

# Comparison of some related plants of Norfolk Island and New Zealand

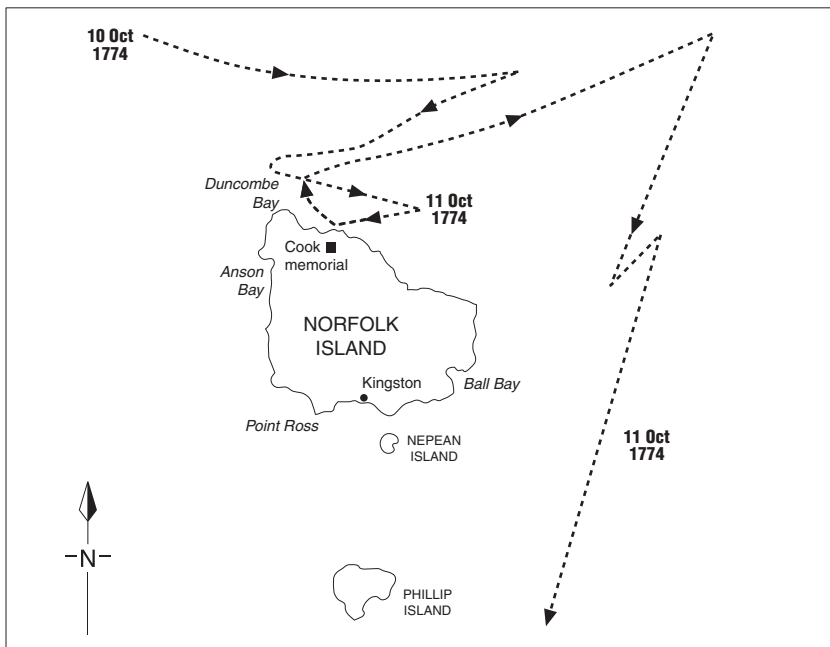
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## INTRODUCTION

During a recent visit to Norfolk Island in November 1996, we were intrigued by similarities and differences in related indigenous bird and plant species found in Norfolk Island and New Zealand. Lord Howe, Norfolk, Kermadecs, Rapa, Pitcairn, Easter Island and the Juan Fernandez group are small isolated islands in the Pacific Ocean spread out along the sub-tropical zone between latitude 25 and 30° S.

Norfolk Island (Fig. 1) is an isolated, volcanic, oceanic island about 8 km long and 5 km wide, bounded mainly by high, steep cliffs of basalt (lava) and tuff (volcanic ash). The highest points are Mount Pitt, 316 m, and Mount Bates, 318 m, from which vantage points we can see most of the coast. There is a small reef area outside the landing site at Kingston.

Figure 1. Map showing Norfolk Nepean and Philip Islands (after John Robson).



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Norfolk Island is about one-fourth the size of Easter Island. Whereas Easter Island is completely volcanic in origin, Norfolk has a thick deposit of easily worked calcarenite on the southern coast, which has been used for the extensive large stone buildings of the convict phase of settlement (1825–1855). This calcarenite consists of horizontal layers of sandy limestone like pancake rock, and is derived from an a mixture of wind- and sea-deposited coral, shell and sand. Nepean Island (Fig. 1), a small flat island off-shore, is the same formation. We have to imagine the coral reef which formerly surrounded the emerging volcano, being eroded into a calm lagoon and the sediments mingling with those from the volcano to form this rock. Ball Bay is walled with basalt, and is thought to be the throat of a crater which blew out seawards.

Philip Island (Fig. 1), another small offshore island, represents half a volcanic cone, with a high vertical cliff from sea-level to summit on the south-east side. This cliff is all that remains of the volcanic throat.

When Captain Cook landed on the northern coast of Norfolk Island on the afternoon of 11 October 1774, he found the island uninhabited, and thought he and his party were the first to set foot on it. He took two boatloads of people and landed without difficulty behind some large rocks which lined part of the coast (the Captain Cook memorial marks the site) (Fig. 1). Johann Forster complained about the struggle to get up the cliffs to the more level pine forest. They observed many trees and plants common in New Zealand, and Cook took a special interest in the flax plants (for rigging) and the “spruce pine” (for masts and spars). He noted the pine forests were perfectly clear and free from underwood, but about 200 yards from the shore the ground was so thickly covered with shrubs and plants as hardly to be penetrated. The soil seemed rich and deep, and there was plenty of fresh water. His party brought on board as much of the edible plants—cabbage-palm, wood sorrel (*Oxalis corniculata*<sup>2</sup>), sow thistle and samphire (*Sarcocornia*)—as time allowed.

