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EFFECT OF TUBER PARTS PLANTED ON GROWTH, YIELD AND SHELF LIFE OF YAM CULTIVARS IN SOUTHERN GUINEA SAVANNA, KOGI STATE

Ogundare, S. K., Etukudo, O.O. and Olajide, K.*

College of Agriculture, Kabba, Division of Agricultural Colleges, Ahmadu Bello University, Zaria, Nigeria

*Corresponding Author's Email: okolawole40@yahoo.com

Abstract

The experiment was carried out at Okoro in Ijumu Local Government Area and Ponyan in Yagba East Local Government Area, Kogi State, Nigeria to investigate the effect of tuber parts planted on growth, yield and shelf life of yam cultivars in Southern Guinea Savanna, Kogi State, Nigeria. The experiment was a 2x3 factorial laid out in a randomized complete block design (RCBD) with three replicates. The treatments consisted of two yam cultivars (Ekumo-Odo and Gambari) and three tuber parts planted (head, middle and bottom). Data on growth, yield and shelf life were taken. The results of the analysis of variance indicated that germination was highest in head region at Okoro and Ponyan with respective values of 97.50 and 98.10%. Sprouting and cumulative germination were earlier in Gambari cultivar at Okoro (90.80%) and Ponyan (94.80%). Yam sett planted using head region had more vines (3.14 and 3.56 cm), greater number of branches (22.86 and 28.41) and consequently higher yield (8.63 and 9.13 t ha^{-1}) at Okoro and Ponyan, respectively. Greater significant weight loss at 30 and 90 days (15.2% and 133.9%) and (16.1% and 93.8%) were recorded for Okoro and Ponyan, respectively. Highest number of defected tubers were observed in cultivar Gambari at 30 and 90 days (15.2 and 133.9%) and (16.1 and 93.8%) were recorded for Okoro and Ponyan, respectively. Conclusively, head region that gave better growth and yield and Ekumo-Odo that produced higher yield and had longer shelf life are recommended for yam producers in the study area.

Keywords: White yam cultivars, Tuber parts, Growth, Yield, Shelf life

Introduction

White yam (*Dioscorea rotundata*), is a widely cultivated tuber crop in West Africa especially in Nigeria, Cameroon and Côte d'Ivoire. Over 90% of the Nigeria yam production occurred in guinea savannah zone. Nigeria alone accounts for 70 per cent of the world production (FAO, 2009). Yams are consumed by boiling, frying, and roasting. The boiled yam can be made into pounded yam; the pounded yam is eaten with various sauces. Yams can be processed into flour, snacks, and flakes (Iseki and Matsumoto, 2020). Peels from yam tubers are used for livestock feed. Many consumers in Nigeria prefer white yam and believe it is valuable in traditional culture, rituals, religion, and rites (Osunde and Orchevba, 2009).

At planting time, yam setts can be obtained by cutting larger ware size tubers into tops, middles and bottoms each weighing 200 to 500 g (Aighewi *et al*., 2015). The yam setts are planted when cut surfaces are dry; usually after a day or two. Hence only the head portion would have a sprouting point and it is preferred because it establishes better and faster. Shoots from the middle and bottom portions take longer to emerge after planting because they are not planted with pre-formed sprouting points (Aighewi *et al.*, 2015). Generally, tubers from the cut sett are milked or harvested after seven to twelve months depending on the variety and agro-ecology. Setts that sprout earlier have a longer growth period because the crop is harvested when the dry season sets in and plants senescence.

Yam is an extremely vital crop both in the domestic and international market (Maalekuu *et al*., 2014). In fact, Nigeria, Cote d'Ivoire and Ghana are the major exporter of yam (FAO, 2005). The storage of yam is challenged by numerous problems and often beyond the usual farmer's control. Postharvest losses constitute a major problem and has been estimated by various authorities that 20-80% of harvested yams are lost after harvest (Maalekuu *et al*., 2014). FAO (1998) estimated that an average of over 25% of the yams produced and harvested in Nigeria are lost in storage. It is obvious that the cost of preventing food losses is generally less than producing an additional amount of food crop of the same value and quantity. It is also generally believed that reducing postharvest losses would be the next most effective tool for preventing global food shortage (Maalekuu *et al*., 2014).

Previous studies on yam centered on tuber size, time of planting and improved propagation methods. However, there is dearth of information on the effects of tuber parts planted on growth, yield and shelf life of yam cultivars in the study area. Therefore, the objectives of this study was to evaluate the effects of tuber parts planted on growth, yield and shelf life of yam cultivars in Southern guinea savanna, Kogi State, Nigeria.

