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Assessing the potential of oil palm Tenera hybrids in Cauvery delta region of Tamil Nadu

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Abstract

India is the largest consumer and importer of palm oil in the world, consuming around 18 per cent of total world consumption. Thanjavur District is the rice bowl of Tamil Nadu and paddy is the main crop raised in nearly 60% of the cropped area. Since there were many risks associated with conventional cropping pattern, the farmers are in search for a farming practice that could provide them stable income and less labour requirement. Tenera hybrids play a pivotal role in oil palm productivity. A field experiment was conducted in the Cauvery Delta Region of Tamil Nadu to study the productivity of ten Tenera hybrids and to select the suitable oil palm hybrid. Ten hybrid combinations viz., 49 x 66 (NRCOP 11), 25 x 214 (NRCOP 12), 25 x 66 (NRCOP 13), 68 x 36 (NRCOP 14), 21 x 214 (NRCOP 15), 131 x 66 (NRCOP 16), 350 x 66 (NRCOP 17), 107 x 214 (NRCOP 18), 61 x 66 (NRCOP 19) and 28 x 68 (NRCOP 20) were planted in Randomized Block Design with three replications (six palms/replication) in the farmer's holding located in Peraiyur Village, Thiruvavur district of Tamil Nadu during 2006. Regular biometric and yield parameters were recorded. Significant differences were observed for palm height (m), palm girth (m), number of leaves/palm/year, number of female and male inflorescence and fresh fruit bunch (FFB) yield among the hybrids. Among the 10 hybrids evaluated, hybrid NRCOP 14 recorded highest palm height (5.59 m) and highest girth (3.05 m). Lowest palm height (4.48 m) was recorded in hybrid NRCOP 16. Number of leaves produced per year (25.8) was highest in NRCOP 20 and female inflorescence (11.20) was highest in NRCOP 17. Data on yield attributes of oil palm revealed that the highest bunch weight of 220.50 kg/palm and per ha yield of 31.53 tonnes was recorded in hybrid NRCOP 17 for the period of 2017 - 18. Pooled data for 2010-18 indicated that the hybrid combination NRCOP-17 recorded higher FFB yield and have better prospects for adaptation under CDZ of Tamil Nadu.

Keywords: oil palm, Tenera hybrids, growth parameters, fresh fruit bunch yield, CDZ

Introduction

The oil palm (*Elaeis guineensis* Jacq.) is the highest edible oil yielding crop giving up to four to six metric tonnes of mesocarp oil and 0.4 to 0.6 MT of palm kernel oil per hectare per annum. It has the highest productivity compared to any other major oil producing crops, thus cutting the cost of land infrastructure, maintenance and harvesting. It is a crop of the future and source of nutrition and has tremendous scope for value addition, crop diversification, import substitution and sustainability. Realizing the potential of the crop in reducing the shortage of edible oil requirement in India, the cultivation of oil palm has got considerable attention from policy makers, researchers and farmers. The country has got a potential of two million ha for cultivation of the crop against the present area coverage of 2.6 lakh ha (Rethinam, 2014) [5]. The total vegetable oil production in the world has increased from 16.1 million tons in 1960 to 81.8 million tons in 1998 and to 159.4 million MT in 2013 with major contribution from palm oil (56.2 million MT) (Rethinam, 2014) [5]. High yielding hybrids can play an important role in increasing the oil productivity in the oil palm. Previous reports have suggested that the enhanced performance of hybrid cross combinations at Chithara and Gangavathi (Mastana Reddy *et al.*, 2009) [3]. Even though the government has been trying to expand the area under palm oil cultivation, factors like low productivity, price fluctuations, insufficient processing facilities and lack of suitable technologies for mechanical harvesting, result in sluggish expansion of oil palm cultivation. Tenera hybrids play a pivotal role in oil palm productivity. Thanjavur District is the rice bowl of Tamil Nadu and paddy is the main crop raised in nearly 60% of the cropped area. Since there were many risks associated with conventional cropping pattern, the farmers are in search for a farming practice that could provide them stable income and less labour requirement. The Government had identified the cultivation of oil palm in the Cauvery delta region as an ideal location for oil palm cultivation. After analysis, the farmers choose to go on with oil palm cultivation which proves to be highly befitting option.

