Asian Journal of Advances in Research

Volume 7, Issue 1, Page 465-473, 2024; Article no.AJOAIR.3828

Influence of Poultry and Goat Manures on Some Selected Soil Chemical Properties, Growth and Yeild of Fluted Pumpkin (*Telfairia occidentalis*)

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://prh.mbimph.com/review-history/3828

Original Research Article

Received: 16/05/2024
Accepted: 20/07/2024
Published: 10/09/2024

ABSTRACT

A field experiment was conducted during the 2021 cropping season at the Teaching and Research Farm of the Department of Agronomy, Faculty of Agriculture and Forestry, University of Cross River State, Obubra Campus to study the effects of poultry and goat manure on selected soil chemical properties, growth and yield of fluted pumpkin *Telfaria occidentalis* was conducted in University of Cross River, Agronomy Department, Teaching and Research Farm, Obubra, Cross River State in

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Cite as: *P.O., Abam, Agba, O.A., and Adiaha, M.S. 2024. "Influence of Poultry and Goat Manures on Some Selected Soil Chemical Properties, Growth and Yeild of Fluted Pumpkin (Telfairia Occidentalis)". Asian Journal of Advances in Research 7 (1):465-73. https://jasianresearch.com/index.php/AJOAIR/article/view/475.*

2021 cropping season. The experiment was three poultry manure rates (0, 3 and 6 t/ha) and goat manures rates (0, 3 and 6 t/ha) factorial with nine treatment combinations laid out in Complete randomized block design (CRBD) replicated three times. Data collected on growth and yield parameters were statistically analyzed using Analysis of variance (ANOVA) procedure. Results shows that either poultry or goat manure increased growth yield of *Telfaria occidentalis* and improved some soil chemical properties. The combined use of both (poultry and goat) manures at 3 t/ha produced plants with longest main vines length, highest number of leaves, fresh and dry matter yield per hectare and gave higher soil chemical properties (soil organic matter) 4.27, soil reaction (pH)(5.93), Available P(8.25 mg/kg), Exchangeable K(0.34 Cmol/kg), Exchangeable Mg (3.23 Cmol/kg) and Cation Exchange Capacity (CEC)(8.24 Cmol/kg) than the initial soil nutrient values obtained before the commencement of this experiment. The trial shows that 3t/ha of combined poultry and goat manure is appropriate for increased soil nutrients, growth and yield of *Telferia occidentalis* in this locality and therefore very strongly recommended.

Keywords: Poultry and goat manure, soil chemical properties, yield, fluted pumpkin.

1. INTRODUCTION

Fluted pumpkin (*Telfaria occidentalis* Hook F). belongs to cucurbitaceae family [1]. It is commonly cultivated in many parts of Nigeria for it leaves and fruits use for food, and medicinal purposes [2]. It is a perennial creeping dioecious vegetable crop that spreads on land or climb with coiled tendrils on stakes shrubs and trees [2,3,4]. The common name varies with different tribes in Nigeria such as: Ikong Ubong (Efiks/Ibibio), Ireke or Apiroko (Yoruba), Ugu (Igbo) respectively [2].

The fresh leaves and shoots are use for soups, sauce and stew [5] both leaves and seed have high economic importance. Nutritional value of leaves are rich in protein (11% crude protein oil) (3%), iron (7.70ppm), carbohydrate, (25%) moisture (86%) 1.7g fibre and 11% ash [5,6,7]. Both leaves and seeds have high economic importance. The seeds are eaten roasted, boiled or grounded to paste and use in soup and local seasoning in foods.

The pulp of fluted pumpkin is used as feed stuff for livestock animals [5]. It has medicinal value as anti-cholesterol, anti-diabetic, anti bacterial and anti-inflammatory qualities that is very important in pharmaceutical industries [8,9].

Studies have shown that most Nigerian soils decline in soil fertility through continues cultivation, deforestation, inapropriate farming practices and low organic matter among other factors [10].

Some Agricultural practices such as bush burning result in low organic matter content fauna and floral that makes fragile soil to be more prone to compaction and erosion [11,12].

The use of organic soil amendments is Vital in maintaining soil physical and chemical properties essential for high growth and yield of crops [7,13,14].

Azuka and Idu [10] indicated that the most important crop nutrient in Agricultural systems are Nitrogen, Phosphorus and Potassium that are present in organic manure in a long duration and sustainable form.

