

Effect Of Different Sources Of Animal Manure On The Growth And Yield Of Okra (*Abelmoschus Esculentus* L.Moench) In Ustoxic Dystropept At Enugu South Eastern, Nigeria.

Nweke, I. A., Ijearu, S. I., Igili, D. N.

Abstract: - A field study was conducted at the Department of Agricultural Education Experimental Farm at Institute of Ecumenical Education Thinker's Corner Enugu South Eastern Nigeria to investigate the effect of different sources of animal wastes on the growth and yield of Okra. The experiment was laid out in a Randomized complete Block Design (RCRD) with four replicates, Poultry manure (12KgPM/plot), Pig manure (12KgPG/plot), Goat manure (12GM/plot) and control that received no treatment (0Kg/plot). The result of the study showed that there were significant differences between the treatments in most of the parameters assessed. The poultry manure recorded the highest Value in all the parameters and was significantly ($P=0.05$) different from the other treatments in fruit weight (11.63gm), number of fruits/plant (23.5) and number of flowers/plant. Goat manure performed competitively better than the Pig manure, in all the parameter measured, while the control plots showed least performance in this study with a yield of 4.48gm.

Key words: - Goat manure, Poultry manure, Pig manure, Okra, Thinkers Corner.

INTRODUCTION

Vegetable growing is one of the major enterprise 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 (Philips, 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 of soybean (Farinde, 2007). Okra production in the South East of 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 costs. For example over 70% of vegetable farmers in Enugu State, South East Nigeria have no access to mineral fertilizer due to high cost and scarcity. Hence Animal wastes that result to animal manures is better alternative and a necessary option. 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 plant nutrients.

It plays a vital role in the soil fertility and productivity and act as a reservoir of plant nutrients especially nitrogen, phosphorous, potassium and micronutrients and as well prevents leaching of nutrients. Poultry manure, Goat manure and Pig manure are very good sources of Organic matter and play a vital role in soil fertility improvement as well as supplying primary, secondary and micronutrients for crop production. Thus the present study was undertaken to assess the effectiveness of four different animal manures on the growth and yield of Okra.

MATERIALS AND METHODS

The investigation was carried out at the Agricultural Education Experimental Farm, Institute of Ecumenical Education Thinker's Corner Emene Enugu ($06^{\circ}48'N$ and $07^{\circ}14'E$). The rainfall pattern is bimodal between November and March. The annual rainfall ranged between 1200mm-1750mm. The soil of the experimental site is an Ultisol (FDALR 1985) and classified as Ustoxic Dystropept. Composite Sample of the top soils (0-30cm) depth was taken with auger before the seed bed preparation. The samples were analyzed for physical and chemical properties according to procedure describe by Black, (1965). Results of the Soil analysis are presented in table 1.

Table 1 Physical and Chemical properties of soil of the experimental site.

| Parameter | Unit | Value |
|-----------------------|-----------------------|------------|
| Coarse sand | % | 16 |
| Fine sand | " | 39 |
| Silt | " | 35 |
| Clay | " | 10 |
| Texture | " | Sandy loam |
| PH (H ₂ O) | " | 4.80 |
| Organic matter | " | 1.18 |
| Total N | " | 0.07 |
| Avail P | mg kg ⁻¹ | 3.70 |
| Ca | Cmol+kg ⁻¹ | 1.8 |
| Mg | " | 1.7 |
| Na | " | 0.18 |
| K | " | 0.06 |
| CEC | " | 12.6 |

- Nweke, I. A., Ijearu, S. I., Igili, D. N.
- Department of Soil Science Anambra State University, Uli Department of Agricultural Education, Institute of Ecumenical Education Thinker's Corner Enugu. Department of crop science Anambra State University, Uli. Corresponding author
- lkechukwunke48@yahoo.com

The treatments consisted of three different animal manure of 12 Kg/plot each equivalent to 10 tons/ha and a control plot that received no treatment that is;

| | |
|---------------------|------------|
| Poultry Manure (PM) | 12 Kg/plot |
| Goat Manure (GM) | 12 Kg/plot |
| Pig Manure (PG) | 12 Kg/plot |
| Control (CO) | 0 Kg/plot |

