



Research Paper

**INCIDENCE AND EXTENT OF DAMAGE DUE TO *Helicoverpa armigera* IN
PIGEONPEA IN EASTERN UTTAR PRADESH: A SURVEY**

Yogesh*, Rajnish Kumar** and Gyan Prakash Morya*

*Research Scholar, Department of Entomology

**Head, Department of Entomology,
B.R.D.P.G. College, Deoria (U.P.).

Abstract

Gram pod borer (*Helicoverpa armigera*), being the most dreaded insect-pest of pigeonpea, an extensive survey was conducted to know the incidence and extent of pod damage due to *H. armigera* in eastern Uttar Pradesh for two consecutive years, 2010-11 and 2011-12. Two districts "Deoria and Siddharthnagar" were considered for survey work. Four blocks of each district and four villages of each block were selected where pigeonpea grown extensively. 2-3 farmers field from each village were used for the purpose. Thus, observations were recorded from 84 farmer's fields of 32 villages. Larval incidence were recorded 45th S.W. (Standard Week) onwards, while pod damage per cent at harvesting stage of the crop. Pooled data for both the districts and years exhibited a population fluctuation of 0.20 Larva/10 plants (3rd S.W.) to 7.08 Larvae/10 plants (11th S.W.). Peak population (>5 Larvae/10 plants/week) were noticed between 9th to 11th S.W., the vulnerable podding stage of the crop. The extent of infestation was much variable between the villages and blocks of both the districts. Average pod infestation was 45.67% and 44.90% recorded in district Deoria and Siddharthnagar, respectively. Pooled data of the investigation regarding the extent of pod damage due to *H. armigera* in pod samples collected from farmer's fields of different villages, blocks and districts showed an average of 45.28% pod infestation in this part of eastern Uttar Pradesh.

Key words: Gram pod borer, Incidence, Infestation, Pigeonpea, Survey.

INTRODUCTION

Gram pod borer (*Helicoverpa armigera*) is the most dreaded among the insect-pests associated with pigeonpea. It is the present throughout the year completing up to seven generations by feeding on 181 cultivated and wild plants species from 45 families in India (Manjunath *et al.*, 1989) and now estimated to cross over 200 hosts (Sarode, 1999). *Helicoverpa* causes heavy losses up to 60 per cent with an annual loss estimated to be US \$ 400 Million in pigeonpea (Anonymous, 2007). Sometimes their infestation level is so high that farmers don't get return even whatever they spend on seeds. The key pest status of *H. armigera* is due to the larval preference for feeding on plant parts rich in Nitrogen such as reproductive structure and growing tips (Fitt, 1989). It is estimated that the infestation of one larva per plant on pigeonpea can cause yield loss of 1015 kg/ha (Reddy and Basavanna, 1978). The extent of losses due to *H. armigera* on pigeonpea are often highly variable across the localities. Since, cropping system play an important role in population build-up of proper insect-pest. Hence,

proper survey of *H. armigera* on their incidence, peak period of infestation and extent of damage is needed for devising suitable management strategies in this part of eastern Uttar Pradesh.

MATERIALS AND METHODS

An extensive survey was conducted to know the extent of damage caused by *H. armigera* in eastern Uttar Pradesh in pigeonpea during 2010-2011 and 2011-2012. Two district "Deoria" and "Siddharthnagar" were considered for survey work. Four blocks of each district Bhatni, Baitalpur, Desahi, Deoria & Bhagalpur (Deoria) and blocks Uskabazar, Soharatgarh, Birdpur & Mithwal (Siddharthnagar) and four villages of each block (table-1) were selected where pigeonpea grown extensively. 2-3 farmer's field from each village were used for sampling. Thus, observations were recorded from 84 farmer's field of 32 villages.

Larval populations were recorded from very beginning right from vegetative growth up to near harvest the crop. Randomly 10 plants from each field of selected villages of different blocks were observed at weekly interval. The collected data on larval population from each block/week were pooled as weekly population (Av. No. of larvae/10 plants/week).

