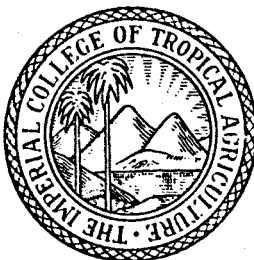


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Speed of Germination, a Characteristic of Possible Taxonomic Significance in Cocos nucifera Linn.

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IN JAMAICA, two distinct kinds of tall coconut, the 'Jamaica Tall' and the 'San Blas' are recognized, and two kinds of palm with semi-tall or dwarf habit, the 'Malayan' or 'St Lucian Dwarf' and the progeny of hybrid palms ('Malayan Dwarf' × 'Niu Leka') from Fiji. The 'Malayan Dwarf' has recently been propagated on a large scale and has a special place in the local economy in view of its resistance to Lethal Yellowing disease (NUTMAN and ROBERTS, 1955; OLLAGNIER and WESTEIJN, 1961; Coconut Industry Board of Jamaica, Research Department *Reports* 1959-1964). The 'Jamaica Tall', though susceptible to this disease, continues to be planted in disease-free areas, and is much more common than the 'San Blas', which was established in occasional large stands mainly by The United Fruit Company. The hybrid progeny palms in Jamaica are mainly ornamentals. They are second and later generation palms following open pollination of hybrids produced by MARECHAL (1928).

Some observations on the flowering and fruiting characteristics of coconuts grown in Jamaica have been summarized previously (WHITEHEAD, 1965; Coconut Industry Board of Jamaica, Research Department *Reports* 1961-64). A study of germination rates has brought to light some further differences which may be of taxonomic importance.

MATERIALS AND METHODS

Seed nuts from the above four named kinds of coconuts were sown in beds of coir fibre, with only a small part of the husk exposed. Seed was from plantations selected for production of commercial planting material. No additional watering was done.

The number of germinated nuts in each nursery bed was regularly recorded.

RESULTS

Numbers of nuts observed, period of setting and percentage germination are given in *Table 1* and illustrated in *Figure 1*, where, for clarity, standard deviations are given only for 'Malayan Dwarf' and 'Jamaica Tall'. Some of the variability observed is probably seasonal or caused by slight differences in maturity of nuts at harvesting and planting.

The data indicate marked differences in speed of germination, with

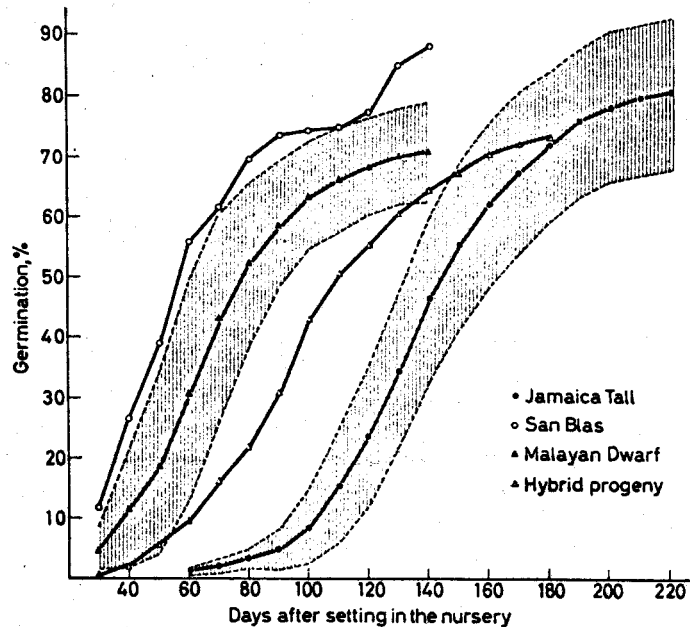


Figure 1. Germination rates of four kinds of coconuts grown in Jamaica. Standard deviations of the mean from germination percentages of individual seed batches observed are shown for 'Jamaica Tall' and 'Malayan Dwarf' as shaded areas

similar rapid germination for 'San Blas'* and 'Malayan Dwarf' seed nuts and very much slower germination for 'Jamaica Tall'. Both 'San Blas' and 'Malayan Dwarf' nuts, in contrast to those of the 'Jamaica Tall', require picking and will germinate on the palm if left; this may be the more readily observable characteristic. The rapid germination of the 'Malayan Dwarf' has previously been mentioned by JACK and SANDS (1929). The variable speed of germination of seed nuts from 'Malayan Dwarf' × 'Niu Leka' hybrid progeny at first led to the speculation that 'Niu Leka' was a late germinator, but recent observations of 'Niu Leka' introductions from Fiji did not support this.

Observed differences in germination speed are retained when husked nuts are germinated.

