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Effect of FYM and Vermicompost on Growth and Yield of okra *(Abelmoschus esculentus* L.*)"* in sandy loam of Sri Ganganagar district in Rajasthan

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Abstract
The study entitled "Effect of FYM and Vermicompost on Growth and Yield of Okra (Abelmoschus esculentus L.)" was conducted during the Kharif season of 2024 at the Department of Horticulture, Tantia University, Sri Ganganagar (Rajasthan). The experiment was designed in Randomized Block Design with seven treatments and three replications. The treatments comprised various combinations of FYM and Vermicompost. The results revealed that the treatment T_3 (FYM 5 t/ha + Vermicompost 5 t/ha) recorded significantly higher growth parameters including plant height (66.45 cm), number of nodes (12.33), number of leaves (20.11), and number of branches (11.78). Similarly, yield attributes such as number of fruits per plant (21.42), average fruit weight (15.49 g), yield per plant (331.79 g), and fruit yield (74.42 q/ha) were highest in T_3. Thus, combined application of FYM and Vermicompost can be recommended for obtaining higher yield and better growth of okra.

Keywords: Okra, FYM, Vermicompost, Growth, Yield, Organic Manure

Introduction

Okra (Abelmoschus esculentus L. Moench) belongs to the family of Malvaceae being economically important vegetable crop grown in subtropical and tropical parts of the world. It is generally an annual plant. It is also known as lady's finger or bhindi originate in tropical Africa. Okra is one of the most popular vegetable in all sections of people. Okra is cultivated for its fibrous fruits or pods containing round and circular seeds. Okra is a good source of vitamins, minerals calories and amino acids found in seeds. It is a multipurpose crop due to its various uses of the fresh leaves, buds, flowers, pods, stems and seeds.

India is the largest producer of okra in the world. The major okra growing states are Uttar Pradesh, Odisha, Bihar, Andhra Pradesh and West Bengal. According to National Horticulture Board's Statistical Report 2021-2022 (First Advance Estimate), the area of okra cultivation is 523 thousand ha and has a production of 6416 thousand MT across India. Okra is a good source of vitamins, calcium, potassium and other minerals. Due to its high iodine content, consumption of okra is good for the control of goiter.

Farm yard Manure (FYM) is a decomposed mixture of cattle dung and urine with straw and litter used as bedding material and residues from the fodder fed to the cattle. FYM contains about 0.5 % nitrogen (N), 0.25 % phosphorus (P), 0.5 % potassium (K). Application of well-rotten FYM improves the soil structure. It increases the soil fertility and adds humus to the soil. It also improves the soil productivity.

Vermicomposting is a process of recycling of organic wastes in an environmentally safe method with the help of earthworms. The worm casts apart from increasing the density of microbes also provide the required nutrients of plants. It contains plant growth promoting substances such as NAA, cytokinins, gibberellins, etc. It helps in lowering C-N ratio, increasing humic acid content, action exchange capacity and water-soluble carbohydrates. Average vermicompost contains 0.9 to 1.5 percent N, 0.3 to 0.64 percent P2O5 and 0.54 to 1.72 percent K2O, 2.00 to 37.7 ppm Cu, 5.7 to 120 ppm Zn and 10.0 to 161.0 ppm Fe. Vermicompost is a by -product of non -thermophillic biodegradation of organic materials through correlation between earthworms and microorganism (Sallaku *et al*., 2009) [10].

Materials and Methods: This chapter comprises the details about the material used and the methods adopted during the course of present investigation entitled “Effect of FYM and Vermicompost on Growth and Yield of okra *(Abelmoschus esculentus* L.*)”* conducted in kharif season during the year 2023-24 at the experimental field of Department of Horticulture, Faculty of Agriculture, Tantia University, Sri Ganganagar, 335002, Rajasthan. The details of the experiment performed, techniques employed and materials used for studies have been described below:

Experimental Site: Department of Horticulture, Faculty of Agriculture, Tantia University, Sri Ganganagar, 335002, Rajasthan, which is situated at 24°34' N latitude and 73°40' E longitudes at an elevation of 583.5 meters above mean sea level. The field topography of the experimental site was fairly leveled with an adequate surface drainage and the field soil was having clay loam texture.

