COCONUT VARIETIES AND HYBRIDS

R. VASUDEVAN PILLAI
Central Plantation Crops Research Institute
Kasargod, Kerala

At the Central Plantation Crops Research Institute, Kasaragod there are, at present, 62 exotic and 32 indigenous collections. Among these introductions a few have stabilised their yield while some others have just started their initial bearing and still others are in the seedling stage. A comparative study of a few exotic and indigenous cultivars with West Coast Tall revealed that some of the exotic indigenous types are superior to the West Coast Tall.

The West Coast Tall variety is one of the local types growing extensively in the West Coast of India. This has economically useful nut characters. They are long lived, hardy and adapted to widely different environmental conditions. However, the main snag encountered in the propagation of these palms is that greater part of the yield comes from a relatively smaller number of palms in a plantation. The selection and breeding of mother palms with uniformly high yield, is the most important step in the improvement of this crop.

Along with the improvement of the local tall palm evaluation of promising indigenous cultivars is also in progress. The studies conducted in this line have shown that indigenous cultivars such as Kappadam, Laccadive Ordinary, Laccadive Micro and Andaman Ordinary are superior to the West Coast Tall in their performance, as will be evident from the Table at the end of the article.

SOME CULTIVARS AND HYBRIDS

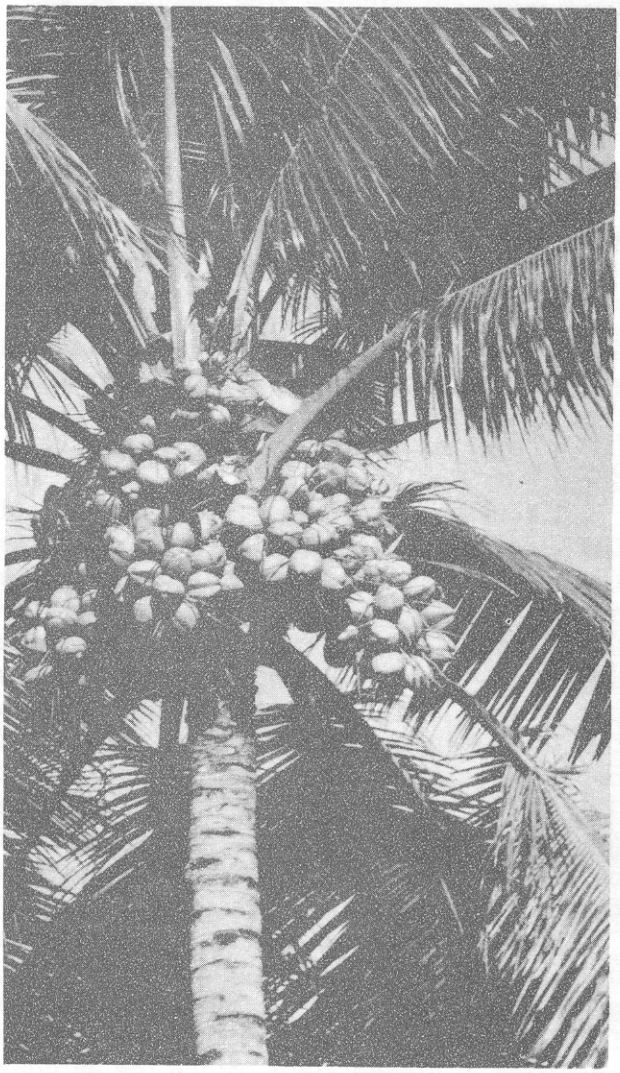
CULTIVARS

Kappadam: This is a tall variety yielding over 80 nuts per year, and one among the three late bearing varieties which yields, on an average, 23 kg of copra per tree per year. Since the size of the nut is fairly big the number of nuts per bunch is about 6 to 7 only.

Laccadive Ordinary: A native of Lakshadweep and resembling in all respects the West Coast Tall palm, this is one of the most promising types recommended for large scale cultivation in India. Whereas the West Coast Tall variety yields 76 nuts per year, this type produces 143 nuts on the average and hence the total outturn of copra is almost double that of West Coast Tall. This variety was also found suitable for ball copra production. The oil content of the copra is also somewhat higher than that in the local tall.

Laccadive Micro: This is a tall late bearing palm from the Lakshadweep island, producing very large number of female flowers with a high setting percentage resulting in higher yield. Since the number of nuts per bunch is very large, the size of individual nuts is small. However, the large number compensates for the size and hence the total outturn of copra per tree per year is 100% more than the West Coast Tall. For ball copra production this is an ideally suited variety and has the highest oil content in copra. Where the farm level transactions are in the form of nuts, this is a highly profitable type.

Andaman Ordinary: Introduced from Andamans and growing well under West Coast conditions, this is an ideal type for tapping also. A tall variety giving medium sized nuts gives 20 kg of copra per year on an average. The copra content is somewhat low when compared with W.C. Tall, but the yield is over 50% more than the W.C. Tall and hence 49 trees only are required to yield one tonne of copra.



