

Palmyrah : A Crop for Future

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<https://doi.org/10.5281/zenodo.10852916>

Abstract

Palmyrah palm (*Borassus flabellifer*.L) belongs to family Arecaceae and is native of tropical Africa. In India, it is grown naturally throughout the country. It is monocotyledonous, dioecious plant almost all parts viz., root leaves, seed and fruit of the palm is used in different ways. It is underutilized palm and grown naturally in forest and barren lands. The importance of the palm is not still recognized by the people. It is third important palm next to coconut and date palm. The centre of origin of Palmyrah palm is Tropical Africa and distributed from India through South-East Asia to New Guinea. According to Literature, it is believed that *B. flabellifer* is a selection from the more diverse *Borassus aethiopum* Mart. Of Africa . Globally, it is grown in Sri Lanka, India, Myanmar, Cambodia, Indonesia , ect., In India is found naturally in forest and community land of Tamil Nadu, Andhrapradesh, Odisha West Bengal, Bihar , Karnataka, Gujarat and Maharastra. In Tamil Nadu 5.1 crore population of Palmyrah is distributed especially in southern parts of state. It is also recognized as the state tree of Tamil Nadu in 1987. It is multipurpose, evergreen plant. All the plant parts of this palm are useful for the welfare of human in different ways. It is good source of nutrition especially tribal peoples. Recently it is grown in orchard form as sole, mixed with fruit crops, boundary plantation and multistory cropping systems.

Varieties

Local varieties are identified as black-skinned and red-skinned palms. The black-skinned fruits have comparatively less red pigment on their skin, whereas the red-skinned fruits have variable amounts of black pigments along with a very liberal distribution of red in their skin.

The Palmyrah Research Station (TNAU), Srivilliputhur has released one improved variety viz., **SVPR -1 Palmyrah palm**. It is a semi dwarf type with a high neera yield of 298 lit. per palm in a tapping duration of 95 days. The neera of this variety has high jaggery content (144 g per lit. of neera) and high brix content.

Germplasm evaluation for dwarf types with high yield and earliness is in progress at TNAU, Killikulam. A total of 265 accessions were assembled from different parts of the country and are under evaluation. Among 8 accessions continuously evaluated for neera yield for 10 years from 1995 – 2004, the accession BF.34 (female) yielded the maximum of 287.85 lit. of neera in a tapping duration of 85 days with a mean of 176.9 lit. followed by BF.36 (male)



recording a maximum of 237.7 lit. with an average of 113.8 lit. and the yield was consistent even in drought years.

Soil

Palmyrah palm can be grown in a wide range of soils including theri and wastelands. However, grow well in deep, sandy soil, loamy soils, red soil, black soil and river alluvium the palms thrive well. Though it has adapted well to arid marginal soil, the yield of neera and fruit is higher in the river basin's fertile soils. The germination and edible quality of the apocolun (tuberous roots) are determined by the soil types. Among the different types of soil studied, the maximum germination (86.2%), tuber length (40.32 cm), girth (12.40 cm), weight (110.2 g) and starch content (98.5%) were recorded in theri soil.

Climate

It is a tropical palm. It is also found growing in semi-arid environments. It can appear in areas with moderate to low rainfall (300-750mm). It grows from sea level up to an altitude of 750 m.

Shade

In theri lands, young seedlings require shade to protect them against sun and desiccating wind, using one or two dried palm leaves.

Planting

The study on the transplanting ability of palmyrah seedlings revealed that the seedlings can be transplanted up to 150 days after sowing, and the seedlings transplanted in earlier days are found to show causalities owing to their inability to withstand transplantation shock. It is also noted that the seedlings beyond 150 days were found to be very difficult to uproot from the nursery and were damaged. The root systems of such seedlings would have been well developed with the formation of thickened tubers and hence could not be removed without damage. Hence, it is advisable to transplant palmyrah seedlings 100 to 150 days after sowing.

Planting of palm trees is done during the monsoon (July-September). Traditionally, most farmers are still growing it as a boundary. In a scientific manner, it is planted at a 3 m x 3 m distance and accommodates 1,110 palms/ha. The pits of 60x60x60 cm are dug during April-May and filled with pit soil and well rotten farmyard manure (FYM) in equal proportion. At the time of planting, carbendazim (50-60 g/plant) should be applied to prevent ingestion. 1110/ha (450/acre). Dioecious in nature and the sex ratio of male to female is 1:1. Planting is done during the northeast monsoon (October - November).

