

Report of the Division of Botany and Plant Breeding-1979

1. BREEDING AND SELECTION

1.1 Controlled Pollination work

Controlled pollination as a source of commercial seed was completely suspended from January 1979 in accordance with the decision made in 1978. 7710 seednuts were harvested from 36,000 female flowers pollinated in 1978 at the Horekelly Seed Garden Unit. Although a harvest of about 12,000 nuts was expected from these pollinations carried out in 1978, only about 7000 could be harvested due to the drought which prevailed in both years (Annual Report of the Botanist, 1978).

Private and public sector estates were supplied with 80 ampoules of *typica* (prepotent) and 160 ampoules of processed *pumila* dwarf pollen for use in their own programmes of controlled pollination.

1.2 Research Nurseries and issues of planting material

41,330 *typica* x *typica* (CRIC 60) and 32,290 *pumila* x *typica* (CRIC 65) seednuts were planted in the two research nurseries at Bandirippuwa estate and the Isolated Seed Garden, Ambakelle.

Summary of the seednuts planted at two nurseries.

Type of planting material	Nursery location	
	Bandirippuwa	Ambakelle
<i>Typica</i> x <i>typica</i> (CRIC 60)	27,892	13,438
<i>Pumila</i> x <i>typica</i> (CRIC 65)	14,185	18,111

3558 seednuts of king coconut and the dwarf red variety were also planted at Bandirippuwa nursery.

The undermentioned numbers of seedlings were issued for the two planting seasons from Bandirippuwa and Ambakelle nurseries.

Type of planting material	Nursery location	
	Bandirippuwa	Ambakelle
<i>Typica</i> x <i>typica</i> (CRIC 60)	13,493	11,626
<i>Pumila</i> x <i>typica</i> (CRIC 65)	20,933	15,766

1.3 Hybrid Performance

A 10 acre hybrid block was established in late 1977 at Mahailuppallama Research Station to observe the performance of hybrids under irrigated and non-irrigated conditions. Initially the whole 10 acres was irrigated until seedling establishment.

This year 5 acres were irrigated at different intervals leaving the rest non-irrigated. Vegetative characters-leaf number and stem girth of those seedlings were recorded at six monthly intervals.

1.4 Pottukulama Research Station

Routine field operations were continued on fields 1 — 10. The yield data of the planting distance trial are being analysed.

This was planted with between row spacings of 25,30, 35 and 40 feet and within row spacings of 15, 18, 21 and 24 feet with densities per acre as follows

within row spacing (ft)	Between row spacing (ft)			
	25	30	35	40
15	116	96	82	72
18	96	80	69	60
21	82	69	59	51
24	72	60	51	45

Typica x nana (form *pumila*), hybrids were used as the planting material. Analysis of yield data over a four year period indicates significant differences in the mean yield per palm both among inter-row spacings and intra-row spacings. As far as yield per unit area is concerned, what really matters is planting density. It was found that at a density of 175 palms/ha the mean yield per palm is of this same order of magnitude whether the system of planting is almost square (rectangularity of 1.04) or highly rectangular (2.67). The number of nuts/palm decreases with increasing density with 83 nuts/palm at density of 128 palms/ha, 68 nuts /palm at a density of 175 palms/ha and 54 nuts/palm at a density of 239 palms/ha.

From this experiment it was established that yields were dependent upon the stand per acre. Different geometrical arrangements for the same plant density gave similar yields. Hence for intercropping purposes rectangular system of planting combining maximum intra-row and minimum intra-row spacing of 30' x 21' 35' x 18' will be advantageous.

1.5 Mother palm seed supply scheme

In order to augment the shortfall in mother palm nuts both "block nuts" and mother palm nuts were supplied to the nurseries. Nuts were collected from twenty-six public and private sector estates; 2,359,911 selected seednuts were supplied to the Planting Division nurseries. 15,000 *pumila x typica* seednuts were supplied to the Coconut Cultivation Board for the Eastern Province nurseries. During the year an additional 3,290 mother palms were selected from Daisy Valley Estate.

The total number of mother palms now stands at 58,021.

