

THREATENED PLANTS OF CANTERBURY
INCLUDING A REVISED SPECIES LIST

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The most recent assessment of New Zealand's threatened plants is published in volume 37 of *New Zealand Journal of Botany* (de Lange et al. 1999). This reappraisal lists 511 uncommon taxa (22% of the New Zealand flora). Of this list, 5 taxa are thought to be extinct and 107 considered threatened. These threatened taxa are listed in categories that reflect their proneness to extinction (24 taxa Critically Endangered, 33 taxa Endangered, 50 taxa Vulnerable). A further 60 species are considered to be declining.

Of this national list 132 species are found in the Canterbury Region. This can be broken down into the following categories, 1 taxa Presumed Extinct, 10 taxa Critically Endangered (includes 2 presumed extinct in Canterbury but found elsewhere), 13 taxa Endangered, 19 taxa Vulnerable, and 25 taxa Declining (includes 2 presumed extinct in Canterbury but found elsewhere). A further 3 taxa are classified as insufficiently known and 19 as taxonomically indeterminate. Species in the latter category are likely to be threatened but require further information. The remaining 42 species are found in other categories of Conservation Dependent (3 species including one presumed extinct in Canterbury), Naturally Uncommon/Sparse (22), Vagrant (1) and Range Restricted (16).

Appendix 1 outlines the justification for each category.

Why does the Canterbury region have so many threatened species? Several factors contribute to the high proportion of threatened plants in the Canterbury flora. Large size of the region and associated geographical and climatic variation is important for botanical diversity generally. Canterbury also has a high level of geological and soil diversity including important areas of mid-Tertiary limestone and volcanic rocks. There are important topographic gradients and a wide range of landforms. Glaciation and tectonic activity have provided opportunities for refugia and local areas of endemism to develop. Superimposed on this is a profound history of human disturbance, resulting in some parts of the region having very high levels of fragmentation, exotic invasion and habitat replacement. Overall, Canterbury, with its mountains, basins, wetlands, plains and coasts, and the many subtle habitats within, provides plenty of scope for botanical diversity.

Localised areas of species richness, such as base-rich limestone and volcanic outcrops, are distinctive features of the Canterbury region. These 'isolated' areas provided unique habitat for speciation to occur, and/or by virtue of their topography have provided refugia, such as cliffs inaccessible to browsing animals, for many species lost elsewhere from the region. Consequently a high proportion of the

Canterbury threatened flora is found in such sites. For example 17.5% of the threatened Canterbury flora is found in limestone ecosystems (Fig. 1). This high proportion reflects high endemism in the limestone flora, and the provision of habitat refugia by limestone ecosystems for species generally. For example the critically endangered *Carex inopinata* is found at the base of limestone bluffs in Canterbury, although it is not a limestone obligate.

Apart from those species that are highly localised in either distribution or habitat, modification of indigenous communities by humans is a major reason for the number of threatened plants found in Canterbury. Human impacts have been most severe in lowland areas, often resulting in the elimination of native vegetation from entire landforms (see e.g., Given and Mittermeier 1999; Given and Spellerberg 2001; Norton and Miller 2000). One is hard pressed to see a native plant on the Canterbury Plains! Montane areas have suffered a similar fate. Because of this habitat modification, native communities in lowland and montane zones typically exist as small isolated fragments. Consequently almost 90% of Canterbury's threatened plants are species of lowland and montane ecosystems, with only 10% extending into sub-alpine and alpine (2 species) zone (Fig. 2). The importance of habitat loss, degradation and fragmentation is also reflected in the number of threatened species found in those ecosystems that have suffered greatest loss of area. For example 26% are wetland species, 15% occur in shrublands, 13% are plants of grassland and 10% are species of coastal habitats (Fig. 1).

Introduced animal and plant pests compound problems of habitat loss and fragmentation. Aggressive sward forming exotic grasses and herbs compete with smaller species of open habitats, and prevent opportunities for seedling recruitment (a particular concern for many threatened shrubs). Browsing animals further reduce the chances for recruitment, and damage mature plants. Remnants are often too small to maintain essential processes, such as disturbance, necessary to provide the habitat diversity for some species. In some cases threatened plants have survived as ageing and isolated individuals despite the loss of associated plant communities. *Muehlenbeckia astonii* is a good example of this, where old and generally non-reproducing plants survive as scattered individuals in a predominately alien landscape.

