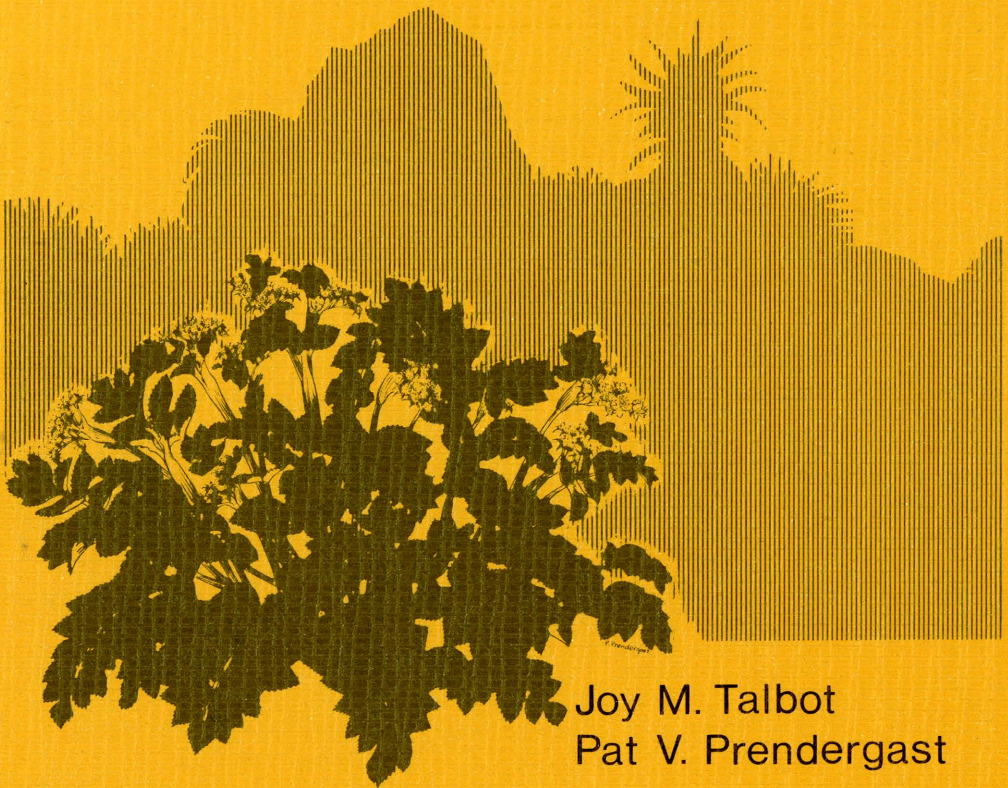


McCaskill **Alpine
Garden**

Lincoln College

A Collection
of High Country
Native Plants



Joy M. Talbot
Pat V. Prendergast

Special Publication No.27 Tussock Grasslands & Mountain
Lands Institute.

McCaskill

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Text: Joy M. Talbot

Illustration & Design: Pat V. Prendergast



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References

The following sources were consulted in the compilation of this manual. They are recommended for wider reading.

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Mark, A. F. & Adams, N. M., 1973: New Zealand Alpine Plants. A. H. & A. W. Reed, Wellington.

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Wilson, H., 1978: Wild Plants of Mount Cook National Park. Field Guide Publication.

Acknowledgement

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June 1984

Introduction

The garden, named after the founding Director of the Tussock Grasslands and Mountain Lands Institute*, is intended to be educational. From the early 1970s, a small garden plot provided a touch of character to the original Institute building, but it was in 1979 that planning began to really make headway. Landscape students at the College carried out design projects, ideas were selected and developed by Landscape architecture staff in the Department of Horticulture, Landscape and Parks, and the College approved the proposals. Construction was completed in time for spring plantings in the same year.

The garden is a collection of plants to provide not only an atmosphere of natural grassland and mountain herbfield, but also to attract attention to the plants that make up those associations. Because many plants are small and rather hidden among the large dominant species, a sense of atmosphere ('being among the tussocks') is of itself unlikely to draw attention to the fascinating denizens of the nooks and crannies. As has always been true, many people climb mountains and tramp through the open country without ever putting their noses to the carpet of plants at their feet. In our educational garden, the beds are therefore raised high, and no point is far from the pathway. In addition, seating enables you to view the plants at eye level.

Many alpine plants demand a good supply of moisture and yet cannot withstand 'wet feet'. On mountain slopes, sub-surface water is always on the move down the slope, and so the plant is supplied without any pooling effects around its roots. In this raised garden, good drainage is provided to achieve this. There are heavy layers of gravel below the soil and a gritty mix throughout the soil.

The large rocks in the garden are greywacke, and were selected from an alpine area for their form and lichen covering. The rocks create a focal point and are intended to give a sense of 'altitude' within the garden. In the centre bed, rock scree is spread over the surface to create a pavement of broken stone, and at the same time, a mulch giving a cool root run.

Plant distributions are in a radial pattern around the focal rocks. Like the spokes of a wheel, they extend across pathways to the outer beds. There are seven groupings, representing the geographic spread of seven regions of the New Zealand native grassland flora. The regions and a diagram of their location in the garden are listed on page 36.

Typical plants of each region were sought, and especially those that help to make the regions distinctive. The collection therefore, includes the physiognomic dominants — the larger plants that confer on a vegetation its basic form and appearance. A tall tussock grassland is very different from a short tussock grassland, although some plant species may be common to each. The same species of tussocks and mountain daisies, for example, may therefore be found growing in different regional areas in the garden. The inclusion of shrubs and small trees is a recognition that grasslands and herbfields are frequently integrated with other vegetation types. The woody species furthermore, add greatly to the landscaping use of texture, form and height within the garden.

Below the vegetation canopy are the less obvious plants — diverse in their growth form and habits — cushion plants, herbs, and mats. Like all gardens, ours requires regular weeding and care is necessary that some alpine plants themselves do not become weeds by outgrowing the less vigorous species. In the summer months, regular nightly watering is controlled by an automatic sprinkler system.

Line drawings by Pat Prendergast are intended as impressions of plants in the garden and should not be used elsewhere for reliable species identifica-

tions. Many of the original sketches were made in the garden itself, as plants flowered and attracted attention during the succession of seasonal changes. Others were done in the field, but illustrate plants included in the garden.

The text has been written by Joy Talbot, a botanist. The emphasis is on relationships — the meanings behind the names, the natural habitats of plants (abbreviated as 'Ha' in the text) and geographic distributions (abbreviated as 'Di' in the text). The relationships between genera and the families in which they are grouped is alphabetically arranged in the annotated index. To find information on the genus of an illustrated plant, first look alphabetically for the family name. For example, to find the meaning and relationships of *Celmisia*, look under the family name Compositae (Daisy family), shown with the illustration for any of the *Celmisia* species.

E. G. White

* In May 1982, the Institute merged with the Joint Centre for Environmental Sciences to become the Centre for Resource Management.

***Acaena inermis* Hook.f. — spined form**

Scarlet Bidibid

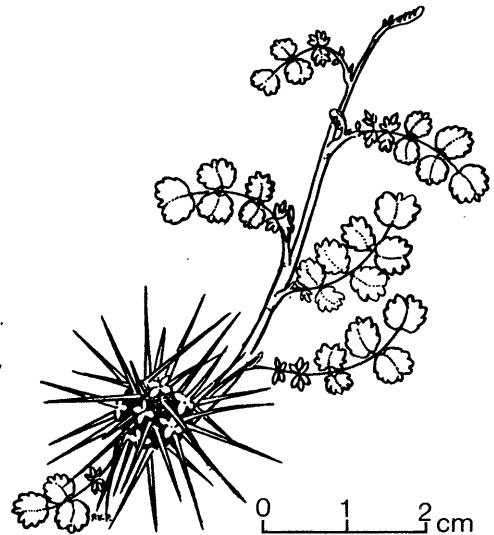
inermis = unarmed

ROSACEAE

Ha: Montane to subalpine riverbeds, fans, tussock grassland.

Di: South Island mainly east of Main Divide, uncommon.

Creeping and rooting herb forming patches. Leaves small, purplish or bronze-green (bright green in shade). Stipules undivided. Heads numerous, brown-green, anthers white. Developing conspicuous red, unbarbed, spines.



***Aciphylla aurea* W. R. B. Oliver**

Golden Spaniard

aurea = golden

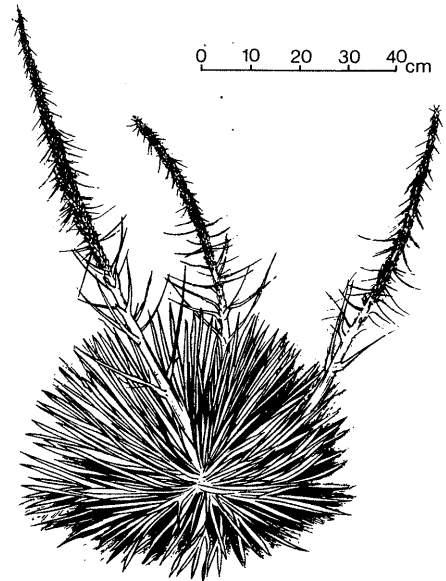
UMBELLIFERAE

Ha: Montane to low alpine well drained sites in tussock grassland, shrubland, open scrub and on rock outcrops. It may overlap with *Aciphylla scott-thomsonii*, the largest spaniard, in higher rainfall regions. It has replaced snow tussocks in many areas of run country because of its resistance to fire and sheep grazing.

Di: Marlborough and Nelson southwards to northern Southland, mostly east of the Main Divide.

