

New Zealand Meteorological Service 1983. Summaries of climatological observations to 1980. *New Zealand Meteorological Service Miscellaneous Publication 177*: 70,78.  
 Ogle, Colin 1987. The retreat of Cook's scurvy grass. *Forest and Bird 18(1)*:26.  
 Stevens, G.R. 1974. *Rugged landscape*. A.H. and A.W. Reed, Wellington.  
 Timmins, S.M.; Atkinson, I.A.E.; Ogle, C.C. (in press). Mana Island: A management opportunity. *New Zealand Journal of Ecology 10*.  
 Wellington Botanical Society, 1984: The future management of Mana Island, Wellington. Unpublished report of a Wellington Botanical Society study team.  
 Wodzicki, K.A.; Oliver, W.R.B. 1944. Mana Island. *New Zealand Science Review*. March-June: 10,14.

## APPENDIX 1 - Glossary of Plant Names

Common Name	Botanical Name
akiraho	<i>Olearia paniculata</i>
annual poa	<i>Poa annua</i>
batchelor's button	<i>Cotula coronopifolia</i>
berry saltbush	<i>Einadia triandra</i>
bidibidi	<i>Acaena anserinifolia</i>
black nightshade	<i>Solanum nigrum</i>
boneseed	<i>Chrysanthemoides monilifera</i>
boxthorn	<i>Lycium ferocissimum</i>
broad-leaved dock	<i>Rumex obtusifolius</i>
browntop	<i>Agrostis capillaris</i>
brush wattle	<i>Albizia lophantha</i>
catsear	<i>Hypochaeris radicata</i>
chickweed	<i>Stellaria media</i>
climbing rata	<i>Metrosideros perforata</i>
club sedge	<i>Scirpus nodosus</i>
cocksfoot	<i>Dactylis glomerata</i>
crested dogstail	<i>Cynosurus cristatus</i>
danthonia	<i>Rytidosperma unarede</i>
dove's foot	<i>Geranium molle</i>
flax	<i>Phormium tenax</i>
floating sweet grass	<i>Glyceria declinata</i>
fumitory	<i>Fumaria officinalis</i>
giant umbrella sedge	<i>Cyperus ustulatus</i>
glasswort	<i>Sarcocornia quinqueflora</i>
gorse	<i>Ulex europaeus</i>
hawksbeard	<i>Crepis capillaris</i>
inkweed	<i>Phytolacca octandra</i>
kaikomako	<i>Pennantia corymbosa</i>
kanuka	<i>Kunzea ericoides</i>
karaka	<i>Corynocarpus laevigatus</i>
karamu	<i>Coprosma robusta</i>
kawakawa	<i>Macropiper excelsum</i>
kohekohe	<i>Dysoxylum spectabile</i>
large-flowered mallow	<i>Malva sylvestris</i>
macrocarpa	<i>Cupressus macrocarpa</i>
mahoe	<i>Meliccytus ramiflorus</i>
manuka	<i>Leptospermum scoparium</i>
mapou	<i>Myrsine australis</i>
meadow rice grass	<i>Microlaena stipoides</i>
Mercury Bay weed	<i>Dichondra repens</i>
milk tree	<i>Paratrophis banksii</i>
mountain flax	<i>Phormium cookianum</i>
NZ ice plant	<i>Disphyma australe</i>
NZ spinach	<i>Tetragonia trigyna</i>

pampas	<i>Cortaderia seloana</i> , <i>C. jubata</i>
pine	<i>Pinus radiata</i>
pohuehue (small-leaved)	<i>Muehlenbeckia complexa</i>
poroporo	<i>Solanum aviculare</i>
prairie grass	<i>Bromus willdenowii</i>
prickly mingimingi	<i>Cyathodes juniperinu</i>
prickly shield fern	<i>Polystichum vestitum</i>
ratstail	<i>Sporobolus africanus</i>
rengarenga lily	<i>Arthropodium cirratum</i>
ripgut brome	<i>Bromus diandrus</i>
ryegrass	<i>Lolium perenne</i>
Scotch thistle	<i>Cirsium vulgare</i>
sheep's sorrell	<i>Rumex acetosella</i>
shield fern	<i>Polystichum richardii</i>
shining spleenwort	<i>Asplenium oblongifolium</i>
shiny karamu	<i>Coprosma lucida</i>
shore convolvulus	<i>Calystegia soldanella</i>
shore groundsel	<i>Senecio lautus</i> var
silver tussock	<i>Poa cita</i>
small-flowered nightshade	<i>Solanum americanum</i>
small-leaved pohuehue	<i>Muehlenbeckia complexa</i>
speargrass	<i>Aciphylla squarrosa</i>
starwort	<i>Callitriche stagnalis</i>
Tasmanian ngaio	<i>Myoporum insulare</i>
tauhinu	<i>Cassinia leptophylla</i>
taupata	<i>Coprosma repens</i>
toetoe	<i>Cortaderia toetoe</i>
tree mallow	<i>Lavatera arborea</i>
veld grass	<i>Ehrharia erecta</i>
velvety nightshade	<i>Solanum chenopodioides</i>
watercress	<i>Nasturtium officinale</i>
wharangi	<i>Melicope ternata</i>
white clover	<i>Trifolium repens</i>
Yorkshire fog	<i>Holcus lanatus</i>

**APPENDIX 2:  
LIST OF VASCULAR PLANTS  
ON MANA ISLAND**

This list is of plants noted 28 March - 1 April and 20-22 July 1984 by nine members of the Wellington Botanical Society, with additional records from Aston (1911), a list made by M. Meads in 1972 (in Atkinson et al. 1975), records of I. Atkinson in 1975 (ibid.), C. Ogle and I. Atkinson on 25-26 September 1984, the authors on 9 October 1986, 2-6 February 1987, and J. Rolfe (pers. comm. November 1986).

