

## The vascular flora of Aorangi Island, Poor Knights Islands, northern New Zealand

P. J. de Lange & E. K. Cameron

To cite this article: P. J. de Lange & E. K. Cameron (1999) The vascular flora of Aorangi Island, Poor Knights Islands, northern New Zealand, *New Zealand Journal of Botany*, 37:3, 433-468, DOI: [10.1080/0028825X.1999.9512646](https://doi.org/10.1080/0028825X.1999.9512646)

To link to this article: <http://dx.doi.org/10.1080/0028825X.1999.9512646>



Published online: 17 Mar 2010.



[Submit your article to this journal](#) 



Article views: 260



[View related articles](#) 



Citing articles: 26 [View citing articles](#) 

## The vascular flora of Aorangi Island, Poor Knights Islands, northern New Zealand

P. J. de LANGE

Science and Research Unit  
Department of Conservation  
Private Bag 68908  
Newton  
Auckland, New Zealand

E. K. CAMERON

Auckland Museum  
Private Bag 92018  
Auckland, New Zealand

**Abstract** An annotated vascular flora of 282 taxa for Aorangi Island, Poor Knights Islands, is presented. Additional records (20 taxa) from Tawhiti Rahi Island, the other major island in the archipelago, are listed separately, resulting in a combined Poor Knights vascular flora of 302 taxa. Two new combinations, *Wahlenbergia littorcola* subsp. *vernica* and *Xeronema callistemon* f. *bracteosa*, are made for plants previously treated as *W. vernica* and *X. callistemon* var. *bracteosa*, respectively. Only one taxon, *Xeronema callistemon* f. *bracteosa*, is provisionally accepted as endemic to the Poor Knights Islands. The control of the more serious weed species on the island is discussed. A case is made for including the Mokohinau Islands within the Poor Knights Ecological Region.

**Keywords** Poor Knights Islands; annotated vascular plant list; taxonomy; endemic plants; ecological region; ecological district; environmental weeds; threatened plants

### INTRODUCTION

#### Location and physiography

The Poor Knights Islands are located in the northern Hauraki Gulf, 20 km east of Northland at 35°26–30'S and 174°42–43'E. The archipelago consists of two main islands, Tawhiti Rahi (163 ha) and Aorangi (110 ha) (island sizes from Taylor 1989), separated by 350 m of open water (Fig. 1). Aorangi (216 m a.s.l.) is the highest island in the group; the highest point of Tawhiti Rahi is 191 m a.s.l. Aside from the two main islands, several smaller islands and islets occur, mainly around Aorangi. To the south-west of Aorangi are two outlier groups, the High Peak Rocks (or The Pinnacles) (6.5 km from Aorangi) and Sugarloaf Rock (9 km from Aorangi). Collectively these islands form the Poor Knights Islands Nature Reserve, with access strictly controlled by the Department of Conservation.

In profile the two main islands are precipitous, rising sharply from the sea. Aorangi is the more accessible, with access possible via a series of low-angled, wave-cut platforms at Crater Bay and Frasers Landing (Fig. 1).

#### Geology

The Poor Knights Islands are considered to be an eroded rhyolitic breccia and minor tuff remnant of late Miocene age. Many land features have been influenced by sea erosion forming marine terraces during fluctuating sea levels, e.g., the seven terraces in Puweto Valley and another forming the flat tops of Tatua Peak and Western Cliffs (Hayward 1991).

#### Maori occupation

Fraser (1925) recorded that a population of between 200 and 300 Maori inhabited the Poor Knights Islands until the 1820s, and that those living on Aorangi belonged to the Ngati Toki hapu of Ngati Wai. In about 1823, while the local warriors were off the island, a raiding party from the mainland massacred the remaining inhabitants. As a result of this action the returning warriors declared the islands *wahi tapu* (sacred place) and abandoned them

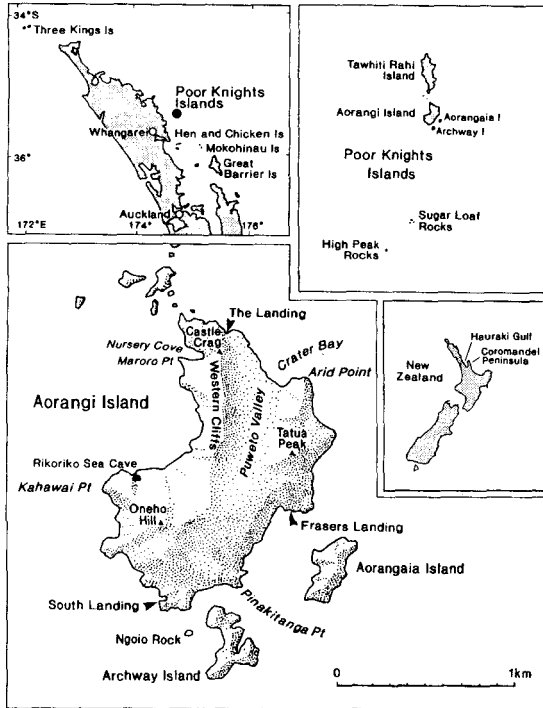


Fig. 1 Place names and location of Aorangi Island, Poor Knights Islands.

(Fraser 1925). Hayward (1993) mapped two pa sites and numerous terraces and stonework features on Aorangi and suggested that virtually all easy slopes were cultivated at some stage in the pre-European period. Toward the end of the eighteenth century pigs (*Sus scrofa*) were introduced to Aorangi (Hayward 1993). Following the departure of the Maori, pigs were left to run wild, ultimately resulting in significant damage to the biota of the Island. Cockayne (1905) was the first to document the damage caused by these animals, and control measures started soon afterward. Wild pigs were finally eradicated in 1936 (Wright & Cameron 1990).

### The Poor Knights Ecological Region

The Poor Knights Islands are renowned for their diversity of reptiles, which include the northernmost extant population of tuatara (*Sphenodon punctatus punctatus*), and eight lizard species of which two are endemic (Daugherty et al. 1994). Aside from reptiles, 10 species of burrowing petrels and shearwaters use the islands, which encompass the only known breeding site for Buller's shearwater (*Puffinus bulleri*). The islands are also home to an

endemic subspecies of bellbird (*Anthornis melanura oneho*), support a large resident population of red-crowned parakeets (*Cyanoramphus novaezelandiae novaezelandiae*), and have a remarkable diversity of endemic or nationally scarce invertebrates. More significantly, the islands are also naturally rodent-free. As a result of these wildlife values the Poor Knights Islands are classified as a separate Ecological Region (McEwen 1987).

### History of botanical investigations

Although the Poor Knights Islands have long been regarded as some of New Zealand's special offshore islands and were rated "Outstanding quality natural environment" (Class 2) by Taylor (1989, p. 20), very little has been published on their vascular flora. The first botanist to publish an account of the Poor Knights Islands flora was L. Cockayne. He landed briefly on Aorangi and examined Tawhiti Rahi by boat, resulting in a provisional flora of 57 vascular plant species for the island group (Cockayne 1905). Cockayne discovered a large population of *Carmichaelia williamsii*, which was then known only from a few scattered mainland sites, and subsequently described two new taxa, *Veronica bollonsii* (now *Hebe bollonsii*) and *Samolus repens* var. *strictus* (Cockayne 1912, 1915a; de Lange 1999). W. R. B. Oliver also explored the Poor Knights Islands, in more detail, during four visits (Pitt 1982). Oliver initially published a brief account of the vegetation of the islands (Oliver 1925), and the following year described the spectacular Poor Knights lily (*Xeronema callistemon*) as a new endemic to the group (Oliver 1926). Although Oliver intended to prepare a flora of the islands (Pitt 1982) this did not eventuate. L. B. Moore and L. Cranwell also visited the islands in November 1933 and during February 1937 (Reynolds 1988). From these visits Cranwell (1937) documented several interesting new vascular plant records for the islands. In 1984, an apparently endemic *Asplenium* species, *Asplenium pauperequitum*, was described from the two main islands (Brownsey & Jackson 1984). In the same decade, R. Beaver (1986a) recognised *Cordyline kaspar*, hitherto considered a Three Kings Islands endemic, from the Poor Knights.

These short accounts and species descriptions form the basis of current knowledge of the vascular flora and vegetation of the islands. This is in marked contrast to the cryptogamic flora, which has been well documented (see Cranwell & Moore 1938a; Hayward & Hayward 1982; J. Beaver 1986; Tehler et al. 1987; Hayward & Wright 1991). In the 1990s,

the Department of Conservation initiated the first major weed control measures for the Poor Knights Islands, soon recognising that a comprehensive vascular flora for the Poor Knights Islands was required. This paper goes some way to meeting that need through the provision of a flora of Aorangi Island. As our visits to the less accessible Tawhiti Rahi Island have been briefer, we have supplemented the Aorangi flora with a provisional list of additional taxa collected or recorded from Tawhiti Rahi Island by other workers.

## METHODS

A draft species list was compiled from the extensive collections lodged within the Auckland Museum herbarium (AK). This was supplemented by a search of the other main New Zealand herbarium which holds extensive Poor Knights specimens, the Museum of New Zealand Te Papa Tongarewa (WELT). Occasional records were extracted from the Landcare Research herbarium (CHR), but this herbarium was not specifically searched and it may hold additional records. Another source for the checklist was an unpublished species list compiled by P. Jackson during his weed surveys on the islands (Jackson 1982). To supplement these records, field visits were made in 1988, 1993, 1994, 1995, 1996, 1997, and 1998 by the authors in association with staff of Department of Conservation, The University of Auckland, University of Canterbury, and Landcare Research.

## TAXONOMY

### New combinations

#### *Wahlenbergia littoricola* subsp. *vernica*

(J.A.Pettersen) de Lange et E.K.Cameron, comb. et stat. nov.

≡ *Wahlenbergia vernica* J.A.Pettersen, *N.Z. Jour. Bot.* 35(1): 26–29 (1997).

HOLOTYPE: “West of Coromandel, Motukarikitahi Island, A. E. Esler, 15 Oct 1971”, CHR 287845!  
PARATYPE: AK 214152!

Pettersen (1997) treated this *Wahlenbergia* as a new, possibly endemic species *W. vernica*. She considered that *W. vernica* was most closely allied to the Lord Howe endemic *W. insulae-howei* Lothian. However, from our study of herbarium material of

both species (AK!, CHR!, NSW!), we disagree. Our observations concur with the descriptions furnished by Smith (1992) and Green (1994) which stress that *W. insulae-howei* has a tufted or spreading habit terminating in single, usually unbranched stems. Furthermore, the leaves of that species are usually crowded into basal rosettes, the flowers are either solitary or 2–3 per stem, deeply campanulate, with the style constricted at half the length down from the stigmatic lobes, and the capsules are hemispherical to shortly obconic. None of these characters is seen in New Zealand specimens of *W. vernica*. However, descriptions of *W. littoricola* (Smith 1992) match New Zealand plants closely with regard to their growth habit, few to many, heavily branched stems, flowers borne in complex thyrsoids, with the corolla shortly campanulate, and the stigma constricted at one third to two-thirds down from the stigmatic lobes. The capsules of *W. littoricola* and *W. vernica* are obconic (cf. Pettersen 1997). Both species are also unified by their comparable ecologies (cf. Smith 1992), and the fact that they share the same chromosome number of  $2n = 54$  (Smith 1992; Pettersen et al. 1995) which is otherwise unknown from other New Zealand radicate species of *Wahlenbergia*. As the only significant character distinguishing New Zealand plants from those in Australia (P. J. Smith pers. comm.) is the consistently glossy leaf surface of New Zealand specimens, we reduce *W. vernica* to the rank of subspecies.

#### *Xeronema callistemon* forma *bractea*

(L.B.Moore) de Lange et E.K.Cameron, comb. et stat. nov.

≡ *Xeronema callistemon* var. *bractea* L.B.Moore, *N.Z. Jour. Bot.* 6(4): 490–491 (1968).

HOLOTYPE: (Fig. 2) “from plant cultivated in Whangarei, K. Pickmere, 11 Nov 1943”, CHR 50094A!

Our October 1995 and 1997 visits to Poor Knights Islands were deliberately timed to coincide with the peak flowering of *X. callistemon*, thereby providing an opportunity to examine flowering specimens to determine the taxonomic status of *X. callistemon* var. *bractea* L.B.Moore. This variety was described by Moore (1968), following her study of a garden plant (CHR 50094A!) which had flowered within a sample of *X. callistemon* gathered from Aorangi in the 1920s (Reynolds 1988). It was the flowering behaviour of this plant which eventually led Moore (1968) to describe it as a distinct variety, var. *bractea*,

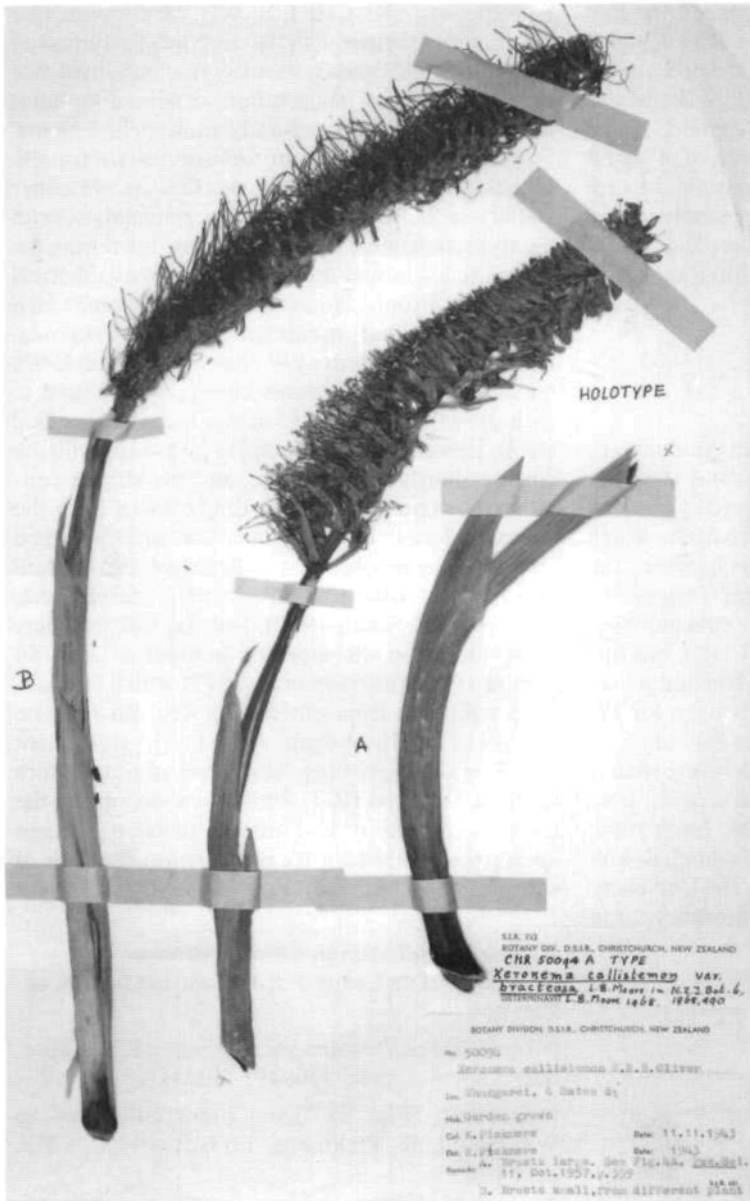


Fig. 2 Holotype of *Xeronema callistemon* f. *bracteosa* (K. Pickmere, CHR 50094A).

distinguished from the type variety by the “floral bracts leaf like in texture, green at least until anthesis, longer than the pedicels” (Fig. 3, 4). Although Moore was familiar with *X. callistemon* in the wild (Cranwell 1937; Reynolds 1988), she evidently did not see var. *bracteosa* in the wild, for she stated that this variety is “said [our emphasis] to be the more plentiful on the islands”. This statement is of some interest as, since 1968, there have been no wild collections of *X. callistemon* determined as var.

*bracteosa* lodged in New Zealand herbaria. Indeed, var. *bracteosa* is only known in herbaria from cultivated specimens.

Although our field observations failed to find any flowering plants exactly matching the type of var. *bracteosa*, three plants (out of several hundred examined) in 1997 were found with green inflorescences bearing greenish bracts marginally longer than the pedicels (e.g., AK 234399–400), and thus approaching those seen in the type of var.



**Fig. 3** Emerging inflorescence of *Xeronema callistemon* f. *bracteosa*. Note that the floral buds are entirely obscured by long floral bracts.



**Fig. 4** Emerging inflorescence of *Xeronema callistemon* f. *callistemon*. Note the floral buds are unencumbered by floral bracts.

*bracteosa* (Fig. 2). Furthermore, one plant (AK 236199), collected as a vegetative clump in 1995 and cultivated until flowering at Auckland for 36 months, produced flowers with bract lengths comparable to the type (Fig. 3). It has also been suggested to us that var. *bracteosa* has a different flowering cycle to the type variety, requiring shade to induce flowering (E. D. Hatch pers. comm.). Our studies of cultivated plants suggest that *X. callistemon* will flower irrespective of location, with plants of both varieties producing more flowers in well lighted sites (as was first reported by Cranwell & Moore 1938b). In the field we also failed to find any other consistent ecological or temporal differences to decisively distinguish var. *bracteosa*. Therefore, we consider var. *bracteosa* as nothing more than an uncommon, sporadically occurring, stable morph of *X.*

*callistemon*. For those who may wish to continue to distinguish this morph from *X. callistemon* by a name, we provide a new combination, at the rank of forma as defined by Valentine (1975), Stuessy (1990), and Stace (1991). This usage is consistent with the application of this rank as employed by other New Zealand botanists for *Hebe* (Garnock-Jones & Molloy 1982) and *Mazus* (Heenan 1998).

At present we treat *X. callistemon* f. *bracteosa* as endemic to the Poor Knights Islands. However, because identification of f. *bracteosa* is based on bract length and colour, attributes best seen in semi-mature floral buds (Fig. 3, 4), accurate determination from dried herbarium specimens, which invariably represent fully flowering specimens, is difficult. Therefore, we cannot discount the possibility that this taxon is present on Hen (Taranga) Island.

## DISCUSSION

### The vascular flora of Aorangi Island

The current work excludes 3 of the 57 species from Cockayne's (1905) original Poor Knights Flora and adds a further 248. The vascular flora of Aorangi now numbers 276 species and 6 hybrids, 81% of which are indigenous (Table 1). With the inclusion of 20 taxa recorded from Tawhiti Rahi and elsewhere within the archipelago, the combined flora of the Poor Knights now stands at 302 taxa, 79% of which are indigenous.

