

Role of quality planting materials in coconut production

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The quality of planting material is the most important factor in getting sustainable and profitable yield from any crop. The production and management of planting material in the nursery decides the performance of coconut in the field and ultimately the quality of the produce. The expectation of every farmer while purchasing seedlings for planting is that it should be early bearing, high yielding, should have high copra and oil content and it shall be of short stature. If poor quality planting materials are used for planting, the performance of the palm will not satisfy the expectation of the farmer causing considerable loss of time and money to the farmer. In the absence of commercially viable vegetative propagation techniques, only seed propagation is possible in coconut. The desirable qualities are controlled by the genes present in 32 chromosomes in each cell of coconut palm which is transferred from generation to generation through seeds. The quality of coconut seedlings, (i.e. the ratio of the performance of seedling in the field and the expectation of farmers) is highly correlated with adult palm characters. Further, as coconut is cross pollinated, the palms do not breed true, making the selection of seed nut and seedling more difficult and important. The desirable qualities are transferred from generation to generation through the

genes present in these chromosomes. Therefore, for producing seedlings with good qualities, the selection of seed garden, mother palms, seed nuts and seedlings assume great importance.

The annual demand of coconut seedlings for the country for new planting and replanting is estimated as 100 lakhs. The present production is 35 lakhs only. There exists a critical gap of 65 lakh seedlings annually and hence private agencies play a major role in production and distribution of coconut seedlings. The domestic demand for coconut and coconut products is also increasing. Besides, the export of coconut and its products are also increasing tremendously. To meet the increasing demand, the production and productivity should be increased. This is possible by increasing the productivity of existing gardens through regular replanting and by adopting better management practices, and new planting in potential areas available in traditional and non traditional states. Production and distribution of quality planting materials is the first step towards better establishment and increasing productivity to meet increasing demand of coconut in our country.

Generally coconut farmers are not aware of the quality criteria in choosing, planting materials to their

garden for replanting & new planting. They select inappropriate mother gardens, mother palms, follow wrong method of sowing and judge the maturity of nuts wrongly. This resulted in terms of poor establishment growth, yield. Keeping this in view I am writing this article to provide some positive aspects on production of quality planting materials in coconut.

Steps in production of quality coconut seedling

1. Right selection of seed gardens

The first and foremost step in the production of quality coconut seedlings is selection of mother gardens. The parameters for selection of mother gardens for seedling production are :

- i) The seed gardens should have palms with record of consistently higher yield
- ii) Containing a heavy proportion high yielding palms (more than 100 nuts per palm per year)
- iii) They should be free from pests & diseases
- iv) They should be located preferably in average conditions without heavy manuring or irrigation.

The Coconut Development Board has been giving more thrust for establishing seed gardens for production and distribution of quality planting materials to the farmers. The CDB also extend support for establishing seed gardens in private sector. Financial assistance @ 25% of cost establishing the garden limited to Rs. 6 lakhs is extended over a period of three years for establishing seed gardens in four ha. in the private sector for production and distribution of quality planting materials especially D x T hybrid and Dwarf varieties. More and more seed gardens should be established in the private sector utilizing financial assistance under the scheme so as to increase the production of hybrid and dwarf seedlings in future.

II. Right Selection of Mother palms

Palms should be regular bearers with annual yield of more than 80 nuts and with copra content of not less than 150g/nut under rain fed condition (Irrigation-120 nuts/year). Palms should reach full bearing stage and should be giving consistently high yield for at least four years. Avoid very old palms of above 60 years. Palms which produce barren nuts or those shedding large number of immature nuts should be discarded. Collect seed nuts during January and April in the West Coast region. Only fully matured nuts i.e. around 12 months old should be harvested. Nuts should not be damaged while harvesting. Discard nuts having irregular shape and size

a. Quality Standards of Tall Mother Palms

The palms should be in the age group of 15 to 50 years with regular yielding of 100 nuts. Steady bearing palms also can be selected as mother palms irrespective of age. The palm should also have more than 30 fully opened leaves with short strong petioles and wide leaf base firmly attached to the stem. It shall bear at least 12 bunches of nuts with strong bunch stalks.

b. Quality Standards of Dwarf Mother Palms

The palms in the age group of 8-30 years with regular yield of 100 nuts are ideal palms. Steady bearing palms-irrespective of age can also be considered. It should have more than 30 fully opened leaves with short strong petioles and wide leaf base firmly attached to the stem. Palms bearing at least 12 bunches of nuts with strong bunch stalks and palms possessing all typical characters of dwarf with regard to stem, crown, nut and inflorescence are ideal.