**PART A:** Native and adventive species occurring in the wild state.

Abundance ratings follow Atkinson et al. (1975), updated where appropriate.

- + = present; plant seen in fewer than five places
- M = many; plant occurs in less than half the suitable habitats
- A = abundant; plant of general occurrence in suitable habitats
- \* = species not native to Wellington Ecological District
- (p) = species which has been planted on the island, but which is present also naturally and/or as a subsequent 'escape'. (It is likely that most pasture grasses and some clovers were sown originally, also.)
- (w) = herbarium specimen collected for WELT (National Museum Wellington)
- (c) = herbarium specimen collected for CHR (DSIR, Christchurch), including those from surveys of Meads in 1972 and Atkinson in 1975.

Habitats:

- S = Shore (including shingle areas to toe of cliffs)
- C = Coastal cliffs (land between shore and edge of plateau)
- V = Valleys (pasture, scrub, or forest cover)
- P = Plateau and ridges (mainly grazed and ungrazed pasture)
- B = Buildings (growing around buildings)

**HABITATS**

TREES AND SHRUBS	S	C	V	P	B	COMMENTS
* <i>Albizia lophantha</i> (brush wattle)			M			6+ shrubs, 2-3m tall (eradicated) + many seedlings, all in head of forest valley. More removed Nov. 1986, Jan. 1987
<i>Alectryon excelsus</i> (titoki) (c)				+		Meads (in Atkinson et al., 1975) - one seedling.
<i>Brachyglottis repanda</i> var. <i>repanda</i> (rangiora)				A		
<i>Carmichaelia arborea</i> var. (NZ broom) (c)				M		
<i>Cassinia leptophylla</i> (tauhinu)	A	A	A	A	M	

**HABITATS**

	S	C	V	P	B	COMMENTS
* <i>Chrysanthemoides monitifera</i> (boneseed)	+					+ Isolated shrubs, flowering 1986
<i>Coprosma areolata</i>				+(1)		In forest, 1.5m tall.
<i>C. lucida</i> (shiny karamu)			+	M		Some > 2m tall and many young plants (Oct. 1986).
<i>C. propinqua</i> ssp. <i>propinqua</i> (c)	A	A	A	A	M	(p) Distinctive, low, sprawling shrubs on beaches and cliffs; planted ones with erect growth forms.
(p) <i>C. repens</i> (taupata)	A	A				
<i>C. rhamnoides</i>				A		
(p) <i>C. robusta</i> (karamu)				M	+(p)	On south-west shore among <i>C. propinqua</i> .
<i>C. crassifolia</i> x <i>C. repens</i> (w)	+(1)					
<i>C. propinqua</i> x <i>C. robusta</i> (c)				+		1 plant (Aston 1911).
<i>Coriaria arborea</i> (tree tutu)						(p) 1 on south-east cliff face
(p) <i>Cordyline australis</i> (cabbage tree)				(p)		
(p) <i>Corynocarpus laevigatus</i> (karaka)				M		(p) Mostly seedlings; c.6 trees 10cm d.b.h.
(p) * <i>Cupressus macrocarpa</i> (macrocarpa)				(p)		(p) Seedlings near jetty.
<i>Cyathodes juniperina</i> var. (prickly mingimingi)				M		Scattered low shrubs on rock outcrops.
<i>Cytisus scoparius</i> (broom)				+		1 on south-east 'corner' of island, 1 on northern cliffs
<i>Dysoxylum spectabile</i> (kohekohe)				+		1 canopy tree in forest; nearby seedlings 10 (1984), many more in Oct. 1986.
<i>Griselinia lucida</i> (puka) (w)				+		1 shrub, 2m tall, in Tauhinu Valley, 1 on northern cliffs.
<i>Hebe stricta</i> var. <i>macroura</i> (c)				M		Few scattered shrubs on steep rocky bluffs.
(p) * <i>Hoheria populnea</i> var. <i>populnea</i> (lacebark)				(p)		(p) Young saplings under macrocarpa trees near farm sheds.
<i>Hymenanthera crassifolia</i> (w) (c)	A	A	+			Shrubs up to 2m x 2m, at widely scattered sites, but 5 on south-west cliffs.
<i>H. obovata</i> var. (c)	+(1)	M(8)				
<i>Kunzea ericoides</i> var. <i>ericoides</i> (kanuka)				M		
<i>Leptospermum scoparium</i> (manuka)				A	A	
<i>Leucopogon fraseri</i> (patotara) (c)				M		
<i>Lycium ferocissimum</i> (boxthorn)	A	A	+	M	M	M Spreading in all sites.
<i>Macropiper excelsum</i> var. <i>excelsum</i> (kawakawa)				+		1 canopy tree seedlings in forest; seedlings on coast near forest valley.
<i>Melicope ternata</i> (wharangi)				+		
<i>Melicytus ramiflorus</i> (mahoe)				+	M	1 shrub (3m tall) near top of south-east cliffs
<i>Metrosideros robusta</i> (northern rata) (c)				+		1 self-sown.
(p) * <i>Myoporum insulare</i> (Tasmanian ngaio)				+(p)	(p)	(p) Atkinson et al. (1975) (on south-east cliffs).
(p) <i>M. laetum</i> (ngaio)				+(1)	+(1)	
<i>Myrsine australis</i> (mapou)				+		2 trees in forest (Atkinson et al. 1975); others all short saplings near mouth of Tauhinu Valley, behind farm sheds, and under macrocarpas in Weta Valley.
<i>Olearia paniculata</i> (akiraho) (c)				+(10)	+(6)	+(2)

