Auckland's threatened plants Vol. I

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Made on the New Zealand Plant Conservation Network website – www.nzpcn.org.nz

Introduction

This book was compiled from information stored on the website of the New Zealand Plant Conservation Network (www.nzpcn.org.nz).

This website was established in 2003 as a repository for information about New Zealand's threatened vascular plants. Since then it has grown into a national database of information about all plants in the New Zealand botanic region including both native and naturalised vascular plants, threatened mosses, liverworts and fungi.

Funding to develop the website was provided by the New Zealand Government's Terrestrial and Freshwater Biodiversity Information System Programme (TFBIS).

The species information used on the website has come from a variety of sources. The indigenous vascular plant text was written largely by Dr Peter de Lange (former Network Vice President). Peter based the descriptions on a wide range of sources including the Flora of NZ Series (Allan 1961, Moore and Edgar 1970 and Webb et al 1987) as well as numerous other taxonomic treatments. For a full bibliography of information sources see the References at the end of this book.

Where no published treatment was available Peter used herbarium specimens and his own knowledge of the flora to prepare species pages. Various other contributors have provided text and additional information to many species pages including botanists such as Mike Thorsen, John Barkla, Cathy Jones, Simon Walls, Nick Singers and many others. The threatened fungi text was written by Eric Mackenzie and Peter Buchanan (Landcare Research).

More than 200 photographers have kindly provided images to illustrate the website and for use in this book especially John Smith-Dodsworth, Jeremy Rolfe, Peter de Lange, Wayne Bennett and Gillian Crowcroft.

The New Zealand Botanic Region

The information on the Network website, from which this book was compiled, is for species that are indigenous to or naturalised within the New Zealand Botanic Region as defined by Allan (1961). The New Zealand botanic region encompases the Kermadec, Manawatawhi/Three Kings, North, South, Stewart Island/Rakiura, Chatham, Antipodes, Bounties, Snares, Auckland Campbell island/Motu Ihupuku and Macquarie.

About the Network

The Network has more than 800 members worldwide and is New Zealand's largest non-governmental organisation solely devoted to the protection and restoration of New Zealand's indigenous plant life.

The vision of the New Zealand Plant Conservation Network is that '*no indigenous species of plant will become extinct nor be placed at risk of extinction as a result of human action or indifference, and that the rich, diverse and unique plant life of New Zealand will be recognised, cherished and restored*'.

Since it was founded in 2003 the Network has undertaken a range of conservation initiatives in order to achieve its vision.

That work has included:

- Training people in plant conservation
- Publishing plant books, reports and posters
- Raising money for the David Given Threatened Plant Research Trust to pay for plant conservation research scholarships
- Advocacy to raise awareness of the importance of plant life in general and especially New Zealand's status as a Global Centre of Plant Diversity
- Lobbying central and regional government and business to protect indigenous plant life
- Educating people about plant life through the Network website
- Connecting people through the monthly newsletter, the Network conference and the annual general meeting

What is a threatened plant?

The NZ Threatened Plant Committee was formed in 1991 and ever since then it has met at regular intervals to review the status of indigenous vascular plants. It is made up of a small group of botanists that between them have an extensive knowledge of the native plants of New Zealand. This group is chaired by Dr Peter de Lange of the New Zealand Department of Conservation.

This committee applies a set of criteria to each native plant to determine its conservation status. The resulting list of species classified as threatened is published in the NZ Journal of Botany (see for example de Lange et al. 2009). The main threat categories used are: Extinct, Critical, Endangered, Vulnerable, Declining. Other categories used are: Recovering, Relict, Naturally Uncommon, Coloniser, Vagrant and Data Deficient. For vascular plants the threat status used in this book is taken from the 2009 conservation assessment (see de Lange et al 2009).

More recently other committees have been established to review the status of non-vascular plants but their lists are yet to be published.

Adiantum formosum

Caption: Adiantum formosum
Photographer: John Barkla

Caption: Under low forest, Ashhurst Domain, Manawatu
Photographer: Colin Ogle

Common Name(s):
Giant maidenhair, Plumed maidenhair

Current Threat Status (2012):
At Risk - Relict

Distribution:
Indigenous. North Island only, with historic records from near Ahipara (Reef Point), Herekino, and the North Wairoa River near Dargaville. The only extant populations now known occur along either side of the Manawatu River Gorge, and in forest near the eastern and western ends, as well as around Woodville. Present in Eastern Australia (Queensland, New South Wales and Victoria) where it is abundant and under no threat.

Habitat:
A species of alluvial forest and gorge sides. Usually found in shaded sites amidst drifts of leaf litter with little (if any) associated vegetation. It rarely grows in full sun.

Features*:
Tall, widely creeping fern form diffuse patches up to 3 x 1.8 m. Rhizome buried (rarely at surface), long-creeping, much-branched to 10 mm diameter; scales golden brown with an acuminate apex and blunt marginal teeth. Fronds usually widely and irregularly placed along rhizome, up to 1.8 m tall. Stipe up to 0.9 m, wiry, basally dull black, distally glossy black, scabrous, finely tuberculate. Frond lamina 0.15-1 x 0.15-0.9 m, 2-4-pinnate, deltoid to pentagonal, firmly membranous to subcoriaceous; adaxial surfaces of rachises and pinna stalks clad with dense antrorse red-brown hairs. Higher order segments of frond (except pinnules) elliptic or triangular. Primary pinnae progressively reducing in size and degree of branching from base to apex. Pinnules symmetric, flabellate or dimidiate and rectangular to trapeziform, undersides glabrous or sparsely clothed with pale divergent (patent) hairs; distal margins irregularly lobed, dentate when sterile. Sori 1-10 on distal margins only, 1 or 2 per lobe; soral flaps lunate to subreniform, glabrous.

Flowering:
Not applicable - spore producing

Fruiting:
Not applicable - spore producing

Threats:
It would appear that this species is spreading vegetatively as preliminary studies on spore germination suggest that while viable spores are produced they cannot germinate within the typical range of New Zealand temperatures (J. E. Braggins & S. Van der Mast pers. comm.). The only known wild populations are thriving but are rather localised and vulnerable to weeds

***Attribution:**
Fact Sheet Prepared for NZPCN by P.J. de Lange (Updated July 2004). Description adapted from Bostock (1998).

References and further reading:
Bostock, P.D. 1998: Adiantaceae. Flora of Australia 48: 248-263.

Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics 2009 Vol. 11 No. 4 pp. 285-309

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=707

Alseuosmia banksii var. linariifolia

Common Name(s):
None known

Current Threat Status (2012):
Naturally Uncommon

Distribution:
Endemic. North Island only, local from Kaitaia to about Kaiwaka

Habitat:
Coastal to lowland. Often in alluvial forest, and/or mixed hardwood forest. Often associated with kauri (Agathis australis (D.Don) Lindl.).

Features:
Bushy slender shrub up to c.1 m tall; branchlets slender, spreading, red-brown, pubescent. Leaves on petioles up to 10 mm long, slender, flattened, pubescent. Lamina submembranous, narrow-linear to linear, 5.0-30.0 × 2.5-7.0 mm; yellow-green to dark green, often more or less red-flushed, rarely flecked, apex acute, base attenuate to cuneately narrowed. Margins entire to subentire – and then with only a few faint teeth toward apex. Flowers 10-15 mm long, mostly solitary, rarely in fascicles of 2-3 together. Calyx pubescent; lobes 4 deeply cut to ½-way, bluntly triangular, pubescent. Corolla tube 8-10 mm long; very slightly flaring, greenish yellow or yellow with red-tinges or completely pink; lobes 3.0-3.5 mm, fimbriate, flaring widely at anthesis. Berry 5-9 × 4-7 mm subglobose to subturbinate, fleshy, red, puberulent.

Flowering:
September - December

Fruiting:
November - February

Threats:
Uncertain. This plant is not very well known, and due to confusion over its exact identity, most records actually refer to an apparently unnamed species instead. Further survey to ascertain its exact status is urgently needed as current indications are that this plant is extremely uncommon with most records coming from roadside scrub and unprotected forest remnants.

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=1487

Caption: Te Arai Scenic Reserve, Northand. Mar 2007.
Photographer: Jeremy Rolfe

Caption: Te Arai Scenic Reserve, Northand. Mar 2007.
Photographer: Jeremy Rolfe

Arthropodium bifurcatum

Common Name(s):
Rengarenga Lily

Current Threat Status (2012):
At Risk - Relict

References and further reading:
Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics 2009 Vol. 11 No. 4 pp. 285-309

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=1513

Caption: Poor Knights, Aorangi
Photographer: Peter de Lange

Caption: Poor Knights, Aorangi
Photographer: Peter de Lange

Atriplex billardierei

Caption: Kaingaroa Beach, Chatham (Rekohu) Islands
Photographer: John Sawyer

Caption: Kaingaroa Beach, Chatham (Rekohu) Islands
Photographer: John Sawyer

Common Name(s):
crystalwort

Current Threat Status (2012):
At Risk - Relict

Distribution:
Indigenous to New Zealand, Formerly present in the Foveaux Strait area and on Stewart Island, Last seen in that area in 1982. Present on the Chatham Islands. Also in Australia where it is apparently extinct except in Tasmania.

Habitat:
It is generally found in the strand zone on open beaches and sandy banks through the build up of sand where it forms low sandy mounds.

Features*:
Decumbent, sprawling, lightly branched, succulent, leafy, monoecious, annual herb, forming circular mats or low mounds within sand, to 2 or 3 m diameter. Branches 20-150 mm long, succulent, cream or yellow, rooting at nodes; exposed surfaces coated with deciduous, watery, spherical, glistening papillae. Leaves 5-20 x 2-7 mm, oblong-obovate, ovate, elliptic, or lanceolate, green to glaucous-green, succulent. Petioles short, 0.5-1 mm. Leaf surface sparsely to densely covered in deciduous watery, spherical, glistening papillae; apex and base obtuse; margin entire, very rarely within one or two lobes. Male flowers axillary, in clusters of 3-4, rarely single; occasionally with rudimentary stigma; perianth lobes 5, green or pale cream, 1.2 mm long. Elliptic-oblong, apex inflexed, cucullate, margins laciniate-crenate, abaxial surface covered in watery papillae; stamens 5, filaments 0.6 mm long, white, anthers 0.2 mm long, oblong, basifixed, pollen sulphur yellow. Female flowers minute, 1-2 mm, shortly stipitate, borne in leaf axils, either solitary, or in pairs, usually accompanied by a short shoot with one pair of reduced leaves. Peduncles minute, 0.25 mm long. Perianth absent; bracteoles fused for ¾ quarter of their length, lips entire; external bracteole surfaces glistening, papillae 0.2-0.3 mm diameter; style connate, stigmas 2.1-1.3 mm, white, half exserted, tapering-terete, 0.1-0.2 mm diameter, exserted portion with antrorse papillae, Ovary flattened at right angles to lips, 0.5 mm diameter, sessile or almost so. Fruiting bracteoles 3.3-9.5 x 2.2-6.0 mm, light brown or tan, subsessile or shortly stipitate; urceolate, valves rigidly fused for ¾ of their length, swollen toward base, corky, otherwise coriaceous with an entire margin, apex usually entire, rarely finely crenate, or fimbriate; surface densely coated in watery papillae 0.2-0.3 mm diameter. Seed circular in outline, convex, 1.8-4.0 mm diameter, testa chesnut-brown, maturing purple-brown, fading to black in dried specimens, surface matt, ± smooth. or finely rugose; radicle lateral, erect.

Flowering:
November to February

Fruiting:
December to April

Threats:
Possibly very vulnerable to human disturbance. Wide-scale coastal erosion and storm inundation are probably the greatest natural threats. It is occasionally browsed by sheep and cattle and horses. There is evidence from Australia and New Zealand that it is susceptible to competition from other introduced strand plants. Plants are easily killed by trampling and by vehicles using beaches. In much of its former range it has also suffered from collection of specimens for museums.