Observations on pod damage per cent were recorded at the time of maturity of pigeonpea. About 300-500 pigeonpea pods were collected from each farmer field by striping 3-4 twigs of 8-10 plants randomly from five different places of crop field. The healthy pods and pods damaged by *H. armigera* larvae were separated and counted. The per cent damage of pod were calculated on the basis of healthy and damaged pod counted earlier. The data obtained on pod damage percentage from farmer's field of each village of particular block of respective districts were pooled thereafter. Finally, the precise data on pod damage per cent due to *H. armigera* of each district was pooled to know the extent of damage.

RESULTS AND DISCUSSION

It is evident from pooled data for both the districts and years (Table-2) exhibited a population fluctuation of 0.22 larva/10 plants (3rd S.W.) to 7.08 larvae/10 plants (11th S.W.). At incidence 0.90 larva/10 plants was noticed, thereafter declined gradually in subsequent weeks and reached its minimum (0.22 larva/10 plants) during 3rd S.W. A sudden increase in larval population (2.16 larvae/10 plants) was recorded in 5th S.W. which increased subsequently and reached its peak (7.08 larvae/10 plants) during 11th S.W., followed by decreased gradually near harvest. The incidence pattern of larvae showed as it was minimum during cooler weeks coincided with the pre-flowering stage, while it was maximum during warmth weeks (March) coincided with complete podding stage. Similar to present study, Kumaret *al.* (2003) also reported larval population of *H. armigera* per plant gradually increased from February (7th S.W.) till first half of April (13th S.W.).

Pooled data related to pod damage per cent presented in table-3 and 4, the pigeonpea growing villages of different blocks of district Deoria and Siddharthnagar showed variable extent of infestation due to *H. armigera*. Among the four blocks of district Deoria under investigation the maximum pod damage due to *H. armigera* was recorded in Bhagalpur block (50.37%), followed by Bhatni (50.00%), Desahi Deoria (49.15%) and Baitalpur (33.03%). Different blocks of district Siddharthnagar under investigation the pod damage in pigeonpea was recorded maximum from Soharatgarh (52.53%), followed by Mithwal (47.40%), Birdpur (47.09%) and Uska Bazar (32.60%).

To get desired results, data on extent of pod damage due to *H. armigera* under different blocks of both the districts were pooled (table-4). The table indicated 45.63% pod damage in district Deoria, while it was 44.90% in district Siddharthnagar. Overall, investigation for two consecutive years regarding the extent of pod damage due to *H. armigera* in pod samples collected from farmer's fields of different villages, blocks and districts showed an average of 45.28% in this part of eastern Uttar Pradesh in pigeonpea.

It is apparent from data that none of the pigeonpea field in different villages, blocks and districts was found free from pod infestation due to *H. armigera*. It indicates the severity of *H. armigera* in this part of eastern U.P. in pigeonpea. The extent of infestation was much variable within the villages and between the blocks of both the districts. Present findings are in

accordance with the findings of Ahmad and Rai (2005), who reported a maximum of 48% pod damage in Sumerpur block of district Hamirpur, 88.89% in Satara block of Kanpur Dehat district with 56.20% average pod damage and 98.1% in Jahanabad block of district Fatehpur with an average of 30.49% pod damage.

Table-1 Selected district their blocks and villages of Eastern U.P. -

District	Blocks	Villages
Deoria	1- Bhatni 2- Baitalpur 3-Desahi Deoria 4- Bhagalpur	1- Ahirauli, Amwa, Bardiha, Devghat 2- Baitalpur, Badhya, Purwamehra, Luchchapar 3- Haraiya, Dhamur, Sahodarpatti, Nautanhathiyagarh 4- Bagahi, Bagha, Bhagalpur, Deorahi
Siddharthnagar	1- Uska Bazaar 2- Sohratgarh 3- Birdpur 4- Mithwal	1- Ajagara, Amhat, Karma, Chorai 2- Agaya, Ahiraula, Bagahi, Chanargaddi 3- Abhaypur, Bagahi, Bajaha, Gayaghat 4- Lohra, Jagdewa, Samogara, Kudaran

Table-2 Larval population of *Helicoverpa armigera* during 2010-2011 and 2011-12 (Pooled)-