HABITATS

S	HABITATS			B	COMMENTS
	C	V	P		
	+ (2)	M			
<i>O. solandri</i> (c)					South-east cliffs, and patch in Aston Valley; single shrubs in Tauhinu Valley and in Kaikomako Valley.
<i>Paratropis banksii</i> (milk tree) (w) (c)	+	+			1 female and 1 male tree and many seedlings in forest; 2 seedlings on cliffs north of the spit; 1 female gnarled tree on south-east cliffs; 1 male shrub on rocks in Kaikomako Valley.
<i>Pennantia corymbosa</i> (kaikomako) (c)	+ (9)	+ (4)	M		Shingle spit, east and south-east cliffs; central-north valleys.
<i>Pimelea prostrata</i> var. <i>prostrata</i> (pinatoro) (c)		M	M		
* <i>Pinus radiata</i>				+ (p)	Seedlings close to mature trees beside 'trig pond'.
(p) * <i>Pitiosporum crassifolium</i> (karo)				+ (p)	Widely planted; seedling on cliff.
<i>Plagianthus divaricatus</i> (shore ribbonwood)(w)	+ (1)				Found Oct. 1986 on south-east shore; flowering.
(p) <i>Pseudopanax arboreus</i> (five finger)				(p)	Recorded as occurring naturally on island by Aston (1911).
* <i>Sambucus nigra</i> (elderberry)	+	+			Shingle spit and under macrocarpas near sheds, one in plantation in Weta Valley.
<i>Solanum aviculare</i> (poroporo)	M(?)	+	M		Shingle spit; edges of plantations.
<i>S. laciniatum</i> (poroporo)	M	+	M		1 patch, just east of trig and below cliff edge.
* <i>Ulex europaeus</i> (gorse)		+			
<i>Urtica ferox</i> (shrub nettle, ongaonga)	+		M		

LIANES

<i>Calystegia sepium</i> agg. (convolvulus)					Among planted shrubs near caretaker's house.
<i>C. soldanella</i> (shore convolvulus)	A				
<i>C. tuguriorum</i> (c)	M	+			
<i>Clematis forsteri</i>					
<i>Freycinella baueriana</i> sp. banksii (kiekie)				+ (1)	One closely-browsed stump with 5cm green sprouts, in Kaikomako Valley (1984).
<i>Metrosideros perforata</i> (clinging rata)	M	+			On rock outcrops in valleys.
<i>Muehlenbeckia australis</i> (pohuehue)				+	
<i>M. complexa</i> (small-leaved pohuehue) (c)	A	A			
<i>Parsonsia</i> sp. (NZ jasmine)				+ (1)	
* <i>Rubus</i> sp. ( <i>R. fruticosus</i> agg.) (w)	+				About 5 young plants under macrocarpas near sheds, 1 on shingle spit near fence.
<i>Tetragonia trigyna</i> (NZ spinach) (c)	A	A	M	+	

FERNS

<i>Adiantum cunninghamii</i> (maidenhair fern) (c)			M		(p) Forest.
<i>Anogramma leptophylla</i> (w)	+				South-east cliffs; 3 small patches totalling some 10-12 plants

HABITATS

S	HABITATS			B	COMMENTS
	C	V	P		
	M	+			
<i>Asplenium flabellifolium</i> (c)					Forest.
<i>A. flaccidum</i> ssp. <i>flaccidum</i> (hanging spleenwort) (c)					Forest.
<i>A. gracillimum</i>					
<i>A. hookerianum</i> (c)					
<i>A. oblongifolium</i> (shining spleenwort)	+	M			+ (p?)
<i>A. polyodon</i>					
<i>A. terrestre</i> ssp. <i>maritimum</i> (c)	+	A			Forest.
<i>A. gracillimum</i> x <i>A. hookerianum</i> (c)					Forest.
<i>A. gracillimum</i> x <i>A. flaccidum</i>					
<i>A. flaccidum</i> x <i>A. terrestre</i> (w)					Forest (J. Rolfe)
<i>Azolla filiculoides</i> (floating water fern)					'Trig pond'.
<i>Blechnum chambersii</i> (c)	M				Forest.
<i>B. filiforme</i> (climbing blechnum)					Forest.
<i>B. membranaceum</i>					Forest (J. Rolfe)
<i>B. minus</i> (swamp kiokio)					Stream bank in House Valley.
<i>B. penna-marina</i> (w)					+ (p?) One small patch in Aston Valley and in 'fernery' of house furthest from sea.
<i>B. sp.</i> (unnamed sp.; <i>B. capense</i> agg.; large fronds; lowest pinnae progressively smaller)					(p?) Forest and Tauhinu Valley (J. Rolfe).
<i>Cheilanthes sieberi</i> (c)					

