Original Research Article

"Effect of organic manure on growth, yield and quality of strawberry(*Fragaria* ×*ananassa*Duch.) under agro-climatic condition in shade net house."

Comment [HT1]: Classify the agro-climatic condition

ABSTRACT

The present study entitled **"Effect of organic manure on growth, yield and quality of strawberry(*Fragaria* × *ananassa*Duch.) under prayagrajagro-climatic condition in shade net house"** was carried out at the experiment field of the department of horticulture, Allahabad school of agriculture, SHUATS, Prayagraj during the year 2023-2024. Organic manures treatments include **T_0** Control **T_1** FYM (12t/ha.) **T_2** Poultry Manure (8t/ha.) **T_3** Vermicompost (10t/ha.) **T_4** Cocopeat (1t/ha.) **T_5** 50% FYM +50% Poultry Manure (6t/ha+4t/ha) **T_6** 50% FYM + 50% Vermicompost (6t/ha + 5t/ha.) **T_7** 50% Poultry Manure + Vermico——mpost (4t/ha+5t/ha) **T_8** 25% FYM+ 25% Poultry Manure + 25% Cocopeat+ 25% Vermicompost (3t/ha. + 2t/ha. + 0.25t/ha+ 2.5t/ha.) The effect of Organic Manure on growth and yield of Strawberry recorded maximum plant height, plant spread and number of leaves in T_8 18.89 DAT, 23.78 DAT, 18.12 DAT respectively. Floral characters significantly took minimum days.The maximum fruit weight 25.31gram were recorded in T_8 with highest yield 331.32 g/plant. Quality parameters includes maximum T.S.S (8.16) ^{0}Brix along with minimum acidity percentage (0.55%). On the basis of our experimental findings it ~~is~~ was concluded that the treatment T8: 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermicompost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.) was found to be best in the terms of vegetative parameters, phenological parameters, flowering and fruiting parameters, yield and quality parameters. The benefit cost ratio was highest in the same treatment with (**3.50**).

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Keywords: Strawberry, Winter Dawn, Organic Manure, Cocopeat, FYM, Vermicompost, Poultry Manure.

INTRODUCTION

Strawberry is one of the most delicious, attractive, nutritious and refreshing soft fruits of the world. The cultivated strawberry (*Fragaria x ananassa* Duch.) is a hybrid of two native American sp; *F. chiloensis* and *F. virginiana*. Strawberries are good source of natural anti-oxidant. Owing to its medicinal properties (anticarcinogenic, antidiabetic and antioxidant), strawberry is gaining popularity among all age group consumers. Strawberries are good source of natural anti-oxidant. In India, it is mainly grown in Maharashtra and in hills of Himachal Pradesh, J&K, Uttarakhand, Uttar Pradesh and Haryana.

There are various ways to enjoy fresh strawberries, which are delightful. With a deep aroma and a good amount of vitamin C, it creates delicious jam and ice cream. It is a delicate, highly perishable fruit that is frequently sent to Western nations frozen. Depending on the variety, fruits can be cylindrical on the ground, conical with a constricted base, or round and long. For every 100g of fresh fruit

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weight, the fruit has 89.9% moisture, 0.7g protein, 8.4g carbohydrate, 0.5g fat, and 59 mg of vitamin C. It is beneficial for persons with indigestion and biliousness. Strawberries are the most delicious and healthy soft fruit, and they grow well in a variety of climates.

Strawberry requires an optimum day temperature of 22^0C to 23^0C and night temperature 7^0C to 13^0C for maximum growth and development. Frost as well as winter injury seriously reduces yield of berries. Plant performs well in sandy loam soil with a pH range of 5.5 to 6.5. The fruit is rich in vitamins and minerals. The taste of fruit mainly depends on three different compounds viz. sugars, acids and aromatic compounds. The strawberry fruit contains 0.55% total sugar and 0.90% to 1.85% acidity the prominent being mallic and citric acid.

The main objective of the strawberry growers is to produce a fruit with appealing appearance (size, color and shape) not necessary accompanied by the same appealing tasteful characteristics.

Now-a-days, organic foodstuffs are being illustrious for all people around the world. Owing to the great local and global market demand of organic fruits, production of organic fruit has rapidly increased in the past one decade to prevent health issues resulting from pesticides and hazardous chemicals. Organic farming enhances soil organic carbon, soil moisture content; improve soil health, increasing productivity, microbial and earthworm population and enzymatic activity in the fruit plant.

Organic manures play direct role in plant growth as a source of all necessary macro and micronutrients in available forms during mineralization and improving physical and chemical properties of soils (Chaterjee*et al.*, 2005). Organically grown strawberry produce higher quality fruit with sweeter in taste, longer shelf life and better flavour **(Reganold*et al.*, 2010)**. The fruit quality and yield of fruits can be increased by using organic manures, which are helpful to reduce fruit drop and increase fruit yield, quality, shelf life and improve the physico-chemical properties of fruits and also increase the marketability as well as demand of fruits.

