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Performance Evaluation of Ground Nut Varieties in Lowland Areas of South Omo, Southern Ethiopia

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Abstract: *Eight improved ground nut varieties with local check were tested at two ground nut producing areas (Benta and Jinka) of South Zone. Randomized complete block design with three replications was used at each location. Seeds were sown on a plot size of 4 m x 3 m (12 m2) in rows of five per plot at a spacing of 60 cm between rows and 10 cm between plants. Analysis of variance revealed significant differences ($p<0.05$ and 0.01) between varieties for seed yield at both locations. So varieties performed differently across each location and they are genetically different. The interaction effect of year with variety was non significant for seed yield and Day to flowering, which implies the varieties performance for this traits was variety potential/its actual potential. Across locations the highest seed yield (2.12 tone /ha) was produced by variety Werer-962 followed Werer-961(1.8 tone/ha) and Werer-963(1.8tone/ha) respectively So varieties Werer-962 was high yielder under tesed locations, so it would be highly recommended under rain fed conditions at Jinka and Benta as well as similar growing vicinity.*

Keywords: *Ground nut, Pea nut, adaptability, Benta, yield potential*

1. INTRODUCTION

Groundnut (*Arachis hypogaea* L.), which is also known as peanut, earthnut, monkey nut and goobers, is an oil seed and grain legume crop. It is one of the world's most important oilseed crops (Upadhyaya *et al*., 2010), ranked as the 4th most important oilseed crop and the 13th most important food crop (Surendranatha *et al*., 2011). It is currently grown on 25.2 million hectares worldwide with a total production of 35.9 million metric tons. Groundnut kernel contains 40-50% fat, 20-50% protein and 10-20% carbohydrate and is rich in vitamins and minerals (USDA, 2010).

As a legume, groundnut fixes atmospheric nitrogen in soils and thus improves soil fertility and saves fertilizer costs in subsequent crops. This is particularly important when considered in the context of the rising prices of chemical fertilizers which makes it difficult for small scale farmers to purchase them. In livestock farming communities, groundnut can be used as fodder for livestock and increases productivity as the groundnut haulm and seed cake are rich in digestible crude protein content (Simtowe et al., nd)

In Ethiopia, groundnut is grown in the lowlands and is the second important lowland oilseed of warm climate next to sesame. It is playing an increasingly important role as an alternative oil crop to an increasing number of small holder farmers. The largest groundnut production areas are found in Oromia (32967.8 ha), Benishangul-Gumuz (9968.73 ha), SNNPR (635.04 ha) and in Amhara (344.57 ha) regional states (CSA, 2011). Somalia and Gambela regional states also produce a considerable amount of ground nuts. Production and productivity of groundnut is increasing from year to year in western Oromia. Over the last five years (2008/09 - 2012/13) Post-harvest estimates of groundnuts have shown an increment of yield that ranges from 11.23 to 13.80Qt/Ha (CSA, 2012/13). However, the improved varieties are not yet exposed to farmers in moisture stress areas particularly in south omo. Therefore, this activity was conducted with objective of evaluating adaptability of improved ground nut varieties and selects the best performing adapted variety for the target areas.

2. MATERIALS AND METHODS

The experiment was conducted at Jinka research center on-station and Benta using randomized complete block design with three replications at each location. Nine varieties including local check were tested with row spacing of 60cm between rows and 10 cm between plants respectively. All agronomic practices recommended for ground nut production were carried out equally for each plot. Plot base data such as disease and insect pest score/1-9sale/, days to heading and thousand seed

weight, stand count at harvest to adjust yield, and grain yield (dry weight of grain harvested from central row. The collected data was subjected to analysis by using SAS software verision9.1.

3. RESULT AND DISCUSSION

The analysis of variance revealed that there was significant between varieties for grain yield at both locations. So varieties performed differently across each location and they are genetically different. Similar result was reported by Tulole etal.(2008), Fikre Hagos etal(2012) and, Jeyaramraja P R and Fantahun Woldesenbet(20140). The interaction effect of year with variety was non significant for seed yield and day to flowering, which implies the varieties performance for this traits was variety potential/its actual potential.

