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EFFECT OF UREA AND NPK 15:15:15 FERTIGATION ON PERFORMANCE OF LEAF YIELD OF FLUTED PUMPKIN (*Telfairia occidentalis*) IN UYO LOCAL GOVERNMENT AREA, NIGERIA

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ABSTRACT

The purpose of this study was to determine the effect of urea and NPK 15:15:15 fertigation on the performance of leaf yield of fluted pumpkin (Telfairia occidentalis) in Uyo Local Government Area. This study adopted a Randomized Complete Block Design (RCBD). The experiment was conducted at the Agricultural Education Skills Acquisition Farm of the University of Uyo. The population consists of 144 fluted pumpkin seeds of Telfairia occidentalis Hook F. The sample size of 108 fluted pumpkin plants was selected for the study using a purposive sampling technique. The number of leaves of fluted pumpkin was counted while fresh leaf weight was measured using an Electronic Compact Scale. 540 grammes of urea and 540 grams of NPK 15:15:15 were dissolved in 108 liters of water each and applied through irrigation pipes, and the same was also measured and applied through the ring method. Data collected were analyzed using weighted mean for answering research questions and analysis of covariance (ANCOVA) for testing the null hypotheses at a 0.05 level of significance. Findings indicated that fluted pumpkin grown with urea and NPK 15:15:15 fertigation performed better in terms of number of leaves and fresh leaf weight than those grown by the ring method of fertilizer application. Also, there was a significant effect of urea, NPK 15:15:15 fertigation on the number of leaves and fresh leaf weight, with urea fertigation showing a highly significant difference. It was concluded that the application of urea and NPK 15:15:15 through fertigation significantly improved the yield parameters of fluted pumpkin. It was recommended that vegetable farmers should adopt urea and NPK 15:15:15 fertilizers applied through the fertigation method to optimize the yield of fluted pumpkin.

Key Words: Urea; NPK 15:15:15, Fertigation and Fluted Pumpkin

INTRODUCTION

Fluted pumpkin (*Telfairia occidentalis Hook F.*) is a leafy vegetable plant that is most popular in the South-East and South-South regions of Nigeria. Its popularity has also spread to other countries like Ghana, Cameroun, and Sierra Leone owing to its versatile nutritional and medicinal values (Ibironke and Iwotome, 2019). Fluted pumpkin, being a major popular vegetable, is locally referred to by the Igbos as Ugu and used for cooking stew, soup (Edikang ikong in Ibibio), yam and vegetable sauces, even cooked slightly with okra and many more. This is why it remains popular in rural areas where it is often considered to be more nutritious than exotic vegetables. Also, the favorable climatic conditions make fluted pumpkin a favorite vegetable crop grown by farmers in the Uyo LGA of Akwa Ibom State.

Pumpkin, originally a native of Central and Southern America, is a fruit-bearing, creeping plant where the stem can be elongated up to 10 m in length when ideal field conditions are met. The plant consists of both vegetative and reproductive structures. Vegetative structures include the leaves, roots, stem, and tendrils, while reproductive structures include fruits and flowers (Chukwudi *et al.*, 2017). Production of fluted pumpkin has been quite profitable to human health and financially viable, not only as a backyard crop but also as a commercial crop to provide appreciable cash income to vegetable farmers in the Uyo LGA of Akwa Ibom State. The cultivation of fluted pumpkin encompasses the total of all operations involved in agronomic practices (site location and preparation, planting, fertilizer application, weed and disease control, and good harvesting methods) of the crop. Adebayo *et al.* (2019) stated that to sustain high yield, proper manure and fertilizers must be incorporated. Vegetable farmers have adopted various systems and methods to ensure better production of fluted pumpkin despite the numerous challenges like inadequate knowledge on the proper fertilizers to use, pest and disease infestation, poor planting materials (seeds), and the off-season of the crop. Therefore, it becomes critical to consider the effect of urea and NPK fertigation as soil fertility management for better yield of fluted pumpkin.

