEL, Lecid. exs. 155).-- Coromandel Co., Mt. Maungatawhiri near Whitianga, on rocks in bush, 800 ft. (= 240 m), VIII.1974, B. W. HAYWARD H 44.235 (AK 154.612).-- Coromandel Peninsula, Thames Co.: Slipper Island, VIII.1973, B. W. & Glenys C. HAYWARD (AK 160.764, 167.758).

Gisborne: Mt. Hikurangi, East Cape, c. 37°55'S, 178°04'E, c. 1200 m, 29.XII.1982, J. K. BARTLETT 27.003 (M).

South Island

Marlborough: Along the Waitohi River, 2 km south of Picton, on moist rocks in open woodland, 60 m alt., 3.V.1980, J. A. ELIX 7882 (ANUC).

Nelson: Roding River, saxicolous on ultramafic rock, 28. VIII.1981, J. K. BARTLETT 24579 a (M).-- Kaihoka Lakes, 40°31'S, sea-level, 12.XII.1982, J. K. BARTLETT 22.882 (M), 22.883 (M).-- Xenascus Peak, Upper Cobb Valley, c. 1100 m, 15.XII.1983, J. K. BARTLETT 27.021 (M).

Porpidia albocaerulescens (Wulf.) Hertel & Knoph

HERTEL, Beih. Nova Hedwigia 79: 433-434 (1984); HERTEL & KNOPH, Mitt. Bot. München 20: 467-488 (1984) - *Lecidea albocaerulescens* (Wulf.) Ach. Method. Lich. 52 (1803) - *Huilia albocaerulescens* (Wulf.) Hertel, Herzogia 3: 371 (1975); GALLOWAY, Fl. New Zeal. Lich. 186 (1985).

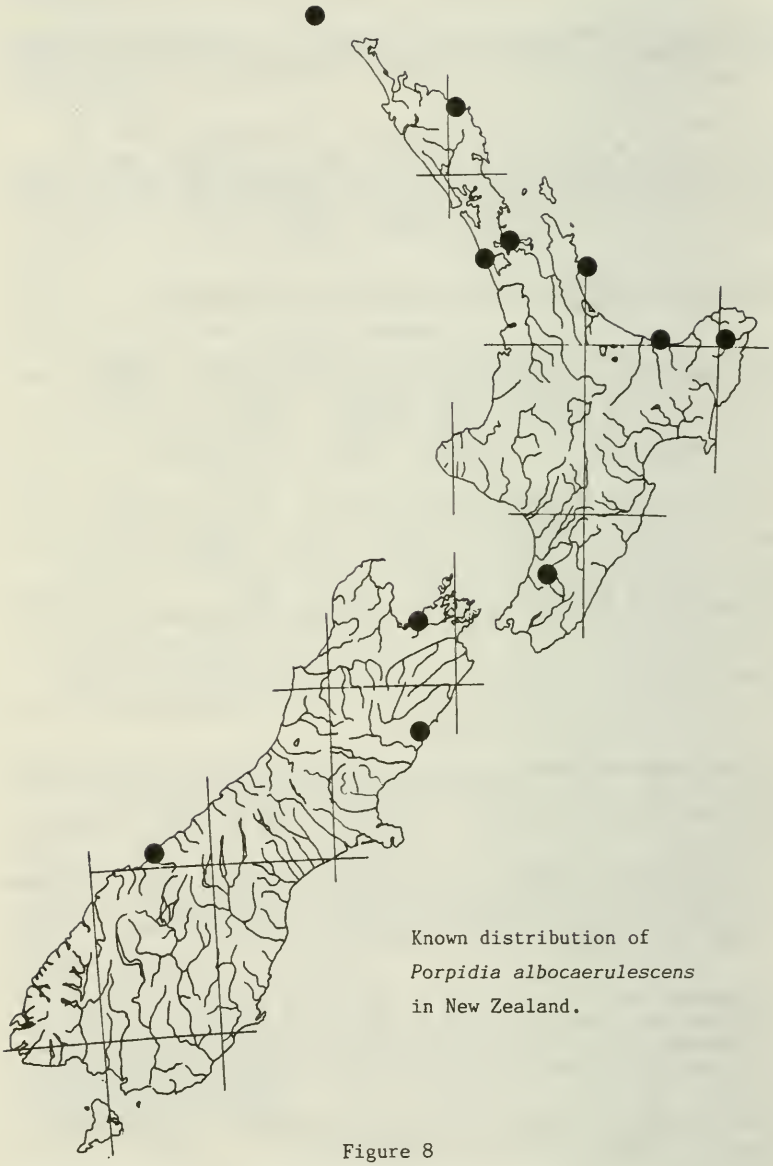
This is an often misunderstood species. Its characters and distribution are discussed in detail by HERTEL & KNOPH (1984), in which a number of New Zealand localities are given. It is not at all an alpine lichen; therefore the records "Otago (Rock and Pillar Range", and "... to 2000 m" (GALLOWAY 1985 p. 186) must be deleted, being based on misidentifications. *Porpidia albocaerulescens* may be confused with other species characterized by large, whitish (to grey) thalli, pruinose, often large apothecia, high hymenia, and large, halonate spores. The following key may help to separate this taxon:

1a Hypothecium dark-brown to black-brown, with stictic acid as the main lichen substance (confluentic acid and porphyrilic acid absent), spores 15-22-27 (-33) x 7,5-10-14 µm

2a Apothecia ± sunken (aspicilioid), always with pruinose discs, excipulum never turning red or violet with K, with an almost colourless to pale-brown interior part and thin hyphae (2-4 µm diam.): *Porpidia albocaerulescens*

2b Apothecia ± sessile, ± constricted at base, rarely pruinose, excipulum K- or K+ reddish-violet (unknown quinones), with a pale-brown, yellow-brown, or dark-brown interior part and thicker hyphae (4-9 µm diam.): *Porpidia macrocarpa*

1b Hypothecium colourless to pale yellowish, stictic acid absent, spores 12,5-22 x 5-8,5 µm



Known distribution of
Porpidia albocaerulescens
in New Zealand.

Figure 8

3a Excipulum with a green-black (epihymenium-like) margin and a colourless, translucent interior part, sometimes with porphyrilic acid, but usually without lichen substances: *Poeltiaria corralensis*

3b Excipulum with a brown-black (epihymenium-like) margin and a yellowish-grey, opaque interior part, with confluentic acid and 2'-O-methylperlatolic acid: *Poeltiaria turgescens*

New records (see fig. 8):

North Island

Auckland, Coromandel Peninsula, Thames Co.: Slipper Island, on grassland rocks, VIII.1973, B. W. & Glenys C. HAYWARD (AK 161.459, 161.465).-- Penguin Island, on maritime rocks, VIII.1973, B. W. HAYWARD H 49.159 (AK 155.043).

South Island

Westland: Coast near Haast River Mouth, Bruce Bay, sea-level, saxicolous on maritime rock, 18.IX.1981, J. K. BARTLETT 23.838 (M).

Porpidia crustulata (Ach.) Hertel & Knoph

HERTEL, Beih. Nova Hedwigia 79: 435 (1984) -- *Lecidea crustulata* (Ach.) Spreng. Syst. Veget., edit. 16, 4(1): 258 (1827) -- *Huilia crustulata* (Ach.) Hertel, Herzogia 3: 371 (1975); GALLOWAY, Fl. New Zeal. Lich. 186-187 (1985).

Only two collections of this species are mentioned in GALLOWAY's Flora (Wellington, Otago).

New records:

North Island

Auckland: Coromandel Peninsula: Coromandel Forest Park, Tapu-Coroglen road, 36°58'-59'S, 175°35'E, c. 450-500 m, sandstone rock near street, 11.I.1985, H. HERTEL (29.123) with P. BUCHANAN, H. MAYRHOFER & G. J. SAMUELS (M).

