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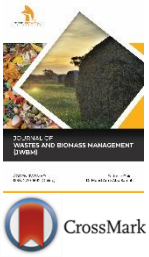

REVIEW ARTICLE

EFFECT OF TILLAGE PRACTICES AND FERTILIZER RATES ON GROWTH, AND YIELD OF SWEET POTATO *(IPOMEA BATATA)*

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ABSTRACT

A field experiment was conducted at the Research Farm of National Root Crops Research Institute Sub-Station, Igbariam to study the effect of tillage practices and fertilizer application rates on the growth and productivity of sweet potato (var. Umuspo1) during the 2021 and 2022 cropping seasons. The experiment was set up as a 4 × 3 factorial fitted in a randomized complete block design (RCBD) with three replications. The main factor comprised four levels of fertilizer rates (0, 200, 400, and 600 NPK 20:10:10/ha) while the sub-factor consisted of three tillage methods (flats, mounds, and ridges). Data collected on the growth and yield of the crop were subjected to analysis of variance (ANOVA) using Genstat 4TH Edition statistical software. The significant means were separated using the least significant difference (LSD) at a 5% probability level. The result indicated that tillage practice had a significant effect on vine length in the 2021 and 2022 cropping seasons whereas the number of leaves showed no significant difference. On the other hand, tillage practice had significant effect on number of roots in the 2022 cropping season. The result obtained on the length of root indicated that both tillage practices and fertilizer application rates had no significant effect on sweet potato root length in the 2021 and 2022 cropping seasons. However, the results on the yield showed that ridges had the best performance in almost all the yield parameters while the application of fertilizer at the rate of 200 kg/ha gave the highest yield.

KEYWORDS

Sweet Potato Cultivation, Tillage Practices, Fertilizer Rates

1. INTRODUCTION

Sweet potato (*Ipomoea batatas)* is believed to have originated from Tropical America (Gichuki et al., 2003). The status of the sweet potato in most parts of the Tropics is that of a minor secondary crop. However, its cultivation is increasing as it gives high yield and also required minimum attention during cultivation. It is undeniably, one of the most important food crops due to its high yield and nutrient value (Williams et al., 2013). Despite the excellent quality of sweet potato in achieving household food security the maximum yield has not been obtained in Nigeria especially in Anambra state, Nigeria where Anambra East happens to be the major sweet potato producing Local Area. In recent times the production rate of sweet potato has been on a decrease despite numerous introduction and production of improved varieties of the crop. The decrease can be attributed primarily to low soil fertility, high level of weed infestation and mostly importantly, the methods of soil preparation as well as fertilizer application rate in the areas of its production.

In Anambra East, most famers cultivate on mounds while other famers in the same agro- ecological zone use ridges, as some still use flat for the cultivation of sweet potato. Tillage is the preparation of land for growing crops. This agronomy practice include; digging, stirring, mound making, overturning etc. It can be done manually or mechanically. Tillage methods influences soil physical, chemical and biological characteristics, which in turn may alter plant growth and yield (Rashidi and Keshavarzpour, 2011). Fertilizers are excellent for soil amendment and provides nutrients for growing various crops. Sweet potato removes appreciable quantities of plant nutrients from the soil, hence incorporation of considerable amount of organic manure or inorganic fertilizer during planting is recommended to maintain soil productivity.

Good tillage practices are good steps toward proper soil management. Proper soil management is a key to sustainable agricultural production (Simmons and Natziger, 2010). Thus, this experiment was designed to evaluate the effect of tillage practices and fertilizer rates on growth, and yield of sweet potato (*Ipomea batata*) to help the farmers in the production area make proper decision on which method and combination works best in terms of increasing sweet potato productivity.

2. MATERIALS AND METHODS

The Research was carried out at Research Farm of National Roots Crops Research Institute sub–station Igbariam, Anambra State, Nigeria, during 2021 and 2022 cropping seasons which lies between latitude 14^0 65N and longitude 12^0 35 E. The experiment is a 4 × 3 factorial laid in randomized complete block design (RCBD) with three replications. The treatment comprised all possible combination of four levels 0, 200, 400, 600 kg/ha of NPK (20:10:10) fertilizer, and three levels of tillage practices (ridges, mounds, and flat). The Field was prepared by making ridges, mounds and flats using manual methods. The experimental field was marked out into three blocks of 30 × 4 m. Each block was further divided into 12 experimental plots of 2 × 4 m (8 m). The blocks was separated from each

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other by 1 m path. The vines of sweet potato variety Umuspo1 was obtained from the National Root Crop Research Institute Umudike, Nigeria. The NPK fertilizer was sourced from Agricultural Development Program (ADP) Awka Anambra State, Ministry of Agriculture.

