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# EVALUATION OF THE VEGETATIVE YIELD PERFORMANCE OF FLUTED PUMPKIN (*Telfairia occidentalis* HOOK F.) TREATED WITH DIFFERENT FERTILIZER AND CUTTING FREQUNCY IN LAFIA, NASARAWA STATE

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***ABSTRACT.***

***The study was conducted during the rainy season of year 2017 in Lafia, Nasarawa state to investigate the effect of fertilizers and cutting frequency on Fluted Pumpkin (Telfairia occidentalis Hook F.). Five (5) fertilizer types comprising of three (3) inorganic (NPK, Urea and SSP) and Two (2) organic (Poultry droppings and Cow dung), with three cutting frequencies of 1,2 and 3 weeks intervals were used. The experiment was laid out in Randomized Complete Block Design (RCBD) with three replications. Growth and yield parameters such as number of leaves, number of branches, vine length, leaf area, total fresh weight and total dry weight were observed. The result showed that significant difference (P≤ 0.05) exist between the treatment means for the different fertilizer types and cutting frequency, poultry dropping exerted higher effect on the number of leaves, vine length, leaf area, total fresh weight and total dry weight while NPK exerted more effect on the number of branches. The result also showed that 1-week interval cutting frequency performed better in terms of number of leaves, number of branches, leaf area and vine length. This result indicates that poultry droppings and NPK can be used as fertilizer for maximum growth and yield of Fluted Pumpkin while 1 week cutting frequency is more appropriate for a better production of fluted pumpkin.***

**Key words :** Yield, fertilizer, growth, cutting frequency.

## INTRODUCTION

Fluted pumpkin*(Telfairia occidentalis* Hook F.) is generally, regarded as a leaf and seed vegetable which is cultivated mainly for its succulent young leaves and shoots which are used as vegetables (Osadebe *et al*., 2014). It is a high climbing perennial with partial drought tolerant root system (Tindall, 2001) with leaves that have high nutritional, medicinal and industrial values being rich in protein (29%), fat (18%), minerals and vitamins (20%) (Osadebe *et al*., 2014). In Nigeria, farmers realize the need for soil amendments by using available resources such as crop wastes, farmyard manure and poultry waste alongside the use of inorganic fertilizers (Adediran, *et al*., 2003). The application of fertilizer has been reported to enhance plant growth and development with many research activities having reported an increase in the vegetative development of crops with fertilizer application (Akanbi *et al*., 2007). However, the quality or rather type of fertilizer required for each plant usually limits their use. The increasing human population has led to

intensive cultivation of farmlands without adequately replenishing soil nutrients which has mostly resulted in the decline in crop yields and depletion of the resource base. The soils become fragile and quickly lose organic matter and nutrients when exposed to harsh environmental conditions or intensive cultivation. Mokwunye *et al*., (1996) reported that, soil fertility decline has been recognized as one of the major biophysical constraints affecting agriculture, particularly nitrogen (N) and phosphorus (P) deficiencies. Osadebe *et al*., (2014) reported that, most farmers lack information on the right harvest schedule for optimum yield and regrowth of the vegetable even though agronomic practice such as cutting frequency has been found to have significant effect on the harvestable leaf and yield of fluted pumpkin.To ensure the proper domestication,

sustainable use and management of this species, efforts must be made to ascertain fertilizer preference and right harvest schedules for the plant.

## MATERIALS AND METHOD

The study was carried out in the Botanical Garden of the Department of Botany, Faculty of Science, Federal University Lafia. The study area falls within the Guinea savanna zone of North Central Nigeria, located between Latitude $08.33^0$N and Longitude $08.32^0$E (NIMET, 2010).The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. Plots measuring 4m x 3m were used and each plot consisted of three rows measuring 1m x 3m giving a total plot size of 77m x 59m. Treatments comprised five fertilizer types which are; poultry droppings, cow dung, Urea, NPK and Single Super Phosphate. Three rates of cutting frequency of 1, 2, and 3 weeks intervals were observed starting from four (4) weeks after germination. Land preparation was done manually and the seeds were planted vertically to the depth of 3cm and covered lightly with top soil using 1m intra row spacing and 1m inter row spacing. Weeding was done Three (3) weeks after planting and subsequently at two weeks interval to clear the plots of weeds. Staking was done after fertilizer application and the vines trained to climb.

