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Additions to the Rust Fungi of New Zealand—III

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Abstract

RUSTS recorded for New Zealand now total 171. Two new species and six species not previously recorded from New Zealand are described and illustrated. Sixteen new host records are given.

SINCE the publication of Additions to the Rust Fungi of New Zealand II (Baker, 1956), the following rusts and hosts have been collected, bringing the total for New Zealand to 171 species. Included in this number is *Puccinia iridis* (DC) Wallr. which was recorded on *Iris xiphium* L by Dingley and Brien (1956).

The writer wishes to thank Miss J. M. Dingley for her helpful advice, and Mr C. M. Smith, of Wellington, for the Latin descriptions of two species.

Coleosporium campanulae (Persoon) Leveille, Ann. Sci. Nat. 3: 8, 373, 1847.
(Text-fig. I, fig. 1.)

Uredo campanulae Pers. Syn. Fung. 217; 1801.

Uredo tremulosa campanulae Strauss, Ann. Wett. Ges. 2; 90; 1810.

Gaeoma campanularum Link. in Willd. Sp. Pl. 6; 16; 1825.

Peridermium rostrupi Ed. Fisch. Bull. Soc. Bot. Fr. 41; 171; 1894.

O, I. Not seen.

II. Uredosori hypophyllous, elliptical, to 0.5 mm long, often confluent, forming groups to 2 mm diameter, bullate, pulverulent, yellow at first, fading to white, becoming exposed by irregular splitting of the epidermis; spores elliptical, oblong-elliptical or ovate, 22–37 x 15–21 μ , average 29 x 17 μ ; epispore hyaline, 1–2 μ thick, finely and densely verrucose; germ pores obscure.

III. Not seen.

TYPE LOCALITY. Europe, on *Campanula* sp.

DISTRIBUTION. Europe, North America, Asia, New Zealand.

HOST. *Campanula persicifolia* L.

Wellington: Wanganui, March, 1937, E. E. Chamberlain. Auckland: Mt. Eden, July, 1958, J. M. Dingley.

Both host and rust are introduced. In Europe and North America the aecidial stage occurs on pines but no alternate host has yet been established for the fungus in this country.

Some of the forms of this rust on the various species of *Campanula* have been separated by Klebahn (1904) into biologically distinct races, but the specialization is not in any case sharply defined.

Coleosporium campanulae has apparently not become well established in New Zealand.

Puccinia gei McAlpine, Agr. Gaz. N.S.W. 6: 756; 1895. (Text-fig. I, fig. 2.)

O, I, II. Unknown.

III. Teleutosori amphigenous, scattered, orbicular, to 1 mm diameter, or in confluent groups to 2 mm diameter, seated on discoloured spots, chocolate brown, pulverulent, long covered, finally surrounded by the ruptured epidermis; spores elliptical, oblong-clavate or sub-clavate, $33\text{--}45 \times 13\text{--}18\mu$, average $38 \times 15\mu$; apex bluntly acuminate, thickened to 8μ , base attenuate, constricted at the septum, basal cell longer and narrower; epispore smooth, $2\text{--}3\mu$ thick in upper cell, $1.5\text{--}2.0\mu$ in lower cell, chestnut brown; pedicel hyaline, fragile, deciduous, to $50 \times 8\mu$; germ pore in upper cell apical or occasionally lateral, basal pore midway between septum and pedicel.

TYPE LOCALITY. Tasmania, on *Geum rei folium* F. v M.

DISTRIBUTION. Tasmania, New Zealand.

HOST. *Geum uniflorum* Buch.

Canterbury: Arthur's Pass, January, 1956, J. M. Dingley.

Geum uniflorum is an endemic species occurring in the South Island mountains. (Cheeseman, 1925, p. 503.) The rust, which is a Tasmanian species, is the only *Puccinia* recorded on indigenous Rosaceae.

Puccinia flavescens McAlpine, Proc. Linn. Soc. N.S.W. 28: 558; 1903. (Text-fig. I, fig. 3.)

Puccinia flavescens McAlp. Rusts Austr. 119; 1906.

O, I. Unknown.

