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EFFECT OF ORGANIC AND INORGANIC FERTILIZER ON GROWTH AND SEED YIELD OF OKRA [*ABELMOSCHUSE SCULENTUS* (L.) MOENCH]

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ABSTRACT

The six different organic and one inorganic treatments as check were evaluated for eleven characters in okra. Highly significant difference due to organic and inorganic fertilizers was observed for all the traits under the study. The treatment T_3 (Vermicompost 6t/ha) was better than the control for most of the characters like fruit girth (1.64cm), seed yield per plant (33.98g), seed yield per plot (758.75g), seed yield 11.43q/ha, germination % (73.71), seed vigour index –I (2461.75) and seed vigour index –II (17.10). The characters like number of fruits per plant (16.23) and fruit length (16.10cm) were found highest in the T_4 treatment.

KEY WORDS
Okra
FYM
Vermicompost
Poultry manure, Seed yield

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INTRODUCTION

Okra (*Abelmoschus esculentus* (L.) Moench) chromosome number (2n = 130) is one of the important vegetable crop grown for its tender green fruits throughout the India. It is native to Tropical Africa commonly known as bhindi or lady's finger in India. Okra contains protein, carbohydrates and vitamin C (Gopalan *et al.*, 2007) and plays a vital role in human diet (Kahlon *et al.,* 2007). Organic manures constitute a dependable source of macro and micro nutrients and are helpful in improving physical, chemical and biological health of soil, reduce nutrient losses, increases nutrient availability and uptake leading to sustainable production devoid of harmful residues, besides improving quality of vegetables. Organic manure can serve as alternative practice to mineral fertilizers (Naeem *et al.,* 2006) for improving soil structure (Dauda *et al.,* 2008) and microbial biomass (Suresh *et al.,* 2004). The continuous and indiscriminate use of inorganic fertilizers has resulted in decreased nutrient uptake, poor quality of vegetables and deterioration of soil health (Ganeshe *et al.,* 2000, Agrawal 2003).Keeping this in view, the present investigation was carried out to verify the effect of organic and inorganic fertilizer on seed production of Okra.

MATERIALS AND METHODS

The present investigation on "Effect of organic and inorganic fertilizer on growth and seed yield of Okra (*Abelmoschus esculentus* (L) Moench) was carried in the Horticulture Complex Maharajpur, Department of Horticulture, Jawaharlal Nehru Krishi Vishwa Vidayalay, Jabalpur during the kharif season 2014. The experiment was laid out in randomized complete block design with four replication and seven treatments. Nitrogen applied in three equal split doses starting after 30 days of sowing of okra later on at interval of 30 days. Phosphorus and potash was applied at the time of sowing as par treatment T_7 (inorganic fertilizer). The calculated quantity of FYM, Vermicompost and Poultry manure was applied at the time of sowing. Observation on different growth, flowering and seed yield were recorded on 5 randomly selected plants from each treatment and replication.

The data were collected for average plant height (cm), first flowering node, number of fruits per plant, fruit length (cm), fruit girth (cm), seed yield per plant (g), seed yield per plot (g), seed yield q/ha, germination %, seed vigour index –I and seed vigour index –II.The first and foremost step is to carry out analysis of variance as recommended by Panse and Sukhatme (1985) and to test the significance of differences among the populations.Standard error, critical difference for each character was worked out to compare the means of two treatments at 5% level of significance.

RESULTS AND DISCUSSION

The analyzed data revealed that there were significant differences between the treatments. The maximum (94.07cm) plant height was recorded in the treatment T_5(FYM 12.5 + VC 3.0 t/ha) followed by T_1 (92.85cm) and T_4 (89.07cm) as compare to other treatments. Among all the treatments, the minimum plant height 79.86cm was recorded in the treatment T_6 (PM 3.5 + VC 3.0 t/ha).

The significantly minimum nodes for first flowering was recorded in the T_7 (4.43) followed by T_2 (4.48) and T_4 (4.58).

The data showed significant result in case of number of fruits per plant. Number of fruits per plant was maximum in the T_4 (16.25) followed by T_2 (14.28), T_3 (13.50) and T_6 (13.49), which were at par with each other. The minimum number of fruits per plant was recorded in T_7 (12.0). All organic manure doses produced significantly higher number of fruits per plant as compared to control. Similar results were reported by Singh and Jain (2002).

The maximum fruit length 16.10 cm was observed in T_4 (FYM 12.5 + PM 3.5 t/ha) followed by the T_3(vermicompost 6.0 t/ha) 15.44cm, T_1(FYM 25.0 t/ha)15.40cm and T_2 (poultry manure 7.0 t/ha) 14.98cm and which were at par with each other. Significant variation was recorded in fruit girth due to effect of organic manure. Significantly highest 1.64, 1.57 and 1.51cm fruit girth were recorded under the treatment T_3(vermicompost 6.0 t/ha),T_7 (control) and T_4 (FYM 12.5 + PM 3.5 t/ha), respectively and which were at par with each other.

The maximum seed yield per plant was recorded in treatment T_3(Vermicompost 6.0 t/ha) (33.98g) at par with T_2 (32.99g), T_6 (31.99g) and T_5 (30.88g)(Verma *et al.*, 2014). The lowest value was noticed in the treatment T_1 (24.89g). Treatment T_3 was found good for seed yield per plot (758.75g) followed by T_2 (746.25g), T_6 (724.25g) and T_5 (710.00g). The minimum seed yield per plot was recorded in treatment T_1 (647.50g).

