

**SCREENING OF DIFFERENT CULTIVARS AGAINST *Helicoverpa armigera* (Hubner)
Hardwick and *Spodoptera litura* (Fabricius) IN GROUNDNUT**

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ABSTRACT

*Ten groundnut cultivars were screened against *Helicoverpa armigera* (Hubner) Hardwick and *Spodoptera litura* (Fabricius) at Entomology Farm, Anand Agricultural University, Anand, during summer - 2011 in a Randomized Block Design with three replications. Experiment was sown in a spacing of 75 cm between two rows and 10 cm within the rows in a gross and net plot area of 4.0 x 3.0 m and 3.0 x 1.5 m, respectively. The observations were recorded on number of larvae per five plants and leaf damage in percentage by both the pest along with pod and haulm yield. The results showed that groundnut cultivars GG 20, GG 6 and TPG 41 were found less susceptible to *H. armigera* and *S. litura*. These cultivars produced higher pod and haulm yield, too. These three cultivars showed promising resistance mechanism, which can be further utilized in breeding programme. All other cultivars exhibited susceptible to highly susceptible mechanism and that was reflected on its pod and haulm yield.*

KEY WORDS: Groundnut, *H. armigera*, *S. litura*

INTRODUCTION

Groundnut (*Arachis hypogaea* Linnaeus) is an annual legume crop and belongs to family Leguminosae. It is also known as peanut, earthnut, monkeynut and goobers. It is world's largest source of edible oil and ranks 13th among the food crops as well as 4th most important oilseed crop of the world (Ramanathan, 2001). It is grown in tropical and sub-tropical regions and in the continental part of temperate countries. The seed (kernels) contains up to 50 per cent non drying oil, 40-50 per cent fat, 20-50 per cent protein and 10-20 per cent carbohydrate (Mehta, 2002).

A comprehensive list of insect and non insect pests of groundnut was given by Nandagopal and Prasad (2004). Among all insect pests, lepidopteron defoliator i.e. *Helicoverpa armigera* (Hubner) Hardwick and *Spodoptera litura* (Fabricius) were most serious problem in groundnut crop. Flowering stage can result in 20 per cent and severe outbreak cause 30 to 40 per cent yield loss in groundnut due to *S. litura* (Kulkarni, 1989). Crop failures due to *S. litura* were reported when despite intensive pest management practices (Wightman and Ranga Rao, 1993). Keeping this in view, 10 genotypes of groundnut were screened

against these two devastating pests of groundnut.

MATERIALS AND METHODS

A field experiment was conducted at Entomology Farm, Anand Agricultural University, Anand, during *summer* - 2011 in a Randomized Block Design with three replications. Different 10 groundnut cultivars were sown in a spacing of 75 cm between two rows and 10 cm within the rows in a gross and net plot area of 4.0 x 3.0 m and 3.0 x 1.5 m, respectively. The crop was kept free from spray of any insecticides. For recording observations, five plants were selected randomly from each quadrat. The observations on number of larvae were recorded from the same selected five plants, whereas total and damaged leaves by *H. armigera* and *S. litura* were also recorded from three branches of all each selected plants at weekly interval starting from one week of germination till the harvest of crop.

RESULTS AND DISCUSSION

The *Helicoverpa armigera* population (Table 1) recorded revealed significant difference among different genotypes. Of the 10 cultivars screened, significantly least numbers of larvae per five plants (1.38) were registered in cultivar GG 20. Cultivar GG 6 registered 1.66 larvae per five plants and it was significantly lower than rest of the cultivars except GG 20. Cultivars GG 7 and GG 4 exhibited larval population of *H. armigera* between 2.16 and 2.26 larvae per five plants and they were at par with GG 11 (2.06 larvae / five plants) in their susceptibility. Among the evaluated cultivars, the highest larval population (2.67 larvae / five plants) was noticed in TG 37 and it was at par with GG 8 (2.63 larvae / five plants) and GG 5 (2.63 larvae / five plants). The leaf damage caused by *H. armigera* showed the significant difference among different genotypes. Cultivar GG 20 noted significantly least damage (16.00 %)

by this pest than all the evaluated cultivars. Cultivars TPG 41 and GG 6 registered 17.87 and 18.28 per cent leaf damage, respectively and they were equally susceptible to this pest, but significantly superior to rest of the cultivars. Cultivars GG 11 and GG 2 recorded 20.36 and 20.54 per cent leaf damage, respectively and they were significantly less susceptible to remaining cultivars. Cultivars GG 7, GG 5 and GG 8 were found equally susceptible to *H. armigera* and they were at par with each other. Among the evaluated cultivars, the higher (24.58 %) leaf damage was noticed in TG 37 and found more susceptible to *H. armigera* followed by GG 8 (23.92 %).

