International Journal of Forestry and Crop Improvement
Volume 9 | Issue 1 | June, 2018 | 29-32 | Visit us : www.researchjournal.co.in
e ISSN-2230-9411

RESEARCH ARTICLE

DOI: 10.15740/HAS/IJFCI/9.1/29-32

Impact of different pruning of *Dalbergia sissoo* and different date of planting of turmeric on growth and yield

Vijay Kumar, K. K. Jain, Satish Kumar and Bheru Lal Kumhar

ABSTRACT : A field experiment was conducted at the Research Farm, of New Dusty Acre Area, Department of Forestry, College of Agriculture, JNKVV, Jabalpur (M.P.) during, *Kharif* season of 2015-16. The experiment involve four pruning intensities+open condition (only crop) in main plot and three different dates of planting in sub plot under strip plot design with four replications.The results revealed that, turmeric recorded highest plant height, stem diameter, LAI, number of leaves, number of shoot/hill and width of fingers, fresh yield and the different date of planting observed higher plant height, stem diameter, LAI, number of leaves, number of shoot/hill and width of fingers, fresh yield.

KEY WORDS : Pruning intensities, Different date of planting, Turmeric yield, LAI, Agroforestry

HOW TO CITE THIS ARTICLE : Kumar, Vijay, Jain, K.K., Kumar, Satish and Kumhar, Bheru Lal (2018). Impact of different pruning of *Dalbergia sissoo* and different date of planting of turmeric on growth and yield. *Internat. J. Forestry & Crop Improv.,* **9** (1) : 29-32, **DOI: 10.15740/HAS/IJFCI/9.1/29-32.**

ARTICLE CHRONICAL : Received : *14.04.2018;* Revised : *19.05.2018;* Accepted : *26.05.2018*

INTRODUCTION

The turmeric (*Curcuma longa* L.) plant is a herbaceous perennial belonging to the family *Zingeberaceae* (Purseglove, 1972). Turmeric (*Curcuma longa* L.) is a rhizomatous plant used as a natural spice, cosmetic and medicine in the world (Hossain *et al*., 2005).

MEMBERS OF RESEARCH FORUM

Address of the Correspondence : **Vijay Kumar,** Department of Forestry, College of Agriculture (J.N.K.V.V.), **Jabalpur (M.P.) India**

Address of the Coopted Authors : K.K. Jain and Satish Kumar, Department of Forestry, College of Agriculture (J.N.K.V.V.), **Jabalpur (M.P.) India**

Bheru Lal Kumhar, Department of Agronomy, College of Agriculture (J.N.K.V.V.), **Jabalpur (M.P.) India**

In India turmeric grown area 186000 ha, production (943 MT) and productivity (5.07 MT ha^{-1}) while, Madhya Pradesh have grown area 142000 ha, production (1.61 MT ha^{-1}) and productivity (1.33 MT ha^{-1}) (Anonymous, 2016). Turmericis one of the important species grown for its underground rhizomes, which are used as condiment dye stuff, drug and cosmetic, volatile oil of the flavouring ingredient of turmeric makes it an indispensable part of every Indian kitchen and is often prescribed against infection of liver, jaundice and disorder of blood (Subramanian *et al*., 2004). Turmeric is a potentially important medicinal and aromatic oil yielding herb which has great demand in ayurvedic industry and for culinary uses in India (Kirtikar and Basu, 1988). Available inter space in the perennial crops can be utilized

for cultivation of rhizomatous spice crops (Singh *et al.*, 2013). In intercropping system, productivity is improved either by efficient interception of available solar energy or by having crop of greater radiation use efficiency (Anonymous, 1979).