***Attribution:**
Description based on de Lange et al. (2000).

References and further reading:
de Lange, P.J. ; Norton, D.A.; Crowcroft, G.M. 2000: Taxonomy, ecology, and conservation of Atriplex billardierei and A. hollowayi sp. nopv. (Chenopodiaceae) in Australasia. New Zealand Journal of Botany 38: 551-567.

Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics 2009 Vol. 11 No. 4 pp. 285-309

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=372

Austroblechnum norfolkianum

Common Name(s):
None Known

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Indigenous. Common on Raoul Island (Kermadec Island group) and the Three Kings Islands, otherwise uncommon and sparingly distributed on mainly offshore islands from the Cavallis south to Mayor Island. Known on the Chatham Islands from South East (Rangatira) Island. Also on Norfolk Island where it is now seriously at risk of extinction

Habitat:
Strictly Coastal. This species is most frequently seen on the outer Hauraki Gulf offshore islands, and on the more remote Three Kings and Kermadecs. It favours shaded sites, usually in or near petrel colonies, or near penguin trails and nests.

Features*:
Tufted fern. Rhizomes stout, erect. Covered in old stipe ends. Stipes of sterile fronds 50-150 mm long, scaly at base. Sterile laminae narrowly elliptic, pinnate, 350-900 x 90-180 mm, dark green to bright green, never red-tinged. somewhat fleshy, upper surfaces shining, glabrous. Sterile pinnae in 35-60 pairs, longest at the middle, 50-90 x 8-18 mm, falcate and tapering to acute apices, gradually reducing to short flanges at base, margins finely toothed, bases adnate. Fertile fronds only slightly shorter than sterile.

Flowering:
Not applicable - spore producing

Fruiting:
Not applicable - spore producing

Threats:
Not threatened in New Zealand, although close to extinction on Norfolk Island. In New Zealand it has a primarily northern offshore island distribution, and is by and large uncommon except on the Kermadec and Three Kings Islands.

Caption: cult. ex Gt Mercury Is.
Photographer: John Smith-Dodsworth

Caption: Great Mercury Island
Photographer: John Smith-Dodsworth

***Attribution:**
Fact Sheet by P.J. de Lange 6 June 2005. Description from Brownsey & Smith-Dodsworth (2000).

References and further reading:

Brownsey, P.J.; Smith-Dodsworth, J.C. 2000: New Zealand ferns and allied plants. David Bateman Ltd, Auckland

Gasper, A.L.; de Oliveira Dittrich, V.A.; Smith A.R.; Salino, A. 2016: A classification for Blechnaceae (Polypodiales: Polypodiopsida): New genera, resurrected names, and combinations. *Phytotaxa 275*: 191–227.

Perrie, L.R.; Wilson, R.K.; Shepherd, L.D.; Ohlsen, D.J.; Batty, E.L.; Brownsey, P.J.; Bayly, M.J. 2014: Molecular phylogenetics and generic taxonomy of Blechnaceae ferns. Taxon 63(4): 745-758.

PPG 1: The Pteridophyte Phylogeny Group 2016: A community-derived classification for extant lycophytes and ferns. *Journal of Systematics and Evolution 54*: 563-603.

Pyner, T. 2017: A new classification of Blechnum. British Pteridological Society. https://ebps.org.uk/new-classification-blechnum/

Wilcox, M.; Warden, J. 2017: Botany of Hillsborough coast bush reserves, Manukau Harbour, Auckland. *Auckland Botanical Society Journal 72*: 32-46.

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=225

Botrychium australe

Common Name(s):
parsley fern, patotara

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Indigenous. Throughout North and South Islands with one old Chatham Island record. Present in Australia, Papua New Guinea and South America.

Habitat:
Lowland to alpine. A species of open ground, short and tall tussock grassland, forest clearings, shrubland, river flats, reverting pasture and seasonally flooded ground. It has also been collected from the margins of peat bogs in the Huntly Basin, lower Waikato.

Features*:
Red-green (bronze) to bright green, fleshy to succulent plant. Roots thick, fleshy, distinctly ridged and contracted. Sterile laminae 1(-2), stalked, broadly ovate or 5-angled, divided 3-5-times, 30-250 x 30-150 mm, the ultimate segments blunt-ended, 1-7 mm wide. Fertile laminae 1(-2) borne on a narrower but longer stalk, fertile portion shorter and narrower than sterile laminae, divided 3-5-times, bearing numerous, spherical, yellow-brown sporangia up to c.10 mm diam.

Caption: Young frond. Taurewa.
Photographer: © John Braggins

Caption: Sporangia. Te Anau.
Photographer: © John Braggins

Flowering:
Not applicable - spore producing

Fruiting:
Not applicable - spore producing

Threats:
Generally uncommon and of sporadic distribution. In some habitats it can be locally abundant, but in many places it is now scarce. There is some evidence of losses happening in the northern part of its range but as yet this seems insufficient to warrant a higher threat listing

***Attribution:**
Fact Sheet by P.J. de Lange 6 June 2005. Description from Brownsey & Smith-Dodsworth (2000).

References and further reading:

Brownsey, P.J.; Smith-Dodsworth, J.C. 2000: New Zealand ferns and allied plants. David Bateman Ltd, Auckland

Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. *Perspectives in Plant Ecology, Evolution and Systematics 11*: 285-309.

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=226

Brachyglottis arborescens

Common Name(s):
Three Kings Rangiora

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Three Kings Islands (present on all the main islands and also Hinemoa Rock within the Princes chain of islets and rock stacks.

Habitat:
Meryta sinclairii forest and in coastal scrub. Sometimes found as an understorey shrub within the dense kanuka (Kunzea aff. ericoides) forest which dominates Great (Manawa Tawhi) Island.

References and further reading:
Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics 2009 Vol. 11 No. 4 pp. 285-309

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=374

Caption: West Island, December 1996
Photographer: Peter de Lange

Caption: Near Trig, Great Island
Photographer: Peter de Lange

Brachyglottis compacta

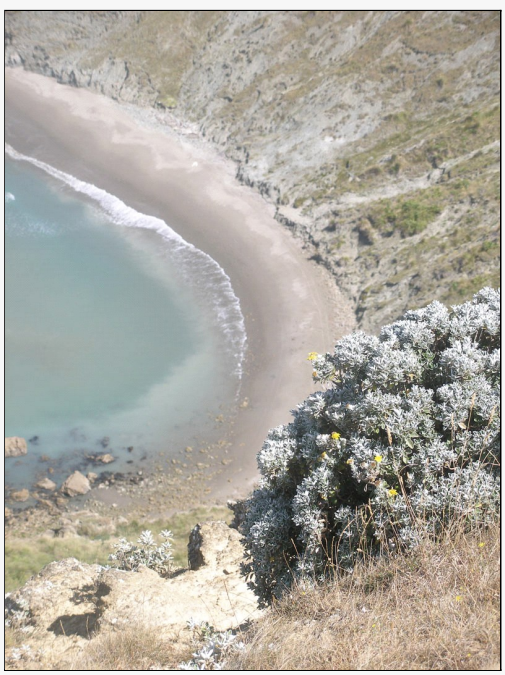
Common Name(s):
Castlepoint daisy, Castlepoint groundsel

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Castle Point, Wairarapa Coast, NI.

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=376

Caption: Castlepoint, Wairarapa
Photographer: John Sawyer



Caption: Castlepoint, Wairarapa
Photographer: John Sawyer

Brachyglottis kirkii var. kirkii

Common Name(s):
Kohurangi, Kirk's daisy

Current Threat Status (2012):
At Risk - Declining

Distribution:
Endemic to the North Island. Locally scattered throughout.

Habitat:
An epiphyte of lowland to lower montane forest, sometimes terrestrial.

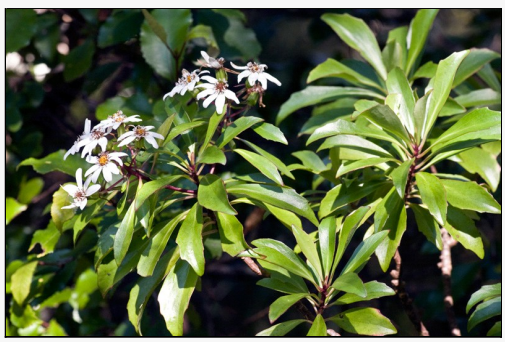
Features:
A spring flowering, usually epiphytic shrub to 1.5 m tall with purple stems and grey bark developed on old wood. Leaves 40 to 100 by 20 to 40 mm, fleshy, variable in shape, usually toothed in upper third, hairless, upper surface pale to dark green, often tinged maroon, undersides paler. Flowers 30 by 40 mm diameter, borne in dense inflorescences of 3 to 20 flowers, the individual daisy-like flowers have white petals (rays). Fruits dry, windborne, dandelion structures.

Flowering:
August to October

Fruiting:
October to December

Threats:
This plant is intolerant of browse and targeted by possums, goats and deer.

Caption: Brachyglottis kirkii var. kirkii
Photographer: Peter de Lange



Caption: Tararua Range. Dec 2009.
Photographer: Jeremy Rolfe

References and further reading:
Variation in *Senecio kirkii* Hook.f. by F.J. Newhook (Transactions and Proceedings of the Royal Society of New Zealand, Volume 72, 1942-43)

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=119

Bromus arenarius

Common Name(s):
sand brome

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Indigenous. In New Zealand known from mainly coastal locations from the Three Kings Islands south to Mahia Peninsula, thence disjunct to Wellington Harbour, and the Chatham Islands. It has been found once in the South Island, inland at Molesworth in Marlborough. Also on Norfolk Island and along the eastern side of Australia

Habitat:
Coastal to lowland (with one montane record from Marlborough). A species of open rocky ground. coastal cliff faces, scree and boulderfield. Often associated with sea bird nesting grounds, especially gulls.

Features*:
Yellow-green annual 200-860 mm tall, tufted or solitary, basal leaves withering at or before flowering. Leaf-sheath densely villous. Ligule 1-2.6 mm, lacerate. Leaf-sheath 70-300 x 1.7-5 mm, densely villous. Culm 150-600(-800) mm, erect or geniculate-ascending, internodes pubescent below panicle. Panicle 70-260 mm, lax, nodding; branches filiform, curving. Spikelets 30-40 mm, 5-8-flowered, numerous, loosely hairy, oblong-lanceolate to wedge-shaped. Glumes unequal, acute, acuminate, apery, covered within long fine hairs; lower 7-9.5 mm, 3-nerved, narrow oblong-lancelate, upper 9.5-13 mm, 5-7-nerved, narrow elliptic-lanceolate. Lemma 11-14 mm, 7-9-nerved, rounded, papery, oblong- to narrowly elliptic-lanceolate, covered with long fine hairs, apex sometimes entire or with 2-acute lobes, awn 14-20 mm, arising 2 mm below lemma apex. Palea ¾ length of lemma, keels sparsely long-ciliate, interkeel glabrous. Callus with minute hairs. Rachilla 1.2 mm, pubescent. Anthers 0.8-1.5 mm.

Flowering:
(July-)August-October

Fruiting:
August-December

Threats:
Although not really threatened this species is never particularly common anywhere. It has a naturally sporadic distribution.

***Attribution:**
Description modified from Edgar and Connor (2000)

References and further reading:
Edgar E. and H. Connor. 2000. Flora of New Zealand. Volume 5. Manaaki Whenua Press: Lincoln, New Zealand.

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=2077

Caption: Bromus arenarius inflorescence prior anthesis
Photographer: Peter de Lange, Ex Cult. October 2005

Caption: Bromus arenarius inflorescence after anthesis
Photographer: Peter de Lange Ex Cult. November 2005

Bulbophyllum tuberculatum

Caption: Bulbophyllum tuberculatum on fallen Kauri bark flake at Opuawhanga
Photographer: Bill Campbell

Caption: Courtman Forest
Photographer: Peter de Lange

Common Name(s):
None Known

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Endemic. North and South islands, from Kaitaia south to Wellington, and in Marlborough and North West Nelson. Probably more widespread than this as easily overlooked.

