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## Monitoring and Evaluation of Chickpea Pod-Borer *Helicoverpa Armigera* (Hubner) (Lepidoptera: Noctuidae) by Using Pheromone Traps

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### Abstract

Monitoring of chickpea pod-borer, *Helicoverpa armigera* (Hb.) and its activities throughout the year was studied by installing pheromone traps at Pulses Research Center, Ishurdi, Pabna during January 2004 to December 2006. Pod-borer moth catching in pheromone traps was started between 3rd weeks of January to 2nd weeks of February depending on the climatic conditions of the year. Catching of moths was increased gradually and reached its peak in the month of April then gradually decreased and diminished to zero in the last week of July and ultimately remained zero upto December. Integrated Pest Management Programme against chickpea pod-borer should be initiated from mid-January to manage this pest population very effectively.

**Key words** : Monitoring, Chickpea, Pest Management, Pod-borer and Catching of moths.

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### Introduction

Chickpea, *Cicer arietinum* L. popularly known as gram, is one of the important pulse crop in Bangladesh. It is attacked by 11 species of insect pests (Rahman *et al.* 1982). Among these pests, the pod borer, *Helicoverpa* (= *Heliothis*) *armigera* (Hubner) is the most destructive in most of the chickpea growing areas (Begum *et al.* 1992). On an average, 30 to 40 percent pods are damaged by this pod-borer causing 400 kg/ha grain losses (Rahman 1990). In favourable

condition, pod damage reach up to 90-95 percent (Shengal and Ujagir 1990; Sachan and Katti 1994). To overcome the devastating losses monitoring of this pest is essential. Regular monitoring of the key pest is a vital component of any IPM program. An effective control strategy always depends on accurate monitoring of the damaging stages of the insect. Monitoring or recording is also necessary to understand the major factors influencing pest population to forecast of its incidence. Pheromone trap catch can be

incorporated in developing predictive models designed to provide information on probable oviposition patterns and population abundance of *Helicoverpa* sp. Moth catch is positively correlated with the larval count (Prabhakar *et al.*, 1998). So, the present study was undertaken to find out emergence,

promptness and seasonal fluctuation of this pod-borer moth and adopting effective pest management technology.

### Materials and Methods

The study was conducted at Pulses Research Center (PRC), Ishurdi, Pabna

#### Appendix 1. Monthly average field temperature and reative humidity during moth catch period at Pulses Research Center, Ishurdi, Pabna, Bangldesh

Moth catch period 2004				
Name of the month	Temperature (°C)		Relative humidity (%)	
	Min.	Max.	Morning	Afternoon
January	10.92	25.17	93.22	66.29
February	14.1	29.88	89.75	53.10
March	18.28	32.48	86.51	38.00
April	26.00	37.28	90.40	51.30
May	24.70	34.10	91.30	68.00
June	26.10	33.40	93.46	82.00
July	25.75	31.77	96.35	87.00
Moth catch period 2005				
Name of the month	Temperature (°C)		Relative humidity (%)	
	Min.	Max.	Morning	Afternoon
January	10.77	24.30	92.64	69.58
February	12.90	24.83	91.89	66.86
March	18.56	31.85	88.51	55.38
April	23.38	34.17	90.93	57.13
May	22.69	33.22	94.58	72.00
June	25.86	32.82	91.73	81.30
July	26.42	32.58	94.54	81.64
Moth catch period 2006				
Name of the month	Temperature (°C)		Relative humidity (%)	
	Min.	Max.	Morning	Afternoon
January	9.56	24.75	93.80	66.48
February	13.26	28.45	93.14	57.39
March	17.89	23.70	88.48	42.93
April	23.32	35.87	88.70	50.06
May	23.43	32.83	93.87	73.06
June	26.00	31.99	94.64	80.83
July	27.56	32.91	94.85	81.66

during from International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), India. Four funnel shape pheromone traps were installed at a distance of 100 m from each other in chickpea research field at PRC, Ishurdi. Pheromone traps baited with rubber septa and the synthetic *H. armigera* pheromone were used to attract the moths. Pheromone septa were changed every four weeks. The moth catch in the pheromone traps were recorded regularly at 9 a.m. Total numbers of moth catch at weekly and monthly intervals are presented in tabular and graphical forms. Meteorological data relating to field temperature and relative humidity during moth catch period of the experiment are presented in Appendix 1.