II. Uredosori epiphyllous, linear, to 1.5 mm long, often confluent, pulverulent chestnut brown, soon naked, arranged along the furrows of the leaf; spores subglobose or obovate, $22\text{--}30 \times 19\text{--}25\mu$, average $25 \times 22\mu$; epispore pallid yellow, $1.5\text{--}2.0\mu$ thick, closely echinulate; germ pores 4-7, scattered.

III. Not seen.

TYPE LOCALITY. Australia, on *Stipa flavescens* Labill.

DISTRIBUTION. Australia, New Zealand.

Host. *Stipa variabilis* Hughes.

Canterbury: Amberley, April, 1950, A. J. Healy.

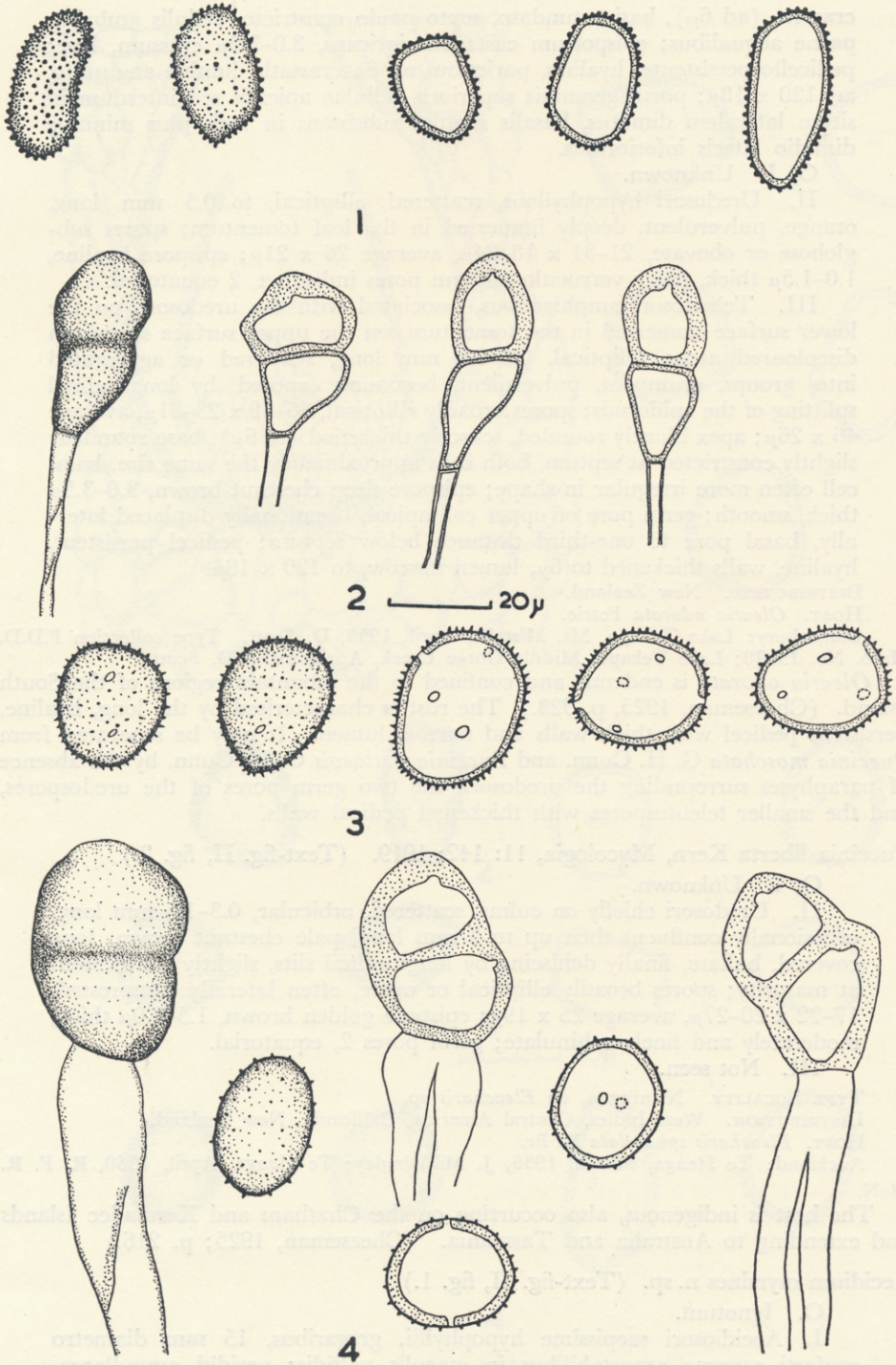
Both host and rust are introduced, the host being a native of Australia and first appearing in New Zealand in the Christchurch area (Allen, 1940). Although McAlpine (1906) states that the teleutospores are in-mixed with the uredospores, no teleutospores were found in the material examined.

