

INTRODUCTION

Native to the Molucca Islands, nutmeg Myristica fragrans was introduced to the West Indies in the early eighteenth century. ^{1? 1843} Grenada became the chief producer in this area and developed into one of two main centres of world production, the other being Indonesia.

Since 1930 nutmeg and mace have formed 35% - 40% of the island's domestic exports. In 1954 2,800 tons, valued at 2.9 million dollars (B.W.I.) were exported. The hurricane which hit the island in 1955 caused great damage to the nutmeg industry. It was estimated that up to 90% of the trees had been destroyed or damaged. Trees stripped of their branches had produced some new growth after a year but were not considered as likely to become economic bearers again.

The normal method of propagation is by seedlings. The only system of selection practiced involves the choice of seed from high yielding trees. Though hermaphroditic trees occur, nutmeg is generally dioecious. Only the females bear fruit. From observations in Banda, Indonesia, Deinum (1931) gives figures for the germination of nutmeg seed. On an average 55% are female, 40% male and 5% bisexual. The sex cannot be determined until flowering which first occurs when the trees are 7 - 8 years old. The trees are then thinned out to leave a ratio of 1 male to 10 females. A further 2 - 3 years is required before an economic crop is obtained. Rehabilitation was therefore to take at least 10 years for a reasonable production to be resumed in Grenada.

The large area requiring rehabilitation and the inadequacy of propagation by unselected seedlings suggested that propagation by vegetative methods would be desirable. At the request of the Department of Agriculture, Grenada, investigations were started at the Imperial College in 1956.

Few positive references to previous work were available. A method of aerial layering is illustrated by McMillan (1954) in

which the layered branch roots in soil. The soil is contained at the top of a bamboo stake driven into the ground and of a length comparable to the height of the branch. Mention is also made of gootee - layering or marcotting, adopted in India on trees which do not readily root from cuttings. The essential feature of this latter method is the constant provision of water to the marcot from an overhead bamboo pot.

Approach grafting is referred to by Ridley (1912). The method resembles that used for mango propagation and is expensive in labour and material.

A budding technique using a wild variety, Myristica sucedanea, as a stock seedling is reported from Indonesia by Postma (1935). For success, the budwood had to be moistened for 24 hours and budding carried out during the wet season. Of 82 seedlings budded, 58 buds took successfully and of these, 26 sprouted. The progress of these trees is reported by Deinum (1949). After 7 years they were healthy, but showed a compact growth.

The sole reference to cuttings is contained in private correspondence from Kew (1938) which reports success in rooting heeled cuttings.

With the facilities available at the Imperial College the following methods appeared practical :-

- (1) The induction of roots on cuttings.
- (2) The induction of roots on material on the parent tree by a form of marcotting.

Budding and grafting appeared to be faced with the problem of uncertain compatability between stocks and scions of different sexes, and the lack of suitable seedling stocks. Further, the variety Myristica sucedanea was unavailable in Trinidad.

The advantages of vegetative propagation are as follows :-

- (1) Only female trees would be propagated.
- (2) Superior clonal material may be selected.
- (3) Earlier bearing may be possible.
- (4) From the research point of view, material from a vegetatively propagated parent is valuable for experimental work.

For a method of propagation to be adopted on a commercial scale it must be suitably adaptable to good estate practice. Highly refined techniques are not normally favoured when they prove expensive and demanding in time and labour. The initial investigations of the writer were aimed at discovering whether root induction was possible, and to what extent a method could be employed at an economic level.

- (1) The increasing reports of success in the rooting of difficult plant species with the better use of growth promoting hormones.
- (2) The published work of Evans (1931) on the factors involved in the rooting of cacao cuttings provided an ideal basis for preliminary treatments.
- (3) If roots were formed readily rooted cuttings could be produced in the existing cacao propagating bins in Grenada. Mr. E. Nichols, of the Regional Research Centre had conducted some preliminary experiments. The investigations with which the student was directly concerned were derived out in conjunction with his work. From these preliminary experiments the following observations appear relevant. Once callus formation had taken place, the rotting which had hitherto resulted in loss of most of the cuttings, was not likely to occur. Cuttings which had callused would produce roots in 4 - 6 months, if given adequate aeration round the basal end of the stem. However, owing to the relatively lengthy time required for rooting to take place, conventional rooting media such as composted sawdust were not satisfactory. Humification and subsequent decomposing of the medium resulted in conditions which were not amenable to root formation. Special fibre, with a low nitrogen/carbon ratio appeared to be a suitable substitute, although an inorganic medium such as vermiculite would probably be better.
- (4) The development of the standard F.O.R.A. propagating bin system for rooting cuttings can be followed from the work of Evans (1931, 1932, 1933) and Cheesman and Spencer (1936). The latter,