

Growth, Yield and Economic Analysis of Fluted Pumpkin (*Telfairia occidentalis* Hook F.) as Affected by Tillage Methods

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Abstract

Field study was conducted in the Teaching and Research Farm of the Oke-Ogun Polytechnic, Saki in Oyo North Senatorial District of Oyo State, Nigeria in 2020 and 2021 rainy seasons to investigate the effect of tillage methods on the growth, yield of fluted pumpkin (*Telfairia occidentalis hook f.*) and its economic analysis. Fluted pumpkin were planted on three different tillage methods namely convectional, reduced conventional and traditional tillage methods. Cultural practices such as land clearing, planting, weed control, plant protection, staking, fertilizer application as well as harvesting operations were carried out as at when due. The experimental farm was laid out in a Complete Randomized Block Design (CRBD). Data were collected on vine length, number of leaves, internode length, stem girth and yield of fluted pumpkin on regular basis. The results from the study revealed that convectional tillage had the highest growth and yield parameters, followed by reduced convectional while the least

growth and yield parameters were observed under traditional tillage method. Economically, reduced convectional tillage has the highest cost benefit ratio between the ranges of 3.05 and 3.61, followed by convectional tillage between the ranges of 2.31 and 2.88 while the least ranges of 2.11 and 2.76 of cost benefit ratio was calculated for traditional tillage method, for 2021 and 2022 farming seasons, respectively. Results from the study indicated that reduced convectional tillage method is more appropriate for the planting of fluted pumpkin and other cucurbitaceous crops in the study area.

Introduction

Telfairia occidentalis belongs to the genus Hooker, Tribe *Joliffeae*, sub-family *Cucurbitoideae* family *Cucurbitaceae*. It is an important vegetable of the Tropical West African. In Nigeria, it is indigenous to Southeastern Nigeria, where it is cultivated as an important nutritional and commercial vegetable. In Nigeria, it is indigenous to Southeastern Nigeria, where it is cultivated as an important nutritional and commercial vegetable. In the North Central Nigeria, it has gained acceptability and there is increase in its cultivation by small farm holders as a source of income (Ndor and Daude 2013). To reduce the ravaging menace of protein and iron malnutrition in Nigeria, increasing the production and supply of protein and iron rich vegetables such as fluted pumpkin (*Telfairia occidentalis* Hook F.) has become a necessity. Fluted pumpkin is a dioecious, creeping vegetable crop that spreads low across the ground and climbs by means of creeping vines and often coiled tendrils. The crop is indigenous to West Africa (Kuku *et al.*, 2014). In Nigeria, the leaves, flowers and seeds are consumed locally as vegetables by humans and fodder for livestock (Idem *et al.*, 2012). It is an important vegetable crop that has high nutritional and commercial value (Kajihansa *et al.*, 2010). According to Muoneke *et al.* (2011), the leaves have about 700 ppm of iron, 11% ash, 3% oil, 25% carbohydrate, 11% crude protein and 86% moisture. Oluwole *et al.* (2003) reported the nutritional importance of fluted pumpkin and stated that the crop, possess medicinal and therapeutic properties such as antidiabetic, anti-cholesterol, anti-bacterial and

antiinflammatory properties. However, commercial production of the succulent fresh leaves of fluted pumpkin in southern Nigeria is facing the challenge of poor soil fertility and poor soil management.

Tillage is defined as the physical, chemical or biological soil manipulation to optimize conditions for seed germination, emergence and seeding establishment (Lal, 1977) has been used in some agro-ecologies to increase crop yield (Akata *et al.*, 2017). The concept of tillage is to create a soil environment favorable to plant growth (Ndaeyo, 2003). However, tillage or soil manipulation is reported to be capable of inducing profound changes in soil fertility status, and that the changes may be manifested in good or poor performances of crops (Aiyelari *et al.*, 2001; Ndaeyo, 2003). According to Ndaeyo (2003), since tillage operation loosen, granulate, crush or even compact soil particles, soil factor that influence plant growth such as bulk density, pore size distribution and hence the composition of the soil atmosphere may be affected.

