AUCKLAND POHUTUKAWAS: a progress report

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The blaze of red along our Auckland coasts at Christmas time has long been a source of pleasure to us all. Planted throughout our city in gardens, parks and along streets as well as round the coastline, the Metrosideros excelsa, our pohutukawa, with its sturdy strength and crimson flowers is a treasured part of our inheritance.

There is however another pohutukawa which is not so widely known, Metrosideros kermadecensis, the Kermadec pohutukawa which adds its splash of colour too but not always at Christmas. It does flower then but also unpredictably at intervals throughout autumn, winter and spring although at its home in the Kermadecs where W.R. Sykes has observed it in 1966-69 he says few trees flowered in winter and most flowered for two months from mid-November.

The most obvious differences between the two species apart from their different flowering habits in New Zealand are the smaller size and rounder shape of the M. kermadecensis leaves and the smaller size of the M. kermadecensis flowers. Since March 1980 I have been observing a growing number of pohutukawas which flower out of season from March to October inclusive but have leaf and other characteristics which are not completely typical of either M. excelsa or M. kermadecensis. A more detailed survey has shown that these aberrant flowerers have a number of characteristics which are intermediate between the two species pointing to the conclusion that a number of hybrids have been produced between the two.

At first I thought that only one or two trees were involved but now I know of over 30 in our own suburban area. Moreover I now find that I am by no means the first to propose the existence of hybrid pohutukawas. Some botanists were loth to accept the idea because they did not think the trees flowered at the same time to allow cross pollination but information I gleaned showed that back about 1930 at least one gardener was disturbed because nurserymen were producing "mongrel" pohutukawas. When the Tamaki Drive was made about that period a firm supplied pohutukawas to line the waterfront and did their best to see that only M. excelsa plants were used. Before they completed the task they ran short of M. excelsa and asked if they could use a few M. kermadecensis to complete the job which was agreed to. A study of some present waterfront trees suggests that some of the substitutes might have been hybrids classed as M. kermadecensis solely on their flowering.

After the Second World War the City Council Domain nursery used to propagate pohutukawas by seed from a line of trees running down the path from the duck pond to the bottom of Grafton Road. Many of these were known to the workers in the nursery as "kermadecensis" because they flowered at irregular intervals throughout the year and as they were then quite small trees and nearly always had dry capsules with seed they were handy for use in propagation. These trees are still there, now about 35 years later, and I have found nine of them which fit the class of putative hybrids so it is no wonder that there are many other such trees now around the city.

Dr. R.C. Cooper, former Botanist at the War Memorial Museum, kindly allowed me access to correspondence he received in the mid-1950s at the time he was writing on the hybridism of M.excelsa and M. robusta, Rec. Auck. Inst. Mus. Vol. 5, No. 1 & 2 pp. 13-40, 14th May, 1958. Both

Miss (now Dr.) Lucy Moore and Mr. A.L. Poole, then Assistant Director of Forestry had suggested that some hybrids might be M. excelsa X M. kermadecensis which they both said hybridised readily in Wellington. Dr. Moore had done a study on the pohutukawas of Courtenay Place in Wellington and Poole too had apparently been quite aware that hybrids existed. Dr. Cooper himself had been aware of the hybrids in the Domain and also at Blockhouse Bay. Thus when I visited the capital in June this year I was naturally interested and within 150 metres of the house in Lower Hutt where we stayed I found two separate pohutukawas in flower and by their leaves they were obvious hybrids.

In order to make comparisons between the trees under observation I decided to concentrate on these characteristics to allow measurable differences to be tabulated:-

(a) Leaf (1 mina) length.
(b) Leaf shape (Roundness Index - see below).
(c) Stamen length.
(d) Calyx lobe tips.

To quantify leaf shape I used a Rotundity or Roundness Index (R.I.) where

$$R.I. = \frac{\text{width of lamina}}{\text{length of lamina}} \times 100$$

This I found worked very well and correlated highly with the shape as judged by the eye.