With the advancement of forest regeneration on Aorangi, some species, e.g., *Gleichenia dicarpa*, appear to have disappeared, while others, such as *Todea barbara* and manuka (*Leptospermum scoparium*), can be expected to decline from shading as the forest canopy matures. Because of past forest destruction, new species, both native and exotic, will continue to establish. This is especially true for taxa with wind-blown seeds. The discovery of two seedlings of nikau (*Rhopalostylis sapida*) on Tawhiti Rahi by C. J. West in 1996 suggest that long-distance dispersal by New Zealand pigeon (*Hemiphaga novaeseelandiae novaeseelandiae*), a frugivorous bird still without a resident population on the islands (R. Pierce pers. comm.), is also contributing to the overall floral diversity of the Poor Knights.

### Endemism

In contrast to the findings of others (e.g., Brownsey & Jackson 1984; R. Beever 1986b; Hayward 1991), we conclude that there is only one vascular plant, *X. callistemon* f. *bracteosa*, possibly endemic to the Poor Knights Islands (Table 2).

Several other taxa, *Asplenium pauperequitum*, *Xeronema callistemon* f. *callistemon*, *Myrsine* aff.

*divaricata*, and *Hoheria* aff. *populnea*, are near endemics to these islands. *Asplenium pauperequitum* is now confined to the Poor Knights, though it appears to have grown previously on the nearby Mokohinau Islands (Cameron 1993; de Lange et al. 1995a). *Xeronema callistemon* f. *callistemon* occurs elsewhere only on Hen Island (Cranwell 1933). The *Myrsine* is known from several locations on the Te Aupouri Peninsula, and near Tutukaka (P. J. de Lange & P. B. Heenan unpubl. data), and the *Hoheria* has been collected from Mauitaha and Marotiri Islands in the Chickens group (P. J. de Lange & M. J. Heads unpubl. data).

The near-absence of endemic taxa within the vascular flora of the Poor Knights is not unexpected. Although the islands have been geologically isolated from mainland New Zealand for at least 2 million years (Hayward 1991), their close proximity to the adjacent coast means that they are still well within the reach of foraging birds and prevailing westerly winds. Therefore, the islands are subject to a steady influx of mainland seed, effectively preventing the genetic isolation and allopatric speciation of the Poor Knights flora.

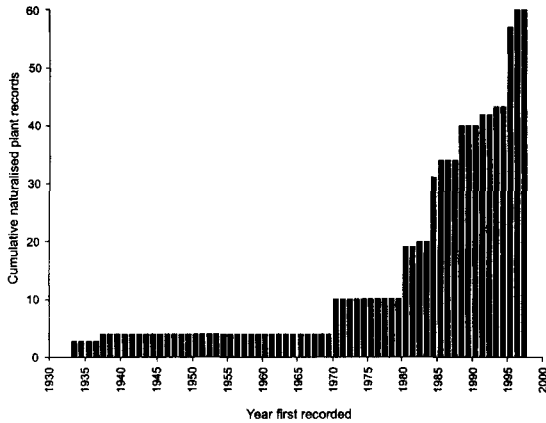
### Environmental weeds

Although partly a reflection of the high level of scrutiny to which the Poor Knights flora has been subjected since 1993, the overall pattern exhibited by the vascular flora is one in which there is an increasing number of exotic species establishing (Fig. 5).

Of the 53 naturalised species recorded from Aorangi, over 61% have wind-dispersed seeds; only two (*Phytolacca octandra*, *Solanum nigrum*) have fleshy fruit that would be ingested by birds; and at least two (*Bidens pilosa*, *Sigesbeckia orientalis*) have seeds that are dispersed by attachment.

**Table 1** Classification of Aorangi Island Flora and additions from other islands in the Poor Knights Islands, excluding hybrids.

Plant group	Aorangi	Additional species from Tawhiti Rahi	Totals
Indigenous ferns & fern allies	54	1	55
Indigenous gymnosperms	2	—	2
Indigenous dicotyledons	107	5	112
Indigenous monocotyledons	64	6	70
Naturalised dicotyledons	38	5	43
Naturalised monocotyledons	17	3	20
Naturalised sub total	55	8	63
Indigenous sub total	227	12	239
Totals	282	20	302
% native	81	58	79



**Fig. 5** Cumulative naturalised plant records for the Poor Knights Islands.

Mexican devil (*Ageratina adenophora*), mist flower (*A. riparia*), moth vine (*Araujia sericea*), and pampas grass (*Cortaderia selloana*) are the four most serious environmental weeds on Aorangi. At present they are subject to an intensive weed control programme initiated by the Department of Conservation in 1994 (K. Hawkins pers. comm.). Elsewhere in the Poor Knights Islands, only Tawhiti Rahi harbours Mexican devil and pampas grass infestations.

If the existing weeding levels are maintained, these four weed species should be eradicated in the near future from the Poor Knights Islands. However, because of the close proximity of the mainland and the direction of prevailing winds, control of fresh outbreaks of these and other new weed species is

likely to be an on-going problem. This is all the more so as the numbers of weed species and their geographical spread on the mainland continues to increase (Cameron 1997).

The other possible source of introductions detrimental to the Poor Knights flora is by the accidental transport of new weeds, insect pests, and diseases by visitors and through the illegal cultivation on the islands of marijuana (*Cannabis sativa*) (de Lange 1994a; de Lange et al. 1995a). To counter these risks, a refined version of recommendations proposed by Wright & Cameron (1990) is now used by the Department of Conservation.

When the vegetation has recovered from the human clearances of last century, there will continue to be natural disturbances such as storm damage, waterspouts (de Lange & Cameron 1997), damage from enormous clumps of Poor Knights lily dislodging and crashing through the forest, wind throw, and landslips. All of these types of disturbance occur on Aorangi, and all continue to create new sites for weed establishment and for indigenous species which require successional habitats.

#### Revision of the Poor Knights Ecological Region

McEwen (1987) distinguished the Poor Knights Ecological Region primarily on the basis of reptile and invertebrate diversity and endemism, the island's exclusive use as a breeding ground for Buller's shearwater, and natural absence of rodents. Various facets of the flora were also included as criteria, the main one of which was the considered high level of endemism, although this was not quantified and we have shown it here to be erroneous

**Table 2** Vascular plant taxa treated at some stage as endemic to the Poor Knights Islands. *Asplenium pauperequitum* is apparently now extinct on the Mokohinau Islands (de Lange et al. 1995a).

Taxon	Publication	Present Distribution
<i>Hebe bollonsii</i> (as <i>Veronica bollonsii</i> )	Cockayne 1912	Poor Knights Is, Hen & Chickens Is, Matapouri Bay
<i>Xeronema callistemon</i> f. <i>callistemon</i>	Oliver 1926	Poor Knights Is, Hen I
<i>Xeronema callistemon</i> f. <i>bracteosa</i> (as <i>X. callistemon</i> var. <i>bracteosa</i> )	Moore 1968	Poor Knights Is
<i>Myoporum laetum</i> var. <i>decumbens</i>	Simpson 1952	Poor Knights Is and other northern islands from Three Kings to Coromandel Peninsula
<i>Hoheria</i> aff. <i>populnea</i>	Allan 1961	Poor Knights Is, Chickens Is
<i>Myrsine</i> aff. <i>divaricata</i>	Allan 1961, Eagle 1982, R. Beaver 1986b	Poor Knights Is, Northland
<i>Asplenium pauperequitum</i>	Brownsey & Jackson 1984	Poor Knights Is, Mokohinau Is



(Table 2). However, during the course of our research it has become apparent that the Poor Knights Islands share many similarities with the Mokohinau Islands (de Lange et al. 1995a, 1995b; F. J. Brook pers. comm. 1996). This archipelago, although presently included in the Taranga Ecological District (McEwen 1987), has more similarity to the Poor Knights Ecological Region with regard to its geology and flora, reptile diversity (albeit with no endemic taxa; de Lange et al. 1995b), and presence of endemic invertebrates (C. Green pers. comm.), including an extant population of the snail *Placostylus hongii*, as well as having at least two endemic vascular plants (a *Hebe* and a *Senecio* (de Lange et al. 1995a; de Lange & Murray 1998)). Indeed, the only significant difference between these island groups is that the Mokohinau Islands have been heavily modified to the present time by humans and kiore (*Rattus exulans*) (Cameron 1990; de Lange et al. 1995a), while the human influence on the Poor Knights ceased by the 1820s. Furthermore, it would appear that the inclusion of the Mokohinau Islands in the Taranga Ecological District has little scientific basis, being largely based on ignorance and convenience (I. Atkinson pers. comm.). As the Hen & Chickens Islands, on which the Taranga Ecological District is centred, have a markedly different flora and geology from both the Mokohinau Islands and the Poor Knights, we suggest that the Mokohinau Islands would be better placed as their own Ecological District within the Poor Knights Ecological Region.

### Conservation of threatened plants

Nine nationally threatened and local species (*sensu*

**Table 3** Nationally threatened and local plant species recorded from Aorangi Island. Conservation status from Cameron et al. (1995).

Conservation Status	Species
<b>Threatened</b>	
Critical	<i>Asplenium pauperequitum</i>
Endangered	<i>Lepidium oleraceum</i> <i>Rorippa divaricata</i>
Vulnerable	<i>Carmichaelia williamsii</i> <i>Sicyos australis</i>
Rare	<i>Tupeia antarctica</i>
<b>Local</b>	
Local	<i>Colensoa physaloides</i> <i>Picris burbidgei</i> <i>Streblus banksii</i>

Cameron et al. 1995) are present on Aorangi (Table 3). Of these taxa, *Asplenium pauperequitum* and *Carmichaelia williamsii* have their only or main strongholds on the Poor Knights Islands, and *Rorippa divaricata*, *Sicyos australis*, and coastal milktree (*Streblus banksii*) have nationally significant populations there. Provided that the Poor Knights remain rodent-free, none of these species, with the exception of *Asplenium pauperequitum*, requires specific conservation management.

### CHECKLIST OF AORANGI ISLAND (POOR KNIGHTS ISLANDS) VASCULAR PLANTS

The order of the checklist follows that of Sykes & West (1996), i.e., alphabetic by family and then genera within the family. Treatment of families follows Brownsey & Smith-Dodsworth (1989) for pteridophytes, Bostock & Spokes (1998) for the Polypodiaceae, Chinnock (1998) for the Lycopodiaceae, Allan (1961) for gymnosperms, Webb et al. (1988) and Struwe et al. (1994) for dicotyledons, and Parham (1979) for most monocotyledons except where Dahlgren et al. (1985), Mabberley (1997), and Chase et al. (1996) are followed for the Asteliaceae, Antheriaceae, and Lomandraceae. Additional records, mainly from Tawhiti Rahi Island, and discounted records are listed separately. Abbreviations of all authorities for plant names follow Brummitt & Powell (1992).

For each plant entry a vernacular name where known is provided, followed by notes on the abundance, ecology, and, where necessary, taxonomic affinities. A herbarium voucher, where known and seen by the authors, is then cited. If more than one voucher exists usually only the earliest collection is cited. Plant records unverified by herbarium voucher (32 taxa) are recorded following the system employed by Sykes & West (1996) except for two species, *Isolepis prolifer* and *Luzula* sp., which were reported by Cockayne (1905). These are not supported by a known herbarium specimen but may have been present on the island in the past, and are treated as historic records. For naturalised species the year of the first record of the plant on Aorangi is given in bold at the end of each entry. Where there is an earlier record on Tawhiti Rahi this date is given in parenthesis.

The term "petrel scrub" refers to the distinctive low shrubland, dominated by taupata (*Coprosma repens*) and coastal mahoe (*Melictyus novae-zelandiae* subsp. *novae-zelandiae*) which develops in the vicinity of the nesting grounds and burrows

of petrels, shearwaters, and other sea-going birds on northern New Zealand offshore islands.

† denotes records additional to those listed by Cockayne (1905), with synonymy that appears probable.

\* denotes naturalised species.

## PTERIDOPHYTA

### PSILOTOPSIDA

#### PSILOTACEAE

†*Psilotum nudum* (L.) P.Beauv.

Scarce. Several stems noted in August 1996, growing amongst rhyolite stones and thick leaf litter in moderately dense kohekohe (*Dysoxylum spectabile*)/pigeonwood (*Hedycarya arborea*) forest, upper Puweto Valley. This is the only record for the Poor Knights Islands. AK 228727

†*Tmesipteris lanceolata* P.A.Dang.

Scarce. Several stems noted growing at base of a rotting black tree fern (*Cyathea medullaris*) trunk. SIGHT ONLY

### LYCOPSIDA

#### LYCOPODIACEAE

†*Lycopodium volubile* G.Forst. waewaekoukou  
One plant collected from open scrub near summit of Oneho Hill by L. Cranwell in 1937. AK 111125

†*Huperzia varia* (R.Br.) Trevis. iwituna  
Scarce. Occasional plants noted growing terrestrially in thick leaf duff in the vicinity of Oneho Hill. AK 169564

### FILICOPSIDA

#### ASPLENIACEAE

*Asplenium flaccidum* G.Forst. hanging spleenwort  
Collected by Wright in 1984 as an epiphyte, south side Oneho Hill. AK 169483

†*A. haurakiense* (Brownsey) Ogle  
Widespread. An abundant and extremely variable fern found throughout the island in petrel scrub, forest, shrubland, and bluffs or in other similar open habitats. Brownsey (1977) treated this fern as a new subspecies of *A. flaccidum*. However, Ogle (1987) elevated Brownsey's subspecies to the rank of species citing instances of sympatry and ecological, morphological, and cytological differences. As *A. haurakiense* is readily distinguishable from *A. flaccidum* and both are frequently sympatric but

remain ecologically distinct, we follow Ogle's taxonomy here.

AK 169506

†*A. lamprophyllum* Carse

Locally abundant fern of shaded rock land particularly within the Puweto Valley, and on the south-west slopes of Oneho Hill. AK 169589

†*A. oblongifolium* Colenso shining spleenwort  
Occasional forest fern. AK 169468

†*A. obtusatum* subsp. *northlandicum* Brownsey  
Local. Mainly observed on exposed rocks around The Landing and at Crater Bay, otherwise a local component of coastal cliff vegetation. It is this species which is associated with the dense growths of *Blechnum norfolkianum* festooning the walls and roof of Rikoriko Sea Cave. Ogle (1987) elevated the two subspecies to specific rank. This taxonomy is not followed here. Both subspecies are allopatric in their occurrences and, despite cytological differences, the morphological characters and ecological partitioning cited by Ogle (1987) are considered here to be insufficient to warrant species rank (see de Lange et al. 1995b). AK 169437–39

†*A. pauperequitum* Brownsey et P.Jackson  
Poor Knights spleenwort

This species is now under severe threat of extinction on Aorangi. At Tatua Peak, approximately 72 plants scattered in three populations are now known. Of those other populations discovered on Aorangi in 1982 and 1984 (Brownsey & Jackson 1984), none now survives. The exact cause of this decline is still unknown. However, storm damage, drought, competition with *Asplenium haurakiense*, over-collecting, disease, and loss of plants through subtle changes in microclimate have all been postulated as factors in this species decline (Wright 1992; de Lange 1994a). The decline is a cause for concern because the species is still unknown in cultivation, thus there is no safeguard of an *ex-situ* reservoir should further decline result in its extinction on Aorangi. Unfortunately, as *Asplenium pauperequitum* is also undergoing decline on Tawhiti Rahi (P. J. de Lange unpubl. data) the long term survival of this critically endangered species (Cameron et al. 1995) looks bleak and it must now rank as one of New Zealand's most threatened endemic plants.

WELT P11827

†*A. polyodon* G.Forst.  
Common. Mainly on Tatua Peak and Oneho Hill, and along the western cliffs of Puweto Valley. AK 169474

†*A. haurakiense* (Brownsey) Ogle × *A. oblongifolium*  
Colenso

An uncommon hybrid, occasionally seen where the  
ranges of both parents overlap. AK 169532

### BLECHNACEAE

†*Blechnum filiforme* (A.Cunn.) Ettingsh. thread fern  
Scarce. Several patches in the vicinity of Oneho Hill  
and Tatua Peak. SIGHT ONLY

†*B. norfolkianum* (Heward) C. Chr.  
Local to locally abundant on colluvium, amongst  
petrel burrows, under rock overhangs, and in cave  
entrances. This species also lines the walls and  
ceiling of Rikoriko Sea Cave. AK 115181

†*B. novae-zelandiae* Chambers et Farrant kiokio  
Occasional specimens noted within forest gaps near  
Puweto Stream. AK 236363

†*Doodia australis* (Parris) Parris rasp fern  
Common fern of open scrub, forest gaps, and slips  
throughout the island. AK 115352

†*D. mollis* Parris mokimoki  
Scarce, several plants noted from the lower Puweto  
Stream, on stream bank in low, open forest. AK 169576

### CYATHACEAE

†*Cyathea dealbata* (G.Forst.) Sw. silver fern/ponga  
Locally common throughout the main forested parts  
of the island. However, mature specimens are scarce,  
the majority of these existing as isolated moribund  
individuals. AK 169508

†*C. medullaris* (G.Forst.) Sw. black tree fern/mamaku  
Observed first by Cranwell in 1937. We only saw  
occasional dead trunks of this species and one young  
plant in 1995 on the southern slopes of Oneho Hill.  
AK 136274

### DAVALLIACEAE

†*Arthropteris tenella* (G.Forst.) Hook.f.  
Locally common in the Puweto Valley and near  
Oneho Hill. Often growing amongst *Asplenium*  
*lamprophyllum*. AK 169467

### DICKSONIACEAE

†*Dicksonia squarrosa* L'Hér. wheki  
Locally common on the eastern and southern slopes  
of Oneho Hill. Scattered specimens occur elsewhere,  
especially within the ephemeral watercourses of the  
Puweto Valley. AK 169473

### DENNSTAEDTIACEAE

†*Histiopteris incisa* (Thunb.) Js.Sm. water fern  
An ephemeral species of open sites. Several small  
plants noted amongst petrel burrows on the western  
flanks of the Puweto Valley, otherwise common on  
slip scars, upper root-plate margins of wind-thrown  
trees, and in other recently exposed sites west of  
Oneho Hill. AK 169475

†*Hypolepis ambigua* (A.Rich.) Brownsey et Chinnock  
Scarce. Occasional plants noted within petrel  
burrows and slip scars on the western flanks of  
Oneho Hill. AK 230416

