Journal of Agriculture and Environment Vol. 19 No. 1, 2023: 135-143
ISSN: 1595-465X (Print) 2695-236X (Online)

GROWTH AND YIELD OF SEVEN VARIETIES OF OKRA (*Abelmoschus esculentus* (L.) MOENCH) IN AGBOR, DELTA STATE, NIGERIA

C. Umeri[1], S.E. Nwajei[2], H. Moseri[1] and M.C. Bamidele[1]

[1]Department of Agricultural Education, University of Delta, Agbor, Nigeria.
[2]Department of Crop Science, Ambrose Alli University, Ekpoma, Nigeria

ABSTRACT

A study was carried out in 2019 to evaluate seven varieties of okra (*Abelmoschus esculentus* (L.) Moench) for growth and yield at the Teaching and Research Farm, University of Delta, Agbor, Delta State. The varieties of okra used were: Local, NH/OK/M, NH/OK/N, NH/OK/Q, NH/OK/S, NH/OK/T and JOKOSO. The experiment was a randomized complete block design with four replicates. Data collected were Plant height, number of leaves/plant, total leaf area/plant, stem girth and fruit yield. Data obtained were analyzed using analysis of variance (ANOVA) and the means were separated using Duncan's Multiple Range Test (DMRT) at 5% level of probability. The result obtained revealed that there were significant differences on the growth and yield characters among the seven varieties of okra. However, NH/OK/M (274.50cm) had the tallest plants while NH/OK/S (91.50cm) had the least. Although the local and JOKOSO varieties jointly produced the highest number of leaves/plant but was not significantly different from the other varieties. NH/OK/M had the highest total leaf area/plant (2359.00cm^2) and thickest stems (1.89cm) while NH/OK/T and NH/OK/Q had the least values of 799.50cm^2 and 1.04cm, respectively. NH/OK/M and NH/OK/S were similar with the highest fruit yield (11.70 t/ha) while the local variety had the least (4.50 t/ha). In terms of growth and yield, NH/OK/M and NH/OK/S were found to be more suitable among the varieties evaluated in this zone. However, NH/OK/M and NH/OK/S are recommended for okra production in this locality.

Keywords: Comparison; growth; Okra; Varieties; yield.

INTRODUCTION

Okra (*Abelmoschus esculentus* (L.) Moench) is a member of the Malvaceae family. It is widely cultivated in the tropics and subtropics, and it is an important vegetable crop consumed worldwide (Olaniyi *et al*., 2009; Omotoso *et al*., 2018). Okra is an indigenous crop of Africa cultivated widely in West and Central Africa for its immature fruits (Varmudy, 2011; Komolafe *et al*., 2021).

World production of okra stood at about 9.4 million tonnes with 69% (5.2 million tonnes) produced in India. As an indigenous crop of Africa, Okra is cultivated widely in Africa for its immature fruits used as vegetable with a yield of 4.18 million tonnes. In Nigeria,

it is estimated at 1.82 million tonnes per year (FAOSTAT, 2020). The total area under cultivation has increased over the years. India has been known to be the highest producer of okra in the world, followed by Nigeria and Sudan (Komolafe *et al*., 2021).

Okra thrives well in different soils, but it is best grown in well- drained sandy and clay loam soils, especially with rich organic matter (Sreenivasa *et al.,* 2010). It can tolerate slightly acidic soil. The crop can be grown in soils with pH range from 4.5 to 7. According to Iyagba *et al*. (2012), okra grows best on loams and sandy loams, but will produce good yields on heavier soils. It is a crop of tropical and sub-tropical climates requiring a long warm and humid growing season (Komolafe *et al*., 2021). It is susceptible to frost and cannot thrive well in cold. It may be grown at elevations from sea level up to 30 m (Omotoso *et al.,* 2018) but can tolerate a wide range of rainfall (Omotoso *et al.,* 2015). Seeds fail to germinate below 20^{o}C. Optimum temperature for seed germination is 29^{o}C. Okra is a stout, erect annual herb that grows to about 4 m tall with spirally arranged leaves with leaf blades up to 50 cm in diameter (Olaniyi *et al*., 2009). The fruit is a capsule and grows quickly after flowering. Fruits or pods are green, 5-35cm long and 1-5 cm in diameter (Adetuyi *et al.,* 2011).