Treatments

Treatments	Treatments Detail
T_1	FYM 2.25 kg/plot
T_2	FYM 4.5 kg/plot
T_3	FYM 4.5 kg/plot + Vermicompost 4.5 kg/plot
T_4	FYM 2.25 kg/plot + Vermicompost 2.25 kg/plot
T_5	Vermicompost 2.25 kg/plot
T_6	Vermicompost 4.5 kg/plot
T_7	Control

Observation recorded

Growth parameter

1. Plant height (cm)
2. Number of Nods
3. Number of leaves
4. Number of branches

Yield Parameter

5. Number of fruits
6. Average fresh weight of fruit (gm)
7. Yield per plant (kg)
8. Fruit yield (q/ha.)

Result and Discussion

The results of the field experiment carried out on “Effect of FYM and Vermicompost on Growth and Yield of Okra (*Abelmoschus esculentus* L.)” in 2024-25 at the experimental field of the present experiment was conducted at Department of Horticulture, Faculty of Agriculture, Tantia University, Sri Ganganagar, District Sri Ganganagar, 335002, Rajasthan are presented in this chapter. The data pertaining to the effect of different treatments on growth, flowering, yield parameters were statistically analysis for test of significance of the results. In addition to tabular presentation, data also depicted through graphs for better understanding wherever necessary. The analysis of variance for different characters is given in the appendices.

Table 1: Effect of FYM and Vermicompost on plant height/ number of nods

Treatments	Plant height (cm)			No. of nods		
	30 DAS	45 DAS	60 DAS	30 DAS	45 DAS	60 DAS
T_1 - FYM 2.5 t/ha	13.77	34.11	57.49	3.39	5.68	10.23
T_2 - FYM 5 t/ha	13.88	36.55	59.52	3.41	5.77	10.32
T_3 - FYM 5 t/ha + Vermicompost 5 t/ha	16.33	41.49	66.45	4.52	6.48	12.33
T_4 - FYM 2.5 t/ha + Vermicompost 2.5 t/ha	15.49	40.32	64.32	4.50	6.42	11.49
T_5 - Vermicompost 2.5 t/ha	14.79	37.52	61.49	3.48	5.98	11.21
T_6 - Vermicompost 5 t/ha	15.33	39.38	63.12	3.49	6.33	11.38
T_7 - Control	10.12	27.56	49.32	2.96	4.77	8.89
S.Em. ±	0.09	0.33	0.61	0.04	0.03	0.17
CD (P=0.05)	0.29	1.04	1.88	0.13	0.09	0.53