### Results and Discussion

The moth catch at weekly intervals in different months of the respective years is presented in Tables I, II and III. and monthly average catch of moth per trap is presented in Fig. 1. Moth catch in the pheromone traps was started from 1<sup>st</sup> and 2<sup>nd</sup> weeks of February in 2004 and 2005 but in 2006, it was started from 3<sup>rd</sup> week of January, respectively (Tables I, II and III). After initiation, moth catch was increased gradually and reached its peak in the month of April, then decreased gradually and diminished to zero in the

month of August and then remained zero upto December (Fig. 1). The moth catch was recorded highest during the 4<sup>th</sup> and 3<sup>rd</sup> weeks of April in 2004 and 2005 respectively and in 2006, it was in the 4<sup>th</sup> week of March. In Nepal, Prasad and Newpane (1992) reported that maximum number of moth trapping was observed during last week of February and first week of April.

It is evident that, peak emergence of moth was highest in the year 2005. This might be due to higher rainfall during the cropping season of 2004-2005. Jayaramiah and Babu (1990) attributed rainfall in the influencing factor on moth emergence of *H. armigera* and showed a positive correlation between moth emergence of rainfall.

Therefore, from the above discussion it is apparent that emergence of chickpea pod-borer moth was increased from the 3<sup>rd</sup> weeks of January to 2<sup>nd</sup> week of February, then its population increased gradually upto April and then declined gradually. So, Integrated Pest Management Programme against chickpea pod-borer, *H. armigera* should be started from mid-January to suppress the pest population very effectively.

**Table I. Number of moth catch at weekly interval in the pheromone traps during January 2004 to December 2004**

Study period (Week)	Average nos. of moth catch in		Weekly trapping moths/trap	
	Trap 1 and 2	Trap 3 and 4	Nos.	Mean $\pm$ S.D
Jan. 1 <sup>st</sup> , 2004	0	0	00	00 $\pm$ 00
Jan. 2 <sup>nd</sup> , 2004	0	0	00	
Jan. 3 <sup>rd</sup> , 2004	0	0	00	
Jan. 4 <sup>th</sup> , 2004	0	0	00	
Feb. 1 <sup>st</sup> , 2004	0	0	00	1.25 $\pm$ 1.89
Feb. 2 <sup>nd</sup> , 2004	3	6	4.5	
Feb. 3 <sup>rd</sup> , 2004	1	0	0.5	
Feb. 4 <sup>th</sup> , 2004	0	0	00	
March 1 <sup>st</sup> , 2004	0	0	00	5.88 $\pm$ 4.22
March 2 <sup>nd</sup> , 2004	19	3	11	
March 3 <sup>rd</sup> , 2004	10	7	8.5	
March 4 <sup>th</sup> , 2004	5	3	4.0	
April 1 <sup>st</sup> , 2004	0	3	0.75	7.81 $\pm$ 4.71
April 2 <sup>nd</sup> , 2004	1	15	8.0	
April 3 <sup>rd</sup> , 2004	0	17	8.5	
April 4 <sup>th</sup> , 2004	2	26	14	
May 1 <sup>st</sup> , 2004	1	10	5.5	5.38 $\pm$ 2.86
May 2 <sup>nd</sup> , 2004	1	1	1.0	
May 3 <sup>rd</sup> , 2004	2	10	6.0	
May 4 <sup>th</sup> , 2004	4	14	9.0	
June 1 <sup>st</sup> , 2004	5	14	9.5	5.88 $\pm$ 2.43
June 2 <sup>nd</sup> , 2004	2	4	3.0	
June 3 <sup>rd</sup> , 2004	3	6	4.5	
June 4 <sup>th</sup> , 2004	6	7	6.5	
July 1 <sup>st</sup> , 2004	1	2	1.5	0.75 $\pm$ 0.56
July 2 <sup>nd</sup> , 2004	1	1	1.0	
July 3 <sup>rd</sup> , 2004	0	0	0.5	
July 4 <sup>th</sup> , 2004	0	0	00	