Habitat:
An epiphytic plant, usually found on trunks and inner branches of trees in lowland or coastal districts. Favoured trees seem to be matai (Prumnopitys taxifolia (D.Don) de Laub.), kahikatea (Dacrycarpus dacrydioides (A.Rich.) de Laub.), rimu (Dacrydium cupressinum Lamb.), totara (Podocarpus totara), tawa (Beilschmiedia tawa G.Benn.), hinau (Elaeocarpus dentatus (J.R.Forst. et G.Forst.) Vahl) and rewarewa (Knightia excelsa R.Br.), It is always found with grey lichens of the genus Rimelia Hale et A.Fletcher, Physcia (Schred.) Michx., Heterodermia Trevis., and Ramalina Ach., and often threaded through the climbing fern Pyrrosia eleagnifolia (Bory) Hovenkamp.

Features*:
Epiphytic orchid forming tightly clumped masses up to 60 mm diameter on canopy branches and trunks of forest trees. Roots numerous, threaded tightly through encrusting lichens and other epiphytic plants. Pseudobulbs conpsicuous, 6-18 x 3-6 mm, green to dark green, ovoid to narrowly ovoid, turgid, smooth surface often spotted with white mealy cells. Apex surmounted by tightly clasping, much reduced scale leaf. Leaf appearing sessile, usually solitary (rarely 2), up to 50 x 5 mm, dark green to purple-green, linear-oblong, acute, glabrous. Flowers racemose, 1-several-flowered, peduncle 10-20 mm long arising from base of pseudobulb; floral bracts triangular, pedicels very short. Ovary minutely tuberculate. Perianth 4 mm long, all aprts except labellum, white to whitish-pink. Dorsal sepal narrow-ovate; lateral similar but broader to triangular-ovate, slightly pouched at base. Petals smaller, ovate, obtuse. Labellum mobile on long slender claw; oblong-obovate to sub-hastate, orange to red, fading toward a yellow base; proximal part with 2 raised ridges, margins recurved at apex. Column short, 2-winged at apex. Capsules ovoid.

Flowering:
(September) - November - April

Fruiting:
November - August

Threats:
Probably quite common, but easily overlooked, and current records imply it is naturally sparse. There have been some documented instances where accessible populations have been stripped bare by plant collectors, which is probably the only serious threat to this species. For this reason it is better to use caution when disclosing new findings.

***Attribution:**
Fact Sheet prepared for NZPCN by P.J. de Lange 14 April 2007: Description adapted from Moore and Edgar (1970).

References and further reading:

Anonymous. 1962. *Bulbophyllum tuberculatum* Col. *Auckland Botanical Society Journal 19*: 1-2.

Moore, L.B.; Edgar, E. 1970: Flora of New Zealand. Vol. II. Government Printer, Wellington.

Moss, T.C. 1968. Notes on *Bulbophyllum tuberculatum*(Orchidaceae). *Wellington Botanical Society Bulletin 35*: 36-39

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=216

Caladenia alata

Caption: Petalochilus alatus at Whangaroa
Photographer: Bill Campbell

Caption: Petalochilus alatus
Photographer: Kevin Matthews

Common Name(s):
None known

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Indigenous. North Island from Te Paki to about Rotorua thence disjunct to the Horowhenua. Exact distribution still unknown it was only recently (1980s) recognised from New Zealand

Habitat:
Coastal to lowland (more rarely montane - up to 800 m a.s.l.). Often in gumland scrub or on open clay pans, in skeletal soils on steep rocky ridges, on the margins of peat bogs or within open sinter and rock in and around geothermal vents. More rarely found in the leaf litter under tall manuka (Leptospermum scoparium) dominated scrub or within seral forest. Usually in dry sites and plants are usually withered off and gone by November.

Features*:
Terrestrial dark green to reddish-green early spring flowering orchid usually occurring at solitary plants sometimes as small colonies of up to 20 plants. All parts finely but sparsely glandular hairy. Leaf solitary up to 60 x 3 mm long, linear, dark green to reddish-green. Stem erect, slender somewhat wiry, up to 100 mm tall, thin and very wiry, sparsely eglandular-glandular hairy. Floral bracts 1(-2). Flowers 1(-2) up to 10 mm diameter, in lax racemes, perianth very pale mauve, pale pink, reddish or white often suffused pale china blue, if darker coloured usually fading to pink or white near flower centre. Sepals up to 3 mm long, narrowly-lanceolate to broadly lanceolate, apex acute to subacute; dorsal sepal erect, others spreading. Petals up to 3 mm long, lanceolate to broadly lanceolate, apex sharply acute, spreading or projecting forwards. Labellum 3-lobed, marked with transverse cerise bars, disc with 2 more or less equal lines of stalked calli extending nearly to apex, stalks white, clavate, callus heads yellow, lateral lobes erect, column-embracing, more or less entire, often finely crimpled to crenulate toward mid-lobe; mid-lobe broadly triangular, strongly recurved under labellum, margins entire, usually bearing a solitary, flattened, orange or yellow callus on either side of mid-lobe base. Column erect to slightly recurved, white or pale pink or mauve, marked with up to 5 darker transverse, red to cerise bars, column wings distinctly broadening toward apex.

Flowering:
August - November

Fruiting:
October - January

Threats:
In New Zealand *Caladenia alata* is a biologically sparse species usually occurring in diffuse, often widely scattered populations of few to many individuals.

***Attribution:**
Fact Sheet prepared for NZPCN by P.J. de Lange 14 April 2007. Description based on herbarium specimens and subsequently published in de Lange et al. (2007).

References and further reading:

de Lange, P.; Rolfe, J. St George, I. Sawyer J. 2007: Wild orchids of the lower North Island. Department of Conservation, Wellington. 194pp.

Hopper, S.D.; Brown, A.P. 2004: Robert Brown's *Caladenia* revisited, including a revision of its sister genera *Cyanicula*, *Ericksonella* and *Pheladenia* (Caladeniinae: Orchidaceae). *Australian Systematic Botany* 17: 1-240.

Jones, D.L.; Clements, M.A.; Sharma, I.K.; Mackenzie, A.M. 2001: A New Classification of *Caladenia* R.Br. (Orchidaceae). *The Orchadian 13*: 389-419.

Moore, L.B.; Edgar, E. 1970: Flora of New Zealand. Vol. II. Government Printer, Wellington.

Rogers, R.S. 1924: *Petalochilus*: a New Genus of New Zealand Orchids. *Journal of Botany 62*: 65-67.

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=618

Caladenia atradenia

Caption: Stegostyls atradenia at Kennedy Bay (October)
Photographer: John Smith-Dodsworth

Caption: Iwitahi Reserve 8/12/00
Photographer: Eric Scanlen

Common Name(s):
None Known

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Endemic. North and northern South Island.

Habitat:
Coastal to montane (0-1000 m a.s.l.). Favouring infertile substrates, especially clay podzols and pumice soils, where ti may be found in the open or more usually in thick leaf litter under Kunzea ericoides (A.Rich.) Joy Thomps. and Leptospermum scoparium J.R.Forst. et G.Forst. shrubland, or in secondary regrowth. Also known from pine plantations and from geothermal areas in low scrub. Despite its colourful flowers its tendency to grow as solitary or small scattered, somewhat diffuse populations means that it is easily overlooked, even in sites where it is well known.

Features*:
Tuberous, terrestrial orchid growing as solitary plants or in small groups of 2-10 individuals, all vegetative parts markedly hairy. Leaf solitary, erect, 100-160 x 1-3 mm, narrowly linear, dark green to red-green; hairs sparse comprising mixtures of eglandular and glandular hairs upto 1 mm long. Scape 100-300 mm long, slender, somewhat wiry though brittle, reddish-green, covered with short hairs similar to those of leaf. Sterile bracts closely sheathing, 9-12 x 2-3 mm, narrowly obovate, subacute, abaxially hirsute. Floral bracts closely sheathing, 5-7 x 3 mm, oblong-elliptic to elliptic, abaxially hirsute. Flowers 1(-2), 20 mm diameter, dark green to dark reddish-green, usually marked with maroon or dark magenta, externally darker from numerous sessile ovoid glands; dorsal sepal strongly incurved over the column; lateral sepals spreading and erect (divergent); petals widely spreeading, suberect, distally incurved. Dorsal sepal 7-10 x 2-3 mm, narrowly obovate, cucullate (hooded); apex apiculate. Lateral sepals 7-11 x 2-3 mm, asymmetrically lanceolate, falcate, acute to subobtuse. Petals 7-10 x 1.5-2 mm, narrowly oblanceolate, asymmetrical, falcate, acuminate. Labellum articulated on short claw, whitish with few, broad purple transverse bars; callii dark purplish-black, lamina 5-6 x 4-4.5 mm, ovate in outline when flattened, erect in proximal half the curved forwards, apex recurved, 3-lobed; lateral lobes 1.5 mm wide, erect, embracing column, entire; mid-lobe 2 mm long, recurved with 4-8 pairs of dark purplish-black linear, papillate marginal calli 0.3 mm long, irregular of shape, decrescent to the apex. Lamina calli in 2 irregular rows, extending well onto the mid-lobe; stalks whitish; heads dark purplish-black, papillate. Basal calli 2, 0.5 mm, subsessile to sessile; head more or less oboid, curved. Longest cali 0.6 mm long; head 0.5 mm across, globose, papillate; stalk 0.3 mm long, slender. Distal calli subsessile to sessile, of irregular shape and arrangement. Column 5-6 x 2-2.5 mm, erect, incurved toward apex, greenish, spotted and blotched red, narrowly winged; central ridge 0.8 mm wide. Capsule 18-24 x 5-6 mm, green stripe with red, narrowly obovoid, very hairy.

Flowering:
August - December

Fruiting:
October - February

Threats:
Caladenia atradenia is a rather sparsely distributed and naturally uncommon orchid. However, it is quite likely that the apparent rarity of this species is also in part due to its being overlooked for despite its colourful flowers it is not easily seen amongst the leaf litter in which it usually grows. Nevertheless some populations have been lost due to weed invasions and land development.

***Attribution:**
Fact Sheet prepared by P.J. de Lange (12 February 2007). Description based on Jones et al. (1997) - .

References and further reading:

Hopper, S.D.; Brown, A.P. 2004: Robert Brown's *Caladenia* revisited, including a revision of its sister genera *Cyanicula*, *Ericksonella* and *Pheladenia* (Caladeniinae: Orchidaceae). *Australian Systematic Botany* 17: 1-240.

Jones, D.L.; Molloy, B.P.J.; Clements, M.A. 1997: Three new species and a new combination in Caladenia R.Br. (Orchidaceae) from New Zealand. *The Orchadian 12*: 221-229.

Jones, D.L.; Clements, M.A.; Sharma, I.K.; Mackenzie, A.M. 2001: A New Classification of *Caladenia* R.Br. (Orchidaceae). *The Orchadian 13*: 389-419.

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=322

Caladenia bartlettii

Common Name(s):
None Known

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Endemic. North Island, from Te Paki to about the northern Waikato and Kaimai Ranges (exact southern limits as yet unclear)

Habitat:
Coastal to montane (0-500 m a.s.l.). Virtually confined to kauri (Agathis australis (D.Don.) Lindl.) forest where it grows in leaf litter, often near the bases of kauri trees. Also found in gumland scrub (but always in association with kauri remnants). Evidently relishes infertile soils.

Features*:
Terrestrial orchid usually occurring as solitary plants sometimes as small colonies of up to 10. All parts finely but sparsely eglandular hairy. Leaf solitary up to 200 x 2 mm long, narrow-linear, dark purple-green to reddish-green. Stem erect, slender somewhat wiry, up to 300 mm tall, sparsely eglandular-glandular hairy. Floral bracts 1(-2). Flowers 1(-2) up to 20 mm diameter, in lax racemes, perianth dark glazed mauve to magenta often fading to pink or white near flower centre. Sepals narrowly-elliptic to broadly elliptic, apex obtuse; dorsal sepal erect others spreading to somewhat deflexed. Labellum 3-lobed, marked with transverse dark pink to magenta bands, disc with 2 unequal lines of stalked callii, stalks dark pink to magenta, globular callus heads yellow, lateral lobes deeply cut; mid-lobe broadly triangular, recurved, margins irregular wavy, dark yellow, marginal callii absent. Column erect to slightly recurved, dark pink to magenta, often with 2-3 darker transverse, irregular bars, column wings distinctly broadening toward apex.

