

COCONUT RESEARCH BOARD



Leaflet No. 47

CONTROLLED POLLINATION OF COCONUT PALMS

This leaflet describes the technique of controlled pollination and is meant as a guide to those who desire to produce their own high-yielding planting material. Those who require more information are kindly requested to visit the Institute's laboratories at Lunuwila.

SELECTION OF PALMS

Palms should be selected on lines advocated in C.R.I. leaflet No. 1. Selected palms should consistently yield more than 100 nuts and 22 kg. (50 lb.) copra per year, besides having desirable vegetative features. (Fig. 1) Generally a single pollinator will be able to work on about 50 palms of medium height and this may be considered as a unit for purposes of selecting palms.

PREPARATION OF PALMS

Husks are tied on to the trunks of the selected palms at intervals of about two feet to facilitate climbing of the palms. The coir rope used for tying husks is impregnated with a mixture of used engine oil (8 parts), kerosene oil (4 parts) and tarnap (3 parts). The treated rope withstands weather as well as attacks by rats and squirrels, and would thereby reduce costs.



Fig.1. Type of palm used as a female parent.

As the selected palms are heavy bearers it may be necessary to remove one or two bunches from the lowest whorl to help the pollinator to get to the crown. It is advantageous to remove old bunch stalks and persistent butt ends as these when aggregated become breeding places for rats which damage the pollination bags and immature nuts. The palms should be numbered for the purpose of maintaining yield records. A record must be kept of dates of opening of spathes on each palm. The degree of success in pollination work will depend to a large measure on a correct recording of the date of opening of the spathe, which is taken as the day on which the sheath (spathe) enclosing the flowers bursts open.

EMASCULATION AND BAGGING

The coconut inflorescence bears both male and female flowers (Fig. 2). However, in nature cross-pollination is the rule as the male flowers shed pollen and fall off the spikelets before the female flowers are ready to receive pollen. The female flowers become receptive on about the twenty-first to twenty third day from date of opening of spathe. A trifid stigma protrudes through the surface of the female flowers, and there is a secretion of nectar from three nectaries. A large number of both winged and wingless insects are attracted to the female flowers at this stage. Receptivity of a single flower lasts 1 — 2 days and that of the whole inflorescence 2 — 5 days.

This natural sequence of events is closely followed for purposes of controlled pollination. The inflorescence is examined on the 18th day from date of spathe opening and the probable date of receptivity of female flowers is noted. Generally, these are receptive on about the twenty-first day. However, there are variations between palms, and the nature of the environment too may result in a different pattern of receptivity. Three days prior to the probable date of receptivity the spikelets are cut about three inches above the female flowers and the remaining male flowers are removed. For convenience of work not more than thirty female flowers are left on each inflorescence. The bunch is tagged for identification and is now ready for bagging, (Fig. 3).

Pollination bags each 90 cm. (36 inches) long are made from 200 gauge polythene tubular film, 60 cm. (24 inches) wide. These bags are cheap (about 22 cents each), and are easily prepared. They have the added advantage that they are relatively cooler, and

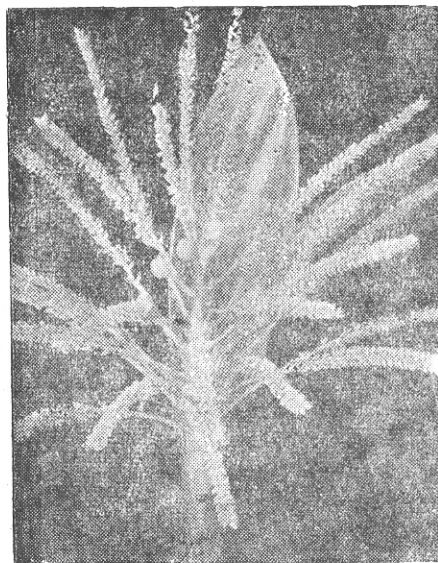


Fig. 2
Coconut inflorescence

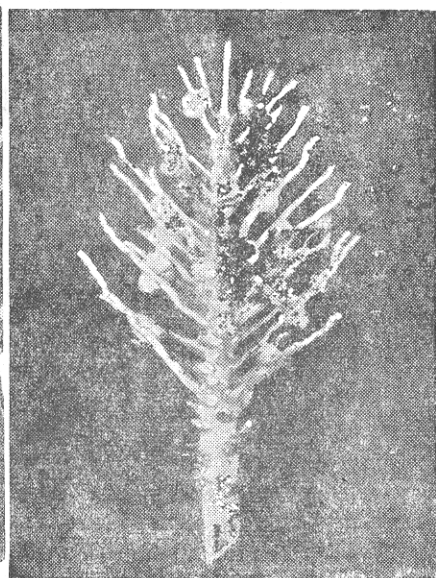


Fig. 3
Emasculated inflorescence
before bagging.

have been observed to give a slightly higher setting of female flowers with controlled pollination when compared with the cloth bags used earlier. However, the bags are damaged by insects particularly the scissor insect; rat and squirrel damage may be common.

