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Comparative effect of Poultry manure and Gliricidiasepium on Growth and Yield of Fluted Pumpkin (Telfairiaoccidentalis) Hook F

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ABSTRACT

The experiment was carried out on the experimental plot,Federal College of Forestry, Jericho Ibadan to examine the influence of poultry manure and*Gliricidiasepium* on the growth and yield of *Telfairiaoccidentalis* Hook F. The experiment was laid out in a Randomized Complete Block Design having seven treatments replicated three times which comprised of poultry manure and *Gliricidiasepium* at three levels (2kg/ha, 4kg/ha and 6kg/ha) and control. Parameters assessed were vine length, number of leaves,stem diameter and yield. Data collected was subjected to Analysis of Variance using General Statistical Software Package at means were separated using Least Significant Difference (LSD) at 5% level of probability.The results from the experiment showed no significant difference in all the treatments applied although plots applied with poultry manure at 2kg had the best performance in the number of leaves having the mean values of 12.33, however *Gliricidiasepium* recorded the highest mean values at 2kg having 59.2 in the vine length.Moreso,*Gliricidiasepium* at 4kg recorded best in stem diameter having 3.15while*Gliricidiasepium* at 6kg recorded best in the mean yield of *Telfairiaoccidentalis* having the mean values of 0.26. Although there was no significant difference between *Gliricidiasepium* at 6kg and poultry manure at 2kg.It was therefore concluded that *Gliricidiasepium* should as organic manure on the growth and yield of *Telfairiaoccidentalis* in the study area.

Keywords : Telfairiaoccidentalis, poultry manure, Gliricidiasepium, growth and yield

Introduction

Telfairiaoccidentalis is a member of the Cucurbitaceae family and a tropical vine grown in West Africa as a leaf vegetable and for its edible seeds, the common names of the plant include fluted gourd, fluted pumpkin, and Ugu (Kayode *et al.,* 2010). It is a perennial climber cultivated on the flat land or on mounds along a fence or next to a tree, thus allowing the fruit to hang from a branch (Schippers, 2002). Recently, it has been discovered to be useful as blood purifier, which could also be used in maintaining good health. The shoots of *Telfairiaoccidentalis* contain high level of potassium and iron, while seeds are composed of 27% crude

protein and 53% fats. The growing period begins in April or May (Eseyin*et al.,* 2007).*Telfairiaoccidentalis* grows fast and vines may grow up to 30.5m in length. In Nigeria the herbal preparation of the plant has been employed in the treatment of anaemia, chronic fatigue and diabetes (Alada, 2000). Anaemia constitutes a serious health problem in many tropical countries because of the prevalence of malaria and other parasite infections. According to (Diallo *et al.,* 2008) children are more vulnerable. The leaves are rich in iron and play a key role in the cure of anaemia; they are also noted for lactating properties and are in high demand for nursing mothers. *Telfairiaoccidentalis* produces leaves for a long periods and it is preferred to short season leafy vegetables such as amaranthus spp. which are rarely harvested than three times in the life of the plant.

Despite the nutritive values obtainable from fluted pumpkin, it is a common observation that the demands far exceed the supply of fluted pumpkin as a vegetable crop resulting in scarcity which increases cost. There is therefore, the need to increase the productivity of the crop by improving the soil condition upon which it is grown.Hence, organic manures can serve as alternative to mineral fertilizers for improving soil structure (Dauda *et al.,* 2008). Farmers realize the need for soil amendments by using available resources such as crop wastes; farmyard manure and animal wastes. However, the quantity and quality required of these materials limit their use. Good quality soil is important for sustainable crop production especially under continous cultivation.Manure is both a natural by-product of livestock production and an excellent source of nutrients for crop production. Manure contains nitrogen (N), phosphorus (P), potassium (K) and micronutrients needed for crop production and can be a substitute for synthetic fertilizers. Unlike synthetic fertilizers, manure also contains organic matter which helps to improve soil tilt, structure, aeration and water holding capacity. Poultry manure contains nutrient elements that can support crop production and enhance the physical and chemical properties of the soil (Adediran*et al.,* 2003). Poultry manure contains high percentage of nitrogen and phosphorus for the healthy growth of plants (Ewulo, 2005). Organic matter is the ultimate determinant of the soil fertility in most tropical soils and this account for its use to raise seedling in tropical areas, the fertility of the soil could be sustained with the addition of poultry manure (Ikpe and Powel, 2002).Gliricidiasepium is an extremely versatile nitrogen-fixing agroforestry tree that can be incorporated in diverse ways into many different smallholder-farming systems (Chirwa*et al.,* 2007).Therefore, this research work was aimed to study the field comparative effect of poultry dropping applications andGliricidiasepium at different rates on the growth andyield of *Telfairiaoccidentalis.*

