

BRYOPHYTES

Mosses

<i>Acrophyllum dentatum</i>	4811
<i>Camptochaete arbuscula</i> ‡	4809
<i>Cyathophorum bulbosum</i>	4803
<i>Distichophyllum microcarpum</i> ‡	4807
<i>Echinodium hispidum</i>	4810
<i>Fissidens leptocladus</i> ‡	
<i>Gymnostomum calcareum</i> ‡	
<i>Homalia falcifolia</i>	
<i>Hypnodendron arcuatum</i> (Smart 1978)	
<i>Hypopterygium filiculaeforme</i> ‡	4802
<i>Leucobryum candidum</i> (Smart 1978)	
<i>Lopidium concinnum</i> (Smart 1978)	
<i>Papillaria crocea</i> ‡	4805
<i>Pterygophyllum distichophylloides</i>	4812
<i>Rhacopilum convolutaceum</i> ‡	4804
<i>Thamnobryum pandum</i>	4808
<i>Thuidium laeviusculum</i> (Smart 1978)	
<i>Weymouthia mollis</i> ‡	

Liverworts

<i>Aneura orbiculata</i> ‡	4814
<i>Chiloscyphus triacanthus</i> ‡	4813
<i>Frullaria nicholsonii</i> ‡	
<i>Monoclea forsteri</i>	4786
<i>Radula buccinifera</i> ‡	4806
<i>Symphyogyna prolifera</i> † ‡	4815
Thalloid species; yellowish, platy habit, unidentified (Skinner pers.comm.) ‡	

LICHEN

<i>Pseudocyphellaria rufovirescens</i> † ‡	4886
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1. Smart recorded *Adiantum aethiopicum* as present in the cavern, but failed to find *A. cunninghamii* which is very abundant throughout the drier sections of the cave. An error in identification perhaps?
2. Smart notes "Only a few plants, all seedlings. Unlikely to survive." Our search did not locate this species.

Motuoroi, East Coast, North Island

by Geoff Walls,¹ Pam Bain,² and Lindsay Daniel³

SUMMARY

The vegetation of Motuoroi, an islet on the East Coast north of Gisborne, has been drastically modified in the past, and is now a mosaic of rapidly regenerating, native, coastal plant communities, with a clear effect of aspect on species composition. Introduced plants are rampant in places. Motuoroi probably once supported thriving breeding colonies of seabirds, but their numbers are now few, most likely because of the presence of rats and wekas.

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INTRODUCTION

Within the beautiful sweep of Anaura Bay on the East Coast of the North Island lies Motuoroi (Figs. 1, 2), an alluring little island, which, from the mainland, looks very precipitous and has the dark mystery of a cloak of coastal greenery. It is part of Anaura Blocks, much of which has been recently surveyed for potential reservation (Daniel 1985). On 14 March 1986, the authors spent three hours on the island to have an initial look at the vegetation, archaeological remnants and animals.

There is almost no flat land on Motuoroi. Its flanks drop steeply from a knife-edge axial ridge and, in places, especially at the east end, the mudstone is so eroded that it is almost vertical. Waves and sea surges constantly lash the island's rocky shores, and the shorn look of the vegetation canopy attests to its exposure to frequent, strong, salt-laden winds. Only 15.2 ha in the area and 107m in height, the island lies just 700m offshore (Fig. 2).

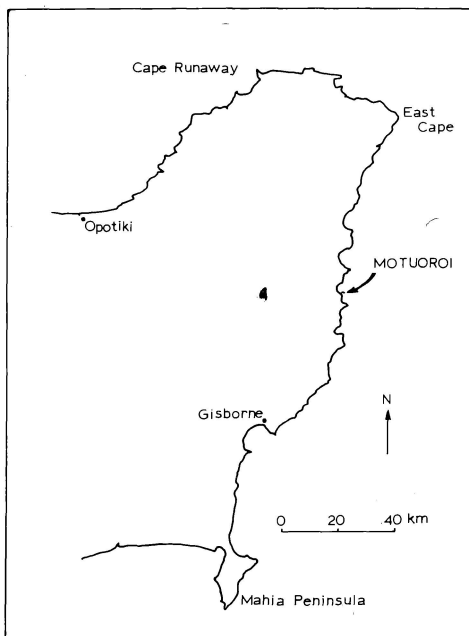


Fig. 1. Location of Motuoroi

ARCHAEOLOGY

Motuoroi Island was described by Monkhouse during the visit of the *Endeavour* to Anaura Bay in 1769.

“This island was of a high wedge like figure, its south face sloping and very well covered with shrubbry, its north face mere naked rock and almost perpendicular. About midway on its ridge were two stages elevated on polls about twenty feet high. From this stage descended a tolerably large village on the South side. The houses were old and now uninhabited” (Beaglehole 1955: 528-583).



