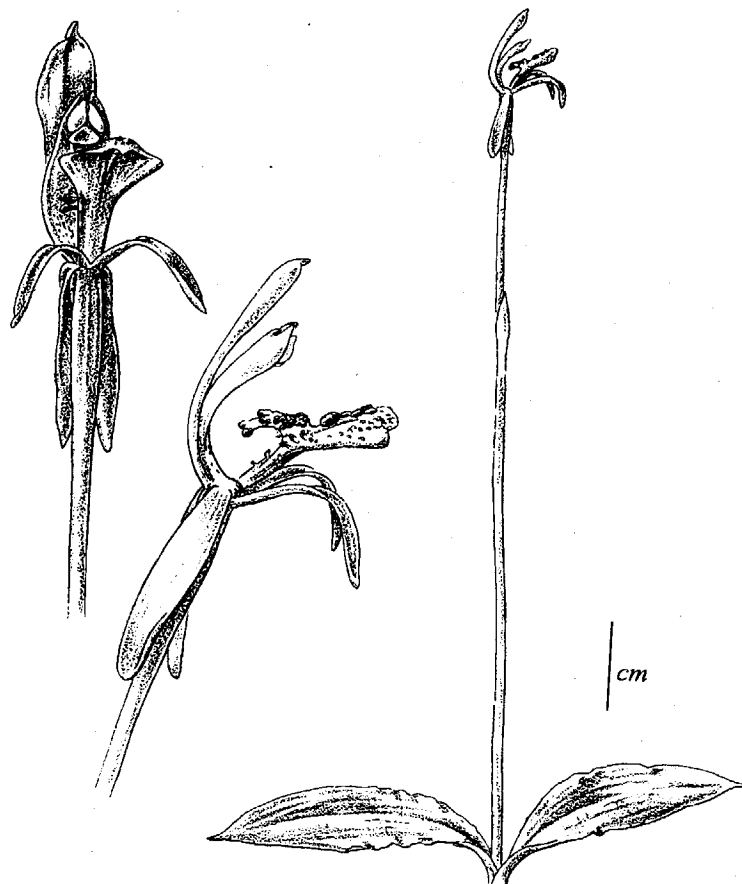


9.6 CATEGORY X AND PRESUMED EXTINCT PLANT PROFILES

Chiloglottis formicifera Fitz.

- Family:** Orchidaceae
- Endemic to:** Indigenous to New Zealand and Australia.
- Common name:** Ant orchid.
- Ranking:** X, Presumed Extinct. **In cultivation:** N.A.
- Descriptor:** A non-descript orchid, with two ovate green leaves (venation conspicuous) and a large flower, whose narrow petals are coloured green while the black or dark red-mottled labellum has a superficial resemblance to an ant.
- Conservancy:** (NL). Collected once in 1901 from near Kaitaia.
- Habitat:** In New Zealand the exact habitat preferences of this species are unclear. A few plants were found near an old pa in low scrub. They were never seen there again. In Australia this species and its close allies, *C. trapeziformis* and *C. truncata*, form a complex and all three taxa are extremely common in Australia in a variety of seral habitats.
- Threats:** A vagrant to New Zealand. This "species" complex is abundant in eastern Australia. Within New Zealand, it is reasonable to assume, from the herbarium evidence available, that this species was collected into extinction. As



most Australian *Chiloglottis* require specific insect pollination vectors, it is unlikely that this orchid would establish itself further if it were to recolonise New Zealand again.

Work undertaken to date

Some opportunistic survey within the far North of New Zealand. As this species is a vagrant to New Zealand, under no threat in Australia, where it is abundant, survey within New Zealand is not a conservation priority.

Priority sites for survey

Not a conservation priority.

Monitoring: objectives and priority sites

To be determined if and when this species is rediscovered.

Research questions

In Australia this species and its close allies, *C. trapeziformis* and *C. truncates*, form a complex whose identification at species level is often difficult. The New Zealand collections, while currently attributed to *C. formicifera*, are probably *C. trapeziformis*. Further research into this matter is required.

Management needs

To be determined if and when this species is rediscovered.

Selected references

de Lange, P.J.; Molloy BPJ 1995 Vagrancy within New Zealand threatened orchids: what are our conservation priorities? *New Zealand Botanical Society Newsletter* 40: 13-14

Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.

***Dichelachne (a)* (CHR 514885A-C; Flaxbourne)**

- Family:** Poaceae
- Endemic to:** Kekerengu Ecological District.
- Common name:** -
- Ranking:** X, Taxonomically indeterminate. **In cultivation:** N.A.
- Descriptor:** A small, robust, tussock-forming grass with stiff, grey-green, rolled leaves overtopped by erect compact flower and seed heads. Tussocks usually retain much dead material.
- Conservancy:** (NM). Discovered in 1975 on coastal limestone hill country northwest of the Flaxbourne River mouth, South Marlborough. It has not been found at any other location.
- Habitat:** Coastal, dry, sunny, free-draining, open rocklands and debris slopes of blocky, siliceous limestone; especially disturbed ground.
- Threats:** Limestone quarrying is a current threat throughout the plant's range. Weeds may be a threat by stabilising substrate and occupying establishment sites.

Work undertaken to date

This *Deyeuxia* was rediscovered during a survey for it in November 1997. A cursory census has indicated there are several hundred individuals over a localised area. There has been a preliminary assessment of threats, and landowner liaison initiation.

Priority sites for survey

All sparsely vegetated areas of coastal limestone along the South Marlborough coast, especially Woodside Gorge, Weld Cone, north of the Flaxbourne River mouth beyond the current population, and Marfells Beach. Second priority sites are nearby, inland limestone openlands around Isolated Bill and Ben More.

Monitoring: objectives and priority sites

Monitoring the effects of current quarrying activity and weeds; and to determine whether there are grazing and other threats.

Research questions

Taxonomy needs to be resolved, including the relationship between this species and Australian *Deyeuxia*. Key environmental factors for seedling establishment, and the possible effect of weeds on population dynamics and sustainability, needs to be determined.

Management needs

To change the ranking and conservation status from extinct (Category X). Ongoing landowner liaison in an effort to secure the known population and minimise threats. Growing and propagating in cultivation.

Selected references

Edgar, E. 1995. New Zealand species of *Deyeuxia* P.Beauv. and *Lachnagrostis* Trin. (Gramineae: Aveneae). *New Zealand Journal of Botany* 33: 1-33.

***Lepidium obtusatum* Kirk**

- Family:** Brassicaceae
Endemic to: ?North Island.
Common name: -
Ranking: X, Presumed Extinct. **In cultivation:** N.A.
Descriptor: A creeping to semi-erect coastal cress, with crenate to coarsely-toothed leaves and conspicuous broad, shallowly-notched seed capsules (silicles).
Conservancy: (AU, WL). Manukau Heads (Karekare) (North Side, Auckland) and Entrance to Port Nicholson (Wellington). Most recent records: Wellington, ?1938-39, Auckland, 1914.
Habitat: Rock outcrops, rock stacks, boulder and shingle beach. May have been closely associated with tern and penguin colonies.
Threats: Collectors; coastal residential development; competition from weeds.

Work undertaken to date

Coastal Cress/Nau Recovery Plan has been published; Coastal Cress Recovery Group set up; all historic sites and potential habitat in the vicinity of the type locality (Wellington) have been surveyed. Some parts of the Manukau Heads and Karekare have been surveyed (not thoroughly).

Priority sites for survey

Waitakere Coast (Auckland), Te Ure O Kupe (Steeple Rock) and Fort Dorset Rocks (Wellington). Opportunistic survey.

Monitoring: objectives and priority sites

To be determined if and when this species is rediscovered.

Research questions

What is the relationship of *L. obtusatum* and its variants to *L. banksii*, *L. nesophilum* and *L. foliosum*?

Management needs

To be determined if and when this species is rediscovered.

Selected references

- Garnock Jones, P.J.; Norton, D.A. 1995. *Lepidium naufragorum* (Brassicaceae), a new species from Westland, and notes on other New Zealand coastal *Lepidium*. *New Zealand Journal of Botany* 33: 43-51.
- Norton, D.A.; de Lange, P.J.; Garnock-Jones, P.J.; Given, D.R. 1997. The role of seabirds and seals in the survival of coastal plants: lessons from New Zealand *Lepidium* (Brassicaceae). *Biodiversity and Conservation* 6: 765-785.
- Norton, D.A.; de Lange, P.J. 1999. *National Coastal Cress/Nau Recovery Plan*. Department of Conservation, Wellington.