The crop is known in many English-speaking countries as 'ladies' finger' or 'ochro' (Remison, 2005). In Nigeria, it is made into soups, stews and sauces with or without palm oil; fish and other condiments, or it's boiled as vegetable. The leaves of okra can also be cooked to make a popular soup called Ilesha in Nigeria (Cooke, 1998). Okra has a high fiber content which helps to stabilize blood sugar by regulating the rate at which sugar is absorbed in the body system (Udoh *et al*., 2005; Ngok *et al.*, 2008).

The adoption of high yield varieties is emphasized by farmers who still dwell on genotypes with poor yield (Agba *et al.*, 2011). Research studies on okra, point out that, varieties with high yielding ability should be recommended for food security (Adetuyi *et al.*, 2011). In Nigeria, agricultural production is low due to lack of proper agronomic practices, infrastructure, low yields associated with poor soils, low-yielding and less stable varieties (Omoregie and Nwajei, 2015). In the study area, crop yield from farmers' fields is low due to soil degradation as a result of oil spillage and exploration (Agba *et al*, 2011; Umeri *et al*, 2018). With regards to high yielding crop varieties, there is need to increase effort on research to cultivate new crop varieties that can withstand the harsh environment in future as a means of tackling food insecurity among the populace in this zone. Hence, this study was conducted to evaluate the growth and fruit yield performance of some okra varieties in Agbor located in a rainforest zone of Delta State, Nigeria.

MATERIALS AND METHODS

Study Area

The study was carried out during the 2019 cropping season at the Teaching and Research Farm, University of Delta, Agbor, Delta State. The area is located on latitude 6^{o}30' 0″ North and longitude 6^{o}45' 0″ East. Agbor has a mean air temperature of 31^{o}C, relative humidity from 60-90%, sunlight lasts for about 6-8 hours daily and a mean annual rainfall of about 2000-3000 mm. The area experiences a distinct wet (April-September) and dry (October-March) seasons. The vegetation at Agbor is a typical area of the rain forest except along drainage streams where swampy areas exist. The soils at Agbor are mainly marine shale and sand beds (Egbai *et al.*, 2015). Crops are mainly grown on flat lands with little or no tillage operation.

Experimental Design and Field Layout

The seeds of NH/OK/M (45 days to mature and average yield 12t/ha), NH/OK/N (45 days to mature and average yield 11t/ha), NH/OK/Q (45 days to mature and average yield 11t/ha), NH/OK/S (45 days to mature and average yield 12t/ha), NH/OK/T (45 days to mature and average yield 10t/ha) were obtained from the National Horticultural Research Institute (NIHORT), Ibadan, Oyo State, while JOKOSO (55 days to maturity and average yield 8t/ha) and the local variety (60 days to maturity and average yield 6t/ha) were obtained from Agbor. The seven varieties of okra were evaluated in a Randomized Complete Block Design (RCBD) with four replicates.

Prior to planting, representative soil samples were randomly collected from the surface soil (0-15 cm depth) using soil auger. The samples were bulked, mixed, air dried and passed through a 2 mm mesh sieve to determine the routine physical and chemical properties of the soil in the laboratory; using the procedure described by Okalebo *et al*. (2002).

The land was manually prepared. Planting was done on 30th July, 2019 at the onset of the rains. Two seeds of each of the varieties of okra were sown on minimally prepared beds at a spacing of 60cm × 30cm intra and inter-row, which was later thinned down to one plant per stand at eight days after planting (DAP). The individual plot size was 2.4m × 1.8m with a spacing of 0.6m within plots and between replicates. A total of twenty-eight (28) plots with twenty-four (24) plants each were involved to give a total of six hundred and seventy-two (672) plants an equivalent to 55,556 plants/ha were used, with a total land area of 0.01 ha. Weed control was done manually at 3 and 7 weeks after planting (WAP) with hoe. Subsequent weeding was done by rouging.

Data Collection

Data were collected on vegetative and yield characters as follows:

Vegetative Characters

The growth parameters were measured at 2, 4, 6, 8 and 10 WAP. Four plants were tagged in the net plot for vegetative data collection. The vegetative data obtained were:

Plant height (cm): A measuring tape was used to measure the height of the four plants/plot from the soil surface to the tip were the youngest leaves branched and the mean value was recorded.

Number of leaves per plant: The number of leaves of the four plants/plot were visually counted and the mean value recorded.

