



Indian Journal of Agriculture and Allied Sciences

A Refereed Research Journal

ISSN 2395-1109
e-ISSN 2455-9709
Volume: 2, No.: 3, Year: 2016

www.mrfsw.org

Received: 21.08.2016, Accepted: 06.09.2016

NOTE ON SCREENING OF PIGEONPEA [*Cajanus cajan* (L.) Millsp.] VARIETIES AGAINST THE INFESTATION OF GRAM POD BORER (*Helicoverpa armigera* Hub.)

Dharmpal Kerketta and Ram Keval

Department of Entomology & Agricultural Zoology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi-221 005, E-mail: dp.ent@gmail.com, ramkewal1968@gmail.com, Corresponding Author: Ram Keval

Abstract: The investigation on comparative performance of some newer genotypes/varieties were carried out at Pigeon pea Research Farm, Banaras Hindu University during the kharif season of 2007-08 and 2008-09. The first incidence of *Helicoverpa armigera* larvae was observed in 4th standard week in genotype NDA-5-25, MAL-27 and KAWR 92-2. The first population was observed in 6th standard week. The peak population was recorded between 4th and 11th standard weeks in several genotypes/varieties, while lowest population was observed in genotype KAWR 92-2 and MAL-20 in terms of larvae. The incidence of pod borer was recorded in 5th week. The peak population was observed during 8th to 12th standard week. The mean population of pod borer on different genotypes ranged from 0.03 larvae per plant on MAL-13 to 0.18 larvae per plant on genotype/variety MAL-27 in 2008-09.

Keywords: Gram pod borer, pigeonpea, screening.

Introduction: India is the world's largest producers of pulses. Pulses are important constituents of Indian diet and supplying a major part of protein requirement. They also function as mini nitrogen factory. Pulses fulfill important constituents for feeding of live stock, provide fuel, wood and construction materials. The country's pulse production was 15.23 million ton among food grain production of 212.05 million ton^[1]. India grows varieties of pulse crops under a wide range which contributed 25 per cent of global production. Pulses production was 8.41 million tons in 1951 which has increased to 15.24 million tons in 2003-04 while productivity was 441 kg/ha. in 1951 which has increased to 747 kg/ha. in 2007^[2]. The per capita availability of pulses declined from 69 grams in 1961 to 37 grams in 2004 as against FAO/WHO recommendation of 80 grams/capita/day. Pigeonpea also known as red gram, arhar, tur is

the most important delicious "Dal". Pigeonpea is a drought tolerant plant, and its seeds and forage have over 20 per cent protein^[3].

The damage caused by insect pests is one of major reasons of low productivity of pigeonpea during last decade. Among various insect pests recorded on pigeonpea crop, gram pod borer, *Helicoverpa armigera* Hubner is the most serious pest recording a yield loss of 50000 tons annually in Uttar Pradesh^[4].

Materials and Methods

The experiment was conducted in kharif season with 3 replications and 6 treatments in Randomised Block Design at Agricultural Research Farm, Banaras Hindu University, Varanasi during 2007-08 and 2008-09. Total 18 plots were taken with plot size was 4 m x 3.75m (15 m Sq.). Row to row and plant to plant distance were 75 cm and 10 cm respectively were maintained. The genotypes/varieties used

for screening were NDA 5-25, PDA 85-5E, MAL-27, KAWR 92-2, MAL-13 and MAL-20 respectively.

Results and Discussion

During 2007-08 the first incidence of *Helicoverpa armigera* larvae was observed in 4th standard week in genotype NDA-5-25, MAL-27 and KAWR 92-2. The first population was observed in 6th standard week. The peak population was recorded between 4th and 11th

standard weeks in several genotypes/varieties. The mean population of gram pod borer was recorded highest in MAL-27 followed by NDA5-25. The lowest population was observed in genotype KAWR 92-2 and MAL-20 in terms of larvae. The highest mean population of gram pod borer was recorded in 11th standard week (14th March, 2007-08) and lowest in 8th standard week which was found nil (Table 1).