Puccinia tekapo n.sp. (Text-fig. I, fig. 4.)

O, I. Ignota.

II. Uredosori hypophyllii, dispersi, ad 0.5 mm longi, aurantiaci, pulverulenti, penitus in tomentum foliae infossi; sporae subgloboasae vel obovatae, $21\text{--}31$ (26) $\times$ $18\text{--}24$ (21) μ ; episprium hyalinum, $1.0\text{--}1.5\mu$ crassum, subtiliter verrucosum, poris geominis duabus in circulo mediano, indistinctis.

III. Teleutosori amphigeni, intermixtis uredosoris inferne in tomentum infossi, elliptici, $0.2\text{--}0.5$ mm longi, dispersi, vel catervis aggregati, erumpentes, pulverulenti, fissuris longitudinalibus demum dehiscetes; sporae latae ellipticae, $36\text{--}49$ (46) $\times$ $23\text{--}31$ (26) μ , apice hebeti vix



TEXT-FIG. I.—Fig. 1—*Coleosporium campanulae* (Pers.) Lev. Uredospores. Fig. 2—*Puccinia gei* McAlp. Teleutospores. Fig. 3—*Puccinia flavesceus* McAlp. Uredospores. Fig. 4—*Puccinia tekapo* McNabb. Uredospores and Teleutospores.

crassato (ad 6μ), basi rotundato, septo paulo constricto, cellulis ambabus paene aequalibus; episorium castaneo-nigricans, $3.0-3.5\mu$ crassum, leve; pedicello persistente, hyalino, parietibus ad 6μ crassatis, lumine angustato, ad $120 \times 18\mu$; porus geominis superioris cellulae apicalis sed interdum in situm lateralem dimotus, basalis septum subsistens in locis plus minusve dimidio lateris inferioribus.

O, I. Unknown.

II. Uredosori hypophyllous, scattered, elliptical, to 0.5 mm long, orange, pulverulent, deeply immersed in the leaf tomentum; spores subglobose or obovate, $21-31 \times 18-24\mu$, average $26 \times 21\mu$; epispore hyaline, $1.0-1.5\mu$ thick, finely verruculose; germ pores indistinct, 2 equatorial.

III. Teleutosori amphigenous, associated with the uredosori, on the lower surface immersed in the tomentum, on the upper surface seated on discoloured areas, elliptical, 0.2–0.5 mm long, scattered or aggregated into groups, erumpent, pulverulent, becoming exposed by longitudinal splitting of the epidermis; spores broadly elliptical, $36-49 \times 23-31\mu$, average $46 \times 26\mu$; apex bluntly rounded, scarcely thickened (to 6μ), base rounded; slightly constricted at septum, both cells approximately the same size, basal cell often more irregular in shape; epispore deep chestnut brown, $3.0-3.5\mu$ thick, smooth; germ pore of upper cell apical, occasionally displaced laterally, basal pore to one-third distance below septum; pedicel persistent, hyaline, walls thickened to 6μ , lumen narrow, to $120 \times 18\mu$.

DISTRIBUTION. New Zealand.

HOST. *Olearia odorata* Petrie.

Canterbury: Lake Tekapo, Mt. Mistake, April, 1959, D. Scott. Type collection P.D.D. Herb. No. 19170; Lake Tekapo, Middle Gorge Creek, April, 1959, D. Scott.