Flowering:
October - December

Fruiting:
November - February

Threats:
Caladenia bartlettii is apparently a rather sparsely distributed and naturally uncommon orchid. However, it is quite likely that the apparent rarity of this species is also in part due to its being overlooked for despite its colourful flowers it is not easily seen amongst the leaf litter in which it usually grows. A further issue is that there seems to be much confusion as to the correct application of the name with a number of unnamed segregates allied to *C. bartlettii* recognised by some New Zealand orchidologists.

Caption: On bank under manuka scrub, Plimmerton.
Photographer: Jeremy Rolfe


Caption: On bank under manuka scrub, Plimmerton.
Photographer: Jeremy Rolfe

***Attribution:**
Fact Sheet prepared by P.J. de Lange (12 February 2007). Description based on Jones et al. (1997) - as Caladenia bartlettii.

References and further reading:

Hopper, S.D.; Brown, A.P. 2004: Robert Brown's *Caladenia* revisited, including a revision of its sister genera *Cyanicula*, *Ericksonella* and *Pheladenia* (Caladeniinae: Orchidaceae). *Australian Systematic Botany* 17: 1-240.

Jones, D.L.; Molloy, B.P.J.; Clements, M.A. 1997: Three new species and a new combination in Caladenia R.Br. (Orchidaceae) from New Zealand. *The Orchadian 12*: 221-229.

Jones, D.L.; Clements, M.A.; Sharma, I.K.; Mackenzie, A.M. 2001: A New Classification of *Caladenia* R.Br. (Orchidaceae). *The Orchadian 13*: 389-419.

Moore, L.B.; Edgar, E. 1970: Flora of New Zealand. Vol. II. Government Printer, Wellington.

Rogers, R.S. 1924: *Petalochilus*: a New Genus of New Zealand Orchids. *Journal of Botany 62*: 65-67

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=1106

Calochilus paludosus

Common Name(s):
Bearded Orchid

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Indigenous. North and northern South Islands (North West Nelson to northern Westland). Present in Australia where it is very common

Habitat:
A species of disturbed habitats. It is usually found in open gumland scrub or pakihi, on clay pans or on road side banks. Also commonly encountered near geothermally active ground. Sometimes found amongst tussock grassland in upper montane situations.

Features*:
Slender to stout orchid 150-900 mm tall. Stem erect, light green to yellow-green (sometimes glaucous). Leaf fleshy, linear-lanceolate, yellow-green to green, channelled, sheathing at base apex acute. Cauline bracts similar but much shorter. Inflorescence a raceme of (1-) 2(-4) flowers. Floral bracts narrow, acute, overtopping ovary. Perianth mostly green, except for bright reddish lamina and red to red-violet cilia of labellum (cilia copious, rather long). Dorsal sepal 10-15 mm long, broad-elliptic, acute, somewhat folded about column; lateral sepals similar though smaller. Petals shorter, obliquely deltoid, apex subacute, directed toward dorsal sepal, green finely striped with red. Labellum green suffused with red or purple, with a reddish apex, not much larger than sepals and petals; ligulate apex, bare rather long, tapering, straight; disc broad with dense long processes; base covered with numerous small, acute purple-red, maroon to red calli, and on each side of these are two short, erect, intramarginal greenish plate-like calli. Column wings with out basal glands or calli.

Flowering:
(September-) October-December

Fruiting:
October - February

Threats:
Habitat loss and plant collectors are the main threats to this attractive bearded orchid

***Attribution:**
Description adapted from Moore and Edgar (1970)

References and further reading:
Moore, L.B.; Edgar, E. 1970: Flora of New Zealand. Vol. II. Government Printer, Wellington.

Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics 2009 Vol. 11 No. 4 pp. 285-309

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=227

Caption: Calochilus paludosus
Photographer: Ian St George

Caption: Calochilus paludosus
Photographer: Eric Scanlen

Calystegia marginata

Common Name(s):
small-flowered white bindweed

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Indigenous. North Island from Te Paki to Manukau in the West and Cuvier Island in the east. There are historic records from near Thames. Present in Eastern Australia.

Habitat:
Primarily coastal but also found in lowland areas. Prefers open shrublands, rough pasture or bracken dominated sites, usually on coastal headlands, but also on road sides, along railway embankments and in rough pasture and lawns.

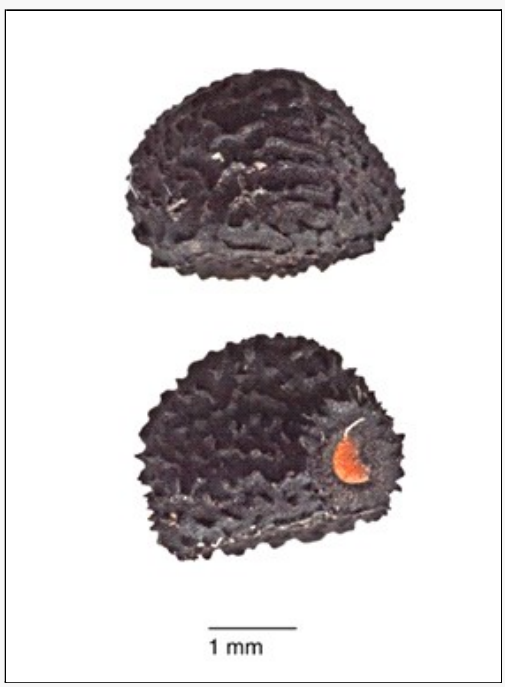
Features*:
Glabrous perennial vine with creeping rhizome and slender twinning or prostrate stems (when prostrate these root freely at the nodes). Petioles slender (20-)50(-55) x 0.5-1 mm. Lamina bright green, 25-80 x 15-45 mm, sagittae, usually narrowly triangular (rarely broadly so); apex acute to acuminate; basal lobes acute, usually distinctly toothed (resembling a fish tail); basal sinus broad and rounded. Flowers usually solitary; peduncles 10-25 mm long, narrowly winged. Bracts broad-ovate, obtuse. 10 mm long. Sepals broad-ovate, < bracts, obtuse. Corolla 15 x 12 mm, white, campanulate. Capsule 6 mm diam., globose. Seeds black, reticulately ribbed, ribs protruberant.

Flowering:
Present throughout the year but peaking in spring and summer

Fruiting:
Present throughout the year

Threats:
Ignorance seems to be the main threat. Because it is frequently mistaken as a convolvulus, it is sprayed. Also its preference for successional habitats and along road margins tend to make it especially vulnerable to routine, roadside weed spraying. Despite this problem there is some field evidence to suggest it is actually increasing its range. Plants have even been found in urban areas such as Whangarei and Auckland, in situations where the species had not previously been known.

Caption: Calystegia marginata on roadside adjacent to Whangaroa Harbour
Photographer: Bill Campbell



Caption: Seed. In cultivation. Jul 2007.
Photographer: Jeremy Rolfe

***Attribution:**
Fact sheet prepared for NZPCN by P.J. de Lange 1 November 2005. Description adapted from Allan (1961) and Webb et al. (1988), supplemented with observations made from fresh and dried material.

References and further reading:

Allan, H.H. 1961: Flora of New Zealand. Vol. I. Wellington, Government Printer.

Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. *Perspectives in Plant Ecology, Evolution and Systematics 11*: 285-309

Webb, C.J.; Sykes, W.R.; Garnock-Jones, P.J. 1988: Flora of New Zealand. Vol. IV. Naturalised Pteridophytes, Gymnosperms, Dicotyledons.Christchurch, New Zealand, Botany Division, D.S.I.R..

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=229

Carex elingamita

Common Name(s):
Three Kings Sedge

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Endemic. Three Kings Island group where it is present on Great (Manawa Tawhi), North East, South West, West Islands and at least Hinemoa Rock in the Princes group. Naturalised in Auckland City

Habitat:
A species of shaded sites under dense forest, often around petrel burrowed ground, boulder falls and rubble.

Features*:
Rather leafy, light to dark green, tussock forming sedge of shaded forested slopes and boulder field. Culms up to 1 m x 1.5 mm, trigonous, smooth; basal bracts light brown. Leaves < culms, 5-10 mm wide, double folded, margins finely scabrid. Inflorescence of 10-12 compound or simple green to grey-green spikes, 60-80 x 5 mm, the lower 2-4 more or less distant on long erect peduncles; terminal spike male, remaining spikes female below with upper third or more male. Glumes equal or < utricles, linear-lanceolate, membranous (somewhat chaffy when old) with red-brown flecks, truncate or almost emarginated, midrib prolonged as a rigid, strongly scabrid awn. Utricles 4-4.5 mm long, trigonous, elliptic-lanceolate, strongly nerved, erect or slightly recurved, membranous, grey-green, margins glabrous, beak slightly > 1.5 mm long. Margins glabrous, crura scabrid not oblique. Stigmas 3. Nut 2 mm long, red-brown.

Caption: West Island, December 1996
Photographer: Peter de Lange

Caption: West Island, December 1996
Photographer: Peter de Lange

Flowering:
September - December

Fruiting:
October - May

Threats:
Not threatened and very common but listed because it occupies a small geographic range.

***Attribution:**
Description adapted from Moore and Edgar (1970)

References and further reading:
Moore, L.B.; Edgar, E. 1970: Flora of New Zealand. Vol. II. Government Printer, Wellington.

Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics 2009 Vol. 11 No. 4 pp. 285-309

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=393

Carex litorosa

Common Name(s):
Sea Sedge

Current Threat Status (2012):
At Risk - Declining

Distribution:
Endemic to North, South and Stewart Islands.

Habitat:
Coastal in salty, brackish marshes and on sandy, tidal river banks.

Features*:
An upright sedge to 800 mm tall (but usually smaller), that forms pale green or reddish, dense tussocks with curly tops. Leaves are flat on one side, curved on the other and slightly serrated along the edge, 1.5 mm wide and about the same length as the flower stem. Flower stems are cylindrical and upright, with light brown spikes.

Flowering:
October to December

Fruiting:
December to April (but seedheads long persistent)

Threats:
Habitat loss through coastal development. Encroachment by weeds is a serious problem in the North Island, especially from species such as spartina, tall fescue and Carex divisa.

***Attribution:**
Fact Sheet prepared for NZPCN by P.J. de Lange 2 September 2003.

References and further reading:
Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics 2009 Vol. 11 No. 4 pp. 285-309

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=120

Caption: Pounawea
Photographer: John Barkla

Caption: Awarua Bay, Southland
Photographer: Jesse Bythell

Carmichaelia compacta

Common Name(s):
Cromwell broom

Current Threat Status (2012):
At Risk - Naturally Uncommon

Distribution:
Endemic. New Zealand: South Island (Central Otago (centred on the Kawarau and Cromwell Gorges and immediate surrounding area, also near Alexandra, Omakau, and Cromwell)

Habitat:
A schist endemic. Colonising rock and debris slopes, rock outcrops, and associated steep tussock grassland, and river gorges.