2.1 Data Collection

Data were taken and recorded for the following attributes:

2.1.1 Growth parameters

Vine length (cm): This was done using measuring tape and is the distance from the ground level to the tip of the longest vine.

Number of leaves per plant: The number of leaves per plant was obtained by counting the leaves of each selected plant within the plot after which their means was calculated and recorded.

Number of branches per plant: This was obtained by counting the number of branches of each selected plant within the plot after which their mean was recorded.

2.1.2 Yield parameter

Number of roots per plots: This was obtained by counting the number of roots of each selected plant within the plot after which their mean was calculated and recorded.

Weight of roots per plot: This was determined by weighing the roots using 50kg weighing balance.

Number of salable roots per plot: These roots more than or equal to 100g and the numbers were counted and recorded.

Number of nonsalable roots per plot: This was assessed by counting the number of roots that were less than 100g.

Weight of saleable roots (kg): This was determined by weighing the salable roots using 50kg weighing balance.

Weight of nonsalable root (kg): This was determined by weighing the non-salable roots using 50kg weighing balance.

2.2 Data Analysis

All data collected was subjected to analysis of variance (ANOVA) using Gen. Stat. Release 10.3 (2010). Significant different among means was separated using least significant different (LSD) at 5% level of probability.

3. RESULTS

3.1 Effect of Tillage Practices and Fertilizer application rates on Sweet Potato Vine Length.

Table 1: Effect of tillage method and fertilizer rates on potato vine length at 8, 10, 12, 14 and 16 weeks after planting (WAP) in 2021 and 2022 cropping season at Igbariam.

Potato vine length (cm)										
Treatments	**8 WAP**		**10 WAP**		**12 WAP**		**14 WAP**		**16 WAP**	
Tillage method	**2021**	**2022**	**2021**	**2022**	**2021**	**2022**	**2021**	**2022**	**2021**	**2022**
Flat	33.37	22.07	68.80	41.00	94.90	59.60	131.30	79.20	161.90	98.60
Mounds	37.52	30.48	76.80	59.10	114.30	80.00	141.70	104.60	171.80	122.50
Ridge	36.32	29.05	74.90	53.10	111.30	75.80	133.70	99.50	165.80	114.10
LSD (0.05)	3.34	4.34	6.67	8.22	16.85	11.42	7.88	14.35	6.36	15.42
Fertilizer rate										
0	39.34	26.23	80.80	47.90	104.40	66.90	147.30	90.90	178.80	104.40
200	35.12	28.80	72.50	54.50	106.70	78.40	136.10	99.90	170.40	120.30
400	32.59	26.66	67.10	50.20	105.60	70.20	128.30	94.70	155.60	113.50
600	35.90	27.10	73.60	51.80	110.60	71.60	130.50	92.20	161.20	108.70
LSD (0.05)	3.86	NS	7.70	NS	NS	NS	9.10	NS	7.34	NS
Interaction										
TM. × FR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

NS = Not significant
TM = Tillage method
FR = Fertilizer rate
* = Significant at 0.05%

Table 2: Interaction effect of tillage method and fertilizer rates on potato vine length at 16 weeks after planting (WAP) in 2021 and 2022 cropping season at Igbariam

		Potato vine length (cm) at 16 WAP	
Tillage method	**Fertilizer rates**	2021	2022
Flat	0	178.40	89.20
	200	164.00	104.70
	400	142.30	102.70
	600	163.10	97.80
Mounds	0	187.60	127.40
	200	179.00	132.40
	400	161.60	119.60
	600	159.00	110.60
Ridge	0	170.50	96.70
	200	168.30	123.70
	400	162.80	118.30
	600	161.50	117.50
LSD (0.05)		12.72	NS

NS = Not significant

Table 3: Effect of tillage method and fertilizer rates on potato number of branches at 8 and 12 weeks after planting (WAP), and number of leaves at 16 WAP in 2021 and 2022 cropping season at Igbariam.