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It is known to be the highest edible oil yielding perennial crop producing two distinct oils, Crude Palm Oil and Palm Kernel Oil. AICRP on oil palm is operated at Agricultural Research Station, Pattukkottai since 2012. Different oil palm Tenera hybrids are maintained at ARS, Pattukkottai and also in the farmer's holding at Peraiyur village. The main objective is to introduce hybrids with high oil yield. The Tamil Nadu government has recognized this centre as Centre of Excellence in Oil palm during 2015 to promote the oil palm cultivation by improving the knowledge and skill of oil palm stake holders. In the present study, different cross combinations of Dura x Pisifera hybrids, developed at ICAR-

Indian Institute of Oil Palm Research, were evaluated for their yield performance and to study the productivity of ten Tenera hybrids and to select the most suitable oil palm hybrid for Cauvery Delta Zone in Tamil Nadu.

Materials and Method

The experiment was laid out in a RBD with ten different new hybrid cross combinations developed at ICAR-IIOPR (Table 1) were planted during 2006 in three replications and six palms per treatment in the farmer's holding located in Peraiyur Village, Thiruvavur district of Tamil Nadu.

Table 1: Different cross combinations and their parents

Tenera Hybrids	Parents
NRCOP 11	49 D X 66 P
NRCOP 12	25 D X 214 P
NRCOP 13	25 D X 66 P
NRCOP 14	68 D X 36 P
NRCOP 15	21 D X 214 P
NRCOP 16	131 D X 66 P
NRCOP 17	350 D X 66 P
NRCOP 18	107 D X 214 P
NRCOP 19	61 D X 66 P
NRCOP 20	28 D X 68 P

D – Dura P - Pisifera

The recommended dosage of fertilizer i.e., 1200:600:1200 g N, P₂O₅, K₂O per plant per year was followed. Regular biometric and yield observations like palm height, girth, number of leaves produced palm⁻¹ year⁻¹, number of female inflorescence, number of male inflorescence and fresh fruit bunch (FFB) yield were recorded and the data were subjected to statistical analysis. Individual bunch weight was measured in kilograms to arrive FFB yield. The palm height was measured from the ground level upto the base of the 25th leaf and palm girth was measured 60 cm from the ground level.

Results and Discussion

Significant differences were observed for palm height (m), palm girth (m), number of leaves palm⁻¹ year⁻¹, number of female inflorescence, number of male inflorescence and FFB yield among the hybrids studied. The growth and yield performance of the oil palm hybrid combinations are furnished in Table 2 & 3. The palm height ranged from 4.5 to 5.6 m between hybrids at the age of 12 years. The lowest palm height (4.5 m) was recorded in NRCOP 16 and it was the highest in NRCOP 14 (5.6 m). The hybrid NRCOP 15 recorded significantly the highest palm girth (3.1 m) and it was the lowest in NRCOP 16 (2.6 m). Number of leaves produced per year (25.8) was the highest in NRCOP 20 and the highest number of female inflorescence (11.2) was recorded in NRCOP 17, while the highest number of male inflorescence (6.4) was recorded in NRCOP 13. Data on yield attributes (Table 3) revealed that the highest FFB productivity (220.50 kg palm⁻¹ and 31.53 t ha⁻¹) were registered in the hybrid NRCOP 17. The lowest FFB yield was recorded in NRCOP 16 (21.66 t ha⁻¹). Higher yield in the above hybrids

