Coconut nursery studies

IV. Suitability of west coast variety nuts harvested in the different months of the year for seednut purposes

By

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INTRODUCTION

On the West Coast of India which is the premier coconut growing tract, coconuts meant for use as seednuts are now being harvested in the summer months (February-May) of the year. Studies have shown (Patel, 1938; Menon and Pandalai, 1958) that the nuts coming up for harvest during these months show relatively much better development than those harvested in the other months of the year. They are bigger sized, contain large quantity of meat, show better germination and give rise to a higher percentage of quality seedlings. Further, the seednuts can be planted in the nursery under very favourable circumstances with the onset of South west monsoon rains in May-June obviating the necessity for any immediate or elaborate watering. The sprouts that come up from these nuts within three to four months of planting find congenial conditions for satisfactory growth and reach the stage of selection early. According to Aiyadurai (1954) on the East Coast nuts harvested from January to June are suitable for use as seednuts.

In the possibility of utilising the nuts harvested from selected mother palms of the tall variety in all the months of the year for seednut purposes had been investigated at the Agricultural Research Station, Nileshwar III and it had been concluded (Annual Report of the Agricultural Research Station, Nileshwar III for 1938-39) that on the West Coast, February-May is the best period for the collection of seednuts judged from early germination, total germination and quality of seedlings.

This question again came up for consideration and discussion at the Nursery Officers' Conference held at Mangalore in April 1958. In view of the ever increasing targets aimed at in producing quality seedlings from year to year, larger and larger numbers of seednuts had to be collected, which in turn necessitated marking of mother palms even in areas which would not have normally been considered quite suitable. It was asked why the best mother palms should not be made use of fully by collecting nuts from them throughout the twelve months of the year. The Conference finally recommended that this aspect may again be investigated in all coconut growing regions. Accordingly, the Central Coconut Research Station, Kasaragod drew up and supplied to

other States layout plans and instructions for the trial and also laid out a trial at the Station itself. The results of the trial laid out at this Station are summarised in this paper.

MATERIALS AND METHODS

The trial was carried out with seednuts harvested in each of the 12 months commencing from June 1959 and concluding in May 1960. Fifty heavy and regular bearing mother palms were selected and 200 ripe nuts were harvested from them every month at the rate of four nuts from each tree. These nuts were then grouped into four lots of 50 nuts each, comprising of one nut from each tree allotted at random. One lot was planted in the nursery on the same day of harvest, the second one after storage for a month, the third one after storage for two months and the fourth after three months' storage. One bed of four rows, each row accommodating 50 nuts, was allotted for the nuts of the same month of harvest.

The date of germination of individual nuts was taken and recorded for a period of one year from the date of sowing in the nursery. The seedlings were studied for measurable characters relating to growth, viz., height, girth at collar and number of leaves, after a period of 10 months from sowing date. The occurrence of dead sprouts was also carefully recorded.

RESULTS AND DISCUSSION

The frequency distribution of nuts that germinated at 30 - day intervals from the date of sowing in the nursery is furnished in Table 1 of Appendix along with the data on total germination (per cent) and mean number of days taken for germination relating to each lot of seednuts. The data are summarised hereunder separately for month of harvest and period of storage.

Particulars	Total germination %	Mean No. of days taken for germination
Month of harvest of seednuts		
June 1959	89.6	146.3
July "	88.6	153.4
August "	87.0	197.1
September "	82.0	201.0
October "	85.0	218.4
November "	88.6	185.3
December "	92.6	164.1
January 1960	85.6	158.0
February "	91.6	135.5
March "	94.0	113.6
April "	88.0	146.1
May "	88.0	170.9

Particulars	Total germination %	Mean No. of days taken for germination
Period of storage of seednuts		
Nil	78.6	190.5
One month	91.6	156.9
Two months	92.6	156.1
Three months	90.6	159.7

In regard to month of harvest the differences in the total germination are not much. It ranged from 82.0 per cent recorded for September harvest to 94.0 per cent recorded for nuts harvested in the month of March. However, in respect of early germination which is highly correlated with the vigour of seedlings, greater differences are seen as is clear from the data furnished below.

