SUMMERS OF BOTANICAL DISCOVERY IN CANTERBURY

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Looming large in my rapidly fading memory of the summer just gone are two remarkable botanical discoveries – pygmy goosefoot (*Dysphania pusilla*; Fig 1), and slender button daisy (*Leptinella filiformis*). These discoveries raise as many questions as they provide answers.

Figure 1 Pygmy goosefoot (*Dysphania pusilla*). (Photo Aalbert Rebergen)

Pygmy goose foot, which was presumed extinct and hadn't been seen for decades, but was found at three places during the summer of 2014/15. Shannel Courtney and Simon Walls first found it in Molesworth (Marlborough), closely followed by a Mackenzie Basin discovery by Aalbert Rebergen then a tardily late discovery in the Heron Basin by myself. In all cases the habitats were bare alluvial silts and gravels associated with the Clarence River, Ohau River, stony margins of a tarn respectively. In all sites pygmy goosefoot was abundant.

It seems unlikely that this distinctive plant would have been overlooked for so long. So pygmy goosefoot is clearly no longer extinct, a concern relieved by long lived seed banks, awakened dormancy, and subtle environmental cues that facilitated mass seed germination.

The other remarkable find was of slender button daisy by Jan Clayton-Greene who came across this diminutive daisy also in the Molesworth Station. *Leptinella filiformis* was presumed extinct until rediscovered by Brian Molloy in the 1990s. Deservedly for Brian, it was literally found in the beer garden of the Hanmer Lodge. But this 'wild' population was lost during the lodge redevelopment and attempts to re-establish it have proven very difficult (Head et al. 2004). Jan's discovery of an extant wild population is clearly very important, but what intrigues me the most is the unremarkable habitat it was found - a gentle ridge on dry hills among open exotic grassland. These nondescript habitats are commonplace, widespread, generally overlooked, not worth the effort to search. This find challenges us to keep an open mind on where to look!

This brings me to an article the late David Given and I wrote for this journal in which we postulated on whether some species were truly threatened (Head and Given 2001). Did some 'threatened' species rank reflect survey effort as opposed to being truly threatened taxa? Clearly the answer is yes as Miles Giller's discoveries of *Carex inopinata* testify (Giller 2012). But it is not quite as simple as just survey effort. As pygmy goose foot suggests an element of luck is required, a good eye, an inquisitive mind, being the key ingredients for botanical glory.
Since our article, it is interesting to look back at some notable discoveries made in Canterbury.

Pygmy goose foot, slender button daisy, Hector's tree daisy (*Olearia hectorii*), water brome (*Amphibromus fluitans)*, Cook's scurvy grass (*Lepidium aegrum*) and heart-leaved kohuhu (*Pittosporum obcordatum*) were all considered extinct in Canterbury but have since been re-discovered since our article.

Hector's tree daisy was found in South Canterbury after Kennedy Lange tweaked the interest of a local botanist who knew of an excellent stand of Hector's tree daisy surviving on a terrace riser in an otherwise highly modified landscape. It seems incredible that an obvious tree could go unnoticed for such a long time. Further survey in similar habitats has failed to find anymore relict populations. It seems luck (as well as being on a steep terrace) was on the side of the one known surviving population of Hector's tree daisy in Canterbury.

Water brome is a nondescript grass found only in ephemeral wetlands, appearing late in the cycle of kettle hole drying and turf colonisation. Water brome is vegetatively very similar to exotic foxtail (*Alopecurus* spp.) which is unfortunately now common in kettle holes. Water brome was thought extinct in the South Island but was discovered by Mark Davis during DOC's inventory of kettle holes in the Heron Basin. Over and above the fortuitous late summer timing of the survey, this remarkable find is a

tribute to Mark's attention to detail. Since its discovery in mid Canterbury it has since been found in the Mackenzie Basin, the Waimakariri Basin and in Otago.

The rediscovery of Cook's scurvy grass after 80 odd years thought extinct was an important find but it required no remarkable skill. It simply reflected an opportunity seized via a helicopter to survey an inaccessible rock stack (Head 2001). Once there a half blind fool should have noticed it. The interesting question is where else does Cook's scurvy grass survive in other coastal refugia in Canterbury? I'll discuss this later.