Olearia odorata is endemic and confined to the mountain regions of the South Island. (Cheeseman, 1925, p. 928.) The rust is characterised by the long, hyaline, persistent pedicel with thick walls and narrow lumen. It may be separated from *Puccinia moschata* G. H. Cunn. and *Puccinia perlaevis* G. H. Cunn. by the absence of paraphyses surrounding the uredosori, the two germ pores of the uredospores, and the smaller teleutospores with thickened pedicel walls.

***Puccinia liberta* Kern, Mycologia, 11: 142; 1919. (Text-fig. II, fig. 2.)**

O, I. Unknown.

II. Uredosori chiefly on culms, scattered, orbicular, 0.3–1.5 mm long, occasionally confluent then up to 3 mm long, pale chestnut brown, long covered, bullate, finally dehiscing by longitudinal slits, slightly pulverulent at maturity; spores broadly elliptical or ovate, often laterally compressed, $17-22 \times 20-27\mu$, average $25 \times 19\mu$; epispore golden brown, $1.5-2.0\mu$ thick, moderately and finely echinulate; germ pores 2, equatorial.

III. Not seen.

TYPE LOCALITY. Nicaragua, on *Eleocharis* sp.

DISTRIBUTION. West Indies, Central America, California, New Zealand.

HOST. *Eleocharis sphacelata* R. Br.

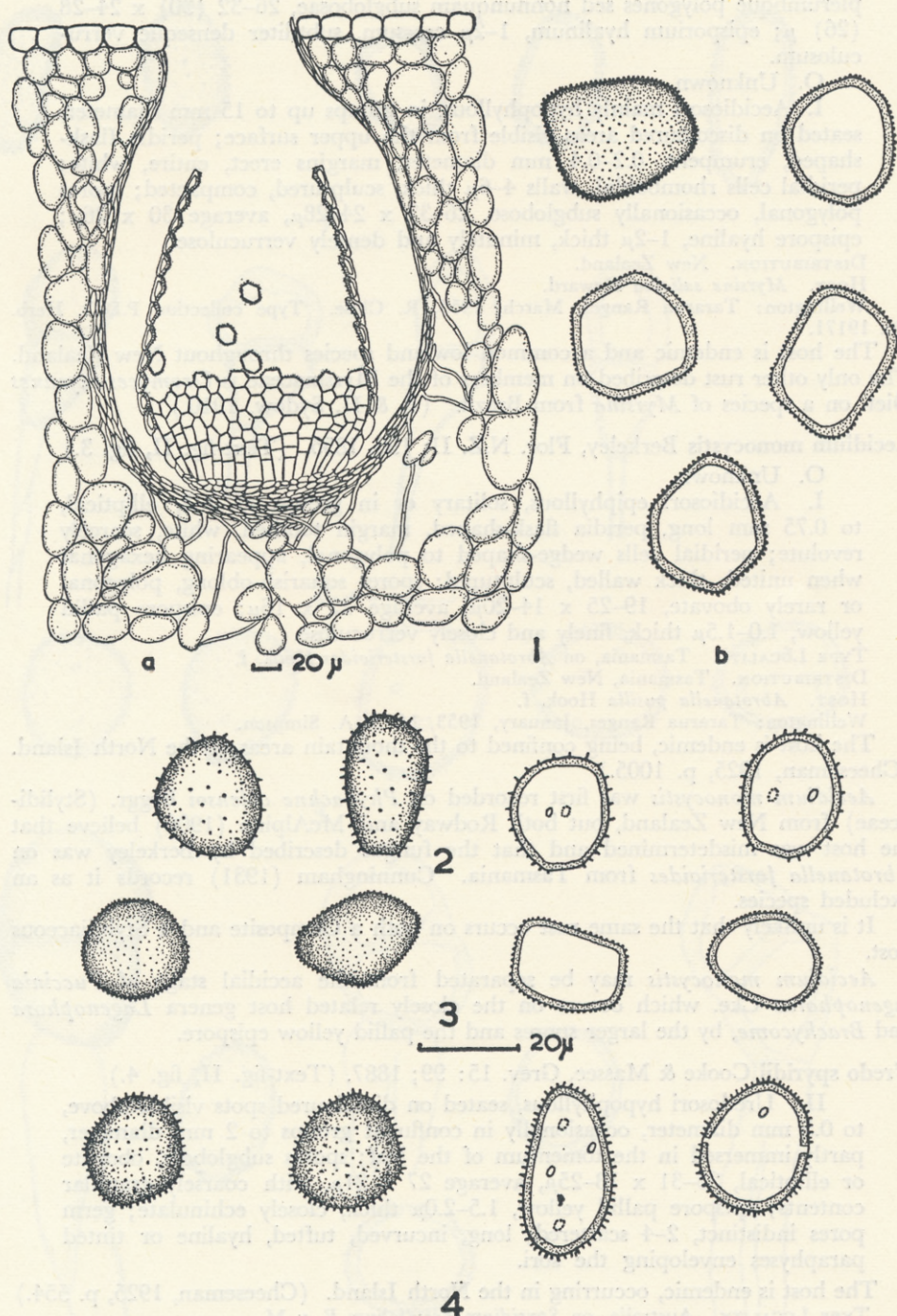
Auckland: Te Henga, March, 1956, J. M. Dingley; Te Henga, April, 1960, R. F. R. McN.