Fig. 2. Anaura Bay and Motuoroi

The remains of this village are still present today on a ridge running southwest towards the mainland. The high point of the western portion of the island is a levelled terrace. Down the ridge from this terrace a two-metre scarp has been cut as defence for a large flat terrace approximately 10m x 6m. Another two-metre scarp defends the lower portion of the ridge. Smaller, flattened terraces also extend down the south side of the slope until it falls away sharply to the sea. These levelled areas probably represent the remains of the village seen by Monkhouse in 1769, with the fighting stages on the summit of the ridge above.

Near the southern shore, beneath a grove of karaka trees, there are two flattened terraces, approximately 5m x 3m and 7m x 3m. It is possible that these karaka trees, and a lone, spreading pohutukawa tree at the eastern tip of the island, have been planted, or are descended from trees associated with Maori occupation. Midden, largely of marine shells, is eroding from the base of the lower terrace.

ANIMALS

Rats were seen eating karaka fruit on the ground and droppings were found in several places. When Bell and Blackburn (1960) visited the island in November 1959, they found it "alive with rats (*Rattus norvegicus*)".

Burrows of small oceanic seabirds were found from the steep shore to the summit and, although many were in current use, there were not large numbers of them. Bell and Blackburn found grey-faced petrels during their visit, but we were unable to identify the present occupants.

Native and introduced birds of forest and open land were conspicuous but not particularly numerous. Those seen or heard during the visit were: blackbird, chaffinch, fantail, harrier, magpie, silvereye, grey warbler and weka. Wekas are capable of swimming to and from the mainland, and starlings probably roost on the island. Birds probably bring many seeds to the island, especially of grasses and fleshy-fruited native and introduced plants.

VEGETATION

Such is the varied nature of the vegetation that it presents a patchwork in which typing is difficult or rather artificial. There are distinct patterns though, and these relate to the topography. Appendix 1 is a checklist of the vascular plants found.

1. Summit

On the main ridge crest at and near the summit is an area of bracken-coastal flax-shrubland. The most common shrubs are rangiora, hangehange, koromiko, karamu and *Pittosporum ralphii*.

2. Northern side

Upper flanks are clothed in scrub or low forest, 2-8 m in canopy height, dominated by *Pittosporum ralphii*, and containing karamu, titoki, mapou, mahoe, cabbage tree, kawakawa, hangehange, rangiora and coastal flax, with some ngaio and manuka. Boxthorn occurs in some exposed dry sites.

Lower flanks are either precipitous and bare, or have a dense cover of coastal flax amongst which are shrubs of koromiko, tree tutu and karamu, and small herbs, ferns and grasses.

Recent slips are mainly bare but in places support densely-growing pampas, with some coastal flax, tree tutu, koromiko, karamu and small herbs and grasses. Bracken and blackberry are dense in places.

3. Southern side and western end

Upper slopes, including the western ridge crest, have low, broad-leaved, coastal forest, 3-10 m in canopy height. The dominant trees are titoki, whau, mahoe, kohekohe, mapou and *Pittosporum ralphii*, with some large-leaved milk tree and a few nikau and cabbage trees. Whau is totally dominant in gullies, where it sprawls downslope, the main trunks almost on the ground. Karaka dominates lower spur sites, where the largest trees are about 15m tall and might be around 80-100 years old. Beneath them is a dense carpet of karaka seedlings. Elsewhere, the understorey is composed of rangiora, hangehange and kawakawa, with some shining spleenwort, maidenhair fern, and the grasses *Microlaena stipoides* and *Oplismenus aemulus*. Pohuehue vines are draped over the forest in places and there is one patch dominated by blackberry.

Lower flanks, just above the shore, have a dense fringe of coastal flax, within which grow taupata, karamu, tree tutu, kawakawa, hangehange and low-growing members of the upper flank forest canopy species. Smaller shore plants are *Senecio banksii*, *Samolus repens*, sea celery and *Isolepis nodosa*.

Slips support much pampas, and native plants common to the northern slips and the southern forests.

These recognisable vegetation patterns give clues to the processes that have shaped them. It is evident that the whole island has had its vegetation highly disturbed - possibly even totally cleared - in the quite recent past. The oldest plants, the karaka trees and the lone pohutukawa are, at most, little over a century old, and most are probably less than half that. There may have been intermittent disturbance within recent decades, but major regeneration has occurred within the last 30-50 years.

The nature of the regenerating vegetation has been, and still is, conditioned largely by aspect. The northern side of Motuoroi is obviously drier and hotter than the southern side, and supports more xerophilic species, notably *Pittosporum ralphii*. On the other hand, the cooler and moister southern side allows broad-leaved species of coastal forest to flourish. Prevailing winds are from the north-west, but most damage to the vegetation from salt-laden gales appears on south-facing slopes, where tree canopy tips are stripped and burnt.

