

Original Research Article

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Effect of Organic Manures on Growth and Yield of Okra (*Abelmoschus esculentus* L.)

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ABSTRACT

Keywords

Okra, Arka Anamika, Poultry Manure, Farmyard Manure, Neem Cake, Yield.

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The present investigation was carried out at the KVK Champhai demonstration farm to evaluate the effect of organic manures on the growth and yield performance of okra (*Abelmoschus esculentus* L). The treatments consisted of poultry manure at 5 t/ha, farmyard manure at 20 t/ha, neem cake at 2 t/ha, and control. All the organic manures were incorporated into the soil one week before sowing. The results revealed that application of organic manures significantly improved growth and yield attributes. Poultry manure recorded the highest plant height (31.7, 69.5, and 102.8 cm at 30, 60 days, and at harvest, respectively), number of fruits per plant (14.8), average fruit weight (15.3 g), and yield (10.1 t/ha), followed by FYM and neem cake, respectively, while control treatments showed the lowest yield and growth attributes. The results are in close conformity with the earlier reports by Darley *et al.*, (1988) and Kumaran *et al.*, (1998). The performance of poultry manure may be attributed to higher nutrient contents than other treatments. The same trend was observed by Amanullah *et al.*, (2010). The study can conclude that poultry manure is the most effective organic manure among all the treatments in respect of plant growth and yield attributes.

Introduction

Okra is one of the most popular vegetable crops grown in Champhai District throughout the year. Being a short-duration vegetable crop, its growth, yield, and quality are largely influenced by the application of fertilizers. However, fertilizers are becoming very costly, and farmers cannot afford to buy fertilizers. Moreover, the use of fertilizers causes the degradation of fertile land and leaves residues in food products. The use of organic manures alone is not sufficient enough to meet the nutritional requirements for increasing the productivity

and yield of okra; however, they play an important role by improving the soil's physical, chemical, and biological properties along with soil health and thus maintaining the quality of crop produce. Popularization of the application of organic manures like poultry manure, FYM, etc., which are locally available, not only to increase productivity but also to sustain the soil fertility, is important. Okra responds very well to organic manure application and is efficient in fertilizer use, which is the key to its higher growth and yield (Buob, 2008) Organic nutrient sources such as farmyard manure, neem cake, and poultry manure not only supply essential nutrients

but also improve soil health and microbial activity (Mahmoud *et al.*, 2014; Singh *et al.*, 2020). Additionally, farmers of Champhai district are not aware of high-yielding varieties of any crops. Most of the farmers are cultivating local varieties, which have less yield and less profit as compared to high-yielding varieties. Keeping in view the above points, KVK Champhai district took up the introduction of the high-yielding variety of okra, Arka Anamika, to find out the effect of organic manures on the growth and yield attributes of the okra variety Arka Anamika.

Materials and Methods

A field experiment was conducted at farmers' fields to evaluate the influence of different organic manures on the growth and yield of the okra variety Arka Anamika. The experimental site lies at 93°10'463" E longitude and 23°32'094" N latitude with an altitude of 1113 m above mean sea level. Treatments were FYM at 20 t/ha (T1), poultry manure at 5 t/ha (T2), neem cake at 2 t/ha (T3), and control (T5). Organic manures were applied and incorporated into the soil before one week of sowing. Spacing was maintained at 45 x 30 cm, and the seeds were sown directly in the field. Intercultural practices were followed during the crop growth. The growth and

yield attributes, such as plant height, average fruit weight (g), number of fruits/plants, and yield, were recorded.

Results and Discussion

Growth attributing traits

The growth-attributing traits, viz., plant height (cm), number of fruits per plant, and average fruit weight (g), were significantly affected due to the application of different organic manures. The highest growth was recorded with the application of poultry manure at 5 t/ha (31.7, 69.5, and 102.8 cm) at 30, 60, and at harvest. This may be due to the fact that of all the organic manures, poultry manure has the highest amount of N, P, and K reported by Kareem *et al.*, (2017). From their experiment, they reported that application of poultry manure enhanced plant height. FYM at 20 t/ha showed significant growth (29.3, 64.2, and 95.6 cm) at 30, 60, and at harvest and neem cake at 2 t/ha (28.5, 62.4, and 91.2 cm) at 30, 60, and at harvest. The minimum plant height was recorded under control treatment (24.6, 55.8, and 82.3 cm) at 30, 60, and at harvest. This may be due to insufficient availability of nutrients. The results found to be in close conformity with the research results of Darley *et al.*, (1988) and Kumaran *et al.*, (1998).

Table.1 Effect of organic manures on growth of okra (*Abelmoschus esculentus* L.)

Treatment	Plant Height at 30 DAS (cm)	Plant Height at 60 DAS (cm)	Plant Height at harvest (cm)
Control	24.6	55.8	82.3
FYM @ 20t/ha	29.3	64.2	95.6
Poultry manure @5t/ha	31.7	69.5	102.8
Neem cake @ 2t/ha	28.5	62.4	91.2

Table.2 Effect of organic manures on yield of okra (*Abelmoschus esculentus* L.)

Treatment	No of fruits per plant	Average fruit weight (g)	Fruit yield (t/ha)
Control	10.8	13.2	7.4
FYM @ 20t/ha	13.5	14.5	9.2
Poultry manure @5t/ha	14.8	15.3	10.1
Neem cake @ 2t/ha	12.6	14.1	8.7

Yield attributing traits

The increased in yield, number of fruits per plants and average fruit weight (g) under the application of organic nutrients such as poultry manure, FYM and neem cake

compared to the control. This may be attributed that organic nutrient improved nutrient availability, soil fertility and microbial activity due to addition of organic manures. Results revealed that applying organic nutrient sources increased the yield attributes (Table 2).

Application of poultry manure at 5 t/ha recorded the highest yield (10.1 t/ha), number of fruits per plant (14.8), and average fruit weight (15.3 g). Poultry manure contains all the major elements required by the plants. Similar findings reported by Amanullah *et al.*, (2010) stated that poultry manure significantly increased the yield and yield components of okra due to enhanced nutrient availability and improved soil fertility. FYM at 20 t/ha also showed significant increase in yield (9.2 t/ha), number of fruits per plant (13.5), and average fruit weight (14.5) while neem cake at 2 t/ha showed the lowest yield (8.7 t/ha), number of fruits per plant (12.6), and average fruit weight (14.1 g) among the organic manures, whereas the control treatment revealed the minimum yield compared to organic manures (7.4 t/ha), number of fruits per plant (10.8), and average fruit weight (13.2 g). This may be attributed to insufficient nutrient supply which leads to reduced vigorous growth and yield. The same trends were observed by Nwangburuka *et al.*, (2012).

In conclusion, the results conclude that all the organic manures greatly enhanced growth and yield attributes of okra. Moreover, the adoption of locally available organic manures not only improves crop productivity but also reduces the cost of cultivation of okra and maintains soil fertility.

Author Contributions

R. Vanlalduati: Investigation, formal analysis, writing—original draft. Malsawmkimi: Validation, methodology, writing—reviewing. Rambuatsaiha:—Formal analysis, writing—review and editing. Lalngaihawmi: Investigation, writing—reviewing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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