Materials and Methods

Description of the study sites: The experiments were carried out at farmers' farm at Okoro Gbede in Ijumu Local Government Area (LGA) and Ponyan in Yagba East LGA of Kogi State, Nigeria. The latitude of Okoro and Ponyan locations ranges between 7.9290°N and 6.0203°E Meters above sea levels, in the Southern guinea savanna Agro-Ecological Zone of Nigeria. Dry seasons are dry and hot while wet seasons are cool. The rainfall spans between April to November with peak in June. The dry season extends from December to March. The mean annual rainfall ranges from 1276 to 1350 mm per annum with an annual temperature range of 18°C - 32°C. The mean relative humidity (RH) is 60%. The major soil order within the experimental site is Gleysol (Babalola, 2010).

Planting materials: The yam materials used were *D. rotundata* obtained from local farmers in Okoro and Ponyan. Yam of 900-1000g that have broken dormancy are cut into head, middle and bottom and weighed between 298 and 300 g, according to farmer's method in the study areas. The freshly cut yam tubers were treated in a suspension containing neem extract that was made from 1 kg neem residues powder soaked in 10 litres of water as disinfectant. The cut setts were then spread out under light shade to dry for 8 hours. Treated yam setts were planted in a heap of 1m by 1m at a depth of 10 cm on 1st April, 2019 at Okoro and 2nd of April, 2019 at Ponyan respectively.

Land preparation: The land was cleared using cutlass and prepared manually with hoe, heap of 1m by 1m were made using hoe and shovel. The experiment was a 2×3 factorial laid out in randomized complete block design (RCBD). Tuber parts planted as sub plots were head, middle and bottom regions. While main plots consisted of yam cultivars which were Ekumo-odo and Gambari. These gave six (6) treatment combinations and were replicated thrice. Each block was made up of six plots of 7 m by 5.5 m. Weeds were controlled using (Atrazine (2.5 l/ha) at the time of planting and hoeing at 4 weeks' intervals after planting. Mulching was done a week after planting in order to conserve water and also create a micro climate that favour the germination of the yam seed. Staking was done fourteen days after planting. Individual yam plant was supported using a stick of 1.8-meter length, this enable the entire plant to be exposed to sun light and for maximum utilization of sunlight for growth, development and starch formation. At planting, poultry manure was applied at the rate of 10 t ha^{-1} to supply the needed macro and micro nutrients required to the plants. Germinated tendrils were inserted into a cut and perforated stem of bamboo of 0.5 m height. This method prevents the attack of all the rodents on the germinating tendril. Also, the leaves of the plants were sprayed with cypermetrin solution at rate of 10 ml in a liter of water to control insect attack on the plant. Harvesting of matured yam was done on 1st September, 2019 at Okoro while harvesting of matured yam in Ponyan occurred on 2nd September, 2019. Vines were removed first and then tubers were dug out manually with proper care. Cleaning was done to remove adhered roots and soil particles. Harvested tubers were stored in a yam barn for 90 days.

Data were taken on early germination percentage. Growth parameters determined were main vine length, vine diameter, number of branches and average branch length. Root characters measured were number of roots per plant, root weight per plant and individual root length and yield characters taken were tuber length, tuber diameter, weight of individual tuber, number of tubers per plant and tuber yield (t ha^{-1}). Shelf life characters of yam measured were tuber weight loss and defected tubers during storage. All the data collected were subjected to analysis of variance (ANOVA) test and treatment means were separated using least significant difference.

Results

The condition of the experimental soils prior planting is presented in Table 1. The pH of the soil in Ponyan was 5.8 while that of Okoro was 6.9. The soil bulk density and total porosity were 1.26 and 42.4; 1.48 and 34.3 for Okoro and Ponyan respectively. Organic matter (3.46%) and nitrogen (0.72%) obtained in Okoro were higher relative to the values (2.56 and 0.39%) recorded in Ponyan. Potassium (0.48 cm/kg), calcium (2.56 cm/kg) and magnesium (2.59 cm/kg) observed in Okoro were higher compared to the values (0.29, 1.27 and 1.98 cm/kg) found in Ponyan. The soil in Okoro was sandy clay loam while that of Ponyan was sandy loam. The soils at both locations have the capability to support yam production and this is evident as the major agricultural output of this area is yam tuber production. Table 2 revealed the characteristics of yam cultivars used.