Even relatively intact ecosystems are not immune from significant threats. Hence a number of threatened plants are found in 'robust' ecosystems. Of the 5% of Canterbury threatened plants found in mountain beech forests - the mistletoes (*Alepis flavida*, *Peraxilla tetrapetala*, *P. colensoi*) and *Pittosporum patulum*, are threatened by possum and deer browse, and hare browse threatens the scree pea (*Montigena novae zelandiae*). Weeds such as mouse ear hawkweed (*Hieracium pilosella*) are invading many nooks and crannies of bluffs. As indicated by recent survey work *H. pilosella* has probably replaced native species such as *Ischnocarpus novae-zealandiae* (Wardle 2000).

Are all plants that appear on lists of rare and threatened species really threatened and if so how critically are they at risk? This is a major question asked by those managing landscapes and biodiversity. Certainly one reason for the extensive number of threatened plants found in Canterbury is due to survey effort. Canterbury is relatively well botanised by good botanists who have thoroughly searched and described many areas. In addition, the botanical diversity of small lowland fragments of modest

terrain is easier to assess than larger rugged areas (as are larger showy species easier to find compared to smaller more cryptic ones). The upshot is that we have good documentation of the distribution, population sizes, ecology and threats for many species. In particular, our knowledge of distribution, habitat preferences and population size is generally more complete for the obvious, unusual, or showy species, such as *Hebe cupressoides*, *Helichrysum dimorphum* and the mistletoes, or for endemic species of small unique habitats, such as the Castle Hill forget me not (*Myosotis colensoi*). For these species we can be confident that they are correctly listed as threatened.

For others species however, there remains uncertainty. Take for example the endangered diminutive wood rush *Luzula celata* that occupies young alluvial terraces of the major Canterbury river systems. Until a few years ago it was known from only very few locations in Canterbury, which were being invaded by gorse, broom and lupins. Given that this plant is easily over looked due to its small size, it may be less common than records suggest. A survey of likely habitat found a significant number of new populations, including populations in new habitat types (tarn margins) found as a consequence of having 'an eye' for the plant.

Carex inopinata is another case in point. Until very recently *C. inopinata* was known from only two small populations, one at limestone bluffs in Canterbury, and the other under alluvial scrub in Marlborough. Like *Luzula celata*, *C. inopinata* is uncharismatic, small and extremely cryptic. Two recent discoveries, one in Southland by Brian Rance (DoC) and another in Central Otago by Ingrid Gruner (Canterbury University) challenge our understanding of this species. The Southland find extends the distributional range enormously, whilst the Central Otago validates a much earlier record by John Hubbard that until now could not be relocated. Ingrid's population is in an area previously botanised as part of a covenant to protect a population of the threatened climbing broom *Carmichaelia kirkii*. Other examples include the recent finding of *Carmichaelia torulosa* and *C. crassicaule* in North Canterbury (thereby filling gaps between Canterbury and Marlborough occurrences). These examples highlight the importance of survey and gives hope that some species are not threatened as such, but are merely yet to be discovered. This is a major challenge facing threatened plant management.

The following list provides the most up-to-date inventory of Canterbury threatened plant species. It is based on national listings and does not include the substantial, but as yet uncompleted, listing of plants that are regionally but not nationally rare and threatened. Previous threatened plant lists (Given 1976, 1990a, b; Cameron 1993; IUCN 1994) provided initial awareness of New Zealand's threatened flora and gave the impetus for greater understanding. Our increasing knowledge of threatened plants has resulted in the development of revised lists, such as the one below. Most species on this list have a herbarium voucher collected from a specimen from Canterbury. Many however require further work to determine their distribution and potential threats. This needs to occur before management objectives are implemented. Some of these species have never been recorded in Canterbury, but are merely expected to occur within the region. These remain as potential 'surprises' for botanists to find in the future.