Month trapping was zero from August to December

**Table II. Number of moth catch at weekly interval in the pheromone traps during January 2005 to December 2005**

Study period (week)	Average nos. of moth catch in		Weekly trapping moths/trap	
	Trap 1 and 2	Trap 3 and 4	Nos.	Mean $\pm$ S.D
Jan. 1 <sup>st</sup> , 2005	0	0	00	00+00
Jan. 2 <sup>nd</sup> , 2005	0	0	00	
Jan. 3 <sup>rd</sup> , 2005	0	0	00	
Jan. 4 <sup>th</sup> , 2005	0	0	00	
Feb. 1 <sup>st</sup> , 2005	0	6	00	1.5+ 1.54
Feb. 2 <sup>nd</sup> , 2005	8	0	4.0	
Feb. 3 <sup>rd</sup> , 2005	1	0	0.5	
Feb. 4 <sup>th</sup> , 2005	3	0	1.5	
March 1 <sup>st</sup> , 2005	6	3	4.5	6.38+ 1.67
March 2 <sup>nd</sup> , 2005	6	5	5.5	
March 3 <sup>rd</sup> , 2005	16	2	9.0	
March 4 <sup>th</sup> , 2005	10	3	6.5	
April 1 <sup>st</sup> , 2005	12	13	12.5	20.00+ 8.58
April 2 <sup>nd</sup> , 2005	35	15	25.0	
April 3 <sup>rd</sup> , 2005	36	27	31.5	
April 4 <sup>th</sup> , 2005	17	5	11.0	
May 1 <sup>st</sup> , 2005	2	2	2.0	5.00+ 5.24
May 2 <sup>nd</sup> , 2005	2	0	1.0	
May 3 <sup>rd</sup> , 2005	5	1	3.0	
May 4 <sup>th</sup> , 2005	18	10	14.0	
June 1 <sup>st</sup> , 2005	16	1	8.5	3.38+ 2.99
June 2 <sup>nd</sup> , 2005	6	2	4.0	
June 3 <sup>rd</sup> , 2005	0	1	0.5	
June 4 <sup>th</sup> , 2005	1	1	1.0	
July 1 <sup>st</sup> , 2005	0	0	00	0.38+0.41
July 2 <sup>nd</sup> , 2005	1	0	0.5	
July 3 <sup>rd</sup> , 2005	2	0	1.0	
July 4 <sup>th</sup> , 2005	0	0	00	

Month trapping was zero from August to December

**Table III. Number of moth catch at weekly interval in the pheromone traps during January 2006 to December 2006**

Study period (Week)	Average nos. of moth catch in		Weekly trapping moths/trap	
	Trap 1 and 2	Trap 3 and 4	Nos.	Mean $\pm$ S.D
Jan. 1 <sup>st</sup> , 2006	0	0	00	1.88 $\pm$ 1.88
Jan. 2 <sup>nd</sup> , 2006	0	0	00	
Jan. 3 <sup>rd</sup> , 2006	8	0	4	
Jan. 4 <sup>th</sup> , 2006	7	0	3.5	
Feb. 1 <sup>st</sup> , 2006	41	1	21	10.50 $\pm$ 8.31
Feb. 2 <sup>nd</sup> , 2006	1	0	0.5	
Feb. 3 <sup>rd</sup> , 2006	9	0	4.5	
Feb. 4 <sup>th</sup> , 2006	20	12	16	
March 1 <sup>st</sup> , 2006	20	8	14	14.00 $\pm$ 3.42
March 2 <sup>nd</sup> , 2006	12	7	9.5	
March 3 <sup>rd</sup> , 2006	18	7	12.5	
March 4 <sup>th</sup> , 2006	31	9	20	
April 1 <sup>st</sup> , 2006	19	16	17.5	14.62 $\pm$ 4.46
April 2 <sup>nd</sup> , 2006	18	14	16	
April 3 <sup>rd</sup> , 2006	21	15	18	
April 4 <sup>th</sup> , 2006	7	7	7	
May 1 <sup>st</sup> , 2006	5	9	7	7.13 $\pm$ 1.24
May 2 <sup>nd</sup> , 2006	8	6	7	
May 3 <sup>rd</sup> , 2006	6	5	5.5	
May 4 <sup>th</sup> , 2006	11	7	9	
June 1 <sup>st</sup> , 2006	6	4	5	3.38 $\pm$ 1.19
June 2 <sup>nd</sup> , 2006	3	2	2.5	
June 3 <sup>rd</sup> , 2006	5	3	4	
June 4 <sup>th</sup> , 2006	3	1	2	
July 1 <sup>st</sup> , 2006	2	1	1.5	1.88 $\pm$ 0.41
July 2 <sup>nd</sup> , 2006	2	2	2	
July 3 <sup>rd</sup> , 2006	3	2	2.5	
July 4 <sup>th</sup> , 2006	1	2	1.5	

