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Field Screening and Evaluation of Pigeonpea Genotypes Against Podborer (*Helicoverpa Armigera*)

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Abstract: Hence an experiment was conducted to screen fifteen germplasm lines for their resistance/tolerance to podborer under natural infestation in pesticide-free open field. To asses the degree of infestation 250 green pods were randomly picked up from all the plants of each plot. The pods damaged by gram podborer were detected by the presence large bored holes in pods. Such infested and healthy pods were counted separately. The pod damage (%) was calculated on the basis of number of pods examined and the number of infested pods. Marketable green pod yield of each genotype under natural pest infestation was also recorded. On the basis of mean infestation, ICP13201 showed the lowest (25%) pod damage and showed lowest susceptibility among the genotypes studied. It was followed by ICP13208 and ICP11964 showed lower pod damage. The rest of the genotype suffered higher pod damage to *Helicoverpa armigera*. Considering the yield potential ICP13201, ICP13214 and ICP13212 showed higher yield potential than other genotypes. Considering the lower susceptibility to *Helicoverpa armigera* and higher yield potential ICP13201 was found to be the best.

Key words: *Cajanus cajan*, *Helicoverpa armigera*, field screening, pod damage, grain yield

INTRODUCTION

Pigeonpea is an important pulse crop in the dietary protein. Its reproductivity has remained static over the past several decades because of heavy damage by insect pests. It is attacked by several insect pests from seedling to pod harvesting. Of these, podborer (*Helicoverpa armigera*) cause damage to the crop from flowering to maturity stage thereby it accounts to an yield loss of more than 1000 million dollors every year (Sharma, 2001), causes complete crop loss (Shanower *et al*., 1999). Though podborer incidence can be controlled by application of chemicals, a variety possessing inbuilt resistance to the pest will be preferred to its manifold advantages like, low input cost, avoidance of pesticide cost besides eliminating residue problems and environmental pollution.

In order to develop varieties resistance to podborer it is necessary to have a resistant source. After identification of resistant source the choice of the best donor is the pre-requisite for a successful breeding programme. Hence an experiment was conducted to screen and evaluate the genotypes in resistant breeding programme.

MATERIALS AND METHODS

Pigeon pea germplasm comprising 15 acessions was screened in replicated trial. The open field screeing technique using natural pest population was followed at Tamilnadu Agricultural University, Coimbatore. Each germplasm was sown at row spacing of 90 and 60 cm between plants.

To asses the degree of infestation 250 green pods were picked up from all the plants of each plot. Pods damaged by podborer were counted by the presence of round, large bored holes in pods. Such infested and healthy pods were counted separately. To asses the grain damage (%) due to podborer all the pods from each genotype is split open and damaged and healthy grains in the sample were counted. The pod damage (%) was calculated on the basis of number of pods examined and the number of infested pods. Similarly grain yield per plant was also calculated. Data were analysed statistically.

RESULTS AND DISCUSSION

Helicoverpa armigera damage is particularly severe in the medium maturing cultivars grown in south and

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Table 1: Susceptibilty of pigeonpea genotypes for GRAM-podborer and their yield

Genotype	Podborer Incidence (%)	Grain yield per plant (g)
ICP 11958	38.00	41.94
ICP11961	50.00	31.97
ICP11962	34.00	35.05
ICP11964	29.00	38.33
ICP11966	54.00	22.20
ICP11967	34.00	36.95
ICP13201	25.00	60.35
ICP13202	48.00	32.00
ICP13207	59.00	42.67
ICP13208	28.00	28.67
ICP13209	69.00	39.47
ICP13197	41.00	33.14
ICP13198	52.00	38.00
ICP13212	28.00	55.30
ICP13214	35.00	57.98
Mean	41.31	39.60
$SE_{(d)}$	2.18	3.68
CV (%)	6.10	15.81

central India. A number of genotypes has been reported to be resistance to *Helicoverpa armigera* (Sharma *et al*., 2001). From the above study none of the entry was completely free from pest. The pigeon pea genotypes differed significantly with respect to their reaction of the pest. Based on the mean infestation by podborer genotype ICP13201 recorded the lowest percentage of (25%) podborer incidence followed by ICP13208 and ICP13212 (28%). Highest percentage of podborer incidence was recorded in ICP13209 (69%) followed by ICP13207 (59%) (Table 1). Similarly according to Reed and Lateef (1990) genotypes with indeterminate growth habit, in general suffer less damage than the determinate types.

Several workers have also reported serious lepidopteran borers damage on determinate clustering early, medium maturing pigeonpea cultivars (Shanower and Romeis, 1999; Minja *et al*., 1999) and also on the cultivars maturing beyond January.

While comparing the yield performance per plant genotype ICP13201 recorded significantly higher grain yield (60.35) followed by ICP13214 (57.98). While ICP11966 showed lesser grain yield. This finding was in conformity with Borad *et al.* (1991) reported higher yield potential of some pigeonpea genotypes showed lesser incidence of podborer.

Saxena *et al*. (2002) evaluated pigeonpea accessions and selected lines for reaction to *Maruca* in the semi arid tropics *Helicoverpa armigera* and *Melanagromyza obtusa* cause serious damage to pigeonpea while under the humid tropical environment *Melanagromyza vitrata* is the major yield reducer of the tropical legumes.

Based on the above study highest grain yield and lower susceptibility to pod borer was recorded in ICP13201. Hence this line can be used as donors for podborer resistant breeding programme.

REFERENCES

Borad, P.K., J.R. Patel and M.G. Patel, 1991. Evaluation of vegetable pigeonpea genotypes resistance to gram Podborer, Plume moth and Podfly. Indian J. Agric. Sci., 61: 682-684.

Minja, E.M., T.G. Shanower, S.N. Silim and L. Singh, 1999. Evaluation of pigeonpea pod borer and pod fly tolerant lines at Kabete and Kiboko in Kenya. Afr. Crop Sci. J., 7: 71-79.

Reed, W. and Lateef, 1990. Pigeon Pea Pest Management. The pigeon pea. Nene, Y.L., S.D. Hari, V.K. Shefia (Eds.), Walling Ford. CAB Int., pp: 349-374.

Saxena, K.B., G.D.S.N. Chandrasena, K. Hettiarachchi, Y.B. Iqbal, H.H.D. Fonseka and S.J.B.A. Jayasekera, 2002. Evaluation of Pigeonpea Accessions and Selected Lines for Reaction to *Maruca.* Crop Sci., 42: 615-618.

Shanower, T.G. and Romeis, 1999. Insect pests of pigeonpea and their management. Ann. Rev. Entomol., 44: 77-96.

Shanower, T., G. Yoshida and A.J. Mand Peter, 1999. Survival, growth and fecundity and behaviour of *Helicoverpa armigera* on pigeon pea and two wild cajanus species. J. Econ. Ent., 90: 837-841.

Sharma, H.C., P.W.C. Green, P.C. Stevenson and M.S.J. Simmonds, 2001. What makes it tasty for the pest identification of *H. armigera* feeding stimulants and location of their production on the pod-surface of pigeonpea. Competitive Research Facility Project Final Tech. Report, London, Dept. for Int. Devp., pp: 11-26.

Sharma, H.C., 2001. Cotton Bollworm/legume pod borer, *Helicoverpa armigera.* Biology and Management. Crop protection compendium. Walling ford: CAB International, 70.