Large clumps of rigid, spear-like, orange-green leaves, growing singly or in small groups. Lowest leaf segments very long, golden edges of leaflets rough. Flower stems spiky, about 1m tall — male stems broad with dense clusters of pinkish-white flowers; female stems narrower, persisting to bear dark brown seed clusters.

A male plant is pictured with its dying flower spikes.



***Aciphylla monroi* Hook.f.**

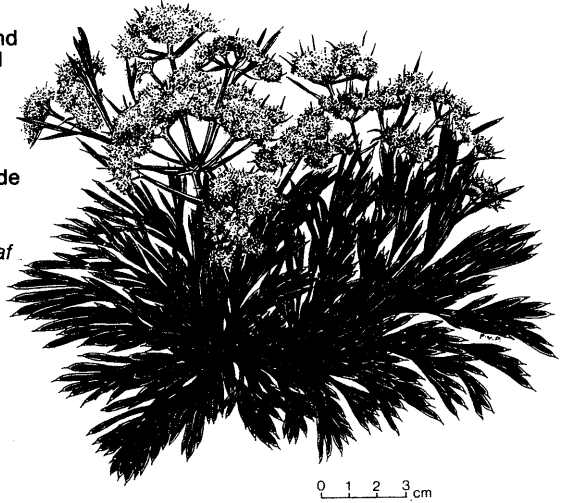
monroi = after Monro, early plant collector

UMBELLIFERAE

Ha: Montane to subalpine open, eroding snow tussock grassland of the eastern mountains extending inland to more wet sites in mixed snow tussock-scrub and snow tussock-herbfield.

Di: South Island, south along and east of the Main Divide to mid-Canterbury.

Small, green tufts with many crowded leaves, each leaf with 2-8 yellow-edged leaflets. Flower clusters yellow, distributed evenly on usually elongated orange stalks.



0 1 2 3 cm

***Anisotome pilifera* (Hook.f.) Ckn. et Laing**

Bristly Mountain Carrot

pilifera = hairy-referring to the leaf segment tips

UMBELLIFERAE

Ha: Low to high alpine rocky sites, especially ledges and crevices. Very palatable, hence virtually eliminated from accessible sites in herbfield and fellfield by introduced animals.

0 1 2 3 cm

Di: South Island; widespread, but absent from all but the more westerly ranges of Central Otago.

Blue-green or glossy dark green clumps with distinctive, large, leathery, aromatic leaves. Leaflets very variable ranging from broadly lobed to highly divided in different localities. Stalks often dark purple. Flower clusters white, robust. Seed heads turning brown.



Blechnum penna-marina (Poir.) Kuhn.

Little Hardfern

penna-marina = sea-quill

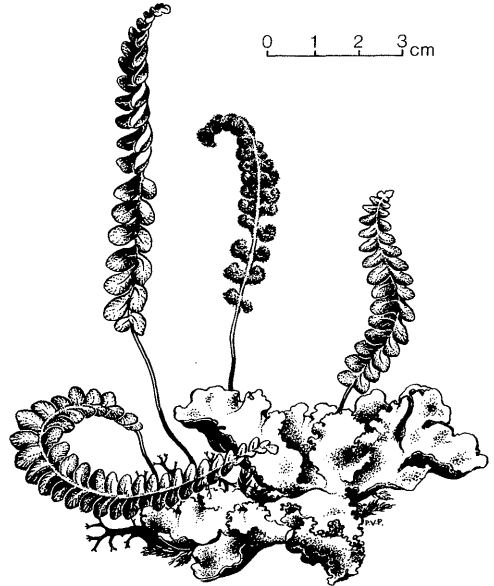
BLECHNACEAE

Ha: Lowland to high alpine — abundant but not important in most habitats.

Di: From South Auckland southwards, also Chatham and Sub-antarctic Islands, Tasmania, Australia and South America.

Small, tough, dark-green fronds arising from wiry, creeping stems. Fertile fronds taller with narrow leaflets, brown or red-brown. Frond height decreases with altitude to only a few cm near its upper limit.

*A dull-green lobed lichen, **Pseudocypbellaria** species and a branching lichen **Cladia retipora** surround the base of the **Blechnum**.*



Bulbinella angustifolia (Ckn. et Laing) L. B. Moore

Maori Onion

angustifolia = narrow-leaved

LILIACEAE

Ha: Montane to low alpine. Locally abundant on moist sites in tussock grassland and herbfield. Also found in depleted tussock grassland.

Di: South Island, east of Main Divide from Hurunui River in North Canterbury southwards.

Tufted plant 20 to 50cm tall with erect, narrow (<1.5cm wide) blunt-tipped leaves. Flowers yellow in heads which exceed leaves, fruit a sessile capsule.

There is no substantiated reference to this genus being eaten by Maoris.



***Cassinia fulvida* Hook.f.**

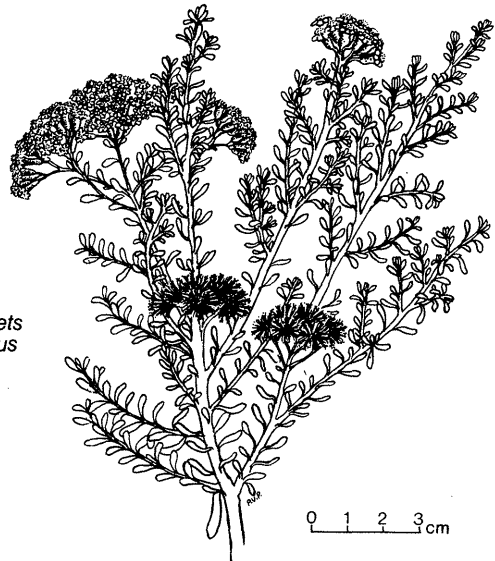
Golden Cottonwood

fulvida = reddish-yellow, tawny
COMPOSITAE

Ha: Lowland to subalpine shrubland.

Di: Opotiki and Rotorua to Stewart Island.

Shrub to 2m tall. Leaves sticky, green above, dense yellowish felt beneath, tiny. Young leaves and branchlets clad completely in sticky yellowish felt. Heads numerous and tiny; fruit fluffy, windborne.



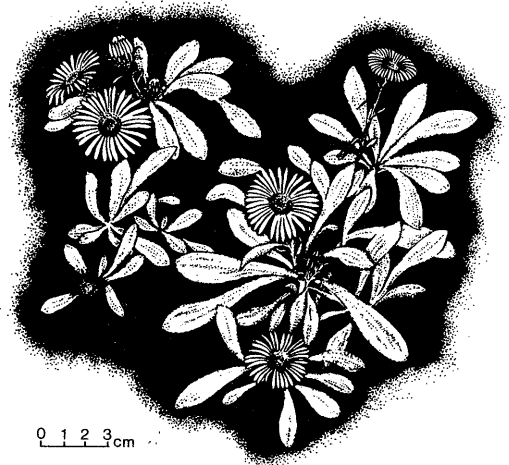
***Celmisia allanii* Martin**

allanii = after Allan, NZ. botanist
COMPOSITAE

Ha: Montane to subalpine grassland and herbfield;
common in snow hollows.

Di: Nelson to N.W. Canterbury.

Sprawling subshrub forming loose patches to 1m across. Leaves to 1.5cm long, in tufts at branch ends, both surfaces covered in fluffy white hairs — upper surface pale grey, lower surface dense soft white. Flower stalks hairy to almost hairless, to 25cm long; flower heads 2-3cm across with, as in all but one ***Celmisia***, white 'petals' (ray-florets) and yellow 'centres' (disk florets).



***Celmisia discolor* Hook.f.**

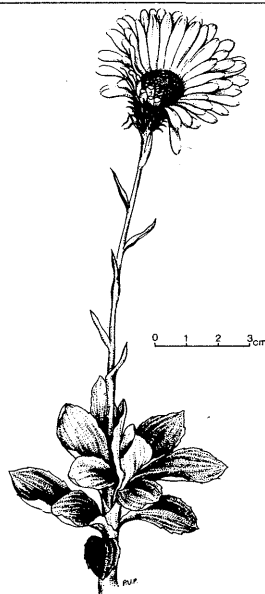
discolor = the two leaf surfaces are of different colours

COMPOSITAE

Ha: Montane to low alpine — in openings in forest and in open areas of snow tussock scrubland, herbfield and rocky places.

Di: South Island — absent in drier eastern regions and south of Westland, otherwise widespread.

Sprawling subshrub forming loose patches of 1 m across. Leathery, toothed leaves form terminal tufts and vary in size and shape. Upper surface usually greyish-green from a thin covering of hairs; dense white felt beneath. Flower stalks sticky, slender; flower head to 3cm wide.



***Celmisia gracilentia* Hook.f.**

Dainty Daisy

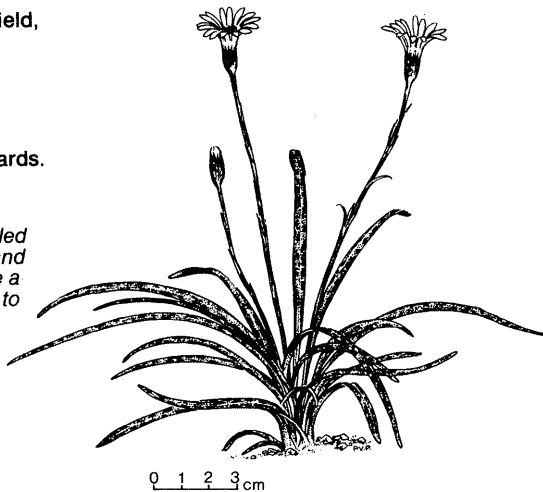
gracilentia = slender

COMPOSITAE

Ha: Lowland to low alpine in a very wide range of communities — scrub, tussock grasslands, herbfield, bogs; also serpentine soils of the mineral belts in Marlborough-Nelson and N.W. Otago.

