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Soybean Varietal Evaluation in Northern Guinea Savanna

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Introduction

Soybean (*Glycine max* [L.] Merr.) Is a member of the family *papilionaceae* (IITA, 1993). It is an herbaceous annual legume, usually erect, bushy and leafy. Soybean is widely distributed in most parts of the world; the crop has a lot of potentials in Africa (Adamu and Amatobi, 2001 and Akande *et al*., 2007). Soybeans requires a free drain soil, sandy or medium loam soil, moderately fertile soils are particularly suitable (Tamiru *et al.,* 2012). It is generally known that the seed of soybean contains the highest and riches protein among all cultivated legumes (FAO, 1989). It is an important source of high quality and inexpensive protein (Obidiebube *et al*., 2013). World-wide interest and attention in soybean is mainly due to its high nutritional value and seed protein content (Tiamigu and Idowu, 2001). It is primarily the source of vegetable oil and protein for use in food and industrial applications (Endress, 2001). It is the largest single edible source of oil and accounts for roughly 50% of the total seed oil production worldwide (Obidiebube *et al*., 2013). There have been many studies on the performance of soybean to environmental conditions, agronomic practices and variety performance. The bulk of soybeans produced in Nigeria come from the southern guinea savanna but production has also extended to the northern guinea savanna and forest belts (Okpara and Ibiam, 2000). Not much has been done on the varietal performance of soybean in the Northern Guinea Savanna of Nigeria. Therefore there is the need to study the performance of some newly developed Soybean genotypes in the Northern Guinea Savanna. The objective of the study was to determine the performance of five soybean genotypes in Northern Guinea Savanna.

Material and Methods

This evaluation was conducted in 2013 wet season at the Lake Chad Research Institute (LCRI) experimental site Biu. Five soybean genotypes (TGX-1904, TGX-1935, TGX-1835, TGX-1448 and TGX-1951) were obtained from Borno State Agricultural Development Programme (BOSADP) and laid out in a Randomized Complete Block Design with six replicates. Fertilizer was applied at the recommended rate of 30kg N, P and K/ha. Weeding was carried out using hoe at 3 and 6 Weeks After Sowing (WAS). Data were collected on plant height, number of branches per plant, days to 50% flowering, stand count, number of pods per plant, , number of seed per pod, 100 seed weight and grain yield. Data taken were subjected to Analysis of Variance (ANOVA). Differences among the means were separated using Least Significant Difference (LSD), at 5% level of probability.

Results and Discussion

Table 1 present the results on the growth performance of five soybean genotypes at Biu. The results showed significant difference in all the growth parameters among the genotypes. Stand count varied from 64-104, with TGX-1835 having the highest stand establishment, while the lowest was TGX-1448. This could be attributed to the low rainfall experienced in this region and the result opposes the findings of Obidiebube *et al*. (2013) where no significant difference was obtained in stand count.TGX-1448 took significantly more days to attained 50% flowering; compared to TGX-1904 . This agrees with the study of Akande *et al*. (2007) where he identified genotype TGX-1904 as early flowering type. TGX-1835 had the highest number of branches, while TGX-1935 recorded the lowest number of branches per plant. Variation in number of branches of soybeans have been reported by (Obidiebube *et al*., 2013; Talaka *et al*., 2013; Aduloju *et al*., 2009 and Constable, 1997) and was attributed to genetic potential of the crops. The study also showed significant difference in plant height in which genotype TGX-1904 was the tallest while the shortest was TGX-1951, this could be attributed to genetic variability as reported by (Aduloju *et al*., 2009; Obidiebube *et al*., 2013 and Talaka *et al*., 2013).

Table 1: Means of Some Growth Parameter of some Soybean Genotypes in 2013

Treatment	Stand Count	Number of Days to 50% Flowering	Number of Branches	Plant Height at harvest (cm)
TGX-1904	101.50	55.17	9.00	60.00
TGX-1935	98.67	58.00	8.00	40.67
TGX-1835	104.17	59.83	9.67	40.17
TGX-1448	64.33	60.83	8.83	55.50
TGX-1951	91.33	59.17	8.50	39.33
Mean	92	58	8.8	47.134
$LSD_{(0.05)}$	22.881	0.7680	1.3429	2.4495

Table 2 showed the results of yield and yield components of Soybean genotypes studied. There was significant difference among Genotypes in number of pods per plants and number of seeds per pod. There was no significant differences in one hundred seed weight and grain yield among the genotypes. TGX-1448 recorded the highest number of pods per plant while TGX-1835 had the lowest number of pods per plant. Number of seeds per pod ranged from 2-3 with TGX-1904 and TGX-1951 significantly having the highest number of seeds per pod while TGX-1935 had the least. Significant difference in number of pod and seed in soybeans were in line with the studies of (Aduloju *et al*., 2009 and Adeniyan and Ayoola 2007) and could be attributed to genetic variability. There was no significant difference among the genotypes in terms of one hundred seed weight and grain yield. This was in contrast with several studies in which significant variations exist in yield of soybeans (Aduloju *et al*., 2009; Adeniyan and Ayoola 2007; and Adeniyan and Ayoola 2006) and could be attributed to the environmental condition.

Table 2: Means of Some Yield Parameter of some Soybean Genotypes in 2013

Treatment	Number of pods/plant	Number of Seed/pod	100 Seed Weight (g)	Grain Yield(kg/ha)
TGX-1904	43.17	2.83	11.98	1133.3
TGX-1935	32.67	2.17	11.57	925.0
TGX-1835	27.00	2.67	12.13	1175.0
TGX-1448	48.17	2.33	12.42	891.7
TGX-1951	32.33	2.83	11.85	1125.0
Mean	36.668	2.566	11.99	1050
$LSD_{(0.05)}$	2.3425	27.365	NS	NS

Conclusion

From this study, it showed that TGX-1835, TGX-1904 and TGX-1951 Genotypes relatively had the highest yields over others evaluated. Though TGX-1448 is presumably the high yielding genotype in the region, its low performance could be attributed to the low rainfall recorded during the growing period thus, it recommended that these genotypes be further evaluated in the Zone for adoption by farmers to overcome the nutritional needs of the populace.

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