Potato vine length (cm)						
	Potato number of branches				Potato number of leaves	
Treatments	8 WAP		10 WAP		16 WAP	
Tillage method (TM)	2021	2022	2021	2022	2021	2022
Flat	6.00	4.75	10.92	8.17	285.20	243.80
Mounds	6.75	7.17	11.25	12.25	306.20	270.60
Ridge	6.58	6.00	10.50	9.00	286.30	248.30
LSD (0.05)	NS	NS	NS	NS	20.51	23.82
Fertilizer rate (FR)						
0	6.78	6.22	11.89	9.56	324.90	245.80
200	6.22	6.56	10.22	10.44	301.60	243.40
400	6.00	5.56	10.89	8.78	269.00	256.40
600	6.78	5.56	10.56	10.44	274.90	271.30
LSD (0.05)	NS	NS	NS	NS	23.68	NS
Interaction						
TM. × FR	NS	NS	NS	NS	NS	NS

NS = Not significant
* = Significant at 0.05%

The effect of tillage practices and fertilizer rates on sweet potato vine length at 8, 10, 12, 14 and 16 weeks after planting (WAP) is shown in Table.1. The result obtained indicated that the tillage had significant effect on sweet potato vine length in 2021 and 2022 cropping season. While fertilizer rate had effect at 8, 10, 14 and 16 WAP in 2021 cropping season only. This result also showed that mound gave the longest sweet potato vine length in the two cropping season while flat recorded the shortest vine length in the cropping seasons. Fertilizer rate at 0 kg/ha recorded highest vine length in 2021 cropping season except in 8 and 12 WAP. While In 2022, 200kg/ha recorded the longest vine length though it was not significant, while 0 kg/ha recorded the lowest vine length.

The interaction of tillage practices and fertilizer application rates on sweet potato vine length was only significant at 16 (WAP) in 2021 cropping season where mounds method at 0 kg/ha of fertilizer application rates gave the highest vine length (187.60 cm) in 2021 (Table 2). While the shortest vine length was found under flat method 400 kg/ha in 2021. In 2022 highest vine length was in mounds method at 200 kg/ha. The lowest vine length was also found in flat method at 0 kg/ha in 20222.

3.2 Effect of Tillage practices and Fertilizer application rates on the number of branches at 8 and 12WAP

The effect of tillage practices and fertilizer application rates on number of branches of sweet potato at 8 and 12 weeks after planting in 2021 and 2022 cropping season at Igbariam is presented in Table 3. The result obtained showed that mounds method had the highest number of branches in both years. While flat had the least number of branches though there was no significant differences. Fertilizer application rates in 2021 cropping season, indicated that at 0 kg/ha the highest number of branches were obtained at 8 and 12 WAP while in 2022 cropping season at 200 kg/ha the highest number of branches were obtained at 8 WAP and the lowest number of branches in 400 kg/ha at 12 WAP. The interaction effect of tillage practice and fertilizer application rates on number of branches shows no significant difference at 8 and 12 WAP in both cropping season.

3.3 Effect of tillage practice and fertilizer application rates on the number of leaves

Mound method had the highest number of leaves in both 2021 and 2022 cropping season while flat recorded the lowest number of leaves in the two season at 16 WAP in 2022 cropping season (Table 3). The highest number of leaves were observed at 0kg/ha in 2021 cropping season while 400kg/ha record the least number of leaves in 2021 cropping season. In 2022 cropping season, 600kg/ha had the highest number of leaves while 200kg/ha gave the least number of leaves. The interaction effect of tillage practices and fertilizer application rates on sweet potato number of leaves was not significant. ($P<0.05$).

3.4 The effect of tillage practice and fertilizer application rate on sweet potato number of salable roots, weight of salable roots (kg).

Table 4: Effect of tillage method and fertilizer rates on potato number of salable roots, weight of salable roots (kg), number of nonsalable roots, weight of nonsalable roots (kg) at harvest in 2021 and 2022 cropping season at Igbariam.

Potato yield parameters								
Treatments	Number of salable roots		Weight of salable roots (kg)		Number of nonsalable roots		Weight of nonsalable roots (kg)	
Tillage method (TM)	2021	2022	2021	2022	2021	2022	2021	2022
Flat	6.00	5.09	1.62	1.12	13.20	7.30	0.78	0.28
Mounds	9.92	7.00	2.62	2.10	15.80	12.90	1.11	0.51
Ridge	9.92	7.00	2.97	1.47	17.40	12.70	1.61	0.68
LSD (0.05)	3.22	NS	0.95	NS	NS	5.20	0.53	0.31
Fertilizer rate (FR)								
0	9.89	4.96	2.73	2.05	16.30	9.60	1.29	0.48
200	9.44	7.81	2.87	1.67	15.20	12.00	1.16	0.52
400	7.78	6.07	1.98	1.36	13.90	9.70	0.93	0.39
600	7.33	6.62	2.04	1.16	16.40	12.60	1.29	0.57
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS
Interaction								
TM. × FR	NS	NS	NS	NS	NS	NS	NS	NS

