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NURSERY STUDIES IN WEST COAST TALL COCONUT

1. GERMINATION OF SEEDNUTS HARVESTED DURING JANUARY TO MAY

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Abstract

Long term nursery studies on the germination of West Coast Tall seed coconuts harvested during January to May and planted in the nursery in June or July indicate the germination trend of seed cocount harvested during the different months The studies brought out the following: 1) On the West Coast, the period January to April is the best for collection of seednuts. 2) There is not much difference in the germination rate between June and July sowing. 3) January nuts are to be preferred to May nuts for seednut purposes. 4) For studies on germination it is advisable to sow the seed-nuts of different harvests separately and record the germination date of each nut till December in June and July sowings since more than 90 per cent of the seednuts would have germinated by December

The coconut palm is at present propagated only through seed. The seednuts are sown in the nursery and the seedlings raised are later selected for vigorous growth and transplanted in the field. On the West Coast of India seednuts for raising seedlings are harvested in the summer months (February to May) of the year. Nursery studies have shown that February to May is the best period for the collection of seednuts judged from early germination, total germination and quality of seedlings (Narayana, 1940). Patel (1938) and Menon & Pandalai (1953) have reported that the nuts harvested during these months show relatively better development than those harvested in the other months of the year. They are bigger in size, contain large quantity of meat, give a high percentage of germination and larger out-turn of seedlings. Further, this period just precedes the South West Monsoon so that with the commencement of the rains the seednuts can be planted in the nursery when the environment is favourable and the weather conditions are helpful for germination of nuts and the growth of seedlings. Later studies by Krishna Marar and Balakrishnan (1963) have indicated that the period from March to June is

the best for collection of seednuts on the West Coast from the point of view of germination of seednuts and performance of resulting seedlings. According to Thampan (1975) the period from January to May or June is the best for seednut collection from the point of view of early germination and vigour of seedlings. The seednuts harvested during the summer months are first kept in the open under shade till the husk becomes dry. They are then stored in sand under shade before planting in the nursery with the onset of the South West Monsoon. In all the nursery studies done, though the date of germination of individual nut in the seednuts harvested during different months has been separately recorded, details of the germination trend of seednuts harvested during each month are not available. To study this aspect, long term nursery studies were conducted in the seednuts collected from selected high yielding West Coast Tall palms during the months of January to May and sown in the nursery either in June or July depending on the onset of South West Monsoon. The seednuts were sown in the nursery in June and studied for germination each year during a period of five years, and in July during a period of three years. The results obtained from these studies are summarised in this paper.

Experimental results

1) June sowing

In this experiment conducted over a period of five years the seednuts collected during the months of January to May were planted in the nursery in June. In these studies, 4668 seednuts collected from 25 to 30 high yielding West Coast Tall palms during the months of January to May were planted in June. The seednuts harvested each month were marked separately before they were stored, and planted in the horizontal position in the nursery. The date of germination of individual nut was noted and recorded for a period of one year from the date of sowing in the nursery. Based on the observations recorded, the date of germination of nuts of each month of harvest was grouped into months in which the germination had taken place. Out of 4668 seedunts collected during January to May and sown in the nursery in June, 4173 seednuts germinated accounting for 89.4 per cent of the seednuts sown. The details are presented in Table 1.

The data indicate that the percentage of germination varied from 73.9 in May nuts to 95.8 in March nuts. The percentage of germination was high [89.7 to 95.8] in the case of nuts harvested during January to April and low [73.9] in the case of nuts harvested in May. The low percentage of germination in May nuts may be due to the very short storage period the nuts had before sowing. On the basis of germination percentage the period January to April is found to be the best for collection of seednuts. From the data on germination it was possible to group them into different months of germination.