**Fertilizer Application**

Fertilizer application was done at two (2) weeks after seed germination using ring method for inorganic fertilizer while the organic fertilizer (Manure) were worked into the soil around the base of the plant as reported by Okubena-Dipeolu *et al.*, (2005). N.P.K (15:15:15) was applied at the rate of 100kg/ha$^{-1}$, Poultry Droppings at the rate of 3t/ha$^{-1}$ (Okubena-Dipeolu *et al.*, 2005). Single Super Phosphate (SSP) was applied at the rate of 60kg $P_2O_5$ ha$^{-1}$, urea was applied at the rate of 80kg/N ha$^{-1}$ and Cow dung at the rate of 5t/ha$^{-1}$as reported by Tanimu (2012). Application was done at two (2) weeks after seed germination using ring method for inorganic fertilizer while the manure (organic fertilizer) were worked into the soil around the base of the plant (Okubena-Dipeolu *et al.*, 2005).

Mean differences in growth and yield performance observed in fluted pumpkin treated with different types of fertilizer showed significant difference ($P\leq0.05$) in number of leaves, number of branches, vine length, leaf area, total fresh weight and total dry

**Field observations**

**Number of Leaves**

Two (2) plants were selected randomly per plot for each of the Three (3) cutting frequencies and the total number of leaves counted. The mean number of leaves was recorded.

**Number of branches**

Two (2) plants were selected randomly per plot for each of the Three (3) cutting frequencies and the total number of branches counted. The mean number of branches was recorded.

**Vine Length**

The same plants above were used. The length of vine was measured from the base to the tip of the longest vine using a measuring tape.

**Leaf Area**

Leaf area was determined using the length and width method reported by Akoroda (1993). The unit leaf area was estimated with the equation

**LA=0.9467 + 0.275lw + 0.9724lwn**

Where,

LA = leaf area;

l = length of central leaflet;

w = maximum width of central leaflet;

n = number of leaflets per leaf.

**Total Fresh Weight**

Fresh weight was observed by placing the entire plant harvested from the field on an electric weighing balance and the weight taken.

**Total Dry Weight**

The plant harvested from the field was dried in an oven set to temperature of $100^0$C for 48 hours. The dried sample was weighed on an electric weighing balance and the dry weight was recorded.

**Harvesting**

Harvesting started at four (4) weeks after planting and the vegetables were harvested by pruning using sharp knife.

**Data analysis**

The Data collected was subjected to Analysis of Variance (ANOVA) test and the means were compared using LSD method at 5% level of probability($P\leq0.05$) using SPSS software Version 17.

## RESULTS

weight. Results of effect of fertilizer types on growth and yield performance of fluted pumpkin showed that poultry droppings recorded the highest number of leaves (43) followed by NPK (40.11), while the control had the least number of leaves (27.78) as

indicated in table 1. Results for number of branches indicated that NPK had the highest number of branches (6.22) followed by poultry droppings (5.78) while control recorded the least number of branches (3). The result for vine length revealed that poultry droppings gave the highest vine length (159.33) followed by NPK (137.67), while the control recorded the least vine length (101.78). The result for leaf area indicated that poultry droppings had the highest leaf area (98.33) followed by NPK (91.57) while the control gave the least leaf area (50.13). Result for total fresh weight showed that poultry droppings recorded the highest total fresh weight (123.60) followed by NPK (89.38) while the control recorded the least total fresh weight (38.29). The result for total dry weight indicated that poultry droppings gave the highest total dry weight (18.16) followed by NPK (15.10) while control had the least total dry weight (7.86).

**Table 1`: Effect of different fertilizer types on the growth and yield performance of *Telfairia occidentalis***

| | Growth and Yield Parameters | | | | | |
|---|---|---|---|---|---|---|
| **Fertilizer Types** | **NL** | **NB** | **VL** | **LA** | **TFW** | **TDW** |
| Control | $27.78^{a}$ | $3.00^{a}$ | $101.78^{a}$ | $50.13^{a}$ | $38.29^{a}$ | $7.86^{a}$ |
| Single Super Phosphate | $31.00^{ab}$ | $3.89^{b}$ | $110.54^{a,b}$ | $56.15^{ab}$ | $44.25^{a}$ | $9.38^{a,b}$ |
| Urea | $30.67^{ab}$ | $3.89^{b}$ | $114.42^{a,b}$ | $61.46^{b}$ | $48.78^{a}$ | $9.98^{a,b}$ |
| Cow dung | $35.00^{b}$ | $4.44^{c}$ | $124.57^{b,c}$ | $76.35^{c}$ | $68.19^{b}$ | $13.36^{b,c}$ |
| NPK | $40.11^{c}$ | $6.22^{d}$ | $137.67^{c,d}$ | $91.57^{d}$ | $89.38^{c}$ | $15.10^{c,d}$ |
| Poultry | $43.00^{c}$ | $5.78^{d}$ | $159.33^{d}$ | $98.33^{d}$ | $123.60^{d}$ | $18.16^{d}$ |
| LSD | 4.39 | 0.47 | 22.03 | 7.03 | 18.21 | 4.14 |