Marsh arrow grass (*Triglochin palustris*) was found by Joy Comrie in a muddy stream margin in the Ahuriri valley years after concerted survey of historic records failed to find it. Then Alice Shanks found it recently in lowland north Otago growing half a metre tall in a Carex swamp.

Melissa Hutchinson's rediscovery of heart-leaved kohuhu is probably the most remarkable. Not seen for over a hundred years on Banks Peninsula, Melissa rediscovered this shrub on a farm among open scrub and second growth coastal forest (see Wilson, 2012). For Melissa to recognise it from weeping mapou with which it was growing was impressive, a tribute to her impeccable attention to detail, as on site they appeared vegetatively identical except for the obvious venation on the undersides of the leaves of *Pittosporum obcordatum*.

Following on from Brian Molloy's interest in limestone, and the many new species Brian discovered, Alice Shanks and Carol Jensen took on DOC's challenging task of surveying many of Canterbury's distinctive limestone ecosystems. This made a substantial contribution to increasing our understanding of our limestone flora, including new populations and range extensions for Canterbury endemic limestone obligates. The Weka Pass sun hebe (*Heliohebe maccaskillii*) and limestone wheatgrass (*Australopyrum calcis* subsp. *optatum*) being 2 such species. Similarly, Mark Davis' South Canterbury coastal survey provided amazing insights into the diversity of native species literally surviving between a rock and a hard place (Davis 2014). Mike Harding's South Canterbury survey of remnants on private land is revealing new information, including the discovery of a new *Melicytus* aff. *flexuosus*. Many others have similarly contributed, such as Jason Butt's recent discovery of the Plains Olearia *(Olearia adenocarpa*) whilst roaming way up the Rakaia River.

Remaining frontiers of botanical exploration in Canterbury

Given the lamentable demise of the Protected Natural Area Programme Surveys (PNAP), survey priorities have had to be more targeted. Our focus has shifted to surveying Canterbury's distinctive ecosystems, such as base rich rock outcrops, kettle holes, coasts, undeveloped alluvial

outwash surfaces etc. These 'naturally rare' ecosystems (Williams et al. 2007) can support disproportionally higher numbers of rare and threatened species compared to widespread and well protected ecosystems. Many of these ecosystems are poorly understood and occur on private land. Unfortunately land use change remains an all pervasive threat to these habitats, increasing the imperative to engage with private landowners.

Despite our efforts, many limestone ecosystems remain unsurveyed, especially in North Canterbury, where entrenched private property rights ideologies have stood in the way of information gathering and collaboration. It is unlikely that these barriers will come down any time soon, not for employees of conservation at least, so they remain a frontier in many regards.

Canterbury is a stronghold for kettle holes. They occur among pronounced glacial moraines in eastern rain shadow ranges. Our inventory of these ecosystems in the Heron Basin (>50) revealed a wealth of information, including the discovery of water brome. But we have only scratched the surface. Most kettles in Canterbury have not been thoroughly investigated, such as those on pastoral leases in the Mackenzie Basin and Waimakariri Basin, but they surely contain bountiful riches.

The North Canterbury coast appears fascinating, mid Tertiary sedimentary parent material, coastal cliffs, embayments, gravel beaches, seal and sea bird colonies etc. It tempts one's imagination of harbouring populations of Cook's scurvy grass, perhaps relict populations of sea spurge (*Euphorbia glauca*) still presumed extinct in Canterbury (a recent 'discovery' at Kaitorete Spit turned out to be a false alarm). To my knowledge much of it remains largely unsurveyed owing to it being remote and inaccessible. But from the small areas I've poked around in, it is botanically very interesting.

More broadly, the dry North Canterbury ranges look interesting to me, in particular those that support extensive prostrate kowhai (*Sophora prostrata*), rather than seral kanuka (*Kunzea* spp.) typically rampant on more humid previously beech forest environments. Miles Giller's article on Smothering Gully in the Omihi Hills (Giller 2013) provides an insight into the possibility of other interesting remnants present in dry North Canterbury. The Lowry Range, for example, would once have been a priority for PNAP survey, but it remains largely a mystery.