*Cyathea cunninghamii* (gully fern)(w)

<i>C. dealbata</i> (ponga)					In manuka-kanuka scrub of Tauhinu Valley; plants on cliffs (Atkinson et al. 1975) not relocated.
<i>C. medullaris</i> (mamaku)					+ (1) One young plant in 1984 in 'fernery' beside house furthest from sea (probably self-established); gone in Jan. 1987.
<i>Histiopteris incisa</i> (water fern)					Forest.
<i>Hymenophyllum rarum</i>					Forest.
<i>H. sanguinolentum</i>					+ (p?) Tauhinu Valley, on rock face.
<i>Hypolepis ambigua</i> (c)					Tauhinu Valley, on rock face.
<i>Lastreopsis velutina</i>					
<i>Pellaea rotundifolia</i>					Forest.
<i>Phymatosorus diversifolius</i> (hound's tongue fern)					Scattered among scrub and stones.
<i>Polystichum richardii</i> (w)					
<i>P. richardii</i> x <i>P. vestitum</i> (w)					
<i>Pteridium esculentum</i> (bracken)					1 plant in manuka-kanuka scrub of Tauhinu Valley.
<i>Pteris pendula</i>					Forest.
<i>P. tremula</i> (c)					
<i>Pyrrosia serpens</i> (c)	M	A	M	+	

GRASSES

* <i>Agrostis capillaris</i> (browntop)			M	M	+	
* <i>A. stolonifera</i> (creeping bent)			M	M	+	Grazed and ungrazed wet grassland.
* <i>A. sp.</i> (w)						A large bent grass in ungrazed pasture of Weta Valley.
* <i>Aira caryophyllea</i> (silvery hairgrass)			M		+	
* <i>Anthoxanthum odoratum</i> (sweet vernal)				A	M	A
* <i>Arrhenatherum elatius</i> (tall oat grass)					+	



HABITATS

	HABITATS				B	COMMENTS
	S	C	V	P		
* <i>Briza minor</i> (quaking grass)						Weta Valley - ungrazed grassland.
* <i>Bromus diandrus</i> (ripgut brome)	A				M	
* <i>B. forskii</i>						
* <i>B. mollis</i> (soft brome)						
* <i>B. willdenowii</i> (prairie grass)	M	M				
* <i>Cynodon dactylon</i> (Indian doab)	M	M				
(c)						
* <i>Cynosurus cristatus</i> (crested dogtail)			M			
* <i>Dactylis glomerata</i> (cocksfoot)	A	A	A		A	
* <i>Dichelachne crinita</i> (plume grass)						
(c)						
* <i>Ehrharta erecta</i> (veld grass) (w)	M	M				Widespread, but not in large quantities in any one site.
* <i>Elymus recisetus</i> agg. (blue wheat grass)						
* <i>Elytrigia repens</i> (couch) (w)						
* <i>Festuca multinodis</i> (w)	M				M	Crevices in rock outcrops, especially on south-west cliffs
* <i>F. rubra</i> ssp. <i>commutata</i> (Chewing's fescue)	M					
* <i>Glyceria declinata</i> (floating sweet grass)						Damp places in pasture; ponds.
* <i>Holcus lanatus</i> (Yorkshire fog)						
* <i>Hordeum murinum</i> (barley grass) (w)	M	A	M		A	
* <i>Lachnagrostis filiformis</i> var. <i>littoralis</i> (w)						Near beach on cliffs below trig.
* <i>L. sp.</i> ( <i>L. richardii</i> ?) (w)						In rock crevice on south-west cliffs.
* <i>Lolium perenne</i> (perennial rye grass)	A	A	A		A	
* <i>Microlaena stipoides</i> (meadow rice grass) (c)	M	A	M			
* <i>Paspalum dilatatum</i> (paspalum)						
* <i>Pennisetum clandestinum</i> (kikuyu grass)						2 patches, c. 5m diam, beside manager's house and on site of old house.
* <i>Poa anceps</i> var. <i>anceps</i>						
* <i>P. annua</i> (annual poa)						
* <i>P. cita</i> (silver tussock) (c)						More common on northern cliffs than southern cliffs.
* <i>P. pratensis</i> (Kentucky bluegrass)	M	M	M			Weta Valley, among tauhinu.
* <i>Ryldosperma penicillatum</i> (w)						Northern cliffs, Weta Valley.
* <i>R. racemosum</i> (w) (c)						Mostly in ungrazed parts of Weta Valley.
* <i>R. unarede</i> (w)						Scattered on some rock outcrops.
* <i>Sporobolus africanus</i> (ratstail)						Tracks.
* <i>Trisetum antarcticum</i> s.s. (w) (c)						One patch, at head of Kaikomako Valley, October 1986.
* <i>Vulpia bromoides</i>						
* <i>Vulpia sp. x Festuca rubra</i> (c)						

SEDGES

* <i>Carex breviculmis</i> (w)						Under manuka in head of forest valley; few near trig.
* <i>C. divisa</i> (w, c)						2 large patches near boat shed and main stream.
* <i>C. flagellifera</i> (c)	M	M	M			Especially large plants around 'trig pond'.