Materials and Methods

Description of the Study Area

Field experiment was conducted at Teaching and Research Farm of the Department of Agricultural and Bio-Environmental Engineering of the Oke-Ogun Polytechnic, Saki (TOPS) in Saki West Local Government Council Area of the Oyo North Senatorial District, Oyo State, Nigeria, West Africa. Saki is on latitude 8° 40' N and 3° 24' E longitude and has an annual rainfall of about 900-1000 mm on wet days, 72.7% relative humidity and temperature range of 21.8 to 31.2 °C (OYSADEP Annual Report, 2015). Field experiment was conducted for two consecutive early rainy seasons farming between March 12th – September 12th for the year 2021 and 2022, respectively. The vegetation within the study area is a typical Guinea Savanna Vegetation zone. Modern Saki is an exporter of cotton, swamp rice, teak, and tobacco while yams, cassava, maize, sorghum, beans, and okra are grown for subsistence. Cattle raising is increasing in importance, and there is a government livestock station. There are vast cattle ranches at Saki and the town houses the headquarter of the Oyo State Agricultural Development Agency (OYSADA).

Land Preparation

The preparation of land for the experiment was carried out by adopting three different methods and each method was used as a tillage treatment. The tillage treatments used were: traditional (tillage with hoeing), reduced-convectional

(ploughing with tractor twice) and conventional (ploughing twice and harrowing once) tillage. The experimental farm consists of three treatments, three replicates which were arranged in a complete randomized block design. The experimental site consists of three blocks and each block consists of three plots making a total of 9 plots. The experimental farm was measured 46 m x 46 m while each block was measured 46 m x 10 m and each plot 10 m x 10 m with a space of 4 m in between the two adjacent plots which enabled the tractor to turn conveniently without entering manually tilled plots. Seedlings of fluted pumpkin were nursed in polythene nylons for three weeks which was later transplanted to well prepare experimental plots of land.

Cultural Operations

A chronological sequence of various cultural operations such as land preparation, nursery, planting, weeding, fertilizer application, plant protection, staking and harvesting operations conducted during the field production of fluted pumpkins in three different tillage methods are presented as following;

Land preparation

Initial land clearing of the experimental farm for traditional tillage treatment was done using traditional implement such as cutlass, rake and bigger hoes. For both reduced-conventional and conventional tillage treatments, the initial land clearing of experimental farm was done using New Holland tractor (70866S) coupled with a disc plough for primary tillage, while secondary tillage was done using a disk harrow or rotary tiller.

Nursery, seed planting and transplanting operations

Two healthy pods of fluted pumpkin were obtained from a vegetable farmer at Ago-Are in ATISBO Local Government Council Area, Oyo North Senatorial District, Oyo State, Nigeria. The pods were broken; seeds were manually extracted and the extracted seeds were allowed to rest for two days as recommended by Chukwurah (2010). The extracted seeds of fluted pumpkins were nursed in polythene for a period of 21 days and later transplanted into experimental plots of land. Sun Atrazine and Force up were applied to prevent weed emergency and protection against soil-borne disease before transplanting. The seedlings of fluted pumpkin were transplanted toward the evening at a spacing of 1m x 1m on 10 m x 10 m experimental plots of land (Akata *et al.*, 2017).

Weed control

A mixture of Sun Attrazine and Force up solution was sprayed immediately after land preparation in all the three tillage methods considered before transplanting operation to prevent weed emergence. Manual weeding was done at 4th, 8th and 12th weeks after planting (WAP) as recommended by Akata *et al.* (2017).

Fertilizer application

Application of fertilizer was done manually for all the treatments considered. Inorganic fertilizer (NPK 15:15:15) was applied two weeks after planting (WAP) at the rate of 200 kg/ha to all the treatments (Akata *et al.*, 2017) and urea fertilizer was again applied at 4 WAP as the most important fertilizer required by cucurbits as reported by Ndor and Dauda (2013). This is also based on the recommendation of the extension leaflets of the Ministry of Agriculture for the area under investigation.

Plant protection measures

Application of pesticides for controlling pests and diseases was carried out manually with a Knapsack sprayer. Insect pest was controlled with *Dichlorvos* and *Chlorpyrifos* by mixing 1ml to 4 litres of water and sprayed at two weeks regular intervals. However, the spraying of chemicals was possibly avoided during the harvesting period to prevent yield contaminations.

Staking of fluted pumpkins

The vines of fluted pumpkins were staked with long bamboo poles and tree branches in order to enhance better vegetative development. The tree branches were tied to bamboo poles horizontally placed on erected Y sticks. The staking materials were sprayed with Perfect killer to prevent termite and any other insect attack.

