Observations on a Twin Coconut Palm

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INTRODUCTION

THE fruit of the coconut palm is a fibrous drupe and contains normally a single seed. It develops from a female flower or button having an ovary consisting of three carpels with axile placentation and one ovule in each carpel. After fertilisation two ovules abort and only one develops into a mature nut with a single cavity containing water. Corresponding to the three carpels of the ovary there are three depressions on the endocarp or shell of the nut. One is soft and bigger than the others and is called the "fertile" or "functional" eye, because the only embryo in a normal fruit is found beneath it embedded in the endosperm or kernel. The two hard eyes are known as the "sterile" or "blind" eyes.

When a normal single-seeded fruit is planted in the nursery for germination, the embryo gives rise to a single sprout which emerges out piercing the soft eye. Though this is the normal feature, rare cases of abnormality characterised by the emergence of more than one shoot from the same nut have been observed and recorded by many (Patel, 1938; Daniel Sunderaraj, 1952; Davis *et al.*, 1953). Among this type of abnormality, nuts with two shoots are more common. Forbes (quoted by Furtado, 1924) appeared to have observed a tree with 14 stems united at the base supposed to have arisen from a nut with 14 cells.

Davis (*loc cit.*) has referred to the different possibilities for the formation of more than one shoot from a single nut. One such is polyembryony, i. e., the development of more than one ovule in the same carpel. In this case there will be only one cavity in the endosperm and the two distinct shoots will be found emerging from a single

"fertile" eye. Each shoot will have a separate haustorium or apple and both will be found lying in contact with each other without being separated by any septum. The two haustoria are often found to be of different sizes and this difference is invariably reflected in the vigour of the seedlings also, the one with the small haustorium being less vigorous than the other.

Another possibility of more than one shoot arising from one nut is polycarpy. In this case, the ovules of more than one carpel develop without aborting and give rise to two-seeded or three-seeded nut according to whether two or three cavities are present inside the nut. The cavities will be found separated by a thick septum or endocarp with distinct endosperm and embryo. The eyes corresponding to the developed ovules will remain soft without getting hardened. If such nuts are planted, more than one seedling can be expected to come out, each from a separate eye.

Fasciation of the plumule or monopodial branching with much restricted axis may also give rise to palms with more than one shoot. Only careful dissection and examination of the nut will reveal the true nature of the abnormality observed in any particular case.

Though the occurrence of twin palms has been reported, the authors have not come across any reference in literature regarding any observations carried out on such palms. One such palm growing at the Central Coconut Research Station, Kasaragod has been under detailed observation for a very long period and the results are summarised in this article.

DE CRIPTION OF THE PALM

The twin coconut palm belongs to the tall variety of the West Coast. The source from which the planting material was originally obtained is not known. It is now a little over 40 years old, and is growing in Field 10, Main Block of the Central Coconut Research Station, Kasaragod. The palms carry register numbers 48 and 48A. There is no information as to how the twin palm had developed. Fig. 1 gives a general view of the palm and Fig. 2 a close-up view of the harvested bunches.

Data regarding the time taken for first bearing and on different aspects of the productive phase such as yield, female flower production, setting percentage, number of bunches produced, etc., are available to date. Attempts were also made to study in detail the stem, leaf and nut characters. The results are given below:—

Fig. 1 — A general view of the twin palm.

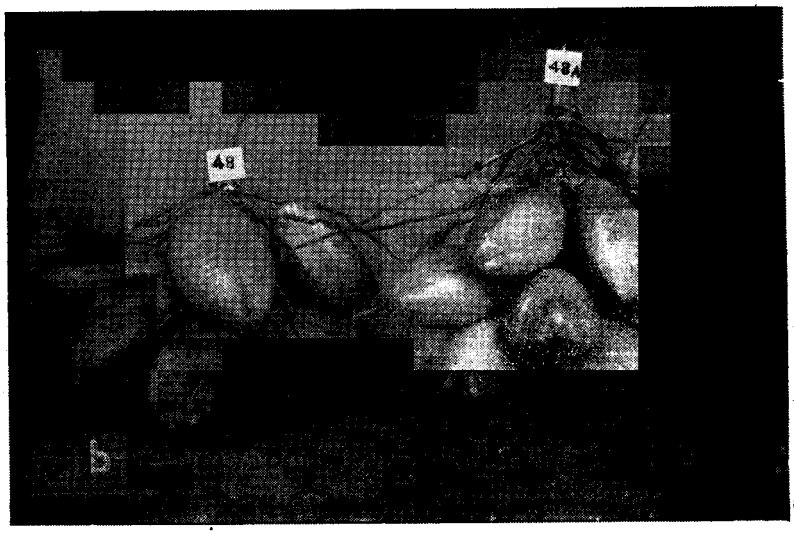

Fig. 2 — Close-up view of the bunches.