S.W.	Average No of Larvae/10 plants/week		Av.
	District Deoria	District Siddharthnagar	
45	0.64	1.16	0.90
46	0.73	1.04	0.88
47	0.60	1.09	0.84
48	0.61	0.58	0.59
49	0.39	0.61	0.50
50	0.43	0.47	0.45
51	0.35	0.34	0.34
52	0.27	0.35	0.31
1	0.36	0.29	0.32
2	0.22	0.30	0.26
3	0.21	0.24	0.22
4	0.20	0.27	0.23
5	2.14	2.18	2.16
6	2.57	3.48	3.02
7	5.24	2.40	3.82
8	4.51	4.51	4.51
9	5.99	4.23	5.11
10	6.11	5.96	6.03
11	7.41	6.76	7.08
12	1.69	2.18	1.93
13	1.75	0.72	1.23

Table-3 Extent of damage in pigeonpea due to *H.armigera* in different blocks of district Deoria during 2010-11 and 2011-12 (Pooled)-

Different plots	Percent pod damage in different blocks			
	Bhatni	Baitalpur	DesahiDeoria	Bhagalpur
P1	24.79	43.39	62.53	33.48
P2	14.56	28.89	57.50	73.77
P3	77.74	27.69	38.60	42.97
P4	30.27	41.34	37.96	62.31
P5	71.91	19.84	41.97	57.92
P6	38.05	21.94	62.16	41.36
P7	35.41	61.59	41.63	52.85
P8	64.39	35.59	46.77	41.96
P9	56.74	29.93	50.49	51.25
P10	86.20	20.12	51.95	45.92
Av.	50.00	33.03	49.15	50.37

Table-4 Extent of damage in pigeonpea due to *H.armigera* in different blocks of district Siddharthnagar during 2010-11 and 2011-12 (Pooled)-

Different plots	Percent pod damage in different blocks			
	Uska Bazar	Soharatgarh	Birdpur	Mithwal
P1	58.65	38.77	27.36	35.62
P2	31.21	48.54	34.34	36.76
P3	31.99	42.77	33.06	49.94
P4	38.83	74.17	51.40	48.46
P5	25.75	68.00	38.65	71.31
P6	23.38	74.71	52.97	39.03
P7	16.31	78.41	76.18	33.31
P8	42.15	29.70	67.69	41.66
P9	24.30	32.96	55.32	66.10
P10	33.44	37.29	33.98	51.87
Av.	32.60	52.53	47.09	47.40

Table-5 Extent of Pod damage in pigeonpea due to *H. armigera* in eastern U.P. : (A Summary)-

District	Year	Pod damage (%)
Deoria	2010-11, 2011-12 (Pooled)	45.67
Siddharthnagar	2010-11, 2011-12 (Pooled)	44.90
Grand Mean		45.28

REFERENCES

- 1- Ahmad, R. and Rai, A.B. (2005). 25 Years of Research on *Helicoverpa* at IIPR. *Indian Institute of Pulse Research*, Kanpur. 208024, pp-1-54.
- 2- Anonymous(2007). In :*AICRP on Pigeonpea Annual Report*, 2006-07. IIPR, Kanpur,pp. 167-178.
- 3- Fitt, G.P. (1989). The ecology of *Heliothis* species in relation to agroecosystem. *Annual Review of Entomology*, 34 : 17-52.
- 4- Kumar, S.; Singh, B. and Singh, P.P. (2003). Population build-up and seasonal abundance of borer species in pigeonpea. *Indian Journal of Entomology*, 65(3) : 379-381.

- 5- Manjunath,T.M.; Bhatnagar, V.S.; Pawar, C.S. and Sithanantham, S. (1989). Ecomomic importance of *Heliothis* in India and an assessment of their natural enemies and host plants. pp 197-228 (in). *Proceedings of the Workshop on Biological control of Heliothis: Increasing the effectiveness of natural enemies*, 11-15 November 1985, New Delhi, India.
- 6- Reddy, S.K.V. and Basavanna, C.G.P.(1978). Studay on the estimation of loss in red gram due to *H. armigera*. *Science Tech. Ser. 20, University of Agricultural Science,Bangalore*.
- 7- Sarode, S.V. (1999). Sustainable management of *Helicoverpa armigera*. *Pestology. Special issue. feb.1999* (279-284).