MATERIALS AND METHODS

The present investigation **"Effect of organic manure on growth, yield and quality of strawberry(*Fragaria* ×*ananassa*Duch.) under prayagraj agroclimatic condition in shade net house."**was laid out on the experimental site of Department of Horticulture, Sam Higginbottom University of Agriculture Technology & Sciences, Naini, Prayagraj. (UP) during 2023-2024. The experiment will be laid out in Randomized Block Design (RBD) with three replications. The treatments in each replication were allotted randomly. Eight treatments having one variety were tried in the experimental design. For research purpose, Organic manures treatments include $\mathbf{T_0}$ Control, $\mathbf{T_1}$ FYM (12t/ha.)$\mathbf{T_2}$ Poultry Manure (8t/ha.) $\mathbf{T_3}$ Vermicompost (10t/ha.) $\mathbf{T_4}$ Cocopeat (1t/ha.) $\mathbf{T_5}$ 50% FYM +50% Poultry Manure (6t/ha+4t/ha),$\mathbf{T_6}$50% FYM + 50% Vermi-compost (6t/ha + 5t/ha.) $\mathbf{T_7}$ 50% Poultry Manure + Vermi-compost (4t/ha+5t/ha) $\mathbf{T_8}$ 25% FYM+ 25% Poultry Manure + 25% Cocopeat+ 25% Vermi-compost (3t/ha. + 2t/ha. + 0.25t/ha+ 2.5t/ha.). The planting of runners was done at the experiment field of the department of horticulture, Allahabad school of agriculture, SHUATS, Prayagraj. The experimental site is situated at latitude of 20º and 15° north and longitude of

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60 °East and at an altitude of 98 meters above mean sea level.

RESULT AND DISCUSSION

PlantHeight (cm): The plant height under the effect of different combinations is shown in Table.1.At 120 DAT, it was observed that T_8 - 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermi-compost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.) 18.89cm.There was significant difference at 5% level with other treatments also. The minimum plant height was T_0 - control (15.45cm). Similar results have been reported by Arancon*et al.* (2004).

Plant spread (cm): The plant spread under the effect of different combinations is shown in Table.1.At 120 DAT, it was observed that T_8 - 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermicompost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.) (23.78cm) followed by T_7-50% Poultry Manure + Vermicompost (4t/ha + 5t/ha.) with (23.66cm). The minimum plant spread was T_0 control (19.11cm). Similar results have been reported by Umar *et al.*(2010). Herencia*et al.* (2011) reported that composts contained nitrogen and phosphorus which enhanced vegetative growth and flower bud initiation.

Number of leaves: The observations of number of leaves plant on strawberry were statistically analyzed and have been presented in table.1. At 120 DAT, it was observed that T_8- 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermicompost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.) gave highest number of leaves 18.12. The minimum number of leaves was T_0 control 13.12. The results are supported by Akath and Singh (2009).

Daystofirst flowering: Data on the mean days to produce first flower transplanting as influenced by different level of organic manure are inscribed in table.1. Comparing the different level of organic manure, data revealed that T_8- 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermi-compost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.) took significantly minimum days 45.87 after transplanting followed by 46.83 with T_6- 50% FYM + 50% Vermi-compost (25t/ha + 5t/ha.)There was a significant difference between all the treatments. Maximum number of days to produced first flower 50.02 days was taken by T_0 control. Similar result found by Nawalkar *et al.* (2007).

Number of flowers per plant: The observations of number of flowers per plant on strawberry were statistically analyzed and have been presented in table.1. The highest number of flowers per plant was recorded in the treatment T_8- 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermi-compost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.) 16.59 followed by T_7 -50% Poultry Manure + Vermicompost (4t/ha + 5t/ha.) with 14.32 and the minimum number of flowers 8.89 was recorded with T_0 control. Singh *et al.* (2008) found significant increase in fruit yield and flowering of strawberry with vermi-compost based fertilizer.

No. of fruits per plant: The perusal of data clearly shows that maximum fruits per plant is 14.11 was noticed in T_8- 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermicompost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.), followed by 11.20 in T_7 -50% Poultry Manure + Vermicompost (4t/ha + 5t/ha.) The minimum fruits ~~is~~ was 5.63 was noticed with T_0 control. The similar findings were also reported by Rana (2001).

Weight of fruit (g): The observations for weight of fruits were keenly analyzed and framed in the

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table.1.The perusal of data clearly shows that maximum weight of fruit 25.31g was noticed in T_8- 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermi-compost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.), followed by 25.28g in T_7 -50% Poultry Manure + Vermi-compost (4t/ha + 5t/ha.) The minimum weight 15.21g was noticed with T_0 control. The similar findings were also reported by Rana (2001).

