

ON ARECANUT (*Areca Catechu* Linn Palmæ) SEEDLING RAISING AT THE SUB-HIMALAYAN WEST BENGAL

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INTRODUCTION

Every grower knows it by the age-old practice that only quality seeds can produce quality progenies. This is more so for perennial crop like arecanut which lives over 60 years and bears after 7-8 years. So, it is essentially required that for the purpose of quality seedling raising, selected nuts should only be collected from the pre-marked mother palms based on desirable morphological characters. In the Second Five Year Plan, it has been emphasized that a large scale distribution of quality seedlings of arecanut should be undertaken in order to minimise the import of arecanut and thereby to save foreign exchange.

The Government of West Bengal has published (1954-55) the acreage of arecanut

in the State as 4,467 acres. To this acreage the Districts of Jalpaiguri and Cooch Behar has contributed 1,520 and 1,793 acres respectively. These two Districts of sub-Himalayan West Bengal contribute more than 73% of the total acreage of the State and more than 99% of the total number of trees grown in orchards in the whole State of West Bengal.

Srinivasan (1956) noted that in the sub-Himalayan West Bengal, 6,090 acres of additional area is readily available for the extension of areca area without detriment to food production and forest preservation policies. Further, he added that in the existing 3,400 acres of sub-Himalayan West Bengal, there is great scope of intensive cultivation throughout the area by gap

filling and underplanting by quality seedlings. Varadarajan (1958) have also observed that the North-East region of West Bengal and North Bihar may cover a total area of 13,000 acres under arecanut and hence there is immense possibilities of growing arecanut in the area, both intensively and extensively.

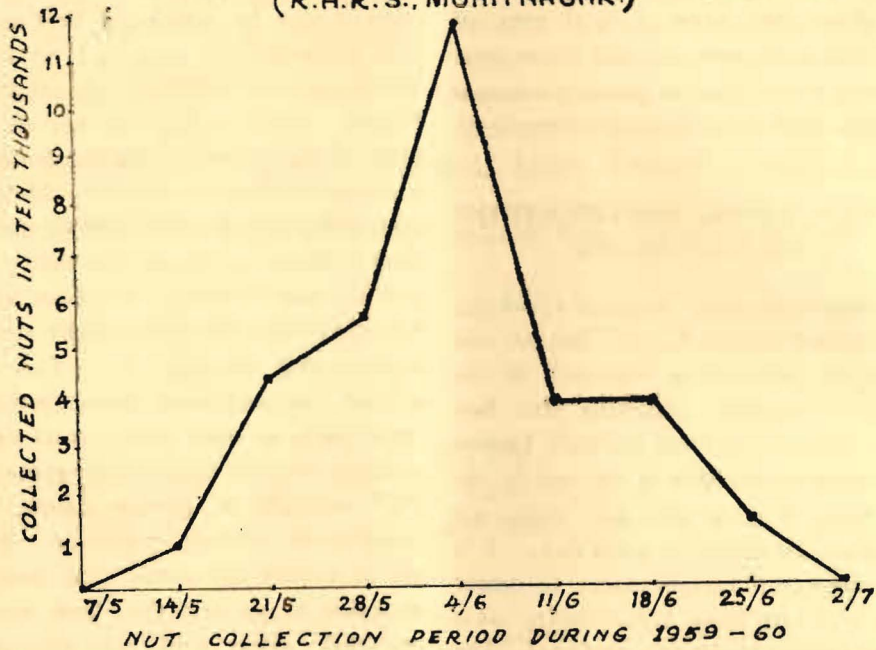
PREVIOUS WORK, OBSERVATIONS AND DISCUSSION

Seednut collection. Nambiar (1949 and 1954) recorded that in Assam, Bengal and Malaya, no principle is followed in the selection of seednuts excepting that best ripe nuts are selected from the bulk harvest of the season irrespective of the age of the trees. Nuts of good size and shape are removed and air-dried for a few days. It is also the practice in certain places to smear the nuts with cow-dung before drying as it is said to induce vigour in seedlings. The present writer has also observed that till now the above observations are more or less true for this region and as a result the local growers are not sure of the quality of the seedlings they raise. Aiyer (1958) has noted that in Mysore, for nursery raising the seednuts are taken from trees between 25-30 years of age and of the kind yielding the type of nuts desired. The bunches reserved for seed purpose on the trees are those that appear about the middle of the flowering season. Patel (1957) has recorded that high and poor yielding trees receiving more or less the same treatment are randomly distributed in the same garden. The variation in yield, he observed, is due to the inherent character of the trees, i. e. genetic constitution. Anonymous (1957) and John (1959) have recorded that high yielding garden of 1-2 acres having palms of 25-50 years of age, isolated by barriers like hills or