HABITATS

	HABITATS				B	COMMENTS
	S	C	V	P		
* <i>C. geminata</i> s.s. (cutty grass) (w)						Forest.
* <i>C. raoultii</i> (w) (c)						Few in lower and upper parts of forest valley; 'trig pond'.
* <i>C. virgata</i>						
* <i>Cyperus ustulatus</i>						
* <i>Eleocharis acuta</i> (spike sedge)	A	A	A		M	Patches on edge of 'trig pond' and fenced-off pond on south-west cliff top; on wet flats below houses.
* <i>Scirpus cernuus</i> (w)						On flats and at mouth of 'home stream'; in seepage between shingle spit and forest valley; plants up to 20cm tall at 'trig pond'.
* <i>S. inundatus</i> (c)						
* <i>S. nodosus</i> (c)	M	M	A			Few plants at 'trig pond'.
* <i>S. prolifer</i>						

ORCHIDS

* <i>Bulbophyllum pygmaeum</i> (w)						One patch on rock in Tauhinu Valley, one in Kaikomako Valley.
* <i>Caladenia carnea</i>						Under kanuka Forest Valley.
* <i>Earina autumnalis</i>						One patch on rocks, Tauhinu Valley.
* <i>E. mucronata</i> (w)						Patches on rocks in Tauhinu Valley.
* <i>Microtis unifolia</i> (w)						Widely-scattered plants, east side of island
* <i>Pterostylis alabola</i>						Under manuka-kanuka scrub in main forested valley.
* <i>Thelymitra longifolia</i>	M	M				

RUSHES

* <i>Juncus articulatus</i>						Water courses in pasture.
* <i>J. australis</i> (c)						
* <i>J. bufonius</i> (toad rush)						Seepage between shingle spit and forest valley.
* <i>J. distegus</i> (w) (c)						
* <i>J. gregiflorus</i> (w)						
* <i>J. pallidus</i>						
* <i>J. planifolius</i> (w)						
* <i>J. tenuis</i> (?)						Stream course, Weta Valley.
* <i>Luzula banksiana</i> var. <i>banksiana</i> (wood rush) (c)						Around old ensilage pit near western cliff-tops.
* <i>L. plicata</i> s.s. (wood rush)						Forest (hybrids between the island's 2 <i>Luzula</i> spp. may be present also).

OTHER MONOCOT HERBS

(other than grasses, sedges, orchids and rushes)

* <i>Ariropodium candidum</i>						1 small patch in forest.
* <i>A. cirratum</i> (tengarenga lily) (c)						
* <i>Dianella nigra</i> (turutu)						Forest.
* <i>Liberia grandiflora</i> (NZ iris) (w)						
* <i>Phormium cookianum</i> (mountain flax)						
* <i>P. cookianum</i> x <i>P. tenax</i> (wandering Jew)						1 plant on north-east cliffs.
* <i>Tradescantia fluminensis</i> (wandering Jew)						
* <i>Triglochin striatum</i>						Small patches at mouth of main stream.

DICOTYLEDON HERBS

	HABITATS					COMMENTS
	S	C	V	P	B	
<i>Acaena anserinifolia</i> (bidibidi) (w)			+			Aston Valley and south-east cliffs.
* <i>Achillea millefolium</i> (yarrow)	+				M	Locally common.
<i>Aciphylla squarrosa</i> s.s. (speargrass)	M	M				Beside boat shed.
* <i>Amaranthus retroflexus</i> (?) (redroot) (w)						
* <i>Anagallis arvensis</i> (scarlet pimpernel)	M	+				
* <i>Angelica pachycarpa</i> (angelica)	+					+ (p) 1 patch on western cliffs (1984); 1 plant on south-east shore (1986). Few plants in pasture in Aston Valley.
* <i>Aphanes microphylla</i> (parsley piert) (w)						Mostly near jetty. Beaches in extreme north-east and south-east of island.
* <i>Apium australe</i> (sea celery)	M					
* <i>Arctotheca (Cryptostemma) calendulacea</i> (cape daisy) (w) (c)	+					
* <i>Aster subulatus</i> (sea aster)	M	M				
* <i>Atriplex hastata</i> (?) (orache) (c)	+					Few plants among driftwood on shingle spit, and beach to north-west.
* <i>Bellis perennis</i> (daisy)					M	
* <i>Beta vulgaris</i> (silverbeet)						North coast; eradicated Nov. 1986 (J. Rolfe).
* <i>Brassica oleracea</i> (cabbage) (w)						Few plants in site of old house and in grazed pasture immediately behind shingle spit; also on south-east shore.
* <i>Callitriche stagnalis</i> (starwort) (c)	+					Seepage on north-east beach; mostly in damp places in pasture.
* <i>Capsella bursa-pastoris</i> (shepherd's purse)	+				M	On beach near jetty.
* <i>Cardamine hirsuta</i> (bitter cress) (w)						
* <i>C. sp.</i> (bitter cress) (w)						On south-east cliffs among rocks.
* <i>Carduus tenuiflorus</i> (winged thistle)	M	M			M	South-west and south-east cliffs, among rocks.
* <i>Centaurium erythraea</i> (centaury)						Ungrazed grassland among tauhinu, in Weta Valley.
* <i>Centella uniflora</i>	+					1 patch on north beach, below trig; 1 at top of western cliffs in rocky gully.
* <i>Cerastium fontanum</i> ssp. <i>triviale</i> (mouse-ear chickweed)						
* <i>C. glomeratum</i> (mouse-ear chickweed) (c)	+					Atkinson et al. (1975).
* <i>Chenopodium album</i> agg. (fathen) (c)	+					Edge of plantation on hill above shingle spit.
* <i>C. murale</i> (nettle-leaved fathen) (c) (w)						Near boatshed, on shingle.
* <i>Chrysanthemum frutescens</i>						On argillite scree on north shore.
* <i>C. segetum</i> (corn marigold) (w)						Most common in patches in pasture in northern half of island.
* <i>Cirsium arvense</i> (Californian thistle)	+					Rock crevices on cliffs and cliff edges; local.
* <i>C. vulgare</i> (Scotch thistle)	A	M			A	
* <i>Colobanthis muelleri</i> (w)						
* <i>Conyza floribunda</i> (flea-bane) (c)	M	M				
* <i>Coronopus didymus</i> (twin cress)	+					Stock-trampled earth around water troughs, farm gateways.
* <i>Cotula australis</i> (c)	+					

