Mother Palm Selection in Coconut for Production of Elite Planting Materials

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ABSTRACT
Coconut is a significant multi-purpose palm extensively grown in the humid tropics and is referred to as ‘Kalpavriksha’ in India taking into consideration that it provides all requirements of life. The palm, being a perennial crop with economic life span of more than sixty years, has a long gestation period of four to seven years depending on the cultivar. The full fruit bearing capacity of the palm is recognizable only after eight to 12 years of planting depending on the genetic and environmental factors. Hence, if the planting material happens to be inferior in quality, or poorly selected the garden will turn out to be highly uneconomical and the grower would incur continuous losses for many years. Replacing the poorly performing garden also takes considerable loss of time and resources. As coconut cultivation needs substantial pre bearing investment, greater emphasis is required on the selection of good quality planting materials of desired variety (Subramanian et al., 2018).
INTRODUCTION

Coconut (Cocos nucifera L.) is commonly known as ‘Kalpavriksha’ meaning ‘The Tree of Life’. It is an important plantation crop of the tropics. The area under coconut is gradually increasing in the Southern states of India during the recent years, as farmers are gradually shifting from traditional agricultural crops towards plantation crops such as coconut. The success of a coconut plantation establishment starts with the production of good quality planting materials. Coconut gardens established using unselected and inferior planting materials would prove to be highly uneconomical and incur a continuous loss to the grower. Hence selection of suitable mother palms and production of quality planting materials is of paramount importance.

Mother palm selection

Since commercially viable vegetative propagation techniques are not available in coconut, seed propagation is the only possible option for establishment of coconut plantations. Hence seed nuts have to be carefully selected from good quality high yielding palms having desirable characters. Such palms from which seed nuts are obtained for the purpose of propagation are known as mother palms. Mother palm selection is a key factor for production of quality planting materials. Presently, there is a great demand for quality coconut seedlings. Hence farmers can resort to production of high-quality planting materials by selecting mother palms from their own gardens. The following guidelines may help farmers in selection of suitable mother palms and raising good quality planting materials (Sivakumar et al., 2019).

Criteria for mother palm selection

1. Palms should be regular bearers and consistently yielding high during the last four years, with an average annual yield of more than 100 nuts and copra content not less than 150 g/nut

2. The palms selected should be in their stabilized bearing phase. Generally, the age of the palms should be more than 20 years old for tall varieties. However, for dwarf palms, the age of the palms may be lesser as they attain the stabilised bearing phase much earlier than the tall varieties.

3. Avoid very young (below 20 years) and old palms (above 60 years). Under normal conditions, palms between 25 and 40 years of age would be in the full bearing stage and be selected as mother palms.

4. Seed nuts can be collected from the newly established seed gardens irrespective of the age of the palms provided, the performance of its parents is known and only high yielders are maintained.

5. A high yielding mother palm in its middle age will have at any time 30 to 40 fully opened leaves in its crown. Total number of leaves in crown is correlated with yield over a long period.

6. According to the disposition of leaves in the crown, the crown shape can roughly be grouped into four classes, viz., spherical, semispherical, drooping and erect. Among these, the palms with spherical and semispherical crowns should be selected, as disposition of leaves is such that the bunches will have sufficient room for normal development and will be fully supported by the leaf petioles. When the crown is of drooping nature, the bunches are likely to slip down, break the inflorescence stalk and shed the nuts in the immature stage. Hence, palms with drooping or erect crown should be avoided even if they show other desirable characters.

7. The petiole should be short and stout and wide leaf base firmly attached to the stem to give effective support to the coconut bunches.
8. Each leaf axil should have an inflorescence with large number of spikes and one or two female flowers per spike. There is some advantage in selecting trees, which bear large number of heavy nuts in a bunch.

9. Bunch stalk should be short, stout and strong.

10. The bunches should be seated on the leaf petioles of the lower whorl and should not show buckling or drooping habit.

11. Palms having medium sized nuts (about 1200g when the husk is fully dried) with round or oblong shape are to be selected. De-husked nuts should be large (about 570g) with thick kernel. Such trees not only give high yields but the nuts also contain, in general more copra than the others.

12. The selected palms should be free from pest and diseases

**Coconut trees unsuitable for seed nut collection**

During the selection process, palms of the following nature should be strictly avoided

- Palms with alternate bearing habit
- Palms showing buckling habit with drooping bunches
- Palms exhibiting severe nutritional disorders such as pencil point disorder, hen and chick disorder, cracking nuts etc.,
- Palms producing habitually barren nuts, i.e., nuts which are empty or do not contain well developed kernel inside or those that shed their nuts before they attain full maturity are to be discarded at the time of selection of mother palms even through such trees may give high yield.
- Palms exhibiting a higher degree of button shedding

- Palms grown under favourable environmental conditions should also be avoided since it is difficult to identify whether the phenotypic expression of the selected palm is due to genotype or environmental influence. For instance, trees grown near manure pits and cattle shed, would tend to produce more nuts than other trees in the garden due to the fertility status of the soil in that region

**Collection of seed nuts from selected mother palms**

Seed nuts collected from selected mother palms possessing the desirable morphological characteristics can be used as a good quality planting material. Special care and attention should be given while harvesting the seed nuts. For seed nut collection, only the matured nuts are to be harvested when they are about 11-12 months old. In palms which have grown very tall, the bunches intended for matured seed nut have to be harvested carefully by lowering them to the ground using a rope in order to avoid any injury to the seed nuts. To assess whether the seed nuts have been harvested in the right stage, one can tap the nuts to hear a resonant sound. On the other hand, the immature nuts would produce a weak sound.

**Storage and curing of seed nuts**

Seed nuts with well dried husk and with adequate water content should be selected for sowing. Tall varieties can be sown one or two months after collection, whereas dwarfs should be sown at the earliest possible after harvest. Before sowing, the nuts can be stored in small mounds under shade to ensure proper drying of the husk. To enhance the germination and production of quality seedlings, the seed nuts can be subjected to air curing and sand curing techniques. After pre-curing, the seed nuts can be raised in nurseries following the recommended practices.
Selection of seedlings

Seed nuts raised in nurseries would take a few months to germinate. Those seed nuts which do not germinate within five months of sowing and those with dead sprouts should be removed. Healthy seedlings which are 9 – 12 months old can be selected for planting. Selection criteria for good quality seedlings includes several parameters such as early germination, rapid growth, seedling vigour, number of leaves and collar girth. Nine-month-old seedlings should have at least four leaves, while ten- to twelve-month-old seedlings should possess six to eight leaves. Early splitting of leaves is considered as a good indicator of seedling vigour and early bearing. Seedlings of dwarf varieties can be easily identified based on their petiole colour, early germination (3 months after sowing), short stature with sturdy leaves bearing narrow leaflets. Seedlings of tall varieties usually grow tall with long and broad leaflets.

Conclusion

Based on the above inputs, farmers can select ideal mother palms from their own gardens for tall and dwarf varieties and can produce healthy and vigorous seedlings, thereby reducing the huge cost incurred on purchase of quality planting materials from commercial firms.

References


Mother palms of ALR (CN) 1

Mother palms of ALR (CN) 2

Mother palms of Chowghat Orange Dwarf (COD)
Mother palms of *Kenthali Dwarf* (KTD)

Mother palms of *Malayan Orange Dwarf* (MOD)

Mother palms of *Malayan Yellow Dwarf* (MYD)

Mother palms of *Gangabondam Green Dwarf* (GBGD)

Mother palms of *Chowghat Green Dwarf* (CGD)