

Original Research Article

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## Effect of Organic Manure and Bio-Fertilizers on Growth and Yield Parameters of Strawberry (*Fragaria x ananassa* Duch.) cv. Chandler

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### ABSTRACT

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A field experiment was conducted during 2017 at Horticulture Research Farm-1, BBAU, Lucknow. Studies on the Effect of organic manure and bio-fertilizers on growth and yield parameters of strawberry (*Fragaria x ananassa* Duch.) cv. Chandler, revealed that plant height, number of leaves, length of leaf with petiole, length of leaf, length of petiole, width of leaf, total number of fruits, length of fruit, width of fruit, weight per fruit, weight of fruit per plant, weight fruit per plot were maximized when foliar spray was done with R.D.F (100%), P.S.B (100%), Vermicompost (100%) and Azotobacter (100%) respectively.

### Introduction

Strawberry (*Fragaria x ananassa* Duch.) originated from the hybridization between two American species (*Fragaria chilionensis* Duch. X *Fragaria virginiana* Duch.) France in the 17th century. At least sixteen wild species strawberry are believed to occur all over the world but in India only four species of *Fragaria* have been reported viz., *F. Chiloensis*, *F. Daltoniana*, *F. Nilgerrernsis* and, *F. Vesca* (Anon,1956). It belongs to family Rosaceae and is octaploid in nature

having 56 somatic chromosome numbers. It is herbaceous crop with prostrate growth habit, which behaves as an annual in subtropical region and perennial in temperate region. Strawberry is one of the most important temperate berry fruit, which can also be cultivated in sub-tropical and tropical region (Sharma and Badiyala, 1980). It can be grown up to 3000 meters, above mean sea level in humid and dry regions. They are bright green above, more pale and hairy below which produced long rooting stolons, where new plants may grow. Fruits of strawberry are

known as achenes, on the surface of fruit small numerous achenes are present. Achenes are monocarpellate (formed from one carpel) and indehiscent (they do not open at maturity) that contain a single seed that nearly fills the pericarp but does not adhere to it, which helps in growth and development of strawberry fruit. All the cultivated varieties of strawberry are octaploid ( $2n = 8x = 56$ ) in nature. According to Aykroyd *et al.*, (1996) fruits possess 96% edible portion having 87.8% moisture, 0.7% protein, 0.2% fat, 1.1% fiber, 9.8% other carbohydrates, 0.4% minerals and give 44 calories from 100g, edible portion. They also reported that fruits are rich source of vitamins as its 100g edible portion gives 30 IU Vitamin A, 0.03 mg Thiamine, 0.01 mg, Riboflavin, 0.2 mg Nicotinic acid and 52 mg Ascorbic acid. The most important aroma compounds are ethyl hexanoate, methyl hexanoate, ethylheptanoate, ethyl propionate, ethyl butanoate, methyl butanoate and linalool. However, concentration of these compounds varies among cultivars. The ripe fruits of strawberry contain slightly more lipids than unripe ones, with higher quantity of oleic acid and lesser of linoleic acid. Essential oil can also be extracted from strawberry leaves. The major constituents of strawberry oil are linalool and non anal. The ripe strawberries attain red colour on maturity and have soft melting pulp of a characteristic flavour, the red colour of the fruit is mainly due to the presence of an anthocyanin, pelargonidin 3-monoglucoside and traces of cyanidin. Strawberry plant is a surface feeder therefore fertility, moisture, drainage and microbial status of the upper layer of soil have great impact on growth, development, fruit yield, quality and production of runners. The application of synthetic fertilizers has improved yield per unit area manifold but these fertilizers are expensive and hamper the ecological balance of the soil. The balanced application of organic manure, biofertilizers

incorporated with inorganic fertilizers to get higher production. Apart from this excessive and unbalanced use of synthetic fertilizers leads to degradation of physiochemical properties and microbial status of soil. Therefore, an alternate source of nutrition is needed to sustain productivity of land.

## Materials and Methods

Strawberry (*Fragaria x ananassa* Duch) cultivar Chandler planted at 30x30 cm a part growing in Horticulture Research Farm-1 of Babasaheb Bhimrao Ambedkar University Lucknow- 226025 were taken for the investigation. T<sub>2</sub> R.D.F., T<sub>3</sub> Vermi-compost, T<sub>4</sub> Azotobacter T<sub>5</sub>P.S.B, T<sub>6</sub> R.D.F + Vermi-compost, T<sub>7</sub> R.D.F + Azotobacter, T<sub>8</sub> R.D.F. + P.S.B. T<sub>9</sub> Vermicompost + Azotobacter and T<sub>10</sub> Vermicompost + P.S.B. along with T<sub>1</sub> water spray during 2017. The experiment was laid out in R.B.D. with three replications. Observations recorded to be Plant height (cm), Number of leaves, Length of leaf with petiole (cm), Length of leaf (cm), Length of petiole (cm), Width of leaf (cm), Total no. of fruits, Length of fruit (cm), Width of fruit, weight/ fruit (g), weight of fruit/plant(g), weight fruit/plot (kg). The data so obtained were analysed statically.

## Results and Discussion

Organic manure and bio-fertilizer results the pronounced effect on quality parameters of strawberry. On the basis of present investigation, it is reported that the plant height, number of leaves, length of leaf with petiole, length of leaf, length of petiole, width of leaf, total no. of fruits, length of fruit, width of fruit, weight per fruit, weight of fruit per plant, weight fruit per plot were increase significantly with the use of organic manure and bio-fertilizer at various treatment combinations (Table 1).