HABITATS

	HABITATS					COMMENTS
	S	C	V	P	B	
<i>C. coronopifolia</i> (batchelor's button) (c)	+					Most in damp places in pasture; on shore in far north-east of island.
<i>C. sp.</i> (c)						Atkinson et al. (1975) (specimen non-flowering, but large size of leaves suggests <i>C. membranacea</i> ).
<i>Craspedia</i> sp. (yellow woollyhead) (c)	+					Scattered in rock crevices around island, but mostly in north-west; Kaikomako Valley.
* <i>Crassula</i> sp.	+					On driftwood and in soil pockets among rocks on south-east coast.
<i>C. sp.</i>	+					
* <i>Crepis capillaris</i> (hawkbeard) (c)	A					Pasture in shallow valley near site of old windmill.
* <i>Cucurbita maxima</i> (pumpkin)						Atkinson et al. (1975) on western shore.
* <i>Datura stramonium</i> (thorn apple)	+					
* <i>Daucus carota</i> (wild carrot) (x)	M					Most on beaches near to and south of jetty.
<i>Dichondra repens</i> (Mercury Bay weed) (w)	M	M				
<i>Disphyma australe</i> (NZ ice plant) (c)	M	A				
<i>Einadia triandra</i> (c)	A	A				
<i>Epilobium nummularifolium</i> (willow herb) (c)	M	M				
* <i>Erodium moschatum</i> (crane's bill) (c)	A	A				
* <i>Foeniculum vulgare</i> (fennel)						
* <i>Fumaria muralis</i> (fumitory)	A	+				
* <i>Galium aparine</i> (cleavers) (c)	M	+				
* <i>G. propinquum</i> (c)	+					
<i>Geranium microphyllum</i>						Among tauhinu close to trig, and on south-east cliffs.
<i>G. molle</i> (dove's foot) (c)	A	M				Among rocks in Aston Valley.
<i>G. sessiliflorum</i> (w)	M	M				
<i>G. solanderi</i> (c)	+					Scattered in open sites on cliff tops, 1 on south-east cliffs (1986).
<i>Glaucium flavum</i> (horned poppy)	M					Locally common, but only on shingle spit and immediately north.
<i>Gnaphalium audax</i> s.s. (cudweed)	M	+				
<i>G. gymnocephalum</i> (cudweed) (c)						
<i>G. sphaericum</i> (cudweed)						On bank of steep, incised stream courses, Aston and Kaikomako Valleys
<i>G. sp.</i> (cudweed) (c)	M					Bank behind house.
<i>Gohocarpus incanus</i> (incl. <i>G. montanus</i> ) (w)	M					Under manuka-kanuka scrub in main forested valley.
<i>Halaragis erecta</i> (c)	M	+				
<i>Helichrysum filicaule</i>						
<i>Hydrocotyle heteromeria</i> (pennywort)						Behind coastal cliffs above shingle spit, among rocks in pasture (1986).
* <i>H. moschata</i> (hairy pennywort)	M					
* <i>Hypochoeris radicata</i> (catsear)	M	A				
* <i>Lactuca virosa</i> (bitter lettuce)	+					Atkinson et al. (1975). Below and east of trig.
* <i>Lathyrus latifolius</i> (everlasting pea) (w)						
* <i>Lavatera arborea</i> (tree mallow)	+					
* <i>Leontodon taraxacoides</i> (hawkbit)	+					
* <i>Lepidium bonariense</i> (c)	M	+				