Month of harvest	Percent of nuts germinated within 120 days of sowing	Month of harvest	Percent of nuts germinated within 120 days of sowing
June 1959	31.0	December 1959	4.5
July ,,	26.0	January, 1960	9.0
August ,,	12.5	February ,,	35.5
September ,,	4.0	March ,,	57.5
October ,,	0.5	April ,,	36.5
November ,,	2.5	May ,,	8.5

Percentage of early germination is comparatively high in the case of nuts harvested in the months of February to April, June and July and is low in the other months. This is also reflected in the reduced time taken for germination by the nuts harvested during these months. In March-harvested nuts with as high as 57.5 per cent of early germination, the mean number of days taken for germination is the lowest, viz , 113.6 days.

Storage of nuts prior to sowing in the nursery appears to have resulted in better total germination and also in percent of early germination considered from the reference point of sowing date. Early germination accounted only for 1.7 per cent of the nuts sown when no storage was done whereas it was 26.0, 26.0 and 22.2 respectively in the case of nuts stored for one month, two months and three months. No additional advantage is apparent in storing nuts for a period of more than one month. If the period elapsed from the date of harvest is taken into consideration instead of from the date of sowing in the

nursery, one month's storage alone has, on the average, shown some beneficial effects; the period taken for germination is found to have been advanced by 3.6 days. Considerable differences in this respect are, however, seen among the different months of harvest. The mean number of days by which one month's storage has advanced germination period are 38.6 (June), 31.1 (December), 29.2 (April), 18.3 (May) and 11.6 (July). In the case of nuts harvested in the months of August-November, storage appears to have actually resulted in delayed germination.

Effect on seedling performance

The data of vegetative characters relating to growth, viz., height, girth at collar and number of leaves of seedlings resulting from the different lots of nuts are furnished in Table 2 of Appendix and are summarised hereunder, separately for month of harvest and period of storage.

Particulars	Seedling data taken 10 months after the date of sowing		
	Height (cm)	Girth at collar (cm)	No. of leaves
Month of harvest of seednuts			
June 1959	80.6	9.5	4.6
July ,,	71.0	9.2	4.4
August ,,	48.1	7.9	3.5
September ,,	43.1	7.5	3.6
October ,,	45.0	7.8	3.5
November ,,	50.9	8.5	3.8
December ,,	54.5	8.4	3.7
January 1960	61.3	9.0	4.1
February ,,	68.6	9.3	4.4
March ,,	79.5	9.5	4.4
April ,,	76.5	8.7	4.0
May ,,	80.9	9.1	4.5
Period of storage of seednuts			
Nil	49.1	8.0	3.7
One month	63.7	8.6	4.1
Two months	69.6	9.2	4.2
Three months	70.8	9.0	4.2

It may be seen that seedlings resulting from nuts harvested in the months of March to June have recorded higher growth values than those from nuts harvested in the other months particularly from August to December. On the average the former group has recorded values which are better than the latter by 66 per cent in height, 15 per cent in girth at collar and 22 per cent in the number of leaves present.

Period of storage of seednuts also appears to have in general benefitted seedling growth. One month's storage has brought out the greatest difference in growth. Two months' storage has caused further improvement but the margin is relatively small. Three months' storage has not improved upon the performance of two months' storage. Though this is the general trend notable exceptions are also seen. The response of nuts harvested in the months of August to October has been little or definitely adverse.