†*H. dicksonioides* (Endl.) Hook. ground fern  
Scarce. In 1995 several small populations were  
present within the oioi (*Apodasmia similis*) rushland  
at Crater Bay, and one large plant grew amongst  
nightshade (*Solanum americanum*) within a petrel  
colony on the western side of Oneho Hill. Specimens  
could not be relocated at these sites in 1996 and  
1997. AK 169477

†*H. distans* Hook.  
Collected from peat on the eastern side of Oneho Hill  
in 1984. During 1995 several small plants were noted  
amongst rotting stumps of pampas grass near Crater  
Bay. AK 169476

†*H. lactea* Brownsey et Chinnock  
One specimen, growing at the entrance of a petrel  
burrow, upper Puweto Valley in 1995. AK 230416

†*Paesia scaberula* (A.Rich.) Kuhn scented pig fern  
One patch on an exposed outcrop of rhyolitic breccia  
within dense coastal forest immediately above the  
South Landing. AK 226830

*Pteridium esculentum* (G.Forst.) Cockayne  
bracken/aruhe  
Local. Mainly dead patches of bracken cover the  
regenerating scrubland above the western cliffs of  
Puweto Valley. Occasional living specimens also  
occur here, but are most frequent around tree falls,  
ephemeral watercourses, and within other open areas  
of the Puweto Valley and Oneho Hill. AK 169550

### DRYOPTERIDACEAE

†*Lastreopsis glabella* (A.Cunn.) Tindale  
One small plant of this species was noted in 1995  
within an ephemeral watercourse draining into  
Puweto Valley from Tatua Peak. SIGHT ONLY

†*L. microsora* subsp. *pentangularis* (Colenso)  
Tindale

Local in the well drained stony soils of the upper and mid Puweto Valley. AK 169486

†*L. velutina* (A.Rich.) Tindale velvet fern  
Scarce. Occasional plants noted on stony ground within the Puweto Valley, and on the nearby western cliffs. AK 169588

†*Polystichum richardii* agg. common shield fern  
Locally common fern of rocky overhangs, ridge tops, steep forested slopes, and ephemeral watercourses. Specimens of this aggregate on the Poor Knights correspond to the widespread, dark green, coastal and lowland form of the complex. AK 169513

†*Rumohra adiantiformis* (G.Forst.) Ching  
Scarce. A low epiphyte noted only at the bases of pohutukawa (*Metrosideros excelsa*) and wheki trunks. AK 169538

### GLEICHENIACEAE

†*Gleichenia dicarpa* R.Br. swamp umbrella fern  
Cranwell collected the only known record for the Poor Knights Islands on Aorangi in 1937. Forest regeneration has probably shaded out this species. AK 115803

### GRAMMITIDACEAE

†*Ctenopteris heterophylla* (Labill.) Tindale  
Collected once by Cranwell in 1933 or 1937, in “summit scrub, not very abundant”. AK 115619

### HYMENOPHYLLACEAE

†*Hymenophyllum cupressiforme* Labill.  
Single collection by Cranwell in 1937 (cited by Parris & Croxall 1972, p. 262).  
CHR 21666 (in part)

†*H. dilatatum* (G.Forst.) Sw.  
One patch 0.3 m × 0.35 m encountered growing terrestrially on thick humus on the south side of Oneho Hill. AK 114508

†*H. multifidum* (G.Forst.) Sw.  
Locally common in forest on the southern slopes of Oneho Hill. AK 169540

†*H. rarum* R.Br.  
Low epiphyte, also on damp logs and rhyolitic boulders, within the south-facing forested slopes and summit area of Oneho Hill. AK 169479

†*H. sanguinolentum* (G.Forst.) Sw.  
Low epiphyte or rupestral species of shaded forest on the southern slopes and summit area of Oneho Hill. AK 169548

†*Trichomanes endlicherianum* C.Presl  
Uncommon. Growing on rhyolitic breccia outcrops in a deep, dark gully on the southern side of Oneho Hill. AK 169491

†*T. reniforme* G.Forst. kidney fern  
Locally common on thick humus near the summit and along the southern slopes of Oneho Hill, under rather open kanuka forest. AK 169547

### OSMUNDACEAE

†*Todea barbara* (L.) T.Moore royal fern  
This fern is locally common in forest around Oneho Hill. Occasional plants also grow at Arid Hill and on the saddle between there and Tatua Peak. The total population, estimated at c. 700–800 plants, is probably the largest known in the country but not particularly healthy. The rapid regeneration of the pohutukawa forest (cf. Reynolds 1988) has all but eliminated the low scrub and open ground this species requires. AK 115873

### PTERIDACEAE

†*Adiantum aethiopicum* L. true maidenhair  
Local. Several small patches amongst scrub on low saddle between Tatua Peak and Oneho Hill. AK 254395

†*A. hispidulum* Sw. rosy maidenhair  
Occasional. Mainly in scrub and relatively open forested parts of the Puweto Valley, otherwise sparsely distributed on the island. AK 228808

†*Cheilanthes sieberi* Kunze subsp. *sieberi*  
rock fern  
Scarce. Several small patches noted on the summit rocks of Tatua Peak, Arid Hill, and on the western cliffs above The Landing. AK 169571

†*Pellaea rotundifolia* (G.Forst.) Hook. button fern  
Occasional throughout the island. Forms approaching the taxon usually interpreted in New Zealand as *P. falcata* (R.Br.) Fée (*sensu* Brownsey & Smith-Dodsworth 1989) were present. AK 115405

†*Pteris* aff. *comans* G.Forst. coastal brake  
Scarce. Occasional plants of this undescribed New Zealand species (J. E. Braggins pers. comm.) were encountered within the shaded rock land beneath the western cliffs of the Puweto Valley. The scarcity on Aorangi of this usually common northern offshore island fern is unusual. SIGHT ONLY

†*P. macilentata* A.Rich.  
Collected once by Cranwell in 1937. AK 106996–97

*P. tremula* R.Br. trembling brake  
Common in the Puweto Valley, near the South  
Landing, and around Oneho Hill. Often within  
canopy gaps, otherwise associated with slip scars and  
ground heavily burrowed by petrels. AK 115490

### POLYPODIACEAE

†*Microsorium pustulatum* (G.Forst.) Copel. subsp.  
*pustulatum* hound's tongue  
Abundant throughout the forest parts of the island.  
Often forming the dominant groundcover, particu-  
larly of well drained partially shaded rock land.  
AK 169584

†*M. scandens* (G.Forst.) Tindale  
fragrant fern/mokimoki  
Occasional patches on shaded rocks within the main  
forested parts of the island. AK 169512

*Pyrrosia eleagnifolia* (Bory) Hovenkamp  
leather fern  
An abundant epiphytic and rupestral species found  
throughout the island. AK 169585

### SCHIZAEACEAE

†*Lygodium articulatum* A.Rich. mangemange  
Recorded by Jackson (1982) from near the summit  
plateau. SIGHT ONLY

†*Schizaea fistulosa* Labill. comb fern  
Collected once by Wright in 1984 amongst moss  
north-east of Oneho Trig. AK 171628

### SPERMATOPHYTA

#### GYMNOSPERMAE

#### ARAUCARIACEAE

†*Agathis australis* (D.Don) Lindl. kauri  
A few kauri still persist on Aorangi in the vicinity  
of Oneho Hill where Cranwell (1937) recorded them.  
However, on account of their small size (1–3 m tall)  
they are difficult to detect in the dense, 6-m-tall  
kanuka (*Kunzea ericoides*) forest. AK 143061

#### PODOCARPACEAE

†*Podocarpus totara* G.Ben ex D.Don var. *totara*  
*totara*  
One totara tree and a seedling were recently (1998)  
discovered by Department of Conservation field staff  
on the southern side of the saddle between Oneho  
Hill and Tatua Peak. This species is also known from  
a single specimen on Tawhiti Rahi (AK 201707).  
AK 234771

### DICOTYLEDONAE

#### AIZOACEAE

*Disphyma australe* (W.T.Aiton) N.E.Br. subsp.  
*australe* horokaka/New Zealand ice plant  
Common species of near-shore rock stacks, exposed  
rock, boulder fall, and cliff faces within reach of the  
sea. From the northern end of Crater Bay to The  
Landing it forms a narrow broken band up to 1 m  
wide along the upper tide level. AK 228805

†*Tetragonia tetragonioides* (Pall.) Kuntze  
New Zealand spinach  
One fruiting plant observed in 1995 within coastal  
turf below Castle Crag, by The Landing.  
SIGHT ONLY

†*T. implexicoma* (Miq.) Hook.f.  
Abundant. Widespread in open sites from the high  
tide mark to the summit peaks. From our study of  
Norfolk Island material of *T. implexicoma* and New  
Zealand *T. trigyna* Banks et Sol. ex Hook.f., we can  
find no significant characters separating these  
species. Accordingly we follow Green (1994) in  
treating *T. trigyna* as synonymous with *T. implexi-*  
*coma*. AK 169592

#### AMARANTHACEAE

†*Amaranthus viridis* L. green amaranth  
Three plants noted in December 1998 from amongst  
*Solanum americanum* thickets at Crater Bay. 1998  
AK 236334

#### APIACEAE

*Apium prostratum* Vent. subsp. *prostratum* var.  
*prostratum* native celery  
Common herb of exposed rock, damp seepages, and  
coastal turf. AK 169418

†*Centella uniflora* (Colenso) Nannf.  
Occasional herb of petrel scrub and low turf  
throughout the inner forested parts of the island.  
AK 169524–25

†*Hydrocotyle heteromeria* A.Rich waxweed  
Occasional herb of damp sunny spots within the  
Puweto Valley and in the vicinity of Oneho Hill.  
AK 226826

†*Scandia rosifolia* (Hook.) J.W.Dawson koheriki  
Collected once by Cranwell and Moore in 1934.  
AK 44834

#### APOCYNACEAE

†*Araujia sericifera* Brot. moth vine  
Moth vine was first discovered on Aorangi by Ngati

Wai during 1993 when part of a seed capsule was found (K. Hawkins pers. comm.). Live plants were not located until 1994, and since then this species has been the target of an intensive weed control campaign, which appears to have been successful. Occasional large vines and seedlings were found in parts of the Puweto Valley during 1995, and in September 1996 only seedlings were found mainly on the plateau above Rikoriko Sea Cave (Henry 1996).

1993  
AK 229845

†*Parsonsia capsularis* var. *grandiflora* Carse

New Zealand jasmine

Forming dense tangles in open scrub and tall forest (often near Buller's shearwater colonies). Aorangi plants have orange or white flowers, which is the same colour range exhibited by this variety on the Three Kings and northern Great Barrier Islands.

AK 169505

#### ARALIACEAE

†*Pseudopanax lessonii* (DC.) C.Koch. houpara

An occasional understorey shrub or small tree. Also a prominent component of petrel scrub and associated transitional vegetation types.

AK 104393

#### ASTERACEAE

†*Ageratina adenophora* (Spreng.) R.King et H.Robertson

Mexican devil

Locally common weed of disturbed ground throughout the island, and the target of an intensive weed control programme since 1993. Infestations are still a problem, with 1414 plants removed by hand-weeding in 1996 (Henry 1996). However, in 1997 only two plants were found.

1984 (1970)

AK 169493

†*A. riparia* (Regel) R.King et H.Robertson

mistflower

Two plants were uprooted in 1995 from a low cliff face under dense pohutukawa forest near Oneho Hill. This species has also been the subject of the weed control, with 312 plants destroyed in the 1996 weed-management programme (Henry 1996). We saw no further plants in 1997.

1984

AK 169492

†*Aster subulatus* Michx. sea aster

Occasional plants noted amongst oioi swards adjacent to brackish ponds at Crater Bay.

1984

AK 169421

†*Bidens pilosa* L. beggar's ticks

Scarce. Several patches seen near the summit of

Tatua Peak, amongst scrub near Arid Point, and on the western cliff tops above Puweto Valley.

1984  
AK 169430

†*Brachyglottis kirkii* var. *angustior* (Allan) C.J.Webb

Kirk's daisy/kohuorangi

A single 1.6-m-tall, sterile plant of the narrow-leaved variety of Kirk's daisy was noted growing terrestrially amongst scrub on Oneho Hill. On nearby Tawhiti Rahi only *B. kirkii* var. *kirkii* has been collected (AK 35330).

SIGHT ONLY

†*B. repanda* J.R.Forst. et G.Forst. rangiora

Locally common in scrub near Oneho Hill.

AK 169510

†*Cirsium vulgare* (L.) Scop. Scotch thistle

Locally distributed through suitably open sites within forest and near petrel colonies.

1982

AK 236353

\**Conyza albida* Spreng. fleabane

Common weed of clay banks, petrel colonies, and dry exposed cliff faces.

1905

AK 169462

†*C. bilboana* Remy

Occasional plants encountered in similar locations to those occupied by *C. albida*.

1995

SIGHT ONLY

†*Cotula australis* (Spreng.) Hook.f.

Locally common, this annual species was mainly observed within coastal turf around Crater Bay, in the vicinity of petrel burrows, and within open rock falls.

AK 169556

†*C. coronopifolia* L. bachelor's button

Abundant within crevices just above the high tide mark, and along the margins of brackish ponds at Crater Bay. Also common in seepages near the South and Frasers Landings.

AK 169417

†*Euchiton audax* (D.G.Drury) Holub

Local. Noted on clay banks at the head of the Puweto Valley and along the drier cliffs faces west of Puweto Valley.

AK 169570

†*E. gymnocephalus* (DC.) Holub

Common on damp earth, forest gaps, and within canopy breaks throughout Puweto Valley.

AK 32286

†*E. involucratus* (G.Forst.) Holub

Local, amongst oioi swards on damp turf surrounding the brackish ponds at Crater Bay.

AK 32266

†*E. limosus* (D.G.Drury) Holub

Scarce. Observed only in 1995 in association with

*E. involucratus* near the outlet of the main pond into which the Puweto Stream drains. SIGHT ONLY

†\**Gamochaeta spicata* (Lam.) Cabrera.

Common weed of bare earth and petrel colonies within Puweto Valley. 1988

AK 182884

†\**G. simplicaulis* (Willd. ex Spreng.) Cabrera

Collected once in 1988 around brackish pools, Crater Bay. 1988

AK 182885

†\**Hypochoeris radicata* L. catsear  
Abundant weed of petrel colonies, slips, and boulder fields; scarce along cliff tops. Also present amongst oioi and in low coastal turf around Crater Bay.

1988

AK 182897

†\**Leontodon taraxacoides* (Vill.) Mérat hawkbit  
Less common than catsear (*Hypochoeris radicata*) but occupying similar coastal habitats. 1984

AK 169426

†*Olearia furfuracea* (A.Rich.) Hook.f. akepiro  
Scarce. Several etiolated shrubs noted in regenerating forest north of Oneho Hill. AK 236363

†*O. rani* (A.Cunn.) Druce var. *rani* heketara  
One small tree (4 m tall) referable to the type and northern variety of heketara occurs in low regenerating forest north of Oneho Hill. AK 169537

†*Ozothamnus leptophyllus* (G.Forst.) Breitw. et J.M.Ward tauhinu  
Collected by Wright in 1985 from coastal cliffs.

AK 171622

†*Picris burbidgei* S.Holzapfel native oxtongue  
Scarce. Observed in 1995 amongst oioi near the campsite, Crater Bay. This site was eliminated by the 1996 storm (de Lange & Cameron 1997) and the species has not been seen since. *Picris burbidgei* is listed as "Local" by Cameron et al. (1995).

AK 226816

*Pseudognaphalium luteoalbum* agg.

Jersey cudweed  
Common in suitably open sites throughout the island. Two taxa can be distinguished from Aorangi. The first of these (AK 226833), *P.* "coast" of Druce (1993), has a more sprawling habit, and silvery-white, finely floccose, spatulate leaves. It is virtually restricted to the exposed boulder falls, cliff faces, and salt marsh of Crater Bay. The second taxon (AK 226817), *P.* "lowland" of Druce (1993),

has a more erect habit, and grey, coarsely floccose, narrow or broadly lanceolate leaves. Although sympatric with the first taxon at Crater Bay, it is more common within the forested parts of the island. AK 32253

†\**Senecio bipinnatisectus* Belcher

Australian fireweed

Occasional plants scattered through forest, particularly around tree falls. 1984 (1980)

AK 169560

†\**S. diaschides* D.G.Drury

Occasional specimens noted around tree falls in forest of Puweto Valley in 1988 and 1995. In 1996, abundant seedlings of this species grew over ground freshly exposed by storm damage at Crater Bay. In 1997, mature plants were frequent along the high ridge on the western cliff tops of Puweto Valley.

1984

AK 169461

†\**S. elegans* L.

One flowering plant noted in 1995 amongst low coastal turf near campsite, Crater Bay. It was destroyed. 1995

SIGHT ONLY

†*S. hispidulus* A.Rich.

fireweed

Occasional in disturbed ground, especially on old slips and near petrel colonies. AK 169448

†\**S. jacobaea* L.

ragwort

Occasional plants noted in canopy gaps and around recent tree falls toward the head of Puweto Valley. 1988

AK 182836

*S. lautus* Willd. var. *lautus* shore groundsel

Seasonally abundant herb of coastal turf, cliff faces, rock land, and disturbed ground near petrel colonies.

AK 169561

†*S. marotiri* C.Webb

gulf groundsel

A single plant discovered in December 1998 growing amongst *Solanum americanum* at Crater Bay. Apparently a recent arrival (cf. de Lange 1998). AK 236343

†*S. minimus* Poir.

fireweed

Local. Frequently seen in association with petrel burrows but never particularly common.

AK 169517

†\**S. vulgaris* L.

groundsel

Collected at Crater Bay as a seedling on bare ground exposed by the 1996 storm and grown on in cultivation. This appears to be the first groundsel

record on a relatively unmodified island for northern New Zealand. **1996**

AK 230772–73

†\**Sigesbeckia orientalis* L.

Scarce in sunny clearings along the banks of the Puweto Stream, and within the scrub on the western cliff tops. Also observed in petrel colonies along the western cliffs below Oneho Hill. **1984**

AK 169441

†\**Sonchus asper* (L.) Hill puha/prickly sow thistle  
Occasional plants scattered amongst oioi swards near Crater Bay, and around petrel colonies. **1995**

AK 236369

\**S. oleraceus* L. puha/sow thistle  
Widespread and locally common in most open habitats and disturbed ground. Often forming dense patches in the vicinity of petrel colonies. Based on their waxy, glaucous, leaf colour, some sterile specimens gathered in August 1996 were suspected to be *S. kirkii*. Samples of these plants when grown on in Auckland soon lost their glaucous colour, matching *S. oleraceus* when mature (AK 230324).