HABITATS

S	HABITATS			B	COMMENTS
	S	C	V		
*	<i>L. oleraceum</i> (Cook's scurvy grass) (c)(w)	+			Meads (in Atkinson et al. 1975) on northern cliffs, below trig. 6 plants on rock outcrop in south of island (Sept. 1984). Mouth of main stream. Cliffs above shingle spit; Kaikomako Valley.
*	<i>Lilaeopsis</i> sp.				
*	<i>Linum bienne</i> (pale flax) (w)	M	+		
*	<i>L. monogynum</i> (rauhauia) (c)	M	+		
*	<i>Lobelia anceps</i> (NZ lobelia) (c)	M	+		
*	<i>Lotus pedunculatus</i> (lotus major) (tomato)				
*	<i>Lycopersicon esculentum</i> (tomato)				
*	<i>Lythrum hyssopifolia</i> (hyssop loosesstrife)				
*	<i>Matva neglecta</i> (dwarf mallow) (c)				
*	<i>M. nicaeensis</i> (French mallow) (c)				
*	<i>M. sylvestris</i> (large-flowered mallow) (w)				
*	<i>Marrubium vulgare</i> (horehound)				
*	<i>Matricaria matricarioides</i>				
*	<i>Medicago arabica</i> (spotted bur medick)				
*	<i>M. lupulina</i> (black medick)				
*	<i>M. polymorpha</i> (bur medick)				
*	<i>M. sativa</i> (lucerne)				
*	<i>Mellilotus indica</i> (King Island mellilot)				
*	<i>Mimulus guttatus</i> (monkey musk)(w)				
*	<i>Modiola caroliniana</i> (creeping mallow)				
*	<i>Montia</i> sp. (unnamed; <i>M. fontana</i> ssp. <i>chondraesperma</i> ) (w)				
*	<i>Nasturtium officinale</i> (watercress)				
*	<i>Orobancha minor</i> var. <i>minor</i> (broomrape) (w)				
*	<i>Oxalis corniculata</i> (w)				
	<i>O. exilis</i>				
	<i>Parietaria debilis</i> (c)				
	<i>Peperomia urvilleana</i> (c)				
*	<i>Petroselinum crispum</i> (parsley)				
*	<i>Phytolacca octandra</i> (inkweed)				
*	<i>Picris echinoides</i> (ox tongue) (c)				
*	<i>Plantago coronopus</i> (buck's horn plantain)				
*	<i>P. lanceolata</i> (narrow-leaved plantain)				
*	<i>P. major</i> (broad-leaved plantain)				
*	<i>P. raoulii</i> var. (w) (c)				
*	<i>Polycarpon tetraphyllum</i> (allseed)				
*	<i>Polygonum aviculare</i> (wireweed)				

HABITATS

S	HABITATS			B	COMMENTS
	S	C	V		
*	<i>Ranunculus amphitricha</i> ( <i>R. rivularis</i> auct.)	+			Main stream (1984 - not seen since).
*	<i>R. parviflorus</i> (small flowered buttercup) (c)				Atkinson et al. (1975).
*	<i>R. repens</i> (creeping buttercup)				
*	<i>R. sceleratus</i> (celery-leaved buttercup) (w)				
*	<i>R. sp.</i> (unnamed; <i>R. hirtus</i> auct.)				
*	<i>Raoulia</i> sp. (w)				
*	<i>Raphanus raphanistrum</i> sp. (wild radish)				
*	<i>Rumex acetosella</i> (sorrel)				
*	<i>R. conglomeratus</i> (clustered dock)				
*	<i>R. crispus</i> (curled dock)				
*	<i>R. obtusifolius</i> (broad-leaved dock)				
*	<i>Sagina apetala</i> (w)				
*	<i>S. procumbens</i> (pearwort) (c)				
*	<i>Sarcocornia quinqueflora</i> (glasswort)				
*	<i>Scleranthus biflorus</i> (c)				
*	<i>Senecio glastifolius</i> (w)				
*	<i>S. glomeratus</i> (w)				
*	<i>S. hispidulus</i> (fireweed) (c)				
*	<i>S. jacobea</i> (ragwort)				
*	<i>S. laevis</i> var. (shore groundsel) (w)				
*	<i>S. minimus</i> (fireweed)				
*	<i>S. vulgaris</i> (groundsel)				
*	<i>Sherardia arvensis</i> (field madder)(w)				
*	<i>Silene gallica</i> (catchfly)				
*	<i>Silybum marianum</i> (variegated thistle)				
*	<i>Sisymbrium officinale</i> (hedge mustard)				
*	<i>Solanum americanum</i> (w)				
*	<i>S. chenopodioides</i> (velvety nightshade)				
*	<i>S. nigrum</i> (black nightshade)				
*	<i>S. tuberosum</i> (potato)				
*	<i>Sonchus asper</i> (prickly sowthistle)				
*	<i>S. Kirkii</i>				
*	<i>S. oleraceus</i> (puwaha, sowthistle)				
*	<i>Spargularia rubra</i> (sand spurrey) (w)				
*	<i>Stellaria media</i> (chickweed) (c)				
*	<i>S. parviflora</i> (native chickweed) (c)				
*	<i>Taraxacum officinale</i> (dandelion)				
*	<i>Torilis nodosa</i> (hedgehog parsley) (w)				

