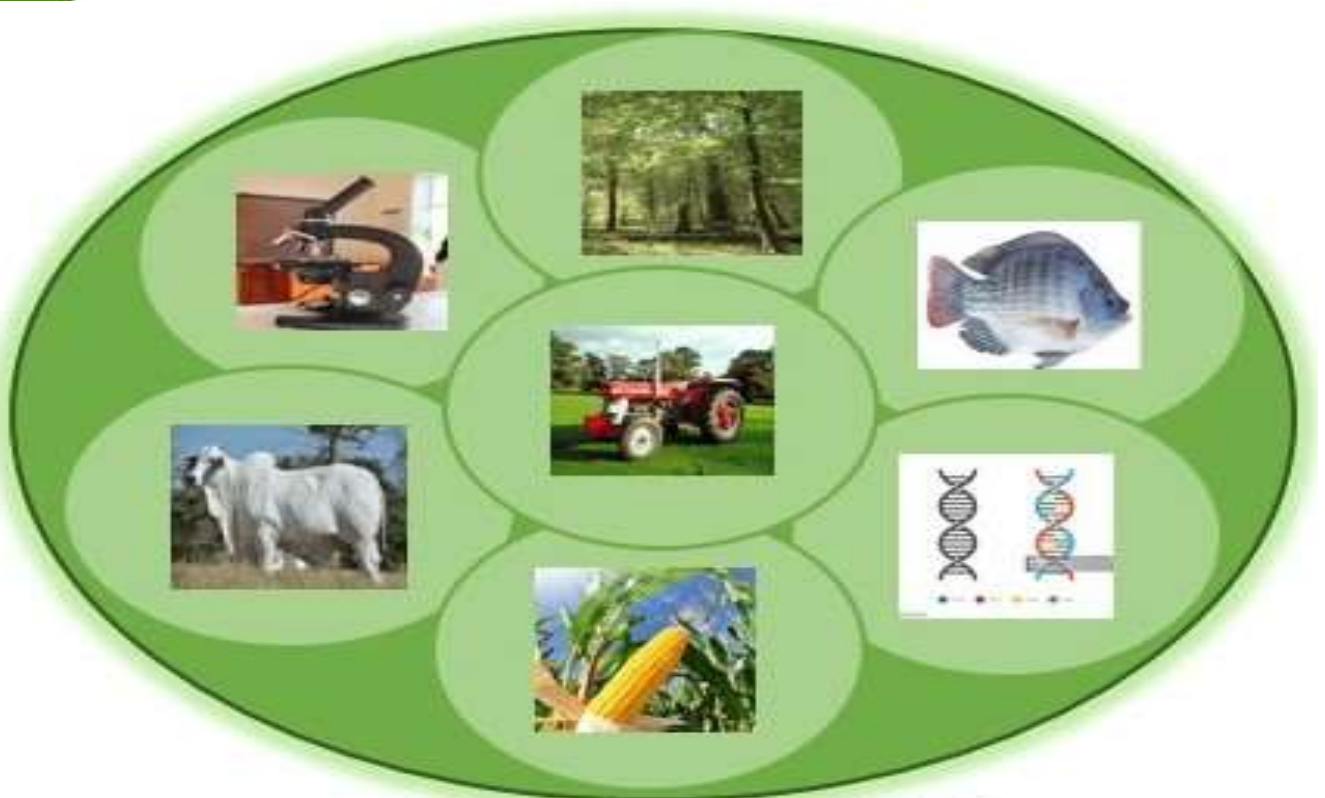




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GROWTH AND YIELD RESPONSE OF SWEET POTATO VARIETIES IN SUDAN SAVANNAH ZONE OF MAIDUGURI, BORNO, STATE

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ABSTRACT

*The aim of the study is to determine the performance of four varieties of sweet potato (*Ipomoea batatas*) in Maiduguri Borno State, Nigeria. The research was conducted during dry season in the year 2018 at Teaching and Research Farm University of Maiduguri, Borno State Nigeria. Four genotypic varieties of sweet potatoes (OFSP-1, WFSP, OFSP and WFSP-2) were used as treatments. The experiment was laid out Random Complete Block Design (RCBD) in three replications. The parameters measured were Vine length, number of leaves, number of tubers per plant and tuber weight per plant. The data analysis was subjected to the Analysis of Variance and treatment means were found to be significant were separated using the Duncan's Multiple Range Test (DMRT) at 5% level of significant. The result revealed that there was a significant difference in the performance of the four different varieties of potato, OFSP-1 perform (produced) the highest yield (530.28kg/ha) while WFSP-2 perform was the least in performance.*

Keywords: Varieties; sweet potatoes; response; growth; yield.

