Original Article

Indian Journal of Plant and Soil
Volume 6 Number 1, January - June 2019
DOI: http://dx.doi.org/10.21088/ijps.2348.9677.6119.2

Effect of Canopy Management (Pruning) on Fruit Yield in Tamarind Plantation at Harur Taluk, Dharmapuri, Tamil Nadu, India

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How to cite this article:

C.N. Hari Prasath, A. Balasubramanian, S. Radhakrishnan. Effect of Canopy Management (Pruning) on Fruit Yield in Tamarind Plantation at Harur Taluk, Dharmapuri, Tamil Nadu, India. Indian J Plant Soil. 2019;6(1):21-24.

Abstract

A field experiment was carried out in 15 year old tamarind plantation at Chinnakupam village, Harur taluk, Dharmapuri district, Tamil Nadu. The tamarind trees were managed with different pruning intensities viz., 15 per cent pruning, 30 per cent pruning, 50 per cent pruning and control for enhancing the flowering and fruiting in Tamarind. The maximum tamarind fruit yield was recorded in T2 (30% pruning) with the value of 39 kg./tree followed by T_3-50 per cent pruning (21 kg./tree) and the minimum fruit yield of 14 kg./tree was recorded in T_4 (Control). To conclude the study, the management of canopy with 30 per cent pruning had a significant increase in the tamarind fruit yield.

Keywords

Tamarind; Canopy management; Pruning intensities; Fruit Yield; Seed raised plantation.

Introduction

Tamarindus indica L., commonly known as tamarind tree is one of the most important multipurpose tree species in the Indian sub-continent. The tamarind tree is a medium sized, semi evergreen with short strong trunk with grey scaly bark. The pods are usually curved, flattened and vary considerably in size and shape, constricted, indehiscent with 1-10 seeded. The seeds are obovate, flattened, brown with 1-15 mm long and joined to each other with tough fibre running through brown sticky pulp. Tamarind tree is long lived and attains a large size, but the rate of growth after the seedling stage is slow. The tree begins to bear fruits at the age of 13-14 years and continues to yield abundant crops for more than 60 years. Tamarind is grown from sea level to about 1000 m MSL. It can thrive in regions with lower rainfall of even 500-750 mm; it is a drought resistant tree and tolerates higher temperature even upto 47°C. It grows economically successful in a wide range of soils varied from red loam, black clay loam, eroded hills to sandy loam situations in India. In India, tamarind (*Tamarindus indica* L.) cultivation is concentrated in the states of Tamil Nadu, Andhra Pradesh, Karnataka, Orissa, Bihar, Maharashtra and Kerala. India produces about 0.25 million tonnes of tamarind pulp/annum, bulk of it coming from the states of Tamil Nadu, Karnataka, Andhra Pradesh and Orissa and to a limited extent from Bihar, Maharashtra and Madhya Pradesh (Belarmin *et al*., 2010). Among the states, Tamil Nadu is the largest producer of tamarind with cultivation area of 21,000 ha to the productivity tune of 66,000 tons per year concentrated in districts like Dindigul, Theni,

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Received on 19.06.2019; **Accepted on** 28.06.2019

Coimbatore, Madurai, Krishnagiri, Dharmapuri and Salem (MoA, 2014). A mature tree may be capable of producing up to 175 kg of fruit per year; however improved cultivars are capable of yielding 265 kg per year (Kumar and Sethuraman, 2000).

Although tamarind is being planted on large scale plantations, since long time as a species of wide adaptability and amplitude of uses, little has been done for its yield improvement (Reddy *et al*., 2010) and to reduce its reproductive age which would in turn make its cultivation economically feasible. Tamarind, a suitable species for wasteland and other afforestation programme (Kumar and Reddy, 2007), planted extensively in Tamil Nadu by forest department, farmers and other agencies suffers from irregular bearing associated with shy bearing which results in poor fruit yield. It is documented by earlier workers that due to profuse flowering in tamarind, the fruit set was very poor, resulting in large scale abscission of flowers as well as fruits during various stages of development (Laxmi, 2011). The main cause for poor pod set might be the failure of fertilization, sterility or higher percentage of defective pollen grains or slow growth of pollen tube or its early degeneration (Lokesh *et al*., 1997). It is necessary to understand flowering behaviour before formulating selection procedure to identify superior methods and to apply them for increasing fruit and seed production.

Pruning is common and constructive technique for a variety of ornamental plants under natural exposed sunlight or greenhouse conditions (Sarkka and Erikson, 2003). Pruning improves light penetration into the canopy, and light is required for flower-bud development, fruit set and growth, and red colour development. Many researcher and their studies have underlined the outcome of pruning on flowering and its effects on the subsequent fruit yield & growth and quantity as well as its quality (Calatayud *et al*., 2007). This creates interest to undertake research on these lines for enhancing the productivity of tamarind. Having the above understanding, the present study is focused to increase the tamarind productivity through silvicultural management (Pruning).