MATERIALS AND METHODS

Experimental Location

The experiment was carried out on the experimental plot, Federal College of Forestry, Ibadan. The college is situated at Jericho Hill, Ibadan North West Local Government Area of Oyo state. The area lies between latitude 70 26'N and longitude 30 54'E. The annual rainfall ranges from 1400mm-1500mm. The area is dominated by two seasons; the dry and rainy season. The dry season usually commence from November to March, while the rainy season starts from April to October (FRIN, 2017).

Land Preparation

The experimental field was cleared and tilled manually and soil samples were collected randomly from the experimental plot, bulked together and taken to laboratory for soil physical and chemical properties analysis.

A total land area of 139m^2 was partitioned into twentyone plots, with each plot measuring 2.5m x 1.5m and furrow path of 0.5m.

Preparation of Poultry manure and *Gliricidiasepium* used for the study

Poultry manure used was collected from the poultry farm within the collegewith the use of hoe and packed into sacks. The poultry manure was air dried forseven(7) days before incorporation into the soil.*Gliricidiasepium*leaves was also collected from its tree and air dried for 14days, made into crumbs before adding into the soil.

Preparation of seeds for planting

Seeds of *Telfairiaoccidentalis* were procured from Federal College of Forestry Jericho, Ibadan. Seeds were extracted from its fruit usingdepulping method and sown into a river sand mixed with soil in sieving baskets prior to transplanting to the experimental plot at four weeks after sowing. Twelve (12)Seedlings were transplanted into the sub unit plots measuring 2.5m x 1.5m at a spacing of 1m x1m within and along the rows.Watering was done immediately after sowing and weeding was carried at regular intervals.

Experimental Design and Layout

The experiment was carried out in Randomized Complete Block Design (RCBD) with seven(7) treatments namely T1 → Poultry Manure (2kg/ha), T2 → Poultry Manure (4kg/ha,)T3 → Poultry Manure (6kg/ha),T4 → Gliricidiasepium(2kg/ha),T5 → Gliricidiasepium(4kg/ha),T6 → Gliricidiasepium(6kg/ha) and T7 → control replicated three times.

Data Collection and Analysis

Assessment of growth parameters was carried out four (4) weeks after transplanting where two (2) seedlings were tagged at the mid row for data collection on weekly basis.Parameters assessed were vine length, done by measuringthe lengthof each plant from the soil level to the tip of the terminal bud of each plant with the aid of a graduated ruler in cm. Number of Leaves present on each seedlings was done by counting the leaves on each plant and stem Girth (mm) of each seedlings was measured with the aid of a vernier caliper.

Yield Parameters

Weight of leaves: The plants were harvested, bulked together and weighed accordingly after 7 weeks of transplanting. Data collected was subjected to Analysis of Variance using General Statistical Software Package (GENSTAT) and significant means were separated using the Least Significant Difference (LSD) at 5% level of probability.

RESULTS

Soil Analysis

Table1: Pre- Cropping physical and chemical properties of the soil used

Soil Properties	Values
pH in H_2O	6.1
Organic Carbon (%)	0.77
Total Nitrogen (%)	0.075
Available Phosphorus (mg/kg)	12.37
Exchangeable Bases (cmol/kg)	
Ca	1.25
Mg	0.45
K	0.42
Na	0.07
Extractable Micro Nutrients (mg/kg)	
Fe	125.6
Cu	1.4
Zn	117.3
Mn	70.
Particle Size Distribution (%)	
Sand (%)	77
Silt (%)	10
Clay (%)	13
Textural class	Sandy Loam

Table 1 shows the pre cropping physical and chemical properties of the experimental soil used. The soil was sandy loam, pH is slightly acidic. It was observed that the soil is low in total Nitrogen, high in organic carbon content, moderately high in exchangeable K, high in available P, Ca and Mg.