***Leptinella filiformis* (Hook.f.) D.Lloyd et C.J.Webb**

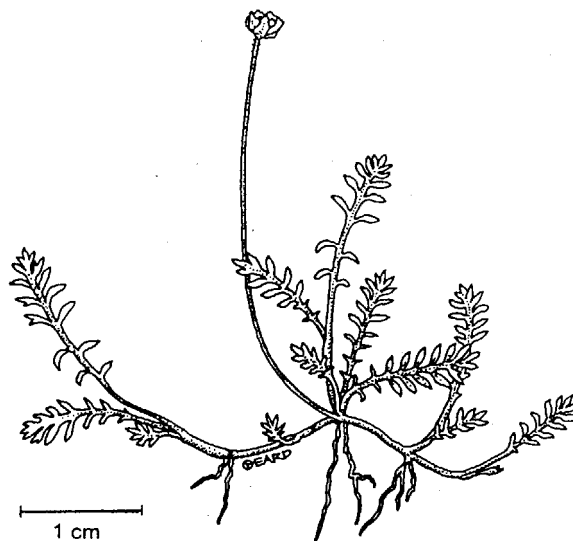
- Family:** Asteraceae
- Endemic to:** Northeast South Island.
- Common name:** Button daisy.
- Ranking:** X, Insufficiently Known. **In cultivation:** No.
- Descriptor:** A turf/mat forming daisy with a tight, creeping habit, small, fern-like, bright-green leaves and small, white flowers borne on thread-like petioles. Known information suggests *L. filiformis* is a basicole, favouring bare soils and lightly vegetated sites where competition is reduced.
- Conservancy:** North Canterbury Plains and Basins (Balmoral and Hanmer areas), and Langridge, Awatere Valley, South Marlborough.
- Habitat:** Seepages? and otherwise dry, alluvial terraces, plains, fans and basins in open short tussocklands. Collected once in the gravel of a Caravan Park.
- Threats:** Not known for sure, but likely to be degradation and loss of habitat by intensive farming, afforestation, weed invasion (especially hawkweeds and introduced grasses) and grazing animals. The current known site is threatened by redevelopment, and its survival here is doubtful without intervention. Natural succession will also make open habitats unsuitable for *L. filiformis*.

Work undertaken to date

Although there have been incidental finds of *L. filiformis* at new localities, there have been records of it for around 50 years, and it has recently been rediscovered in the Hanmer area. There has been limited information gathered about its biogeography and ecology. Lloyd (1972) described it as monoecious.

Priority sites for survey

Despite its Category X ranking, survey for *L. filiformis* is vital as there have been no recent, dedicated surveys for this species. Priority sites for survey are seeps, flushes and open drylands on the floor of the upper Awatere Valley, and in natural and semi-natural areas remaining on the Amuri, Hanmer, and Emu Plains.



Monitoring: objectives and priority sites

Monitor the Hanmer site for as long as possible to assess threats and population trends.

Research questions

What are the threats to the continued existence of *L. filiformis* in the wild?

Management needs

Negotiate with landowners of the Hanmer site to enable re-introduction once redevelopment has occurred; establish in cultivation for research, advocacy, and insurance purposes; and cultivate for transplanting back to the Hammer site and for translocation into wild sites, e.g. Culverden, Medbury, and Bankside Scientific Reserves, and into the Hanmer Field Centre, residents gardens, the local school, etc.

Selected references

- Lloyd, D.G. 1972a. A revision of the New Zealand, Subantarctic, and South American species of *Cotula*, Section *Leptinella*. *New Zealand Journal of Botany* 10: 277-372.
- Lloyd, D.G. 1972b. Breeding systems in *Cotula* L. (Compositae, Anthemideae). 1. The array of monoclinal and dichous systems. *New Phytologist* 71: 1181-1194.
- Lloyd, D.G. 1972c. Breeding systems in *Cotula* L. (Compositae, Anthemideae). 2. Monoecious populations. *New Phytologist* 71: 1195-1202.
- Lloyd, D.G. 1987. The reinstatement of *Leptinella* at generic rank, and the status of the 'Cotuleae' (Asteraceae, Anthemideae). *New Zealand Journal of Botany* 25: 99-105.
- Molloy, BPJ 1999 Notes on the rare button daisy *Leptinella filiformis* (Hook.f.) D.G.Lloyd & C.J.Webb. *New Zealand Botanical Society Newsletter* 55: 16-20.

***Logania depressa* Hook.f.**

- Family:** Loganiaceae
- Endemic to:** Waiouru area.
- Common name:** -
- Ranking:** X, Presumed Extinct. **In cultivation:** N.A.
- Descriptor:** A prostrate shrub with small white flowers, and leaves about 6 mm long. The plant form is superficially similar to *Coprosma perpusilla*.
- Conservancy:** (WG). Known only from William Colenso's original collection in 1846 in the vicinity of present day Waiouru. The site was possibly in the southern part of the Rangipo Desert or eastwards in a basin of the Moawhango Valley, perhaps in the area of the Moawhango Dam, or further east on flat, elevated sites south of the Three Kings Range.
- Habitat:** Probably an area of short-statured turf plants in a wet (possibly temporarily wet) hollow among red tussock (*Chionochloa rubra*) or hard tussock (*Festuca novae-zealandiae*) tussock-grassland.
- Threats:** The cause of the apparent extinction of *L. depressa* is unknown. The region where it apparently grew still retains much native vegetation and has many other indigenous species which are regionally or nationally uncommon. However, most of the vegetation is modified by past and/or present grazing by livestock, feral horses, deer, hares and rabbits, and by weeds, fires, topdressing, roading, and massive local changes associated with hydro-electric power development (canals and the Moawhango Dam).

Work undertaken to date

Many botanists have watched for this species during vegetation and plant surveys in the general area where it is presumed to have occurred. Since the 1970s, Tony Druce and others have made intensive surveys of turf communities of the Moawhango basins and surrounding open country, resulting in finds of many species not previously known in this region, or even in the North Island. Further finds of species with disjunct distributions were made in the region as recently as December 1996, which suggests that opportunistic surveys for *L. depressa* should still be maintained. Taxonomic revision of the genus *Logania* in Australia in 1997 confirmed *L. depressa* as being endemic to New Zealand.

Priority sites for survey

Rangipo Desert and Moawhango River basins in the southern Kaimanawa Range. Because many of the special plant species already known in this area are disjunct to the eastern South Island, especially central Otago, there is a possibility that *L. depressa* was also in the South Island - and might still be there.

Monitoring: objectives and priority sites

To be determined if and when this species is rediscovered.

Research questions

To be determined if and when this species is rediscovered.

Management needs

To be determined if and when this species is rediscovered.

Selected references

Oliver, WRB 1921 *Logania depressa*. *New Zealand journal of Science and Technology* 4: 263-265.

***Muellerina celastroides* (Schult.f. et J.H.Schult.bis) Tiegh.**

- Family:** Loranthaceae
- Endemic to:** Indigenous to New Zealand and Australia.
- Common name:** Mistletoe.
- Ranking:** Presumed Extinct. **In cultivation:** N.A.
- Descriptor:** A mistletoe with yellow-green to glaucous-green, ovoid, somewhat leathery leaves, and pendulous lemon-yellow flowers. The haustoria are external and multiple.
- Conservancy:** (NL). Collected from one site in the 1830s from the vicinity of Paihia, Bay of Islands. A fragment in Kew attributed to Colenso, was probably part of the same collection made originally by Raoul.
- Habitat:** In New Zealand, the single collection was said to have been made from the branches of a pohutukawa (*Metrosideros excelsa*). In eastern Australia, where this species is abundant, it is commonly associated with *Banksia* and *Casuarina* trees growing along river banks and estuaries.
- Threats:** A vagrant, this species has been collected once in New Zealand in the early 1830s and never seen again. It is unlikely that collectors were responsible for the loss of this species. It would seem that the lack of suitable host was a more significant factor in the apparent extinction of this species from New Zealand.

Work undertaken to date

Some opportunistic survey of large pohutukawa around the Bay of Islands. However, as this species is a vagrant to New Zealand, under no threat in Australia, where it is abundant, survey within New Zealand is not a conservation priority.

Priority sites for survey

Not a conservation priority.

Monitoring: objectives and priority sites

To be determined if and when this species is rediscovered.

Research questions

To be determined if and when this species is rediscovered.

Management needs

Depending on the circumstances, management may be necessary. The extent to which this is carried out can only be determined if and when this species is rediscovered.

Selected references

- de Lange, P.J.; Molloy, B.P. 1995 Vagrancy within New Zealand threatened orchids: what are our conservation priorities? *New Zealand Botanical Society Newsletter* 40: 13-14.
- de Lange, P.J.; Norton, D.A. (ed.). 1997. *New Zealand's loranthaceous mistletoes*. Proceedings of a workshop hosted by Threatened Species Unit, Department of Conservation, CASS 17-20 July 1995. Department of Conservation, Wellington.

***Myosotis laingii* Cheeseman**

- Family:** Boraginaceae
Endemic to: Balaclava Ecological District.
Common name: Forget-me-not.
Ranking: X, Presumed Extinct. **In cultivation:** N.A.
Descriptor: A forget-me-not with strap-like leaves, long leaf and inflorescence stalks, and large-petalled cream flowers.
Conservancy: (NM). South-west Marlborough, in the Lake Tennyson area in the upper Clarence River catchment, and collected from the Kaikoura Ranges.
Habitat: Limited information. River terraces.
Threats: Unknown.