Effect of tuber parts planted and white yam cultivar on germination at 2, 4 and 6 weeks after planting is presented in Table 3. There were significant differences in the germination pattern of yam across the weeks due to the tuber parts planted. At 2, 4 and 6 weeks after planting (WAP), germination was highest in plots planted using head region at both locations with 21.60 and 31.40%; 46.80 and 54.30%; 28.90 and 12.60%, respectively, while the least germination (16.40 and 14.60%; 30.60 and 28.10% and 19.60 and 15.60%, respectively) occurred in plots planted with the lower region. The order of germination percentage of yam was head region > middle region > lower region. Cumulative percent germination was significantly highest (97.50 and 98.10%) in head region while lower region gave the least (66.60 and 58.30%) at both locations.

Table 1: Physicochemical properties of the of the soils of the experimental sites prior to planting in 2019 cropping season

Properties	Okoro Gbede (Ijumu LGA)	Ponyan (Yagba East LGA)
Particle size		
Sand (mg/kg)	638	771
Clay (mg/kg)	271	98
Silt (mg/kg)	091	131
Soil texture	Sand clay loam	Sandy loam
Soil pH	6.9	5.8
Bulk density (g/cm3)	1.26	1.48
Total porosity (%)	42.4	34.3
Organic matter (%)	3.46	2.56
Total N (%)	0.72	0.39
Available P (mg/kg)	2.36	6.08
K	0.48	0.29
Ca	2.56	1.27
Mg	2.59	1.98

Source: Department of Crop, Soil and Pest Management, Federal University of Technology, Abeokuta

Table 2: Characteristics of yam cultivars used

Yam cultivar	Knife impact	Moisture content	Skin thickness
Ekumo-Odo	Hard	Low	Thick
Gambari	Soft	High	Thin

Among the white yam cultivars tested, germination percentage (36.40% and 32.80%; 54.10% and 46.80%) was higher in Gambari when compared with the values (6.40% and 10.60%; 26.30% and 31.80%) obtained in Ekumo-Odo at 2 and 4 WAP, respectively. Conversely, at 6 WAP, germination percentage (47.70% and 44.20%) became higher in Ekumo-Odo relative to 9.30% and 15.20% recorded in Gambari. Cumulative germination at both locations indicated that, germination (90.80% and 94.80%) was higher in Gambari and significantly better than Ekumo-Odo that had 80.00% and 86.6% at Okoro and Ponyan. respectively.

Table 4 presents the effect of tuber parts planted and white yam cultivar on growth characters of yam. Significant difference was observed among the tuber parts planted with respect to main vine length (cm), number of branches and average branch length at Okoro and Ponyan but main vine diameter did not vary statistically. Longest main vine length (3.14 cm and 3.56 cm) and highest number of branches (22.86 and 28.41) were obtained in plots planted with head region at both locations. Plants grown using middle region recorded moderate main vine length (2.96 cm and 3.01 cm) and number of branches (20.00 and 22.83) at Okoro and Ponyan, respectively. The least main vine length (2.84 cm and 2.66 cm) and number of branches (18.44 and 17.44) were associated with tuber part planted using lower region at both locations. Effect of tuber parts planted on individual branch length was inconsistent at both locations. At Okoro, middle region gave the longest average branch length of 57.40 cm while the shortest (48.90 cm) was obtained in lower region. However, yam setts planted using head region had the longest average branch length with 47.50 cm at Ponyan. The shortest average branch length (39.90 cm) was attributed to plant grown using middle region.

Among the white yam cultivars used, Ekumo-Odo significantly produced higher main vine length, greater number of branches and longest average branch length at both locations with respective values of 2.64 cm and 3.21 cm; 24.30 cm and 24.41 cm and 56.80 cm and 49.40 cm. Lower main vine length (2.23 and 3.04 cm), least number of branches (21.60 and 26.67) and shortest average branch length (46.30 cm and 44.30 cm) were obtained in cultivar Gambari in Okoro and Ponyan, respectively. Main vine diameter only differed with the cultivars at Okoro but statistically similar in both cultivars at Ponyan. Thicker main vine diameter of 1.59 cm was recorded in Ekumo-Odo at Okoro while the tinier main vine diameter (1.31 cm) was obtained in Gambari from the same location. Effect of tuber parts planted and white yam cultivar on root characters of yam is shown in Table 5. Significant differences were observed in number of roots per plant, root weight per plant and individual root length at both locations except root weight per plant in Ponyan which was not significantly affected. Plots planted with Head region produce more roots (26.30 and 32.80) at the two locations, followed by plants grown with middle region that had (24.80 and 21.40) while the lower region had the least number of roots (16.30 and 18.90).

