BOTANICAL HIGHLIGHTS IN THE COOK ISLANDS

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By the time this appears in print the rigours of a Canterbury winter will doubtless be nearly over so I offer these notes to provide a vision of warmer climes.

The Southern Cook Islands lie just within the tropics and nearly all parts have a much warmer climate than anywhere in New Zealand. The slight qualification is because the mountain tops on Rarotonga attain heights of 600-700 m and have a cooler climate with a vegetation consisting of many familiar genera of flowering plants; *Metrosideros, Ascarina, Coprosma, Weinmannia* and *Freycinetia*. Likewise the ferns have many genera in common with New Zealand, whilst at specific level there are *Histiopteris incisa* and *Blechnum procerum* agg. On many days when the sun blazes in the lowlands it is cloudy and misty up there so that one does not get the feeling of a tropical climate at all.

I was in Rarotonga last January and February, the hottest time of the year, and it was like being in a sauna in the lowlands with high humidities added to high temperatures. The cooler heights of the mist zone beckoned seductively but it took hours of sweat and toil to get there, struggling upwards through valley bottom forest and up the valley sides and on to the narrow ridges where the trees become more and more dwarfed and sometimes give way altogether to low scrub and fern.

There were several reasons why I decided to go to Rarotonga and Mangaia to the southeast at this season, one of them being that I had never before visited the tropical Pacific then. This meant that I had never seen a number of plants in flower or fruit, although some of them are very common. In addition, I wanted to know if there were rainy season annuals that I was unaware of.

Since I am a pretty general botanist, highlights for me include such experiences as seeing beautiful cultivated plants and tasting exciting fruits for the first time, as well as finding rare and elusive endemics. The most spectacular flowering tree of the Cooks must surely be the common flamboyant (*Delonix regia*), which could hardly fail to impress even the most prosaic botanist. In January the great umbrella-shaped flamboyant crowns were a solid mass of scarlet and crimson. Much less evident were the bright yellow flowers of its leguminous relation the golden shower (*Cassia fistula*), which hung down in long racemes from the branches as well as the shoots. Pride of India (*Lagerstroemia flos-reginae*), with glorious purple flowers was rare but unforgettable when seen. Its flowers superficially resemble those of the other two but in reality the species

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belongs to the Lythraceae and is a giant relation of the crêpe myrtle (*L. indica*) which we sometimes cultivate here.

I stayed for some of the time at the Totokoitu Research Station jointly run by DSIR and the Cook Island Agricultural Department, this being a research orchard with a range of tropical fruits. In addition to the usual tropical delights it was very nice to sample sweet sop (*Annona squamosa*), and its cousin soursop (*A. muricata*), sapodilla (*Manilkara zapota*) and carambola or star fruit (*Averrhoa carambola*). I am afraid that the native Cook Island edible-fruited *Eugenia reinwardtiana, Melastoma denticulatum* and *Vaccinium cereum* pale into insignificance beside them.

In New Zealand we are hearing a lot about ginger plants, some of the information being dramatised media hype which should be taken with a pinch of salt. In the Cook Islands there are a number of species in several genera of the Zingiberaceae (ginger family) in cultivation, as well as a few adventives. None are indigenous though. The only species which has made a significant ecological impact is kopi enua (*Zingiber zerumbet*) and this is abundant near tracks and streams in the lower parts of the main valleys on Rarotonga. But it should be remembered that this plant has been around for a long time because it must be a pre-European introduction like its ecological companion ti or *Cordyline fruticosa* (=*C. terminalis*). For the first time I saw its white flowers protruding from green or red cone-like inflorescences and followed the Cook Island custom of using the latter to provide a hair shampoo. Incidentally, true ginger (*Zingiber officinale*) is sometimes grown in the Cooks.

