

# PLANT INTRODUCTION FOR THE IMPROVEMENT OF CROPS WITH SPECIAL REFERENCE TO COCONUT

K. SATYABALAN

(Central Coconut Research Station, Kasaragod.)

## Plant Introduction—Its Importance

ONE of the well known and widely adopted methods of crop improvement is the introduction and study of varieties of the particular crop and related species, from different parts including foreign countries. This work is given great prominence in the agricultural development of many progressive countries. Some of the crops which have become very economic and are on a wide scale being cultivated are reported to have originated from introductions made some time or other. In India though its importance has been stressed by scientists from time to time it took definite shape only in 1944 when the scheme of the Division of Botany in the Indian Agricultural Research Institute, for the establishment of an organisation for the introduction of economic plants was approved by the Indian Council of Agricultural Research and started functioning. It was recently reported (Indian Farming April 1955) that since the inception of the plant introduction service, over 7,600 exotic varieties, including wild relatives of cereals, legumes, fodder crops, grasses, vegetables, roots and tubers and other crops have been collected for assessing their economic value.

The importance of this method of crop improvement needs very little mention. The introduced varieties and species if found suitable for the new environment can be straight away multiplied and released for large scale cultivation. This will save good lot of time and efforts. It also happens that some of the new introductions may have some valuable characters which can be transferred to local or other adapted varieties through hybridisation. Literature on plant breeding is replete with instances where introduced varieties have provided valuable material for breeding work. Rajasekhara Mudaliar (1953) in his review of plant introduction work in the different countries of the world has given selected examples by which America benefited by plant introduction. He has also dealt with the introductions of the different crops in India and has pointed out how the introductions of ground nut, a native of Brazil, cashewnut a native of South America and cinchona and para rubber from Kew Gardens have benefited India to a considerable extent. Often such introduced plants have helped to establish industries or augment the food resources of the country. A monumental example of the latter is the tapioca. It was first introduced in Travancore-Cochin

State as a famine crop and has since then saved the lives of millions during the period of food shortage and famine.

### Introduction of Coconut Varieties

Attempts to exploit this method for the improvement of the Coconut had been made even in the early thirties of this century when about a dozen exotic varieties from countries like New Guinea, Cochin China, Java, Siam, Philippines, Fiji, Strait Settlements, Ceylon, etc., were obtained and planted at the Coconut Research Station, Pilicode and subsequently at the Coconut Research Station, Kasaragod. These varieties were studied for various characters including production of female flowers, setting percentage, yield of nuts, copra and oil content. Based on the varietal studies made, a key for the classification of coconut varieties has been prepared by G. V. Narayana and C. M. John (1949). At the Central Farm Ollukara and Government Coconut Farm Vytilla varieties from F.M.S., Sea Island, Texas and Philippines have been obtained and planted for study. There are also instances of introductions by private agencies. These are mostly fancy varieties of palms showing different colour of foliage, colour, size and shape of nuts, early or late bearing nature, etc.

Though the above attempts of introducing new coconut varieties from outside were of a pioneering nature, it cannot be said to have been exhaustive. In fact, a review of the literature on the coconut has shown the existence of a number of varieties or forms in most of the coconut producing countries of the world. It is quite likely that many of the so-called varieties may actually turn out to be only one. Only a detailed study under identical conditions will throw

light on this aspect. John and Menon (1946) in their report to the Indian Central Coconut Committee have stressed upon the introduction of varieties and ecotypes of the ordinary variety from the important coconut tracts of the world for trials and a thorough study, and have suggested for the deputation of a well experienced and competent officer to these countries to survey and collect desirable forms and varieties.

An important aspect of Research programmed at Central Coconut Research Station, Kasaragod, which is being developed as a centre of fundamental research on the agricultural aspect of coconut by the Indian Central Coconut Committee is a comprehensive study of world varieties of coconut. Accordingly, an attempt to contact the important coconut growing countries of the world for getting nuts of economic varieties through the courtesy of Indian Council of Agricultural Research has been made. Already seednuts from some of the countries like Guam, Philippines, Malaya, Borneo, Solomon Islands, Seychelles, Panama, East Africa and West Indies have been received and planted in the nursery. Besides, seednuts of varieties from Andaman, Laccadive Islands, East Godavari in Andhra State and Puri and Sakhigopal from Orissa have also been received. The external characters of the seednuts received have been thoroughly studied before they were planted in the nursery. (Vide Appendix). From the characters of the nuts studied it appears that the varieties San Ramon of Philippines, Borneo, Panama and Seychelles are unusually big in size and appear to be promising. The seedlings are to be planted in the field to see how the nuts of the progenies would conform to mother stock, and studied in detail.

### Limitations

In the introduction of perennial crops in general and coconut in particular some difficulties are met with or have to be anticipated. In the case of coconut though this method is applicable, the time lag between the introduction and actual release for cultivation is often much because 15 to 20 years are required to know the adaptability and performance of a new introduction to a particular environment. One cannot expect that all the varieties and species available in the coconut growing countries of the world are cosmopolitan in nature and will equally do well in other countries as the condition of soil and climate vary considerably from country to country. For example, according to Smith (1932) the famous San Blas Coconut of Panama which is very productive proved disappointing when introduced in Malaya States. Local experience also lends support to this view. So far, only a few varieties namely Cochin China, Java, Siam, Laccadive ordinary and Laccadive small among the introduced ones appear to be promising. It has also to be noted that in most varieties of coconut, cross pollination is the rule and all the progenies may not breed true to all the parental characters. Because of this peculiar feature,

progress through introduction may not be so quick in coconut as in the case of other annual crops which are vegetatively propagated. Besides, with the introduction of new plants one has to guard against the introduction of dangerous pests and diseases alien to this country from foreign countries, which may destroy even the existing plantations.