Month trapping was zero from August to December

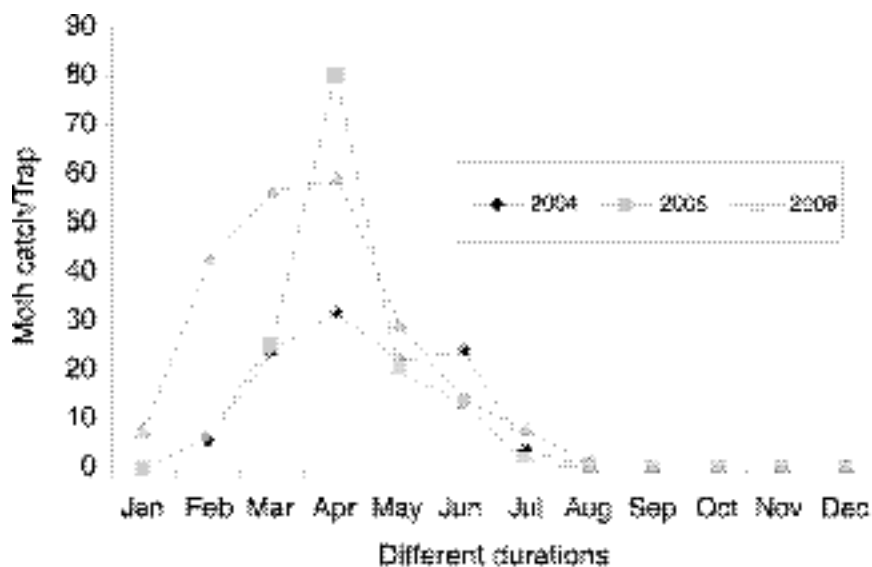


Fig. 1. Relationship between duration and moth catch in the years 2004, 2005 and 2006

## References

- Begum, N. Hussain, M. Chowdhury, S.I. (1992) Effect of sowing date and plant density to pod-borer incidence and grain yield of chickpea in Bangladesh. *Int. Chickpea Newsletter*, **27**: 19-21.
- Jayaramiah, M. Babu, H.C.S. (1990) Present status of *Helicoverpa armigera* in pulse and strategies for its management in Karnataka. Proceeding First National Workshop *Helicoverpa* Management, Directorate of Pulse Research, Kanpur, India, 30-st August, 1990.
- Prabhakar, M. Singh, Y. Newpane, S.P. (1998) Predicting *Helicoverpa armigera* of chickpea by using sex pheromone traps. *Indian J. Ent.*, **60** (4): 339-334.
- Prasad, L.N. Newpane, F.P (1992) Monitoring the chickpea borer, *Helicoverpa armigera* (Hubner) over period 1987 to 1990 by pheromone trap at Rampur, Chitwan, Nepal, ACIAR, Food *Legume Newsletter* **17**: 9
- Rahaman, M.M. (1990) Infestation and yeild loss in chickpea due to pod-borer in Bangladesh. *Bangladesh J. Agril, Res.*, **15**(2): 16-23.

- Rahaman, M.M. Mannan, M.A. Islam, M.A. (1982) Pest survey of major summer and winter pulses in Bangladesh. In. Proceeding of the National Workshop on pulses. August 18-19, 1981. Edited by A.K. Kaul. Published by Director, Bangladesh Agricultural Research Institute, Joydebpur, Dacca. pp 265-273.
- Sachan, J.N. Katti, G. (1994) Integrated Pest Management. Proceeding of International Symposium on pulses Research, April 2-6, IARI, New Delhi, India. pp 23-30.
- Shengal, V.K. Ujagir., R. (1990) Effect of synthetic pyrethroids, neem, extracts and other insecticides for the control of pod damage by *Helicoverpa armigera* on chickpea chickpea and pod damage-yield relationship at Patancheru in Northern India. *Crop Protection*, **9**: 29-32.

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