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Dr. Rajendra Prasad K

Sr. Scientist (Horticulture) &
Head, Dr. YSRHU-Horticultural
Research Station, Pandirimamidi
Rampachodavaram(M), Alluri
Sitarama Raju, Andhra Pradesh,
India

Dr. Vengaiah PC

Sr. Scientist (Food Science and
Technology), Dr. YSRHU-
Horticultural Research Station,
Pandirimamidi
Rampachodavaram(M), Alluri
Sitarama Raju, Andhra Pradesh,
India

Dr. Sumitha S

Scientist (Plantation Crops)
ICAR-CPCRI, Kasargod, Kerala,
India

Studies on low cost production of Palmyrah seedlings *Borassus flabellifer*. (L)

Rajendra Prasad K, Vengaiah PC and Sumitha S

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Abstract

A study was conducted on the low cost production of seedlings in palmyrah (*Borassus flabellifer*) at All India coordinated research project on palms palmyrah center, Dr.YSRHU- horticultural research station, pandirimamidi which is located in tribal area of Alluri sitaramaraju district, Andhra Pradesh. The main objectives of the study are low cost production of palmyrah seedlings. Palmyrah seedlings production is a tedious procedure because of its apocolon length. Palmyrah nut itself produce a apocolon length of 40 to 50cm and then produce adventitious roots. Due to this huge length the production of seedling in nursery is very hectic and cost effective, hence the cuttings of apocolon are used to reduce the production cost. Among the different cuttings transplanted i.e 10cm, 20cm, 30cm, 40cm full length tried, 20cm cuttings of apocolon survived best (84 per cent) compared to others 10 cm (30 percent), 30 cm (75 percent) and 40 cm control(92percent). Reduction in length of the apocolon cutting doesn't affect the growth of the palmyrah seedlings and it also improves the vigour of the seedling. Palmyrah apocolon cuttings also reduce the production cost and it is very convenient for handling of palmyrah seedlings.

Keywords: Palmyrah, seedlings, apocolon, cuttings

Introduction

The palmyrah palm (*Borassus flabellifer* L.) belongs to family Arecaceae, is a perennial, important multipurpose tree with uses including food, beverage, fibre, fodder, medicinal and timber. The palm is native to Indian subcontinent and Southeast Asia, including Nepal, India, Bangladesh, Sri Lanka, Cambodia, Laos, Burma, Thailand, Vietnam, Malaysia, Indonesia and the Philippines. In India, palmyrah palms grown in the dry landscape of the semi-arid regions of Tamil Nadu, Andhra Pradesh, Telangana, Chhattisgarh, Odisha, West Bengal, Bihar, Kerala, Karnataka, Goa, Maharashtra and Gujarat are a significant source of livelihood support for many rural communities. Occurrence of palms was also reported in Andaman Islands and NE region.

Among the four major sugar yielding palms, palmyrah considered to be at first in sugar yield and other edible and non-edible products. The sweet sap or neera collecting from the palmyrah inflorescence is a major source of sweetening agent i.e jaggery in rural areas of Andhra Pradesh and Tamil Nadu. The endosperm of the immature seed nuts from young fruit is a delicacy during summer like that of tender coconut. Mature fruits are roasted and mesocarp is consumed as traditional food and many values added products can also be prepared from this fruit. The fruits are germinated to produce tubers which are used as food and as food additives. Several products of Palmyrah parts are known to have medicinal value and used in several traditional medicines and preparations. The non-edible parts like fiber from leaf spathe also more economical and have export value. The Palmyrah palm is the future palm of mankind considering its multiple uses of this palm.

Palmyrah is a dioecious palm and belongs to the family Arecaceae, subfamily Borassoideae and genus *Borassus*. The three most economically important species of *Borassus* are *Borassus aethiopum* Mart, *Borassus flabellifer* Linn, and *Borassus sondaicus* Becc. (Mohanadas, 2002) [4]. The species *Borassus flabellifer* L. is abundant in the arid tropics of South America, West Africa, India, Sri Lanka and Southeast Asia (Morton, 1988) [6]. The palmyrah palms are slow growing of the remote tubular type and have no distinguishing features to identify the sex until flowering. The palm commences flowering only after 10-15 years of maturity (George and Karun, 2011) [11]. Palmyrah is an annual flowering type and usually female flowers during the month of February to march in Andhra Pradesh conditions. The tender fruits appear from April to May. The tender fruit has very good nutritional and antioxidant properties and also utilized as food source for human consumption (Mehta *et al.*, 2016) [7].

Corresponding Author:**Dr. Rajendra Prasad K**

Sr. Scientist (Horticulture) &
Head, Dr. YSRHU-Horticultural
Research Station, Pandirimamidi
Rampachodavaram(M), Alluri
Sitarama Raju, Andhra Pradesh,
India

Palmyrah is a good source of carbohydrate, calcium, magnesium, iron and fibre but limited in fat and protein (Arunachalam *et al.*, 2011)^[1]. fibre from the fruits and leaves from the branches, cordage weaving and plaiting and trunk wood for construction and fuel (Tahir *et al.*, 2007; George *et al.*, 2007)^[8, 3].