Introduction

Sweet potato (*Ipomoea batatas* L.) is a member of the *Convolvulaceae* family that originated from Central America spreading across the Pacific and transported to warmer region of Asia and Africa by Spanish and Portuguese traders. Sweet potato (*Ipomoeae batatas* (L Lam) is a perennial crop belonging to the family of *Convolvulaceae* (repetition) which is usually cultivated as an annual crop. It is among the important food crops in the world. It ranks second after Irish potato in the world's root and tuber crop production; also within the sub-Saharan Africa, it is the third most important root and tuber crop after cassava and yam. (Mohammed and Sadiq, 2016). Sweet potato (*Ipomoea batatas*) L. Lam) is a widely grown and an important staple food crop in

most parts of tropical and subtropical regions of the world and ranked 7th among the world's major food crops (FAO, 2004) Muoneke and Ukpe (2010). Asia including: China, India, Indonesia and others 88,511,139 tons, Latin America including Brazil and Cuba 1,966,398. North American including - United States has 1,081,720 tons, Oceania including Papua, New Guinea with 742,554 tons and lastly Africa including: - Nigeria, Uganda, Kenya, Tanzania etc with a total production figure of 14,213,680 and Nigeria specifically has 2,838,000 tons Muoneke and Ukpe (2010). In Nigeria it is an important stable food particularly in the Northern part from where the bulk of the production comes and which it is even used in many aspects of nutritional and industrial purposes (Mohammed and Sadiq, 2016). An

average production figure in Nigeria was estimated at 273,300 metric tons which was equated to the world's average production of 437,000 metric tons (Mohammed and Sadiq, 2016). Sweet potato is fast becoming emerging food security crop in Nigeria and is cultivated in all agro-ecological zones of the country (Olatunji and Adeyongu, 2021). Increasing potential of the crop in poverty alleviation and food security due to its high productivity per unit area and time makes sweet potato an important crop for the survival of the resource poor farmers in Nigeria where the crop serves as a starch staple food for human consumption. The tuber can be eaten roasted, fried or boiled (Muoneke and Ukpe, 2010). Current record shows that 381,000 – 510,000 ha of land are subjected to sweet potato cultivation in Nigeria with an annual production figure of 3.46 million metric tons (NRCRI, 2009). Estimated yields of sweet potatoes in the research fields varied from 40 to 70 t/ha for improved varieties, while in multi-location trials yields averaged 23.5t/ha across seasons and locations (Asa., *et al* 2021). Considering the current economic crisis in the country many people sleeping in hunger, mal-nutrition some died. it had become a necessary to provide solution to this problem. The breeders are always on their toad to ensure the improvement of the existing varieties available in the world that give a high yield in the crop production. Crop yield depends on environmental acceptance of the crop genetic potential of the crop. There are five agro ecological zones in Nigeria each with it unique environmental characteristics. Savannah zones had the greatest advantage for growing sweet potato due to moderate rainfall (Aliyu., *et al.*, 2019). This research going to compare the performance of two varieties of potato (orange fleshed and white fleshed) in Sudan savannah of Maiduguri Borno state Nigeria. The purpose of the study is to evaluate the variety with early maturity and high yield in the study area.

Materials and Method

The experiment was conducted in the University of Maiduguri Teaching and rResearch Farm during the 2018 dry season. The demonstration Farm is located on Latitude 11.8° N and Longitude 03° 12' 16.464"E and an altitude of 350.5m above the sea level), sudan savannah of Nigeria (Aliyu *et al* 2023). Treatments were consisted of four different varieties of *Sweet potato* (OFSP-1, WFSP, OFSP and WFSP-1). Randomized Complete Block Design (RCBD) three blocks of four replications.

Agronomic practices: Land preparation: the land was cleared plough and four ridges was constructed at 10m² x10m² and m² block. The stem was cut for planting at the vine length of 20cm 3-4 nodes per vines were put into consideration. Weeding was done manually to keep the plots weed-free. Irrigation was done regularly tube. Well and water pump were used as the sources of irrigation. Irrigation was scheduled to three times per weekend Harvesting was done manually at 16 WAP. Data collection and Data analysis: Vine length (cm). Number of leaves/plant at 4, 6, 8, 10, and 12 WAP, Number of tuber per plant, tuber diameter had been taken used Vanier caliper and Tuber weight (kg) ha. was taken by the use of weigh balance. Yield per hactre was taken.

Data analysis: Data obtained were computed using ANOVA and means were separated using DMRT at 5% level of probability.

Results and Discussion

Effect of sweet potato varieties on vine length at 4, 6, 8, 10 and 12 WAP

Result shows significant difference ($P \leq 0.05$), among all varieties of sweet potato (Table 1). At 4 WAP, orange flash sweet potato (OFSP) recorded the highest vine length while white flash sweet potato (WFSP-2) gave the least vine length. At 6 WAP, OFSP-1 and OFSP

recorded statistically similar vine length. At 8 and 10 WAP, OFSP-1 and OFSP had the highest but similar vine length. While at 12 WAP OFSP-1 gave the higher vine length. This indicates that variety can be used as a good vine source especially where production is aimed at

producing sweet potato vines. This significant difference observed could be attributed to difference in genetic composition of the varieties as reported by (Rahman *et al.*, 2013 and alike *et al.*, 2013).