According to Barrow (1860), they landed on October 10th and left the same evening. According to J. R. Forster (Hoare 1982) and John Robson (2000, p. 10 and map 2.23) they sighted the island on the 10th and landed on the 11th ‘after dinner’ for a few hours, then in the evening left and steered for New Zealand.

Forster’s plant list includes flax (*Phormium tenax*), New Zealand spinach (*Tetragonia tetragonoides*), *Mesembryanthemum* (really *Carpobrotus*), *Oxalis corniculata*, *Coprosma lucida* (really *C. pilosa*), *Ripogonum scandens* (probably not, as Norfolk has many large lianes) as well as a palm he calls *Areca oleracea* (now *Rhopalostylis baueri* var. *baueri*) and the “spruce pine” or “*Cupressus*”, now known as Norfolk Island pine (*Araucaria heterophylla*).

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<sup>2</sup> Names of Norfolk Island plants follow those in *Flora of Australia* Volume 49. Oceanic Islands 1. Australian Government Publishing Service, Canberra (1994).

They did not venture inland and did not mention the bananas and lemon trees (*Citrus jambhiri*—a thorny Indian species often used for stock) which may have been there already as the relics of earlier visits by Portuguese, Spanish or Polynesians. The Spanish and Portuguese have a long history of criss-crossing the Pacific in every direction since c. 1500 A.D., and there can hardly be an island where they did not land. The Polynesians' ability to navigate is well known. Their pre-Cook flake tools and hand-axes are in some of Norfolk's museums. Whoever was responsible, the lemons are now naturalised in the native forests, and are a frequent host for the amazing parasitic mistletoe *Korthalsella disticha* (Fig. 2).

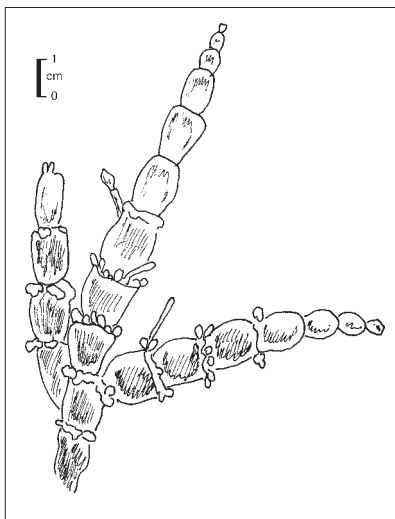


Figure 2. *Korthalsella disticha*, drawn from photo, J. A. Petterson.

Matthew Flinders and Ferdinand Bauer spent time on Norfolk Island in January to March and May to July 1796. Their job was to check on convict food supplies for Governor John Hunter of NSW penal colony, but no doubt they collected and wrote plant and animal lists as well. If they noted bananas and lemons in the forest then these probably pre-dated Cook's visit.

The climate is not hot enough for coconuts, and not cold enough for apples, but is favourable for bananas and most subtropical fruits. Had it not been for the strong recommendations of Turner, Smithers and Hoogland, and the acceptance of the challenge by the Australian Conservation Foundation to preserve the forests, Norfolk Island could have been by now almost in the same state as Easter Island, with cattle roaming everywhere, seedling trees being browsed and grazed to extinction, and adult trees being milled at an unsustainable rate. A small team of Australian Conservation Department officers is in charge of a thriving reforestation project which involves creating reserves, clearing introduced pest species where possible, raising seedlings of rare and valued species and planting these in the clearings. One of the problem trees is the African olive (*Olea europaea* subsp. *cuspidata*), whose seeds are scattered by birds all over the forest. Although its fruit is of no culinary value, the timber is excellent. It becomes a large tree. Another species regarded as a pest is the guava (*Psidium cattleianum*), whose groves of saplings are chipped for mulch. Cattle are controlled with fences and cattle-stops. There are no pigs, goats, or rabbits on Norfolk Island.

