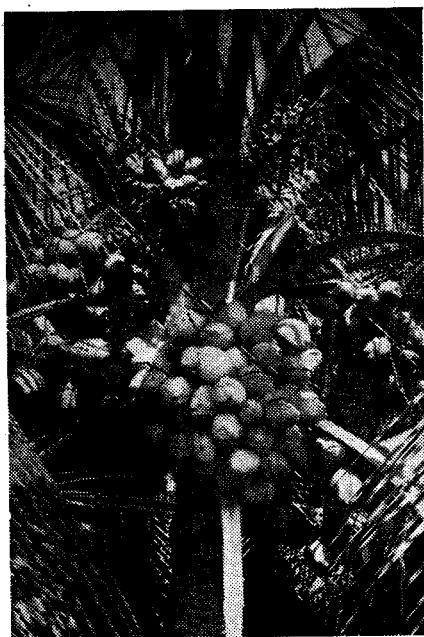


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Hybrid coconut—gives better yield and is more disease tolerant

PLANTATION CROPS RESEARCH —A SURVEY

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PLANTATION crops which occupy about two per cent of the area cultivated under all crops in India account for an export earning of about 250 crores of rupees per annum. While production of crops such as tea, coffee, cashew, pepper and cardamom is highly export-oriented, coconut, arecanut, rubber, cocoa, oil palm, etc. are oriented towards import substitution and industry based. This article accounts in brief the salient achievements in the field of coconut and arecanut research during the last quarter of the century.

Arecanut

Large quantities of arecanut were being imported into India to meet the country's requirement. During the year 1956-'57, 39,903 tonnes of nuts valued at 5.45 crores of rupees were imported. Research on arecanut commenced from 1956 onwards had its impact on overall production as well as production per unit area as is evident from Table I.

The combined effect of improved agronomic practices and plant protection measures increased the per hectare production by 16% from the base year of 1956-'57.

Intensive work on the evolution of high-yielding varieties of arecanut taken up from 1960 onwards has yielded a new variety, 'Mangala' which is under release. This is precocious and semi-tall in habit having nuts of good market quality and pests and disease tolerance comparable with the local. It has recorded 71% more yield as compared to local, successively over a period of six years. This variety which is under release is expected to increase the per acre yield of arecanut substantially. A few other high-yielding varieties are also in different stages of field testing.

Coconut

In the evolution of high-yielding varieties of coconut, work done so far has shown that hybrids, involving West Coast Tall, Dwarf Orange, Gangabondam and Laccadive ordinary and the last variety by itself are superior to the local and can play vital role in enhancing the production of coconut in the country.

Of the above, the hybrids are not only high yielders, but are also early bearers which is an important characteristic in a crop like coconut

which has a long pre-bearing age of 6 to 8 years. Reducing the pre-bearing age of coconut has far-reaching effects in stabilising the economy of coconut cultivators. Research work taken up recently at the Central Plantation Crops Research Institute has indicated the possibility of bringing down the pre-bearing age of West Coast Tall variety of coconut to about two years. Further work is in progress on this aspect.

The coconut and arecanut planters are well aware of the superiority of these hybrids and varieties, but the extremely limited availability of planting material sets limits to their exploitation for production. At this Institute, programmes are now underway to produce superior hybrids and varieties of these crops in adequate numbers using modern methods of seed production.

Mixed Cropping and Farming

Root studies taken up in coconut have shown that in a unit area of the plantation 23 per cent of soil on area basis alone is being effectively utilised by the coconut roots. Seventy-four per cent of the roots do not extend beyond two metres from the

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base. On depth basis eighty per cent of the roots are confined to 31 cm to 120 cm layer of the soil. These indicate that the soil in a coconut plantation is in a position to support a number of other crops provided they are compatible.

The West Coast Tall variety which requires a manurial input of 0.5 kg nitrogen, 0.32 kg P_2O_5 and 1.2 kg K_2O per palm per year has been observed to produce a total of 12.67 tons dry matter (moisture free basis) per hectare annually. Of the different crop combinations of coconut and cacao, coconut, cacao and pineapple, and coconut, cacao, pineapple and pepper, the last combination can produce 19.3 tonnes of dry matter per hectare. The surface soil which is not being used by coconut plants offers favourable situation for raising grass and legumes for rearing milch animals.

A project on mixed farming in progress at the Kayangulam Regional Station of this Institute gave an additional net profit of Rs 2,850 from a hectare of coconut garden during its initial year of operation. There was also a five per cent increase in the standing crop of coconut. The total dry matter production per hectare per year was 26.26 tonnes. With the substantial reduction in the cost of cultivation of coconut in this method of farming and the higher yield due to the improved management conditions, the net economy of this project will be much higher in due course.