The data present in the table 2 reveal that all the treatment had significant difference in case of seed yield q/ha. The maximum 11.43, 11.22, 10.83 and 10.59q/ha seed yield was found in treatment T_3(Vermicompost 6.0 t/ha), T_2 (poultry manure 7.0 t/

Table 1: Treatments details
The following treatments were applied

S. No.	Treatments
T_1	Farm Yard Manure (FYM) 25.0 t/ha
T_2	Poultry manures 7.0 t/ha (PM)
T_3	Vermicompost 6.0 t/ha (VC)
T_4	FYM + PM 12.5+3.5 t/ha
T_5	FYM + VC 12.5 + 3.0 t/ha
T_6	P M + VC 3.5+ 3.0 t/ha
T_7	Control = Recommended NPK (150:110:80)

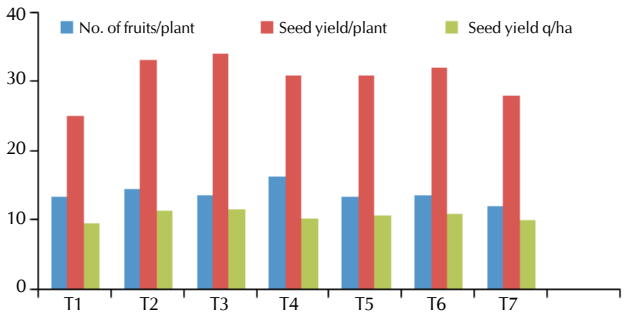

Figure 1: presentation of yield attributing characters

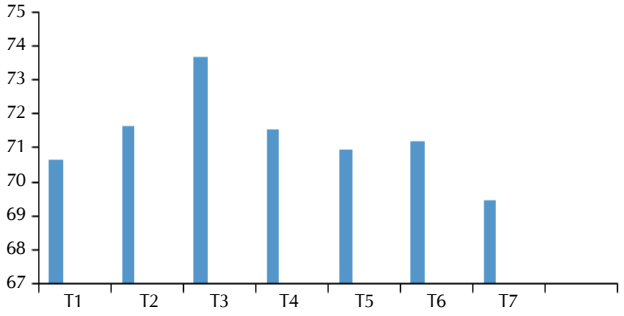

Figure 2: presentation of germination % of different treatments

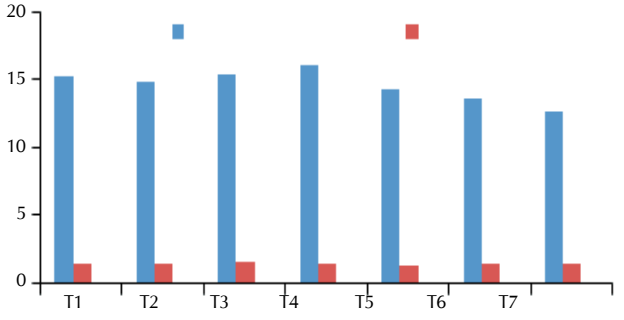

Figure 3: presentation of fruit length and fruit girth (cm)

Table 2: mean performance of the different organic and inorganic fertilizer in okra.

Treatments combination	Plant height (cm)	Node tofirst flowering	Number of fruits /plant	Fruit length (cm)	Fruit girth (cm)	Seed yield/ plant (g)	Seed yield/ plot (g)	Seed yield q/ha	Germination %	Seed vigour index -I	Seed vigour index -II
T1	92.85	5.13	13.25	15.40	1.45	24.89	647.50	9.50	70.66	2009.50	13.99
T2	81.54	4.48	14.28	14.98	1.47	32.99	746.25	11.22	71.65	2284.20	15.76
T3	80.24	4.60	13.50	15.44	1.64	33.98	758.75	11.43	73.71	2461.75	17.10
T4	89.07	4.58	16.25	16.10	1.51	30.70	693.75	10.05	71.57	2242.85	15.39
T5	94.07	4.88	13.25	14.38	1.41	30.88	710.00	10.59	70.97	2218.52	15.19
T6	79.86	4.80	13.49	13.72	1.44	31.99	724.25	10.83	71.22	2137.88	14.31
T7	85.22	4.43	12.00	12.77	1.57	27.78	651.75	9.79	69.50	1992.42	13.14
CD 5%	NS	0.24	1.97	1.72	0.55	1.43	15.60	0.29	0.78	24.84	0.16
S Em±	6.87	0.11	0.66	0.58	0.18	0.14	5.25	0.10	0.26	8.36	0.05

ha), T_6 (PM 3.5 + VC 3.0 t/ha) and T_5 (FYM 12.5 + VC 3.0 t/ha), respectively and which were at par with each other. The lowest seed yield 9.50q/ha was noticed in T_1 (FYM 25.0 t/ha) (Damse *et al*., 2014).

The maximum 73.71 % seed germination was recorded in T_3 (vermicompost 6.0 t/ha) followed by the T_2 (71.65%),T_4 (71.57%) and T_6 (71.22%) similar finding reported by Sharma and Gogai (2015), whereas, the lowest 69.50% germination was noticed in T_7 (control).The maximum seed vigour index-I was noticed in T_3 (vermicompost 6.0 t/ha) followed by T_2 (poultry manure 7.0 t/ha), whereas, the minimum seed vigour index I was observed in the T_7 (control). The same pattern follows in case of seed vigour index –II.

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