was attributed to more number of female inflorescence production with higher sex ratio. Under favourable growing conditions, an inflorescence is initiated in the axil of each leaf of the palm. The rate of leaf production varies with age and on an average three leaves are produced per month in young palms and two per month in the case of older palms (Verheye, 2010) [6]. The development of an oil palm inflorescence between the stages of initiation and flower maturity lasts two to three years for both sexes, the process being initiated soon after seedling establishment. In tropical humid climates with regular rainfall, inflorescence and fruit production is spread evenly throughout the year. Typically, a mature palm will alternate between male and female inflorescence production during its lifetime. In regions with high and regular rainfall, oil palm sex ratios tend to vary little throughout the year, in contrast to areas experiencing a marked dry season, where the sex ratio undergoes extensive fluctuations. This illustrates the well-established observation that oil palm sex determination is strongly influenced by climatic factors, with male inflorescence production being promoted by water deficit (Adam *et al.*, 2005) [1]. Water supply is the main yield-limiting factor in oil palm (Kallarackal *et al.*, 2004) [2]. The oil palm industry is focusing on yields mainly in terms of FFBs, relegating the critical parameters of bunch oil extraction rate and kernel extraction rate (Ng *et al.*, 1998). From the present study with twelve years data, it is observed that the hybrid NRCOP 17 recorded significantly the highest FFB productivity under Cauvery Delta region in Tamil Nadu and this hybrid with higher FFB yield with such better prospects was found to be better for adoption under Cauvery Delta region.

Table 2: Growth performance of oil palm hybrids (2017-18)

Hybrids	Palm height (m)	Palm girth (m)	No. of leaves produced/palm/year	No. of male inflorescence	No. of female inflorescence
NRCOP 11	4.6	2.8	24.5	5.3	10.78
NRCOP 12	4.7	2.9	23.2	4.3	10.40
NRCOP 13	5.3	2.7	25.3	6.4	11.00
NRCOP 14	5.6	3.0	25.5	5.2	9.00
NRCOP 15	4.8	3.1	24.2	5.5	10.38
NRCOP 16	4.5	2.6	25.0	5.6	9.20
NRCOP 17	4.9	2.8	24.0	4.3	11.20
NRCOP 18	4.7	2.8	22.0	5.8	10.30
NRCOP 19	4.7	2.9	24.0	4.8	10.64
NRCOP 20	5.3	3.0	25.8	5.6	11.00
SE d	0.10	0.11	0.61	0.24	0.54
CD at 5%	0.19	0.22	1.21	0.48	1.09

Table 3: Yield performance of oil palm hybrids (2017-18)

Hybrids	Total number of inflorescence	Per cent of female flowers	FFB yield (kg/palm)	FFB Yield (t/ha)
NRCOP 11	16.10	66.96	178.77	25.56
NRCOP 12	14.71	70.69	181.78	25.99
NRCOP 13	17.40	63.22	180.20	25.77
NRCOP 14	14.20	63.38	153.83	22.00
NRCOP 15	15.89	65.31	165.92	23.73
NRCOP 16	14.77	62.28	151.50	21.66
NRCOP 17	15.46	72.43	220.50	31.53
NRCOP 18	16.06	64.18	195.20	27.91
NRCOP 19	15.43	68.95	201.98	28.88
NRCOP 20	16.63	66.14	208.60	29.83
SE d	0.81	-	2.57	-
CD at 5%	1.62	-	5.13	-

References

- Adam H, Jouannic S, Escoute J, Duval Y, Verdeil JL, Tregear JW. Reproductive developmental complexity in the African oil palm (*Elaeis guineensis*). American Journal of Botany. 2005;92:1836-1852.
- Kallarackal J, Jeyakumar P, Jacob S. Water use of irrigated oil palm at three different arid locations in Peninsular India. Journal of Oil Palm Research. 2004;16:45-53.
- Mastana Reddy BG, Patil DR, Arulraj S, Joshi VR, Shetti H. Performance of different oil palm cross combinations under Tungabhadra Command area. International Journal of Oil Palm. 2009;6(1):23-25.
- Ng SK, Thong KC, Khaw CH, Ooi SH, Leng KY. Balanced Nutrition in Some Major Plantation Crops in South East Asia. In: Potassium in Asia. International Potash Institute, Basel, 1995, 235-244.
- Rethinam P. Increasing vegetable oil production through oil palm cultivation in India-Status and Strategies. Technical Bulletin of Society for Promotion of Oil Palm Research and Development (SOPOPRAD), 2014, 3-18.
- Verheye W. Growth and Production of Oil Palm: Soils, Plant Growth and Crop Production Encyclopedia of Life support systems (EOLSS), 2010, II. <http://www.eolss.net>.