

Comparative effects of farmyard manure, sawdust and NPK 15-15-15 fertilizer on growth and yield of garden egg (*solanum gilo*).

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Abstract

A study was carried to determine the effect of inorganic and organic fertilizer for garden egg production. This is to assess and establish the type that will produce optimum yield. The fertilizer types evaluated were poultry manure, sawdust, NPK 15-15-15. The study was conducted on Alfsoil soil at kabba. The experimental design used was Randomized Completely Block Design (RCBD) with five treatments. The treatment were poultry manure (25 tons/hac) T1, sawdust 25 tons/hac (T2), NPK 15-15-15 (400kg/hac) T3, poultry manure (25 tons/hac) + NPK 15-15-15 (400kg/hac) T4 and control (No fertilizer application) T5. All the treatments were replicated four times to give a total of twenty (20) Experimental plots. The gross experimental site was 25m x 11m (275m²). Each bed was 1m x 5m (5m²). Planting was carried out using 2 seeds per hole at a spacing of 60cm x 60cm. The plant population per bed was 32 plants and for the whole plots were 640 plants. The result of this study showed that the combination of poultry manure and NPK 15-15-15 had significant effect (P<0.05) on Number of leaves, Number of fruits and weight of fruits (fruit yield). The yield performance sequence was in the order FYM + NPK 15-15-15 > FYM > sawdust > NPK control.

Keywords: poultry manure, sawdust, NPK 15-15-15, garden egg, afsoil.

Introduction

Agriculture in developing countries has the economic potential to produce sufficient food for its inhabitants. However, in the tropics diets are often imbalanced not only because of ignorance of solid dietary principles and food prejudice but also because of lack of good spice and varieties.

Moreover, most people lack the economics resources to purchase nutritionally balanced diets. However, vegetable fruits could be used as a low income source vitamins and minerals lacking in most of our diets. One of the vegetable fruits that hold such promise attribute is garden egg (*solanum gilo*).

Garden egg is an important fruit vegetable and its versatility for use in the preparation of various dishes; make it increasingly popular in Nigeria. The fruits are edible while fresh. Information is also lacking of appropriate fertilizer use and management for the production of garden egg in Nigeria. There is also the need to evaluate the available organic and inorganic fertilizers for their potentials for producing cucumber. The price of inorganic fertilizers has steadily increased from #1500/50kg/bag in kogi state and kwara states in 2010 to #2,200 and #3,400/50kg/bag in kogi and kwara States in 2012 to give a 90% fold price increase, which is not only beyond the reach of the local farmer but has almost reduced farming to an unprofitable venture.

As an alternative, organic fertilizer materials are readily available or can be easily generated by the farmer. In addition to their slow release of the whole range of minerals required by the crop, organic manure improves soil physical and chemical properties which positively improved crops yield.

Hati km et al (2006) strongly advocated for supplementary use of inorganic fertilizer along with organic manure in order to produce the decomposition of the latter. He also said that using organic organic manure with inorganic fertilizer raises farmer's yields by about 25% and above that obtained using fertilizers alone. Therefore this experiment was aimed at evaluating other alternative sources of fertilizer for producing garden egg

Materials and Methods

The field experiment was carried out at Teaching and Research Farm of college of Agriculture kabba, kogi state, Nigeria. The area lies between latitude 07° 56' North and Longitude 06° 45' East and 427m above sea level with an average rainfall of 1362.20mm with bimodal distribution. The area has two distinct seasons in a year, the rainy and dry seasons.

The soil type used for the experiment has been classified by USDA(1975), as afsoil. Surface soil samples (0-15cm) were collected randomly from the two experimental sites. They were analyzed using the IITA (1979) method of soil Analysis. The site of the experiment has been left to fellow for two years. The site was manually cleared, stumped and leveled to give a fine tilth, afterwards demarcated into plots.

The experimental design used was Randomized Completely Block Design (RCBD) with five treatments. The treatments are Farmyard manure (25 tons/hac) T1, sawdust 25 tons/hac (T2), NPK 15-15-15 (400kg/hac) T3, Farmyard manure (25 tons/hac) + NPK 15-15-15 (400kg/hac). T4, control (No fertilizer application). All the treatments were replicated four times to give a total of twenty (20) experimental plots. The gross experimental site was 25m x 11m (275m²). Each bed was 1m x 5m (5m²). Planting was carried out using 2 seeds per hole at a spacing of 60cm x 60cm. The plant population per bed was 32 plants and for the whole plots were 640 plants. Vertox 85 was sprayed twice at the rate of 5 large full match box (140gm) to 10 litres of water at 2 and 4 weeks respectively, after planting.