**1984 (1980)**

AK 169431

†\**Taraxacum officinale* Weber dandelion  
Local. Occasional plants scattered throughout the island in suitably open or disturbed sites. **1995**

AK 236342

†\**Vellereophyton dealbatum* (Thunb.) Hilliard et B.L.Burt

Collected by Wright in 1985 amongst oioi at Frasers Landing. Seen in the same site in 1993. No plants observed there or elsewhere on the island since then.

**1985**

AK 169451

## BRASSICACEAE

†\**Brassica oleracea* L. wild cabbage  
Collected once by Moore and Cranwell in 1933.

**1933**

AK 63213

†*Cardamine debilis* DC. agg.

This small cress is sparsely distributed throughout shady sites on the island. Plants correspond to the form called “narrow petal” by Pritchard (1957).

AK 169562

*Lepidium oleraceum* Sparrm.

nau/Cook’s scurvy grass

Reported as abundant on Aorangi in 1925 (Reynolds 1988) but, despite the abundance of sea birds and

absence of rodents, Cook’s scurvy grass seems to have declined in numbers since then and is now very uncommon (cf. Norton et al. 1997). One plant was noted on a cliff face near the South Landing in 1993, and a single plant was found at the base of the western cliffs, Puweto Valley in 1996 (CHR 510596) but not seen there in 1997. **AK 100094**

†\**Lepidium pseudotasmanicum* Thell.

pepperpress

Five plants noted beside track leading to Crater Bay campsite in 1995. Scattered plants were observed in low scrub on the western cliff tops above Puweto Valley in 1996. **1995**

SIGHT ONLY

†*Rorippa divaricata* (Hook. f) Garn.-Jones et Jonsell  
New Zealand land cress

Local. One plant was noted in 1995 adjacent to main track leading to the campsite from Crater Bay. This plant was eliminated by the 1996 storm. Also in 1995 c. 200 plants were growing amongst pampas grass and Mexican devil within a grey-faced petrel (*Pterodroma macroptera gouldi*) colony on the western cliffs overlooking Puweto Valley. Cranwell first collected *Rorippa* from Aorangi in 1937 but subsequent visitors to the island did not report or collect the species until 1995. The scarcity of this species is paralleled by that of Cook’s scurvy grass and must bring into question some of the comments raised by Norton et al. (1997) regarding the importance of sea birds for both species. The only significant population of *R. divaricata* found on Aorangi was intermixed with two serious environmental weeds, pampas grass and Mexican devil. Herbarium evidence suggests that the range of this species has largely contracted to the outer offshore islands of the Hauraki Gulf (de Lange et al. 1995b). This is a pattern evident in several other nationally threatened species, e.g., *Picris burbidgei* (P. J. de Lange unpubl. data), *Sicyos australis* (Cameron 1992), and *Senecio scaberulus* (Drury 1975). At present, *Rorippa divaricata* is listed as an endangered species (Cameron et al. 1995). The rediscovery of this species on Aorangi is therefore significant because it adds another refuge for this species whose only other island strongholds are Fanal (Motukino) Island and Lady Alice Island (de Lange et al. 1995b). **AK 49907**

## CALLITRICHACEAE

†*Callitriche muelleri* Sond.

Locally abundant in 1995 on damp soil under tall



forest in the Puweto Valley. No plants seen in the same sites in 1996 or 1997. AK 182879

†\**C. stagnalis* Scop. starwort  
A few small plants observed once in coastal fresh water pool, Crater Bay. 1996  
SIGHT ONLY

### CAMPANULACEAE

*Wahlenbergia littorcola* subsp. *vernica*  
(J.A.Petterson) de Lange et E.K.Cameron  
Locally common within the vicinity of petrel burrows, under short scrub, along cliff tops, or on the forest floor within canopy gaps. The flowers of Poor Knights specimens are uniformly pale lilac. AK 37149

### CARYOPHYLLACEAE

†\**Cerastium glomeratum* Thuill.  
annual mouse-ear chickweed  
Occasional herb of disturbed ground, especially in the vicinity of petrel colonies. 1984 (1980)  
AK 169526

*Spergularia media* (L.) C.Presl sea spurrey  
Local succulent herb of exposed rock platforms, rock stacks, and cliff faces subject to wave splash; also local on the western Puweto Valley clifftops. AK 169432

†\**Stellaria media* (L.) Cirillo subsp. *media*  
chickweed  
Local. Plants noted in rank growth above Landing Bay, near the campsite, Crater Bay, and on the western Puweto Valley cliff tops. 1995 (1970)  
SIGHT ONLY

†*S. aff. parviflora* Hook.f.  
A common sprawling herb of shaded rock faces, petrel colonies, forest floor, and damp seepages, favouring well manured ground. This taxon differs from *S. parviflora* sens. str. by its larger size, erect habit, fleshy bright green leaves with distinctive hairy petioles, and flowers, which have conspicuously longer petals. It is also known from the Three Kings Islands (where it is sympatric with *S. parviflora* sens. str.), south to at least the Aldermen Islands. AK 169580

### CHENOPODIACEAE

†*Einadia triandra* (G.Forst.) A.J.Scott pigweed  
Scarce. One patch noted in the low coastal turf near South Landing. SIGHT ONLY  
*E. trigonos* (Roem. et Schult.) Paul G.Wilson subsp. *trigonos* pigweed

Abundant. Widespread in coastal turf, petrel scrub, and inland on bluffs and ledges. AK 100615

*Sarcocornia quinqueflora* (Ung.-Sternb.) A.J.Scott subsp. *quinqueflora* saltwort/glasswort  
Abundant succulent herb of wave-washed platforms and cliff faces subjected to regular saltwater spray. The 1996 storm severely reduced the extent of the Crater Bay population. AK 171621

### CONVOLVULACEAE

†*Calystegia sepium* (L.) R.Br. agg. pink bindweed  
This species is locally common amongst oioi and coastal cutty grass (*Cyperus ustulatus*) adjacent to pools of brackish water in Crater Bay. AK 169291

†*C. soldanella* (L.) R.Br.  
Common in low coastal turf above high water-tide mark. Occasionally seen inland around petrel burrows. AK 169286

†? *C. sepium* (L.) R.Br. × *C. soldanella* (L.) R.Br.  
Scarce, confined to Crater Bay where the distributions of both parents overlap. As a result of severe storm damage of the forest margin above Crater Bay (de Lange & Cameron 1997), numerous immature specimens of this hybrid were encountered on the freshly exposed ground during our August 1996 visit. Although assumed to be of this parentage, flowering specimens collected from here in December 1998, though rather variable with respect to the size of their dark pink striped flowers, possessed conspicuously winged peduncles, while the leaves were often basally toothed. These are features of *C. marginata* R.Br., which is apparently absent from the islands, but does grow locally on the nearby mainland at Tutukaka (L. J. Forester pers. comm.) AK 236351

†*C. tuguriorum* (G.Forst.) Hook.f.  
One patch observed amongst mingimingi (*Leucopogon fasciculatus*) scrub near the summit of Tatua Peak. SIGHT ONLY

†*Dichondra repens* agg. taxon 1  
Mercury Bay weed  
A distinct taxon occurring mainly on northern offshore islands. It may be distinguished by its fleshy, dark green, glossy leaves (fading with age to bright yellow), and by the sparsely hairy surface, with the hairs aligned. It is strictly coastal and on Aorangi is common in the low peaty, turf at Crater Bay. AK 226832

*D. repens* agg. taxon 2 Mercury Bay weed

The most widespread of the *D. repens* agg. in the North Island. Common in coastal forest, slips, and open gaps within forest on Aorangi. This taxon is separable from Taxon 1 by the non-succulent, grey-green coloration of the leaves (fading to brown with age), their flannel-like texture, and by the patterning of the hairs, which are randomly scattered across the leaf surface. AK 107436

### CORIARIACEAE

†*Coriaria arborea* R.Linds. var. *arborea* tutu  
One specimen noted in thick scrub on the apex of the ridge separating Tatu Peak from Oneho Hill. AK 236347

### CORYNOCARPACEAE

*Corynocarpus laevigatus* J.R.Forst. et G.Forst. karaka  
Common in most forested parts of the island. Especially common in the Puweto Valley. AK 236352

### CRASSULACEAE

†*Crassula sieberiana* (Schult. et Schult.f.) Druce  
All Poor Knights Islands specimens of *Crassula* are treated here as *C. sieberiana*, despite the fact that many collections would also key out to *C. tetramera* (*sensu* Webb et al. 1988). Toelken (1981) initially described this taxon, at the rank of subspecies, from plants gathered from the southern part of the Northern Territory of Australia. In New Zealand, *C. tetramera* is said to differ from *C. sieberiana* by its erect, scarcely branching, annual habit, and pedicellate flowers (Webb et al. 1988). Forms matching this description have been frequently collected from offshore islands in northern New Zealand (e.g., AK 193194, 193210), as well as inland around Auckland City (AK 222775) and from Marlborough and Canterbury (CHR!). However, in cultivation northern New Zealand plants of *C. tetramera* are unstable, soon developing the sprawling, branched habit and subsessile-sessile flowers of *C. sieberiana*. Also, in these more northerly locations *C. sieberiana* is invariably an annual. For these reasons, we place northern New Zealand plants previously referred to *C. tetramera* within *C. sieberiana*. Further study into the status of *C. tetramera* throughout New Zealand is needed. On Aorangi, *C. sieberiana* is a seasonally common plant of exposed rock and low coastal turf, typically close to the high tide mark. AK 100308

### CUCURBITACEAE

*Sicyos australis* Endl. mawhai/ambush vine

Abundant. An often conspicuous vine of canopy gaps, petrel scrub, and coastal turf. In October 1995, the majority of vines appeared unhealthy with foliage often damaged by an as yet unidentified leaf-mining insect (e.g., AK 226818). Following the 1996 storm (de Lange & Cameron 1997) we encountered numerous seedlings of *Sicyos* colonising the freshly exposed ground above Crater Bay. At present mawhai is classified as a vulnerable species by Cameron et al. (1995). AK 169530

### CUNONIACEAE

†*Weinmannia silvicola* Sol. ex A.Cunn. towai  
Local. Apparently confined to the southern and eastern slopes of Oneho Hill, where it is often a conspicuous understorey tree, over-topped by pohutukawa. AK 102773

### DROSERACEAE

†*Drosera auriculata* Backh. ex Planch. sundew  
Local plant of bare clay along cliff margins within the inner parts of the island. AK 169552

### EPACRIDACEAE

*Leucopogon fasciculatus* (G.Forst.) A.Rich. mingimingi  
Locally common around Oneho Hill and in low scrubby locations throughout the island. AK 105377

### ESCALLONIACEAE

†*Corokia cotoneaster* Raoul  
Occasional to locally common in open scrub in the Puweto Valley near and on Tatu Peak, Oneho Hill, and along the western cliffs toward Castle Crag. Scattered plants also occur in scrub near Crater Bay. AK 182862

### FABACEAE

*Carmichaelia australis* R.Br. native broom  
Common throughout all forest types, where it forms shrubs up to 4 m tall, with occasional, exceptional specimens exceeding 6 m in height. Within petrel scrub and on exposed ridge tops near Tatu Peak, Oneho Hill, and the western cliffs, *C. australis* grows with *C. williamsii*. AK 103122–23

*C. williamsii* Kirk  
This distinctive, large, yellow-flowered species is locally common in three main habitat types, petrel scrub, open pohutukawa forest, and exposed rocky ridge tops running from Tatu Peak, Oneho Hill, the

western cliffs, Castle Crag, and along the margins of the Puweto Valley. In August 1996 bellbirds were seen visiting the flowers. A nationally vulnerable species (Cameron et al. 1995), *C. williamsii* is now virtually confined to the northern offshore islands, with the Poor Knights and Aldermen Islands the recognised stronghold for the species (Heenan & de Lange 1999). Within the Poor Knights the most extensive populations occur on Aorangi, where a population of 1800 individuals has been estimated (Heenan & de Lange 1999). AK 103094

†*Sophora microphylla* Aiton kowhai  
About 20 trees up to 5 m tall and numerous saplings occur on the eastern margin of the Puweto Valley near Tatua Peak. A few trees also grow near Nursery Cove (K. Hawkins pers. comm.). The seedlings and saplings of Poor Knights *S. microphylla* have only a slightly flexuous habit, lacking the pronounced divaricating habitat seen in some North Island populations of this species, while the adult specimens have larger, overlapping, oblanceolate leaflets. These are characters seen elsewhere in Chatham Island plants of kowhai, which were once distinguished as a different species, *S. chathamica* Cockayne. AK 226831

### GENIOSTOMACEAE

*Geniostoma rupestre* var. *ligustrifolium* (A.Cunn.) Conn hangehange  
A common shrub of forest understorey. In October 1995, bellbirds were seen visiting the flowers. Poor Knights plants often exhibit much larger and thicker leaves than is usually seen in mainland populations of this species. Because of this some workers (e.g., Allan 1961) have considered that Poor Knights plants were the same as *G. ligustrifolium* var. *maius* Cheeseman. However, Conn (1980) considered var. *maius* part of the normal range of variability within his concept of *G. rupestre* var. *ligustrifolium*. Recent observations of wild and cultivated Three Kings Islands plants from where var. *maius* was described (Cheeseman 1906) suggest that var. *maius* could be distinct from var. *ligustrifolium*, with which it is sympatric (P. J. de Lange & R. O. Gardner unpubl. data). The Three Kings plants differ from var. *ligustrifolium* by a number of characters. These include hirsute seedlings and juvenile foliage; convolute, glossy, adult leaves with revolute margins, prominent acumen, sparse brownish white hairs on the petiole and lamina; significantly larger, heliotrope-scented flowers; and larger fruit (R. O. Gardner pers. comm.). In contrast, our observations

and collections of Poor Knights plants suggest that specimens from this location are more variable than was implied by Allan (1961) and are not referable to var. *maius*. The *Geniostoma* of the Poor Knights have larger leaves than the usual range seen on the mainland, glabrate seedlings, mat foliage, shorter acumen, flat leaf margin, and irregular covering of white hairs in adult specimens. These features together with the smaller, distinctively curry-scented flowers are typical of other northern North Island populations of var. *ligustrifolium*. Further study into this variation is needed. AK 106035

### GENTIANACEAE

†\**Blackstonia perfoliata* (L.) Huds.  
Local. Occasional plants noted in peaty turf at Crater Bay. 1995  
SIGHT ONLY

†\**Centaurium erythraea* Raf. centaury  
Common weed of open ground, including the margins of brackish pools at Crater Bay and shallow soil on exposed boulder falls. 1985 (1980)  
AK 169276

### GERANIACEAE

†\**Geranium solanderi* Carolin "coarse hairs"  
One of the two *Geranium* taxa informally recognised by Gardner (1984). The other taxon, *G. solanderi* "large petals", is also present on the island (see next entry). On Aorangi, *G. solanderi* "coarse hairs" is of local occurrence, growing in disturbed sites such as in the vicinity of wind thrown trees. We have followed Gardner (1984) in treating this form of *G. solanderi* as naturalised in New Zealand. 1984  
AK 169504

†*G. solanderi* Carolin "large petals"  
Scarce. Confined to cliff faces near petrel burrows. AK 229846

### HALORAGIACEAE

†*Gonocarpus incanus* (A.Cunn.) Orchard  
Local. Only noted amongst moss and tea tree (kanuka/manuka) litter in the vicinity of Oneho Hill. AK 101099

*Haloragis erecta* (Banks ex Murray) Oken subsp. *erecta* toatoa/fireweed  
Locally common as a seasonal weed of forest gaps, and in 1995 amongst the oi oi and coastal toetoe (*Cortaderia splendens*) swards around Crater Bay. This latter habitat was eliminated by the 1996 storm. AK 100941

**LAURACEAE**

†*Beilschmiedia tarairi* (A.Cunn.) Benth. et Hook.f.  
ex Kirk taraire  
A single large tree, a sapling, and several small  
seedlings grow on a terrace about midway down the  
Puweto Valley. AK 169572

†*B. tawa* (A.Cunn.) Benth. et Hook.f. ex Kirk  
tawa  
Local south of Oneho Hill and Pinakitanga Point.

Specimens are easily overlooked in the forest as they resemble mangleo (*Litsea calicularis*) which is common at these locations. Wright (1984) considered such broad-leaved examples of tawa a distinct species, *B. tawaroa* A.E. Wright, and this is the only form of tawa present on the Poor Knights. Here, unlike the majority of *B. tawaroa* populations known to us, it appears to be stable, reaching the widest leaf dimensions recorded for the species (see Wright 1984). Based on observations and collections of broad-leaved tawa from other offshore islands and mainland locations (de Lange 1994b) and critical studies of wood, pollen, and fruit (Patel 1987; Moar 1993; Gardner 1996), we find the separation of *B. tawaroa* from *B. tawa* difficult to justify, particularly when considered in relation to taxonomic decisions reached for other large-leaved island races of mainland plants within the Hauraki Gulf (R. Beaver 1986b; de Lange 1994b; Gardner 1996, 1997). Therefore, until such time as additional evidence is presented to support the claims made by Wright (1984), we prefer to retain all wide-leaved populations of tawa within *B. tawa*. AK 169482

†*Litsea calicularis* (A.Cunn.) Benth. et Hook.f. ex Kirk  
mangleo  
Widespread in forested parts of the island. AK 169428

**LINACEAE**

*Linum monogynum* G.Forst. rauhuia  
Occasional. Mainly on cliff faces, where flowering plants were conspicuous during 1995. The flowers of Poor Knights plants occasionally have the pale blue or blue-striped flowers (e.g., AK 234318) seen infrequently in other mainland and Chatham Island populations. Cockayne (1902) cited the pale blue or striped flowers of Chatham Island plants as the sole basis for his recognition of a new endemic variety, var. *chathamicum* Cockayne, upheld by Given (1996) but not by Allan (1961). Cockayne (1915b) later reported *Linum monogynum* var. *chathamicum* from New Zealand, based on his observation of blue-flowered plants near Wellington. Allan (1961)

implied that such occurrences were the result of hybridism with the introduced *L. marginale*. We have seen no evidence to support this. Although it is our experience that *L. monogynum* does vary nationally with regard to growth form, leaf shape, and size, and deserves further study, flower colour is not a reliable character on which to separate taxa. AK 100892

**LOBELIACEAE**

†*Colensoa physaloides* (A.Cunn.) Hook.f.  
koru/colensoa

Common in shaded sites beneath the cliff faces of Tatu Peak and Oneho Hill, and only locally distributed elsewhere. Flower colour on Aorangi ranges from the purple commonly seen on the mainland to almost pure white.

