

1. Donald McLean Track, near Karamatura Track junction (the quadrat study site referred to in *The Botany of Auckland*) - one adult (over 10' ) and three juveniles.
2. Home Track, Piha Road end - two adult specimens ( 14' & 12' ).
3. Kelly Creek Track (near Waitakere Dam Walk) - one juvenile ( 4' ).
4. Lucy Cranwell Track - one adult specimen ( 8' ).
5. Huia Ridge Track - six juveniles.

## Environmental vascular plant weeds and new records for Motutapu, Waitemata Harbour

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### Introduction

The Auckland Botanical Society carried out a two day weed survey for the Department of Conservation (DoC) on Motutapu Island involving 21 members on 3 and 17 October 1993. We searched three quarters of the coastal band of vegetation (mainly cliffs) and the main central valley (bush and poplar plantation area). We only looked at terrestrial weeds (wetlands not looked at) from a native environment viewpoint. Pasture weeds were ignored. Most of the main weed habitats were searched, leaving only a small part of the coast, some bush remnants and the residents' gardens which were unseen by us.

Motutapu is a Recreation Reserve (1560 ha) with a rich Maori history and has been grazed since the 19th century. Over the last two years the feral wallabies and possums have virtually been eliminated. Most of the island is pasture. Forest is reduced to small remnants mostly on coastal cliffs. This highly modified state is reflected in the vascular plant flora of 368 species, of which 60% are adventive species (Table 1). DoC plans to ecologically restore much of the island.

Table 1     Vascular flora of Motutapu

Plant Group	Native	Adventive	Totals
Ferns and fern allies	27 (10)*	1 (1)	28
Gymnosperms	1 (0)	2 (1)	3
Dicots	72 (0)	156 (8)	228
Monocots	45 (0)	64 (4)	109
<b>TOTALS</b>	<b>145 (10)</b>	<b>223 (14)</b>	<b>368</b>

\* the number of additions to Esler's (1980) article are in brackets

The island was fully botanically surveyed by Alan Esler (Esler 1980) in November 1977 (A.E. Esler pers. comm.). "New record" on the following list means an addition to Esler's published flora. If the species is not a "new record" it was present on the island in 1977. With the browsing pressure of possums and wallabies now gone, coupled with the recent upgrading of fences to prevent stock grazing the bush areas, the vegetation of Motutapu will change quickly. Plants, both native and exotic, which have been suppressed by browsing should now increase. Therefore it is a very important period to regularly monitor the vegetation for new weeds and for weeds which may increase rapidly.

New records that I personally did not see are cited pers. comm. or by their herbarium number.

## List of Motutapu environmental weeds

### Gymnosperms

- *Cupressus macrocarpa macrocarpa*  
Local, establishing slowly on NW cliffs. Remove where possible, not a priority.