Philip Island shows how quickly a forested island can have both vegetation and soil destroyed by overgrazing. In 1788, pigs, goats and rabbits were released there and multiplied enormously. The pigs and goats eventually died out from lack of food, but the rabbits survived, eating every seedling and leaf, and turning the formerly forested island into a red and yellow desert, with only a few old trees and bushes in a forest remnant near the summit. Eight years ago the last of the rabbits was killed. The island is now gradually revegetating, with Owen and Beryl Evans and their assistants nurturing and watering and protecting every new seedling tree and shrub that emerges. Owen and Beryl are an elderly retired couple who, five years ago, were living in tents among the old trees near the summit. A bird-banding program has been going on for years, with volunteer workers risking their lives to record the seabirds which nest on the cliffs.

The following discussion is of Norfolk Island species related to or identical with New Zealand species. The list is incomplete as our stay was only 17 days.

## **BIRDS**

The boobook owl (*Ninox novaeseelandiae royana*), an endemic subspecies, is very like the New Zealand morepork. When only one last specimen, a female, was found on Norfolk, two males were sent from New Zealand in 1987. One of these died, and the other fathered six chicks in three clutches. As the boy owls came of age to mate, father got stropy and wouldn't let them, so he was shipped on to Lord Howe Island to do the same job there. The boobook owl population is increasing. We heard one cry at night, and that cry was different from the moreporks we are used to, a sadder cry trailing away at the end.

The green parrot (*Cyanoramphus novaeseelandiae cookii*), now rare, is remarkably like New Zealand's red-crowned parakeet, with the same red forehead and facial patches. The Norfolk Island bird we saw in a photograph appears identical to those we saw just a week later flying free on Little Barrier Island.

The Norfolk pigeon (*Hemiphaga novae-zelandiae spadicea*) was greedily eaten by early settlers and became extinct. The Forsters, travelling with Captain Cook, reported that it was like the New Zealand wood pigeon, perhaps even bigger.

The Norfolk kaka (*Nestor productus*) also became extinct through human need or greed. The Forsters said it was similar to the New Zealand kaka, but more brightly coloured.

The Norfolk Island emerald dove (*Chalcophaps indica*) which we saw flying free, is similar to the Australian greenback dove, which we saw caged in Hamilton Zoo a few days later. Both have a light brown body and glossy green wings, and may be conspecific.

The Norfolk grey fantail (*Rhipidura fuliginosa pelzelni*) is about the same size and shape as New Zealand's pied fantail, but with pale grey body and

narrower tail feathers, so that its 'fan' is smaller. The tail feathers are grey-brown, lacking the white margins which make the New Zealand pied fantail so conspicuous.

## FERNS AND FERN ALLIES

The following species which we saw on Norfolk Island are the same as found in New Zealand:

*Adiantum diaphanum* (three-frond maidenhair), *Arachniodes aristata* (prickly shieldfern), *Arthropteris tenella* (climbing fern), *Doodia media* (rasp fern), and *Pteris tremula* (tender brake-fern or shaking brake), *Marattia salicina* (king fern), *Microsorium pustulatum* (kangaroo fern) and *Psilotum nudum* (skeleton forkfern).

*Asplenium difforme*, the coastal *Asplenium* of Norfolk Island, looks remarkably similar to *A. terrestre* subsp. *maritimum* of the Wellington coast, but not identical. We found it in rock clefts at Ball Bay.

*Pyrrhosia confluens* (felt-fern), common in the forest, differs from New Zealand's *Pyrrhosia eleagnifolia*, in having the sori crowded at the tip of each leaf.

*Nephrolepis cordifolia*, the tuberous ladder-fern, is the same as the invasive species in New Zealand. It is probably naturalised in Norfolk Island also. On the northern slopes of Mount Pitt there is also a native, non-tuberous, non-invasive ladder fern similar to the un-named *Nephrolepis* species found in thermal areas in New Zealand.

## MONOCOTYLEDONS

*Cordyline obtecta* (ti) may be identical with *C. kaspar* Oliver of Three Kings Islands. It has 50 cm long and c. 5 cm broad, soft, green leaves, that are easily torn across.

*Cordyline fruticosa* (rau-ti), only seen by us in cultivation, is apparently a native of Pitcairn Island, and was brought to Norfolk Island by the Pitcairn Islanders. It has shorter, broader, softer leaves, glossy green or brightly coloured red and orange, and the starchy root was used to brew beer.

