

EXPERIMENTS ON A COCONUT ESTATE

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IT was an inherited love of the soil that urged me to carry out experiments on my own. Modern ideas at that time were stimulated in me by my good friend Mr. P. A. Keiller, Analyst of the Colombo Commercial Co., Ltd., and the late Gate Mudaliyar Rajapakse who, as everyone knows, was then a leading authority on coconuts.

There was, attached to my Achchitotam estate at Mundel, 10 acres of jungle land. This jungle, to all intents and purposes, can be considered as virgin forest; it was forest for several hundred years and carried some of the best known hardwoods and other valuable timber. The soil is a greyish sandy loam of a non-lateritic type, hard when dry, but friable and suitable for good root development. The average rainfall is about 45 inches per annum, with shade temperatures rising to 90 degrees. Elevation is only about 20 feet about sea-level.

In 1927, I cleared these 10 acres by the methods then prevalent. As I had set my heart on having a fruit orchard run on scientific lines, I set apart two acres for this purpose and used the remainder for coconuts. I proposed to adopt methods different from those then in vogue and to experiment with the following objects in view :—

- (1) To obtain a greater number of trees per acre.
- (2) To reduce soil temperature to combat long periods of drought and uneven distribution of rainfall.
- (3) To test the efficiency of mass-selection of parent trees.
- (4) To record the progress of well-selected seedlings, carefully tended up to maturity.
- (5) To combat the growth of Illuk.

At that time, these five points of investigation were breaking new ground, and I am glad to say that the results have been amply rewarding. I feel I can now lay claim to being the first in the field in this country as the only person to have a group of coconut palms with individual records of yields (six during each year) over the past 25 years from the first day nuts were harvested.

I am indeed proud of this achievement. If I were able to repeat the work, however, I would plant without burning, and I would strongly recommend this experiment to those who are younger, and able to carry it through and see the results.

To make my multi-purpose experiment clear, I will now refer to each of the five points in detail :—

1. To get a greater number of palms to the acre, I adopted the triangular, or alternate system of planting. The plants in each row alternate with the plants on either side of it. They are in straight lines whichever way one looks and the palms are equidistant. In the square method of

planting, two rows of equidistant palms cut each other at right angles; in the triangular method, there are three equidistant rows cutting each other at 60 degrees. This, I consider, is an advantage for the cultivation and also for the manuring of the coconuts by the method of broadcasting the manure, which method will in my opinion soon supercede the method of manuring coconuts by the age-old method of circular rings or trenches round the base of each individual palm. In the case of the 26 feet spacing distance between palms, which I adopted, the distance between the rows is actually about 24 feet. This triangular method of planting gives 15% more trees to the acre. In my 8 acres I have thus got 572 palms as against the 640 which I would have had on the whole 10 acres of land at the same planting distance, using the square method. Though I am short by 68 palms, equal to a trifle over 1 acre, I have been able to get the 2 acres I wanted for my fruit orchard at the sacrifice of the equivalent of only 1 acre of coconuts.



TRIANGULAR PLANTING
Inter-locking overhead canopy of leaves.

2. With this triangular system of planting, the circular crowns of the palms more or less meet each other in the centre of each triangle, thereby forming a complete overhead canopy. This prevents the direct rays of the sun scorching the soil below, so the soil temperature and the rate of transpiration of soil moisture is thereby reduced and also the rain drops do not directly strike the soil. Those who have experienced the effects of the droughts during the past few years can imagine what this shading means to coconut plants in dry areas, such as the Puttalam District. It is almost a filtered ray that strikes the ground even when the sun is directly overhead. When walking between the rows, a definite gloom is noticeable, especially when the sun is shining brightly overhead. In the square method, the ground between the rows is fully exposed to the rays of the

sun, and the ravages of the heavy downpours which occur periodically in this district.

3. Selection was carried out by choosing a field in the best-yielding portion of the main estate with a yield of about 4,500 nuts per acre per annum. The procedure was as follows: You spot by the eye, the palms you consider most suitable, mark them, and start recording each crop for at least two years. At the end of this period, you select your parent trees from amongst those yielding over 100 nuts per palm. Fuller and more accurate methods have been worked out more recently by the Coconut Research Institute, and information may be had on application.

4. It is hardly necessary for me to elaborate on the necessity for the elimination of undesirable plants in the nursery; and for having well-prepared holes for planting out the selected seedlings. My procedure, after planting out, was to manure the young plants only after the third year, in the belief that the food material in the husk and in the nut, together with the food material in the well-prepared hole, and with almost virgin soil all around it, was sufficient for the young plant to carry on. From the fourth year onwards I gave each plant half a pound of muriate of potash, and I increased the dose each year by half a pound, until I reached 2 lbs. There is no doubt potash is a limiting factor for coconuts on these and other light loamy soils. For this knowledge I am greatly indebted to experiments carried out by Pacific Export, Ltd., and to the trials carried out by the Colombo Commercial Co., Ltd., under the direction of Mr. P. A. Keiller in the 1920's, at Hunu-

pitiya. The progress made as a result of the application of potash was truly remarkable. From the eighth year onwards, manuring was carried out once in two years. Nitrogen and phosphoric acid were then added to make up a complete mixture. Only very limited quantities of nitrogen were added for a number of years, owing to its presence in the green manures which were regularly incorporated into the soil. Unfortunately, during the War years, I could not adhere strictly to this manurial programme, nor to the two yearly periods of application, and this together with the droughts experienced, made it impossible for me to obtain the target yield of 50,000 nuts within the time I had fixed. I hope, however, to reach this figure shortly, *i.e.*, to exceed 6,000 nuts per acre, per annum.

5. Illuk grows rampant on newly cleared areas, and well knowing the damage it can do, and the hindrance it is to cultivation, at the end of two and a half years, as soon as my catch-crop of plantains was removed, the whole area was ploughed and harrowed. When finishing off with the chain harrow, a mixture of *Calapogonium mucunoides* and *Centrosema pubescens* was sowed in rows with my seed drill. These covers were periodically harrowed, ploughed, or buried in trenches. After a period of ground covers, *Boga medelloa*, an erect shrubby cover, was grown in alternate rows, and when ready it was cut and buried in the other rows. The growth, both of the creeping and of the erect covers was exceedingly good. The ground cover was usually 2 to 2½ feet thick, and the latter 4 to 5 feet high. By adopting such measures in the early stages, I not only eradicated the illuk completely but also added to the already good earth very large quantities of green nitrogenous material. As the years passed by and the palms grew up, the canopy referred to above, was sufficient to provide overhead shade and so keep the illuk under control.

Besides the cultural methods described above, all droppings and other estate litter were buried. The huge butt-ends however were removed and burnt, and the ash returned to the soil. The necessity for precautions against soil erosion did not arise, but draining was a problem. During the last 10 years or so, manuring was done by broadcasting the manure between the rows and incorporating it into the soil by harrowing. When weed growth is excessive during favourable weather conditions, it is slashed down with the harrow, but unfortunately even this had to be neglected during periods of low prices.