Hybrids — More Disease Tolerant

Coconut and arecanut are prone to the attack of large number of pests and diseases. Of all the diseases, the root (wilt) disease of coconut which has spread over an

area of about 2.5 lakh ha in central and south Kerala and causing an estimated loss of rupees 150 million per annum has shaken completely the economy of the small holders, who depend to a great extent on the income of their few coconut trees for their daily bread. The disease is of a complex nature and a rod shaped virus, a bacterium and fungi have been found to be associated with it. On the basis of preliminary indications about the field tolerance of one of the coconut hybrids to this disease, a survey was undertaken by the Institute towards the close of 1971 in Trivandrum, Quilon, Alleppey, Kottayam, Ernakulam and Idikki districts of Kerala State. The results are given in Table II

The data indicate that the $D \times T$ and the $T \times D$ hybrids are tolerant to the disease, the incidence ranging from 4.6 to 8.4 per cent as compared

For maximum return from the soil—mixed farming crop combination consisting of coconut, cocoa, pineapple and pepper





Raising grass for milch animals in coconut gardens

ment of each of the crop will have the accompanying problems of price structure coming down as has already happened in the case of arecanut. The stabilisation of plantation crop industry under such circumstances will depend upon how cheap the commodity is able to be produced so that even at lower prices the cultivator is able to make a reasonable margin of profit. Development of post-harvest technology for the full utilisation of all the products involved in the crop including quality standards as required by the international market is essential so that the price of the commodity goes up. Adequate market research should also be conducted to have first hand information on market trends,

Mangala—the new variety of arecanut under release

to 48.5 per cent in the common West Coast Tall variety. Another interesting observation is that the few D × T hybrids which are susceptible to the disease get infected mostly after the age of 15 years and therefore the reduction in yield is much less as compared to that of the West Coast Tall which is prone to the disease right from the beginning. It has also been observed that the decline of West Coast Tall palms affected in the early stages of bearing is much more rapid as compared to late infection. While the average yield of the diseased D × T palms is 46.4 nuts, the yield of West Coast Tall is strikingly low, only 9. It is interesting to record here that in Jamaica, more or less similar results have been obtained using Malayan Dwarf as one of the parents in the crossing programme against lethal yellowing.

Outlook for the morrow

In the wake of a concentrated multi-disciplinary research approach now being organised in the plantation crops destruction of barriers of production is expected to take place fast. Higher production and becoming self-sufficient in the require-



TABLE I. TOTAL PRODUCTION AND AVERAGE YIELD PER HECTARE IN INDIA

Year	Production ('000 tonnes)	Yield/ha (kg)
1956-'57	74.75	789
1957-'58	80.58	833
1958-'59	78.21	815
1959-'60	81.86	827
1960-'61	95.46	844
1961-'62	97.11	838
1962-'63	99.00	837
1963-'64	98.46	799
1964-'65	107.51	854
1965-'66	119.90	868
1966-'67	130.10	915
1967-'68	135.40	918
1968-'69	139.10	905

Time Taken for Flowering (years)

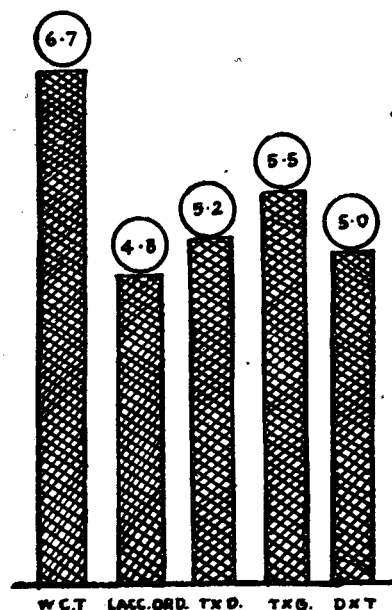
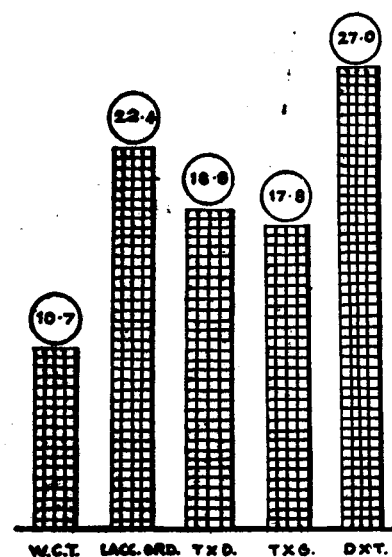


TABLE II. FIELD TOLERANCE OF HYBRIDS TO ROOT (WILT) DISEASE

Name of variety	*Age group	Total No. of palms studied	Disease incidence (per cent)		Average yield of nuts per palm	
			Age group wise	Average	Healthy	Diseased
Dwarf x Tall (NCD)	1	21	0			
	2	158	1.9	4.6	111.6	46.4
	3	62	12.9			
Tall x Dwarf	1	112	6.3			
	2	121	8.3			
	3	30	16.7	8.4	59.8	24.1
Dwarf orange	1	66	16.7			
	2	222	15.3			
	3	483	20.9	18.9	44.6	24.8
Dwarf green	1	2	0			
	2	48	6.3			
	3	100	8.0	7.3	38.4	11.3
West Coast Tall	1	1133	24.1			
	2	723	64.8			
	3	1108	62.7	48.5	26.2	9.1

Annual Outturn of Copra per Palm (kg)



*Age group 1 3-7 years
 2 7-15 years
 3 Above 15 years

possible ways of price stabilisation and related handling problems. The Central Plantation Crops Research Institute has reckoned these problems and efforts are on in this direction.