



RESEARCH PAPER

Performance of high density planting of mango (*Mangifera indica* L.) under mid-western plain zone of Uttar Pradesh

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Abstract : An experiment was conducted at Zonal Research Centre –Nagina (Bijnor)-246 762(U.P.) during 2000 to evaluate the performance of high density planting of mango (*Mangifera indica* L.). The mango variety Dashehari scion wood of 20-22cm grafted on seedling rootstock in July 1999 were planted at Horticulture Section in August, 2000 at two spacing viz., 10m × 10m (100 plants/ha-normal density) and 3.0m × 3.0 (1111 plants/ha-high density). Five grafts were planted in normal density and 160 grafts were planted in high density employing about 0.1940 ha area. Grafts in normal density were planted at marked points prepared by pit digging (1×1×1m) and then by filling the pits with dug soil mixed with 100 g N, 75 g P₂O₅ and 75 g K₂O fertilizer mixture, whereas grafts in high density were planted directly with the use of fertilizers containing 100 kg N, 75 kg P₂O₅ and 75kg K₂O/ha. Normal package of practices was applied in both the system of plantings. The plant height (5.30m) was recorded under normal planting whereas it was found little different in high density of mango at 11th year of their planting. The stem girth under normal system was noted as 55.7cm whereas, it was slightly reduced to 50.7cm under high density of planting. The expansion of East-West and North-South direction both were recorded same as 3.10m and 3.03m in normal planting and high density planting, respectively. The fruit yield 22.30q/ha was noted under normal density of planting whereas, it was 242.20q/ha at 5th year of planting under high density planting system. The fruit yield ranged from 22.30 to 109.80 q/ha from 5th year to 11th year, respectively under normal system of planting whereas it ranged from 242.2 to 1093.22q/ha under HDP system of planting. The observations showed that the fruit yield ratio of normal system of planting to HDP were 1:10.86, 1:9.92, 1:9.90, 1:8.67, 1:9.80, 1:9.27 and 1:9.95 from 5th year to 11th year of age, respectively. So, it is a very informative and need of the hour to plant HDP system of mango just to get 9 to 10 times more yield for increasing mango productivity and to reach the king of fruit to the common people.

Key Words : High density planting, *Mangifera indica*, Mango

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INTRODUCTION

High density planting (HDP) system, enables earlier cropping, high regular yields and improved farm management practices, leading to higher productivity and profitability. High density planting in fruit trees was first

introduced in case of apple in Europe during the nineteen sixties, with the development of Malling and Malling - Merton rootstocks. Subsequently, this was experimented in other temperate fruit crops like peach, plum, pear and sweet cherry. Today, majority of new orchards of apple and to some extent that of other fruit crops in Europe,

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New Zealand, USA and Australia use this intensive system of fruit production profitably Iyer and Kurian (2006).

The main aim of high density planting is to produce more and more from unit area, from one species, in order to make the venture of tropical fruit production more remunerative and sustainable. It is necessary that the impact of system architecture on bio-physical parameters be closely investigated for various agro-ecological situations. With shrinking land-holdings the future lies only in integrated systems that would lead to stable soil and environment health besides getting maximum useful biomass from unit land.

MATERIAL AND METHODS

An experiment was conducted at Zonal Research Centre, Nagina (Bijnor) under Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (U.P.) during August 2000 to evaluate the performance of high density planting of mango (*Mangifera indica* L.). The grafted mango of Dashehari prepared on mango seedling rootstock in July 1999 were planted at Horticulture Section in August, 2000 at two spacing viz., 10m × 10m (100 plants/ha-normal density) and 3.0m × 3.0 (1111 plants/ha-high density). Five grafts were planted in normal density and 160 grafts were planted in high density employing about 0.1940 ha area. Grafts in normal density were planted at marked points prepared by pit digging (1×1×1m) and then by filling the pits with dug soil mixed with 100g N, 75 g P₂O₅ and 75 g K₂O fertilizer mixture, whereas grafts in high density

were planted directly in soil mixed with fertilizers containing 100g N, 75 g P₂O₅ and 75 g K₂O fertilizer mixture. Regular package of practices were applied in both the methods of planting. After five years of age under high density planting, minor pruning was applied just to control the over growth of canopy. After that minor pruning was done at the time fruit harvesting as 20-25cm stalk was cut together with fruits just to maintain the sustainable growth of canopy. The data recorded on different vegetative characters and yield contributing traits in the present investigation were subjected to the two way statistical analysis.