In contrast, *Cordyline australis* (ti-kouka) of New Zealand has such strong-fibred leaves that they were commonly used by the Maori for weaving durable sandals. Its strong thick trunk, covered in knobby grey bark, is quite unlike that of *C. obtecta* or *C. fruticosa*.

*Cyperus lucidus* (moo-oo grass), with straw-coloured seed heads, is similar to New Zealand's *C. ustulatus*, which has chocolate-brown seed heads.

*Dianella intermedia* Endl. of Norfolk Island (blue-berry) is not the same as *D. nigra* Colenso of New Zealand (which used to be known as *D. intermedia*). The Norfolk Island plant has stiffer, shorter, narrower panicles, shorter than the leaves whereas the New Zealand species has tall, slender, open panicles, usually

taller than the leaves. Both species have similar pink, blue, or purplish-black berries and tiny rotate 6-petalled flowers.

*Freycinetia baueriana* (screw-palm) with brilliant orange bracts is similar to the New Zealand *F. banksii* (kiekie), which has white bracts.

*Phormium tenax* (flax) is the same species as *P. tenax* of New Zealand. Only one variety with erect yellow flowers and comparatively short leaves occurs on Norfolk, whereas New Zealand has many varieties, mostly with erect, reddish flowers and very long leaves, used by Maori for many different crafts like piupiu skirts, ropes, baskets or woven cloth, depending on the stiffness or flexibility of the leaf and strength of the fibre. I doubt if the Norfolk Island variety has strong enough fibre for rope-making.

*Rhopalostylis baueri* var. *baueri* (niau palm) is similar to New Zealand's *R. sapida* (nikau). The crown-shaft or 'bulb' of leaf-sheaths at the top of the trunk in niau is not as plump as that of nikau. The flowers of niau are white and the fruit are pink and twice the size of those of nikau. The midribs of niau leaflets are used for broom-making in Norfolk Island, as coconut midribs are used in the tropics. We have not heard of this use in New Zealand, perhaps only because manuka was commonly used for brooms here.

## DICOTYLEDON TREES AND SHRUBS

*Coprosma baueri*, with scarlet berries, appears to be the same species as *C. repens*, the common shore taupata of New Zealand, with orange berries. We saw it on Philip Island near the summit.

*Coprosma pilosa*, however, is not identical with any New Zealand species, although rather similar to *C. robusta*.

*Dodonaea viscosa* subsp. *viscosa* on Norfolk Island is almost the same species as in New Zealand, but has larger leaves and far more beautiful fruiting colours. We don't have those rich, rosy reds and pinks on green-leaved plants in New Zealand (Fig. 3).

*Dysoxylum bijugum* with its two or three pairs of opposite leaves and an evil smell (sharkwood) is not at all like New Zealand's *D. spectabile*, which has imparipinnate leaves (that is, with a large terminal leaflet as well as several opposite pairs). *D. bijugum* has flowers and fruits axillary among the leaves, while *D. spectabile* has the flowers and fruits coming directly out of the trunk.

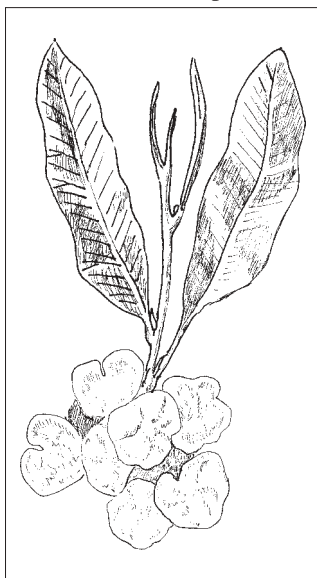


Figure 3. *Dodonaea viscosa*, Norfolk Island subspecies. Drawn from life, J. A. Petterson.

*Exocarpos phyllanthoides* var. *phyllanthoides* (Isaacwood) was a real surprise to us New Zealanders, as it is a tree with large, broad, dark-green phyllodes (flattened stems). It is found only in Norfolk Island and New Caledonia. The only *Exocarpos* in New Zealand, *E. bidwillii*, is a stiff, little, alpine shrub with short, furrowed, yellow-brown stems. Both have leaves reduced to scales, and berries emerging from the stem tips.