Di: Widespread from Coromandel Peninsula southwards.

Slender, tufted herb, leaves dark-green above mottled with silver, satiny-white beneath except for midrib and incurved margins. Slender satiny flower stems have a few small dark-tipped bracts and a flower head 1.5 to 3cm across.



***Celmisia hieracifolia* Hook.f.**

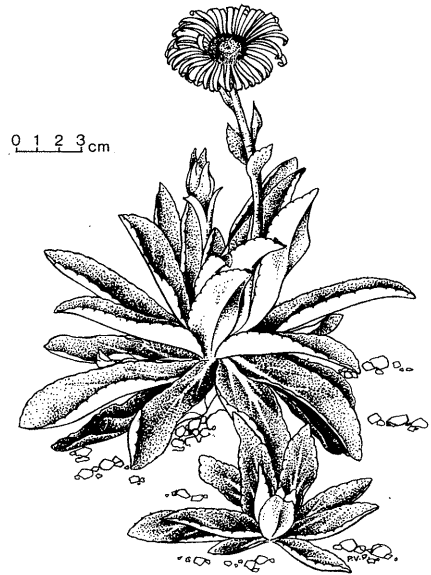
hieracifolia = hawkweed-leaved

COMPOSITAE

Ha: Montane to low alpine, snow tussock-herbfield; often prominent in open places especially fellfield and debris slopes.

Di: North Ruahine and Tararua Ranges; South Marlborough Sounds and parts of Nelson.

Tufted herbs, usually single but sometimes forming extensive patches. Leaves leathery, 4 to 12cm long, dull green and slightly sticky above, pale yellow to buff, dense, satiny hairs below. Leaf margins wavy and toothed. Flower stalks are sticky and bear heads 3-5cm across. A variable species due in part to hybridism.



***Celmisia spectabilis* Hook.f.**

Cotton Daisy

spectabilis = beautiful

COMPOSITAE

Ha: Montane to low alpine. The most versatile *Celmisia*, spanning the widest altitudinal, geographical, climatic and vegetational ranges. On the foothill ranges of Canterbury it becomes abundant as a fire weed following depletion of the tussock cover.

Di: Mt Hikurangi southwards to South Canterbury.

Stout, tufted herb usually in patches to 1m or more across. Very thick, grooved, leathery leaves reach 20cm and are deep to pale shining green above and covered in dense, soft buff to white felt below. Loosely hairy flower stalks bear heads 3-5cm wide.



***Corallospartium crassicaule* (Hook.f.) J. B. Armst.**

Coral Broom

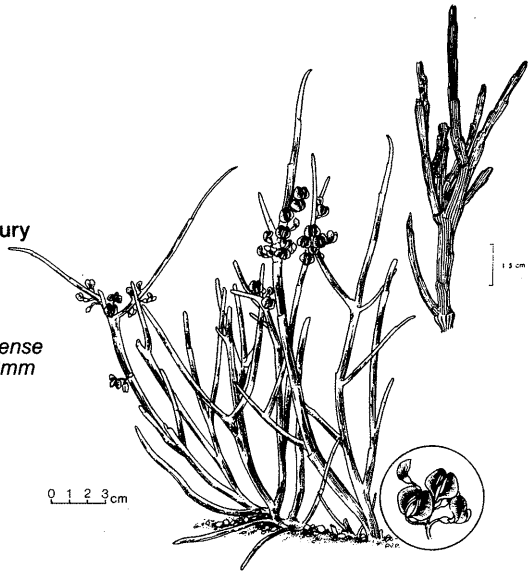
crassicaule = thick stemmed

PAPILIONACEAE

Ha: Montane to low alpine. Local on dry open sites, including rock outcrops, in tussock grasslands.

Di: Mountains east of Main Divide from mid-Canterbury (Mt. Torlesse) to Central Otago (Lake Wanaka).

Rigid, leafless shrub up to 2m tall. Stout, deeply grooved, subcylindrical branches are notched alternatively at 1-2cm intervals. Cream flowers in dense clusters of up to 20 develop at the notches. Pods 6mm long with whitish hairs.



***Cordyline australis* Hook.f.**

Ti, Cabbage Tree

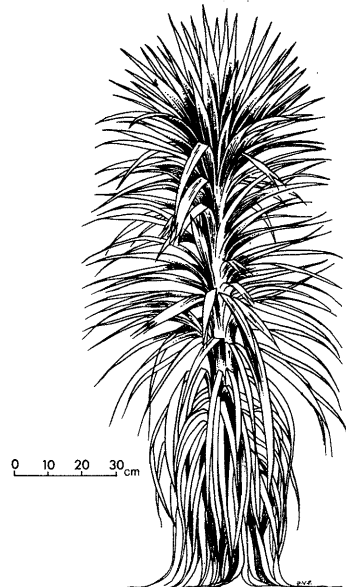
australis = southern

AGAVACEAE

Ha: Lowland to montane forest margins, open places: abundant near swamps.

Di: North, South, Stewart Islands.

Tree reaching 17m. Leaves light-green, narrow (3-6cm wide), bending from base when old. Flowers in large terminal bunches, white. Berries blue-white. A young, unbranched plant is pictured.



The cooked tap roots and tender shoots of all ***Cordyline*** species can be eaten.

***Craspedia lanata* (Hook.f.) Allan**

Grey Woollyhead

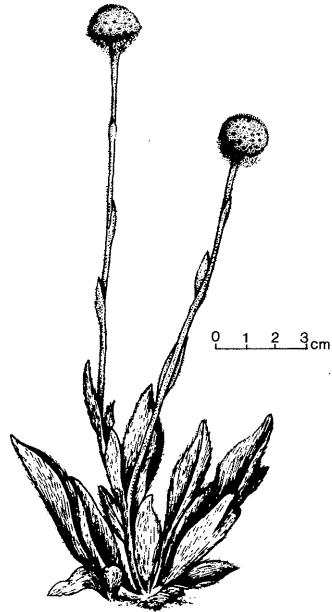
lanata = woolly

COMPOSITAE

Ha: Montane to high alpine tussock grassland, herb-field, fellfield and cushion communities.

Di: Drier eastern and interior mountains from central Marlborough to Otago.

Rosette plants intermediate between *C. uniflora* and *C. incana*. Leaves covered in dense greyish-white felt but less felted than *C. incana* especially on the flower stem; felt may wear off older leaves. Button-like flower heads up to 2cm across, either white or yellow.



***Cyathodes fraseri* (A. Cunn.) Allan**

Patotara Dwarf Heath

fraseri = after Fraser, botanist

EPACRIDACEAE

Ha: Abundant on coastal to low-alpine open, well-drained sites. In alpine areas it is most common in drier sites east of the Main Divide but may be present in stony or rocky places in higher rainfall areas. It also tolerates the ultrabasic soils of the mineral belt.

Di: North, South and Stewart Islands.

A distinctive, rather prickly shrub usually forming open patches. Shoots ascending from prostrate stems carry hard, sharp-tipped, bronze-green leaves. Flowers creamy, scented; fruit orange, sweet and juicy.



Gaultheria crassa Allan

Lily of the Valley Shrub

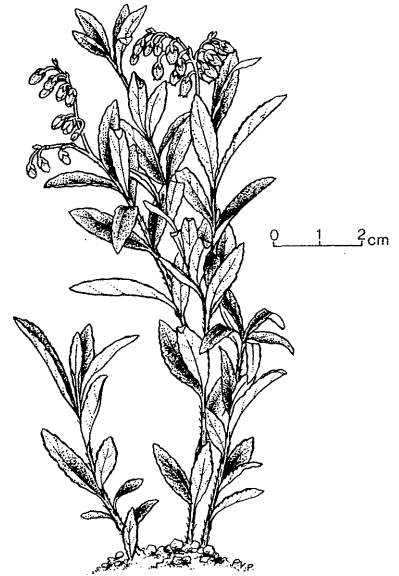
crassa = thick

ERICACEAE

Ha: Montane to subalpine; in most plant communities but especially in scrub, shrubland, grassland and rocky places, reaching the subnival zone.

Di: Ruahine mountains southwards.

Bushy shrub reaching 1m, dwarfed at higher altitudes. Leaves alternate, very thick and rigid, brownish-green, pointed, finely toothed. Flowers creamy-white in long tips, prolific. Fruit a small hard, brown capsule.



Gaultheria depressa var. *novae-zelandiae* Franklin

Mountain Snowberry

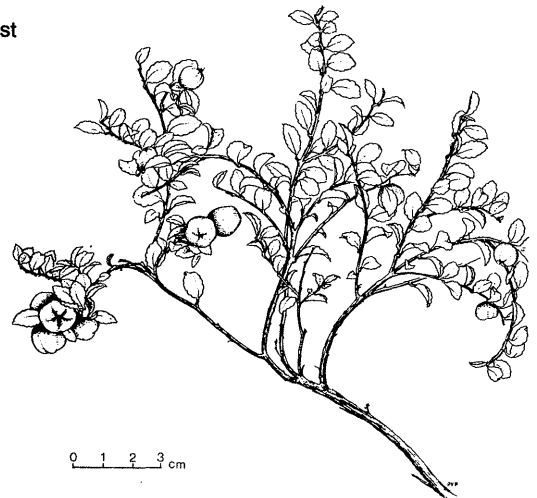
depressa = low growing, *novae-zelandiae* = New Zealand

ERICACEAE

Ha: Open areas in lowland to low alpine grassland, herbfield and rock places; also open montane forest and scrub.