Table1. *Combined Analysis of Variance for 3 traits of 9 varieties*

Source of varation	DF	DTF	GY	TSW
Replication(R)/L	4	45.2	664336.8	178.9
Treatment(T)	8	26.3	**887574.9*** **	104.9
Location(L)	1	1.8	24918.5ns	91.1
L*T	**8**	**5.2**	**98614.3ns**	**14.7**
Error	34	9.7	151475.4	78.1
CV (%)		5.3	21.4	16.8

Note: **, **, *** and ns= stastically significant and non significant at 0.05, 0.01 and 0.001 probability level respectively, DF=degree of freedom, DTF= days to 50% flowering, GY(Kg)= grain yield, TSW(g)= Thousand seed weight, CV(%)= coefficient of variation, L*T= location interaction with variety/treatments*

Across locations the highest seed yield (2.12 tone /ha) was produced by variety Werer-962 followed Werer-961(1.8 tone/ha) and Werer-964(1.66tone/ha) respectively (Table 2.).

Table2. *Mean values of yield and yield components of Ground nut varieties during 2014 cropping season at Benta and Jinka(on-station)*

	On-station			Benta			Combined		
Treatments	**GY(Qt/ha)**	**TSW**	**DTF**	**GY(qt/ha)**	**TSW**	**DTF**	**GY(qt/ha)**	**TSW**	**DTF**
Werer-962	32.7	60.3	60.3	28.7	59.7	59.7	21.2	60.0	60.0
Werer-961	21.8	60.0	60.0	21.4	46.7	61.0	18.0	47.5	60.2
Werer-964	19.1	58.7	60.0	20.7	53.77	55.7	**16.6**	53.7	56.3
Fetene	18.8	55.0	59.7	18.1	53.7	55.0	**15.3**	54.3	55.7
Tole-2	18.3	53.0	59.3	17.3	51.7	63.3	**14.8**	55.8	61.3
Lote	17.2	51.7	59.3	16.5	61.0	61.0	**14.0**	59.8	60.3
Local	16.6	48.3	57.0	17.2	44.7	57.7	**21.2**	46.3	58.8
Werer-963	14.1	48.0	56.7	13.7	49.3	57.0	**18.0**	50.5	56.8
Bulki	13.8	44.3	55.0	11.7	46.0	59.3	**16.6**	45.2	59.8
Lsd	6.8	14.1	4.3	7.08	17.0		4.8	10.4	3.6

Note. *DTF= days to 50% fower, GY(Kg)= grain yield, TSW(g)= Thousand seed weight*

4. CONCLUSION AND RECOMMENDATION

Generally, the present study entails the presence of significant variations among ground nut varieties. Results revealed that Werer-962 (2.12 tone /ha) showed to be best performer variety followed by Werer-961(1.8 tone/ha) and Werer-963(1.8tone/ha) respectively. Therefore, use of this variety especially Were-962 in the studied area is recommendable.

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APPENDICES

Appendix1. Mean Square Values for Crop Phenology and Growth Parameters of Sorghum at Benta and jinka during 2014.

	On- station				Benta			
Source of varation	DF	DTH	Gy	TSW	DF	DTH	GY	TSW
Replication	2	20.3^{ns}	276637.7	0.64^{ns}	2	25.1^{ns}	276091.3^{ns}	153.5^{ns}
Treatment	8	10.6^{Ns}	964905.3*	98.2^{ns}	8	20.9^{ns}	729414.4**	101.4
Error	16	12.5	158041.7	66.7	16	14.4	167502.9	96.9
CV (%)		4.2	20.7	15.3		6.4	22.2	91.1

Note: **, **, *** and ns= stastically significant and non significant at 0.05, 0.01 and 0.001 probability level respectively, DF=degree of freedom, DTH= days to 50% heading, GY(Kg)= grain yield, TSW(g)= Thousand seed weight, CV(%)= coefficient of variation, L*T= location interaction with variety/treatments*