There is scanty literature information on the influence of organic- manure on soil chemical properties, growth and yield of fluted pumpkin *Telfaia occidentalis* in Obubra, Cros River, South-South, Nigeria.

There is scanty literature information on the influence of poultry and goat manures on the performance of *Telfaria occidentalis*.

Therefore, this study aimed to determine the influence of poultry and goat manures on some soil chemical properties , growth and yield of *Telfaria occidentalis* in Obubra, South, South Nigeria.

2. MATERIALS AND METHODS

The experiment was carried out in 2021 at the Teaching and Research Farm, Department of agronomy, Faculty of Agriculture, Obubra Campus, Cross River University, Cross River State Nigeria to determine the influence of poultry and goat manures treatments on selected soil properties, growth and yield of *Telefiaria occidentalis.*

Geographically Obubra is located between latitude 05^0 59”N and longitude 08^0 15”E (Cross

River Agricultural Development Project [15]. The climate is tropical humid with annual rainfall of 2000- 2500 mm per annum, average temperature range of 27 -310C [15].

The rainfall pattern is bimodal with wet period from April to October peak rains in July that is interrupted by short dry period in August (August break) followed by another rainy period in September to October. Dry season is from November to March [15].

The experimental Design was 3 x 3 factorial of 3 poultry manure rates at 0, 3 and 6t/ha and 3 goat manure rates (0, 3 and 6t/ha) with 9 treatment combinations laid out in Randomized complete block design replicated three times.

A land sized 42 x 17m (714m^2) was manually cleared, ploughed, divided into three Blocks. Each block was divided into 9 plots of 5m x 4m(20m^2) where planting beds were constructed with 0.5m separating each adjourning plot and 1.0 m between blocks.

After land preparation composite soil samples were collected at random from the experimental plots. These were bulked together mixed thoroughly and composite soil sample was collected for laboratory analysis to determine the properties of the soil using standard methods.