### Conclusion

In spite of the above-mentioned limitations, the work of introduction of new varieties and ecotypes from other countries so far done in India has shown a fruitful avenue of coconut improvement. A programme of work of considerable potential utility has been initiated in a methodical way with the fervent hope that information of a fundamental nature of practical benefit for the grower will emerge therefrom in due course.

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**APPENDIX**  
**External characters of seednuts received for planting at the Central Coconut Research Station, Kasaragode**

Serial No.	Name of country from where introduced	Name of variety if any	Size	Shape	Average weight	Average length	Average breadth	Remarks
1	Guam	1. Large nuts 2. Red Husk nuts 3. Bunching nuts	Medium Medium Medium	Round Round Oblong	1 lb. 13 oz. 2 lb. 3 oz. 1 lb. 4 oz.	6.9 in. 7.5 in. 7.8 in.	6.2 in. 6.9 in. 4.1 in.	.. .. This type has got the characteristics of Dwarf variety. According to Copeland (1931) this is perhaps the largest nut found on a plantation scale. 3,270 nuts of this variety give 1 ton of copra.
2	Philippines	1. San Ramon	Big	Round	4 lb. 1 oz.	9.5 in.	8.5 in.	According to Copeland (1931) Coconino or baby coconut bears about 4 years after planting—prolific bearer with rather thick and hard copra. 7,000 or more nuts required to produce one ton of copra.
3	Malaya	2. Coconino	Small	Oblong	9 oz.	5.9 in.	4.2 in.	According to Ahmed Bin Haji Omar (1919) this is called 'fragrant Coconut'. It has a scented meat.
4	Borneo	1. Tall Green 2. Dwarf Green 3. Dwarf Orange 4. Dwarf Yellow 5. Klapa wangi	Big Medium Small Medium Medium	Round Oblong Oblong Oblong Round	3 lb. 2 oz. 1 lb. 10 oz. 1 lb. 5 oz. 1 lb. 13 oz. 1 lb. 13 oz.	9.8 in. 7.9 in. 7.2 in. 7.8 in. 6 in.	8.6 in. 8.1 in. 8.1 in. 9.1 in. 6 in.	Nuts from Central area of North Borneo
5	Br. Solomon Islands	..	Big Medium Big Medium	Round Round Oblong Oblong	4 lb. 15 oz. 3 lb. 9 oz. 2 lb. 6 oz. 1 lb. 12 oz.	9.1 in. 8.5 in. 9.2 in. 8 in.	7.7 in. 7.7 in. 6.9 in. 6.4 in.	Nuts from an interior place of North Borneo.

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APPENDIX—(cont.)

Serial No.	Name of country from where introduced	Name of variety if any	Size	Shape	Average weight	Average length	Average breadth	Remarks		
6	Seychelles	..	Big	Long	3 lb. 5 oz.	1 ft. 1.6 in.	6.4 in.	Long tapering at stigmatic end		
		..	"	Long	2 lb. 7 oz.	10.7 in.	6 in.	Long with a constriction near the stalk end		
		..	"	Ovate	2 lb. 11 oz.	9.9 in.	6.6 in.	Ovate shape tapering. These may come under the variety "Coco Seychellois" described by F. Durocher-Yvon (1953)		
7	Panama	..	Big	Round	3 lb. 5 oz.	9.2 in.	9 in.	..		
		..	Medium	Round	2 lb. 6 oz.	9.0 in.	7.8 in.	..		
8	East Africa	1. Kenya	Big	Round	2 lb. 4 oz.	9.1 in.	6.9 in.	..		
		2. Zanzibar	Medium	Round	1 lb. 10 oz.	9 in.	6.2 in.	..		
9	West Indies	1. Jamaica	Big	Round	2 lb. 5 oz.	10.1 in.	8.7 in.	..		
		1. Jamaica	Medium	Oblong	1 lb. 10 oz.	7.5 in.	6.7 in.	..		
		2. Trinidad	Big	Round	2 lb. 13 oz.	7.9 in.	7.5 in.	..		
		2. Trinidad	Medium	Oblong	2 lb. 7 oz.	9.7 in.	7.3 in.	..		
1	India	1. Andaman	..	Long	1 lb. 13 oz.	8.3 in.	6.2 in.	..		
			..	Indian Varieties	..	..	..	..	..	
			..	Round	4 lb. 9 oz.	9 in.	10.5 in.	..	..	
			..	Oblong	4 lb. 12 oz.	12.7 in.	10.9 in.	..	..	
			..	Triangular	4 lb. 7 oz.	11.4 in.	10.8 in.	..	..	
		2. East Godavari,	..	Big	Oblong	5 lb.	11.3 in.	9.8 in.	..	Strangely ribbed large nut
			..	Big	Round	3 lb. 9 oz.	10.7 in.	2 ft. 2 in.	..	Triangular large nuts
			..	Big	Oblong	3 lb. 7 oz.	1 ft. 1 in.	1 ft. 10 in.	..	Normal nut
		3. Orissa	..	Small	Oblong	1 lb. 6 oz.	7 in.	1 ft. 5 in.	..	..
			..	Big	Long	3 lb. 10 oz.	11 in.	6.5 in.	..	..