Observations on the number of nuts germinated in each month in the nuts harvested during January to May indicate the germination trend of seednuts in relation to the month of harvest. Details of the number of seednuts germinated in different months

Table I : Germination in the nuts harvested during January to May and sown in June

Month of harvest	No. of nuts sown	No. of nuts germinated	Percentage of germination
January	448	408	91.1
February	985	929	94.3
March	860	824	95.8
April	1622	1455	89.7
May	753	557	73.9
Total	4668	4173	89.4

and percentage of germination in the seednuts harvested from January to May and planted in the nursery in June are presented in Table 1 a. The data indicate that 86.2 per cent of the 408 seednuts germinated from January harvest, germinated during the period July to September in which the maximum germination of 45.8 per cent was in August. In the case of February harvest also 81.9 per cent of the 929 seednuts germinated during the period July to September in which the maximum germination of 41.0 per cent was again in August. In the case of seednuts harvested in March, 76.2 per cent of 824 seednuts germinated during the period July to September in which the maximum percentage of germination 37.5 and 37.4 per cent was equal in both the months August and September respectively. From April harvest onwards there was delay in germination. Out of 1455 seednuts germinated 53.3 per cent germinated during the period July to September in which the maximum germination of 43.3 per cent was in September. From now on the germination was still delayed and extended up to February. In the case of May harvest, out of 557 seednuts germinated, only 18.0 per cent germinated during the period July to September. Out of the balance of 82.0 per cent, October accounted for the maximum germination percentage of 30.5. By the end of December all the nuts germinated from the harvest of January, February and March accounted for cent per cent of total nuts germinated However, in the case of April and May harvests it was 99.3 and 96.1 respectively. The data indicate that there is a distinct trend in the germination of seednuts harvested during January to May. The seednuts harvested earlier than April germinated earlier than those harvested later The maximum percentage of germination was in August in the case of nuts harvested in January and February, while it was equal in August and September in the case of nuts harvested in March. It was maximum in September in the case of nuts harvested in April, and in October in the case of nuts harvested in May. In the case of nuts harvested in April and May the germination extended up to February.

2) July sowing

This experiment was done for three years to find out whether there is any change in the germination trend observed in June sowing. During this period, 2703 seednuts harvested from high yielding West Coast Tall palms during the months January to May were planted in the nursery in July. As explained in the case of June sowing, the seednuts were marked separately before they were stored in sand and were planted in the horizontal position in the nursery. The date of germination of the nuts was recorded for a period of one year from the date of sowing in the nursery. Based on the observations recorded the date of germination of nuts harvested in each month were grouped into months in which the germination had taken place. Out of 2703 seednuts collected during January to May and sown in the nursery in July, 2340 seednuts germinated accounting for 86.7 per cent of the seednuts sown. The details are presented in Table 2.

Table 2: Germination in the nuts harvested during January to May and sown in July

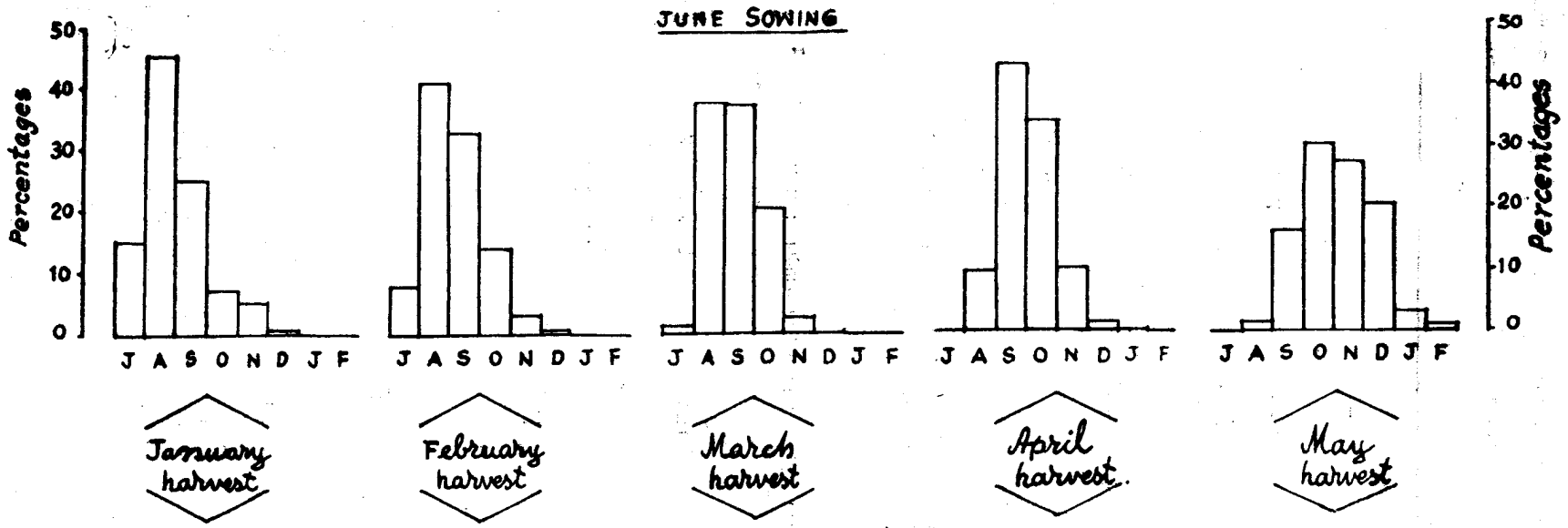
Month of harvest	No. of nuts sown	No of nuts germinated	Percentage of germination
January	418	362	86.6
February	525	490	93 3
March	686	659	96.2
April	867	722	83.3
May	207	107	52.2
Total	2703	2340	86.7