Work undertaken to date

There has been a failed attempt to relocate *M. laingii* during a general ecological survey of the upper Clarence in 1988 as part of a PNA Programme of Balaclava Ecological District. Limited information has been gathered about its biogeography and ecology. The *Myosotis* genus is being revised by A. Robertson, Massey University.

Priority sites for survey

It is vital that a detailed survey for *M. laingii* is undertaken on the valley terraces and fans of the upper Clarence catchment, both above and below Lake Tennyson, including margins near the outlet and head of the lake.

Monitoring: objectives and priority sites

To be determined if and when this species is rediscovered.

Research questions

To be determined if and when this species is rediscovered.

Management needs

To be determined if and when this species is rediscovered.

Selected references

Pseudognaphalium* aff. *luteo-album

- Family:** Asteraceae
- Endemic to:** George Ecological District.
- Common name:** -
- Ranking:** X, Taxonomically indeterminate. **In cultivation:** N.A
- Descriptor:** Small, much-branched herb-daisy with narrow, deltoid leaved covered in white cottony hairs. The phyllaries are pale green.
- Conservancy:** (NM). Apparently confined to a wetland called "The Zoo" in the upper reaches of Nidd Stream, Clarence River, South Marlborough.
- Habitat:** Lowland, fertile wetland (swamp).
- Threats:** Unknown, but most likely to be habitat degradation caused by grazing and weed invasion, especially Californian thistle (*Cirsium arvense*) and Yorkshire fog (*Holcus lanatus*).

Work undertaken to date

This *Pseudognaphium* was discovered in 1975 by A.P. Druce in the headwaters of the Nidd Stream, where it was considered uncommon. Several subsequent attempts to relocate the species during cursory surveys has been unsuccessful. However, similar forms occur in the Yeo Stream. Limited information has been gathered about its biogeography and ecology. There has been no detailed survey undertaken for this species.

Priority sites for survey

A detailed survey of "The Zoo" wetland is vital. As the species may be a short-lived annual, the optimum time for survey is probably early summer.

Monitoring: objectives and priority sites

To be determined if and when this species is rediscovered.

Research questions

To be determined if and when this species is rediscovered.

Management needs

If rediscovered, the nature and degree of threats needs to be determined, and management directed to mitigate these.

Selected references

Druce, A.P.; Williams, P.A. 1989. Vegetation and flora of the Ben More-Chalk Range area of Southern Marlborough, South Island. *New Zealand Journal of Botany* 27: 167-199.

***Pterostylis nutans* R.Br.**

- Family:** Orchidaceae
- Endemic to:** Indigenous to New Zealand and Australia.
- Common name:** Nodding orchid.
- Ranking:** X, Presumed Extinct. **In cultivation:** Yes
- Descriptor:** A conspicuous terrestrial orchid, producing numerous green rosette leaves and a single flowering stem. The flower is rather large, and similar to our endemic hooded orchids except that it is curved in on itself, giving a pendulous appearance.
- Conservancy:** TT, (NL, AU).
- Habitat:** In New Zealand, this species has been collected from low scrub amongst grass near a World War II gun emplacement, and amongst leaf litter under podocarp trees. In Australia this common species occurs in a wide variety of seral and climax-community habitats, reaching its greatest abundance following fires.
- Threats:** Plant collectors; as a vagrant within the New Zealand flora this species remains naturally uncommon because it cannot set seed without its obligate insect pollination vector. This vector is not yet known from New Zealand. Without human intervention this species can only reproduce asexually. Thus it will eventually, over time, naturally die out.



Work undertaken to date

The rediscovery of this species in 1995 at Waihaha, west of Taupo, well south of its historic occurrences (Kaitaia 1910-1915, Castor Bay, Auckland North Shore, 1942), was made entirely by accident; opportunistic survey within Northland and Auckland.

Priority sites for survey

As this species is a vagrant to New Zealand, and under no threat in Australia where it is abundant, survey within New Zealand is not considered a high conservation priority.

Monitoring: objectives and priority sites

As this species is common in Australia, any monitoring in New Zealand is deemed to be of low priority.

Research questions

As this species is common in Australia, any research in New Zealand is deemed to be of low priority.

Management needs

As this species is common in Australia, any management in New Zealand is deemed to be of low priority.

Selected references

de Lange, P.J.; Molloy BPJ 1995 Vagrancy within New Zealand threatened orchids: what are our conservation priorities? *New Zealand Botanical Society Newsletter* 40: 13-14.

St George, I.; Irwin, B.; Hatch, D. 1996. *Field guide to the New Zealand orchids*. New Zealand Native Orchid Group, Wellington.

Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.

***Stellaria elatinoides* Hook.f.**

- Family:** Caryophyllaceae
Endemic to: Eastern North and South Islands.
Common name:
Ranking: X, Presumed Extinct. **In cultivation:** N.A.
Descriptor: A diminutive dark-green to grey-green annual, with narrow pointed leaves and inconspicuous green, apetalous flowers.
Conservancy: (EC/HB, CA, OT, ?SL). Collected in the 1840's from near Cape Kidnappers and Lake Rotoatara (long since drained), sparingly collected from near Ashburton, the Waitaki Valley, parts of Central Otago and possibly Southland. Most recent collection: Ashburton (1930).
Habitat: Uncertain. Has been collected from dry stony ground, around ephemeral pools, on eyots within braid rivers, and amongst *Raoulia monroi* and *Stellaria gracilentia* turf on river terraces.
Threats: This species appears to have always been uncommon. It may have succumbed to the gross habitat modification of the Hawke's Bay and Canterbury Plains, competition from weeds and possibly animal browse.

Work undertaken to date

Some opportunistic survey, especially within the Waitaki/Ashburton area has been undertaken.

Priority sites for survey

Our almost total ignorance of this species' life-cycle and exact habitat preferences is a serious problem for planning surveys. The historic distribution of this species suggests that it should and could still occur in other suitable locations along the eastern side of the North and South Islands e.g. Wairarapa, Marlborough. Suitable habitat still persists in the vicinity of Ashburton and Waitaki so plants may still survive there, and in similar habitat in the Wairarapa

and Marlborough areas. Patches in these areas containing scabweed are priorities for survey. People should be encouraged to look for this species as and when the opportunity arises within any potentially suitable habitat.

Monitoring: objectives and priority sites

This is dependent upon rediscovery. Any site containing the species would be a priority.

Research questions

Uncertain. Almost total ignorance of the ecology and in particular the species life-cycle and exact habitat preferences is a limitation.

Management needs

To be determined if and when this species is rediscovered.

Selected references

Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.



***Trilepidea adamsii* (Cheeseman) Tiegh.**

Family: Loranthaceae (in a genus of only one species).

Endemic to: North Island.

Common name: Adam's mistletoe

Ranking: X, Presumed Extinct.

In cultivation: No

Descriptor: A small, leafy shrub mistletoe, with somewhat fleshy, dark-green, leathery rhomboidal to ovate leaves, which had paler green or reddish undersurfaces. The large, long-tubular flowers opened greenish-yellow with red stripes, soon fading to a uniform pinkish-red. The berries were said to be red.

Conservancy: (NL, AU, WK.,?WG). Sparingly reported from Northland, Auckland, Coromandel and near Hamilton. One possible record from the vicinity of Wellington is held by the Paris Herbarium. Last collected from Sanatorium Hill, Cambridge in 1954.

Habitat: Primarily a lowland species (0-400m a.s.l.) restricted to coastal and lowland kauri (*Agathis australis*) forest. Recorded hosts include *Coprosma arborea*, other *Coprosma* species, *Myrsine australis*, and *Melicope ternata*. The species seems to have favoured seral habitats and probably had a high light requirement. Despite the large size of the flowers, flowering plants were not particularly conspicuous, and the species was said to be easily overlooked. Herbarium specimens, paintings and accounts provided by those who saw this plant, suggest it was never very common except, possibly, in one location near Thames.

Threats: Plant collectors; habitat loss; reduced seed dispersal. If the species still survives possums could be a threat. Recent suggestions that this species may have been bird-pollinated, and that the loss of suitable pollination vectors were a factor in this species decline, have yet to be supported with appropriate evidence.

Work undertaken to date

Individuals who saw this species have been interviewed, (herbarium) specimens examined and most historic sites surveyed. A paper detailing the results of this recent assessment is planned.

Priority sites for survey

Any location where the main hosts persist in coastal and lowland sites, and on possum-free northern islands especially the Barrier Islands and Waiheke. It is important that searches are conducted in sites where the host species are of long-



standing presence (>80 years), as these are more likely to carry *T adamsii* infections.

Monitoring: objectives and priority sites

To be determined if and when this species is rediscovered.

Research questions

To be determined if and when this species is rediscovered.

Management needs

To be determined if and when this species is rediscovered.

Selected references

de Lange, P.J.; Norton, D.A. (ed.). 1997. *New Zealand's loranthaceous mistletoes*. Proceedings of a workshop hosted by Threatened Species Unit, Department of Conservation, CASS 17-20 July 1995. Department of Conservation, Wellington.

Norton, D.A. 1991. *Trilepidea adamsii*: an obituary for a species. *Conservation Biology* 5:52-57.