South Island

Nelson: Takaka Hill, on quartzite pebbles (erronously called "Marbel"), undated, W. MARTIN s.n. (CHR 407.422).

Southland: Catlins State Forest, c. 10-15 km NE of Quarry Hills, Tokanui - Owaka street, pebbles of road embankment, 12.II.1985, H. HERTEL (30.815) & H. MAYRHOFER (M, CHR).

Protoparmelia petraeoides (Nyl. ex Bab. & Mitt. in Hook.) Hertel

HERTEL, Beih. Nova Hedwigia 79: 452 (1984) -- *Lecidea petraeoides* Nyl. ex Bab. & Mitt. in HOOKER, Fl. Tasman. 2: 352, tab. CC, fig. D* (1860) -- *Lecidea petraeoides* Nyl. Enum. Gén. Lich. 125 (1858) nomen nudum.

New synonyms:

Lecidea subtenebrosa Nyl. Flora 49: 339-340 (1867); NYLANDER, Lich. Novae Zelandiae 104-105 (1888); ZAHLBRUCKNER, Catal. Lich. Univ. 3: 703 (1925); ZAHLBRUCKNER, Denkschr. Akad. Wiss. Wien, mat.-nat. Kl., 104: 307 (1941); GALLOWAY, Fl. New Zeal. Lich. 239-240 (1985). - Type: "Nova Zelandia, Otago, W. COLENSO, ex herb. JONES" (H-Nyl. 19.635, fragmentum holotypi).

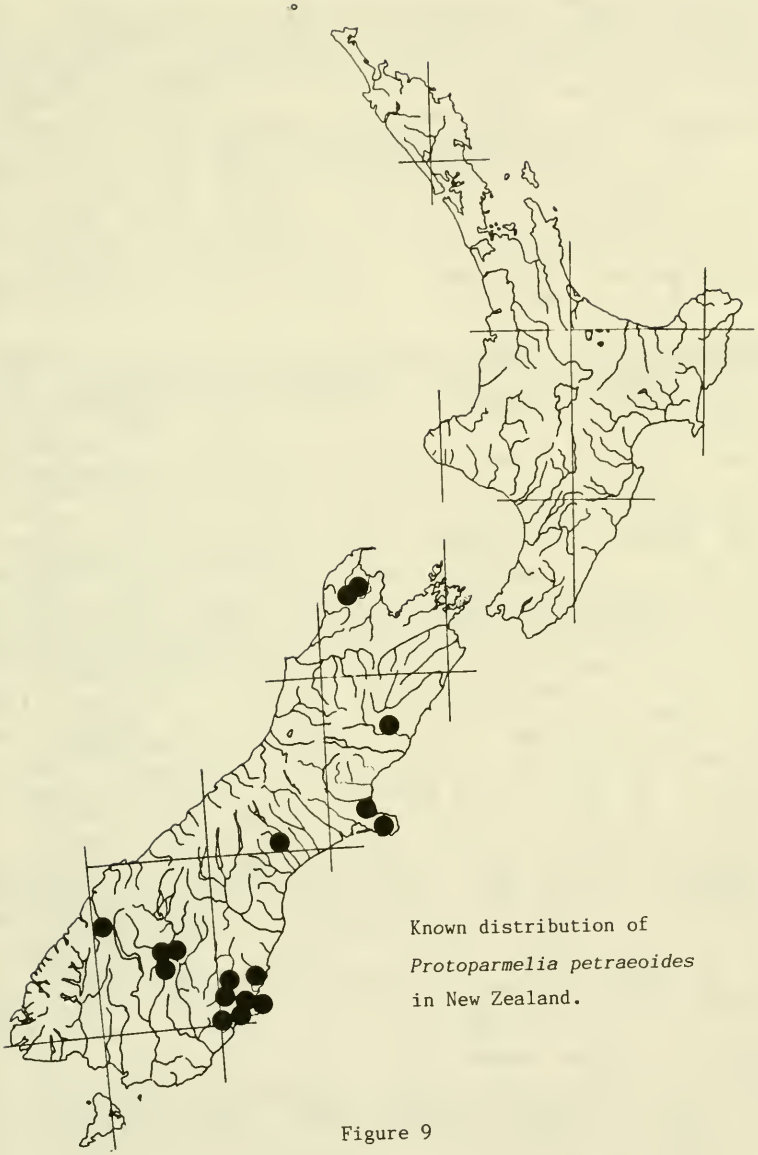
Lecidea myoplaca Zahlbr. Denkschr. Akad. Wiss. Wien, math.-nat. Kl., 104: 311-312 (1941); G. SCHNEIDER, Bibl. Lichenol. 13: 214-216 (1979); GALLOWAY, Fl. New Zeal. Lich. 212-213 (1985) (erroneously cited as a synonym of *Lecanora blanda* Nyl.) -- Type: New Zealand, Otago, Horse Range near Dunback, c. 600 m, on rock, J. S. THOMSON T 1428, ZA 3700 (W: holotype, BM: isotype).

