

EVALUATION OF THE PERFORMANCE OF TWO SOYBEAN VARIETIES (*Glycine max* (L) MERILL) IN YOLA, ADAMAWA STATE

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ABSTRACT

The study was carried out at the research farm of sabon Rayuwa centre for cosmology and culture, Yola, during the 2008 growing season to evaluate the yield performance of two medium-maturing soybean varieties (*Glycine max*(L) merill), samsoy II and TGX 1448-2E. the experimental design was randomized complete block design (RCBD), comprising of two treatments replicated five times. The data collected were germination and establishment counts, plant height at 56 and 94 days after planting, days to 50% flowering, days to 95% maturity, number of pods per plant, number of nodules per plant, percentage field shattering, total weight of seeds (two middle rows), total weight of seed per plot, weight of 100 seeds, shelling percentage and total weight of seeds expressed in kilogram per hectare. The data were analyzed using the analysis of variance (ANOVA) and the means separated using least significant difference (SLD). The seeds were sown at a spacing of 50cm between rows and 5cm between the plants after the seeds was dressed. The results shown that there was no significant difference at $P=0.01$ and $P=0.05$ for 50% flowering, mean number of nodules per plot (2 plants per plot and 100 seed weight) significant difference was observed at $P=0.05$ for mean height of plants at 56 and 94 DAP, days to 95% maturity and field shattering percentage. While highly significant difference at $P=0.01$ were obtained for mean number of pods per plant (two middle rows), mean total weight of seeds expressed in kg/ha. It is therefore established that these two varieties can be grown in Yola during the wet season of the year.

Keywords: Evaluation, Performance, Varieties, Treatments, Design, Inoculation, and Yield

INTRODUCTION

Much interest and attention have been directed towards soybean based on its potentials. Panlette (1978) reported that 18th century missionaries returning from china brought the first soybean to Western Europe while it was first introduced to USA in 1804. He stressed that America took interest in soybean in 1952. Today, many nations recognized the crop as one of the most important crop.

Oyekan (1986) reported that soybean could adapt to various ecological zones in Nigeria with the development of appropriate varieties. Yields between 1000 kg/ha and 2000kg/ha were obtained in trials from different varieties across the various ecological zones of the country (Root and Oyekan 1987), Okar (1988) stated that the crop (). Uwala (1985) reported that soybean has long been regarded as a sacred crop full of many outstanding qualities over other legumes and other protein containing food products. Wudiri (1989) stated that soybean contains a good balance of amino acids, calories, vitamins and minerals; the oil is high in unsaturated fatty acids with no cholesterol and highly gestible. It has about 40% protein while cowpea has 25%, it has better balanced amino acids than other vegetable protein sources. Soybean contains about 20% oil while cow milk is 3.5% and brown cowpea 1.5%, the say oil provides over twice the calories of carbohydrates and protein also the oil is 85% unsaturated and its cholesterol-free which is found to control granary weevils.

Soybean has high potentials in the nutritional and healthcare delivery programme and in industries which is highlighted by the large array of product to which it has been converted for human, animal and industrial use. Despite the high yielding and resistance of bacteria pustule caused by *Xanthomona campestris*, some varieties have too serious agronomic problems of being unable to nodulate with *Rhizobium japonicum* before planting and storing in good conditions. Nangju (1980) however, reported that the local cultivars can form effective nodules with indigenous rhizobia and therefore can be grown without seed inoculation with *Rhizobium japonicum*.

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Results of trials by Olufajo and Adu (1986) showed that although inoculation could increase grain-yields, such increases are not significantly different from the uninoculated ones. Olufajo (1987) further stressed that the in availability of cheap, easy-to-operate labour saving device for planting and threshing of soybean remains a major limitation in soybean production, especially when considered against the background of high cost and acute shortage of farm labour to execute these cumbersome operations.

