



## RESPONSE OF ORGANIC MANURES ON GROWTH AND YIELD OF MANGO (*Mangifera indica* L.) CV. DASHEHARI

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**ABSTRACT:** The present investigation was carried out at Horticulture Research Centre, Patharchatta, G. B. Pant University of Agriculture and Technology, Pantnagar. The experiment was laid out with thirteen treatments and three replication in Randomized Block Design. Maximum tree height was observed with the application of poultry manure 25 kg per tree, whereas, maximum tree girth was recorded with application of *neem* cake 30 kg per tree during both the years. Minimum number of fruits and fruit yield (kg) per tree was recorded in control, while maximum number of fruits and fruit yield (kg) per tree with application of 75 kg vermicompost per tree during both the years. Application of different organic manures on mango trees is useful for improving the growth and yield characteristics.

**Keywords:** Mango, organic manures, growth, yield.

Mango is the main fruit of Asia and this fruit has developed its own importance all over the world. Being an useful and delicious fruit, it was the part of culture and religion since long time. From ancient time, it has been favourite of the kings and commoners because of its nutritive value, taste, attractive fragrance and health promoting qualities and now, it is recognized as one of the best fruits in world market. As many as 63 countries of the world have been growing mango but India is still a leading nation in area and production of mango (Chattopadhyay, 1). Management of mineral nutrition of fruit trees is an important practice in an orchard. In fact, intensive mango culture is not possible without adequate manuring. Indiscriminate use of chemicals causes biological imbalance leading to soil deterioration and environmental pollution. The ever increasing cost of chemical fertilizers and decline in soil health due to excessive dependence on chemical inputs left us with other option of utilizing biological inputs like organic manures. Organic manures have been sought to be one of the answers to restore the soil health apart from solving nutritional problem of plants. Keeping these points in mind, the present investigation was, therefore, undertaken to study the response of organic manures on growth, yield and quality of mango cv. Dashehari.

### MATERIALS AND METHODS

The experiment was conducted at Horticulture Research Centre, Patharchatta, G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand during the years 2007-08 and 2008-09. The experiment was conducted on 18 years old mango trees of cv. Dashehari consisting of thirteen treatments viz., T<sub>1</sub>-Control, T<sub>2</sub>-FYM 100 Kg/ tree, T<sub>3</sub>-FYM 125 Kg/ tree, T<sub>4</sub>-FYM 150 kg/tree, T<sub>5</sub>-Vermicompost 25 kg/tree, T<sub>6</sub>-Vermicompost 50 kg/tree, T<sub>7</sub>-Vermicompost 75 kg/tree, T<sub>8</sub>-Poultry manure 25 kg/tree, T<sub>9</sub>-Poultry manure 50 kg/tree, T<sub>10</sub>-Poultry manure 75 kg/tree, T<sub>11</sub>-Neem cake 10 Kg/tree, T<sub>12</sub>-Neem cake 20 Kg/tree and T<sub>13</sub>-Neem cake 30 kg/tree in 'Randomized Block Design' with three replications. The total number of trees included in the experiment was 39. All the selected trees were almost uniform in growth and vigour. The trees were given uniform cultural operations during the course of investigation. All treatments were applied on 15 December 2007 and 2008. Full dose of farm yard manure, vermicompost, poultry manure and neem cake were applied as basal. No manure was applied to the control. Observations on tree height, tree girth, tree volume and shoot length of each plant were recorded during winter month

(Dormancy period). Flowering and fruit set (Reproductive characters) were recorded in terms of panicle length, number of flower per panicle and number of fruits per panicle at marvel stage in March-April and yield parameters were recorded at the time of harvest.

## RESULTS AND DISCUSSION

### Growth

It is evident from the Table 1 that the different treatments showed significant response on growth characters during both the years. Data showed that maximum tree height was observed with the application of poultry manure 25 kg per tree which was closely followed by application of FYM 150 kg per tree during both the years which is similar to the findings of Hemang *et al.* (2) who reported that the application of poultry manure 15 kg per plant attained maximum plant height in banana. Maximum tree girth was recorded with application of neem cake 30 kg per tree which was significant over T<sub>1</sub>, T<sub>5</sub>, T<sub>6</sub>, T<sub>11</sub> and T<sub>12</sub> treatments followed by vermicompost 75 kg per tree in the year 2007-08. In

2008-09, trees attained maximum tree girth with vermicompost 75 kg per tree.