## HABITATS

	S	C	V	P	B	COMMENTS
* <i>Trifolium dubium</i> (suckling clover)	M	+	+	+	+	Grassland of Weta Valley.
* <i>T. glomeratum</i> (clustered clover)	M					Bare areas on west and south-west cliff tops.
* <i>T. ornithopodioides</i> (trigone)	M					Near western cliff tops.
* <i>T. pratense</i> (red clover)	A	A	A	M	+	
* <i>T. repens</i> (white clover)	A	A	A	M	M	
* <i>T. striatum</i>						
* <i>T. subterraneum</i> (subterranean clover)	+					Aston and Kaikomako Valleys.
* <i>Urtica urens</i> (nettle) (c)	M	+	+	+	M	Near wharf, and on edges of driveways between buildings.
* <i>Veronica persica</i> (field speedwell) (w)	+					Forest.
* <i>Vicia hirsuta</i> (hairy vetch)	M				+(1)	
* <i>V. sativa</i> (vetch)	M				M	
* <i>Vitadina australis</i> (w)					+(2)	North-east cliff edge and near trig.
* <i>Wahlenbergia gracilis</i> (harebell)	M	+	+		M	
* <i>W. marginata</i> (harebell)	+	M	M		M	

## PART B: Indigenous species present on Mana Island as planted specimens only.

- Aristolita serrata* (wineberry): 2 beside pond nearest houses.  
*Blechnum discolor* (crown fern): 2 in 'fernery' beside house furthest from sea.  
*Coprosma macrocarpa* var. *macrocarpa*: 1 female by generator shed.  
*Cortaderia toetoe* (toetoe): mixed with pampas in pasture windbreaks.  
*Dodonaea viscosa* "purpurea": 2 in garden of house furthest from sea.  
*Griselinia littoralis* (broadleaf): 1 beside pond nearest houses.  
*Hebe sibirica* var. *sibirica* (koromiko) (w): many around buildings.  
*H. speciosa*: 5(+) around furthest house from sea.  
*Metrosideros excelsa* (pohutukawa): numerous around buildings.  
*Olearia traversii* (Chatham Island akeake): 1 near 'trig pond'.  
*Phormium tenax* (NZ flax): mixed with pampas and toetoe in windbreaks; also around ponds and buildings.  
*Pittosporum eugenioides* (tarata, lemonwood): around several ponds and beside houses and implement sheds.  
*P. ralphii* (c): 1 beside old house, Meads (in Atkinson et al. 1972).  
*P. tenuifolium* spp. *tenuifolium* (kohuhu): 1 beside 'trig pond'; 6-10 between farm implement sheds and beach.  
*Podocarpus totara* (totara): 1 beside pond nearest houses.  
*Pseudopanax arboreus* (five finger): 2 beside pond nearest houses. Recorded by Aston (1911), but wild plants could not be located in 1972-86 surveys.  
*P. lessonii* (houpara): few near houses, some possibly hybrids with *P. crassifolius* (lancewood).  
*Sophora microphylla* (kowhai): few near houses.  
*S. tetrapterata* (?) (kowhai): few near houses (close examination of these shows that they are more likely to be the exotic species cultivated as *S. "Otari Gnome"*)

# Mosses of the Mt. Owen and Turks Cap Ranges, North-west Nelson, New Zealand

John K. Bartlett, Pakuranga, Auckland

## Introduction by J. Lewinsky<sup>1</sup>

When learning of John Bartlett's sudden death on 1 May 1986 his manuscript of the mosses of the Mt. Owen and Turks Cap Ranges was present on my desk. John had sent it to me to comment upon. In agreement with his father, Mr. K. Bartlett, I have made the paper ready for publication. Since John collected the mosses on a field-trip with the Wellington Botanical Society this bulletin was found to be an appropriate outlet.

When editing the manuscript I have tried to make as few alterations as possible. A few author citations and names have been changed to avoid invalid publication. The species concept and the annotations in the 'Species list' are John's alone and do not always represent my own opinion. I have not seen any of the specimens. From the manuscript it was not always possible to tell if the frequency given for each taxon refers only to the study area or to the whole of New Zealand. Sometimes the first seems to be the case, sometimes the latter. A few comments have been added after the list.

The number of species recorded in the paper shows how excellent a collector John was. Personally I benefitted from his keen eyes when he collected *Orthotrichum* for my revision of the Australasian taxa. He was in contact with many bryologists all over the world sending critical specimens for closer examination.

John kept all his collections in his home at Pakuranga. After his death they have been transferred to the Auckland Institute and Museum (AK). They will for many years be a rich source for the study of the New Zealand bryophyte flora.

## INTRODUCTION

Collections of bryophytes, lichens and saxicolous algae were made during a field-trip to the Mt. Owen and Turks Cap Ranges by the Wellington Botanical Society in January 1983. Details of geology, soils and higher plants in the area visited are given in Bell (1973).

The following annotated list gives details of habitats and frequencies of the mosses found. In the list, collecting sites are given in detail and indicated by numbers and letters. In all, 39 different sites were sampled and the habitat diversity of the relatively small study area is readily apparent (cf. list of localities with habitat information). Approximately 178 taxa were collected. For comparison it can be mentioned that ca. 370 mosses are known from the Nelson region, an area west of the Pelorus River and north of the Buller Gorge, including the Mt. Richmond Forest Park. In New Zealand the number of mosses reported so far is ca. 550. The phytogeography of some of the more interesting species is briefly discussed.

1. Botanisk Museum, Copenhagen, Denmark.