AN ISOLATED SEED GARDEN FOR COCONUTS

By D. V. LIYANAGE,

Botanist.

THE need for an isolated seed garden for coconuts has been felt for a long time. The proposal was first made in 1930 by Sir Marcus Fernando and then again in 1950, the late Prime Minister. Hon. Mr. D. S. Senanayake referred to this subject when he addressed a field day gathering at Bandirippuwa. However, so far, this proposal has not been implemented for various reasons, Now that the preliminary work, such as the purchase of a ladder (*C.C.Q.*, 1953, No. 1, p. 23), that would facilitate pollination work, and the development of techniques in hybridization work relative to coconuts have been done, this scheme can be executed provided the necessary expenditure is forthcoming.

Before presenting the case for an isolated seed garden, it is necessary to examine the breeding system of the coconut palm (*Cocos nucifera*, L.). A detailed account of this subject has been published by the writer elsewhere (Tropical Agriculturist, Vol. 105, pp. 171-175). The tall variety of the coconut palm that is commonly grown in Ceylon is generally cross-pollinated. Consequently, when nuts are derived through uncontrolled pollination, the identity of the male parent is not known. Agents of pollination are both wind and insects.

According to the present methods of selection, seed nuts are collected either from selected high-yielding (elite) palms or from high-yielding blocks. The elite palms generally do not form a compact block, but are distributed within a mixed population. Even in the high-yielding blocks, a good percentage of the crop is contributed by a relatively small number of high-yielding palms. In other words, a high percentage of that population will consist of palms yielding about 40 nuts per palm per year, or less. Hence in this composite population with widely variable bearing capacities between palms, natural pollination will involve many undesirable types of parents. Seed nuts collected through uncontrolled pollination will be of diverse origin. This genetic diversity amongst environmental factors, explains the presence of high and low yielding palms on estates.

How could we eliminate these low yielders, provided the environmental factors are right?* Palms that give more than 150 nuts a year are known on many estates. Unfortunately, there are no known methods of vegetative reproduction, *e.g.*, as in Hevea rubber, and therefore clonal multiplication is not possible. As we have to depend only on sexual reproduction, the problems that face the improvement of the coconut palm are rather intricate. By a process of controlled pollination and selection, whereby the undesirable type of parent is eliminated, it should be possible to improve the yield of nuts or copra even during the first generation. There are two methods open.

(1) By artificial pollination between selected parents.

*This discussion is limited to methods of mass selection only.

(2) By establishing a block of high yielding palms away from any coconut plantation and allowing them to intercross between themselves without any contamination with foreign pollen—an isolated seed garden.

The first method is rather slow and expensive and further it will not be possible to produce the annual requirements of seed nuts. The second method offers a better practical proposition.

The isolated seed garden is to be exclusively planted with selected seedlings derived from controlled pollinations between elite palms. The total stand will consist only of high yielders. They would freely intercross under natural conditions,without any contamination with pollen from inferior palms. Therefore the resultant nuts are bound to be of a superior genetical constitution (genotype) than those derived from ordinary estate blocks or isolated high yielding palms. Further undesirable progenies, if any, can be eliminated by a stringent selection of seedlings raised from these nuts.

The second phase in this work, is to cross selected high-yielders from the isolated seed garden, and establish a second block with those nuts. The value of this work is two-fold. When the plants are established, the day-to-day requirements of planting material can be supplied with seed nuts of more superior genotype than are supplied now, and simultaneously, by a process of modified mass selection a superior strain of coconut is evolved.

From the point of view or economics of the coconut industry, it is hoped that by using selected seedlings derived from the nuts of the isolated seed garden, the overall average in yield of nuts or copra for Ceylon can be markedly increased, so that cost of production will be reduced. Hence on this assumption, an isolated seed garden is an insurance against lean times in the future of the coconut industry.