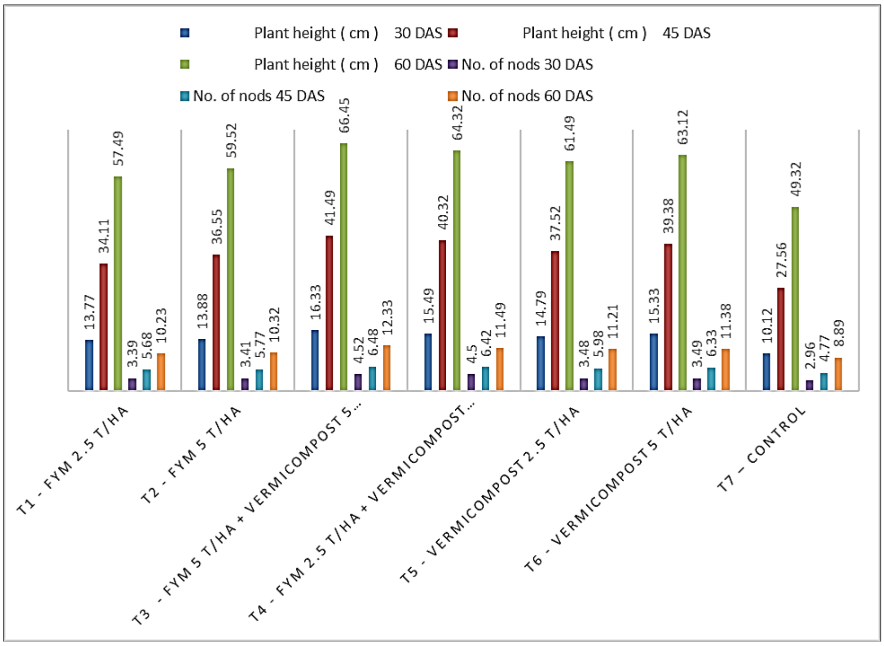

Fig 1: Effect of FYM and Vermicompost on plant height / no. of nods

Table 2: Effect of FYM and Vermicompost on Number of leaves / number of branches

Treatments	Number of leaves per plant			Number of branches		
	30 DAS	45 DAS	60 DAS	30 DAS	45 DAS	60 DAS
T_1 - FYM 2.5 t/ha	7.75	10.49	14.17	2.20	6.28	10.16
T_2 - FYM 5 t/ha	7.78	11.36	15.49	2.40	6.33	10.22
T_3 - FYM 5 t/ha + Vermicompost 5 t/ha	8.10	13.32	20.11	2.70	6.48	11.78
T_4 - FYM 2.5 t/ha + Vermicompost 2.5 t/ha	8.07	13.17	19.98	2.60	6.46	11.56
T_5 - Vermicompost 2.5 t/ha	8.03	12.11	16.35	2.50	6.39	10.33
T_6 - Vermicompost 5 t/ha	8.05	12.49	17.56	2.50	6.43	10.49
T_7 - Control	5.98	8.11	13.48	2.00	6.26	8.49
S.Em. ±	0.06	0.17	0.21	0.03	0.06	0.11
CD (P=0.05)	0.21	0.53	0.66	0.11	0.20	0.35

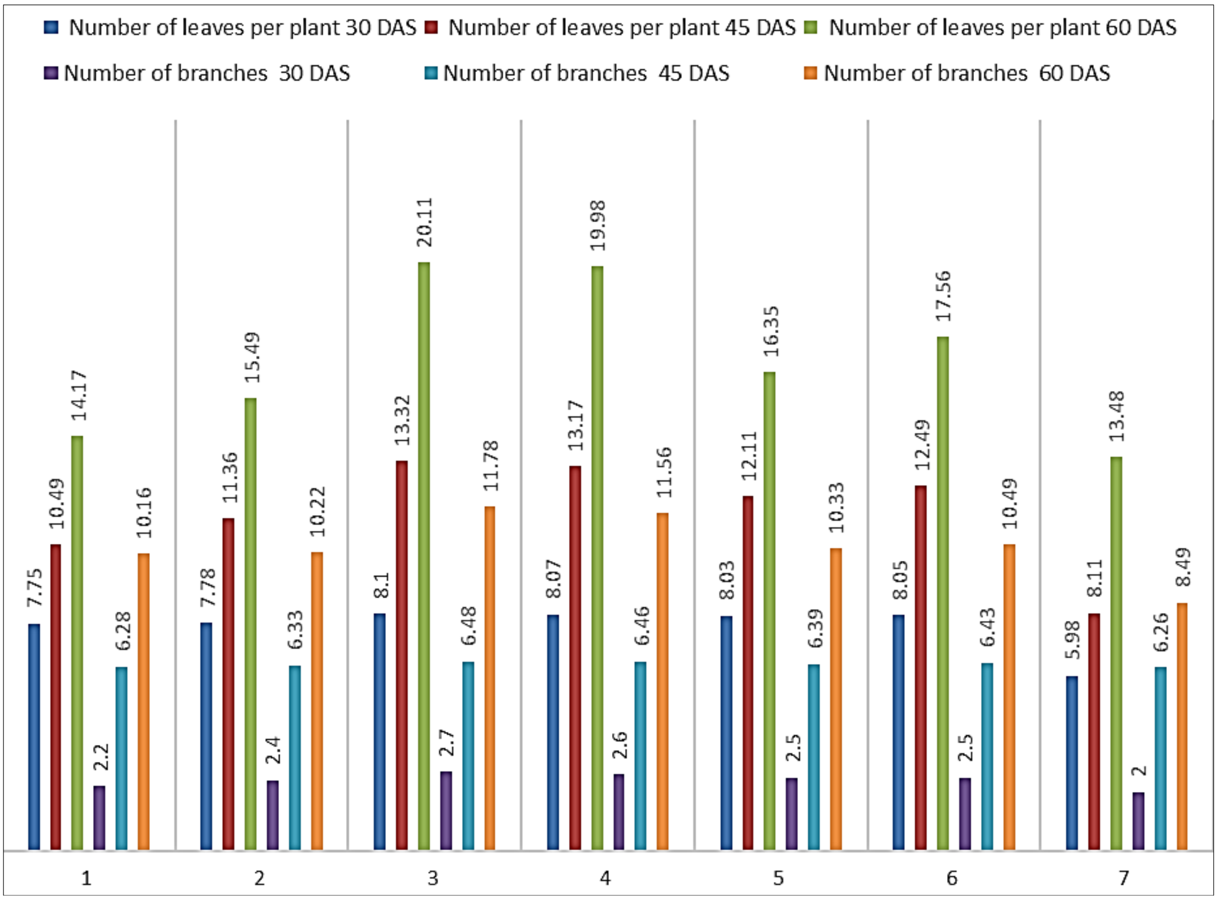

Fig 2: Effect of FYM and Vermicompost on no. of leaves per plant/ number of branches

