EFFECT OF POULTRY AND GOAT MANURE ON THE YIELD OF CUCUMBER IN NSUKKA, ENUGU STATE

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Abstract
This study was carried out to determine the effect of poultry and goat manure on the yield of cucumber in Nsukka, Enugu State. Three research questions were developed to guide the study. The study adopted experimental research design and was carried out in the research farm of Agricultural Education Department, Faculty of Vocational and Technical Education, University of Nigeria, Nsukka. The plants population for the study was 120 while a sample of 60 plants were selected using random sampling technique for the study. The treatments consisted the application of poultry manure and goat manure which were laid in a Randomized Complete Block design and replicated 3 times to form 12 beds. The cucumber fruit were collected and weighed using weighing balance at 8th weeks after planting (WAP) and recorded in the observation schedule. Mean was used for the analysis. The findings showed that plot treated with poultry manure had the best performance rate than goat manure and there was a positive effect of poultry manure on the yield of cucumber (Cucumis sativus). The study revealed that poultry manure was the best treatment when compared with goat manure. It is recommended that the combined effect of poultry manure and goat manure should be adopted in Nsukka for cucumber production.
Keywords: Cucumber, Poultry Manure, Goat Manure

Introduction

Cucumber (Cucumis sativus L.) is an important vegetable and one of the most popular members of the Cucurbitaceae family. It is thought to be one of the oldest vegetables cultivated by man with historical records dating back 5,000 years (Eri, 2021). Cucumber (*Cucumis Sativus* L.) is an ancient annual vegetable that belongs to the family Cucurbitaceae. Cucumber originated from an area in India between the Himalayas and the Bay of Bengal and the cultivation of cucumber started about 3000 years ago. The fruit is eaten fresh in salads with other vegetables. The soils where cucumber is cultivated require moderate to high nutrient levels so as to achieve high yields. Infertile soils result in bitter and misshapen fruits which are often rejected by consumer thereby reducing farmer's income.

Recently, cucumber entered the farming system of Enugu State, farmer cultivate cucumber mainly as sole crop in the flood plains and lowland soils (Adetula & Denton, 2013). Cucumber (*Cucumis Sativus* L) consists of approximately 125 genera and 960 species, mainly in tropical and subtropical regions. It is a creeping vine that roots in the ground and grows up trellises or other supporting frames, wrapping around supports with thin, spiraling tendrils. The plant has large leaves that form a canopy over the fruit that is roughly cylindrical, elongated with tapered ends, and may be as large as 60cm long, 10cm in diameter.

In addition, *Cucumis Sativus* has three main varieties "slicing", "pickling" and "burpless". Within these varieties, several different cultivars have emerged. Cucumber bears edible fruits when ripe and much like tomato and squash they are often perceived, prepared and eaten as vegetables. Cucumber is a good source of B vitamins; the fruit contains 95% water, keeping the body hydrated while helping the body eliminate toxins (Seng, 2012). The skin of cucumber fruits can be used for treatment of skin irritation and sun burn, as aloe vera would be used. The fruit contains lariciresinol, pinoresinol, and secoisolariciresinol lignans which have strong history of research in connection with reduced risk of several cancer types, including breast cancer, ovarian cancer, uterine cancer and prostate cancer and also contains enough sugars and electrolytes to replenish many essential nutrients, reducing the intensity of both hangover and headache (Seng, 2012). It has low caloric and high-water content and as a result, cucumber is an ideal diet for people who are looking for weight loss. The high water content and dietary fiber in cucumbers are very effective in ridding the body of toxins from the digestive system, thus aiding digestion. The juice of cucumber contains a hormone which is needed by the cells of the pancreas for producing insulin which has been found to be beneficial to diabetic patients. The fruits also contain a lot of potassium, magnesium and fiber for treating both low and high blood pressure. Cucumber is an excellent source of silica, which is known to help promote joint health by strengthening the connective tissues, which include muscles, tendons, ligaments, cartilage and bone.