Dalbergia sissoo grows fast and medium large sized tree belonging to family leguminosae.Commonly known as shishumIt has been grown since long times in combination with agricultural crops, field boundaries, around fruit orchards which can be grown in with Sissoo. It is having multiple uses such as fuel, wood, fodder, shade, and nitrogen fixing ability (Singh and Sharma 2007). *Dalbergia sissoo* grows fast. It makes an excellent timber and side branches can be lopped for feeding livestock. It requires deep loamy soil and adequate moisture to grow well (Hegde, 1987).The present forest area of the country 69.7 mha (23.82%) is not in a position to meet out the present demand of fuel, fodder, timber, raw material for small and large scale industry and forest products (Dhyani *et al.,* 2013).The conservation of natural resources is an area of concern for sustainable productivity and micro-environmental conditions are also modified under the canopy. It has been observed that air as well as soil temperature is low while the humidity remains higher under tree canopy, which itself has generated the interest for future research for adaptation to changing climate (Rani, 2009; Dhillon *et al.,* 2010; Rani *et al.,* 2011 and Gupta *et al.,*2005). The pruning treatment can effective change the micro-climate under canopy (such as increased air temperature, soil water content and decrease the relative humidity). Many scientists reported the positive effect of height and intensity of pruning on biomass production (Das and Dalvi, 1981). Biomass yields and productivity of crops have also been reported higher under pruned trees. In tree crop system, canopy pruning alleviate shading of crops and appeared as an effective mean of increasing the light permeability to under storey crops (Newaj and Dar, 2007).

EXPERIMENTAL METHODS

A field experiment was conducted at Dusty acre area, Department of Forestry Jawaharlal Nehru Krishi VishwaVidyalaya, Jabalpur (M.P). Jabalpur during 2015-16. lies between 22°49' to 2408' North Latitude and 78021' to 80058' East Longitude with an attitude of 411.78 m MSL. It comes under the agro-climate region classified as Kymore Plateau and Satpura Hills. The climate of the region is semi and with hot dry summer and cold dry winter. The soil of the experimental area was medium black, clay loam in texture, neutral in reaction (pH 7.21), medium in organic carbon (0.46), medium in available nitrogen (207 kg ha^{-1}), medium in available phosphorus (16.26 kg ha^{-1}) and very low in potash (172 kg ha^{-1}). The experiment was conducted during rainy season under 16 years old *Dalbergia sissoo* planted at a distance of 5×5 m^2. The experiment involve four pruning intensities *viz*., no pruning, (25%, 50% and 75%) pruning in *Dalbergia sissoo* + open condition (only crop) in main plot and three different date of planting 20 June 2015, 27 June 2015and 03 July 2015 in sub plot under strip plot design with four replications.The crop and tree parameter were analyzed statistically using analysis of variance for strip plot design. The significance was tested for all the parameters at 5 per cent level.

EXPERIMENTAL RESULTS AND ANALYSIS

Inputs on production potential of turmeric in *Dalbergia sissoo* based agrisilviculture system of Agroforestry. 25 per cent pruning *i.e*. crop grown with trees recorded highest plant height (83.6), 50 per cent pruning recorded significantly plant height (81.9), which was superior followed by pruning 75 per cent pruning (80.3) over the all treatments. Different date of planting significant effect on plant height first date of planting (D_1) significantly highest plant height (84.9), at par with second date of planting (D_2) plant height (83.2) over the third date of planting (D_3). 25 per cent pruning recorded highest stem diameter (22.8),50 per cent pruning recorded significantly stem diameter (22), which was superior to 75 per cent, no pruning and open condition is having significantly loweststem diameter (20.1), different date of planting significant effect on stem diameter first date of planting (D_1) significantly highest stem diameters (23.4), at par with second date of planting (D_2) over the third date of planting (D_3). It might be attributed that partial shaded conditions of tree provide favourable physical condition for penetration, proliferation of light to under storey grown crop and ramification of root resulted in better growth and height of plant the stem diameter was also higher in case of 25 per cent of pruning intensity which was significant as compared to other pruning intensities. Sundararaj and Thulasidas (1976); Meena

(2008); Kandianna and Chandaragiri (2008) and Gill and Kumar (2010).