The significantly lowest numbers of *S. litura* larvae (1.32 larvae / five plants) were registered in cultivar GG 20 than all the evaluated cultivars except TPG 41 (1.49 larvae / five plants). Cultivars GG 6 and GG 11 registered 1.57 and 1.66 larvae per five plants and it was statistically equally susceptible to TPG 41. Cultivars GG 7, GG 2, GG 4 and GG 5 were found susceptible in descending order to *S. litura*. Cultivar TG 37 was found highly (2.42 larvae/ five plants) susceptible to *S. litura* and it was at par with GG 8 (2.36 larvae/ five plants). The leaf damage caused by *S. litura* showed that the evaluated cultivars differed significantly in their susceptibility. Cultivar GG 20 noted significantly least (14.55 %) leaf damage by the pest than all the tested cultivars. Cultivar TPG 41 registered 15.72 per cent leaf damage and was significantly less susceptible to rest of the cultivars except GG 20. Plots grown with cultivars GG 6, GG 7 and GG 11 were observed 16.97, 17.51 and 17.75 per cent leaf damage, respectively and they were equally susceptible to the pest. Cultivars GG 2 and GG 4 recorded 18.82 and 19.55 per cent leaf damage, respectively. Among the evaluated cultivars, the higher (22.23 %) leaf damage was

observed in plots grown with GG 8 and found more susceptible to *S. litura* followed by TG 37 (22.04 %) and GG 5 (21.68 %). As the cultivars screened for their relative resistance against pests of groundnut vary from one region to another region and hence the findings of present study regarding the performance of different cultivars could not be compared and discussed.

The cultivar GG 20 registered highest (1489.00 kg/ha) pod yield of groundnut (Table 1) and it was at par with TPG 41 (1320.00 kg/ha) and GG 6 (1319.00 kg/ha). Cultivars GG 11, GG 2, GG 7 and GG 4 recorded 1047.00, 1013.00, 997.00 and 994.00 kg/ha pod yield, respectively. Among the tested cultivars, TG 37 produced lowest (778.00 kg/ha) pod yield followed by GG 8 (806.00 kg/ha) and GG 5 (903.00 kg/ha). The cultivar GG 20 registered highest (3667.00 kg/ha) yield of groundnut haulm (Table 1) and it was at par with TPG 41 (3527.00 kg/ha), GG 6 (3417.00 kg/ha) and GG 11 (3389.00 kg/ha). The haulm production in GG 2, GG 7 and GG 4 was between 3111.00 and 3222.00 kg/ha (Table 1). The lowest haulm yield (2889.00 kg/ha) was noted in cultivar TG 37 followed by GG 8 (2917.00 kg/ha).

CONCLUSION

From the above results, it can be concluded that the groundnut cultivars GG 20, GG 6 and TPG 41 were found less susceptible to *H. armigera* and *S. litura*. These cultivars produced higher pod and haulm yield, too. These three cultivars showed promising resistance mechanism,

which can be further utilized in breeding programme. Cultivars GG 11, GG 7, GG 2 and GG 4 were found susceptible to *H. armigera* and *S. litura* which reflected on yield. Cultivars TG 37, GG 8 and GG 5 were observed highly susceptible to *H. armigera* and *S. litura*. These cultivars produced lower pod and haulm yield.

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Table 1: Incidence of *H. armigera* and *S. litura* on groundnut cultivars and its effect on yield.

Cultivars	<i>H. armigera</i>		<i>S. litura</i>		Yield (kg/ha)	
	Larvae / Five Plants *	Leaf Damage (%) **	Larvae / Five Plants *	Leaf Damage (%) **	Pod	Haulm
GG-2	1.58(2.00)	26.95(20.54)	1.54(1.87)	25.71(18.82)	1013.00	3222.00
GG-4	1.66(2.26)	27.79(21.74)	1.60(2.06)	26.24(19.55)	994.00	3111.00
GG-5	1.77(2.63)	28.86(23.30)	1.62(2.12)	27.75(21.68)	903.00	3000.00
GG-6	1.47(1.66)	25.31(18.28)	1.44(1.57)	24.33(16.97)	1319.00	3417.00
GG-7	1.63(2.16)	28.60(22.91)	1.53(1.84)	24.74(17.51)	997.00	3194.00
GG-8	1.63(2.16)	28.60(22.91)	1.53(1.84)	24.74(17.51)	997.00	3194.00
GG-11	1.77(2.63)	29.28(23.92)	1.69(2.36)	28.13(22.23)	803.00	2917.00
GG-20	1.60(2.06)	26.82(20.36)	1.47(1.66)	24.92(17.75)	1047.00	3389.00
TPG-41	1.37(1.38)	23.58(16.00)	1.35(1.32)	22.42(14.55)	1489.00	3667.00
TG-37	1.54(1.87)	25.01(17.87)	1.41(1.49)	23.36(15.72)	1392.00	3528.00
	1.78(2.67)	29.72(24.58)	1.71(2.42)	28.00(22.04)	778.00	2889.00
ANOVA						
S. Em. ±						
T	0.02	0.28	0.02	0.32	112.16	144.60
P	0.02	0.31	0.02	0.40	-	-
T × P	0.08	0.99	0.07	1.25	-	-
C.D. at 5 %						
T	0.06	0.77	0.06	0.88	333.24	429.65
P	0.06	0.92	0.06	1.1	-	-
T×P	0.21	NS	0.19	NS	-	-
C.V.%						
	8.14	6.29	7.52	8.46	18.09	7.75

* Figures outside the parenthesis are $\sqrt{X + 0.5}$ transformed values, those inside are retransformed values

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[MS received: February 2, 2014]

[MS accepted: March 23, 2014]