

|  |                    |         |              |
|--|--------------------|---------|--------------|
| <i>Pseudopanax lessonii</i>                          | houpara            | NO, IN? | Widespread   |
| <i>Pseudopanax crassifolius</i> x <i>P. lessonii</i> | hybrid pseudopanax | IN      | ~3 specimens |
| <i>Sonchus kirkii</i>                                | puha               | PL      | Localised    |
| <i>Sophora microphylla</i>                           | kowhai             | PL      | Localised    |
| <i>Veronica plebeia</i>                              | speedwell          | NO      | Localised    |
| <i>Vitex lucens</i>                                  | puriri             | PL      | Widespread   |

#### Monocotyledons

|   |                           |         |                 |
|---|---------------------------|---------|-----------------|
| <i>Astelia hastata</i>                  | collospERMUM              | PL      | Localised       |
| <i>Carex banksiana</i>                  | fine-leaved bastard grass | NO      | Widespread      |
| <i>Carex lambertiana</i>                | forest sedge              | NO      | Widespread      |
| <i>Carex uncinata</i>                   | bastard grass             | NO      | Widespread      |
| <i>Carex flagellifera</i>               | trip-me-up                | IN, NO? | Single location |
| <i>Cordyline australis</i>              | cabbage tree              | IN      | Widespread      |
| <i>Cyperus ustulatus</i>                | coastal cutty grass       | IN      | Localised       |
| <i>Dianella nigra</i>                   | inkberry                  | NO      | Widespread      |
| <i>Earina autumnalis</i>                | Easter orchid             | PL      | Single specimen |
| <i>Gastrodia sesamoides</i>             | pot-bellied orchid        | NO      | Extinct         |
| <i>Juncus planifolius</i>               | grass-leaved rush         | IN      | Localised       |
| <i>Juncus</i> sp. ( <i>australis</i> ?) | wiwi                      | NO      | Localised       |
| <i>Microlaena stipoides</i>             | rice grass                | NO      | Widespread      |
| <i>Oplismenus hirtellus</i>             | panic grass               | NO      | Widespread      |
| <i>Phormium tenax</i>                   | flax                      | PL      | Single location |
| <i>Rhopalostylis sapida</i>             | nikau                     | PL      | Widespread      |
| <i>Ripogonum scandens</i>               | supplejack                | PL      | Single specimen |

## ***Pittosporum crassifolium* (Pittosporaceae) on the dunes at Piha, Waitakere Ranges**

**Rhys Gardner**

### **Introduction**

More than a decade ago I contributed to a report on a proposed effluent disposal scheme at North Piha's Les Waygood Park (LWP), in the dunes on the northern side of the Marawhara Stream (Fig. 1). The field would receive filtered sewage and grey-water from a new toilet block to be constructed near the pre-school and Barnett Hall buildings. This fluid would be spread in dripper lines on the surface of a rectangular area c. 1600 sq m. in extent, some 150 m or so southwards of the toilet block (Fig. 1).

These developments were carried out, and the disposal field seems to be working satisfactorily. To a non-engineer though, the chief interest here is the unique vegetation the field is located in: a several metres tall scrub nearly entirely formed by karo (*Pittosporum crassifolium*).

### **Previous description of LWP vegetation**

The changes to the plant cover in this part of the Piha dunes, between 1940 and the mid-70s, were described and mapped by Alan Esler (1975). His historical information came from aerial photographs and P. A. Lush's 1948 M.Sc. thesis at the University of Auckland (partly published, Williamson [née Lush] 1953). I have not had access to the photographs or the thesis.

Esler termed the southern half or so of LWP the "Marawhara Accretion", a dune landform that had rapidly built up, post-1940, through extension of the foredune some 250 m southwards. The fundamental cause of the accretion would have been the arrival, from the south, of a large pulse of sand in the longshore drift. Additionally, the man-made diversion of the Marawhara Stream in the early

1940s seems likely to have prevented the stream, whenever it flooded, from trimming back the southern end of the foredune. (A local history of Piha (Woodward 2012: 39) states that this work was carried out in the early 1940s under the direction of Winstone's engineer and local bach-owner Mr Les Waygood, who wanted to create space for campers and thus bring safety to this part of the beach).