On the other hand, species of *Hedychium* were certainly introduced in European times. *H. gardnerianum* is the main weedy species causing concern in New Zealand and, with more reason in the Kilauea Volcano area of Hawaii where it forms an understorey to *Metrosideros* and tree ferns over large areas. But it is rare in the Cooks and I only saw it once near an old planting site where it was scarcely wild. The usual species on Rarotonga is white ginger, *H. coronarium*, which can form large dense stands. A notable instance being that on the top of Te Kou, the second highest mountain, where it was originally planted many years ago, presumably for the large, deliciously fragrant, white flowers.

During my time on Mangaia, I stayed in a small isolated cottage on the remoter east side of this uplifted coral or makatea island. There I was surrounded by pineapple fields in which grew a great variety of weeds, one of them being the attractive Natal redtop grass (*Rhynchelytrum repens*) which when the sun was low caused the area to glow pink and red. Below the slopes with pineapple fields are large swamps with taro plots where the outer parts of the volcanic cone meet the great upper terrace wall of jagged coral. Here I was interested to see large mats of the adventive creeping yellow-flowered water primrose (*Ludwigia peploides* subsp. *montevidensis*) in similar wet habitats to those in northern New Zealand. More spectacular were the pink or blue flowers of the waterlily *Nymphaea stellata*, the

proportion of the two colours varying greatly. Beautiful Lake Tiriara abuts directly on to the makatea coral wall and on its inner accessible margin is a band of various sedges often dominated by a giant *Schoenoplectus* which is very probably conspecific with the well-known totora reed covering the crater lake Rano Raraku on Easter Island. Amongst this sedge on Mangaia grew the large *Polygonum glabrum* which I also saw on Rarotonga and which is quite distinct from any other *Polygonum* in the herbarium at Lincoln. I believe that this species is indigenous to the Cooks.

Before leaving Mangaia I must mention the climax of my stay, namely a visit to the remote and inhospitable high makatea region called the Reia with its ferociously jagged coral surface. This entailed a long walk in the blazing sun through increasingly sparse vegetation of Pandanus scrub before scrambling up on to the Reia itself (an old pair of gloves would have been useful). Just before getting to the top I noticed two interesting ferns in the coral fissures. Both have a restricted distribution in the Cooks which excludes Rarotonga but includes the Ngaputoru Group northeast of Rarotonga. One species was the Cook Island endemic *Phymatosorus katuii* described from Mauke Island by the late Garth Brownlie, whilst the other belongs to the *Asplenium polyodon* complex although the habitat seemed so strange compared to those in New Zealand (including the Kermadec Islands).

The *pièce de résistance* of the day was to find a few flowering bushes of what is very probably *Nesoluma polynesicum*. This sapotaceous species was first reported for the Cooks by Mark Merlin of the University of Hawaii four years ago whilst doing an ecological survey of the makatea. The species is otherwise only known from Rapa in the far south of French Polynesia and Hawaii from where it was first described. The distribution seems very unlikely but there are similar examples. The tree amaranth (*Charpentiera australis*) has a similar distribution. I found it on Rarotonga in 1975 and discovered another small population this year; elsewhere it occurs only in the Austral Islands in southern French Polynesia with all the other species in the genus being Hawaiian endemics. On Mitiaro in the Ngaputoru Group grows the small daisy-like composite *Tetramolopium sylvae* which, along with its closest relations, is otherwise confined to Hawaii. These Cook Island and Hawaiian distributions cannot easily be explained.

On Rarotonga the most exciting finds were of native plants in the higher montane areas. For me the greatest thrill was to be shown the beautiful *Cyrtandra lillianae* with large white flowers which was thought to be extinct, indeed it was only known from the type specimen until rediscovered recently by Gerald McCormack, Conservation Officer on Rarotonga, in a precipitous valley head a little below one of the highest of Rarotonga's spire-like peaks. After exploring several similar valley heads this year we discovered two more localities of this rare shrub, each with fewer than 10 plants. During this work I also found a few plants of its smaller-flowered but also endemic relation, *C. rarotongensis;* Gerald had wondered whether this species was also extinct. With *C. lillianae* grew an as yet undescribed

species of *Psychotria*, a rubiaceous genus new to the Cooks which I first found in 1982 and which I now realise is fairly common.