Di: Volcanic Plateau southwards.

Low, spreading shrub usually less than 10cm high. Leaves 4-8mm long, alternate, thick, shiny, toothed; stems and young leaves with dark hairs. Flowers inconspicuous, single, barrel-shaped, white. Fruit (swollen calyx lobes) white, pink or red on different plants, 8-16mm long, succulent and edible.



***Geum parviflorum* Smith**

New Zealand Avens

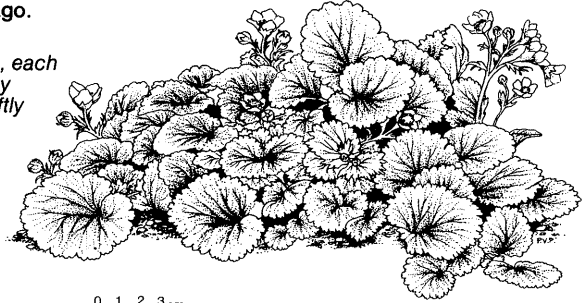
paviflorum = small flowered

ROSACEAE

Ha: Montane to low alpine grassland, shrubland, herbfield including rock crevices and especially in steep, damp places.

Di: North, South Islands also South America. Not found on Volcanic Plateau, Mt Egmont or Central Otago.

One to several tufts of darkish green, hairy leaves, each with a large terminal leaflet. Flowers white on hairy stems up to 30cm tall. Seed head reddish with softly hooked bristles.



0 1 2 3 cm

***Hebe albicans* (Petrie) Ckn.**

albicans = whitish

SCROPHULARIACEAE

Ha: Subalpine to alpine slopes.

Di: Mountains of Nelson.

Low spreading shrub; leaves blue-green, thick, margins bevelled. Flowers white in lateral clusters.



0 1 2 3 cm

***Hebe buchananii* (Hook.f.) Ckn. et Allan**

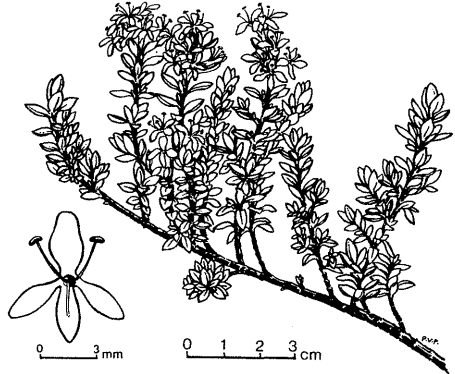
buchananii = after Buchanan, early botanist

SCROPHULARIACEAE

Ha: Low to high alpine highly exposed sites such as rock outcrops, especially in cushion vegetation and fellfield.

Di: Drier, interior mountains from Canterbury (Godley Valley) southwards to Central Otago and Lakes District.

Small shrub, 10-20cm tall. Branches rough, stout, leaves concave, thick, dull green. Short, simple flower clusters are near branch tips; flowers white.



***Hebe decumbens* (J. B. Armst.) Ckn. et Allan**

decumbens = stems lie along ground before turning up

SCROPHULARIACEAE

Ha: Subalpine to low alpine rocky sites in grassland.

Di: Mountains of Marlborough and adjacent parts of Nelson and North Canterbury.

Small shrub. Branches purplish, leaves slightly concave, fleshy, green, with a distinct red margin. Flowers white in lateral clusters near branch tips, extending beyond leaves.



***Hebe epacridea* (Hook.f.) Ckn. et Allan**

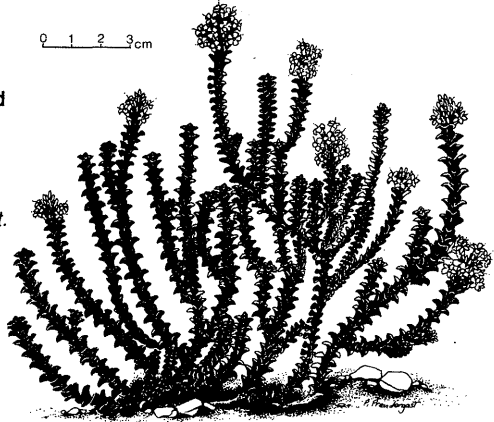
epacridea = like *Epacris*, a heath plant

SCROPHULARIACEAE

Ha: Subalpine to high alpine screes, surface moraine, shingle slopes or rock crevices in fellfield.

Di: From Nelson and Marlborough southwards along and east of the Main Divide to North Otago and Lakes District.

Sprawling dwarf shrub. Leaves smallish, dark green, thick, curving sharply back; leaf bases joined together. Flowers white in terminal clusters wider than leafy shoot.



***Hebe pimeleoides* (Hook.f.) Ckn. et Allan**

pimeleoides = like *Pimelea*, an unrelated plant.

SCROPHULARIACEAE

Ha: Montane to low alpine dry, open places.

Di: East of the Main Divide from Marlborough southwards.

Small prostrate to erect shrub. Leaves thickish, sometimes blue-green and / or red-edged, slightly concave. Flowers usually blue to purple in simple, lateral spikes.



***Hebe raoulii* (Hook.f.) Ckn. et Allan**

raoulii = after Raoul, surgeon-botanist

SCROPHULARIACEAE

Ha: Montane to low alpine rocky outcrops.

Di: Drier mountains and hills of Canterbury.

Small straggling, semi-erect shrub. Branchlets with short hairs, leaves shiny green with red edges which are often toothed. Flower heads broad and compact at branch tips, flowers lavender-coloured to almost white.



***Helichrysum bellidioides* (Forst. P.) Willd.**

Everlasting Daisy

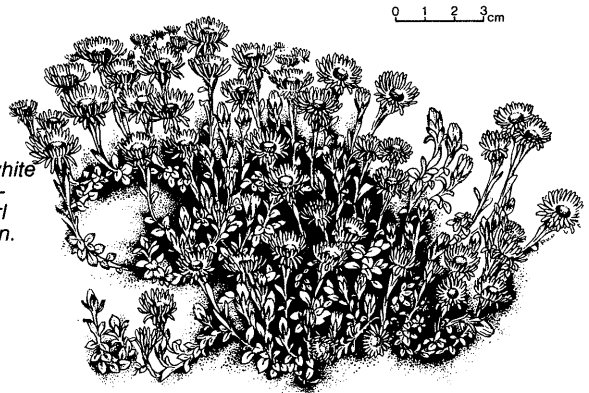
bellidioides = like the English daisy, *Bellis*

COMPOSITAE

Ha: Abundant, lowland to low-alpine in most open habitats, especially open or depleted vegetation such as roadsides and riverbed gravels; also on ultrabasic soils of the mineral belt.

Di: East Cape and Mt Egmont southwards including Stewart, Chatham and Subantarctic Islands.

Stems trailing, forming loose patches. Leaves either green or grey-white (when young) above, densely white hairy beneath. Flowers heads often prolific and long-lasting with white, papery petal-like bracts which curl inwards in dull weather; centres pale yellow or brown. Seed heads fluffy.



***Helichrysum selago* (Hook.f.) Benth. et Hook.f.**

selago = like *Selago*, an unrelated plant

COMPOSITAE

Ha: Montane to high alpine, dry rocky places especially cliffs.

Di: Nelson to Southland on drier mountains.

Small shrub with numerous round, narrow, scaly branches. Scale leaves thick, triangular, shining green on backs; dense white hairs on inside and base of leaves and on stem, outline each leaf. Flower heads single, creamy, terminal; wider than branch tips.



0 1 2 3cm

***Leucogenes grandiceps* (Hook.f.) Beauverd**

South Island Edelweiss

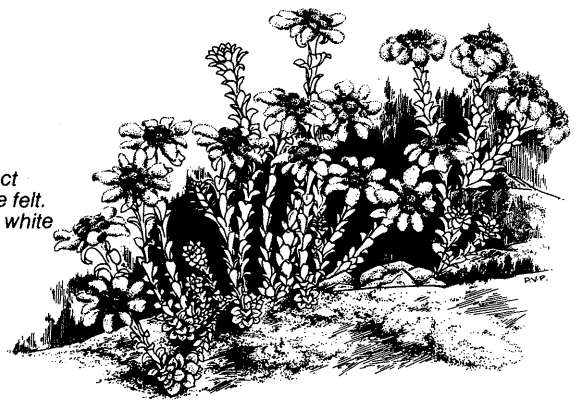
grandiceps = large headed

COMPOSITAE

Ha: Subalpine to high alpine rock outcrops.

Di: South and Stewart Islands, throughout.

Sprawling semi-woody herbs with short, leafy, erect stems, leaves to 1cm long, rounded with soft white felt. Flower heads conspicuous with persistent, woolly white bracts and brown centres producing fluffy fruit.



0 1 2 3cm

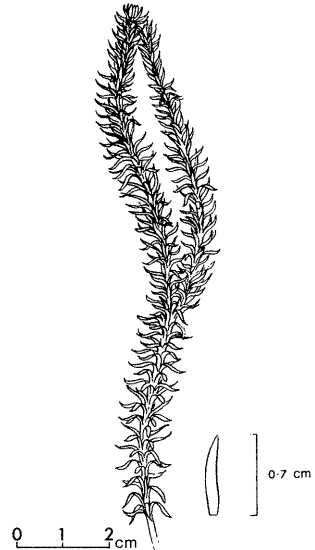
australianum = southern

LYCOPODIACEAE

Ha: Montane to low alpine. Common in open, moist places in snow tussock grassland and herbfield; also on well-lit rock outcrops in forest and scrub.

Di: North, South and Stewart Islands. Also Tasmania, Australia and Indonesia.