Fruit Diameter (cm): The perusal of data clearly shows that maximum diameter of fruit 3.56cm was noticed in T_8- 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermi-compost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.), followed by 3.29cm in T_7 -50% Poultry Manure + Vermi-compost (4t/ha + 5t/ha.) The minimum diameter 1.98cm was noticed with T_0- control. The similar findings were also reported by Rana (2001).

Yield of fruits per plant (g): Data on the fruit yield per plant as influenced by different organic manure are presented in table.1. It is evident from the obtained data that maximum yield /plant 331.32g was recorded with T_8- 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermicompost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.) followed by 295.67 g/plant with T_7 -50% Poultry Manure + Vermicompost (4t/ha + 5t/ha.) The minimum yield per plot was noticed in T_0- control with 197.51g

Similar result was found by Pringle *et al.* (2002) and Schoppleinet *al.*(2002).

Total soluble solids (TSS): The observations on T.S.S (^{0}Brix) as influenced by different levels of organic manure are given in the table.1. data reveals that there exists a useful and meaningful impact on T.S.S. content of fruits by the different treatments supplied. The highest T.S.S. content 8.16 ^{0}Brix was noticed with T_8 -25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermi-compost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.)andthe minimum T.S.S. content 5.78^{0}Brix was recorded in T_0 (control). The similar findings were also reported by Sahoo and Singh (2005).

Acidity (%): Data collected after the analysis is given in the table.1.It is evident that fruit acidity was highly influenced by different treatments supplied. The maximum acidity 0.84 was observed with T_0 control followed by 0.73 with Poultry Manure (8t/ha.) The minimum acidity 0.55 was reported in T_8- 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermicompost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.). The results are supported by Shashi *et al.* (2008).

Ascorbic acid: For the covetous of studying the ascorbic acid content of fruits, the observations were keenly analyzed and framed in the table.1. The perusal of data clearly shows that maximum ascorbic acid 55.21 mg was noticed in T_8- 25% FYM + 25% Poultry Manure + 25% Cocopeat + 25% Vermi-compost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.). followed by 54.81 mg in T_5-50% FYM + 50% Poultry Manure (6t/ha + 4t/ha.).

During the study it was observed that ascorbic acid content of fruits was influenced by the different organic manure supplied. There was a significant

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Notion	PlantHeight (cm) at 120 days	Plant spread (cm) at 120 days	No.of leaves at 120 days	Daystofirst flowering	No. of flowers /plant	No.of fruits /plant	Weight of fruit (g)	Fruit Diameter (cm)	Fruits Yield /plant (g)	Total soluble solids (^{0}Brix)	Ascorbic acid (mg/100g)
T_0	15.45	19.11	13.12	50.02	8.89	5.63	15.21	1.98	197.51	5.78	50.87
T_1	16.30	20.98	14.46	48.57	11.45	8.14	19.38	2.73	219.65	6.45	51.62
T_2	16.31	21.14	15.24	49.40	13.27	10.48	24.13	2.42	245.50	6.38	52.17
T_3	17.88	21.23	16.90	48.83	13.04	10.80	21.82	3.01	253.09	7.15	51.75
T_4	16.42	20.13	14.18	49.28	9.36	7.19	17.81	2.29	200.12	5.80	51.25
T_5	17.64	21.08	16.26	47.71	11.24	9.01	23.01	3.14	312.55	7.27	54.81
T_6	17.49	23.49	16.82	46.83	12.85	10.71	24.49	2.60	282.43	7.02	53.20

Table:1 Effect of organic manure on vVegetative, fFloral and qQualitycharacters and yYieldattributes of sStrawberry cv. Winter Dawn.

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T_7	18.17	23.66	17.28	46.13	14.32	11.20	25.28	3.29	295.67	7.30	54.03
T_8	18.89	23.78	18.12	45.87	16.59	14.11	25.31	3.56	331.32	8.16	55.21
SEd(±)	1.15	3.25	0.92	1.04	0.62	1.40	1.53	0.46	0.89	1.55	1.26
$CD_{5\%}$	2.25	6.32	1.88	2.08	1.25	2.80	3.07	0.92	1.79	3.10	2.52
CV	4.42	12.65	3.62	4.16	2.56	5.60	5.98	1.67	3.56	6.02	4.35

difference among all the treatments. The minimum ascorbic acid content 50.87 was noticed with T0 control. The similar findings were also reported by Rana (2001).

CONCLUSION

On the basis of our experimental findings, it ~~is~~ was concluded that the treatment T8: 25% FYM + 25% Poultry Manure + 25%Cocopeat + 25% Vermi-compost (3t/ha. + 2t/ha. + 0.25t/ha. + 2.5t/ha.) was found to be best in the terms of vegetative parameters, phenological parameters, flowering and fruiting parameters, yield and quality parameters.

The benefit-cost ratio was highest in the same treatment with (3.50).

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