Lakshadweep Micro

In addition to these indigenous cultivars, there are a few exotic cultivars which if cultivated on an extensive scale will increase the production to a considerable extent. They are San Ramon, Philippines Ordinary, S. S. Green and Fiji. Among these four cultivars, except Fiji which gives only 17.8 kg of copra per tree per year all others give over 20 kg. The number of nuts in these cultivars ranges between 89 to 104 except in the case of San Ramon which is one of the biggest sized nuts, where the yield is only 58 nuts per year. Where farm level transactions are done on the basis of nuts this cultivar may not be a suitable one, but if they are converted to copra and sold this becomes economical.

HYBRIDS

Unlike in wheat, rice, sugarcane, cotton, barley, oats, chillies, maize, potato and many vegetables, hybridisation work in coconut is difficult and it takes very long for tangible results to be obtained. The principal objective of the coconut breeder therefore, is the evolution of an early bearing, heavy yielding variety with good quality and quantity of copra and high oil content. Despite the economic bearing habit of West Coast Tall it is characterised by a long pre-bearing period which sometimes goes upto 10 years. As a result of efforts to evolve early bearing economic types, a few hybrids have already been produced.

Philippines San Ramon

Tall x Dwarf hybrid : In this hybrid the female parent is the West Coast Tall and the male, the early bearing Dwarf Orange. In the early days of hybrid production the Chowghat dwarf green was used as the male parent since this dwarf is the earliest of all varieties. Subsequent studies have shown that hybrids involving parents of Tall and Dwarf Orange perform better in their copra content per nut and annual outturn of copra than Dwarf green. Available evidences point to the fact that they are early and prolific bearers. However, variations between individual hybrid palms are seen in their yielding capacity. This is because every palm by itself is of a different genetical constitution. The early bearing habit exhibited by the hybrid, no doubt, is a thing long awaited by the cultivator. The evidences available so far have indicated that the Tall x Dwarf hybrid may have the life span of the Tall. The available data on these hybrids conclusively show that these hybrids are superior to the random bred West Coast Tall palms. A comparative study of this hybrid with West Coast Tall as well as some of the exotic and indigenous types is presented in the table. One undesirable character noticed in this hybrid is the thin husk. This can be considered undesirable only in areas where the husk of the nut is in demand. Regarding its performance under a variety of climatic conditions it was observed by the author during a survey of the coconut growing areas in our country that except in a few cases where a particular tree was inferior, the average performance was quite satisfactory. This is also evident from the very high demand for the seedlings of this hybrid. Even all resources put together by the Institute as well as the Department of Agriculture in the different states have not been sufficient to meet the demand of cultivators. The early bearing and heavy yielding characteristics of these hybrids have been taken advantage of by the cultivators.

Dwarf x Tall hybrids : Among the coconut hybrids, the Dwarf x Tall hybrid generally known as D x T hybrid is the most important one. This is actually a reciprocal of the previous one. This hybrid

Dwarf x Tall

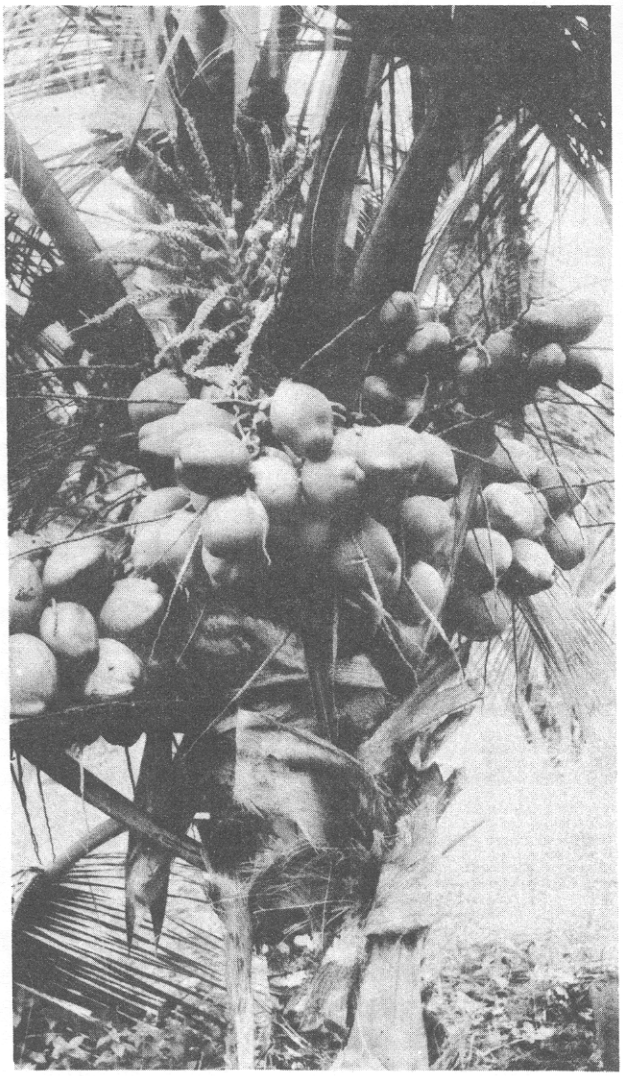
was known formerly as Natural Cross dwarf, because from the open pollinated nuts of the dwarf orange, this could be isolated. In the dwarf orange variety there is about 30% cross pollination taking place even though it is generally referred to as self-pollinating type. This results in the production of natural hybrids in these dwarfs, the dwarfs being females and some unknown talls the male. In the controlled crossing programme it has been proved that such hybrids could be produced by pollinating the dwarf orange female palms with pollen from the tall palm. Hence these natural hybrids are presently called Dwarf x Tall hybrids. Among the various hybrids produced so far, the D x T hybrids are found

