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The Impact of Organic and Inorganic Manure on the Cultivation of Pumpkin (Cucurbita Maxima)

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Abstract: *A field experiment to assess the effect of organic and inorganic manure on cucurbita was conducted at the demonstration farm at Enugu metropolis Nigeria. The layout was four plots with four replications designed in a complete randomized block design. The treatment were applied at three levels viz: poultry droppings at 5, 10 and 15g, cow dung at 5, 10 and 15g, sheep dung at 15g and NPK at 5, 10 and 15g application rates per 195 Square meters respectively. The study revealed that cow dung gave the highest leaf yield, followed by NPK and poultry droppings which gave the next leaf yield. Sheep dung produced the lowest leaf yield during the experimental period. Suggestions were made as to which organic manure is best to be used as an alternative to the inorganic manure (NPK) for the production of cucurbita.*
Key Words: *Organic, Inorganic, Manure, Pumpkin*

I. Introduction

Cucurbita species is a group of very popular vegetables belonging to many different species. They are one of the common grown leafy vegetables of low land tropics in Asia and Africa. All African species are used for their leaves but on a few occasions they are grown for their seeds[11] and leafy vegetable of high dietary value produced and consumed in most part of Nigeria. Cucurbita species is widely distributed in Malaysia, West Africa, Indonesia and many other tropical regions.

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It is a genus in the gourd family (cucurbitaceae) first cultivated in the Andes and Mosoamerica and now used in many parts of the world.[13][14] Some species have edible seeds like (the squashes, marrows and pumpkins, and the chilacayote) and some are planted for their fruits. They gourds appear in many color, including blue, orange, yellow, red, and green. It is of various species like cucurbita pepo, C. maxima C. moschata, C. mixta.

The cucurbita maxima species contains varieties that produce pumpkin – like fruit but the skin is usually more yellow than orange and the stems are soft and sponge or corky without riders and without an enlargement next to the fruit. They don't really make good handles for jack-o'-lanterns. Varieties such as Atlantic Giant, Big Max and Show king are often listed as pumpkins but are more properly called pumpkin – squash or squash – type pumpkins. Other members of the maxima group are Hubbard squashes,[15] Banana squashes, butter cup squashes and turban squashes – in short most autumn and winter squash.

Cucurbita requires little water and grows fastest in semiarid and arid environments[7]. Warm weather is required during the vegetation period[8]. Germination temperature range is between 15^0C and 37^0C with an optimum at 25^0C[9]. Pathogens and insects still affect it, but if left to its own devices in semiarid, it would fare better than the average buttermint from the seed catalog[12].

According to [2], it is an annual plant showing great variation in habit or growth. It is spineless, up to 90cm with a strong root system. The stem carries leaves which are green in colour with small flowers in cluster with black-brown shiny seeds. The plant requires a fertile well drained soil. Seeds are sown in rows. The plant does not stay too long on the field therefore; it does not require any intense weeding throughout its life span.

[4]stated that the soil fertility of an area or location is very important and optimum productivity may turn to long term economic benefits which will reflect on the yield, meaning that soil fertility management is a vital part of successful crop production. Waste from plants and animals are referred to as organic manure. On the other hand, inorganic fertilizers are usually simple chemical compounds manufactured in factory or obtained by mining which supply essential plant nutrients.

Pumpkin is a warm season vegetable as earlier mentioned which is usually planted after the danger of frost is gone, and the soil has become warm enough for seed germination. Pumpkins actually mature at different times. Pumpkin for Halloween are planted so that they mature as close as possible to the Halloween time, pumpkins for making pre can mature early or late depending on the variety Harvest pumpkin fruits when the

rain is hard and cannot be poked by finger nail, and the fruit is orange in color. Cuts and bruises should be avoided when harvesting fruits.[15]

Application of manure usually increases the number of harvest before sensescene there by suggesting that manure improves growth rate of plants[3]. Many studies have shown that application of organic and or inorganic fertilizers increase plant growth mainly because they contain considerable quantities of plant nutrients including micro nutrient which have high benefits for plant growth[5]

Objectives

The objectives of the study are to find out: -

The effect of organic manure on the yield of cucurbita

The effect of inorganic manure on the yield of cucurbita

The interaction between the different levels of organic and inorganic manure.