Also, Cucumbers require nutrients for good production. The nutrients are specific in function and must be supplied to the plant at the right time and in the right quantity for proper growth and reproduction (Akande & Oluwatoyinbo, 2015). However, the authors indicate that there is renewed interest in proper and effective use of organic manure to maintain soil fertility. Aside from being source of plant nutrients, organic manure, e.g. poultry manure and goat dung has improved agricultural productivity. Organic manure helps to increase the population of soil micro-organisms which have some influence in protecting plant against pathogens like nematodes and soil born insects and also provides plant growth hormones like auxins. Organic manure also helps to improve the physical condition of the soil and provides the required plant nutrients. It enhances cation exchange capacity and acts as a buffering agent against undesirable soil pH fluctuations. The application of organic manure has been found to have higher comparative economic advantage over the use of inorganic fertilizer (Agbede & Ojeniyi, 2013).

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Therefore, the nutritional composition of cucumber fruit per 100g edible portion is carbohydrate (3%), protein (1 %), total fat (0.5%) and dietary fiber (1%) (USDA, National Nutrient Data Base, 2014). Like other agricultural ventures, cucumber production solely depends on climate for optimal yield. The climatic condition required for optimal life cycle is a warm climate. This implies that expected yield of cucumber production can be affected with a change in climate. Generally, farmers have encountered series of loses as a result of change in climate (Iyagba & Isirima, 2017).

Application of Poultry Manure (PM) and goat manure to soil improves productivity and yield in terms of quality and quantity (Utobo, 2014). The authors reported that an increase in yield associated with an increase in poultry and goat manure rates observed confirms a similar work by (Atijegbe, 2014) who reported a corresponding increase in both manures with successive increase in the levels of poultry and goat manure. This suggests that both poultry and goat manure as reported by (John,2014) contains essential nutrients which are associated with high photosynthetic activities that promote root and vegetative growth thereby leading to increased fruit yield. Ayoola and Adeniran (2014) observed that variation in nutrient source among treatments will result insignificant variation in fruit yield in most crops.

Organic farming relies on use of ecosystem friendly techniques rather than external agricultural inputs such as synthetic fertilizers where management practices that maintain and increase soil fertility within a tolerable measure is adopted (Ayoola & Adediran, 2014). It is for this reason this technique that is environmentally friendly, more effective and cheaper is actively being researched. Production of cucumber is fast becoming popular among farming households in Nsukka, Local Government Area, Enugu State, due to its high nutritional and medicinal values. The study assessed the effect of poultry and goat manure on the growth and yield of cucumber in Nsukka, Local Government Area.

Purpose of the Study

The main purpose of the study is to determine the effects of poultry and goat manure on the yield of Cucumber in Nsukka Local Government Area, Enugu State. Specifically, the study sought to determine the:

1. Effect of poultry manure on yield of cucumber
2. Effect of goat manure on yield of cucumber
3. Combined effect of poultry and goat manure on yield of cucumber

Research Questions

The following research questions guided the study:

1. What is the effect of poultry manure on the yield of cucumber?
2. What is the effect of goat manure on yield of cucumber?
3. What is the combined effect of poultry and goat manure on yield of cucumber?

Methodology

This study was carried out in the research farm of Agricultural Education Department, Faculty of Vocational and Technical Education, University of Nigeria, Nsukka, adopted experimental research design. Specifically, completely randomized design with three replications. Experimental research design in the view of Oskar (2011) is a collection of research designs which use manipulation and controlled testing to understand causal process. Generally, one or more variables are manipulated to determine their effect on dependent variables. Experimental research design is appropriate for this study because it deals with observing phenomenon and taking record of the necessary parameters.

The population for the study was one twenty (120) stands of cucumber plants drawn from 4 portion of 12 plots. Each experimental portion contained 3 plot and each plot contain 10 cucumber stands. Random sampling was employed. Sixty (60) stands of cucumber plant was used for this study. Five (5) out of ten (10) in each plot of three replicates was selected randomly from the twelve (12) plot that was used for the experiment. Instrument for data collection was yield parameters which was collected on three randomly selected plants from each plot using weighing balance, books and pen.