### Dicotyledons

- *Ageratina adenophora* Mexican devil  
Local, could spread quickly. Remove where possible, medium priority.
- *Albizia lophantha* brush wattle  
NW coast, central valley, elsewhere local. On Tiritiri Matangi it has proved to be a very useful plant as a winter nectar source for birds. Regeneration should ultimately eliminate it from the valley, but it should be removed from cliffs and the coast. Medium priority.
- *Araujia sericifera* moth plant  
Locally abundant at south end of central valley; very local elsewhere. Because it is still reasonably local in distribution and has the potential to smother it is a high priority to eradicate.
- *Chrysanthemoides monilifera* bone-seed  
Very rare (more common on Rangitoto), most undesirable shrub. Locally covers Tamaki Drive sandstone cliffs. New record. All plants on both islands should be immediately uprooted. Extremely high priority.
- *Crataegus monogyna* hawthorn  
Local, mainly lower central valley; also Emu Bay. Remove, medium priority.
- *Erigeron karvinskianus* Mexican daisy  
Common along bare western sandstone cliffs, absent elsewhere. Potential to form low cover on bare cliffs. Remove where possible, medium priority.
- *Ficus carica* fig  
Few large spreading plants: near causeway, Gardiner Gap and Pig Bay. Remove, potential to spread, low priority.
- *F. rubiginosa* Port Jackson fig  
At least two cultivated trees in Home Bay and three wild plants (new record) between Emu Point and Islington Bay (Bot Soc). Also one wild plant south of Home Bay, *Fromont* (AK). Extremely high priority to remove wild and cultivated plants as this tree has the potential to be spread by birds and naturalise on the bare lava of Rangitoto.
- *Ligustrum lucidum* tree privet  
Local by school, March 1992. New record. Highest priority to eradicate.
- *L. sinense* privet  
Locally common, south end of central valley; rare-absent elsewhere. Highest priority to eradicate.
- *Lonicera japonica* Japanese honeysuckle  
Thought to have been seen by the school or near the causeway in March 1992 (R.G. Smart pers. comm.). New record. Highest priority to search and eradicate if found. This species has proven to be the most difficult weed to eradicate on Tiritiri Matangi Island now that it is amongst the regenerating and planted bush there.
- *Lycium ferocissimum* boxthorn  
Rare, Billy Goat Point and south Mullet Bay. Eradicate, medium priority.
- *Olea europaea* African olive  
Rare, south of Mullet Bay. New record. Eradicate, medium priority. Wild seedlings from a recent commercial planting of olives on Rakino (P. de Lange pers. comm.) should be searched for.
- *Rhamnus alaternus* rhamnus  
Abundant on cliffs, decreases from west to east. This may be related to the different geology - sandstone to greywacke. Most dominant weed on the island, also present on

Rangitoto. Distribution and abundance known to DoC. Highest priority to develop a method of eradication for both islands.

When returning from Islington Bay on the ferry a Rangitoto bach owner, on learning the purpose of our visit, told me how a Department of Lands and Survey Ranger (Mr G. Holmes) planted rhamnus on Motutapu around 1968 to control erosion and that the bach owners were not to blame for its introduction!

Herbarium specimens indicate a trend of the spread of rhamnus in the Hauraki Gulf. Note - herbarium records do not necessarily give establishment times, but can give a trend, especially where there are abundance ratings. First records are cited for each area:

<u>Locality</u>	<u>Date</u>	<u>Comments</u>	<u>Herbarium No.</u>	<u>Collector</u>
Motuihe	ca. 1930	very common	CHR 3884	M. Hodgkins
	1934	-	CHR 8986	-
Rangitoto	ca. 1930	1 or 2 near summit, nowhere else	re CHR 3884	M. Hodgkins
	1947	single shrub	CHR 61047	L. Millener
Papakohatu (Crusoe) Id	1946	common	AK 23281	E. Turbott
Motutapu	1968	-	AK 119488	P. Hynes
North Head	1971	-	AK 128677	K. Wood
Tamaki Drive	1981	quite common	AKU 13131	E. Cameron 590
The Noises	1978-84	many, but removed	-	I. Atkinson (1984)
(Motuhoropapa)	1993	few, ca. 10, ringbarked	AK 209953	E. Cameron 7206
Motukorea	1990	common	AKU 22231	V. May
Musick Point	1993	frequent	AK 211435	E. Cameron 7406
Waiheke Id	1993	by Oneroa	-	P. de Lange pers. comm.

From these records it appears that neither the Rangitoto bach owners or the L&S Ranger are to blame, and that Motuihe is the most likely source of the Gulf's rhamnus. Many exotic species have been planted on Motuihe. From Motuihe it has spread in most directions. Judging from the large size and high density of rhamnus presently on Motutapu and from Esler's (1980) comments, I am sure it was well established there long before 1968. Esler informed me (pers. comm.) that in 1977 the rhamnus did not appear to be planted on Motutapu. In March 1993 during the Bot Soc trip to The Noises we only saw ca. 10 young plants of rhamnus on Motuhoropapa, Atkinson (1984) removed many from this island during 1978-84. But it must be a fairly recent arrival to this island because it has yet to establish on Otata Island close by. It must be on Rakino Island and so far it has only established on western Waiheke and appears absent from the rest of the island (pers. ob.).