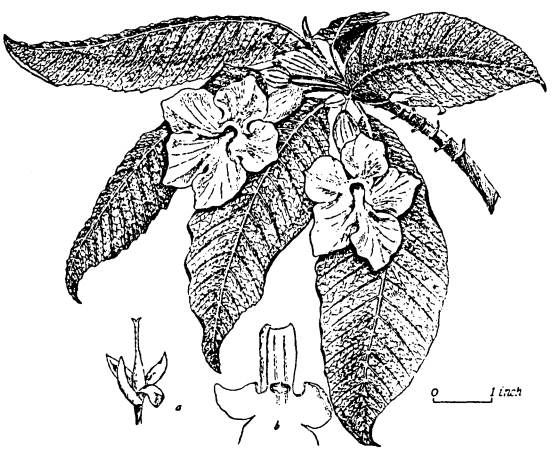
On the edge of the mist zone between 400 and 450 m in the remote southeastern part of Rarotonga I saw three or four plants of the very rare shrubby lobeliad, *Sclerotheca viridifolia*, and on one of them were a few of the beautiful greenish yellow flowers with their purple stamen tubes. In 1982 I found a similar number of plants in an almost identical habitat elsewhere and these are the only plants of this very rare endemic that I have ever seen. I had thought that it might be extinct. *Sclerotheca* has only 4 species, the other 3 being rare mountain plants from Tahiti. Related genera occur from Rapa to Hawaii where there is a proliferation of these striking and sometimes almost bizarre lobeliads.

Whilst climbing along a narrow rather dry ridge top high above Rarotonga's airport Gerald pointed out two unknown lianoid indigenous plants in flower and from which he had no Cook Island Maori names or proper Latin names. One was collected by T.F. Cheeseman in 1899 on the first botanical survey in the Cook Islands and until recently his sterile specimen was thought to be a species of *Derris*. Although it is a legume it is the plant known in Australia and Norfolk Id as *Millettia australis*, native wisteria. There is a true *Derris* in the Cooks but it is a Malaysian species called *D. malaccensis* which was deliberately introduced from New Guinea, hence its common name of ora Papua. The roots are used to kill reef fish although in theory this is forbidden. It looks to be wild sometimes but it does not have rhizomes or stolons and never produces flowers anywhere in Polynesia, so I suspect that people have always had a hand in its presence.

The other unknown species on this ridge was quite new to me and turns out to be a *Cocculus* species in the primitive dicot family Menispermaceae. The genus is widespread in the Old World tropics but in Polynesia has only been previously recorded from Hawaii and once again, Rapa Island. The Cook Island plant is obviously closely related to the one in Rapa but as yet I don't know if it is distinct from it or if either is conspecific with the Hawaiian plant. Later in the trip I worked along another sharp ridge in this western part of Rarotonga, and near the *Dodonaea, Dianella, Pittosporum* and *Planchonella* which I expected to find, were a few small tufts of *Doryopteris concolor* on a basaltic outcrop. This dry country fern belongs to the Adiantaceae and I had only seen it once before in the Cooks, in a similar habitat on Aitutaki to the north.

Finally, on a different note I was interested to find flowers on mato, *Homalium acuminatum* (Flacourtiaceae), one of the most abundant indigenous trees below about 250 metres on Rarotonga, but strangely one hardly ever sees its flowers at any time of the year. The three trees that I saw flowering had either partly fallen over or had half broken branches which were floriferous. When I commented upon this I was told that it never flowers properly unless a natural disaster occurs. Thus after Cyclone Sally had devastated many parts of Rarotonga in January 1987, whole hillsides of

leafless trees turned white or pale pink with the small shuttlecock-like flowers of mato. A few hours after I arrived back from the Cooks Cyclone Peni passed through the islands. Fortunately damage was negligible on Rarotonga and I now hear that *Homalium acuminatum* did not have a floral display in 1990.



Cyrtandra lilliane. a, pistil and calyx; b, stamens. From Wilder, G.P. 1931. *Flora of Rarotonga.*, B.P. Bishop, Museum.