



GROWTH AND YIELD RESPONSE OF FLUTED PUMPKIN (*Telfairia occidentalis* Hook, F.) AS INFLUNCED BY THE APPLICATION OF RABBIT URINE AND RABBIT DROPPINGS

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ABSTRACT

The study was carried out to assess the growth and yield response of fluted pumpkin (*Telfairia occidentalis* Hook, F.) as influenced by different rates of rabbit urine and droppings at the Federal College of Forestry, Jericho, Ibadan, Nigeria. The treatments consisted of four levels of rabbit urine (10, 20, 30 and 40 ml per 10 kg soil), four levels of rabbit droppings (10, 20, 30 and 40 g per 10 kg soil) and a control. These were arranged in a Completely Randomized Design (CRD) with four replicates. Data were collected on number of leaves, plant height, stem girth, number of nodes and leaf area, the parameters were measured weekly for ten weeks. It was shown from the results that, the rabbit urine significantly enhanced all growth parameters compared to rabbit droppings and the control. Highest number of leaves 95.00, plant height of 111.00 cm², stem girth of 4.15 cm, number of nodes of 31.25 and leaf area of 344.70 cm² after 10 weeks of planting with the application of 40 mL of rabbit urine. The study also showed that, rabbit droppings improved growth relative to the control but rabbit urine performed better. The findings indicated that rabbit urine, particularly at 40 mL per 10 kg soil, is highly effective organic fertilizer for fluted pumpkin production.

Keywords: Fluted pumpkin, Sustainable, Rabbit, Organic, Fertilizer.

INTRODUCTION

One of the important leafy vegetable widely cultivated and consumed in west Africa and particularly in Nigeria is fluted pumpkin (*Telfaria occidentalis* Hook. F.) This vegetable is valuable for its medicinal, nutritional and economic importance. (Schippers, 2002). The leaves contain vitamins, protein and minerals, while the seed has good amount of oil and protein (Uguru *et al*, 2011). However, fluted pumpkin has low productivity due to low soil fertility and cost of inorganic fertilizer which has really increased. Full dependence on commercial or inorganic fertilizers has brought about environmental and health issues, pointing to organic nutrient sources (Agele *et al.*, 2015). Some of the benefits of applying organic manure are the following; it improves soil structure, it enhances microbial activity and gradually release nutrients, therefore, supporting sustainable crop productivity. An aspect of agriculture where rabbits are produced generates an amount of urine and droppings as wastes. Their urine is particularly rich in nitrogen, while their droppings contain organic matter and essential macro nutrients (Mutai, P.A. 2018). The application of these waste materials as compost or organic manure in crop production reduces environmental pollution and also reduces the cost of inputs for the purpose of improving soil fertility to increase crop yield.

This study investigated was to investigate the effects urine and droppings of rabbits on the growth and yield of fluted pumpkin, with the aim of determining the most effective organic treatment for best pumpkin yield.

MATERIALS AND METHODS

Experimental Site

The experiment was carried out at the horticultural garden of the Federal College of Forestry, Ibadan, Nigeria (7.54°N, 3.34°E). The experimental site has a tropical climate of annual rainfall of 1300-1600 mm, mean temperature of about 28.9°C, and relative humidity of approximately 89%.



Experimental Design and Treatments

The treatments consisted of four levels of rabbit urine (10, 20, 30 and 40 mL per 10 kg soil), four levels of rabbit droppings (10, 20, 30 and 40 g per 10 kg soil) and a control. These were arranged in a Completely Randomized Design (CRD) with four replicates. The total experimental units for this experiment was thirty-six and inside each of the experimental unit, that is, each nylon were 10 kg soil-filled polythene pot planted with one fluted pumpkin seedling. The treatments were:

- T1: Control (no amendment)
- T2: 10g of rabbit droppings
- T3: 20g of rabbit droppings
- T4: 30g of rabbit droppings
- T5: 40g of rabbit droppings
- T6: 10 mL of rabbit urine
- T7: 20 mL of rabbit urine
- T8: 30 mL of rabbit urine
- T9: 40 mL of rabbit urine

Preparation and Application of Treatments

Rabbit droppings were collected and air-dried for one week and it was later crushed to reduce the particle size. This was properly mix with the soil two weeks before transplanting. Also, rabbit urine was collected and diluted with water at a ratio of 1:5, this was also applied weekly to the soil around the plants.

Data Collection

Data were collected weekly starting from two to ten weeks after planting on the following parameters:

- i. Number of leaves
- ii. Plant height (cm)
- iii. Stem girth (cm)
- iv. Number of nodes
- v. Leaf area (cm²)

Data Analysis

Data collected were subjected to Analysis of Variance (ANOVA) and treatments means were separated using Duncan Multiple Range Test (DMRT) at 5% probability test.

RESULTS AND DISCUSSION

Soil Physico-Chemical Properties

Table 1 showed the pre-planting soil analysis result of the soil used for the experiment. The result showed that, the soil was sandy clay with was slightly acidic with the P^h of (6.09), moderate organic matter of (5.85%) and the total nitrogen that is on the low side, showing that there is need for nutrient supplementation. The table above showing the physico-chemical properties of the soil indicated that the soil was moderately fertile but deficient of phosphorus and potassium, also much of a sandy loam texture prone to leaching of nutrient. The condition of the soil stated above made it suitable for this study, that is, evaluation of the effectiveness of rabbit urine and droppings as organic nutrient sources. The parameters taken attributed greatly to the added nutrients and the condition of the soil.