The four treatments were laid out in a randomized complete block design (RCBD) with four replications. The plot sizes were 3m x 4m (12m²), with plants spaced at 75cm x 75cm intra and inter rows respectively. Raised beds were used for better drainage. The animal manure at the rate 12 Kg/plot each for the respective manures were incorporated into the soil at their respective plots during tillage operations and allowed 7 days for ageing before planting the Okra seeds. Lady Finger Okra variety was used for the trial. It is an elite variety obtained from Agricultural development program of ministry of Agriculture, Enugu State (ENADEP). Seeds of Okra were sown at the rate of 2 seeds per hole and a depth of about 2cm deep and were thinned down to one plant per hill two weeks after germination. Ten plants from each plot were randomly selected and used for the assessment of plant height, Number of fruits, fruit diameter and weight of fruit. Data collected were subjected to the statistical analysis of variance procedure for a randomized complete block design according to Steel and Torrie (1980) and treatment means was compared using LSD at 0.05.

Result

The result of the soil analysis of the experimental site presented in table 1 showed that the soil textural class is sandy loam. The soils are acidic and low in nutrient elements.

The effect of different Animal manures on growth and yield of Okra.

The numbers of flowers per plant were significantly ($P=0.05$) increased by the application of animal manure (table 2). More number of flowers were recorded in poultry and manure compared to the other treatments and PG and GM are significantly better than the control plots. Table 2 also showed that the result of number of leaves, number of branches and plant height were not significantly increased. The effect of the Animal manure on these parameters was statistically similar. The poultry manure however recorded the highest value in these parameters and was closely followed by Goat manure, while the control plots recorded the least values. There were more branches in PM than the other treatments and number of leaves was increased in poultry manure, 74.84 % greater than CO, 49.47 % higher than PG and 42.62 % higher than the GM. The result of fruit diameter in table 3 showed non-significant among treatments, while significant differences were recorded among the treatments in number of fruits and weight of fruit. The order of increase in the fruit weight was PM>GM>PG>CO. The highest fruit yield value (11.63 gm/ha) was observed in PM treated plots. The value was 61.48 %, 23.04 % and 11.01 % higher than observed value in control, Pig manure and Goat manure treatments respectively. The number of fruit values varied between 7.0-

23.5. There were more number of fruits in poultry manure treated plots compared to the other treatments.

Table 2 Effect of different sources of Animal manure on the number of leaves, flowers, branches and plant height.

| Treatments | Number of Leaves/ Plants | Number of Flower/ Plants | Number of Branches/ Plants | Plant height cm |
|------------|--------------------------|--------------------------|----------------------------|-----------------|
| CO | 20.02 | 11.75 | 1.05 | 30.98 |
| PG | 40.62 | 12.25 | 2.17 | 64.38 |
| GM | 45.65 | 15.25 | 4.25 | 76.30 |
| PM | 79.56 | 23.50 | 4.67 | 84.15 |
| LSD (0.05) | NS | 5.6 | NS | NS |

CO = Control, PG = Pig manure, GM = Goat manure, PM = Poultry manure.

Table 3 Effect of different sources of Animal manure on the number of fruits/plant, fruit diameter and weight of fruit.

| Treatment | Number of fruits/ Plant | Fruit diameter cm | Weight of fruit gm/ha |
|-----------|-------------------------|-------------------|-----------------------|
| CO | 7.0 | 3.07 | 4.48 |
| PG | 11.25 | 3.87 | 8.95 |
| GM | 15.25 | 4.58 | 10.35 |
| PM | 23.5 | 5.05 | 11.63 |
| LSD(0.05) | 6.0 | NS | 1.0 |

CO= Control, PG = Pig manure, GM = Goat manure, PM = Poultry manure.