Table 1. Gram pod borer, *Helicoverpa armigera* larval population on long duration pigeonpea during Kharif 2007-2008.

Genotypes/ Varieties	Larval population plant ⁻¹										
	24 th Jan	31 st Jan	7 th Feb	14 th Feb	21 st Feb	28 th Feb	7 th March	14 th March	21 st March	28 th March	Average
NDA-5-25	0.07 (0.75)	0.07 (0.75)	0.07 (0.75)	0.07 (0.75)	0.00 (0.71)	0.07 (0.75)	0.00 (0.71)	0.33 (0.91)	0.07 (0.75)	0.13 (0.79)	0.09 (0.76)
PDA85-5E	0.00 (0.71)	0.20 (0.83)	0.33 (0.91)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.07 (0.75)	0.00 (0.71)	0.13 (0.79)	0.00 (0.71)	0.08 (0.76)
MAL-27	0.07 (0.75)	0.00 (0.71)	0.07 (0.75)	0.20 (0.83)	0.00 (0.71)	0.20 (0.83)	0.40 (0.94)	0.27 (0.88)	0.40 (0.93)	0.00 (0.71)	0.16 (0.81)
KAWR92-2	0.07 (0.75)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.02 (0.72)
MAL-13	0.00 (0.71)	0.00 (0.71)	0.07 (0.75)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.33 (0.90)	0.20 (0.83)	0.13 (0.79)	0.08 (0.76)
MAL-20	0.00 (0.73)	0.07 (0.75)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.02 (0.76)
Average	0.03 (0.73)	0.07 (0.75)	0.10 (0.77)	0.07 (0.75)	0.00 (0.71)	0.04 (0.74)	0.08 (0.76)	0.18 (0.82)	0.13 (0.79)	0.04 (0.74)	0.07 (0.76)

Figures in parentheses are transformed value = $x + 0.5$
 Difference between treatments (CD at 5%) = 0.05
 Difference between periods (CD at 5%) = 0.04
 Difference between treatments and periods (CD at 5%) = 0.12

During 2008-09 first incidence of larvae was observed in 5th standard week in all genotypes/varieties except MAL-27 while the peak population of gram pod borer during 8th and 11th standard week in genotypes/varieties MAL-20, MAL-27, PDA 85-5E and MAL-13 respectively. The peak larval population was

observed during 12th standard week (Table-2) in genotypes/varieties NDA-5-25 and KAWR 92-2. The highest mean population of borer was recorded in 12th standard week and lowest in 4th and 10th standard weeks. These observations were also recorded by [5].

Table 2. Gram pod borer, *Helicoverpa armigera* larval population on long duration pigeonpea during Kharif 2008-2009.

Genotypes/ Varieties	Larval population Plant ⁻¹										
	24 th Jan	31 st Jan	7 th Feb	14 th Feb	21 st Feb	28 th Feb	7 th March	14 th March	21 st March	28 th March	Average
NDA-5-25	0.00 (0.71)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.20 (0.83)	0.13 (0.79)	0.04 (0.73)
PDA85-5E	0.00 (0.71)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.07 (0.75)	0.07 (0.75)	0.40 (0.95)	0.13 (0.80)	0.07 (0.75)	0.00	0.09 (0.77)
MAL-27	0.13 (0.80)	0.13 (0.79)	0.00 (0.71)	0.20 (0.83)	0.27 (0.88)	0.33 (0.91)	0.13 (0.79)	0.07 (0.75)	0.33 (0.90)	0.00	0.18 (0.82)
KAWR92-2	0.00 (0.71)	0.07 (0.75)	0.13 (0.80)	0.07 (0.75)	0.07 (0.75)	0.00 (0.71)	0.07 (0.75)	0.00 (0.71)	0.33 (0.91)	0.00	0.08 (0.76)
MAL-13	0.00 (0.71)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.07 (0.75)	0.13 (0.80)	0.00 (0.71)	0.13	0.03 (0.73)
MAL-20	0.00 (0.71)	0.07 (0.75)	0.00 (0.71)	0.00 (0.71)	0.27 (0.87)	0.20 (0.83)	0.20 (0.83)	0.13 (0.80)	0.13 (0.80)	0.00	0.11 (0.78)
Average	0.02 (0.72)	0.08 (0.76)	0.02 (0.72)	0.04 (0.74)	0.11 (0.78)	0.11 (0.78)	0.14 (0.80)	0.08 (0.76)	0.18 (0.82)	0.04	0.09 (0.76)