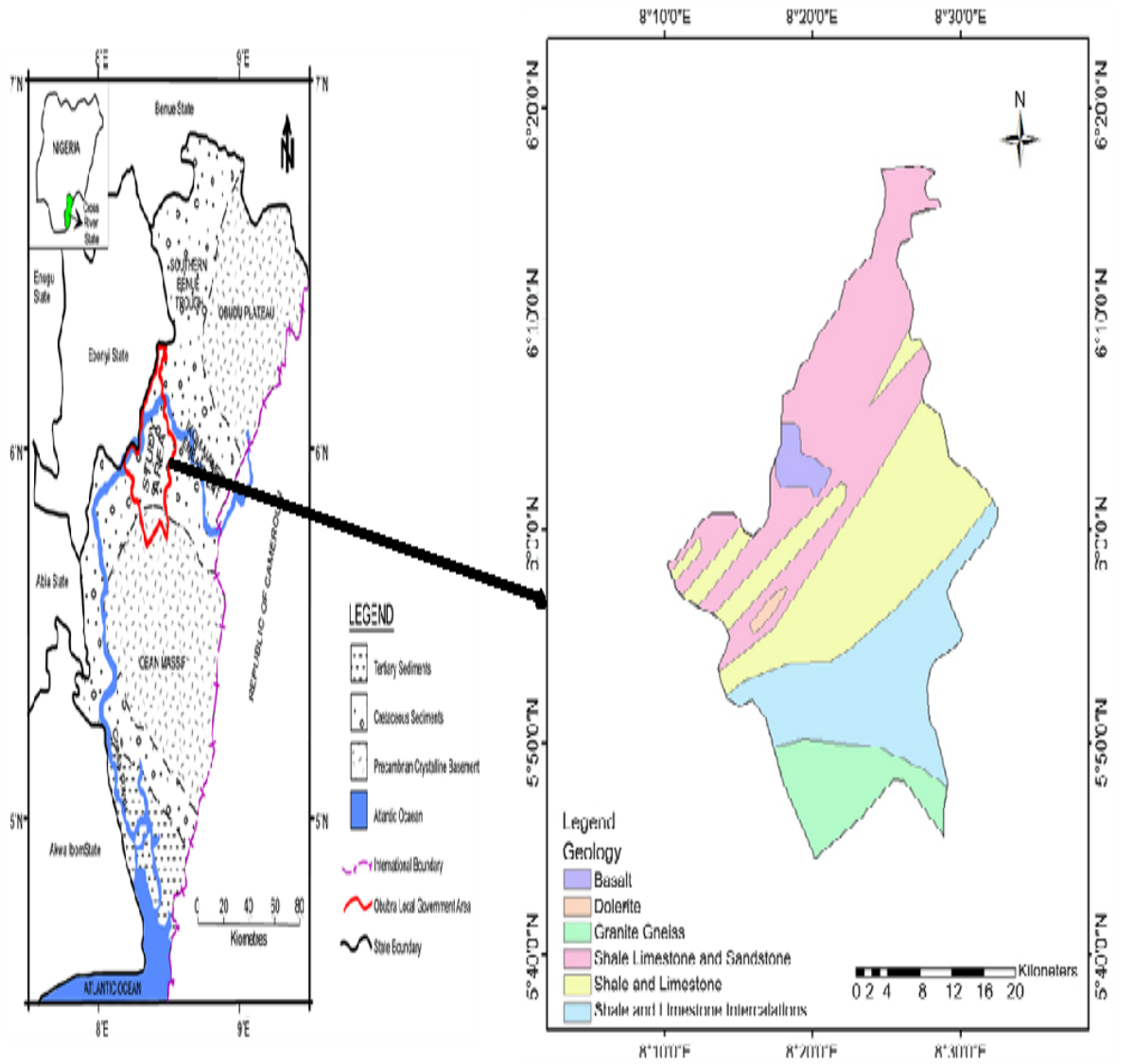

Fig. 1. Map of the study area

Well cured poultry and goat manures were applied in the appropriate plots according to the scheduled treatment rates (poultry manure at 0 (control no manure,3 and 6.t/ha. Also goat manure at 0, 3 and 6 t/ha, in the label plots.

After harvesting of *Telfaira Occidentalis* at the end of the experiment, another soil samples were collected from each treated plots for laboratory analysis to determine effects of the treatments on the some selected soil chemical properties, soil reaction (pH), soil organic matter, total N, Available P, Exchangeable K, Exchangeable Mg and Cation Exchange Capacity (CEC).

Soil reaction (pH) was determined using pH meter in soil solution ratio 1:2 in 0.0l $CaCl_2$. Soil organic carbon were determined by Nelson and Sommers [16] and total Nitrogen by Miccro-Kjeldahl digestion method after digestion of samples with concentrated sulphuric (H_2SO_4) acid . Available phosphorus (P) was determined by Bray and kurtz [17] extraction method.

Exchangeable cations were extracted using NH_4OA_c solution. Potassium (K) and sodium (Na) were read using flame photometer, while calcium (Ca) and magnesium (Mg) were determined on the atomic absorption spectrophotometer. Effective cation exchange capacity (ECEC) was established by summation of total exchangeable bases (potassium P, calcium Ca, magnesium Mg and sodium Na) and exchangeable acidity (Aluminum Al, and Hydrogen H). Fluted pumpkin (*Telfaira Occidentalis* matured seeds were planted at the spacing of Im × 0.5m inter and intra row respectively at the rate of one seed per hoe on 10th March, 2021. *Telfaria occidentalis* seedlings were staked supported with bamboo stakes at 4 weeks after planting (WAP). Weeding was done manually at 6, 10 and 15 weeks after planting (WAP) to keep the field weeds free. Sequential harvesting of fresh Foliage leaves of *Telfaria occidentalis* started at 8 weeks after planting (WAP) and continue till the end of the experiment on November 2022. Date were collected on growth and yield parameters (Number of leaves and braches per plant, main vine length (cm) fresh leaves weight per plot and hectare. No. of leaves were obtained by physical counting of the per plant, main vein length measured with meter rule. Fresh foliage were weighed per treatment at each harvest using weighing balance. All soil and plant data collected were statistically analyzed using analysis of variance (ANOVA) Procedure as described by Gomez and Gomez [18]. Treatment means that showed significant differences were separated using fisher least significant difference (FLSD) at 0.5% probability level according to Obi, [19].

3. RESULTS AND DISCUSSION

The study site soil properties presented in (Table 1) showed that the texture is sandy loam, low in nutrients. The low soil nutrients level of the soil indicate that there is need for application of organic manure (Poultry and goat manure to improve soil properties for good crop growth and high yield [20].

