

Parasitism of chickpea pod borer larvae, *Helicoverpa armigera* (Hubner) by its parasitoid *Campoletis chloridae* Ushida

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Abstract

Helicoverpa armigera Hubner larvae were parasitized by *Campoletis chloridae* Ushida on chickpea crop. The parasitization per cent varies from 1.00 to 72.00% from 46th Standard Meteorological Weeks to 15th SMW during *Rabi* 2010-11 and maximum parasitization attained 72.00% on 6th SMW. During *Rabi* 2011-12 the parasitization range obtained from 2.86 to 80% on same SMW. The highest parasitization per cent also obtained 80% on 6th SMW on 2011-12.

Keywords: *Campoletis chloridae*, chickpea, *Helicoverpa armigera*,

Introduction

Chickpea is attacked by about 57 insect species in India, about half a dozen of which are considered to be of economic importance. However, about 80-90% of the total pod damage is because of a single pest, the gram pod borer, *Helicoverpa armigera* Hubner. Efforts were made to combat the problem by using higher doses and more toxic mixtures of insecticides. This indiscriminate and injudicious use of pesticides eroded the sustainability of the system and resulted in development of resistance, residues and newer pest problems. It has been established that *H. armigera* cannot be controlled by the use of insecticides alone and is best managed by harmoniously blending various components of integrated pest management. Therefore, it was considered desirable to observe natural parasitoid (*Campoletis chloridae* Ushida) on chickpea crop.

Materials and methods

Large numbers of larvae of pod borer were collected on chickpea crops at weekly interval from 46th SMW to 15th SMW, in 2010-11 and 2011-12. Each larva was kept separately in plastic tube of 1" size. Fresh chickpea leaves were provided for larval feeding. Feeds were changed daily and always cleaned and sterilized tubes were used for rearing these larvae. The

parasitoids emerged out from the larvae during their rearing in laboratory for knowing the species composition of chickpea pod borer were identified and counted. The parasitization per cent was also worked out.

$$\text{Parasitization \%} = \frac{\text{No. of parasitoids emerged}}{\text{No. of larvae reared}} \times 100$$

Result and Discussion

The larval parasitization by *C. chloridae* Ushida during *Rabi* 2010-11 showed that parasitization of pod borer ranged 37.04 to 65.05% in 46th to 51th SMW and the emergence of adult moth escaped from parasitization was ranged 5 to 32. Parasitization of the pest decreased thereafter due to change in climatic condition and ranged from 10 to 22% in 52nd and 5th SMW. The minimum parasitization was observed on 3rd SMW. Due to the parasitization and natural death of the pest, only single moth recorded on 52nd, 2nd and 4th SMW. The pest parasitization increased again 30 to 72% on 6th to 12th SMW and the emergence of 2 to 22 moth occurred during this period. Further the larval parasitization decreased from 1 to 14% in 13th to 14th SMW (Table 1).

Larval parasitization by *C. chloridae* varied from 30 to 62.50% in 46th to 50th SMW, where the moth emergence was ranged 1 to 27.

Thereafter, the parasitization of the pest decreased and ranged from 11.76 to 16% on 51th, 52nd, 2nd, 4th and 5th SMW with 10 to 26 moth emergence. The parasitization was found 58.73 and 45.45% in 1st and 3rd SMW with 11 and 17 emerged moth, respectively. The parasitization of pest fluctuated again and increased 17 to 80% with 8 to 55 moth emergence on 6th to 12th SMW. Further, larval parasitization decreased from 2.86 to 18% in 13th to 15th SMW with moth emergence of 57 to 68 during *Rabi* 2011-12.