Figures in parentheses are transformed value = $x + 0.5$
 Difference between treatments (CD at 5%) = 0.05
 Difference between periods (CD at 5%) = 0.05

Difference between treatments and periods (CD at 5%) = 0.12

The incidence of gram pod borer was recorded in 4th week of January. The peak population was observed during 4th to 11th standard week. The mean populations of gram pod borer on different genotypes/varieties ranged from 0.02 larvae per plant on MA-20 to 0.16 larvae per plant on genotype/variety MAL-27 in 2007-08. The highest mean population observed in 11th standard week that is 0.18 larvae per plant and lowest population recorded in 8th standard week in which no population observed. The incidence of gram pod borer was recorded in 5th week. The peak population was observed during 8th to 12th standard week. The mean populations of pod borer on different genotypes/varieties ranged from 0.03 larvae per plant on MAL-13 to 0.18 larvae per plant on genotype/variety MAL-27 in 2008-09.

The highest mean population observed in 12th standard week i.e. 0.16 larvae per plant and lowest population recorded in 4th and 10th standard week in which 0.03 larvae per plant were recorded. Recorded that gram pod borer (*Helicoverpa armigera*) started with pod formation and grain filling stage i.e. 4th standard week and remained active in the field from 23 January, continued until 8th April and peaked on 24th March ^[5]. Observed that gram pod borer appeared in first week of February, lasted up to the 13th standard week ^[6].

Conclusion: The gram pod borer *H. armigera* was noticed in 4th and 5th standard week respectively during both the years, whose peak population was noticed during 4th to 11th standard week in 2007-08 and 8th to 12th standard week in 2008-09, in different varieties. The highest and lowest population recorded in 11th and 8th standard weeks and 12th to 4th standard weeks in both the years respectively. The genotype MAL-13 was most susceptible to gram pod borer which showed higher grain damaged in both the years. The KAWR 92-2 is most suitable for cultivation of this zone.

References

1. Anonymous. (2005). The Hindu Survey of Indian Agriculture (Annual) Published by National Press, Chennai, India pp 54-57.
2. Maruthi, G. R., Tyagaraj, C. R., Chary, G. R., Ramachandran, K. and Girija, A. (2007). Characterization of rainfed pigeonpea growing region based on soil, climate, crop and

socioeconomic parameters. *Indian Journal of dry land ARD*, 22 (1):57-66.

3. Mathews, C. and Saxena, K.B. (2005). Prospects for pigeon pea cultivation in drought-prone areas of South Africa. *Proceedings of The First International Edible Legume Conference in conjunction with the IVth World Cowpea Congress* Durban, South Africa, pp.111.
4. Sachan, J.N. and Lal, S.S. (1988). Changing pest complex in relation to cropping system in pulses. Paper presented during National Seminar on changing pest situation in current agriculture scenario of India, February 14-16, 1988, I.A.R.I., New Delhi.
5. Kumar, A. and Nath, P. (2004). Effect of weather parameters on population buildup of pigeonpea pod borers. *Indian Journal of Entomology*, 66(4):293-296.
6. Kumar, S., Singh, B. and Kumar, N. (2003). Assessment of pod damage caused by pod borer complex in pre-rabi pigeonpea. *Indian Journal of Pulses Research*, 16(2): 169-170.