Materials and Resources include; Mona Lisa cucumber seed, poultry manure, goat manure and water were used. Implements like a hoe, cutlass, basket, knife and weighing scale was used. Book and pen were also used for recording of data. Experimental Procedure involved; **Step 1:** The experimental site was mapped out and cleared of existing vegetation manually with hoe and cutlass, debris and other wastes. The experimental plots were made with hoe and demarcated into fifteen. The whole plots measuring 7.5m² x 5.5m², each plot measuring 1.5m x 1m with 0.5m between plots. **Step 2:** Dried poultry and goat manure from the research poultry farm of Animal Science Department was applied to the respective plots. The experimental site was divided into four portion, portion A has three (3) plots with poultry manure, portion B has three (3) plots with goat manure and portion C has three (3) plots with poultry and goat manure and portion D has 3 plot which is control. Manure randomly worked into the soil with hoe two weeks before planting to allow decomposition, mineralization and nutrient release into the soil while portion D is control. The cucumber seeds, (Mona Lisa) was used. It was obtained from Nsukka, Enugu State**.** **Step3:** The cucumber seeds were sown at a spacing rate of 50cm x 40cm 2 seed per hole, because the seeds are tiny in a single row which was thinned to one seed per stand 2 weeks after emergence, the seeds were sown in May. **Step 4:** Weeding was done manually by hand pulling to eliminate competition and ensure efficient use of the manure at two weeks interval. Data on the yield was collected using weighing scale at 8th weeks after planting (WAP). All data collected from the experiment was analyzed using mean.

Results

Research Question 1: What is the effect of poultry manure on the yield of cucumber?