Harvesting of sample fruits

Harvesting of matured fluted pumpkins leaves started eight weeks after planting (WAP). The cutting of marketable vegetables (leaf + soft stem) was carried out using kitchen knives. Freshly harvested leaves were weighed with digital weighing scale (MP 1001 Gallenhamp) of 0.001 kg accuracy and sold at Sango market, Saki, Nigeria.

Data Collection

Five fluted pumpkin were randomly selected from each tillage treatment plots, tagged and monitored for the purpose of data collection. Some crops from each tillage treatment were left to fruiting for the purpose of yield parameters.

Growth and Yield parameters

Growth parameters such as survival percentage, number of leaves per plant, leaf area per plant, vine length, total foliar yield were collected at 4 weeks after planting on weekly basis using appropriate tools. The yield parameters collected include were number of pods per plant, length of pods per plant, circumference of pods per plant, pod yield (t/ha), number of seeds per pod and seed yield (t/ha).

Economic analysis of fluted pumpkin on tillage methods

The economic analysis of fluted pumpkin as affected by tillage methods were estimated in terms of total cost of production, gross and net monetary returns using the method described by Khan *et al.* (2009). The total cost of fluted pumpkin production in each of the tillage methods was calculated using Equation 1

$$TCP = C_{hl} + C_{ma} + C_{df} + C_{fz} + C_{sd} + C_{pe} + C_{mc} \quad 1$$

Where: C_{hl} = cost of human labour, C_{ma} = cost of hiring of machinery, C_{df} = cost of diesel fuel,

C_{sd} = cost of seed, C_{pe} = cost of pesticides and C_{mc} = cost for miscellaneous
Gross monetary returns (GMR) were calculated by multiplying the energy output (yield) of the crops by the market price using as described in equation 2 (Khan *et al.*, 2009).

$$GMR = Yield (kg\ ha^{-1}) \times Market\ price\ of\ the\ yield (\#\ kg^{-1}) \quad 2$$

Net monetary returns and Cost benefit ratio were calculated using Equation 3 and 4, respectively

$$NMR = GMR - TCP \quad (\text{Khan } et\ al., 2009)$$

$$3\ Cost\ Benefit\ Ratio = \frac{Gross\ monetary\ return}{Total\ cost\ of\ production} \quad (\text{Majid, 2011}) \quad 4$$

Results and Discussions

Survival Percentage

The average survival percentage of fluted pumpkin in the three tillage methods considered during the field cultivation of fluted pumpkin over a period of two farming seasons is presented in Figure 1. Conventional tillage has the highest average plant count 96 and 95%, followed by reduced-conventional with a values of 89 and 85% while the least values of 78 and 75% were recorded for traditional tillage in the year 2021 and 2022 farming season, respectively. This result is similar to the findings of Akata *et al.* (2017) who reported an average value of 96 for flat tillage practice while the same value of 100 % of emergency percentage was reported for seedbed, heap and ridge, respectively.