NS = Not significant
* = Significant at 0.05%

The result obtained showed that tillage practice was only significant in 2021 cropping season (Table 4). The result indicated that the flat recorded the lowest number of salable roots in both 2021 and 2022 cropping season. Fertilizer application rate had no significant effect in both 2021 and 2022 cropping seasons. Though 0 kg/ha gave highest number of salable root, in 2021 cropping season the lowest was recorded at 600 kg/ha fertilizer application rates. In 2022 cropping season, 200 kg/ha gave the highest number salable roots and the lowest number of salable root was obtained at 0 kg/ha. The interaction effect of tillage practice and fertilizer application rate had no effect on sweet potato number of salable

roots in 2021 and 2022 cropping season. The effect of tillage practice and fertilizer application rate on weight of salable roots was only significant in 2021. The result obtained indicated that the highest weight of salable roots was gotten under ridge method in 2021 cropping season (2.97 kg) (Table 4) and the flat tillage recorded the lowest weight of salable roots in 2021 cropping season. While mounds and flat tillage gave the highest and lowest in 2022 cropping season respectively although it was not significant.

Under the fertilizer application rate the highest weight of salable roots was at 200 kg/ha in 2021 cropping season (2.87 kg) (Table 4) and while 400 kg/ha fertilizer application rate gave the lowest weight of salable roots (1.98 kg). Questionably, 0 kg/ha produced the highest weight of salable roots and lowest was recorded at 600 kg/ha. Although, fertilizer application rate was not significant in both 2021 and 2022 cropping seasons. The result also showed that the interaction effect of fertilizer application and tillage practice had no significant effect in both cropping seasons.

3.5 The effect of tillage practice and fertilizer application rates on number of nonsalable roots

The result obtained showed that the number of non-salable roots was significant in 2022 cropping season alone also it indicated that ridges gave the highest number of nonsalable roots while flats recorded the lowest number of nonsalable roots (Table 4). In 2022 cropping season, the mounds followed by ridges produced the highest number of non-salable roots while flat produce the lowest number of nonsalable roots. Under the fertilizer application rates the highest number of non-salable roots were obtained at 600 kg/ha in 2021 and the lowest was recorded at 400 kg/ha. Similar trend was also observed in 2022 cropping season. Tillage practice and fertilizer application rates had no significant in both years (Table 4).

Tillage practice had significant effect on weight of nonsalable roots (kg) in both years while fertilizer application rates had no significant effect in both years on weight of nonsalable roots. The result indicates that ridge produced the highest weight of nonsalable in both years. Also similar trend showed that flat produce the lowest weight of nonsalable roots in both years. The fertilizer application rates had no significant on weight of salable root. But the result showed that application of 400 kg/ha gave the lowest weight of non-salable roots in both years. Whereas 600 kg/ha gave highest weight of nonsalable roots. The interaction effect of tillage practice and fertilizer application rates had no significant effect both years for weight of sweet potato non salable roots.

4. Discussion

4.1 Effect of tillage practices and fertilizer application rates on vine length

From the result of the experiment, tillage practice had significant difference for vine length for 2021 and 2022 cropping season where mounds gave the highest sweet potato vine in the 2021 and 2022 cropping season while flat recorded the lowest vine length in the both season. The result also indicated that fertilizer application rate had significant different at 8, 10, 14 and 16 WAP in 2021 cropping season only. Fertilizer application rate of 200 kg/ha in 2022 cropping season produced highest sweet potato vine length while control gave the highest sweet potato vine length 2021 cropping except for 12 WAP, where 600 kg /ha gave the highest sweet potato vine length though it was not significant. The result also indicated that tillage practice and fertilizer application rate had interaction on sweet potato's vine length at 16 WAP in 2021 cropping season. Mounds at 0 kg/ha gave the highest vine length in 2021 cropping season. While the shortest vine length was found under flat at 400 kg/ha in 2021. The highest sweet vine length was recorded at 200 kg/ha under mounds, whereas the lowest vine length was recorded at 0 kg/ha under flat in 2022 cropping season. When ridges and mounds are constructed at a considerable height of about 30 cm, they provide favorable condition around the planting zone that are essential for normal growth of sweet potato (Traynor, 2005, Parwada et al., 2011).