At Okoro, plots treated with Head region produce plants with heaviest roots (31.40 g), followed by the middle region which gave (28.60 g) while the lightest root (24.40 g) was recorded in plot planted with lower region. Root length values were not consistent with the tuber parts planted at both locations; yam setts planted using Middle region produced the longest roots (34.60 cm and 36.80 cm) at Okoro and Ponyan. The shortest roots were recorded from plots where lower region was planted with 30.90 cm and 29.40 cm, respectively.

Effect of cultivar on number of roots indicated that number of roots (43.00 and 47.40) were highest in Gambari relative to 38.00 and 36.10 recorded in Ekumo-Odo at Okoro and Ponyan, respectively. However, Ekumo-Odo significantly produced heavier roots (28.60 g and 31.40 g) than the roots of Gambari that gave 23.30 g and 26.80 g at both locations. White yam cultivars significantly influence individual root length only at Okoro with Ekumo-Odo having longer roots (36.30 cm) compared to 33.70 cm obtained in Gambari. Effect of tuber parts planted and white yam cultivar on tuber characters and yield of yam is presented in Table 6. Tuber part planted significantly influenced tuber length, tuber diameter, tuber weight and tuber yield but number of tubers per plant was not statistically different.

Table 3: Effect of tuber parts planted and white yam cultivars on germination at 2, 4 and 6 weeks after planting (%)

Treatment	No of tuber planted	2WAP		4WAP		6WAP		Total (%)	
		Okoro	Ponyan	Okoro	Ponyan	Okoro	Ponyan	Okoro	Ponyan
TPP									
HR	120	21.60a	31.40a	46.80a	54.30a	28.90a	12.60b	97.50a	98.10a
MR	120	20.80a	18.70b	31.40b	30.40b	28.40a	27.30a	80.60b	76.40b
LR	120	16.40b	14.60c	30.60b	28.10c	19.60b	15.60b	66.60c	58.30c
WYC									
Ekumo-Odo	180	06.40b	10.60b	26.30b	31.80b	47.70a	44.20a	80.00b	86.60b
Gambari	180	36.40a	32.80a	54.10a	46.80a	09.30b	15.20b	90.80a	94.80a
Interaction TPP vs WYC		ns	ns	ns	ns	ns	ns	ns	ns

TPP= Tuber parts planted, HR= head region, MR=middle region, LR= lower region, WYC= white yam cultivar. ns = non-significant

Table 4: Effect of tuber parts planted and white yam cultivars on growth characters of yam

Treatment	Main vine length (cm)		Main vine diameter (cm)		Number of branches		Average branch length (cm)	
	Okoro	Ponyan	Okoro	Ponyan	Okoro	Ponyan	Okoro	Ponyan
TPP								
HR	3.14a	3.56a	1.56a	1.66a	22.86a	28.41a	54.60b	47.50a
MR	2.96b	3.01b	1.44	1.41a	20.00b	22.83b	57.40a	39.90b
LR	2.84b	2.66c	1.46	1.32a	18.44c	17.44c	48.90c	42.60b
WYC								
Ekumo-Odo	2.64a	3.21a	1.59a	1.43a	24.30a	24.41a	56.80a	49.40a
Gambari	2.23b	3.04b	1.31b	1.36a	21.60b	22.67a	46.30b	44.30b
Interaction TPP vs WYC	ns	ns	ns	ns	ns	ns	ns	ns

TPP=tuber parts planted, HR= head region, MR=middle region, LR= lower region, WYC= white yam cultivar. ns = non-significant.

Table 5: Effect of tuber parts planted and white yam cultivars on root characters of white yam

Treatment	Number of roots per plant		Root weight per plant (g)		Individual root length (cm)	
	Okoro	Ponyan	Okoro	Ponyan	Okoro	Ponyan
TPP						
HR	26.30a	32.80a	31.40a	26.80a	33.40b	31.70ab
MR	24.80a	21.40b	28.60b	26.40a	34.60a	36.80a
LR	16.30b	18.90b	24.40c	25.80a	30.90c	29.40b
WYC						
Ekumo-Odo	38.00b	36.10b	28.60a	31.40a	36.30a	32.40
Gambari	43.00a	47.40a	23.30b	26.80b	33.70b	33.80
Interaction TPP vs WYC	ns	ns	ns	ns	ns	ns

TPP=tuber parts planted, HR= head region, MR=middle region, LR= lower region, WYC= white yam cultivar. ns = non-significant

