

Palmyrah — the tree of life

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The origin of the genus Borassus is in Africa, and the species in India, Borassus flabellifer or palmyrah is distinct from its ancestral species B. aethiopum or the African fan leaf palm. The genus Borassus is widely distributed in the sub-tropical regions of Africa, East and South-East Asian countries extending up to Indonesia. In India, the palm is spread in Tamil Nadu, Andhra Pradesh, Madhya Pradesh, Bihar, Orissa and West Bengal. Among the 102 million palms in India, 51.9 million are distributed in Tamil Nadu, where it is designated as the 'Tree of the State', as well.

Neera, the sweet sap collected from the inflorescence of palmyrah, is one of the main sources of palm gur. Besides neera, the tree yields tender endosperm, fruits, spongy haustorium and apocolon (tuber) which are edible. The non-edible produces from the palm include leaves, fibre and timber. Several other produces are of medicinal value including its root. This is the only palm in which all of its parts are useful from crown to root.

PALMYRAH pertains to the sub-family *Borassoideae* of the palm family *Arecaceae*. The palm is dioecious and sex can be differentiated only during flowering. Its stem is tall, generally unbranched and grows to a height of 20–30 m with diameter ranging from 60 to 90 cm. The crown has 20–30 palmate fan-shaped leaves. Petiole is stout with its base (butt) vertically split and clasping the stem. The stem of the juvenile palm is covered with dry leaves and butts, while that of older palms are left with scars of petioles. Leaf lamina is large, 1–1.5 m in span, coriaceous with 60–80 lanceolate, in duplicate segments.

Male spadix is large, elongated and much branched than the female ones. Each branch is ensheathed by a spathe having 2–3 spikes. Each spike is cylindrical, stout, imbricated by numerous bracts enclosing small spikelets. Each spikelet has 15–20 sessile

florets with 3 sepals, 3 petals and 6 stamens. A single male inflorescence may have nearly 200 000 florets.

Female spadix is sparingly branched and the number of flowers in a spadix range from 30 to 75. The female flowers are large, solitary, globose and perianth is 6-lobed. Ovary is 3–4 celled. It takes 4 months for the

Palmyrah palm with groundnut as intercrop

fruits to mature after pollination of flowers. The fruit is a drupe with accerscent perianths, fleshy mesocarp and stony endocarp. Fruits are generally 3-seeded.

CLIMATE AND SOIL

Palmyrah thrives well in arid zones and it is a tree of sub-tropical



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region. Though it grows well in sandy plains, it is suited to red, black soils and river alluvium. The palm is fit to arid regions with annual rainfall of less than 750 mm. However, it also flourishes well in wet conditions and it does not suffer from flooding. It can come up at elevations up to 800 m. Since the palm has deep and extensive root system it contains soil erosion and prevents shifting of sand dunes. It is commonly used on tank and field bunds to strengthen them. The tree also serves as fire-breaker in savanna where wild fires are common.

CULTIVATION

Palmyrah is generally propagated by direct sowing at the time of monsoon. Fruit maturity coincides with either north-east or south-west monsoon at different states of India. Fruits can be collected from heavy bearing, dwarf, medium aged palms and such fruits are heaped in shade for 4 weeks. Individual seednuts are loosened from the fruits and soaked in the fungicide Carbendazim at 0.1% for 24 hr to reduce the incidence of tuber-rot disease and enhance the nut germination.

SOWING

A spacing of 3 m × 3 m is adopted to establish plantations accommodating 1110 palms/ha. Pits are formed to a size of 30 × 30 × 60 cm³. The pit is filled half with a mixture of 10 kg farmyard manure (FYM) and field soil. The seednut is positioned at 5 cm deep in the pit with its narrow conical end facing down or sidewise. To prevent the damage by termites 100 g of Malathion 4% dust is sprinkled around the nut and covered with soil. Since the germination of seednuts is normally 60–65%, gap filling is essential in the subsequent year when fruits become available.

WATERING

Since planting coincides with

monsoon, watering is not required during that period. However, if there is a failure of rain, pot watering immediately after planting and at alternate days has to be done up to a month. For uniform establishment, watering at weekly intervals is essential during non-rainy periods for one year. To increase *neera* and fruit yield in grown-up palms pitcher irrigation is recommended twice a month during the tapping season.

MANURING

After basal dressing with FYM at 10 kg/pit, the amount of FYM is increased @ 10 kg in every 2 years, till a dose of 60 kg is reached in 11th year. Thereafter the same quantity can be maintained.

AFTER CULTIVATION

The interspace between palms has to be ploughed before monsoon and the basin is to be rectified to a radius of 45 cm around young seedling to facilitate water harvest. It is essential that the basin has to be widened to 2 m for older palms. Leaves should not be cut from juvenile trees. When they reach a height of 2 m, few leaves can be removed. Defoliation up to 50%, leaving 16–22 leaves is recommended in adult palms. Normally, senesced leaves and butts are removed and tree cleaning is done once a year before tapping.