Although treated as *Pratia physaloides* (A.Cunn.) Hemsl. by Allan (1961) and Webb et al. (1988), we have followed Hooker (1853) in placing this species in the segregate genus *Colensoa*. From New Zealand species of *Pratia*, *Colensoa* differs through its distinctive chromosome number,  $n = 13$ , (cf.  $n = 7$ , or multiples thereof, for *Pratia* (Beuzenberg & Hair 1959; Murray et al. 1992)), and markedly different woody shrub habit and seeds (for the latter see Webb et al. 1988). AK 234134

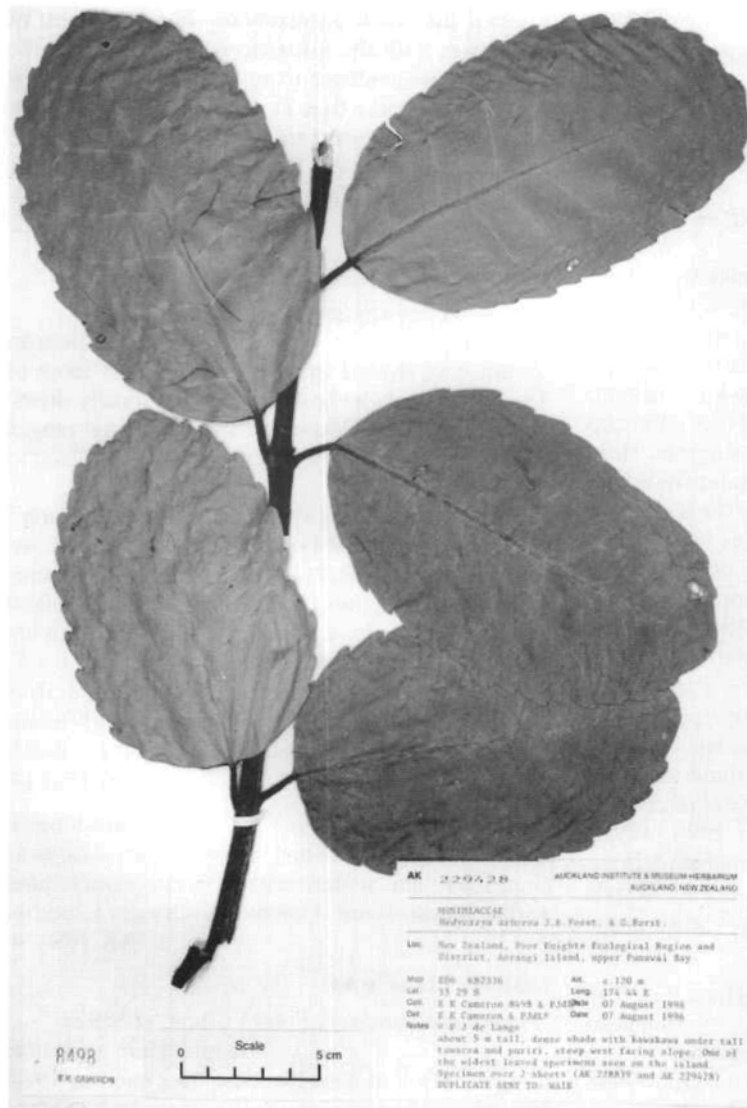
*Lobelia anceps* L.f. shore lobelia  
Occasional in coastal turf, amongst oioi swards at Crater Bay and within suitably damp sunny spots within coastal forest. Common at Frasers Landing. AK 169424

**LORANTHACEAE**

†*Tupeia antarctica* (G.Forst.) Cham. et Schltr.  
taapia/white mistletoe  
Wright collected a single male specimen in 1984 parasitic on a coastal maire (*Nestegis apetala*) tree near the summit of Oneho Hill. Specific searches in 1995 and 1996 failed to find this species there or elsewhere on the island. This is the only known occurrence of this species on a northern offshore island, and it is also the most recent record for this species in Northland (de Lange & Norton 1997). Cameron et al. (1995) list *Tupeia* as Rare. AK 169522

**MALVACEAE**

†*Hoheria* aff. *populnea* Poor Knights houhere  
The Poor Knights form of *H. populnea* A.Cunn. differs from mainland examples of this species in their smaller stature, pronounced suckering habit, much broader, coriaceous, bright green (otherwise



**Fig. 6** Herbarium specimen (*E. K. Cameron 8498 & P. J. de Lange, AK 229428*) of large-leaved form of *Hedycarya arborea* from Aorangi Island.

unpigmented), subtire leaves, and smaller flowers. The same taxon occurs on Mautitaha and Marotiri Islands (Chickens group), where it is sympatric with *H. populnea* sens. str. We have followed previous workers (e.g., Allan 1961; Eagle 1982) in treating this taxon as distinct from *H. populnea*. On Aorangi, houhere is widespread in forest and along cliff edges in low scrub. In these sites it often forms a suckering shrub or small tree 3–5 m tall. **AK 169497**

#### MELIACEAE

†*Dysoxylum spectabile* (G.Forst.) Hook.f.

kohekohe

Kohekohe is a widespread and important canopy constituent of forest throughout the island.

**AK 169498**

**MONIMIACEAE**

†*Hedycarya arborea* J.R.Forst et G.Forst.

pigeonwood/porokaiwhiri

Common in Puweto Valley and other mature forest south of Oneho Hill. Poor Knights and Three Kings plants differ from mainland populations by their much larger, broadly elliptic-obovate, distantly serrate to subentire foliage (Allan 1961). The largest leaved *Hedycarya* we saw on Aorangi had a leaf blade  $16.8 \times 10.0$  cm (Fig. 6, AK 228839), while the largest mainland example of *H. arborea* specimen we have seen (AK 99602), measured  $14.5 \times 8$  cm. The Poor Knights and Three Kings *Hedycarya* may also be separated by seed size; 12 randomly selected Aorangi *Hedycarya* seeds averaged 12.5 mm long  $\times$  10.8 mm wide (widest width) and 8 seeds of *H. arborea* from Huapai (NW Auckland) averaged  $10.4 \text{ mm} \times 7.6 \text{ mm}$ . However, as already observed for tawa (*Beilschmiedia tawa*) and hangehange (*Geniostoma rupestre* var. *ligustrifolium*), the distribution of these large-leaved forms is rather complex. Although the foliage of Three Kings *Hedycarya* is distinctly and uniformly larger, on the Poor Knights the pattern is complicated by the occurrence of intermediates and plants with foliage dimensions the same as that usually seen in mainland populations of *H. arborea* (AK 99599, 228843–44). Further south in the Hauraki Gulf and Bay of Plenty, large-leaved *Hedycarya* is gradually subsumed within the more usual smaller-leaved form of *Hedycarya*. Thus, on the Mokohinau, Hen and Chickens, and Mayor Islands, populations of *Hedycarya* show a gradation from the broadly obovate subentire foliage typical of Three Kings and the majority of Poor Knights *Hedycarya*, to the oblanceolate-lanceolate, distantly toothed form more typical of mainland New Zealand. This type and geographic pattern of variation is commonly seen in many other offshore island populations of otherwise common mainland species (R. Beever 1986b), and there is generally insufficient reason to justify the recognition of these offshore island races as distinct taxonomic entities (cf. Wright 1984). Therefore, until this variation is critically studied we advocate caution in attributing any taxonomic significance to these large-leaved island populations.

AK 99599–601

**MORACEAE**

†*Streblus banksii* (Cheeseman) C.J.Webb

coastal milktree

Coastal milktree is presently listed as a Local species by Cameron et al. (1995), primarily because of the

near extirpation of this species from the mainland and many rodent-infested offshore islands (see Atkinson 1972; de Lange et al. 1995a). The abundance of coastal milktree on Aorangi is presumed to be related to the absence of rodents. On Aorangi, this species is especially prominent in the understorey of the Puweto Valley forest, although seedlings and saplings are widespread in all vegetation types.

AK 169488, 169514

†*S. heterophyllus* (Blume) Corner milktree/turepo  
One small tree (5 m) and scattered seedlings occur along the margins of an ephemeral tributary to the main Puweto Stream. SIGHT ONLY

**MYOPORACEAE**

*Myoporum laetum* G.Forst.

ngaio

Common in petrel scrub and in open gaps within otherwise dense forest. A variable species with some forms sprawling while others form small trees 5 m tall. Poor Knights plants have been treated as a separate and endemic variety (var. *decumbens* Simpson) in the past (Simpson 1952). However, in a pattern consistent with other decisions reached here for tawa, hangehange, and possibly pigeonwood, this variety of *Myoporum* is no longer considered distinct from the natural range of variation exhibited by *M. laetum* (R. J. Chinnock pers. comm.). Specimens with the features of var. *decumbens* have been collected from the Three Kings, Rimariki, and Mokohinau Islands to as far south as the Coromandel Peninsula.

AK 37226

**MYRSINACEAE**

†*Myrsine australis* (A.Rich.) Allan mapou

Common small tree of lightly forested parts of the island. Often associated with and locally hybridising with *M. aff. divaricata*.

AK 169470

*M. aff. divaricata*

Abundant shrub or small tree in all vegetation types, from coastal turf to dense forest. The Poor Knights taxon is allied to *M. divaricata* A.Cunn., differing in its generally larger, distinctly coriaceous foliage with markedly less conspicuous leaf glands (when viewed by the naked eye), virgate branching habit, and subtle differences in stigma and anther characters (P. B. Heenan & P. J. de Lange unpubl. data). Although long-considered endemic to the Poor Knights (Allan 1961; Eagle 1982; R. Beever 1986b) this form is locally present in several sites at Te Unahi, in dune fields near Te Arai, and on some rock stacks near Tutukaka Harbour. This last occurrence probably results from seed dispersed by birds flying

from the nearby (20 km) Poor Knights Islands. Although it is tempting to assign this taxon some level of taxonomic rank, critical study of the range of leaf sizes and plant growth form spanning the Northland peninsula and elsewhere is needed. Research into this problem is still in progress (Heenan & de Lange 1998). AK 106065–71

†*M. australis* (A.Rich) Allan × *M. aff. divaricata* A.Cunn.

Apparently confined to one location south-west of the summit of Oneho Hill, where nine shrubs up to 4.5 m tall grow within a few metres of each other amongst kanuka. AK 228801–02

## MYRTACEAE

†*Kunzea ericoides* var. *linearis* (Kirk) W.Harris  
kanuka

Common. Generally restricted to the upper slopes of Oneho Hill where it forms an almost pure forest c. 6 m tall. Elsewhere on the island, kanuka usually occurs as an occasional canopy tree, although it is locally common along the western cliffs and on the summit slopes of Tatua Peak. Specimens generally have the long, narrow, slightly pubescent leaves of var. *linearis*, but are not as pubescent as populations of this taxon on the adjacent mainland coast (e.g., AK 5513). AK 102471

†*Leptospermum scoparium* J.R.Forst. et G.Forst.  
manuka

Scarce. Occasional plants grow amongst kanuka near Oneho Hill (particularly near the trig) and along the upper slopes of Tatua Peak. AK 169553

*Metrosideros excelsa* Sol. ex Gaertn. pohutukawa  
Common constituent of canopy forest, otherwise an important pioneer species on rocky ground and in scrub. Specimens ranging from low sprawling shrubs along the cliffs and rocky margins of the island, to tall (30 m) trees in the Puweto Valley. During October 1995, occasional pink- and whitish pink-flowered forms were observed below Castle Crag. CHR 385032

†*M. perforata* (J.R.Forst. et G.Forst.) A.Rich.  
white rata  
Common within kanuka forest and on the pohutukawa trees along the western flank of Oneho Hill. AK 169471

## NYCTAGINACEAE

†*Pisonia brunoniana* Endl. parapara  
Parapara, together with kawakawa (*Macropiper excelsum*) and coastal milktree is one of the most

common understorey shrubs and small trees on the Poor Knights. It forms dense thickets throughout most of the forested parts of the island, and occasionally extends into petrel scrub. The laminae of Poor Knights parapara often have distinctly sinuous-undulate margins, but in cultivation these are soon lost, with new foliage assuming the flat margin normally seen in other offshore island and mainland populations of this species. AK 101723–25

## OLEACEAE

†*Nestegis apetala* (M.Vahl) L.A.S.Johnson  
coastal maire

Common understorey tree in the upper reaches of the Puweto Valley. Otherwise generally a local species, only occasionally seen forming dense nearly pure thickets under pohutukawa, especially along the margins of Crater Bay and near Frasers Landing. AK 236354

†*N. lanceolata* (Hook.f.) L.A.S.Johnson  
white maire  
One sapling noted on the western cliffs below Oneho Hill. SIGHT ONLY

## ONAGRACEAE

†*Oenothera stricta* Link subsp. *stricta*  
evening primrose  
One plant in scrub near campsite, Crater Bay, in 1995. It was destroyed. 1995  
SIGHT ONLY

## OXALIDACEAE

*Oxalis exilis* A.Cunn. oxalis  
Common but inconspicuous herb of forest floor and petrel colonies. Also encountered on inland cliff ledges. AK 169422

†*O. rubens* Haw. oxalis  
Occasional specimens grow amongst scrub, boulder falls, and sedges near petrel colonies. AK 169434

## PEPEROMIACEAE

†*Peperomia urvilleana* A.Rich. wharanui  
Common succulent herb on fallen trees, boulders, and cliff faces throughout island. AK 169516

## PHYTOLACCACEAE

†*Phytolacca octandra* L. inkweed  
Frequent amongst *Carmichaelia williamsii* on forested ridges and a major weed of petrel colonies and other similar areas of disturbed ground. At one

site occurring intermixed with *Rorippa divaricata*, pampas grass, and Mexican devil. **1984 (1980)**  
AK 169518

### PIPERACEAE

*Macropiper excelsum* subsp. *peltatum* R.O.Gardner  
f. *peltatum* kawakawa  
The light green, glossy foliage of the Poor Knights *Macropiper* has led to past confusion with *M. excelsum* f. *psittacorum* (Endl.) A.C.Smith (e.g., Smith 1975; R. Beever 1986b; Sykes 1992). Sykes (1992) proposed subspecies rank for this taxon (*M. excelsum* subsp. *psittacorum* (Endl.) Sykes), but Gardner (1997) confined subsp. *psittacorum* to Lord Howe, Norfolk, and the Kermadec Islands, treating Three Kings, Poor Knights, and Mokohinau populations as a new subspecies, *M. excelsum* subsp. *peltatum*. Poor Knights plants belong to f. *peltatum*. Kawakawa is abundant in most vegetation types but is at its most luxuriant within the tall forest of the Puweto Valley. Occasional specimens with conspicuous adventitious roots and/or layering habit occur within the shaded upper reaches of the Puweto Valley and below Tatua Peak (AK 228809).  
AK 224580

### PITTOSPORACEAE

†*Pittosporum cornifolium* A.Cunn. tawhiri karo  
Common, usually growing in well drained sites, e.g., open rockland, bluffs, and amongst *Xeronema* clumps in open forest. Poor Knights plants are distinct from the usual mainland forms of this species in having much larger leaves which often have a slightly pubescent margin. AK 208661–62

*P. crassifolium* Banks et Sol. ex A.Cunn. karo  
Abundant shrub or small understorey tree of pohutukawa forest throughout Aorangi. Also seen in petrel scrub and amongst flax (*Phormium tenax*) on rock stacks and in some parts of Crater Bay. Flowers seen were paler rose-red than is usually seen in many mainland populations. AK 224842

### PLANTAGINACEAE

†*Plantago australis* Lam. swamp plantain  
Common in damp seepages around island. Particularly conspicuous at outlet of large brackish pond below campsite at Crater Bay in 1995. **1984**  
AK 169449

†*P. lanceolata* L. narrow-leaved plantain  
Local in low scrub near Arid Point and amongst oiioi rushland at Crater Bay. **1995**  
AK 236335

†*P. major* L. broad-leaved plantain  
Common in damp open seepages at Crater Bay. **1985**  
AK 169275

### POLYGONACEAE

*Muehlenbeckia complexa* (A.Cunn.) C.F.W.Meissn.  
tororaro  
Abundant in petrel scrub and amongst flaxland throughout the island. Poor Knights specimens and those on the Three Kings and Mokohinau Islands have larger, shinier leaves than the mainland form. AK 169453

### PRIMULACEAE

†*Anagallis arvensis* L. subsp. *arvensis* var. *arvensis*  
scarlet pimpernel  
Common in coastal turf and along ridge tops in low stunted vegetation. **1995 (1980)**  
AK 236350

*Samolus repens* var. *strictus* Cockayne  
marsh primrose

Abundant herb bordering the brackish rock pools near high-water mark in Crater Bay. Also common amongst saltwort on rock stacks and cliff faces subject to regular salt spray and wave wash. Poor Knights, Kermadecs, and Norfolk Island plants were separated from *S. repens* by Cockayne (1915a) as var. *strictus* (de Lange 1999). Although discussed by Allan (1961) he did not accept the variety, but Sykes (1977) later reinstated it. Aside from the localities mentioned by Cockayne (1915a) and Sykes (1977), var. *strictus* is also found on the Three Kings Islands, at North Cape, on the Karikari Peninsula, and at Tatapihi (Groper) Island (Mokohinau Islands) (de Lange et al. 1995b). The exact southern limit of this variety is uncertain at present. AK 107076

### RANUNCULACEAE

†*Clematis paniculata* J.F.Gmel.  
puawhanga/clematis  
Common throughout island in most vegetation types. AK 169460

### RUBIACEAE

†*Coprosma macrocarpa* Cheeseman  
Three Kings karamu  
A single shrub, collected in 1995 from near Tatua Peak has the same calyx characters and fruit dimensions of *C. macrocarpa* sens. str. (M. J. Heads pers. comm.), which is otherwise known only from the Three Kings Islands. AK 226819



†*C. aff. macrocarpa* Cheeseman coastal karamu  
Abundant in all vegetation types, especially in tall forest within the Puweto Valley. AK 169458