Means followed by different superscripts within same column are significantly different ($P \leq 0.05$).
Means followed by same superscripts within same column are not significantly different ($P \leq 0.05$).
NL- No of leaves, NB-No of branches, VL- Vine length, LA-Leaf area, TFW- Total Fresh Weight, TDW- Total Dry Weight

The results for cutting frequency showed that significant differences ($P \leq 0.05$) exist in number of leaves, number of branches, vine length and leaf area. The result for effect of cutting frequency revealed that 1 week cutting frequency gave the highest mean number of leaves (37.06), highest mean number of branches (5.67), highest mean vine length (181.22) and highest leaf area (87.03) as shown in Table 1. While three weeks cutting interval recorded the lowest mean number of leaves (31.61), number of branches (3.67), vine length (91.35) and leaf area (54.78) respectively (Table 2).

**Table 2: Effect of Cutting Frequency on Different Morphological Features of *Telfairia occidentalis***

| **Cutting Frequency** | **Growth and Yield Parameters** | | | |
|---|---|---|---|---|
| | **NL** | **NB** | **VL** | **LA** |
| 3 weeks | $31.61^{a}$ | $3.67^{a}$ | $91.35^{a}$ | $54.78^{a}$ |
| 2 weeks | $35.11^{b}$ | $4.28^{b}$ | $101.58^{a}$ | $75.19^{b}$ |
| 1 week | $37.06^{b}$ | $5.67^{c}$ | $181.22^{b}$ | $87.03^{c}$ |
| LSD (0.05) | 3.10 | 0.47 | 15.58 | 4.93 |

Means followed by different superscripts within same column are significantly different ($P \leq 0.05$).
Means followed by same superscripts within same column are not significantly different ($P \leq 0.05$).
NL- No of leaves, NB-No of branches, VL- Vine length, LA-Leaf area

## DISCUSSION

Results showed that poultry droppings followed closely by NPK exerted more effect on the number of leaves, number of branches, vine length, leaf area, total fresh weight and total dry weight of *Telfairia occidentalis* better than all other treatments which

include Cow dung, Urea, SSP and especially the control. This might be ascribed to the presence of nitrogen and high mineral component in poultry droppings which stimulated growth, rapid leaf production, cell elongation and play essential role in branching (El-gizawy and Mehaseb, 2009; Fosho *et al.*,2011). A similar work by Idem (2012) on fluted pumpkin showed that poultry droppings and NPK fertilizer increased agronomic parameters of the plant. Grubben and Denton (2004) observed that organic fertilizer contributed significantly to the number of vines, vine length and number of leaves in vegetable and Saalu *et al*. (2010) reported that poultry droppings had a significant influence on the growth and yield of *Telfairia occidentalis*. It was observed from the results that poultry droppings contributed more to the fresh and dry yield of fluted pumpkin than the other fertilizer treatments as shown in Table 1. A similar observation was reported by Beckman (1973) in which he stated that, "the use of poultry manure enhances soil productivity, increases the soil organic carbon content, soil micro-organisms, improves soil crumb structure, the nutrient status of the soil, which in turn enhances crop yield. Olaniyi and Ajibola (2008), also showed that the yield and quality of tomato fruits produced with poultry manure are comparable with those obtained using synthetic fertilizer and concluded that Poultry manure can therefore be a suitable replacement for inorganic fertilizer in vegetable production.

Results of the cutting frequency showed that harvest intervals of 1 week gave better outcome followed by 2weekly with the 3 weekly intervals showing the least outcome in terms of number of leaves, number of branches, vine length and leaf area. This confirms the findings of Enyi (1976), in which it was reported that,short harvest intervals or frequent harvests enhance the growth of more branches which helped to increase leaf yield. Ogar and Asiegbu (2005), reported that the higher leaf yields is achieved with frequent harvest compared to infrequent harvest schedule because it mostly promotes greater branching resulting from frequent removal of apical dominance with cutting of the terminal buds, which allowed more flushes. This also supports the findings of Ossom (1986) on fluted pumpkin in which it was reported that, short harvest interval caused profuse branching resulting in more vine and leaf growth. The stimulatory effect of more frequent harvests appears to be associated with the frequent release from apical dominance in the vines, giving rise to more profuse branching, more production of leaves, and, consequently, increased fresh weight yields (Meyer *et al*., 1960).

## CONCLUSION

The results of the study indicates that poultry droppings and NPK can be used as fertilizer for maximum growth and yield of Fluted Pumpkin, while 1 week cutting frequency can be used for a better vegetative production of the plant as it seems to support better and faster regrowth. Therefore, it is recommended that these treatments can be adopted for the cultivation of fluted pumpkin for vegetative purposes.

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