Leaf area/plant (cm^2): The leaf area of four plants were determined by graphical method and the area obtained was multiplied by the total number of leaves and the mean recorded.

Stem girth (cm): A digital venier caliper was used to determine the biggest stem girth for four plants/plot and the average value recorded.

Yield Character

Fruit yield (t/ha): A weighing balance was used to measure the fruits harvested per plot. The values were extrapolated to tonnes per hectare.

Data Analysis

Data on growth and yield obtained were subjected to analysis of variance (ANOVA) using GenStat Version 15.2 (2012) software programme and where significant differences exist, means were separated using Duncan's Multiple Range Test (DMRT) at 5% level of significance.

RESULTS

Soil Physico-chemical Properties

Results of the physico-chemical properties of the experimental site prior to planting of okra (Table 1) showed that the soil used was loamy sand, slightly acidic with moderate organic carbon (8,30g/kg) and deficient in nitrogen (0.45g/kg), available phosphorus (10mg/kg) and exchangeable bases.

Table 1: Physico-chemical properties of the soil of the experimental site prior to planting

Parameters	Values
Sand (gkg^{-1})	820
Silt (gkg^{-1})	70
Clay (gkg^{-1})	110
Textural Class	Loamy sand
pH (H_20 1:1)	5.75
Organic carbon (gkg^{-1})	8.30
Total nitrogen (gkg^{-1})	0.45
Available phosphorus ($mgkg^{-1}$)	10.00
Exchangeable calcium ($cmolkg^{-1}$)	1.02
Exchangeable magnesium ($cmolkg^{-1}$)	0.46
Exchangeable potassium ($cmolkg^{-1}$)	1.05
Exchangeable sodium ($cmolkg^{-1}$)	0.07
Total Exchangeable Bases ($cmolkg^{-1}$) [$Ca^{2+} + Mg^{2+} + K^{+} + Na^{+}$]	2.60
Total Exchangeable Acidity ($cmolkg^{-1}$) [$Al^{3+} + H^{+}$]	0.11
Effective cation exchange capacity ($cmolkg^{-1}$)	2.71
Base saturation %	95.94

Plant Height

Significant ($P<0.05$) differences were observed for the plant height among okra varieties except at the early vegetative stage of growth (2-4WAP) (Table 2). The height of okra increased from 2 to 10WAP. At 10WAP, the height varied from 91.50cm in NH/OK/S to 274.50cm in NH/OK/M. It was observed that NH/OK/M was significantly different from NH/OK/N, NH/OK/S, NH/OK/Q and JOKOSO.

Number of Leaves per Plant

There was no significant difference in the number of leaves/plant among okra varieties throughout the sampling periods except at 2 WAP early stage of growth (Table 2). At 2WAP,

NH/OK/M with the highest number of leaves/plant (22.00) was significantly different from NH/OK/S and NH/OK/T varieties but did not differ significantly from the other varieties. NH/OK/T had the least (13.00). The number of leaves/plant increased in the crops from 2-10 WAP. At 10 WAP, the number of leaves/plant varied among varieties from 43.00 to 54.00. The highest and least values of the number of leaves/plant were for local variety and NH/OK/S with 54.00 and 43.00, respectively.