Materials and Methods

The study was carried out during 2016-2018 in the Chinnakupam village, Harur Taluk, Dharmapuri district, Tamil Nadu, India (12º01′00′′N 78º27′38.7′′ E). The plant material consisted of tamarind trees, planted in 2002 with the spacing of 5 × 5 m were employed for productivity enhancement of tamarind fruit through the management of canopy with different pruning intensities.

The experiment was initiated during April, 2017. The trees were selected on the basis of uniform vigor and development. The pruning intensities applied in the tamarind plantation, *viz*., 15 per cent pruning, 30 per cent pruning, 50 per cent pruning and Control (No pruning management). The observation recorded was fruit yield by the pods harvested from each tree were weighed and expressed in kg tree^{-1}. The data obtained were subjected for statistical analysis to evaluate the possible relationship between the different parameters and analysis of variance employing statistical methods described by Panse *et al*. (1985).

Results and Discussion

Pruning is an important cultural operation for obtaining quality yield from the fruiting trees, which involves judicious removal of vegetative parts. An unpruned tree becomes very large, which inhibits light penetration inside the canopy and reduction in fruit production (Mishra *et al*., 2011). Among the different pruning intensities, highest fruit yield of 39 kg. was obtained T_2 with 30 per cent pruning intensity followed by T_3 with 50 per cent pruning intensity with yield of 21 kg. and lowest of 14 kg. was recorded in T_4 Control (Unpruned).

On supporting the present investigation, Saifuddin *et al*. (2010) documented that pruning increased the fruit yield in *Bougainvillea glabra* from the University of Biological Science, Malaysia. The study carried out by Bennewitz *et al*. (2011) in Maule region of Chile reported that increasing level of dormant pruning had a strong effect in promoting the yield of premium fruit in sweet cherries.

Table 1: Effect of different pruning intensities on fruit yield in tamarind tree

	Treatment	Yield (kg.)
T_1	15% Pruning	18
T_2	30% Pruning	39
T_3	50% Pruning	21
T_4	Control	14
	SEd	3.19
	CD (0.05)	6.95

On contrary to the present investigation, trees which had not pruned were characterized by a significantly higher yield in comparison to pruned ones (Rutkowski *et al*., 2015) in Avocado. This fact is consistent with the statement of Jankiewicz and

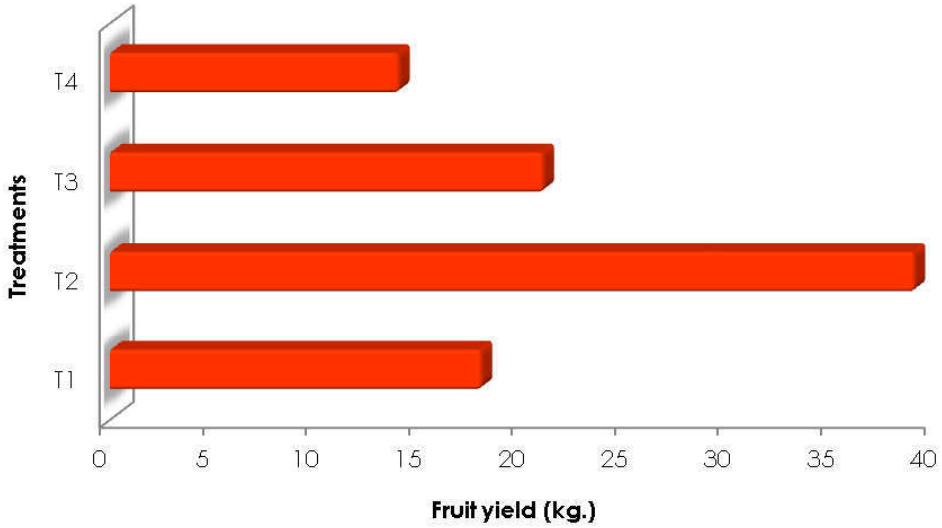

Fig. 1: Effect of different pruning intensities on fruit yield in tamarind tree

Lipecki (2015); Mika *et al*. (2003); Ikinci (2014); Whiting *et al*. (2005) and Callesen (1997), they reported that tree pruning intensities decreased tree yield.

Conclusion

The improved canopy management like pruning plays an important role in regulating and increasing the flowering and fruit production. Imposing of different pruning intensities in 15 year old tamarind plantation help to conclude that 30 per cent pruning not only resulted with flowering and fruiting but also enhance the nutrient status and biochemical constituents in tamarind.