Shoots erect, 5-20cm tall, dwarfed and more branched in more exposed places, green or orange-green. Small bulbils are borne near the tip for vegetative reproduction. Spore sacs yellow, scattered among normal scale leaves towards branch tip.



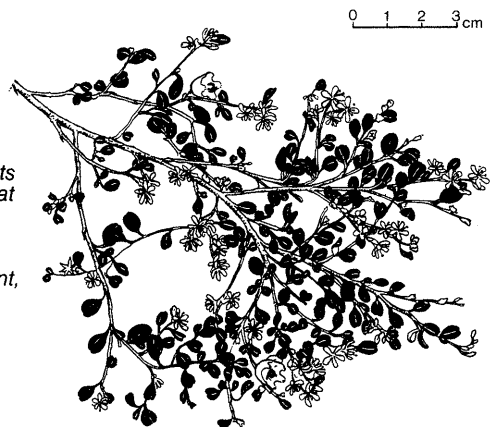
axillaris = fruit borne in leaf axils

POLYGONACEAE

Ha: Pioneer on damp stony sites in lowland to subalpine zones — river flats, moraines, open areas of tussock grassland and herbfield. Also ultrabasic soils of the mineral belts.

Di: Central North Island southwards.

Straggling shrub with dark wiry branches that form mats to a metre or more across; sheathing, papery stipules at each node. Leaves opposite, thick, dark green, pale beneath, 6-8mm long, almost round. Small yellowish-white male or female flowers occur singly or paired in leaf axils. Black fruit (nuts) are surrounded by succulent, glassy swollen petals which are edible.



***Myosotis australis* R.Br.**

Native Forget-me-not

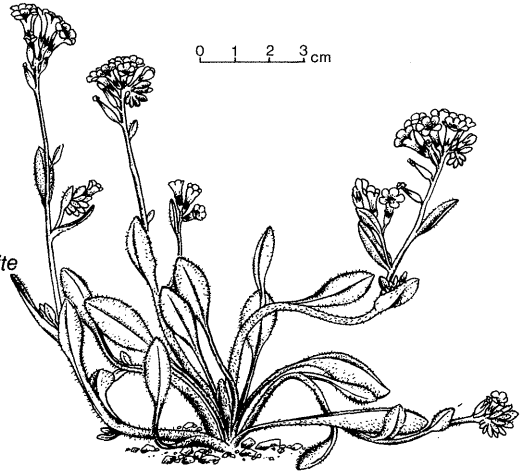
australis = southern

BORAGINACEAE

Ha: Most common in montane to low alpine, depleted, often eroded tussock grassland, also in stony and rocky places.

Di: North and South Islands, also Tasmania and Australia. The yellow-flowered, brown leaved form pictured is more common in Canterbury and Otago.

Highly variable green to brown leaved, hairy herb. Several to many, erect or arching flower stems form a tight head which unrolls as the fruits ripen; flowers white or yellow.



***Myosotis colensoi* (Kirk) Macbride**

Native Forget-me-not

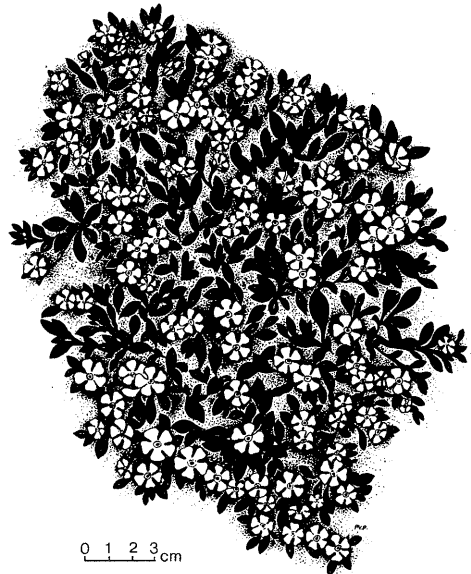
colensoi = after Colenso, botanist

BORAGINACEAE

Ha: Montane limestone rocky outcrops.

Di: Upper Waimakariri Valley.

Dark green cushions up to 10cm across (or larger in cultivation). Trailing stems are crowded with small (10 × 2-3mm) leaves covered with stiff, flat hairs. Short flower heads carry few to many white flowers (about 8mm across) with yellow centres.



***Nothofagus solandri* var. *cliffortioides* (Hook.f.)**

Mountain Beech

solandri = after Solander, early botanist, *cliffortioides* = (meaning obscure)

FAGACEAE

Ha: Common in drier forests (often dominant) in the montane to subalpine zones. In Canterbury, eastern Nelson and Marlborough and on the volcanic plateau it forms a very distinctive tree line marking the lower limit of the alpine zone.

Di: Central North Island southwards.

Tree reaching 20m, dwarfed at higher elevations. Leaves 1-1.5cm long, pointed, bases uneven, white-felted beneath. Branchlets often in one plane. Flowers small, of two sexes — male flowers reddish, female flowers sticky. Fruit small nuts enclosed in prickly cases.



***Olearia arborescens* (Forst.f.) Ckn. et Laing.**

A Tree Daisy

arborescens = almost a tree

COMPOSITAE

Ha: Lowland to subalpine forest, scrub and shrubland, also rocky banks.

Di: From East Cape southwards to Stewart Island.

Shrub or tree up to 5m. Leaves indistinctly waved and toothed, dark green above, dense satiny hairs beneath. Flowers white, numerous. Fruits fluffy, windborne. May hybridize with *O. avicenniaefolia*.



***Olearia avicenniaefolia* (Raoul) Hook.f.**

Mountain Akeake

avicenniaefolia = leaves like *Avicennia*, the mangrove

COMPOSITAE

Ha: Lowland to montane forest, shrubland and rocky banks.

Di: South and Stewart Islands.

Shrub to tree to 7m. Branchlets and undersides of leaves with white, densely matted hairs; leaves light green above, leathery, smooth-edged. Flowers white, scented, in numerous heads. Fruits fluffy, windborne.



***Olearia odorata* Petrie**

Scented Tree Daisy

odorata = scented

COMPOSITAE

Ha: Montane to subalpine scrub and shrubland.

Di: Mountains of Canterbury, Westland and Otago.

Shrub to 4m tall with tangled branchlets. Leaves usually in opposite bunches; dark green above, white, densely matted hairs beneath. Flower heads small and few, sticky, scented. Fruits fluffy, windborne.



***Ourisia macrocarpa* var. *Calycina* (Col.) Ckn.**

Mountain Foxglove

macrocarpa = large fruited, *calycina* = cup-bearing
SCROPHULARIACEAE

Ha: Palatable and therefore large plants often restricted to inaccessible bluffs. Where animal pressure is light, may be prominent in subalpine to low alpine scrub, mixed snow tussock-scrub and snow tussock-herbfield, also streamsides.

Di: Nelson to Central Westland.

Robust tuft of large, leathery leaves, hairless, dark green above; lower surface, as well as flowering stems which are sparsely hairy, often purple. Flower stems may elongate to 70cm as fruit ripen. Flowers white, orange-centered, large (2-3cm across). Capsule enclosed in calyx lobes which are broad and often notched at tips.



***Pachystegia insignis* (Hook.f.) Cheesem.**

Marlborough Rock Daisy

insignis = striking
COMPOSITAE

Ha: Lowland to subalpine dry rock outcrops. Widely cultivated.

0 2 4 6 8 10 12 cm

Di: Eastern Marlborough.

Stout, sprawling shrub reaching 2m. Branches densely felted. Leaves to 18cm long, very thick, dark green above; white, dense felt beneath and along leaf margins. Heads 1-5 together, 5-7cm diameter; ray florets white, bracts in many series, hairy. Fruits silky, windborne. A complex species as yet not fully described.



Podocarpus nivalis Hook.

Snow Totara

nivalis = in snowy places

PODOCARPACEAE

Ha: Montane to low alpine scrub, mixed snow tussock-scrub, forest margins, stable debris, and rocky places. It is also important in the scrub zone found on moraines.

Di: South Island and from Te Moehau in the northern Coromandel Range to Tongariro and the Ruahine Range in the North Island.

Prostrate to semi-erect, spreading, highly aromatic shrub. Leaves blunt and thick. Pollen-bearing spikes reddish. Seeds (on separate female bushes) borne singly on fleshy, red, edible stalks, often prolific.



Ranunculus crithmifolius ssp. *crithmifolius* Hook.f.

crithmifolius = *Crithmum* (samphire)-leaved; samphire is an English sea-cliff plant.

RANUNCULACEAE

Ha: Low to high alpine loose rock debris and bare eroded soils. Plants are well camouflaged.

Di: Wairau Gorge, S.E. Nelson; Craigieburn Range, Central Canterbury southwards to North Otago; on drier greywacke mountains.

Small, hairless, summer-green debris plants with mottled, greyish-brown fleshy leaves which vary in size, shape and dissection in different locations. Single flowers on short flowering stems which bend towards the leaf bases as the fruit ripens.



***Ranunculus crithmifolius* ssp. *paucifolius* Fisher.**

paucifolius = few leaved

RANUNCULACEAE

Ha: Debris of montane limestone rocks.

Di: Limited to Castle Hill, Waimakariri River, inland Canterbury.

*Small, summer-green debris plants with leaves of similar texture to subspecies **crithmifolius** but much less dissected; toothed. Single flowers with up to 8 petals, on short stems; up to 5 cm wide.*

A rare and protected species.