9.7 PROFILES FOR OTHER SEVERELY THREATENED PLANTS

Atriplex billardierei agg.

- Family:** Chenopodiaceae
- Endemic to:** Indigenous to New Zealand and Australia.
- Common name:** Saltbush.
- Ranking:** O, Endangered. **In cultivation:** No.
- Descriptor:** Annual, succulent, coastal herb which forms low sandy mounds with only the tips of the branchlets showing. The leaves are covered in small, crystal-like balls.
- Conservancy:** NL, WL, (AU, BP, EC/HB, OT, SL).
- Habitat:** Beach strands (often associated with river mouths and also adjacent to promontories or where beach profiles are relatively stable).
- Threats:** Collectors; habitat loss (natural disturbance, recreational use of land); rabbit browse (North and South Islands).

Work undertaken to date

Survey in the North Island; monitoring and seed collection; survey of the south-east of the South Island imminent; taxonomic work; monitored and seed collected of Chatham material in 1996 for Canterbury University; germination trials of Northland and Chatham Island seed; comparison with Australian material; cytology determined; longevity of seed banks being resolved.

Priority sites for survey

Stewart Island; Shades Beach (Otago); Great Exhibition Bay (Northland).

Monitoring: objectives and priority sites

Ongoing on Chatham Islands to monitor long-term influences of weather factors, e.g. recent reported increase in northern storms in key habitat areas has produced a dramatic reduction of plants over previous years due to beaches being regularly completely inundated and reshaped.

Research questions

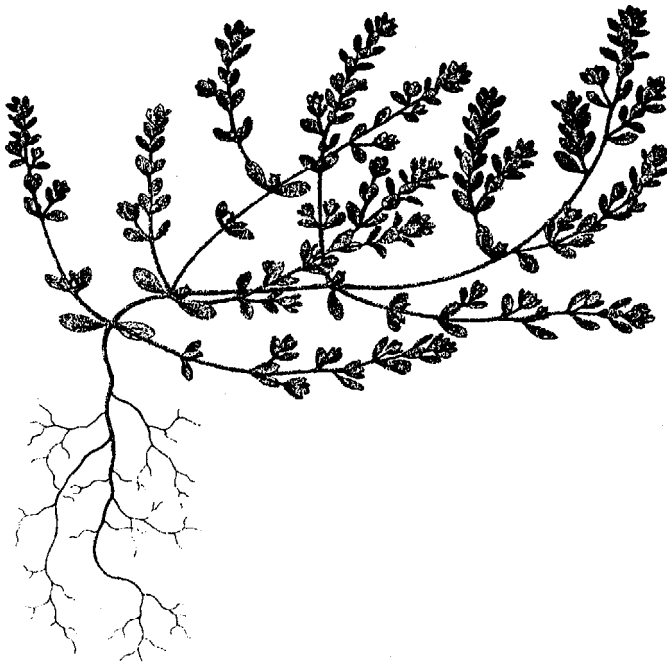
Taxonomic status being reviewed.

Management needs

Advocacy to mitigate collection, and with northern population beach users to mitigate habitat disturbance; rabbit control at sites; translocation to historical sites.

Selected references

- de Lange, P.J.; Murray, B.G.; Crowcroft, G.M. 1997. Chromosome number of New Zealand specimens of *Atriplex billardierei*, Chenopodiaceae. *New Zealand Journal of Botany* 35: 129-131.



***Brachyscome pinnata* Hook.f.**

Family: Asteraceae
Endemic to: Eastern South Island.
Common name:
Ranking: Unranked. **In cultivation:** Yes.
Descriptor: Diminutive daisy of lowland dry grasslands.
Conservancy: CA, (NM).
Habitat: Found on dry, low-altitude tussock grasslands .
Threats: Habitat loss; animal browse (though this is sometimes useful to open the habitat up); weed encroachment.

Work undertaken to date

None - just rediscovered after intensive survey of past habitats; confirmed as a good species.

Priority sites for survey

Some survey may be needed but has been done effectively in the past.

Monitoring: objectives and priority sites

Monitor population dynamics of all individuals.

Research questions

How is the habitat of *B. pinnata* best managed? What is the reproductive ecology of *B. pinnata*?

Management needs

Advocacy to alert people of threat and help locate new sites; establish in cultivation for research, advocacy, and insurance purposes; translocation into new sites within its range; population enhancement at current site: browse control as suggested by the results into research on habitat management; weed control at site.

Selected references

***Carex dolomitica* Heenan et de Lange**

Family: Cyperaceae

Endemic to: Mt Burnett, Collingwood.

Common name:

Ranking: Unranked, Vulnerable recommended.

In cultivation: Yes.

Descriptor: Robust, channel-leaved sedge with persistent inflorescences.

Conservancy: NM.

Habitat: Dolomite and dolomite marble solution karren and hogsbacks.

Threats: Habitat destruction and degradation due to quarrying and weed encroachment.

Work undertaken to date

Taxonomic status resolved; habitat surveyed.

Priority sites for survey

Other nearby dolomite and dolomite marble occurrences in the adjacent Kahurangi National Park.

Monitoring: objectives and priority sites

Population dynamics of the three main populations, and to see if there is establishment on quarry sites.

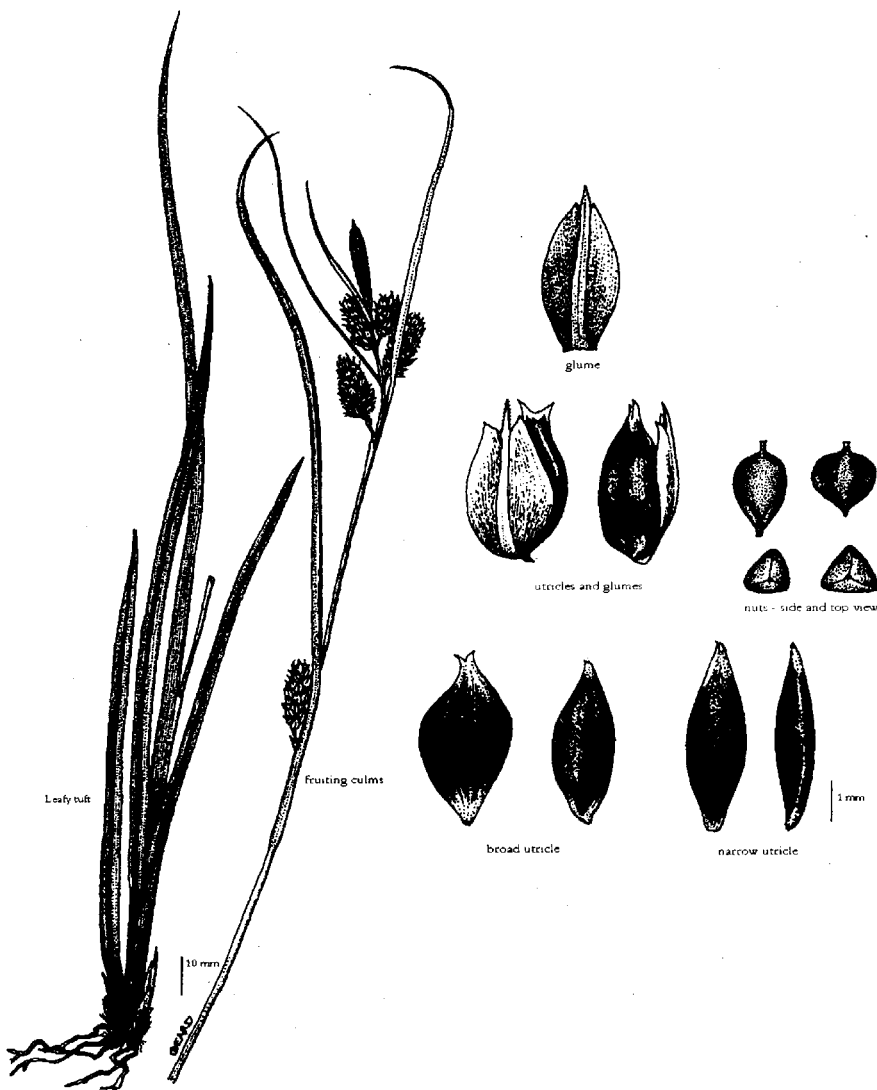
Research questions

Management needs

Reduction of quarrying; weed control at sites.

Selected references

Heenan, P.B.; de Lange, P.J. 1997. *Carex dolomitica* (Cyperaceae), a new and rare species from New Zealand. *New Zealand Journal of Botany* 35: 423-428.



***Carex tenuiculmis* (Petrie) Heenan et de Lange**

Family: Cyperaceae

Endemic to: South, Stewart, and Chatham Islands.

Common name: Red-leaved swamp sedge.

Ranking: I, Insufficiently Known, Endangered recommended.

In cultivation: Yes.

Descriptor: A medium sized, red-leaved, tussock-forming sedge with pendulous inflorescences.

Conservancy: WL, NM, CA, OT, SL.