On the forest floor on the south side of the island there is little understorey establishment. At the time of visit there was an abundance of tiny seedlings of whau. It may be that summer dryness and the effects of wind, and even of rat browsing and seabird trampling on the steep slopes, make establishment of native trees, shrubs and ferns difficult. This may have the effect in places of creating a cycling process in which the shorter-lived forest plants, such as whau, mahoe and kawakawa, grow up, die and re-establish in these sites. Elsewhere, however, where there is forest and scrub, it is likely that the longer-lived species such as karaka, kohekohe, large-leaved milk tree, titoki and nikau will gradually assume dominance. All of these processes would be encouraged if burrowing seabird numbers increased.

There are so many introduced plants on the island that it suggests that both recent disturbance has occurred and that fruit-eating birds frequently visit the island. Plants that probably arrived with blackbirds, starlings, silvereyes and thrushes, and are now abundant, are blackberry, Japanese honeysuckle, inkweed, nightshade and boxthorn. Pampas, thistles, fleabane and several other introduced grasses and herbs are most likely wind-borne and have come from the adjacent mainland, but could also have been carried by birds. It would be almost impossible to decide which native plants, if any, had been introduced by birds.

As regeneration of the native plants proceeds, there should be fewer open sites. Most introduced plants will be superseded by a cloak of low coastal native forest, the precursors of which are well-developed.

REFERENCES

- Beaglehole, J.C. 1955. The voyage of the "Endeavour" 1768-1771. Cambridge University Press.
 Bell, B.D.; Blackburn, A. 1960. The islands of Gisborne, East Coast. *Notornis Vol. VIII*: 244-246.
 Daniel, L.J. 1985. Waipare Highlands Reserve Proposals. Dept. of Lands and Survey, Gisborne.

APPENDIX

Checklist of Vascular Plants, Motuoroi Island

*denotes species introduced to New Zealand. Common names are given for plants named in the text.

PODOCARP TREE

Podocarpus totara

DICOT TREES, SHRUBS, AND LIANES

<i>Alectryon excelsum</i>	titoki
<i>Brachyglottis repanda</i>	rangiora
<i>Carpodetus serratus</i>	
<i>Cassinia leptophylla</i>	
<i>Clematis foetida</i>	
<i>Coprosma areolata</i>	
<i>C. repens</i>	taupata
<i>C. rhamnoides</i>	
<i>C. robusta</i>	karamu
<i>Coriaria arborea</i>	tree tutu
<i>Corynocarpus laevigatus</i>	karaka
<i>Dysoxylum spectabile</i>	kohekohe
<i>Entelea arborescens</i>	whau
<i>Geniostoma rupestre</i> var.	hangehange
<i>Hebe stricta</i> var.	koromiko
<i>Kunzea (Leptospermum) ericoides</i>	
<i>Leptospermum scoparium</i>	manuka
* <i>Lonicera japonica</i>	Japanese honeysuckle
* <i>Lycium ferocissimum</i>	boxthorn
<i>Macropiper excelsum</i>	kawakawa
<i>Meliccytus ramiflorus</i>	mahoe
<i>Metrosideros excelsa</i>	pohutukawa
<i>Muehlenbeckia australis</i>	pohuehue
<i>M. complexa</i>	
<i>Myoporum laetum</i>	ngaio
<i>Myrsine australis</i>	mapou

Pseudopanax arboreus
P. lessonii
Olearia rani
Paratrophis banksii
Pennantia corymbosa
Pimelea prostrata s.s
Pittosporum ralphii
P. tenuifolium
Rubus fruticosus agg.
Solanum pseudo-capsicum

large-leaved milk tree

blackberry

DICOT HERBS

Apium australe
**Cirsium* sp.
**Conyza canadensis*
Dichondra repens
Haloragis erecta
Lobelia anceps
**Lotus* sp.
Oxalis sp.
**Phytolacca octandra*
Samolus repens
Senecio banksii
Scandia rosifolia
**Solanum nigrum*

sea celery

fleabane

inkweed

nightshade

MONOCOT TREES AND LIANE

Cordyline australis
Rhopalostylis sapida
Ripogonum scandens

cabbage tree
 nikau

MONOCOT HERBS

Carex sp.
**Cortaderia selloana*
C. toetoe
Isolepis nodosa (*Scirpus nodosus*)
Microlaena stipoides
Oplismenus aemulus
Phormium cookianum

pampas

coastal flax

FERNS

Adiantum cunninghamii
Asplenium oblongifolium
Cyathea dealbata
Hypolepis sp. (*H. ambigua?*)
Pellaea rotundifolia
Phymatosorus diversifolius
Polystichum richardii
Pteridium esculentum
Pyrrosia serpens

maidenhair fern
 shining spleenwort

bracken