Fencing

Fencing is essential to keep away the stray cattle from pulling out the tuber and feeding on young foliage. If not, it will affect the growth and unduly extend the tree-bearing period even up to 20-25 years.



Watering

Planting coincides with monsoon. If rain fails, pot watering immediately after planting and on alternate days up to a month is required. Later watering can be done once a week during non-rainy periods for a year. If rainfall is scarce, pitcher irrigation can be provided twice a month during tapping season to increase neera and fruit yield.

After cultivation

Gap filling is required. Ploughing the interspace before monsoon and rectification of a basin of 45 cm around young seedlings is essential. For grown-up palms, the basin has to be widened to 2 m around the base. Young leaves should not be removed from juvenile palms. One or two leaves can be removed later when the palms reach a height of 2 m. Adult trees can be defoliated up to 50% leaving 16 - 22 leaves at the crown. Removing all the leaves leaving the bud and crown is harmful to the palm. Foliage and butts (leaf base) should not be removed during summer. Butts and old sensed leaves are to be removed and the tree cleaned once a year before monsoon or tapping. Care should be taken not to injure the stem while cleaning.

Manuring

Nutrients play an important role in the growth, development, and yield of palm trees. It is better to apply fertilisers as per the nutrient status of the soil. There is a recommendation of 10 kg FYM/pit before planting and it may be increased every two years till reaching 60 kg FYM/tree/year. The manures are applied before the onset of the monsoon. According to the recommendation, the highest neera yield, the longest possible tapping period (136 days), and the highest number of palms available for tapping (8 out of 10) were obtained when 60 kg of FYM was applied before the onset of the North East monsoon. Similarly, when 25-year-old palms were supplied with organic and inorganic fertilizers, the neera yield was the highest, at 50 kg FYM.

Root feeding studies with coconut tonic showed that the thin and brittle roots seen on the upper soil surface were found to be ineffective in absorbing the tonic and the feeder roots were seen only at a depth of > 90 cm from the soil surface. The feeder roots of young palms (10 years old) required more than 24 hours absorbing the tonic, whereas older palms required only 5-6 hours.

Composting

The palmyrah compost can be prepared from its pith. Composting technology of palmyrah pith includes palmyrah pith (100 kg) + poultry manure (10 kg) + urea (1 kg) + *Pleurotus* fungus 2 bottles (1kg) + lingo cellulolytic fungi 2 bottles (1 kg) + *Trichoderma viride* (1kg) which offered highest N - content (0.78%), P - content (0.09%) and K - content (0.97%) and all the micronutrients like Fe, Cu, Mn & Zn were higher.



Defoliation

The young leaves should not be removed from juvenile palms. When the palm attains a height of 2.0 m, one or two leaves may be removed. In adult palms, 30–50% of the leaves should be removed. It is also advisable that a minimum of 16–22 leaves are retained on the crown. During summer, the leaves are removed and cleaned before tapping and the stem should not be injured while cleaning. Studies on defoliation of palmyrah up to 30 per cent resulted in an increase in yield of both neera and nungu in male and female trees, as compared to the control. The increase in neera yield was more in female trees (179.30 per cent) than in male trees (113.26 per cent). The annual increase in nungu was discovered to be 13.87 percent. The mean increase in neera from both male and female was discovered to be 146.28%.

Intercropping

Generally, it is found growing as a mixed crop in orchard and paddy fields and also in bunds, road sides, and dry lands. It is a slow-growing palm so that the groundnut, cowpea, green gram, and vegetables can be grown as intercrops in the alley spaces to generate additional income. Groundnut, Gingelly, Cowpea and Green gram can be raised as intercrops during the rainy season. Moringa as a border crop fair well. Fruit trees like Ber, Custard Apple, and West Indian Cherry can also be planted as mixed crops.