Habitat: Pool edges, mesotrophic wetlands, fertile swamps, and adjacent palustrine shrublands in continually damp flushes, and margins of small streams and slow-moving pools of water.

Threats: Habitat degradation due to drainage, and land development; naturally sparse populations make *C. tenuiculmis* vulnerable to catastrophic events; competition from invasive weeds; grazing and trampling by stock.

Work undertaken to date

Publication on taxonomy and ecology; limited survey.

Priority sites for survey

Opportunistic survey throughout its range, especially northern Southland/Te Anau.

Monitoring: objectives and priority sites

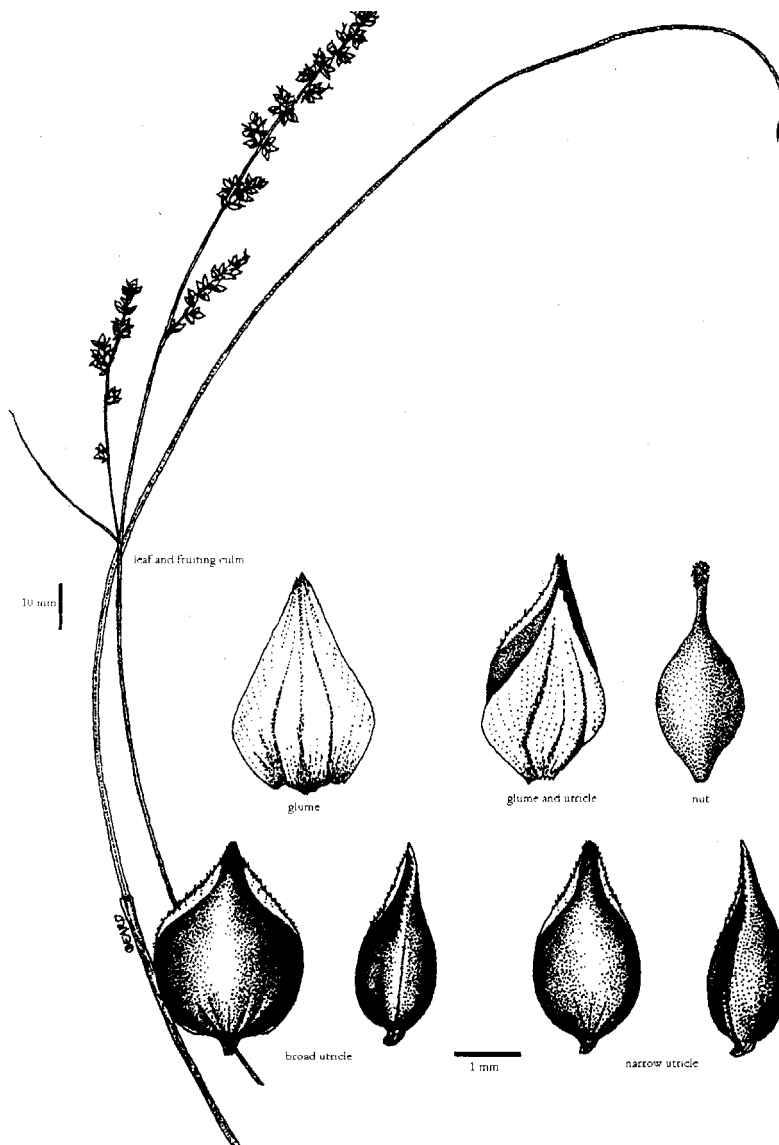
Research questions

Management needs

Protection of sites by securing legally protected land; weed control at sites; advocacy with landowners to prevent stock damage.

Selected references

Heenan, P.B.; de Lange, P.J.; Murray B.G. 1997 *Carex tenuiculmis* comb et stat. nov. (Cyperaceae), a threatened red-leaved sedge from New Zealand. *New Zealand Journal of Botany* 35:159-165.



***Carmichaelia hollowayi* G.Simpson**

Family: Fabaceae
Endemic to: St. Mary's Ecological District.
Common name: Holloway's broom.
Ranking: Taxonomically indeterminate, Endangered recommended.
In cultivation: Yes.

Descriptor: Rhizomatous, low-statured broom, with thick cladodes (stems). Flowers are purplish with yellowish, black-spotted reniform seeds.

Conservancy: OT.

Habitat: Limestone outcrops.

Threats: Quarrying; lack of recruitment (caused by seed predation by rats); animal browse; weed encroachment; lack of legal land protection.

Work undertaken to date

Taxonomic revision completed; survey, with only 54 plants located; monitoring of big population on private land, especially for threats by rodents; a South Island Native Broom Recovery Plan has been funded.

Priority sites for survey

Monitoring: objectives and priority sites

Continue monitoring effect of rabbit browse (lower Waitaki sites, Otago); population trends at Waitaki.

Research questions

Management needs

Advocacy to help mitigate habitat disturbance; animal control to prevent browse (especially of seeds); weed control (*Hieracium*, cocksfoot, festuca) at sites; secure legal land protection.

Selected references

- Heenan, P.B. 1996. A taxonomic revision of *Carinichaelia* (Fabaceae - Galegeae) in New Zealand (Part 11). *New Zealand Journal of Botany* 34: 157-177.
- Heenan, P.B. 1998. An emended circumscription of *Carmichaelia*, with new combinations, a key, and notes on hybrids. *New Zealand Journal of Botany* 36: 53-63.



***Carmichaelia vexillata* Heenan**

- Family:** Fabaceae
- Endemic to:** Eastern South Island.
- Common name:** -
- Ranking:** Unranked. **In cultivation:** No.
- Descriptor:** Red tipped, stout-stemmed, prostrate broom, whose flowers are a tall standard.
- Conservancy:** CA, OT, NM.
- Habitat:** Glacial tills (inter-montane basins), colluvial and alluvial terraces among tussock grassland and salt pans.
- Threats:** No recruitment due to *Hieracium* smothering; rabbit, hare, and stock browse; habitat destruction, especially by ploughing and oversowing.

Work undertaken to date

Taxonomic status resolved; a South Island Native Broom Recovery Plan has been funded.

Priority sites for survey

Awatere Valley, South Marlborough; survey likely areas in Otago; Mackenzie Basin.

Monitoring: objectives and priority sites

Monitor at known and new sites (based on results of survey) to track recruitment.

Research questions

How is *Hieracium* best controlled? What impact does rabbit and hare browse have on *C. vexillata*?

Management needs

Hieracium control at sites; browse control as suggested by the results of research into the effects of browse on *C. vexillata*; advocacy with the public to increase awareness in hope of finding new sites; advocacy to mitigate the effects of habitat destruction.

Selected references

- Heenan, P.B. 1995. A taxonomic revision of *Carmichaelia* (Fabaceae - Galegeae) in New Zealand (Part 1). *New Zealand Journal of Botany* 33: 455-475.
- Heenan, P.B. 1998. An emended circumscription of *Carmichaelia*, with new combinations, a key, and notes on hybrids. *New Zealand Journal of Botany* 36: 53-63.

***Hebe perbella* de Lange**

Family: Scrophulariaceae
Endemic to: Northwestern North Island.
Common name: Bartlett's hebe.
Ranking: Unranked, Vulnerable recommended.

In cultivation: Yes.

Descriptor: A shrub hebe, with firmly fleshy leaves, hairless ridged branchlets, violet-red to lilac flowers, with a rather short flower tube, and subacuminate seed capsules.

Conservancy: NL. Northland (West Coast only) from Ahipara south to Maungaraho Rock (Kaipara).

Habitat: Igneous rock (usually basic) outcrops, bluffs and along the margins of cliffs above narrow stream gorges. Occasionally extending into gumland scrub.

Threats: Habitat destruction and degradation through animal browse, weed encroachment (particularly pampas grasses and mist flower), recreational rock climbing (one site only), and collectors.

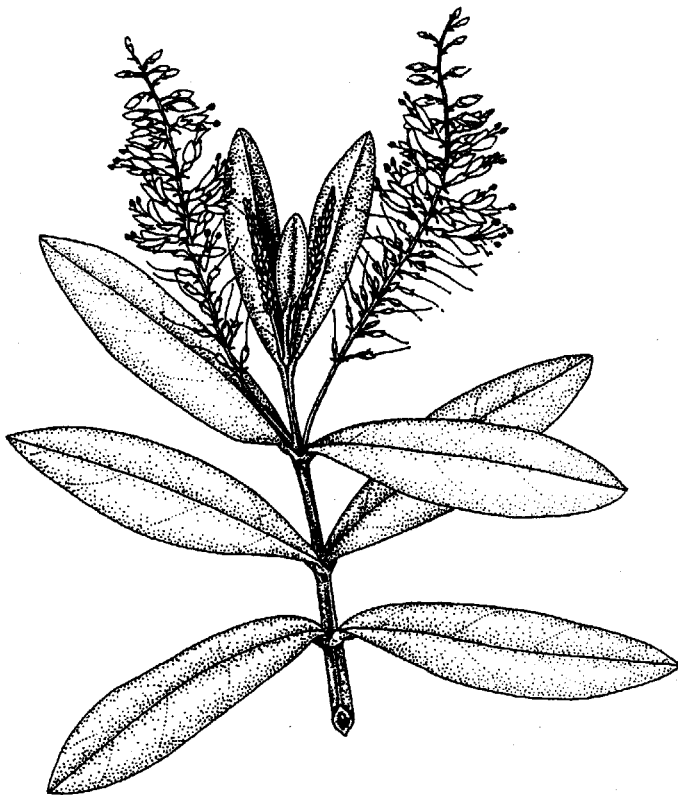
Work undertaken to date

Species taxonomically described; most populations surveyed and conservation status assessed.