situated at distances to prevent from pollination from nearby gardens should be chosen, for the purpose of seednut collection (it may be mentioned here that this area is a level land area and no hills are there excepting the Himalayan range in the North). Much before the harvest of the year, all the palms of the garden are to be observed for their vigour and yielding characters and all the diseased, less vigourous and poor yielding trees having less than 10 leaves and less than 3 bunches with poor setting of nuts (less than 100 per bunch) should be rejected with marking "R". This practice should be continued consequetively for three years, so that after 3 years study one can find out only the desirable selected palm ("S" marked) or proven palms for the purpose of seednut collection. Bavappa. etc. al. (1958) has noted that seednuts of desirable shape and thin husk should be recorded along with the morphological features like internodal distance, girth, number of leaves, crown habit, number of bunches, nut set, colour of nut, shape of nut, number of nuts per pound and maintained in the form of a parent palm register. This will enable to study the performance of the progenies with reference to each of the parent palm characters noted.

In the sub-Himalayan West Bengal collection season of seednuts starts from early May and extends upto the end of June with the peak period between the last week of May and first week of June. In the light of experience noted beforehand, this research station has marked more than 3 thousand mother palms from the reputed gardens of higher yield and has collected more than 3 lakhs of quality seednuts during 1959-60 in order to raise and distribute quality seedlings to the growers.

GRAPH SHOWING THE SEEDNUT COLLECTION PERIOD IN THE SUB HIMALAYAN REGION OF NORTH BENGAL DURING 1959-60.
(R.A.R.S., MOHITNAGAR.)



So all the preliminaries regarding the selection of reputed garden of high yielding palm should be finished by the month of February at the latest. The period between March and April may be utilised for checking the records, spot visit for verification, to contact the garden owners etc.

Nambiar (1949) has reported that in the sub-Himalayan West Bengal and Assam the flowering season is definitely late and lasts from June to September and consequently, the harvesting season is between May and June. Present writer has also observed that even within the region itself the nuts mature late by about 3-4 weeks time in the places at the foothills of the Himalayan range than those places away from the hills. As one goes further south towards the Bay of Bengal, he will find that the maturity of nuts starts more early, i. e.

by December. From the above observations, it may be mentioned that the maturity of nuts in the South Bengal starts after the elapse of a period of about two months (October and November) after the cessation of the rainy season by the end of September. (in South Bengal average annual rainfall and temperature is 70" and 80°F respectively). But for the maturity of nuts at the sub-Himalayan region it takes about seven months time (October to April) from the cessation of the rainy season by the end of September (in sub-Himalayan region average rainfall and temperature is 150" and 75°F respectively) Gardner et. al. (1952) has noted that injudicious use of irrigation water in early autumn causes prolonged growth. So the heavy rainfall with low temperature may have some effect for the late maturity of the nuts in the area.

After the harvest of the ripe nuts in this region of sub-Himalayan West Bengal the grower faces a great difficulty in sun drying of the nuts as rain also starts by that time and as a result the nuts get spoiled by fungus attack. This is the reason why local people use their nuts after water steeping and thus allowing fermentation and bad smell to the nut so this drying problem necessitates to make a study to find out if by any practice the ripening period can be shifted about a month earlier, i. e. by April at the latest. In order to make a study of variability on the maturity of nuts due to the proximity of

the Himalayan range this research station has made a collection of about 11000 seed-nuts of winter season harvest from the different parts of India. Information of the nuts as collected during the winter season of 1958-59 is given below. After 7-8 years, i. e. by 1966-67, these seedlings will come to flowering and thus the Research Station will conclusively get the information as to whether the variation of the flowering season (fruit bearing) is due to the proximity of the Himalayan range or due to the genetical constitution (varietal or type character).

Table showing the germination percentage of seednuts received from places other than North Bengal during the winter season of 1958-59.

S. No.	Name of the place.	Date of despatch by the officer concerned.	Mode of packing.	Mode of transport.	Date of receipt by this office.	Date of sowing at the R.A.R.S.	No. of days between the despatch of nuts and sowing.	Total No. of nuts sown for sprouting.	Total No. of nuts sprouted	Percentage of germination.	Remarks.
1.	South Bengal.	28-11-58	Gunny bag.	Air transport.	13-12-58	13-12-58	16 days	5,000	2,350	47.00%	The nuts were sent without any treatment.
2.	Kyatasandra. (Mysore State).	22-12-58	Wooden box with saw dust.	Rail	17-1-59	18-1-59	28 days	2,000	1,169	58.45%	Do.
3.	Vittal. (Mysore State).	27-12-58	Gunny bag.	Rail	17-1-59	18-1-59	23 days	2,000	1,126	56.30%	Do.
4.	Peechi. (Kerala State).	30-1-59	Gunny bag.	Rail	5-3-59	6-3-59	36 days	1,500	1,111	74.10%	Do.