Fig. 1: The effects of poultry manure on the yield of cucumber

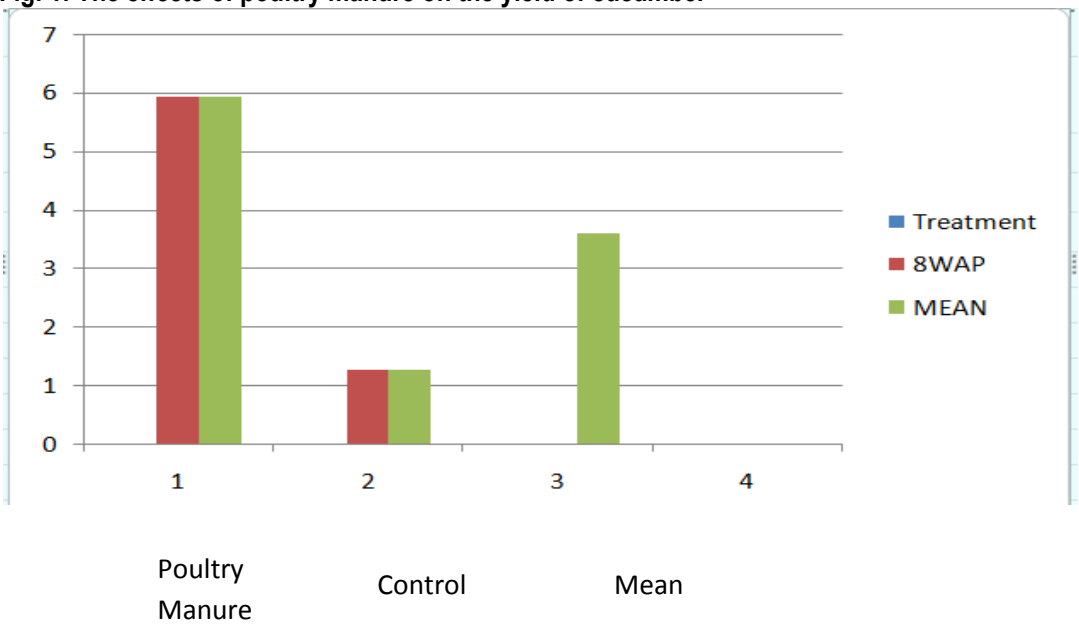

Table 1: Yield of cucumber on the effect of poultry manure

Treatment	8WAP	MEAN
Poultry manure (20kg)	5.93	5.93
Control	1.27	1.27
Mean		3.60

The data presented in table 1 indicated that at 8 weeks after planting, the yield of cucumber increased in amount of 20kg poultry manure is 5.93 and mean 5.93 mean number of yield at 8th week after planting respectively. This show that 20kg poultry manure result in more yield at 8th weeks after planting than control, indicating that application of poultry manure have positive effect on the yield of cucumber.

Research Question 2: What is the effect of goat manure on the yield of cucumber?

Fig. 2: Effect of goat manure on the yield of cucumber

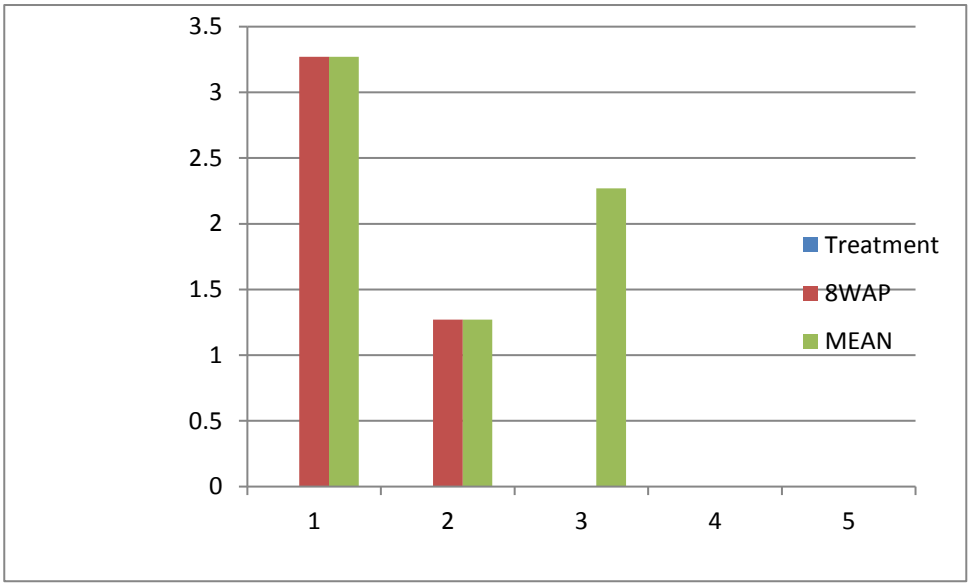

Table 2: The yield of cucumber on the effect of 20kg goat manure

Treatment	8WAP	MEAN
Goat manure (20kg)	3.27	3.27
Control	1.27	1.27
Mean		2.27

The data presented in Table 2 indicated that at 8th weeks after planting, the yield of cucumber increased in amount of 20kg poultry manure. The cucumber treated with 20kg poultry manure recorded 3.27 and 3.27 mean number of yields at 8weeks after planting respectively. This shows that poultry manure result in more yield at 8weeks after planting.

Research Question 3: What is the combine effect of poultry and goat manure on the yield of cucumber?

Fig. 3: Combine effect of 10kg poultry and 10kg goat manure on the yield of cucumber