Farmyard manure x sawdust were applied at the rate of 25 tons/hac x 40 tons/hac respectively at 2 weeks before planting. They were incorporated into the soil during land preparation while NPK fertilizer was applied at 2 weeks after planting at the rate of 400kg/hac. Hoe weeding was carried out twice at 2 and 4 weeks after planting. 10 plants were collected randomly from each bed for data collection and analysis. Parameters taken for analysis include, number of leaves, number of fruits and weight of fruits (fruit yield) tons/hac.

Data collected were analyzed using analysis of various (Anova)

Results and Discussion

Table 1 shows the result of the analysis of soil, sawdust and poultry manure used on the experimental site. Table 2 shows the summary of the result of the effect of the treatments applied. The treatments applied significantly ($P < 0.05$) influenced number of leaves, number of fruits and fruits yield of garden egg at 5 weeks after planting (Tables 2) followed by plots that received the combination of FYM and NPK, then sawdust etc. The trend of the results obtained for number of leaves at 5 weeks might be due to the fact that by 5 weeks the FYM applied would have release its nitrogen gradually to the soil/crop to used to produce more number of leaves. The trend of performance with reference to the number of fruits as per the treatments applied was in the order FYM + NPK FYM sawdust NPK control. The explanation for the trend observed may be because the FYM was able to improve the soil structure and the soil water holding capacity. This consequently supplies the crop with adequate moisture to produce more number of fruits as observed from Table 2. Generally speaking the following reasons could be given for the trend of the result obtained. Poultry manure was able to release its nutrients gradually to the plant for effective nutrient utilization. The poultry has the ability to improve soil structure and the water holding capacity of the soil. The trend of result obtained in this study agreed with the findings of Hossain *et al.* (2007) who reported that soil provided with farmyard manure retains moisture content longer than soil provided with inorganic fertilizer. This is because moisture is essentially required at the fruiting stage of garden egg. Also the findings in this study agreed with the finding of kaura *et al.* (2005) who reported that organic manure are superior to inorganic fertilizer in improving planting growth. The order of performance with reference to weight of fruits as per treatments applied was in the order FYM + NPK FYM sawdust control (Table 2). The trend of the result obtained in this study agreed with the findings of Sarkar *et al.* (2003), who all concluded that FYM and mineral fertilizers usually give higher yields.

Also according to them FYM or organic fertilizers applied above in adequate/amounts can sustain good crop yield under intensive to that of mineral fertilizer because of the former's slow nutrient release factor, its ability to buffer the soil P^H against undesirable fluctuations. When FYM is applied together with mineral fertilizers, the latter aids the decomposition of the former

Satyanarayana, (2002) also strongly advocated for supplementary use of inorganic fertilizer along with organic manure in order to promote the decomposition of the latter. He also discovered that using organic manure with inorganic fertilizer raises farmer's yields by about 25% over and above that obtained using Inorganic fertilizers alone.

Conclusion

From the study, it was observed that the use of poultry manure + NPK 15-15-15 is desirable in southern Guinea savannah soil.

Table 1 Results of Soil, Sawdust and Manure Analysis use for the

Properties	<u>Experiment</u>		
	Soil Type: Afisol (FAO)	Sawdust	Poultry manure
p ^H	6.60	7.30	7.90
Ca mol Kg ⁻¹	2.50	1.55	19.0
K Mol kg ⁻¹	0.12	2.03	1.33
Na mol kg ⁻¹	0.31	0.42	3.0
Mg mol kg ⁻¹	1.53	0.95	11.59
Ex. acidity	0.08	0.04	0.01
CEc	4.54	4.99	34.93
Base saturation %	98	99	100
Organic carbon %	1.68	3.92	5.88
Total N %	0.17	0.40	0.59
Available phosphors	19.74	33.6	58.80
Sand %	81.20	N/A	N/A
Silt %	12.20	N/A	N/A
Clay %	6.60	N/A	N/A

N/A—Not available

Table 2: GROWTH AND YIELD PARAMETER OF CUCUMBER

<u>Treatment</u>	<u>Number of leaves</u>	<u>Number of fruit</u>	<u>Weight of fruit</u>
Poultry T ₁	21	57	14.23
Sawdust T ₂	16	43	11.08
NPK T ₃ 15-15-15	10	33	7.95
Poultry Manure T ₄ + NPK 15-15-15	17	68	20.1
Control T ₅	13	27	5.8
LSD	5.20	18.26	6.18

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