Seedlings raised from the seednuts received from the other parts of India are thriving well. From a study of the above table, it may reveal that the nuts from Peechi, though took the longest number of days on transit by rail and to put for sowing during the driest season, have shown the highest germination percentage.

Bhat (1956) have also registered such phenomenon. This year (1959-60) also this research station is collecting about 40,000 seednuts of winter harvest for raising seedlings.

Srinivasan (1956) observed that there exists two types of nuts in the sub-Himalayan region of West Bengal, namely, (1) local type which ripen by February to April and (2) Bengala type introduced from South Bengal which ripen by October-November. Further, he has noted that there are instances that one and the same palm yields two flushes in two distinct seasons as noted earlier. Author of this article has tried his best to find out if any such phenomenon actually exists in this area but he has failed to locate any such phenomenon that may exist.

NURSERY PRACTICES.

Nambiar (1949 and 1951) and Aiyer (1958) have reported that seed arecanuts are sprouted in straw bundle before sowing in the primary nursery. Sundara Murthi (1950) has mentioned the use of soil media for sprouting of seednuts. Bavappa (1956) observed that sprouting the nuts in loosely tied straw bundles (muda) gave low germination and poor establishment as compared with that of the direct sowing. Anonymous (1957) has noted that seednuts should be sprouted first in the sand filled shallow pits by putting the calyx upward and covered with sand or soil just to cover the seeds. The writer has observed that the pit-method of sprouting the seednuts if resorted to in this area, there is great risk of allowing the seednuts to rot as the average rainfall here is about 150". As already mentioned the peak period of the harvest season of seednuts at this area is by the end of May and beginning of June when the North East monsoon also starts in this area.

Table showing the rainfall in inches per month for the year 1957, 1958 and 1959 (upto October) (Mohitnagar, West Bengal.)

Month Year	Janu- ary	Febru- ary	Mar- ch	April	May	June	July	August	Sept.	Oct.	Novr.	Decr.	Total.
1957	Not recorded				3.76	22.73	34.05	32.97	5.59	5.99	—	—	105.09
1958	0.48	0.20	1.09	3.73	9.85	32.89	24.66	52.75	15.24	5.94	—	—	146.83
1959	0.97	—	2.06	6.17	9.55	20.71	27.54	11.37	18.99	17.94	—	—	115.30

Considering the heavy rainfall and harvest season of the seednuts at the area, during 1959-60 sowing of the nuts has been done at the Research Station directly in 6"

raised nursery beds (of 4' width and with provision for 1½' drain in between two beds to be used for irrigation and drainage purpose) giving spacing of 1' x 1' and without

going through the stage of primary nursery (meant for sprouting of the seednuts). For the purpose of gap filling, about 20% of the total seednuts have been sown for sprouting in the above noted raised nursery beds with the spacing of 2" x 2" with their calyx point-

ing upward and covering the calyx with earth. Below is the table showing the observations (1959-60) on the germination percentage of nuts (1) sown at different depth and (2) sown with different position of seednuts taken at the Research Station.

Table showing the germination percentage of the nursery experiments conducted at the Regional Arecanut Research Station, Mohitnagar (1959-60).

Name of the experiment.	Name of the design.	Date of sowing.	Treat-ment.	No. of nuts sown per treatment.	% age of germination. (mean)	Remarks.
(a) Optimum depth of sowing seednuts.	Latin Square 5 x 5.	12-5-59	0" depth	30	87.3	Nuts of a single middle bunch of middle aged palm were utilised for all the treatments of one replication.
			1" depth	30	81.3	
			2" depth	30	83.3	
			3" depth	30	82.6	
			4" depth	30	82.00	
(b) Compara-tive study of different position of seednuts in sowing.	Randomi-sed block design with four treat-ments and eight re-plication.	12-5-59	Vertical position	30	85.00	Nuts of a single middle bunch of middle aged palm were utilised for one replication (all the treatments)
			Slanting position (45°)	30	89.10	
			Horizontal position	30	84.00	
			Topsytwary position	30	77.50	

From the table it may be seen that (a) practically there is not much difference of germination percentage between the different treatments of depth of sowing and (b) topsytwary position of seednuts registered the lowest germination percentage.