Table 2 : Chemical properties of *Gliricidiasepium* leaves used

Properties	Values
pH	8.6
% Mg	0.60
%Ca	1.02
% K	2.10
%N	2.63
%P	0.07
Fe (mg/kg)	192.28
Cu (mg/kg)	5.76
Zn (mg/kg)	64.07
Mn (mg/kg)	124.25
Na (mg/kg)	33.43

Table 2 above shows the result for the laboratory analysis of *Gliricidiasepium* leaves used for the experiment. It shows the chemical composition of the *Gliricidiasepium* leaves which consist of nutrients both at large and small quantity. The result shows that the pH is slightly alkaline, Nitrogen(N), Magnesium(Mg), Calcium(Ca) and Potassium (k) are high while Phosphorus (P) is low.

Table 3: Chemical properties of the poultry manure used

Properties	Values
pH	8.54
Organic carbon(%)	9.86
Total Nitrogen (%)0.62	
Avail. P	1.82
Exchangeable bases(cmol/kg)	
Ca	18 .0
Mg	2.33
K	0.92

Na	0.99
Extractable micronutrients(mg/kg)	
Mn	536
Fe	2358
Cu	62
Zn	721
%C/N Ratio	15.90

Table 3 shows the chemical properties of the poultry manure used and it contained higher nutrients in pH, organic carbon, N, P, Mg, Fe and Cu than the Gliricidiasepium except for phosphorus which had lower values.

Table 4: Influence poultry manure and *Gliricidiasepium* on the number of leaves of *Telfairiaoccidentalis*

Treatments		**Number of leaves Weeks after transplanting**						
		1	**2**	**3**	**4**	**5**	**6**	**7**
Poultry Manure	2kg	3.00	4.67	6.33	7.67	9.67	11.0	12.3
	4kg	3.67	4.67	6.33	7.33	9.00	10.0	11.3
	6kg	3.00	4.33	6.33	7.33	9.67	10.6	11.6
Gliricidiasepium	2kg	3.33	5.00	6.33	7.67	8.67	9.67	10.6
	4kg	3.33	4.33	6.00	7.67	8.67	9.67	10.6
	6kg	3.00	4.00	6.00	7.33	9.67	10.6	11.6
Control		2.67	4.00	6.00	7.33	9.00	10.0	11.3
		NS	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**

Influence of poultry manure and *Gliricidiasepium* on the number of leaves of *Telfairiaoccidentalis* as presented in table 4.At the7th week, plants treated with 2kg ofpoultry manure produced the highest number of leaves with the mean values of 12.33. Similar values was recorded onpoultry manure and *Gliricidiasepium* at 6kg having 11.6. The least mean values wasrecorded on plots treated with *Gliricidiasepium* both at 2kg and 4kg having 10.6. It was also observed that there were no significant differences in the number of leaves produced by *Telfairiaoccidentalis*seedlings subjected to different levels of *Gliricidiasepium* and poultry manure.

Table 5 : Influence of poultry manure and *Gliricidiasepium* on Vine Length(cm) of *Telfairiaoccidentalis*

Treatments		Vine Length(cm) Weeks after transplanting						
		1	**2**	**3**	**4**	**5**	**6**	**7**
	2kg	4.83	11.0	19.6	21.6	41.1	43.4	43.8
Poultry Manure	4kg	6.13	12.9	20.4	23.9	44.6	46.0	47.7
	6kg	6.57	16.0	24.6	26.3	50.3	56.6	58.6
	2kg	8.03	17.8	25.9	33.5	55.1	57.3	59.2
Gliricidiasepium	4kg	5.47	10.4	19.2	23.7	40.2	40.8	41.8
	6kg	5.23	14.9	24.8	27.2	45.8	50.2	54.0
Control		6.27	12.2	21.8	24.1	47.6	50.5	53.8
		S	**S**	**S**	**NS**	**NS**	**S**	**S**

Table 5 shows the influence of poultry manure and *Gliricidiasepium* on the vine length of *Telfairiaoccidentalis*.*Gliricidiasepium* at 2kg had the overall best in terms of vine length with 59.2 but was not significantly different from poultry manure at 6kg having 58.6while Gliricidiasepium at 4kg had the least mean values with 41.8.

