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Tanusa Kuanr

Department of Fruit Science and Horticulture Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

Sarat Chandra Sahoo

Department of Fruit Science and Horticulture Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

Chinmaya Jena

Department of Fruit Science and Horticulture Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

Corresponding Author:

Tanusa Kuanr

Department of Fruit Science and Horticulture Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

Assessment of T x T coconut (*Cocos nucifera*) hybrids for leaf parameters under Coastal Odisha

Tanusa Kuanr, Sarat Chandra Sahoo and Chinmaya Jena

Abstract

A trial was carried out at Coconut Research Station, All India Co-ordinated Research Project on Palms at Bhubaneswar is situated nearer to the observatory of O.U.A.T. campus during 2018-19. Experiment was laid on Randomized Block Design (RBD) with six treatments and four replications. The treatments were T₁- WCT x TPT (West Coast Tall x Tiptur Tall), T₂- LCOT x ADOT (Laccadive Ordinary Tall x Andaman Ordinary Tall), T₃- BGRT x ADOT (Benaulim Green Round Tall x Andaman Ordinary Tall), T₄- ECT x LCOT (East Coast Tall x Laccadive Ordinary Tall), T₅- BENT x ADOT (Benaulim Tall x Andaman Ordinary Tall) and T₆- IND041 (Sakhigopal Local Tall). Significant results was observed among the treatments and it was recorded that initial maximum number of leaves per palm and final maximum number of leaves was recorded in BGRT X ADOT are 27.9 and 29.83 respectively. As well the number of leaves produced per palm per year was highest in BGRT X ADOT (12.56), maximum leaf length was recorded 5.13 m in WCT X TPT and the minimum petiole length was recorded in IND 041 (137.18 cm).

Keywords: Coconut, T x T hybrids, leaf parameters

Introduction

The coconut (*Cocos nucifera*) is a member of the palm tree family (Arecaceae) and the only known living species of the genus *Cocos*. Coconuts are known for their versatility of uses, ranging from food to cosmetics the diets of many people in the tropics and subtropics, furnishing and decoration. The coconut also has cultural and religious significance in certain societies, particularly in India, where it is used in Hindu rituals. In India, it is grown in 17 states and 3 Union Territories mostly along the coastal regions of the country in an area of around 2,082.11 thousand hectares with a total annual production of 23,904.10 million nuts and productivity of 11,481 nuts/ha/year (CDB statistical year book, 2016-17) [1]. The traditional areas of coconut are confined in the states of Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, Odisha, Goa, West Bengal, Pondicherry, Maharashtra and islands of Lakshadweep and Andaman & Nicobar. India ranks at 1st position in coconut production.

Odisha with its ideal climate and fertile soil makes coconut cultivation perfect for the region. The state has significant contribution in coconut farming in the country occupying 5th position in area coverage and 6th position in production in the country. Coconut is grown in an area of 50.91 thousand hectares with an annual production of 341.68 million nuts and productivity of 6711 nuts/ha/year in Odisha (CDB statistical year book, 2016-17) [1]. But the production and productivity of coconut in Odisha is very low as compare to national average. This is due to use of poor quality planting materials, backyard planting and improper care and management. Selvaraj *et al.* (2017) [5] indicated that hybrids are having more potential to increase the productivity and overall coconut production and the seedlings of the hybrids are more vigorous, producing higher number of leaves within 12 months, having higher leaf area and dry weight indicating precocity in growth and development. To address the poor yield of coconut in state an attempt was made to evaluate the T X T hybrids on their leaf parameter in coastal region of Odisha.

Materials and Methods

The experiment was carried out at Coconut Research Station, All India Co-ordinated Research Project on Palms at Bhubaneswar is situated nearer to the observatory of O.U.A.T. campus during 2018-19. The site has clay loam soil with experiencing tropical climate with average temperature wavers between 15 °C to 18 °C in the winter and 40 °C to 45 °C in the summer months. Monsoons are brought about by the south-east monsoon winds in the month of June

with recorded average annual rainfall of 1500 mm. The study was carried out in 5 year old plants taking 6 treatments by adopting Randomized Block Design (RBD) with four replications. The treatments were T₁- WCT x TPT (West Coast Tall x Tiptur Tall), T₂- LCOT x ADOT (Laccadive Ordinary Tall x Andaman Ordinary Tall), T₃- BGRT x ADOT (Benaulim Green Round Tall x Andaman Ordinary Tall), T₄- ECT x LCOT (East Coast Tall x Laccadive Ordinary Tall), T₅- BENT x ADOT (Benaulim Tall x Andaman Ordinary Tall) and T₆- IND041 (Sakhigopal Local Tall). Observations

were recorded no. of leaves per palm at initial and final stage of experiment, no. of leaves per palm per year by counting the leaves on palm in each treatments and length of leaf (m) and length of petiole (cm) was recorded by measuring.