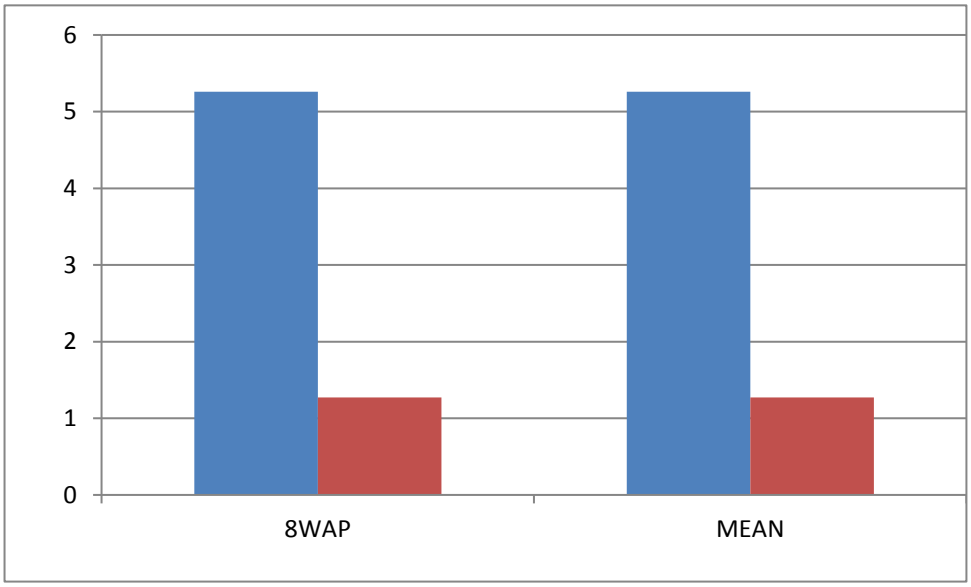

Table 3: The yield of cucumber on the combined effect 10kg poultry manure and 10kg goat manure.

Treatment	8WAP	MEAN
Combine Application	5.26	5.26
Control	1.27	1.27
Mean		3.27

The data presented in table 3 indicated that at 8 weeks after planting, the yield of cucumber increased in amount of 10kg goat manure and 10kg poultry manure. The cucumber treated with combined effects of 10kg goat manure and 10kg poultry manure recorded 5.26 and 5.26 mean number of yields at 8weeks after planting respectively. This shows that 10kg goat manure and 10kg poultry manure resulted in more yield at 8weeks after planting.

Discussion of the Findings

The following findings emerged from the study based on the research questions

1. **The effect of Poultry Manure on the yield of Cucumber**

Findings of the study revealed that application of 20kg poultry manure affects the yield of cucumber. The findings also revealed that cucumber treated with 20kg poultry manure resulted in more yield. These findings were in agreement with those of Utobo (2014) that application of 20kg poultry manure increases the growth and yield of cucumber because of the nutrient composition of the soil due to organic manure.

2. **The effect of goat manure on the yield of cucumber**

Findings of the study revealed that application of 20kg goat manure affects the yield of cucumber. The findings also revealed that cucumber treated with 20kg goat manure resulted in more yield than the control. These findings were in agreement with those of Ojeniyi, Akanni & Awodun (2013) that addition of goat manure improves soil fertility, growth yield and nutrients status of cucumber.

3. **The combine effect of poultry and goat manure on the yield of cucumber**

Findings of the study revealed that application of 10kg goat manure and 10kg poultry manure produce more yield of cucumber than control These findings were in agreement with Enujeke (2013) that comparative effect of organic manure improves soil fertility and also improves soil structure and enhances the growth and yield of cucumber.

Conclusion

Cucumber Plant treated with poultry manure had highest number of leaves, branches and

vine length followed with the performance of cucumber treated with combined application of poultry and goat manure and finally the one treated with goat manure. Poultry manure was the best treatment and had the highest growth parameter when compared with goat manure and combined application in 4, 6 and 8 weeks after planting.

Cucumber plant treated with poultry manure had the highest yield followed with the performance of cucumber treated with combined application of poultry and goat manure and finally the one treated with goat manure. Poultry manure was the best treatment and had the highest yield parameter when compared with goat manure and combined application after 4th, 6th, and 8 weeks after planting.

Recommendations

Based on the findings of the study, the following recommendations were made by the researcher:

1. Application of different types of organic manure treatment should be used for production of cucumber by the farmers for a best yield.
2. Poultry and goat manure treatment should be adopted so as to boost the number of the leaves, the branches and vine length of the leaves.
3. Extension agents should teach farmers correct measurement for combined application of organic manure.

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