Priority sites for survey

Warawara, Herekino and Tutamoe Ranges.

Monitoring: objectives and priority sites



Research questions

Management needs

Animal control to mitigate affects of browse and to reduce the risk of further weed invasions through spread by animals and associated habitat disturbance; weed control needs to be carried out as soon as possible in the Hauturu, Ahipara, and Maungaraho areas (the latter in conjunction with Kaipara District Council) before the spread of pampas grasses becomes unmanageable; advocacy plan required to deal with recreational rock climbing problem, and to mitigate collection; discussion with rock climbing company and Kaipara District Council over significance of Maungaraho Rock population of *Hebe perbella*.

Selected references

de Lange, P.J. 1998. *Hebe perbella* (Scrophulariaceae) - a new and threatened species from western Northland, North Island, New Zealand *New Zealand Journal of Botany* 36, 399-406.

Mazus novaezeelandiae* W.R.Barker subsp. *impolitus

Heenan

Family: Scrophulariaceae

Endemic to: North and South Islands.

Common name: Dwarf mazus, dwarf musk.

Ranking: Unranked, Vulnerable recommended.

In cultivation: Yes.

Descriptor: A mat-forming, stoloniferous, creeping herb with conspicuous white flowers, and dull brownish-green, glabrous leaves with a prominent brown margin.

Conservancy: NL, AU, WK, EC/HB, WG, WL, CA, OT, (BP, WC).

Habitat: Primarily confined to coastal dune slacks, and associated wetlands. In Central Otago subsp. *impolitus* grows in seepages on river flats.

Threats: Habitat degradation and destruction (dune slacks converted to pasture or exotic forestry; river flats drained, ploughed and over-sown): many populations occur on seriously degraded private land and are under imminent risk of extinction; weeds, especially pasture grasses and clovers, whose competitive edge over subsp. *impolitus* is accelerated by artificial fertilisers, by trampling of habitat by livestock, and addition of dung and urine, especially by cattle.

Work undertaken to date

Initial taxonomic revision of *Mazus* showed that New Zealand plants were endemic, and not the same as the Australian *M. pumilio* (Barker 1991). Heenan (1998) revisited the taxonomy of *M. novaezeelandiae*, and recognised a further subspecies and forma. The new subspecies, subsp. *impolitus* is the taxon reported on here.

Priority sites for survey

As a result of Heenan (1998), all known *Mazus* populations will need to be re-determination as to their identity, except for those populations studied during the taxonomic revision. Many herbarium specimens cannot be reliably separated into either subspecies (Heenan 1998).

Monitoring: objectives and priority sites

The moderate threat status advocated for subsp. *impolitus* by Heenan (1998) means that all sites deserve resurvey and monitoring. However, the need for this may not be as urgent as that suggested for subsp. *novaezeelandiae*. The Central Otago sites, which have not been confirmed recently, require urgent resurvey.

Research questions

Is grazing of subsp. *impolitus* sites harmful (trampling, increase of weed growth), or beneficial to the survival this taxon (keeping down rank pasture growth which would shade out subsp. *impolitus*)? Are there different effects of grazing in different places?

Management needs

Secure legal land protection of a range of sites spanning the distribution of the subspecies; fencing of some sites has resulted in losses through competition from grasses, and grazing experiments are needed to help resolve this issue; weed control at sites; advocacy to mitigate artificially raised fertility of sites and degradation by livestock.

Selected references

- Barker, W.R. 1991. A taxonomic revision of *Mazus* Lour. (Scrophulariaceae) in Australia. In Banks, M.R.; Smith, S.J.; Orchard, A.E.; Kantvilas, G. (eds). *Aspects of Tasmanian Botany - a tribute to Winifred Curtis*. Hobart, Royal Society of Tasmania. p. 85-94.
- Heenan, P.B. 1998. *Mazus novaezeelandiae* (Scrophulariaceae): taxonomy, distribution, habitats, and conservation. *New Zealand Journal of Botany* 36: 407-416.

***Mazus novaezeelandiae* W.R.Barker subsp. *impolitus* f. *hirtus* Heenan**

Family: Scrophulariaceae
Endemic to: Northern North Island.
Common name: Dwarf mazus, dwarf musk.
Ranking: Unranked, Endangered recommended.
In cultivation: Yes.

Descriptor: A mat-forming, stoloniferous, creeping herb with conspicuous white, lilac-tinged flowers, and hairy leaf margins.

Conservancy: NL, WK; EC/HB.

Habitat: Mainly in coastal areas, associated with wetlands and kahikatea forest.

Threats: Habitat degradation and destruction (dune slacks converted to pasture or exotic forestry; river flats drained, ploughed and over-sown); many populations occur on seriously degraded private land and are under imminent risk of extinction; weeds, especially pasture grasses and clovers, whose competitive edge over f. *hirtus* is accelerated by artificial fertilisers, by trampling of habitat by livestock, and addition of dung and urine, especially by cattle.

Work undertaken to date

Initial taxonomic revision of *Mazus* showed that New Zealand plants were endemic, and not the same as the Australian *M. pumilio* (Barker 1991). Heenan (1998) revisited the taxonomy of *M. novaezeelandiae*, and recognised a further subspecies and forma. The latter taxon is the one reported here.

Priority sites for survey

Suitable habitat in Northland, Auckland, Waikato, Bay of Plenty, and East Coast/Hawke's Bay Conservancies. As a form of subsp. *impolitus*, f. *hirtus* frequently occurs close to, or in direct association with, subsp. *impolitus*, thus surveys for either taxon can be conducted jointly.

Monitoring: objectives and priority sites

Foley's Bush, Kaitaia contains the largest known population of the f. *hirtus*, and is also the type locality for this taxon. Although the forest is now protected, fencing has allowed rank pasture to develop, so the f. *hirtus* is now thought to be on the decline. Monitoring of this population is vital.

Research questions

Throughout its range f. *hirtus* is under severe threat from weeds, and as this is a common theme to all *M. novaezeelandiae* populations (irrespective of taxonomic rank), developing a management methodology to reduce further losses is a key research area (see other *M. novaezeelandiae* plant profiles).

Management needs

Secure legal land protection of a range of sites; fencing of one site has resulted in losses through competition from grasses and grazing experiments are needed to help resolve this issue; weed control at sites; advocacy to mitigate artificially raised fertility of sites and degradation by livestock.

Selected references

Barker, W.R. 1991. A taxonomic revision of *Mazus* Lour. (Scrophulariaceae) in Australia. In Banks, M.R.; Smith, S.J.; Orchard, A.E.; Kantvilas, G. (eds). *Aspects of Tasmanian Botany - a tribute to Winifred Curtis*. Hobart, Royal Society of Tasmania. p. 85-94.

Heenan, P.B. 1998. *Mazus novaezeelandiae* (Scrophulariaceae): taxonomy, distribution, habitats, and conservation. *New Zealand Journal of Botany* 36: 407-416.

***Mazus novaezeelandiae* W.R.Barker subsp.
*novaezeelandiae***

- Family:** Scrophulariaceae
Endemic to: Central and Southern North Island.
Common name: Dwarf mazus, dwarf musk.
Ranking: Unranked, Critically Endangered recommended.
In cultivation: Yes.
- Descriptor:** A mat-forming, stoloniferous, creeping herb with conspicuous white or lemon-yellow flowers, and glabrous, shiny leaves.
- Conservancy:** WK, EC/HB, WG, WL.
- Habitat:** Confined- to kahikatea forest or in boggy pasture where kahikatea once grew. Very occasionally reported as a weed in bowling greens (these usually in the vicinity of former kahikatea forest).
- Threats:** Habitat degradation and destruction. Many populations occur on seriously degraded private land and are under imminent risk of extinction; weeds, especially pasture grasses and clovers, whose competitive edge over subsp. *novaezeelandiae* is accelerated by artificial fertilisers, by trampling of habitat by livestock, and addition of dung and urine, especially by cattle.

Work undertaken to date

Initial taxonomic revision of *Mazus* showed that New Zealand plants were endemic, and not the same as the Australian *M. pumilio* (Barker 1991). Heenan (1998) revisited the taxonomy of *M. novaezeelandiae*, and recognised a further subspecies and forma. The type subspecies is the taxon discussed here.

Priority sites for survey

Sites where earlier records exist but which have not been checked recently (e.g., Sutherland's Bush in Turakina Valley, Mercer Valley, Lower Waikato). As a result of Heenan (1998) all known *Mazus* populations will need to be re-determined as to their identity, except for those populations studied during the taxonomic revision. Many herbarium specimens cannot be reliably separated into either subspecies (Heenan 1998).