Protoparmelia petraeoides is based on a specimen from Tasmania. It was known in southeastern Australia under the name *Lecidea aspidula* Krempelh. (e.g. ELIX & STREIMANN 1982: 78). It was reported for New Zealand from Otago, where it is, according to GALLOWAY (l.c. - under *Lecidea subtenebrosa*), "especially common on schist rocks of Central Otago".

New records (see fig. 9):

South Island

N. W. Nelson: Tasman Mts., Lonely Lake, c. 1270 m, 20.XII. 1983, J. K. BARTLETT 26.994 (M). -- Cobb Valley, schist saddle leading to Mt. Aorere, 1580 m, 8.XII.1981, J. K.



Known distribution of *Protoparmelia petraeoides* in New Zealand.

Figure 9

BARTLETT 22.832 e (M).

Canterbury: Hanmer Springs, along track to Dog Stream Waterfall, 42°30'S, 172°50'E, 450-470 m, on pebbles in rather open *Leptospermum* scrub, 27.XI.1980, L. TIBELL 9765 a (UPS).-- Castle Rock, Port Hills, Christchurch, 425 m, on exposed greywacke rocks, 6.II.1980, J. A. ELIX 6966, 6976, 6982 (all ANUC).-- Banks Peninsula, Devils Gap, 43°49'30"S, 172°49'30"E, exposed basaltic summit rocks, 670-710 m, 19.I.1985, H. HERTEL (29.698) with H. MAYRHOFER, C. D. MEURK & H. D. WILSON (M). -- Banks Peninsula, on outcropping siliceous rocks facing SE, 1.I.1981, L. TIBELL 10.168 (UPS).-- Mt. Peel, Lynn Stream Valley, Long Spur above Acland's Hut, 43°50'30"S, 171°11'E, c. 1000 m, exposed rock in *Chionochloa* grassland, 15.I.1985, H. HERTEL (29.454) with H. MAYRHOFER & B. P. J. MOLLOY (M).

