

THE BOTANY OF TWO SMALL ISLANDS IN OKARITO LAGOON, SOUTH WESTLAND

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Okarito Lagoon is the largest unmodified coastal wetland in New Zealand. The area is well known for its outstanding avifauna (over 80 bird species have been recorded from the lagoon and surrounding forest, Ian James pers. comm.) and is a common feeding ground for kotuku (white heron; *Egretta alba modesta*) and spoonbills (*Platalea regia*). The lagoon also has a diverse and fascinating flora, both in the saltmarsh and other wetland communities of the lagoon, as well as in the adjacent shrubland, forest and coastal communities. While 'islands' of saltmarsh vegetation, often only isolated at high tide, are common throughout the lagoon, a small forested island is also present at the southern end of the lagoon near the outlet of Deep and Tidal Creeks. In this note we describe the geography and flora of this island and compare it with an adjacent saltmarsh island (Fig. 1, Table 1).

The forest island (NZMS 260 H34 818721) is elliptic in shape (area of c. 150 m²) and elevated about 1.5 m above high tide mark. The island is separated from the nearest land (to the northeast) by an approximately 100 m wide section of lagoon which is sometimes free of water at low tide. The island comprises bouldery material, probably of glacial origin, which is similar to the underlying substrate on the adjacent mainland. The forest canopy species are rimu (*Dacrydium cupressinum*) and kamahi (*Weinmannia racemosa*), with a dense understorey of cuttygrass (*Gahnia xanthocarpa*), kiokio (*Blechnum* sp. "kiokio") and gorse (*Ulex europaeus*). Most canopy trees, which reach a height of about 10 m, show the influence of onshore salt-laden winds (especially from the southwest) in their canopy shape. One kamahi supported a rich abundance of epiphytic plants including four orchids (*Bulbophyllum pygmaeum*, *Dendrobium cunninghamii*, *Earina autumnalis* and *E. mucronata*) and two ferns (*Ctenopteris heterophylla* and *Hymenophyllum minimum*). A total of 38 species of vascular plants were recorded of which two (*Holcus lanatus* and gorse) are naturalised in New Zealand. The presence of *Hymenophyllum minimum* growing both as an epiphyte and on shady banks is of interest. This species appears to have a localised distribution along the West Coast, often being absent from large areas of suitable habitat (D.A. Norton pers. obs.). However, its very small size makes detection difficult and opportunistic!

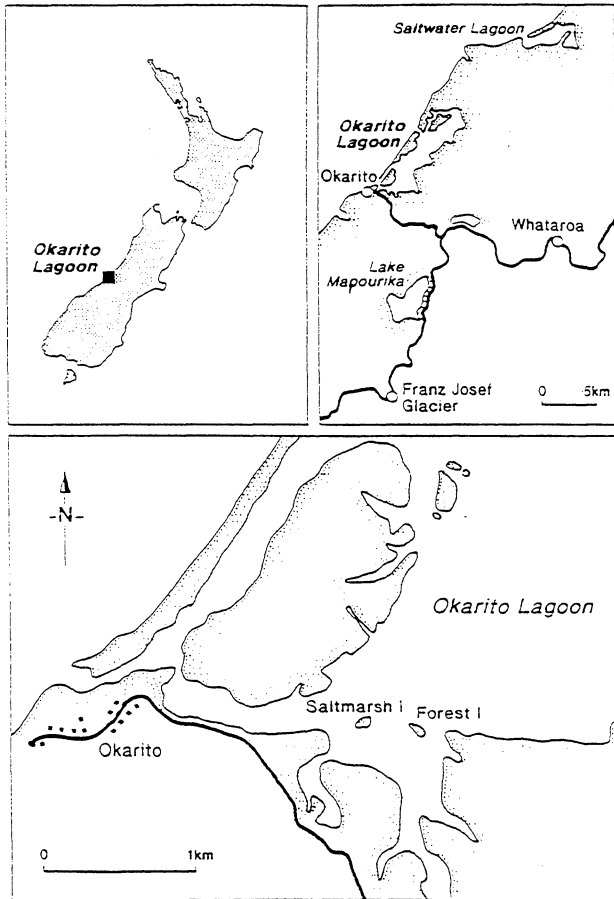


Figure 1. Okarito Lagoon, showing the location of the Forest and Saltmarsh Islands.

Table 1. Vascular Flora of Two Islands in Okarito Lagoon

Dispersal modes: B, bird dispersed; Wd, wind dispersed; Wt, water dispersed.

Floristic records: •, species present; +, species present but not regarded as resident; *, naturalised species.