High yields can be obtained from poor soil with appropriate soil fertility management techniques. Orji *et al.* (2022) averred that yield is a complex character and is a function of several component traits and their interaction with the environment, fertilizers, quality, and quantity of crop harvested from a unit of land expressed in kilograms per hectare. Fresh leaves yield is the quantity of fluted pumpkin leaves harvested from a particular area of land within a given period. Food and Agriculture Organization (FAO) (2023) reported that pumpkin producers can produce 21-40 tons of pumpkin per hectare (11000-36000 lbs per acre). The yield depends on the variety of the pumpkin cultivated, the planting distance, the environmental conditions, and fertilizer application (Amao *et al*., 2018).
Urea is mainly utilized as a source of nitrogen, which is an essential nutrient for plant growth. Meister (2019) asserted that urea is nitrogenous in nature with a single element, which is an essential component of many compounds of plants, such as chlorophyll, nucleotides, proteins, alkaloids, enzymes, hormones, and vitamins for the build-up of the crop. Sindha *et al.* (2024) stated that urea application is commonly used because of its high solubility, rapidly and efficiently absorbed by plants. NPK 15:15:15 fertilizers are chemical or synthetic fertilizers that are manufactured artificially and contain mineral chemicals, which, when added into the soil, help to improve crop yield. According to Mortiza (2023), the proportion of NPK 15:15:15 in a compound fertilizer is represented by numbers. The three numbers label on fertilizer bags correspond to the percentage of these materials found in the fertilizers which play significant roles in promoting the growth and yield of crops, like nitrogen (N) which helps in

facilitating the growth and make the crop greenish in colour; phosphorus accelerate the maturity of the plant while potassium help to improve the quality of fruits and seeds.

Urea and NPK 15:15:15 fertigation is a primary technique in which the fertilizer is dissolved and dispensed with irrigation water through a drip irrigation system to get higher fertilizer use efficiency as well as increase the crop yields (Valducci, 2020). The use of frequent fertigation, combined with improved irrigation scheduling, increased residence time of nutrients in the root zones while reducing the potential for groundwater pollution (Ashrafi *et al*., 2020). Fertigation allows application of the right amounts of plant nutrients uniformly to the wetted root volume zone where most of the active roots are concentrated, and this helps enhance nutrient use efficiency by vegetables, thereby improving the productivity and quality of the crop. This implies that urea and NPK 15:15:15 fertigation will result in greater absorption, assimilation, and translocation of nutrients for increased photosynthesis, increased production, and ultimately reflected in the final leaves of fluted pumpkin. The conventional method, like the ring method, is the practice of applying fertilizer to the base of the plant near the root in a circular way.

Christo *et al*. (2020) reported that Super-Gro liquid fertilizer levels of 15ml and 20ml per 5 liters of water are necessary to improve nutrient contents of fluted pumpkin leaf and higher yield. Similarly, Mounashree *et al*. (2018) studied the influence of fertigation on growth and yield of strawberry (*Fragaria* X *ananassa* Duch.) and reported that application of 75% RDF through fertigation stands best in terms of plant height (27-29 cm), number of trifoliate leaves (27-30), plant spread (>50 cm), maximum leaf area (>175 cm2), number of runners per plant (1.75-1.85) and plant dry weight (28-30 g). Ayas (2021) studied on the effect of irrigation and fertigation levels on Cabbage and found that the highest yield was obtained from 100% irrigation and full fertigation treatment as 73.2- and 68.4-tons ha-1 respectively, while the lowest yield was obtained from zero irrigation and full fertigation treatment as 3.0- and 3.0-tons ha-1, respectively. Therefore, application of urea and NPK15:15:15 using fertigation fosters an increase in the number of leaves of fluted pumpkin than the ring method.

Akonye *et al*. (2022) evaluated the performances of *Telfairia occidentalis* Hook fil. under varying growth media subject to the amount of urea granules (25g, 50g, 100g, 125g and 150g) dissolved in water containing micronutrients and observed that urea growth media, M25U produced the highest vine length, number of leaves, total leave area of *T. occidentalis*. Similarly, Goler and Ibrahim (2018) investigated the effect of fertilizers and cutting frequency on fluted pumpkin (*Telfairia occidentalis* Hook F.) and observed that 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. Plant nutrition is an important aspect for enhancing production, but at present, the application of fertilizer in conventional ways is not able to give optimal yield and fertilizer use efficiency. It therefore becomes pertinent that the application of urea and NPK 15:15:15 fertigation is advisable when soil conditions restrict nutrient availability to be used by crops.