The above results seem to show that the differential response of nuts harvested in the different months of the year is mainly caused by the environmental conditions which the seednuts had faced in the nursery after sowing and not due to the differences in the development of nuts. For the nuts harvested during the summer months satisfactory conditions exist for sowing in the nursery, for the nuts to germinate and for the sprouts to grow rapidly. If the period of germination happens to coincide with the prevalence of drier soil and atmospheric conditions, germination gets delayed, sprouts tend to dry up and seedling growth gets stunted. The success in raising nursery will depend upon the ability to provide the conditions required for optimum germination and growth of the nuts and seedlings at different stages of growth in the most satisfactory manner. The easiest and cheapest way is to adapt our practices to the prevailing natural conditions. Environmental conditions will vary from region to region and hence there is need to work out proper schedules to suit them in the different areas. The studies have also brought out the beneficial effects of storing seednuts for a month or two prior to sowing in the nursery.

SUMMARY AND CONCLUSIONS

The possibility of using for seednut purposes ripe nuts harvested in the different months of the year and stored for different periods was investigated. It was concluded that from the point of view of germination of seednuts and performance of resulting seedlings, the period from March to June is the best for the collection of seednuts on the West Coast. Storage of seednuts for a month or two prior to sowing in the nursery has beneficial effects.

ACKNOWLEDGEMENT

Thanks are due to Shri K. A. Parameswara Iyer who was associated with this investigation in the beginning before his resignation. To Dr. K. M. Pandalai, Joint Director of the Station we are highly indebted for his constant encouragement.

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APPENDIX

TABLE I

Studies of the effect of month of harvest and period of storage of seednuts on germination

Month of harvest	Period of storage (months)	Frequency distribution of nuts germinated at different intervals (days) after sowing in the nursery: 0–30	31–60	61–90	91–120	121–150	151–180	181–210	211–240	241–270	271–300	301–330	331–365	Total number of nuts germinated	Percentage of germination	Mean no. of days taken for germination from sowing	Mean no. of days taken for germination from date of harvest	Effect of storage on germination early (−) and late (+)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
June, 1959	Nil				2	4	4	11	10	4	1			36	72	196.3			
	1			2	21	12	11	3						49	98	127.7	157.7	— 38.6	
	2		1	5	9	12	12	10	1					50	100	142.3	202.3	+ 6.0	
	3			5	17	20	1	1						44	88	118.9	208.9	+ 12.6	
July, 1959	Nil				4	6	17	10	5		1			43	86	173.4			
	1			2	16	19	9	1	1					48	96	131.8	168.8	— 11.6	
	2			3	18	11	9	1		1				43	86	129.5	189.5	16.1	
	3			2	7	8	5	4	9	8				43	86	178.7	268.7	95.3	
August, 1959	Nil					10	17	6	3	4				40	80	175.3			
	1				21	9	1	8	7				1	47	94	151.8	181.8	6.5	
	2					6	3	3	11	10	11	2		46	92	233.3	293.3	118.0	
	3			1	3		6	4	4	14	9			41	82	228.0	318.0	142.7	
September, 1959	Nil				1	6	8	8	12	2				37	74	190.0			
	1				4	5	3	7	9	9	3			40	80	205.3	235.3	45.3	
	2				3	1	12	11	8	6	1			42	84	195.5	255.5	65.5	
	3					1	4	12	22	6				45	90	213.0	303.0	113.0	
October, 1959	Nil				1	1	4	2	16	2	3	3		32	64	222.3			
	1					1	10	9	16	5	1			42	84	206.7	236.7	14.4	
	2						10	4	20	12	2			48	96	222.7	282.7	60.4	
	3						4	14	25	3	2			48	96	227.0	312.0	89.7	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
November, 1959	Nil						6	9	10	10	1			36	72	210.0			
	1					2	4	15	25	1	3			50	100	212.6	242.6		24.6
	2				5	10	26	5						46	92	153.7	213.7	—	4.3
	3					19	25		1					45	90	156.7	246.7		28.7
December, 1959	Nil					1	10	9	20	4				44	88	203.7			
	1					4	5	12	19					44	88	142.6	172.6	—	31.1
	2			1		6	35	4	1					47	94	165.2	225.2		21.5
	3				4	28	17		1					50	100	144 8	234.8		31.1
January, 1960	Nil						19	18	2					39	78	194.5			
	1			1		15	25	2	1					44	88	157.3	187.3	—	7.2
	2				7	24	10	1			1			43	86	141.9	201.9		7.4
	3				10	14	20	1						45	90	138.3	228.3		33.8
February, 1960	Nil					4	31	4	3	1				43	86	176.2			
	1				1	30	15	1			1			48	96	146.1	176.1	—	0.1
	2				41		8							49	98	116.2	176.2		—
	3			25	4	6	7	1						43	86	103.3	193.3		17.1
March, 1960	Nil				1	39	5							45	90	137.6			
	1			1	39	2	3							45	90	109.5	139.5		1.9
	2			38	5	2	3	1						49	98	94.9	154.9		17.3
	3		10	4	17	13	5							49	98	112.5	202.5		64.9
April, 1960	Nil				1	12	3	11	5	2	3			37	74	188.7			
	1				31	5	7	1	1		1			46	92	129.5	159.5	—	29.2
	2			1	17	26			3					47	94	132.2	192.2		4.2
	3				23	13	6	3	1					46	92	133.9	223.9		5.29
May, 1960	Nil					8	6	7	4	8	7			40	80	209.8			
	1				14	4	4	23	1					46	92	161.5	191.5	—	18.3
	2			1	1	25	19							46	92	146.0	206.0	—	3.8
	3				1	12	21	4	6					44	88	166.4	256.4		46.6