Table 1. Soil Physical and chemical properties of the study site before planting (0-40cm)

Properties	Value
Mechanical properties	
Coarse Sand (%)	18.2
Fine Sand (%)	67.4
Silt (%)	7.2
Clay (%)	17.3
Textural Class	Sandy loan
Chemical Properties	
PH in water	5.05
PH in KCl	4.04
Organic Carbon %	0.78
Organic Matter %	1.26
Total Nitrogen %	1.07
Available Phosphorus (C mol/kg)	6.5
Base saturation (%)	67.3
Exchangeable Cation (C mol/kg)	
Potassium (k) (C mol/kg)	0.17
Magnessium (mg) (C mol/kg)	1.6
Calcium (ca)	2.1
Sodium (Na)	0.07
Exchangeable acidity (C mol/kg)	
Aluminum	116
Hydrogen	211
Cation Exchange Capacity (C mol/kg)	5.63

Table 2 shows chemical properties of poultry and goat manure used in the study. Laboratory analysis of these manure indicate that they have higher percentage of Nitrogen N, Phosphorus P, Magnesium Mg and Calcium Ca, than the soil of this experimental site.

Poultry manure is slightly richer in nutrients than goat manure (Table 2). The application of manures with these chemical composition cold be beneficial for enhancing the fertility status of the experimental soil.

The used of poultry and goat manures significantly (P > 0.05) increased numbered and branches of fluted pumpkin in relative to control plots that were not treated with the manure (Table 3). Plots that received poultry manure gave longer main vines length than those of goat manure. The high vegetative growth parameters of fluted pumpkin (*Telfaria accidentalis)* recovered in this study could be attributed to the increased in availability of essential plant nutrients release by poultry and goat manures application. This finding supported the works of Udom *et al.,* [21]. They obtained increased in growth of fluted pumpkin as result of poultry and cow dung application.

Table 4 shows that application of (poultry and goat) manure increased the yield of *Telfaria occidentalis*). In this study, all the yield components (Dry leaf weight per plant, fresh foliage leaves weight and pod yield per hectare measured were significantly higher in poultry manure treated plots than goat manure.

Table 2. Chemical composition of poultry and Goat manures used in this experiment

Properties	Nutrients Values.	
	Poultry manure	Goat.
Nitrogen (%)	1.89	0.63
Phosphorus (%)	1.24	0.35
Potassium (%)	2.11	15.17
Calcium (%)	7.32	1.32
Magnesium (%)	2.01	1.43
Organic Carbon (%)	51.23	63.14
Organic Matter (%)	23.35	38.78

Table 3. Effects of poultry and goat manures on main vine length (cm), number of leaves and branches per plant of *Telfairia occidentalis* at fruiting Time

Treatments	No. of leaves Per plant	No. of Branches Per plant	Main Vine Length (cm)
Poultry manure Rates (t/ha)			
0	18.42	5.34	63.23
3	30.24	8.16	123.69
6	42.37	12.1	163.58
LSD (0.05)	3.2	0.52	15 .21
Goat manure Rates (t/ha)			
0	18.31	5.34	63.23
3	28.18	7.12	118.34
6	37.31	9.21	147.43
LSD (0.05)	4.3	0.51	16.30

Table 4. Effects of poultry and goat manures on the yield of *Telfairia Occidentalis*

Treatments	Fresh foliage leaves per hectare (t/ha)	Dry leaf per Plant (g)	Pod fruit yield per hectare (t/ha)
Poultry manure Rates (t/h)			
0	5.13	72.34	3.45
3	8. 42	146.58	10.34
6	15. 23	284.12	11.51
LSD (0.05)	0.76	12.32	0.05
Goat manure Rates (t/ha)			
0	5.14	72.34	3.45
3	7.23	129.79	6.26
6	13.15	217.36	9.13
LSD (0.05)	0.83	13.14	0.05

Table 5. Effects of poultry and goat manures on selected soil properties after harvest of *Telfaira occidentalis*

Treatments	Soil organic matter (%)	Soil PH	Total Nitrogen N (%)	C mol/ kg			
				P	K	Mg	CEC
Poultry manure (t/ha)							
0	1.26	5.04	0.08	6.57	0.18	1.61	5.62
3	1.73	5.16	0.11	6.99	0.22	1.94	6.31
6	2.54	5.58	0.15	7.54	0.26	2.13	7.42
LSD (0.05)	0.001	0.02	0.002	0.03	0.001	0.02	0.04
Goat Manure (t/ha)							
0	1.26	5.04	0.08	6.58	0.18	1.61	5.62
3	1.89	5.18	0.12	6.89	0.20	1.83	6.21
6	2.86	5.57	0.14	7.32	0.23	2.02	7.33
LSD (0.05)	0.001	0.02	0.002	0.3	0.001	0.02	0.04