- *Rubus fruticosus* agg. blackberry  
Locally common lower central valley to Home Bay; also a few at Emu Bay (Esler 1980).  
Eradicate, low priority.
- *Rumex sagittatus* climbing dock  
Local, lower central valley and towards Home Bay. New record. Eradicate, high priority.
- *Salix cinerea* grey willow  
Probably planted, by Home Bay Creek and houses. Remove, low priority.
- *Salix fragilis* crack willow  
Local, Emu Bay Creek. Remove, low priority.
- *Senecio mikanioides* German ivy

Single patch 0.5 km south of Billy Goat Point (L. Haines pers. comm.). New record. Eradicate, highest priority.

- *Solanum mauritianum* woolly nightshade  
Abundant to local, widespread. High priority to remove.
- *Ulex europaeus* gorse  
Occasional, widespread. Not generally a problem to native areas except on cliffs. Remove where appropriate, low priority.
- *Vinca major* periwinkle  
Extensive colony at Home Bay. Potentially a very bad weed. Currently more or less contained between road and stream. Eradicate, medium priority.

#### Monocotyledons

- *Ammophila arenaria* marram grass  
Western Beach (Esler 1980), not seen by us. Eradicate, low priority.
- *Arum italicum* Italian arum  
Remnants of habitation. Remove where possible, low priority.
- *Asparagus asparagoides* smilax  
Locally common on western side; local Home Bay area. Also present on Rangitoto. Highest priority to develop a method of eradication on both islands.
- *Canna x generalis*  
Emu Bay (Esler 1980), not seen by us. Plants sterile. Remove, low priority.
- *C. indica* Indian shot  
Locally dominating, Home Bay. Plants set seed. Remove, low priority.
- *Cortaderia jubata* and *C. selloana* pampas grasses  
Occasional, widespread. Remove, high priority. Will increase with the decrease in browsing by feral mammals.
- *Crocoshia x crocosmiiflora* montbretia  
Home Bay by creek; Islington Bay (Esler 1980). Remove, low priority.
- *Gladiolus undulatus* wild gladiolus  
Local, Islington Bay. Removal probably impractical, low priority.
- *Iris foetidissima*  
Local, Islington Bay cliffs. New record, uprooted. If more found, remove. Low priority.
- *Iris orientalis* garden iris  
Local, Home Bay and Islington Bay (Esler 1980). Remove if practical. Low priority.
- *I. pseudacormus*  
Local patch, Home Bay stream mouth. New record. Remove, low priority.
- *Pennisetum clandestinum* Kikuyu grass  
Occasional, widespread. Kill before planting in Kikuyu areas.
- *Phoenix canariensis*  
Single plant ca. 1 m tall (including leaves), small gully, Islington Bay (M. Fromont pers. comm.). New record. Eradicate along with any cultivated specimens on the island. Medium priority.
- *Stenotaphrum secundatum* buffalo grass  
Occasional, widespread. Kill before planting in these areas.
- *Tradescantia fluminensis* wandering Jew  
Seen by outside tap, lower building at outdoor education camp, February 1991. New record. Highest priority to check around these buildings and eradicate.
- *Watsonia meriana* cv. 'Bulbillifera' bulbil watsonia  
Small patch at Islington (Esler 1980). Remove if practical, medium priority. Also present on Rangitoto.
- *Zantedeschia aethiopica* arum  
Remnants of habitation. Remove if practical, low priority.

## Aggressive weeds on Rangitoto that could impact on Motutapu

We did not survey Rangitoto but I am familiar with some areas, especially around Islington Bay and by Rangi Wharf. These weeds fall into two categories: (a) apparently naturalised only on Rangitoto, and (b) on both islands. None of the many succulent species on Rangitoto appear to be a threat to Motutapu. To date none have naturalised there.

### (a) On Rangitoto only

- \**Buddleja davidii* buddleia
- \**Cotoneaster glaucophyllus* cotoneaster
- \**Dipogon lignosus* mile-a-minute
- \**Hakea sericea* needlebrush
- Hypericum androsaemum* tutsan
- \**Hedera helix* ivy
- \**Nephrolepis cordifolia* tuber sword fern
- \**Pinus pinaster* maritime pine
- \**Polygonum capitatum* pink-head knotweed, locally common at Islington (P. de Lange pers. comm.). This species is a large threat to Rangitoto and perhaps only a threat to the eastern greywacke cliffs of Motutapu.
- Senecio angulatus* Cape ivy (apparently does not set seed).