The host is indigenous, also occurring on the Chatham and Kermadec Islands and extending to Australia and Tasmania. (Cheeseman, 1925; p. 216.)

***Aecidium myrsines* n. sp. (Text-fig. II, fig. 1.)**

O. Ignotum.

I. Aecidiosori saepissime hypophyllii, gregaribus, 15 mm diametro conferti superne aspectabilibus in maculis pallidis; peridid ampullacea, erumpentia, 0.2–0.4 mm lata, marginibus erectis, integris, albidis; cellulae peridiales rhomboidales, parietibus $4-6\mu$ crassis, sculptis, compressis; sporae



TEXT-FIG. II.—Fig. 1—*Aecidium myrsines* McNabb. a, Aeciosorus. b, Aecidiospores. Fig. 2—*Puccinia liberta* Kern. Uredospores. Fig. 3—*Aecidium monocystis* Berk. Aecidiospores. Fig. 4—*Uredo spyridii* Cke. & Mass. Uredospores.

plerumbque polygones sed nonnunquam subglobosae, 26–32 (30) $\times$ 24–28 (26) μ ; episporium hyalinum, 1–2 μ crassum, subtiliter denseque verruculosum.

O. Unknown.

I. Aecidiosori mainly hypophyllous, in groups up to 15 mm diameter, seated on discoloured areas visible from the upper surface; peridia flask-shaped, erumpent, 0.2–0.4 mm diameter, margins erect, entire, white; peridial cells rhomboidal, walls 4–6 μ thick, sculptured, compacted; spores polygonal, occasionally subglobose, 26–32 $\times$ 24–28 μ , average 30 $\times$ 26 μ ; epispore hyaline, 1–2 μ thick, minutely and densely verruculose.

DISTRIBUTION. New Zealand.

Host. *Myrsine salicina* Heward.

Wellington: Tararua Ranges, March, 1955, R. Close. Type collection P.D.D. Herb. No. 19171.

The host is endemic and a common lowland species throughout New Zealand. The only other rust described on members of the Myrsinaceae is *Uromyces myrsines* Diet. on a species of *Myrsina* from Brazil. (P. & H. Sydow, 1910.)

Aecidium monocystis Berkeley, Flor. N.Z. II: 196, 1855. (Text-fig. II, fig. 3.)

O. Unknown.

I. Aecidiosori epiphyllous, solitary or in groups of 2–3, elliptical, to 0.75 mm long, peridia flask-shaped, margin toothed, white, scarcely revolute; peridial cells wedge-shaped to polygonal, appearing hexagonal when united, thick walled, sculptured; spores squarish-oblong, polygonal or rarely obovate, 19–25 $\times$ 14–20 μ , average 22 $\times$ 16 μ ; epispore pallid yellow, 1.0–1.5 μ thick, finely and closely verruculose.

TYPE LOCALITY. Tasmania, on *Abrotanella forsterioides* Hook. f.

DISTRIBUTION. Tasmania, New Zealand.

Host. *Abrotanella pusilla* Hook. f.

Wellington: Tararua Ranges, January, 1953, M. J. A. Simpson.

The host is endemic, being confined to the mountain areas of the North Island. (Cheeseman, 1925, p. 1005.)