But let's not forget Jan Clayton-Greene's discovery of slender button daisy in nondescript commonplace highly modified habitats. This highlights the need to keep an open mind and eyes! After all, if the presumed nationally

extinct *Stellaria elatinoides* is to be found, it is likely to be hanging on in nondescript modified habitats that have somehow survived land development.

Of course all the new information increases our obligation to protect these values. But that is another story.

In the list (Table 1, p. 36) of the 'current' threatened plant species for Canterbury (de Lange et al. 2013), I have highlighted to the best of my knowledge the species that have not been recorded in Canterbury (or parts thereof) for many years, and are potentially regionally extinct.

References

Davis M 2014. Native vegetation remnants of the mid-south Canterbury coast. Canterbury Botanical Society Journal 45: 36–52.

de Lange PJ, Rolfe JR, Champion PD, Courtney SP, Heenan PB, Barkla JW, Cameron EK, Norton DA, Hitchmough RA 2013. Conservation status of New Zealand's indigenous flora, 2012. Department of Conservation, Wellington.

Giller M 2012. The [not quite so] elusive *Carex inopinata*. Canterbury Botanical Society Journal 43: 19–24.

Giller M 2013. The vegetation of Smothering Gully, Omihi Hills, North Canterbury. Canterbury Botanical Society Journal 44: 43–49.

Head N, Given D 2001. Threatened plants of Canterbury including a revised species list. Canterbury Botanical Society Journal 34: 5–14.

Head N 2001. Rediscovery of Cook's scurvy grass *Lepidium oleraceum* on Banks Peninsula. Canterbury Botanical Society Journal 35: 43–47.

Head N, Molloy B, Spencer A. 2004. Re-establishment of *Leptinella filiformis* into suitable remnant habitats in Canterbury: a progress report. Canterbury Botanical Society Journal 38: 87–93.

Williams PA, Wiser S, Clarkson B, Stanley MC 2007. New Zealand's historically rare terrestrial ecosystems set in a physical and physiognomic framework. New Zealand Journal of Ecology 31: 119–128.

Wilson H 2012. *Pittosporum* on Banks Peninsula. Canterbury Botanical Society Journal 43: 11–16.

Table 1 Threatened plants in Canterbury.

Species	**Threat Rank 2012** (de Lange et al. 2013)	**Notes**
Dysphania pusilla	Extinct	Rediscovered 2015
Myosotis laingii	Extinct	Nationally extinct
Myosotis traversii var. *cinerascens*	Extinct	Nationally extinct
Stellaria elatinoides	Extinct	Nationally extinct
Botrychium lunaria	Nationally Critical	Presumed extinct in Canterbury
Brachyscome pinnata	Nationally Critical	
Cardamine (c) (CHR 500569; Awahokomo)	Nationally Critical	
Carmichaelia curta	Nationally Critical	
Carmichaelia hollowayi	Nationally Critical	
Ceratocephala pungens	Nationally Critical	
Chaerophyllum basicola	Nationally Critical	
Chaerophyllum colensoi var. *delicatulum*	Nationally Critical	
Chenopodium detestans	Nationally Critical	
Craspedia (j) (CHR 516302; Lake Heron)	Nationally Critical	
Crassula peduncularis	Nationally Critical	
Deyeuxia lacustris	Nationally Critical	
Epilobium hirtigerum	Nationally Critical	Possibly extinct in Canterbury
Epilobium pictum	Nationally Critical	Possibly extinct in Canterbury
Gentianella calcis ssp. *calcis*	Nationally Critical	
Gentianella calcis ssp. *Manahune*	Nationally Critical	
Gentianella calcis ssp. *taiko*	Nationally Critical	
Gentianella calcis ssp. *waipara*	Nationally Critical	
Juncus holoschoenus var. *holoschoenus*	Nationally Critical	Presumed extinct in Canterbury
Koeleria aff. novozelandica (AK 252546; Awahokomo)	Nationally Critical	
Lepidium aegrum	Nationally Critical	
Leptinella conjuncta	Nationally Critical	
Leptinella filiformis	Nationally Critical	
Leptinella nana	Nationally Critical	
Myosotis colensoi	Nationally Critical	
Myosotis lytteltonensis	Nationally Critical	
Olearia adenocarpa	Nationally Critical	
Pachycladon exile	Nationally Critical	
Poa spania	Nationally Critical	