### (b) On Rangitoto and Motutapu

- Ageratina adenophora* Mexican devil
- \**Asparagus asparagoides* smilax
- \**Chrysanthemoides monilifera* bone-seed
- \**Cortaderia jubata* and \**C. selloana* pampas grasses
- \**Rhamnus alaternus* rhamnus
- Watsonia meriana* cv. 'Bulbillifera' bulbil watsonia

\* = highest priority to control or remove on Rangitoto

## Native plants suspected to be planted on Motutapu (pre 1992)

Unfortunately there appears to be no records of past plantings on Motutapu. Restoration plantings started in 1993 are all propagated from seed collected on Motutapu.

Six species appear to be outside their natural geographical distribution, at least eleven others are within their geographical distribution but are planted from an unknown provenance, and an Australian species very closely related to a New Zealand species has been planted.

Any native species suspected to be planted, and particularly when the provenance is unknown, should not be used for propagation for revegetation programmes on the island. In the longer term these specimens should be eradicated as they decrease the scientific value of the island's flora. Some of the planted species could hybridise with natural species present and these should be removed immediately.

Examples:

(a) **Natives present which are outside their natural geographic or ecological distribution:**

*Griselinia littoralis* kapuka Few, Sandy Bay and Home Bay

*Meryta sinclairii* Sandy Bay

*Olearia albida* Few, Sandy Bay and south of Administration Bay (AK 216147). All plants were the same height and adjacent to other planted species. Although this species is found to the north, south and west of Motutapu I know of no records of it in the Inner Gulf Islands Ecological District.

*O. paniculata* One? Islington Bay (J. Hawley pers. comm.)

*Pittosporum huttonianum* Few, near causeway

*P. ralphii* Few near causeway and by Home Bay toilets

*Pseudopanax laetus* Few near causeway.

(b) **Within their geographical distribution but are probably sourced (some only in part) from off the island:**

*Agathis australis* kauri Home Bay, Administration Bay

*Astelia grandis* Few, near causeway

*Coprosma repens* taupata Home Bay toilets

*Hebe macrocarpa* (refer Esler 1980)

*Kunzea ericoides* kanuka (refer Esler 1980)

*Myoporum laetum* ngaio Few, near causeway

*Pittosporum crassifolium* karo Administration Bay

*P. eugenioides* tarata Few, central valley

*Podocarpus totara* totara Locally abundant, central valley

*Prumnopitys ferruginea* miro Central valley (J. Hawley pers. comm.)

*Vitex lucens* puriri Few, Sandy Bay and elsewhere.

(c) **Exotic mistaken for a native:**

*Myoporum insulare* Australian ngaio Few, near causeway (AK 215459)

**New Records for Motutapu**

(if not otherwise stated they are from the two Bot Soc trips on 3 and 17 October 1993)

*Adiantum diaphanum*

Occasional in cave between Home and Emu Bays (M. Fromont pers. comm.)

\**A. raddianum*

Common in cave between Home and Emu Bays. *Fromont* (AK 212034)

\**Araucaria heterophylla*

Single seedling, Home Bay. *Cameron 7370b* (AK 216211)

*Blechnum* "Green Bay"

NW of Emu Point and SW Administration Bay. *Cameron 7356 and Hambly* (AK 216142-3). *Blechnum* sp. 1 recorded by Esler (1980) is also present

*Cheilanthes distans*

Locally common SW of Administration Bay on coastal greywacke cliffs. *Cameron 7354* (AK 216144)