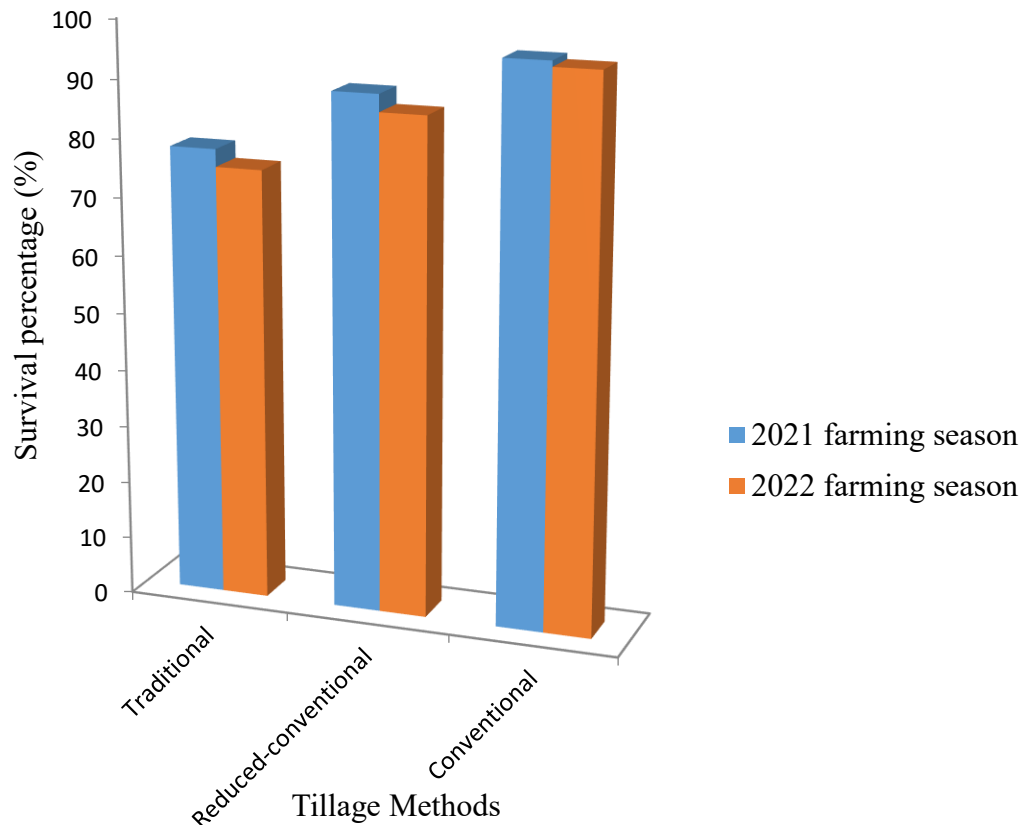


Figure 1: Effect of Tillage Methods on Survival Percentage of Fluted Pumpkin

Effect of Tillage Methods on Growth Parameters

The influence of tillage methods on number of leaves, length of vine (cm), vine girth (cm) and leaf area (cm²) measured at different weeks after planting during the field cultivation of fluted pumpkin is presented in Table 1. Conventional tillage treatment recorded the longest length of vines with values of ; 52.04, 68.24 and 94.00 cm in 2021 while 52.16, 69.32, 95.10 and 134.24 cm were recorded in 2022, respectively, followed by reduced-conventional; 49.24, 64.89, 92.04 and 128.22 cm in 2021 and; 49.24, 65.01, 86.23 and 124.20 cm in 2022. The lowest length of vine of 48.02, 64.23, 89.40 and 120.05 cm; 49.24, 65.01, 86.23 and 124.20 cm were recorded for traditional tillage in 2021 and 2022 farming seasons, respectively. Similar trend was observed for number of sub-vines with conventional tillage having the highest number of sub-vines: 3.46, 4.64, 5.10 and 5.28 cm; 3.79, 4.38, 5.16 and 5.39 cm, followed by reduced-conventional with a values of 3.25, 4.28, 5.04 and 5.28 cm; 3.29; 4.32, 5.06 and 5.34 cm while the least values of 3.23, 4.20, 4.86 and 5.20 cm; 3.68, 4.20, 5.02 and 5.24 cm, was observed in traditional tillage, respectively in 2021 and 2022 farming seasons.

The number of functional leaves per plant at 2 weeks interval differed significantly for tillage treatments but not significant in both cropping season as presented in Table 1. However, the most vegetative leaves was observed for conventional tillage were 10, 22, 24 and 31 and (10, 23, 25 and 32); followed by reduced-conventional with values of 9, 18, 23 and 31 and 10, 20, 27 and 33 while the least number leaves per plant of 8, 16, 22 and 28; 10, 14, 23 and 29 were recorded for traditional tillage at 3, 5, 7 and 9 WAP in 2021 and 2022 farming seasons. The measured vine girth (cm) as affected by tillage treatments at two weeks regular interval for 2021 ad 2022 farming seasons is also presented in Table 1. It was observed from the table that the vine girth increased with increased in weeks after planting. Conventional tillage recorded the highest number of vine girth with values of 2.08, 2.31, 2.48 and 2.70 cm; 2.10, 2.38, 2.50 and 2.78 cm while the least value of 1.98, 2.06, 2.43 and 2.64 cm were observed for traditional tillage at 3, 5, 7 and 9 WAP in 2021 and 2022, respectively.