Aecidium monocystis was first recorded on *Phyllachne colensoi* Beggr. (Stylidiaceae) from New Zealand, but both Rodway and McAlpine (1906) believe that the host was misdetermined and that the fungus described by Berkeley was on *Abrotanella forsterioides* from Tasmania. Cunningham (1931) records it as an excluded species.

It is unlikely that the same rust occurs on both a Composite and a Stylidiaceous host.

Aecidium monocystis may be separated from the aecidial stage of *Puccinia lagenophorae* Cke. which occurs on the closely related host genera *Lagenophora* and *Brachycome*, by the larger spores and the pallid yellow epispore.

Uredo spyridii Cooke & Masee, Grev. 15: 99; 1887. (Text-fig. II, fig. 4.)

II. Uredosori hypophyllous, seated on discoloured spots visible above, to 0.5 mm diameter, occasionally in confluent groups to 2 mm diameter, partly immersed in the tomentum of the leaf; spores subglobose, obovate or elliptical, 23–31 $\times$ 18–25 μ , average 27 $\times$ 21 μ , with coarsely granular contents; epispore pallid yellow, 1.5–2.0 μ thick, closely echinulate; germ pores indistinct, 2–4 scattered; long, incurved, tufted, hyaline or tinted paraphyses enveloping the sori.

The host is endemic, occurring in the North Island. (Cheeseman, 1925, p. 554.)

TYPE LOCALITY. Australia, on *Spyridium parvifolium* F. v M.

DISTRIBUTION. Australia, Tasmania, New Zealand.

Host. *Pomaderris rugosa* Cheesem.

Auckland: Silverdale, July, 1955, F. W. Bartlett; Silverdale, August, 1955, F. W. Bartlett; Orere Point, September, 1956, J. M. Dingley.

NOMENCLATURAL CHANGES

Publications by overseas workers on the problems of rust nomenclature have necessitated changing the names of several rusts recorded from New Zealand by Cunningham (1931) and Baker (1956).

Uromyces viciae-fabae (Pers.) Schroet.

Previously recorded from New Zealand as *Uromyces fabae* (Pers.) de Bary by Cunningham (1931).

Jorstad (1958a) found that the type material in Persoon's herbarium contained both uredospores and teleutospores, so that the original specific name used by Persoon must take priority.

Puccinia allii Rud.

Previously recorded by Baker (1956) as *Puccinia porri* (Sowerby) Wint. Most modern workers now consider *Puccinia allii* to be a compound species embracing *P. porri* and *P. blasdalei* Diet. & Holw. (Jorstad, 1958b). Hitherto *P. porri* has been separated from *P. allii* by the former possessing cupulate aecidia and a higher proportion of mesospores to teleutospores. Moore (1959), however, calls the rust of *Allium sativum* *Puccinia allii*, and retains *P. porri* for the rust of *Allium cepa* and *A. porrum*.

Peristemma pseudosphaeria (Mont.) Jorst.

Formerly recorded as *Puccinia sonchi* Rob. by Cunningham (1931). Grove (1913) first discovered that the uredospores were produced in a peridium and that "the so-called paraphyses are really the upper part of a delicate imperfect peridium composed of hyaline pseudo-parenchyma cells". H. Sydow erected the genus *Peristemma* to include *Puccinia sonchi*.

The specific epithet "pseudosphaeria" was first applied by Montagne in 1840, and so must take priority over "sonchi" Roberge. In 1856, however, Montagne republished without alteration his description of *Puccinia pseudosphaeria*, calling it a new species and without referring to his earlier description, which is therefore generally overlooked. A full description of the rust, its synonymy, and its distribution is presented by Jorstad (1956).

ADDITIONAL HOST RECORDS

Caecoma kaiku G. H. Cunn. Host: *Parsonsia capsularis* R. Br.

Auckland: Whakarewarewa, June, 1945, C. M. Smith.

Puccinia caricina DC ex Jorst. Host: *Carex coriaceae* Hamlin.

Canterbury: Cass, March, 1959, P. Evans.

Puccinia coprosmae Cke. Host: *Coprosma pumila* Hook.

Three Kings Islands: North East King, December, 1955, P. J. Brook.