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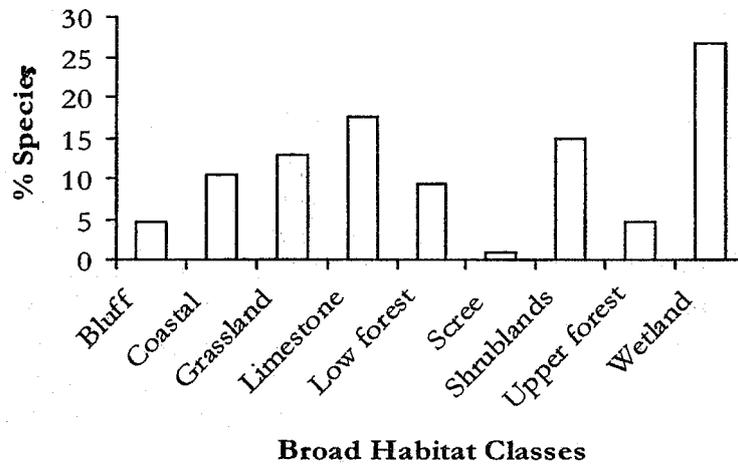


Fig. 1. Percentage of threatened species per broad habitat class from the following categories; Presumed Extinct, Critically Endangered, Endangered, Vulnerable, Declining, including taxonomically indeterminate species (n=87).

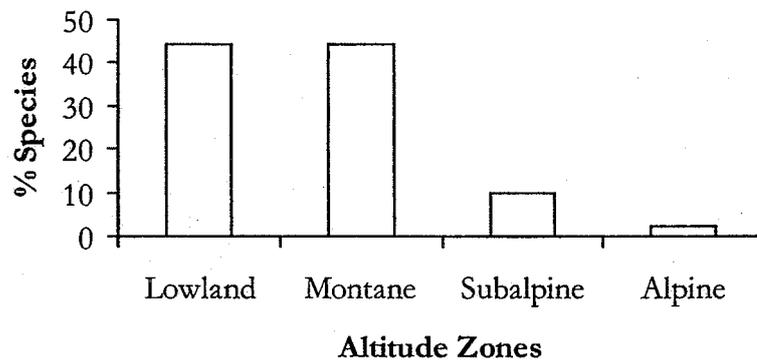


Fig. 2: Percentage of threatened species per altitude zone from the following categories; Presumed Extinct, Critically Endangered, Endangered, Vulnerable, Declining, including taxonomically indeterminate species (n=87). The altitude zones are defined as follows: lowland sea level – 500m; montane 500m – 900m; sub-alpine 900m – 1300m; alpine 1300m -1850m.

**CANTERBURY CONSERVANCY NATIONALLY THREATENED AND
UNCOMMON PLANTS** (based on de Lange et al. 1999)

- * Presumed extinct in Canterbury
 ? Records from Canterbury but uncertain of current presence of majority
 ! Unsure if occurs in Canterbury
Bold Subject to deliberate management intervention by the Department of Conservation

PRESUMED EXTINCT

**Stellaria elatinoides*

THREATENED

CRITICALLY ENDANGERED

? *Amphibromus fluitans*

Brachyscome pinnata

Carex inopinata

Carmichaelia hollowayi

****C. juncea***

Ischnocarpus exilis

Leptinella filiformis

L. nana

Poa spania

**Sebaea ovata*

Coprosma obconica sens. str.

C. pedicellata

? *Deschampsia caespitosa* var.

macrantha

? *Gratiola nana*

? *Iphigenia novae-zelandiae*

? *Isolepis basilaris*

? *Lepidium tenuicaule*

Mazus novaezeelandiae subsp.

impolitus

Myosotis colensoi

? *M. pygmaea* var. *glauca*

? *Ranunculus ternatifolius*

? *Senecio scaberulus*

? *Uncinia strictissima*

ENDANGERED

? *Ceratocephala pungens*

? *Chenopodium detestans*

? *Crassula peduncularis*

Hebe armstrongii

Hebe cupressoides

Helichrysum dimorphum

**Juncus holoschoenus* var.

holoschoenus

**Lepidium oleraceum* sens. str.

Luzula celata

Muehlenbeckia astonii

***Myosotis* "australis var.**

***lytteltonensis*"**

Pittosporum patulum

? *Triglochin palustris*

DECLINING

Alepis flavida

Austrofestuca littoralis

Carmichaelia crassicaule

C. kirkii

C. torulosa

Coprosma wallii

* *Eleocharis neozelandica*

? *Epilobium hirtigerum*

* *Euphorbia glauca*

Ileostylus micranthus

? *Isolepis fluitans*

? *Lepidium sisymbrioides* subsp.