Objective of the study

- The study was conducted with the following objectives;
- To compare the performance of two varieties of soybean in Yola Adamawa state.
 - To find out whether these varieties would be suitable to Yola environment.
 - To compare the yield in the two varieties, in order to recommend which is better suited.
 - To recommend the suitable variety to farmers based on the yield performance.

MATERIALS AND METHODS

The study was carried out during the 2008 growing season on the research farm of sabon Rayuwa centre for cosmology, ecology and culture, Yola Adamawa state, in the Northern Guinea Ecology zone of Nigeria. The study area is located on latitude 9°14' north and longitude 12°38' east at an Altitude of 158.5m above seal level.

Experimental Layout

The experimental design was randomized complete block design (RCBD) comprising of two treatments, the varieties, (variety 1, Samsoy II)(variety 2, TGX-144-2E), replicated five times for each variety in order to minimize variations within and among the plots. The treatments were allocated to the replications using randomization techniques by drawing lots. Each plot size was 6m x 2.5m comprising of two treatments and five replications with 1.5m wide pathway between each plot and replication.

Cultural practices

The land was leveled while each plot was bond with soil heaps to prevent soil erosion and flooding, each plot was then pulverized with a hot to make the soil level smooth and suitable for seed sowing. The two varieties of soybean seeds (Samsoy II and TGX 1448-2E) were dressed with Apron plus and planted when the rains were fully established. On the 2nd of August 2008 the seeds were sown by drilling method at a spacing of 50cm between rows for the five replications of each variety. Weeding with hoe was done at 21 and 42 days after planting. Split application of NPK fertilizer was given at three and six weeks after planting at the recommend done of 200kg/ha i.e 300 grammes per plot of 6x2.5 metres. After two weeks the plants were thinned to a spacing of 5cm between plants to give a plant population of 600 plants per plot.

Data collected

The following data were collected and recorded;

Date of planting, germination, count at 10 days after planting DAP and percentage establishment count at 21 DAP and percentage, plant height at 7 weeks after planting and at harvest from two middle rows. Days to 50% flowering, days to 95% maturity, number of pods per plant, number of nodules per plant, percentage field shattering, total weight of seeds from two middle rows, total weights of seed pr plot (g), weight of 100 seeds (g), shelling percentage from two middle rows and total weight of seeds expressed in kilogram per hectare.

The data collected was subjected to statistical analysis of variance (ANOVA) and the means were separated using the least significant difference (LSD).

RESULTS AD DISCUSSION

Percentage germination count at 10DAP and establishment count at 21 DAP Samsoy II and TGX 1448-2E had a mean germination of 100% as shown on table 1. statistical analysis shows that there was no statistical difference between the two varieties (treatments) since they were subjected to the same treatment of dressing which has proved effective in protecting the seeds from soil fungi bacteria and insects initially. Similar trend was also recorded with the establishment counts and percentage as well as the analysis. Mean height of plants at 56 and 94 DAP and days to 50% flowering and 90% maturity.

At 56 DAP TGX-1448-2E was fast in growth with a mean height of 37cm while Samsoy II was 26.2cm as shown on table 1. At this stage, the leaves were broaden and formed canopy most especially TGX-1448-2E. At 94 DAP Samsoy II was 35.8cm while TGX 1448-2E still took the lead in height with 50.5cm. This stage marks the maturity of the crops by the pods turning yellow and the leaves beginning to fall off as indicated that no more growth is expected. Significant difference was observed among the varieties in terms of height (Table 1)

50% flowering occurred from 42-46 Dap for the two varieties and the mean recorded was 44. Days to 95% maturity recorded mean of 117 for Samsoy II variety while 112 mean was recorded for TGX 1448-2E as shown in table 1.

From the analysis, there was no significant difference recorded between the plants at 50% flowering while significant different was observed in days to 95% maturity.

Mean number of pods and nodules per plant.

TGX 1448-2E recorded high mean number of pods with 81.4 while Samsoy had mean of 59.4 as shown on table 1. Highly significant difference was also observed for the mean number of pods. There was no significant difference observed for mean number of nodules per plot taken from two plants per plot.