STATEMENT OF THE PROBLEM

Fluted pumpkin (*Telfairia occidentalis*) is extensively cultivated by small-scale farmers, virtually by every household in the Uyo LGA of Akwa Ibom State. But the cultivation is done only by the peasant vegetable farmers who may not cultivate in large quantities, lack knowledge on the quantities of fertilizers to apply, or the timeliness and appropriate method of fertilizer application. More so, there is a shift from the use of inorganic fertilizers to poultry manure by vegetable farmers in Uyo LGA. This has led to over-dependence on poultry manure, making it

scarce and expensive for vegetable farmers to get. It seems vegetable farmers rarely or may not use urea and NPK fertigation on fluted pumpkin because they may not be aware or may lack full knowledge of the method of application.

At present, the application of fertilizer by vegetable farmers through conventional methods such as the ring method, side placement, and top dressing is not able to give higher yields, and the fertilizer use efficiency is decreasing day by day as a result of run-off by rain, leaching below the root zone, and volatilization. Based on this, there is a need to use fertigation that may enhance the use efficiency by crop and facilitate nutrient circulation to especially where soil conditions restrict nutrient availability.

PURPOSE OF THE STUDY

The main purpose of this study was to determine the effect of urea and NPK 15:15:15 fertigation on the leaf yield performance of fluted pumpkin (*Telfairia occidentalis*) in the Uyo Local Government Area. Specifically, the study sought to:

i. determine the effect of urea, NPK 15:15:15 fertigation, and without fertigation on the number of leaves of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA.
ii. determine the effect of urea, NPK 15:15:15 fertigation, and without fertigation on fresh leaf weight of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA.

RESEARCH QUESTIONS

The following questions were raised to guide the study.

i. What is the effect of urea, NPK 15:15:15 fertigation, and without fertigation on the number of leaves of fluted pumpkin *(Telfairia occidentalis)* in Uyo LGA?
ii. What is the effect of urea, NPK 15:15:15 fertigation, and without fertigation on fresh leaf weight of fluted pumpkin *(Telfairia occidentalis)* in Uyo LGA?

RESEARCH HYPOTHESES

The following null hypotheses were formulated to guide the study

H_{01} There is no significant effect of urea, NPK 15:15:15 fertigation, and without fertigation on the number of leaves of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA

H_{02} There is no significant effect of urea, NPK 15:15:15 fertigation, and without fertigation on fresh leaves weight of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA

MATERIALS AND METHODS

This study adopted an experimental layout of a Randomized Complete Block Design (RCBD). The experiment was conducted at the Agricultural Education Skills Acquisition Farm of the University of Uyo. The area of the land was 120 m2, where each block measured 6.5m x 6m, and each plot for the beds measured 6.5m x 1m. Each bed was separated by 1m within a row and 0.5m between. 144 fluted pumpkin seeds of *Telfairia occidentalis* Hook F were planted 2 per hole at a depth of 3-4cm at a spacing of 1m x 1m. The treatments involved were T_1 urea fertigation, T_2 NPK 15:15:15 fertigation, T_3 urea without fertigation, and T_4 NPK 15:15:15 without fertigation on *Telfairia occidentalis,* which serves as a control. 540 grams of urea and 540 grams of NPK 15:15:15 were dissolved in 108

liters of water each and applied through irrigation pipes, and the same measured was applied through the ring method. Standardized instruments such as measuring tape, garden line, and pegs, ranging from a pole, shovel, hand-fork, and electronic compact scale, were used. The measurement was taken from 108 fluted pumpkin plants as a sample size. The results are presented in tables using weighted mean to answer research questions and Analysis of Covariance (ANCOVA) to test null hypotheses. A post hoc analysis was employed using Scheffe's post hoc test to test for significance.

RESULTS AND DISCUSSION

Research Question 1: What is the effect of urea, NPK 15:15:15 fertigation, and without fertigation on the number of leaves of fluted pumpkin *(Telfairia occidentalis)* in Uyo LGA.

Results in Table 1 show the mean effect of urea, NPK 15:15:15 fertigation, and no fertigation on the number of leaves of fluted pumpkin (Telfairia occidentalis). It indicates that the mean number of leaves of fluted pumpkin grown with urea fertilization and NPK 15:15:15:15 fertigation responds better than those grown with urea or NPK 15:15 without fertigation. This reveals that fluted pumpkin grown with urea fertigation performs better in terms of the number of leaves, followed by NPK 15:15:15 fertigation compared to those grown with urea and NPK 15:15:15 without fertigation, respectively.