Although NPK fertilizer application rates had significant in 2021 at 8, 10, 14 and 16 WAP, the highest values for vine length were obtained from control and 200 kg/ha respectively. These results are corroborate with the findings by (Kareem, 2013). In this study, Vine length was observed to decrease at NPK rates above 200 kg/ha. This is in agreement with reports of who stated that vine production in sweet potato was not significant affected by NPK and when applied at higher levels it led to the production of shorter vines (Rashid and Waithaka, 2009). The Number of branches at 8 and12 WAP. Showed that tillage practice had no significant effect on the number of branches at 8 and 12 WAP 2021 and 2022 cropping season. The highest number of branches was recorded at mounds while flat gave the lowest number of branches at 8 and 12 WAP. The Result equally indicated also that fertilizer application rates had no significant, where control shows highest number of branches in 2021 at 8 and 12 WAP. While in 2022 200kg/ha gave the highest value at 8 and 12 WAP. Tillage practices and fertilizer application rates showed no interaction at 8 and 12 WAP.

4.2 Effect of Tillage Practice on Number of Leaves

Tillage practices had no significant effects on the number of leaves at 16 WAP in 2021 and 2022 cropping season where mounds gave the highest number of leaves in 2021 and 2022 cropping season at 16 WAP. Whereas flat recorded the lowest least number of leaves in 2021 and 2022 cropping season at 16 WAP. Fertilizer application rate was significant in 2021 cropping season only. Where control gave the highest number of leaves while 400 kg/ha recorded the least number of leaves in 2021. 600 kg/ha gave the highest number of leaves while 200 kg/ha gave the least number of leaves in 2022 cropping season. Fertilizer application rates showed significant effect on number of leaves at 16 WAP in 2021 this cropping season. This observed significant effect on number of leaves at 16 WAP could be as a result of the beneficial effect of NPK on the activation of Photosynthesis and metabolic process of organic compound in plants which increase growth of plant (Purekar et al., 1992).Tillage practice and fertilizer application rates showed no interaction.

4.3 Effect of tillage practice and fertilizer application rates on the number of roots

The result obtained showed that tillage practice has no significant on number of roots in 2021 cropping season where ridges gave the highest number of roots while, flat gave the lowest number of roots. 2022 cropping season shows significant where mounds produced highest number of roots whereas flat produced the lowest number of roots. Similarly, fertilizer application rates showed no effect in 2021 cropping season where control gave the highest number of roots and 400 kg/ha gave the lowest number of roots. In 2022 cropping season fertilizer application rates had no significant also where 200 kg/ha gave the highest number of roots and 0kg/ha gave the lowest number of roots. This could be an indication that both ridging and mounding provided adequately favourable condition for sweet potato growth and both loosened the soil, optimized infiltration and facilitated root expansion. This study's finding is similar to the reports that yam yield are similar whether on ridges or mounds by (Danquah et al., 2014). These results disagreed with these researchers reported 38% increase in sweet potato yield on ridges over mounds (Ennin et al., 2003). Similar, reported that planting on ridges is better than mounds and flat as ridges planting resulted in greater growth and yield of the crop (Boberry, 2015). The higher yields of sweet potato on ridging over mounding and flat might be due to the higher plant population density on ridges that helped to suppress weeds and reduced competition for available nutrients between the crops and weed. Evapotranspiration and weed infestation mounding and flatting is high because of the greater soil surface area exposure, hence control of weeds is difficult. This might have contributed to the lower roots yields on mound and flat than on ridges. (Ennin et al., 2009)

4.4 Effect of tillage practice and fertilizer application rates on weight of roots (kg)

The result indicated that tillage practice had significant on weight of roots (kg) in the both 2021 and 2022 cropping seasons. This result equally showed that ridges produced the highest roots weight in 2021 and 2022 cropping season, while flat produced the lowest weight of roots in 2021 and 2022 cropping season. This result agrees with the finding of these researchers reported 38% increase in sweet potato yield on ridges over mound and flats (Ennin et al., 2003). Similarly, recommended that planting sweet potato on ridges is better than mounds and flats, as ridges planting resulted in greater growth and yield of the crop (Brobbey, 2015). The higher yield of sweet potato on ridging over mounding and flatting might be due to the higher plant population density on ridges that helped to suppress and reduced competition for available nutrients the crops and weeds. Evapo-transpiration on mound was high because of greater soil surface area exposure, hence control of weeds is difficult. This might have contributed to the lower roots yields obtained on mounds and flat than on ridges (Ennin et al., 2009).