The calculated leaf area as affected by tillage methods is presented in Figure 2 with conventional tillage had the highest value of 98.24, 102.20, 110.46 and 114.23 cm²; 97.24, 100.14, 112.36 and 118.06 cm², followed by reduced-conventional tillage with a value of 95.06, 98.14, 100.04 and 116.28 cm²; 96.20, 99.08, 99.86 and 114.24 cm² while the smallest leaf area of 93.20, 96.14, 99.26 and 110.24 cm²; 94.02,

96.18, 100.02 and 110.34 cm² were recorded for traditional tillage at 3, 5, 7 and 9 WAP for 2021 and 2022 farming seasons, respectively.

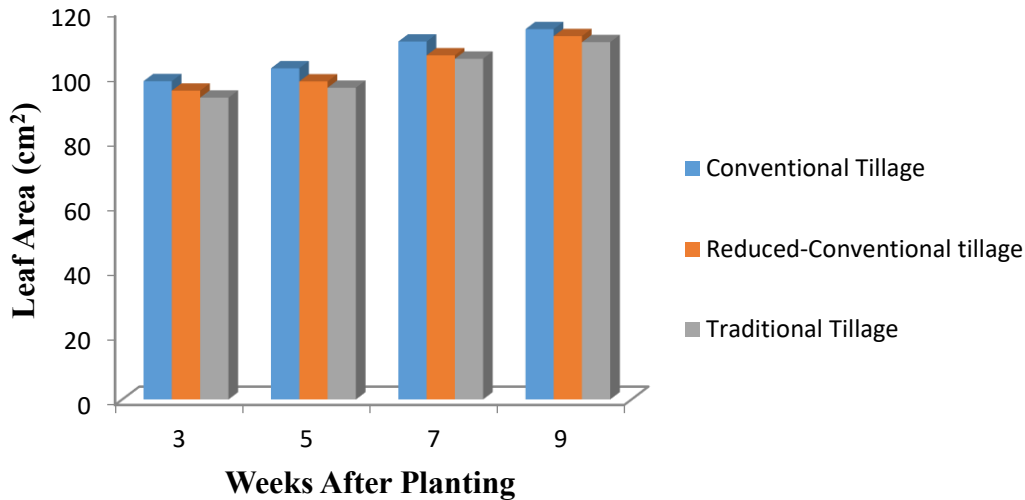


Figure 2: Effect of Tillage Methods on Leaf Area of Fluted Pumpkin at Weeks after Planting

Table 1: Effect of Tillage Methods on Measured Growth Parameters of Fluted Pumpkin

Tillage Methods	2021 Weeks After Planting				2022 Weeks After Planting			
	3	5	7	9	3	5	7	9
Traditional								
Length of vine (cm)	48.02	64.23	89.40	120.05	49.24	65.01	86.23	124.20
Number of leaves	8	16	22	28	10	14	23	29
Number of sub-vines	3.23	4.20	4.86	5.20	3.68	4.20	5.02	5.24
Vine girth (cm)	1.98	2.06	2.43	2.64	2.00	2.14	2.46	2.68
Reduced-Conventional								
Length of vine (cm)	49.24	64.89	92.04	128.22	48.86	68.06	89.10	125.23
Number of leaves	9	18	23	32	10	20	27	33
Number of sub vines	3.25	4.28	5.04	5.22	3.29	4.32	5.06	5.34
Vine girth (cm)	2.02	2.26	2.46	2.68	2.04	2.32	2.46	2.70
Conventional								
Length of vine (cm)	52.04	68.24	94.00	132.06	52.16	69.32	95.10	134.24
Number of sub vines	3.46	4.64	5.10	5.28	3.79	4.38	5.16	5.39
Number of leaves	10.00	22.00	24.00	31.00	10.00	23.00	25.00	32.00
Vine girth (cm)	2.08	2.31	2.48	2.70	2.10	2.38	2.50	2.78

Effect of Tillage Methods on the Yield of Fluted Pumpkin

The effect of tillage methods on the harvested yield of fluted pumpkin over a period of two years is presented in Figure 3. Conventional tillage had the highest harvested yield between the ranges of 5945 to 6014 kg/ha, followed by reduced-conventional between the ranges of 5853 to 5950 kg/ha while the least harvested yield between the ranges of 4997 to 5242 kg/ha was observed under traditional tillage. Similar results were reported by Akata *et al.* (2017) on the effect of tillage practices on growth and yield productivity of fluted pumpkin and also corroborated with the report of Okechukwu *et al.* (2022) foliage yield of fluted pumpkin (*Telfairia occidentalis* Hook.) as influenced by organic by organic manure and cutting frequencies on soil of Calabar, Nigeria.