The data indicate that the percentage of germination varied from 52.2 in May nuts to 96.2 in March nuts. The percentage of germination was high (83.3 to 96.2) in the case of nuts harvested during January to April and low (52.2) in the case of nuts harvested in May. These data indicate that on the basis of germination percentage the period January to April is the best for collection of seednuts. The data on germination of seednuts harvested during January to May was grouped into different months of germination.

Details of the number of seednuts germinated in different months and percentage of germination in the seednuts harvested from January to May are presented in Table 2 a. The data indicate that 79.0 per cent of the 362 seednuts germinated from January harvest, germinated during the period July to September in which the maximum germination of 41.2 per cent was in August. In the case of February harvest 85.7 per cent of the 490 seednuts germinated during July to September in which the maximum percentage of germination 41.0 per cent was equal in both the months August and September. In the case of June sowing, germination percentage was equal in March harvest while in the case of July sowing it was equal in February harvest. In the case of March harvest, out of 659 nuts germinated, 65.3 per cent germinated during the period July to September in which the maximum germination of 50.6 per cent was in September indicating late germination. In the case of April harvest, out of 722 seednuts germinated, only 30.6 per cent germinated during August and September. Out of the remaining 69.4 per cent, October accounted for the maximum germination of 35.6 per cent. In the case of May harvest, out of 107 seednuts germinated only 25.2 per cent germinated up to September. Out of the remaining 74.8 per cent, November accounted for the maximum germination of 29.0 per cent. By the end of December more than 90 per cent germination of the total nuts germinated have been recorded in the harvests of January to May. In July sowing the germination extended up to January only.

The germination trend of seednuts in July sowing was similar to that of June sowing except that the percentage of germination in March harvest and June sowing was similar to the percentage of germination in the nuts of February harvest in July sowing-one month earlier than the July sowing (Fig. 1). The variation in germination of nuts harvested in different months may be due to the storage period the seednuts had before they were sown in the nursery. According to Nampoothiri et al. (1973) there is no difference in the number of days taken for germination from the date of harvests when the nuts are stored for different periods. It is only reasonable to expect that when the date of sowing is considered, the nuts harvested earlier will take only less time for germination than later harvested nuts. Besides indicating the germination trend of West Coast Tall seed coconuts harvested during January to May in June and July sowings, these studies have shown that (1) on the West Coast of India the period January to April is the best for collection of seednuts whether they are sown in the nursery in June or July depending on the onset of the South West Monsoon, (2) overall germination in June sowing is only slightly better than in July sowing and that if sowing is delayed by a month from June to July it will not very much affect the germination of seednuts; (3) germination is high (91.9 per cent in June sowing and 86.6 per cent in July sowing) in January nuts and low (73.9 per cent in June sowing and 52.2 per cent in July sowing) in May nuts. Hence it is better to prefer January nuts to May nuts for sowing in the nursery in June or July; 4) for studies on germination and seedling characters it is advisable to sow the seednuts harvested in different months seperately and record the germination date of each nut till December in June and July sowings since more than 90 per cent of the seednuts would have germinated by that time.