Esler's description and sketch map are unambiguous: from the 1940s to the mid-70s, the dunes of LWP had a cover of spinifex (*Spinifex sericeus*) on their seaward side, and, inland to the Marawhara Stream, a denser cover mainly of Kikuyu grass (*Cenchrus clandestinus*), legumes and pohuehue (*Muehlenbeckia complexa*). The only shrub noted, apart from lupin (*Lupinus arboreus*), was tauhinu (*Ozothamnus leptophyllus*). No mention was made of karo here or at other places on Piha's dunes.

### Present vegetation of LWP

The locations of the vegetation zones A–E are shown in Fig. 1.

**A.** The seaward side of the foredunes is c. 30 m wide, and, has, up to the gently undulating crest at c. 5 m a.s.l., a light cover of *Spinifex sericeus*.

**B.** The landward side of the foredunes. Down from the foredune crest, a gently descending strip c. 10 m wide of short broken dunelets carries a fairly dense cover of pohuehue, *Ficinia nodosa*, *Lagurus ovatus* and *Lachnagrostis billardiarei*, among moribund spinifex and scattered 1 m tall bushes of lupin. Immediately inland there is a strip 10–15 m wide of nearly level ground before the poorly defined edge of an inner dune crest (almost the height of the outer one) is reached. This relatively damp "swale" is thickly vegetated, mainly by *Ficinia nodosa*, along with pohuehue and some 1 m tall bushes of taupata (*Coprosma repens*), many of which are moribund.

**C.** From the second dune crest inland, approximately three-quarters of the rest of the dune terrain here is a gradually landwards-descending set of ill-defined low crests and patches of level ground. Its cover is mainly of karo bushes, but with some open areas too. The larger karo reach c. 4 m tall. They are generally heavily branched below, and their trunks, above their root flanges, are typically 15–20 cm in basal diameter.

The canopy of this scrub is generally dense enough to have prevented other plants from establishing (nor is there any obvious development of soil). In the more open stands, though, and in the larger gaps, *Carex testacea* and pohuehue are common, with lesser amounts of flax (*Phormium tenax*) and coastal toetoe (*Cortaderia splendens*). Some larger gaps are overrun by Kikuyu grass.

In the landward half or so of this zone the karo canopy is augmented by *Coprosma macrocarpa* ssp. *minor*. Many of these coprosmas have grown angled towards distant light-gaps and now are struggling to maintain their position. In relatively open places there are small bushes of *Leucopogon fasciculatus*, some of which are dying, perhaps through drought or by overgrowth of pohuehue. Also present in the canopy or around the edges of groups of karo, but less frequent than *Coprosma macrocarpa* and almost confined to the landward 50 m of the transect, are fairly small plants of *Cordyline australis*, *Meliccytus ramiflorus*, *Myrsine australis*, *Piper excelsum*, *Pseudopanax arboreus* and *P. lessonii*. Throughout this scrub, even in relatively open places, seedlings and saplings of karo are quite infrequent.

The effluent disposal field takes the form of a strip c. 100 m long and 15 m wide, and is located c. 40 m in from the seaward edge of the scrub. The 2008 aerial photo on which Fig. 1 here is based shows that the karo here have larger crowns than those elsewhere and form a nearly continuous canopy. I doubt that this is because of the improving effects of the effluent field (which would have been working for just a few years), but I have not made any comparison of growth rates in and outside the field.

**D.** As noted above, the karo scrub occupies about three-quarters of the inner dunes. The remaining quarter, comprising the area's north-eastern quadrant but with an extension south-east to the stream (south of E), has a cover much like that described by Esler (1975) for the inner dune system in 1974, that is, a knee-high tangle of pohuehue, Kikuyu grass, *Lotus suaveolens*, and introduced grasses and herbaceous weeds (now including *Ehrharta erecta*). Again, it is notable that karo hardly seems to be invading this zone.