0 1 2 cm

***Ranunculus insignis* Hook.f.**

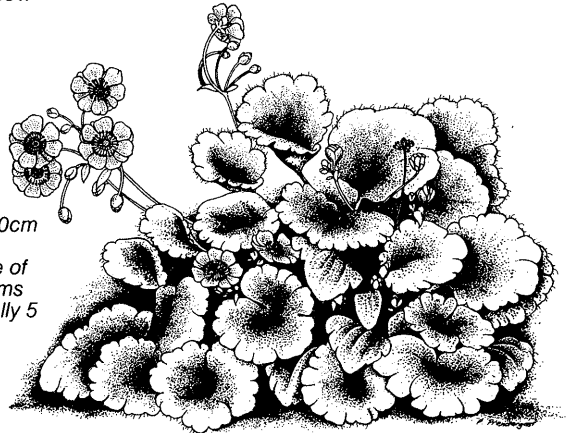
insignis = striking

RANUNCULACEAE

Ha: Montane to low alpine sheltered areas in scrub, snow tussock grassland, herbfield and rocky places; common and often conspicuous.

Di: Volcanic plateau south to eastern Canterbury mountains. On Kaikoura coast occurs nearer sea level on limestone.

Tufted herb varying in size from 50cm to less than 10cm high. Leaves basal, bright-green, thick, undivided; coarsely toothed margins have a conspicuous fringe of brown hairs. Flowers usually many on branched stems but single on smaller forms; 1-5cm across with usually 5 to 7 bright yellow petals.



0 1 2 3 cm

Ranunculus lappaceus Smith.

Grassland Buttercup

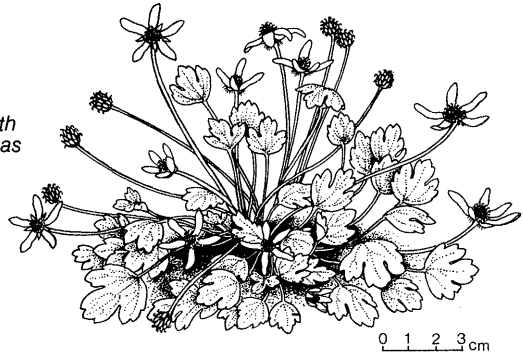
lappaceus = burr bearing

RANUNCULACEAE

Ha: A minor species in lowland to subalpine grassland and shrubland; also present in snowbanks and other alpine habitats.

Di: North, South, Stewart Islands.

Small rosettes with hairy, broad, coarsely toothed to three-lobed leaves. Single, 1-2cm diameter flowers with five petals on slender flow stems which become taller as seeds ripen. Seed heads strongly hooked.



Senecio bellidioides Hook.f.

New Zealand Groundsel

bellidioides = like *Bellis*, the common lawn daisy

COMPOSITAE

Ha: Present in a wide range of communities in the montane to high alpine zones, but preferring moist sites — shrubland, grassland, herbfield, rocky places. Often overlooked.

Di: South and Stewart Islands, throughout.

Flat rosettes; leaves leathery, green above, margins and often both surfaces hairy; margins have a slight 'stitched' appearance. Flowers to 3cm wide, bright yellow on usually simple stems. A complex species as yet poorly understood.



A Key to the Tussock Grasses in the Garden

1. Large tussocks; leaves mostly 70–150 cm long ▶ 2
Small tussocks; leaves less than 70 cm long ▶ 6
2. Older leaf sheaths becoming flattened, coiling inwards and breaking crosswise into chaffy segments ▶ 3
Older leaf sheaths persisting intact and remaining straight ▶ 4
3. Young sheaths not hairy, inside of sheath chestnut brown; leaves dull tawny-green
Chionochloa rigida
Young sheaths hairy, inside of sheath lighter coloured — pale green to light brown to orange;
leaves relatively wide (widest in the garden), glossy and drooping *Chionochloa flavescens*
4. Leaves red-tinted, very narrow, rigid, splitting lengthwise when reflexed, inside of sheaths shining chestnut brown *Chionochloa rubra*
Leaves not as above ▶ 5
5. Leaves with prominent midrib beneath, leaf edges hairy; inside of sheaths pale brown to purple *Chionochloa pallens*
Midribs less prominent, leaves not hairy; inside of sheaths dull, dark purplish-brown *Chionochloa macra*
6. Leaves with persistent sheaths (dead leaves breaking at sheath/leaf junction) ▶ 7
Dead leaves persisting intact ▶ 8
7. Leaves blue-green to dark green, ligules* long, sheathing stem (a wide range of forms is present in the garden) *Poa colensoi*
Leaves lime-green to fawn-green, each with a prominent hairy ligule; individual plants joined by runners *Rytidosperma setifolium*
8. Leaves rolled, dull ▶ 9
Leaves folded, shiny; tussock lax, fawn-green from a mixture of dead and living leaves *Poa laevis*
9. Living leaves minutely rough to fingers drawn down the leaf *Festuca novae-zelandiae*
Smaller tussock (to 30 cm); leaves smooth, bluish-green *Festuca matthewsii*

*Ligule — a small flap at the junction of sheath and blade of leaf, sometimes reduced to hairs.

***Chionochloa flavescens* Zotov.**

Broad-leaved Snow Tussock

flavescens = turning yellow

GRAMINEAE

Ha: Montane to low alpine, chiefly subalpine shrubland, scrub, grassland and cliffs; limited mostly to areas of higher rainfall.

Di: Tararua Range, South Island Main Divide with a distinct form on Mt Anglem, Stewart Island.

Large green or tawny-green tussock with heads borne clear above leaves.

In the unburnt condition this species is usually palatable to animals while *C. rubra* is the least favoured of those described.



***Chionochloa macra* Zotov.**

Slim Snow Tussock

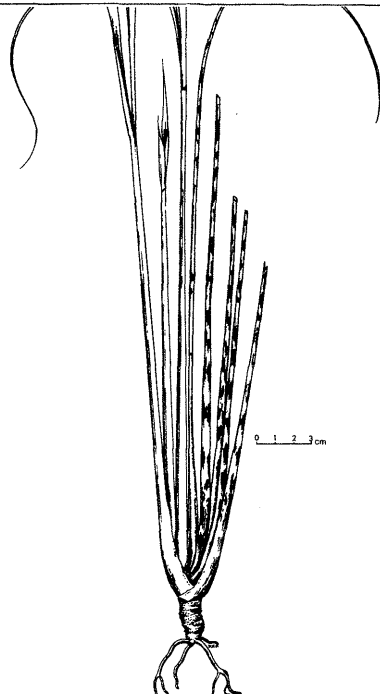
macra = thin

GRAMINEAE

Ha: Usually associated with narrow-leaved snow tussock. North of the Rakaia Valley it is common on montane to high alpine slopes, although usually restricted to cold, shady slopes at lower sites. Southwards it is common at higher altitudes, typically in a zone above *C. rigida*.

Di: On the drier mountains of the interior from Marlborough to Central Southland.

Large tussocks, heads barely overtopping leaves.



***Chionochloa pallens* Zotov.**

Mid-ribbed Snow Tussock

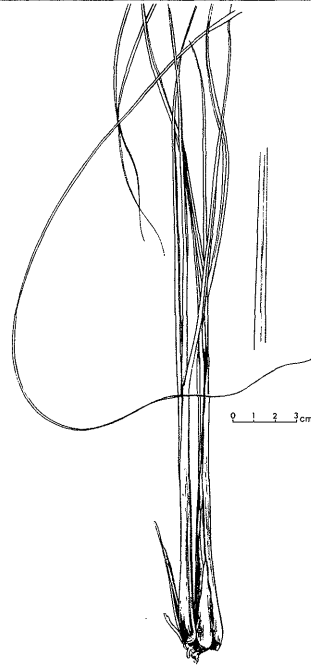
pallens = pale, referring to leaf sheath

GRAMINEAE

Ha: Low alpine grassland and shrubland usually associated with broad-leaved snow tussock from the Tararua Range southwards, but often preferring better drained or higher altitude sites than those occupied by *C. flavescens*.

Di: On the higher mountains of the North Island from the Volcanic Plateau southwards, widespread in the higher rainfall western regions of the South Island and in the east from mid-Canterbury northwards.

Large green or tawny-green tussocks, half the size of *C. flavescens*, seldom 1m tall. Head borne clear above the leaves.



***Chionochloa rigida* (Raoul) Zotov.**

Narrow-leaved Snow Tussock (Wi Kura)

rigida = stiff

GRAMINEAE

Ha: Montane to low alpine zones. It is believed that destruction of the forest on many of the mountains east of the Main Divide a few hundred years ago enabled it to increase its range downwards. It provided much of the original plant cover of the higher run country in the South Island but continued burning and grazing has reduced its importance in many areas (see *Aciphylla aurea*).

Di: Banks Peninsula and the mountains east of the Main Divide from mid Canterbury to Southland, descending to sea level in Otago.

Large tawny-green tussock with heads barely overtopping leaves. Sometimes hybridises with *C. flavescens*.



Chionochloa rubra* Zotov.*Red Tussock**

rubra = red

GRAMINEAE

Ha: Common and conspicuous on the volcanic mountains and the mineral belt of Nelson-Marlborough in grassland and shrubland but elsewhere is usually restricted to poorly drained often peaty valley floors, terraces or slopes, mostly below the tree line and descending to sea level.

Di: North, South and Stewart Islands.

Large red-brown tussock usually 1m or more tall. Heads barely overtopping leaves.



Festuca matthewsii* Cheesem.*Alpine Fescue Tussock**

matthewsii = after Matthews, forester

GRAMINEAE

Ha: Subalpine to low alpine snow tussock grassland and shrubland. In wet regions small tufts are common but inconspicuous, while on the run country of the drier interior and eastern mountains distinct tussocks are found. These have increased at the expense of snow tussock in response to burning and grazing, especially in South Canterbury and Central Otago.