	Dispersal mode	Forest Island	Saltmarsh Island
<i>Apium</i> sp. "slender"	Wt		•
<i>Astelia grandis</i>	B	•	
<i>Blechnum</i> sp. "kiokio"	Wd	•	
<i>Bulbophyllum pygmaeum</i>	Wd	•	

<i>Coprosma foetidissima</i>	B	•	
<i>Coprosma propinqua</i>	B		•
<i>Coprosma</i> sp. "tayloriae"	B	•	
<i>Cordyline australis</i>	B	•	•
<i>Cortaderia richardii</i>	Wd		•
<i>Ctenopteris heterophylla</i>	Wd	•	
<i>Dacrycarpus dacrydioides</i>	B	•	
<i>Dacrydium cupressinum</i>	B	•	
<i>Dendrobium cunninghamii</i>	Wd	•	
<i>Earina autumnalis</i>	Wd	•	
<i>Earina mucronata</i>	Wd	•	
<i>Festuca arundinacea*</i>	Wd		•
<i>Gahnia xanthocarpa</i>	Wt	•	
<i>Griselinia littoralis</i>	B	•	
<i>Haloragis erecta</i>	?		•
<i>Holcus lanatus*</i>	Wd	•	
<i>Hymenophyllum minimum</i>	Wd	•	
<i>Hymenophyllum sanguinolentum</i>	Wd	•	+
<i>Isolepis cernua</i>	Wt, Wd	•	
<i>Juncus kraussii</i> var. <i>australiensis</i>	Wt, Wd		•
<i>Juncus planifolius</i>	Wt, Wd	•	
<i>Lachnagrostis filiformis</i>	Wd		•
<i>Lepidosperma australe</i>	Wt, Wd	•	
<i>Leptocarpus similis</i>	Wt, Wd		•
<i>Leptospermum scoparium</i>	Wd	•	
<i>Lobelia anceps</i>	Wt, Wd		•
<i>Luzula picta</i> s.s.	Wt, Wd	•	
<i>Lycopodium varium</i>	Wd	•	
<i>Manoao colensoi</i>	B	•	
<i>Metrosideros perforata</i>	Wd	•	
<i>Myrsine australis</i>	B	•	
<i>Neomyrtus pedunculata</i>	B	•	
<i>Olearia avicenniifolia</i>	Wd		•
<i>Phormium tenax</i>	Wt, Wd		•
<i>Phymatosorus pustulatus</i>	Wd	•	
<i>Plagianthus divaricatus</i>	Wt		•
<i>Podocarpus hallii</i>	B	•	
<i>Prumnopitys ferruginea</i>	B	•	
<i>Pseudopanax crassifolius</i>	B	•	
<i>Puccinellia stricta</i>	Wd		•
<i>Pyrrosia eleagnifolia</i>	Wd	•	

<i>Ripogonum scandens</i>	B	•	
<i>Rubus australis</i>	B	•	
<i>Samolus repens</i>	Wt, Wd	•	•
<i>Selliera radicans</i>	Wt, Wd	•	•
<i>Ulex europaeus*</i>	Wt	•	•
<i>Weinmannia racemosa</i>	Wd	•	
Number of species:	38		17

The saltmarsh island (NZMS 260 H34 815722) is roughly circular in shape (area of c. 700 m²). This island has formed from glacial silts washed along the coast from the Waiho River and deposited in the lagoon (Ian James pers. comm.) and is very low-lying and water-covered during spring tides. The island is dominated by jointed rush (*Leptocarpus similis*) with a fringe of sea rush (*Juncus kraussii* var. *australiensis*). Scattered plants of tall fescue (*Festuca arundinacea*) and harakeke (*Phormium tenax*) occur across the island, while the two dominant woody species, mingimingi (*Coprosma propinqua*) and shore ribbonwood (*Plagianthus divaricatus*) are most common at the higher northern end. A total of 17 species of vascular plants was recorded of which two (tall fescue and gorse) are naturalised in New Zealand. The epiphytic filmy fern *Hymenophyllum sanguinolentum*, present on a dead rimu branch that presumably had been carried down by recent floods, was not recorded as a permanent island resident in this study. The presence of *Haloragis erecta* and *Olearia avicenniifolia* growing only on logs suggests that these may be important early establishment sites while the island is still very wet. However, it remains to be seen if these plants (especially *O. avicenniifolia*) will persist.

Despite its much larger size, the saltmarsh island has only half the number of species that occur on the smaller forest island, in apparent contradiction to the predictions of island biogeographical theory. The difference in the number of species between the two islands and the small number of shared species (only four excluding *Hymenophyllum sanguinolentum*) is not surprising given their very different environments. The saltmarsh island is low-lying and estuarine, with a very simple vegetation structure, while the forest island is well above lagoon water levels (including flood waters) and has a forest community providing a rich diversity of habitats (as evidenced by the abundance of epiphytic species). These differences emphasise the importance of environmental factors in influencing species richness on islands.

The two islands also highlight the importance of efficient dispersal mechanisms for establishing plants on islands. Most of the plants on the forest island have fleshy fruit with seeds dispersed by birds (e.g., most trees and shrubs). Others

(e.g., orchids and ferns) have wind-dispersed seeds or spores, or are saltmarsh plants with seeds that are presumably dispersed by water. Of the four common shrub/tall herb species on the saltmarsh island, two (mingimingi and *Cordyline australis*) have fleshy, fruit and one (harakeke) has wind or water dispersed seeds, while shore ribbonwood has a dry capsule that readily breaks open to release presumably water dispersed seed. The remaining plants on this island are common saltmarsh species with seeds or fruits that are water dispersed. The presence of gorse on both islands suggests that the gorse seeds are also readily dispersed by water as is the case for some other legumes (eg., *Sophora microphylla*).

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