RESULTS AND DISCUSSION

Present investigation was carried out with vegetative and yield contributing factors and the results so obtained are described here under in the following heads.

Tree height (m) :

The plant height was recorded in normal planting after five years of their planting and it was found significantly at increasing order upto 10th year of age and it ranged from 1.60 m to 5.30m. Then, after slight pruning the growth of the tree was constant. Under HDP system, it was found that plant height was significantly increased upto 10th year of age; however, it was comparatively higher to normal system of planting. This is because that growth of the plant was increased slightly higher just to competition among them in search of light for photosynthesis (Table 1).

Table 1 : Vegetative characters and fruit yield of mango variety Dashehari under normal system and HDP system of planting

Treatments (Year)	Plant height (m)		Stem girt (cm)		Canopy (E-W) (m)		Canopy (N-S) (m)		No. of fruits/plant		Fruit yield / plant (kg)		Fruit yield /ha (q/ha)		Fruit yield ratio (N:HD)
	Normal (A1)	HDP (A2)	Normal (A1)	HDP (A2)	Normal (A1)	HDP (A2)	Normal (A1)	HDP (A2)	Normal (A1)	HDP (A2)	Normal (A1)	HDP (A2)	Normal (A1)	HDP (A2)	
2005 (B1)	1.60	1.50	22.2	21.5	1.48	1.47	1.40	1.50	74.33	72.67	22.30	21.80	22.30	239.80	1:10.75
2006 (B2)	2.10	2.27	30.6	26.7	1.95	2.03	1.87	1.97	97.00	89.67	29.10	26.90	29.10	295.00	1:10.13
2007(B3)	2.57	2.60	39.2	31.8	2.38	2.40	2.18	2.13	126.33	118.00	37.90	35.40	37.90	389.40	1:10.27
2008(B4)	3.37	3.40	48.0	37.3	2.85	2.70	2.58	2.37	171.33	152.33	51.40	45.70	51.40	502.70	1:9.78
2009(B5)	4.30	4.50	56.2	45.3	3.20	2.87	2.97	2.53	250.33	234.00	75.10	70.20	75.10	772.20	1:10.28
2010 (B6)	5.30	5.60	65.3	56.4	3.75	2.97	3.55	2.80	302.66	278.00	90.80	83.40	90.80	917.40	1:10.10
2011(B7)	5.30	5.57	74.3	65.0	4.38	3.03	4.12	3.03	366.00	334.00	109.80	100.20	109.80	1102.20	1:10.03
Mean	3.50	3.63	47.9	40.5	2.85	2.49	2.67	2.33	198.29	180.81	59.49	52.91	59.49	582.06	
C.D.	0.09		0.61		0.07		0.08		4.69		1.41		10.91		
Factor A															
Factor B	0.18		1.23		0.12		0.15		8.78		2.64		20.41		
Factor A×B	N/A		1.73		0.17		0.21		12.42		3.73		28.87		

Stem girth (cm) :

The stem girth was recorded in normal planting after five years of their planting and it was found significantly at increasing order upto 11th year of age and it ranged from 22.2cm to 74.3cm. Under HDP system, it was found that stem girth was significantly increased also upto 11th year of age; however, it was comparatively lower to normal system of planting. This is because that growth of the plant was increased slightly higher just to competition among them in search of light for photosynthesis (Table 1).

Tree canopy (East-West):

The plant canopy of East-West direction was recorded in normal planting after five years of their planting and it was found significantly at increasing order upto 11th year of age and ranged from 1.48m to 4.38m. Under HDP system, it was found that plant canopy was significantly increased also upto 11th year of age; however, it was comparatively lower to normal system of planting viz., 1.47m to 3.03m. This is because that growth of the plant canopy was increased slightly lower just to competition among them in search of nutrition for their proper growth and development (Table 1).