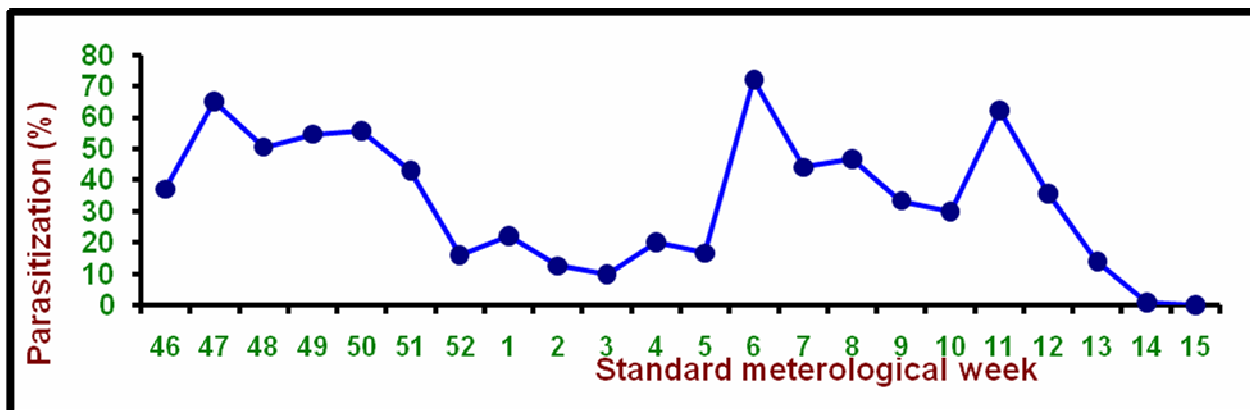
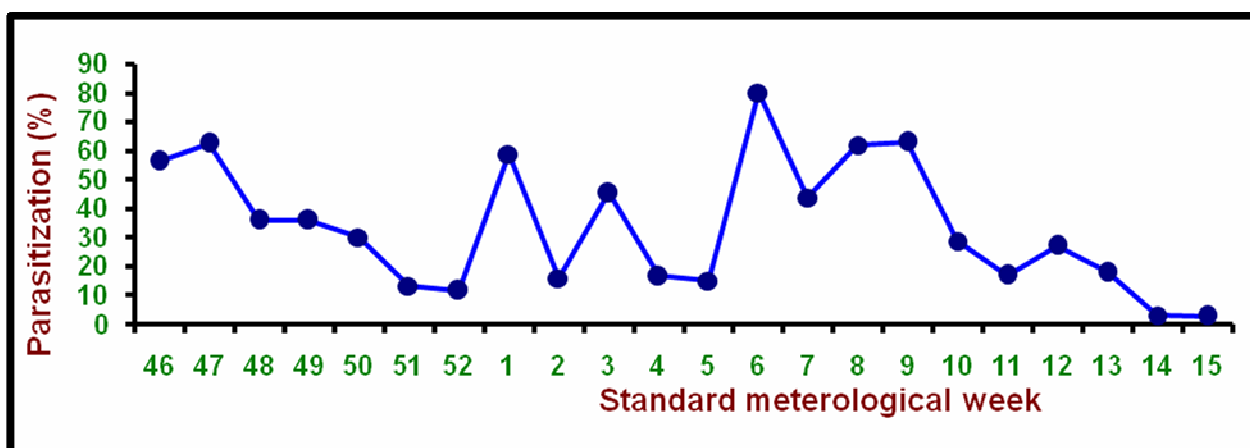
On the basis of two years observations i.e. 2010-11 and 2011-12, the peak parasitization of 72 and 80% were recorded on 6th SMW respectively, while the minimum pest parasitization 1 and 2.86% on 14th SMW were obtained in *Rabi* 2010-11 and 2011-12, respectively (Fig. 1 A & B).

Based on the experimental finding of larval parasitization of two consecutive *Rabi* seasons of 2010-11 and 2011-12, it was revealed that only one parasitoid, *C. chloridae* Uschida was prevalent for parasitizing the larvae of *H. armigera* in this region. Similar finding was also reported by Yadava *et al.* (1985), Bilapate *et al.* (1988), Dubey *et al.* (1995), Kaur *et al.* (2000), Devi *et al.* (2002), Gupta & Deshray (2003).

The extent of parasitization varied from 01.00 to 72.00% and 2.86 to 80.00% during *Rabi* 2010-11 and 2011-12, respectively. The experimental findings also revealed that the extent of larval parasitization was more in the beginning as well as in mid part of crop season. The extent of parasitization were observed varying widely from 3.57 to 80.64% (Sachan and Bhaumik, 1998) and 0.98 to 68.50% (Kaur *et al.* 2000), which was found in accordance with the present studies.

Table 1 Parasitization of chickpea pod borer larvae under natural conditions

Standard Meteorological week	2010-11		2011-12	
	Larval parasitization (%)	Moth emergence	Larval parasitization (%)	Moth emergence
46	37.04	30	56.45	1
47	65.05	32	62.50	2
48	50.45	30	36.11	5
49	54.55	8	36.11	17
50	55.56	6	30.00	27
51	42.86	5	13.21	21
52	16.00	1	11.76	45
1	22.00	2	58.73	11
2	12.50	1	16.00	26
3	10.00	3	45.45	17
4	20.00	1	16.67	17
5	16.67	3	15.00	10
6	72.00	2	80.00	8
7	44.00	4	43.75	14
8	46.67	6	62.00	11
9	33.33	17	62.90	11
10	30.00	5	28.75	30
11	62.00	12	17.00	31
12	35.71	22	27.10	55
13	14.00	60	18.00	68
14	1.00	32	3.00	81
15	0.00	66	2.86	57

Fig. 1 A: Parasitization of *H. armigera* larvae during *Rabi* 2010-11Fig. 1 B: Parasitization of *H. armigera* larvae during *Rabi* 2011-12

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