Table 1.0: Effects of sweet potato varieties on vine length (cm) at 4, 6, 8, 10 and 12 WAP during 2018 dry season in Maiduguri

Treatment	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
OFSP-1	14.56 ^{ab}	24.38 ^a	25.82 ^a	27.31 ^a	73.40 ^a
WFSP	11.56 ^{bc}	13.29 ^b	14.70 ^b	16.44 ^b	42.41 ^b
OFSP	17.23 ^a	22.75 ^a	25.35 ^a	25.67 ^a	58.69 ^{ab}
WFSP-2	11.37 ^c	12.21 ^b	14.33 ^b	17.67 ^b	50.67 ^{ab}
SE	0.85	0.80	0.74	1.33	7.98

Means with the same letter (s) along the column are not significant different at 5% level using DMRT

Effect of sweet potato varieties on number of leaves at 4, 6, 8, 10, and 12 WAP

Result shows significant difference ($P \leq 0.05$), among all varieties of sweet potato (Table 2). At 4 WAP, OFSP recorded the highest means number of leaves per plant (7.52), at 6, 8, 10 and 12 WAP, OFSP-1 recorded the highest mean(s) number of leaves. Other varieties had similar means number of leaves. The difference among sweet potato varieties in number of leaves per plant could be attributed

to the differences in their genotypic composition. The result is in agreement with the finding of Wariboko and Ogidi (2014), whose results showed that the varieties were significantly different in their growth parameters. Variety OFSP had the highest number of leaves and this one of the important factor for selecting Sweet potato varieties and serve as an indicator of adaptability of the crop to the growing condition of the study area (Nwankwo *et al.*, 2012).

Table 2.0: Effect of sweet potato varieties on number of leaves at 4, 6, 8, 10 and 12 WAP during 2018 dry season in Maiduguri

Treatment	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
OFSP-1	6.08 ^{ab}	10.53 ^a	15.34 ^a	18.67 ^a	22.67 ^a
WFSP	4.17 ^b	5.67 ^c	8.03 ^b	15.67 ^{ab}	19.27 ^{ab}
OFSP	7.52 ^a	7.65 ^b	8.71 ^b	9.50 ^{ab}	9.40 ^b
WFSP-2	5.42 ^{ab}	7.00 ^{bc}	8.73 ^b	8.56 ^b	9.00 ^b
SE	0.73	0.46	1.11	2.75	3.54

Means with the same letter (s) along the column are not significant different at 5% level using DMRT.

Effect of sweet potato varieties on number of tuber/plant, tuber weight/plant, tuber yield/plot, tuber diameter and tuber yield/plant.

Result shows significant difference ($P \leq 0.05$), among all varieties of Sweet potato (Table 3.0) OFSP-1 indicated highest mean number of tuber (3.17), OFSP recorded the highest mean of tuber yield per plot (6.33), OFSP-1 and OFSP recorded the highest mean of tuber

weight per plant, OFSP-1 recorded the highest mean of tuber diameter and OFSP-1 indicated the highest mean of tuber yield, while WFSP-1 and WFSP variety had similar mean numbers. Egbe *et al.*, (2012), observed difference in yield and yield components of sweet potato as a result of accumulation and distribution of dry matter among the major organs. This is related to the genetic and environmental factors.

Table 3: Effect of sweet potato varieties on number of tuber/plant, tuber weight/plant, tuber yield/plot, tuber diameter and tuber yield/plant during 2018 dry season in Maiduguri.

Treatment	Number of tuber/plant	Tuber yield/plot (kg)	Tuber weight /plant (kg)	Tuber diameter (cm)	Tuber yield (kg/ha)
OFSP-1	3.17	5.17	2.11 ^a	7.42 ^a	530.28 ^a
WFSP	2.50	5.33	1.12 ^b	5.12 ^{ab}	403.55 ^{ab}
OFSP	2.83	6.33	2.21 ^a	9.00 ^{bc}	462.24 ^{ab}
WFSP-2	2.08	3.67	0.88 ^b	6.55 ^c	314.71 ^b
SE	0.40	1.78	0.26	0.60	43.311

Means with the same letter (s) along the column are not significant different at 5% level using DMRT.

Conclusion and recommendation

Based on the findings, it's revealed that different varieties had significant differences at sampling stages. Results showed a significant difference at sweet potato sampling stages. OFSP-1 recorded the highest (530.28kg/ha) yield while WFSP-2 produced the least yield. Orange flashed sweet potato variety (OFSP-1) it more recommended for farmers in Maiduguri borno state Nigeria adopted in their production to maximum the productivity in the area.

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I. Aliyu¹, I. Y. Dugje¹, M.A Muhamman² and U.G. Magaji² 2023. Evaluation of cowpea (*vigna unguiculata* (L.) Walp) varieties and sowing dates Magaji² for growth and yield of cowpea intercropped with sesame in sudan savannah of Nigeria. 8th national conference on sustainable crop production and food security under the emerging environmental challenges in Nigeria.

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