Gap filling should be finished by the month of September at the latest and the newly transplanted seedlings are to be irrigated frequently for their establishment, otherwise there is every possibility of allow-

ing the newly transplanted seedlings to wither away. Considering the above mentioned facts, it may be mentioned that if there are facilities for irrigation, one may go for bulk sprouting in the raised bed methods and then transplanting the same within September. Adherence to the latter practice will help considerably to avoid the weeding problem during the rainy season. To minimise the weeding problem a cover crop like *Phaseolus mungo* (kalai) is of great use.

SHADE

Srinivasan (1956) recorded that for the purpose of shade and green manure, *Boga Medeola* and *Crotolaria anagyroids* would be helpful. Results at the Research Station also corroborate with the above observations. These legumes may be sown with spacing of 3' by the month of May to get a good shade during summer months

IRRIGATION AND DRAINAGE

Srinivasan (1956) noted that as the sub-Himalayan West Bengal is a humid area with heavy rainfall, so irrigation is not required and in fact irrigation or drainage is not in vogue in this area. But irrigation is a necessity in this area during the period between February to April and drainage is also essential during the rainy season. For this purpose deep drains of atleast 3' in depth all round the nursery area and cross drains of 1' depth at right angles to the main drainage channels at 50' apart are essentially required. Otherwise water logging will cause high mortality of the seedlings.

MANURING

It has already been mentioned that *Boga medeola* and *Crotolaria anagyroides* serves both the purpose of green manuring and shade. These plants being perennial in nature, lopping may be utilised for green manure purpose. In case the nursery is not located in a rich soil, it is desirable to manure the nursery for getting vigorous seedlings.

SELECTION OF SEEDLINGS FOR TRANSPLANTING

Bavappa et. al. (1957) have observed that earlier germinated nuts produce more vigorous seedlings than late germinated ones.

Anonymous (1959) have noted that only vigorous seedlings, which have produced five or more leaves at the end of one year and having good girth are to be selected for distribution and planting.

PLANT PROTECTION MEASURE

Attack of red and white mites on the arecanut seedlings were reported causing yellowish patches on the leaves. These enlarge and give a bronze appearance to leaves which finally dry out and the seedlings show a sickly appearance. Mites are commonly found to infest the lower surface of the leaves of the areca seedlings. Patel et. al. (1958) recorded that the mites could be controlled by spraying wettable sulphur (1 oz. in 2 gallons of water) soon after the attack is noticed.

SUMMARY

1. Seednuts should be collected only from the proven mother palms of 25-50 years of age, having 3-4 bunches and more than 100 nuts per bunch. Nuts of first and last bunch should not be taken for seedlings raising.
2. In the region of sub-Himalayan West Bengal, there is only one seednut collection season and the peak period of seednut collection is between the last week of May to first week of June.
3. Within the region itself the nuts mature late by about 3-4 weeks time in the places at the foothills of the Himalayan range than those places away from the hills.
4. Sun drying of ripe nuts is a problem here and so it is worthwhile to observe the performance of the seedlings raised from the seednuts collected from other parts of Indian Union during the winter harvest.

5. For reasons of coincidence of the rainy season and harvest season of arecanuts at this area, the seednuts may be sown directly in 6" raised nursery beds of 4' width with spacing of 1'X1'. There should be drainage-cum-irrigation channels of 1½' width in between two nursery beds and 3' deep drainage channel should be there all round the nursery area. There should be 1' deep drains at every 50' interval connecting the 3 feet deep drains.

6. For the purpose of gap filling, 20% of the seednuts may be sown in raised nursery beds (sandy soil) with spacing of 2"X2". Gap filling should be finished by the month of September at the latest. The newly transplanted seedlings should be adequately irrigated for their establishment. If there are facilities for irrigation, one may go for bulk sprouting in raised nursery beds and this would be economic as rainy season weeding cost might be avoided by this practice.

7. Seednuts may not be sown in the topsyturvy position as this results low germination percentage.

8. Seednuts received from long distant places show almost normal germination percentage even after a long period of 36 days required for transit by rail.

9. For the purpose of shade and green manure, *Boga medeola* and *Crotalaria anagyroides* are found to be very much helpful as these legumes can thrive well under low pH condition and are perennial in nature.

10. Irrigation is essentially required during the period between February to April and drainage is essential during the rainy season.

11. Only vigorous seedlings which have produced five or more leaves at the end of one year and having good girth are to be selected for distribution and transplanting.

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