*C. repens* A.Rich. taupata  
One of the most common shrub species along the coastline of Aorangi and the adjoining islets. As noted by Eagle (1982), the majority of Poor Knights taupata exhibit a much smaller leaf dimension than is considered typical of the species. However, in cultivation this difference is gradually lost over time, and careful scrutiny in the wild revealed that most small-leaved forms were confined to exposed sites or active petrel colonies, where the harsh conditions may be a major influencing factor. As on Tatapihi Island, the northernmost of the Mokohinau Islands (de Lange et al. 1995b), some female specimens of Poor Knights plants were heterophyllous (e.g., AK 222793). Furthermore, some extremely small-leaved specimens sampled from Archway Island were unusual in that they exhibited apparently monoecious flowering behaviour, with individual plants bearing both male and female flowers (AK 226828). Similar observations have been made in *C. repens* populations from Kapowairua, Spirits Bay, the Surville Cliffs, and at the Mokau River (P. J. de Lange unpubl. data). Further study into the sexual expression of this species is needed, and of other observed instances of apparent monoecy in New Zealand *Coprosma* (e.g., Moore & Mason 1974; Heads 1996), particularly with regard to pollen fertility and stigma receptivity. AK 37334

*C. robusta* Raoul karamu  
Local. Scattered plants occur in low scrub near the summit of Oneho Hill. AK 169489

†*C. aff. macrocarpa* × *C. repens* A.Rich.  
One specimen growing with putative parents at base of cliffs on the eastern side of Tatu Peak. AK 236355

## RUTACEAE

†*Melicope ternata* J.R.Forst. et G.Forst. wharangi  
Common through forested parts of Aorangi. During August 1996 we observed bellbirds visiting the flowers of this species. AK 104479

## SAPINDACEAE

†*Alectryon excelsus* Gaertn. subsp. *excelsus* titoki  
Common in the Puweto Valley, on the saddle connecting Oneho Hill and Tatu Peak and along the slopes running north and south of Oneho Hill. The relationship of these island plants to the Three Kings Islands endemic *A. excelsus* subsp. *grandis*

(Cheeseman) de Lange et E.K.Cameron is discussed by de Lange et al. (1999). AK 105255–57

†*Dodonaea viscosa* Jacq. akeake  
An infrequent component of scrub and low forest along cliff faces leading from Puweto Valley to Tatu Peak, around Oneho Hill, and along the western cliffs. Occasional specimens up to 10 m tall were encountered. AK 228834

## SAPOTACEAE

*Pouteria costata* (Endl.) Baehni tawapou  
Major canopy tree of the forested parts of Aorangi. This species is especially common within the Puweto Valley, particularly along the forested margin of Crater Bay. AK 106018

## SCROPHULARIACEAE

*Hebe bollonsii* (Cockayne) Cockayne et Allan  
Common along the forested margins and petrel scrub of Crater Bay, otherwise locally common on rocky ridges leading up to Tatu Peak and below Oneho Hill. Poor Knights plants typically form a shrub 1.5–2 m tall with uniformly pale lilac flowers which fade to white after anthesis. Although long considered an endemic to the Poor Knights and Hen and Chickens Islands (Cheeseman 1925; Allan 1961), specimens attributable to *H. bollonsii* occur locally within parts of the Tutukaka Harbour (AK 157350) and on rock stacks near Matapouri Bay, on the mainland. In the past *H. bollonsii* was also thought to occur on the Mokohinau Islands (Wright 1980; Heads 1993), but the Mokohinau *Hebe* is now considered to be a related, undescribed taxon, apparently endemic to the Mokohinau Islands (Eagle 1982; Cameron & Wright 1990; de Lange et al. 1995a). AK 169481

†*H. stricta* (Benth.) L.B.Moore agg. koromiko  
Scarce. Scattered specimens occur within low scrub north of Oneho Hill. Although attributed to *H. stricta* by past collectors, specimens are remarkably pubescent and on vegetative characters are equally well placed within *H. pubescens* sens. lat. However, the flowers of cultivated plants had the distinctive rounded corolla lobes of the *H. stricta* agg. Similar forms occur at Maunganui Bluff and on the Karikari Peninsula (P. J. de Lange unpubl. data). AK 169481

*Veronica plebeia* R.Br.

Scarce. Occasional plants noted growing in dry rhyolitic breccia cracks under petrel scrub along the western cliffs above Puweto Valley. Although treated as naturalised, Webb et al. (1988) implied that

*V. plebeia* may be indigenous, and it was treated as such by de Lange & Crowcroft (1996). We follow their treatment here. AK 236249

### SOLANACEAE

*Solanum americanum* subsp. *nutans* (R.J.F.Hend.) R.J.F.Hend. nightshade

A widespread herb of slips, petrel colonies, and other disturbed ground. Often intermingled with black nightshade (*S. nigrum*) on account of which it is easily overlooked. First recorded by Cockayne (1905) as *S. nigrum*. AK 169563

*S. aviculare* G.Forst. poroporo  
Occasional to locally common component of forest understorey and petrel scrub. This species is most commonly found in the vicinity of Buller's shearwater burrows. White- (AK 169450) and blue-flowered (AK 208649) races are present on the island. Of the two types, the white-flowered race is more common. AK 208649

†*S. laciniatum* Aiton poroporo  
Scarce. One white-flowered specimen (flowers 33 mm diameter) present in October 1988 southwest of Oneho Hill, in wind-thrown area. Saplings and another white-flowered specimen grew in 1995 within open pohutukawa forest east of Oneho Hill, and further saplings were observed on the western slopes of Tatua Peak in October 1997.

SIGHT ONLY

†\**S. nigrum* L. black nightshade  
Occasional weed of disturbed ground, especially near petrel burrows where it often occurs intermixed with *S. americanum*. 1995  
AK 236336

### THYMELAEACEAE

*Pimelea* sp.

Specimens with a procumbent habit and young branchlets thickly invested in long, silky, white hairs, bright green to grey-green leaves, and white fruit are common in all exposed rockland, cliff faces, and short turf communities on Aorangi. This taxon, the most widespread of an ill-resolved complex of procumbent, semi-procumbent, and upright forms of generally northern *Pimelea*, has often been referred to either *P. prostrata* (J.R.Forst. et G.Forst.) Willd. or *P. urvilleana* A.Rich. (see Allan 1961). However, until the types of these species are critically examined, it seems inadvisable to assign Poor Knights plants to either species (C. J. Burrows pers. comm). AK 101711–13

### TILIACEAE

*Entelea arborescens* R.Br. whau  
Generally confined to disturbed sites, e.g., the margins of petrel scrub, sites of recent canopy collapse, and within petrel colonies. Specimens are often partially covered in tangles of *Sicyos australis*. AK 102669

### URTICACEAE

*Parietaria debilis* G.Forst.  
Abundant herb of dark overhangs within forest, and amongst petrel burrows. AK 169591

### VERBENACEAE

†*Vitex lucens* Kirk puriri  
Locally common on Aorangi, especially in the lower Puweto Valley. Scattered specimens occur elsewhere especially on the forested saddle between Tatua Peak and Oneho Hill, leading toward Frasers Landing. AK 108229

### VIOLACEAE

*Melicytus novae-zelandiae* (A.Cunn.) P.S.Green subsp. *novae-zelandiae* coastal mahoe  
Common and, next to taupata, the major constituent of petrel scrub on the island. It extends to the tops of summit bluffs and is occasionally present in tall forest, especially in the vicinity of tree falls. AK 100117

*M. ramiflorus* J.R.Forst. et G.Forst. subsp. *ramiflorus* mahoe  
Abundant understorey tree throughout the main forested parts of Aorangi. AK 100269

†*M. novae-zelandiae* (A.Cunn.) P.S.Green × *M. ramiflorus* J.R.Forst. et G.Forst.  
Scarce. Occasional specimens of this putative hybrid were observed at the fringes of petrel scrub near Frasers Landing. Although the flowering times of the two parents do not generally overlap, during our August 1996 trip we noticed *M. novae-zelandiae* in full flower beside occasional flowering *M. ramiflorus*. SIGHT ONLY

### MONOCOTYLEDONAE

#### ANTHERIDIACEAE

*Arthropodium cirratum* (G.Forst.) R.Br. rengarenga lily  
A conspicuous component of all exposed cliff faces where it usually grows mixed with coastal tussock grass (*Chionochloa bromoides*) and *Xeronema*. Also common amongst coastal cutty grass (*Cyperus*

*ustulatus*) and oioi swards and above the high tide mark, in suitably open sites around the island. Poor Knights plants, together with those from the Three Kings, are popular with horticulturists as they have an unusually robust habit and larger than usual showy flowers. Accordingly, it is this form, known as cv. White Knight, which has become popular in cultivation in recent years. AK 236332

### ASTELIACEAE

†*Astelia banksii* A.Cunn. coastal astelia  
Abundant on exposed cliffs, in low scrub, and as a low epiphyte on pohutukawa. AK 228804

†*A. trinervia* Kirk kauri grass  
Locally common on the upper slopes of Oneho Hill where several small colonies grow in kanuka forest. AK 169413

†*Collospermum hastatum* (Colenso) Skottsb. kowharawhara  
Locally common within the forks of trees in the upper Puweto Valley. Frequently encountered mixed with *Astelia banksii* on the windswept summit of Tatu Peak and occasional in the low scrub north of Oneho Hill. AK 236356

### CYPERACEAE

†*Baumea juncea* (R.Br.) Pall.  
Confined to the margins of brackish ponds at Crater Bay. AK 109788–89

*Carex flagellifera* Colenso trip-me-up  
Probably the most common of the five carices recorded from Aorangi. Usually associated with tree falls and slips within forested areas but also encountered within the transitional vegetation bordering petrel scrub and forest proper. This species is most likely to have been the basis for the record of *C. dissita* made by Cockayne (1905). AK 109841

†*C. inversa* R.Br.  
Several small patches noted in low forest and scrub near the Puweto Stream. AK 236339

†*C. spinirostris* Colenso  
Common throughout the island in mature forest, similar shaded sites, and within the vicinity of petrel colonies. AK 169595

†*C. testacea* Boott trip-me-up  
Local. Associated with *C. flagellifera*. AK 234401

†*C. virgata* Boott kuawa  
Occasional plants noted within the Puweto Stream bed. SIGHT ONLY

†*C. aff. testacea*

A distinctive, as yet unnamed species common throughout the western and some eastern parts of the North Island. This sedge differs from *C. testacea* in possessing wider, double-folded leaves and slightly scabrid utricles, and from *C. raoulii* Boott in having male spikes without terminal female flowers (Ogle 1990). Discovered at one site in the mid Puweto Valley, growing with *C. testacea* and *C. flagellifera*. AK 236345

*Cyperus ustulatus* A.Rich. coastal cutty grass  
Common within petrel scrub and as an ephemeral in the vicinity of tree falls and slips. Also associated with the burrows of Buller's shearwaters. Poor Knights specimens have a much larger habit and more robust, thicker spikes, with fawn-coloured glumes compared with most mainland forms. These features are maintained in cultivation. Similar plants have been collected from the Kermadec Islands (Sykes 1977; W. R. Sykes pers. comm.), Three Kings Islands, and Mokohinau Islands. AK 109355

*Isolepis cernua* (Vahl) Roem. et Schult.  
Abundant within seepages and cracked rhyolite breccia above The Landing, Crater Bay, and Frasers Landing. Widespread in similar exposed sites throughout the island. AK 169444

†*I. inundata* R.Br.  
During October 1995 this species was locally common in the semi-dried Puweto Stream course. In August 1996 no specimens were encountered here or elsewhere on the island. AK 169288

*I. nodosa* (Rottb.) R.Br.  
Abundant in low scrub, amongst oioi, and in flaxland throughout the island. This species is locally common along the cliff-tops above the western Puweto Valley. AK 109446

*I. prolifer* (Rottb.) R.Br.  
Recorded by Cockayne (1905). As there is suitable habitat for this species on Aorangi and it is unlikely to have been wrongly identified, we accept the record. HISTORIC RECORD

†*I. reticularis* Colenso  
One patch observed in a damp seepage in dense forest above the South Landing, October 1995. AK 236368

### JUNCACEAE

†*Juncus gregiflorus* common rush  
One plant appeared and has persisted at Crater Bay following the 1996 storm. AK 236371

*J. krausii* var. *australiensis* (Buchenau) Snogerup  
sea rush  
Local. Mainly confined to damp seepages and cracks  
within the rhyolite rock of Crater Bay and Frasers  
Landing. AK 169500

*J. planifolius* R.Br.  
Local. An occasional component of turf bordering  
the brackish ponds at Crater Bay. Also found within  
damp seepages at the head of the Puweto Valley.  
AK 169423

†*J. sarophorus* L.A.S.Johnson  
Scarce. Four clumps noted near the eastern margin  
of Crater Bay in October 1995; by August 1996 these  
appeared to have been eliminated, probably through  
storm damage. AK 169289

*Luzula* sp.  
Recorded by Cockayne (1905). Searches of AK,  
CHR, and WELT herbaria for *Luzula* from the Poor  
Knights have been unsuccessful.

## HISTORIC RECORD

## LEMNACEAE

†*Lemna minor* L. duckweed  
Scarce. Observed once in 1995 in the largest  
freshwater pond at Crater Bay. This habitat was  
seriously damaged following the 1996 midwinter  
storm (de Lange & Cameron 1997) and the species  
has not been seen on the island since.

SIGHT ONLY

## LOMANDRACEAE

*Cordyline australis* (G.Forst.) Endl.  
ti kouka/cabbage tree  
One unhealthy adult and scattered juveniles noted in  
rocky saddle on Tatua Peak. Distinguished from *C.*  
*kaspar* which is more common on Aorangi by the  
much narrower (3–3.4 cm wide) lanceolate, dark  
green, strictly erect leaves. Following fieldwork in  
1984, R. Beever (1986a) recorded *C. kaspar* as the  
main cabbage tree on the Poor Knights Islands and  
*C. australis* present on Tawhiti Rahi but not on  
Aorangi. He suggested that it was a recent intro-  
duction to the Poor Knights. AK 236358

†*C. kaspar* W.R.B.Oliv. Three Kings cabbage tree  
Abundant throughout the island. Distinguished from  
*C. australis* by the basal suckering habit, smaller  
stature, and much broader leaves (c. 5–7 cm wide),  
usually with a conspicuous glaucous foliar bloom.  
Wright (1983) and R. Beever (1986a) were the first  
to record that the cabbage trees on the Poor Knights  
were mainly *C. kaspar*. AK 171025–27

†*C. pumilio* Hook.f. ti rauriki  
A single plant located in dense scrub on the main  
ridge separating Tatua Peak from Oneho Hill.  
AK 238346

†*C. australis* (G.Forst.) Endl. × *C. kaspar* W.R.B.Oliv.  
Occasional specimens with yellow-green, narrower  
(3–4.8 cm wide) leaves, and a non-suckering habit  
are probably hybrids between this species and *C.*  
*australis*. SIGHT ONLY

## ORCHIDACEAE

†*Acianthus sinclairii* Hook.f. heart-leaved orchid  
Occasional throughout the forested parts of Aorangi.  
Locally common in thick leaf litter along the  
southern side and summit area of Oneho Hill.  
AK 228726

†*Caladenia chlorostyla* D.L.Jones, Molloy et  
M.A.Clem.  
Scarce. Occasional flowering plants were encoun-  
tered along the ridge leading to Oneho Hill from  
Tatua Peak. AK 230354

†*Cyrtostylis oblonga* Hook.f.  
Local. Two to three plants were first observed in  
1988 growing amongst kanuka leaf litter and the  
moss *Ptychomnion aciculare* Hedw. in scrub near the  
summit of Oneho Hill. A larger flowering population  
was located in the same area in August 1996,  
suggesting that this orchid is a relatively recent  
arrival on the island. Despite searching, no additional  
locations were discovered. The separation of  
*Cyrtostylis* from *Acianthus* is strongly supported on  
DNA evidence (B. P. J. Molloy pers. comm.).  
AK 228725

†*Drymoanthus adversus* (Hook.f) Dockrill  
Scarce. Occasional specimens seen on the trunks of  
pohutukawa near Oneho Hill. SIGHT ONLY

†*Earina autumnalis* (G.Forst.) Hook.f.  
raupeka/Easter orchid  
Scarce. Occasional specimens encountered as low  
epiphytes in pohutukawa/kanuka forest on the  
summit of Oneho Hill and along the southern flanks  
of this high point. AK 169539

†*E. mucronata* Lindl.  
Locally common as a low epiphyte, especially within  
the summit area of Oneho Hill. AK 169544

†*Microtis unifolia* (G.Forst.) Rchb.f.  
onion-leaved orchid  
Abundant in all suitably open habitats.  
SIGHT ONLY

†*Pterostylis alobula* (Hatch) L.B.Moore  
Locally common in thick leaf litter under dense  
kanuka forest within the Puweto Valley, Tatuā/  
Oneho Hill saddle, Oneho Hill, and on the southern  
slopes of Oneho Hill. AK 169410

†*Thelymitra longifolia* J.R.Forst. et G.Forst.  
makuku/sun orchid  
The autogamous form of this widespread species  
(see de Lange 1997) appears to be the only form  
present on Aorangi. It is locally common in low  
scrub at Arid Point and in open sites on the tops of  
Tatuā Peak. AK 169528

†*T. pauciflora* R.Br. sun orchid  
Local. Occasional plants with reddish leaves and  
small apparently cleistogamous blue flowers occur  
in low scrub at Arid Point and in low coastal turf at  
Crater Bay. SIGHT ONLY

†*Winika cunninghamii* (Lindl.) M.A.Clem.,  
D.L.Jones et Molloy pekapeka/Christmas orchid  
One small plant noted growing on the trunk of a  
towai tree on the southern margin of Oneho Hill.  
SIGHT ONLY

## PHORMIACEAE

†*Dianella nigra* Colenso te turutu/blueberry  
Local. Mainly found in low scrub near Arid Point  
and in similar habitat near Oneho Hill.  
AK 236366

*Phormium* aff. *tenax* harakeke/flax  
Abundant. As noted by de Lange et al. (1995b), flax  
from the Three Kings, Poor Knights, and Mokohinau  
Islands differ from the adjacent mainland form of  
flax in having a conspicuous golden yellow leaf  
margin. Other differences include the generally  
smaller overall stature of the plant, tendency for the  
upper third of the leaf to twist and droop, the butter  
yellow colour of the inflorescence bracts, salmon-  
pink faintly yellow-tinged flowers, and the greenish  
brown conspicuously inflated pods (P. J. de Lange  
unpubl. data). Aside from the yellow colour of the  
leaf margins and bracts, these features are seen also  
in the Chatham Islands form of *P. tenax* J.R.Forst.  
et G.Forst., which is considered to be a distinct  
undescribed species (B. P. J. Molloy pers. comm.).  
AK 228112, 228185