DISCUSSION

The result of the study showed that the treatments are capable of improving crop yield and that okra responded well to the animal manure. Though there was no statistical significance difference observed in number of leaves, branches and plant height. The values obtained indicated that the application of animal manure increases the vegetative growth of okra. The result could be attributed to the manure type, rate and method of application and type of soil. Sharma (2004) observed that organic manure improves plant height, cob size, grain yield and weight when manure is correctly applied at the required amount. While Grey and William (2006) reported an increase in the supply of nutrients following organic manure application. The observed improvement in the yield of okra could be attributed in part to the ability of the animal manure to increase soil organic matter content thereby increasing crop yield and secondly to changing of chemical composition of the soil in line with the observations of Haynes and Beare, (1994). Leng (2006) attributed yield increase resulting from the addition of organic manure to increase in cat ion exchange capacity and to increase in water holding capacity. When organic manure is applied in sufficient quantity to the soil, it can supply all the necessary primary and secondary nutrient required for crop growth. This view has been expressed by Cooke, (2002), who noted that nitrogen application had no effect on fruit size in soil containing 6.17% of organic manure. However, high rate of

organic manure application had the consequence of organic layer being ramified with white fungal mycelia which have water repellent properties with symptoms similar to that of moisture stress (Miller, 1998). The result obtained from the studied soil showed that poultry manure was the richest manure among Goat and Pig manure applied at the same rate, this was followed by Goat and lastly pig manure. Thus Wevil (2002) reported that applications of poultry manure to the soil are necessary for a satisfactory response to okra. Poultry manure has the highest nutrient and was able to release these nutrients for okra plant competitively faster than goat and pig manure. The result showed profound effect of poultry manure on vegetative development of the plant and supplies nutrients that enhance vigorous growth that culminates in increase in fruit yield obtained. Aliyu, (2000) and Dauda *et al*, (2008) made similar observation in their separate studies with poultry manure in the growth and yield of crops.

CONCLUSION

From the result of the study, it can be concluded that the use of animal manure in crop production is desirable as it had variable impacts on the growth and yield of crops. The use of animal manure will improve soil organic matter status, nutrient availability and good crop yield as well as ensures stability of soil structure. The animal 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 goat manure for the production of okra and other vegetable/horticultural crops for better crop planting and increase in farmer's yield and income.

Reference

- [1]. Adeboye M.S. (1996), Production of Field Crops. Mc Graw-Hill publishers company Ltd New Delhi.
- [2]. Aliyu I. (2000). The effect of organic and mineral fertilizer on growth yield and composition of pepper (*Capsicum annum L.*) Bio. Agric. Hort. 18:29-38
- [3]. Cooke G.W. (2002). Fertilizer for Maximum Yield, London. The English language Book Society and Granda publ.Ltd, London.
- [4]. Dauda, S.N. Ajayi, F.A. and Ndor.E. (2008) Growth and yield of water melon (*citrullus Lanantus*) as affected by poultry manure application. Journal of Agriculture and Social Science 5:121-128.
- [5]. Farinde, G.C. (2007) Dry season vegetable gardening, Agric Extention News letter information Kano. Vol.17 No 2 P7.
- [6]. Farinde A.O. and Owalarefe L.B. (2007) Nigeria fertilizer sector, present situation and Future prospects IFDC. Technical Bulletin 12(1) P.18.
- [7]. Gardner R.C. (2004). Continuous Arable Cropping with the use of Manure. Horticultural Science journal. Vol.1 P74-80.
- [8]. Grey C. and William V. (2006). The Right away to Grow Fresh Vegetable all Year round. Macmillan publ. London.
- [9]. Haynes R.I and Beare M.H. (1994). Aggregation and organic carbon storage in meso-thermal humid soils. Adv. Soil Sci 6:153-158.
- [10]. Leng, B. (2006). Effect of organic manure on soil temperature, early vegetative development in muskmelon and weed growth. Proceedings, national agricultural plastic congress (22): 19-27.
- [11]. Miller W.P. (1998). Plant nutrient utilization and Diagnostic plant symptoms. Macmillan publ London.
- [12]. Sharma D.H. (2004). Fundamentals of Soil Science 7th edition U.K. Longman.
- [13]. Steel G.D. and Torrie J.H. (1980). Principles and procedures of statistics. A biometrical approach 2nd edition McGraw-Hill Book Co. Inc. New York pp 633.
- [14]. Wevil.V.C. (2002). Quality of Horticultural Products. Better Worth and Co. publ. Ltd.London.