Effect Organic Manure On The Growth And Yield Of Okra

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Abstract: Field experiments to investigate the effect of different sources organic manure (cow, sheep, poultry and the combination of the treatments i.e SPC Manure) on growth and yield of okra were carried out. Treatments were laid out in a randomized complete block design (RBCD) with three replications. Data were collected on growth and yield parameters (plant height, number of leaf, stem girth, number of fruits and fruit weight). Results obtained indicated that growth and yield of okra were lowest in control treatments which showed that the organic manures used in the study especially poultry manure positively influenced the performance and yield of the okra. Poultry manure positively increased okra plant height by 30.40% and SPC manure increased number of fruit of okra by 9.00% compared to control treatments. Fresh fruit weight was significantly increased by 125.66% with poultry manure compared to control treatments. Based on the findings on the experiments it could be deduced that poultry manure seems to promote higher growth and yield of okra. Thus it is recommended for farmers.

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INTRODUCTION

Vegetable cultivation is one of the major enterprises in horticulture which is becoming more popular due to the greater appreciation of their food values (Gardner, 2004), Vitamins and minerals (Adeboye 1996). Vegetables contribute an important part of the diet to many people in the tropics more especially in the South East, Nigeria. Okra is essentially a tropical crop and among the most commonly grown vegetable throughout Nigeria. It is cultivated for its fresh fruits in both tropical and sub-tropical countries (Philsips, 1997). The stem yield is useful as fiber. While the leaves are considered good cattle feed and are consumed sometimes. The seeds however can be roasted and used as substitute for coffee (Farinde and Owolarafe, 2007). The essential and non-essential amino acid which okra contains is comparable to that soybean (Farinde, 2007). Okra production in Nigeria often recorded low yield. The low yield experience has been attributed to poor soil fertility and deficiency in important mineral nutrients. This is because fertilizer has become a scarce commodity, even when available, is beyond the reach of the poor resource farmers due to its high cost. The organic matter of the soil which can be replenished and maintained by the application of Animal manure has been considered by Roddy and Reddi, (1992), as the life of soil as well as store house of plants nutrients.

It plays a vital role in the soil fertility and productivity and act as a reservoir of plant nutrients especially nitrogen, phosphorus, potassium and micronutrients and as well prevents leaching of nutrients. Poultry manure, sheep manure and cow dung manure are very good sources of organic matters and play a vital role in soil fertility improvement as well as supplying primary, secondary and micronutrients for crop production. Roddy and Reddi (1992). Thus the present study was undertaken to assess the effectiveness of four different organic manures on the growth and yield of Okra.

MATERIALS AND METHOD

The variety of okra and the polythene bags used were collected from Kano agricultural and rural development agency (KNARDA). It is an early maturing line name variety. The experiment was conducted at the Department of Agricultural education experimental farm, F.C.E (T) Bichi, Kano state during dry season.

Experimental Design, Treatments and Seed Planting:

Seed were planted at a spacing f 50cm x 50cm. two to three seeds per hole which were later thinned to two seedlings per stand after their germination. Each replication consist of 5 rows and 3 stands with a total...
of 15 plants /rep. the field measurement was 9.8m (47.04m²). The experimental design was in a Randomized Complete Block Design (RCBD), block of 5 treatment replicated 3 times. The beds were prepared by fiddling the soil using hoe and then hand labeling.

**Trial Management**

These are the activities that were carried out on the farm before the data was collected. These include:

- **Manuring**- Poultry manure was applied to the farm two weeks before planting in order to ensure decomposition of the organic manure.

- **Watering** – The period of the field trial was during dry season, so there would be a great need for applying water to ensure effective growth and maximum growth. Watering was done manually on a daily basis.

- **Weeding**- Regular weeding was carried out on the field in order to prevent competition, infestation of pests and diseases and also to ensure maximum growth of crops. It was carried out manually and as frequent as the weeds emerged.

**Data Collection**

Five plants were randomly tagged per plot for data collection. Data collected includes:

- **Establishment count** – This involve the counting of established stands at five weeks after planting.

- **Number of leaf per plant** – This was done by counting the number of leaf on every tagged plant in the net plot. The average number of leaf was then determined.

- **Stem girth** - This was the measurement of the girth from 5cm above the ground level. It was done using a thread and meter rule.

- **Number of days to 50%flowering** – It was taken from the day of planting to when the plants produced 50% flowers from each block.

- **Number of fruits per plant** – This involve the physical counting of all the fruits that emerged on the plants.

- **Fresh fruit weight per bed**- This involve the weighting together of all the okra fruits harvested in a bed in a fresh form.

**Data Analysis**

Data obtained was subjected to statistical analysis using Analysis of variance (ANOVA) to determine if the treatments have any significant effect on parameters measured. Means of significant treatment will be further separated using Duncans Multiple Range Test (DMRT).

**RESULT**

**Plant height**

From table 1, it could be seen that the highest value obtained foe plant height is in the okra treated with poultry manure (PM) which is 30.40cm, and was closely followed by combination of treatments i.e sheep, poultry, and cow dung (SPC) with a mean height of 29.10cm while also from the table it is found that control treatment recorded the least values with mean of 23.94cm.