†*Xeronema callistemon* f. *bracteosa* (L.B.Moore) de  
Lange et E.K.Cameron  
Scarce. A very occasional morph growing with *X.*  
*callistemon* f. *callistemon* (see notes under  
taxonomy). AK 234399

†*X. callistemon* W.R.B.Oliv. f. *callistemon*  
raupo taranga/Poor Knights lily  
Abundant. This near endemic of the Poor Knights  
is a conspicuous component of all exposed cliff and  
rock outcrops on Aorangi. Specimens epiphytic in  
the forks of pohutukawa are also common, having  
arisen through the "capture" by trees of dislodged  
masses from the cliffs above. The trails of  
devastation and masses of semi-rotted plants littering  
the bases of cliffs readily testify to the regular  
collapse of *Xeronema* colonies. On occasion these  
fall directly into the sea, where they may float for  
considerable lengths of time. During the 1995 visit,  
a large mass of *Xeronema* was observed floating near  
Archway Island and another, later, c. 12 km south-  
west of Aorangi. Other such floating masses have  
been reported washed ashore on Lady Alice Island  
(Hen and Chickens) (Cranwell & Moore 1935), and  
it is possibly by this means that *Xeronema* originally  
reached Hen Island. That *Xeronema* can survive  
saltwater immersion was demonstrated when a  
floating piece obtained from the waters surrounding  
the Poor Knights was grown on to flowering by A.  
D. Lorimer of Hamilton in 1977 (P. J. de Lange  
unpubl. data.). It is, however, not known how long  
plants can tolerate saltwater immersion before their  
ability to regenerate is lost. WELT 40683

## POACEAE

†\**Aira caryophyllea* L. subsp. *caryophyllea*  
shivery hair grass  
Abundant on all suitably open sites from just above  
high tide mark to the summit slopes of Tatuā Peak.  
1985 (1970)  
AK 171627

†\**A. praecox* L.  
Frequent within shallow earth on boulder falls and  
on the summit of Tatuā Peak. 1995  
AK 236415

†\**Bromus arenarius* Labill. sand brome  
Local component of oiwi swards and petrel scrub at  
Crater Bay. 1933 (1980)  
AK 235499

†\**B. diandrus* Roth ripgut brome  
Common amongst Buller's shearwater burrows  
toward The Landing. 1995  
AK 236337

†\**B. hordeaceus* L. soft brome  
Local. Occasional plants noted amongst *Solanum*  
*americanum* at Crater Bay. 1998  
AK 236341

- †\**B. lithobius* Trin. Chilean brome  
Locally distributed amongst rotting pampas grass tussocks near campsite. This is a new northern geographical limit for this species in New Zealand (cf. Forde & Edgar 1995).  
1995  
AK 230415
- †\**B. willdenowii* Kunth prairie grass  
Common grass of petrel colonies and open ground around Crater Bay.  
1984  
AK 169531
- †*Chionochloa bromoides* (Hook.f.) Zotov coastal tussock grass  
Abundant on exposed cliff faces, less frequently on open rocky ground. Often associated with *Xeronema* colonies.  
AK 110036
- †\**Cortaderia selloana* (Schult. et Schult. f.) Asch. et Graebner pampas grass  
First recorded from Crater Bay, by Wright & Cameron (1990) as *Cortaderia jubata* (Lemoine) Stapf., pampas grass has been the target of a lengthy eradication programme. Pampas grass was still widely distributed across Crater Bay, Puweto Valley, and the western cliff faces near Oneho Hill in October 1995. In 1996 no further specimens of pampas grass were observed, but by the following year two seedlings were discovered at the storm-damaged site at Crater Bay (de Lange & Cameron 1997). These plants may have established from fresh seed blown across from the mainland.  
1984  
AK 169419
- C. splendens* Connor coastal toetoe  
Widespread in all open vegetation types, especially amongst petrel scrub, associated flaxland, and on bare rock at Crater Bay. Poor Knights Islands specimens of *Cortaderia* belong to the smaller race of *C. splendens*, whose status was briefly discussed by Connor (1972).  
AK 236349
- †*Deyeuxia quadriseta* (Labill.) Benth.  
One patch observed amongst oioi below the main pool at the forest/rock land interface of Crater Bay.  
AK 236365
- Dichelachne crinita* (L.f.) Hook.f. New Zealand plume grass  
In October 1995 and 1997 this annual species was commonly observed in flower throughout the largely bare rock of Crater Bay. Numerous specimens also occurred on slip faces on and below the cliffs fringing the Puweto Valley.  
AK 169555
- †\**Digitaria ciliaris* (Ritz.) Koeler Locally common in 1995 amongst disturbed ground leading to the forest edge at Crater Bay.  
1937  
CHR 396388
- †*Echinopogon ovatus* (G.Forst.) P.Beauv. hedgehog grass  
Local component of the ground cover within the canopy gaps of the lower Puweto Valley.  
Also present amongst grey-faced petrel colonies along the eastern Puweto Valley cliffs.  
AK 228792
- †*Elymus multiflorus* (Hook.f.) A.Löve et Connor coastal wheat grass  
Seasonally common in petrel scrub and on patches of bare earth near petrel burrows. Poor Knights specimens correspond to the long-awned variant discussed by Connor (1994).  
AK 110597
- †\**Hordeum murinum* L. subsp. *murinum*  
Collected once in 1988 from rock crevices adjacent to an old camping site behind The Landing.  
1988  
AK 182890
- Lachnagrostis billardierei* (R.Br.) Trin. wind grass  
Abundant in October 1995 within low petrel scrub, coastal turf and around the margins of the brackish pools at Crater Bay.  
AK 110217–18
- †*L. filiformis* Trin. New Zealand wind grass  
Less common than the former species, with small populations noted amongst oioi swards at Crater Bay and in canopy gaps within the Puweto Valley.  
AK 165213
- †*L. littoralis* (Hack.) Edgar subsp. *littoralis* coastal wind grass  
Abundant. Coastal wind grass occurs in a variety of littoral habitats from the rock crevices just above the splash zone through to the margins of brackish ponds at Crater Bay. In this habitat *L. littoralis* is frequently sympatric with both *L. billardierei* and *L. filiformis*.  
AK 110223
- †\**Lolium perenne* L. ryegrass  
Occasional plants observed in 1995 sprouting from within a black-backed gull (*Larus dominicanus*) nest near the South Landing. In 1998 *L. perenne* became a locally common component of damp peaty seepages amongst oioi rushland at Crater Bay.  
1995  
AK 236338
- †*Microlaena polynoda* (Hook.f.) Hook.f.  
This grass is one of the most widespread forest grasses on the island, often forming dense bamboo-like tangles in Puweto Valley. Not seen so abun-

dantly on any other northern offshore island by us.  
AK 109889

†*M. stipoides* (Labill.) R.Br.

Locally common in petrel scrub, canopy forest gaps,  
and amongst low scrub near Arid Point.

AK 236344

*Oplismenus hirtellus* (L.) P.Beauv. bush rice grass  
Common forest grass. Usually forming dense carpets  
around recent tree falls and within Buller's  
shearwater colonies. Some Poor Knights specimens  
correspond to subsp. *hirtellus* but the majority of  
collections in AK are of an intermediate nature, and  
fit neither subsp. *hirtellus* nor subsp. *imbecillis* using  
the characters provided by Sykes & West (1996).

AK 109918

†\**Parapholis incurva* (L.) C.E.Hubb. sickle grass  
Seasonally common grass of all open ground subject  
to periodic wave wash or spray.

1995

SIGHT ONLY

†\**Paspalum dilatatum* Poir. paspalum  
Local. Several small patches in low scrub bordering  
track to campsite at Crater Bay, and within seepages  
near Frasers Landing.

1995 (1991)

AK 236340

†*P. orbiculare* G.Forst. scrobic  
Scarce. Observed once in 1996 within petrel scrub  
above Frasers Landing.

AK 143414–15

*Poa anceps* G.Forst. subsp. *anceps*  
Common in forest, forming dense swards on cliff  
faces and rock outcrops fringing the Puweto Valley,  
and is locally common on Tatua Peak and within low  
scrub at Arid Point.

AK 110479

†\**P. annua* L. annual poa  
Uncommon. Occasional amongst low turf near Tatua  
Peak and on coastal bush margin.

1985

AK 169296

†*P. pusilla* Berggr.  
Local. Occasional in low scrub at Arid Point and on  
the summit of Castle Hill.

SIGHT ONLY

†*Rytidosperma biannulare* (Zotov) Connor et Edgar  
bristle grass

Occasional grass of open sites and low scrub,  
especially near Arid Point.

SIGHT ONLY

†*R. gracile* (Hook.f.) Connor et Edgar  
bristle grass

Occasional to locally common in open sites through-  
out Aorangi.

SIGHT ONLY

†*R. unarede* (Raoul) Connor et Edgar bristle grass  
Occasional on eroding clay banks and amongst petrel  
colonies at the head of Puweto Valley.

AK 110134

†\**Sporobolus africanus* (Poir.) A.Robyns et Tourn.  
ratstail grass

Abundant in all suitably open or disturbed habitats  
throughout the island.

1984 (1970)

AK 169503

†*Stipa stipoides* (Hook.f.) Veldkamp  
coastal immorality grass

Common tussock of rock outcrops just above the  
splash zone and on cliff faces frequently subjected  
to salt spray. One inland occurrence on the bluffs of  
Tatua Peak.

AK 109979

†*Trisetum arduanum* Edgar  
One patch observed on cliff face near South Landing.

SIGHT ONLY

†\**Vulpia bromoides* (L.) Gray  
Common throughout island in areas of open ground,  
low turf, and scrub.

1988

AK 182894

†\**V. myuros* (L.) C.C.Gmel. var. *myuros*  
Collected once by Moore and Cranwell in 1933.

1933

AK 219680

## RESTIONACEAE

*Apodasmia similis* (Edgar) B.G.Briggs et  
L.A.S.Johnson oioi  
Abundant around brackish ponds at Crater Bay, in  
seepages at Frasers Landing, and on rock stacks,  
within petrel scrub, and on cliff faces and boulder  
falls throughout the island.

AK 109360

## RIPOGONACEAE

†*Ripogonum scandens* J.R.Forst. et G.Forst.  
kareao/suplejack  
One vine noted in dark gulch under dense pohutu-  
kawa forest above South Landing, and a single  
seedling observed in the mid Puweto Valley.

AK 236367

## TYPHACEAE

†*Typha orientalis* C.Presl raupo  
Known from a single site at Crater Bay. Here a small  
population (possibly one plant) grows amongst a  
dense sward of oioi at the margin of the large  
brackish pond.

AK 169447

**ADDITIONAL POOR KNIGHTS RECORDS**

The only additional records are 20 species recorded from the other main island within the Poor Knights Islands, Tawhiti Rahi. One of these records, *Euphorbia glauca*, was collected from an unspecified location within the “Poor Knights Islands” (A. T. Pycroft, Jan 1932, AK 102967). Based on other Pycroft plant collections in AK from the Poor Knights we have assumed that it was collected from Tawhiti Rahi. *Euphorbia glauca* is a nationally rare species (Cameron et al. 1995) and it has not been reported from the Poor Knights Islands since 1932.

**PTERIDOPHYTA****FILICOPSIDA****GRAMMITIDACEAE**

- †*Anarthropteris lanceolata* Copel.  
A. E. Wright, AK 155324

**SPERMATOPHYTA****DICOTYLEDONAE****APIACEAE**

- †\**Daucus carota* L. (1996)  
C. J. West, AK 229732

**ASTERACEAE**

- †*Brachyglottis kirkii* (Kirk) C. Webb var. *kirkii*  
L. Cranwell, AK 35330, 128097  
†\*?*Carduus tenuiflorus* Curtis (1980)  
A. E. Wright, AK 154685  
†*Euchiton sphaericus* (Willd.) Holub  
A. E. Wright, AK 166392  
†*Senecio glomeratus* Poir.  
B. S. Parris, AK 128157

**BRASSICACEAE**

- †\**Cardamine hirsuta* L. (1980)  
A. E. Wright, AK 154697

**EUPHORBIACEAE**

- Euphorbia glauca* G. Forst.  
A. T. Pycroft, AK 102967

**FABACEAE**

- †\**Ulex europaeus* L. (1984)  
A. E. Wright, AK 166387

**OROBANCHACEAE**

- †\**Orobanche minor* Sm. (1970)  
J. P. Croxall, AK 128187

**PITTOSPORACEAE**

- †*Pittosporum umbellatum* Banks et Sol. ex Gaertn.  
A. E. Wright, AK 201708–09

**MONOCOTYLEDONAE****AREACEAE**

- †*Rhopalostylis sapida* H. Wendl. et Drude  
C. J. West pers. comm.

**ASTELIACEAE**

- †*Astelia solandri* A. Cunn.  
A. E. Wright, AK 201697

**CYPERACEAE**

- †*Carex breviculmis* R. Br.  
A. E. Wright, AK 201728

**JUNCACEAE**

- †*Juncus pauciflorus* R. Br.  
A. E. Wright, AK 201629

**ORCHIDACEAE**

- †*Corybas trilobus* (Hook. f.) Rchb. f.  
C. J. West pers. comm.  
†*Pterostylis banksii* A. Cunn. in Hook. f.  
B. S. Parris, AK 128081

**POACEAE**

- †\**Anthoxanthum odoratum* L. (1991)  
E. K. Cameron, AK 203295  
†\**Dactylis glomerata* L. (1970)  
B. S. Parris, AK 128069  
†\**Lagurus ovatus* L. (1997)  
B. S. Parris, AK 232721

**EXCLUDED RECORDS****PTERIDOPHYTA****BLECHNACEAE**

*Blechnum chambersii* Tindale  
Recorded by Jackson (1982). No other records of this species have been made from the Poor Knights Islands. Although this species could be present, it seems more likely that Jackson confused *B. chambersii* with *B. norfolkianum*, which is abundant on the main islands, but absent from his list.

**PTERIDACEAE**

*Anogramma leptophylla* C. Presl Jersey fern  
Recorded by Brownsey & Smith-Dodsworth (1989).



The record is not substantiated by a herbarium specimen and so is best excluded (P. J. Brownsey pers. comm.).

## SPERMATOPHYTA

### DICOTYLEDONAE

#### ARALIACEAE

*Meryta sinclairii* (Hook.f.) Seem.

Although Cheeseman (1925) recorded that Maori knew of this distinctive, large-leaved species growing on the Poor Knights Islands, he noted that Cockayne (1905) did not record this species from there nor were there supporting herbarium specimens known. In more recent accounts dealing with the biogeography of these islands, or of *Meryta*, the Poor Knights have been excluded from known occurrences (Atkinson 1956; Moore 1957; Allan 1961). Despite this, and admittedly with some doubt, Jackson (1982) reported the species. In our fieldwork specific searches for this species on the islands failed. Cockayne (1905) suggests that earlier records could be the result of confusion with *Cordyline* trees. We think this explanation unlikely but note that *Pisonia brunoniana*, with its large-leaves and erect habit, when viewed from a distance has a superficial similarity to *Meryta*, and could be the basis for past records.

#### ASTERACEAE

*Senecio kermadecensis* Belcher

Drury (1975) discussed the possibility that this Kermadec Island endemic (Sykes 1977) may occur on the Poor Knights. As noted by Sykes (1977) and Webb et al. (1988), the specimen discussed by Drury is best assigned to *S. minimus*.

#### MYRTACEAE

*Kunzea sinclairii* (Kirk) W.Harris

Reported from the Poor Knights Islands by Hynes (1950). However, we have seen no specimens of *K. sinclairii* sens. str. from the Poor Knights. Presumably the record of this Great Barrier Island endemic from these islands is based on stunted forms of *K. ericoides* var. *linearis* from the Poor Knights.

#### RANUNCULACEAE

*Clematis cunninghamii* Turcz.

Reported by Cockayne (1905) as *C. parviflora* A.Cunn. In the absence of herbarium specimens we believe the record was based on a misidentification of *C. paniculata*. This species is common on the Poor Knights Islands and yet was not reported by

Cockayne. Specimens of *C. paniculata* from the Poor Knights are rather variable with respect to foliage size and shape, and could be confused with sterile specimens of *C. cunninghamii*.

### MONOCOTYLEDONAE

#### POACEAE

\**Paspalum vaginatum* Sw. saltwater paspalum  
Recorded from a salt meadow on Aorangi by Cockayne (1905) as *P. distichum* L. However, until recently the name of the maritime *P. vaginatum* has been confused with the freshwater-favouring *P. distichum* (see Edgar & Shand 1987). Thus, most early New Zealand maritime records of *P. distichum* involve *P. vaginatum*. Cockayne's record is unsupported by a voucher, and there have been no further records for this species on the Poor Knights. This is surprising, considering the tenacious habit of the species and the number of suitable habitats available at Crater Bay and Frasers Landing. We think it rather unlikely that this species would have died out. Therefore, the record is excluded from the checklist.

### ACKNOWLEDGMENTS

The authors are grateful to the Department of Conservation staff, especially Regional Conservator Gerry Rowan, and Ngati Wai, for permission to land, camp, and collect plant specimens from the Poor Knights Islands Nature Reserve. In particular we thank Gillian Crowcroft, Lisa Forester, Peter Heenan, Noel Henry, Ian McFadden, and Wayne Parr for field assistance. Neville and Roger Stevenson of Skyworks Ltd assisted with helicopter transport to the islands. We thank Patrick Brownsey, Colin Burrows, Rhys Gardner, Peter Heenan, Brian Molloy, Barbara Parris, Peter Smith, and Bill Sykes for comments on their specialist plant groups. Fred Brook, Ian Atkinson, Keith Hawkins, Brian Murray, Richard Parrish, Ray Pierce, Caren Shrubshall, Sandra van der Mast, David Towns, and Carol West provided helpful comments on new records, fauna, plant propagation, weed control, island management, and draft versions of this paper. We also acknowledge the past collecting efforts of Lucy Cranwell, Barbara Parris, and Anthony Wright. We thank Stephen McCraith and Doug Rogan (AK), Fiona Pitt (WELT), and Kerry Ford (CHR) for herbarium assistance. Chris Edkins provided Fig. 1, Gillian Crowcroft provided Fig. 3 & 4, and Doug Rogan assisted with the manuscript preparation. This paper has benefited from constructive comments provided by John Braggins, Lisa Forester, Dan Hatch, Keith Hawkins, Rhys Gardner, Michael Heads, Peter Heenan, David Norton, and Bill Sykes.