Aiyadurai (1954) from his nursery studies made earlier in Nileshwar and Pattambi (now in Kerala), and Coimbatore and Pattukottai in Tamil Nadu and suggested that the procurement of seednuts should be done from February to May in West Coast and March to June in East Coast. Later studies by Sundaresan *et al* (1974) have indicated that seed coconut of East Coast Tall can be collected from February to August and stored for one or two months to get high percentage of germination and that they should be planted before the middle of October to get the benefit of North East Monsoon. In their studies on influence of the month of seednut maturity on germination and vigour of coconut seedlings in East Coast



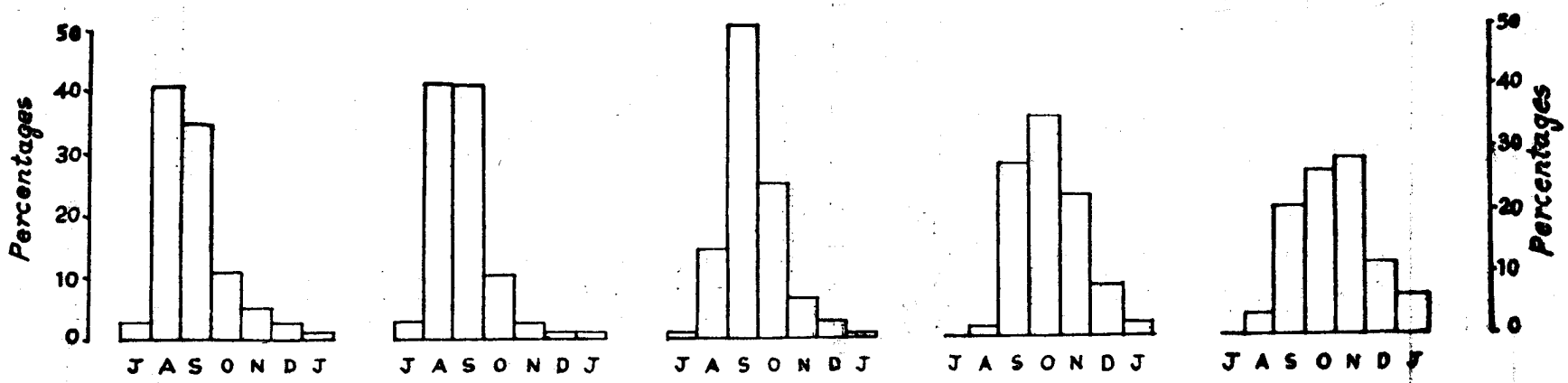


Fig. 1. TREND IN THE GERMINATION OF SEEDNUTS IN THE DIFFERENT MONTHS

Table 1 a. Germination in different months,

Months of harvest	No. of seednuts Sown/Germinated	July	August		September	
		No. of nuts germinated	No. of nuts germinated	Cumulative total	No. of nuts germinated	Cumulative total
January	448/408	62 [15.2]	187 [45.8]	249 [61.0]	103 [25.2]	352 [86.2]
February	985/929	74 [8.0]	381 [41.0]	455 [49.0]	306 [32.9]	761 [81.9]
March	860/824	11 [1.3]	309 [37.5]	320 [38.8]	308 [37.4]	628 [76.2]
April	1622/1455	2 [0.1]	144 [9.9]	146 [10.0]	630 [43.3]	776 [53.3]
May	753/557	2 [0.4]	7 [1.3]	9 [1.7]	91 [16.3]	100 [18.0]
Total	4668/4173	151 [3.6]	1028 [24.7]	1179 [28.3]	1438 [34.5]	2617 [62.8]

Note : Figures in parentheses give the percentage of total nuts germinated.