Table 6. Main Integration effects of poultry and goat manures on some soil properties, growth and yield of *Telfiaria occidentalis*

Treatments (poultry x goat manures) interactions (P XG)	No. of leaves per plant	No. of branches per plant	Main vine length(cm)	Fresh foliage leaf yield per hectare(t/ha)	Pod yield per hectare(t/ha)	Soil organic matter (cmol/kg)	Soil pH	Total N (%)	P cmol/kg)	K cmol/kg	Mg cmol/kg)	CEC (cmol/kg)
P_0G_0	18.42	5.34	63.23	5.13	3.45	1.26	5.04	0.08	6.51	0.18	1.61	5.62
$P0G_1$	28.18	7.12	118.34	7.21	6.26	1.89	5.18	0.12	6.89	0.19	1.83	6.21
P_0G_2	37.31	9.21	147.43	8.42	9.13	2.56	5.51	0.14	7.32	0.20	2.02	7.33
P_1G_0	30.24	8.36	123.69	12.11	10.34	1.73	5.16	0.11	6.99	0.22	1.84	7.61
P_1G_1	68.45	15.43	206.78	35.68	16.78	4.24	5.93	0.18	8.25	0.34	3.23	8.24
P_1G_2	49.15	11.33	157.13	20.23	13.82	2.75	5.61	0.15	7.24	0.27	2.15	7.42
P_2G_0	42.37	12.16	163.58	17.15	11.51	2.54	5.52	0.13	7.54	0.26	2.13	7.42
P_2G_1	52.16	13.32	174.35	18.21	12.46	3.18	5.72	0.16	8.11	0.28	2.56	7.84
P_2G_2	48.26	14.16	197.27	16.14	14.17	3.47	5.83	0.17	7.58	0.31	2.78	7.45
LSD(0.05)	2.11	0.02	14.31	0.06	0.04	0.01	0.001	0.0001	0.01	0.0002	0.003	0.001

Note: $P_0G_{0=}$ 0t/ha poultry manure + 0 t/ha goat manure, $P0G_{1=}$ 0t/ha poultry manure + 3 t/ha) goat manure, $P_0G_{2=}$ 0t/ha poultry manure + 6 t/ha goat manure, $P_1G_{0=}$ 3t/ha poultry manure + 0 t/ha goat manure, $P_1G_{1=}$ 3 t/ha poultry manure, + 3 t/ha goat manure, $P_1G_{2=}$ 3t/ha poultry manure + 6t/ha goat manure , $P_2G_{0=}$ 6t/ha poultry manure + 0 t/ha goat manure , $P_2G_{1=}$ 6 t/ha poultry manure ,+ 3 t/ha goat manure, $P_2G_{2=}$6t/ha poultry manure + 6 t/ha goat manure.

This high yield values obtained in poultry manure rates as compared with goat manure suggests that poultry manure is superior to goat manure with respect to *Telfaria occidentalis.* Yield in the study area corroborated the observations that poultry manure is an excellent soil amendment material that provide essential plant nutrients require by many vegetables crops including *Telfairia occidentalis* [22,23,24].

The effects of poultry and goat manures on some soil properties after harvest is presented in Table 5. It was observed that poultry and goat manures application significantly increased soil chemical properties.

Result of soil analysis after harvest of *Telfairia Occidentalis* indicated that the values of selected soil chemical properties (soil organic matter, soil reaction pH, total N, P, K, Mg and CEC) of the study soil were higher than those observed at the commencement of the experiment before poultry and goat manures were applied (Table 5). Similar Observation were made by other workers [25,26].

There was significant effects of poultry and goat manures interaction on some measured parameters of *Telfairia occudentalis* and soil properties as presented in Table 6. Plots treated with a combination of both poultry and goat manures resulted in higher growth and yield of *Telfairia Occidentalis* as compared with where either poultry or goat manure was treated alone. All cases of combined application of 3t/ha of poultry and goat manure each produced the highest number of leaves (68.45) branches (15.42) per plant, longest main vine (206.78cm) fresh foliage leaves (25.68t/ha) and pods (16.78 t/ha) yield respectively.