sisymbrioides

! *Libertia peregrinans*

Melicytus flexuosus

? *Montigena novae-zelandiae*

? *Myosurus minimus* subsp. *novae-*

zelandiae

Olearia fimbriata

O. fragrantissima

? *Peraxilla colensoi*

P. tetrapetala

? *Sonchus kirkii*

VULNERABLE

? *Anogramma leptophylla*

Australopyrum calcis* subsp. *optatum

Carex tenuiculmis

Carmichaelia curta

C. vexillata

? *Convolvulus verecundus* subsp.

verecundus

Teucrium parvifolium
 ? *Tupeia antarctica*
Urtica linearifolia

**RECOVERING
 CONSERVATION DEPENDENT**

Desmoschoenus spiralis
 * *Pittosporum obcordatum*
Ranunculus godleyanus

**NATURALLY UNCOMMON
 SPARSE**

? *Anemanthele lessoniana*
Brachyglottis sciadophila
 ? *Carex cirrhosa*
 ? *C. uncifolia*
 ? *Centipeda minima*
Coprosma intertexta
 ? *Crassula multicaulis*
 ! *Euchiton ensifer*
 ? *E. nitidulus*
Gnaphalium luteo-album var.
compactum
Heliohebe raoulii subsp. *maccaskillii*
Ischnocarpus novae-zelandiae
 ? *Korthalsella salicornioides*
 ? *Lepilaena bilocularis*
Muehlenbeckia ephedroides
 ! *Oreomyrrhis colensoi* var. *delicatula*
 ? *Plantago obconica*
Pleurosorus rutifolius
Pseudopanax ferox
 ? *Ranunculus macropus*
 ? *Senecio dunedinensis*
 ? *Tetragonia tetragonioides*

VAGRANT

Chiloglottis valida

RANGE RESTRICTED

? *Achnatherum petriei*
 ? *Aciphylla montana* var. *gracilis*
 ? *Carex albula*
Carmichaelia appressa
 ? *Centrolepis minima*
 ? *Epilobium purpuratum*
 ! *Gentiana lillputiana*
 ? *Geum divergens*
Hebe amplexicaulis f. *hirta*
H. pareora

Helichrysum plumeum
 ! *Leucogenes tarahaoa*
Rachelia glaria
 ? *Ranunculus brevis*
R. grahamii
Wahlenbergia akaroa

INSUFFICIENTLY KNOWN

? *Atriplex australasica*
 ? *Carex allanii*
 ? *Corallospartium crassicaule* var.
racemosum

**TAXONOMICALLY
 INDETERMINATE**

Presumed Extinct
 * *Myosotis traversii* var. *cinerascens*

CRITICALLY ENDANGERED

? *Gentiana* (a) (CHR 529112; Mt
 Brown)

ENDANGERED

* *Botrychium* aff. *lunaria* (CHR
 289336; North West Nelson)
 ? *Brachyscome* (b) (CHR 518295;
 Pareora River)
 ? *Cardamine* (a) (CHR 312947;
 "Tarn")
 ? *Colobanthus* (a) (CHR 515133;
 Pareora River)
Craspedia (c) (CHR 529115; Kaitorete
 Spit)
 ? *Gentiana* (b) (CHR 529111; Pareora
 River)
 ? *Geranium* (a) (CHR 518296; Pareora
 River)
 ? *Ranunculus* aff. *royi* (CHR 513327;
 Waihao)
 ? *Ranunculus* aff. *stylosus* (CHR
 513131; Manuhune)

VULNERABLE

Gentiana (c) (CHR 519113; Waitaki
 Valley)

DECLINING

? *Pimelea* aff. *arenaria* (AK 216133;
 Southern New Zealand)

SPARSE

? *Oreomyrrhis* (a) (CHR 364086;
"minute flower")

INSUFFICIENTLY KNOWN

? *Chenopodium pusillum* (CHR
203825)
? *Craspedia* (j) (CHR 516302; Lake
Heron)

? *Galium* aff. *perpusillum* (CHR
476063; Kaitorete Spit)

? *Hebe pimeleioides* var. *glauco-
caerula* (CHR 462377)

? *Leptinella intermedia* (CANU
17225)

EDITOR'S NOTE: CURRENT NAMES

A characteristic of this journal is the long lists of botanical names it contains. It is a tedious task checking the accuracy of these names and I have not been absolutely thorough in doing this. I have detected some errors, but stress that it is the responsibility of authors to carefully check that their species lists are accurate. Authors also vary in their use or acceptance of recent name changes and no attempt has been made to change names with reference to the most up to date revisions.