Table 6: Influence of poultry manure and *Gliricidiasepium* on Stem diameter(mm) of *Telfairiaoccidentalis*

Treatments		Stem Diameter(mm) Weeks after transplanting						
		1	**2**	**3**	**4**	**5**	**6**	**7**
	2kg	1.17	1.53	1.90	2.12	2.37	2.60	2.74
Poultry Manure	4kg	1.43	1.73	1.97	2.11	2.30	2.51	2.68
	6kg	0.97	1.57	1.82	2.01	2.16	2.35	2.51
	2kg	1.77	2.20	2.42	2.51	2.61	2.83	3.01
Gliricidiasepium	4kg	1.90	2.30	2.55	2.74	2.88	2.98	3.15
	6kg	1.33	1.60	1.83	2.04	2.22	2.39	2.53
Control		1.83	2.20	2.40	2.65	2.81	2.98	3.13
		NS	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**

Table 6 shows the Influence of poultry manure and *Gliricidiasepium* on the stem girth *of Telfairiaoccidentalis.* It was observed that the application of *Gliricidiasepium* at 4kg performed best having the mean values of 3.15 while the least performance was observed in poultry manure at 6kg having 2.51.

Table 7: Influence of poultry manure and *Gliricidiasepium*on the yield *Telfairiaoccidentalis*

Treatments		**Yield in kg**
	2kg	0.25
Poultry Manure	4kg	0.24
	6kg	0.20
	2kg	0.23
Gliricidiasepium	4kg	0.24
	6kg	0.26
Control		0.14
		NS

Table 7 shows the influence of poultry manure and *Gliricidiasepium* on the yield of *Telfairiaoccidentalis.*The result showed no significant difference in all the treatments applied althoughGliricidiasepium at 6kg performed best. However, similar results was observed in plots applied with poultry manure at 2kg while the control had the lowest yield with the mean value of 0.14.

Discussion

The result of the study carried out on the influence of *Gliricidiasepium* and poultry manure levels on the growth and yield performance of *Telfairiaoccidentalis* showed no significant effect on all the parameters assessed which include number of leaves, stem diameter and yield except for the mean vine length.

There was no significant difference in the number of leaves among the different levels of poultry manure and *Gliricidiasepium* used in the study as similar mean values were observed in all the treatments applied although poultry manure at 2kg/ha had the highest values.The high level of nutrient as reported by Quinton (2006) might have had negative effect on the growth of the crop andthat manure application should be limited to amounts needed to make up for the difference between crop need and the existing soil fertility levels, any manure application more or less will result into negative effect on production. *Gliricidiasepium* at 2kg had the overall best in terms of vine length but was not significantly different from poultry manure at 6kg.*Gliricidiasepium* leaf mulch increases plant heights, this could be attributed to rapid decomposition of the *Gliricidiasepium* leaves required for plant growth. Shah *et al.,*2009 and Achieng *et al.,*2010confirms that *Gliricidiasepium* significantly increased the height of plants.Gliricidiasepium at 4kg/ha had the highest values on stem diameter in this study . The result showed that the application of *Gliricidiasepium* and control

resulted in larger stem diameter. This was in agreement with the finding of Sekar (2010) that manure when applied in too high dose could affect the germination of seeds as it becomes injurious to the seeds.Gliricidiasepium at 6kg/ha performed best in the yield of *Telfairiaoccidentalis* although not significantly different from poultry manure at 2kg/ha.Ikpe and Powel (2002) reported that manure applied in correct proportion not just improves soil porosity but it also contribute to good plants growth, development and yield (Ijoya and Sophie, 2009).

Conclusion

The experiment examines the growth and yield performance of *Telfairiaoccidentalis* as influenced by poultry manure and *Gliricidiasepium*.It was therefore concluded that*Gliricidiasepium* at 6kg/ha should be used as organic amendmenton the growth and yield of *Telfairiaoccidentalis* in the study area.

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