Table 2: Vegetative traits of okra at Agbor after cropping in 2019

Parameter/	Weeks after planting				
Crop variety	2	4	6	8	10
Plant height					
NH/OK/M	19.30	32.75	87.75^{b}	141.75^{ab}	274.50^{a}
NH/OK/T	19.50	31.00	68.25^{b}	123.25^{ab}	185.70^{ab}
NH/OK/N	19.30	34.00	80.75^{b}	95.50^{c}	100.50^{c}
NH/OK/S	21.70	27.75	66.50^{b}	88.75^{c}	91.50^{c}
NH/OK/Q	21.00	29.75	64.75^{b}	136.50^{ab}	138.50^{b}
JOKOSO	19.50	34.00	85.00^{b}	117.00^{b}	132.00^{b}
LOCAL	5.750	34.25	132.75^{a}	160.00^{a}	193.70^{ab}
SE±	3.70 (ns)	0.95 (ns)	8.90	9.60	24.10
Number of leaves/plant					
NH/OK/M	22.00^{a}	24.00	28.00	41.00	52.00
NH/OK/T	13.00^{c}	20.00	26.00	32.00	44.00
NH/OK/N	18.00^{ab}	23.00	30.00	30.00	45.00
NH/OK/S	15.00^{b}	20.00	25.00	30.00	43.00
NH/OK/Q	18.00^{ab}	22.00	28.00	36.00	46.00
JOKOSO	18.00^{ab}	26.00	35.00	40.00	54.00
LOCAL	17.00^{ab}	24.00	34.00	38.00	54.00
SE±	1.06	0.84 (ns)	1.45 (ns)	1.76 (ns)	1.84 (ns)
Total leaf area/plant (cm^2)					
NH/OK/M	190.50^{a}	504.75^{a}	985.75^{ab}	2304.75^{a}	2359.00^{a}
NH/OK/T	177.50^{ab}	275.50^{ab}	809.75^{ab}	820.75^{c}	832.25^{c}
NH/OK/N	89.90^{c}	216.50^{ab}	840.75^{ab}	877.00^{c}	799.50^{c}
NH/OK/S	153.50^{abc}	202.00^{ab}	688.75^{bc}	884.00^{c}	949.75^{b}
NH/OK/Q	127.25^{bc}	300.75^{ab}	982.75^{ab}	1119.00^{bc}	1146.25^{b}
JOKOSO	115.00^{bc}	368.50^{ab}	653.50^{bc}	825.00^{c}	858.75^{c}
LOCAL	152.40^{abc}	583.28^{a}	1064.75^{a}	1405.50^{b}	1488.50^{b}
SE±	13.36	54.86	59.29	204.36	212.91
Stem girth (cm)					
NH/OK/M	0.43	0.63	0.97^{ab}	1.51^{ab}	1.97^{a}
NH/OK/T	0.34	0.49	0.69^{c}	0.85^{b}	1.04^{b}
NH/OK/N	0.45	0.51	0.82^{abc}	1.17^{ab}	1.89^{a}
NH/OK/S	0.44	0.55	0.73^{bc}	0.93^{b}	1.10^{b}
NH/OK/Q	0.46	0.53	0.84^{ab}	0.96^{b}	1.27^{b}
JOKOSO	0.31	0.58	0.87^{ab}	1.16^{ab}	1.21^{b}
LOCAL	0.41	0.60	1.23^{a}	1.55^{a}	1.75^{a}
SE±	0.02 (ns)	0.02 (ns)	0.07	0.11	0.15

Values with the same letter(s) superscript in column are not significantly different using DMRT ($p>0.05$); ns: not significant.

Total Leaf Area/Plant

The total leaf area plant increased from 2-10 WAP (Table 2). The result indicates a significant ($P<0.05$) difference in total leaf area among the okra varieties throughout the weeks after planting. However, at 10 WAP, the total leaf area varied from 832.25 cm^2 to 2359.00 cm^2. The highest (2359.00 cm^2) total leaf area plant was for NH/OK/M while the least (832.25 cm^2) was for NH/OK/T.

Stem Girth

There was significant ($P<0.05$) difference on the stem girth among the seven varieties of okra throughout the period after planting except at the early vegetative stage of growth (2-4 WAP) (Table 2). The stem girth increased from 2-10WAP and among the varieties. At 10 WAP, the value ranged from 1.04 to 1.97 cm. NH/OK/M was significantly the widest (1.97 cm) while NH/OK/T was the smallest (1.04 cm). In all NH/OK/M was statistically similar with NH/OK/N and LOCAL but was significantly different from NH/OK/T, NH/OK/S, NH/OK/Q and JOKOSO.

Fruit Yield

Table 3 showed that the improved varieties of okra yielded significantly more fruits per hectare than the two Indigenous varieties. The fruit yield ranged from 4.50 to 11.70 t/ha. NH/OK/M and NH/OK/S out-yielded the other varieties (11.70 t/ha), though significantly similar, while the local variety had the least (4.50 t/ha).