**Table.1** Effect of organic manure and bio-fertilizers on growth and yield parameters of strawberry (*Fragaria x ananassa* Duch.) cv. Chandler

Length of leaf (cm)		Length of petiole (cm)			Width of leaf (cm)			Total no. of	Length of fruit	Width of fruit	weight/ fruit (g)	weight of fruit/plant(g)
30 DAS	60 DAS	30 DAS	60 DAS	90 DAS	30 DAS	60 DAS	90 DAS					
3.26	5.30	6.76	26.00	18.43	2.80	5.20	8.73	7.66	3.30	2.26	10.33	81.80
5.66	9.16	9.13	15.60	23.63	5.33	8.36	14.03	12.66	6.80	4.63	16.26	200.60
4.76	7.60	8.36	14.16	22.60	5.16	6.63	12.30	9.66	4.86	3.33	14.83	160.66
5.36	9.00	9.03	14.83	23.26	5.23	7.43	12.66	10.33	5.33	3.86	15.63	195.20
4.46	6.03	7.50	13.40	21.30	4.16	5.86	11.50	8.00	4.33	2.96	14.10	123.46
4.73	7.30	7.76	13.96	22.50	5.10	6.53	12.20	8.10	4.40	3.06	14.60	150.03
4.86	8.30	8.40	14.53	22.86	5.20	7.36	12.60	12.33	6.20	4.33	15.20	183.43
4.46	5.90	7.00	13.03	20.70	3.33	5.80	10.70	12.31	5.93	4.20	14.06	115.33
4.63	6.43	7.63	13.73	21.46	4.76	6.30	11.60	11.66	5.70	4.00	14.36	132.16
3.56	5.46	6.96	12.40	18.66	3.20	5.73	10.06	9.33	4.80	3.30	13.36	109.10
<b>0.450</b>	<b>0.473</b>	<b>0.499</b>	<b>0.628</b>	<b>50567</b>	<b>0.500</b>	<b>0.565</b>	<b>0.774</b>	<b>0.977</b>	<b>0.513</b>	<b>0.460</b>	<b>1.005</b>	<b>18.915</b>
<b>1.346</b>	<b>1.417</b>	<b>1.495</b>	<b>1.881</b>	<b>1.698</b>	<b>1.497</b>	<b>1.692</b>	<b>2.318</b>	<b>2.925</b>	<b>1.537</b>	<b>1.376</b>	<b>3.008</b>	<b>56.635</b>

Treatments	Plant height (cm)			Number of leaves			Length of leaf with petiole (cm)	
	30 DAS	60 DAS	90 DAS	30 DAS	60 DAS	90 DAS	60 DAS	90 DAS
T <sub>1</sub> control	3.53	8.33	13.66	2.33	10.33	14.66	12.86	21.10
T <sub>2</sub> R.D. F	5.40	9.46	15.80	4.33	12.66	17.66	16.23	25.60
T <sub>3</sub> Vermi-compost	4.73	9.26	15.30	3.66	11.33	15.66	15.20	24.63
T <sub>4</sub> Azotobacter	5.13	9.43	15.63	4.33	12.33	17.60	15.76	25.36
T <sub>5</sub> P.S. B	3.86	8.56	14.86	3.33	10.66	15.33	14.00	22.80
T <sub>6</sub> R.D.F + Vermicompost	4.20	8.90	15.23	3.66	11.33	15.33	15.16	23.93
T <sub>7</sub> R.D.F + Azotobacter	4.76	9.30	15.56	4.00	11.33	15.66	15.40	24.90
T <sub>8</sub> R.D.F. + P.S.B	3.83	8.56	15.46	2.66	10.33	15.33	13.73	22.23
T <sub>9</sub> Vermicompost+Azotobacter	3.96	8.80	15.20	3.33	10.66	15.33	14.70	23.56
T <sub>10</sub> Vermicompost +P.S.B.	3.63	8.33	14.20	2.33	10.33	14.66	1350	21.93
SEM. (±)	0.206	0.181	0.429	0.380	0.447	0.548	0.599	0.586
C.D. (P=0.05)	0.617	0.542	1.284	1.138	1.339	1.640	1.792	1.756

The plant height, number of leaves, length of leaf with petiole, length of leaf, length of petiole, width of leaf, total no. of fruits, length of fruit, width of fruit, weight per fruit, weight of fruit per plant, weight fruit per plot were obtained in T<sub>2</sub> application of (R.D.F.).and It is

increased significantly with the use of organic manure and Vermi-compost during the course investigation get the support of Ingle *et al.*, (2008) in okra, Poniker *et al.*,(2006), Nowsheen *et al.*, (2006) and Tripathi *et al.*, (2010) in strawberry.

In conclusion, from the investigation with Azotobacter, Vermicompost, PSB and Recommended Dose of Fertilizers (RDF) on strawberry cv. Chandler it can be safely concluded that T<sub>2</sub> (R.D.F.) (100%) significantly increase the plant height, number of leaves, length of leaf with petiole, length of leaf, length of petiole, width of leaf, total number of fruits, length of fruit, width of fruit, weight per fruit, weight of fruit per plant, weight fruit per plot. On the basis of above findings, it may be concluded that for getting substantial higher yield of quality berries with more propagating materials, the plants of strawberry should be treated with organic manure and bio-fertilizers in the plains of Uttar Pradesh, India.

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