Observations revealed (Table 1) that calculated tree volume was minimum with application of vermicompost 50 kg per tree in 2007-08, while in 2008-09, it was minimum in control trees. The maximum tree volume in 2007-08 was calculated with application of poultry manure 25 kg per tree confirming to reports of Yadav *et al.* (8), and in 2008-09 calculated tree volume was maximum with the application of vermicompost 75 kg per tree. Maximum shoot length was observed with application of vermicompost 75 kg per tree followed by neem cake 30 kg per tree and minimum shoot length was recorded in control during both the years. Application of organic manures have been reported to facilitate the wider absorption of macro and micro nutrients which helps in better growth and development of plants (Kononova, 3). Better growth in the plants treated with organic manures may be because of more IAA biosynthesis in the plants. This is also in agreement with the finding of Li *et al.* (4) who reported that organic manures increased IAA and cytokinins in the soil.

**Table 1: Response of organic manures on growth characters of mango cv. Dashehari**

Treatment	Tree height (m)		Tree girth (cm)		Tree volume (m <sup>3</sup> )		Shoot length (cm)	
	2007	2008	2007	2008	2007	2008	2007	2008
T <sub>1</sub> -Control	6.50	6.67	77.00	81.33	130.37	141.43	10.80	10.73
T <sub>2</sub> -FYM 100 kg/ tree	6.33	6.70	79.33	85.67	132.17	149.25	11.90	11.93
T <sub>3</sub> -FYM 125 kg/ tree	6.12	6.45	80.33	87.33	140.00	156.69	12.85	12.78
T <sub>4</sub> -FYM 150 kg/ tree	6.47	6.73	78.67	85.67	151.22	166.41	13.00	13.10
T <sub>5</sub> -Vermicompost 25 kg/tree	6.07	6.44	67.67	75.67	129.77	147.22	13.45	13.53
T <sub>6</sub> -Vermicompost 50 kg/tree	5.88	6.20	69.00	77.00	125.35	143.51	13.72	13.90
T <sub>7</sub> -Vermicompost 75 kg/tree	6.17	6.45	88.33	98.33	159.05	184.23	14.70	14.80
T <sub>8</sub> - Poultry manure 25 kg/tree	6.77	6.98	82.00	87.67	166.30	178.65	12.80	12.95
T <sub>9</sub> -Poultry manure 50 kg/tree	6.00	6.28	78.00	83.67	136.20	150.76	13.55	13.43
T <sub>10</sub> -Poultry manure 75 kg/tree	6.28	6.58	79.00	85.00	157.29	171.95	13.77	13.60
T <sub>11</sub> -Neem cake 10 kg/tree	5.93	6.21	74.67	81.00	134.13	147.26	13.38	13.28
T <sub>12</sub> -Neem cake 20 kg/tree	6.27	6.55	74.67	80.00	150.62	166.16	13.93	14.10
T <sub>13</sub> -Neem cake 30 kg/tree	6.23	6.52	90.00	96.00	154.73	170.50	14.13	14.23
C.D. (P=0.05)	0.56	0.54	10.76	10.42	15.00	19.22	0.40	0.59

Table 2: Response of organic manures on yield characters of mango cv. Dashehari.