Table 3: Fruit yield (t/ha) of some varieties of okra at Agbor after cropping in 2019

Crop variety	Fruit yield (t/ha)
NH/OK/M	11.70^a
NH/OK/T	10.60^a
NH/OK/N	10.50^a
NH/OK/S	11.70^a
NH/OK/Q	10.60^a
JOKOSO	7.40^b
LOCAL	4.50^c
SE±	0.16

Values with the same letter(s) superscript are not significantly different using DMRT ($p>0.05$)

DISCUSSION

Genetic make-up and environmental conditions prevalent at the growing periods have been known to influence the growth characters of crops (Tiamiyu *et al.*, 2012). It was observed that NH/OK/M which had the highest plant height significantly gave the highest fruit yield. Agba *et al.* (2011); Omotoso and Johnson (2015) reported the highest yield from the okra variety with the highest plant height among the varieties tested. In this study, NH/OK/M, NH/OK/T, NH/OK/N, NH/OK/S and NH/OK/Q had similar yield value of approximately 2t/ha and were significantly different from the LOCAL variety. Generally, the varieties with the tallest plants had higher fruit yield than the other varieties. Such finding

emphasized the importance of plant height as an important growth attribute in determining the crop's final yield.

The number of leaves/plant was found to contribute immensely in promoting both growth and yield in okra (Sreenivasa *et al.*, 2010). Although the JOKOSO and Local varieties of okra had more number of leaves/plant but were not significantly different from the improved varieties. This could be that the environmental conditions which prevailed during the stage of growth may have enhanced equal chances in the production of leaves among the varieties studied. This is in agreement with the work reported by Eke *et al*. (2008) who observed no difference on the number of leaves among varieties of okra.

Total leaf area of a plant encourages higher photosynthesis and hence in the growth of a plant. From this study, total leaf area contributed significantly to the highest vegetative growth obtained from NH/OK/M variety of okra and hence higher fruit yield due to higher photosynthetic material accumulated. The findings is in line with those of Adetuyi *et al*. (2011) who emphasized the role of this vegetative trait in selecting superior varieties for fruit production.

The stem girth as a vegetative trait is important in determining the resistance and susceptible a crop is to lodging conditions. However, okra was reported to have good girth that can withstand lodging effects (Varmudy, 2011). From this study, NH/OK/M variety of okra showed higher resistance to lodging than other varieties. However, the significant bigger girth produced by NH/OK/M variety of okra is an advantage in wind resistance. Omotoso *et al*. (2018) reported a significant difference in stem girth among okra genotypes.

The fruit yield is an important index for selecting crop varieties. There was significant difference in the fruit yield among the okra varieties evaluated. However, considering the overall yield performance from NH/OK/M and NH/OK/S varieties, the various components of yields estimated contributed immensely towards this higher fruit yields by these crop varieties. This report is in line with those of Sreenivasa *et al.* (2010); Varmudy (2011); Omotoso *et al*. (2018); (Komolafe *et al*., 2021) who observed high fruit yield from improved okra varieties due to genes and the environmental conditions which prevailed.

CONCLUSION

This study was conducted to evaluate some varieties of okra in Agbor, Delta State. In this study, it was observed that NH/OK/M had taller plants, higher leaf area and stem girth than other varieties. NH/OK/M and NH/OK/S had similar fruit yield and differed significantly from the indigenous varieties of okra tested and therefore best suited to the rainforest zone (Agbor), Delta State, Nigeria.

REFERENCES

Adetuyi, F.O., Osagie, A.U. and A.T. Adekunle (2011). Nutrient, ant-nutrient, mineral and zinc bioavailability of okra {*Abelmoschus esculentus* (L) Moench} variety. *American Journal of Food Nutrition*, 1:49 – 54.

Agba, O.A., Mbah, B.N., Asiegbu, J. E. and I.B. Adinya (2011). Effects of spacing on the chemical composition of 13 wild plant foods of Niger. *Journal of Food Compound Analysis*, 13: 83 – 92.

Cooke, J.A., Jagt, D.J., Pastuszyn, A., Mountalia, G. and R.S. Glew (1998). Nutrient and growth and yield of okra {*Abelmochus esculentus* (L.) Moench} in Obubra, Cross River State. *Global Journal of Agricultural Science*, 1: 57 - 61.

Egbai, J.C., Efeya, P. and R.E. Iserhien-Emekeme (2015). Geo-electric evaluation of aquifer vulnerability in Igbanke, Orhionmwon Local Government Area of Edo State, Nigeria. *International Journal of Science, Environment & Technology*, 4: 701-715.

Eke, K.A., Essien, B.A. and J.U. Ogbu (2008). Determination of optimum planting time of okra (*Abelmoschus esculentus*) cultivar in the derived Savannah. Proceedings of the 42nd Annual Conference of Agricultural Society of Nigeria (ASN). October 19th to 23rd in Ebonyi State University, pp 242 – 245.