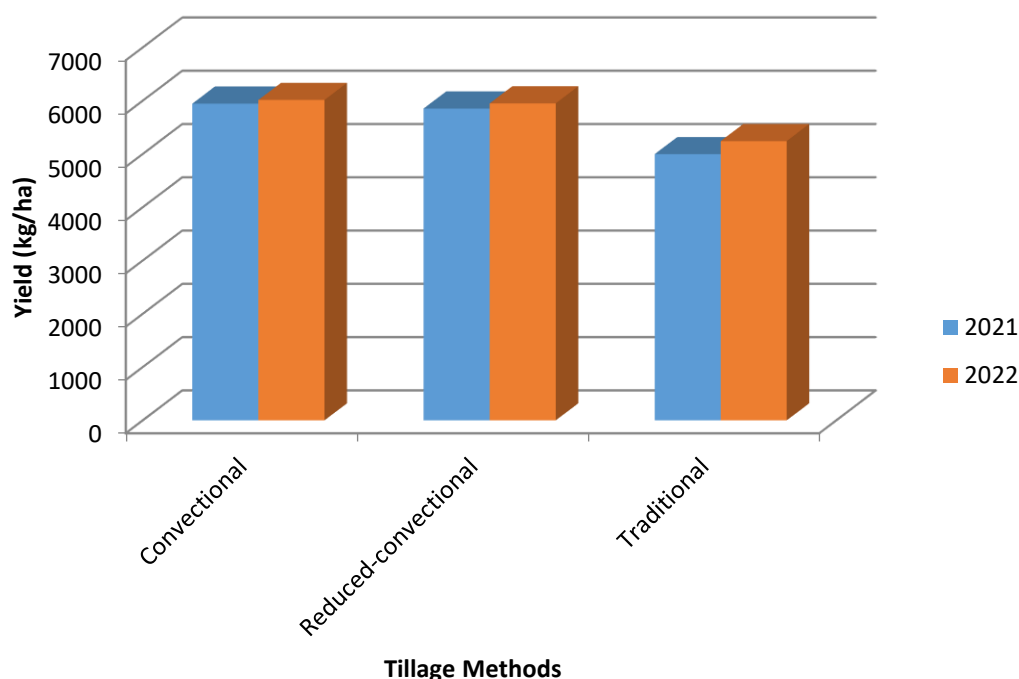


Figure 3: Effect of Tillage Methods on Harvested Yield of Fluted Pumpkin

Economic analysis of fluted pumpkin in tillage methods

The economic analysis of fluted pumpkins in terms of the total cost of production, gross monetary return, net gain and cost-benefit ratio in different tillage methods for two cropping seasons are presented in Table 2. Conventional tillage had the highest total cost of production between the ranges of ₦165000.00 and ₦208, 000.00 k, followed by traditional tillage between the

ranges of ₦145000.00 to 198500.00 k while the least ranges of ₦127000.00 and 156000.00 k was observed under reduced-convectional tillage. The highest gross monetary return between the ranges of ₦475600 and ₦481120.00 was observed for convectional tillage, followed by reduced convectional with a range of ₦458560.00 and ₦476000.00k while the least range value of ₦399760.00 and ₦419432.00 k was obtained under traditional tillage. Reduced convectional tillage had the highest net monetary return between the ranges of ₦331560.00 and ₦382000.00

While the least ranges of ₦220932.00 and ₦254760.00 of net monetary return was observed under traditional tillage. Morteza *et al.* (2012) reported 34939 and 31956\$ ha⁻¹ total expenditure for tomato and cucumber production, while the gross production value was found to be 95850 and 57280\$ h^{a-1}, respectively. Figure 4 illustrate the calculated cost benefit ratio of the planted fluted pumpkin under different tillage methods for two farming seasons and it was observed from the figure that the highest cost benefit ratio between the ranges of 3.05 and 3.61 were calculated for reduced conventional tillage, followed by conventional tillage between the ranges of 2.31 and 2.88 while the least ranges of 2.11 and 2.76 of cost benefit ratio was calculated for traditional tillage method, for 2021 and 2022 farming seasons, respectively Other authors reported similar results for the benefit to cost ratio such as 2.53 for a sweet cherry, 2.37 for orange, 1.89 for lemon and 1.88 for mandarin (Demircan *et al.*, 2006).