Pseudognaphalium ephemerum	Nationally Critical	
Ranunculus pauciflorus	Nationally Critical	
Ranunculus aff. *royi (CHR 513327; Waihao)*	Nationally Critical	
Ranunculus aff. *stylosus (CHR 515131; Manahune)*	Nationally Critical	
Raoulia (a) (CHR 79537 ; "K")	Nationally Critical	
Sebaea ovate	Nationally Critical	Extinct in Canterbury but re-established at Leithfield Beach
Senecio scaberulus	Nationally Critical	Presumed extinct in Canterbury - dubious record though
Triglochin palustris	Nationally Critical	Presumed extinct in Heron Basin
Trisetum aff. *lepidum (CHR 251835; Awahokomo)*	Nationally Critical	
Australopyrum calcis subsp. *optatum*	Nationally Endangered	
Cardamine (a) (CHR 312947; "tarn")	Nationally Endangered	
Carex uncifolia	Nationally Endangered	
Carmichaelia torulosa	Nationally Endangered	
Centipeda minima ssp. *minima*	Nationally Endangered	
Craspedia (c) (CHR 529115; Kaitorete)	Nationally Endangered	
Crassula multicaulis	Nationally Endangered	
Euchiton ensifer	Nationally Endangered	
Gingidia aff. *enysii (CHR 283817; Mt Brown)*	Nationally Endangered	
Gunnera densiflora	Nationally Endangered	
Hebe armstrongii	Nationally Endangered	Extinct in Rangitata catchment
Hebe salicornioides	Nationally Endangered	
Heliohebe maccaskillii	Nationally Endangered	
Iphigenia novae-zelandiae	Nationally Endangered	Extinct low altitude Canterbury
Lagenifera montana	Nationally Endangered	
Leonohebe cupressoides	Nationally Endangered	
Lepidium sisymbrioides	Nationally Endangered	
Lepidium solandri	Nationally Endangered	
Muehlenbeckia astonii	Nationally Endangered	
Myosurus minimus ssp. *novae-zelandiae*	Nationally Endangered	Extinct in Canterbury outside of the Mackenzie Basin
Olearia hectori	Nationally Endangered	
Pittosporum patulum	Nationally Endangered	

Ranunculus acraeus	Nationally Endangered	
Ranunculus brevis	Nationally Endangered	?
Uncinia strictissima	Nationally Endangered	Presumed extinct in Canterbury
Anemanthele lessoniana	Nationally Vulnerable	
Anogramma leptophylla	Nationally Vulnerable	
Atriplex buchananii	Nationally Vulnerable	
Carex cirrhosa	Nationally Vulnerable	
Carex inopinata	Nationally Vulnerable	
Carex rubicunda	Nationally Vulnerable	
Carmichaelia crassicaulis ssp. *racemosum*	Nationally Vulnerable	
Carmichaelia astonii	Nationally Vulnerable	Possibly not in Canterbury
Carmichaelia juncea	Nationally Vulnerable	Extinct in the wild in Canterbury
Carmichaelia kirkii	Nationally Vulnerable	
Daucus glochidiatus	Nationally Vulnerable	
Geranium retrorsum	Nationally Vulnerable	
Gratiola concinna	Nationally Vulnerable	
Hebe pareora	Nationally Vulnerable	
Helichrysum dimorphum	Nationally Vulnerable	
Hypericum rubicundulum	Nationally Vulnerable	
Isolepis basilaris	Nationally Vulnerable	
Isolepis fluitans var. *fluitans*	Nationally Vulnerable	Presumed extinct in Canterbury
Kirkianella novae-zelandiae f. *novae-zelandiae*	Nationally Vulnerable	
Lachnagrostis tenuis	Nationally Vulnerable	
Lepilaena bilocularis	Nationally Vulnerable	?
Leucogenes tarahaoa	Nationally Vulnerable	
Mazus novaezeelandiae ssp. *impolitus* f. *impolitus*	Nationally Vulnerable	
Myosotis brevis	Nationally Vulnerable	
Myosotis glauca	Nationally Vulnerable	
Olearia fimbriata	Nationally Vulnerable	
Pachycladon cheesemanii	Nationally Vulnerable	Extinct on Banks Peninsula
Pittosporum obcordatum	Nationally Vulnerable	
Rachelia glaria	Nationally Vulnerable	
Ranunculus ternatifolius	Nationally Vulnerable	Possibly extinct in Canterbury
Rytidosperma merum	Nationally Vulnerable	
Senecio dunedinensis	Nationally Vulnerable	
Spiranthes novae-zealandiae	Nationally Vulnerable	