III. Right time of Harvesting and Selection of seeds

Mature nuts should be harvested when at least one nut in the oldest bunch starts to dry. In Talls, it takes 11-12 months for a nut to become a mature seed nut whereas in dwarfs, nuts will mature in 10-11 months after pollination. Seed nuts are preferably selected from the center of the bunch, as development of nuts at top and bottom may not be uniform leading to poor germination and quality of seedlings. Harvested seed nuts are stored in shade, to prevent drying of nut water, till its husk become completely dry. Seed nuts of tall variety can be stored for two months after harvest whereas the seed nuts of dwarfs should be sown within 15 days of harvest.

iv) Raising nursery

Select well-drained, coarse-textured soil near dependable water source for irrigation. Prepare raised beds if water stagnation is a problem during rainy season. Soil may be treated with chlordane 5% dust @ 120 kg/ha, or drenched with Chlorpyrifos in places where nursery is being raised for the first time as a precaution against white grubs and termites. Nursery can be raised either in the open with artificial shade or in gardens where the palms are tall and the ground is not completely shaded. The seed nuts should be planted in long and narrow beds at a spacing of 40 x 30 cm during May-June, either vertically or horizontally in 20-25cm deep trenches. Advantage of vertical planting is that it causes less damage during transit. However, in delayed planting when the nut water goes down considerably it is good to go for horizontal sowing for better germination.

Use Poly bag seedlings to avoid transplanting shock and early bearing

Vigorous seedlings could be prepared by this method. For this, germinated seednuts are transplanted in poly bags of size 60 x 40 cm with 8-10 holes at the bottom. The potting mixture is in the 2:1:1 ratio of topsoil, sand and compost mixture. The advantage of poly bag seedlings is that there is no transplanting shock and the seedlings are with better vigor. But the disadvantage is the increase in transportation and seedling cost. Mulching and shading should be done immediately after the end of monsoon if the nursery is raised in open space. Keep nursery free of weeds. Regular surveillance for incidence of pests and disease should be done regularly and adopt plant protection measures. Remove those nuts that have not sprouted even after five months of sowing. Farmers can adopt this method for production of good quality seedlings from seednuts collected from good mother palms available in their on garden or collected from reputed sources.

Quality Parameters of Coconut seeds and seedlings

Sowing of selected seed nuts in the nursery and selection of seedlings from the nursery is an important step for ensuring high yield. Only seedlings with good quality should be selected through a rigorous selection based on characteristics viz: early germination, rapid growth and seedling vigour; six to eight leaves; collar girth of 8-10 cm; early splitting of leaves etc. The colour of the petiole of the seedling leaf can also be used as a selection criterion for dwarfs and hybrids. The Dwarfs should exhibit the petiole colour of the mother palm while, the petiole colour of hybrid seedlings may range from green/brown/intermediate shades of the parents. More vigorous seedlings can be obtained by Poly bag nursery. Select seedlings, based on the above characteristics. The recovery of good seedlings will be 60 to 65% of total seed nuts sown. There are no serious pest and diseases in coconut nurseries. However, bud rot affected seedlings are to be avoided for planting. The symptoms are yellowing and withering of the spindle leaf followed by drying and death of the seedlings. The spindle of the affected seedlings will easily come out with a gentle pull and rotting can be seen in the lower end of the detached leaf. Quality standards for good seeds and seedlings are shown in Table 1 & 2.

Recommended Varieties

The tall varieties are extensively grown throughout India while dwarf is grown mainly for parent material

in hybrid seed production and for tender coconuts. The tall varieties generally grown along the west coast are

Table 1
Quality parameters for selection of coconut seed nuts

PARAMETER	Standards
Germination	>80%
Purity	>98%
Fruit weight (g)	>400g – Dwarfs >600g – Talls
Nut water	Present
Pest and disease incidence	Nil
Maturity	11-12 months-Tall 10-11 months-dwarf

Table 2
Quality parameters for selection of coconut seedlings

Characters	Standards
Age of the seedling	5 to 9 months
No of leaves	6 & above
Girth at collar region	Dwarfs- > 8 cm; Hybrids/ Talls- > 10 cm
Height	Dwarf- >80 cm; Hybrids/ Talls-> 100 cm
Petiole Color	Dwarf should exhibit petiole color of parent; Hybrids green/brown/ intermediate shades of parents.
Disease /pest Incidence	Absent

called West Coast Tall and along the east coast is called East Coast Tall. Benaulim is the tall variety grown in Goa and coastal Maharashtra. Laccadive Ordinary, Laccadive Micro, Tiptur Tall, Kappadam, Komadan and Andaman Ordinary are some of the tall varieties. Chowghat Dwarf Orange, Chowghat Dwarf Yellow, Chowghat Dwarf Green, Malayan Yellow Dwarf and Malayan Orange Dwarf are some of the dwarf varieties grown in India. Gangabondam is a semi tall type grown in certain tracts of Andhra Pradesh. Details of some of the coconut varieties and hybrids released for cultivation in India are given in Table 3