The calyx lobes or sepals are a useful diagnostic feature but need a hand lens for close inspection. The triangular tips like the calyces are very tomentose in both species but the M. kermadecensis lobes have a somewhat hairless green quadrangular point thus often with a gland or spot, also green thus,  . The M. excelsa tips are tomentose but sometimes a line like a hair parting is visible. When dried and pressed the two species are not easy to distinguish as the M. excelsa tips become hairless claws so the lobes must be inspected when green. Other measurements such as capsule size and style length tended to duplicated the size differences of the stamens and the leaves so they were not used.

This table summarises information about the following sets of trees:-

(a) Local specimens, apparently M. kermadecensis. 5 trees.

(b) Raoul Island specimens of M. kermadecensis held in the herbarium at Auckland War Memorial Museum. 12 individuals.

(c) Dr. R.C. Cooper's lists of M. excelsa trees from Blockhouse Bay, Mayor Island, Bay of Plenty, and specimens from N.Z. Herbaria. (Rec. Auck. Inst. Mus. Vol. 5, No. 1 & 2 pp. 13-40, 14th May, 1958.) This has measurements from 262 trees.

(d) Some older Remuera M. excelsa trees. 10 trees.

(e) Putative hybrids between M. excelsa and M. kermadecensis. 11 trees. Full details are not yet available about all 30+ trees noted.

The columns referring to the length of leaves at the second node below the flower or seed head are used because Dr. Cooper made all his leaf measurements in this way. As these leaves tend to be smaller than many others on the same tree I have also used where possible samples of the larger leaves seen within reach at a cursory inspection.

Measurements of lengths and R.I. show first the mean then the range. Lengths are in mm to the nearest integer.

SUMMARY OF METROSIDEROS SPECIMENS OBSERVED

	Length of stamens	Length of leaves at 2nd node	R.I. of leaves at 2nd node	Length of larger leaves	R.I. of larger leaves	Type of calyx lobes
Local M. kermadecensis	17 15-20	32 28-38	63 53-72	41 39-48	66 51-74	kermadecensis
Raoul Is. (Museum)	17 16-18	34 31-41	64 53-81	39 35-49	67 58-76	kermadecensis
Cooper's lists of M. excelsa	24 14-33	71 41-109	38 25-58			
Remuera M. excelsa	27 20-37	61 53-69	40 35-42	98 80-126	40 37-43	excelsa
Putative hybrids M.excelsa x M. kermadecensis	22 18-25	40 31-50	54 46-66	66 49-84	54 48-60(70)	Mixed. About $\frac{3}{4}$ kermadecensis to $\frac{1}{4}$ excelsa

From my observations and these results emerge the following distinguishing points:-

(a) The flowers of M. excelsa, judged by stamen length, are noticeably larger than those of M. kermadecensis while the putative hybrids are intermediate in size.

(b) The leaves of M. excelsa are much longer (larger leaves mean 98 mm) than those of M. kermadecensis (larger leaves mean 40 mm) while those of the putative hybrids are of intermediate length (mean 66 mm). If more than just the odd leaf of an aberrant flowerer is over 50 mm long then the tree is probably hybrid.

(c) The leaf shape is useful in separating the classes. M. excelsa leaves are slim, rarely exceeding R.I. 43 whereas M. kermadecensis are more rotund, rarely below R.I. 51. The putative hybrids fit in between with a mean R.I. 54 and a maximun of R.I. 60 except for an occasional rise to 70.

(d) It would appear that the putative hybrids so far observed have a tendency to show one characteristic like M. kermadecensis e.g. lobes or round leaves. Are there hybrids which show one M. excelsa character but are not noted because they do not flower out of season?

I have surveyed only a small part of Auckland and I hope members will note trees in their own areas which appear to be non-conformists. If you notice pohutukawas flowering out of season, between February and October would you make a written note of the measurements I have indicated, e.g. length of stamens, length and width of the larger leaves that you can reach. Note too the kind of calyx lobe on the flowers or green capsules. If you could send me details with the address and position I should be very grateful.

If you would like to see examples of the putative hybrids have a look at these trees:-

(a) The tree immediately across the road, opposite the West Door of the Museum in the Domain.

(b) The tree in Gillies Avenue at the Newmarket School close to a tennis court corner.

(c) Some of the trees around the Maori church in Okahu Bay near Tamaki Drive.