\**Chrysanthemoides monilifera*

- Very rare, uprooted, except for one bush at Sandy Bay
- Dicksonia squarrosa*  
Local, southern central valley
- \**Ficus rubiginosa*  
Rare, Emu Point to Islington Bay, *Parris* (AK 215445). Also about 0.5 km south of Home Bay, *Fromont* (AK 212033)
- Histiopteris incisa*  
Local, by creek SW of Administration Bay
- \**Iris foetidissima*  
Rare, Islington Bay, plant uprooted (B.S. Parris pers. comm.)
- \**I. pseudacormus*  
Local, Home Bay. *Cameron 7371* (AK 215456). It is possible that this is part of the *I. orientalis* recorded by Esler (1980)
- Lastreopsis velutina*  
About 1 km south of Home Bay. *Fromont* (AK 212171)
- Ligustrum lucidum*  
Local, by school, March 1992 (pers. ob.)
- \**Lonicera japonica*  
Probably near school or causeway, March 1992 (R.G. Smart pers. comm.)
- \**Olea europaea*  
Rare, south of Mullet Bay, coastal slope
- Pellaea rotundifolia*  
Coastal, *Wadham* (AK 142097)
- \**Phoenix canariensis*  
Islington Bay, single plant ca. 1 m tall (M.L. Fromont pers. comm.)
- Polystichum richardii*  
Occasional, coastal shrubland, Gardiner Gap (Bot Soc). Also *Wadham* (AK 142091)
- Pteris comans*  
0.5 km SE of Billy Goat Point (Bot Soc). Also *Matthews* (AK 115516)
- P. macilenta* (= *P. pendula*)  
Occasional, southern central valley
- \**Rumex saggitatus*  
Local, lower central valley and towards Home Bay
- \**Senecio mikanioides*  
Single patch, 0.5 km south of Billy Goat Point (L. Haines pers. comm.)
- \**Tradescantia fluminensis*  
Local, Education Camp, February 1991 (pers. obs.)
- \**Valerianella carinata* corn salad  
Local, coastal bank, Gardiner Gap. *Cameron 7352* (AK 216146)

A surprising absence from Motutapu and Rangitoto is *Coprosma rhamnoides*.

\* = adventive species

Collection dates for non Bot Soc herbarium records:

Fromont, M.L. May 1993  
Matthews, H.B. June 1920  
Wadham, J.H. June 1948

## Discussion

Residents' gardens should be surveyed for potential environmental weeds (e.g. monkey apple, loquat) as most of the problem species are garden ornamentals which naturalise.

Motutapu cannot be treated in isolation regarding weeds. Not only must Rangitoto be closely looked at as well, but other islands and adjacent mainland must be managed to control weeds if Motutapu, Rangitoto and other gulf islands are to be protected from aggressive environmental weeds species in the long term, e.g. look at the increasing spread of rhamnus in the Gulf. This spread will increase for bird-dispersed species as native bird populations are restored on the gulf islands.

It must be remembered that volcanic Rangitoto Island and its flora is recognised as unique in New Zealand and therefore environmental weeds must not be allowed to spread on to it from Motutapu, and interfere with the fascinating regeneration occurring there.

There are still many aggressive Auckland weeds that appear not to have reached Motutapu or Rangitoto yet. These islands should be regularly monitored to eradicate such species if they ever arrive, e.g.

*Acmena smithii* monkey apple (native pigeon distributed seed)  
*Ageratina riparia* mist flower (wind distributed seed)  
*Asparagus scandens* climbing asparagus (bird distributed seed)  
*Hedychium gardnerianum* Kahili ginger (bird distributed seed)  
*Polygala myrtifolia* sweet pea bush (water? wind? distributed seed).

Urgent weed eradication is required on both Motutapu and Rangitoto. There are several potential aggressive species not well established yet (e.g. bone-seed and Port Jackson fig), and initial effort should be directed towards eradicating their small existing populations. Other species if left will have a much larger impact than they currently do and they also require urgent management, e.g. "high" and "highest" priority weeds in the Weed Species List. A weed strategy for the inner Hauraki Gulf and relevant parts of the adjacent mainland is long overdue.

The exact locality of weeds mentioned is known and could be marked on maps if required.

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### References

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### ***Wahlenbergia gracilentia* (Campanulaceae)**

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The recent revision of *Wahlenbergia* in Australia (Smith 1992) has allowed me to identify the following specimen as *W. gracilentia*, a new record for New Zealand. " North Cape region, Waitanoni Stream, rare, on dry rocky slope by waterfall, A.E Wright 9510, 30.11.89, AK 189997".