Treatment	Panicle length (cm)		Total number of flower per panicle		Initial fruit set (Pea stage)		Final fruit set (Harvest stage)		Number of fruit/tree		Fruit Yield (kg/tree)	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
T <sub>1</sub> -Control	18.17	19.50	1796.67	1830.00	5.05	4.91	0.10	0.09	475.00	133.33	68.08	20.10
T <sub>2</sub> -FYM 100 kg/tree	25.50	24.50	1833.33	1806.67	5.86	5.83	0.15	0.16	596.67	256.67	90.93	38.60
T <sub>3</sub> -FYM 125 kg/tree	20.07	21.17	1840.00	1863.33	5.86	5.77	0.13	0.13	616.67	266.67	94.78	38.09
T <sub>4</sub> -FYM 150 kg/tree	22.87	23.20	1940.00	1933.33	6.03	5.91	0.13	0.14	645.00	250.00	98.84	36.28
T <sub>5</sub> -Vermicompost 25 kg/tree	24.07	24.53	1993.33	1910.00	6.70	6.53	0.19	0.20	700.00	296.33	107.43	42.33
T <sub>6</sub> -Vermicompost 50 kg/tree	25.10	24.50	1820.00	1816.67	7.11	7.07	0.21	0.23	750.00	308.33	115.63	44.05
T <sub>7</sub> -Vermicompost 75 kg/tree	24.90	26.00	1913.33	1853.33	7.22	7.28	0.21	0.24	840.00	366.67	127.43	52.37
T <sub>8</sub> -Poultry manure 25 kg/tree	23.47	23.17	2036.67	1938.33	6.23	6.12	0.14	0.11	700.00	285.00	106.13	40.71
T <sub>9</sub> -Poultry manure 50 kg/tree	19.07	19.50	1810.00	1820.00	6.04	6.32	0.10	0.14	673.33	285.00	103.13	40.71
T <sub>10</sub> -Poultry manure 75 kg/tree	24.33	25.30	1913.33	1910.00	6.14	6.19	0.12	0.13	713.33	297.33	108.17	42.47
T <sub>11</sub> -Neem cake 10 kg/tree	23.37	24.03	2040.00	1953.33	7.17	7.20	0.21	0.24	686.67	278.33	106.67	39.76
T <sub>12</sub> -Neem cake 20 kg/tree	23.07	25.00	1756.67	1853.33	7.02	7.04	0.21	0.20	726.67	289.33	110.61	42.18
T <sub>13</sub> -Neem cake 30 kg/tree	22.07	21.67	1973.33	1880.00	7.05	7.03	0.21	0.19	746.67	308.00	114.96	44.04
C.D. (P=0.05)	4.44	4.28	138.57	202.72	0.43	0.40	0.020	0.027	50.00	36.81	8.54	5.63

The treatments (Table 2) showed significant response on yield characters during both the years. Data revealed a significant impact of various treatments on panicle length. Data indicated that the application of FYM 100 kg per tree and vermicompost 75 kg per tree were best having maximum panicle length in both the years. While, control trees showed minimum panicle length in both the years. The maximum number of flowers per panicle was recorded with application of 10 kg neem cake per tree which was closely followed by 25 kg poultry manure per tree applied in the years 2007-08 and 2008-09.

All the treatments showed significant response over control on initial fruit set (Pea stage) and final fruit set (Harvest stage) per cent during both the years. The maximum initial fruit set (Pea stage) was recorded with application of 75 kg vermicompost per tree which was closely followed by 10 kg neem cake per tree in the years 2007-08 and 2008-09. The data indicated that higher fruit retention (Harvest stage) was recorded in the treatments T<sub>6</sub>, T<sub>7</sub>, T<sub>11</sub>, T<sub>12</sub> and T<sub>13</sub> in year 2007-08, while, in the year 2008-09, the higher fruit retention was recorded under the treatments T<sub>7</sub> and T<sub>11</sub>. However, minimum final fruit retention (Harvest stage) was observed in control treatment confirming to the results of Shirol *et al.* (6) in Sapota and Yadav *et al.* (8) in guava.

Data recorded on number of fruits and yield (kg) per tree (Table 2) showed that there was minimum number of fruits and yield (kg) per tree in control, while, maximum number of fruits per tree and yield (kg) per tree with application of 75 kg vermicompost per tree followed by 50 kg vermicompost per tree and 30 kg neem cake per tree during both the years. The increase in yield and yield contributing characters due to application of vermicompost and neem cake have been due to their contribution to more C/N ratio and greater presence of essential plant nutrients for physiological processes. This may lead to better metabolic activities in the plant which ultimately leads high protein and carbohydrates synthesis

(Singh *et al.*, 7). Increase in yield and other yield contributing characters apparently resulted from improved chemical and physical properties of the soil that were induced by organic manure application (Mahendra *et al.*, 5).

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