Percentage shattering, mean total weight of seeds from two middle rows and per plot.

In table 2, percentage shattering taken on the field shows that Samsoy II had mean of 11.1% and TGX 1448-2E recorded 16.66% mean however, significant difference was observed for the percentage shattering. Total yield from two middle rows as presented in table 2 shows the shelling capacity of the varieties as 826g Samsoy II and 1001g for TGX 1448-2E. Highly significant difference was observed. The entire mean total weight of Samsoy II recorded 2304g while TGX 1448-2E recorded 3058g, comprising of the two middle rows. Highly significant difference was also observed.

100 seed weight, shelling percentage and total weight of seeds in kilogram per hectare (kg/ha).

Hundred seeds was counted from each of the variety and the weight taken shows Samsoy II with 3.8g and TGX 1448-2E with 4.4g. The shelling percentage for the varieties recorded Samsoy II with 57% and TGX 1448-2E with 62% respectively. The weight of seeds required if the varieties is to be planted on a hectare of land for Samsoy II is 1536.0kg/ha and TGX 1448-2E 2038.7 kg/ha. Highly significant difference was observed between the varieties as shown on Table 2.

CONCLUSION

From the study it is said that under good management practice TGX 1448-2E gave high yield, high pod number and good height at harvest. Although two varieties yielded well and with this result farmers can now plant medium variety of Samsoy II and TGX 1448-2E successfully between first and second week of August because of the short raining season.

RECOMMENDATION

Based on the results obtained it is therefore recommended that;

The appropriate time for planting medium variety of soybean in Adamawa state, is between first and second week of August. The plant should be harvest when all the pods are dried but not too dry because all the seed will shatter. More experimental trails should be carried out in order to determine more varieties that would be adaptable to the ecological zone. With the continuous trial, there would be development of high yielding, good quality and quantity of soybean grain that will be made available to farmers for high production.

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Table 1: Evaluation of the growth of two varieties of Soybean (glycine max (L) merill) in Yola, Adamawa State.

Varieties	Percentage		Mean height of plant from two middle rows		Days to			Mean number of pods per plant (two middle rows)	Mean of number of nodules per plot (two plant per plot)
	Germination	Establishment	56 DAP	94 DAP	50% flower	95% maturity			
V1 (samsoy II)	100	100	26.2	35.8	44	117			
V2 (TGX1448-2E)	100	100	37.0	50.5	44	111	59.7	7.3	
SE	-	-	3.4	4.6	0	1.8	81.4	10.6	
LSD	-	-	9.1	8.4	19.0	2.2	6.9	1.0	
CV %	-	-	10.6	10.7	0	1.6	10.0	3.4	
F.tab.at 1%	-	-	98.50	98.50	98.50	98.50	0.10	11.2	
F.tab.at 5%	-	-	18.51	18.51	18.51	18.51	98.50	98.50	
F.calculated	-	-	31.4	65.1	0	90	18.51	18.51	
							110.7	13.5	

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Table 2: Evaluation of the yield and field shattering of two varieties of soybean (*Glycine max* (L) merill)

Varieties	field shattering °C _o	mean total weight of seeds (two middle rows)	mean total weight of seeds per plot (g)	100 seeds weight (g)	shelling % (two middle rows)	total weight of seeds in kg/ha
VI (samsoy II)	11.1	826	2304	3.8	57	1536
V2 (TGX1448-2E)	16.6	1001	3058	4.4	62	2038
SE	1.7	7.5	8.8	0.2	-	5.8
LSD	3.2	4.0	2.2	1.2	-	6.0
CV %	0.2	6.0	8.9	4.9	-	8.9
F.tab.at 1%	98.50	98.50	98.50	98.50	-	98.50
F.tab.at 5%	18.51	18.51	18.51	18.51	-	18.51
F.calculated	40.4	139.2	168.5	2.5	-	176.0