A similar trend was observed in the improved soil properties where plants that had both poultry and goat manures at 3t/ha each gave greater selected soil nutrient values (soil organic matter 4.24%, soil reaction pH 5.93, total N(0.18%) available P (8.25 mg/kg), exchangeable K(.0.34cmol/kg), exchangeable Mg (3.23 cmol/kg), and CEC (8.24 cmol) respectively as compared with other treatments. This agrees with the findings of Ekundayo and Olayinka [27].

The Improvement of the soil chemical properties recorded in this study could be due to the decomposition and enhanced release and mineralization of the applied poultry and goat manures, therefore releasing more essential plant nutrients that were available for better growth yield of *Telfairia occidentalis and higher* soil nutrients. Similar influences of organic manure on improvement of soil properties was reported by Ewulo *et al.,* [28] Onwu *et al.,* [29] [30,31].

4. CONCLUSION

The used of poultry and goat manures increased growth, yield of fluted pumpkin (*Telfairia occidentalis*) and improved soil properties of the study area. The combined application of both poultry and goat manures at 3t/ha produced better performance of (longest main vines length, highest branches, fresh foliage and pods yield per hectare and resulted in improvement of some soil nutrients and chemical properties.

5. RECOMMENDATION

Farmer and Researchers are recommended to apply either 6t/ha poultry or goat manure or a combination of 3t/ha each of both (poultry and goat) manures for optimum growth, fresh foliage yield, higher soil fertility status by increased in soil properties (organic matter, total N,P,K, Mg and CEC).

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFFERENCES

1. Axtell BL. Minor oil crop food and agricultural organization (F A O) Agricultural services bulletin F A O of united national; 1992.
2. Udoh DI, Ndon BA, Asuquo PE, Ndaeyo NU. Crop production techniques for the tropics. Cconcept publication Lagos Nigeria. 2005;446.
3. Olejeme OC, et al. Effects of cutting frequency and staking methods on growth and yield of fluted pumpkin (*Telfairia*

Occidentalis Hook F) In Ishiagu Ebonyi State, Nigeria Proceedings of National Annual conference of crop science society of Nigeria, Held at Federal University of Technology Owerri, Imo State. 2019;95-103.

4. Ogar EA, Asiegbu JE. Effects of fertilizer rates and cutting frequency on the marketable vegetative and fruit yields in fluted pumpkin in southern Nigeria. Agro science. 2005;4(1):66 – 69.
5. Fasuyi AO. Nutritional potentials of some tropical vegetable leaf meals chemical characterization and functional properties. African Journal of Biotechnology. 2006;5; 4a-53
6. Essien AI, Ebana RUB, Udoh it B. Chemical evaluation of pods and pulp of fluted pumpkin. Fruit. Science Journal. 2018;45:175:178.
7. Essien BA, Essien JB, Azu Dof. Sustainable soil fertility management and improvement on the leaf yield of fluted pumpkin (TELFAMIA ACCIDENATIS HOOK F,) NI South eastern Nigeria. proceedings of crop science society of Nigeria. National Annual Conference held at Federal University of Technology, Owerri Imo state. 2019;191-2001.
8. Alada ARR. The Hematological effects Telfairia occidentatis diet preparation on rats. Africa. J. BIOMED. RES. 2011;3:185-186.
9. Egbekan MK, Nda Suleiman EO, Akinyeye O. Utilization of fluted pumpkin fruit (*Telfairia Occidentalis*) in mamailade manufacturing plant. Food Journals of Human nutrition. 2017;52 (2):171-176.
10. Azuka CV, Ldu MC. Effect of organic manures Application on phosphorus and nitrogen contents of coarse textured ultisols and okra productivity in NSUKLA south eastern Nigeria proceedings of National Annual conference of crop science society of Nigeria Owerri, Imo State. 2019;226-236.
11. Awodum MA. Effect of Poultry manure on growth yield and nutrient content of fluted pumpkin (*Telfairia occidentalis* HOOK F). Asian Journal of Agricultural Research. 20071;67-73.
12. Olatunji OSA, Ayuba BC, Anjembe SO, Ojeniyi. Effect of NPK and poultry manure on cowpea and soil nutrient composition. Journal of soil science Nigeria Journal of soil science. 2012;22(1):108-113.
13. Uka UN, Chukuka KS, Lwuagwu M. Relative effect of organic and inorganic fertilizers on the growth of Okra. Journal of agricultural Sci. 2013;58(3):159-166.
14. Usman M. Cow Dung, Goat and Poultry Manure and Their Effects on the Average Yields and Groth Parameters of Tomato Crop. Journal of Biology, Agriculture and Healthcare. 2015;2224-3208. 2225-093X, 5: 5-6
15. Cross River Agricultural Development Project (CRADP 2000). Report on wet lands of Cross River State, Nigeria. 2000; 115.
16. Nelson WL, Sommers LE. Total carbon organic carbon and organic matter in page AL, Miller RH, Kenergy DR. (Edit) Methods of soil analysis Part 2. Ameri. Soci. of Agron. Madison. 1982;5:39 – 579.
17. Bray RH, Kurz. Determination of total and Organic matter and available form of phosphorus in soils, Soil Sci. 1945;59:39–45.
18. Gomez KA, Gomez AA. Statistical procedures for Agricultural Research 2nd Edition; 1986.
19. Obi IU. Statistical method in detecting differences between treatments means and research methodology issues in laboratory and field experiment AP Express Publication Comp. Nsukka Nigeria. 2002;117.
20. Okon E, Udoh, Uboro IE, Effiong GS. Effects of goat and poultry manure application on selected soil properties and yield of Garden Egg (*Solanuim Melongena*) on acid sand of Akwa Ibom state of Nigeria. Nigerian Journal of soil science. 2016;26:319–324.
21. Udom GN, Harry GI, Udoh PI, Osundare KO. Effect of complementary use of Organic and Inorganic fertilizers on growth and yield of fluted pumpkin (*Telfairia Occidentalis* F. Hook on an ultisol. Proceedings of Annual National conference of crop Science Society of Nigeria Held at University of Uyo, Uyo Akwa Ibom State. 2019;68–76.
22. Eneje RC, Uzoukuw I. Effects of rice mill easte and poultry manure on some soil chemical properties and growth and yield of maize Nigerian journal of soil science. 2012;22(1):59-64.
23. Ewulo BS. Effects of poultry and cattle manure on sandy clay loan soil. Journal of Agric and veterinary sciences. 2005;4:839-841. Fagwalawa LD, Yahaya SM. Effect