INTERCROPPING

During rainy season gingelly, groundnut, cowpea and greengram are grown as intercrops. Fruit trees such as *ber*, custard apple and West Indian cherry can also be planted as intercrops.

CROP PROTECTION

Palmyrah suffers as coconut, due to the infestation of *Oryctes rhinoceros* (rhinoceros beetle), *Rhynchophorus ferrugineus* (red palm weevil) and *Opisina arenosella* (leaf-eating caterpillar). These insects can be effectively

managed by adopting the control measures recommended for coconut.

Unlike coconut, palmyrah does not suffer due to diseases. Though bud rot caused by *Phytophthora palmivora* was a constraint in palmyrah during the earlier periods of Twentieth century, the disease was effectively eradicated. There are no further reports of the disease in palmyrah. Few minor foliar diseases caused by *Pestalotia palmarum*, *Stigmina palmivora* and *Graphiola borassi* can be controlled by foliar application of copper oxychloride at 0.2%.

YIELD

If the palm is properly taken care of, it starts flowering at 10–12 years. Though flowering is seasonal, it varies in Tamil Nadu among tracts from March–April to October–November. In Kerala the tree flowers in August–September. Tapping refers to inducing the phloem tissues of the peduncle to exude sap. A mud pot coated with slaked lime is tied to the spadix for collecting the sap. In a tapping duration ranging from 3 to 4 months, a palm yields 100–200 litres of *neera* commencing from 12–15 years of age. Female palms if left untapped, can bear 70–200 fruits.

Planting seednuts collected from potent mother palms and adopting the scientific cultivation aspects mentioned above are bound to increase the yield manifold. Intensive cultivation once followed will pave the way for extensive cultivation, bringing large areas of wastelands under this productive palm.

USES

‘Tala Vilasam’ a Tamil poem lists 801 uses of palmyrah. The palm yields several edible and non-edible produces as listed in box at page 17. Moreover, value-addition could be made to several of the edible produces.

THRUST AREAS FOR IMPROVEMENT

- The development of the palm from

seedling to flowering needs documentation to understand its growth thoroughly.

- In coconut, seedling characters are found to be associated with flowering. Such investigations in palmyrah on the correlation of juvenile characters with that of adult palms will help in crop improvement programmes.

- In palmyrah, its height is a limiting factor and climbing is essential to collect *neera*. Moreover, the labour time, efforts as well as risks depend on the tree height. Dwarfness and precocity in bearing are the two alternatives and research is in progress to tap such characters.

- It may not be possible to induce flowering throughout the year. The palm blooms in summer and winter at different tracts. However, within a plantation there exist trees which flower as early in October and as late in May. This may not be due to seasonal influence. Such genetic variations could be exploited to have plantations with staggered flowering so that *neera* is available almost all through the year.

- The yield of *neera* in a day range from 1 to 20 litres/palm implying that there are wide scopes for selection for superior mother palms. Females are more yielders of *neera* than the males and a few spadices of such female palms could be spared for the fruits to mature and seednuts could be collected for palm improvement projects or used to establish new plantations.

- Studies carried out in large plantations has revealed the sex ratio to be 1:1. If it is possible by mo-

Edible produces	Products
<i>Neera</i>	Palm jaggery, palm candy, palm sugar, palm honey
Tender endosperm	Candy, <i>Sharbat</i> , <i>kheer</i>
Fruit	Squash, jam, juice
Apocolon	<i>Halva</i> , <i>pakora</i> , <i>laddu</i>
Haustorium	<i>Halva</i> , <i>peda</i>
Non-edible produces	Uses
Stem	Timber, furniture, fuel
Root	Basket
Leaves	Handicrafts
Petiole	Fibres
Leaf butt	Fibres
Leaf lamina	Handicrafts, utility items

lecular or biotechnological methods to differentiate the sexes at earlier stages of growth, preference can be given for females and plant them in compact blocks for easier tapping or fruit harvest. However, male palms cannot be rejected since they are equal in potential in yielding *neera* and many other non-edible produces.

- Though the palm is prone to attack of insects that affect coconut, it is resistant to major diseases. The palm might be rich in phytoalexins or such defence-related proteins and the genes coding for defence mechanisms could be cloned and used in recombination techniques.

- Though the palm has multifarious uses and each of its part is useful, one way or the other, the population of the palm is declining due to indiscriminate felling of the palms for fuel. Hence awareness should be created among those who own the palm and utilize it,

not to overexploit it and fell young palms. This is possible with the co-operation of the Khadi and Village Industries Commission, Palm Gur and Fibre Marketing Federations, Non-Governmental Organizations involved in the welfare of the palmyrah workers, Agricultural Universities and scientists involved in All-India Co-ordinated Research Project on Palms of the Indian Council of Agricultural Research, which has included palmyrah as one of its mandatory palms for development from Eighth Plan period onwards.

SUMMARY

The palmyrah palm, known as Tree of the State in Tamil Nadu is full of potentials, having multifarious uses. Every part of this tree is useful, one way or the other. In such a backdrop it is essential to create awareness among farming community about its usefulness. The indiscriminate felling of this tree should also be stopped so that a great asset may be preserved.

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