Plate I

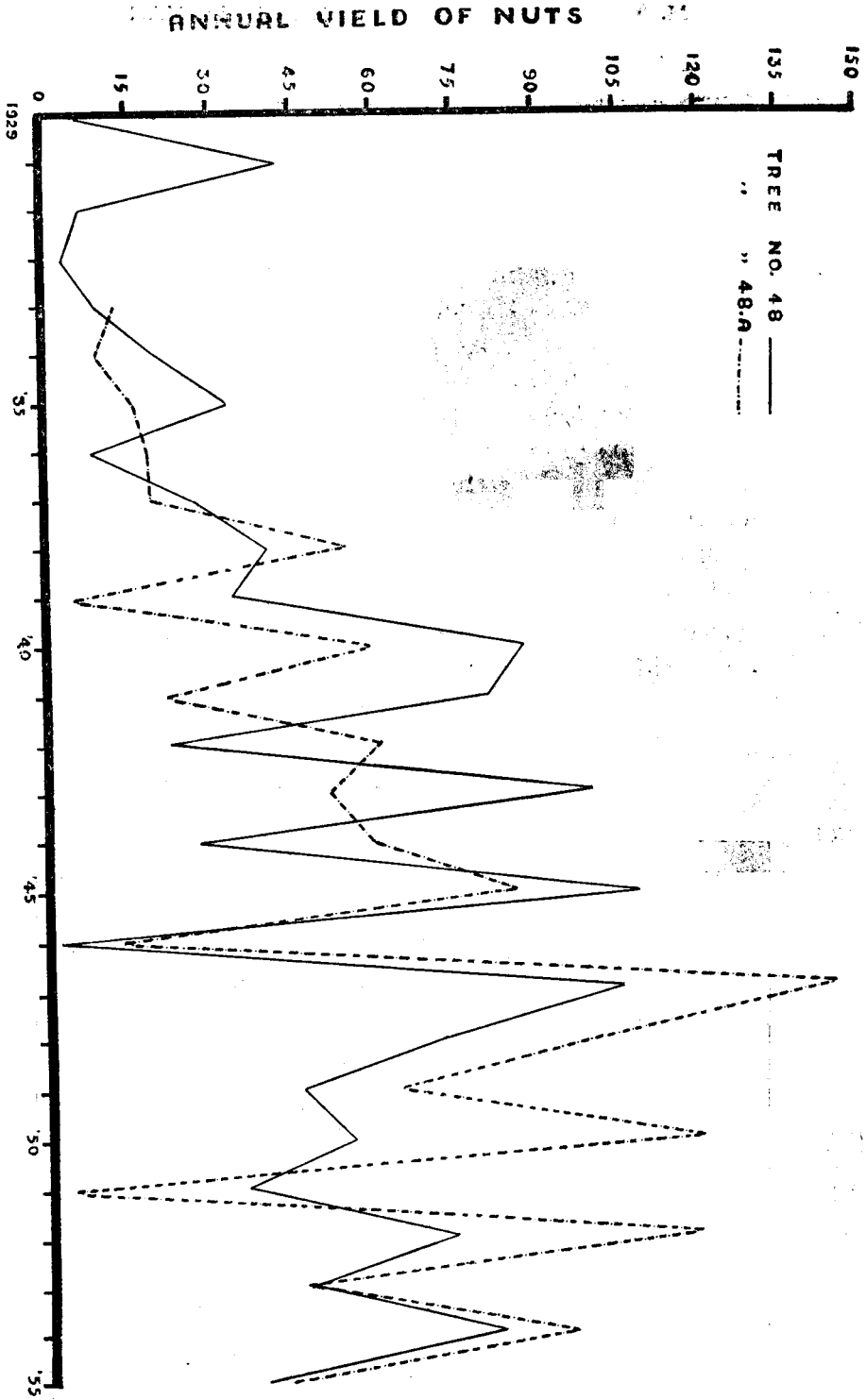

Fig. 3 — Yield curves of two palms of the twin.