Irrigation

After planting during the monsoon, need-based irrigation should be applied. During winter, plants are irrigated at a 15-20 days interval. Under semi-arid irrigated conditions, the plants are not irrigated after establishment. If the plants are irrigated twice a month during the tapping season, it significantly increases neera and fruit yield. The young seedlings are covered with dried leaves to protect them from high temperatures and desiccating wind.

Flowering and fruiting

It is a dioecious plant where male and female flowers are borne on different plants. It is a single, unbranched, stout and erect palm. The gestation period of the palm is very long (12–20 years). The identification of palmyrah palms as either male or female takes place during flowering. The inflorescence is the spadix. Flowering takes place throughout the year, but the peak period is April–May. The anthesis takes place between 8.00 and 11.00 am after the opening of spathe, 16–25 days are required to open the flowers. It is pollinated by insects and wind. The palm takes 120-130 days from fruit set to harvest. The fruits are round to spherical in shape, fleshy, 15-20 cm in diameter and weigh 1–3 kg. The fruit's colour turns from green to dark purple or black when ripe.



Tapping

The extraction of neera from the inflorescence is called "tapping," which is the most important use of this palm. There are different kinds of tapping which vary according to the sex of the palm and the age of the inflorescence. In the male palm, the sheath covering the young (two weeks old) is removed and allowed to dry for three days. The end is cut every time, and the pot is tied to the inflorescence. This method is called "**aripantai**" and is practiced for one to one and a half months. In the other method, known as **vallupantai**, a one-month old inflorescence is selected and each male spike bearing sessile flowers is pretreated by pressing and stroking the inflorescence. Three to six such spikes are brought together, wrapped with palmyrah leaves and fitted to a pot.

In the case of female palm, the young female inflorescence is tapped by a method called **Thattupalai**. The tappers soften the tissue by hitting the inflorescence main axis with the iron rod and the fork is used to press the regions from which the fruits develop. The other method **Kaivetty** is employed when the inflorescence is about 2 to 3 months old. The inflorescence at this stage is mature and bears fruits, and the fruits are sliced as the tapping progresses.

Normally, the female palm is tapped for a longer period (April–December) compared to the male palms (December–February). The neera is collected twice a day, in the early morning and in the evening. Each time, at the end of the collection of the neera, a new surface is made by cutting a thin slice of the inflorescence. During the collection of the neera, the climber takes a bigger pot and empties it into the neera collected in the small pots placed on each inflorescence. Hence, at evening time, when neera is collected, the bottom sediment, which contains the yeast and bacteria, is left behind. Every fifteenth day, the entire sediment is completely removed but not washed.

The *neera* so tapped is otherwise called *padaneer*, which is transparent, pleasant-smelling, and sweet. It contains sugar (12-16%), most essential amino acids, and vitamins such as ascorbic acid and B complex. Hence, it is considered to possess medicinal properties too. The neera is drunk as such or used for the preparation of secondary products through some processing. By the membrane filtration technique, neera can be processed and the shelf life can be extended by up to one month under refrigerated conditions (Anon, 2021).

Harvesting

At the age of 25-30 years, tapping can be done. Sap is harvested just before the inflorescences open. The leaves are removed at the time of tapping so that the tapper can easily reach the inflorescences. After removing the flower buds in male palms, inflorescences (usually about 12) are tied together. Usually, three to four days after cutting the tops of the stalks of the inflorescences, the bucket is hung and supported by a basket. Individual inflorescences are



handled in female palms where flowers are broken off and bent towards the bucket to increase the sap flow. This was carried out early in the morning. To prevent fermentation, some slaked lime is added to the sap but this also affects the flavor. The yield of the sap depends on the skill and technique used by the tapper.

Tuber (Apocolun) Maturity

The optimum period for tuber maturity was found to be 135 days after sowing. The mean rate of linear growth of tubers among various stages, at weekly intervals was found to be 0.91 cm/day and the rate of growth of the tuber was much faster in the early stages to development and there after it showed a gradual decline and falling down to the least rate of linear growth during the final stage. The linear growth of tuber showed that there was a steady increase in growth for a total period of 49 days, beyond which the growth ceased and the emergence of root appeared correspondingly. The overall mean linear growth of tuber was found to be 44 cm. The number of days required to reach the optimum stage of tuber harvest was discovered to be 125-135 days after sowing, after which tuber quality degrades.

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