Acaena buchananii	Declining	
Aciphylla subflabellata	Declining	
Alepis flavida	Declining	Presumed extinct on Banks Peninsula
Amphibromus fluitans	Declining	
Anisotome patula	Declining	
Brachyglottis sciadophila	Declining	
Carex albula	Declining	
Carex litorosa	Declining	
Carex tenuiculmis	Declining	
Carmichaelia corrugata	Declining	
Carmichaelia crassicaulis ssp. *crassicaulis*	Declining	
Carmichaelia nana	Declining	
Carmichaelia uniflora	Declining	
Carmichaelia vexillata	Declining	
Connorochloa tenuis	Declining	
Convolvulus verecundus	Declining	
Coprosma acerosa	Declining	
Coprosma intertexta	Declining	
Coprosma obconica	Declining	
Coprosma pedicellata	Declining	
Coprosma virescens	Declining	
Coprosma wallii	Declining	
Deschampsia cespitosa	Declining	Presumed extinct Banks Peninsula and lowland Canterbury
Eleocharis neozelandica	Declining	Presumed extinct in Canterbury
Eryngium vesiculosum	Declining	
Euphorbia glauca	Declining	Presumed extinct in Canterbury
Ficinia spiralis	Declining	
Gunnera arenaria	Declining	
Heliohebe lavaudiana	Declining	
Hypericum involutum	Declining	
Lobelia ionantha	Declining	
Luzula celata	Declining	
Melicytus crassifolius	Declining	
Melicytus flexuosus	Declining	Very close to being extinct in Canterbury
Montigena novae-zelandiae	Declining	
Muehlenbeckia ephedroides	Declining	
Olearia fragrantissima	Declining	
Olearia lineata	Declining	

Parahebe canescens	Declining	
Peraxilla colensoi	Declining	
Peraxilla tetrapetala	Declining	
Pimelea aridula subsp. *aridula*	Declining	
Pimelea sericeo-villosa ssp. *sericeo-villosa*	Declining	
Pimelea sericeo-villosa ssp. *pulvinaris*	Declining	
Pimelea villosa	Declining	
Poa billardierii	Declining	
Pterostylis tanypoda	Declining	
Pterostylis tristis	Declining	
Ranunculus haastii	Declining	
Raoulia aff. *hookeri (AK 239529; "coast")*	Declining	?
Raoulia monroi	Declining	
Rytidosperma telmaticum	Declining	
Solanum aviculare var. *aviculare*	Declining	
Sonchus kirkii	Declining	
Teucridium parvifolium	Declining	
Traversia baccharoides	Declining	
Tupeia antarctica	Declining	Extinct in Mackenzie Basin
Urtica linearifolia	Declining	
Anthosachne multiflora	Data Deficient	
Carex decurtata	Data Deficient	
Epilobium insulare	Data Deficient	
Haastia pulvinaris var. *minor*	Data Deficient	
Leptinella intermedia	Data Deficient	
Melicytus aff. *alpinus (d) (CHR 541567; "dark")*	Data Deficient	
Melicytus aff. *alpinus (f) (CHR 530143; Brockie)*	Data Deficient	
Myosotis suavis	Data Deficient	
Pachystegia aff. *insignis (CHR ; Lowry)*	Data Deficient	
Pimelea declivis	Data Deficient	
Polygonum plebeium	Data Deficient	Possibly extinct in Canterbury
Ranunculus aff. *reflexus (d) (CHR 394270; Mount Peel)*	Data Deficient	
Schizeilema pallidum	Data Deficient	
Uncinia sinclairii	Data Deficient	?