organic manure on the growth and yield of Okra Imperial Journal of interdisciplinary research. 2016;2(3):130-133.

24. Ikeh AO, Ndaeyo NU, Uduak IG, Iwo GA, Ugbe LA. Udoh KL, Effiong GS. Growth and yield response of pepper (*Capsicum Fruterscens* L.) to varied poultry manure rates in Uyo, Southeastern Nigeria ARPN. Journal of Agricultural and biological science. 2012;7:9:735-742.
25. Udounang PIFS, Ndaey ONU. Effect of selected crushed crop residues on the vegetative performance of fluted pumpkin (*Telfairia Occidentalis* Hook) in Obio Akpa Oruk Anam LGA Akwa Ibom state. Proceeding of crop science society of Nigeria held at FUtTO Owerri. Imo state. 2019;150-155.
26. Okon E, Udoh, Usoro IE, Effiong GS. Effect of goat and poultry manure application on selected soil properties and yield of Garden egg (*Solanum melongena*) of Nigeria. Nigeria Journal of soil science. 2016;26:319-325.
27. Ekundayo RA, Olayinka A. Effects of Application of compost and in organic P on Soil Chemical in an ultisol Nigeria journal of Soil Science. 2016;26:38-67.
28. Ewulo BS, Ojiniyi SO, Akanni DA. Effects of poultry manure on selected soil physical and chemical properties, growth, yield and nutrient status of tomato. African journal of agricultural research. 2008;3(a):612-616.
29. Onwu AC, Abubakar JR, Unah PO. Effect of poultry manure on growth yield of okra and soil properties in Markudi, North Central Nigeria International Journal of Agricultural and food science. 2014;4(1):9-12.
30. Eseyin OA, Forah EO, Dook ABD. Preliminary study of the hypoglycenic action of the extract of *Telfairia Occidentalis* on some biochemical paramaters in rat. African Journal of Biotechnology. 2020;5:34-4 8.
31. Olaniyi JO, Akambi WB, Olaniran OA, Ilupeg OT. The effects of organicmineral and inorganic fertilizers the growth fruit yield, quality and Chemical Compositional Conference of agricultural bio-science A Review. American Journal of Bio Chemistry and Molecular Biology. 2010; 2000(1):30-38.

Peer-review history:
The peer review history for this paper can be accessed here:
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