Puccinia coronata Cda. Host: *Agrostis tenuis* Sibth.

Auckland: Kawhia, December, 1947, A. J. Healy; Wellington: Upper Hutt, January, 1952, A. J. Healy.

Phalaris minor L.

Canterbury: Ashley River, January, 1957, A. J. Healy.

Puccinia distincta McAlp. Host: *Senecio cruentus* DC.

Southland: Invercargill, July, 1957, F. E. Wilkins. Canterbury: Riccarton, January, 1955, A. J. Healy.

Puccinia lagenophorae Cke. Host: *Lagenophora cuneata* Petrie.

Canterbury: Lake Tekapo, November, 1958, D. Scott.

Brachycome sinclairii Hook. f.

Canterbury: Lake Tekapo, December, 1958, D. Scott.

Puccinia punctata Link. Host: *Galium tenuicaule* A. Cunn.

Canterbury: Lake Tekapo, December, 1958, D. Scott.

- Puccinia unciniarum* Diet. & Neg. Host: *Uncinia uncinata* Kukenth.
Wellington: Upper Hutt, March, 1953, A. J. Healy.
- Puccinia whakatipu* G. H. Cunn. Host: *Anisotome carnosula* Cockayne & Laing.
Canterbury: Porter's Pass, January, 1960, W. R. Philipson.
- Uromyces armeriae* (Schlecht.) Lev. Host: *Armeria maritima* (Mill.) Willd.
Auckland: Remuera, September, 1956, J. M. Dingley. Wellington: Palmerston North.
December, 1957, G. N. Paulin.
- Uromyces edwardsiae* G. H. Cunn. Host: *Sophora tetraptera* Mill.
Southland: Dunsdale, February, 1958, E. G. Wilkins.
- Uromyces striatus* Schroet. Host: *Medicago arabica* Medic.
Auckland: Mt Albert, August, 1955, J. M. Dingley.
- Uromyces thelymitrae* McAlp. Host: *Thelymitra caesia* Petrie.
Wellington: Upper Hutt, December, 1952, A. J. Healy.
- Aecidium disciforme* McAlp. Host: *Hebe brachysiphon* Summerh.
Canterbury: Cass, March, 1959, W. R. Philipson.
- Aecidium myopori* G. H. Cunn. Host: *Myoporum acuminatum* R. Br.
Hawke's Bay: Hastings, March, 1956, T. Conway.

LITERATURE CITED

- ALLAN, H. H., 1940. *Naturalized Flora of New Zealand*. D.S.I.R. Bulletin No. 83.
- BAKER, S. D., 1956. Additions to the rust fungi of New Zealand, II. *Trans. Roy. Soc. N.Z.* 83: 453-463.
- CHEESEMAM, T. F., 1925. *Manual of the New Zealand Flora*. Ed. 2., Wellington; Govt. Printer.
- DINGLEY, JOAN M., and BRIEN, R. M., 1956. New records of fungous diseases in New Zealand, 1955-56. *N.Z. J. Sci. Tech.* 38: 433-439.
- CUNNINGHAM, G. H., 1931. *The rust fungi of New Zealand*. Dunedin; John McIndoe.
- GROVE, W. B., 1913. *The British Rust Fungi*. Cambridge; The University Press.
- JORSTAD, I., 1956. On the *Sonchus* rust *Peristemma pseudosphaeria* (Mont.) n. comb. (Syn. *Puccinia sonchi* Rob.) *Friesia*. 5: 278-283.
- 1958a. Nomenclature notes, chiefly on Uredinales. *Nytt. Mag. Bot.* 6: 135-140.
- 1958b. Uredinales of the Canary Islands. *Skr. norske Vidensk Akad.* I, 1958, 2.
- KLEBAHN, H., 1904. *Die Wirtswechselnden Rostpilze*. Berlin; Gebr. Borntraeger.
- McALPINE, D., 1906. *The Rusts of Australia*. Melbourne; Govt. Printer.
- MOORE, W. C., 1959. *British Parasitic Fungi*. Cambridge; The University Press.
- SYDOW, P. & H., 1910. *Monographia Uredinearum*. 2: Leipzig; Gebr. Borntraeger.

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