Di: South Island, widespread throughout.

Blue-green or fawn tussocks 14-40cm long with a lax head exceeding the leaves. Distinguished from blue tussock when in flower by the presence of obvious awns.



***Festuca novae-zelandiae* Cockayne**

Hard Tussock, Fescue Tussock

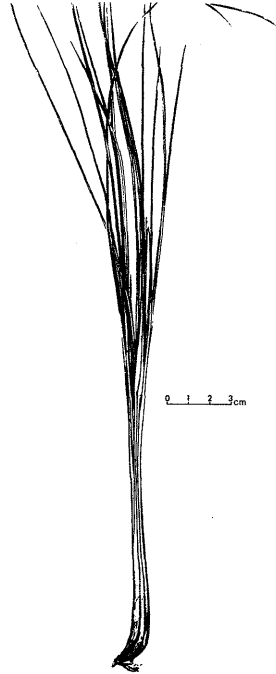
novae-zelandiae = New Zealand

GRAMINEAE

Ha: Lowland to subalpine grassland and shrubland. The dominant tussock of the montane zone especially east of the Main Divide from Nelson to Central Otago. Where mountain ranges carry no forest, hard tussock reaches its upper altitudinal limit in many areas close to the natural tree line which delimits the alpine zone.

Di: North, South and Stewart Islands.

Erect, fawn tussock 30-60cm tall, head usually overtopping leaves.



***Poa colensoi* Hook.f.**

Blue Tussock

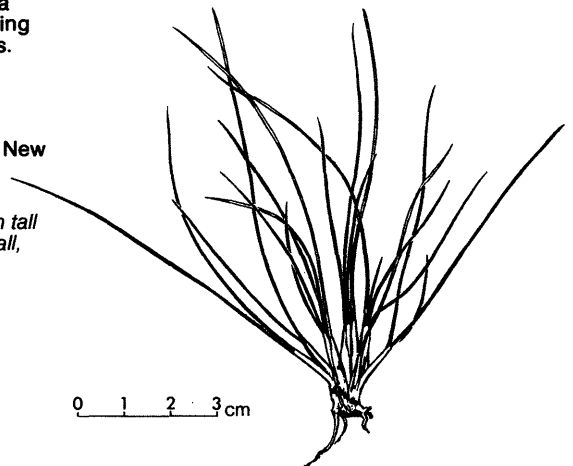
colensoi = after Colenso, botanist

GRAMINEAE

Ha: One of the most common grasses throughout the alpine zone, becoming less common towards sea level. It occupies a wide range of habitats including grassland, shrubland, herffield and rocky places. Although palatable, a tolerance of grazing has allowed it to persist and usually increase where pressure has been heavy.

Di: Widespread in mountainous regions throughout New Zealand.

Blue or green tussocks or small tufts, from 5-50cm tall depending largely on altitude. Neat spikelets in small, open heads considerably overtop leaves.



***Poa laevis* R. Brown**

Silver Tussock

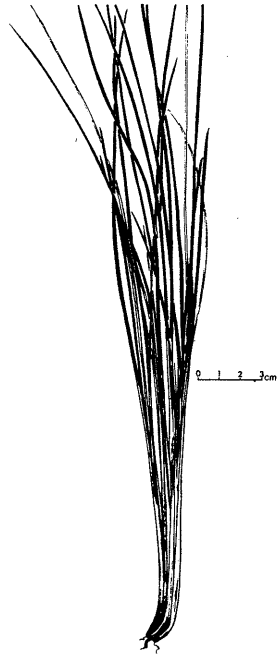
laevis = smooth

GRAMINEAE

Ha: Lowland to montane grassland, shrubland and bouldery ground, characteristically colonizing fertile places. In the past it dominated, with *Festuca novae-zelandiae*, the montane grasslands but continuous burning to increase palatability has reduced its importance.

Di: Throughout New Zealand in fertile areas, especially in the South Island, east of the Main Divide. Also Tasmania and Australia (= *P. caespitosa*).

Lax tussock 30-70cm tall, head barely overtopping leaves.



***Rytidosperma setifolium* (Hook.f.) Connor et Edgar**

Bristle Tussock

setifolium = bristle-leaved

GRAMINEAE

Ha: Lowland to high alpine rock outcrops and other open habitats including moraine. In Marlborough, North Canterbury and locally elsewhere it has become important in open, depleted snow tussock grassland and herbfield.

Di: Widespread in mountain regions throughout New Zealand.

Small pale-green to light-brown tussocks. Spikelets comparatively large, aging pale straw-coloured.



Family and Genera Names

AGAVACEAE (Agave family) — tropical and subtropical, mainly arid regions, about 20 genera and 700 species; 2 N.Z. genera.

Cordyline (club-palm — referring to the fleshy roots) about 15 species — India, Malaya, Polynesia, S. America, and N.Z.; 5 N.Z. species.

BORAGINACEAE (Forget-me-not family) — temperate and subtropical, about 90 genera and nearly 2000 species; 2 genera in N.Z.

Myosotis (mouse ear) — about 50, mostly temperate, species; 34 N.Z. species, 18 reach the alpine zone but several are local in occurrence.

BLECHNACEAE — terrestrial ferns of wide distribution, 5 genera; 2 in N.Z.

Blechnum (a kind of fern) more than 2000 species mostly of the southern hemisphere; 15 native, but only 1 reaches the alpine zone.

COMPOSITAE (Daisy family) — largest family of flowering plants, cosmopolitan — more than 1000 genera and 25,000 species; 29 genera in N.Z.

Cassinia (after Cassini, french botanist) — about 20 species of Australia, N.Z. and S. Africa; 5 native species, 2 of which reach the subalpine zone.

Celmisia (greek Celmis, an attendant of Cybele, the Phrygian mother of the gods) — more than 60 species, mostly in N.Z., a few in Australia and Tasmania; 50 species reach the alpine zone.

Helichrysum (sun gold) — about 350 species of Europe, Asia, Africa, Australia, N.Z.; 9 N.Z. species, 6 reaching the alpine zone.

Leucogenes (white genus) — genus of 2 species found only in N.Z., both alpine.

Olearia (Olive — the leaves of some species resemble those of the olive) — about 130 species almost confined to Australia and N.Z.; 32 native species.

Pachystegia (thick covering — referring to bracts of flower head). A genus of 1 species confined to N.Z.

Senecio (old man — probably referring to bearded fruits) — cosmopolitan genus with over 1500 species. Of the 40 N.Z. species, at least 8 reach the alpine zone.

ERICACEAE (Heath family) — cosmopolitan, with about 90 genera and about 3000 species; 2 genera in N.Z.

Gaultheria (after Gauthier, amateur botanist) — widespread genus of about 120 species, mostly American. The 7 N.Z. species are confined to N.Z., 3 reach the alpine zone.

EPACRIDACEAE (Epacris family) — mostly confined to Australia but extending to Indomalaysia and New Zealand, 30 general and 400 species; 5 N.Z. genera.

Cyathodes (cup-shaped — referring to the disc in which the flower sits) — about 175 species of Australasia and Malaysia; 4 of the 8 native species reach the alpine zone.

FAGACEAE (Beech family) — temperate and tropical forests, 8 genera and about 1000 species; 1 N.Z. genus.

Nothofagus (false beech) — about 30 species from New Guinea, New Caledonia, Australia, Tasmania, S. America and N.Z.; 2 reach the subalpine zone.

GENTIANACEAE (Gentian family) — subcosmopolitan, about 80 genera and 900 species; 3 genera in N.Z.

Gentiana (after Gentius, an Illyrian king) — about 400 species worldwide, except Africa; of the 19 native mainland species, most reach the alpine zone although several are local in occurrence. They are usually among the last of the alpinists to flower in February to April.

GRAMINEAE (POACEAE) (Grass family) — cosmopolitan, about 650 genera and about 9000 species; about 30 genera in N.Z.

Chionochloa (snow grass) — An Australasian genus of about 20 species concentrated in N.Z.; 14 reach the alpine zone although some are local in distribution.

Festuca (a straw) — a large genus from temperate and tropical mountain regions; 5 native mainland species.

Poa (fodder-grass) — about 150 species of temperate and cold regions; 19 native mainland species, about 11 reach the alpine zone, although only one is common.

LILIACEAE (Lily family) — cosmopolitan, about 250 genera and about 3500 species; 8 N.Z. genera.

Bulbinella (small bulb) — 20 species from South Africa and N.Z.; 6 N.Z. species, at least 3 reaching the alpine zone.

LYCOPODIACEAE (Clubmoss family) — 2 genera in N.Z.

Lycopodium (wolf foot) — subcosmopolitan with more than 150 species; 12 N.Z. species, 3 reaching the alpine zone.

PAPILIONACEAE (Pea family) — cosmopolitan with about 375 genera and over 5500 species; 8 genera in N.Z.

Corallorhiza (coral broom) — consists of a single species, confined to the South Island.

PODOCARPACEAE (southern conifer family) — mainly of southern hemisphere, some 7 genera and over 100 species; 5 N.Z. genera.

Podocarpus (seed with a foot — referring to the stalked seed) — a large southern hemisphere genus; 4 N.Z. species, 1 reaching the alpine zone.

POLYGONACEAE (Dock family) — cosmopolitan, with over 30 genera and about 800 species; 3 genera in N.Z.

Muehlenbeckia (after Muehlenbeck, amateur botanist) — genus of about 20 species; N.Z., Australia, Pacific Islands, S. America; 5 native species, only 1 extending to the alpine zone.