Table 1: Mean Analysis of Effect of Urea, NPK 15:15:15 Fertigation and without Fertigation on Number of Leaves of Fluted Pumpkin Uyo LGA

Categories	Number of Plants	Mean Number of Leaves
Urea with Fertigation	27	33.11
NPK15:15:15 Fertigation	27	27.70
Urea without Fertigation	27	23.23
NPK15:15:15 without Fertigation	27	23.26
Total	**108**	**26.82**

Research Hypothesis 1

There is no significant effect of urea, NPK 15:15:15 fertigation, and without fertigation on the number of leaves of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA. (Table 2)

The result in Table 2 reveals that the calculated F-value is 11.48 and the F-Sig .000 at 3 and 104 degrees of freedom at 0.05 level of significance. Since the F-Sig value .000 is less than the p-value of .05, the null hypothesis, which stated that there is a significant effect of urea, NPK 15:15:15 fertigation, and without fertigation on the number of leaves of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA, is rejected. Hence, there is a significant effect of urea, NPK 15:15:15 fertigation, and without fertigation on the number of leaves of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA. Since there is a significant difference, a post hoc analysis was employed using Scheffe's test. The result of the analysis is presented in Table 3.

Table 2: Analysis of Covariance Showing Effect of Urea, NPK 15:15:15 Fertigation and without Fertigation on Number of Leaves of Fluted Pumpkin (*Telfairia occidentalis*) in Uyo LGA

Source of Variation	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1778.959[a]	3	592.986	11.480	.000
Intercept	77700.759	1	77700.759	1504.296	.000
CODING	1778.959	3	592.986	11.480	.000
Error	5371.869	104	51.653		
Total	84851.587	108			
Corrected Total	7150.828	107			

a. R Squared = .043 (Adjusted R Squared = .015

The result in Table 3 indicated that only urea fertigation had a higher interactive mean effect of 9.87 with other treatments. Meanwhile, NPK 15:15:15 fertigation, urea without fertigation, and NPK 15:15:15 without fertigation had lower positive and negative interactive mean effects, ranging from -9.85 to -9.88, with other treatments. This implies that urea fertigation exerts a significant effect on the number of leaves of fluted pumpkin when compared to treatments: NPK 15:15:15 fertigation, urea without fertigation, and NPK 15:15:15 without fertigation.

Table 3: Scheffe Post Hoc Showing the Interactive Effect of Urea, NPK 15:15:15 Fertigation and without Fertigation on Number of Leaves of Fluted Pumpkin (*Telfairia occidentalis*) in Uyo LGA

(I) CODING	(J) CODING	Mean Difference (I-J)	Std. Error	Sig.
Urea Fertigation	NPK15:15:15 Fertigation	5.47	1.96	.060
	Urea without Fertigation	9.87*	1.96	.000
	NPK15:15:15 without Fertigation	9.87*	1.96	.000
NPK15:15:15 Fertigation	Urea Fertigation	-5.47	1.96	.060
	Urea without Fertigation	4.47	1.96	.164
	NPK15:15:15 without Fertigation	4.44	1.96	.168
Urea without Fertigation	Urea Fertigation	-9.88*	1.96	.000
	NPK15:15:15 Fertigation	-4.47	1.96	.164
	NPK15:15:15 without Fertigation	-.026	1.96	1.000
NPK15:15:15 without Fertigation	Urea Fertigation	-9.85*	1.96	.000
	NPK15:15:15 Fertigation	-4.44	1.96	.168
	Urea without Fertigation	-.14	.39	.989

* The mean difference is significant at the 0.05 level

Research Question 2: What is the effect of urea, NPK 15:15:15 fertigation, and without fertigation on the fresh leaves weight of fluted pumpkin *(Telfairia occidentalis)* in Uyo LGA?