**E.** The remainder of LWP, from the inland edge of the dunes back to the Marawhara Stream, is a levelled area of mown grass in long-term use by the North Piha Campers Club. It is c. 2 m above the stream's usual summer-time level, and was created by the 1940s stream diversion. At its northern end the former stream course is marked by a close-spaced curve of pohutukawa (*Metrosideros excelsa*), the larger of which are multi-trunked, c. 12 m tall and c. 50–100 cm in basal diameter. Presumably these were planted some short time after the stream's diversion to the south-east.

Two ablutions blocks serve this club, and lie in zone D a short way west of these pohutukawa trees. I mention them only because they serve the fieldworker as useful features for orientation and scale; see for example the Whites Aviation photograph WA 44013F, "Aerial View of Piha", taken 2 April 1957, accessible on-line.

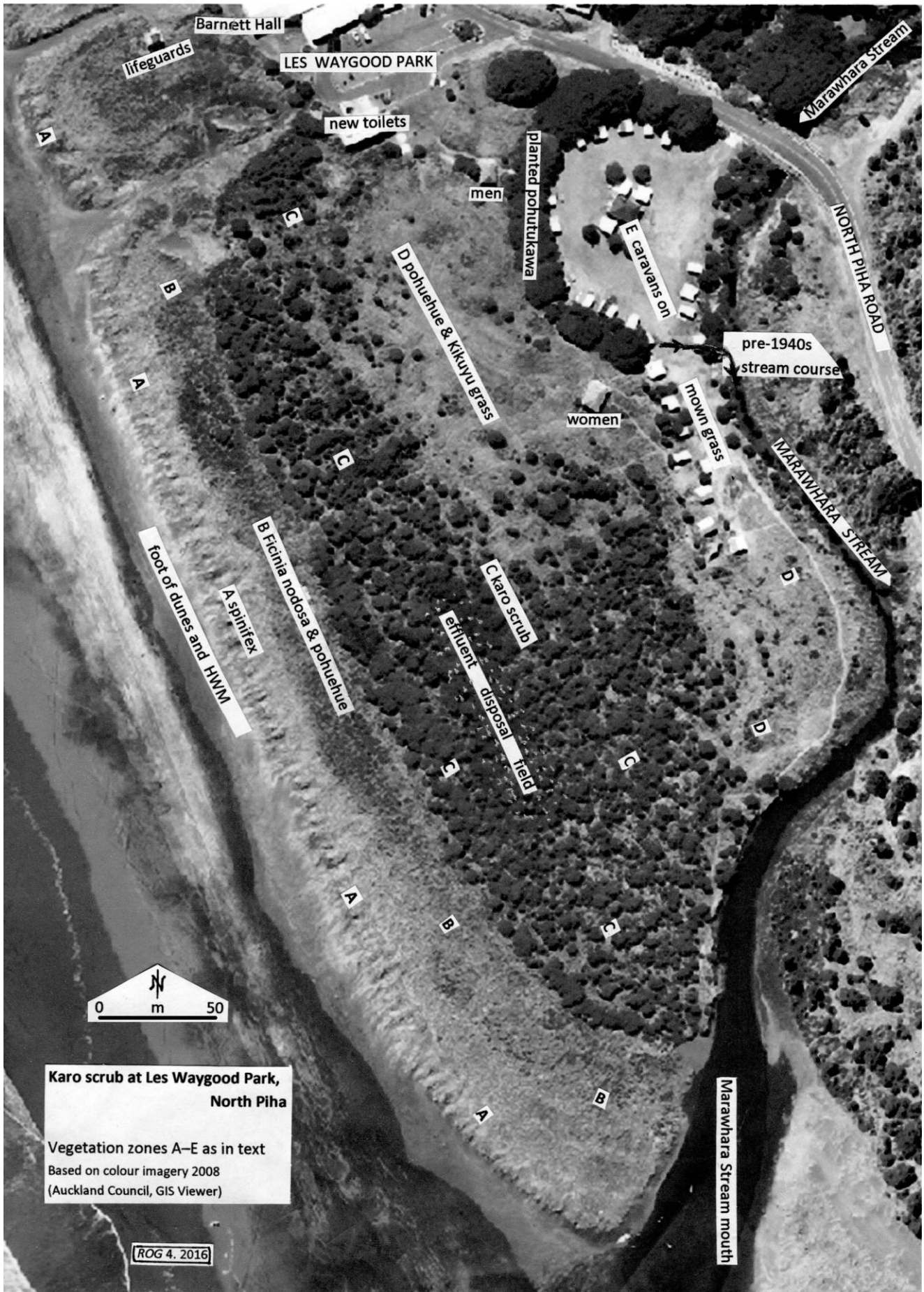


Fig. 1. Karo scrub and other vegetation zones at Les Waygood Park, Piha.

## Discussion

I believe that LWP's karo scrub is a natural development rather than a planting. Ring-counts of several of the larger trees indicate a trunk-diameter growth rate of somewhat less than a centimetre a year, with the oldest age obtained being 28 years for a tree with a trunk 20 cm in basal diameter. That is, the scrub seems to have developed through invasion of an area that, in 1974, was largely covered by pohuehue (and probably, given the trends noted by Esler, by Kikuyu grass a short time later).

The natural distribution of karo along the Whatipu-Piha cliffs is very sporadic, so it might just be possible that the scrub derives from hedges planted by local property-owners. It could be significant, then, that the earliest Piha specimen of karo in the Auckland Museum herbarium (*Moore & Melville*, coll.

1961, AK 155800) is noted as coming from "sand behind dunes at foot of cliffs".