Otago: Lamb Hill, Hindon, 400-600 m, 14.VI.1933, J. S. THOMSON 284 (OTA 029.448 - det. ZAHLBRUCKNER 1941: 307 as *Lecidea subtenebrosa* Nyl.).-- Flagstaff Hill near Dunedin, 45°50'S, 170°28'E, basalt rock outcrops near summit, 650 m, H. HERTEL 30.104 (M), 30.112 (M), 30.116 (M) & H. MAYRHOFER. - Flagstaff Hill, E sedl., 550 m, XII.1958, J. MURRAY 3695 (OTA). -- Abbott's Hill W of Dunedin, 42°52'30"S, 170°25'E, 340 m, basaltic rocks, 30.I.1985, H. HERTEL (29.977) with P. BANNISTER & H. MAYRHOFER (M, OTA).-- Pulpit Rock, Silver Peaks, 45°45'S, 170°26'30"E, 750 m, VIII.1959, J. MURRAY 4216 (OTA). -- Mt. Maungatua SW of Dunedin, 45°54'S, 170° 08'E, swampy summit plateau, schist rocks, exposed, 850-890 m, 31.I.1985, H. HERTEL 30.054 (M), 30.064 (M), 30.087 (M) with A. F. MARK & H. MAYRHOFER. -- 5-6 miles south of Sutton, Middlemarch-Mosgeil Road, c. 450 m, schist tor, 18.IX.1981, C. D. MEURK ML25 (herb. Meurk). -- Rock and Pillar Range, summit rocks, 1430-1445 m, 28.I.1985, H. HERTEL 32.264 (M), 32.276 (M) with A. F. MARK & H. MAYRHOFER. -- Rock and Pillar Range, on schist tors below summit, 1160-1190 m, 18.IX.1981, F. Joy WALKER & C. D. MEURK RP 17 (BM). Alexandra, on flat surface of schist rocks, 24.XII.1963, W. MARTIN (CHR 407.353, 407.420). -- Little Valley Road, 6 km from Alexandra, 45°17'S, 169°27'E, c. 460 m, 2.II.1985, H. HERTEL 30.244 (M, CHR), 30.234 (M) with P. CHILD & H. MAYRHOFER.-- Old Man Range, Obelisk, road to Fruitlands, 1200-1300 m, siliceous rock in tussock grassland, 45°20'S, 169°13'E, 6.XI.1981, V. WIRTH (11.294) & C. D. MEURK (STU).-- Old Man Range, 5000' (= 1520 m), III.1959, A. F. MARK (OTA). -- W Red Hut, Herbert S. F., 610 m, 8.VII.1970, P. CHILD 514 (herb. P. Child).

Southland: W. Dome, summit rock, 1230 m, 20.VI.1982, C. D. MEURK ML 23 (CHR). -- Fiordland, Key Summit (7 km SE of Mt. Christina, near Routeburn Track), 850-950 m, subalpine region, 44°47'S, 168°10'E, 11.XI.1981, V. WIRTH 11.230 (STU).

Rhizocarpon grande (Flk. ex Flot.) Arnold

ARNOLD, Flora 54: 149 (1871); FEUERER, Ber. Bayer. Bot. Ges. 49: 72, 88 (1978); GALLOWAY, Fl. New Zeal. Lich. 505 (1985) - *Lecidea petraea* α. *fuscoatra* C. *grandis* Flörke ex FLOTOW, Flora 11: 690 (1828).

GALLOWAY (l.c.) calls this lichen, recorded from Canterbury and Otago: "still very much undercollected".

New records:

South Island

Otago: Mt. Maungatua, SW of Dunedin, swampy summit plateau with scattered rocks, 45°54'S, 170°08'E, 850-890 m, 31.I. 1985, H. HERTEL (30.061) with H. MAYRHOFER & A. F. MARK (M).

Rhizocarpon superficiale (Schaer.) Vain.

RUNEMARK, Opera Bot. 2(1): 53-58 (1956); GALLOWAY, Fl. New Zeal. Lich. 506 (1985).

According to GALLOWAY's Flora there is only a single New Zealand record: "Summit of Bold Peak, Humboldt Mts., Otago, 1927, G. E. & Greta DU RIETZ".

New records:

South Island

Canterbury: Summit of Mt. Peel, 43°51'S, 171°09'E, exposed rocks, 1600 m, 1750 m, 16.I.1985, H. HERTEL 29.510 (1600 m) (M), 29.569 (1750 m) (M, CHR) with H. MAYRHOFER, C. D. MEURK, B. P. J. MOLLOY.

Westland: Mt. Haast, High Peak, 2950 m, exposed rock on ridge, 4.I.1967, R. G. CUNNINGHAME (CANU, herb. FINERAN no. 2445, named "*Rhizocarpon neozelandicum* Räs." by C. W. DODGE 1967).