## REFERENCES

- Allan, H. H. 1961: Flora of New Zealand. Vol. 1. Wellington, Government Printer.
- Atkinson, I. A. E. 1956: An account of *Meryta sinclairii* (Pukanui) on Marotiri Island. *Tane* 7: 16–22.
- Atkinson, I. A. E. 1972: Vegetation and flora of Sail Rock, Hen and Chicken Islands. *New Zealand Journal of Botany* 10: 545–548.
- Beever, J. E. 1986: Mosses of the Poor Knights Islands, northern New Zealand. *Journal of the Royal Society of New Zealand* 16: 259–273.
- Beever, R. E. 1986a: The species of *Cordyline* (Agavaceae) on the Poor Knights Islands, northern New Zealand. *Journal of the Royal Society of New Zealand* 16: 251–258.
- Beever, R. E. 1986b: Large-leaved plants of northern offshore islands, New Zealand. In: Wright, A. E.; Beever, R. E. ed. The offshore islands of northern New Zealand. *New Zealand Department of Lands and Survey Information Series* 16: 51–61.
- Beuzenberg, E.; Hair, J. B. 1959: Contribution to a chromosome atlas of the New Zealand flora 3. Miscellaneous families. *New Zealand Journal of Science* 2: 531–538.
- Bostock, P. D.; Spokes, T. M. 1998: Polypodiaceae. *Flora of Australia* 48: 468–495.
- Brownsey, P. J. 1977: A taxonomic revision of the New Zealand species of *Asplenium*. *New Zealand Journal of Botany* 15: 39–86.
- Brownsey, P. J.; Jackson P. J. 1984: *Asplenium pauperequitum* – a new fern species from the Poor Knights Islands, New Zealand. *New Zealand Journal of Botany* 22: 315–321.
- Brownsey, P. J.; Smith-Dodsworth, J. C. 1989: New Zealand ferns and allied plants. Auckland, David Bateman.
- Brummitt, R. K.; Powell, C. E. 1992: Authors of plant names. Kew, Royal Botanic Gardens.
- Cameron, E. K. 1990: Vascular plants of the main northern Mokohinau Islands, north-east New Zealand. *Tane* 32: 113–130.
- Cameron, E. K. 1992: Decline of mawhai (*Sicyos australis*). *New Zealand Botanical Society Newsletter* 28: 11–12.
- Cameron, E. K. 1993: *Asplenium pauperequitum* – a new locality. *New Zealand Botanical Society Newsletter* 34: 7–8.
- Cameron, E. K. 1997: The current and future impacts of adventive plant species in New Zealand In: Craw, J. ed. Tomorrows weeds, a window on the future. Proceedings of Northland Regional Council Seminar, August 1996. Pp. 3–14.
- Cameron, E. K.; Wright, A. E. 1990: Additional vascular plant records for Fanal Island, Mokohinau Islands. *Tane* 32: 133–135.
- Cameron, E. K.; de Lange, P. J.; Given, D. R.; Johnson, P. N.; Ogle, C. C. 1995: New Zealand Botanical Society threatened and local plant lists (1995 revision). *New Zealand Botanical Society Newsletter* 39: 15–28.
- Chase, M. W.; Rudall, P. J.; Conran, J. G. 1996: New circumscriptions and a new family of asparagoid lilies: genera formerly included in Anthericaceae. *Kew Bulletin* 51: 667–680.
- Cheeseman, T. F. 1906: Manual of the New Zealand flora. Wellington, Government Printer. 1199 p.
- Cheeseman, T. F. 1925: Manual of the New Zealand flora. 2nd ed. Wellington, Government Printer.
- Chinnock, R. J. 1998: Lycopodiaceae. *Flora of Australia* 48: 66–95.
- Cockayne, L. 1902: A short account of the plant-covering of Chatham Island. *Transactions & Proceedings of the New Zealand Institute* 34: 243–325.
- Cockayne, L. 1905: Notes on a brief botanical visit to the poor Knights Islands. *Transactions of the New Zealand Institute* 38: 351–360.
- Cockayne, L. 1912: Descriptions of new plants. *Transactions & Proceedings of the New Zealand Institute* 44: 50–52.
- Cockayne, L. 1915a: Notes on New Zealand floristic botany, including descriptions of new species, etc. (No.1). *Transactions & Proceedings of the New Zealand Institute* 48: 193–202.
- Cockayne, L. 1915b: Some hitherto-unrecorded plant habits (X). *Transactions & Proceedings of the New Zealand Institute* 48: 203–209.
- Conn, B. J. 1980: A taxonomic revision of *Geniostoma* subgn. *Geniostoma* (Loganiaceae). *Blumea* 26: 245–364.
- Connor, H. E. 1972: *Cortaderia splendens* Connor sp. nov. (Gramineae). *New Zealand Journal of Botany* 9: 519–525.
- Connor, H. E. 1994: Indigenous New Zealand Triticeae: Gramineae. *New Zealand Journal of Botany* 32: 125–154.
- Cranwell, L. M. 1933: A new locality for *Xeronema callistemon*. *New Zealand Journal of Science and Technology* 15: 234–236.
- Cranwell, L. M. 1937: New plant records from the Poor Knights, with special mention of *Todea barbara*. *Records of the Auckland Institute and Museum* 2: 101–110.
- Cranwell, L. M.; Moore, L. B. 1935: Botanical notes on the Hen and Chickens. *Records of the Auckland Institute and Museum* 1: 301–318.

- Cranwell, L. M.; Moore, L. B. 1938a: Intertidal communities of the Poor Knights Islands, New Zealand. *Transactions of the Royal Society of New Zealand* 67: 375–403.
- Cranwell, L. M.; Moore, L. B. 1938b: *Xeronema*: an island lily. *Royal Institute of Horticulture* 8: 24–27.
- Dahlgren, R. M. T.; Clifford, H. T.; Yeo, P. F. 1985: The families of the Monocotyledons. Berlin, Springer-Verlag.
- Daugherty, C. H.; Patterson, G. B.; Hitchmough, R. A. 1994: Taxonomic and conservation review of the New Zealand herpetofauna. *New Zealand Journal of Zoology* 21: 317–323.
- de Lange, P. J. 1994a: *Asplenium pauperequitum* – Poor Knights fern in poor condition. *Conservation Science Newsletter* 7: 7–8.
- de Lange, P. J. 1994b: Some notes on the vascular flora of Cuvier (Repanga) Island. *Conservation Science Newsletter* 10: 4–5.
- de Lange, P. J. 1997: Orchids of Great and South West Islands, Three Kings Islands Group, northern New Zealand. *Tane* 36: 1–14.
- de Lange, P. J. 1998: Notes on *Senecio marotiri* (Asteraceae). *New Zealand Botanical Society Newsletter* 53: 5–9.
- de Lange, P. J. 1999: Typification of *Samolus repens* var. *strictus*. *New Zealand Journal of Botany* 37: 179–181.
- de Lange, P. J.; Crowcroft, G. M. 1996: The vascular flora of Maunganui (Casnell) Island, Scott's Landing, Mahurangi Harbour. *Auckland Botanical Society Journal* 51: 38–49.
- de Lange, P. J.; Cameron, E. K. 1997: Waterspout damage to Aorangi Island, Poor Knights. *Auckland Botanical Society Journal* 52: 37–38.
- de Lange, P. J.; Norton, D. A. ed. 1997: New Zealand's Ichoranthaceous mistletoes. Wellington, Department of Conservation.
- de Lange, P. J.; Murray, B. G. 1998: *Senecio repangae* (Asteraceae) – a new endemic *Senecio* species from north-eastern North Island, New Zealand. *New Zealand Journal of Botany* 36: 509–519.
- de Lange, P. J.; McFadden, I.; Cameron, E. K. 1995a: Preliminary report of the flora and fauna of Fanal Island, Mokohinau Islands Nature Reserve. *Science and Research Series* 94. Wellington, Department of Conservation.
- de Lange, P. J.; Cameron, E. K.; Taylor, G. A. 1995b: Flora and fauna of Tatapihi (Groper) Island, Mokohinau Islands. *Tane* 35: 69–94.
- de Lange, P. J.; Cameron, E. K.; Murray, B. G. 1999: *Alectryon excelsus* subsp. *grandis* (Sapindaceae): a new combination for an uncommon, small tree, endemic to the Three Kings Islands, New Zealand. *New Zealand Journal of Botany* 37: 7–16.
- Druce, A. P. 1993: Indigenous vascular plants of New Zealand (9th revision). Unpublished checklist held at Landcare Research, Lincoln.
- Drury, D. G. 1975: Illustrated and annotated key to the erectitoid *Senecios* in New Zealand (*Senecioneae* – *Compositae*) with a description of *Senecio diaschides*. *New Zealand Journal of Botany* 12: 513–540.
- Eagle, A. E. 1982: Eagle's trees and shrubs of New Zealand. 2nd series. Auckland, William Collins Publishers Ltd.
- Edgar, E.; Shand, J. E. 1987: Checklist of Panicoid grasses naturalised in New Zealand; with a key to native and naturalised genera and species. *New Zealand Journal of Botany* 25: 343–354.
- Forde, M. B.; Edgar, E. 1995: Checklist of pooid grasses naturalised in New Zealand. 3. Tribes Bromeeae and Brachypodieae. *New Zealand Journal of Botany* 33: 35–42.
- Fraser, N. M. 1925: The Poor Knights Islands: a brief account of the Maori occupation, New Zealand. *New Zealand Journal of Science & Technology* 8: 8–14.
- Gardner, R. O. 1984: *Geranium solanderi* and allies in New Zealand. *New Zealand Journal of Botany* 22: 127–134.
- Gardner, R. O. 1996: Fruit and seed of *Beilschmiedia* (Lauraceae) in New Zealand. *Blumea* 41: 245–250.
- Gardner, R. O. 1997: *Macropiper* (Piperaceae) in the south-west Pacific. *New Zealand Journal of Botany* 35: 293–308.
- Garnock-Jones, P. J.; Molloy, B. P. J. 1982: Polymorphism and the taxonomic status of the *Hebe amplexicaulis* complex (Scrophulariaceae). *New Zealand Journal of Botany* 20: 391–399.
- Given, D. R. 1996: Flora. In: Anon. ed. The Chatham Islands, heritage and conservation. Christchurch, Canterbury University Press. Pp. 80–92.
- Green, P. S. 1994: Aizoaceae. *Flora of Australia* 49: 76–79.
- Hayward, B. W. 1991: Geology and geomorphology of the Poor Knights Islands, northern New Zealand. *Tane* 33: 23–27.
- Hayward, B. W. 1993: Prehistoric archaeology of the Poor Knights Islands, northern New Zealand. *Tane* 34: 89–105.

- Hayward, B. W.; Hayward, G. C. 1982: Lichens of Tawhiti Rahi, Poor Knights Islands, northern New Zealand. *Journal of the Royal Society of New Zealand* 12: 373–379.
- Hayward, B. W.; Wright, A. E. 1991: Lichens from the Poor Knights Islands, northern New Zealand – additions and an updated species list. *Tane* 33: 39–48.
- Heads, M. J. 1993: Biogeography and biodiversity in *Hebe*, a South Pacific genus of Scrophulariaceae. *Candollea* 48: 19–60.
- Heads, M. J. 1996: Biogeography, taxonomy and evolution in the Pacific genus *Coprosma* (Rubiaceae). *Candollea* 51: 381–405.
- Heenan, P. B. 1998: *Mazus novaezeelandiae* (Scrophulariaceae): taxonomy, distribution, habitats, and conservation. *New Zealand Journal of Botany* 36: 407–416.
- Heenan, P. B.; de Lange, P. J. 1998: A new and remarkably local species of *Myrsine* (Myrsinaceae) from New Zealand. *New Zealand Journal of Botany* 36: 381–387.
- Heenan, P. B.; de Lange, P. J. 1999: Reproductive biology, ecology and conservation of *Carmichaelia williamsii* (Fabaceae), a rare and bird pollinated legume from New Zealand. *Pacific Conservation Biology* 5.
- Henry, N. 1996: Poor Knights weed eradication trip, 3–9 September 1996. Unpublished Department of Conservation Report held at Northland Conservancy Office, Whangarei. 4 p.
- Hooker, J. D. 1853: The botany of the Antarctic voyage of H. M. Discovery ships Erebus and Terror in the years 1839–1843 II. Flora Novae-Zelandiae Part I. Flowering plants. London, Reeve.
- Hynes, P. 1950: [untitled]. *Auckland Botanical Society Newsletter* 8: 4–7.
- Jackson, P. J. 1982: Flora of the Poor Knights Islands. Unpublished manuscript held at Auckland Museum Herbarium, Auckland.
- Mabberley, D. J. 1997: The plant-book. Cambridge, Cambridge University Press.
- McEwen, W. M. ed. 1987: Ecological Regions and Districts of New Zealand. 3rd ed. Wellington, Department of Conservation.
- Moar, N. T. 1993: Pollen grains of New Zealand dicotyledonous plants. Lincoln, Manaaki Whenua Press.
- Moore, L. B. 1957: The species of *Xeronema* (Liliaceae). *Pacific Science* 11: 355–362.
- Moore, L. B. 1968: Taxonomic notes on New Zealand monocotyledons. *New Zealand Journal of Botany* 6: 473–492.
- Moore, L. B.; Mason, R. 1974: *Coprosma talbrockei* sp. nov. and allied creeping species (Rubiaceae). *New Zealand Journal of Botany* 12: 137–148.
- Murray, B. G.; Cameron, E. K.; Standing, L. S. 1992: Chromosome numbers, karyotypes, and nuclear DNA variation in *Pratia Gaudin* (Lobeliaceae). *New Zealand Journal of Botany* 30: 181–187.
- Norton, D. A.; de Lange, P. J.; Garnock-Jones, P. J.; Given, D. R. 1997: The role of seabirds and seals in the survival of coastal plants: lessons from New Zealand *Lepidium* (Brassicaceae). *Biodiversity and Conservation* 6: 765–785.
- Ogle, C. C. 1987: Taxonomic changes in *Asplenium* (Aspleniaceae: Filicales) in New Zealand. *New Zealand Journal of Botany* 25: 591–593.
- Ogle, C. C. 1990: Changes in the vegetation and vascular flora of Motuhora (Whale Island) 1970–1986. *Tane* 32: 19–48.
- Oliver, W. R. B. 1925: Vegetation of Poor Knights Islands. *New Zealand Journal of Science and Technology* 7: 376–384.
- Oliver, W. R. B. 1926: New Zealand angiosperms. *Transactions of the New Zealand Institute* 56: 1–5.
- Parham, J. W. 1979: In: Smith, A. C. Flora Vitensis Nova. Vol. 1. Kauai, Hawai'i, Pacific Tropical Botanic Garden.
- Parris, B. S.; Croxall J. P. 1972: *Hymenophyllum cupressiforme* Labill. (Hymenophyllaceae) in New Zealand. *New Zealand Journal of Botany* 10: 259–266.
- Patel, R. N. 1987: Wood anatomy of the dicotyledons indigenous to New Zealand. 16. Lauraceae. *New Zealand Journal of Botany* 25: 477–488.
- Peterson, J. A. 1997: Revision of the genus *Wahlenbergia* (Campanulaceae) in New Zealand. *New Zealand Journal of Botany* 35: 9–54.
- Peterson, J. A.; Williams, E. G.; Dawson, M. I. 1995: Contributions to a chromosome atlas of the New Zealand flora. *New Zealand Journal of Botany* 33: 489–496.
- Pitt, F. D. H. 1982: The botanical collecting trips of W.R.B. Oliver. *National Museum of New Zealand Records* 2(8): 65–79.
- Pritchard, G. G. 1957: Experimental taxonomic studies on species of *Cardamine* Linn. in New Zealand. *Transactions of the Royal Society of New Zealand* 85: 75–89.
- Reynolds, K. 1988: My adventures with the two Lucy's – Part Two: The Poor Knights. *Auckland Botanical Society Journal* 43: 72–78.
- Simpson, G. 1952: Notes on some New Zealand plants and descriptions of new species (No.5). *Transactions & Proceedings of the Royal Society of New Zealand* 79: 419–435.

- Smith, A. C. 1975: The genus *Macropiper* (Piperaceae). *Botanical Journal of the Linnean Society* 71: 1–38.
- Smith, P. J. 1992: A revision of the genus *Wahlenbergia* (Campanulaceae) in Australia. *Telopea* 5: 91–175.
- Stace, C. A. 1991: Plant taxonomy and biosystematics. Great Britain, Edward Arnold.
- Struwe, L.; Albert, V. A.; Bremer, B. 1994: Cladistics and family level classification of the Gentianales. *Cladistics* 10: 175–206.
- Stuessy, T. F. 1990: Plant taxonomy. New York, Columbia University Press.
- Sykes, W. R. 1977: Kermadec Islands flora. An annotated check list. *DSIR Bulletin* 219.
- Sykes, W. R. 1992: Two new names in *Macropiper* Miq. (Piperaceae) from New Zealand. *New Zealand Journal of Botany* 30: 231–236.
- Sykes, W. R.; West, C. J. 1996: New records and other information on the vascular flora of the Kermadec Islands. *New Zealand Journal of Botany* 34: 447–462.
- Taylor, G. A. 1989: A register of northern offshore islands and a management strategy for island reserves. *Department of Conservation Northern Region Technical Report Series* 13.
- Tehler, A.; Lumbsch, T.; Hayward, B. W. 1987: First record of the lichen genus *Roccellina* from New Zealand. *New Zealand Botanical Society Newsletter* 7: 7–8.
- Toelken, H. R. 1981: The species of *Crassula* L. in Australia. *Journal of the Adelaide Botanic Gardens* 3: 57–90.
- Valentine, D. H. 1975: The taxonomic treatment of polymorphic variation. *Watsonia* 10: 385–390.
- Webb, C. J.; Sykes, W. R.; Garnock-Jones, P. J. 1988: Flora of New Zealand. Vol. IV. Christchurch, Botany Division, DSIR. 1365 p.
- Wright, A. E. 1983: Conservation status of the Three Kings Islands endemic flora in 1982. *Records Auckland Institute and Museum* 20: 175–184.
- Wright, A. E. 1984: *Beilschmiedia* Nees (Lauraceae) in New Zealand. *New Zealand Journal of Botany* 22: 109–125.
- Wright, A. E. 1992: Survival battle for tiny fern. *New Zealand Botanical Society Newsletter* 30: 12.
- Wright, A. E.; Cameron, E. K. 1990: Vegetation management on northern offshore islands. In: Towns, D. R.; Daugherty, C. H.; Atkinson, I. A. E. ed. Ecological restoration of New Zealand Islands. *Conservation Series* 2: 221–237.