The how and why of this karo invasion can only be speculated on. Perhaps a fire here produced the right conditions for it, but I note that although the LWP dunes have the largest area of karo scrub at Piha, a similar cover is developing locally on the dunes south from here, on what Esler (1974) called the "Central Dunes". (Some of these karo trees are as large as the LWP ones, but a number of them are dying back, perhaps because of the notably hot 2015–16 summer).

In New Zealand at large a sand-dune scrub that is dominated by karo is a novelty — such vegetation is not mentioned in the classic works, nor in a more recent nationwide inventory (Partridge 1992).

## References

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## Bird's-foot clover (*Trifolium ornithopodioides*) – rediscovered in Auckland

Ewen K. Cameron

While carrying out a vegetation survey of Motuhoropapa Island (8.12 ha), which is part of The Noises group in Auckland's inner Hauraki Gulf, I came across an exotic herb that was unfamiliar to me: bird's-foot clover or trigonel (*Trifolium ornithopodioides*) (Fig. 1).

### Distribution

Bird's-foot clover is native to western and southern Europe and NW Africa (Webb et al. 1988). Checking with other New Zealand herbaria revealed that there were two earlier collections for Auckland, both with rather vague localities, one presumed to be collected in the 1930s and the other in 1954 (Table 1). Presumably these two collections are what the "Auckland City" record is based on in the *Flora of New Zealand* (Webb et al. 1988: p. 690). Looking at the general distribution of bird's-foot clover in New Zealand, based on 71 herbarium specimens, it appears to have its stronghold in the South Island (except the West Coast), extending to the southern North Island, and with only three records in the northern half of the North Island. It has also been

collected on the Chatham Islands. Excluding the two historical Auckland records the next most northern collection is from a roadside at Hawaii Beach near



**Fig. 1.** The first Auckland region collection of bird's-foot clover in 61 years, from Motuhoropapa, The Noises. Note the faded 2-flowered inflorescence with immature pods; corolla > pod (with scattered hairs); pod > calyx; and a single seed from a mature pod. Scale divisions 0.5 mm. Collected 15 Dec 2015 (AK 359828).