FAOSTAT (2020). Food and Agriculture Organization Statistics. http://www.fao.org/faostat/en/#data/QCL(Assessed August 2020)

GenStat. (2012). *GenStat Procedure Library Release*. 15th Edition. Ltd., VSN, International.

Iyagba, A.G., Onuegbu, B.A. and A.E. Ibe (2012). Growth and yield response of okra (*Abelmoschus esculentus* (L.) Moench) varieties to weed interference in South-Eastern Nigeria. *Global Journal Science Frontier Research*, 12: 23-31.

Komolafe, R.J., Ariyo, O.J. and C.O. Alake (2021). Diversity in phenotypic traits and mineral elements of Okra (*Abelmoschus esculentus* (L.) Moench) genotypes. *International Journal of Agronomy*, 1: 10-14.

Ngok. T.H., Ngo. Q.N., Van. A.T. and N.V. Phung (2008). Hypolidemic effect of extracts from *Abelmoschus esculentus* (Malvaceae) on tyloxapol- induced hyperlipidemia in mice. *Warasan Phesatchasat.*, 35: 42 – 46.

Okalebo, J.R., Gathua, K.W. and P.L. Woomer (2002). *Laboratory methods of soil and plant analysis*. Working manual 2nd edition sacred Africa. Nairobi, Kenya. pp 22-77.

Olaniyi, J.O., Akanbi, W.B., Olaniran, O.A. and O.T. Ilupeju (2009). Effects of organo-mineral and inorganic fertilizers on the growth, fruit yield, quality and chemical compositions of okra. Proceedings of the 3rd International e-Conference on Agricultural BioSciences. *http://www.e-conference.elewa.org/agriculture*

Omoregie, A.U. and S.E. Nwajei (2015). Evaluation of some varieties of millet (*Pennisetum typhoides*) in a forest-savanna transition zone of Edo State, Nigeria. In: Omeje, S.I., Emosairue, C.C., Chukwuji, C.C., Bratte, L., Isikwenu, J.O., Isiorhovoja, R.A. and Agbogidi, M.O. (Eds). Agriculture: The Nigerian economy beyond oil. *Proceedings of the 49th Annual Conference of the Agricultural Society of Nigeria* 2:1346-1349.

Omotoso, S.O. and O.Y. Johnson, (2015). Growth and yield of two varieties of okra *(Abelmoschus esculentus* (L). *Moench)* as affected by potassium fertilizer sources. *Journal of Biology, Agriculture & Healthcare*, 5: 98-104.

Omotoso, S.O., Fawole, F.O., Alukoand, A. and F. Kehinde-Fadare (2018). Growth and yield of two okra *(Abelmoschus esculentus* L. Moench) varieties as affected by organic fertilizer grown on an Oxic Paleustalf in Ekiti State. *Global Advanced Research Journal of Agricultural Science*, 7:137-144.

Remison, S.U. (2005). *Arable and Vegetable Crops of the Tropics*. Gift print associate, Benin City. 39 pp.

Sreenivasa, M.N.; Nagaraj, M.N. and S.N. Bhat (2010). Beejamruth: A source for beneficial bacteria. *Karnataka Journal of Agricultural Science*, 17: 72-77.

Steel, R.G. and J.H. Torrie (1980). *Principles and Procedures of Statistics*, McGRAW- Hill Publisher Co. New York. pp 234-456.

Tiamiyu, R.A., H.G. Ahmed and A.S. Muhammad (2012). Effect of sources of organic manure on growth and yields of okra (*Abelmoschus esculentus*) in Sokoto, Nigeria. *Nigerian Journal of Basic and Applied Science*, 20 (3): 213-216.

Udoh, D.J., Ndon, B.A., Asaquo, P.E and N.U. Ndueyo (2005). *Crop Production Techniques for the Tropics*. Concept Publishers, Lagos, Nigeria. pp 223 – 247.

Umeri, C., Omoregie, A.U. and H. Moseri (2018). The effects of nitrogen and potassium on the growth and yield of cassava (*Manihot esculenta* Crantz) variety at Igbodo, Delta State, Nigeria. *Journal of Agriculture, Food & Environment*, 5: 58 – 68.

Varmudy, V. (2011). *Marketing Survey Needed to Boost Okra Exports*. Department of Economics, Vive Kananda College, Puttur Karnataka. 97pp.