Table 2: Economic Analysis and Benefit-Cost Ratio of Fluted Pumpkins in Tillage Methods

Year	Cost and return Components	Unit	Tillage Methods		
			Traditional	Reduced Conventional	Conventional
2021	Yield	kg ha ⁻¹	5242.90	5950.00	6014.00
	Sale price	#kg ⁻¹	80.00	80.00	80.00
	Total cost of production	#ha ⁻¹	198500.00	156000.00	208000.00
	Gross monetary return	#ha ⁻¹	419432.00	476000.00	481120.00
	Net monetary return	#ha ⁻¹	220932.00	382000.00	351600.00
	Benefit-cost ratio		2.11	3.05	2.31
2022	Yield	kg ha ⁻¹	4997.00	5732.00	5945
	Sale price	#kg ⁻¹	80.00	80.00	80.00
	Total cost of production	#ha ⁻¹	145000.00	127000.00	165000.00
	Gross monetary return	#ha ⁻¹	399760.00	458560.00	475600.00
	Net monetary return	#ha ⁻¹	254760.00	331560.00	310600.00
	Benefit-cost ratio		2.76	3.61	2.88

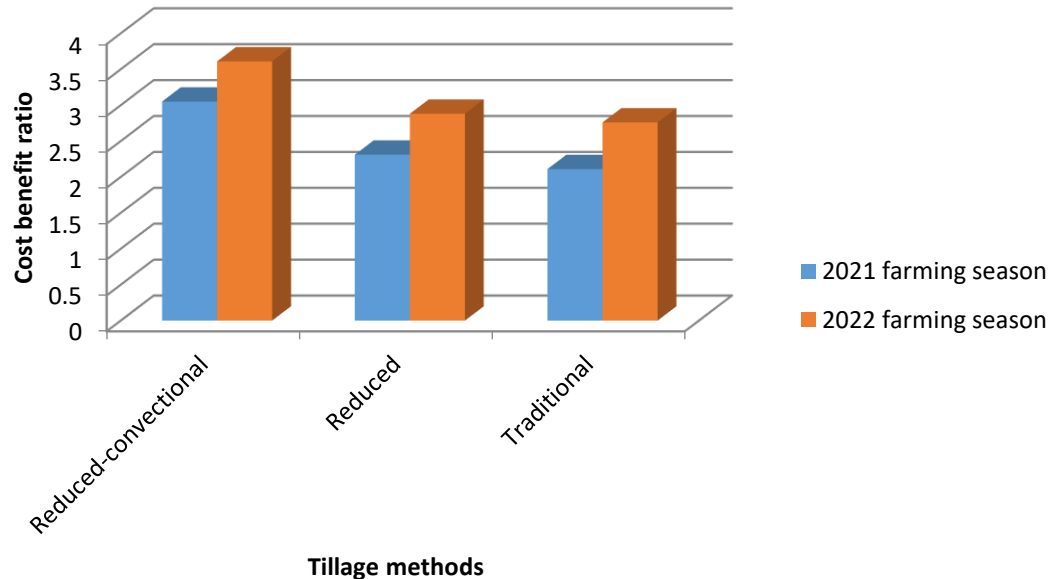


Figure 4: Cost Benefit Ratio of Fluted Pumpkin under Tillage Methods

Conclusions

Effect of different tillage methods on the yield and economic analysis of fluted pumpkin has been investigated. Based on the results from the study, the following points were drawn:

- i. Conventional tillage had the highest growth parameters, followed by reduced conventional while the least measured growth parameters were observed under traditional tillage method
- ii. Economically, reduced-convectional tillage has the highest net monetary return, followed by convectional tillage while the least net monetary return was observed for traditional tillage method
- iii. The highest cost benefit ratio between the ranges of 3.05 and 3.61 were calculated for reduced conventional tillage, followed by conventional tillage between the ranges of 2.31 and 2.88 while the least ranges of 2.11 and 2.76 of cost benefit ratio was calculated for traditional tillage.

Recommendations

Based on the results from the study, reduced convectional tillage method is hereby recommend for the planting of fluted pumpkin and other similar cucurbitaceous crops in the study area.