RANUNCULACEAE (Buttercup family) — cosmopolitan, with about 50 genera and over 1800 species; 5 genera in N.Z.

Ranunculus (small frog) — over 300 species, chiefly of temperate regions; 32 native species (several former species have been merged), at least 17 of which reach the alpine zone. All species are poisonous (they contain 'Ranunculin' which causes stomach upsets).

ROSACEAE (Rose family) — cosmopolitan, 122 genera, 3370 species; 4 N.Z. genera.

Acaena (thorn) — about 150, mainly southern hemisphere, species; 15 native species, at least 5 reaching the alpine zone.

Geum (latin name for these plants) — 60 species worldwide; 6 N.Z. species, 4 reaching the alpine zone.

RUBIACEAE (Coffee family) — subcosmopolitan with about 450 genera and over 6000 species; 3 genera in N.Z.

Coprosma (dung smell) — almost 100 species of the Malaysian and Pacific regions, about 45 in N.Z., at least 8 reaching the alpine zone.

SCROPHULARIACEAE (Foxglove family) — mainly north temperate, about 200 genera and over 3000 species; 11 N.Z. genera.

Hebe (Greek goddess of youth) — about 100 species, mostly in N.Z., but some in S. America, Tasmania, S.E. Australia and New Guinea. About half of the 79 native species reach the alpine zone.

Identification of *Hebe* species is difficult although all have opposite leaves forming a '+' from above. Hybridism is nearly universal.

Ourisia (after Ouris, governor of Falkland Islands) — about 24 species in S. America, Tasmania and N.Z.; 8 out of 10 natives reach the alpine zone.

THYMELAEACEAE (Daphne family) — cosmopolitan, but especially in Africa — about 45 genera and 500 species; 2 genera in N.Z.

Pimelea (fatty — referring to the oily seeds) — about 80, chiefly Australasian shrub species; 17 native species, about 9 reaching the alpine zone.

UMBELLIFERAE (Carrot family) — subcosmopolitan, largely temperate uplands; about 300 genera and 2500 — 3000 species; 14 N.Z. genera.

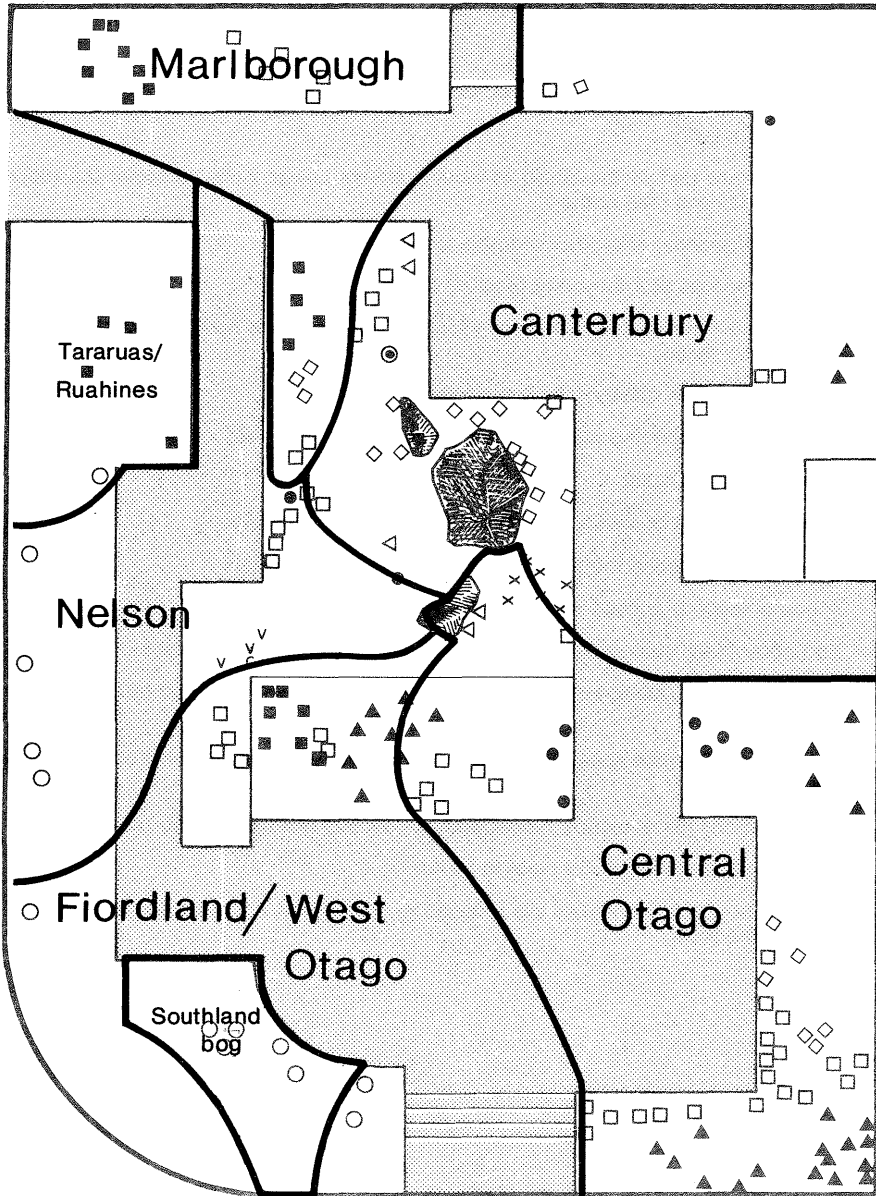
Aciphylla (sharp leaf) — 40 species mostly confined to N.Z. (1 in Chatham Islands and 1 in Australia); almost all reach the alpine zone, although some are quite local.

Anisotome (unequally cut — referring to the unequal carpels) — about 20 species of Australia and N.Z.; 15 N.Z. species, 11 of the 12 mainland species reach the alpine zone.

Glossary

Alternate	arranged singly along a stem, not in opposite pairs.
Anther	the part of the stamen (male organ of flower) containing the pollen.
Awn	a bristle projecting from grass spikelets.
Axil	the upper angle between the leaf and the stem.
Berry	a fleshy fruit, usually containing many seeds.
Biennial	living for two years and flowering only in the second.
Blade	the expanded part of a leaf; in grasses the part of the leaf above the sheath: may be narrow, rolled or bristle-like.
Bract	a modified, usually reduced leaf, especially on a flower stem.
Bulbil	a small cluster of fleshy scales produced on above-ground parts for vegetative reproduction.
Calyx	the outer, usually green, flower parts which protect the developing flower in bud; consists of separate or joined sepals.
Capsule	a dry fruit, splitting to release many seeds.
Carpel	one of the flower's female reproduction organs, comprising a basal seed-bearing ovary joined to a pollen-receiving stigma by a usually stalk-like style.
Deciduous	falling at the end of a season, usually of leaves in the autumn.
Disk floret	inner florets, as distinct from the ray floret, in the daisy family.
Dissected	of leaves, cut into many parts.
Drupe	a fleshy, succulent fruit with the seed enclosed in a bony casing; a stone fruit.
Floret	a small flower usually one of a cluster, as in the head of a daisy or the spikelet of grasses.
Fronde	a leaf, especially in ferns.
Fruit	ripened ovary containing the seeds (including associated parts such as a swollen receptacle, the common support of the parts of a flower); may be fleshy or dry.
Habitat	the place in which a plant grows.
Herb	any higher plant which is not woody (includes ferns, grasses, etc.).
Hybrid	a plant whose parents are of different species.
Lax	loosely arranged — not compact.
Leaflet	one leaf-like portion of a compound leaf.
Ligule	(in grasses) an appendage at the junction of blade and sheath; usually a small flap but may be reduced to hairs or absent altogether.
Lobe	any segment of a leaf or leaf-part, especially when rounded.
Midrib	the main central vein of a leaf.
Node	place on a stem where one or more leaves are attached.

Nut	a hard fruit which does not split to release the single seed within.
Opposite	arranged in pairs.
Petal	one separate part of the whorl of usually showy flower parts, between the calyx and the stamens (see anther).
Pod	a dry fruit opening along two margins to release seeds.
Pollen	the microspores of a flowering plant or conifer.
Ray floret	strap-shaped florets that form a rim ("petals") to the flower head in many members of the daisy family.
Rosette	a circle of leaves radiating from a centre at ground level.
Runner	a trailing stem growing out along the ground and taking root.
Scale	a minute leaf or bract.
Scrub	a close covering of woody growth not more than 5–6 m high.
Sheath	base of leaf clasping the stem; in grasses a tubular envelope.
Shrub	a woody much branched plant lacking a distinct trunk.
Spike	an unbranched, elongated shoot of unstalked flowers or (in grasses etc.) spikelets.
Spikelet	a tiny spike; in grasses and grass-like plants the florets are enclosed by overlapping scales.
Stipule	scale-like or leaf-like appendage at the base of the leaf-stalks of some species; usually paired.
Sub-shrub	a semi-woody plant, usually herbaceous above and woody near the base.
Summer-green	dying back to underground parts in winter.
Whipcord	a shrub in which the leaves are reduced to scales that are close-set and pressed against the stem.



- Key
- | | |
|-----------------------------|-------------------------|
| ▲ <i>C. rigida</i> | ▷ <i>Poa caespitosa</i> |
| ● <i>C. macra</i> | ◇ <i>Poa colensoi</i> |
| □ <i>F. novae-zelandiae</i> | ⊙ <i>R. setifolia</i> |
| x <i>F. matthewsii</i> | ○ <i>Carex</i> |
| ○ <i>C. rubra</i> | |
| v <i>C. pallens</i> | |
| ■ <i>C. flavescens</i> | |

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