Table 2 a Germination in different months,

Months of harvest	No. of seednuts Sown/ Germinated	July	August		September	
		No. of nuts germinated	No. of nuts germinated	Cumula-tive total	No. of nuts germinated	Cumula-tive total
January	418/362	11 (3.0)	149 (41.2)	160 (44.2)	126 [34.8]	286 [79.0]
February	525/490	18 (3.7)	201 (41.0)	219 (44.7)	201 [41.0]	420 [85.7]
March	686/659	3 (0.5)	94 (14.2)	97 (14.7)	334 [50.6]	431 [65.3]
April	867/722	—	13 (1.8)	13 (1.8)	208 [28.8]	221 [30.6]
May	207/107	—	4 (3.7)	4 [3.7]	23 [21.5]	27 [25.2]
Total	2703/2340	32 [1.4]	461 [19.7]	493 [21.1]	892 [38.1]	1385 [59.2]

Note : Figures in parentheses give the percentage of total nuts germinated

of nuts harvested during January to May and sown in June

October		November		December		January		February	
No. of nuts germinated	Cumulative total	No. of nuts germinated	Cumulative total	No. of nuts germinated	Cumulative total	No. of nuts germinated	Cumulative total	No. of nuts germinated	Cumulative total
30 [7.4]	382 [93.6]	23 [5.6]	405 [99.2]	3 [0.8]	408 [100.0]	—	408 [100.0]	—	408 (100.0)
130 [14.0]	819 [95.9]	33 [3.6]	924 [99.5]	5 [0.5]	929 [100.0]	—	929 [100.0]	—	929 (100.0)
169 [20.5]	797 [96.7]	24 [2.9]	821 [99.6]	3 [0.4]	824 [100.0]	—	824 [100.0]	—	824 (100.0)
495 [34.0]	1271 [87.3]	152 [10.4]	1423 [97.7]	23 [1.6]	1446 [99.3]	8 [0.6]	1454 [99.9]	1 [0.1]	1455 (100.0)
170 [30.5]	270 [48.5]	152 [27.3]	422 [75.8]	113 [20.3]	535 [96.1]	18 [3.2]	553 [99.3]	4 [0.7]	557 (100.0)
994 [23.8]	364 (86.6)	384 [9.2]	3995 [95.8]	147 [3.5]	4142 [99.3]	26 [0.6]	4168 [99.9]	5 (0.1)	4173 (100.0)

of nuts harvested during January to May and sown in July

October		November		December		January	
No. of nuts germinated	Cumulative total	No. of nuts germinated	Cumulative total	No. of nuts germinated	Cumulative total	No. of nuts germinated	Cumulative total
41 [11.3]	327 [90.3]	20 [5.6]	347 [95.9]	11 [3.0]	358 [98.9]	4 [1.1]	362 [100.0]
50 [10.2]	470 [95.9]	12 [2.5]	482 [98.4]	4 [0.8]	486 [99.2]	4 [0.8]	490 [100.0]
162 [24.5]	593 [89.8]	45 [7.0]	638 [96.8]	18 [2.7]	656 [99.5]	3 [0.5]	659 [100.0]
257 [35.6]	478 [66.2]	165 [22.9]	643 [89.1]	63 [8.7]	706 [97.8]	16 [2.2]	722 [100.0]
29 [27.1]	56 [52.3]	31 [29.0]	87 [81.3]	13 [12.2]	100 [93.5]	7 [6.5]	107 [100.0]
539 [23.0]	1924 [82.2]	273 [11.7]	2197 [93.9]	109 [4.7]	2306 [98.6]	34 [1.4]	2340 [100.0]

Tall variety in Ambajipeta, Andhra Pradesh, Kailasa Rao and Srirama Rao (1968) found the period January to June as the suitable period for collection of seednuts. Since the climatical factors vary from year to year, these studies have to be conducted over a long period to arrive at definite conclusions. The results reported in this paper were derived on the basis of data gathered during a period of five years in the case of June sowing and three years in July sowing. Similar studies in other tracts with local cultivars over a long period will indicate the suitable period for collection of seed coconut and the germination trend in the nuts harvested during different months in the areas where climatic conditions are different.

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