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Mass Production of Coconut Hybrids Calls for Cautious Approach

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IN recent years considerable attention has been paid to the production and study of intervarietal hybrids in the coconut. The satisfactory performance of most of the *Tall x Dwarf* and *Tall x Gangabondam* hybrids in which the desirable characters of both the parents are manifested to a considerable extent has led to an increased demand for such hybrids from cultivators amongst whom these seem to have acquired much popularity. But it has not been possible to meet the increased demand from the public. Cultivators naturally ask why steps should not be taken to raise adequate numbers of hybrid seedlings to meet the enhanced demand.

The question cannot be answered straightaway one way or the other for there are a few points which have to be considered carefully in connection with the increased production of hybrid seedlings. They are discussed below.

HYBRID VIGOUR AND NURSERY SELECTION

Earlier workers on coconut breeding had reported the manifestation of maximum hybrid vigour in seedlings obtained by crossing the *Tall* and the *Dwarf* varieties of the palm. But recently such vigour has also been shown in the products obtained by crossing *Tall* and *Gangabondam* and *Tall* and *Spicata* varieties. On account of the highly cross-pollinated nature of the *Tall* variety, the progenies obtained by using this as one of the parents, do not reveal uniform vigour. This makes it necessary to see that the utmost care is exercised in the selection of seedlings in the nursery and that seedlings that exhibit maximum vigour only are selected.

As hybrid vigour is usually high in the heterozygous generations it is also necessary that the parental crosses are repeated and studied in order to get seedlings with maximum vigour, when they are raised from seed. In plants in which vegetative propagation is possible the procedure is easy. In the coconut, however, asexual propagation is also not possible and repeated hybridisation is the only way in which stable progenies of economic importance could be evolved. This, besides being a time-consuming affair, requiring a lot of patience, is also rather an expensive process.

LIMITATIONS ON PRODUCTION OF HYBRIDS

The artificial production of inter-varietal hybrids in coconut is of a highly technical nature. The age to which the coconut palm grows, its height, the long interval between generations, the absence of genetical purity in the material available for hybridisation, the long period of experimentation necessary before a hybrid could be declared superior, are factors which are responsible for slow progress in coconut hybridisation work. To add to these the actual pollination work itself is of a technical nature and the shortage of skilled mazdoors who know the technique makes it difficult to take up pollination on a large scale.

For the production of promising hybrid seedlings, prepotent high yielding

parent palms are required. Paucity of prepotent mother palms possessing good combining ability, and dearth of pedigree pollen parents such as good *Dwarf* and *Gangabondam* palms have also imposed limitations on increasing production of hybrid material.

IMPORTANCE OF PARENTAL SELECTION

A survey of the performance in some growers' holdings of hybrid seedlings supplied from this Station has shown certain defects in some of the palms. For instance, a few hybrids are reported to produce relatively small-sized nuts which are not likely to fetch a good price in the market. Some hybrids are reported to turn into alternate bearers producing nuts only once in two years. These undesirable characters noticed in these hybrids can be due to incompatible parental combinations. Thus, for the production of good promising hybrids, the need for a careful selection of the combining parents becomes clear.

All combinations of *Tall* x *Dwarf* or *Tall* x *Gangabondam* are not found to give progenies possessing uniformly desirable characters. The following data, for example, of young *Tall* x *Dwarf* hybrid palms which have recently flowered at this Research Station illustrate this point. These hybrids were raised from the nuts of two West Coast *Tall* mother palms obtained by crossing them with different *Dwarf* male parents.

Female parent	Male parent	Mean copra content per nut	Remarks
I/76	IX E/56	185.00 gm.	These hybrids have flowered within 4 to 5 years after planting.
I/76	IX E/23	118.03 gm.	
I/76	IX E/34	158.10 gm.	At present their mean yield varies from 30 to 40 nuts per annum.
VIII/23	IX E/56	173.05 gm.	
VIII/23	XI/71	230.00 gm.	
VIII/23	IX E/23	141.00 gm.	

The data indicate that for the female parent I/76 the combination with IX E/56 and for palm VIII/23 the combination with XI/71 are more promising than the others. Similarly in other hybrids like Tall x Gangabondam also parental combinations have to be fixed by studying different sets of individuals. Hence the need to pay more scrupulous attention to the selection of female and male parents has arisen. This can be done only on the basis of the results of studies on a large number of such hybrids involving the working out of the different combinations. Unless the parental combinations are fixed and standardised, there is the danger of production of hybrid seedlings that may not have the desired qualities.

LONGEVITY AND YIELD OF HYBRIDS

What is the life span of a hybrid seedling? The question is often asked. Since the earliest hybrids planted at this Station are now only twentyfive years old, nothing definite can be said about their longevity at present although they have been consistently yielding very well, all these years.

Sufficient information regarding the adaptability of the hybrid seedlings to different climatic and soil conditions also is not yet available. This is also an important factor which should not be lost sight of. The fact that the hybrids grow more vigorously than either of the parents need not necessarily mean that they will come up quite as well, under unfavourable soil and environmental conditions as the more adapted tall variety. It has to be stressed in this connection that unless they are raised under favourable soil conditions and management, they are not likely to prove early and high yielders. The growers should give due consideration to this point when they think of planting hybrid seedlings in preference to those of the ordinary tall variety.

HYBRIDS AS MOTHER PALMS

Another aspect that the cultivators should take note of is that these hybrid palms, however high yielding they may be, should not be selected as mother palms for seed purposes. This is very important. It should be remembered that being hybrids wide segregation should be expected in their subsequent generations. It is just possible that the

stability of the hybrids may be well maintained in the first generation but whether this would be repeated in the second can at present be only a matter of pure conjecture. At any rate, one cannot exclude the possibility of a reversal in the second generation to the original parental characteristics.

In the case of the coconut this is bound to be a long term programme. The work of hybridisation, in other words, should be looked upon as only still in the experimental stage, with the researchers actively engaged in working out a detailed and systematic hybridisation programme in all its various aspects.

MASS SCALE HYBRID

PRODUCTION INADVISABLE

The question of increasing the production and popularising the supply of hybrid seedlings has to be considered in the light of the points discussed above. The parental combinations have to be studied and standardised. Progeny behaviour and stability in subsequent generations also have to be carefully ascertained before any large scale production and supply of hybrid seedlings is attempted.

Having regard to the difficult problems posed by the coconut palm; the only feasible way open to the breeder in this crop appears to be suitably to modify the breeding programme in the light of the experience so far gained and recommend planting material from only such combinations as have proved to be of sufficient merit. Just because their yield records have so far been satisfactory, it is not advisable to produce hybrid seedlings on a mass scale. In any case, it is too premature to go in for hybrid coconut seedlings for large scale planting.

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When in the case of a hybrid seedling, the question is often asked, "Will it be a true hybrid?" the answer is that it will only be a true hybrid if it is a true hybrid. It should be remembered that the only way to be sure of this is to have a true hybrid in the first place. It is just possible that the