Along with multipurpose uses the trunk also act as good source of fuel wood in brick industries due its latent heat generated by the its wood and also the belief of quality brick. One side the population of the palmyrah is reducing by cutting down the palms as fuel wood and on other side its huge economic demand like tender fruits, mature nut endosperm, and tubers leads to a drastic reduction in population and finally leads a demand for the palmyrah nursery plant material vice versa. The palmyrah seed takes 40-60 days to initiate germination and the first leaf emerge out after a period of 100 days from sowing (George and Karun, 2011; Masilamani *et al.*, 2020)^[2, 5].

Palmyrah is mainly propagated through seeds and there is no vegetative method available for its propagation (Masilamani *et al.*, 2018)^[5]. Propagation of Palmyrah through seed is hectic and time taking and its maintenance in big sized nursery bags is also a very expensive and tedious labour work. Several problems are encountered during production of palmyrah seedlings i.e lengthy apocolon leads to high cost of potting mixture, poly bags and also maintenance for prolonged nursery period. The length of apocolon cannot be reduced if they are planted in smaller pots and its growth clearly shows in the figure 1 the growth of tuber behaviour in the small earthen pot.

Materials and Methods

Studies were conducted on the low cost production of seedlings in palmyrah (*Borassus flabellifer* L) at All India coordinated research project on palms palmyrah center, Dr.YSRHU- horticultural research station, pandirimamidi during the year 2022. The weather conditions are costal humid and the station is located at an elevation of 250m MSL with 17 degrees 25 degrees East latitude and 81 degrees 45 degrees North longitude. The average normal rainfall of 1190 mm was received over 120 rainy days. Maximum temperature ranged from 28.9.0 °C to 36.9 °C and minimum from 14.4°C to 29.2 °C. The research station is located in tribal area of Alluri Sitaramaraju district, Andhra Pradesh. it is proposed to reduce the time and also reduce the cost of production tuber cuttings as an alternative method for the propagation of Palmyrah. The matured 80 to 90-day s uniform growth,

straight healthy seedlings are selected for this cuttings experiment. The selected tuber cuttings are prepared with sharp knife with slant cut to reduce the mortality and after cutting the cut end is applied with the Bordeaux paste to avoid fungal infections. For all the tubers the radicle length is cut down uniformly at 2.5 cm size at the bottom. The size of cuttings selected for transplants are i.e. one fourth(10 cm)size , half (20cm) size, three fourth (30cm)size and full length (40cm) size as control used for this experiment .The potting mixture used are red soil, coco peat and FYM in the 1:1:1 ratio and mixed well before filling in polybags. All the apocolon cuttings after planting in poly covers are kept under 50 percent green shade net house for the entire period of growth. These cuttings are kept in affordable size polybags and irrigation is done as per the requirements. The experimental design applied is CRBD and replicated four times.

Results and Discussion

Among the treatments applied for the propagation of seedling of palmyrah the highest per cent survival rate is recorded in full length tubers (40 cm) tubers i.e that is in control followed by 84 percent in tubers cutting of 20 cm which are significantly different. The lowest percent survival rate is recorded in 10 cm tuber cuttings which are survived well at initial stages but later they dried. This may be due to unavailability of nutrients due to small size of the cuttings. The highest leaf length emerged from tuber cutting is 3.8 cm recorded in 20 cm tuber cuttings and lowest in 10 cm tuber cuttings which are significantly different. The highest number of leaves emerged per tuber cutting after 210 days recorded is 2.3 whereas lowest number recorded is 0.7 in 10 cm tuber cuttings. The highest seedling vigour recorded is 193.2 in 20cm tuber cuttings whereas the lowest in 10 cm tuber cutting seedlings.

The maintenance cost of each nursery seedling production reduced with size of tuber cutting, among the treatments 20 cm sized cuttings recorded the low in cost of production and successes in comparison with the others. The production cost is related to potting mixture, poly cover and maintenance in comparison with bigger sized tuber cuttings. Other important observations recorded are uniformity in growth of seedlings.

Conclusion

Based on this observation we can conclude that the 20cm palmyrah tuber cuttings can be used as propagating material for early and vigorous seedlings with low production cost.

Table 1: Effect of apocolon cuttings on growth of Palmyrah seedlings *Borassus flabellifer*. (L)

Apocolon cuttings	Percent survival Apocolon cuttings	Leaf length @30 days (cm)	Number of leaves /seedlings @ 210 DAS(Nos.)	Vigor index
A ₁ - 40 cm control	92	2.0	1.3	119.3
A ₂ - 10 cm size	30	1.0	0.7	21.0
A ₃ - 20 cm size	84	3.8	2.3	193.2
A ₄ - 30 cm size	75	2.5	1.4	105.0
S. Em (±)	2.7	0.18	0.19	
CD (5%)	8.4	0.57	0.6	



Fig 1: Germination and seedling growth of palmyrah apocolon in small earthen pot

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