Results in Table 4 show the mean effect of urea, NPK 15:15:15 fertigation, and without fertigation on the fresh leaf weight of fluted pumpkin *(Telfairia occidentalis)*. It indicates that the mean fresh leaves weight of fluted pumpkin grown with urea fertigation and NPK 15:15:15 fertigation was more than urea without fertigation and NPK 15:15:15 without fertigation. This implies that fluted pumpkins grown with urea fertigation perform better in terms of fresh leaves weight, followed by urea without fertigation, and then those grown with NPK 15:15:15 fertigation and NPK 15:15:15 without fertigation, respectively.

Table 4: Mean Analysis of Effect of Urea, NPK 15:15:15 Fertigation and without Fertigation on Fresh Leaf Weight of Fluted Pumpkin Uyo LGA

Categories	Number of Plants	Mean Fresh Leaves Weight (g)
Urea with Fertigation	27	124.06
NPK15:15:15 Fertigation	27	80.26
Urea without Fertigation	27	89.85
NPK15:15:15 without Fertigation	27	77.95
Total	**108**	**93.03**

Research Hypothesis 2

There is no significant effect of urea, NPK 15:15:15 fertigation, and without fertigation on the fresh leaves weight of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA.

The result in Table 5 indicated that the calculated F-value was 7.23 and the F-Sig .000 at 3 and 104 degrees of freedom and 0.05 level of significance. Since the F-Sig value .000 is less than the p-value of .05, the null hypothesis, which stated that there is no significant effect of urea, NPK 15:15:15 fertigation, and without fertigation on fresh leaves weight of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA, is rejected. Hence, there is a significant effect of urea, NPK 15:15:15 fertigation, and without fertigation on the fresh leaves weight of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA.

Since there is a significant difference, a post hoc analysis using Scheffe's Test was employed. The result of the analysis is presented in Table 6.

Table 5: Analysis of Covariance Showing Effect of Urea, NPK 15:15:15 Fertigation and without Fertigation on Fresh Leaves Weight of Fluted Pumpkin (*Telfairia occidentalis*) in Uyo LGA

Source of Variation	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	36822.819[a]	3	12274.273	7.234	.000
Intercept	934670.550	1	934670.550	550.838	.000
CODING	36822.819	3	12274.273	7.234	.000
Error	176468.764	104	1696.815		
Total	1147962.132	108			
Corrected Total	213291.582	107			

a. R Squared = .173(Adjusted R Squared = .149)

Results in Table 6 indicated that only urea fertigation had a more significant interactive mean effect of 34.20 and 43.80 than other treatments. Other treatments, particularly NPK 15:15:15 fertigation, urea without fertigation, and

NPK 15:15:15 without fertigation, had lower positive and negative interactive mean effects ranging from -34.20 to -46.12. This implies that urea fertigation exerts a significant effect on fresh leaf weight of fluted pumpkin when compared to other treatments: NPK 15:15:15 fertigation, urea without fertigation, and NPK 15:15:15 without fertigation

Table 6: Scheffe Post Hoc Showing the Interactive Effect of Urea, NPK 15:15:15 Fertigation and without Fertigation on Fresh Leaves Weight of Fluted Pumpkin (*Telfairia occidentalis*) in Uyo LGA

(I) CODING	(J) CODING	Mean Difference (I-J)	Std. Error	Sig.
Urea Fertigation	NPK15:15:15 Fertigation	43.80*	11.21	.003
	Urea without Fertigation	34.20*	11.21	.030
	NPK15:15:15 without Fertigation	46.12*	11.21	.001
NPK15:15:15 Fertigation	Urea Fertigation	-43.80*	11.21	.003
	Urea without Fertigation	-9.59	11.21	.865
	NPK15:15:15 without Fertigation	2.30	11.21	.998
Urea without Fertigation	Urea Fertigation	-34.20*	11.21	.030
	NPK15:15:15 Fertigation	9.59	11.21	.865
	NPK15:15:15 without Fertigation	11.90	11.21	.770
NPK15:15:15 without Fertigation	Urea Fertigation	-46.12*	11.21	.001
	NPK15:15:15 Fertigation	-2.30	11.21	.998
	Urea without Fertigation	-11.90	11.21	.770

* The mean difference is significant at the 0.05 level

DISCUSSION

Effect of Urea and NPK 15:15:15 Fertigation on the Number of Leaves of Fluted Pumpkin