TABLE 2

Data on seedling characters

Month of harvest of seednuts	Period of storage prior to sowing (months)	Data of seedling characters taken 10 months after the date of sowing		
		Height (cm)	Girth at collar (cm)	No. of leaves
1	2	3	4	5
June, 1959	Nil	50.9	8.7	3.8
	1	77.5	7.0	4.8
	2	96.9	11.3	4.8
	3	97.2	11.0	5.0
July, 1959	Nil	57.3	8.2	3.8
	1	64.4	10.8	4.8
	2	78.2	10 1	4 7
	3	83.9	9.1	4.4
August, 1959	Nil	52.2	8.4	3.8
	1	71.8	9.5	4.5
	2	38.5	7.0	3.1
	3	29.7	4.6	2.4
September, 1959	Nil	43.4	7.6	4.0
	1	40.7	7.2	3.5
	2	50.1	7.9	4.0
	3	38.3	7.1	3.0
October, 1959	Nil	38.2	7.2	3.4
	1	45.2	8.0	3.7
	2	47.5	7.8	3.5
	3	48.9	8.0	3.5
November, 1959	Nil	43.7	8.1	3.8
	1	39.2	7.8	3.7
	2	60.0	9.2	4.2
	3	60.7	8.8	4.0
December, 1959	Nil	38 8	7.3	3.2
	1	56.0	8.0	3.2
	2	66.7	9.0	3.8
	3	66.3	9.2	4.5

1	2	3	4	5
January, 1960	Nil	45.6	8.0	3.4
	1	57.2	9.3	4.0
	2	64.7	9.2	4.7
	3	77.8	9.6	4.4
February, 1960	Nil	50.6	8.7	3.5
	1	55.6	9.0	4.7
	2	81.6	9.6	4.4
	3	86.5	9.8	4.8
March, 1960	Nil	68.4	9.3	4.4
	1	70.3	9.2	4.3
	2	86.7	9.7	4.6
	3	92.7	9.7	4.3
April, 1960	Nil	47.8	6 8	3.0
	1	83.6	9.1	4.4
	2	85.6	9.7	4.1
	3	88.9	9.3	4.6
May, 1960	Nil	52.9	7.2	4.2
	1	102.7	8.5	3.9
	2	89.9	10.3	4.8
	3	78.1	10.2	4.9