**Number of leaves**

From table 1, it could be seen that the highest value obtained for plant height is in the okra treated with poultry manure (PM) which is 30.40cm, and was closely followed by combination of the treatments i.e sheep, poultry, and cow dung (SPC) with a mean height of 29.10cm while also from the table we find out that the control treatment recorded the least values with a mean of 23.94cm.

**Stem girth**

From table 1, it could be seen that the average number of stem girth was generally higher with PM than the other treatments. The PM however recorded the highest value with 2.70%, followed by SPC 2.48%, while from the table it could also be seen that the control treatment recorded the least value with 1.88%

**Number of fruit**

From table 1 , it could be seen that the number of leaves obtained were generally higher in Okra treated with PM which is 7.77%,higher than SPC which is 7.22%, higher than SM 6.33%, higher than CD 6.22%, and lastly control treatment which were the least value with 3.66%.

**Fruits weight**

From Table 1, it could be seen that the highest fruit weight was observed in PM treatment. The order of increase in the fruit weight was
PM>SPC>SM>CD>CO. The value was 126.55%, 111.97%, 96.37%, 89.25%, and 45.66%.

Table 1: Effect of different sources of organic manure on the Plant height, Number of leaves, Stem girth, Number of fruits, and fruits weight of okra.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>plant height(cm)</th>
<th>Number of leaves</th>
<th>Stem girth(cm)</th>
<th>number of fruit</th>
<th>Fruits weight(g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>23.11</td>
<td>6.444</td>
<td>1.880</td>
<td>3.666</td>
<td>45.66</td>
</tr>
<tr>
<td>Type of Manure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow dung</td>
<td>27.11</td>
<td>7.444</td>
<td>2.326</td>
<td>6.222</td>
<td>89.25</td>
</tr>
<tr>
<td>Sheep</td>
<td>27.43</td>
<td>7.888</td>
<td>2.333</td>
<td>6.333</td>
<td>96.37</td>
</tr>
<tr>
<td>Poultry</td>
<td>30.40</td>
<td>8.222</td>
<td>2.700</td>
<td>7.778</td>
<td>126.5</td>
</tr>
<tr>
<td>Sheep + Cow dung+poultry</td>
<td>29.10</td>
<td>9.000</td>
<td>2.481</td>
<td>7.222</td>
<td>111.9</td>
</tr>
</tbody>
</table>

DISCUSSION

Plant height of okra is genetically determined IAR (1995). The height of the okra studied is perhaps more of genetic than an environmental trait. The positive effect of organic manure on plant height could be due to the contribution made by manure to fertility status of the soils as the soils were low in inorganic carbon content. Manure when decomposed increases both macro and micro nutrients as well as enhances the physico-chemical properties of the soil. This could have led to its high vegetative growth. The non-significant difference observed in the treatments supplied with sheep and cow manure with control treatment could be either there were some nutrients already present in the soil or the plants need was satisfied with that quantity of nutrients present in the soil. Okra grown on poultry manure performed better in terms of the height of the plant than other sources of organic manure. This shows that poultry manure were readily available and in the best form for easy absorption by the plant roots, hence there was a boost in the morphological growth of the plant.

The results of this study also corroborated the finding of Ajari et al., (2003) in okra production in which they reported that organic manure, especially poultry manure could increase plant height of crops when compared with other sources of manures. The increase in number of leaf per plant with organic fertilizer application stressed its importance during the vegetative growth of crop plants (Tindall, 1992).

All the nutrients supplied by the different manure sources might have been diverted to vegetative growth. This may be due to their bulkiness and higher amount of nutrients already present in the soil may contribute to this phenomenon.

The increase in fresh fruits weight of okra due to poultry manure application could be attributed to easy solubilization effect of released plant nutrient leading to improve nutrient status and water holding capacity of the soil. The results obtained were in agreement with the findings of Sanwal et al., (2007) in turmeric (Curcuma longa) Premsekhkar and Rajashree (2009) in okra (A. esculentus) in which they reported that higher yield response of crops due to organic manure application could be attributed to improved physical and biological properties of the soil resulting in better supply of nutrients to the plants.

CONCLUSION AND RECOMMENDATION

The application of CD, SM, PM and SPC manure had a significant effect on plant height, number of leaves per plant and fresh fruit weight of okra grown under irrigation during dry seasons. The results obtained revealed that okra responded well to the application of poultry manure compared to other sources of organic manures and control treatment in the study. Based on the finding of this study, it may be recommended that, the used of organic manure in crop production is desirable as it had variable impacts on the growth and yield of crops. The used of organic manure will improve soil organic matter status,
nutrient availability and good crop yield as well as ensures stability of soil structure. The organic manure is cheap, more easily accessible and available. It is a good alternative to chemical fertilizer and has sustainability effects on soil. Therefore it is advisable to use poultry manure or SPC manure for the production of okra and other vegetable/horticultural crops for better crop planting and increase in farmer's yield and income.

REFERENCE