Caption: Seeds. From cultivated plant
Photographer: John Barkla


Caption: Kawarau Gorge
Photographer: John Barkla

Features*:
Erect or spreading shrub, up to 1-2 x 1-2 m, with densely placed branches and cladodes. Branches erect and spreading from base, 10-60 mm diameter. Cladodes linear, striate, compressed, erect to spreading, green, glabrous, often crowded at ends of branches, 60-220 x 1.5-2.5 mm; apex subacute, yellow; leaf nodes 4-9. Leaves 1-9-foliolate, fleshy, obovate or sometimes ovate, hairy; upper surface mottled; lower surface green; apex emarginate to retuse; margin hairy; leaflets sessile or with short petiolule, 1.5-7.0 x 1.0-6.5 mm; petiole hairy, 8-16 mm long. Leaves on cladodes reduced to a scale, triangular, glabrous, < 0.5 mm long; apex acute. Stipules clasping shoot, triangular, 0.4-0.5 x 0.4-0.5 mm; adaxial surface glabrous; abaxial surface hairy, becoming glabrous with age; apex subacute to obtuse; margin hairy. Inflorescence a raceme, 1 per node, each with 3-6 flowers. Peduncle glabrous to sparsely hairy, green, 7-16 mm long. Bracts triangular to narrow-triangular, pale green becoming membranous, 0.5-1 mm long; apex acute to subacute; margin hairy. Pedicel glabrous, pale green, 2-4 mm long. Bracteoles at base of receptacle or on upper part of pedicel, narrow rounded, white, c. 0.25 mm long; claw pale green, c.2 mm long. Stamens 3.0-3.5 mm long; lower filaments connate for c.¨þ length and with outside filaments free for 0.3-0.5 mm. Pistil exserted beyond stamens, c. 4 mm long; style with a ring of hairs below stigma; ovules 6-7. Pod obovate, broad at distal part, dorsally compressed, brown, pale grey, or straw-coloured, indehiscent, with inflated valves, 5.0-5.5 x 3.0-4.0 mm; beak on upper suture, slightly curved, stout, pungent, c.1 mm long. Seeds oblong-reniform, 1-2 per pod, light olive green or yellow-green with black mottling, 2.0-2.5 x 1.5-2.0 mm.

Flowering:
October - February

Fruiting:
December – July

Threats:
A narrow range endemic that is known from many sites but with an combined overall small population. Seedlings and juveniles are scarce, and there appears to be little recruitment. At accessible sites it is heavily browsed by sheep, goats, hares, and rabbits and these animals are probably the main reason for the lack of recruitment. Further, browsing pressure may be causing early senescence of older plants.

***Attribution:**
Description from Heenan (1996)

References and further reading:
Heenan, P.B. 1995: A taxonomic revision of Carmichaelia (Fabaceae - Galegeae) in New Zealand (part I). New Zealand Journal of Botany 33: 455-475

Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics 2009 Vol. 11 No. 4 pp. 285-309

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=409

Carmichaelia williamsii

Caption: Tatua Peak, Aorangi
Photographer: Peter de Lange

Caption: Tatua Peak, Aorangi
Photographer: Peter de Lange

Common Name(s):
William's Broom, Giant-flowered broom

Current Threat Status (2012):
At Risk - Relict

Distribution:
Endemic. North Island only, where it known mainly from northern offshore islands (particularly the Poor Knights and Alderman Islands) to East Cape. On the mainland it is now known from only two small remnant populations near East Cape.

Habitat:
A strictly coastal species of open forest, scrub, cliff faces and talus slopes.

Features*:
Erect to suberect, spreading, usually leafless shrub up to 2-4 x 2-4 m. Branches 50-100 mm diam., stout, rather woody, ascending or spreading. Cladodes 130-380 x 5-12 mm, yellow-green, green to dark green, stout, linear, striate, compressed, glabrous, apex obtuse; leaf nodes 7-16. Leaves present on seedlings and reversion shoots or shaded cladodes of adult plants. Petiole 1-5 mm. Lamina fleshy, 1-3-foliolate, 6-23 x 5-15 mm, green often yellow toward proximal end, elliptic, obovate to broad-elliptic, apex retuse, base cuneate. Terminal leaflet larger than lateral leaflets. Leaves on cladodes reduced to scales, , 1 mm long, broad-triangular. Stipules 1.5 x 1 mm, free, broad-triangular, sometimes with a second pair of denticles. Inflorescence a 1-6-flowered raceme, usually in fascicles of 3-4 per node. Peduncle 1-6 mm long, hairy, green. Bracts 1-1.4 x 0.8-1.5 mm, narrow-triangular to broad-triangular, apex subacute to obtuse. Pedicel 4-8 mm long, hairy, pale green. Bracteoles 0.4-0.6 x 0.2 mm, narrow-triangular to linear, apex subacute. Calyx 8-9 x 4.7-5.5 mm, campanulate, green. Bud green becoming yellow-green at maturity. Standard 18-22 x 11-13.5 mm, ovate, patent, keeled, margins incurved, apex subacute to weakly retuse, greenish-yellow, yellow, to pale yellow with central portion and marginal veins maroon-red to purple. Wings 20-22 x 4-4.5 mm, oblong, falcate, shorter than keel, yellow to pale yellow. Keel 25-27 x 7-8 mm, apex narrow and acute, yellow, distal part of inner surface maroon-red or purple. Stamens 28-30 mm long; dorsal filaments fused for ¾ length, otherwise free for remainder of length. Pistil 32-33 mm long, exserted well beyond stamens. Pods 23-34 x 6-12 mm, oblong to oblanceolate, light to dark brown, valves dehiscent; beak 2-4 mm, stout, apex pungent. Seeds 5-15 per pod, 3-5 x 2-3 mm, reniform to oblong-reniform, dull red to orange-red usually mottled with black.

Flowering:
From July and October, though sporadic flowering may occur throughout the year.

Fruiting:
Throughout the year.

Threats:
Flowers, fruits and seed are palatable to rats. Some populations are at risk from coastal erosion. Plants tend to be short-lived, and are often inflicted with lemon tree borer (Oeomona hirta). Because the species is principally bird-pollinated, by New Zealand honeyeaters, the loss of these pollinators may affect reproductive effort. Though previously ranked as Nationally Endangered on the basis of the loss of mainland populations and the limited extent of island populations, it is now ranked as Relict on the basis that the loss of (most) mainland populations was historical and the island populations appear stable

***Attribution:**
Fact Sheet prepared for NZPCN by P.J. de Lange 13 June 2006. Description modified from Heenan (1996).

References and further reading:
Heenan, P. B. 1996: A taxonomic revision of *Carmichaelia* (Fabaceae-Galegeae) in New Zealand. Part 2. *New Zealand Journal of Botany 34*: 157-177.

Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics 2009 Vol. 11 No. 4 pp. 285-309

For more information, visit:
http://nzpcn.org.nz/flora_details.asp?ID=58

Definitions of botanical terms

A glossary has been provided below with definitions for many of the botanical terms used in the species descriptions.

Glossary

Term	Definition
Abaxial	Facing away from the stem of a plant (especially denoting the lower surface of a leaf).
Acerose	Narrow with a sharp stiff point.
Achene	A simple, dry, one–seeded (one–celled) fruit
Acicular	Needle-shaped.
Acidic	Having a low pH, opposite of basic or alkaline.
Acroscopic	Pointing towards, or on the side of, the apex
Acuminate	Gradually tapered to a point. Sharply pointed.
Acute	Pointed or sharp, tapering to a point with straight sides.
Adnate	Fusion of unlike parts, e.g. stamens fused to petals.
Adventive	A plant that grows in the wild in New Zealand but which was introduced to the country by humans.
Agglutinated	Stuck together.
Allelopath	An organism that releases compounds that are toxic to other species.
Allelopathy	The release by an organism of compounds that are toxic to other species.
Alternate	Attached singly at each node but changing from one side of a stem to the other.
Alveolate	Honeycombed with ridged partitions.
Amplexicaul	clasping or surrounding the stem
Anamorph	Asexual fruiting stage, usually of an ascomycete fungus.
Anastomosing	Rejoining after branching, as in some leaf veins.
Annual	A plant that completes its complete life cycle within the space of a year
Annual evergreen	Plants that lose their over-wintering leaves rapidly in the first half of the growing season. Annual evergreens never present a leafless appearance, but are closer in a functional sense to a deciduous plant than they are to multi-annual evergreens.
Annulus	Line of thickened cells that governs the release of spores from a sporangium
Anterior	Towards the front.
Anther	The pollen-bearing portion of the stamen.
Antheridium	Male reproductive organ formed on the prothallus of a fern
Anthesis	When the flower is fully developed and functioning. The time of pollination or bloom.
Apex	Tip; the point furthest from the point of attachment.
Apices	Plural of apex. Tip, the point furthest from the point of attachment
Apiculate	Bearing a short slender and flexible point.
Apiculus	A small, slender point.
Apomixis	A form of reproduction whereby seed is formed without the usual mode of sexual fusion
Appressed	Pressed against another organ or surface.
Aquatic	Growing, or living in, or frequenting water. Applied to plants and animals and their habitats. Opposite of terrestrial (land living).
Archegonium	Female reproductive organ of a fern formed on the prothallus
Arcuate	Curved into an arch.
Aril	An often fleshy appendage on the outside of a seed.
Artificial thinning	Selectively removing vegetation to create gaps to facilitate natural invasion of native plants, or to plant later successional plants.
Ascending	Growing obliquely upward.
Asexual	Vegetative reproduction, lacking sexual involvement by sperm or egg cells
Attenuate	Narrowing gradually
Auricle	A small, ear-shaped appendage.
Auriculate	Bearing a small, ear-shaped appendage.
Autogamous	Self-fertilising flowers.
Autotrophic	Of or relating to organisms (as green plants) that can make complex organic nutritive compounds from simple inorganic sources by photosynthesis
awn	A stiff or bristle like projection often from the tip or back of an organ
Axil	The upper angle between the leaf and the stem.
Axis	The longitudinal supporting structure around which organs are borne, e.g., a stem bearing leaves.
Barbellate	Barbed, having or covered with protective barbs or quills or spines or thorns or setae
Basal	At the base.
Basiscopic	Pointing towards the base
Beak	A prominent extension of an organ
Bifid	Deeply split into two lobes.
Bifurcate	Divided into two.

Term	Definition
Biosecurity	Preventing, eradicating, controlling and managing risks posed by pests and diseases.
Biotic	Pertaining to the living parts of the environment
Bipinnate	With each primary pinna divided to the midrib into a secondary pinna
Biserrate	Doubly serrate.
Blade	The flattened part of a leaf.
Blunt	Not pointed at the ends
Bog	A quagmire covered with specialised plants including sphagnum moss, grasses, sedges, rushes, sundews, umbrella ferns and other plants; has wet, spongy ground, a marsh-plant community on wet, very acid peat. Fed only by rainfall.
Bottleneck	A genetic term; refers to the fact that in smaller populations there could be lower genetic variability
Brachyblasts	Short shoots
Bract	A reduced leaf or leaf-like structure at the base of a flower.
Bracteate	Bearing bracts: leaves or leaf-like structure reduced at the base of a flower.
Bracteolate	With small bracts.
Bracteole	A small bract.
Bracteoles	Bracts directly below the flower
Brevideciduous	Brief (1 month or less) loss of most leaves from the canopy just before flowering or during flushing of a new cohort of leaves.
Bryophyte	Plant group including mosses, liverworts and hornworts
Bryophytes	Plant group including mosses, liverworts and hornworts
Bulbil	A bud produced vegetatively on the stem or frond that is capable of breaking of and growing into a new plant
Bullate	With rounded projections covering the surface as if blistered
Caespitose	Growing in dense tufts
Calli	Circular, warty, stalked thickenings commonly found on the lip (labellum) of the orchid (plural of callus).
Callose	Hardened or thickened.
Callus	Stalked thickening on the lip (labellum) of an orchid.
Calyx	The group of sepals, or outer floral leaves, of a flower
Campanulate	Bell-shaped.
Canaliculate	With longitudinal channels or grooves.
Canopy	The uppermost cover formed by the branches and leaves of trees or the spread of bushes,shrubs and ground covers.
Canopy closure	Stage where canopies of shrub and tree species meet.
Canopy manipulation	Selectively removing vegetation to create gaps to facilitate natural invasion of native plants, or to plant later successional plants.
Capillary	Hair-like
Capitula	Plural of capitulum: A dense head-like inflorescence of many flowers as occurs in most Asteraceae (daisies)
Capitulum	A dense head-like inflorescence of many flowers as occurs in most Asteraceae (daisies)
Capsule	A dry fruit formed from two or more fused carpels that splits open when ripe.
Carbon sinks	Carbon locked away, or sequestered e.g. by trees
Carpel	One unit of the female part of a flower that consists of a basal seed-bearing ovary joined to a receptive stigma by a stalk-like style.
Cauda	Tail-like appendage. (pl. caudae; adj. caudate)
Caudex	The axis of a woody plant, esp. a palm or tree fern, comprising the stem and root.
Cauline	Belonging to the stem, as in cauline leaves emerging from the stem.
Cerise	Bright or deep red.
Chartaceous	Having a papery texture.
Chlorophyll	The green pigment of plants.
Chlorotic	Lacking chlorophyll, therefore yellowish, suffering from chlorosis.
Cilia	Short small hair–like structures on a cell or microorganism
Ciliate	With small hairs (cilia).
Ciliolate	Diminutive of ciliate, i.e., having very small hairs
Cladode	Flattened stem with the function of a leaf
Cladodes	Usually flattened, photosynthetically active branches, these may be leaf–like (e.g., Phyllocladus) or branch–like (e.g., Carmichaelia)
Clavate	Club-shaped, gradually widening towards apex.
Cleft	Having indentations that extend about halfway to the center, as in certain leaves.
Cleistogamous	Flowers that self-fertilise without opening.
Coherent	Sticking together of like parts.
Column	Stamen and stigmas fused to form a single organ.