Plate II

RESULTS

(1) Time taken for first bearing:-

Nuts were first harvested from tree No. 48 in 1929 and from tree No. 48A in 1933, i. e., about 13 to 17 years after the twin palm was planted out in the field. Under the soil and climatic conditions obtaining at the Station, this interval should be taken as much longer than usual. This may or may not be the result of 'twin' nature of the palm. Similar observations on large numbers of twin palms alone will enable a definite conclusion to be drawn.

(2) Stem characters:-

The data obtained are given below:-

	48	48A
Height of stem	33 ft— 2"	33 ft—11"
Girth at base	2 ft— 7"	2 ft— 8"
Girth at collar	1 ft—10"	2 ft— 0"

48A appears to be slightly more vigorous than 48.

(3) Crown characteristics:—

Both the palms have the same type of crown viz., semi-spherical. They differ in the direction of leaf spiral, it being left in 48 and right in 48A. The number of functioning leaves in the crown is 30 in 48 and 32 in 48A.

(4) Leaf characters:—

The data regarding leaf characters are summarised below:-

	48	48A
Length of leaf	14 ft—0·5"	14 ft—8"
Length of petiole	3 ft—5"	3 ft—5·5"
Number of leaflets	208	216
Length of the longest leaflet	3 ft—11"	3 ft—9"
Colour of petiole	Yellowish green	Yellowish green

48A appears to be a shade better than 48 in quantitative characters.

(5) Production phase:-

The data in respect of the production phase are summarised below. The yield of good nuts obtained from each of the two palms is also represented graphically in Fig. 3.

Character (mean per annum)

	48	48A
Total number of bunches produced	7·8	7·6
Barren axils	4·0	3·0
Barren bunches (devoid of female flowers)	1·1	0·7
Beetle-attacked bunches	0·6	0·6
Number of female flowers produced	149·4	172·7
Yield of good nuts	44·8	52·4
Yield of barren nuts	0·4	0·3
Setting percentage	32·1	33·0

48A appears to be a better yielder than 48 and this is to be attributed mainly to the larger number of female flowers produced by it. The setting percentage is almost the same in both. In all the other characters there is no appreciable difference between the two.

The yield curves show that the pattern of bearing is almost the same in both.

(6) Nut characters:-

The following is the summary of the different nut characters studied:—

Character	48	48A
Colour of the nut	Brown	Brown
Shape of the nut	Oblong	Oblong
Size of the nut	Medium	Medium
Weight of unhusked nut	2 lb. 1·5 oz.	2 lb. 2·8 oz.
Volume of unhusked nut	1607·5 c.cm.	1597·5 c.cm.
Weight of husked nut	1 lb. 0·1 oz.	1 lb. 0·4 oz.
Volume "	90·5 c. cm.	93·2 c. cm.
Length of nut	20 8 cm.	20·4 cm.
Maximum girth of the nut	42·6 cm. (*)	40·6 cm.
Thickness of husk	16·0 mm. (*)	12.2 mm.
Thickness of kernel	12·1 mm.	12·9 mm.
Weight of copra per nut	4·8 oz.	4·8 oz.
Oil percentage in copra	71·72	71·89

(*) Significantly better than the other.

Maximum girth and thickness of husk are more in the nuts of 48 than those of 48A. In all the other characters, the differences noticed are not appreciable.

DISCUSSION

From the results given above it may be seen that the only clear cut difference observed between the two palms of the twin is in leaf spiral. One is left while the other is right. Some difference is also observed in yield and female flower production, 48A being better than 48. In size of unhusked nut, the nuts of 48 appear to be slightly bigger than those of 48A.

Since there is no information as to how this twin palm has arisen, no attempt is made at this stage to explain the differences noted in relation to its origin. As already referred to previously, one of the seedlings of the twin, particularly in case of polyembryony, is often found to be less vigorous than the other. It will be interesting to know whether the slight difference in vigour and performance now observed between the two palms of the twin can be explained on the basis of the difference that might have been there in the seedling stage.

A few twin palms have recently been planted out after making a detailed study of the internal nut and seedling characters. This basic information may be extremely useful in correlating the later performance of the palms with their earlier characteristics.

SUMMARY

The results of observation of a twin coconut palm in bearing are recorded. Differences have been observed between the two in a few of the characters studied.

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