The 25 per cent pruning was recorded height leaf area index (20.4), number of leaves (9.2), number of shoot per hill (4.2) 50 per cent pruning recorded significantly leaf area index (19.9), number of leaves (9.1), number of shoot per hill (4.0) which was superior to 75 per cent, no pruning and open condition is having significantly lowest leaf area index (18.4), number of leaves (8.8), number of shoot/hill (3.6). Different date of planting significant effect on first date of planting (D_1) significantly highest leaf area index (19.5), number of leaves (9.7), number of shoot per hill (4.3) at par with second date of planting (D_2), number of leaves (9.5), number of shoot per hill (4.1) over the third date of planting (D_3). LAI due to increase in number of leaves. The increased LAI is due to increase in number of leaves/plant. The reduction in LAI towards, maturity was due to top reduction in number of leaves/plant, hence there was a decrease in total leaf area with ageing of plants. Leaves revealed that in Ist date of planting leaves were more in green colour and greater size of the leaves reflecting the effects of planting dates because. Due to more favourable environmental condition *viz.*, aeration, root proliferation light interception, Dhillon *et al*. (2009) and Gill and Kumar (2010).

The 25 per cent pruning recorded highest width of fingers (2.0) and fresh yield (2734.4), 50 per cent pruning recorded significantly width of fingers (1.9) and fresh yield (2535.4)which was superior to 75 per cent, no pruning and open condition is having significantly lowest width of fingers (1.5) and fresh yield (2088.5). Different date of planting significant effect on width of fingers first date of planting (D_1) significantly highest width of fingers (2.0) and fresh yield (22890.6) at par with second date of planting (D_2) width of fingers (1.8) and fresh yield (2590) over the third date of planting (D_3) and fresh yield (1700). This might be due to favourable environmental conditions *viz.*, aeration, light interception, drainage and nutrient uptake were favourable and availability of better soil condition helped in increasing the growth and yield Singh *et al*. (2013) and Dhyani and Chauhan (1989).

Conclusion:

It may be concluded that the 25 per cent pruning intensities recorded high fresh yield (2734.4 kg ha^{-1}) over the another treatments. Different date of planting significantly higher fresh yield (2890.6 kg ha^{-1}).

Table 1: The turmeric yield influence by pruning intensity and different date of planting at the age of 16 years

Treatment	Plant height (cm)	Stem diameter (mm)	Leaf area index	Number of leaves	Number of shoot /hill	Width of fingers (cm)	Fresh yield (kg ha^{-1})
Pruning intensities							
P_0 Control	79.9	20.5	19.1	8.9	3.7	1.6	2182.3
P_1 - 25% pruning	83.6	22.8	20.4	9.2	4.2	2.0	2734.4
P_2 – 50% pruning	81.9	22	19.9	9.1	4.0	1.9	2535.4
P_3- 75% pruning	80.3	20.9	19.5	9	3.8	1.8	2427.1
P_4- Only crop	76.1	20.1	18.4	8.8	3.6	1.5	2088.5
S.E.±	0.40	0.31	0.37	0.06	0.02	0.05	140.2
C.D. (P = 0.05)	1.23	0.96	1.15	0.17	0.08	0.22	432.1
Date of planting							
D_1- 20/06/2015	84.9	23.4	22.6	9.7	4.3	2.0	2890.6
D_2- 27/06/2015	83.2	21.8	20.2	9.5	4.1	1.8	2590
D_3- 03/07/2015	73	18.5	15.6	8.2	3.2	1.5	1700
S.E.±	0.24	0.11	0.11	0.07	0.04	0.02	99.43
C.D. (P = 0.05)	0.86	0.39	0.41	0.24	0.14	0.07	344.0

REFERENCES

Anonymous (1979). Multiple cropping in coconut and arecanut gardens. Ed. Nelliat, E.V. and Bhat, K.S., Central Plantation Crop Research Institute.*Technical Bull.*, **3** : 54.

Anonymous (2016). *Horticulture statistics division department of Agriculture,* Cooperation and farmers welfare Ministry of Agriculture and farmers welfare Government of India. pp.17, 233.

Das, R.B. and Dalvi, G. S.(1981). Effect of interval and intensity of cutting *Leucaenleucocephela*. Resarch Report 2 pp. 21-22.

Dhillon, W.S., Chauhan, S.K. and Singh, N. (2009). Physiology and yield of turmeric under poplar tree canopy. *APA News*, **30** : 5-6.

Dhillon, W.S., Srinidhi, H.V., Chauhan, S.K., Singh, C., Singh, N. and Jabeen, N. (2010). Micro-envoriment and physiology of turmeric cultivated under poplar tree canopy. *Indian J. Agroforestery,* **12** (2) : 23-37.

