

THE FLOWERING OF CABBAGE TREES (*CORDYLINA AUSTRALIS*) IN CHRISTCHURCH 1987 - 1993

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Introduction

The cabbage tree *Cordyline australis* (Forst. f.) Endl. (Agavaceae) is part of the natural flora of Christchurch, and is also widely grown in city gardens. After reading an account (Brockie 1986) of the variation of flowering frequency of native flax *Phormium tenax* in Wellington, I decided to conduct an annual census of flowering of cabbage trees in my part of Christchurch, beginning in 1987. Each year at the time of flowering I travel a route from my home in Avonhead through Ilam and round the south side of the University campus, a distance of about three kilometres. As I go I note the location and state of all the cabbage trees seen from the road. The states are: Juvenile (never having flowered), First Flowering (when there is always a single inflorescence), Not Flowering (but having previously flowered), and Flowering. In the last case I also estimate the number of inflorescences. An accurate count is often not possible as I can usually only see one side of the tree.

Almost all the gardens were at least 25 years old at the start of the census, and some were much older. The visibility of trees from the road seems to have decreased during the years of the census with the growth of intervening trees of other kinds. Some cabbage trees have been cut down and others planted. For these reasons, the census does not record the same trees every year.

During the winter of 1993 I checked the records of the first six years against one another, and against what was then visible along the route, intending to construct a permanent list of trees to check, and to follow these trees over a number of years. The number of trees that I had observed every year was embarrassingly small - only five trees, two of which were in my own garden! Certainly inaccuracies of reporting addresses or location of the tree in the garden contributed to the impossibility of identifying as the same trees those noted in different years. While in each year I had recorded from 51 to 84 trees, the records suggest that about 170 different trees had been involved, of which 63 were not now visible, almost all clearly having been removed, not simply obscured. This obscuration factor was borne out during the 1993 census: with the deciduous trees now covered in leaves and with a further season's growth on their shoots, many trees observed in the winter were difficult or impossible to find. A few more must have been removed since the winter. As far as can be judged, the proportion of juveniles removed was much the same as in the total population, so there is no evidence that the age-structure of the population is being altered from that cause. There are certainly numerous juveniles in the district, so the species is not a disappearing element of the local flora.

It is a matter of common experience that suburban gardeners tend to plant trees near the edges of their properties. This policy seems to be applied very strongly to

cabbage trees: very few grow more than one metre from the boundary of the property, and many are so close that it is difficult to be certain from the street which property they are growing on. A tree which will not take up much ground space will be planted closer than many, and be less likely to be removed because it has outgrown its space. Nor is it at all clear how many of the trees arose unbidden: a self-seeding tree is more likely to be left undisturbed in the shrubberies which line the fences on many properties.

Census Results

Table 1 shows the results of the censuses: percentages of the adult trees (i.e. those which have flowered previously, usually indicated by a branching trunk) which flowered in each year range from 61% in 1988 to 94% in 1989, with a grand average over the seven years of 80%. A preliminary statistical study suggests that the variation between years is more than would be expected by chance, but the run is too short to try to assign causes.

Any such attempt would have to cope with a tendency in some trees to alternate high and low flowering years, with no inflorescences at all in some low years. This feature occurs much more often than random variation would suggest, though with full records for so few trees it is not yet possible to estimate the proportions. As Figure 1 shows, there are trees with maxima in even years and trees with maxima in odd years, as well as trees which have more obscure patterns. Brockie reports in terms of a three-year cycle in *Phormium*: the non-alternating example in this figure is consistent with a three-year cycle.

Figure 2 shows the flowering of three trees which have been observed every year since their first flowering. In the first year there is always one inflorescence, terminal on the trunk. The three graphs show that one tree is more vigorous than the others, and has from the beginning, an alternating pattern superimposed on its general growth.

Disease

There have always been some sickly trees, many of them clearly very old. I have seen no sign that this is now more prevalent. The flowering records certainly do not suggest the onset of any widespread disease, and will serve as a benchmark should the disease be observed in Christchurch.

Conclusions

The flowering of cabbage trees varies from year to year in a way that seems to be greater than random variation, but no attempt has been made to find the cause. Individual trees may show a pattern of maximum flowering in alternating years; the maxima may be in either odd or even numbered years. There is no evidence of widespread disease and there is a considerable pool of juvenile trees in the neighbourhood.

REFERENCE

Brockie, R.E. 1986. Periodic heavy flowering of New Zealand flax (*Phormium*, Agavaceae). NZ Journal of Botany 24: 381-86

Table 1 Census Results

YEAR	1987*	1988	1989	1990	1991	1992	1993
DATE	NOV 17	OCT 28	NOV 13	NOV 27	NOV 22	NOV 27	NOV 16
Juvenile	8	11	5	8	12	15	12
First Flowering	0	5	1	1	1	0	2
Non-flowering	4	19	4	12	19	13	11
Flowering	39	30	68	38	38	56	53
All trees	51	65	78	59	70	84	78
Adult total	43	49	72	50	56	69	64
% flowering	91	61	94	76	67	81	83

* The 1987 numbers are not strictly comparable as the route was extended from 1988

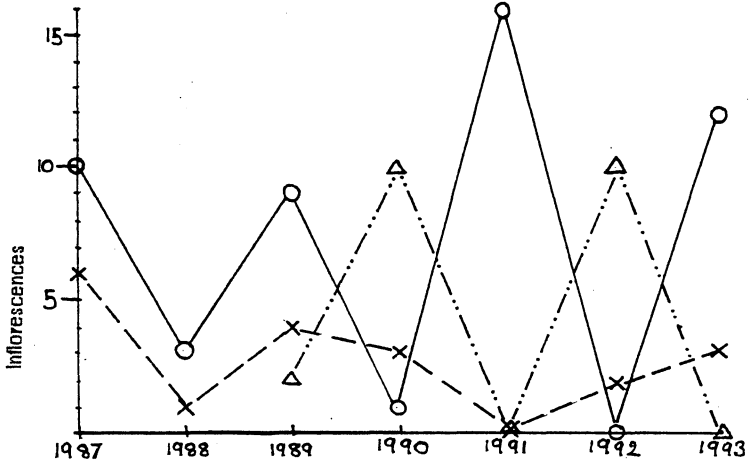


Fig. 1. Three patterns in the flowering of mature *Cordyline australis* trees: inflorescence counts for two alternating pattern trees, one with odd-year and one with even-year maxima, and one non-alternating pattern.

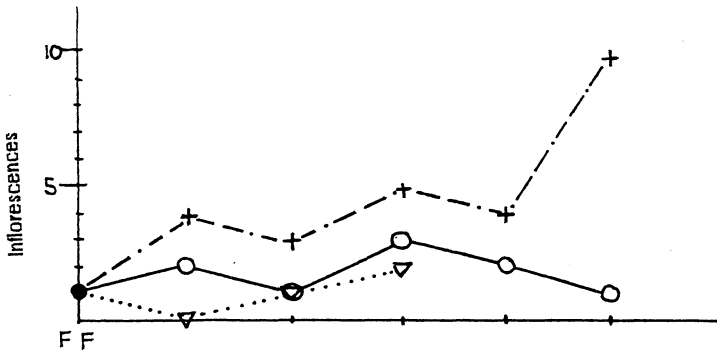


Fig. 2. Inflorescence counts for three young *Cordyline australis* trees, from the year of their first flowering (FF).