Scope of Arecanut Improvement by Breeding

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The arecanuts, commonly known as betelnuts, are the fruits of Areca catechu Linn which is used in chewing with betel leaf and also for social purposes by rich and poor alike. The crop is mainly cultivated in the tropical regions of South and South East Asia. Its original home is not clear and various disputed opinions prevail. A sort of confusion exists regarding the exact number of areca species. About forty species have been reported. The nuts of few other species like A. Concinna and A. nagensis are also used as substitute. India is short of her betelnut requirements and annually imports about ten lakh maunds. The scope for increasing production by extending area under cultivation is very limited due to the extremely localised nature of the crop. The average yield per palm is much less due to lack of reliable seed material, due to the severe attack of diseases like Koleroga (fruit-rot), Anaberoga and others, due to inadequate irrigation facilities and absence of scientific knowledge about cultural and manurial practices. Therefore, the possibilities of increasing production is mainly by evolving high yielding, drought and disease resistant seed materials through proper breeding techniques and also by improvement in cultural and manurial methods.

In areca gardens, one finds palms producing varying number of inflorescences per year and also a great deal of variation in fruit-set amongst the bunches. Palms are monoecious with unisexual flowers but in stray cases hermaphrodite flowers are also observed in between the male and female flowers. The male flowers begin to open first and continue flowering from the tip to the base. Practically, when all the male flowers have completed blooming and shed, the female flowers begin to open in their sequence of development. The palms, however, are essentially cross-pollinated ones due to this sort of their behaviour of flowering. Details regarding flowering behaviour anthesis, period of receptivity of stigma, pollen viability and storage, the extent of natural, self and cross-pollinations, suitable hybridization technique, etc., are lacking and needs investigation. Inheritance of economic characters and self-behaviour in controlled crosses are to be studied. Since high and poor yielding trees are randomly distributed in the gardens and receiving more or less identical treatments, the variations in the yield is therefore primarily due to the inherent characters of the trees. The practice amongst the growers ever since the crop in cultivation whether in raising a new garden or replacing the deteriorated trees or gaps, is by transplanting the seedlings raised from the open-pollinated seednuts collected from the high yielding mother palms located invariably in their own old gardens or at the most, from nearby gardens. Though the seednuts have been collected from the high yielding mother palms, the progeny segregates due to the unknown male parent, which the grower actually finds to his dismay after a number of years of hard labour and lot of expenses in raising the palms.

No different varieties of arecanut are known. The size and shape of fruits and kernels and also their number in bunch vary a great deal. The size of the nuts vary from big to very small shape oblong to spherical and taste of the nuts higly astringent to sweet. A detailed survey of number of gardens situated in different arecanut growing regions may be undertaken for recording genetic variation, selecting high yielding desirable palms for hybridization, determining the occurrence of uneconomic palms and the possibilities of replacing them with the reliable seedlings. All the indigenous as well as exotic species and types of areca should be collected and studied for various economic characters like the age of flowering; number of inflorescence annually produced; number, size and shape of nuts and their taste; ability of the palm to withstand drought and diseases like Koleroga, Anaberoga, Band etc. habit of growth and others so as to utilize them in crossing programme.

Arecanut being a perennial seed propagated crop and taking about 6 to 8 years to come to flowering will obviously take a long time before suitable strains are evolved. For early improvement and upgrading of areca industry, it is suggested to distribute reliable seedlings (i) grown from the seednuts collected from open-pollinated, highly productive and very well isolated gardens. The trees which are on an average and below economic level in the selected gardens may, if possible, be removed, if not the distal portions of the inflorescence where only male flowers are situated are to be cut when they are quite young and much before they start blooming so as to avoid pollen contamination and setting of nuts due to them on the selected highly productive palms. Seednuts gathered from such high yielding palms are likely to be then due to cross-pollination among themselves and therefore the seedlings raised from them are expected to be more productive and reliable than the traditional method of raising seedlings from the seednuts gathered from high yielding mother palms contaminated with pollen of poor yielders, (ii) grown from the crossed seednuts obtained through controlled cross-pollination of the highly productive trees. These trees should preferably be selected from very well isolated small group of palms which were being replaced by the seedlings of the very garden since generations; this is with the view of taking advantage of the possible hybrid vigour. The presence of distinct groups of male and female flowers on inflorescences, their separate phases of flowering and easiest way of removing all unopened male flowers and effecting controlled cross-pollination are likely to make it possible to produce crossed seednuts on a mass scale. After the development of technique of storage of pollen grains for a long duration, it may become even feasible to cross-pollinate selected palms growing several miles apart in different regions. The best possible parental combinations are to be ascertained by studying a number of cyclic crosses amongst the highly productive palms with the purposes of maximum utilization of hybrid vigour. Morphological characters of the high yielding palms are to be determined and if possible to be applied in the selection of seedlings in the nursery.