to be the most promising types because of their high yielding nature combined with good quality and quantity of copra. The total outturn of copra per tree per year in this hybrid is the highest, so that for producing one tonne of copra only 4762 nuts are required. In other words, 38 trees of D x T hybrid are capable of giving one tonne of copra. In other words, half an hectare of D x T hybrid garden is equivalent to one hectare of West Coast Tall garden. In addition to this, the D x T hybrid is the most tolerant to root wilt disease of all the hybrids and cultivars so far tested. Another interesting feature of this hybrid is that even under diseased conditions the palms are capable of giving economic yields.

Tall x Gangabondam : Gangabondam is an indigenous dwarf type found mainly in the Godavari districts of Andhra Pradesh. This green dwarf is superior to the Chowghat Dwarf Orange as well as the Dwarf Green in copra content and oil percentage. In this hybrid the desirable characters of Gangabondam are found. The copra content per nut is more than that of T x D hybrid and the oil is also slightly higher. A tree of this hybrid produces 22.5 kg of copra per year compared to 12.5 kg of W.C. Tall. When compared with T x D hybrid only about 500 nuts less is required to produce one tonne of copra.

Laccadive x Gangabondam : Among the other intercultivar hybrids this particular combination is worth mentioning. Laccadive Ordinary by itself is found to be superior to the West Coast Tall. So also is the case with Gangabondam into dwarf orange and dwarf green. Hence it is logical to infer that a combination of these two cultivars should be superior. However, this hybrid is only on par with its female parent regarding the total outturn of copra. But there is an increase in the copra content per nut and hence for the production of one tonne of copra lesser number of nuts are only required.

Several crosses between indigenous and exotic cultivars and also within exotic cultivars have been effected to locate promising re-combinations among them. A diallel series of crosses having reciprocals and another set without reciprocal combinations have been done. All of them are under evaluation. Indications are there that a few crosses are very promising. Their assessment will be made only when they reach the stabilised yield.



Lakshadweep Ordinary x Gangabondam

It is accepted by all concerned with coconuts that coconut improvement at best is a very slow process requiring patience, intensive planning, sustained and dedicated efforts. This fact makes it all the more necessary that it should be tackled from different angles. A very comprehensive and long range breeding programme for the improvement of the crop has already been initiated at the Central Plantation Crops Research Institute, Kasaragod, Kerala. In the meanwhile in order to aug-

ment the production of coconuts in this country following general recommendations can be adopted by the cultivators.

1. Improved planting material of the local Tall alone should be used for future planting.

2. Limited number of seedlings available of the promising cultivars and hybrids may be obtained and used for planting.

3. D x T hybrids which can be separated from the open pollinated progenies of Dwarf should be planted on a large scale.

4. Better management practices may be adopted especially for the high yielding hybrids and cultivars.

5. Adequate fertilizer application for the plants should be taken up in the proper time.

Performance of a few cultivars and hybrids

Name of cultivar/ hybrid	Time taken for flowering (in years)	Average No. of nuts/ tree/ year	Mean copra content/ nut (kg.)	Mean annual out-turn of copra/ tree (kg.)	Oil per-centage	No. of nuts required per metric tonne of copra	No. of trees required to produce 1 tonne of copra
San Ramon	6	58	349	20	68	2858	49
S.S. Green	4	105	197	21	68	5012	48
Philippines	4	99	214	21	66	4695	47
Fiji	5	90	199	18	70	5025	56
Laccadive Ordinary	5	143	160	23	72	6875	43
Laccadive Micro	6	213	113	24	75	8850	40
Kappadam	6	82	284	23	61	3530	48
Andaman Ordinary	5	123	167	20	64	6025	49
West Coast Tall	7	77	177	13	70	5650	74
Tall x Dwarf	5	143	177	25	68	5650	39
Dwarf x Tall	5	127	210	26	68	4762	38
Tall x Gangabondam	6	116	193	22	69	5160	44
Laccadive x Gangabondam	6	123	171	21	69	5860	47