References

- Akata, O.R., Akpan, E.A. and Emmanuel, S. (2017). Effects of Cover Cropping on Wee Dynamics and Yield Productivity of Cassava (*Manihot esculenta Crants*) in Uyo, Southeastern, Nigeria, *Apex Journal International*; 61-66
- Aiyelari, E. A. Ndaeyo, N. U. and Agboola, N. U. (2001). Effects of tillage practices on growth and yield of cassava (*Manihotesculenta*) and some soil properties in Ajibode, Southwestern Nigeria. *Ind. J. Agricul. Sci.*, 71(3): 171-176
- Chukwurah, N. (2010). Juvenile Morphological Markers for Maleness in Fluted Pumpkins (*Telfairia Occidentalis* Hook F.) A Dissertation Submitted to the Department of Crop Science, Faculty of Agriculture University of Nigeria, Nsukka in Partial Fulfilment for the Requirement for the Degree of Master of Science (M.sc) in Plant Breeding and Genetics.
- Demican, V., Ekinici. KK., Akbolat. DHM. and Ekinici. C. (2006). Energy and economic analysis of sweet cherry production in Turkey: A case study from Isparta province. *Energy Convers. Manage* 47: 1761–1769.
- Idem, N. U. A., Ikeh, A. O. Asikpo, N. S. and Udoh, E. I. (2012). Effect of organic and inorganic fertilizer on growth and yield of fluted pumpkin (*Telfaria occidentalis*, Hook F.) in Uyo, Akwa Ibom State, Nigeria. *Journal of Agriculture and Social Research*, 12, (2): 74 – 84.
- Khan, M.A., Awan, I.U. and Zafar, J. (2009). Energy Requirement and Economic Analysis of Rice Production in Western Part of Pakistan. *Soil and Environment* 28(1): 60-67.
- Khan, S., Khan., M.A. and Latif, N. (2010). Energy requirements and economic analysis of wheat, rice and barley production in Australia. *Journal of Soil and Environ*; 29(1):61-68
- Kuku, A., Etti, U. J. and Ibironke, I. S. (2014). Processing of fluted pumpkin seeds, *Telfairia occidentalis* (Hook F) as it affects growth performance and nutrient metabolism in rats. *African Journal of Food, Agriculture, Nutrition and Development*, 14, (5): 9192 – 9214
- Lai, R. (1977). Importance of tillage systems in soil water management in the tropics. In: Lai, R. (editor), *Soil Tillage and Crop Production*. IITA, Ibadan, Nigeria. pp. 25-32
- Majid, R., Mohammad, G. and Saeed, A. (2011). Effect of Different Tillage Methods on Yield and Yield Components of Tomato (*lycopersicon esculentum*), *Journal of Agricultural and Biological Science*: 5(2).
- Muoneke, C. O., Ndukwe, O. O. and Onuoha, C. 2011. Growth and Yield Responses of Fluted Pumpkin (*Telfairia occidentalis* Hook F.) as Affected by Organic Manure Sources and Rates in an Ultisol of South-Eastern Nigeria *Journal of Agriculture and Biological Science*, 3, (1): 1 – 15.
- Morteza, T., Hassan, G. M. and Nasim, M. (2012). Energy input-output modelling and economical analyse for corn grain production in Iran. *Journal of Elixir Agriculture* 52:1150-11505.
- Ndaeyo, N. U. (2003). Growth and Yields of Maize (*Zea mays* L.) Cassava (*Manihotesculenta*Crantz) intercrops as influenced by different Tillage practices. *J. Sustainable. Trop. Agri. Res.*, 8: 82-88.
- Ndor, E. and Dauda, N.S. (2013). Growth and Yield Performances of Fluted Pumpkinss (*telferia occidentalis* hook f.) UnderOrganic and Inorganic Fertilizer on Ultisols of North Central Nigeria. *Global Journal of Plant Ecophysiology*, 3(1): 7-11

- Okechukwu C. U., Joyce F. A. and Fidelis, V. A. (2022). Foliage Yield of Fluted Pumpkin (*Telfairia occidentalis* HOOK F.) as Influenced by Organic Manure and Cutting Frequencies on Soil of Calabar, Nigeria. *Global Journal of Agricultural Sciences*: 21 : 79-84
- Oluwole, F. S., Falade, A. O. and Ogundipe, O. O. (2003). Anti-inflammatory effect of some common Nigeria vegetables. *Nigerian Journal of Physiology*, 18, 35 – 38.