Term	Definition
Columnar	Shaped like a column
Composite	many small flowers tightly packed together e.g., daisy flowers.
Compound	Composed of several similar parts (cf simple)
Concave	Curved inward.
Concolorous	Of the same colour.
Conical	Cone-shaped.
Connate	Fusion of like parts.
Conspecific	Individuals of the same species.
Cordate	Heart-shaped with the notch at the base.
Coriaceous	Leather–like; thick, tough, and somewhat rigid.
Corolla	The whorl of petals of a flower.
Corymb	Modified raceme where stalks of lower flowers are elongated to same level as the upper flowers.
Cosmopolitan	A species or other taxonomic group that is distributed widely throughout the world.
Costa	The midrib
Crenate	With rounded teeth (bluntly toothed) along the margin.
Crisped	Margin tightly wavy or crinkled, curled or wavy.
Cristate	With a crest.
Crown	The growing point of an upright rhizome or trunk. This usually produces a tuft or ring of fronds.
Crura	The two small projections at the mouth of a utricle in Carex
Cucullate	Hood-shaped.
Culm	The erect stem of a grass.
Cuneate	Wedge-shaped.
Cupular	Cup-shaped.
Cuttings	Stems and/or leaves taken from plants for propagation
Cyathium	A cup-like structure that surrounds the inflorescence in Euphorbia
Cyme	Inflorescence at the terminus of a branch and where new flowering branches emerge laterally below the flower.
Cytorace	Populations (or infraspecific taxa) that differ in chromosome number or chromosome morphology, e.g., Nematoceras trilobum agg. has two cytoraces, a diploid and a tetraploid (in which the chromosomes are doubled).
Cytotype	Populations (or infraspecific taxa) that differ in chromosome number or chromosome morphology, e.g., Nematoceras trilobum agg. has two cytotypes, a diploid and a tetraploid (in which the chromosomes are doubled).
Deciduous	Marked leaflessness in winter, and greater than 90% leaves lost by beginning of spring flush.
Decrescent	Diminishing.
Decumbent	With a prostrate or curved base and an erect or ascending tip.
Decurrent	Attached by a broadened base.
Decurved	Curved downward.
Deflexed	Bent abruptly downward.
Dehiscence	The time of opening at maturity to release the contents, e.g., a capsule releasing the seeds.
Dehiscent	Splitting open at maturity to release contents (of a fruit).
Deltoid	Shaped broadly like an equilateral triangle.
Dentate	Toothed along the margin with the teeth pointing outward, not forward.
Denticles	minute teeth
Denticulate	having a very finely toothed margin
Dichotomous	Divided into two equal branches.
Digitiform	Finger-like.
Dioecious	Having male and female flowers on separate plants of the same species.
Diploid	With two complete sets of chromosomes in each cell.
Disarticulating	Separating at a joint.
Discoid	Disc-shaped.
Disjunct	A species or other taxonomic group that occupies areas that are widely separated and scattered and therefore have a discontinuous distribution.
Distal	Toward the apex, away from the point of attachment (cf. proximal).
Distichous	In two rows on opposite sides of the axis.
Divaricating	Branching at a very wide angle with stiff intertwined stems.
Domatia	small structures on the lower surface of a leaf in some woody dicotyledons, located in the axils of the primary veins and usually consisting of depressions partly enclosed by leaf tissue or hairs.

Term	Definition
Dorsal	Of the back or outer surface relative to the axis. (cf. ventral)
Drupe	A stone fruit, the seed enclosed in a bony covering (endocarp) which is surrounded by a + fleshy layer (mesocarp)
Early successional species	Plants which are able to colonise an open area after disturbance but which are often temporary and are replaced by taller plants in time and shaded out.
Echinate	having sharply pointed spines or bristles.
Ecological district	A characteristic landscape and biological community defined in the PNA (Protected Natural Area) programme.
Ecological restoration	Attempt to reinstate original (pre-disturbance) state of a habitat, plant community or ecosystem.
Ecosourced	Plants sourced from seed collected from similar naturally growing plants in the area of the planting site.
Ecosourcing	Using native plants grown from locally grown seeds. Eco-sourced plants help to preserve the ecological distinctiveness of an area, and ecosourced plants fare better and are adapted to survive in the local conditions.
Eglandular	Without glands.
Elaiosome	Fleshy, oil-rich structure attached to seed that attracts ants which act as dispersers.
Ellipsoid	Elliptic in long section and circular in cross-section.
Elliptic	Broadest at the middle
Emarginate	With a notch at the apex.
Emarginated	Having a shallow notch at the tip, as in some petals and leaves.
Emergent	In an aquatic sense - wetland herbs that are rooted in the substrate below water level, but carry leaves and stems above the water level e.g. rushes and raupo. Found on the shallow margins of lakes, ponds and waterways. In a forest sense - tree that is appearing above the surrounding canopy.
Emergent marginals	An aquatic plant having most of its structure above water. Other aquatic plants are submerged or floating.
Endemic	Unique or confined to a place or region, found naturally nowhere else.
Endophyte	An endosymbiont (usually a bacterium or fungus) that lives within a plant for at least part of its life without causing any apparent disease.
Endophytes	Endosymbionts (usually bacteria or fungi) that live within plants for at least part of their lives without causing any apparent disease.
Endosperm	The nutritive tissue of a seed, consisting of carbohydrates, proteins, and lipids.
Enrichment planting	Returning to a revegetation site and creating gaps, or filling existing gaps, with different plants of plants, usually later successional plants which may not have survived being planted in the first phases of the project.
Ensiform	Sword shaped
Entire	Smooth. Without teeth, notches or divisions.
Entomophilous	Pollinated by insects.
Epicalyx	Calyx–like structure outside, but close to, the true calyx.
Epigeal	Growing on or close to the ground or emerging from the ground after germination (often used for cotyledons).
Epiphyte	A plant that grows upon another plant but is not parasitic and does not draw nourishment from it.
Epiphytic	Growing upon another plant but not parasitic and not drawing nourishment it
Erose	Irregularly toothed, as if gnawed.
Estuarine	Pertaining to the meeting of freshwater and seawater wetlands.
Ethnobotany	The study of people's classification, management and use of plants.
Eusporangia	Sporangia that arise from groups of epidermal cells
Evanescent	Lasting a very short time or running a short distance.
Ex situ	Away from the place of natural occurrence.
Ex-situ	Maintenance of plants as live specimens or propagules in cultivation as insurance against the loss of wild populations and as source for material for translocation.
Excurrent	Having the axis prolonged to form an undivided main stem or trunk (as in conifers).
Extravaginal	Outside an enclosing sheath
Falcate	Hooked or curved like a sickle.
Fastigiate	Branches erect and close to central axis.
Fen	A type of wet land that accumulates peat deposits. Fens are less acidic than bogs, deriving most of their water from groundwater rich in calcium and magnesium.
Ferrugineous	Rust–like (a colour term)
Fertile frond	Fronds that bear sporangia.
Filamentous	Resembling a filament.
Filiform	Thread like, resembling a filament.
Filiramulate	Branching at a very wide angle with stiff intertwined stems.
Fimbriae	Plural of fimbria: Fringe. A fimbria is composed of many fimbrillae (individual hair-like structures).
fimbriate	With fringes.
Flabellate	Fan shaped.
Flaccid	Limp, not rigid, flabby.
Flange	A projecting rim.

Term	Definition
Flexuose	With curves or bends.
Floccose	Having tufts of soft woolly hairs
Floret	A small flower, usually one of a cluster - the head of a daisy for example.
Foliaceous	Leaf-like.
Foliolate	Having leaflets.
Founder effect	When a small number of plants (and therefore their genes) from a larger population are selected some genetic information is lost.
Frond	A leaf, the complete leaf of a fern including the stipe and lamina
Fulvous	Orange–yellow.
Funneliform	Funnel-shaped.
Fusiform	Broadest near the middle and tapering toward both ends.
Galea	Helmet- or hood-shaped.
Galeate	Shaped like a helmet or hood.
Gametophyte	A plant that produces sperm and egg cells and in which sexual reproduction takes place - in ferns this is known as the prothallus
Gene pool	The mixture of all genes and gene variations of a group or population.
Genetic diversity	The variety of genes in a plants or populations.
Genetic variation	Differences displayed by individuals within a plant which may be favoured or eliminated by selection.
geniculate	abrubtly bent
Genus	A taxonomic rank of closely related forms that is further subdivided in to species (plural = genera). In a scientific name (e.g., Sicyos australis), the first word is the genus, the second the species.
Gibbous	Swollen or enlarged on one side, as in a gibbous moon.
Glabrescent	Lacking hair or a similar growth or tending to become hairless
Glabrous	Without or devoid of hairs, smooth.
Gland	A structure that secretes a sticky or oily substance.
Glandular	A structure that secretes a sticky or oily substance.
Glaucous	Covered with a fine, waxy, removable powder that imparts a white or bluish cast to the surface.
Gley	A soil prone to seasonal inundation.
Globose	Globe-shaped.
Glume	One of two bracts at the base of a grass spikelet.
Groundwater	Groundwater is the water beneath the surface that can be collected with wells, tunnels, or drainage galleries, or that flows naturally to the earth's surface via seeps or springs. Groundwater is the water that is pumped by wells and flows out through springs.
Gymnosperm	Plants in the class Gymnospermae that have seeds which are not enclosed in an ovary.
Gynodioecious	A species population containing plants that produce bisexual (perfect) flowers, and plants that produce only female (pistillate) flowers.
Gynoecium	The female reproductive organs of a flower; the pistil or pistils considered as a group. Means literally "womans house" i.e., the overall structure that contains the female sex organs
Hastate	Spear like. Shaped like an arrowhead, but with basal lobes pointing outward rather than downward.
Haustorium	The absorbing organ of a parasite or hemiparasite
Hemi–parasite	Obtains water and nutrients from the roots of other plants but also manufactures food through photosynthesis.
Hemi–parasitic	Obtaining water and nutrients from the roots of other plants then manufacturing food through photosynthesis.
Herbarium	The place where collections of dried/pressed plants are kept.
Hermaphrodite	Having both male and female sexual characteristics and organs.
Heteroblastic	Exhibiting differences in leaf shapes or forms in juvenile and adult phases of the plant.
Heteroblasty	The state of being heteroblastic (i.e., exhibiting differences in leaf shapes or forms in juvenile and adult phases of the plant).
Hirsute	Hairy.
Hyaline	Membranous, thin and translucent.
Hybrid	An individual that is the offspring of a cross between two different varieties or species.
Hybridise	Breeding with a member of a different plant or type.
Hydrophyte	A plant species adapted to growing in or on water or in wet situations. Aquatic or semi-aquatic.
Hymenium	The fertile, spore–bearing layer of a fruitbody.
Hypanthium	A ring–like, cup–shaped, or tubular structure of a flower on which the sepals, petals, and stamens are borne.
Imbricate	Overlapping.
imbricating	Overlapping.
Imparipinnate	Odd–pinnate, a leaf shape; pinnate with a single leaflet at the apex.
In-situ	On site conservation relating to the maintenance of plants in the wild.
Inbreeding	Genetic similarity in offspring of closely related individuals.