Monitoring: objectives and priority sites

The high threat status advocated for subsp. *novaezeelandiae* by Heenan (1998) means that all sites deserve resurvey and monitoring.

Research questions

Is grazing of subsp. *novaezeelandiae* sites harmful (trampling, increase of weed growth) or beneficial to the survival of this taxon (keeping down rank pasture growth which would shade out subsp. *novaezeelandiae*)? Are there different effects of grazing in different places?

Management needs

Secure legal land protection of a range of sites, e.g. Makara (type locality); fencing of some sites has resulted in losses through competition from grasses and grazing experiments are needed to help resolve this issue; weed control at

sites; advocacy to mitigate artificially raised fertility of sites and degradation by livestock.

Selected references

- Barker, W.R. 1991. A taxonomic revision of *Maxus* Lour. (Scrophulariaceae) in Australia. In Banks, M.R.; Smith, S.J.; Orchard, A.E.; Kantvilas, G. (eds). *Aspects of Tasmanian Botany - a tribute to Winifred Curtis*. Hobart, Royal Society of Tasmania. p. 85-94.
- Heenan, P.B. 1998. *Mazus novaezeelandiae* (Scrophulariaceae): taxonomy, distribution, habitats, and conservation. *New Zealand Journal of Botany* 36: 407-416.

***Myosotis laeta* Cheeseman**

- Family:** Boraginaceae
Endemic to: Nelson Ecological Region.
Common name: -
Ranking: Vulnerable, B recommended. **In cultivation:** No.
Descriptor: Prostrate, brown/green-leaved forget-me-not with a tall head of cream flowers.
Conservancy: N/M
Habitat: Open tussockland and shrubland on upland ultramafic substrates.
Threats: Only one known population, so susceptible to catastrophic events; collectors: prone to mechanical damage and loss from foot and vehicle traffic.

Work undertaken to date

Survey of Hills massif completed; Red Hills population rediscovered; population censused; monitoring set up for threats and changes in population dynamics and habitat; barrier erected to limit vehicular access; research on reproduction biology being undertaken by Massey University.

Priority sites for survey

Ultramafic melange outcrops along the Bryant Range, especially near Mt Stareall; further survey at southern end of the Red Hills.

Monitoring: objectives and priority sites

Continue monitoring population dynamics, habitat change, and threats.

Research questions

Why is *M. laeta* so range-restricted? What are the vegetation succession interactions? How is *M. laeta* maintained in cultivation?

Management needs

Possible translocation to Mt Stareall site if survey indicates loss from there; establish in cultivation for insurance against loss in the wild, and for advocacy and research purposes; possibly requires a more vehicle-proof barrier at Red Hills.

Selected references

***Myrsine argentea* Heenan et de Lange**

Family: Myrsinaceae
Endemic to: Burnett Range, Wakamarama Ecological District.
Common name: Dolomite mapou, Burnett mapou.
Ranking: Unranked, Vulnerable recommended.

In cultivation: Yes.

Descriptor: A suckering shrub to small tree, with a loosely divaricating habit, silvery-green, heart-shaped leaves, yellow flowers, and white fruit.

Conservancy: NM.

Habitat: Confined to dolomite and dolomite-marble karren-field and hogsbacks. Usually a component of the low shrubland associated with rock outcrops but also found on rock within silver beech forest.

Threats: Habitat degradation and destruction due to quarrying and weed encroachment (especially Mexican daisy, *Erigeron karvinskianus*).

Work undertaken to date

Taxonomy resolved at species rank; exact distribution on mountain surveyed.

Priority sites for survey

Other dolomite occurrences in Northwest Nelson, including Mt Arthur Tablelands; calcareous geology elsewhere on the Burnett Range.

Monitoring: objectives and priority sites

This taxon is locally abundant, and undergoing successful recruitment. Monitoring is only necessary to gauge the effects of quarrying and weeds on the population.



Research questions

Is *M. argentea* a dolomite obligate?

Management needs

Urgent measures need to be taken to prevent further habitat destruction and degradation by quarrying and the spread of Mexican daisy on to the dolomite outcrops.

Selected references

Fleenan, P.B.; de Lange, P.J. 1998. A new and remarkably local species of *Myrsine* (Myrsinaceae) from New Zealand. *New Zealand Journal of Botany* 36: 381-387.

***Pterostylis irwinii* D.L.Jones, Molloy et M.A.Clem.**

- Family:** Orchidaceae
Endemic to: Central North Island.
Common name: Greenhood.
Ranking: Unranked. **In cultivation:** Yes.
Descriptor: A tall, slender, grass-leaved, greenhood orchid with large, red-tinted, minutely hairy flowers.
Conservancy: TT, NM. Earlier known only from a single site at Erua, but recently confirmed at Takaka Hill (B.P.J. Molloy pers. comm. 1999).
Habitat: Amongst *Polystichum* and in a seasonal wetland with small trees and shrubs, e.g. *Coprosma wallii* and *Olearia virgata*.
Threats: Uncertain. Extremely uncommon (possibly naturally so). However, in recent years plants have become harder to find amongst the dense *Polystichum* fern. It is possible that plants are being shaded out through the aggressive growth of this fern. Flooding from the river may impact on the plants; flooding occurred in 1997 but the impacts have yet to be assessed.



Work undertaken to date

Species taxonomically described in 1997. Searches have been made for the species in the vicinity of the known site, and regular counts of plants have occurred in each of the last three years; *Polystichum* was trimmed back in October 1997.

Priority sites for survey

Uncertain. Virtually nothing is known about the ecology and habitat requirements of this orchid, which was only discovered in the mid 1990s.

Monitoring: objectives and priority sites

Research questions

What are the habitat requirements, autecology and population dynamics of *P. irwinii*? How does *P. irwinii* respond to the opening up of its habitat? What are the threats to *P. irwinii*?

Management needs

Research; threat mitigation once threats are established.

Selected references

Jones, D.L.; Molloy, B.P.J.; Clements, M.A. 1997. Six new species of *Pterostylis* R.Br. (Orchidaceae) from New Zealand. *The Orchadian* 12: 266-251.

***Pterostylis porrecta* D.L.Jones, Molloy et M.A.Clem.**

Family: Orchidaceae

Endemic to: North and South Islands.

Common name: Greenhood.

Ranking: Unranked, Vulnerable recommended.

In cultivation: No.

Descriptor: Terrestrial, narrow-leaved, greenhood orchid up to 20 cm tall, with solitary flowers whose lateral sepals are strongly decurved so that they point downwards.

Conservancy: EC/HB, NM.

Habitat: Uncertain. Known at present from two localities in modified primary and secondary conifer/broadleaved-hardwood forest, usually in shaded sites. At the North Island site, the orchid grows on soils derived from calcareous alluvium, while the South Island site alluvial soils are derived both from limestone and ultramafic substrata.

Threats: The two known populations are small and very vulnerable to unscrupulous plant collectors. Plants have been illegally removed in the past from the only known North Island site. Other threats have yet to be identified, as facets of this orchid's ecology, and its distribution are still poorly known. It may be that as this species is only known from lowland forest remnants, that it has declined through the destruction of these habitats in the past. *Pterostylis porrecta* was apparently first discovered in the mid-1980s, and aside from these few records it is otherwise not represented in New Zealand herbaria. This suggests that it may always have been a sparsely distributed species. Currently it has been recommended that this species be listed as "Vulnerable" on account of the lack of autecological information for the species and the small number of plants known (Jones et al. 1997).

Work undertaken to date

Pterostylis porrecta was formally described in 1997; prior to this it was widely known as *Pterostylis* aff. *graminea* (Cameron et al. 1995, St George et al. 1996). Although a very distinctive species, it is still only known from the two populations, despite wider ad hoc searches.

Priority sites for survey

Uncertain. The limited information available suggests that this species could occur anywhere in lowland sites on soils derived from base-rich substrates, e.g. the Roding Catchment, Nelson.

Monitoring: objectives and priority sites:

Jones et al. (1997) advocate a need to monitor the species at the two known sites. Very little is known about the species, and until further autecological information is obtained, determining appropriate management measures may prove difficult

Research questions

What are the exact habitat requirements of *P. porrecta*? Is it a naturally sparse species? What are the population dynamics of *P. porrecta*?