2. SEED GARDENS

2.1.1 Seed Garden, Ambakelle

Subsequent to the identification of very desirable parent palms on the basis of their yield, shape of the nuts and husked nut weight. open pollinated nuts from those "elite" palms were used to study the percentage germination and seedling quality. More

More than 90 % of those selected palms gave positive results for this nursery test. These elite palms are now being used to produce *typica* x *typica* improved planting material. In addition, pollen collected from original prepotents was released daily at the seed garden.

Production of natural cross *pumila* x *typica* and *eburnea* x *typica* hybrid seednuts were continued at the Seed Garden. In addition to 900 palms emasculated in field No 11A 1820 palms from 11A and 1457 palms from field No. 11B are available for emasculation from this year. The number of flowers emasculated is given below.

Field Number	Number of flowers emasculated
5	3016
9	2540
10(a)	5109
10(b)	3633
11(a)	2720
11(b)	1457

28,110 *pumila* x *typica* and 15,395 *eburnea* x *typica* seednuts were harvested during this year. This shortfall in production was mainly due to the drought which prevailed throughout the previous year as reported in the Annual Report for 1978.

1161 mm of rainfall was received in 97 rainy days with uneven distribution. Most of the yellow dwarf and green dwarf palms were severely affected by drought resulting in about 3000 casualties. This natural disaster will result in a drastic fall in seednut production next year.

2.1.2 Seed Garden, Horekelly

This station received only 1598 mm of rainfall during the year. Establishment of seedlings was affected by the prolonged dry spell. 612 vacancies in field No 5 were supplied with red dwarf seedlings for the May/June season. During the October/November season 589 vacancies were filled in field No 5. 1204 vacancies in fields 1, 3, 4 and 5 were supplied with green dwarf (*pumila*) seedlings as follows:

Field No 1	882 seedlings
" " 2	52 "
" " 3	275 "
" " 4	8 "

3. LABORATORY AND FIELD INVESTIGATIONS

1. The investigation on colour inheritance of inter-varietal hybrids was completed this year.
2. Extraction and identification of pigments present in the epicarp of the coconut of different varieties and hybrids was initiated.

Pigments in epicarp of the coconut were separated into chlorophylls, carotenoids and xanthophylls on the basis of their relative solubility in organic solvents. As a result of further separation of these pigments by thin layer chromatography and paper chromatography, it was observed that two colour forms of form *typica* (green and copper

brown) have similar carotenoids. The three colour forms of dwarfs have carotenoids which have similar Rf values but differ from those of the tall variety. When the form *typica* is crossed with the 3 colour forms of dwarfs carotenoids characteristic of dwarfs appear to be more prominently present in hybrids. However, in the hybrids colour of the carotenoids are masked to a certain degree due to the presence of chlorophylls.

(2) Preliminary investigations on dry matter production of nursery seedlings at different planting densities were carried out. They need to be repeated on a more organized scale next year in a design capable of statistical analysis.

(3) Induction of parthenocarpic nuts using synthetic hormones was attempted. This project was suspended due to the difficulties which arose as a result of the severe drought experienced.

(4) 832 open pollinated hybrid seednuts from Bandirippuwa Estate field No 14 were planted in order to find out the segregation pattern of the F₂ generation. Preliminary observations of these seedlings are being completed and they will be planted at Kirime-tiyana Estate to study their subsequent performance.

4. PERSONNEL

(a) Miss S. Dharmawardena, B.Sc., was recruited as Research Assistant.

(b) Mr. W. S. C. Perera was appointed as Superintendent, Isolated Seed Garden, Ambakelle.

(c) Mr. Dunstan Fernando was recruited as Assistant Manager, Mother Palm Seed Selection Scheme.

(d) Mr. R. R. A. Peries (Research Assistant) and Mr. K. A. Premasiri (Field Assistant) resigned from their respective posts. Mr. R. B. Rodrigo, (Field Officer) resigned from the post after 28 years of service at C.R.I.

(e) Dr. M. A. P. Manthirratna, Botanist, resigned on 25th November from his post after 26 years of service at C.R.I.

C. JAYASEKERA
Officer-in-Charge