Term	Definition
Incoherent	Not sticking together.
Incursion	Entrance of a pest into an area where it is not present
Indumentum	A covering of fine hairs (or sometimes scales)
Indusia	Plural of indusium, a membrane covering a sorus of a fern
Indusium	A thin tissue that covers the sorus in many ferns. Plural: indusia.
Inflorescence	The arrangement of flowers on the stem. A flower head.
Infundibuliform	Funnel–like.
Interkeel	The space between the keel and the leaf blade
Internode	The part of an axis between two nodes; the section of the stem between leaves.
Internodes	Part of a stem between two nodes.
Intramarginal	Within or near the margin.
Involucral bracts	The scales surrounding the flower head or capitula.
Involucre	A group of bracts surrounding a flower head.
Involute	With margins rolled inward toward the upper side.
Irritable	Responding to touch.
Jugate	Paired.
Juvenile	A plant of non-reproducing size.
Keel	A prominent or obvious longitudinal ridge (as in a boat).
Labellar	Pertaining to the labellum: a lip; in orchid flowers referring to the middle petal which usually differs in size, shape or ornamentation from the two lateral petals.
Labellum	A lip; in orchid flowers referring to the highly modified middle petal which usually differs in size, shape or ornamentation from the two lateral petals.
Lacinia	A jagged lobe.
Laciniae	Jagged lobes.
Laciniate	Cut into narrow, irregular lobes or segments.
Lacustrine	Of or having to do with a lake, of, relating to, or formed in lakes, growing or living in lakes.
Lamina	The expanded flattened portion or blade of a leaf, fern frond or petal.
Lanceolate	Lance-shaped; of a leaf several times longer than wide with greatest width about one third from the base, tapering gradually to apex and more rapidly to base
Lateral	On or at the side.
Lax	With parts open and spreading, not compact.
Laxly	With parts open and spreading, not compact
Leaflet	One section of a compound leaf.
Lemma	The lower of two bracts enclosing the flower in grasses.
Lenticillate	Bark that is covered in fine lenticles (breathing pores)
Ligulate	Strap–like, tongue–shaped
Ligule	The membrane between the leaf and the stem of a grass; the "petal" of a ray floret in a composite inflorescence
Linear	Long and narrow with more or less parallel sides.
Littoral	Occurring at the border of land and sea (or lake). On or pertaining to the shore. The shallow sunlit waters near the shore to the depth at which rooted plants stop growing.
Lobe	A recognisable, but not separated, rounded division or segment of a leaf or pinna. Used to describe ferns and leaves in Cotula and Leptinella.
Lobed	Part of a leaf (or other organ), often rounded, formed by incisions to about halfway to the midrib.
Lobule	A small lobe or sub-division of a lobe
Lustrous	Glossy, shiny.
Lycophytes	Seedless vascular plants that belong to the phylum Lycophyta (characterised by microphylls -primitive leaves found in ancient plants).
Lyrate	Pinnatifid or pinnatisect terminal lobe much larger than lower lobes.
Maculate	Blotched or spotted.
Mangrove	Coastal wetland dominated by Manawa or mangrove Avicennia marina var. resiifera. Northern New Zealand only, salt marsh replaces it further south.
Margin	The edge or border of a leaf
Marine	Pertaining to the sea and saltwater systems.
Marsh	A tract of wet land principally inhabited by partially-submerged herbaceous vegetation. Has fewer woody plants than swampier habitats.
Mealy	Dry, powdery, crumbly.
Median	In the middle.
Membranous	Very thin, like a membrane.
Mid-lobe	The middle part into which a leaf is divided.
Midrib	The central or principal vein of a leaf or pinna of a fern.
Mire	Synonymous with any peat-accumulating wetland. Term covers bogs and peaty swamps, fens, carr, moor, muskeg and peatland. Term excludes marsh which is non-peat forming.

Term	Definition
Molecular techniques	Where proteins and genes are used to investigate plant relationships
Monitoring	Recording of quantitative data over time to document changes in condition or state of species or ecosystems.
Monoecious	Having male and female flowers on the same plant of the same species.
Montane	Land between 300 and 800 metres above sea level.
Mucronate	Tipped with a short, sharp, point.
Mucronulate	Having a very small mucro; diminutive of mucronate.
Multi-annual evergreen	Overlapping annual cohorts of leaves always present.
Multifid	Cleft into many lobes or segments
Multiseptate	With many septa.
muricate	Rough with short, hard points like the shell of Murex, a genus of tropical sea snails with elaborately pointed shells.
Mycorrhiza	A symbiotic relationship between a fungus and a plant.
Mycorrhizal associations	Symbiotic association between fungi and plant roots which assists plant health by allowing increased ability for uptake of nutrients and promote plant growth.
Napiform	A long swollen but tapering root – like a parsnip, or carrot.
Native	Naturally occurring in New Zealand (i.e., not introduced accidentally or deliberately by humans).
naturalised	Referring to plants that have escaped from cultivation (including gardens or forest plantations) and can now reproduce in the wild (without human assistance)
Nectary	Organ that produces nectar.
Nerve	Prominent vein or rib.
Nerves	Strands of conducting and usually strengthening tissue in a leaves or similar structures
Net veins	Veins that repeatedly divide and re-unite.
Net venation	Feather-like or hand-like venation on a leaf.
Nival	Growing at high altitudes. From Latin: nivalis, snowy etc. from nix, nivis, snow.
Node	The point at which leaves, branches or roots arise on a stem.
Ob-	Prefix meaning inverted, in reverse direction.
Obcordate	Heart shaped with the notch at the apex.
Oblanceolate	Tapering and widest towards the apex or inversely lanceolate.
Oblique	Slanting; of a leaf, larger on one side of the midrib than the other, in other words asymmetrical.
Oblong	Rectangular.
Obovate	Roughly elliptical or reverse egg shaped and widdest near the apex (i.e., the terminal half broader than the basal half).
Obtuse	Blunt or rounded at the apex, with the sides meeting at an angle greater than 90°.
Operculate	With a small lid.
Opposite	A pair of organs attached at nodes in pairs on either side of a stem or axis.
Orbicular	Almost or approximately circular.
Outbreeding depression	A reduction in vigor of offspring from distant parents. It can occur when a locally adapted population is moved and mixed with plants adapted to different conditions.
Outer canopy deciduous	Marked reduction in leaf number in the outer canopy in exposed high light environments over winter.
Oval	Planar, shaped like a flattened circle, symmetrical about both the long and the short axis; about twice as long as broad, tapering equally both to the tip and the base. Synonymous with elliptical.
Ovary	Part of a flower containing the ovules and later the seeds.
Ovate	Egg-shaped and widest at base.
Ovoid	Oval; egg–shaped, with rounded base and apex.
Pakihi	A term which in its strict sense refers to open clears within forest dominated by low scrub and rushes. However, more usually used to refer natural and induced wetlands and their associated shrublands. A vernacular most frequently used in the West Coast for impoverished soils and their associated peats, left after forest has been cleared
Palea	The small upper bract enclosing the flower of a grass
palea	1. The upper of the two bracts that enclose each floret in a grass spikelet. 2. A small bract at the base of a disc floret in some plants of the composite family. 3. Scales on various parts of ferns (referred to as paleate or paleaceous). From the Latin word for 'chaff'.
paleae	Plural of palea, from the Latin word for 'chaff'. 1. The upper of the two bracts that enclose each floret in a grass spikelet. 2. A small bract at the base of a disc floret in some plants of the composite family. 3. Scales on various parts of ferns (referred to as paleate or paleaceous).
Palmately	Radiating from a point, as fingers radiating from the palm of a hand.
Palmatifid	Deeply divided into several lobes arising from more or less the same level.
Palmatisect	Intermediate between palmate and palmatifid, i.e. the segments are not fully separated at the base; often more or less digitate.
Palustrine	Pertaining to wet or marshy habitats. Term covers mires and marshes
Pandurate	Fiddle-shaped.
Panicle	Highly branched (multiple raceme).

Term	Definition
Papilla	A short rounded projection.
Papillae	A soft, fleshy projection, usually small and nipple–like.
Papillate	With short rounded projections.
Papillose	Warty, with short rounded projections or gland-dotted
Parallel venation	Veins are parallel along leaf.
Parasite	An organism that derives all its nourishment from its host.
Patent	Spreading or expanded, e.g., spreading petals.
Peat	A mass of partially carbonised plant tissue formed by partial decomposition in water of various plants and especially of mosses of the genus Sphagnum, widely found in many parts of the world, varying in consistency from a turf to a slime used as a fertiliser, as stable litter, as a fuel, and for making charcoal. Partially carbonized vegetable matter saturated with water; can be used as a fuel when dried. A type of soil deriving from dead organic material situated in a wet area, where the reduced amount of [[oxygen available in the wet conditions results in the organic material not decomposing as much as it usually would do so in the presence of more oxygen. Used in growing media. Represents an important carbon sink –drainage of peat releases large amounts of carbon (CO_2) to the atmosphere.
Pedicel	The stalk of a single flower in an inflorescence or fruit (either in a cluster or existing singularly).
Peduncle	The stalk of a solitary flower or the main stalk of an inflorescence or flower cluster.
Pedunculate	Describing fruits, which are borne on a stalk (a peduncle).
Pellucid	Transparent.
Peltate	Shield-like, with the stalk attached well inside the margin
Pendent	Hanging down from its support
Pendulous	Hanging or drooping.
Penicillate	With a tuft of hairs at the end, like a brush.
Perennial	A plant lasting for three seasons or more
Perianth	A collective term for the calyx (sepals or tepals) and corolla (petals) of the flower, especially when these are indistinguishable
Petal	Part of flower inside the sepals; usually coloured.
Petiolate	Having a petiole.
Petiole	Leaf stalk.
phloem	The vascular tissue in land plants that is primarily responsible for the distribution of sugars and nutrients manufactured in a shoot.
Photopoint	A monitoring technique where repeat photos are taken of the same scene from the same point over a period of time in order to quantify changes.
Pilose	Bearing long, soft hairs.
Pinna	A segment of a divided lamina that is classified as primary, secondary or tertiary according to the degree of dissection of the lamina.
Pinnae	Divisions of a pinnate leaf
Pinnate	With leaflets arranged regularly in two rows on either side of a stalk as in a feather; the lamina on a fern is divided into separate pinnae
Pinnatifid	Pinnately lobed, cleft more than halfway to the midrib. Not cleft all the way to the rachis.
Pinnatisect	Pinnately divided almost to midrib but segments still confluent.
Pioneer	Plant species are hardy species that should be planted first to establish a good canopy cover that restricts weed growth and promotes natural regeneration. In natural ecosystems these are the first plants to arrive and grow on a site.
Pistil	The female reproductive organ of a flower, consisting of an ovary, style, and stigma.
Pistillate	A flower with one or more pistils, but no stamens.
Plano-convex	Flat on one side, convex on the other.
Plumose	Feathery.
Podzol	Infertile, acidic soil, strongly leached to form a whitish-grey subsoil underlain by a layer enriched in iron, aluminium and organic matter; usually under forest in a wet temperate climate.
Pole	A subcanopy size individual with a long thin trunk and foliage tuft of a potential canopy tree.
Pollinia	Compact masses of orchid pollen.
Population enhancement	Increasing a population for a specific biological purpose, e.g., when a species is already present in an area but extra individuals are added to address a sex imbalance.
Porrect	Extending forward.
Procumbent	Lying and flat along the ground but not rooting
Propagate	To reproduce a plant by sexual (i.e., from seed) or asexual (e.g., from cuttings) means.
Prostrate	A general term for lying flat along the ground. This includes procumbent (that is lying and flat along the ground but not rooting) and decumbent (with a prostrate or curved base and an erect or ascending tip).
Provenance	The place of origin (of a plant that is in cultivation).
Proximal	Toward the base or point of attachment (cf. distal).
Pseudobulb	Thickened surface stem; usually looking like a bulb.
Pseudoterminal	Falsely terminal – as in a bud which appears to occupy a terminal position but does not