Dhyani, S.K. and Chauhan, D.S. (1989). *Evaluation of crop in relation to shade intensities o Khasipine* (*Pine khasya).* Progress Report, Agroforestry Division, ICAR Research Complex for NE Region, Shilling (Meghalaya): 1-3.

Dhyani, S.K., Handa, A.K. and Uma (2013). Area under agroforestry in India: An Assessment for present status and future perspective. *Indian J. Agroforestry,* **15**(1): 164-187.

Gupta, D.C., Zomer, R.J. and Bossio, D.A. (2005). Poplar agroforestry in India: Trendsand impacts. IWMI Project Report. Colombo, International Wate Management Institute. pp.57.

Gill, B.S. and Kumar, B. (2010). Growth, yield and quality of turmeric (*Curcuma longa* L.) as influenced by planting method, plant density and planting material. *J. Spices & Aromatic Crops,* **19** : 42-49.

Hegde, N.G. (1987). Handbook of wastelands development. Pune, India: BAIRNelliat, E.V. and Bhat, K.S., Central Plantation Crop Research Institute. *Technical Bull.*, **3**: 54.

Hossain, M.A., Ishimine, Y., Akamine, H. and Motomura, K. (2005a). Effects of seed rhizome size on growth and yield of turmeric (*Curcuma longa* L.). *Plant Prod. Sci.,***8** : 86-94.

Kandianna, N. K. and Chandaragiri, K.K. (2008). Monetary and non monetary input on turmeric growth, nutrient uptakes yield and economics under irrigated condition. *Indian J. Hort.*, **65** (2) : 209-213.

Kirtikar, K.R. and Basu, B.D. (1988). *Indian medicinal plants,* vol II. India Book Distributors, Dehra Dun, pp. 2444–2449.

Meena,MukeshBabu (2008). Effect of different pruning intensities and doses of fertilizers on the growth and productivity of wheat under agri-silviculture (Shisham+Wheat) practice. M.Sc.Thesis (Agronomy), College of Agriculture, JNKVV, Jabalpur, M.P. India : pp. 52-55.

Newaj, R.S.A and Dar (2007). Tree growth and biomass productivity of herbaceous layer under different pruning regimes in *Albiziaprocera* based agri-silviculture system. *Range Mgmt.& Agroforestry,* **28** (2A): 108-110.

Purseglove, J.W. (1972), *Curcuma domestica* Val. In: Tropical Crops: Monocotyledons 2 (pp. 522–528). Longman, London, United Kingdom.

Rani, S. (2009). Valuation of winter flowering annuals for seed production under poplar based agroforestry system. M.Sc. Thesis, Punjab Agricultural University, Ludhiana (Punjab) India. 69p.

Rani, S., Chauhan, S.K., Kumar, R. and Dhatt, K.K. (2011). Bioeconomic appraisal of flowering annuals for seed production under poplar (*Populusdeltoides*) based agroforestry system. *Tropical Agric.Res.*, **22**: 125-133.

Sharma, T.R. and Rai, G.K. (2004). Selection of suitable cultivars of turmeric as component crop under mango orchards JNKVV. *Research J.*, **38** (2) : 29-30.

Singh, B. and Sharma, K.N. (2007). Tree growth and nutrient status of soil in a poplar (*Populusdeltoides* Bartr.) based agroforestry system in Punjab, India. *Agroforestry Systems,* **70** (2) : 125-134.

Singh, D.K., Aswal, S., Aswani, G. and Shivhare, M.K. (2013). Performance of planting material on growth and yield of turmeric under guava orchard. *Hort Flora Res. Spectrum,* **2** (2) : 116-120.

Singh, R., Bhushan, S., Kumar, S. and Shanker, S. (2013). Yield assessment of elephant foot yam grown under multilayer vegetable cropping system. *Bioscan,* **8** (4): 1237-1239.

Subramanian, V. Kumar, S.L. and Nair, G.S. (2004). Effect of time and method of planting on the yield of second crop of turmeric in Wyand. *Indian Cocaa. Arecant & Spices J.* **5** (1) : 5-8.

Sundararaj, D.D. and Thulasidas, G. (1976). *Botany of field crops.* The Macmillan Company of India Ltd. Delhi, India.