Tree canopy (North-South):

The plant canopy of North-South direction was recorded in normal planting after five years of their planting and it was found significantly at increasing order upto 11th year of age and ranged from 1.40m to 4.12cm. Under HDP system, it was found that plant canopy was significantly increased also upto 11th year of age; however, it was comparatively higher to normal system of planting during initial phase; however, it was lower onwards viz., 1.50m to 3.03m. This is because that growth of the plant canopy was increased slightly lower just to competition among them in search of nutrition for their proper growth and development (Table 1).

Fruits per tree :

The fruits per tree were recorded in normal planting after five years of their planting and it was found significantly at increasing order upto 11th year of age and ranged from 74.33 to 366.00. Under HDP system, it was found that fruits per tree were significantly increased also upto 11th year of age; however, they were comparatively lower to normal system of planting viz., 72.67 to 334.00. This is because that number of fruits

per tree were recorded slightly lower just to competition among them in search of nutrition for their proper development (Table 1).

Fruit yield per tree :

The fruit yield per tree was recorded in normal planting after five years of their planting and it was found significantly at increasing order upto 11th year of age and ranged from 22.30 to 109.80kg per tree. Under HDP system, it was found that fruits per tree were significantly increased also upto 11th year of age; however, they were comparatively lower to normal system of planting viz., 21.80 to 100.20kg per tree. This is because that number of fruit yield per tree was recorded slightly lower just to competition among them in search of nutrition for their proper growth and development (Table 1).

Fruit yield per hectare :

The fruit yield per hectare was recorded in normal planting after five years of their planting and it was found significantly at increasing order upto 11th year of age and ranged from 22.30 to 109.80q/ha. Under HDP system, it was found that fruit yield per hectare was significantly increased also upto 11th year of age; however, it was comparatively tremendous higher to normal system of planting viz., 239.80 to 1102.20q/ha. This is because that number of trees were per hectare were nearly eleven times higher to normal system of planting (Table 1).

Fruit yield ratio (Normal: HDP):

The fruit yield ratio from normal to HDP was recorded after five years of their planting and it was found at increasing order upto 11th year of age and ranged from 1:10.75 to 1:10.03. A minute observation showed that fruit yield ratio was decreased during 6th year of age; however, it was increased during next year. Again, it was decreased during 7th year of age, but increased again during onward year. During last two years, the fruit yield was found in decreasing trend, but the ratio was maintained more than 1:10 in successive years. Majumder *et al.* (1982), Ram and Sirohi (1985) and Ram and Sirohi (1991) studied on high density orcharding in mango cv. AMRAPALI and DASHEHARI, respectively and the present result is in accordance with the above findings. Oosthuysen (1992) and Ravishanker *et al.* (1992) studied on the pruning which are akin with the current studies.

Conclusion :

For production fruit yield per unit area, emphasis may be given to the planting space. High density of planting system (3×3m) produced almost ten times more yield as compared to normal system of planting (10×10m). So, HDP system was found promising for commercial cultivation to traditional system of planting.

REFERENCES

Iyer, C.P.A. and Kurian, Reju M. (2006). *High density planting in tropical fruits : Principles and practices.* International Book Distributing, Lucknow ISBN 81-8189-094-9.

Majumder, P.K., Sharma, D.K. and Singh, R.N. (1982). A study

on “high density” orcharding in mango (*Mangifera indica* L.) var. Amrapali. *Punjab Hort. J.*, **22** : 123-127.

Oosthuysen, S.A. (1992b). Ideas on pruning of mango trees. SA Mango Growers' Assoc. Yearbook 12. pp. 1-7.

Ram, S. and Sirohi, S.C. (1985). Studies on high density orcharding in mango cv. DASHEHARI. *Acta Hort.*, **231** : 339-344.

Ram, S., and Sirohi, S.C. (1991). Feasibility of high density orcharding in Dashehari mango. *Acta Hort.*, **291** : 207- 211.

Ravishankar, H., Nalawadi, U.G., and Rao, M.M. (1992). Smoothing of alternate bearing rhythm in “Alphonso” mango by period and intensity of pruning under mildtropical rainy climatic conditions. IV Internat. Mango Symp. Abstrs., 86 p.

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