Table 1. Physico-Chemical Properties Experimental Soil

Parameter	Topsoil
pH	6.09
O.C (%)	3.39
O.M (%)	5.85
TN (%)	0.29
(%) SAND	76.50
(%) CLAY	13.00
(%) SILT	10.50
P (mg/kg)	1.80
Ca (Cmol/kg)	11.22
Mg (Cmol/kg)	5.02
Na (Cmol/kg)	3.22
K (Cmol/kg)	0.22
Cu (mg/kg)	2.00
Mn (mg/kg)	32.00
Zn (mg/kg)	12.00
Fe (mg/kg)	50.00

Source: FRIN Soil lab. (2025)

Effect of Organic Nutrient on Number of Leaves

Table 2 showed that rabbit urine brought about significant increase in leaf production compared to rabbit dropping and the control. The application of 40 mL rabbit urine gave the highest number of leaves (95.00). This result was confirmed by Moller and Muller (2012), that rapid availability of nitrogen from urine promotes leaf initiation and expansion.

Table 2: Effects of Rabbit Droppings and Urine on Number of Leaves at 10 WAP

Treatment	Number of Leaves
Control	47.75
10 g Droppings	63.25
20 g Droppings	65.75
30 g Droppings	74.00
40 g Droppings	73.50
10 mL Urine	75.00
20 mL Urine	75.00
30 mL Urine	82.50
40 mL Urine	95.00
LS	7.01
SE±	3.02

Means separated using Duncan Multiple Range Test at $p \leq 0.05$

Effect of Organic Nutrient on Plant Height

The result in Table 3 revealed that, rabbit urine increases progressively the plant height the more the application was increased. The plant with the tallest height (111.00) was obtainable at T9 (40 mL Urine). This confirmed the findings of Taiz and Zeiger (2018) that cell elongation, stem growth are likely enhanced by the presence of Nitrogen available from urine



Table 3: Effects of Rabbit Droppings and Urine on the number of leaves at 10 WAP

Treatment	Plant Height (cm)
Control	72.50
10 g Droppings	84.75
20 g Droppings	89.25
30 g Droppings	96.50
40 g Droppings	95.00
10 mL Urine	98.75
20 mL Urine	101.00
30 mL Urine	105.25
40 mL Urine	111.00
L.S	16.85
SE±	8.22

Means separated using Duncan Multiple Range Test at $p \leq 0.05$

Effect of Organic Nutrient on Stem girth and Number of Nodes

The result as presented in Table 4 and 5 showed that, thicker stems and higher number of nodes are (4.15 cm) and (31.25) respectively, these were obtained from T9 (40 mL) which was rabbit urine. This supported the outcome of Authur *et al.* (2012) that node formation is associated with enhanced meristematic activity, which is stimulated by adequate nitrogen and growth hormones present in urine.

Table 4: Effects of Rabbit Droppings and Urine on Stem girth (cm) at 10 WAP

Treatment	Plant Height (cm)
Control	2.95
10 g Droppings	3.20
20 g Droppings	3.35
30 g Droppings	3.60
40 g Droppings	3.55
10 mL Urine	3.65
20 mL Urine	3.75
30 mL Urine	3.95
40 mL Urine	4.15
LS	0.42
SE±	0.20

Table 5: Effects of Rabbit Droppings and Urine on Number of Nodes at 10 WAP

Treatment	Plant Height
Control	18.50
10 g Droppings	22.75
20 g Droppings	24.00
30 g Droppings	26.50
40 g Droppings	25.75
10 mL Urine	27.25
20 mL Urine	28.00
30 mL Urine	29.75
40 mL Urine	31.25
LS	2.76
SE±	1.34

Effect of Organic Nutrient on Leaf Area

Table 6 presented result of effects of rabbit urine and droppings on leaf area of fluted pumpkin. The result showed that, the highest leaf area was recorded at T9 (40 mL Urine of rabbit). It has been proven that larger leaf area improves light interception and photosynthesis, making possible the accumulation of higher biomass. The study showed that rabbit droppings also supported and improved plant growth compared to the control. It was observed from this study that rabbit droppings released



nutrients slowly, therefore, making it less significantly effective than rabbit urine within the experimental period.

Table 6: Effect of Rabbit Urine and Droppings on Leaf Area (cm²) at 10 WAP

Treatment	Leaf Area (cm ²)
Control	210.40
10 g Droppings	255.60
20 g Droppings	268.75
30 g Droppings	295.50
40 g Droppings	290.25
10 mL Urine	300.80
20 mL Urine	312.45
30 mL Urine	330.90
40 mL Urine	344.70
LS	35.76
SE±	17.43

WAP = Weeks After Planting

CONCLUSION AND RECOMMENDATION

It was demonstrated that both the rabbit urine and droppings had positive impact on the growth and yield of fluted pumpkin. However, the rabbit urine at 40 mL was significantly effective than the droppings. The application of 40 mL rabbit urine per 10 kg soil produced the best performance across all growth parameters. Therefore, rabbit urine can be used in place of inorganic fertilizers for its efficiency, low-cost and its friendliness to the environment for fluted pumpkin production. Rabbit urine at 40 mL per 10 kg soil is recommended for optimum growth of fluted pumpkin. Farmers should integrate rabbit production with vegetable farming to enhance nutrient recycling. Further field trials are recommended to validate these findings under open field conditions.

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