The female flowers are enclosed by firmly tying the bag round the inflorescence axis (stalk) over a layer of cotton waste, the upper open end of the bag is likewise loosely tied (Fig. 4).

POLLEN AND POLLINATION

The Institute supplies pollen from selected palms of the 'tall' and 'dwarf' varieties. The pollen which is supplied in sealed glass tubes should be transported in an ice - flask, and stored in a refrigerator, preferably at deep-freeze temperatures, until required for use. Furthermore, when pollen samples are taken to the field for the day's pollination, they should preferably be packed in ice. These simple precautions will help conserve pollen viability which will be reflected in setting of nuts following pollination.

The receptive stage of the female flowers can be easily recognised by examining them through the transparent bag. If receptive, the glass tube containing pollen (which is taken to the crown of the palm) is broken and the pollen tipped into a small test tube. The brush and pollen sample are taken through the lower end of the bag, (Fig. 4), the brush dipped in the pollen sample and adhering pollen dusted on to the stigmatic surface of

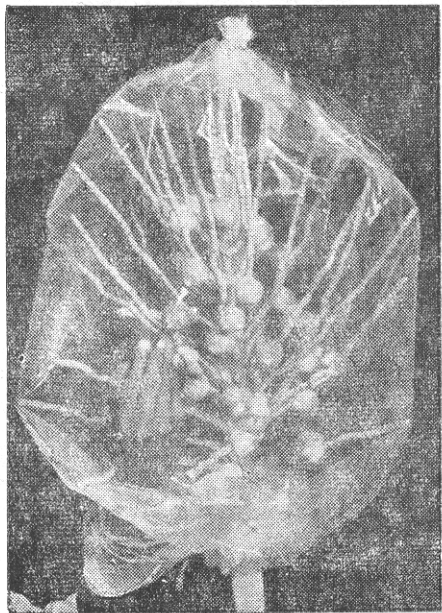


Fig. 4
Female flowers bagged for pollination

receptive female flowers. The bag is firmly tied after withdrawing the pollen sample and brush.

It is necessary to do a second pollination usually on the day following the first pollination. Pollinations should be done either early in the morning or late in the evening. The pollination bag is removed on the third day following the second pollination, and nuts will be ready for harvesting eleven to twelve months later. The pollination brushes, tubes etc. should be sterilised in rectified spirits and dried before use.

Any pollen remaining after the day's pollinations are completed should be stored for further use. This is done by keeping the pollen in a test-tube plugged with cotton wool, placed in a desiccator containing 43.4 percent sulphuric acid. The desiccator is kept in a refrigerator at 0° to 5° C. It is desirable to change the acid in the desiccator once every fortnight.

ASSESSMENT OF THE CROP

The number of nuts per palm that can be harvested will be less than under natural pollination, due to a number of factors. A fair assessment of the crop of pollinated nuts can be made by counting the developing button nuts eight weeks after pollination. A further reduction of about 10—15 percent may be expected before harvest. It may be desirable to mark the nuts while they are still on the palm, so that even a fallen nut could be easily identified.

EQUIPMENT NECESSARY FOR CONTROLLED POLLINATION WORK

1. Refrigerator with deep-freeze compartment.
2. 60 pollination bags.*
3. One dozen paint brushes (No. 2)*.
4. Two dozen soda-glass test tubes 75 mm. x 10 mm. (3"x3/8")
5. One desiccator 150 mm. (5½ inch) diameter or any convenient size, with perforated shelf.*

6. 100 filter papers to suit desiccator shelf.*
7. Pair of secateurs.*
8. Surgical cotton wool.*
9. 2.5 litres (three bottles) 98-99% sulphuric acid (to be diluted to 43.4% for use)*.
10. Rectified spirits.*
11. 22 kg. (50 lb.) cotton waste.*
12. G. I. sheets (for tags), wire, twine, paint etc.*

*These quantities are sufficient to commence work on one unit of 50 palms and will have to be renewed as work progresses