Fertilizer application rates showed significant on weight of roots in 2021 cropping season where 200 kg/ha produced highest weight of roots while 400 kg/ha produced the lowest weight of roots. Similar trend was also observed in 2022 cropping season where 200 kg/ha recorded the highest weight of roots 0 kg/ha recorded lowest weight of roots though it was not significant. This result was not in agreement with the findings of who stated that NPK fertilizer increases the yield of sweet potato through the formation of large sized tuber roots and that sweet potato yield increased with an increase in the rate of NPK fertilizer from 60 kg/ha to 150 kg/ha (Uwah, *et al*., 2013; Njokwu et al., 2001; Abd El-Baky et al., 2009). According to these authors the greatest sweet potato yield was obtained

with 150 kg/ha. In this study, however, almost all the yield component decreased above 200 kg/ha, suggesting that the 200 kg/ha is sufficient for sweet potato yield in the study area.

4.5 Effect of Tillage practice on the length of roots

Tillage practices had significant on the length of roots in 2021 cropping season where ridge gave the highest length of roots, while flat produced the lowest length of roots. Similarly, ridge gave highest length of root in 2022 and flat produced the lowest length of root but not significant.The reason as to why the ridge tillage system recorded higher mean root length as compared to the mound and flat tillage system could be explained in three ways. Firstly, given the same area, ridges utilize gaps that are left between mounds flat such that ridges gets more soil than mounds and flats, resulting in more space for lengthening of storage roots during development. This would facilitate lengthening before reaching the soil surface. Secondly, soil moisture and temperature influence the sub – aerial soil micro climate around the sweet potato plant, which has an effect on the storage root initiation, growth and development. Because of the protracted structure or ridges, they tend to have lower soil surface temperature than flats and mounds since they experienced elongated heat transfer when compared to conical mounds, which experience circular heat movement (Agbede and Adekiya, 2011). This is enhanced by tillage which results in soil inversion giving rise to an increase pore spaces between the soil particles, which facilitated penetration of heat through the soil resulting in soil within the first 10cm below the soil surface having an evaluated soil temperature than the next 10cm (Odiugo, 2008). Finally, also highlighted, that mounds loose more moisture through evaporation than ridges due to heightened soil surface temperature resulting in more soil moisture retention in ridges than the mounds under similar environmental conditions (Ennin et al., 2009). This could be the reason why greater root length was found on ridges than mounds. In ridges, retained soil moisture facilitated nutrient uptake that was used in the process of photosynthesis in formation of assimilates which were partition as carbohydrate deposits during storage roots initiation.

Fertilizer application rate had no significant in both, 2021 and 2022 cropping season, 400 kg/ha produced the shortest length of roots in 2021 cropping season. While 200 kg/ha gave the longest roots length in 2022. There was no interaction between the tillage practice and fertilizer application rates in both 2021 and 2022 cropping season.

4.6 Effect on tillage practice on number of salable roots

Tillage practice had no significant effect in 2021 cropping season where flat gave the lowest number of salable roots. The same trend was observed in 2022 though it was not significant. This result agree with (Traynor, 2005; Parward et al., 2011). Who reported that when ridges or mounds are constructed at a considerable height of 30 cm, they provide favourable conditions around the planting zones that are essential for the normal growth of sweet potato. Proper seedbed preparation, ridging and mounding in the cultivation of root crops had been reported to loosen the soil, optimized infiltration, enhances rooting depth and improves soil water management by (FAO, 2000). Fertilizer application rates had no significant in both 2021 and 2022 cropping season 0 kg/ha produced the highest number of salable roots in 2021 cropping season while 600 kg/ha gave the lowest number of salable roots. 200 kg/ha gave the highest salable roots and 0 kg/ha recorded the lowest number of salable roots. Tillage practice and fertilizer application rate had no interaction in 2021 and 2022 cropping season.

5. Conclusion and Recommendation

This study indicated that ridges produced the highest in most growth and yield parameters and the application of NPK fertilizer had the potential of increasing the growth and yield of sweet potato as well. The greatest growth and yield were obtained with 200 kg/ha. For optimum sweet potato production a combination of ridges and 200 kg/ha is recommended for Igbariam, Anambra State.

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