Central Otago: Old Man Range, Obelisk Range, 45°19'S, 169° 12'E, exposed schist rocks of tors near summit, 1670 m, 3.II.1985, H. HERTEL 30.337 (M), 30.377 (M, BM, AK, CHR) with P. CHILD & H. MAYRHOFER.-- The Remarkables: Double Cone above Lake Alta, 45°04'S, 168°48'E, exposed rocks of

crest, 2280 m, 5.II.1985, H. HERTEL 30.431 (M), 30.432 (M), 30.437 (M), 30.445, 30.448 (M, CHR) & H. MAYRHOFER.

Five specimens (HERTEL 29.569, 30.431, 30.432, 30.445, 30.448) were chemically studied by TLC; always rhizocarpic, psoromic and stictic acids were found.

Rhizocarpon viridiatrum (Wulf.) Koerb.

RUNEMARK, Opera Bot. 2(1): 81-84 (1956); FEUERER, Ber. Bayer. Bot. Ges. 49: 81-82, 100 (1978); GALLOWAY, Fl. New Zeal. Lich. 507 (1985).

According to GALLOWAY (1985) there are only two records of this very characteristic, parasymbiotic (on species of *Aspicilia*) species from New Zealand (Canterbury), but he supposed it to be probably widerspread in the Southern Alps.

New records:

North Island

Auckland: Kawakawa Bay, Papanui Point, 36°56'S, 175°13'E, rocks of coastal cliffs, 12.I.1985, H. HERTEL (29.140) with H. MAYRHOFER & G. J. SAMUELS (M, AK).

South Island

Canterbury: Banks Peninsula, Devil's Gap, 43°49'30"S, 172° 49'30"E, exposed basaltic rocks near summit, 670-710 m, 19.I.1985, H. HERTEL (29.710) with H. MAYRHOFER, C. D. MEURK & H. D. WILSON (M, BM, CHR).-- Rangitata River Co.: Stew Point, 43°43'S, 171°05'E, volcanic rock outcrops on steep, sunny exposed slope, 17.I.1985, H. HERTEL (29.629) with H. MAYRHOFER, C. D. MEURK & B. P. J. MOLLOY (M).-- Mt. Peel area: Lynn Stream Valley, Long Spur above Acland's Hut, 43° 51'S, 171°11'E, 730-750 m, rock outcrops, 15.I.1985, H. HERTEL 29.423 (M, BM), 29.434 (M, CHR, AK) with H. MAYRHOFER & B. P. J. MOLLOY. - Bankside Scenic Reserve, Canterbury Plains, between Selwyn and Rakaia River, c. 6 km SSW of Dunsandel, 65 m, pebbles on ground in grassland area, 14.I.1985, H. HERTEL (29.235) with H. MAYRHOFER, C. D. MEURK & B. P. J. MOLLOY (M).

Otago: Summit of Silver Peak (Pulpit Rock), W of Waitati, 45°45'S, 170°26'30"E, schist rocks, 760 m, 29.I.1985, H. HERTEL (32.344) with G. T. S. BAYLIS & H. MAYRHOFER (M).-- Flagstaff Hill near Dunedin, 45°50'S, 170°28'E, rock outcrops

(basalt) near summit, c. 650 m, 1.II.1985, H. HERTEL (30.111) & H. MAYRHOFER (M).

Six specimens were studied chemically (HERTEL 29.140, 29.423, 29.629, 29.710, 30.111, 32.344). Besides rhizocarpic acid only in 29.629 and 29.710 traces of norstictic acid were found by TLC.

Tremolecia atrata (Ach.) Hertel

HERTEL, Khumbu Himal 6(3): 351-352 (1977); HERTEL, Beih. Nova Hedwigia 79: 458 (1984); GALLOWAY, Fl. New Zeal. Lich. 585-586 (1985).