*Korthalsella disticha* (mistletoe) was another surprise to us, as it is a giant compared with New Zealand's three miniature species of *Korthalsella*, which grow on *Leptospermum* and several other small-leaved shrubs. The illustration shows it at half natural size, growing parasitically on *Citrus jambhiri* (Fig. 2).

*Macropiper excelsum* subsp. *psittacorum* (kava) of Norfolk, Lord Howe and the Kermadec Islands, with its large, glossy, dark green leaves, is unlike New Zealand's common kawakawa (*M. excelsum* subsp. *excelsum*), which is much smaller in both leaf and fruit. However, both subspecies have similar short, erect fruiting spikes with coalescent orange fruits. A distinct species on the Three Kings Islands, *Macropiper melchior*, has spikes in which the orange fruits are not coalescent but separate. Lord Howe Island also has a similar species (*M. hooglandii*) with separate red fruits on short, curved spikes. None of these are the ceremonial kava of Fiji, which is a different genus.

*Melicytus ramiflorus* subsp. *oblongifolius* is similar to *M. ramiflorus* subsp. *ramiflorus* (mahoe) of New Zealand, but the leaves are smaller, smoother and thicker and the flowers are white.

*Meryta latifolia*, with huge, thick, oblong leaves, and *M. angustifolia*, with equally large but thinner and narrower leaves, both almost extinct in the wild, are being planted in open places, home gardens, and forests on Norfolk Island. It is good to see healthy young trees of both species being cherished and protected from grazing animals. *Meryta sinclairii* of the Three Kings and Hen and Chickens Islands is similar but distinct, with thicker, rounded, sinuate leaves with a distinct petiole. It is becoming well-known as an excellent ornamental tree in New Zealand, and is known as puka.

*Nestegis apetala* (ironwood), common in Norfolk Island, is found also on offshore islands of the east coast of northern New Zealand.

*Pennantia endlicheri*, an inhabitant of the forest on Norfolk Island appears similar to *Pennantia baylisiana* (formerly *Plectomirtha baylisiana*) of Three Kings Islands. It has large, leathery leaves.

*Pouteria costata* (bastard ironwood) is the same species as found in northern New Zealand (tawapou). This species is uncommon in forest on Norfolk Island. Milky sap is a distinctive feature of this tree.

## HERBACEOUS DICOTYLEDONS

*Carpobrotus (Mesembryanthemum) glaucescens* appears similar to New Zealand's *Disphyma australis* in general appearance, but differs in having

magenta flowers and fleshy, red, edible fruits, which taste like salty strawberry jam. *Disphyma australis* has pale pink flowers and dry capsules.

*Dichondra repens* and *Oxalis corniculatus* which form part of the dense close turf inside the prison ruins, are the same as in New Zealand.

*Hibiscus diversifolius* (prickle hibiscus) is the same species as in northern New Zealand, a shrubby plant with sharp spines and showy yellow flowers with a purple centre.

*Samolus repens* var. *stricta*, the tiny shore primula, has white or pink flowers in Norfolk, but white flowers in New Zealand. It is found also in Australia, New Caledonia and the Kermadecs.

*Wahlenbergia gracilis* (strict sense) is the same species as found in New Caledonia, and is not found in New Zealand. It has slender branching stems and small, blue, long-tubed flowers, and grows as a pioneer in recently cleared places.

*Wahlenbergia vernicosa* (Pettersen 1997) was recently found by Peter de Lange near the shore at Anson Bay (we regret not going down to Anson Bay). He also found it on Tasmania's coast. I believe it will also be found on Lord Howe Island and other volcanic islands north of New Zealand (Fig. 4).



Figure 4. *Wahlenbergia vernicosa*, New Zealand, drawn from life, J. A. Pettersen.

## ACKNOWLEDGEMENTS

Thanks to Angela Guymer, Paul Stevenson, Paul Zeising, and Honey McCoy, for their help and guidance during our stay on Norfolk Island in November 1996. Also to Owen and Beryl Evans for a visit to their camp on Phillip Island. Also to Peter de Lange for helpful input and for seeking out *W. vernicosa*, even if he believes it to be *W. littoralis* Smith.

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