The study showed that fluted pumpkin grown with urea and NPK15:15:15 fertigation perform better in terms of number of leaves, and there is a significant effect of urea and NPK 15:15:15 fertigation and urea and NPK15:15:15 without fertigation on number of leaves. This implies that urea and NPK15:15:15, irrespective of the method of application (either by fertigation or by ring method), support the growth of fluted pumpkin in terms of the number of leaf development. Meanwhile, urea and NPK15:15:15 fertigation hasten the leaf development process. This occurs as a result of the uniform distribution of dissolved nutrients directly to the root of the crop. The finding is in tandem with the finding of Mounashree *et al*. (2018) who in a study on the influence of fertigation on growth and yield of strawberry (*Fragaria* X *ananassa* Duch.) in Mudigere, Karnataka, India reported that application of 75% RDF through fertigation stands best in terms number of trifoliate leaves (27-30), maximum leaf area (>175 cm), number of runners per plant (1.75-1.85) and plant dry weight (28-30 g). Fertigation stands out the best due to the increased nutrient absorption that overcomes the soil's inability to transfer nutrients to the plant on time and nutrient balance, as it is precisely mixed to prevent over- or low concentration. The finding is also in agreement with the finding of Gurpreet *et al*. (2024) investigated the impact of drip fertigation on growth, yield and quality of strawberry (*Fragaria* × *ananassa* Duch.) cultivar using recommended NPK dose through soil and recommended NPK dose through drip fertigation and found that the plant produced the greatest incremental plant height (26.16 cm), leaf area (148.94 cm2), leaf number per plant (26.16), and leaf area index through the application of drip fertigation than those through soil application. Fertigation results in greater absorption, assimilation, and translocation of nutrients for increased photosynthesis, increased production, and ultimately reflected in the final leaves of fluted pumpkin.

Effect of Urea and NPK 15:15:15 Fertigation on Fresh Leaf Weight of Fluted Pumpkin

The study indicated that fluted pumpkin grown with urea and NPK15:15:15 fertigation perform better in terms of fresh leaves weight than those grown with urea and NPK15:15:15 without fertigation, respectively. It was further observed that there was a significant effect of urea, NPK 15:15:15 fertigation, and without fertigation on the fresh leaves weight of fluted pumpkin (*Telfairia occidentalis*) in Uyo LGA. This may be due to the increase in leaf length and number of leaves of fluted pumpkin grown using urea fertigation and NPK15:15:15 fertigation. The increase in leaf weight might be that the dissolved nutrients were made available directly to the root of the crop, thereby minimizing losses through leaching. The finding is in support of the finding of Akonye *et al*. (2022), who evaluated the performance of *Telfairia occidentalis* Hook fil. Under varying growth media subject to the amount of urea granules (25g, 50g, 100g, 125g and 150g) dissolved in water and observed that urea growth media, M25U produced the highest VML, NL, LA, TLA, of *T. occidentalis* while M50U medium had the highest LA and RL. Urea produced the highest growth because it is an essential component that facilitates chlorophyll formation, which builds up the cell in the plant. The finding is also in agreement with the submission of Goler and Ibrahim (2018) who investigate the effect of fertilizers and cutting frequency on Fluted Pumpkin (*Telfairia occidentalis* Hook F.) and observed that significant difference ($P \leq 0.05$) 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. Therefore, the urea and NPK15:15:15 fertigation method of application of fertilizers enhances the fresh leaves weight of fluted pumpkin because the fertilizer was made in liquid form and was absorbed fast by the crop.

CONCLUSION

Urea and NPK15:15:15 fertigation on the leaf yield of fluted pumpkin in Uyo, Nigeria. The results indicated that the application of urea and NPK15:15:15 through fertigation significantly improved the yield parameters of fluted pumpkin in terms of the number of leaves and fresh leaves weight than urea and NPK 15:15:15 without fertigation, but with urea fertigation showing a highly significant difference from other categories. This is because the use of fertilizers delivered through a fertigation system enhances nutrient use efficiency by plant roots and reduces nutrient losses, leading to improved overall crop performance.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made:

i. Vegetable farmers should adopt urea and NPK15:15:15 fertigation methods to apply to fluted pumpkin in optimizing the number of leaves.
ii. Agricultural extension services should use the findings to guide farmers on the optimal application of urea and NPK15:15:15 fertigation to encourage the growth of more leaves to achieve fresh leaf weight for fluted pumpkin.

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