Management needs

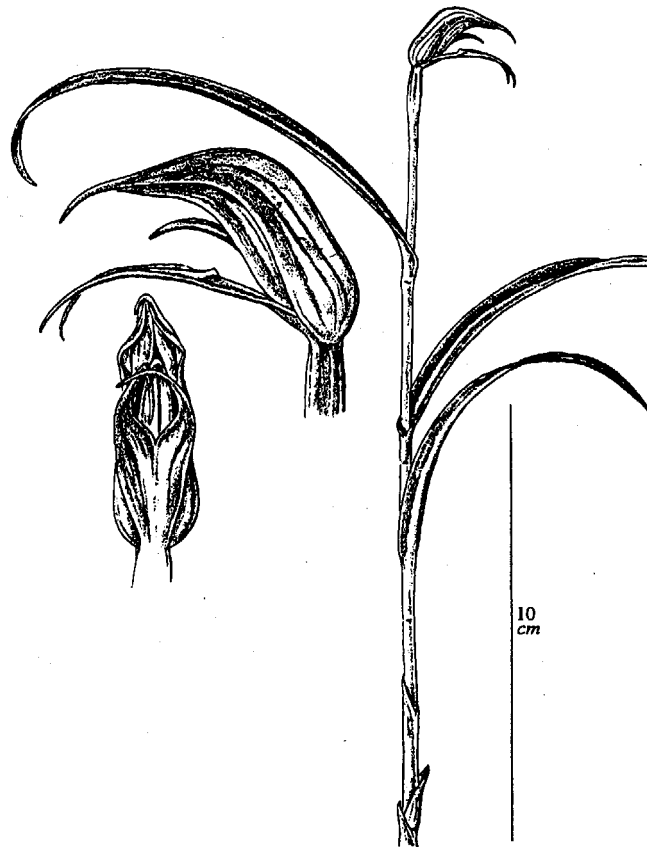
As an extremely local orchid this species is especially vulnerable to plant collectors. It is important that the locations of this species in the wild are regularly inspected to ensure that the populations are protected from this threat and other, natural stochastic factors, e.g., flooding and erosion.

Selected references

Cameron, E.K.; de Lange, P.J.; Given, D.R.; Johnson, P.N.; Ogle, C.C. 1995. New Zealand Botanical Society threatened and local plants lists (1995 revision). *New Zealand Botanical Society Newsletter* 39: 15-28.

Jones, D.L.; Molloy, B.P.J.; Clements, M.A. 1997. Six new species of *Pterostylis* R.Br. (Orchidaceae) from New Zealand. *The Orchadian* 12: 266-281.

St George, I.; Irwin, J.B.; Hatch, E.D. 1996. *Field guide to the New Zealand orchids*. New Zealand Native Orchid Group, Wellington.



***Pterostylis puberula* Hook.f.**

- Family:** Orchidaceae
Endemic to: New Zealand.
Common name: Dwarf greenhood.
Ranking: O, Critical. **In cultivation:** No.
Descriptor: A small plant with a basal rosette of silvery-green, trowel-shaped leaves. on narrowly-winged stalks, and hairs on the flower-stem.
Conservancy: NL, WK, (WL, NM, AU, BP). Recorded recently (1990) from North Cape and from several sites near Thames (1996, 199').
Habitat: Open, clay pans (especially gumlands and ultramafic sites), under low manuka scrub and on starved soils.
Threats: Habitat degradation and destruction (weed encroachment, pig rooting, natural succession); naturally small populations make them susceptible to catastrophic events; collectors.

Work undertaken to date

Cytology; taxonomy resolved - this species was previously incorporated in the Australian complex of *Pterostylis nana*, (hence the Category O listing in Molloy and Davis, 1994). In 1995 it was established that the New Zealand taxon was distinct from *P. nana* s.s., and the name for the New Zealand plant (*P. puberula*) was revived; breeding ecology, and mycorrhizae studied; suitable sites surveyed in the North Island (Northland, Auckland, Waikato, Wellington); monitoring of known populations.

Priority sites for survey

All historical sites.

Monitoring: objectives and priority sites

Photograph sites to determine population trends in Kauaeranga Valley.

Research questions

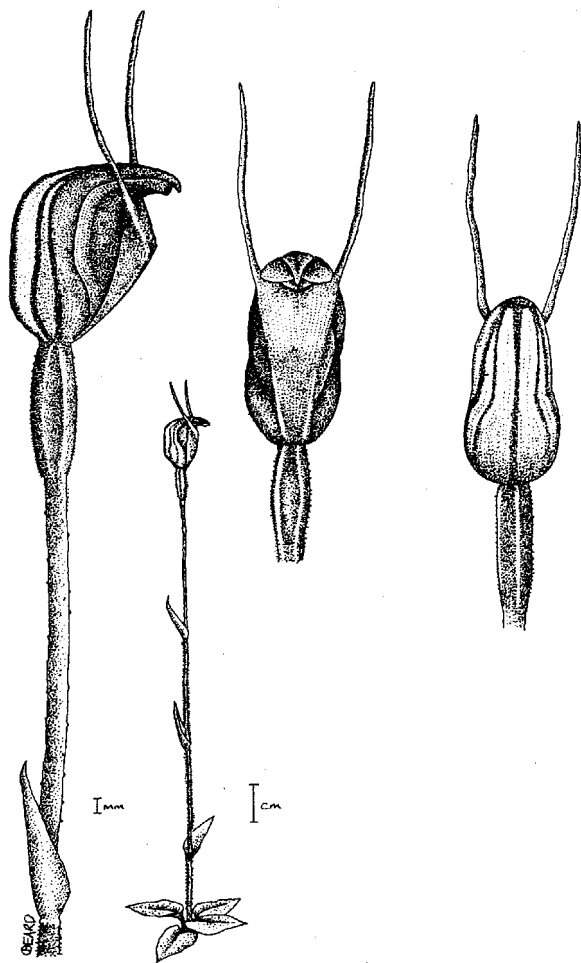
What are the population ecology and dynamics of *P. puberula*?

Management needs

Weed. control at sites; animal (pig) control; translocation to establish new populations; advocacy with orchid collectors to stop collecting and report sightings.

Selected references

- de Lange, P.J. 1996. *Pterostylis puberula* - is it really so scarce? *New Zealand Native Orchid Group Journal* 60: 16-18.
St George, I. 1996. *Pterostylis* aff. *nana* (aka *P. puberula*). *New Zealand Native Orchid Group journal* 59: 1-2.



***Selliera rotundifolia* Heenan**

Family: Goodeniaceae

Endemic to: Wanganui- Manawatu coast.

Common name: Round-leaved selliera, round-leaved half-star.

Ranking: A, Endangered recommended.

In cultivation: Yes.

Descriptor: A mat-forming, rhizomatous herb with round, shiny, succulent leaves.

Conservancy: WG, WL.

Habitat: Dune slacks, sometimes periodically flooded.

Threats: Habitat degradation and destruction through land development for farming, exotic forestry, roading, and coastal housing; weed encroachment.

Work undertaken to date

Taxonomy resolved at species rank (Heenan 1997); limited survey; under legal land protection in Whitiua Scientific Reserve (Whangaehu River mouth) and Hawken's Lagoon Conservation Area (Waitotara River mouth). Several other sites recommended for protection in Foxton PNAP survey report; limited monitoring as part of vegetation monitoring in dune slacks; opportunistic survey of Horowhenua Coastline; species range extended to Patea as a result of survey in December 1997.

Priority sites for survey

Past botanical surveys of the Wanganui-Manawatu coast have assumed generally that all *Selliera* plants were *S. radicans*. This means that dune slacks within the range given by Heenan (1997), but where the species is not known for certain, deserve re-survey for *S. rotundifolia*. During visits to suitable habitat north and south of the known range, opportunistic checks might be made for the species as well. *Selliera* plants with round leaves occur in other types of coastal habitat such as sea cliffs, outside the known range of *S. rotundifolia*, but those examined to date have proved to be *S. radicans*. Nevertheless, the possibility that *S. rotundifolia* occurs in other habitats and outside its recorded range should be kept in mind. Another reason for this possibility is that the coastal Wanganui-Manawatu area has no other endemic plant species, with the possible exception of an unnamed *Pimelea*.

Monitoring: objectives and priority sites

The dune slack habitat of *S. rotundifolia* has other nationally threatened species that have become locally extinct in the same region, including *Sebaea ovata*, *Libertia peregrinans*, *Mazus novaezeelandiae*, *Eleocharis neozelandica*, *Pimelea* "Turakina" and *Isolepis basilaris*. Where the habitat remains, weed encroachment and natural successional changes are probably among the causes of these losses; in a number of sites, *S. rotundifolia* survives after other threatened species have become locally extinct.

This leads to some objectives for monitoring *S. rotundifolia*. The rate of dune slack change and loss might be estimated by monitoring the species across its range. Such monitoring should record the species' continued presence and, in specific sites, its density, growth, presence of other native plants and weeds. In

addition, such monitoring would give advance warning of declines in *S. rotundifolia* itself.

Research questions

How are plant communities in ephemeral wetlands of dune slacks best managed to sustain the full range of native species?

Management needs

Management of sites with *S. rotundifolia* should be directed at management of the whole community of which it is a part. There is a need for experimental weed control and control of off-road vehicles. Formal protection is needed for more sites within the range of *S. rotundifolia*.

Selected references

Heenan, P.B. 1997. *Selliera rotundifolia* (Goodeniaceae), a new, round-leaved, species from New Zealand. *New Zealand Journal of Botany* 35: 133-138.

Ogden, J. 1974. Observations on two coastal ecotypes of *Selliera radicans* Cav. (Goodeniaceae) growing in the Manawatu District of New Zealand. *New Zealand Journal of Botany* 13: 541-540.

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