DISCUSSION

A major problem in the classification of coconut palms concerns the difficulty of applying conventional taxonomic procedures. Few characteristics which can be readily and rapidly observed are available and there are difficulties in assembling representative collections of living and preserved material. As a consequence, little has so far been accomplished in the realm of taxonomy.

The need for collecting and describing 'varieties' or 'strains' of coconut

* A small sample of 'Niu Vai' coconuts, which have a similar fruit form to the 'San Blas', was recently introduced from Wallis Island in the Pacific; they had a similar germination pattern.

Table 1. Cumulative average germination percentages for the four main kinds of coconuts grown in Jamaica

	Tall palms		Semi-tall or dwarf palms	
	'San Blas'	'Jamaica tall'	'Malayan dwarf'	'Hybrid progeny'
Total nuts sown	246	45 947*	54 671*	652
Period of sowing	15.7.61 to 13.7.62	7.12.61 to 8.11.62	10.12.61 to 7.12.62	4.8.61 to 3.9.62
30	11.7	—	4.9 ± 3.7	0.6
40	26.1	—	11.7 ± 10.2	1.8 ± 2.7
50	38.7 ± 15.1	—	18.7 ± 14.9	5.5 ± 3.0
60	55.7 ± 22.8	1.0 ± 0.8	30.9 ± 18.2	9.6 ± 5.8
70	61.4 ± 19.5	1.9 ± 1.3	43.0 ± 17.4	15.9 ± 10.3
80	69.7 ± 9.4	3.2 ± 1.7	52.2 ± 13.5	22.0 ± 13.3
Cumulative average germination percentages at intervals of ten days	73.3 ± 5.7	4.6 ± 3.4	58.7 ± 10.5	31.0 ± 14.4
100	74.5 ± 4.5	8.4 ± 6.2	63.8 ± 8.9	43.1 ± 20.7
110	75.0 ± 5.3	15.2 ± 9.5	66.3 ± 8.7	50.9 ± 22.7
120	77.6 ± 6.2	23.7 ± 11.7	68.7 ± 7.9	55.6 ± 23.5
130	85.3 ± 8.6	34.6 ± 12.9	70.2 ± 7.9	60.7 ± 23.0
140	88.2 ± 9.0	46.8 ± 13.8	71.0 ± 8.1	64.8 ± 20.3
150	†	55.5 ± 13.8	†	67.8 ± 17.4
160		62.6 ± 13.8		70.8 ± 14.5
170		67.6 ± 13.6		72.2 ± 12.4
180		72.2 ± 12.5		73.9 ± 10.6
190		76.3 ± 12.5		
200		78.8 ± 12.7		
210		80.2 ± 12.7		
220		81.1 ± 12.7		

* Seed nuts set in regular monthly batches of at least 1 000 nuts.

† Majority of seedlings transplanted and counts discontinued.

Standard deviations based on means of individual batches.

has been repeatedly stressed and a useful check list was recently prepared (MAO, 1959) but more detailed descriptions are required.

A commonly accepted classification distinguishes tall and dwarf coconut palms as two botanical varieties, *typica* and *nana*, based mainly on plant height, but with reference to flowering pattern, time of flowering and general habit.

Using this system the 'San Blas' and the 'Malayan Dwarf' belong to different botanical varieties. However, they resemble each other more closely than either resembles the 'Jamaica Tall', not only in germination pattern, but in other respects, such as fruit composition and the period from flowering to harvesting (Coconut Industry Board of Jamaica, Research Department Report 1964).

In addition, it is difficult to see how the 'Niu Leka' can be considered to be in the same botanical variety (LIYANAGE, 1958) as the 'Malayan Dwarf', since it differs markedly in flowering pattern (MARECHAL, 1928) and in general habit.

It is clear that there is some danger in the general application of this taxonomic system to coconut palms throughout the world, at least until detailed descriptions of local strains are available and patterns of variability have been more certainly established. The use of the designation *typica* to describe all palms with tall habit in such a variable species is particularly unfortunate and care should be taken in applying results and conclusions for one area to another where palms may be of very different genotypes.

Adequate descriptions of local strains are particularly urgent for selection and breeding work and when considering disease symptoms. Speed of germination is an additional useful characteristic (with fruit composition) particularly for distinguishing 'San Blas' and 'Jamaica Tall' palms in Jamaica. Germination data may be of value in describing coconuts in other areas. Detailed descriptions of strains present here are currently being prepared.

SUMMARY

The seed germination patterns of four kinds of coconut palms grown in Jamaica are compared. The need for descriptions of local strains is again emphasized, and it is suggested that speed of germination may be a useful additional characteristic in compiling these descriptions.

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