A useful aid to checking plant names is the publication: Parsons, M.; Douglass, P.; Macmillan, B. H. 1998: Current names for wild plants in New Zealand. Lincoln, Manaaki Whenua Press. This lists plant names that were current to December 1995.

Inevitably such a published list quickly becomes out of date. Consequently Landcare Research Herbarium maintains a Plant Names Database for Angiosperms, Ferns and Gymnosperms and prints out hardcopy of this from time to time. The latest copy was printed on 20 November 2001 as a reference for use in the Herbarium.

The Plant Names Database can be accessed on the internet:
<http://nzflora.landcare.cri.nz/plantnames>

Aaron Wilton and Kerry Ford at Landcare Research, Lincoln, would welcome any comment on the accuracy or currency of this list.

Warwick Harris
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Appendix 1. Threat Categories

(Taken from de Lange et al. 1999)

Presumed Extinct

Taxa that are no longer known to exist in the wild both within New Zealand and (if applicable) their overseas range, or in cultivation after repeated searches of known or likely localities.

Threatened

Taxa whose classification places them within Critically Endangered, Endangered, or Vulnerable categories. These are taxa whose survival is now a matter of conservation priority. Their classification within the three subheadings of threat provides a measure of the degree of risk associated with each taxon.

Critically Endangered

Taxa whose extinction is considered inevitable within a stated time period (10 years) unless there is direct conservation intervention, or which persist as individuals or populations reduced to sufficiently critically low levels that extinction through stochastic events is a distinct possibility. Some critical taxa are now only known from cultivation.

Endangered

Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Vulnerable

Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Included are taxa of which most or all populations are decreasing because of over-exploitation, extensive destruction of habitat, or other environmental disturbance; and taxa with populations that continue to be seriously depleted and whose ultimate security is not yet assured.

Declining

Taxa that are numerically abundant but which are either under threat from serious adverse factors throughout their range, or occur as widely scattered, typically small populations, many of which are undergoing declines through loss of reproductive ability, recruitment failure, predation, or through other processes of often subtle habitat change. Declining taxa are listed to highlight their plight, for without some level of management they are destined to become the future threatened plants of New Zealand.

Recovering

Taxa whose populations are either: (1) naturally restricted to susceptible habitats (e.g., offshore islands), where their survival is utterly dependent on continual rigid conservation measures (e.g., rodent control), or (2) taxa whose populations were once under serious threat and, as a result of past conservation intervention (e.g., goat eradication), have shown the capacity to recover naturally without further management measures.

Conservation Dependent

Taxa whose survival is now dependent on the continuation of existing conservation measures.

Natural Population Recovery

Taxa whose populations were once reduced to precariously low levels and still occur as small populations. As a result of past conservation intervention, the candidate taxa have demonstrated the ability to recover their former range through natural means, to such an extent that further conservation assistance is no longer required.

Naturally Uncommon

Taxa that are not considered under immediate or obvious threat but which, for varying reasons, have the potential to become threatened. Three subheadings are recognised to accommodate the different situations whereby taxa can be naturally uncommon.

Sparse

Taxa that, for largely undetermined reasons, occur within typically small and widely scattered populations. This distribution appears wholly natural and is not considered the result of past or recent anthropogenic disturbance. However, as the candidate taxa usually occur in small numbers at any given site, they are naturally susceptible to extirpation within parts of their range.

Vagrant

Taxa whose presence within the New Zealand botanical region is naturally transitory. These are invariably taxa that have failed to establish themselves significantly beyond their point of introduction through reproductive failure or for quite specific ecological reasons. Many vagrants are able to reproduce only by vegetative means and, in such instances, when in suitable habitats, they can form extensive clonal populations.

Range Restricted

Taxa whose distribution is naturally confined to specific substrates (e.g., ultramafic rock), habitats (e.g., high alpine fell field), or geographic areas (e.g., subantarctic islands). Typically Range Restricted taxa are under no obvious or immediate anthropogenic threat.

Insufficiently Known

Taxa that are suspected but not definitely known to belong to any of the above categories because of a lack of information. It is hoped that listing a taxon as "Insufficiently Known" will stimulate studies to find out its true category of threat.

Taxonomically Indeterminate

Taxa about which there is doubt regarding taxonomic status and which require further investigation, and those recently discovered taxa whose taxonomic status has yet to be determined. In both instances, available information suggests that candidate taxa could be under some level of threat.