Acknowledgement

The authors acknowledge ICAR-Indian Institute of Natural Resins and Gums, Ranchi for funding the network research project on "Harvesting Processing and Value Addition of Natural Resins and Gums – Tamarind Seed Gum".

Reference

1. Belarmin Fandohan, Achille Ephren Assogbadjo, B. Sinsin and Van Damme. Impact of habitat type on the conservation status of Tamarind (*Tamarindus indica* L.). *African Journal of Biotechnology, 2010;65(3)*: 11-19.
2. Bennewitz Eduardo von, Claudio Fredes, Tomas Losak, Carolina Martínez and Jaroslav Hlusek. Effects on fruit production and quality of different dormant pruning intensities in 'Bing'/'Gisela®6' sweet cherries (*Prunus avium*) in Central Chile. *Ciencia Investication Agraria.* 2011;38(3):339-344.
3. Calatayud A., D. Roca E. Gorbe and P.F. Martynez. Light acclimation in rose (*Rosa hybrida* cv. Grand Gala) leaves after pruning: effects on chlorophyll a fluorescence, nitrate reductase, ammonium and carbohydrates. *Scientia Horticulture,* 2007;111:152-159.
4. Callesen O. Orchard systems for sour cherry. *Acta Horticulturae,* 1997;451:653-660.
5. Ikinci A. Influence of pre- and postharvest summer pruning on the growth, yield, fruit quality, and carbohydrate content of early season peach cultivars. *Scientific World Journal.* 2014(1-2):104865. http://dx.doi.org/10.1155/2014/104865.
6. Jankiewicz L.S. and J. Lipecki. Physiology of orchard plants. *Warszawa,* Poland. 2011.pp.427-434 (in Polish).
7. Kumar Ashok M. and Y.N. Reddy. Effect of Calcium nitrate and Salicylic acid spray at flowering on transduction of flowering in cv. *Baneshan. Crop Research.* 2007;34(3):146-49.
8. Kumar K.P.V. and M.G. Sethuraman. Aricanut fibre and tamarind seed coat as raw materials for varnish preparation. *Bulletin of Electrochemistry,* 2000;16(6):264-66.
9. Laxmi D.V. Studies on fruit set, fruit drop and development in seeded and seedless types of tamarind (*Tamarindus indica* L.). *M.Sc. Thesis,* UAS, Bangalore. 2011.
10. Lokesh, A.R., B.S. Sarala and Raju Chaven. Evolutionary significance of style orientation in *Tamarindus indica* L. and possible evolutionary constraints for low reproductive success. *In*: Proc. National Symposium on *Tamarindus indica* L.

Tirupathi, Andhra Pradesh, India. 1997.pp. 212-217.

11. Mika A., Z. Buler and A. Krawiec. Effect various methods of pruning apple trees after planting. *Journal of Fruit and Ornamental Plant Research.* 2003;11:33-43.
12. Mishra A.K., G. Pandey and Rakesh Chandra. *Proceedings of the 20th Group Worker's Meeting of AICRP on (STF),* CISH, Lucknow. 2011.pp.1-108.
13. MoA (Ministry of Agriculture). Indian Horticultural Database 2014. IG Printer Pvt. Ltd., New Delhi. 2014.
14. Panse V.G., P.V. Sukhatme and V.N. Amble. Statistical methods for agricultural workers (Ref. Edn.). ICAR, New Delhi. 1985.
15. Reddy Pulla C.H., Y.N. Reddy, R. Chandrasekhar and Reddy P. Narayana. Effect of precursor microbial interactions on induction of flowering and fruiting in mango. *4th Indian Horticulture Congress*, 2010. New Delhi Book of abstract. 2010.p.259.
16. Rutkowski Krzysztof, Zofia Zydlik and Eugeniusz Pacholak. Effect of tree pruning intensity on the yield and fruit quality of the sour cherry. *Zemdirbyste-Agriculture.* 2015;102(4):417-22.
17. Saifuddin Mohammed, A.B.M.S. Hossain, N. Osman, M.A. Sattar, K.M. Moneruzzaman and M.I. Jahirul. Pruning impacts on shoot-root-growth, biochemical and physiological changes of *Bougainvillea glabra. Australian Journal of Crop Science.* 2010;4(7):530-37.
18. Sarkka L. and C. Erikson. Effects of bending and harvesting height combinations on cut rose yield in a dense plantation with high intensity lighting. *Scientia Horticulture.* 2003;98:433-447.
19. Whiting M., D. Ophardt, O. Lenahan and D. Elfving. Managing sweet cherry crop load: new strategies for a new problem. *Compact Fruit Tree.* 2005;38:52-58.