Term	Definition
Puberulent	Minutely clad in short, soft hairs
Pubescence	Covering of soft, fine hairs
Pubescent	Covered in short, soft hairs.
Pungent	Ending in a stiff sharp point
Pustule	Small blister-like elevation.
Quadrate	Square, rectangular.
Raceme	An unbranched, elongated inflorescence with pedicellate flowers maturing from the bottom upward i.e., flowers attached to the main stem by short stalks.
Rachis	the axis of an inflorescence or of a compound leaf
Ray	An outer ring of strap-like florets in the head of Asteraceae (daisy) flowers.
Re-introduction	Translocating wild or cultivated individuals to sites where the taxon has been known to occur in the past, but from which it has disappeared.
Recurved	Curved backward.
Reflexed	Bent back on itself
Reniform	Kidney shaped.
Repand	With a slightly wavy margin.
Replum	The outer structure of a pod in which the valves have dehisced (persists after the opening of the fruit)
Restiad	Area dominated by rush-like plants (collectively known as restiads) of the family Restionaceae. Includes Chatham Island and North Island Sporodanthus and oioi (Apodasmia similis)
Retrorse	Pointing backward.
Retuse	A shallow notch at the rounded or blunt apex of a leaf.
Rhizoid	Any of various slender filaments that function as roots in mosses and ferns and fungi.
Rhizomatous	With underground creeping stems.
Rhizome	An underground stem (usually spreading horizontallly or creeping) or short and erect.
Rhombic	Diamond-shaped.
Rhomboid	Diomond shaped, nearly rhombic.
Riparian	Relating to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater.
Riparian margin	Refers to the edges of streams, rivers,lakes or other waterways.
Riparian plants	Refers to plants found growing near the edges of streams, rivers or other waterways.
Riparian zone	A strip of land next to streams, rivers, and lakes where there is a transition from terrestrial (land vegetation) to aquatic (water) vegetation. Also known as “berm”.
Riverine	Pertaining to rivers, streams and such like flowing water systems.
Rootstock	A short, erect, underground stem.
Rosette	A radiating cluster of leaves.
Rostellum	In orchids, a modified stigma that prevents self-fertilisation.
Rosulate	A dense radiating cluster of leaves.
Rugose	Wrinkled.
Rugulose	Having small wrinkles.
Runcinate	Sharply pinnatifid or cleft, the segments directed downward.
Runner	A trailing stem that roots at the nodes.
Rupestral	Growing on rocks.
Rushes	A group of distinctive wetland plants. They have solid stems (grasses have hollow stems), true rushes Juncus sp. have rounded leaves.
Sagittate	Shaped like the head of an arrow; narrow and pointed but gradually enlarged at base into two straight lobes directed downwards; may refer only to the base of a leaf with such lobes; cf. hastate.
Salt marsh	A coastal wetland, with specialized salt tolerant plants (halophytes).
Sapling	A juvenile tree that has reached the stage of 1 or 2 main stems but is still in the shrub layer.
Saprophyte	A plant lacking chlorophyll and living on dead organic matter.
Saprophytic	Lacking chlorophyll and living on dead organic matter.
Sarcotesta	The fleshy, often highly coloured outer layer of the seed coat in some species, e.g., titoki (Alectryon excelsus).
Scabrid	Roughened or rough with delicate and irregular projections.
Scale	Any thin, flat, membranous structure.
Scape	A leafless flower stem.
schizocarp	A fruit which splits when dry, from the Greek skhizein 'split' and karpos 'fruit'
schizocarps	Plural of schizocarp, a fruit which splits when dry, from the Greek skhizein 'split' and karpos 'fruit'
Scutiform	Shield-shaped.
Sedges	A group of grass-like or rush-like herbaceous plants belonging to the family Cyperaceae. Many species are found in wetlands some are forest floor plants. Leaves are usually angular. Hence the saying "rushes are round and sedges have edges".

Term	Definition
Seedling	A newly germinated plant.
Self sustaining	Able to sustain itself, or replace itself, independently of management i.e. regenerate naturally
Self thinning	Natural tree death in a crowded, even-aged forest or shrubland.
Semi-deciduous	Partial leaflessness in winter, and greater than 50% leaves lost by the beginning of spring flush.
Sepal	Outer part of flower; usually green.
Serrate	Sharply toothed with teeth pointing forwards towards apex.
Serrulate	Finely serrate, i.e., finely toothed with asymmetrical teeth pointing forward; like the cutting edge of a saw.
Sessile	Attached by the base without a stalk or stem.
Seta	The stalk of a fruiting moss capsule
Sheath	A portion of an organ that surrounds (at least partly) another organ (e.g., the tubular envelope enclosing the stem in grasses and sedges).
Silicles	The flattened usually circular capsule – compared with the narrow, elongated fruit (silique) – containing the seed/seeds. A term used almost exclusively for plants within the cabbage family (Brassicaceae)
Silique	A capsule, usually 2-celled, with 2 valves falling away from a frame (replum) bearing
Simple	Of one part; undivided (cf compound).
Sinuate	With a wavy margin.
Sinus	The space or recess between lobes; in hebes a gap between the margins of two leaves of an opposite pair that may be present in the bud before the pair of leaves separate.
Sorus	A cluster of two or more sporangia on the margin or underside of the lamina of a fern, sometimes protected by an indusium.
Spathulate	Spatula or spoon-shaped, a rounded blade tapering gradually to the base.
Spheroidal	Almost spherical but elliptic in cross section.
Spicate	Arranged in a spike.
Spike	Flowers attached to main stem without stalks.
Spikelet	Collection of individual grass florets borne at the end of the smallest branch of the inflorescence.
Sporangia	Plural of sporangium. Structures in which spores are produced.
Sporangium	Structure in which spores are produced.
Spore	A single-celled reproductive unit similar in function to that of the seed in a flowering plant.
sporophyte	The spore producing plant in ferns that is usually the visible part.
Stamen	The male reproductive organ of a flower where pollen is produced. Consists of an anther and its stalk.
Stamens	The male, pollen bearing organ of a flower.
Standing water	Where water lies above the soil surface for much of the year.
Stellate	Irregularly branched or star shaped.
Stigma	Female part of the flower that is receptive to pollen, usually found at or near the tip (apical end) of the style where deposited pollen enters the pistil.
Stipe	The stalk of a frond.
Stipitate	Borne on a stipe or stalk.
Stipulate	A leaf with stipules.
Stipule	A scale-like of leaf-like appendage at the base of a petiole, usually paired.
Stolon	A stem which creeps along the ground, or even underground.
Stoloniferous	Producing stolons
Stramineous	Chaffy, like straw or straw-colored.
Stria	A fine line or groove.
Striae	Fine lines or grooves.
Striate	Fine longitudinal lines or minute ridges
Style	The elongated part of the flower between the ovary and the stigma.
Sub-	A prefix meaning under, somewhat or almost.
Subglabrous	Very slightly, but persistently, hairy.
Suborbicular	Slightly rounded in outline
Substrate	The surface upon which an orchid grows.
Subtended	Immediately beneath, occupying a position immediately beneath a structure, i.e., flower subtended by bract
Subulate	Slender and tapering to a point.
Succession	Progressive replacement of one species or plant community type by another in an ecosystem.
Successional	Referring to species, plant communities or habitats that tend to be progressively replaced by another.
Succulent	Fleshy and juicy.
Summer-green	Used in New Zealand to indicate herbs or sub-shrubs that die down to a root stock or rhizomatous network.
Supplementary planting	Returning to a revegetation site and creating gaps, or filling existing gaps, with different plants of plants, usually later successional plants which may not have survived being planted in the first phases of the project.

Term	Definition
Surface water	Water present above the substrate or soil surface.
Surveillance	Regular survey for pests inside operational and managed areas e.g. nurseries, standout areas on parks.
Survey	Collection of observations on the spatial distribution or presence or absence of species using standardised procedures.
Sustainable Land Management	The use of farming practices which are sustainable both financially and environmentally including management of nutrient runoff, waste disposal or stock effluent, reducing impacts of nutrients on waterways, preventing erosion and soil loss, and protecting native forest and wetland habitats from stock damage.
Swamp	Low land that is seasonally flooded; has more woody plants than a marsh and better drainage than a bog. They are more fertile and less acidic than bogs because inflowing water brings silt, clay and organic matter. Typical swamp plants include raupo, purei and harakeke (flax). Zonation and succession often leads through manuka to kahikatea swamp forest as soil builds up and drainage improves.
Symbiote	An organism that has an association with organisms of another species whereby the metabolic dependence of the two associates is mutual.
Symbiotic	The relation between two different species of organisms that are interdependent; each gains benefits from the other (see also symbiosis).
Sympatric	Occupying the same geographical region.
Synangia	Structures made up of fused sporangia
Synonym	A botanical name that also applies to the same taxon.
Systematics	The study of taxonomy, phylogenetics, and taxagenetics.
Tabular	Shaped like a rectangular tablet.
Taxa	Taxonomic groups. Used to refer to a group at any level e.g., genus, species or subspecies.
Taxon	A taxonomic group. Used to refer to a group at any level e.g., genus, species or subspecies.
Taxonomy	The process or science of classifying, naming, and describing organisms
Tepal	An individual member of the perianth.
Terete	Cylindrical and tapering.
Terminal	At the tip or apex.
Ternatifid	Leaflets In threes,
Tetrad	A group of four.
Tomentum	A hairy covering of short closely matted hairs.
Translocation	The movement of living organisms from one area to another.
Trifid	Divided into three.
Trifoliate	Having three leaflets.
Trigonous	Three–angled
Tripinnate	With each secondary pinna divided to the midrib into tertiary pinnae
Triquetrous	Triangular in cross section and acutely angled.
Truncate	With the apex or base squared at the end as if cut off.
Tuberculate	Bearing small swellings.
Tubular	Tube-shaped.
turbinate	Top-shaped.
Turgid	Distended through internal pressure
Type locality	The place or source where a holotype or type specimen was found for a species.
Ultramafic	A type of dark, usually igneous, rock that is chemically dominated by magnesium and iron-rich minerals, the partially metamorphosed form of which is serpentinite.
Umbel	Umbrella like; the flower stalks arise from one point at the stem.
Undulate	Wavy edged.
Undulose	Wavy edged.
Unitubular	A tube partioned once – literally one tube (compare – multitubular – many tubes)
Utricle	A thin loose cover enveloping some fruits (eg., Carex, Uncinia)
Valvate	Opening by valves.
Vascular plant	A plant that possesses specialised conducting tissue (xylem and phloem). This includes flowering plants, conifers and ferns but excludes mosses, algae, lichens and liverworts.
Velutinous	Thickly covered with delicate hairs; velvety.
Ventral	Of the front or inner (adaxial) surface relative to the axis. (cf. dorsal)
Vermiform	Worm-shaped.
Vernicose	Glossy, literally as if varnished, e.g., Hebe vernicosa has leafs than appear as if varnished
Verrucose	Having small rounded warts.
Verticillium	A fungus disease that will cause wilting and death.
Villous	Covered with long, soft, fine hairs.
Water table	The level at which water stays in a soil profile. The zone of saturation at the highest average depth during the wettest season.
Wetland	A site that regularly has areas of open water for part or all of the year, or has a water table within 10 cm of the surface for at least 3 months of the year. Wetland ecosystems support a range of plant and animal species adapted to a aquatic or semi-aquatic environment.

Term	Definition
Whipcord	A shrub in which the leaves are reduced to scales that are close-set and pressed against the stem.
Whorl	A ring of branches or leaves arising at the same level around the stem of a plant.