Quality Certification and Accreditation

Production and distribution of good quality coconut seedlings is one of the most important thrust areas identified by Coconut Development Board under MIDH. This can be achieved only through setting up regulated network of nurseries for the production of certified planting materials. Up-gradation of existing nurseries to meet the accreditation requirements and enhancing their production potentials also is being taken up by Coconut Development Board. The accredited nurseries will be under the monitoring of Coconut Development Board for certification / accreditation. The nurseries shall have to undergo an accreditation process involving application to CDB for approval based on certain essential and desirable criteria and granting accreditation for a specific period based on the inspection by an expert committee constituted for this purpose. The accreditation of coconut nurseries was being taken up by the National Horticulture Board as part of horticulture nursery certification programme. From 2015-16, CDB is also

designated as and agency to implement this programme from 2015-16 onwards in view of the importance of

S. No	Name	Area for which recommended
1	Chandrakalpa	Kerala, Karnataka, TN
2	Kerachandra	AP, Maharashtra
3	Chowghat Orange Dwarf	All coconut growing regions
4	KalpaPratibha	West Coast region and peninsular India
5	KalpaDhenu	West Coast region and Andaman and Nicobar Islands
6	KalpaMitra	West Coast region and West Bengal
7	Kalpatharu	Kerala, Karnataka, TN
8	Kalparaksha	West Coast region and root (wilt) diseases tracts of Kerala
9	Kalpasree	West Coast region and root (wilt) diseases tracts of Kerala
10	Pratap	Konkan region
11	VPM-3	Tamil Nadu
12	ALR 1	Tamil Nadu
13	Kamrupa	Assam
14	KeraSagara	Kerala
15	KeraKeralam	Kerala, Tamilnadu and West Bengal;
16	KeraBastar	Andhra Pradesh, Konkan region in Maharashtra and Tamil nadu
17	Kalyani Coconut-I	West Bengal
18	Gauthami Ganga	Andhra Pradesh
Hybrids		
1	Chandra Sankara	Kerala, Karnataka, Tamil Nadu
2	KeraSankara	Kerala, Karnataka, Maharashtra, Andhra Pradesh
3	Chandra Laksha	Kerala, Karnataka
4	KalpaSankara	West Coast region and root (wilt) disease tracts of Kerala
5	KalpaSamrudhi	Kerala and Assam
6	Laksha Ganga	Kerala, Tamil Nadu
7	Kera Ganga	Kerala
8	KeraSree	Kerala
9	KeraSowbhagya	Kerala
10	Ananda Ganga	Kerala

supplying good quality planting materials to the farming community.

It is evident from the above analysis that quality seed nuts and seedlings are obtained through a series of selection made at different stages with utmost care. We are having high yielding coconut varieties suitable for specific regions in our country. We also have the production technologies defined for each varieties/regions. Considerable efforts have been made by both research and development departments in establishing seed gardens and planting material sources to cater to the demand of quality planting materials. However there are several limitations for this conventional method of production of planting materials from seed. One seedling can be produced from one nut that too with a gestation period of 20-24 months. Hybrid seedling productions also have limitations. In India 98% of the existing plant



population is tall and only a limited number dwarf palms are available. Hence hybrid seedling production is less than 3.5% of the total planting material production. Increasing demand for hybrids leads to sale of uncertified planting materials by private nurseries at higher price. Even reputed nurseries levy high price varying from Rs.250-500/- for a single seedling that too after a long waiting period. If quality is assured, farmers show willingness to pay higher price. From a single mother palm, there is producing limit for hybrid seedlings. At present hybridization is carried out in seven CDB DSP farms, CPCRI and at Farmers gardens. Annual production of hybrids hardly touches 50,000 per annum. Hybrid seedling production is time consuming. As such there is an overall limit for hybrid production. Rapid multiplication techniques like tissue culture should be developed for large scale production of quality planting materials to meet the increasing demand. This should be the long term strategy of research organizations in coconut seedling production. Increasing production in the existing seed gardens, establishment of more dwarf mother gardens and starting the centralised nurseries with active participation of the farmers initiated by CDB through farmer producer organisations are the need of the hour to enhance quality planting materials production to meet the demand. Besides, there should be greater emphasis in popularizing the importance of using quality planting material and quality parameters for the selection of mother gardens, seed nuts and seedlings to the farming community.