Table 6: Effect of tuber parts planted and white yam cultivars on tuber characters and yield of yam

Treatments	Tuber length		Tuber diameter (cm)		Tuber weight (kg)		No of tubers/plant		Harvested yield (t ha^{-1})	
	Okoro	Ponyan	Okoro	Ponyan	Okoro	Ponyan	Okoro	Ponyan	Okoro	Ponyan
TPP										
HR	41.31a	40.29a	9.46a	10.71a	2.61a	3.61a	1.00a	1.00a	8.63a	9.13a
MR	38.43b	37.61a	7.43b	8.47b	2.03a	2.98b	1.00a	1.00a	6.14b	6.31b
LR	27.80c	21.40b	5.60c	6.01c	1.63b	1.86c	1.00a	1.00a	4.98c	4.63c
WYC										
Ekumo-Odo	36.32b	37.42b	10.96a	12.86a	2.74a	2.68a	1.00a	1.00a	8.48a	8.74a
Gambari	48.47a	48.54a	8.96b	7.74b	1.51b	1.16b	1.00a	1.00a	6.81b	6.92b
Interaction TPP vs WYC	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

TPP=tuber parts planted, HR= head region, MR=middle region, LR= lower region, WYC= white yam cultivar. ns=non-significant

Head region produced the longest tuber (41.31 cm and 40.29 cm), widest tuber (9.46 cm and 10.71 cm), heaviest tubers (2.61 kg and 3.61 kg) and highest tuber yield (8.63 t ha^{-1} and 9.13 t ha^{-1}) at both locations, this was followed by plants grown in plots with middle region with 38.43 and 37.61 cm, 7.43 cm and 8.47 cm, 2.03 kg and 2.98 kg and 6.14 t ha^{-1} and 6.31 t ha^{-1} while plots with lower region produce shortest tuber of 27.80 cm and 21.40 cm, thinnest tuber (5.60 cm and 6.01 cm), lightest tuber (1.63 kg and 1.86 kg) and lowest tuber yield (4.98 t ha^{-1} and 4.63 t ha^{-1}).

Yam cultivars had significant effect on tuber length, tuber diameter, tuber weight and tuber yield but number of tuber per plant was not significantly influenced by white yam cultivars at both locations. Among the cultivar evaluated, Gambari produced longer tubers (48.47 cm and 48.54 cm) at both locations compared to the values (36.32 cm and 37.42 cm) obtained from Ekumo-Odo. However, thicker tubers, heavier tubers and higher tuber yield were attributed to Ekumo-Odo at Okoro and Ponyan with respective values of 10.96 cm and 12.86 cm, 2.74 kg and 2.68 kg and 8.48 t ha^{-1} and 8.74 t ha^{-1} relative to 8.96 cm and 7.74 cm, 1.51 kg and 1.16 kg and 6.81 t ha^{-1} and 6.92 t ha^{-1}.

Tables 7 and 8 show the effect of tuber parts planted and cultivars on tuber weight loss and number of defected tubers during storage of yam at 30 and 90 days after storage. There was no significant difference observed in tuber weight loss and number of defected tubers due to differences in tuber parts planted at Okoro and Ponyan. However, significant differences were observed in tuber weight-loss during storage and number of defected tubers among the cultivars used. Greater significant weight loss (1.31 and 0.56 and 1.86 and 0.96) and number of defected tubers (08.00 and 72.00 and 11.00 and 66.00) occurred in cultivar Gambari at 30 and 90 days after storage for both locations. Percentage weight loss over time (15.20% and 133.90%) and (16.10% and 93.80%) was higher in Gambari at 30 and 90 days for Okoro and Ponyan, respectively when compared with the values (1.90% and 15.90%) and (5.90% and 17.10%) obtained from Ekumo-Odo in this experiment.

Table 7: Effect of tuber parts planted and white yam cultivars on tuber weight loss during storage of yam

	Okoro			Ponyan		
Treatment	Wt@H	30 DATS	90 DATS	Wt@H	30 DATS	90 DATS
TPP						
HR	2.61	2.08a (25%)	1.07a (94%)	3.61	3.41a (5.9%)	1.66a (105%)
MR	2.03	1.54a (24%)	0.98a (90%)	2.98	2.74a (8.7%)	1.41a (104%)
LR	1.63	1.34a (21.6%)	0.69a (94%)	1.86	1.72a (8.1%)	0.86a (100%)
WYC						
Ekumo-Odo	2.74	2.69a (1.9%)	2.32a (15.9%)	2.68	2.53a (5.9%)	2.16a (17.1%)
Gambari	1.51	1.31b (15.2%)	0.56b (133.9%)	2.16	1.86b (16.1%)	0.96b (93.8%)
Interaction TPP vs WYC	ns	ns	ns	ns	ns	ns