II. Materials and Methods

The field was designed in a randomized complete block design (RCBD) containing four (4) plots with four replicates at 3 levels i.e. 5, 10 and 15g of poultry droppings, cow dung, sheep dung and NPK.

Data was obtained during rainy season between July and September 2008 from the demonstration farm in Enugu metropolis which is an urban area, the capital of Enugu state. A low land lying around latitude$6^0$23'N and longitude $7^0$30'E surrounded by streams and large water holes with an annual rainfall of 1000mm-200mm where observations were made on growth and yield of curcubita treated with poultry dung, cow dung, sheep dung and NPK t different levels, respective.

Table 1: Yield of Cucurbita with different treatments

Treatment	Level/rate(g)	Rep i (kg)	Rep ii (kg)	Rep iii(kg)	Rep iv (kg)
Poultry Dropping	5	1.740	1.960	1.520	0.900
	10	1.600	1.530	1.290	0.270
	15	1.400	1.960	1.420	0.080
Cow dung	5	1.300	1.820	2.270	2.300
	10	0.960	2.020	1.800	2.060
	15	1.600	1.580	2.400	2.400
Sheep dung	5	1.100	0.020	0.480	1.100
	10	2.220	0.460	0.460	1.020
	15	1.990	0.780	1.750	0.990
NPK	5	1.190	1.800	1.210	1.200
	10	1.000	1.640	1.600	1.320
	15	0.560	1.800	1.820	1.820

Source: Field Work, 2008.

Hypothesis

H_{O1}: There is no significant difference between the means of treatments.

H_{O2}: There is no significant difference between the means of three levels of the treatments.

H_{O3}: There is no significant interaction between the treatments and the levels.

Decision Rule

If the computed F is greater than the tabulated F, the H_O is therefore rejected otherwise it is accepted at 5% level of significance.

Two way analysis of variance was used to analyze the data using Minitab for windows and the result is shown in the table below.

Table: 2

Two-way Analysis of variance

Analysis of variance for REPLICATES

SOURCE	**DF**	**SS**		**MS**
TREATMENT	3	4.381		1.460
LEVEL	2	0.271		0.136
INTERACTION	6	1.159		0.193
ERROR	36	10.758	0.299	
TOTAL	47	16.569	0.299	

INDIVIDUAL 95% CI

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TREATMENT        Mean        ---+---------+---------+---------+-------
1                            1.34                          (-------*-------)
2                            1.88                                  (-------+-------)
3                            1.03                  (-------*-------)
4                            1.41                          (-------*-------)
                                       ---+--------+---------+---------+---------
                                                  0.80      1.20      1.60
LEVEL            Mean        -------+---------+---------+---------+-----
1                            1.37                    (---------*---------)
2                            1.36                  (---------*---------)
3                            1.52                          (---------*---------)
                                       -------+---------+---------+---------+-----
                                                1.20  1.40      1.60  1.80
                             1.41                          (-------*-------)
                                                -------+---------+---------+---------+-
                                                      1.05      1.40      1.75  2.10
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The result of the experiment revealed that H_{O1} was rejected indicating that there is significant difference between the means of treatment while H_{O2} and H_{O3} were accepted meaning there is no significant difference between level of treatments and interaction between treatments and levels.

Cow dung proved to be best with a means yield of 1.88 as compared to NPK Poultry droppings with means yields of 1.41 and 1.34. Cucurbita however showed a very low response to sheep droppings with a means yield of 1.03. This is in line with the findings of[5] that poultry manure has a positive influence on the growth and yield of cucurbita and amaratus leaf.
Similarly[10] reported that vermicompost and NPK significantly influenced the growth and yield of cucurbita.

III. Conclusion and Recommendation

In conclusion it is evident that cow dung, NPK and poultry droppings gave higher yield than sheep dung with cow dung giving the highest yield. This means cow dung and poultry droppings re good alternative organic manure for the inorganic manure (NPK) in the production of pumpkin (cucurbita). This is in accordance with findings of[1].

It is therefore recommended that famers should make use of recommended organic and inorganic manure viz cow dung, poultry droppings NPK for better growth and yield of cucurbita especially cow dung and poultry droppings as they are cost effective, less toxic and environment friendly, cheaper and can be readily sourced within the environment which will go a long way in reducing production cost and subsequent yield of cucurbita.

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