Statistical analysis

The data collected for all the characters involved in the experimental study were subjected to analyze by statistical methods for proper interpretation. Data on leaf parameters of T X T hybrids of coconut are prescribed in table-1

Table 1: Evaluation of T X T coconut hybrids on leaf parameter

Treatment	No. of leaves/palm (initial)	No. of leaves/palm (Final)	No. of leaves/palm/year	Length of leaf (m)	Length of petiole (cm)
WCT X TPT	23.7	26.22	11.67	5.13	143.17
LCOT X ADOT	26.3	28.56	12.33	5.00	148.81
BGRT X ADOT	27.9	29.83	12.56	5.05	146.31
ECT X LOCT	26.1	27.43	11.47	4.90	142.61
BENT X ADOT	23.5	26.25	12.05	4.87	142.35
IND 041	24.6	27.43	11.48	5.07	137.18
SEm (±)	0.9	0.72	0.25	0.26	4.21
C.D. at 5%	2.9	2.19	0.75	NA	NA

Research Findings

The results obtained from the present investigation are given below

Number of leaves per palm

The data on number of leaves per palm were recorded and statistically analysed. The analysed data have been presented in above table-1. There was significant difference among different Tall x Tall hybrids. The number of leaves per palm was recorded at the initial stage of experimentation revealed that maximum number of leaves per palm was recorded in BGRT X ADOT (27.9) which was on par with LCOT X ADOT (26.30) and ECT X LCOT (26.10) and the minimum number of leaves per palm was recorded in BENT X ADOT (23.5). At the end of investigation the number of leaves per palm varied significantly from 26.22 to 29.83. The maximum number of leaves per palm was observed in BGRT X ADOT (29.83) which was on par with LCOT X ADOT (28.56). The minimum number of leaves per palm was observed in WCT X TPT (26.22).

No. of leaves per palm per year

The data pertaining to the number of leaves produced per palm per year were recorded and statistically analysed and presented in above table-1. The number of leaves produced per palm per year varied significantly among the T x T hybrids and maximum was recorded in BGRT X ADOT (12.56) which was on par with LCOT X ADOT (12.33) and BENT X ADOT (12.05). The minimum the number of leaves produced per palm per year was in ECT X LOCT (11.47).

Length of leaf (m)

Data on leaf length of T X T hybrids were statistically analysed and analysed data have been presented in Table-1. The perusal of data revealed that the length of leaf ranged from 4.87 m as the minimum value in BENT X ADOT to 5.13 m in WCT X TPT. However, there was no significant variation among different crosses with respect to leaf length.

Length of petiole (cm)

The data recorded on petiole length of different T X T hybrids

were statistically analysed and presented. The crosses under evaluation did not vary significantly so far length of petiole was concerned. However the maximum petiole length was recorded in LCOT X ADOT (148.81cm) and minimum in IND 041 (137.18 cm).

Discussion

The growth and development of inflorescences are closely related with the development of leaves. The total number of leaves on the crown as well as the rate of production of leaves determine the capacity of palm to build up photosynthates which favour the early commencement of flowering Ramadanan and Mathew, (1977)^[2] and higher yield.

The study revealed significant variations among different Tall x Tall hybrids in number of functional leaves and rate of productions of leaves which ranged from 26.22 to 29.83 and 11.47 to 12.56. The study is in agreement with findings of Tripura *et al.* (2018)^[6] and Selvaraj *et al.* (2017)^[5]. More or less similar results reported by Ramanandam *et al.* (2017)^[3] in hybrid palms. That superiority of BGRT X ADOT cross was observed with respect to number of leaves per palm as well as rate of production of leaves over other hybrids. The variations in hybrid palm with respect to number of leaves per palm and rate of production of leaves might be attributed to genetic potential of palms.

The length of leaf and petiole length are important characters as they decide the ability of the leaf to support the inflorescence in its axils and also increase the photosynthetic efficiency. While studying the leaf and petiole length of hybrids, no significant variations were observed among the Tall x Tall hybrids. However it revealed the range from 4.87 m to 5.13 m and 137.18cm to 148.81cm respectively. The results are quite similar to the findings of Ramanandan *et al.* (2018)^[4]. The length of leaf and petiole length are important characters as they decide the ability of the leaf to support the inflorescence in its axils and also increase the photosynthetic efficiency. While studying the leaf and petiole length of hybrids, no significant variations were observed among the Tall x Tall hybrids. However it revealed the range from 4.87 m to 5.13 m and 137.18cm to 148.81cm

respectively. The results are quite similar to the findings of Ramanandan *et al.* (2018)^[4].

Conclusion

In the present study, it was observed that initial maximum number of leaves per palm and final maximum number of leaves was recorded in BGRT X ADOT are 27.9 and 29.83 respectively. As well the number of leaves produced per palm per year was highest in BGRT X ADOT (12.56) where as there was no significant variation among different crosses with respect to leaf length and petiole length was observed and maximum leaf length was recorded 5.13 m in WCT X TPT and the minimum petiole length was recorded in IND 041 (137.18 cm).

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