Yield parameter

Table 3: Effect of FYM and Vermicompost on number of yield parameter

Treatments	Number of fruits per plant	Average Fresh weight of fruit (gm)	Yield per plant (gm)	Fruit yield (q/ha.)
T_1 - FYM 2.5 t/ha	19.98	13.59	271.52	61.22
T_2 - FYM 5 t/ha	20.11	13.77	276.91	63.33
T_3 - FYM 5 t/ha + Vermicompost 5 t/ha	21.42	15.49	331.79	74.42
T_4 - FYM 2.5 t/ha + Vermicompost 2.5 t/ha	20.49	14.33	293.62	71.42
T_5 - Vermicompost 2.5 t/ha	20.22	14.20	287.12	65.49
T_6 - Vermicompost 5 t/ha	20.33	14.28	290.31	68.42
T_7 - Control	15.49	9.45	146.38	53.49
S.Em. ±	0.38	0.13	2.21	0.68
CD (P=0.05)	1.17	0.40	6.82	2.10

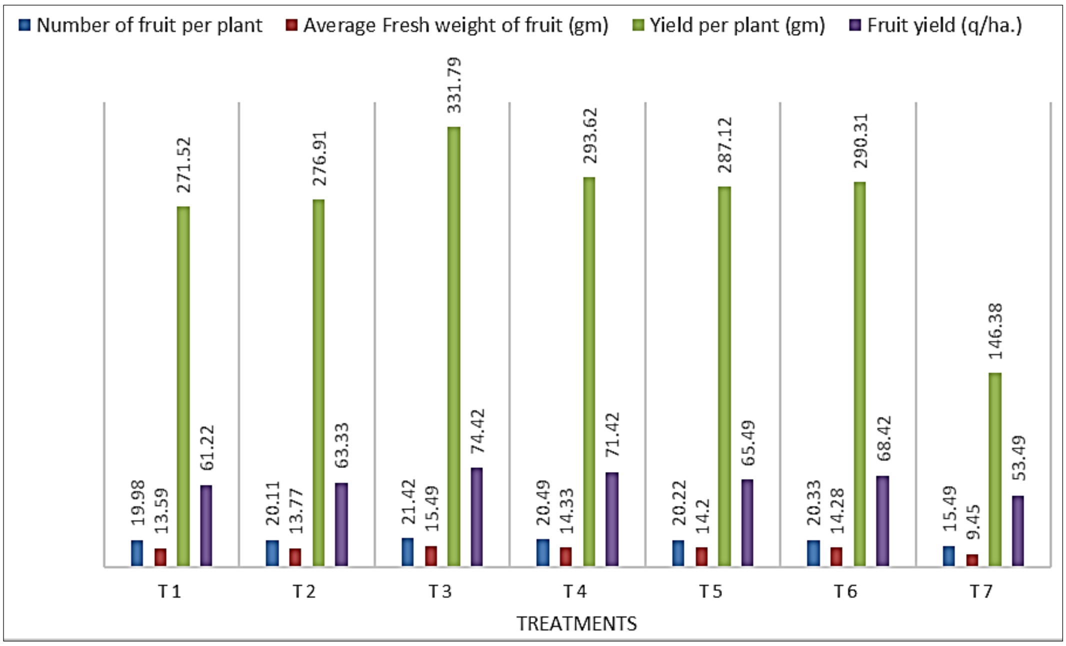

Fig 3: Effect of FYM and Vermicompost on number of yield parameter

Discussion

Among all treatments, T_3 (FYM 5 t/ha + Vermicompost 5 t/ha) recorded the maximum growth and yield parameters. This may be attributed to improved soil structure, nutrient supply, and microbial activity due to the combined effect of FYM and Vermicompost. The synergistic effect enhanced nutrient availability, resulting in better root growth and higher yield. Similar findings were reported by Sharma and Choudhary (2014) and Gupta *et al.* (2019), who observed that integrated organic nutrient management significantly enhanced yield attributes of okra.

Conclusion

On the basis of present investigation entitled "Effect of FYM and Vermicompost on Growth and Yield of Okra (*Abelmoschus esculentus* L. Moench). It can be concluded that treatment T_3 (FYM 5 t/ha + Vermicompost 5 t/ha) was found significantly superior in terms of growth and yield attributes of okra crop among organic manures.

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