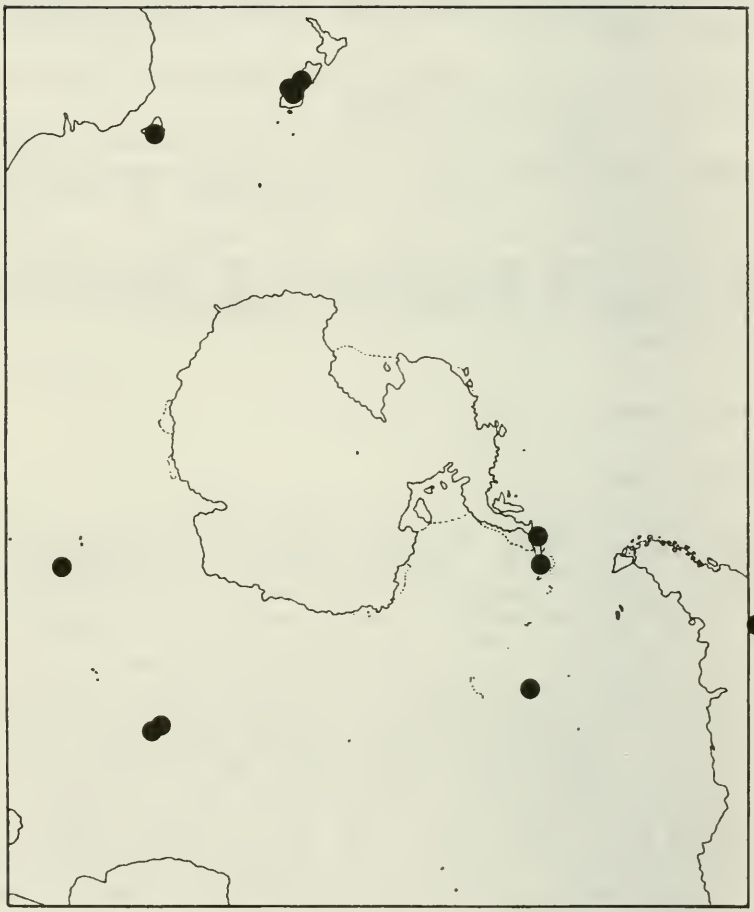
Only two records (Temple Peak 1830 m, Mt. Alack 2550 m) are mentioned in GALLOWAY's Flora. I was surprised to find this widespread species (see fig. 10) so rare in the areas we visited.

New records:

South Island

Westland: Mt. Haast, Col between West and Middle Peaks, 2955 m, on rocks of a ridge, 10.I.1967, B. A. FINERAN 2477 (CANU, small and poorly developed thalli as an admixture), 2481 (CANU, fine specimen, named "*Lecidea melastroma* Nyl." by C. W. DODGE).-- Mt. Haast, West Peak, summit, summit-rocks, 10.I.1967, B. A. FINERAN 2455 (CANU, small thalli as an admixture), 2463 (CANU, named *Lecidea melastroma* by DODGE).-- Mt. Haast, High Peak, 2950 m, summit rocks, 4.I. 1967, P. J. DOSSOR (CANU, herb. FINERAN 2452, poorly developed specimen); High Peak,exposed rock on ridge, 2950 m, 4.I. 1967, R. G. CUNNINGHAME (CANU, herb. FINERAN 2445).-- Mt. Alack Ridge, upper neve of Fox Glacier, 2550 m, site of Pioneer Hut, exposed rock on top of ridge, 11.I.1967, B. A. FINERAN 2363 (CANU), 2366 (CANU, fine specimen, named *Lecidea triangularis* H. Magn. by DODGE), 2377 (CANU, a very small specimen as an admixture), 2393 (CANU, fine specimen, named *Lecidea chalybeiza* Nyl. by DODGE).

Canterbury: Phipps Peak, Arthur Pass, rock near summit, 1890 m, 5.III.1966, B. A. FINERAN 2212 (CANU, small thalli as admixtures).-- Two Thumb Peak, Rangitata Valley, c. 43°30'S, 170°40'E, on stable broken rock at summit of High Peak, 2541 m, B. A. FINERAN 3030 (CANU), 3031 (CANU, small thallus as an admixture), 3034 (CANU), 3036 (CANU).



Known distribution of *Tremolecia atrata*
in the Subantarctic region

Figure 10

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