TPP=tuber parts planted, Wt@H= Weight at harvest, DATS = Days after tuber storage, DTPP=tuber parts planted, HR= head region, MR=middle region, LR= lower region, WYC= white yam cultivar, NTS= number of tuber stored, NS= not significant

Discussion

Germination was highest in plots treated with head region compared to both middle and lower region. Node and inter node concentration determines germination in crop especially in yam. Concentration of node was heaviest in head region compared to middle and lower region. Also, other factors that influence germination in yam is dormancy and age of deposited starch in the yam could influence dormancy in yam. The Head region starch deposited earlier than either both middle region and lower region and this could be a factor that aids germination in head region planted plots. The yam tuber which contains a deposit of starch does not have dormant buds as found on a typical tuber such as potato. However, at the end of dormancy a meristematic layer of cells beneath the

Table 8: Effect of tuber parts planted and white yam cultivars on number of defected tubers of yam

		Okoro		Ponyan	
Treatment	NTS	30 DATS	90 DATS	30 DATS	90 DATS
TPP					
HR	60	03.00a	23.00a	04.00a	18.00a
MR	60	03.00a	26.00a	06.00a	21.00a
LR	60	04.00a	21.00a	04.00a	21.00a
WYC					
Ekumo-Odo	90	01.00b	11.00b	03.00b	17.00b
Gambari	90	08.00a	72.00a	11.00a	66.00a
Interaction TPP vs WYC		ns	ns	ns	ns

TPP=tuber parts planted,NTS= number of tuber stored, DATS = Days after tuber storage, WYC= white yam cultivar, ns = not significant skin of the tuber produces sprouts usually from the head region (Iseki and Matsumoto, 2020).

At planting time, yam seeds can be obtained by cutting large ware size tuber into tops, middles and bottoms. The sets are planted when cut surfaces are dry usually a day or two. Algbewi *et al.* (2015) reported that only the head portion would sprout earlier and it is preferred because it establishes better and faster. Earliness to sprouting in head region suggest that each activation is faster, indicating the possible existence of signaling mechanism that perceived the availability of resources in meristemaric cells (Cranfurd *et al.*, 2001).

Sprouting was earlier in cultivar Gambari. In addition, its cumulative germination was greater. Cultivar Gambari could be considered soft yam that has more water content than Ekumo-Odo that tends to be harder. All the conditions required for the sprouting of yam favoured cultivar Gambari, the skin is thinner compared to Ekumo-Odo, this could allow easy passage of both water and air in and out the tubers. This could be responsible for the better germination observed in cultivar Gambari.

Growth and yield characters of yam were significantly influenced when Head region was planted. This is expected because the yam with head region establish earlier and developed faster than either yam from middle region or lower region. It produced more number of vines that bears the leaves, number of branches which indicated higher photosynthetic activities because the crop was exposed most to sunlight. Also plots with head region recorded the highest number of roots showing that nutrients uptake from the soil solution will be higher than other plants established using either middle or lower region. All these translated to better tuberization in the yam raised using head region.

Among the two cultivars tested, Ekumo-Odo gave higher yield, this suggested difference in the genetic makeup of the two cultivars and this makes the cultivar Ekumo-Odo to adapt better to the growing environment than Gambari. Also, during the growing season there was severe drought that lasted for 28 days. The effect was evident on cultivar Gambari and this could be responsible for the reduced yield obtained in this cultivar. Greater significant tuber weight loss and number of defected tuber occurred in cultivar Gambari when compared to Ekumo-Odo. This is expected because of the differences in the characteristics of the two yam tubers. Ekumo-Odo contains lesser moisture content, texturally harder and contains thicker skin than cultivar Gambari which has higher in moisture content, softer texture and thinner skin. These could be responsible for greater weight loss and higher number of defected tubers in cultivar Gambari.

Conclusion

The result of this study indicated that tuber parts planted and yam cultivars varied in most of the growth and yield traits measured. Head region had positive impact on growth and yield of yam. Cultivar Ekumo-Odo produced higher yield and longer shelf life characters in this experiment. Therefore, head region that gave better growth and yield of yam and Ekumo-Odo that produced higher yield and had longer shelf life are recommended for yam producers in the study area.

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